



# **OPERATING MANUAL**

**AUTORANGING MULTIMETER**

**CMM-10**



Version 1.7

Multimeter CMM-10 has been designed for the purpose of measurements of AC/DC voltage, AC/DC current, resistance, capacitance, frequency, duty cycle, temperature and also for testing diodes and continuity.

The most important features of CMM-10 are:

- automatic or manual regulation of the measurement range,
- **DATA HOLD** function, which facilitates readings of measurements in the case of insufficient lighting or in inaccessible places,
- **REL** function, which allows you to make measurements relative to a stored reference value,
- circuit continuity sound signalling,
- the function of automatic switching of the meter into the standby mode in order to prolong the durability of batteries,
- 3 7/8 digits display (5000 counts).

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# 1 Introduction

The CMM-10 meter is a modern, high-quality measuring device, which is easy and safe to use. Please acquaint yourself with the present manual in order to avoid measuring errors and prevent possible problems related to operation of the meter.

In the present manual we apply three kinds of warnings. These are texts in frames, which describe possible dangers both for the user and the meter itself. The messages starting from the word '**WARNING:**' describe situations which imply a risk for life or health should the recommendations presented in the present manual not be observed. The word '**CAUTION!**' introduces a description of a situation where non-observance of the recommendations presented in the present manual may imply damage for the meter. Indications of possible problems are preceded by the word '**Note:**'.

**WARNING:**

The purpose of the CMM-10 meter is to realise measurements of AC/DC voltage, AC/DC current, resistance, capacitance, frequency, duty cycle, diode test, continuity and temperature. Using the meter in a manner which does not comply with the recommendations specified in the present manual may lead to its damage and constitutes a source of a serious risk for the user.

**WARNING:**

The CMM-10 meter may be operated solely by qualified and properly authorised personnel for work at electric installations. Using the meter by unauthorised personnel may lead to its damage and constitutes a source of a serious risk for the user.

### **WARNING:**

**Before using the instrument acquaint yourself with the present manual and observe the safety regulations and recommendations specified by the manufacturer.**

## **2 Safety**

In order to guarantee proper operation and correctness of the obtained results it is necessary to observe the following recommendations:

- Before commencing operation of the meter please acquaint yourself thoroughly with the present manual,
- The instrument should be operated solely by properly qualified personnel, who also must be trained regarding the industrial safety regulations,
- Use great care when making measurements if the voltages are greater than 30VAC rms or 60VDC. These voltages are considered a shock hazard,
- Do not exceed the maximum allowable input range of any function,
- Never ground yourself when taking electrical measurements. Do not touch exposed metal pipes, outlets, fixtures, etc., which might be at ground potential. Keep your body isolated from ground by using dry clothing, rubber shoes, rubber mats, or any approved insulating material,
- Turn off power to the circuit under test before cutting, unsoldering, or breaking the circuit. Small amounts of current can be dangerous,
- When using the probes, keep your fingers behind the finger guards on the probes,
- If "OL" appears in the display during a measurement, the value exceeds the range you have selected. Change to a higher range,
- It is prohibited to operated the meter:
  - ⇒ If it is damaged and completely or partially out of order,
  - ⇒ If the insulation of the test leads has been damaged,

- ⇒ If it has been stored for an excessive period of time in inadequate conditions (e.g. if it is humid),
- Repairs must be realised solely by an authorised service workshop.

**WARNING:**

**Do not realise measurements in environments in which there are inflammable gases. Otherwise operation of the meter under such conditions may cause sparking and explosion.**

<b>CAUTION!</b>	
<b>Input Limits</b>	
<b>Function</b>	<b>Maximum Input</b>
V DC or V AC	600VDC/AC rms
mA AC/DC	500mA 250V fast acting fuse
A AC/DC	10A 250V fast acting fuse
Frequency, resistance, capacitance, duty cycle, diode test, continuity	250VDC/AC rms
Temperature	250VDC/AC rms

### 3 Preparation of the meter for operation

Having purchased the meter examine completeness of the contents of the package.

Before measurements commence, it is necessary to realise the following actions:

- Make sure the conditions of the batteries or accumulators permit to realise measurements,
- Make sure the casing of the meter and the insulation of the test leads are not damaged,

- Insert the black test lead into the negative **COM** terminal and the red test lead into the other positive terminal,
- ALWAYS turn the function switch to the **OFF** position when the meter is not in use. This meter has Auto OFF that automatically shuts the meter OFF if 30 minutes elapse between uses.

