

INSTRUCTION MANUAL

MT986

10A MICRO-OHMMETER



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1. DESCRIPTION

The MT986 Digital Micro OHM Meter is a hand-held testing device with the following measurement capabilities: Time, Resistance, Temperature and Length. It can be used as a $\mu\Omega$ (micro ohm) meter to measure resistance of precise bonding, detect the resistance of various shunts, the resistance of metallic materials, wires and cables, etc. The meter can calculate the length of cable according to the material, temperature and specification of the cable. There are eight programmable cable gauges.

2. SAFETY INSTRUCTIONS

2.1. Safety Symbols



WARNING: observe the instructions given in this manual; improper use could damage the instrument or its components.



Double-insulated meter

2.2. Electric Shock and Fire Hazard

- Do not connect this unit to live voltage.
- Do not expose this unit to rain or moisture.
- Do not use the unit if it is wet or damaged.
- Do not operate with the case open.
- Do not attempt to repair this unit, it contains no user serviceable parts.
- Do not expose the unit to extremes in temperature or high humidity, refer to "Specifications".
- Before opening the case, remove the test leads from the circuit and power off the unit.
- Using this unit near equipment that generates electromagnetic interference can result in unstable or inaccurate readings.
- Inspect the test leads and accessories before use, they must be clean and dry, and the insulation must be in good condition.
- Use this unit for the manufacturer's intended purpose only, as described in this manual, any other use can impair the protection provided by the unit.
- Failure to observe these warnings could result in severe injury or death.

3. FEATURES

- This instrument is designed with a large LCD allowing high-resolution readings and faster testing speeds.
- All tests are performed by four-wire method.
- Maximum resolution.
- Cable length measurement.
- Power supply from a 7.4V rechargeable li-ion battery.
- 4.0 Bluetooth Two-way communication.

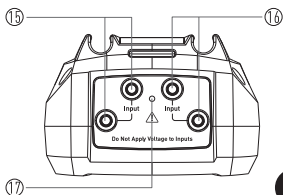
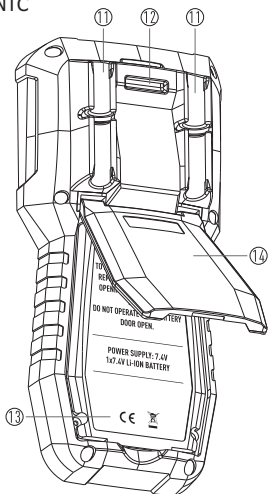
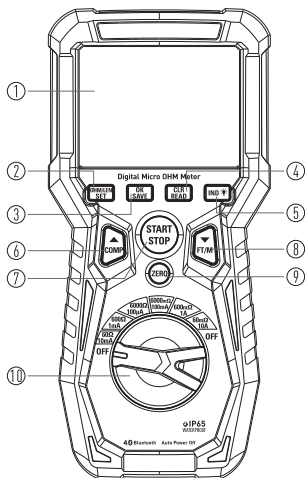
- Low-power indication.
- Auto Power Off.
- Data hold.
- Data storage of up to 999 readings.

4. DESCRIPTION

4.1. Meter Description

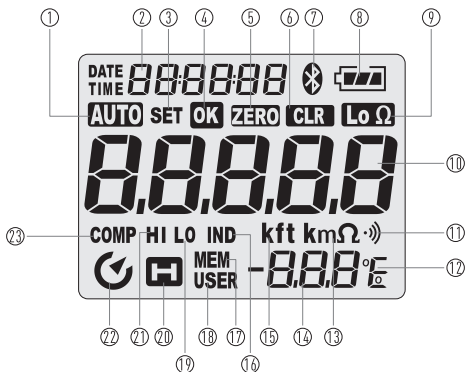
- 1 - LCD Display
- 2 - OHM/LEN/SET Button
- 3 - OK/SAVE Button
- 4 - CLR/READ Button
- 5 - IND/Backlight Button
- 6 - UP/COMP Button
- 7 - START/STOP Button
- 8 - DOWN and FT/M Button
- 9 - ZERO Button
- 10 - Rotary Selector Switch
- 11 - Test Lead Holders
- 12 - Lanyard Hole

