User Manual

DIGI-SENSE™

AC/DC True RMS Clamp Meter

with Bluetooth® Mobile App and
NIST-Traceable Calibration

Model 20250-63

THE STANDARD IN PRECISION MEASUREMENT

Introduction

The Digi-Sense AC/DC True RMS Clamp Meter with Bluetooth® Connectivity (model 20250-63) allows you to transmit data directly to your Android™ or iOS® device using our free D/S Meter mobile app. Now you can view data at a safe distance from potentially hazardous parameters or even use your smart device as a real-time secondary display for checking measurements, eliminating the need to write down readings on paper. The results are automatically stored in the app with a date-and-time stamp and can be saved as a CSV file and emailed for future reference, manipulation, or analysis to help determine trends and conditions over a long period of time. You can also use the app to attach photos and notes to the records creating a clear reference point for your work.

Setup is simple. Download the free D/S Meter app to your Android or iOS device. Place the clamp meter in Bluetooth mode and open the app on your smart device. The clamp meter will be sensed by your device and be listed as an available source that you can select. Once selected, the measured data is displayed on your device and some of the instrument functions can also be accessed. A full description of its operation is available for download in the app.

The AC/DC TRMS Clamp Meter measures AC current to 1000 A AC, voltage (AC and DC), resistance, capacitance, frequency, temperature, duty cycle, and continuity. Special functions include auto ranging, diode test, and audible continuity check. This instrument is fully tested and calibrated to NIST-traceable standards for reliable measurements right out of the box, saving you time and money.

Safety

International Safety Symbols

This symbol, adjacent to another symbol or terminal, indicates the user must refer to the manual for further information.

This symbol, adjacent to a terminal, indicates that, under normal use, hazardous voltages may be present

Double insulation

SAFETY NOTES

- Do not exceed the maximum allowable input range of any function:

Function	Maximum Input
A AC, A DC	1000 A DC/AC
V DC, V AC	750 V DC/AC
Resistance, Capacitance, Frequency, Diode Test	300 V DC/AC
Temperature	300 V DC/ AC

- Do not apply voltage to meter when resistance function is selected.
- Set the rotary function switch OFF when the meter is not in use.
- Remove the battery if meter is to be stored for longer than 60 days.

WARNINGS

- Set rotary function switch to the appropriate position before measuring.
- When measuring volts do not switch to current/ resistance modes.
- Do not measure current on a circuit whose voltage exceeds 600 V.
- When changing ranges always disconnect the test leads from the circuit under test.
- Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.

- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTIONS

- Improper use of this meter can cause damage, shock, injury or death. Read and understand this user manual before operating the meter.
- Always remove the test leads before replacing the battery.
- If the test leads need to be replaced, you must use a new one which should meet EN 61010-031 standard.
- Inspect the condition of the test leads and the meter itself for any damage before operating the meter. Repair or replace any damage before use.
- Use great care when making measurements if the voltages are greater than 25 VAC rms or 35 VDC. These voltages are considered a shock hazard.
- Always discharge capacitors and remove power from the device under test before performing Diode, Resistance or Continuity tests.
- Voltage checks on electrical outlets can be difficult and misleading because of the uncertainty of connection to the recessed electrical contacts. Other means should be used to ensure that the terminals are not "live".
- If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

Unpacking

Check individual parts against the list of items below. If anything is missing or damaged, please contact your instrument supplier immediately.

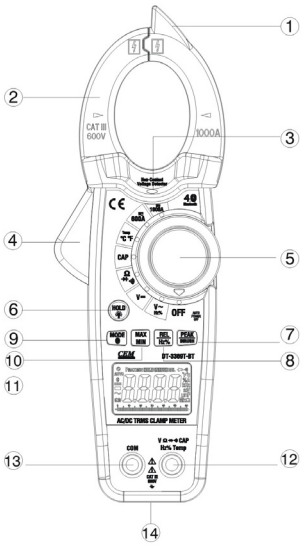
1. Meter
2. Test leads
3. One type K temperature probe
4. One 9 V battery
5. Carrying case
6. User manual
7. NIST-traceable calibration report with data

