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OWON CM210E

OWON CM210E Mini Digital Clamp Meter User Manual

Model: CM210E

1. Introduction

Thank you for choosing the OWON CM210E Mini Digital Clamp Meter. This device is a compact, high-precision instrument designed for measuring AC/DC current, AC/DC voltage, resistance, capacitance, diode, and frequency. It features non-contact voltage (NCV) detection and a Variable Frequency Control (VFC) function for accurate measurements in various environments. Please read this manual thoroughly before use to ensure safe and proper operation.

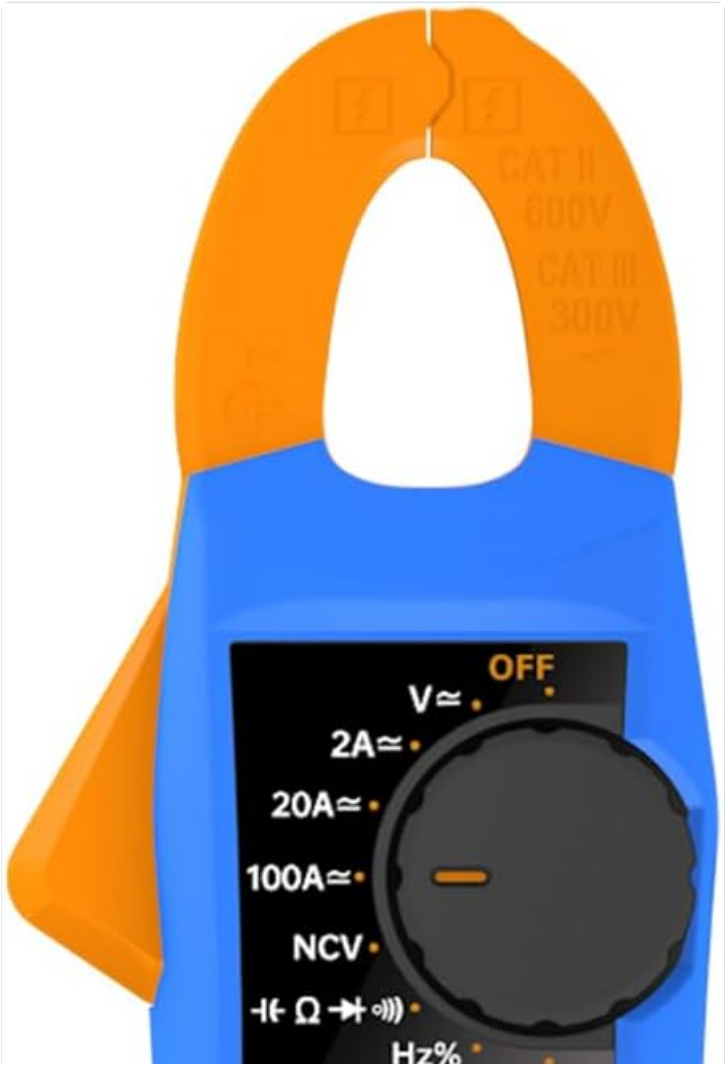




Figure 1.1: The OWON CM210E Mini Digital Clamp Meter, a compact tool for electrical measurements.

2. Safety Information

Always adhere to basic safety precautions when using electrical testing equipment to prevent personal injury or damage to the meter or equipment under test.

- Do not exceed the maximum input values specified for each measurement range.
- Exercise extreme caution when working with voltages above 30V AC RMS, 42V peak, or 60V DC. These voltages pose a shock hazard.
- Before measuring current, ensure the circuit is de-energized and the clamp jaws are properly closed around a single conductor.
- Do not use the meter if it appears damaged or if the insulation is compromised.
- Ensure the battery cover is securely closed before operation.
- Remove test leads from the meter before opening the battery cover.
- Always use the correct function and range for measurements.
- Keep fingers behind the probe barriers when making measurements.

3. Product Overview

The OWON CM210E is a compact and versatile digital clamp meter. Below are its key components and features.

