



Accurate solar radiation measurements

The accurate solar radiation measurements and the reliable driving require a little knowledge and attention: think about environmental influences (wind, rain/snow, soiling), re-calibration (bi-annual), without mentioning data processing, spectral effects, etc. Essentially accurate broadband solar radiation measurements are obtained using two components: a set of suitable pyranometers, including an optional pyrhelimeter (DNI sensor) with solar tracker, and suitable data logger.

EKO's broadband pyranometer product line includes instruments of all ISO classes, ranging from the Second Class MS-40, via the First Class MS-60, up to the top-class Secondary Standard MS-80. The highly accurate MS-57 pyrhelimeter combines unprecedented fast response time with a minimal temperature dependency.

EKO's pyranometers and pyrhelimeter have a flat spectral response which measure the broadband solar radiation homogeneously. Technically speaking, only pyranometers and pyrhelimeters measure the broadband solar radiative fluxes correctly. Broadband radiation sensors are physical instruments which provide accurate measurements. Every user of such radiation sensors needs a reasonable awareness of their measurement quality. By taking into account some simple rules the data product generated by these radiometers will fulfil the requirements for your applications.

HOW-TO Application Guide

- 1 Verify if the radiation measurement method of your application is described in norms, regulations or standards; there is a reason why those instructions give guidelines for radiation measurements; take these considerations into account when choosing your radiometer system.
- 2 Determine the interval of data you will need: daily totals or one minute values or something in between. The shorter the timing, the higher the quality of the radiometer must be. There is an ISO classification for pyranometers which is widely used and which states useful information about instruments and accuracies (see ISO 9060, also look at "CIMO Guide", publication WMO-No. 8). Note, that an ISO secondary standard pyranometer, such as the MS-80, is the highest class pyranometer commercially available.
- 3 Will you have data redundancy, meaning that more than one instrument is available to measure the radiative quantity? This significantly increases the quality of the measurements as any irregularities can be discovered quickly. For example, use a DNI sensor, i.e. the MS-57, along with a suntracker, shading ball assembly and two MS-80 pyranometers to measure all three components, which are the direct-normal, the diffuse and the global solar irradiance.
- 4 Take care of data quality and instrument maintenance, such as cleaning, re-calibration, etc. It is very important not to lose sight of your radiation sensors: no instrument works well when its soiled or polluted. Furthermore, re-calibration is a logical, recurring necessity. Some critical maintenance procedures are built into EKO's turn-key evaluation systems. The MV-01 ventilation units and heater can be combined with the sensor to improve the data availability under all conditions.