Key Features

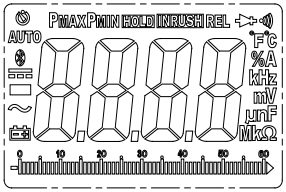
- Bluetooth interface
- User-friendly mobile app
- Noncontact AC voltage indicator light
- Temperature measurement via type K thermocouple
- 1.2" (30 mm) clamp jaw opening
- Electronic overload protection
- Auto-ranging with auto power-off
- Data Hold function; Max/Min readings

Meter Description

1. NCV test
2. Current clamp
3. Noncontact AC voltage indicator light
4. Clamp trigger
5. Rotary function switch
6. Data HOLD and Backlight button
7. PEAK and INRUSH button
8. REL and Hz% button
9. MODE select and Bluetooth button
10. Max/Min button
11. LCD
12. V Ω ⇥ •))) CAP Hz% Temp
13. COM input jack
14. Battery compartment (on rear)



Display Layout



HOLD	Data Hold
Minus sign	Negative reading display
0 to 5999	Measurement display digits
REL	REL/ DCA Zero
MAX/MIN	Maximum/Minimum
	Auto Power-off
AUTO	Autorange mode
DC/AC	Direct Current / Alternating Current
	Low battery
mV or V	Milli-volts or Volts (Voltage)
Ohms	MkΩ (Resistance)
A	Amperes (Current)
F	Farad (Capacitance)
Hz/%	Hertz (Frequency)/Percent(duty ratio)
°F and °C	Fahrenheit and Celsius units (Temperature)
n, m, µ, M, k	Unit of measure prefixes: nano, milli, micro, mega, and kilo
•)))	Continuity test
	Diode test
	Bluetooth 4.0

Setup and Operation

NOTE: Read and understand all **Warning** and **Caution** statements in this user manual prior to using this meter. Set the rotary function switch to the OFF position when the meter is not in use.

AC/DC Current Measurements

WARNING: Ensure that the test leads are disconnected from the meter before making current clamp measurements.

1. Set the rotary function switch to the **1000 A** or **600 A** range. If the approximate range of the measurement is not known, select the highest range then move to the lower range if necessary.

2. Press the **REL** button to zero the meter display.

3. Use the **MODE** button to select AC or DC Current.

4. Press the trigger to open jaw. Fully enclose only one conductor. For optimum results, center the conductor in the jaw.

5. The clamp meter LCD will display the reading.

AC Voltage Measurement

1. Insert the black test lead into the negative **COM** terminal and the red test lead into the positive **V** Ω →|– •))) **CAP Hz% Temp** terminal.

2. Set the rotary function switch to the **V~** position.

3. Connect the test leads in parallel to the circuit under test.

4. Read the voltage measurement in the display.

DC Voltage Measurement

1. Insert the black test lead into the negative **COM** terminal and the red test lead into the positive **V** Ω ⊣◀ •)) **CAP Hz% Temp** terminal.

2. Set the rotary function switch to the **V**– position.

3. Connect the test leads in parallel to the circuit under test.

4. Read the voltage measurement in the display.

Resistance Measurements

1. Insert the black test lead into the negative **COM** terminal and the red test lead into the **V** Ω ⊣◀ •)) **CAP Hz% Temp** positive terminal.

2. Set the rotary function switch to the Ω ⊣◀ •)) position.

3. Touch the test probe tips across the circuit or component under test.

4. Read the resistance measurement in the display.

Capacitance Measurements

WARNING: To avoid electric shock, discharge the capacitor under test before measuring.

1. Set the rotary function switch to the **CAP** position.

2. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the **V** Ω ⊣◀ •)) **CAP Hz% Temp** positive jack.

3. Touch the test probe tips across the part under test. If "**OL**" appears in the display, remove and discharge the component.

4. Read the capacitance value in the display.

5. The display will indicate the proper decimal point and value.

Note: For very large values of capacitance measurement, it can take several minutes before the final reading stabilizes.

Frequency Measurements

1. Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the **V Ω →+ •)) CAP Hz% Temp** positive jack.

