



# **OPERATING MANUAL**

# **INDUSTRIAL MULTIMETER**

**CMM-40**



Version 1.5

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# 1 Introduction

We appreciate your having purchased our industrial meter. The CMM-40 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 '**ATTENTION!**' 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 '**Caution:**'.

**WARNING:**

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

**WARNING:**

**The purpose of the CMM-40 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-40 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.**

## **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 20VAC rms or 40VDC. These voltages are considered a shock hazard,
- Before use for non-contact AC voltage measurements, always test the voltage detector on a known live circuit to verify proper operation,
- Set function switch to the appropriate position before measuring,
- When measuring volts do not switch to current/resistance modes,
- Do not exceed the maximum allowable input range of any function,
- Do not apply voltage to meter when resistance function is selected,
- When changing ranges using the selector switch always disconnect the test leads from the circuit under test,
- Do not exceed the maximum rated input limits,
- 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 with wet hands.

**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.

**ATTENTION!**

**Input Limits**

Function	Maximum Input
V DC or V AC	1000V DC/AC rms
mA AC/DC	500mA 1000V fast acting fuse
A AC/DC	10A 1000V fast acting fuse (20A for 30 seconds max every 15 minutes)
Frequency, Resistance, Capacitance, Duty Cycle, Diode Test, Continuity	1000V DC/AC rms
Temperature	1000V DC/AC rms
Surge Protection: 8kV peak per IEC 61010	

## 2.1 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

## 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.

### **WARNING:**

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

## 4 Functional description

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

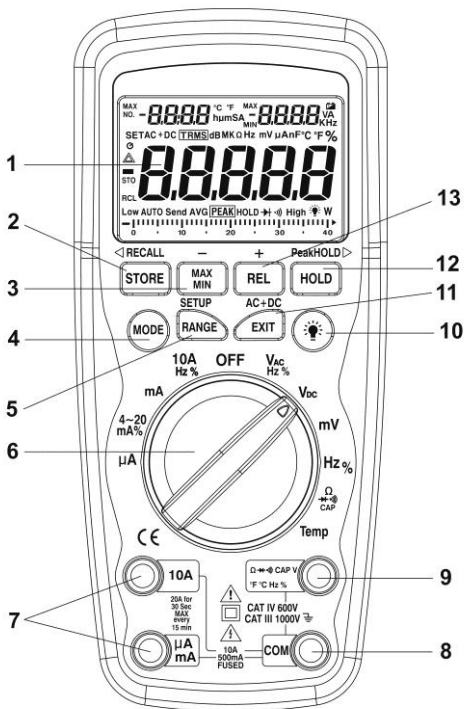


Illustration 1. CMM-40



### 4.1.1 Sockets

**7 measurement socket mA,  $\mu$ A, 10A**

Measurement socket for the purpose of measurements of direct and current.

**8 measurement socket COM**

Measurement socket common for all the measurement functions (connection to the mass of the device).

**9 measurement socket  $\Omega$   $\rightarrow$   $\rightarrow$   $\rightarrow$  CAP V  $^{\circ}$ F  $^{\circ}$ C Hz %**

Measurement socket for all the measurement functions except of current measurements.

### 4.1.2 Elements of selection of the measurement function

**1 40,000 count LCD display**

**2 STORE(<RECALL) button**

**3 MAX/MIN (-) button**

**4 MODE button**

**5 RANGE(SETUP) button**

**6 Rotational selector**

Selection of function:

- **$\mu$ A** – direct and alternative current measurement up to 4000 $\mu$ A,

- **4~20mA%** – loop current measurement,
- **mA** – direct and alternative current measurement up to 400mA,
- **10AHz%** – direct and alternative current measurement up to 10A, frequency and duty cycle measurement,
- **OFF** – meter off,
- **V<sub>AC</sub>Hz%** – alternative voltage, frequency and duty cycle measurement,
- **V<sub>DC</sub>** – direct voltage measurement,
- **mV** – direct and alternative voltage measurement up to 400mV,
- **Hz%** – frequency and duty cycle measurement,
- **Ω** **▶** **▶** **▶** **CAP** – resistance, capacitance and continuity measurement and diode testing,
- **Temp** – Celsius or Fahrenheit temperature measurement.

