

SRS-200 with optional Leveling Plate and Mounting Bracket



SRS-200 Solar Radiation Sensor Installation and Setup Instructions

Revision 2.3

July 2022

Disclaimer

The following warranty and liability disclaimer apply to this product.

PACE SCIENTIFIC INC ("PACE") MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE REGARDING ITS HARDWARE AND SOFTWARE PRODUCTS. PACE DOES NOT WARRANT, GUARANTEE OR MAKE ANY REPRESENTATIONS REGARDING THE USE OR THE RESULTS OF THE USE OF ITS HARDWARE AND SOFTWARE PRODUCTS IN TERMS OF THEIR CORRECTNESS OR OTHERWISE. THE ENTIRE RISK AS TO THE RESULTS AND PERFORMANCE OF ITS HARDWARE AND SOFTWARE PRODUCTS IS ASSUMED BY YOU. THE EXCLUSION OF IMPLIED WARRANTIES IS NOT PERMITTED BY SOME STATES. THE EXCLUSION MAY NOT APPLY TO YOU"

"IN NO EVENT WILL PACE, ITS OFFICERS, EMPLOYEES OR AGENTS BE LIABLE TO YOU FOR ANY CONSEQUENTIAL, INCIDENTAL OR SPECIAL DAMAGES (INCLUDING DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION AND THE LIKE) ARISING OUT OF THE USE OR THE INABILITY TO USE ITS HARDWARE AND SOFTWARE PRODUCTS EVEN IF PACE HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. BECAUSE SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL DAMAGES, THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.

PACE PROVIDES THIS DOCUMENTATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This documentation could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in later editions. Pace Scientific Inc. may make improvements and/or changes in the product(s) and/or program(s) described in this documentation at any time without notice.

Copyright © 2016-2022 Pace Scientific Inc.
All rights reserved.

The Pace SRS-200 Solar Radiation Sensor measures solar irradiance from 360 to 1120 nanometers. It is compatible with Pace Scientific's XR5, XR440 and XR450 Data Loggers.

Suggested Mounting Angle

- For measurements to monitor the irradiance on a solar voltaic or thermal collection panel the data is probably most relevant if the sensor's base is mounted on the same plane as the collection panel.
- For evapotranspiration (ET) or environmental measurements, the sensor should be mounted on a level surface.
- For measurements where the immediate effect on humans is of interest, the sensor may be mounted so that its axis is aligned with the sun's rays at solar noon. This will maximize the mid-day readings and provide what is probably a more accurate measure of the solar radiation people are exposed to.

Mounting the Sensor

The Sensor may be mounted on any solid surface. A single threaded hole on the underside of the sensor accepts a 10-32 machine screw. A 10-32 x 3/8" flat head Nylon screw is provided for mounting the sensor to the optional SRS-LEV Leveling Plate and/or the optional SRS-BKT Mounting Bracket. If the sensor will be mounted on material thicker than 5/16", it may be necessary to use a 10-32 screw longer than the one provided.

Sensor Orientation

To minimize azimuth error (typically less than 1%), mount the sensor with the cable exit pointing towards true north if you are in the northern hemisphere. If in the southern hemisphere, mount the sensor with the cable exit pointing towards true south. Mount the sensor in a location ideally free from sunlight obstructions year-round.

Mounting the Optional Leveling Plate

If not using the Optional Mounting Bracket:

The Leveling Plate has a beveled mounting hole to accept the sensor's Nylon mounting screw. Mount the sensor to the Leveling Plate, and orient the Leveling Plate on a suitable flat surface so that the Sensor's cable exit is pointing to true north in the northern hemisphere, or to true south in the southern hemisphere. Use the 3 open holes on the Leveling Plate as a template to mark drill points on the mounting surface. Drill the 3 marked holes with a 0.2" or #7 drill bit. Level the plate using the three hex head cap screws, then fasten the plate to the flat surface using three 10-32 screws and nuts (not included).

If using the Leveling Plate with the Optional Mounting Bracket:

Mount the bracket to a vertical or horizontal pole with a diameter from 1.25" to 2.1" (30 mm to 54 mm). Position the leveling plate on the bracket and loosely mount the plate using the included machine screws, making sure the sensor cable exits the sensor at true north if in the northern hemisphere or true south if in the southern hemisphere. Level the plate by adjusting the three hex head cap screws on the plate. Once the plate is level, tighten down the machine screws.

Wiring Connections

SRS-200

For units with stainless steel cable connector (units shipped after May 2018)

<u>SRS-200 Cable</u>	<u>XR5 Terminal</u>	<u>Function</u>
White	Channel 1 - 8	Output signal
Black	C	Ground
Red	E	Power: +5 Vdc, 0.3 mA
Clear	see note below	Shield ground

Note: Clear wire may be terminated to C, or left unterminated, or for maximum transient protection, especially if cable is greater than 10 meters, terminate clear wire to earth ground or a ground rod.

<u>SRS-200 Cable</u>	<u>XR440 Terminal</u>	<u>Function</u>
White	Channel 1 - 4	Output signal
Black	C	Ground
Red	E	Power: +5 Vdc, 0.3 mA
Clear	see note below	Shield ground

Note: Clear wire may be terminated to C, or left unterminated, or for maximum transient protection, especially if cable is greater than 10 meters, terminate clear wire to earth ground or a ground rod.

