

Designed to optimize solar energy

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“*‘All you need is sunshine.’  
That’s not entirely true, when working on a solar power project  
you need a lot more to get the most energy out of that sunshine.*”

The amount of solar radiation reaching your power plant cannot be changed; however, you can make the most of it by choosing high quality equipment. Not only by selecting efficient generating technologies, but also by installing the industry’s best instruments to monitor the environmental parameters affecting your solar energy project performance.

Whether it is to optimize yield, manage your assets, make investment decisions, schedule plant maintenance or to forecast the energy output reliably, we offer the instruments you need. From smart pyranometers and weather stations, to the unique new DustIQ for continuous monitoring of module soiling. Kipp & Zonen and Lufft have it all.



# Pyranometers

**Widest range of Classic and Smart pyranometers available**  
**The industry standard (CMP10 and CMP11)**  
**SMP models with digital Modbus® output**  
**5-year warranty**  
**MTBF in excess of 10 years**

For the accurate measurement of solar radiation industry experts use high quality pyranometers. Global Horizontal Irradiance (GHI) is important because it is the parameter measured in weather and climate networks, derived from satellite instruments and calculated with clear sky energy models.

A pyranometer tilted in the Plane of Array (POA) of the PV modules measures the irradiance available to the cells and is used for calculating energy yield and Performance Ratios. This is why you will often see pyranometers in pairs, one horizontal and one tilted.



Find the full specifications at [www.kippzonen.com/pyranometers](http://www.kippzonen.com/pyranometers)

# DustIQ Soiling Monitoring System

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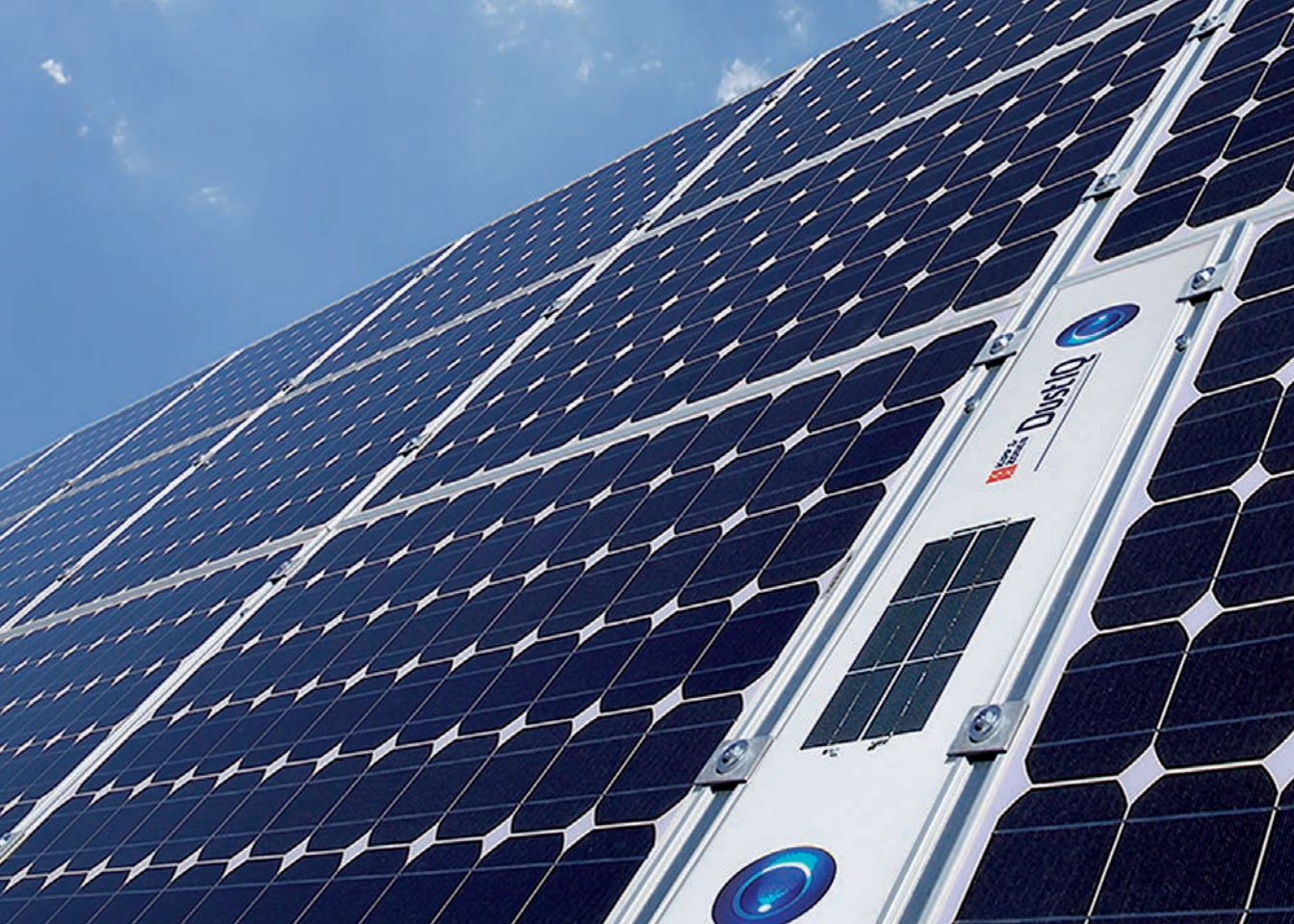
**Know exactly when and where to clean**  
**The only maintenance-free solution**  
**Simple on-site calibrations for the local dust type**  
**Digital Modbus® signal**  
**PV panel temperature sensor soon to be included**

