DOC No: SGS/002201

Solar Sensor Calibration made easy

Solar Radiation Sensor Calibration

As Per ISO 9847:1992

SGS Weather Calibration Lab is "one-stop solutions provider" for solar radiation calibration. ***We offer indoor Calibration services of all makes and models*** *of Pyranometers and Outdoor Calibration Facility for Phyreliometers. SGS Weather Solar Radiation Calibration is designed to calibrate the all Pyranometers according to the "Direct beam calibration (type IIc) of the ISO 9847" Solar Energy – Calibration of field Pyranometers by comparison to a reference Pyranometer. During the calibration procedure, the output signals of both the reference and the test Pyranometer are recorded simultaneously. From these recordings, the sensitivity of the test Pyranometer is calculated.*

The calibration process is controlled via a dedicated user interface on PC. Data storage, including data backup, and quality assurance of the measurement (lamp stability and homogenity) are taken care of by the control unit. The procedure involves an unshaded and a shaded measurement. The transition is done using an automated shutter. The System is fully automatic and the only manual operation is the exchange of the instrument positions.

Benefits to Customers

- Fully automatic Indoor Calibration
- Complete Data storage of calibration and automatic calculation in SGS Weather Solar Radiation Calibration Lab
- Well established and traceable calibration methods
- Fast turnaround times
- Automated quality assurance of the measurement
- Suitable for all common Pyranometer models
- Indoor all-season calibration
- No dark environment required
- Calibration references available with us for many brands and models of Pyranometers
- OEM approved calibration facility

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SGS Weather Indoor Calibration Laboratory
Pyranometer Calibration Procedure

We follow the instructions included in ISO 9847:1992 for pyranometers calibration. ISO 9847:1992 Solar energy – Calibration of field pyranometers by comparison to a reference pyranometer. The sensitivity of the pyranometer under test (the 'test sensor') is determined by calibrating this pyranometer against a reference sensor.

This calibration method is described in ISO 9847 as a type IIc calibration, an indoor direct beam calibration. A reference pyranometer with a known sensitivity *St* in V/(W/m²) and a test pyranometer are placed side by side under an artificial light source. A shaded, an unshaded and another shaded reading are taken from both pyranometers, before the sensors are interchanged and the readings are repeated. A buzzer alerts the user when the sensors need to be interchanged, or when an error occurs.

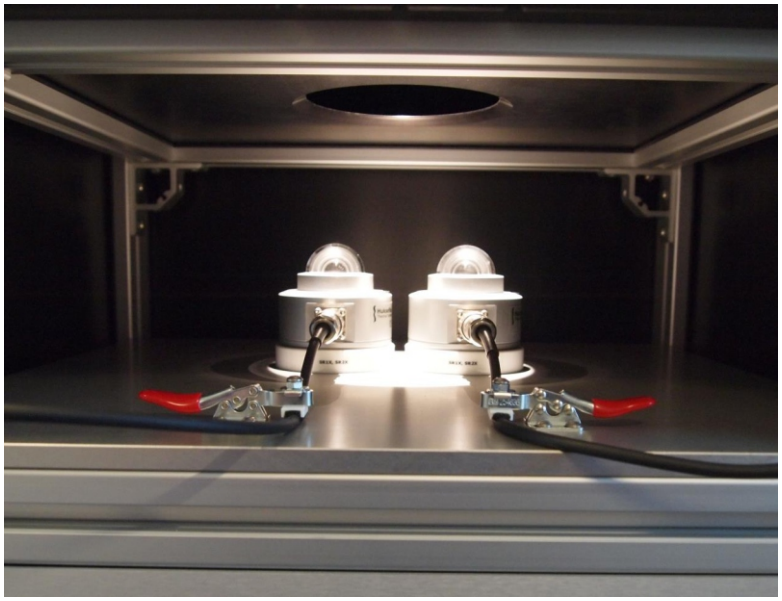
The sensitivity *Sr* in V/(W/m²) of the pyranometer under test is determined by

$$St = Se\,(Vt + Vt'/Vr + Vr')$$

Where
$Vt = Vt, - Vt,$
$Vt' = Vt',u - Vt',s$
$Vr = Vr,u - Vr,s$
$Vr' = Vr',u - Vr',s$

With *V* voltage readings on the test (*t*) and reference (*r*) pyranometer, respectively shaded (*s*), unshaded (*u*), in original position (no apostrophe) or in interchanged positions (with apostrophe).

The shaded readings before and after an unshaded reading are linearized to find the values for *Vt,*, *Vt',s*, *Vr,s* and *Vr',s*.



Voltage readings are taken on a Campbell Scientific CR1000 datalogger. Expanded uncertainty of the transfer itself is be calculated to be 0.5%. To find the uncertainty of the sensitivity of the test sensor, we include the uncertainty of the reference sensor itself and that of any corrections that are applied. Standard calibration includes a measurement of the sensor resistance, the insulation resistance and the 95 % response time of the test sensor.

Various digital pyranometers are supported, with slight changes to the measurement protocol. The calibration lab supports two different calibration modes: side-by-side comparison and a single pyranometer mode. The calibration includes various levels of quality control on input parameters and measurement results. The results are displayed on the Calibration Certificate.

Time taken by us for Calibration

2 working days after receipt of Pyranometer at our Calibration Center.

Contact for Recalibration Services
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