**10** Backlight button 

**11** EXIT(AC+DC) button

**12** HOLD(PEAKHOLD>) button

**13** REL(+) button

## 4.2 LCD display



Illustration 2. LCD display of the CMM-40 meter

**▶▶▶** – continuity check mode

**✚** – diode test mode

 – Battery status

**n** – nano ( $10^{-9}$ ) (capacitance)

**μ** – micro ( $10^{-6}$ ) (amps, cap)

**m** – milli ( $10^{-3}$ ) (volts, amps)

**A** – Amps

**k** – kilo ( $10^3$ ) (ohms)

**F** – Farads (capacitance)

**M** – mega ( $10^6$ ) (ohms)

**Ω** – Ohms

**Hz** – Hertz (frequency)

**%** – percent (duty ratio)

**AC** – alternating current

**DC** – direct current

**°C** – degrees Celsius

**°F** – degrees Fahrenheit

**MAX** – maximum

**MIN** – minimum

**No.** – serial number

**S – second**

**SET – set up parameter**

**AC +DC – alternating current + direct current**

**TRMS – true RMS**

**STO – store**

**RCL – recall**

**AUTO – auto range**

**PEAK – peak hold**

**V – Volts**



– 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 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.

### 5.1 DC voltage measurements

#### ATTENTION!

**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 **VDC** 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 **V** 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,
- Having done the measurement disconnect the test leads from the meter.

## 5.2 AC voltage measurements

### 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.

### ATTENTION!

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.

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

- Set the function switch to the **VAC/Hz/%** 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 red test lead banana plug into the positive **V** 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 main display and the frequency in the right auxiliary display,
- Press the **MODE** button to indicate “Hz”,
- Read the frequency in the main display,
- Press the **MODE** button again to indicate “%”,
- Read the % of duty cycle in the main display,

- Press **EXIT (AC+DC)** for 2 seconds into the function of AC+DC. Test DC and AC True RMS,
- Having done the measurement disconnect the test leads from the meter.

### **5.3 mV voltage measurements**

#### **ATTENTION!**

**Do not measure mV 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 mV voltage, it is necessary to realise the following actions:

- Set the function switch to the **mV** position,
- with the **RANGE** button set the measurement range manually if necessary,
- Press the **MODE** button to indicate “**DC**” or “**AC**”, or in AC range press **EXIT** for two seconds and chose “**AC+DC**”,
- Insert the black test lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive **V** 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 mV voltage in the display,
- Having done the measurement disconnect the test leads from the meter.

## 5.4 DC current measurements

### ATTENTION!

Do not make 20A 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  **$\mu$ A/mA** 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  **$\mu$ A/mA** jack,
- For current measurements up to 20A DC, set the function switch to the **10A/HZ/%** 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,
- Having done the measurement disconnect the test leads from the meter.



## 5.5 AC current (frequency, duty cycle) measurements

### ATTENTION!

Do not make 20A 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 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 AC, set the function switch to the  **$\mu$ A** position and insert the red test lead banana plug into the  **$\mu$ A/mA** jack,
- For current measurements up to 400mA AC, set the function switch to the **mA** position and insert the red test lead banana plug into the  **$\mu$ A/mA** jack,
- For current measurements up to 20A AC, set the function switch to the **10A/HZ/%** 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. In the 10AAC range, right auxiliary display frequency,
- Press and hold the **MODE** button to indicate “**Hz**”,
- Read the frequency in the display,
- Momentarily press the **MODE** button again to indicate “**%**”,
- Read the % duty cycle in the display,
- Press and hold the **MODE** button to return to current measurement,



- Press EXIT for 2 seconds into the function of AC+DC. Test DC and AC True RMS,
- Having done the measurement disconnect the test leads from the meter.

## 5.6 Resistance measurements

### ATTENTION!

**Measurements must not be realised in live circuits. Capacitors must be discharged.**

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  $\Omega$  jack,
- Press the **MODE** button to indicate “ $\Omega$ ” on the display,
- 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,
- Having done the measurement disconnect the test leads from the meter.


## 5.7 Continuity Measurements

### ATTENTION!

**Measurements must not be realised in live circuits. Capacitors must be discharged.**

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 lead banana plug into the negative **COM** jack. Insert the red test lead banana plug into the positive  $\Omega$  jack,
- Press the **MODE** button to indicate  and " $\Omega$ " on the display,
- Touch the test probe tips to the circuit or wire you wish to check,
- If the resistance is less than approximately  $35\Omega$ , the audible signal will sound. If the circuit is open, the display will indicate "**OL**",
- Having done the measurement disconnect the test leads from the meter.

## 5.8 Diode Measurements

### ATTENTION!

**Measurements must not be realised in live circuits. Capacitors must be discharged.**

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


- Set the function switch to the green  $\Omega$    **CAP** position,
- Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive  $\Omega$  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,
- Having done the measurement disconnect the test leads from the meter.