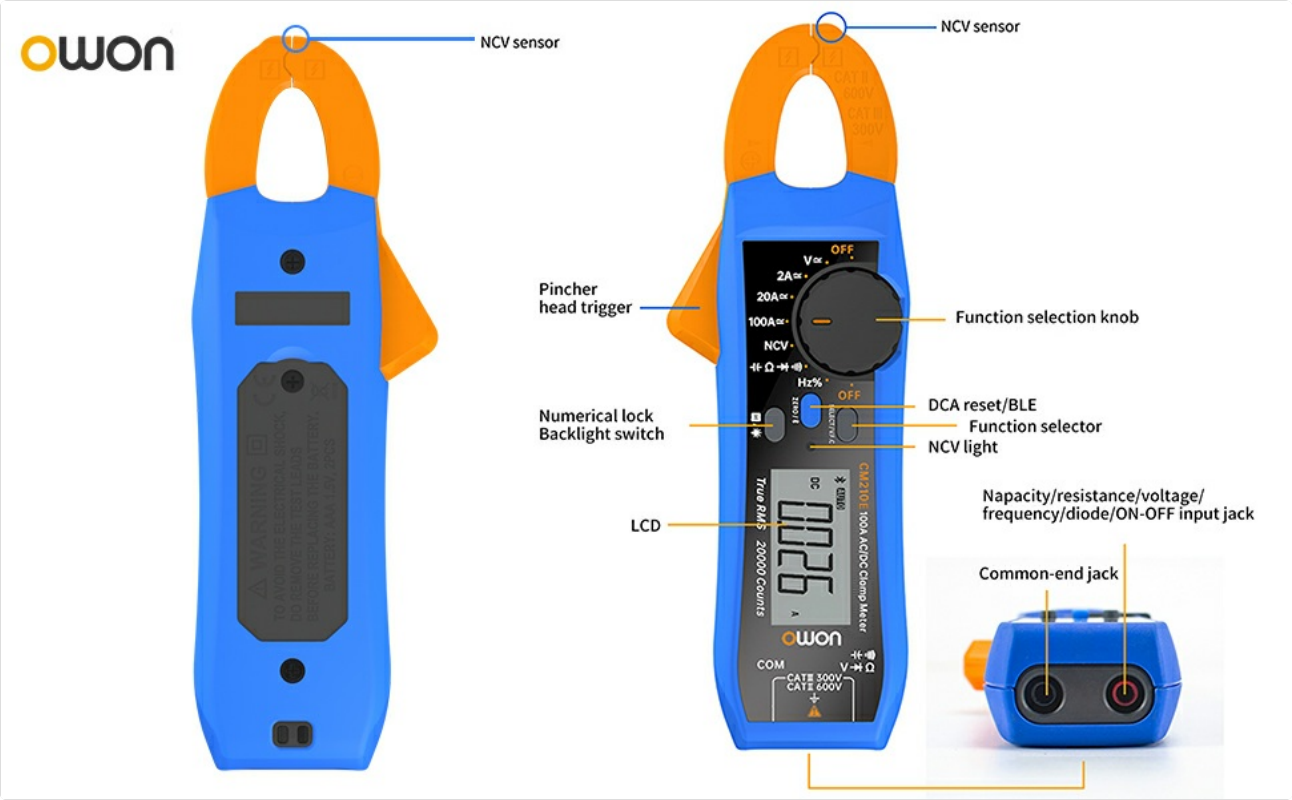


Figure 3.1: Labeled diagram of the OWON CM210E Mini Digital Clamp Meter, showing the NCV sensor, clamp trigger, function selection knob, DCA reset/BLE button, function selector, NCV light, LCD display, backlight switch, input jacks, and common end jack.

Key Features:

- **Multimeter Functionality:** Measures AC/DC current, AC/DC voltage, resistance, capacitance, diode, and frequency.
- **High Resolution Current Measurement:** 100A AC/DC with 1mA resolution for precise small current testing.
- **Non-Contact Voltage (NCV) Test:** Detects AC voltage and electromagnetic fields without direct contact.
- **Variable Frequency Control (VFC):** Reduces measurement impact from high-frequency interference, ensuring stable readings in noisy environments.
- **Compact Design:** Small and portable for easy carrying.
- **True RMS:** Provides accurate measurements for both sinusoidal and non-sinusoidal waveforms.
- **Data Hold:** Freezes the displayed measurement for easy reading.
- **Backlight:** Improves visibility of the LCD display in low-light conditions.