2. Set the rotary function switch to the **V~** position.

3. Press **Hz%** button to select the Frequency (Hz) or Duty cycle (%).

4. Touch the test probe tips across the part under test.

5. Read the value on the display.

6. The display will indicate the proper decimal point and value.

7. In Voltage and Current mode, press **Hz%** button to select Frequency (Hz) or Duty cycle (%).

Temperature Measurements

WARNING: To avoid electric shock, be sure the thermocouple probe has been removed before changing to another measurement function.

1. Set the rotary function switch to the **TEMP** position.

2. Insert the Temperature Probe into the negative **COM** and the **V Ω →+ •)) CAP Hz% Temp** positive jacks, observing polarity.

3. Touch the temperature probe head to the device under test. Continue to touch the part under test with the probe until the reading stabilizes.

4. Read the temperature on the display. The digital reading will indicate the proper decimal point and value.

5. Use the **MODE** button to select °F or °C.

Continuity Measurements

1. Insert the black test lead into the negative COM terminal and the red test lead into the **V Ω ⊣◀ •)) CAP Hz% Temp** positive terminal.

2. Set the rotary function switch the Ω ⊣◀ •))) position.

3. Use the **MODE** button to select continuity "•))". The display icons will change when the **MODE** button is pressed.

4. Touch the test probe tips across the circuit or component under test.

5. If the resistance is <50 Ω, a tone will sound.

Diode Test

1. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the **V Ω ⊣◀ •)) CAP Hz% Temp** positive jack

2. Turn the rotary function switch to the Ω ⊣◀ •)) position. Use the **MODE** button to select the diode function if necessary (diode symbol will appear on the LCD when in Diode test mode).

3. Touch the test probe tips to the diode or semiconductor junction under test. Note the meter reading.

4. Reverse the test lead polarity by reversing the red and black leads. Note this reading.

5. The diode or junction can be evaluated as follows:

   - If one reading displays a value (typically 0.400 V to 0.900 V) and the other reading displays **OL**, the diode is good.

   - If both readings display **OL**, the device is open.

   - If both readings are very small or '0', the device is shorted.

Noncontact AC Voltage Measurements

WARNING: Risk of Electrocution. Before use, always test the Voltage Detector on a known live circuit to verify proper operation.

1. Touch the probe tip to the hot conductor or insert into the hot side of the electrical outlet.

2. If AC voltage is present, the detector light will illuminate.

Note: The conductors in electrical cord sets are often twisted. For best results, rub the probe tip along a length of the cord to assure placing the tip in close proximity to the live conductor.

Note: The detector is designed with high sensitivity. Static electricity or other sources of energy may randomly trip the sensor. This is normal operation.

MODE/Bluetooth Button

Press the **MODE/Bluetooth** button to select between functions when a multifunction position is selected. For example, you can select between measuring voltage, diode, or continuity "V ⊣◁ •))" by turning to that switch position and then toggling between the functions by pressing the **Mode/Bluetooth** button. Also functions in "°F or °C" and "AC or DC" current switch settings.

Press and hold the **MODE/Bluetooth** button to turn the system on; the auto power-off function will be cancelled.

Press the **MODE/Bluetooth** button until the Bluetooth turns on or off, indicated by the Bluetooth icon on the display.

PEAK/INRUSH Button

Note: Only ACV functions can do the PEAK value measurement.

1. PEAK Key is the peak value measurement key that acts with trigger.

2. In ACV functions, press **PEAK/INRUSH** button to activate the detection of Maximum and Minimum peak AC Voltage values with a response time of 1 ms. Both values are constantly updated and are displayed cyclically every time the same button is pressed again.

3. The display shows the symbol associated with the selected function: "PMAX" for maximum peak value, "PMIN" for minimum peak value.

Note: For ACA functions, only the **INRUSH** value measurement is possible.