## 5.9 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 green  $\Omega$   **CAP** position,
- Insert the black test lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive  $\Omega$  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,
- Having done the measurement disconnect the test leads from the meter.

## 5.10 Temperature measurements

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

- Set the function switch to the green **Temp** position,
- Insert the temperature probe into the input jacks, making sure to observe the correct polarity,
- Press the **MODE** button to indicate “°F” or “°C”,
- 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,
- Having done the measurement disconnect the probe leads from the meter.

**Caution:**

The temperature probe is fitted with a type K mini connector. A mini connector to banana connector adaptor is supplied for connection to the input banana jacks.

## ***5.11 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 green **Hz/%** position,
- Insert the black lead banana plug into the negative **COM** jack and the red test lead banana plug into the positive **Hz** 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,
- Having done the measurement disconnect the test leads from the meter.

## ***5.12 % 4 – 20 mA measurements***

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

- Set up and connect as described for DC mA measurements,
- Set the rotary function switch to the **4-20mA%** position,
- The meter will display loop current as a % with 0mA=-25%, 4mA=0%, 20mA=100%, and 24mA=125%. Special functions

## ***5.13 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,
- To exit the manual ranging mode and return to autoranging, press **EXIT**.

**Caution:**  
**Manual ranging does not apply for the Temperature, Continuity, Diode test, mV, current 10A and 4~20mA functions.**

## **5.14 MAX/MIN**

Press the **MAX/MIN** key to activate the MAX/MIN recording mode. The display icon "**MAX**" will appear. The meter left auxiliary display will display and hold the maximum reading and will update only when a new “max” occurs. The display icon "**MIN**" will appear. The right auxiliary display meter will display and hold the minimum reading and will update only when a new “min” occurs.

To exit MAX/MIN mode press **EXIT**.

## **5.15 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.

**Caution:**  
**Relative mode does not operate in the 4~20mA, diode test and continuity function.**

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,
- Left auxiliary display the margin of initial value and the current value. Right auxiliary display the initial reading. Main display the reading after **REL** test,
- Press the **EXIT** button to exit the relative mode.

## ***5.16 DATA HOLD function***

The hold function freezes the reading in the display. Press the **HOLD** key momentarily to activate or to exit the **HOLD** function.



## ***5.17 PEAK HOLD function***

The peak hold function captures the peak AC or DC voltage or current. The meter can capture negative or positive peaks as fast as 1 millisecond in duration. Hold the **PEAK** button for 2 s. "**MAX**" will display in left auxiliary display, "**MIN**" will display in right auxiliary display. The meter will update the display each time a lower negative, or higher positive peak occurs.

Press the **EXIT** button to exit the peak hold mode.

**Auto Power Off** feature will be disabled automatically in this mode.

## ***5.18 Display backlight***

Press the  key to turn the backlight on. The backlight will automatically turn off after **SET** time. Press the  button to exit the backlight on mode.

## ***5.19 Data record function***

In order to realise data store it is necessary to do the following:

- In the current testing mode, press **STORE** button one time, enter into STORE function. On the left upper corner of LCD shows **NO. XXXX**, which states current storage serial number,
- Then, press button **PEAK HOLD** to change into the initial serial number 0000. (Press again it will change back). On the

- right upper corner of LCD shows **XXXX**, which states how many current storage is used,
- Press **STORE** button again, enter into recording interval time set up function. On the left upper shows 0000 S, which states recording interval time; using button + and - to select, the range is 0~255 seconds,
  - When the recording interval time is 0000 S, then press **STORE** button again to change into manual recording. Press the **STORE** button again to record once,
  - When the recording interval time is 1~255 S, then press **STORE** button again to start recording automatically from 0000 or XXXX (chosen earlier). Recording times is showed on the left upper corner, data is showed on the right upper corner (Due to digitally limitation, there is only display preceding four numbers),
  - To finish above STORE function, press **EXIT** button shortly.

## ***5.20 Data memory clean function***

If you want to clean all the memory data, the steps are:

- When power off, press the **EXIT** button long time,
- Then turn the switch from **OFF** to random, and release the **EXIT** button, the LCD will flash thrice and meantime buzzer thrice, which means all memory data have been cleaned.

## ***5.21 Data recall function***

In order to realise data recall it is necessary to do the following:

- Press **STORE (◀RECALL)** button two seconds to enter into RECALL function. On the left upper corner shows XXXX, which states current storage serial number. On the right upper corner shows XXXX, which states how many current storage is used,
- Press button **HOLD (PeakHOLD)** shortly once to scan data from 0000 to XXXX continuously,
- Press again then scan again,
- Use button + & - to select serial number XXXX on the left upper corner and record data on the right upper corner,
- To finish above RECALL function, press EXIT button.



