TENMARS

# SOLAR POWER METER
# TM-206

## User's Manual


CE

HB1TM2060000

**CONTENTS**

## 1. FOREWORD

Solar meter: a device used to measure solar power. From the moment you buy such a product, your future is not uncertain any more. When the sun shines recklessly, just take the TM-206 and aim its opening at the sun, and you will see how powerful the sun is. If you want your skin white, you surely cannot do without it!

Measurement: Expressed by $W/m^2$ or BTU ($ft^2$*h).

## 2. SAFETY PRECAUTIONS AND PROCEDURES

This instrument conforms with safety Standard EN 61010-1 related to electronic measuring instruments.

For your own safety and to avoid damaging the instrument follow the procedures described in this instruction manual and read carefully all notes preceded by this symbol ⚠.

**CAUTION**

For your own safety and to avoid damaging the instrument follow the procedures described in this instruction manual and read carefully all notes preceded by this symbol ⚠.

When taking measurements:

- Be particularly careful when measuring voltages exceeding 20V to avoid risks of electrical shocks.
- Avoid doing that in humid or wet places.

Avoid doing that in rooms where explosive gas, combustible gas, steam or excessive dust is present.

- Keep you insulated from the object under test.

Do not touch exposed metal parts such as test lead ends, sockets, fixing objects, circuits etc.

- Avoid doing that if you notice anomalous conditions such as breakages, deformations, fractures, leakages of battery liquid, blind display etc.

## 3. APPLICATIONS

- Transmission measurement is most suitable for measuring the effectiveness of the solar film.
- Solar radiation measurement.
- Car windows light intensity measurement.
- Optimal incident angle for the solar panel.
- Measurement of the sun’s transmission through transparent and film glass
- Convenient, no need to adjust, data displayed clearly.

## 4. FEATURES

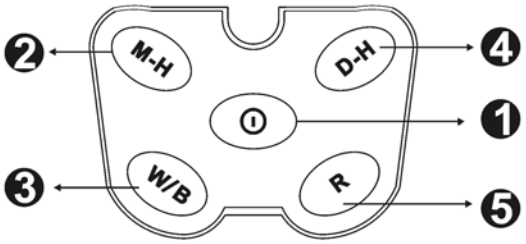
- Super low price, high precision.
- Measurable light sources, including all visible light.
- Overload display OL.
- Select either $W/m^2$ or BTU / ($ft^2$*h) units1
- Stable for long use.

## 5. NAME AND FUNCTION OF EACH PART

### 5.1. THE LCD DISPLAY SHOWS:

| | |
|---|---|
|  | 1. Data hold .<br>2. Max. value.<br>3. Min. value.<br>4. Decimal point.<br>5. numeral screen.<br>6. W/m$^2$<br>7. BTU (ft$^2$*h)<br>8. Low battery indicator |

### 5.2. BUTTONS:

| | |
|---|---|
|  | 1. Power button<br>2. Lock up Max. and Min button<br>3. W/m$^2$ / BTU (ft$^2$*h) switch button<br>4. Data Hold button.<br>5. Auto Range |

### 5.2.1. Power button  :

- Press the “  ” button to turn ON the power. The display comes alive.
- Press the “  ” button once again to turn OFF the power and put the device go into sleep mode. The display changes from light to dark.

### 5.2.2. Lock up Max. and Min button:

- When you test in W/m$^2$ or BTU (ft$^2$*h) press the “  ” button to display the max. or min. reading.
- Press and hold the “  ” button for 1 second to allow the device to read the max. value. Press the button one more time to read the min. value.
- Press and hold the “  ” button for more than 1 second, and the max. and min. come off.
- When the “  ” button is functional, the “  ” button is disabled.

### 5.2.3. BTU (ft$^2$*h) / W/m$^2$ button  :

- Press the “  ” button to turn ON the power and put the device to operating mode. The screen displays BTU (ft$^2$*h). Press the “  ’ button to switch from BTU (ft$^2$*h) to W/m$^2$. To select a different unit, just press this button once again.