Soiling of PV modules results in lost energy production. Cleaning is the answer, but it costs time, money and resources; so you don't want to do it too early. On the other hand, lost energy also costs money and not reaching contractual targets can incur penalties; so you don't want to be too late.

What to do?

Fit DustIQ. A simple to install and use system that continuously measures the soiling ratio. You can now calculate the loss of power produced by your modules at different locations across the plant in real-time, and can initiate cleaning of the modules and the DustIQ when the critical level of loss has been reached.

Read more at [www.kippzonen.com/DustIQ](http://www.kippzonen.com/DustIQ)



SunPower  
Duro10



SOLYS 2

# Solar Monitoring Stations

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**Monitors all solar irradiance components: DNI, DHI, GHI**  
**No regular sun tracker maintenance**  
**For every climate, work load and performance**  
**Configure your own SOLYS station**  
**RaZON<sup>+</sup> integrated solution**

All solar energy generating technologies use radiation from the sun and sky as their source. Concentrating technologies use reflectors or lenses to focus the Direct Normal Irradiance from the sun and it is also commonly monitored for solar prospecting and the O&M of PV plants.

DNI is measured using a pyrliometer mounted on an automatic sun tracker to stay pointed directly at the sun throughout the day. Usually, GHI and Diffuse Horizontal Irradiance (DHI) are also monitored, DHI with a pyranometer shaded from the direct sun beam.

We offer both a high-end solar monitoring station, based on our SOLYS sun tracker equipped with a pyrliometer and two pyranometers, and the innovative RaZON<sup>+</sup> an all-in-one solar monitoring system with built-in data logging.

# Lufft All-In-One Weather Stations



**Simple installation**

**No moving parts**

**Digital Modbus® signal**

**Choice of measurement parameters**

**Optional PV panel temperature sensor**

At sites where solar radiation is measured it is usually required to monitor other environmental and meteorological parameters that affect the output of solar energy plants. Lufft UMB series weather stations combine several meteorological sensors in one convenient housing, with simple installation and a single cable for power and data.

The model most commonly used for solar energy site assessment and plant monitoring is the WS500-UMB, with measurements of air pressure, ultrasonic wind speed and direction, and fan-ventilated air temperature and relative humidity. The WS600-UMB adds a radar precipitation sensor.







# RT1 Smart Rooftop Monitoring System

- Easy to install**
- Soiling resistant design**
- Digital Modbus® output**
- Solar irradiance measurement**
- PV panel temperature measurement**

Most commercial size rooftop PV installations do not have any operational monitoring and to simply solve this problem we offer a specially designed duo-sensor that fits directly onto a module corner without the need of any tools.

RT1 is fully weatherproof and measures the incoming Plane of Array solar irradiance with a silicon diode and diffuser, the design of which is largely self-cleaning. RT1 also comes with a temperature sensor for the PV panel, providing you with all the information you need to monitor your rooftop power installation.



Read more at [www.kippzonen.com/RT1](http://www.kippzonen.com/RT1)



# Albedometers

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**Two pyranometers and a mounting**  
**Large area for satellite data validation**  
**In PV plants for bifacial modules**  
**All ISO 9060 classes available**  
**Analog or digital output**  
**Easy to assemble**

Bifacial PV modules generate extra power from light on the rear side that is primarily reflected from the surface below. However, this varies with the type of surface, weather conditions, angle of the sun and shading effects. These variables make it necessary to measure how the albedo of the surface changes.

The albedometer is mounted low, around 1.5 m, and does not need a lower glare screen. Two similar pyranometers are mounted horizontally, to measure incoming and reflected irradiances in  $W/m^2$ . The ratio of the two is the albedo of the surface below.



# Dataloggers

- Intuitive, EzSetup and a graphical block-oriented setup**
- Software extensibility with DLL libraries**
- Built-in 10 channel A/D, 8 channel DIO**
- Unlimited expansion of analog and digital inputs options**
- Built-In ethernet, 32-bit processor**
- Multiple communications simultaneously**
- Built-in 2-line backlit LCD display with 3 navigation buttons**
- Expansion of memory up to 32GB**

Our dataloggers have a highly modular design that is scalable to handle simple to complex requirements. Designed for maximum value and functionality, our datalogger is a high-performance data recorder and communications device ideal for remote real-time data acquisition, control, and communications.

Our SUTRON datalogger has the ability to simultaneously take measurements and transmit information for a wide range of applications. Choose the right datalogger for your application.

Read more at [www.sutron.com/datalogger](http://www.sutron.com/datalogger)





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OTT HydroMet brands