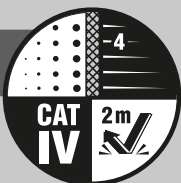


ENGLISH

CL900



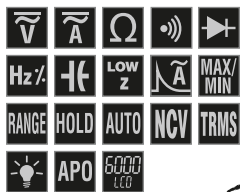
# INSTRUCTION MANUAL

## 2000A Digital Clamp Meter

### *True RMS Measurement Technology*

- NON-CONTACT VOLTAGE TESTING
- INRUSH CURRENT
- LOW IMPEDANCE
- DATA HOLD
- RANGE HOLD
- AUDIBLE CONTINUITY
- DIODE TEST
- CAPACITANCE
- FREQUENCY

1000V   
 2000A   
 60M  $\Omega$  



**TOUGH METER**

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## GENERAL SPECIFICATIONS

Klein Tools CL900 is an auto-ranging, true root mean square (TRMS) digital clamp meter that measures AC/DC current via the clamp and measures AC/DC voltage, resistance, continuity, frequency, duty-cycle, capacitance, and tests diodes via test-leads. It features a Low Impedance (LoZ) mode for identifying and eliminating ghost or stray voltages, and has a dedicated mode for capturing Inrush Current.

- **Operating Altitude:** 6562 ft. (2000m)
- **Relative Humidity:** <80% non-condensing
- **Operating Temperature:** 32° to 122°F (0° to 50°C)
- **Storage Temperature:** 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:** 10.4" x 3.9" x 1.7" (265 x 99 x 43 mm)
- **Weight:** 18.6 oz. (526 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.

- **Pollution degree:** 2 IEC EN 61010-1, 61010-2-032, 61010-2-033.
- **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.*

## ELECTRICAL SPECIFICATIONS

| Function                     | Range   | Resolution | Accuracy (50/60 Hz) |
|------------------------------|---------|------------|---------------------|
| <b>AC Voltage<br/>(V AC)</b> | 600.0mV | 0.1mV      | ±(1.0% + 8 digits)* |
|                              | 6.000V  | 1mV        | ±(1.0% + 5 digits)  |
|                              | 60.00V  | 10mV       | ±(1.2% + 5 digits)  |
|                              | 600.0V  | 0.1V       |                     |
|                              | 1000V   | 1V         | ±(1.5% + 5 digits)  |
| <b>DC Voltage<br/>(V DC)</b> | 600.0mV | 0.1mV      | ±(0.9% + 8 digits)  |
|                              | 6.000V  | 1mV        | ±(1.0% + 3 digits)  |
|                              | 60.00V  | 10mV       |                     |
|                              | 600.0V  | 0.1V       |                     |
|                              | 1000V   | 1V         | ±(1.2% + 3 digits)  |

**Input Impedance:** 10MΩ **Frequency Range:** 50 to 400Hz

**Maximum Input:** 1000V AC RMS or 1000V DC

\*Accuracy specified from 5% to 100% of the measuring range

|                                |        |      |                    |
|--------------------------------|--------|------|--------------------|
| <b>AC Current<br/>(A) TRMS</b> | 600.0A | 0.1A | ±(2.0% + 5 digits) |
|                                | 2000A  | 1A   | ±(2.5% + 8 digits) |
| <b>DC Current (A)</b>          | 600.0A | 0.1A | ±(2.0% + 5 digits) |
|                                | 2000A  | 1A   | ±(2.5% + 8 digits) |

**AC Frequency Range:** 50 to 60Hz, >500mA

**DC:** >200mA (low current requires use of DC ZERO function)

|                                  |       |      |                      |
|----------------------------------|-------|------|----------------------|
| <b>AC Current (A)<br/>Inrush</b> | 600A  | 0.1A | ±(2.5% + 5 digits)** |
|                                  | 2000A | 1A   | ±(3.0% + 8 digits)** |

**AC Frequency Range:** 50 to 60Hz

when auto-ranging >3A detectable  
(>2A if held in 600A range)

