METRIA M52 Portable Conductivity Meter

Instruction Manual

Introduction

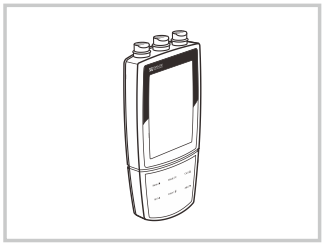
Thank you for selecting the METRIA M52 portable conductivity meter. This manual provides a step-by-step guide to help you operate the meter, please carefully read the following instructions before use.

Unpacking

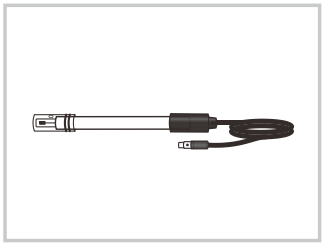
Before unpacking, ensure that the current work environment meets following conditions.

- Relative humidity is less than 80%.
- Ambient temperature is greater than 0°C and less than 60°C.
- No potential electromagnetic interference.

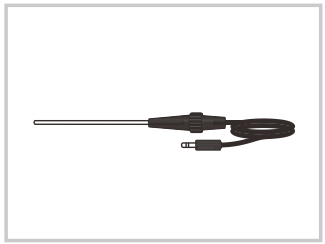
The following list describes the standard components of the meter. After the unpacking, please check all components are complete. If any are damaged or missing, please contact nearest distributor.



METRIA M52 Conductivity Meter



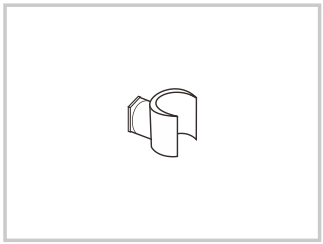
CON-1 Conductivity Electrode



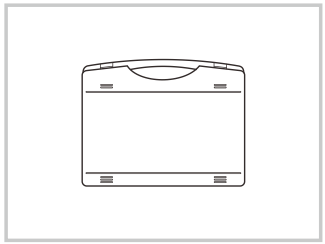
TP-10K Temperature Probe



Conductivity Standard Solutions



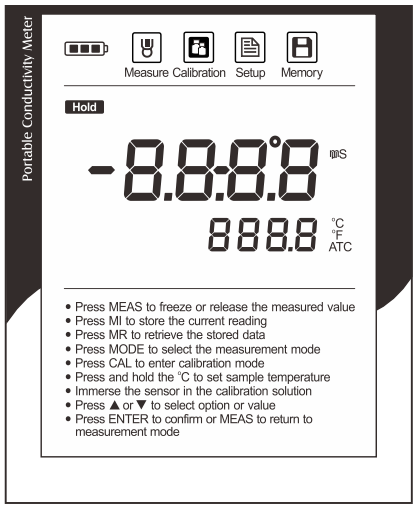
Electrode Clip



Carrying Case

Display

The METRIA M52 portable conductivity meter is equipped with an easy-read LCD display that used to show the measured values and mode icons. The following table describes the function of each icon.



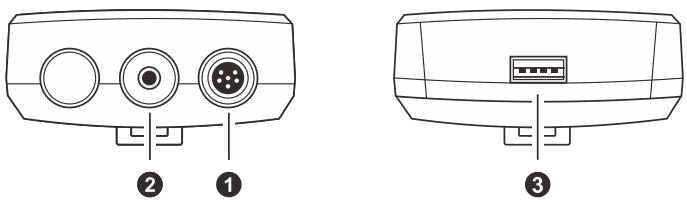
INDEX:

Measure	Measurement mode icon: Indicates the meter is in the measurement mode.		Low battery alarm: When the battery is depleted, the icon will disappear.
Calibration	Calibration mode icon: Indicates the meter is in the calibration mode.	Hold	Hold icon: Indicates the measuring value has been locked.
Setup	Setup mode icon: Indicates the meter is in the setting mode.	ATC	Automatic Temperature Compensation: Indicates the temperature compensation is enabled.
Memory	Memory icon: Indicates the data is stored into memory.		

Keypad

KEY	FUNCTION
Meas | 🔓	• Switches the meter ON/OFF. • Locks the measured value, press the key again to resume measuring. • Exits the calibration or setting and returns to measurement.
°C	• Sets the temperature.
Cal | 🖹	• Starts calibration. • Enters the setup menu (Press and hold the key for 3 seconds).
MI | ▲	• Stores current reading to memory. • Increase value or scroll up through the menu item.
MR | ▼	• Views the calibration report or data logs. • Decrease value or scroll down through the menu item.
Enter | 💡	• Confirms the calibration, settings or displayed options. • Turn on/off the backlight (Press and hold the key for 3 seconds).