## 5.22 Parameter setting up function

In order to realise parameter setting up it is necessary to do the following:

- Press the **RANGE (SETUP)** button second seconds to enter into SET function,
- Then press SET shortly once, change on setting content,
- Setting content includes (in sequence):
  - A: upper limit buzzer alarm
  - B: lower limit buzzer alarm
  - C: auto power off time
  - D: turn off phonating
  - E: backlight time
- Use ← + - → buttons to select the parameter,
- Press **SET** button continuously to switch to setting content, till exiting set up to testing mode. So the updated setting content is saved. If press **EXIT** button in this period, all setting can't be saved.

## 5.23 AC + DC function

In order to use AC + DC function it is necessary to do the following:

- In all the measuring mode press **EXIT** button for 2 seconds to enters into AC+DC testing. The precision is the same as AC measure. LCD shows AC+DC signal,
- Press button **EXIT** to exit.

## 6 Replacement of the batteries

The CMM-40 meter is supplied by means of one 9V battery. 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.**

**WARNING:**

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

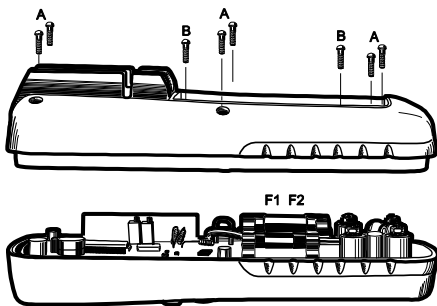
**Caution:**

**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.**

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 (B) using a Phillips head screwdriver,
- Insert the battery into battery holder, observing the correct polarity,

- Put the battery cover back in place. Secure with the screws.



**Illustration 3. Battery cover of the CMM-40 meter**

## 7 Replacement of the fuses

**WARNING:**

**To avoid electric shock, disconnect the test leads from any source of voltage before removing the meter 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,
- Remove the battery cover (two "B" screws) and the battery,
- Remove the six "A" screws securing the rear cover,
- Gently remove the old fuse and install the new fuse into the holder,
- Always use a fuse of the proper size and value (0.5A/1000V fast blow for the 400mA range [SIBA 70-172-40], 10A/1000V fast blow for the 20A range [SIBA 50-199-06]),
- Replace and secure the rear cover, battery and battery cover.

**WARNING:**

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

## 8 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.
- The electronic system of the meter does not require maintenance.

## 9 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,

## 10 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.

# 11 Attachments

## 11.1 Technical data

“m.v.” means measured value of standard.

### DC voltage measurement

Range	Resolution	Basic uncertainty
400,00mV	0,01mV	± (0.06% m.v. + 4 digits)
4,0000V	0,0001V	
40,000V	0,001V	
400,00V	0,01V	
1000,0V	0,1V	± (0.1% m.v. + 5 digits)

### AC voltage measurement (True RMS) AC + DC

Range	Resolution	Basic uncertainty
400,00mV	0,01mV	± (1% m.v. + 40 digits)
4,0000V	0,0001V	± (1% m.v. + 30 digits)
40,000V	0,001V	
400,00V	0,01V	
1000,0V	0,1V	

- frequency range 50 to 1000Hz

### DC current measurement

Range	Resolution	Basic uncertainty
400,00µA	0,01µA	± (1% m.v. + 3 digits)
4000,0µA	0,1µA	
40,000mA	0,001mA	
400,00mA	0,01mA	
10,000A	0,001A	

- 20A: 30 sec max with reduced accuracy

## AC current measurement (True RMS) AC + DC

Range	Resolution	Basic uncertainty
400,00 $\mu$ A	0,01 $\mu$ A	$\pm$ (1,5% m.v. + 30 digits)
4000,0 $\mu$ A	0,1 $\mu$ A	
40,000mA	0,001mA	
400,00mA	0,01mA	
10,000A	0,001A	

- 20A: 30 sec max with reduced accuracy

### Caution:

Accuracy is stated at 65°F to 83°F (18°C to 28°C) and less than 75% RH.

AC switch according to the calibration of sine wave. It generally increase  $\pm$ (2% reading + 2% full scale) if non sine wave in the wave crest less than 3.0.

