

# Sonel CMP-200F Multimeter True RMS User Manual

Home » Sonel » Sonel CMP-200F Multimeter True RMS User Manual



#### **Contents**

- 1 CMP-200F Multimeter True RMS
- 2 Introduction
- 3 Safety
- 4 Preparing the meter for operation
- **5 Functional description**
- **6 Measurements**
- 7 Special features
- 8 Replacing the battery
- 9 Maintenance and care
- 10 Storage
- 11 Dismantling and disposal
- 12 Technical data
- 13 Service
- 14 Documents / Resources
  - 14.1 References

#### **CMP-200F Multimeter True RMS**

CMP-200F True RMS multimeter is intended for measuring direct and alternating voltage, alternating current, resistance, capacitance, and for testing diodes and circuit continuity.

The most important features of CMP-200F include:

- · non-contact current measurement
- non-contact voltage detector,
- · automatic detection of AC and DC voltage
- · automatic range setting,
- low-impedance voltage measurement LowZ,
- MAX/MIN function for displaying maximum, minimum and aver-age values,
- HOLD function used to maintain the read-pot on the meter screen,
- built-in flashlight for lighting the measurement location,
- sound signal for circuit continuity.
- AUTO-OFF function,
- 4-digit display (read-out 6000).

#### Introduction

Thank you for purchasing Sonel multimeter. CMP-200F meter is a modern, easy and safe measuring device. Please acquaint yourself with this manual in order to avoid measuring errors and prevent possible problems in operation of the meter.

This manual contains three types of warnings. They are presented as a framed text describing the possible risks for the user and the device. Texts WARNING describe situations, which may endanger user's life or health, when instructions are not followed. Texts CAUTION! begin a description of a situation, which may result in device damage, when instructions are not followed. Indication of possible problems is preceded by symbol.



- CMP-200F meter is designed to measure the current and AC/DC voltage, frequency, resistance, capacitance, as well as to test the circuit continuity and diodes. Any application that differs from those specified in the present manual may result in a damage to the device and constitute a source of danger for the user.
- CMP-200F meter must be operated only by appropriately qualified personnel with relevant certificates authorising the personnel to perform works on electric systems. Unauthorized use of the meter may result in its damage and may be a source of serious hazard to the user.
- Before operating the device, read thoroughly this manual and observe the safety regulations and guidelines
  provided by the producer. Failure to follow instructions specified in this manual may result in a damage to the
  device and be a source of serious hazard to the user.

#### Safety

#### 2.1 General rules

In order to provide conditions for correct operation and the correctness of the obtained results, the following recommendations must be observed:

- · before using the meter read carefully this manual,
- the meter should be operated only by qualified persons that have passed health and safety training,
- be very careful when measuring voltages exceeding (as per IEC 61010-1:2010/AMD1:2016):

Normal locations	Wet locations
60 V DC	35 V DC
30 V AC RMS	16 V RMS
42.4 V AC of peak value	22.6 V AC of peak value

as they generate a potential risk of electric shock,

- do not exceed the maximum limits of the input signal,
- during the voltage measurements do not switch the device in the current or resistance measuring mode and vice versa,
- · when changing ranges, always disconnect the test leads from the tested circuit,
- hold the measuring probes by the spot provided, restricted by a special barrier to avoid accidental contact with exposed metal parts,
- If during the measurement symbol OL appears on the screen, it indicates that the measured value exceeds the
  measurement range,
- It is unacceptable to operate:
  - ⇒ a damaged meter which is completely or partially out of or-der,
  - ⇒ a device with damaged insulation of test leads,
  - ⇒ a meter stored for an excessive period of time in disadvan-tageous conditions (e.g. excessive humidity).
- · repairs may be carried out only by an authorised service point.



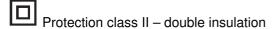
- · Never start the measurements if you have wet or damp hands.
- Do not perform measurements in explosive atmosphere (e.g. in the presence of flammable gases, vapours, dusts, etc.). Using the meter in such conditions may result in sparking and cause an explosion.

The limit values of the input signal		
Function	The maximum input value	
200 A AC	200 A AC	
V DC, V AC	1000 V DC/AC RMS	
V DC, V AC (Low Z)	600 V DC/AC RMS	
Resistance, continuity, diode test, capacitance	300 V DC/AC RMS	

#### 2.2 Safety symbols

This symbol located near another symbol or terminal, indicates that the user should read the further information contained in the manual.

This symbol located near the terminal, indicates that in normal use there is a possibility of dangerous voltages.



Terminals with this marking cannot be connected to a circuit where the voltage to ground exceeds the maximum safe voltage of the device.

