

# ANAHEIM SCIENTIFIC®

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## User Manual

Model M140

Mini Solar Power Meter



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# 1 Introduction

Thank you for purchasing a M140 Solar Power Meter from Anaheim Scientific. The M140 measures solar irradiance in units of  $W/m^2$  or  $[BTU/(ft^2 \cdot h)]$ . Durable and reliable the M140 is easy to use.

## 1.1 The M140 Features:

- Super low price, high precision
- Measurable light sources include all visible light
- Overload display OL
- Select either  $W/m^2$  or  $[BTU/(ft^2 \cdot h)]$  units
- Power off: Manual on/off by push button, or auto shut-off after 15 minutes

## 1.2 The M140 Applications:


- Solar power evaluations
- Finding the optimal incident angle for solar panels
- Measurement of the sun's transmission through transparent and opaque materials

## 2 Safety Summary




### CAUTION

Adhere to the following conditions for safe and effective usage of this meter

- Do not operate the meter in an environment filled with combustible gas, liquids, dust or fibers
- In order to avoid reading incorrect data, please replace the battery immediately when the symbol "" appears on the LCD
- For long storage, remove the battery to prevent the battery from leaking causing damage
- Operating Environment: This meter is designed for use with in Pollution Degree 2
- Operating Environment: 5°C ~ 40°C, <80% RH, ≤2km altitude
- Storage Environment: -10 to 60°C, <70% RH
- Clean the device with a dry soft cloth. Wet cloths, liquid and water are prohibited.

### 3 Compliance Statements

	<p><b>Caution:</b> This symbol indicates that the equipment and its accessories are subject to special collection and disposal procedures</p>
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This meter is EMC compliant and has undergone tests according to EN61326 (1997) + A1 (1998) + A2 (2001)

### 4 Product Contents and Inspection

This unit is tested prior to shipment. It is therefore ready for immediate use upon receipt. An initial physical inspection should be made to ensure that no damage has been sustained during shipment.

Inspect the packing box on receipt for any external damage. If any external damage is evident, remove the instrument and visually inspect its case and parts for any damage. If damage to the instrument is evident, a description of the damage should be noted on the carrier's receipt and signed by the driver or carrier agent. Save all shipping packaging for inspection. Forward a report of any damage to the agent through which the unit is procured.

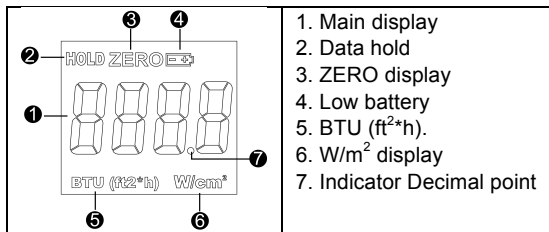
Retain the original packing in case subsequent repackaging for return is required. Use of the original packing is essential.

After the mechanical inspection, verify the contents of the shipment. The items included in this package are:

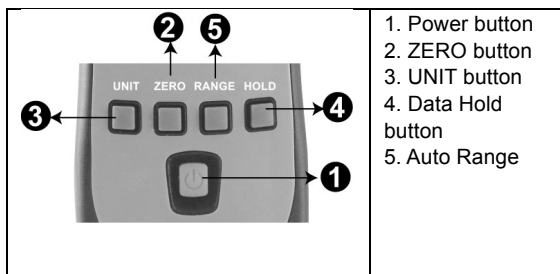
- M140 Meter
- User Manual
- Carrying Case
- 2 x AAA Batteries

## 5 Device Description

### 5.1 LCD Display:





## 5.2 Control Buttons:




## 6 Device Operation

### 6.1 “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 into sleep mode. The display changes from light to dark.

### 6.2 “ZERO” Button:


You should always make sure the meter is “zeroed out.” This means that when in complete darkness the

meter reads “0.00”. With the solar sensor covered, press the “” button for the zero adjustment. When the light sensor cover is not attached properly, “CAP” is indicated.


### 6.3 “UNIT” Button:

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

### 6.4 Data “HOLD” Button:

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



### 6.5 Auto “Range” Button:

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

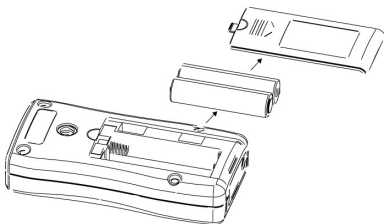


the device will become overloaded or has become overloaded "OL". In this case, press the "HOLD" button, and "1999" or your acquired value then comes up.

