

## User Manual

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 **DIGI-SENSE™**

## Autoranging Clamp Meters

with NIST-Traceable Calibration

**Models 20250-57 (1000 A AC),  
20250-58 (1000 A AC/DC, True RMS)**



THE STANDARD IN PRECISION MEASUREMENT

## Introduction

The Digi-Sense Autoranging Clamp Meters (1000 A AC Model 20250-57; 1000 A AC/DC True RMS Model 20250-58) offer all the basic features needed for measurement. The double-molded plastic housing and jaw are designed for use in tight places. A large backlit display provides easy-to-read measurements. The instruments are fully tested and calibrated to NIST-traceable standards. Careful use of the meter will provide years of reliable service.

## 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.
- Do not apply voltage to meter when resistance function is selected.
- Set the function switch OFF when the meter is not in use.

## WARNINGS

- Set rotary function switch to the appropriate position before measuring.
- When measuring volts, do not switch to current/resistance modes.
- When changing ranges using the rotary function switch, always disconnect the test leads from the circuit under test.
- Do not exceed the maximum rated input limits:

| <b>Input Limits</b>  |  |  |
|--|--|--|
| <b>Function</b>  | <b>Maximum Input,<br/>Model 20250-57</b> | <b>Maximum Input,<br/>Model 20250-58</b> |
| A  | 1000 A AC                                | 1000 A AC/DC                             |
| V  | 600 V AC/DC                              | 600 V AC/DC                              |
| Frequency, Duty cycle, Resistance, Diode, Continuity, Capacitance Test | 250 V AC/DC                              | 250 V AC/DC                              |
| Temperature (°C/°F)  | —  | 60 V DC, 24 V AC                         |

## 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.
- 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.
- Remove the battery if the meter is to be stored for long periods.
- 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.

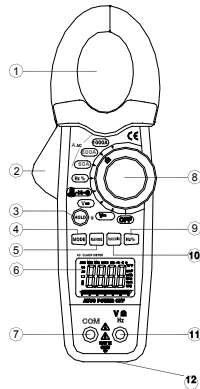
1. Meter
2. Test leads
3. Temperature probe (model 20250-58 only)
4. Carrying case
5. 9 V battery
6. User manual
7. NIST-traceable calibration report with data

## **Key Features**

1. Durable double-molded housing
2. 1 $\frac{3}{16}$ " (30 mm) jaw opening
3. CAT III 600 V safety rating
4. Electronic overload protection
5. Autoranging with auto power-off

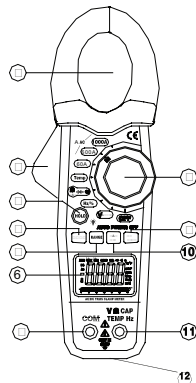
## Meter Description (Model 20250-57)

1. Current clamp
2. Clamp trigger
3. Data HOLD and Backlight button
4. MODE select button
5. RANGE select button
6. LCD
7. COM input jack
8. Rotary function switch
9. Hz% Hold button
10. Max/Min button
11. V  $\Omega$   $\rightarrow$   $\rightarrow$  Hz jack
12. Battery compartment (on rear)



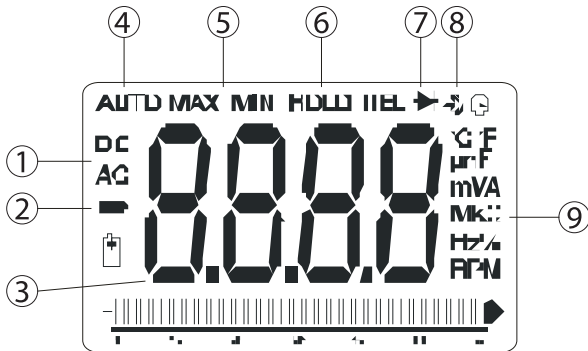
## Meter Description (Model 20250-58)