Connectors



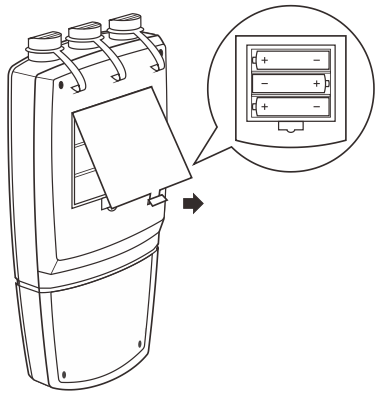
INDEX:

NO.	CONNECTOR	DESCRIPTION
1	6-pin Connector	Used for connecting the conductivity electrode
2	Phone Jack	Used for connecting the temperature probe
3	USB	Used for connecting the USB cable

Installing the Batteries

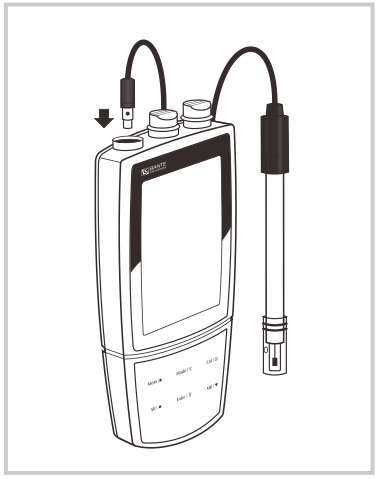
- Remove the battery cover from backside of the meter.
- Insert three AA batteries into the battery compartment, note polarity.
- Replace the battery cover into its original position. Installation is completed.

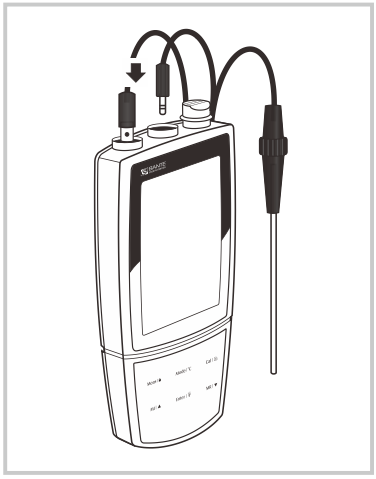
ⓘ When the batteries are depleted, the meter allows using the DC5V power adapter with USB cable for power supply. NOTE, take out the batteries.



Connecting the Sensors

- Take out the conductivity electrode from the packaging. Insert the 6-pin connector into the connector socket on meter. Ensure the connector is fully seated. After connection is completed, DO NOT pull on the sensor cord. Always make sure that the connector is clean and dry.
- Insert the connector of temperature probe into to the corresponding connector socket.





Prior to Use

Soak the conductivity electrode for a few minutes in tap water to remove dirt and oil stains on the electrode

Switching the Meter On and Off

- Press the **Meas** key to switch on the meter, the display shows the measured value.
- Press and hold the **Meas** key for 5 seconds, the meter will switch off.

ⓘ To enable the Auto-Power Off feature, please refer to chapter SETUP MENU.

Setup Menu

The METRIA M52 portable conductivity meter contains an integrated setup menu that is used to customize the displayed option to meet measurement
requirements. The following table describes the functions of the menu items.

MENU	DESCRIPTION	OPTIONS	DESCRIPTION	DEFAULT
CELL	Set the cell constant to match connected electrode.	0.1	K=0.1	K=1
		1	K=1	
		10	K=10	
CAL	Set the number of calibration points.	1	1 point	3 points
		2	2 points	
		3	3 points	
COE	Set the temperature correction method and coefficient.	LC	Linear (Range: 0.0~10.0%/°C)	Linear 2.1%/°C
		nLC	Non-linear	
PURE	If enabled, pure water coefficient will be applied automatically for ultra-pure water measurements.	YES	Enable	Disable
		NO	Disable	
Std	Set the normalization temperature for measurement and calibration.	25°C	25°C	25°C
		20°C	20°C	
UNIT	Set the default temperature unit.	°C	Degrees Celsius	°C
		°F	Degrees Fahrenheit	
HOLd	If enabled, the meter will automatically sense a stable reading and lock the measurements.	YES	Enable	Disable
		NO	Disable	
OFF	If enabled, the meter will automatically turn off if no key is pressed within 30 minutes.	YES	Enable	Disable
		NO	Disable	
CLr	Delete all stored readings in the memory.	YES	Enable	Disable
		NO	Disable	
rSt	If enabled, all of the calibration data and selected parameters will back to factory default settings, the meter must be recalibrated.	YES	Enable	Disable
		NO	Disable	