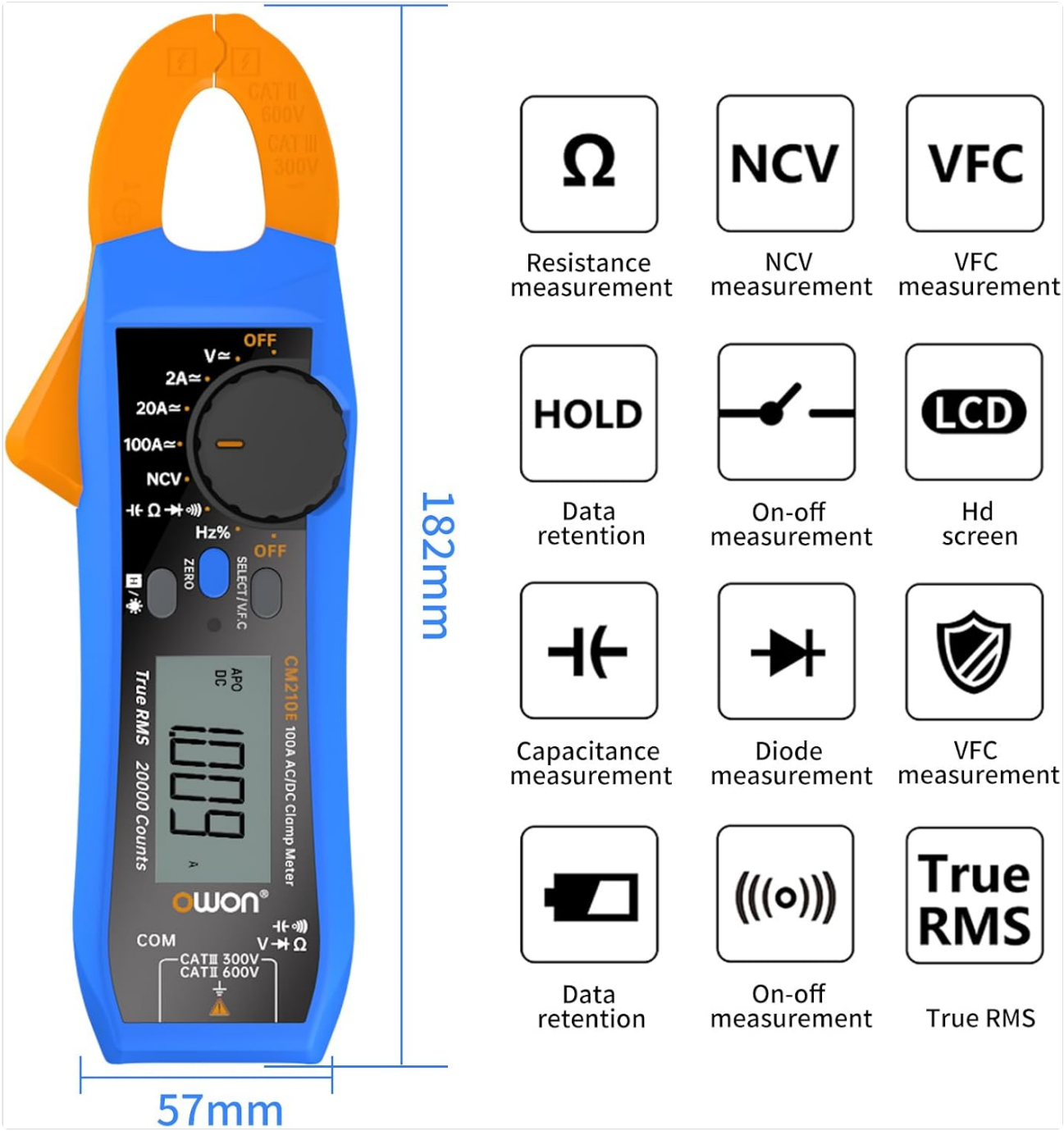


Figure 3.2: Visual representation of the OWON CM210E's features, including Resistance measurement, NCV measurement, VFC measurement, Data retention, On-off measurement (Continuity), HD screen, Capacitance measurement, Diode measurement, and True RMS.

4. Setup

4.1. Battery Installation

1. Ensure the meter is turned OFF.
2. Locate the battery compartment on the back of the meter.
3. Use a screwdriver to open the battery cover.
4. Insert two AAA batteries, observing the correct polarity (+/-).
5. Replace the battery cover and secure it with the screw.

4.2. Connecting Test Leads

For voltage, resistance, capacitance, and diode measurements, connect the test leads to the input jacks located

at the bottom of the meter:

- Insert the black test lead into the "COM" (Common) input jack.
- Insert the red test lead into the "VΩHz" (Voltage, Resistance, Frequency, Capacitance, Diode) input jack.

5. Operating Instructions

Turn the function selection knob to the desired measurement mode. For functions with multiple options (e.g., Resistance, Capacitance, Diode), use the "SELECT/VFC" button to cycle through them.

5.1. AC/DC Current Measurement (Clamp)

1. Turn the function knob to the "2A~", "20A~", or "100A~" range for AC current, or "100A=" for DC current.
2. Press the clamp trigger to open the jaws.
3. Place the jaws around a **single conductor** (not a power cord with multiple wires).
4. Release the trigger to close the jaws securely around the conductor.
5. Read the current value on the LCD display.
6. For DC current, press the "ZERO" button to zero the display before measurement if needed.



Figure 5.1: High precision induction probe for accurate small current detection.



Figure 5.2: Performing frequency measurement using the clamp function.

5.2. AC/DC Voltage Measurement

1. Connect the test leads as described in Section 4.2.
2. Turn the function knob to the "V~" (AC Voltage) or "V=" (DC Voltage) range.
3. Connect the test probes in parallel to the circuit or component you wish to measure.
4. Read the voltage value on the LCD display.