## Resistance measurement

Range	Resolution	Basic uncertainty
400,00 $\Omega$	0,01 $\Omega$	$\pm$ (0,3 % m.v. + 9 digits)
4,0000k $\Omega$	0,0001k $\Omega$	$\pm$ (0,3 % m.v. + 4 digits)
40,000k $\Omega$	0,001k $\Omega$	
400,00k $\Omega$	0,01k $\Omega$	
4,0000M $\Omega$	0,0001M $\Omega$	
40,000M $\Omega$	0,001M $\Omega$	$\pm$ (2 % m.v. + 10 digits)

## Capacitance measurement

Range	Resolution	Basic uncertainty
40,000nF	0,001nF	± (3,5 % m.v. + 40 digits)
400,00nF	0,01nF	
4,0000µF	0,0001µF	± (3,5 % m.v. + 10 digits)
40,000µF	0,001µF	
400,00µF	0,01µF	
4000,0µF	0,1µF	± (5 % m.v. + 10 digits)
40,000mF	0,001mF	

## Frequency measurement (electronic)

Range	Resolution	Basic uncertainty
40,000Hz	0,001Hz	± (0,1 % m.v. + 1 digit)
400,00Hz	0,01Hz	
4,0000kHz	0,0001kHz	
40,000kHz	0,001kHz	
400,00kHz	0,01kHz	
4,0000MHz	0,0001MHz	
40,000MHz	0,001MHz	Not specified
100,00MHz	0,01MHz	

- Sensitivity: 0.8V rms min. @ 20% to 80% duty cycle and <100kHz; 5Vrms min @ 20% to 80% duty cycle and > 100kHz

## Frequency measurement (electrical)

Range	Resolution	Basic uncertainty
40,00Hz ... 10,000kHz	0,01Hz ... 0,001kHz	± 0,5 % m.v.

- Sensitivity: 1Vrms



## Duty cycle measurement

Range	Resolution	Basic uncertainty
0,10 ... 99,0%	0,01%	$\pm (1,2 \% \text{ m.v.} + 2 \text{ digits})$

- Pulse width: 100 $\mu$ s - 100ms, Frequency: 5Hz to 150kHz

## Temperature measurement

Range	Resolution	Basic uncertainty
-50.0...1200,0°C	0,1°C	$\pm (1\% \text{ m.v.} + 2,5^\circ\text{C})$
-58.0...2192,0°F	0,1°F	$\pm (1\% \text{ m.v.} + 4,5^\circ\text{F})$

- \* probe accuracy not included

## 4-20mA% loop measurement

Range	Resolution	Basic uncertainty
-25,00 ... 125,00%	0,01%	$\pm 50 \text{ digits}$

- 0mA=-25%, 4mA=0%, 20mA=100%, 24mA=125%

## Other technical data

- Measurement category in acc. with EN 61010-1 .....III 1000V
- Ingress protection in acc. with EN 60529 ..... IP67
- Pollution degree.....2
- Power supply ..... one 9V battery
- Diode test ..... I=0,9mA, U<sub>0</sub>=2,8V DC
- Continuity test ..... I<0,35mA, sound signal for R<35 $\Omega$
- Ovrange indication ..... OL displayed
- Crest factor .....  $\leq 3$  at full scale up to 500V  
.....decreasing linearly to  $\leq 1,5$  at 1000V
- PEAK ..... captures peaks >1ms
- Measurements rate.....2 times per second, nominal
- Input impedance ..... >10M $\Omega$  VDC & >9M $\Omega$  VAC
- Display ..... 40,000 count backlit liquid crystal with bargraph
- Store capacitance ..... 2000
- Size ..... 187 x 81 x 55mm
- Weight (includes holster) ..... 342g

- p) Fuses ..... mA,  $\mu$ A ranges; 0.5A/1000V ceramic fast blow  
..... A range; 10A/1000V ceramic fast blow
- q) Operating temperature..... 0°C to 40°C (32°F to 104°F)
- r) Storage temperature..... -20°C to 60°C (-4°F to 140°F)
- s) Operating humidity..... max 80% up to 31°C (87°F)  
..... decreasing linearly to 50% at 40°C (104°F)
- t) Storage humidity..... <80%
- u) Max. operating altitude ..... 2000m (7000ft)
- v) Auto power OFF ..... 15 minutes (approx.) with disable feature
- w) Enclosure ..... double molded, waterproof
- x) Compliance with the requirements specified in the following  
norms ..... EN 61010-1  
..... EN 61010-2-032
- y) Quality standard ..... ISO 9001

## **11.2 Standard equipment**

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

- The CMM-40 meter,
- Test leads (2 pieces),
- 9V battery,
- K Type temperature probe,
- Sockets protective plugs (2 szt.),
- Operating manual,
- Carrying case,
- Warranty card.

### **11.3 Manufacturer**

The manufacturer of the device, which also provides guarantee and post-guarantee 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.**