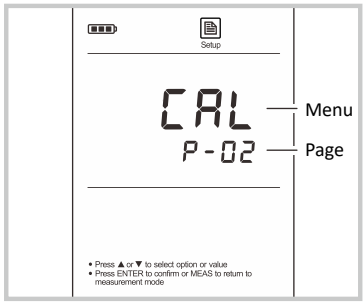
ⓘ The meter contains two temperature correction methods. The linear temperature correction is appropriate for most samples. If the current sample is belong to the natural water (e.g., natural ground, well, or surface waters), using the non-linear correction is necessary.

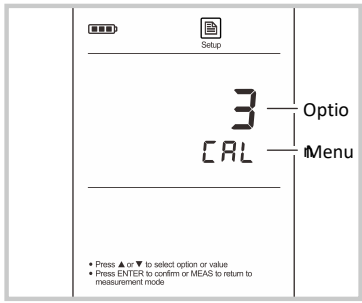
Note: non-linear correction can only be performed at temperature range from 0°C to 36°C. If the temperature value is out of above range, the meter will always show "----".

Setting the default option

1. Press and hold the 🖹 key for 3 seconds to enter the setup menu.
2. Press the ▲ or ▼ key to select the menu item (e.g., CAL/P-02).
3. Press the **Enter** key, the meter shows an option.
4. Press the ▲ or ▼ key to select the desired option, press the **Enter** key to confirm. Setting is completed.

ⓘ If you want to exit the setting, press the **Meas** key.



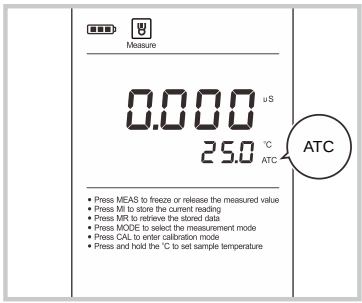


Temperature Compensation

For better accuracy, we recommend the use of either a sensor with a built-in or a separate temperature probe for the calibration or measurements.

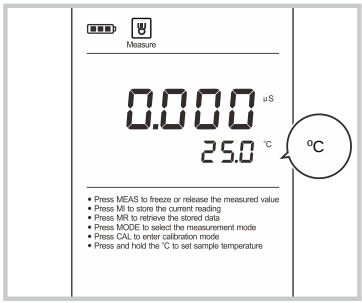
Automatic Temperature Compensation

Connect the temperature probe to the meter (Refer to page 4 “Connecting the Sensors”). The ATC icon immediately appears on the display, the meter is now switched to the automatic temperature compensation mode.



Manual Temperature Compensation

If the meter does not detect a temperature probe, the °C icon will show on the display indicating that the meter is switched to the manual temperature compensation mode. To set the temperature value of sample, follow the steps below.



1. Press and hold the **°C** key for 3 seconds to enter the temperature setting mode.
2. Press the ▲ or ▼ key to modify the temperature value.
3. Press the **Enter** key to confirm.

ⓘ Press the ▲ or ▼ key once, the setting value will increase or decrease by 0.1. Press and hold the ▲ or ▼ key, the setting value will increase or decrease by 1.

Selecting the Conductivity Electrode

The METRIA M52 portable conductivity meter is capable of using the 3 types of conductivity electrodes. Prior to the calibration and measurement, you need to select the different sensors as per your sample concentration. The table below shows available electrode and its effective measuring ranges.