### 5.2.4. Data hold button:

- Press the “  ” button to go into hold mode, and “ **D-H**” appears on the screen to allow you to read the data. Press this button once again to deactivate it.

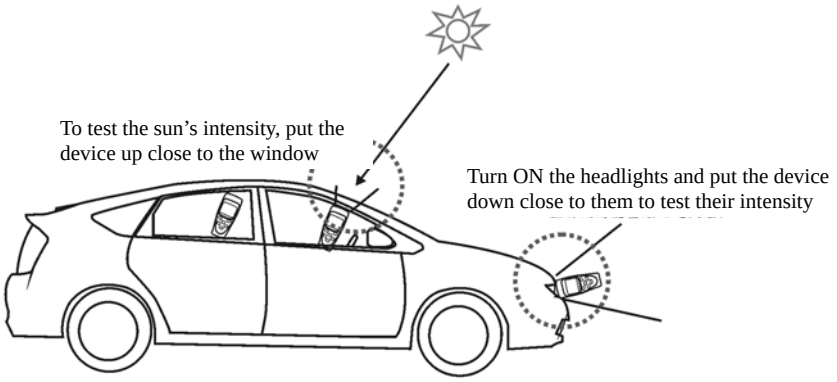
**5.2.5. Auto Range button** Large integrated circuit design  **:**

- Press the “  ” power button to turn ON the power and put the device to operating mode. If “**199.9**” comes up on the screen, it suggests
- the device will become overloaded or has become overloaded “**OL**”. In this case, press the “  ” button, and “**1999**” or your acquired value then comes up.

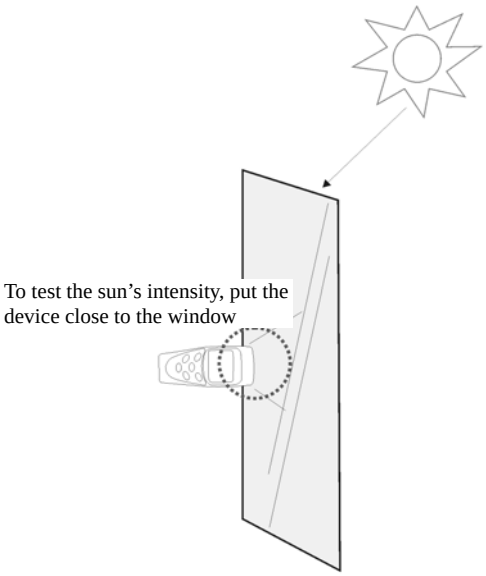
**5.3. TEST PROCEDURE**

- Press the ZERO adjustment for the zero adjustment if any digits is appear
- If performing the zero adjustment after powering on, several digits may not disappear. In this case, perform the zero adjustment again.
- Measure your car’s headlights:
- Turn ON your car’s headlights. Then turn ON the TM-206 solar meter, and “00.0” appears on the screen. Put the device down close to the headlights. Switch between high beam and low beam, and light intensity values appear on the screen. Both the right and left headlights must be tested. Note the values and put them in your car for reference. (Picture 2)
- Measure the effect of solar insulation of your vehicle’s windows:
- Press the “  ” button to turn ON the TM-206 solar meter, “00.0” appears on the screen. Aim the device at the sun and close to a window, and the intensity appears on the screen. Open the window and aim the device at the sun. Compare the value against that acquired when the window is closed to understand the efficiency of the window’s solar film. Test your new car and preserve the measurements in it. After that, test it at least once every year. (Picture 2)
- NOTE.：When the light sensor cover is not attached “CAP” is indicated. Make sure that it is attached. If performing the zero adjustment after powering on, several digits may not disappear. In this case, perform the zero adjustment again.