#### Preparing the meter for operation

After purchasing the meter, check whether the content of the package is complete.

Before performing the measurement:

- make sure that the battery level is sufficient for measurements,
- · check whether the meter casing and insulation of the test leads are not damaged,
- to ensure consistent measurement results it is recommended to connect black lead to COM terminal and red lead to the second terminal,
- when the meter is not in use, set the function switch in OFF position.

The device has the AUTO-OFF function triggered after approx. 15 minutes of user inactivity. To turn the meter on again, set the function switch to OFF position and then set it at the desired function.



Connecting wrong or damaged leads may cause electric shock.

• The meter must not be connected to the voltage source when it is set to current or resistance measurement or to diode test. Failure to observe this precaution may damage the meter!

When using the meter, be sure to:

- · discharge capacitors in the tested power sources,
- disconnect the power supply when measuring the resistance and diode tests,
- turn off the meter and disconnect test leads before removing the back cover to replace the battery.



#### WARNING

Do not use the meter if the cover of battery compartment is removed.

It is possible that in certain low ranges of AC or DC volt- age, when the meter is not connected to the leads, the screen will show random and variable readings. This is a normal phenomenon, which results from the input sensitivity with high input resistance. When connected to a circuit, the read-out will stabilize and the meter will provide the correct value.

## **Functional description**

#### 4.1 Measuring terminals and functions



- 1. Non-contact voltage detector
- 2. Fork clamp
- 3. Indicator light of the non-contact voltage detector
- 4. LCD display
- 5. HOLD button

- Freezing the measurement results on the display (press briefly)
- Flashlight mode (press and hold)

#### 6. Function buttons

- MODE button
- o Changing the measurement mode in functions: resistance / diode test / continuity / capacitance / LowZ AC / LowZ DC (press briefly)
- o Backlight (press and hold)
- MAX/MIN button displaying the highest / lowest value from those currently recorded
- o To enable the function press briefly
- o Selection of maximum or minimum value press briefly
- o To disable the function press and hold for approx. 1 sec

### 7. COM measuring terminal

Measuring input, common for all measuring functions excluding current.

# 8. Measurement terminal VΩ → •))) CAP

Measuring input for measurements other than current measurement.

#### 9. Rotary switch

Function selection:

- $\Omega^{\frac{1}{2}}$  OAP resistance measurement, diode test, continuity, capacitance measurement
- ~ 200A measurement of alternating current, up to 200 A
- V = Auto measurement of direct and alternating voltage
- OFF the meter is switched off
- V = LowZ low-impedance voltage measurement

#### 10. Flashlight

#### 4.2 Display



V	Voltage measurement
Α	Current measurement
~	Alternating signal
===	Constant signal
_	Negative read-out value
Ω	Measurement of resistance
•1)))	Continuity test
→	Diode test
F	Measurement of capacitance
n / μ / m / k / M	The prefix of multiple measure ment unit
OL	Exceeded measurement range
•	Auto-off mode
	Low battery
AUTO	Automatic range setting
Н	HOLD function activated
LoZ	Low-impedance voltage meas-urement
MAX / MIN	Maximum / Minimum value

### 4.3 Leads

The manufacturer guarantees the correctness of read-outs only when original test leads are used.



# WARNING

Connecting wrong leads may cause electric shock or measurement errors.



- The probes are equipped with additional removable tip guards.
- The probes must be stored in a designated area.

#### Measurements

The content of this chapter should be thoroughly read and understood since it describes methods of measurements and basic principles of interpreting measurement results.

#### 5.1 Current measurement



# **MARNING:**

Disconnect the test leads before measuring current using fork clamp.

To perform the current measurement:

- set the rotary switch at ~ 200A,
- set the measuring fork clamp so that there is a single cable within it at the height of the arrows,
- read the measurement result on the display.



#### 5.2 Non-contact voltage detector



- The detector is designed to detect the presence of a voltage, not for determining its absence.
- Electric shock hazard. Before using the tester, check if its operational by testing it on a known AC voltage (i.e. next applicable socket with live voltages).

To activate the detector:

- set the rotary switch at any position,
- touch the tip of the detector to the tested object.

If the AC voltage is present, the indicator light will glow red.



- The wires in the extension cords are often twisted. For best results, move the tip of the detector along the wire to locate the live line.
- The indicator has a high sensitivity. It can be randomly actuated by static electricity or other energy sources. This is normal.
- The type and thickness of the insulation, distance from the power source, shielded cables and other factors may affect the operation of the tester. If you are unsure about the test result, check the presence of voltage in a

different way.