\*\*Accuracy specified assumes AC sine wave

|                   |         |      |                     |
|-------------------|---------|------|---------------------|
| <b>Resistance</b> | 600.0Ω  | 0.1Ω | ±(1.5% + 5 digits)  |
|                   | 6.000KΩ | 1Ω   |                     |
|                   | 60.00kΩ | 10Ω  |                     |
|                   | 600.0kΩ | 100Ω |                     |
|                   | 6.000MΩ | 1kΩ  |                     |
|                   | 60.00MΩ | 10kΩ | ±(2.0% + 10 digits) |

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

|                    |         |       |                     |
|--------------------|---------|-------|---------------------|
| <b>Capacitance</b> | 60.00nF | 10pF  | ±(5.0% + 35 digits) |
|                    | 600.0nF | 0.1nF | ±(3.0% + 5 digits)  |
|                    | 6.000μF | 1nF   |                     |
|                    | 60.00μF | 10nF  |                     |
|                    | 600.0μF | 0.1μF |                     |
|                    | 6000μF  | 1μF   | ±(5.0% + 5 digits)  |

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

**ELECTRICAL SPECIFICATIONS**

|                  |          |         |                    |
|------------------|----------|---------|--------------------|
| <b>Frequency</b> | 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   |                    |

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

|                   |              |       |                    |
|-------------------|--------------|-------|--------------------|
| <b>Duty Cycle</b> | 0.1% – 99.9% | 0.10% | ±(1.2% + 2 digits) |
|-------------------|--------------|-------|--------------------|

**Pulse width:** 0.1ms – 100ms

**Frequency width:** 5Hz to 10kHz

**Sensitivity:** >8V RMS

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

**OTHER MEASUREMENT APPLICATIONS**

- **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 RMS in Voltage setting, 600V RMS in all other settings
- **Polarity:** "-" on display indicates negative polarity
- **Non-Contact Voltage Detection:** >90V AC
- **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 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.
- 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.
- Do not hold meter above hand & finger guard during use.

## WARNINGS

- 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.
- Usage of this meter in any way other than that specified by the manufacturer can impair safe operation, resulting in severe injury or death.
- 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.









## SYMBOLS ON METER

|  |                           |   |                          |
|--|---------------------------|---|--------------------------|
|    | Alternating Current (AC)  |    | Direct Current (DC)      |
| <b>A</b>   | Amperage                  | <b>V</b>  | Voltage                  |
|    | Audible Continuity        | <b>Hz</b>   | Frequency                |
|    | Diode Test                | <b>%</b>  | Duty-Cycle               |
|    | Capacitance               | <b>LoZ</b>  | Low Impedance            |
| <b>Ω</b>   | Resistance (Ohms)         | <b>ZERO</b>   | DC Current Zero Function |
| <b>+</b>   | Positive                  | <b>-</b>  | Negative                 |
| <b>COM</b>   | Common                    |  | Ground                   |
|  | Double Insulated Class II |   |                          |

 **Warning or Caution:** *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

|  |                                   |   |                                  |
|--|-----------------------------------|---|----------------------------------|
|  | AC Measurement                    |  | DC Measurement                   |
|  | Negative Reading                  |  | Data Hold                        |
| <b>AUTO</b>  | Auto Ranging                      | <b>MAX</b>  | Maximum Value Hold               |
| <b>MIN</b>   | Minimum Value Hold                |  | Low Battery                      |
|  | Auto Power Off                    |  | Audible Continuity               |
|  | Diode Test                        | <b>INRUSH</b>   | Inrush Current                   |
| <b>k</b>   | kilo (value x 10 <sup>3</sup> )   | <b>m</b>  | mili (value x 10 <sup>-3</sup> ) |
| <b>M</b>   | Mega (value x 10 <sup>6</sup> )   | <b>n</b>  | nano (value x 10 <sup>-9</sup> ) |
| <b>μ</b>   | micro (value x 10 <sup>-6</sup> ) | <b>F</b>  | Farads                           |
| <b>Ω</b>   | Ohms                              | <b>A</b>  | Amps                             |
| <b>V</b>   | Volts                             | <b>LoZ</b>  | Low Impedance                    |
| <b>Hz</b>  | Frequency (Hertz)                 | <b>%</b>  | Duty Cycle                       |

