HUKX

Sensor
Technology

Brochure

Industrial series Class A and
Class B pyranometers

SR300-D1
SR200-D1
SR100-D1

SR300-D1, SR200-D1, SR100-D1 Industrial series Class A and Class B pyranometers

Hukx introduces “industrial-grade” solar radiation monitoring! The all-digital Class A models SR300-D1 and SR200-D1 and Class B model SR100-D1 pyranometers are engineered to measure solar radiation with best-in-class reliability and measurement accuracy.

- ISO 9060 Class A and Class B performance: the right pyranometer for every application and budget
- main applications: PV system performance monitoring and meteorology
- built-in surge protection: engineered to withstand extreme conditions at PV power plants; upgradable to 4 kV with optional SPD01 Surge Protection Device
- flexible integration: RS-485 galvanic isolation guarantees reliable operation and allows flexibility for system designers
- electromagnetic compatibility (EMC): meets IEC 61326-1 Industrial Equipment requirements. Rated for Industrial Electromagnetic Environments
- local safety codes: enables system designers to comply with local safety regulations
- fewer external components: designed to minimize integration costs
- lowest cost of total ownership: supported by a worldwide calibration organization to minimize downtime and reduce operations & maintenance (O&M) costs

Figure 1 Industrial pyranometer models SR300-D1, SR200-D1 and SR100-D1. In front, the leading Class A model SR300-D1, with heating, tilt sensor, and the status LED. On the left and right are the non-heated Class A model SR200-D1 and Class B model SR100-D1, respectively.

Industrial-grade, high-accuracy and reliable

SR300-D1, SR200-D1 and SR100-D1 may look like their predecessors, but in many ways, they are entirely new instruments. We built upon the measurement capabilities of the earlier pyranometer models SR30, SR20, and SR15, and tailored the sensors to their most common applications in PV system performance monitoring systems and meteorological stations.

SR300-D1, SR200-D1 and SR100-D1 comply with industrial-grade immunity, emission, electrical, environmental, and safety requirements for use in these outdoor and industrial environments, significantly improving measurement reliability. Ease of operation is further enhanced through advanced functionality and diagnostics.
See Table 1 for a comparison.

SR300-D1 pyranometer for PV power plants

Succeeding our market-leading SR30 model, SR300-D1 is intended for deployment where the highest measurement reliability and accuracy are required. Most importantly, the pyranometer is heated to mitigate dew and frost and has an on-board tilt sensor. See our SR300-D1 product page for more details.

PV System performance monitoring: IEC 61724-1 Class A compliant

SR300-D1 and SR200-D1 both comply with IEC requirements for "Class A" PV system performance monitoring. SR300-D1 complies for all locations and climatic conditions, while SR200-D1 is suitable for climates in which dew and frost are not an issue. SR100-D1 meets the requirements for Class B.

Figure 2 Typical use of pyranometers at PV power plants. The above picture shows two SR200-D1 pyranometers, one tilted for Plane of Array (POA) measurement (left), and another mounted horizontally for Global Horizontal Irradiance (GHI) measurement (right).

Surge protection: immunity to high-impulse voltages & currents

SR300-D1, SR200-D1 and SR100-D1 are classified for use in Industrial Environments, according to IEC 61326-1 and IEC 61000-6-2. When designing a measuring system, pyranometer users may reach several levels of immunity.

With the optional Surge Protection Device SPD01, this immunity can be increased to 4 kV. Up to 3 pyranometers can be protected with a single SPD01. A third-party SPD with similar specifications may also be used.

To attain the required level of immunity for a given installation, some general system components should be included, such as:

– lightning protection system
– earthing and grounding network
– external surge protection, in addition to the native on-board sensor protection

RS-485 galvanic isolation

The RS-485 interface of the industrial pyranometers is galvanically isolated from its internal electronics, as well as the instrument body. Both isolation barriers are rated at 1.5 kV. This contributes to reliable operation, flexibility in system design, and reduced integration costs for all industrial pyranometers.

Electrical safety in the workplace

A PV power plant is a potentially hazardous work-place environment. To comply with safety regulations, SR300-D1, SR200-D1 and SR100-D1 feature a dedi-cated earthing terminal for connection to protective earth. When the pyranometer is isolated from the mounting platform, it can still be properly earthed via this terminal.

SR300-D1, SR200-D1 and SR100-D1 allow system designers to comply with safety regulations. These are often based on EU and US electrical safety standards, such as:

– EN-50110 Operation of Electrical Installations
– NFPA 70 National Electrical Code (NEC)

Figure 3 The SPD01 Surge Protection Device.

Lowest total cost of ownership

Customers prefer Hukx pyranometers for their unsurpassed measurement accuracy and lowest cost of ownership. Total ownership costs are primarily determined by installation, on-site inspection, accidental damage, and calibration.

– fewer external components: Internal protection and isolation reduce the requirements and costs for added external protection devices.
– minimize risk of damage: Preventive measures, such as surge protection and dome protection, lower the risk of accidental damage.
– worldwide calibration organization: Pyranometers must be calibrated every 2 years. Our worldwide calibration organization reduces calibration costs by simplifying return logistics and turnaround times. Learn more about pyranometer calibration services.
– efficient O&M: Minimize inspection with built-in remote sensor diagnostics and quickly install using spring-loaded leveling and (for SR300-D1) on-site status-LED diagnostics.