1. Turn off the meter and then insert conductor into jaw.

2. Press the **PEAK/INRUSH** button , "----"will appear in the display.

3. Turn on the meter and then read the value on the display.

Data HOLD/Backlight Button

To freeze the LCD reading, press the **HOLD** button. While data hold is active, the **HOLD** icon appears on the LCD. Press the **HOLD** button again to return to normal operation. The LCD is equipped with backlighting for easier viewing, especially in dimly lit areas. Press the backlight button to turn the backlight on. Press again to turn the backlight off.

Relative Button

1. Press the **REL** button to zero the display; "**REL**" will appear in the display. The displayed reading is now the actual value less the stored "zero" value.

2. Press the **REL** button to view the stored value; "**REL**" will flash in the display.

3. To exit this mode, press and hold the **REL** button until "**REL**" is no longer visible in the display.

MAX/MIN Button

1. Press **MAX/MIN** key to measure the maximum and minimum values. This mode is activated on each measurement except for continuity test, diode test capacitance test, frequency test, and duty cycle test.

2. The MAX/MIN mode is disabled by holding the **MAX/MIN** button down for several seconds or by moving the rotary function switch.

HZ%

When the rotary function switch is on the Hz%, Voltage, or Current position, the **Hz%** button allows you to select the frequency test (Hz) or the duty cycle test (%).

LCD Backlight Button

The LCD is equipped with backlighting for easier viewing, especially in dimly lit areas. Press the **HOLD/backlight** button to turn the backlight on. Press again to turn the backlight off.

Automatic Power-Off

In order to conserve battery life, the meter will automatically turn off after approximately 15 minutes of nonuse. To turn the meter on again, turn the rotary function switch to the OFF position and then to the desired function position.

Specifications

Function	Range	Resolution	Accuracy (% of reading + digits)
AC True RMS Current (Auto-ranging)	60.00 A	10 mA	+2.5% of rdg + 8 digits
	600.0 A	100 mA	+2.5% of rdg + 8 digits
	1000 A	1 A	+2.8% of rdg + 8 digits

Over-range protection: maximum input 1000 A
Accuracy specified from 5% to 100% of the measuring range
Frequency response: 50 Hz to 60 Hz True RMS

Function	Range	Resolution	Accuracy (% of reading + digits)
DC Current (Auto-ranging)	60.00 A	10 mA	+2.5% of rdg + 8 digits
	600.0 A	100 mA	+2.5% of rdg + 8 digits
	1000 A	1 A	+2.8% of rdg + 8 digits

Over-range protection: maximum input 1000 A

Function	Range	Resolution	Accuracy (% of reading + digits)
DC Voltage (Auto-ranging)	600.0 mV	0.1 mV	+0.9% of rdg + 5 digits
	6.000 V	1 mV	+1.0% of rdg + 3 digits
	60.00 V	10 mV	+1.0% of rdg + 3 digits
	600.0 V	100 mV	+1.0% of rdg + 3 digits

Maximum input: 750 V dc

Function	Range	Resolution	Accuracy (% of reading + digits)
AC True RMS Voltage (Auto-ranging)	6.000 V	1 mV	+1.2% of rdg + 5 digits
	60.00 V	10 mV	+1.2% of rdg + 5 digits
	600.0 V	100 mV	+1.5% of rdg + 5 digits

AC response: 50 Hz to 1 kHz
Accuracy specified from 5% to 100% of the measuring range
Accuracy PEAK function: ±10% rdg
Maximum input: 750 V ac rms

Function	Range	Resolution	Accuracy (% of reading + digits)
Resistance (Auto-ranging)	600.0 Ω	0.1 Ω	+1% of rdg + 4 digits
	6.000 kΩ	1 Ω	+1.5% of rdg + 2 digits
	60.00 kΩ	10 Ω	+1.5% of rdg + 2 digits
	600.0 kΩ	100 Ω	+1.5% of rdg + 2 digits
	6.000 MΩ	1 kΩ	+2.0% of rdg + 5 digits
	60.00 MΩ	10 kΩ	+3% of rdg + 8 digits