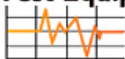
FEATURE DETAILS



1. 6000 count LCD display
2. Function selector switch
3. Clamp
4. "COM" jack
5. "VΩ" jack
6. Data Hold / Backlight button  
"RANGE" button
8. "MAX/MIN" button
9. SEL (select) / DC Zero button
10. INRUSH button
11. Clamp trigger (press to open clamp)
12. Arrow markings
13. Non-contact Voltage Testing Button
14. Non-contact Voltage Testing Sensor
15. Non-contact Voltage Testing LED Indicator
16. Polarity markings (for DC current)

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

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## 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 approx. 30 minutes of inactivity. To deactivate the auto power OFF functionality, press and hold the "SEL/DC ZERO" 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) / DC ZERO BUTTON (FOR SECONDARY FUNCTIONS)

The **SEL/DC ZERO** button ⑨ activates the secondary function for each application accessible by the function selector switch ②:

- In Current **A**  and Low Impedance **LoZ**  modes, it toggles between AC and DC measurements.
- In Frequency/Duty Cycle **Hz%** setting, it toggles between these measurements.
- In Continuity/Resistance/Diode-Test  setting, it toggles through these measurements in order.
- In DC current setting, pressing and holding for more than one second initiates the DC ZERO function. Subsequent DC current measurements automatically subtract the measurement that was present as an offset correction.

The default function for each application is printed on the meter in white, the secondary functions in orange. An icon on the LCD display will indicate which function is active.

### 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 as the meter continues to take samples.

1. When measuring, press "MAX/MIN" button ⑧ to toggle between the Maximum value (MAX) and Minimum value (MIN). If a new Maximum or Minimum, 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.

## INRUSH CURRENT

Rotate the Function Selector switch ② to the Current **A**  $\approx$  setting and press **INRUSH** ⑩ prior to an inrush event to test for inrush current. While the meter monitors current waiting for the inrush event, "----" will be visible on the display.

## NON-CONTACT VOLTAGE TESTING

Press and hold the "NCV" button ⑬ to test for AC voltage using the integrated non-contact voltage tester. Approach the conductor under test leading with the sensing antenna ⑭. The meter delivers visual warning signals via the LED indicator ⑮ and audible signals (beeps) when AC voltage is detected. Release the "NCV" button to exit NCV testing mode.

**NOTE:** *It is not recommended to perform continuity and NCV testing simultaneously, as both tests utilize the same audible signal, making it difficult to resolve which test is responsible for the audible alarm.*

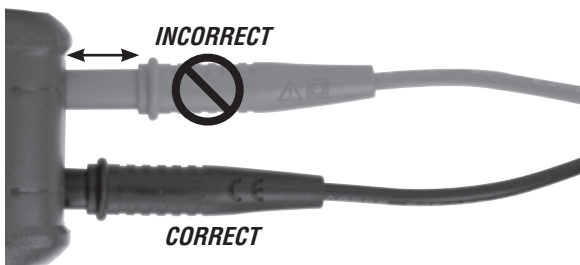
**NOTE:** *Only voltages of 90V AC or greater will be detected.*



## OPERATING INSTRUCTIONS

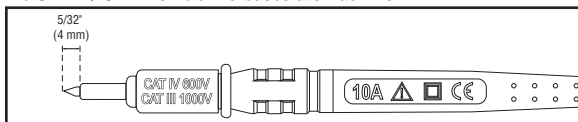
### CONNECTING TEST LEADS

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.