- 13 - Battery Cover
- 14 - Tilt Stand
- 15 - Black Input Jack
- 16 - Red Input Jack
- 17 - NTC



4.2. Symbols and Annunciators

- | | |
|---|---|
| 1 - Automatic Range Prompt | 14 - Ambient temperature, Data record number, User select number indication |
| 2 - Date or Time Display Digits | 15 - k (kilo)/ft (feet) |
| 3 - Set Symbol | 16 - Inductance Test Function is Enabled (For reference only) |
| 4 - OK Symbol | 17 - Memory Function |
| 5 - Zero Symbol | 18 - User Select Mode Symbol |
| 6 - CLR Symbol | 19 - Low Limit Value Prompt |
| 7 - Bluetooth Function is Enabled | 20 - Data Hold |
| 8 - Battery Indicator | 21 - High Limit Value Prompt |
| 9 - Resistance Mode Symbol | 22 - Auto Power Off Function is Enabled |
| 10 - Measurement Display Digits | 23 - Comparison Function is Enabled |
| 11 - Buzzer Symbol | |
| 12 - Temperature Units (°C-Celsius/°F-Fahrenheit) | |
| 13 - k (kilo)/m (meters or milli)/Ω(ohms) | |



5. DESCRIPTION OF FUNCTION BUTTON

5.1. OHM/LEN/SET Button

- Short press the **OHM/LEN/SET** button to switch between resistance measurement and cable length measurement.
- Long press the **OHM/LEN/SET** button to enter the setting mode, a long press of the **OHM/LEN/SET** button will cycle the settings from COMP set, Bluetooth on or off, Date set, Time set, Auto Power Off switch on or off, and then to exit setting function.
- See operating instructions for details.

5.2. OK/SAVE Button

- The **OK/SAVE** button is used for Data storage function. Refer to “**Operation**” for a complete description of the programming process.

5.3. CLR/READ Button

- The **CLR/READ** button is used for Data read function. Refer to “**Operation**” for a complete description of the programming process, see operating instructions for details.
- Press the **CLR/READ** button to exit the data read function.

5.4. IND/Backlight Button

- Press the **IND/Backlight** button to turn on/off the backlight.
- Hold down the **IND/Backlight** button to turn on/off the IND function.
- If the **IND** function is enabled, the meter will automatically switch to inductive resistance measurement mode (for reference only).

5.5. UP/COMP Button

- Press the **UP/COMP** button used during the user-selected programming process or comp function, see operating instructions for details.
- Hold down the **UP/COMP** button to turn the COMP function on/off , see operating instructions for details.

5.6. START/STOP Button

Press the **START/STOP** button to start or stop the measurement.

5.7. DOWN and FT/M Button

- Press the **DOWN** and **FT/M** button used during the user-selected programming process or comp function, see operating instructions for details.
- Hold down the **DOWN** and **FT/M** button to switch the length unit in the mode of measuring cable length.

5.8. ZERO Button

Press the **ZERO** button to clear the measurement result.

6. OPERATING INSTRUCTIONS

WARNING: Do not connect the unit to live voltage.
--

6.1. Calibration Procedure

1. Each time the meter is turned **ON**, it should be calibrated before use.
2. Set the rotary switch from the **OFF** Position to the desired range.
3. Connect the two red leads (the red set of kelvin clips are plugged into the red terminals on the meter).
4. Connect the two black leads (the black set of kelvin clips are plugged into the black terminals on the meter).
5. Connect the two kelvin clips to the supplied copper rod, move the clips

as close together as possible without letting them touch, see **Fig 1**.

Note: Make sure the calibration bar and kelvin clips jaws are clean.

6. Press the **START/STOP** button to start testing.

7. When the readout data is stable, press the **ZERO** button. This will complete the zeroing of the test leads.

8. Remove the two Kelvin clips from the supplied copper rod.

Note: The zeroing procedures for all ranges are the same.