**WARNING:**

**Connection of inappropriate or damaged test leads constitutes a risk of an electric shock with a dangerous voltage.**

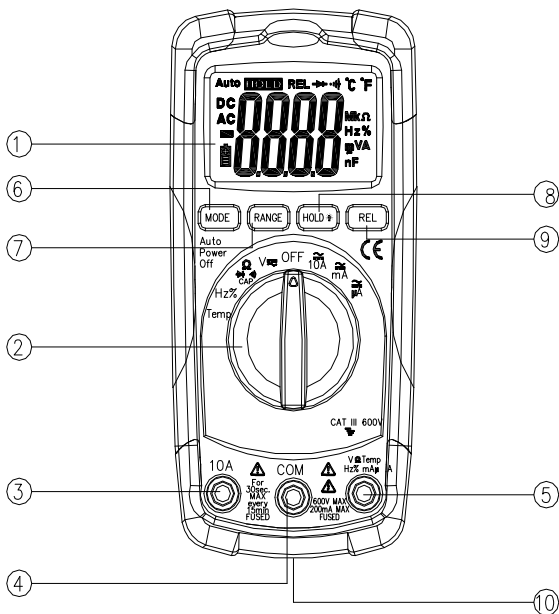
**Note:**

**On some low AC and DC voltage ranges, with the test leads not connected to a device, the display may show a random, changing reading. This is normal and is caused by the high-input sensitivity. The reading will stabilize and give a proper measurement when connected to a circuit.**



## 4 Functional description

### 4.1 Measurement sockets and elements of selection of the measurement function



CMM-10

### 4.1.1 Sockets


- 3 measurement socket 10A**  
Measurement socket for the purpose of measurements of direct current up to 10A.
- 4 measurement socket COM**  
Measurement socket common for all the measurement functions.
- 5 measurement socket VΩTEMPHz%mAμA**  
Measurement socket for all the measurement functions except of 10A current measurements.

### 4.1.2 Elements of selection of the measurement function

#### 1 5000 count Liquid Crystal Display with symbolic signs

#### 2 Rotational selector

Selection of function:

- **Temp** – Celsius or Fahrenheit temperature measurement
- **Hz%** – frequency and duty cycle measurement
- **Ω →  CAP** – resistance, capacitance and continuity measurement and diode testing
- **V<sub>~</sub>** – AC and DC voltage measurement
- **OFF** – meter off
- **10A<sub>~</sub>** – AC and DC current measurement up to 10A
- **mA<sub>~</sub>** – AC and DC current measurement up to 400mA
- **μA<sub>~</sub>** – AC and DC current measurement up to 400μA

#### 6 MODE button

- Measurement mode selection: Ohm / Diode / Continuity / Cap, DC / AC, Hz / %Duty

#### 7 RANGE button

- Manual range selection

#### 8 HOLD button

- Data Hold function
- Back Light function

**9** REL button


- Relative measurement function

**10** battery compartment lid

## **4.2** *LCD display*

 – continuity

 – battery status

 – diode

DC, AC – voltage (current) direct, alternating

°C – Celsius degrees

°F – Fahrenheit degrees

AUTO – auto range

REL – relative

HOLD – display hold

## **4.3** *Test leads*

The manufacturer guarantees correct measurement indications provided original test leads are used.

**WARNING:**

**Connection of inadequate test leads constitutes a risk of electric shock with a dangerous voltage or may be a cause of measurement errors.**

## 5 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

## 6 Measurements

It is recommended to get acquainted thoroughly with the contents of the present chapter since it describes the measurement systems, the manner of realisation of measurements and the basic principles of interpretation of the results.

### 6.1 *DC voltage measurements*

#### CAUTION!

**Do not measure DC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.**

In order to realise a measurement of DC voltage, it is necessary to realise the following actions:

- Set the function switch to the  $V_{\text{DC}}$  position,
- With the **RANGE** button set the measurement range manually if necessary,
- Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive **VΩTEMPHzmAμA** jack,
- Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit,

- Read the voltage in the display.

## 6.2 AC voltage measurements

### CAUTION!

Do not measure AC voltages if a motor on the circuit is being switched ON or OFF. Large voltage surges may occur that can damage the meter.