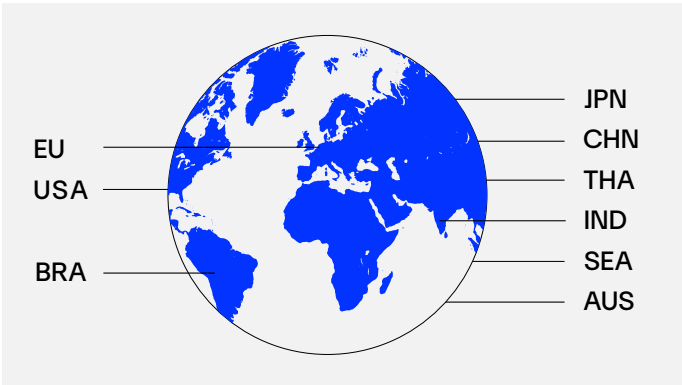

Figure 4 Lowest cost of ownership: make use of the worldwide Hukx calibration organization.

Table 1 SR300-D1, SR200-D1 and SR100-D1: main specifications compared.

Instrument specifications

	SR300-D1	**SR200-D1**	**SR100-D1**
ISO 9060:2018 classification	spectrally flat Class A	spectrally flat Class A	spectrally flat Class B
IEC 61724-1:2021 compliance for solar irradiance measurement	meets Class A PV monitoring system requirements for all locations and climatic conditions	meets Class A PV monitoring system requirements for locations where dew and frost are expected for < 2 % of annual GHI hours	meets Class B PV monitoring system requirements for all locations and climatic conditions
dew and frost mitigation	heating included	-	-
IEC 61724-1:2021 compliance for single-axis tracker and pyranometer tilt angle measurement	meets Class A PV monitoring system requirements	-	-
tilt measurement	tilt measurement included	-	-
manufacturer's estimate of achievable measurement accuracy for daily sums, of global horizontal solar irradiance following ASTM G213 uncertainty evaluation*	2.3 %	2.4 %	4.6 %
on-site diagnostics power and communication status LED	•	-	-
remote diagnostics alerts instrument leakage heating malfunction change of tilt and rotation	 • • •	 - - -	 - - -
remote diagnostics measurements internal humidity internal pressure instrument tilt and rotation	• • •	• - -	• - -

* in summer at mid-latitudes, instruments used under rated operating conditions, expanded measurement uncertainties k = 2

Table 2 SR300-D1, SR200-D1 and SR100-D1: test certificates supplied with the instruments.

Certificates and reports

	SR300-D1	SR200-D1	SR100-D1
product certificate confirming verification of specifications and classification	•	•	-
calibration certificate	•	•	•
temperature response test of individual instrument	•	•	-
directional response test of individual instrument for 0 to 95 ° angle of incidence	•	•	-
accelerometer test of individual instrument (0 to 180 ° tilt, -30 to +50 °C)	•	-	-

Optional accessories

We offer accessories for use with the SR300-D1, SR200-D1 and SR100-D1, including electrical and mounting hardware options.

- SPD01 Surge Protection Device (for 1 to 3 instruments) for cables longer than 3 meters and to upgrade Surge Protection to level 4
- PID01 Pyranometer Insulation Disk, electrically insulating the instrument from the mounting platform, spring-loaded for easy leveling
- LM01 spring-loaded leveling mount; a practical mount for easy mounting, leveling, and instrument exchange on flat surfaces
- TLM01 tube leveling mount with a set of bolts
- calibration certificate including customer name and contact information
- DP01 dome protector, set of 5 pieces
- AMF03 albedometer fixture
- PMF01 and PFM02 mounting fixtures

Figure 5 Optional LM01 spring-loaded leveling mount (one part) and TLM01 tube leveling mount (2 parts) for SR300-D1, SR200-D1, and SR100-D1. Spring-loaded leveling is a major time-saver during installation.

See also

– Consult our pyranometer selection guide.
– Learn more about SR300-D1, SR200-D1, and SR100-D1 on our YouTube channel.
– Understand the importance of ventilating and heating pyranometers.
– View our complete range of solar sensors.

Figure 6 Two SR300-D1 pyranometers that are connected to the SPD01 Surge Protection Device. With the optional SPD01, you can upgrade surge immunity to level 4.

SR300-D1, SR200-D1, and SR100-D1 specifications

General specifications

measurand	hemispherical solar radiation
dome protector	included (model DP01)
available cable lengths	3, 5, 10, or 20 m

EMC and surge immunity

equipment classification	Industrial Equipment
surge immunity	level 2, test level 1 kV
with optional SPD01*	level 4, test level 4 kV

* at cable length of 3 m

Electrical safety in the workplace

safety compliance	EU Low Voltage Directive (2014/35/EU) USA National Electric Code (NFPA70)
earthing terminal	included on instrument

Digital communication

communication protocol	modbus RTU
RS-485 isolation voltage	1.5 kV
hardware interface	2-wire RS-485

About Hukx

Hukx is the leading innovator in solar radiation and heat flux sensor technology. We are proud to set the standard in high-accuracy measurement, and to be working at the heart of the energy transition.

Customers worldwide rely on our bestselling pyranometers and heat flux sensors. From sensor design and selection to supply and recalibration, we support you across the entire lifecycle.

Hukx is headquartered in the Netherlands, with locally owned representative sales offices in the USA, Brazil, India, China, Southeast Asia, and Japan.

Let us help you select the best sensor for your application.
Get in touch with our experts today via: info@hukx.com

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