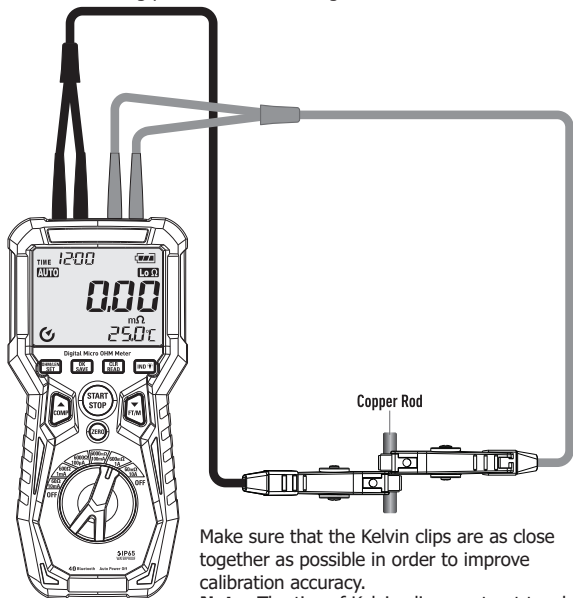


Fig 1.

6.2. Resistance Measurement

1. Set the rotary switch from the **OFF** Position to the desired range, calibrate the meter as described in "**Calibration Procedure**".
2. Connect kelvin clips to the object under test
3. Press the **START/STOP** button to start the measurement, for inductive resistance tests, hold down the **IND/Backlight** button, LCD will display **IND** and the meter will automatically switch to inductive resistance measurement mode (for reference only).

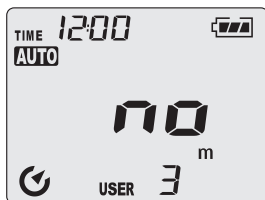
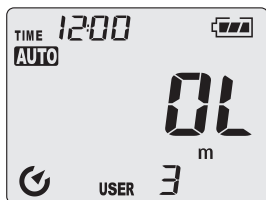
- Wait until the display stays stable and provides the reading on the LCD display

6.3. Measuring Temperature (Resistance Measurement)

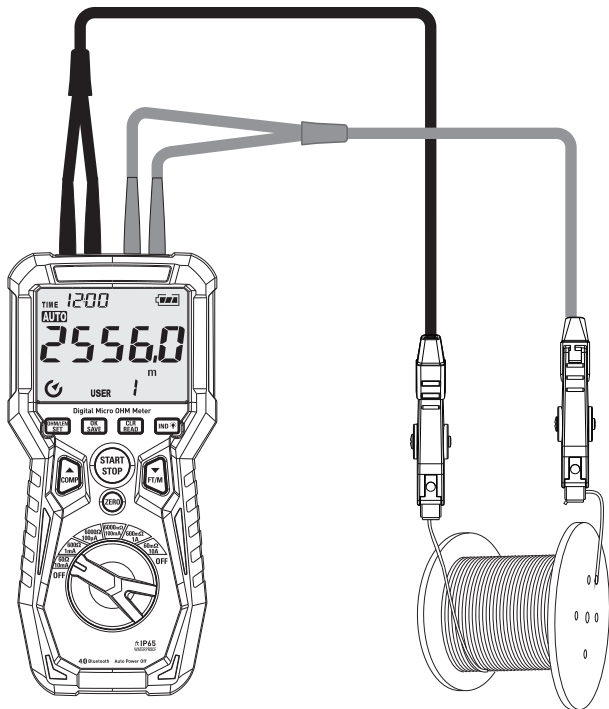
- In resistance measurement mode, the temperature is displayed in the lower right corner of the LCD.
- When the temperature is lower than -10°C or 14°F, the display will show “-OL”.
- When the temperature is higher than 59°C or 138°F, the display will show “OL”.
- Press and hold the **DOWN** and **FT/M** button to select °C /°F when in resistance measurement mode.