#### 5.3 AC/DC voltage measurement



# WARNING

- Electric shock hazard. The ends of measuring probes, due to their length, may not reach the live parts inside some network connections of lowvoltage electrical equipment, because the contacts are arranged inside the sockets. In such a case, the read-out will be 0 V with the simultaneous presence of voltage in the socket.
- Before acknowledging the absence of voltage in the socket make sure that the ends of the of the probe touch the metal contacts inside the socket.



#### CAUTION!

Do not measure the voltage when an electric motor located within the circuit is being switched on or off. Resulting voltage spikes may damage the meter.

To perform AC or DC voltage measurement:

- set the rotary switch at V = Auto.
- connect black test lead to COM terminal, and red test lead to VΩ
   CAP terminal, contact the tips of test probes to the points of measurement,
- read the measurement result on the display.

#### 5.4 Resistance measurement



#### WARNING

Do not perform measurements on the circuit under the voltage. Before the measurement disconnect the power and discharge capacitors.

To perform measurement of resistance:

- set the rotary switch at  $\Omega \xrightarrow{} \bullet )))$  CAP.
- connect black test lead to COM terminal, and red test lead to VΩ → (CAP terminal)
- contact the tips of test probes to the points of measurement; the best solution is to disconnect one side of the tested element, to prevent the remaining part of the circuit interfere with the read-out of the resistance value,
- read the measurement result on the display.

#### 5.5 Circuit continuity test



# 🔼 WARNING

Do not perform measurements on the circuit under the voltage. Before the measurement disconnect the power and discharge capacitors.

To perform the continuity test:

set the rotary switch at Ω → ○))) CAP.

- connect black test lead to COM terminal, and red test lead to VΩ → (CAP terminal)
- press MODE button to display
   )))) on the screen.
- contact the tips of test probes to the points of measurement,
- read the measurement result on the display; the beep will be activated when resistance values are below approx. 50  $\Omega$ .

#### 5.6 Diode test



# **MARNING**

Do not perform measurements on the circuit under the voltage. Before the measurement disconnect the power and discharge capacitors. Do not test the diode under voltage.

To perform the diode test:

- set the rotary switch at  $\Omega \xrightarrow{}$  CAP.
- connect black test lead to COM terminal, and red test lead to VΩ → (CAP terminal)
- press MODE button to display on the screen,
- contact the tips of test probes to the diode. The red test probe should contact the anode and the black should contact cathode,
- read the test result on the display the forward voltage is displayed.
  - ⇒ For a typical silicon rectifier diode, it is approx. 0.7 V, and for a germanium diode it is approx. 0.3 V
  - ⇒ For LEDs with a low power, typical voltage value is in the range of 1.2...5.0 V depending on the colour.
  - ⇒ If the diode is polarized in the reverse direction, or there is a break in the circuit, the display will show OL.
  - ⇒ When the diode is shorted, the meter will show a value near 0 V,
- after completing the measurements, remove test leads from the terminals of the meter.

#### 5.7 Capacitance measurement



#### WARNING

Risk of electric shock. Disconnect the power supply from the tested capacitor and discharge all capacitors before any starting capacity measurements.

To perform the measurement:

- set the rotary switch at Ω<sup>→(•)))</sup> CAP.
- connect black test lead to COM terminal, and red test lead to VΩ → (CAP terminal)
- press MODE button to display F on the screen,
- · contact the probe tips to the tested capacitor,
- read the measurement result on the display.

#### 5.8 Low Z measurement (elimination of interference and induced voltages)

Measurement function in 'Low Z' mode eliminates the influence of interference voltages or induced voltages, making the measurement more accurate and reliable. These voltages may occur due to capacitive coupling between the live conductors and the unused conductors located in the vicinity.

To perform the measurement:

- set the rotary switch at V \( \overline{\pi} \) Low Z,
- press MODE button to display the following symbol:
  - $\Rightarrow$  ~, if an alternating voltage is to be measured,
  - $\Rightarrow$  = , if a constant voltage is to be measured,
- connect black test lead to COM terminal, and red test lead to VΩ
- contact probe blades to measurement points (for DC circuits: connect red probe to the positive pole),
- · read the measurement result on the display.

#### Special features

# 6.1 Button HOLD ■ 6.1.1 HOLD function

This function is used to 'freeze' the measurement result on the display. To do this, briefly press HOLD button. When the function is enabled, the display shows symbol HOLD.

To return to the normal operation mode of the device, press HOLD •• button again.

#### 6.1.2 Flashlight

Press and hold HOLD •• button for 1 second to turn on/off the flashlight mode.

# 6.2 Button MODE

#### 6.2.1 Changing the measurement mode

Press briefly MODE \*\* button to switch between the available measurement modes.