CONDUCTIVITY ELECTRODE	MEASURING RANGES	CELL CONSTANT
CON-0.1	0.1~100µS/cm	K=0.1
CON-1	10µS/cm~10mS/cm	K=1
CON-10	100µS/cm~200mS/cm	K=10

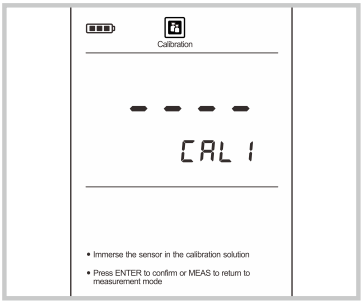
Calibrating the Meter

The meter allows 1 to 3 points calibration. To ensure higher accuracy, we recommend that you perform 3 points calibration or select a standard value close to the sample value you are measuring. The meter will automatically detect these conductivity standard solutions and prompt the user to calibrate the meter. When the calibration is completed, all new calibration values will automatically override existing data.

The following table shows acceptable conductivity range of standard solution for each measuring range.

MEASURING RANGE	CALIBRATION SOLUTION RANGE	DEFAULT
0~20µS/cm	7~17µS/cm	10µS/cm
20~200µS/cm	70~170µS/cm	84µS/cm
200~2000µS/cm	700~1700µS/cm	1413µS/cm
2~20mS/cm	7~17mS/cm	12.88mS/cm
20~200mS/cm	70~170mS/cm	111.8mS/cm

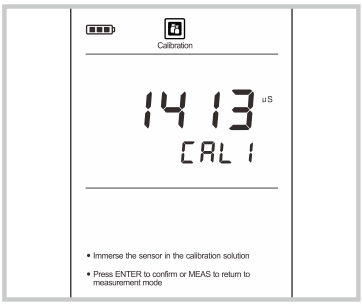
Single point calibration



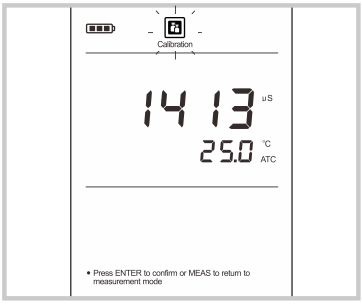
1.1 Make sure that you have selected 1 point calibration in the setup menu.

1.2 Rinse the conductivity electrode with distilled water, then rinse with a small amount of standard solution.

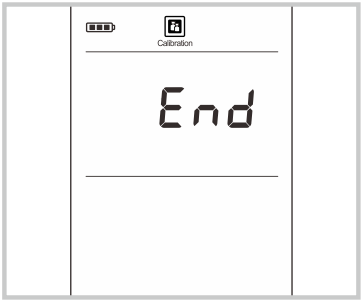
1.3 Press the **Cal** key, the display shows “CAL1” and waits for recognizing the standard solution.



1.4 Place the electrode (and temperature probe) into the conductivity standard solution, the meter automatically shows current calibration standard (e.g., 1413µS/cm).



1.5 Press the **Enter** key, the meter begins the calibration, the Calibration icon will continuously flashing.



1.6 Wait for the reading to stabilize, the display automatically shows END. Single point calibration is completed.

Multi-point calibration

2.1 Ensure that you have selected 2 or 3 points calibration in the setup menu.

2.2 Repeat steps 1.2 to 1.5 above, when the first calibration point is completed, the display will show “CAL2”. The meter prompts you to continue with second point calibration.

2.3 Rinse and place the electrode (and temperature probe) into the standard solution, the display automatically shows current calibration standard (e.g.,12.88mS/cm).

2.4 Press the **Enter** key, the meter begins the calibration, the Calibration icon will continuously flashing.

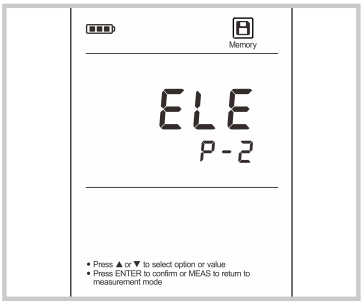
2.5 Wait for the reading to stabilize, the display will show “CAL3”. The meter prompts you to continue with third point calibration.

2.6 Repeat the steps 2.3 and 2.4 above until the meter returns to the measurement mode. Calibration is completed.

Exit the calibration

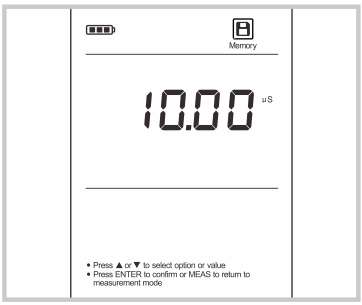
During the calibration process, if you want to exit the calibration, press the **Meas** key.