6.4. Measurement of Wire Length

- Set the rotary switch from the **OFF** Position to the desired range, calibrate the meter as described in “**Calibration Procedure**”.
- Short press the **OHM/LEN/SET** button to switch to length measurement.
- Press the **UP/COMP** or **DOWN** and **FT/M** button to select the user-defined mode, and there are 8 user defined modes (1 - 8) on the meter, the selected modes are displayed in the upper left corner of the screen.
- Press the **START/STOP** button to start the measurement.
 - If the location has already been programmed, “OL” appears on the LCD, Continue with the following steps.
 - If “no” appears, see **Programming Procedure** for details.



- For best results, allow the meter and the cable to be measured to attain the same ambient temperature, typically, it will take about 30 minutes.
- Strip the insulation back on each end of the wire to be measured.
Note: make sure both ends of the wire are clean and the conductor is fully exposed, use abrasive paper to remove oxide layer on each end if necessary.
- Press the **START/STOP** button to start the measurement.
- Wait until the display stays stable and take the reading on the LCD.
- Hold down the **DOWN** and **FT/M** button to select the desired unit (1m=3.281ft).



6.5. Programming Procedure

WARNING: Do not connect the unit to live voltage or charged cable.

Note: The sample length of user wires must be between 1m and 100m in METER mode or between 3.3ft and 320ft in FEET mode.

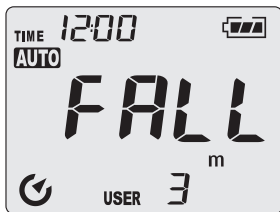
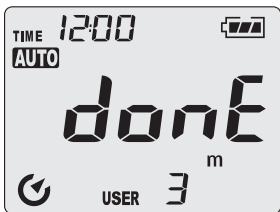
1. Set the rotary switch from the **OFF** Position to the desired range, calibrate the meter as described in "**Calibration Procedure**".
2. Press the **OHM/LEN/SET** button to switch to length measurement.
3. Press the **UP/COMP** or **DOWN** and **FT/M** button to select the user-defined mode.
4. For best results, allow the meter and the sample wire to be measured to attain the same ambient temperature usually around 30 minutes.

5. Remove the insulation at both ends of the cable under test.

Note: Make sure that the two conductors of the cable under test are clean and fully exposed, and that the insulation must be removed to make it easier for the test clip to fully clamp the cable, if desired, use grinding pads to clean the exposed cables.

Note: A solid, stable and clean connection between the Kelvin clips and the test cable will ensure accurate and repeatable test measurements.

6. Hold down the **OHM/LEN/SET** button. The meter enters sample cable length setting mode, "**SET**" button appears on the LCD; in this mode, the display alternately show "**OK**" and "**CLR**", the length value will also flash.
7. Press the upper end of the **UP/COMP** or **DOWN** and **FT/M** button to increase or press the lower end of this button to decrease the reading on the display in 0.1 increments, adjust the reading until it equals the length of the sample wire measured.
8. Connect an Kelvin clip to one end of the sample cable and the other Kelvin clip to the other end of the cable under test.
9. Press the **OK/SAVE** button to enter Calibration; press the **CLR/READ** button to exit the Calibration.
- When pressing the **OK/SAVE** button, if the display shows "**donE**" briefly then the meter will return to measurement mode, the setting is successful, and the meter exits the Calibration.
 - If the display shows "**FALL**", the setting has failed and you should check whether the connections and contacts are correct and good.



10. When the meter shows "**FALL**", the display alternately shows "**OK**" and "**CLR**",
- Pressing the **OK/SAVE** button will erase the stored data in the selected memory location and the meter will return to measurement mode and the selected memory location will be empty.
 - Pressing the **CLR/READ** button will cause the meter to return to measurement mode.

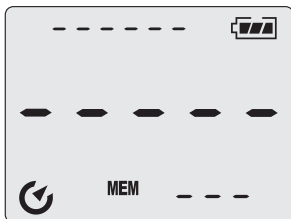
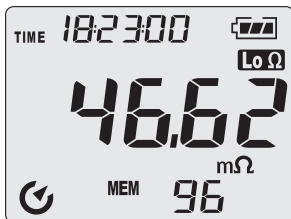
6.6. Save, Read and Clear the Data

6.6.1. Save Data

Under the measurement state, press the **OK/SAVE** button to save data with maximum amount up to 999 readings.