1. Current clamp
2. Clamp trigger
3. Data HOLD and Backlight button
4. MODE select button
5. RANGE select button
6. LCD
7. COM input jack
8. Rotary function switch
9. DC ZERO button
10. Max/Min button
11. V  $\Omega$   $\rightarrow$   $\rightarrow$  CAP Hz Temp jack
12. Battery compartment (on rear)



## Display Layout

1. **AC DC** AC (alternating current) and DC (direct current)
2. **-** Minus sign
3. **8.8.8.8** 6000 count (0 to 5999) measurement reading with 61-segment analog bar graph
4. **AUTO** Autorange mode
5. **MAX MIN** Max and Min readings
6. **HOLD** Data HOLD mode
7. **→|** Diode test mode
8. **•)))** Audible continuity
9. **μ,m,V,A,K, M,Ω;** Units of measure list (20250-57);  
**°C,°F, μ,m,V, A,K,M,Ω** Units of measure list (20250-58)



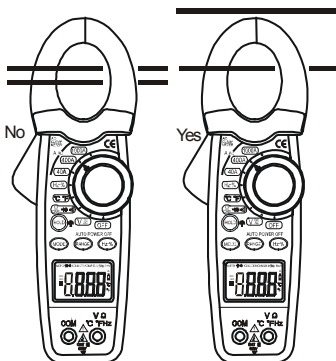
## Setup and Operation

**Note:** Read and understand all warning and precaution statements listed in the safety section of this operation manual prior to using this meter. Set the rotary function switch to the OFF position when the meter is not in use.

### AC and AC/DC Current Measurements

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

1. Set the Function switch to the **1000A** or **600A** or **60A** range.
2. For model 20250-58 only, select **AC** or **DC** by pressing the **MODE** button.
3. If the range of the measured is unknown, select the higher range first then move to the lower range as necessary.



4. Press the trigger to open jaw. Fully enclose one conductor to be measured (see diagram above). The LCD will display the reading.
5. In DCA mode, to ensure the reading is correct, press the **DC ZERO** button to clear the reading on the LCD before measurement. The LCD will display the reading (model 20250-58 only).



## AC/DC Voltage Measurements

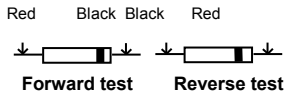
1. Insert the black test lead into the negative COM terminal and the red test lead into the positive V terminal.
2. Set the rotary function switch to the **V** position.
3. For model 20250-58, select **AC** or **DC** by pressing the MODE button.
4. Connect the test leads in parallel to the circuit under test.
5. Read the voltage measurement in the display.

## Resistance and Continuity Measurements

1. Insert the black test lead into the negative COM terminal and the red test lead into the positive terminal.
2. Set the rotary function switch to the  $\Omega \rightarrow \text{diode symbol}$  position.
3. Use the multifunction MODE button to select resistance.
4. Touch the test probe tips across the circuit or component under test. It is best to disconnect one side of the device under test so the rest of the circuit will not interfere with the resistance reading.
5. For Resistance tests, read the resistance value in the display.
6. For Continuity tests, if resistance is  $<100 \Omega$ , a tone will sound.

## Diode and Continuity Measurements

1. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive diode jack.
2. Turn the rotary function switch to the  $\rightarrow| \cdot )))$  position.
3. Press the MODE button until “ $\rightarrow|$ ” appears in the display.
4. Touch the test probes to the diode under test. Forward voltage will indicate 0.4 V to 0.7 V. Reverse voltage will indicate “OL”. Shorted devices will indicate near 0 mV and an open device will indicate “OL” in both polarities.



## Capacitance Measurements

**WARNING:** To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any capacitance measurements. Remove the batteries and unplug the line cords.

1. Set the rotary function switch to the  $\Omega \rightarrow| \cdot )))$  **CAP** position.
2. Insert the black test lead banana plug into the negative COM jack and the red test lead banana plug into the positive V jack.
3. Touch the test leads to the capacitor to be tested.
4. Read the capacitance value on the display.