#### 6.2.2 Backlight

Pressing and holding MODE button for 1 second will turn on/off the backlight of the rotary switch and functions

#### 6.3 Button MAX/MIN

- To enable the mode, press MAX/MIN.
- Press MAX/MIN button to switch between the extreme values of the on-going measurement.
  - ⇒ Symbol MAX symbol the meter displays the highest value out of existing measurement readings.
  - ⇒ MIN symbol the meter displays the lowest value out of existing measurement readings.
- To disable the function, press and hold MAX/MIN button for approx. 1 second or turn the rotary switch.



- If the reading is outside the measurement range, symbol OL is displayed.
- The button is not active for voltage and capacitance measurement, as well as continuity and diode test.

#### 6.4 Auto-Off

The meter automatically shuts off after 15 minutes of user inactivity. Symbol  $\odot$  in the upper left corner of the display indicates activated function.

Auto-off function may be temporarily disabled. For this purpose:

- set the rotary switch at OFF position,
- press and hold MODE button,
- set the rotary switch at the desired measuring function,
- wait until the meter reaches the measurement readiness,
- release MODE button. When the automatic shutdown is deactivated, the display does not show icon





Each pass of the rotary switch through "OFF" position with non-pressed MODE button, will activate again the Auto-Off function.

#### Replacing the battery



#### WARNING

To avoid electric shock, do not use the meter if the battery compartment cover is not in place or is not properly fastened.

The meter is powered by 2 AA 1.5 V batteries. It is recommended to use alkaline batteries.

To replace the battery:

- set the rotational function selector at OFF,
- remove test leads from the terminals of the meter.
- unscrew 1 screw fixing the compartment cover,
- · remove the cover.
- · remove the batteries and insert new ones, observing the polarity,
- put on the cover and tighten the fixing screw.



- While performing the measurements with the battery symbol displayed, the user must be aware of additional measurement uncertainties or unstable operation of the device.
- If the meter does not work properly, check the batteries in order to ensure that they are in proper condition and properly installed in the device.

#### Maintenance and care

The digital multimeter has been designed for many years of reliable use, provided that the following recommendations are observed for its maintenance and care:

- 1. THE METER MUST BE DRY. Wipe the dampened meter.
- 2. THE METER MUST BE USED AND STORED IN NORMAL TEMPERATURES. Extreme temperatures may shorten the life of electronic components and distort or melt plastic parts.

- 3. THE METER MUST BE HANDLED CAREFULLY AND GENTLY. Dropping the meter may damage its electronic elements or the housing.
- 4. THE METER MUST BE KEPT CLEAN. From time to time wipe the housing with a damp cloth. DO NOT use chemicals, solvents or detergents.
- 5. USE ONLY NEW BATTERIES OF RECOMMENDED SIZE AND TYPE. Remove the old or discharged batteries from the meter to avoid leakage and damage.
- 6. IF THE METER IS TO BE STORED FOR LONGER THAN 60 DAYS, remove the batteries and keep them separately.



The electronic system of the meter does not require maintenance.

#### **Storage**

During the storage of the device, the following recommendations must be observed:

- · disconnect the test leads from the meter,
- make sure that the meter and accessories are dry,
- when the device is to be stored for longer time, remove the battery.

#### Dismantling and disposal

Worn-out electric and electronic equipment should be gathered selectively, i.e. it must not be placed with waste of another kind.

Worn-out electronic equipment should be sent to a collection point in accordance with the law of waste electrical and electronic equipment.

Before the equipment is sent to a collection point, do not dismantle any elements.

Observe local regulations concerning disposal of packages, waste batteries and accumulators.

#### **Technical data**

#### 11.1 Basic data

⇒ "m.v." means a standard measured value.

#### True RMS measurement for AC current

Range	Resolution	Accuracy
200.0 A	0.1 A	± (3% m.v. + 5 digits)

- All AC current ranges are specified from 5% to 100% of range
- Frequency range: 50 Hz...60 Hz

#### True RMS voltage measurement

Range	Resolution	Accuracy
6.000 V	0.001 V	± (1.2% m.v. + 5 digits)
60.00 V	0.01 V	± (1.2% m.v. + 2 digits)
600.0 V	0.1 V	1 ± (1.2 /6 111.V. + 2 digits)
1000 V	1 V	± (1.5% m.v. + 2 digits)

- All AC voltage ranges are specified from 5% to 100% of range
- AC voltage measured starting from 1 V
- Input impedance: ≥10 MΩ
- Frequency range: 50 Hz...1000 Hz (sine wave), 50/60 Hz (all waves)
- Overload protection: 1000 V DC/AC RMS