6.6.2. Read Data

- When the meter is in the ready or test state, long press the **CLR/READ** button, the meter displays the last saved data, then press the **UP/COMP** or **DOWN** and **FT/M** button to show the previously saved data.
- When the last saved data is displayed, press the **UP/COMP** button, the first one will be displayed; while the first saved data is displayed, press the **DOWN** and **FT/M** button, the last one will be displayed, and so on.
- If no data is saved, the meter displays "-----".

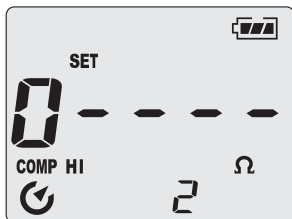


6.6.3. Clear Data

- While checking the saved data, the presently displayed data may be cleared by a short press of the **CLR/READ** button.
- The LCD displays "**CLR**" to prompt if all saved data is cleared after holding down the **CLR/READ** button.
- Press the **CLR/READ** button, all saved data will be cleared.
- To exit and return to checking data, press the **OK/SAVE** or **OHM/LEN/SET** button.

6.7. Set the High/Low Limit Comparative Value (Resistance Measurement)

- Hold down the **OHM/LEN/SET** button when on the resistance selection, "**SET**" appears on the LCD and "**COMP**" starts flashing.
- Press the **OK/SAVE** button to set the high limit comparative value, the main display area displays "0--" the input area, and the highlighted "0" indicates the current input digit, the value in the lower right corner refers to the current group number of the high/low limit warning value.



3. Set the High/Low comparative value, short press the **OHM/LEN/SET** button to change the high limit comparative value or low limit comparative value.
4. Select the unit of resistance, after each long press on the **DOWN** and **FT/M** button, the unit will display "**Ω, mΩ, kΩ**", the same group of high lowers comparative value should have the same unit.
5. Input comparative value, input the length no more than 5 digits, the current input digit will flash, switch the current input digit forward or backward by pressing the **OK/SAVE** button, or to increase or decrease numerical value (0-9) by pressing the **UP/COMP** or **DOWN** and **FT/M** button.
6. After getting the correct input, hold down the **OK/SAVE** button, the meter will save the high and low limit comparative values (30 groups of comparative values may be set), wait to set the high and low limit warning values, if there is no need to set the next group of high and low limit warning values, press the **CLR/READ** button to exit and return to the interface to proceed with measurement.

6.8. Comparing Function

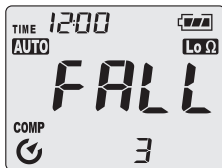
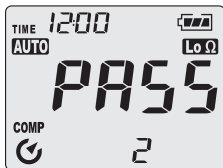
If the comparing function is to be activated, take following steps:

1. Select or delete the set comparative value:

- Hold down the **UP/COMP** button, the meter will recall the last group of high and low limit warning values (warning value).
- Press the **UP/COMP** or **DOWN** and **FT/M** button to display the set of high and low limit comparative values in a cycle.
- Press the **CLR/READ** button to delete the currently displayed group of high and low limit comparative values.
- If no high and low limit values were previously set, the meter will automatically jump to the high and low limit comparative value. Set the High/Low limit comparative value.

2. Start or exit comparing function:

- Press the **START/STOP** button to activate the currently selected high and low limit value and start testing, when the measured value exceeds the set range, the buzzer will sound, and "**PASS**" and "**FAIL**" will be displayed accordingly.



- Hold down the **UP/COMP** button to exit the comparing function.

6.9. Bluetooth Function

If the Bluetooth function is activated, the user can transfer data from the instrument to the Meter-X app.