## Frequency or % Duty Cycle Measurements

### For Model 0250-57:

1. Set the rotary function switch to the **Hz%** position.
2. Press the **Hz%** button to indicate “Hz” in the display.
3. Insert the black lead banana plug into the negative COM jack and the red test lead banana plug into the positive Hz jack.
4. Touch the test probe tips to the circuit under test.
5. Press the **Hz%** button again to indicate “%” on the display. Read the % of duty cycle on the display.

### For Model 20250-58:

1. Set the rotary function switch to the **Hz%** position.
2. Insert the black lead banana plug into the negative COM jack and the red test lead banana plug into the positive Hz jack.
3. Press the MODE button to select “Hz” or “%”.
4. Touch the test probe tips to the circuit under test.
5. Read the frequency or % of duty cycle on the display.

## Temperature Measurements (Model 20250-58 only)

**WARNING:** To avoid electric shock, disconnect both test probes from any source of voltage before making a temperature measurement.

1. Set the function switch to TEMP.
2. Insert the temperature probe into the negative COM and the V jacks, making sure to observe the correct polarity.
3. Select °C or °F units by pressing the MODE button.
4. Touch the temperature probe head to the part whose temperature you wish to measure. Keep the probe touching the part under test until the reading stabilizes (about 30 seconds).
5. Read the temperature in the display. The digital reading will indicate the proper decimal point and value.

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

### MODE Button

To select DC/ACV, OHM/Diode/Continuity/CAP (°C or °F model 20250-58 only).

### Data HOLD and Backlight Button

To “freeze” a reading on the screen, press the data **HOLD** button. While data HOLD is active, the “HOLD” display icon appears on the LCD. Press the **HOLD** button again to resume normal operation.

**Note:** The HOLD feature will activate when the Backlight is turned on.

The backlight function illuminates the display and is used when the ambient light is too low to permit viewing of the displayed readings. Press the **HOLD/backlight** button for one second to turn the backlight on and press the button a second time to turn the backlight off.

## **RANGE Button**

When the meter is first turned on, it defaults to Auto Ranging. This automatically selects the best range for the measurements being made and is generally the optimal mode for most measurements. For measurement situations requiring that a range be manually selected, perform the following:

1. Press the **RANGE** button. The “Auto Range” display indicator will turn off, and the “Manual Range” display indicator will turn on.
2. Press the **RANGE** button again to step through the available ranges until you select the range you want.
3. Press and hold the **RANGE** button for 2 seconds to exit the Manual Ranging mode and return to Auto Ranging.

**Note:** Manual Ranging does not function in the AC Current, Diode, and Continuity check functions.

## **Automatic Power-Off**

To conserve battery life, the meter automatically turns off after 30 minutes of nonuse.