Viewing the calibration report

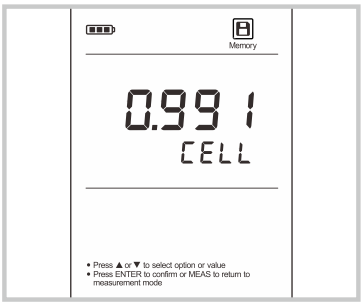


3.1 Press the **MR** key in the measurement mode and the ▲ or ▼ key until the display shows

ELE/P-2.



3.2 Press the **Enter** key. The meter shows the calibration point 1 (e.g., 10.00µS/cm).



3.3 Press the ▼ key, the meter shows the calibration factor of the calibration point 1 (e.g., 0.991).

3.4 Press the ▼ key again, the meter shows the next data set.

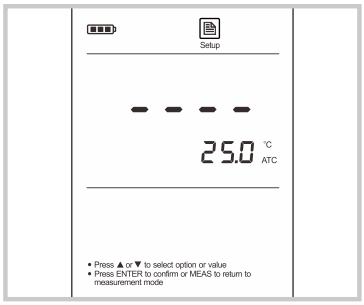
3.5 To exit the calibration report, press the **Meas** key.

ⓘ If the meter does not calibrated, the display will only show "----".

Temperature Calibration

During the measurement process, if the temperature reading displayed differs from that of an accurate thermometer, the meter needs to be calibrated.

1. Connect the temperature probe to the meter and place into a solution with a known accurate temperature.
2. Press and hold the **ºC** key to enter the temperature setting mode.
3. Press the ▲ or ▼ key to set the temperature value.
4. Press the **Enter** key to confirm. Calibrating is completed.



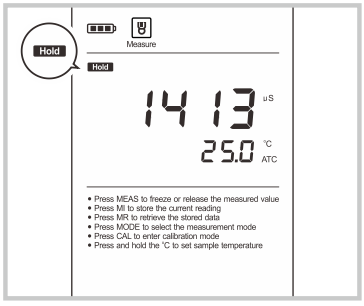
ⓘ During the setting process, press the ▲ or ▼ key once, the setting value will increase or decrease by 0.1. Press and hold the ▲ or ▼ key, the setting value will increase or decrease by 1.

Conductivity Measurement

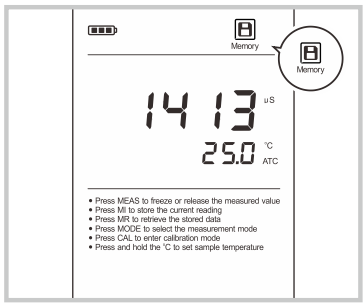
1. Rinse the conductivity electrode thoroughly with distilled water.
2. Place the electrode into the sample solution, stir the electrode gently.
3. Record the measured value when the reading is stable.

Auto-Hold

The meter contains an Auto-Hold function. If enabled, the meter will automatically sense a stable reading and lock the measurements, the HOLD icon appears on the display. If disabled, press the 🔓 key, the meter will immediately lock the displayed value. Press the **Meas** key to resume measuring.



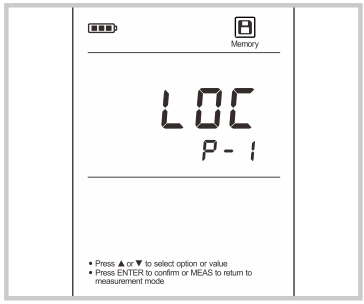
Storing and Recalling Data



The METRIA M52 portable conductivity meter is capable of storing and recalling up to 100 data sets.

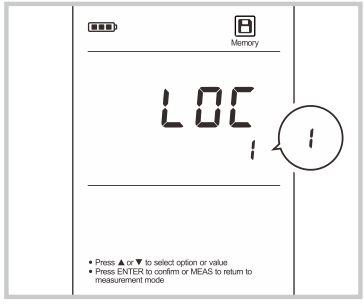
Storing readings into memory

During the measurement process, press the **MI** key to store the reading into the memory, the Memory icon appears on the display.



Viewing stored readings

1. Press the **MR** key in the measurement mode, the meter shows LOC/P-1 (Data Log).



2. Press the **Enter** key, the meter shows the serial number of the stored data.



3. Press the ▼ key, the meter shows the stored data.
4. Press the ▼ key again, the meter shows the next data set.
5. Press the **Meas** key, the meter returns to the measurement mode.

Clearing the memory

Please refer to page 5 SETUP MENU.