# DC voltage measurement

Range	Resolution	Accuracy
6.000 V	0.001 V	± (0.9% m.v. + 5 digits)
60.00 V	0.01 V	± (1.0% m.v. + 2 digits)
600.0 V	0.1 V	± (1.0 % III.v. + 2 digits)
1000 V	1 V	± (1.2% m.v. + 2 digits)

• Input impedance: ≥10 MΩ

• Overload protection: 1000 V DC/AC RMS

#### Low Z measurement

Range	Resolution	Accuracy
6.000 V	0.001 V	
60.00 V	0.01 V	± (3.0% m.v. + 40 digits)
600.0 V	0.1 V	

- All AC voltage ranges are specified from 5% to 100% of range
- Input impedance:  $3 \text{ k}\Omega$
- Frequency range: 50 Hz...1000 Hz (sine wave), 50/60 Hz (all waves)
- Overload protection: 600 V DC/AC RMS

#### **Resistance measurement**

Range	Resolution	Accuracy
600.0 Ω	0.1 Ω	± (1.0% m.v. + 4 digits)
6.000 kΩ	0.001 kΩ	
60.00 kΩ	0.01 kΩ	± (1.5% m.v. + 4 digits)
600.0 kΩ	0.1 kΩ	
6.000 ΜΩ	0.001 ΜΩ	± (2.5% m.v. + 4 digits)
60.00 ΜΩ	0.01 ΜΩ	± (3.5% m.v. + 4 digits)

• Overload protection: 300 V DC/AC RMS

## Capacitance measurement

Range	Resolution	Accuracy
60.00 nF	0.01 nF	
600.0 nF	0.1 nF	± (3.0% m.v. + 5 digits)
6.000 μF	0.001 μF	± (3.0 % III.V. + 3 digits)
60.00 μF	0.01 μF	
600.0 μF	0.1 μF	± (3.5% m.v. + 10 digits)
4000 μF	1 μF	± (5.0% m.v. + 10 digits)

- Accuracy unspecified for capacitance of <6 nF
- All capacitance ranges are specified from 10% to 100% of range
- Overload protection: 300 V DC/AC RMS

# 11.2 Operating data

a) measurement category according to IEC 61010-1	CAT IV 600 V (III 1000 V)
b) type of insulation	double, Class II
c) housing type	double-composite
d) degree of housing protection acc. to EN 60529	IP40

e) pollution degree	2
f) opening of measurement clamp	
g) power supply of the meter	
h) diode test	
i) continuity test	•
	<b>G</b>
j) indication for range exceeding	<del>-</del>
k) low battery indication	·
I) measurement rate	•
m) crest factor	•
n) range of the non-contact voltage detector	
o) input impedance	
p) input impedance for Low Z	
g) compatibility with HVDC adapters	• •
r) AC read-out	•
s) AC bandwidth	mac rime (rine and rine)
sine waves	501000 Hz
all waves	
t) display	
u) dimensions	
v) meter weight	
w) meter weight (without batteries)	9
x) operating temperature	•
y) operating humidity	
z) storage temperature	
aa) storage humidity	
bb) drop test	
cc) maximum operating altitude	
dd) Auto-Off function	
ee) compliance with the requirements of the following standards	• •
EN 61010-2-32, E	
ff) quality standard	•
··/ -	

#### **Service**

The provider of guarantee and post-guarantee services is:

## SONEL S.A.

Wokulskiego 11 58-100 Świdnica Poland

tel. +48 74 884 10 53 (Customer Service) e-mail: **customerservice@sonel.com** 

web page: www.sonel.com



Service repairs must be performed only by the manufacturer.

## SONEL S.A.

Wokulskiego 11 58-100 Świdnica Poland

#### **Customer Service**

tel. +48 74 884 10 53

e-mail (GLOBAL): <u>customerservice@sonel.com</u> e-mail (PL): <u>bok@sonel.pl</u>

www.sonel.com

#### **Documents / Resources**



<u>Sonel CMP-200F Multimeter True RMS</u> [pdf] User Manual CMP-200F Multimeter True RMS, CMP-200F, Multimeter True RMS, RMS

#### References

- Sonel.com
- Sonel.com/
- <a>Sonel.pl</a>
- Sonel.pl/
- User Manual

#### Manuals+, Privacy Policy

This website is an independent publication and is neither affiliated with nor endorsed by any of the trademark owners. The "Bluetooth®" word mark and logos are registered trademarks owned by Bluetooth SIG, Inc. The "Wi-Fi®" word mark and logos are registered trademarks owned by the Wi-Fi Alliance. Any use of these marks on this website does not imply any affiliation with or endorsement.