1. Hold down the **OHM/LEN/SET** button while on the resistance mode after turing the meter on, "**SET**" appears on the LCD and "**COMP**" starts flashing.
2. Hold down the **OHM/LEN/SET** button again, and "**Bluetooth**" starts flashing.
3. Press the **OK/SAVE** button to switch to the Bluetooth function settings. LCD shows "**Bluetooth**" and "on".
4. Press the **UP/COMP** or **DOWN** and **FT/M** button to change the setting for the Bluetooth function, if Bluetooth is on, the LCD will show "on", if not the LCD will show "**OFF**".
5. Press the **CLR/READ** button to exit and return to the measurement interface.

6.10.SET Date

1. Hold down the **OHM/LEN/SET** button while on resistance measurement interface after startup, "**SET**" appears on the LCD, and "**COMP**" starts flashing.
2. Hold down the **OHM/LEN/SET** button, and "**Bluetooth**" starts flashing.
3. Hold down the **OHM/LEN/SET** button again, and "**DATE**" starts flashing.
4. Press the **OK/SAVE** button to set date, the year digit starts flashing.
5. Press the **OK/SAVE** button to switch between year, month and day.
6. Press the **UP/COMP** or **DOWN** and **FT/M** button to increase or decrease numerical value.
7. Hold down the **OK/SAVE** button to save the settings.
8. Press the **CLR/READ** button to exit and return to the measurement interface.

6.11. SET Time

1. Hold down the **OHM/LEN/SET** button when on the measurement interface after startup, "**SET**" appears on the LCD, and "**COMP**" starts flashing.
2. Hold down the **OHM/LEN/SET** button, and "**Bluetooth**" starts flashing.
3. Hold down the **OHM/LEN/SET** button, and "**DATE**" starts flashing.
4. Hold down the **OHM/LEN/SET** button again, and "**TIME**" starts flashing.
5. Press the **OK/SAVE** button to set time, the hour digit starts flashing.
6. Press the **OK/SAVE** button to switch between hour, minute and second.
7. Press the **UP/COMP** or **DOWN** and **FT/M** button to increase or decrease numerical value.
8. Hold down **OK/SAVE** button to save the settings.

9. Press the **CLR/READ** button to exit and return to the measurement interface.

6.12. Auto Off

- The Meter automatically turns off after 10 minutes of inactivity when auto-off is active.
- If the Meter has automatically shut down, restart it by pressing any key or turning the rotary switch.
- To disable the Auto Off feature, take following steps:
 1. Hold down the **OHM/LEN/SET** button at the interface of resistance to be measured after startup, "**SET**" appears on the LCD, and "**COMP**" starts flashing.
 2. Hold down the **OHM/LEN/SET** button again, and "" starts flashing.
 3. Hold down the **OHM/LEN/SET** button again, and "**DATE**" starts flashing.
 4. Hold down the **OHM/LEN/SET** button again, and "**TIME**" starts flashing.
 5. Hold down the **OHM/LEN/SET** button again, and "" starts flashing.
- 6. Press the **OK/SAVE** button to switch auto off function, LCD shows "" and "**on**".
- 7. Press the **UP/COMP** or **DOWN** and **FT/M** button to switch function, if auto off is on, the LCD will show "**ON**", otherwise the LCD will show "**OFF**".
- 8. Press the **CLR/READ** button to exit and return to the measurement interface.

7. MAINTENANCE

WARNING: Before opening the case, remove the test leads from the circuit and switch off the unit.

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

- Keep the meter dry, if it gets wet, wipe it.
- Use and store the meter in normal temperatures, extreme temperatures can shorten the life of the electronic parts and damage the Li-ion battery or distort and melt plastic parts.
- Handle the meter gently and carefully, dropping it can damage the electronic parts or the case.
- Keep the meter clean, wipe the case occasionally with a damp cloth, do not use chemicals, cleaning solvents, or detergents.
- If the meter is to be stored for a long period of time, the batteries should be removed to prevent damage to the unit.