### WARNING:

Risk of Electrocution. The probe tips may not be long enough to contact the live parts inside some 240V outlets for appliances because the contacts are recessed deep in the outlets. As a result, the reading may show 0 volts when the outlet actually has voltage on it. Make sure the probe tips are touching the metal contacts inside the outlet before assuming that no voltage is present.

In order to realise a measurement of AC voltage, it is necessary to realise the following actions:

- Set the function switch to the  $V_{\text{AC}}$  position,
- With the **RANGE** button set the measurement range manually if necessary,
- Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive **VΩTEMPHzmAμA** jack,
- Touch the black test probe tip to the neutral side of the circuit. Touch the red test probe tip to the “hot” side of the circuit,
- Read the voltage in the display.

## 6.3 DC current measurements

### WARNING:

To avoid electric shock, do not measure DC current on any circuit whose voltage exceeds 250V.

### CAUTION!

Do not make 10A current measurements for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.

In order to realise a measurement of DC current, it is necessary to realise the following actions:

- Insert the black test lead banana plug into the negative **COM** jack,
- For current measurements up to 4000 $\mu$ A DC, set the function switch to the  **$\mu$ A** position and insert the red test lead banana plug into the **V $\Omega$ TEMPHz%mA $\mu$ A** jack,
- For current measurements up to 400mA DC, set the function switch to the **mA** position and insert the red test lead banana plug into the **V $\Omega$ TEMPHz%mA $\mu$ A** jack,
- For current measurements up to 20A DC, set the function switch to the **10A** position and insert the red test lead banana plug into the **10A** jack,
- Press the **MODE** button to indicate “**DC**” on the display,
- Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current,
- Touch the black test probe tip to the negative side of the circuit. Touch the red test probe tip to the positive side of the circuit,
- Apply power to the circuit,
- Read the current in the display.

## 6.4 AC current measurements

### WARNING:

To avoid electric shock, do not measure AC current on any circuit whose voltage exceeds 250V.

### CAUTION!

Do not make current measurements on the 10A scale for longer than 30 seconds. Exceeding 30 seconds may cause damage to the meter and/or the test leads.

In order to realise a measurement of AC current, it is necessary to realise the following actions:



- Insert the black test lead banana plug into the negative **COM** jack,
- For current measurements up to 4000 $\mu$ A DC, set the function switch to the  **$\mu$ A** position and insert the red test lead banana plug into the **V $\Omega$ TEMPHz%mA $\mu$ A** jack,
- For current measurements up to 400mA DC, set the function switch to the **mA** position and insert the red test lead banana plug into the **V $\Omega$ TEMPHz%mA $\mu$ A** jack,
- For current measurements up to 20A DC, set the function switch to the **10A** position and insert the red test lead banana plug into the **10A** jack,
- Press the **MODE** button to indicate “**AC**” on the display,
- Remove power from the circuit under test, then open up the circuit at the point where you wish to measure current,
- Touch the black test probe tip to the neutral side of the circuit. Touch the red test probe tip to the “hot” side of the circuit,
- Apply power to the circuit,
- Read the current in the display.

## 6.5 Resistance measurements

### WARNING:

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

In order to realise a measurement of the resistance it is necessary to realise the following actions:



- Set the function switch to the  $\Omega$    CAP position,
- Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive **V $\Omega$ TEMPHz%mA $\mu$ A** jack,
- Press the **MODE** button to indicate “ $\Omega$ ” on the display,
- With the **RANGE** button set the measurement range manually if necessary,
- Touch the test probe tips across the circuit or part under test. It is best to disconnect one side of the part under test so the rest of the circuit will not interfere with the resistance reading,
- Read the resistance in the display.

## 6.6 Continuity Measurements


### WARNING:

To avoid electric shock, never measure continuity on circuits or wires that have voltage on them.

In order to realise continuity test it is necessary to realise the following actions:

- Set the function switch to the  $\Omega$    CAP position,
- Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive **V $\Omega$ TEMPHz%mA $\mu$ A** jack,






- Press the **MODE** button to indicate  and “**Ω**” on the display,
- Touch the test probe tips to the circuit or wire you wish to check,
- If the resistance is less than approximately 150Ω, the audible signal will sound. If the circuit is open, the display will indicate “**OL**”,

## 6.7 Diode Measurements

**WARNING:**

**To avoid electric shock, do not test any diode that has voltage on it.**

In order to realise diode test it is necessary to realise the following actions:

- Set the function switch to the **Ω**   **CAP** position,
- Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive **VΩTEMPHz%mAμA** jack,
- Press the **MODE** button to indicate  and “**V**” on the display,
- Touch the test probes to the diode under test. Forward voltage will typically indicate 0.400 to 0.700V. Reverse voltage will indicate “**OL**”. Shorted devices will indicate near 0V and an open device will indicate “**OL**” in both polarities.