## Specifications

| Function   | Model 20250-57     |                                  | Model 20250-58        |                                  |
|------------|--------------------|----------------------------------|-----------------------|----------------------------------|
|            | Range & Resolution | Accuracy (% of reading)          | Range & Resolution    | Accuracy (% of reading)          |
| AC Current | 60.00 AAC          | $\pm(2.5\% + 10 \text{ digits})$ | 60.00 AAC (True RMS)  | $\pm(3.0\% + 10 \text{ digits})$ |
|            | 600.0 AAC          | $\pm(2.0\% + 5 \text{ digits})$  | 600.0 AAC (True RMS)  | $\pm(3.0\% + 8 \text{ digits})$  |
|            | 1000 AAC           |                                  | 1000 AAC (True RMS)   | $\pm(3.0\% + 5 \text{ digits})$  |
| DC Current | —                  | —                                | 60.00 ADC             | $\pm(2.8\% + 10 \text{ digits})$ |
|            | —                  | —                                | 600.0 ADC             | $\pm(2.8\% + 8 \text{ digits})$  |
|            | —                  | —                                | 1000 ADC              | $\pm(3.0\% + 5 \text{ digits})$  |
| DC Voltage | 600.0 mVDC         | $\pm(0.8\% + 3 \text{ digits})$  | 600.0 mVDC            | $\pm(0.8\% + 3 \text{ digits})$  |
|            | 6.000 VDC          | $\pm(1.5\% + 3 \text{ digits})$  | 6.000 VDC             | $\pm(1.5\% + 3 \text{ digits})$  |
|            | 60.00 VDC          |                                  | 60.00 VDC             |                                  |
|            | 600.0 VDC          |                                  | 600.0 VDC             |                                  |
|            | —                  | —                                | 800 VDC               | $\pm(2.0\% + 3 \text{ digits})$  |
|            | 1000 VDC           | $\pm(2.0\% + 3 \text{ digits})$  | —                     | —                                |
| AC Voltage | —                  | —                                | 600.0 mVAC (True RMS) | $\pm(0.8\% + 20 \text{ digits})$ |
|            | 6.000 VAC          | $\pm(1.5\% + 5 \text{ digits})$  | 6.000 VAC (True RMS)  | $\pm(1.8\% + 5 \text{ digits})$  |
|            | 60.00 VAC          | $\pm(2.0\% + 5 \text{ digits})$  | 60.00 VAC (True RMS)  |                                  |
|            | 600.0 VAC          |                                  | 600.0 VAC (True RMS)  |                                  |
|            | 750 VAC            | $\pm(2.0\% + 5 \text{ digits})$  | 750 VAC (True RMS)    | $\pm(2.5\% + 5 \text{ digits})$  |
| Resistance | 600.0 $\Omega$     | $\pm(1.0\% + 4 \text{ digits})$  | 600.0 $\Omega$        | $\pm(1.0\% + 4 \text{ digits})$  |
|            | 6.000 K $\Omega$   | $\pm(1.5\% + 2 \text{ digits})$  | 6.000 K $\Omega$      | $\pm(1.5\% + 2 \text{ digits})$  |
|            | 60.00 K $\Omega$   |                                  | 60.00 K $\Omega$      |                                  |
|            | 600.0 K $\Omega$   |                                  | 600.0 K $\Omega$      |                                  |
|            | 6.000 M $\Omega$   | $\pm(2.5\% + 3 \text{ digits})$  | 6.000 M $\Omega$      | $\pm(2.5\% + 3 \text{ digits})$  |


**Note:** No autoranging in 600 mV AC voltage range (model 20250-58).

| Function  | Model 20250-57   |  | Model 20250-58   |  |
|---|--|--|--|--|
|   | Range & Resolution   | Accuracy (% of reading)  | Range & Resolution   | Accuracy (% of reading)                                    |
| Capacitance                                       | 40.00 nF   | ±(3.0% reading + 50 digits)  | 40.00 nF   | ±(5.0% reading + 100 digits)                               |
|   | 400.0 nF   | ±(3.5% reading + 10 digits)  | 400.0 nF   | ±(3.0% reading + 5 digits)                                 |
|   | 4.000 µF   |  | 4.000 µF   | ±(3.5% reading + 5 digits)                                 |
|   | 40.00 µF   | —  | 40.00 µF   | ±(5.0% reading + 5 digits)                                 |
|   | —  | —  | 100.0 µF   | ±(5.0% reading + 5 digits)                                 |
|   | 400.0 µF   | ±(5.0% reading + 5 digits)   | —  | —  |
| 4000 µF   | —  |  | —  |  |
| Frequency   | 9.999 Hz   | ±(1.2% reading + 2 digits)<br>Sensitivity:<br>9 to 1000 kHz:<br>10 Vrms min.<br>1000 kHz to 10 MHz:<br>20 Vrms min.<br>@ 20% to 80% duty cycle | 9.999 Hz   | ±(1.2% reading + 2 digits)<br>Sensitivity:<br>10 Vrms min. |
|   | 99.99 Hz   |  | 99.99 Hz   |  |
|   | 999.9 Hz   |  | 999.9 Hz   |  |
|   | 9.999 kHz  |  | 9.999 kHz  |  |
|   | 99.99 kHz  |  | 99.99 kHz  |  |
|   | 999.9 kHz  |  | 999.9 kHz  |  |
| 10 MHz  | 10 MHz   |  |  |  |
| Duty cycle  | 5.0 to 94.9%   | ±(1.2% reading + 2 digits)   | 0.5 to 99.0%   | ±(1.2% reading + 2 digits)                                 |
|   | Pulse width: 100 µs to 100 ms;<br>Frequency: 30 Hz to 15 kHz |  | Pulse width: 100 µs to 100 ms;<br>Frequency: 5.000 Hz to 100.0 kHz |  |
| Temperature, type K (probe accuracy not included) | —  | —  | -20 to 1000°C  | ±(3.0% reading + 5°C)                                      |
|   | —  | —  | -4 to 1832°F   | ±(3.0% reading + 7°F)                                      |