Electrode Care and Maintenance

- DO NOT touch the measurement area of electrode and always make sure that is clean.
- If there is a build-up of solids inside the measurement area, these should be removed very carefully with a cotton bud soaked in solvent, taking care not to touch the metal parts of the inner cell. After the solids are removed, the electrode must be recalibrated.



Measurement Area

Troubleshooting

LCD DISPLAY	CAUSE	CORRECTIVE ACTION
- - -	Electrode dried out	Soak the conductivity electrode in tap water for 10 minutes.
	Measured value is out of range	Check the electrode whether dirty or broken.
Err	Electrode does not suit the current sample	Replace the conductivity electrode.
	Electrode is broken	Replace the conductivity electrode.
	Keypad is not working properly	Replace the batteries.

Specifications

Conductivity	Model	METRIA M52
	Range	0.01~20.00, 200.0, 2000µS/cm, 20.00, 200.0mS/cm
	Accuracy	±0.5% F.S
	Resolution	0.001, 0.01, 0.1, 1
	Calibration Points	1 to 3 points
	Calibration Solutions	10µS/cm, 84µS/cm,1413µS/cm,12.88mS/cm,111.8mS/cm
Temperature	Range	0~105°C, 32~221°F
	Accuracy	±0.5°C
	Resolution	0.1°C
	Calibration Points	1 point
General	Temperature Compensation	0~100°C, 32~212°F, Manual or Automatic
	Temperature Coefficient	0.0~10.0%/°C
	Compensation Modes	Linear, Non-linear or Pure Water
	Cell Constant	K=0.1, 1, 10
	Reference Temperature	20°C or 25°C
	Memory	Stores up to 100 data sets

	Output	USB communication interface

	Connector	6-pin
	Display	LCD
	Power Requirements	3 × 1.5V “AA” batteries
	Dimensions	170 (L) × 85 (W) × 30 (H)mm
	Weight	300g

Addendum 1: Preparation of Conductivity Standard Solutions

Place AR potassium chloride reagent in a 50ml beaker and dry in an oven for 3 to 5 hours at 105°C, then cool to room temperature in desiccator.

CALIBRATION SOLUTIONS	REAGENT
84µS/cm	Accurately weigh out 42.35mg of KCL and dissolve in 1 litre deionised water.
1413µS/cm	Accurately weigh out 745.9mg of KCL and dissolve in 1 litre deionised water.
12.88mS/cm	Accurately weigh out 7.45g of KCL and dissolve in 1 litre deionised water.
111.8mS/cm	Accurately weigh out 74.5g of KCL and dissolve in 1 litre deionised water.

Stir the solution until the reagent has thoroughly mixed. Preparation is completed.

Addendum 2: How to calculate the temperature coefficient

To determine the temperature coefficient of sample solution use the formula below:

$$T_C = \frac{C_{TB}-C_{TA}}{C_{TA}(T_B-25)-C_{TB}(T_A-25)} \times 100\%$$

Where:

T_C = Temperature coefficient

C_{TA} = Conductivity at Temperature A

C_{TB} = Conductivity at Temperature B

T_A = Temperature A

T_B = Temperature B

1. Press and hold the **ºC** key for 3 seconds to enter the temperature setting.
2. Press the ▲ or ▼ key to set the temperature to 25 °C.
3. Place the electrode into the sample solution A and record the temperature value T_A and conductivity value C_{TA}.
4. Condition the sample solution and electrode to a temperature that is about 5°C to 10°C different from T_A. Record the temperature value T_B and conductivity value C_{TB}.
5. Calculate the temperature coefficient according to the formula above.

Hazardous Substance Statement

METRIA Instruments is committed to the reduction and eventual elimination of all hazardous substances in both the manufacturing process and finished products we supply. We have an active manufacturing and procurement program to minimize and eliminate the use of harmful heavy metals such as cadmium, lead, mercury and the like. New technologies and design parameters are also promoting these efforts and we expect to have little or no such materials in our product in the coming years. We welcome our customer suggestions on how to speed up these efforts.



Warranty

The warranty period for meter is of two years from the date of shipment. Above warranty does not cover the sensor and calibration solutions. Out of warranty products will be repaired on a charged basis. The warranty on your meter shall not apply to defects resulting from:

- Improper or inadequate maintenance by customer.
- Unauthorized modification or misuse.
- Operation outside of the environment specifications of the products.

For more information, please contact the nearest authorized distributor.