Picture 2:




Picture 3




- Measure the solar insulation effect of your house's windows:
- Close the window. Press the "  " button on your TM-206 solar meter, and "00.0" comes up on the screen. Put the device close to the window and aim it at the sun. Compare the value against that acquired when the window is closed and the device is placed at the same position,
- in order to understand the window's heat efficiency. (Picture 3)

## 6. ELECTRIC SPECIFICATION

- Battery life: approx. 100 hr.
- Accuracy：typically within ± 10W/$m^2$ [ ±3 BTU / ($ft^2$*h) ] or ±5% , whichever is greater in sunlight; Additional temperature induced error ±0.38W/$m^2$ / ℃ [ ±0.12 BTU / ($ft^2$*h)/ ℃] from 25℃ , 15% other visible light source
- Operating temp. & RH: 5°C~40°C, below 80%RH.
- Storage temp. & RH: -10 °C ~60 °C, below 70%RH.
- DISPLAY：3-1/2 digits LCD with maximum reading 1999.
- Sampling Time：Approx. 0.25 second
- Resolution：1W/$m^2$、1 BTU /($ft^2$*h).
- Accuracy: < ±3/year
- Over-input：Display shows" OL".
- Range：1999W/$m^2$ 、634 BTU /($ft^2$ * h).
- Dimensions & weight: 132(L) x 60(W) x 38 (H)mm, approx. 150g.
- EMC: this instrument is EMC-compliant and has undergone compatibility tests according to EN61326 (1997) + A1 (1998) + A2 (2001).

### ACCESSORIES

- User manual.
- 9V battery(NEDA 1604 IEC 6F 22 JIS 006P)*1
- carrying case.

## 7. SAFETY AND MAINTENANCE STANDARDS

- Operating altitude: below 2,000m.
- Operating environment: for indoor use, expose to pollution level II.
- This is a precision device. During use or storage, do not go beyond its spec. to prevent any possible damage or danger.
- Do not put this device in direct sunlight or where it is hot and/or damp.
- Remember to turn OFF the power after use. For long storage, remove the battery to prevent the battery from leaking to cause damage to the parts inside.
- Clean the device with a dry soft cloth. Wet cloths, liquid and water are prohibited.

## 8. BATTERY REPLACEMENT

When the symbol "[+ -]" is displayed, batteries need replacement.

| CAUTION |
| --- |
| Before replacing batteries disconnect the test leads from any energized circuits to avoid electrical shocks. |

Turn OFF the meter and disconnect the test leads from the input terminals.

- Unscrew the battery cover and remove the battery. Insert a new battery of the same type (9V NEDA1604, JIS006P, IEC6F22) observing the proper polarity, re-screw the battery cover and reposition the protective holster.

## 9. SERVICE

Warranty Conditions

This instrument is guaranteed for one year against material or production defects, in accordance with our general sales conditions. During the warranty period the manufacturer reserves the right to decide either to repair or replace the product. Should you need for any reason to return back the instrument for repair or replacement take prior agreements with the local distributor from whom you bought it. Do not forget to enclose a report describing the reasons for returning (detected fault). Use only original packaging. Any damage occurred in transit due to non original packaging will be charged anyhow to the customer.

The warranty doesn't apply to:

- Accessories and batteries (not covered by warranty).
- Repairs made necessary by improper use (including adaptation to particular applications not foreseen in the instructions manual) or improper combination with incompatible accessories or equipment.
- Repairs made necessary by improper shipping material causing damages in transit.
- Repairs made necessary by previous attempts for repair carried out by non skilled or unauthorized personnel.
- Instruments for whatever reason modified by the customer himself without explicit authorization of our Technical Dept.

Service

Shouldn’t the instrument work properly, before contacting your distributor make sure that batteries are correctly installed and working, check the test leads and replace them if necessary.

Should you need for any reason to return back the instrument for repair or replacement take prior agreements with the local distributor from whom you bought it. Do not forget to enclose a report describing the reasons for returning (detected fault). Use only original packaging. Any damage occurred in transit due to non original packaging will be charged anyhow to the customer.

The manufacturer will not be responsible for any damage to persons or things.

## 10. END OF LIFE

Caution: this symbol indicates that equipment and its accessories shall be subject to a separate collection and correct disposal

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