5.3. Resistance Measurement

1. Connect the test leads as described in Section 4.2.
2. Turn the function knob to the "Ω" (Resistance) range.

3. Ensure the circuit or component under test is de-energized.
4. Connect the test probes across the component.
5. Read the resistance value on the LCD display.



Figure 5.3: Performing a resistance measurement on a circuit board using the test leads.

5.4. Capacitance Measurement

1. Connect the test leads as described in Section 4.2.
2. Turn the function knob to the "Capacitance" range (often shared with resistance/diode, use SELECT/VFC button to choose).
3. Ensure the capacitor is fully discharged before testing.
4. Connect the test probes across the capacitor terminals.
5. Read the capacitance value on the LCD display.



Figure 5.4: Measuring capacitance of a component using the test leads.

5.5. Diode Test

1. Connect the test leads as described in Section 4.2.
2. Turn the function knob to the "Diode" range (often shared with resistance/capacitance, use SELECT/VFC button to choose).
3. Ensure the diode is disconnected from the circuit.
4. Connect the red probe to the anode and the black probe to the cathode. The display will show the forward voltage drop.
5. Reverse the probes. The display should show "OL" (Open Loop) for a good diode.



Figure 5.5: Testing a diode using the red and black test leads.

5.6. Non-Contact Voltage (NCV) Detection

1. Turn the function knob to the "NCV" range.
2. Move the NCV sensor (located at the top of the clamp jaws) close to the conductor or electrical outlet.
3. The meter will emit an audible beep and the NCV light will flash, indicating the presence of AC voltage. The intensity of the beeps and flashes may vary with voltage strength.



Figure 5.6: Demonstrating non-contact voltage detection near an electrical outlet.

5.7. VFC Function

The VFC (Variable Frequency Control) function is designed to accurately measure AC voltage and current in circuits with variable frequency drives (VFDs) or other noisy environments. When activated, it filters out high-frequency interference that can distort readings.

- To activate VFC, select an AC Voltage or AC Current range, then press the "SELECT/VFC" button. The VFC indicator will appear on the display.
- Perform your measurement as usual.
- Press "SELECT/VFC" again to deactivate VFC.

5.8. Data Hold

To freeze the current reading on the display, press the "HOLD" button. Press it again to release the hold and resume live readings.

5.9. Backlight

Press the backlight switch button to turn the LCD backlight ON or OFF for improved visibility in dark areas.

6. Maintenance

6.1. Cleaning

Wipe the meter with a damp cloth and mild detergent. Do not use abrasives or solvents. Keep the input terminals free of dirt and moisture.

6.2. Battery Replacement

When the battery indicator appears on the display, replace the batteries as described in Section 4.1. Prompt replacement ensures accurate readings.

6.3. Storage

If the meter is not used for an extended period, remove the batteries to prevent leakage. Store the meter in a cool, dry place, away from direct sunlight and extreme temperatures.

7. Troubleshooting

Problem	Possible Cause	Solution
Meter does not power on.	Dead or incorrectly installed batteries.	Check battery polarity; replace batteries.
"OL" displayed during measurement.	Overload or open circuit.	Select a higher range, check circuit continuity, or ensure probes are making good contact.
Inaccurate readings.	Low battery, incorrect range, external interference.	Replace batteries, select appropriate range, move away from strong electromagnetic fields, use VFC if applicable.
NCV not detecting voltage.	Voltage too low, sensor not close enough, or meter malfunction.	Ensure voltage is present, bring sensor closer, or test with known live circuit.

8. Specifications

Parameter	Value
Model	CM210E
Brand	OWON
AC/DC Current Range	Up to 100A (1mA resolution)
Measurement Functions	AC/DC Current, AC/DC Voltage, Resistance, Capacitance, Diode, Frequency, NCV, VFC
Display Counts	20000 Counts (True RMS)
Power Source	2 x AAA Batteries (included)
Dimensions (approx.)	182mm (Height) x 57mm (Width) x 32mm (Thickness)
Weight (approx.)	430 grams (including batteries)
Included Components	Clamp Meter, Test Leads, User Manual



Figure 8.1: Dimensions of the OWON CM210E Mini Digital Clamp Meter, showing a height of 182mm and width of 57mm.



Figure 8.2: Image showing the OWON CM210E Clamp Meter, a carrying case, test leads, a quick guide, and a screwdriver, representing the included components.

9. Warranty and Support

Specific warranty information is not provided in the product details. For warranty claims or technical support, please contact your retailer or the official OWON customer service. Keep your purchase receipt as proof of purchase.

For further assistance, you may visit the OWON official website.

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