**Note:**

**The value indicated in the display during the diode check is the forward voltage.**

## 6.8 Capacitance measurements

### WARNING:

To avoid electric shock, disconnect power to the unit under test and discharge all capacitors before taking any capacitance.

In order to realise capacitance measurement it is necessary to realise the following actions:

- Set the rotary function switch to the  $\Omega \rightarrow \text{CAP}$  position,
- Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive **V $\Omega$ TEMPHz%mA $\mu$ A** jack,
- Press the **MODE** button to indicate "F",
- Touch the test leads to the capacitor to be tested,
- Read the capacitance value in the display.

## 6.9 Frequency or % duty cycle measurements

In order to realise frequency or % duty cycle measurement it is necessary to realise the following actions:

- Set the rotary function switch to the **Hz/%** position,
- Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive **V $\Omega$ TEMPHz%mA $\mu$ A** jack,
- Touch the test probe tips to the circuit under test,
- Read the frequency on the display,
- Press the **MODE** button to indicate "%",
- Read the % duty cycle in the display.

## 6.10 Temperature measurements

In order to realise temperature measurement it is necessary to realise the following actions:

- Set the function switch to the **Temp** position,

- Insert the temperature probe into the input jacks **COM** and **VΩTEMPHz%mAμA**, making sure to observe the correct polarity,
- 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),
- Read the temperature in the display,
- When setting "Celsius" or "Fahrenheit" into initial state, please remove the battery cover and slip the "°C /°F" switch to the corresponding position.

## 7 Special functions

### 7.1 *Autoranging/manual range selection*

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

- Press the **RANGE** key. The "AUTO" display indicator will turn off,
- Press the **RANGE** key to step through the available ranges until you select the range you want,
- Press and hold the **RANGE** button for 2 seconds to exit the ManualRanging mode and return to AutoRanging.

### 7.2 *Relative mode*



The relative measurement feature allows you to make measurements relative to a stored reference value. A reference voltage, current, etc. can be stored and measurements made in comparison to that value. The displayed value is the difference between the reference value and the measured value.

In order to realise relative measurement it is necessary to realise the following actions:


- Perform the measurement as described in the operating instructions,
- Press the **REL** button to store the reading in the display and the "REL" indicator will appear on the display,
- The display will now indicate the difference between the stored value and the measured value,
- Press the **REL** button to return to normal operation.

### **7.3 DATA HOLD function**

The Data Hold function allows the meter to "freeze" a measurement for later reference.

- Press the **HOLD**  button to "freeze" the reading on the indicator. The indicator "HOLD" will appear in the display,
- Press the **HOLD**  button to return to normal operation.

### **7.4 Display backlight**

Pressing and holding the **HOLD**  button for >1 second makes the display backlight function turn on or off.

**Note:**

**The HOLD feature will activate when the backlight is turned off.**

## **8 Battery replacement**

The CMM-10 meter is supplied by means of one 9V battery type. It is recommended to use alkaline battery.

**Attention:**

**When making measurements with a battery's mnemonic on, one must take into account additional indefinite measurement uncertainty or unstable working of the meter.**

**WARNING:**

**Should the test leads be left in the sockets during replacement of the battery, there might be a risk of electric shock with a dangerous voltage.**

In order to replace the battery it is necessary to do the following:

- Remove all the test leads from the measurement sockets and place rotational selector in the position OFF,
- Open the rear battery cover by removing two screws using a Phillips head screwdriver,
- Remove the old battery and insert the new one into battery holder, observing the correct polarity,
- Put the battery cover back in place. Secure with the two screws.