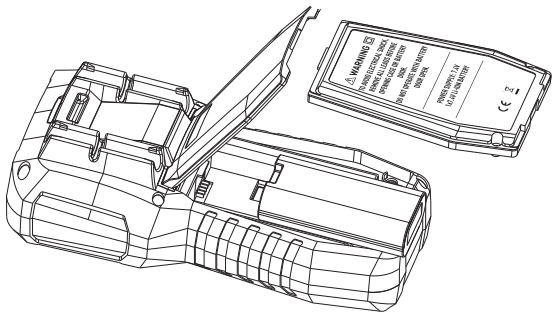
7.1. Recharging the Internal Battery

When the LCD displays symbol "  ", it is necessary to recharge the battery.

WARNING: To avoid electric shock, disconnect the test leads from any source of voltage before removing the battery cover.

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

1. Turn the Meter off and remove the test leads from the terminals.
2. Remove the battery cover.
3. Remove the battery (7.4V Li-ION battery) and recharge it.
4. Once charged replace the battery in the battery compartment and close the battery cover.



7.2. Cleaning the Instrument

- Use a soft and dry cloth to clean the instrument.
- Never use wet cloths, solvents, water, etc.

7.3. Disposing of the Instrument

WARNING: The symbol  on the instrument indicates that the appliance and its accessories must be collected separately and correctly disposed of.

8. SPECIFICATIONS

8.1. Range and Accuracy

8.1.1. Resistance Measurement

Range	Resolution	Accuracy	Protection Against Overcharge
6000Ω/100μA	0.0001kΩ	±(0.25%+50)	Max 60V Overload Protection
600Ω/1mA	0.01Ω	±(0.25%+30)	
60Ω/10mA	0.001Ω	±(0.25%+20)	
6000m/100mA	0.0001Ω		
600mΩ/1A	0.01mΩ		
60mΩ/10A	0.001mΩ	±(0.25%+25)	

8.1.2. Length Measurement

Range	Resolution	Accuracy	Protection Against Overcharge
50-30000m (6000Ω/100μA)	0-2000m: 0.1m 2000-20000m: 1m	±(2%+0.3km)	Max 60V Overload Protection
5-30000m (600Ω/1mA)	20000-30000m: 0.01km	±(1%+0.01km)	
1-3000m (60Ω/10mA)		±(1%+1m)	
0.1-300m (6000mΩ/100mA)		±(0.5%+0.5m)	
0.1-30m (600mΩ/1A)			
0.1-3m (60mΩ/10A)			

8.1.3. Temperature Measurement

Range	Resolution	Accuracy
-5 to 50°C	0.1°C	±(2.0%+1.8°C)
23 to 122°F	0.1°F	±(2.0%+3.5°C)

Note:

- The range and accuracy of length measurement are related to the material, cross-sectional area and temperature of the cable. The above data is based on a copper conductor of 1mm² square at 25°C, for reference only.
- Length unit: 1m = 3.281ft

8.2. General Specifications

Function	Range
Display	99999 counts LCD display
Low Battery Indication	"  " is displayed
Over-Range Indication	"OL" display
Operating Temperature	0 to 40°C (32 to 104°F)
Storage Temperature	-20 to 60°C (-4 to 140°F)
Operating Humidity	Max 80% up to 31°C (87°F) decreasing linearly to 50% at 40°C (104°F)
Storage Humidity	<80%
Operating Altitude	2000meters (7000ft.) maximum.
Drop Protection	1m (3.3ft)
Battery	1 x 7.4V rechargeable Li-ION battery, 2600mAh
Battery Charger Power Supply	100/240VAC, 50/60Hz, 12VDC, 2A
Auto Power	After approx. 15 minutes (May be disabled)
Dimensions	212 x 100 x 67mm
Weight	600g

9. ACCESSORIES PROVIDED

- Carrying Bag
- User Manual
- Copper Rod
- Kelvin Clips x 2
- 1 x 7.4V Rechargeable Li-ION Battery (Battery charger)

10. APP DOWNLOAD

- Download Meter-X APP to connect with the meter to get more functionality.
- Search the APP name Meter-X on App Store (for iOS) or Google play (for Android) or scan the QR code to download the APP.





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