Input protection: 300 V dc or 300 V ac rms

Function	Range	Resolution	Accuracy (% of reading + digits)
Capacitance (Auto-ranging)	60.00 nF	10 pF	+5% of rdg + 30 digits
	600.0 nF	0.1 nF	+3% of rdg + 5 digits
	6.000 µF	1 nF	+3% of rdg + 5 digits
	60.00 µF	10 nF	+3% of rdg + 5 digits
	600.0 µF	0.1 µF	+4% of rdg + 10 digits
	6000 µF	10 µF	+4.5% of rdg + 10 digits

Input protection: 300 V dc or 300 V ac rms
Accuracy is not stated below 6 nF

Frequency with Test Leads (AC Voltage)

Function	Range	Accuracy (% of reading + digits)
Frequency (Auto-ranging)	10 Hz to 20 kHz	±(1.0% + 5 digits)

Input protection: 750 V AC rms
Sensitivity: >15 V AC rms

Function	Range	Accuracy (% of reading + digits)
Frequency	40 Hz to 1 kHz	±(1.0% + 5 digits)

Maximum input: 1000 A AC
Sensitivity: >50 A (600 A range); >500 A (1000 A range)

Function	Range	Resolution	Accuracy (% of reading + digits)
Duty Cycle	20.0% to 80.0%	0.1	+1.2% of rdg + 10 digits

Function	Range	Resolution	Accuracy (% of reading + digits)
Temperature	–20 to 760°C	0.1/1°C	+3% of rdg + 5°C
	–4 to 1400°F	0.1/1°F	+3% of rdg + 9°F

Sensor: Type K thermocouple
Input protection: 300 V dc or 300 V ac rms

Function	Testing condition	Reading
Diode	Forward DCA is approx.1 mA, open circuit Voltage MAX . 3 V	Forward voltage drop of Diode
Continuity	Test current MAX. 1.5 mA	Buzzer makes a long sound when resistance is <50 Ω

Input protection: 300 V dc or 300 V ac rms

General Specifications

Clamp jaw opening	1.2" (30 mm) approx.
Bluetooth version	4.0
Display	6000 counts LCD, backlighting
Continuity check	Threshold 50 Ω; Test current <0.5 mA
Diode test	Test current of 0.3 mA typical; Open circuit voltage <3 VDC typical
Low battery indication	is displayed
Over-range indication	'OL' display
Measurement rate	3 readings per second, nominal
PEAK	Captures peaks >1ms
INRUSH	100 MS
Temperature sensor	Type K thermocouple

Input Impedance	10 MΩ (VDC and VAC)
AC response	True RMS (AAC and VAC)
Operating temperature	41 to 104°F (5 to 40°C)
Storage temperature	–4 to 140°F (–20 to 60°C)
Operating humidity	Max 80% up to 87°F (31°C) decreasing linearly to 50% at 104°F (40°C)
Storage humidity	<80%
Operating altitude	7000 ft (2000 m) maximum
Battery	One (1) 9 V battery
Auto power-off	Approximately 15 minutes
Dimensions	$9^{13}/_{32}$" x $3^{5}/_{32}$" x $1^{15}/_{16}$" (23.9 x 8 x 4.9 cm)
Weight	10.8 oz (305 g)
Safety	Conforms to UL STD. 61010-1, 61010-2-030, 61010-2-033 and 61010-031; Certified to CSA STD. C22.2, NO. 61010-1, 61010-2-30, 61010-2-033 and 61010-031.

Intertek 4007177

Maintenance, Recalibration, and Repair

WARNING: To avoid electrical shock, disconnect the meter from any circuit, remove the test leads from the input terminals, and turn OFF the meter before opening the case. Do not operate the meter with an open case.

Cleaning and Storage

Periodically wipe the case with a damp cloth and mild detergent; do not use abrasives or solvents. If the meter is not to be used for 60 days or more, remove the battery and store it separately.

Battery Replacement

1. Remove the Phillips head screw that secures the rear battery door.
2. Open the battery compartment.
3. Replace the 9 V battery.
4. Secure the battery compartment.

It is recommended that Digi-Sense products are calibrated annually to ensure proper function and accurate measurements; however, your quality system or regulatory body may require more frequent calibrations. To schedule your recalibration, please contact InnoCal, an ISO 17025 calibration laboratory accredited by A2LA.

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