**WARNING:**

**To avoid electric shock, do not operate the meter until the battery cover is in place and fastened securely.**

**Note:**

**If your meter does not work properly, check the fuses and batteries to make sure that they are still good and that they are properly inserted.**

## 9 The fuses replacement

**WARNING:**

**To avoid electric shock, disconnect the test leads from any source of voltage before removing the fuse cover.**

In order to replace the fuses it is necessary to do the following:

- Disconnect the test leads from the meter and place rotational selector in the position OFF,
- Open the battery cover by loosening the screw on the cover using a Phillips head screwdriver.,
- Gently remove the old fuse and install the new fuse into the holder,

**CAUTION!**

**Always use a fuse of the proper size and value (0.5A/250V fast blow for the 400mA range, 10A/250V fast blow for the 10A range).**

- Put the battery cover back in place. Insert the screw and tighten it securely.

**WARNING:**

**To avoid electric shock, do not operate your meter until the fuse cover is in place and fastened securely.**

## 10 Cleaning and maintenance

This multimeter is designed to provide years of dependable service, if the following care instructions are performed:

1. **KEEP THE METER DRY.** If it gets wet, wipe it off.
2. **USE AND STORE THE METER IN NORMAL TEMPERATURES.** Temperature extremes can shorten the life of the electronic parts and distort or melt plastic parts.
3. **HANDLE THE METER GENTLY AND CAREFULLY.** Dropping it can damage the electronic parts or the case.
4. **KEEP THE METER CLEAN.** Wipe the case occasionally with a damp cloth. DO NOT use chemicals, cleaning solvents, or detergents.
5. **USE ONLY FRESH BATTERIES OF THE RECOMMENDED SIZE AND TYPE.** Remove old or weak batteries so they do not leak and damage the unit.
6. **IF THE METER IS TO BE STORED FOR A LONG PERIOD OF TIME,** the batteries should be removed to prevent damage to the unit.

**Note:**

The electronic system of the meter does not require maintenance.

## 11 Storage

In the case of storage of the device, the following recommendations must be observed:

- Disconnect all the test leads from the meter,
- Make sure the meter and its accessories are dry,
- In the case the meter is to be stored for a prolonged period of time, the battery must be removed from the device.

## 12 Dismantling and utilization

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 worn-out electric and electronic equipment.

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

Observe the local regulations concerning disposal of packages, worn-out batteries and accumulators.

## 13 Attachments

### 13.1 Technical data

- "m.v." means measured value of standard

#### DC voltage measurement

Range	Resolution	Basic uncertainty
400,0mV	0,1mV	$\pm (0,5\% \text{ m.v.} + 2 \text{ digits})$
4,000V	0,001V	$\pm (1,2\% \text{ m.v.} + 2 \text{ digits})$
40,00V	0,01V	
400,0V	0,1V	
600V	1V	$\pm (1,5\% \text{ m.v.} + 2 \text{ digits})$

- Input impedance: 7,8 M $\Omega$

#### AC voltage measurement

Range	Resolution	Basic uncertainty
400,0mV	0,1mV	$\pm (1,5\% \text{ m.v.} + 70 \text{ digits})$
4,000V	0,001V	$\pm (1,2\% \text{ m.v.} + 3 \text{ digits})$
40,00V	0,01V	$\pm (1,5\% \text{ m.v.} + 3 \text{ digits})$
400,0V	0,1V	
600V	1V	$\pm (2,0\% \text{ m.v.} + 4 \text{ digits})$

- Input impedance: 7,8 M $\Omega$
- Frequency range 50...400Hz



### DC current measurement

Range	Resolution	Basic uncertainty
400,0 $\mu$ A	0,1 $\mu$ A	$\pm$ (1,0% m.v. + 3 digits)
4000 $\mu$ A	1 $\mu$ A	$\pm$ (1,5% m.v. + 3 digits)
40,00mA	0,01mA	
400,0mA	0,1mA	
4,000A	0,001A	$\pm$ (2,5% m.v. + 5 digits)
10,00A	0,01A	

### AC current measurement

Range	Resolution	Basic uncertainty
400,0 $\mu$ A	0,1 $\mu$ A	$\pm$ (1,5% m.v. + 5 digits)
4000 $\mu$ A	1 $\mu$ A	$\pm$ (1,8% m.v. + 5 digits)
40,00mA	0,01mA	
400,0mA	0,1mA	
4,000A	0,001A	$\pm$ (3,0% m.v. + 7 digits)
10,00A	0,01A	