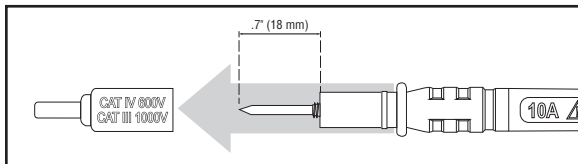
### TESTING IN CAT III / CAT IV MEASUREMENT LOCATIONS

Ensure the test lead shield is pressed firmly in place. Failure to use the CATIII / CATIV 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 CURRENT (LESS THAN 2000A)**

AC Current is measured by pressing the clamp trigger **11** 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 **11** fully released, and that the wire passes perpendicularly through the center of the clamp **3** in line with the arrow markings **12**.

**To measure current:**

1. Rotate the Function Selector switch **2** to the Current **A**  $\approx$  setting.
2. The meter defaults to AC measurement. To measure DC, press the "SEL/DC ZERO" 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.



3. Place the clamp **3** around the wire. When measuring DC current, align the polarity markings **16** on the clamp with the polarity of the wire to avoid negative readings. The current measurement will be shown in the display. The meter will auto-range to display the measurement in the most appropriate range.

**To measure inrush current:**

1. Rotate the Function Selector switch **2** to the Current **A**  $\approx$  setting. Place the clamp **3** around the wire and press "INRUSH" **10**. The Display **1** will show "----". Initiate the Inrush event and the inrush current will be captured and presented in the display. A second press of "INRUSH" **10** will reset the Inrush measurement, "----" will be presented on the display and the meter will wait for the next Inrush event.
2. Press and hold "INRUSH" **10** for more than one second to return to normal measuring mode.

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

**NOTE:** If non-zero values are displayed prior to measuring in DC current mode, an offset correction may be required to improve accuracy. With meter in DC current mode, press and hold the "SEL/DC ZERO" button **9** for more than one second to initiate the DC current ZERO function. Subsequent DC current measurements automatically subtract the measurement that was initially present as an offset correction.

## 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 voltage V $\sim$  or DC voltage V $\text{---}$  setting. The AC or DC icon on the LCD indicates which setting is selected.



Black lead    Red lead



-or-



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.

**⚠ Do not attempt to measure voltages greater than 1000V in any Voltage setting.**

### 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  $\approx$ LoZ setting. The meter defaults to AC measurement. To measure DC, press the "SEL/DC ZERO" 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.



Black lead    Red lead



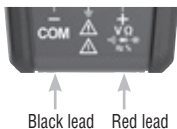
2. Apply test leads to the circuit to be tested to measure voltage. The meter will auto-range to display the measurement in the most appropriate range.

**⚠ 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.



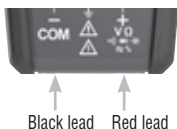
**NOTE:** The meter defaults to Continuity testing in this setting. Ensure that the Continuity Testing icon (•)) is visible on the display. If not, press the "SEL/DC ZERO" button (9) repeatedly until the (•)) icon is shown.

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/DC ZERO" 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.

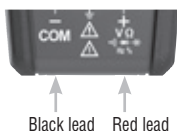
**NOTE:** When in a Resistance setting and the test leads are open (not connected across a resistor), or when a failed resistor is under test, the display will indicate O.L. This is normal.

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

## OPERATING INSTRUCTIONS

### DIODE TEST

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

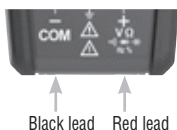


**NOTE:** The meter defaults to Continuity testing in this mode. Press the "SEL/DC ZERO" button (9) twice to enter Diode testing mode. The Diode icon  $\rightarrow|+$  will appear on the display.

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 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. To test Duty-Cycle, press the "SEL/DC ZERO" button (9) once. Ensure that the appropriate icon (either Hz or %) appears on the display.

1. Measure by connecting test leads across the circuit.

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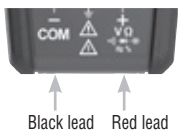
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Melrose, MA 02176  
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## OPERATING INSTRUCTIONS

## 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  $\text{F}$  setting.



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.

## MAINTENANCE

## BATTERY REPLACEMENT

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

1. Loosen screw on 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.**

## 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](http://www.epa.gov) or [www.ecycle.org](http://www.ecycle.org) for additional information.

# NOTES

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