

ENGLISH

CL600



# INSTRUCTION MANUAL

## 600A AC Auto-Ranging Digital Clamp Meter

### True RMS Measurement Technology

- NON-CONTACT VOLTAGE TESTER
- AUTO-RANGING
- DATA HOLD
- RANGE HOLD
- AUDIBLE CONTINUITY
- DIODE TEST

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



**TOUGH METER**



Intertek

# KLEIN TOOLS®



For Professionals... Since 1857™



## GENERAL SPECIFICATIONS

Klein Tools CL600 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, and tests diodes via test-leads.

- **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, 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.

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## 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:** 10MΩ

**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>	600.0Ω	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

### 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, current <0.35mA
- **Sampling Frequency:** 3 samples per second
- **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.
- 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**

	<b>AC</b>		<b>DC</b>
	<b>Resistance (in Ohms)</b>		<b>Audible Continuity</b>
	<b>Double Insulated Class II</b>		<b>Ground</b>
	<b>Diode</b>	<b>A</b>	<b>Amperage (Amps)</b>
<b>V</b>	<b>Voltage (Volts)</b>		
	<b>Warning or Caution</b>		

*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.*

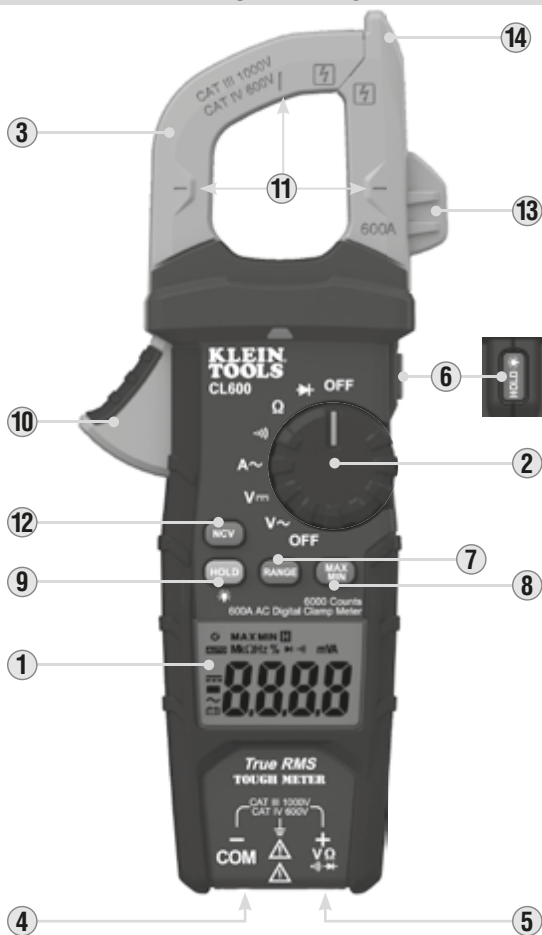
 **Risk of Electrical Shock**

*Application around and removal from UNINSULATED HAZARDOUS LIVE conductors is permitted.*

**SYMBOLS ON LCD**

	<b>AC Measurement</b>		<b>DC Measurement</b>
	<b>Negative Reading</b>		<b>Data Hold</b>
<b>AUTO</b>	<b>Auto Ranging</b>	<b>MAX</b>	<b>Maximum Value Hold</b>
<b>MIN</b>	<b>Minimum Value Hold</b>		<b>Low Battery</b>
	<b>Auto Power Off</b>		<b>Audible Continuity</b>
<b>k</b>	<b>kilo (value x 10<sup>3</sup>)</b>	<b>M</b>	<b>Mega (value x 10<sup>6</sup>)</b>
<b>m</b>	<b>mili (value x 10<sup>-3</sup>)</b>	<b>Ω</b>	<b>Ohms</b>
<b>V</b>	<b>Volts</b>	<b>A</b>	<b>Amps</b>

## 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. Data Hold / Backlight button #2      |
| 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 either of the OFF settings. 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 settings) to power ON the meter. To deactivate the power OFF functionality press and hold the "RANGE" button ⑦ 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.