- Frequency range 50...400Hz

### Resistance measurement

Range	Resolution	Basic uncertainty
400,0 $\Omega$	0,1 $\Omega$	$\pm$ (1,2 % m.v. + 4 digits)
4,000k $\Omega$	0,001k $\Omega$	$\pm$ (1,0 % m.v. + 2 digits)
40,00k $\Omega$	0,01k $\Omega$	$\pm$ (1,2 % m.v. + 2 digits)
400,0k $\Omega$	0,1k $\Omega$	
4,000M $\Omega$	0,001M $\Omega$	
40,00M $\Omega$	0,01M $\Omega$	$\pm$ (2,0 % m.v. + 3 digits)

### Capacitance measurement

Range	Resolution	Basic uncertainty
40,00nF	0,01nF	$\pm$ (5,0 % m.v. + 7 digits)
400,0nF	0,1nF	$\pm$ (3,0 % m.v. + 5 digits)
4,000 $\mu$ F	0,001 $\mu$ F	
40,00 $\mu$ F	0,01 $\mu$ F	
100,0 $\mu$ F	0,1 $\mu$ F	$\pm$ (5,0 % m.v. + 5 digits)

## Frequency measurement

Range	Resolution	Basic uncertainty
5,000Hz	0,001Hz	± (1,5 % m.v. + 5 digits)
50,00Hz	0,01Hz	
500,0Hz	0,1Hz	± (1,2 % m.v. + 3 digits)
5,000kHz	0,001kHz	
50,00kHz	0,01kHz	
500,0kHz	0,1kHz	
5,000MHz	0,001MHz	± (1,5 % m.v. + 4 digits)
10,00MHz	0,01MHz	

- Sensitivity: ≥8V RMS

## Duty cycle measurement

Range	Resolution	Basic uncertainty
0,1 ... 99,9%	0,1%	± (1,2 % m.v. + 2 digits)

- Sensitivity: ≥8V RMS
- Pulse width: 100µs - 100ms,
- Frequency width: 5Hz do 150kHz

## Temperature measurement

Range	Resolution	Basic uncertainty
-20 <sup>0</sup> C...+760 <sup>0</sup> C	1 <sup>0</sup> C	± (3% m.v. + 5 <sup>0</sup> C or 9 <sup>0</sup> F)
-4 <sup>0</sup> F...+1400 <sup>0</sup> F	1 <sup>0</sup> F	

\* probe (K type) accuracy not included

## Other technical data

- Measurement category in acc. with EN 61010-1 ..... II 600V
- Insulation ..... double, class II
- Ingress protection in acc. with EN 60529 ..... IP40
- Pollution degree ..... 2
- Power supply ..... 9V battery
- Diode test ..... I=0,3mA, U<sub>0</sub>=1,5V DC
- Continuity test ..... I<0,3mA, sound signal for R<50Ω
- Overrange indication ..... OL displayed
- Measurements rate ..... 2 times per second, nominal
- Input impedance ..... 7,8MΩ (V AC/DC)
- Display ..... 5000 counts LCD display with function indication

- l) Dimensions..... 138 x 68 x 37mm
- m) Weight:.....Approx. 210 g
- n) Fuses ..... mA,  $\mu$ A range: 0,5A/250V fast,  
..... A range: 10A/250V fast
- o) Operating temperature..... 0..+50°C at < 70 % rel. humidity
- p) Storage temperature..... -20..+60°C at < 80 % rel. humidity
- q) Operating altitude ..... max 2000m
- r) Auto power OFF ..... 30 min
- s) Compliance with the requirements specified in the following norms ..... PN-EN 61010-1:2004  
..... PN-EN 61010-2-032
- t) Quality standard .....ISO 9001

## **13.2 Standard equipment**

The standard set provided by the manufacturer includes the following components:

- The CMM-10 meter,
- Test leads (2 pieces),
- 9V battery,
- K type temperature probe,
- Operating manual,
- Warranty card.

## **13.3 Manufacturer**

The manufacturer of the device, which also provides warranty and post-warranty service is the following company:

**SONEL S. A.**  
ul. Wokulskiego 11  
58-100 Świdnica  
Tel: +48 74 858 38 60  
Fax: +48 74 858 38 09  
E-mail: [export@sonel.pl](mailto:export@sonel.pl)  
Web page: [www.sonel.pl](http://www.sonel.pl)

**Note:**

**Service repairs must be realised solely by the manufacturer.**

**Made in China for SONEL S.A.**