For units without stainless steel cable connector (shipped prior to June 2018)

<u>SRS-200 Cable</u>	<u>XR5 Terminal</u>	<u>Function</u>
Green	Channel 1 - 8	Output signal
Clear	C	Ground
White	E	Power: +5 Vdc, 0.3 mA

<u>SRS-200 Cable</u>	<u>XR440 Terminal</u>	<u>Function</u>
Green	Channel 1 - 4	Output signal
Clear	C	Ground
White	E	Power: +5 Vdc, 0.3 mA

LogXR Software Setup for all XR5 Data Loggers

Sensors with 5 digit serial number (units shipped after June 2019)

Scaling:

In the Setup Screen, select channel tab number that the SRS-200 is wired to, and select/enter the following:

Type: 0-2.5V

Slope: 800

Offset: 0

Data will be scaled to read in W/m^2

Sensors with 8 digit serial numbers (example: 7510-0218) – units shipped June 2019 and earlier

Scaling:

In the Setup Screen, select channel tab number that the SRS-200 is wired to, and select/enter the following:

Type: 0-2.5V

Slope: 500

Offset: 0

Data will be scaled to read in W/m^2

Excitation:

Sensor excitation is selected in the Main tab of the Setup screen. The SRS-200 requires a minimum of 30ms of excitation. Any XR5 setup meets to this requirement. A Sensor Excitation of 30ms is recommended for best battery life, unless other connected sensors require a longer excitation time (see note below).

Note:

Sensor Excitation must be set to the longest excitation time required by all the connected sensors. For example, if a TRH-100 Temperature and Relative Humidity Probe is also connected to an XR5 Data Logger (which has an excitation requirement of 150ms), then select a Sensor Excitation of 150ms.

Pocket Logger Software Setup for all XR440 and XR450 Data Loggers

Sensors with 5 digit serial number (units shipped after June 2019)

Scaling:

In the Setup Screen, click the Scaling drop down list for the channel that the SRS-200 is wired to, and select New Linear Scale and then enter the following scaling values:

High Value: 4000
Low Value: 0

Data will be scaled to read in W/m^2

Sensors with 8 digit serial numbers (example: 7510-0218) – units shipped June 2019 and earlier

Scaling:

In the Setup Screen, click the Scaling drop down list for the channel that the SRS-200 is wired to, and select New Linear Scale and then enter the following scaling values:

High Value: 2500
Low Value: 0

Data will be scaled to read in W/m^2

Sensor Care and Maintenance

The sensor has a domed diffuser and housing to facilitate self-cleaning from rainfall. Over time, dust and debris can collect on the diffuser and cause low readings. Moisture on the diffuser can also cause low readings. Dust or pollen deposits are best removed with water or window cleaner and a soft cloth. If the sensor is installed in a marine environment, salt deposits can be dissolved with vinegar and a soft cloth. **Never use abrasive material or abrasive cleaners on the diffuser.**

Stainless Steel Cable Connector

SRS-200 units shipped after May 2018 have an in-line stainless steel cable connector, allowing the sensor to be disconnected from its signal cable.

When connecting the two halves, finger-tighten only*. The O-ring inside the connector could be damaged if a wrench or pliers is used. Pay attention to thread alignment to avoid cross-threading. When fully tightened, 1-2 threads may still be visible.

*NOTE: To avoid damaging the pins inside the connector, finger-tighten the connector by turning only the metal nuts. Do not tighten by turning the black cable.

Technical Support

For questions or comments, please contact Pace Scientific Technical Support:

Phone: 704-799-0688 (8-5pm EST)

Fax : 704-799-0177

Email: support@pace-sci.com

Specifications

Sensor Type	Silicon Cell Pyranometer
Operating Environment	-40° to 158° F (-40° to 70° C) 0 – 100 % relative humidity Submersible in water to 30 meters
Measurement Range	0 to 1250 W/m ²
Calibration Uncertainty	±5%
Measurement Repeatability	Less than 1%
Long-term Drift	Less than 2% per year
Non-linearity	Less than 1%
Directional Error (Cosine Response)	Less than ±2% at solar zenith angle of 45° Less than ±5% at solar zenith angle of 75°
Temperature Coefficient	0.04 ±0.04% per °C
Resolution with XR5 Data Logger	0.5 W/m ²
Resolution with XR440 Pocket Logger	1.0 W/m ²
Spectral Range (10% points)	360 to 1120 nanometers
Response Time	Less than 1 ms
Signal Output	1.25 Vdc @ 1000 W/m ² ; 1.25 mV per W/m ²
Field of View	180°
Power Requirement	5 Vdc and 0.3 ma
Attached Cable Length	16.4 ft (5 meters)
Cable Type	4-conductor, Santoprene rubber jacket
Recommended Maximum Cable Length	164 ft (50 meters)
Housing Material	Black anodized aluminum
Construction	Potted housing (prevents moisture ingress)
Dimensions (excluding cable)	24 mm diameter, 28 mm height (0.94” diameter, 1.10” height)
Weight	3.2 oz. (90 g)
Mounting	Mounts to any flat surface with single 10-32 screw (threaded mounting hole in base; Nylon 10-32 x 3/8” flat head screw included) Mounts to optional Leveling Plate #SRS-LEV Mounts to horizontal or vertical pole using optional Bracket #SRS-BKT

Specifications subject to change without notice.