## DATA HOLD

Press either of the Data Hold / Backlight buttons ⑥ or ⑨ to hold the measurement on the display. Press again to release the display to return to live measuring.

## BACKLIGHT

Press and hold either of the Data Hold / Backlight buttons ⑥ or ⑨ 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).

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## 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).
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

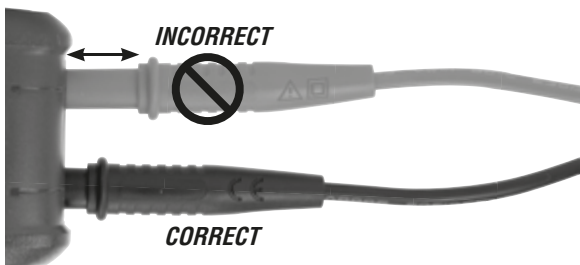
When working with test leads, one test probe may be mounted in the test lead holder **13** to facilitate natural two-handed operation with the clamp in one hand and a single test probe in the other.



## OPERATING INSTRUCTIONS

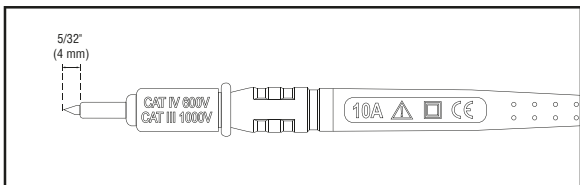
## CONNECTING TEST LEADS

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.



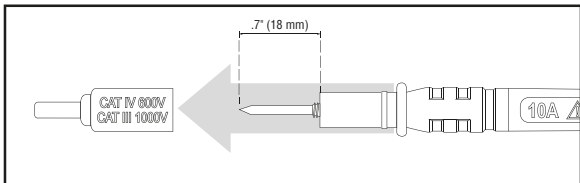
## TESTING IN CAT III / CAT IV MEASUREMENT LOCATIONS

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 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  $A\sim$  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.

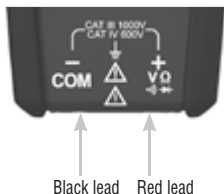
**⚠ Disconnect test leads when measuring with the clamp.**

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## OPERATING INSTRUCTIONS

## AC VOLTAGE (LESS THAN 1000V)

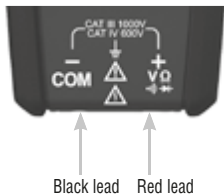
1. Insert RED test lead into V $\Omega$  jack ⑤, and BLACK test lead into COM jack ④, and rotate function selector switch ② to the AC voltage V $\sim$  setting.



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.

## 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 DC voltage V $\text{---}$  setting.



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.

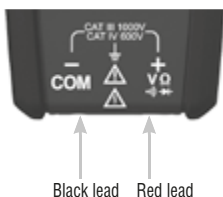
**NOTE:** If "-" appears on the LCD, the test leads are being applied to the circuit in reverse. Swap the position of the leads to correct this.

**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.

## OPERATING INSTRUCTIONS

### CONTINUITY

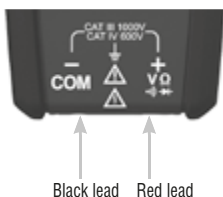
1. Insert RED test lead into V $\Omega$  jack (5), and BLACK test lead into COM jack (4), and rotate function selector switch (2) to the Continuity  $\bullet\))$  setting.
2. Remove power from circuit.
3. Test for continuity by connecting conductor or circuit with test leads. If resistance is measured 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 Resistance  $\Omega$  setting.
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.



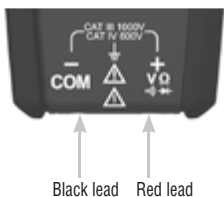
**NOTE:** When in a Resistance setting and the test leads are open (not connected across a resistor), or when a failed resistor is under test, the display will indicate O.L. This is normal.

**⚠ 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 Diode-Test  $\rightarrow|+$  setting.
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.



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## 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.***

**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.erecycle.org](http://www.erecycle.org) for additional information.

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