## 6.6 Battery Replacement:

	<p style="text-align: center;"><b>WARNING</b></p> <p>If the symbol "  " appears on the LCD, please replace the battery immediately</p>
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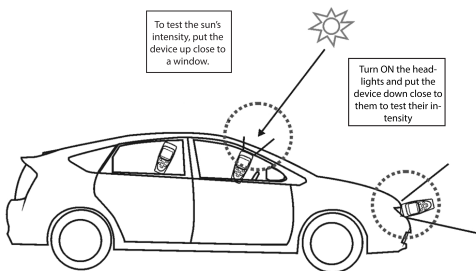
- Remove the battery cover
- Noting the polarity, replace the battery.
- Install the battery cover.



## 7 Testing Examples

- Measure your car's headlights.

Turn ON your car's headlights. Then turn ON the solar meter and "000.0" appears on the screen. Put the device down close to the headlights. Switch between high beam and low beam, and light intensity values



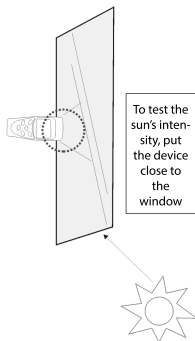
appear on the screen. Both the right and left headlights must be tested. Note the values and put them in your car for reference.

- Measure the effect of the solar insulation of your car's windows:

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.

- Measure the effect of the solar insulation of your house's windows:

Close the window. Press the “☀️” button on your TM-750 solar meter, and “000.0” 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.



## 8 Technical Specifications

<b>Accuracy</b>	Typically within $\pm 10\text{W/m}^2$ [ $\pm 3$ BTU / (ft <sup>2</sup> *h) ] or $\pm 5\%$ , whichever is greater in sunlight; Additional temperature induced error $\pm 0.38\text{ W/m}^2/\text{ }^\circ\text{C}$ [ $\pm 0.12$ [BTU/(ft <sup>2</sup> *h)]/ $^\circ\text{C}$ ] from 25 $^\circ\text{C}$
<b>Resolution</b>	0.1W/m <sup>2</sup> or 0.1 [BTU/(ft <sup>2</sup> *h)]
<b>Range</b>	1999 W/m <sup>2</sup> or 634 [BTU/(ft <sup>2</sup> *h)]
<b>Accuracy Attenuation</b>	< $\pm 3\%$ /year
<b>Display</b>	3 $\frac{3}{4}$ digits LCD with maximum reading 3999
<b>Sampling Rate</b>	About .25 seconds
<b>Power Supply</b>	2 AAA Batteries
<b>Battery life</b>	50 hours during consecutive use
<b>Dimensions</b>	134 × 48 × 27 mm (H × W × D)
<b>Weight</b>	90g
<b>Warranty</b>	Limited two-year warranty

## 9 Service, Repairs, Calibration

- The following are instructions regarding policies for servicing, repairing or calibrating Anaheim Scientific products. Turnaround time is usually less than ten (10) working days unless expedited service is requested and pre-arranged.
- Send an email to [service@anaheimscientific.com](mailto:service@anaheimscientific.com) requesting an RMA number specifying your request for either service/repair and/or calibration with your product's model number.
- Once you receive a reply from [service@anaheimscientific.com](mailto:service@anaheimscientific.com), you will be asked to ship prepaid to the address below. Package the unit carefully using filler or bubble wrap, and if possible, ship in the original box. Ship each unit separately. (Anaheim Scientific is not responsible for any shipping damage that may occur.)
- Include a packing list with each unit shipped stating what type of service is required and include the return shipping information: name, address and telephone number.
- If the unit is in warranty, please provide the following: proof of purchase or copy of the original invoice.
- If the unit is out of warranty, prepayment is required by Check, Money Order or Credit Card.
- Return all merchandise to Anaheim Scientific with pre-paid shipping. The flat-rate repair charge for Non-Warranty Service does not include return

shipping. Return shipping to locations in North American is included for Warranty Service.

- For overnight shipments and non-North American shipping fees please contact Anaheim Scientific

Anaheim Scientific  
ATTN: Service/Repair  
22820 Savi Ranch Parkway  
Yorba Linda, CA 92887

[www.anaheimscientific.com](http://www.anaheimscientific.com)

## 10 Limited Two-Year Warranty

- Scientific warrants to the original purchaser that its products and the component parts thereof, will be free from defects in workmanship and materials for a period of two years from date of purchase.
- Anaheim Scientific will, without charge, repair or replace, at its option, defective product or component parts. Returned product must be accompanied by proof of the purchase date in the form of a sales receipt.
- To help us better serve you, please complete the warranty registration for your new instrument via our website [www.anaheimscientific.com](http://www.anaheimscientific.com)
- Exclusions: This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. The warranty is void if the serial number is altered, defaced or removed.
- Anaheim Scientific shall not be liable for any consequential damages, including without limitation damages resulting from loss of use. Some states do not allow limitations of incidental or consequential damages. So the above limitation or exclusion may not apply to you.
- This warranty gives you specific rights and you may have other rights, which vary from state-to-state.

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