## **Specifications (continued)**

|                               |  |
|-------------------------------|--|
| <b>Clamp size</b>             | Opening 1 <sup>3</sup> / <sub>16</sub> " (30 mm) approximately                                     |
| <b>Diode test</b>             | Test current of 0.3 mA typical;<br>Open circuit voltage 1.5V DC typical                            |
| <b>Continuity check</b>       | Threshold <30 Ω (20250-57), <100 Ω (20250-58), Test current <1 mA                                  |
| <b>Low-battery indication</b> | "  " is displayed |
| <b>Overrange indication</b>   | " OL " is displayed  |
| <b>Measurement rate</b>       | 2 per second, nominal  |
| <b>Input impedance</b>        | 7.8 MΩ (VDC and VAC)   |
| <b>Display</b>                | 6000 counts LCD  |
| <b>AC Current</b>             | 50–60Hz (AAC) (20250-57),<br>50–60Hz (AAC TRMS) (20250-58)   |
| <b>AC Voltage bandwidth</b>   | 50–60Hz (VAC) (20250-57),<br>50–60Hz (VAC TRMS) (20250-58)   |
| <b>Operating temperature</b>  | 14 to 122°F (–10 to 50°C)  |
| <b>Storage temperature</b>    | –14 to 140°F (–30 to 60°C)   |
| <b>Operating humidity</b>     | 90% (0 to 30°C); 75% (30 to 40°C);<br>45% (40 to 50°C)   |





|                           |   |
|---------------------------|---|
| <b>Operating altitude</b> | 9842 ft (3000 meters),<br>Storage 32,808 ft (10,000 meters)   |
| <b>Overvoltage</b>        | Category III 600 V  |
| <b>Battery</b>            | One 9 V battery   |
| <b>Auto power-off</b>     | 30 minutes approximately  |
| <b>Weight</b>             | 7.1 oz (200 g) model 20250-57;<br>10.7 oz (303 g) model 20250-58  |
| <b>Dimensions</b>         | 8 <sup>7</sup> / <sub>8</sub> " x 3 <sup>3</sup> / <sub>16</sub> " x 1 <sup>11</sup> / <sub>16</sub> " (22.6 x 8 x 4.3 cm)  |
| <b>Safety</b>             | For indoor use and in accordance with<br>Overvoltage Category II, Pollution<br>Degree 2. Category II includes local<br>level, appliance, portable equipment,<br>etc., with transient overvoltages less<br>than Overvoltage Cat. III |



## **Maintenance, Recalibration, and Repair**

### **Cleaning and Storage**

- The meter should be cleaned with a damp cloth and mild detergent when necessary. Do not use solvents or abrasives.
- Store the meter in an area with moderate temperature and humidity.

### **Battery Replacement**

1. Remove the one rear Phillips head screw.
2. Open the battery compartment.
3. Replace the old battery with one 9 V battery.
4. Replace the cover and secure the screw.

**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.

**INNOCAL**<sup>®</sup>  
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