HUKX

Sensor
Technology

Brochure

Industrial Class A pyranometer
with heating and tilt sensor

SR300-D1

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Industrial Class A pyranometer

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Hukx is proud to introduce the SR300-D1 spectrally flat Class A pyranometer. As the successor to our market-leading SR30 model, SR300-D1 is further optimized for use at photovoltaic (PV) power plants. The sensor complies with industrial-grade requirements for surge immunity and installation safety. SR300-D1 is designed for applications where measurement reliability and accuracy are critical.

- IEC Class A performance: designed for IEC 61724-1 Class A PV system performance monitoring
- all-climate reliability: internal heating for dew and frost mitigation ensures reliability and accuracy in any environment
- 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
- lowest total cost of ownership: supported by a worldwide calibration organization to minimize downtime and reduce operation and maintenance (O&M) costs

Figure 1 SR300-D1: Industrial Class A pyranometer, designed for use at PV power plants.

SR300-D1 pyranometer for PV power plants

Hukx introduces “industrial-grade” solar radiation monitoring! The all-digital heated SR300-D1 pyranometer is engineered to measure solar radiation with the utmost reliability and measurement accuracy. SR300-D1 is the successor to our SR30-M2-D1 pyranometer, renowned worldwide as the ideal instrument for PV system performance monitoring.

SR300-D1 continues to provide the measurement accuracy of the SR30. It may look like it as well, but in many ways the SR300-D1 is a completely new instrument, tailored for use in PV monitoring systems.

SR300-D1 complies with industrial-grade immunity, emission, electrical, environmental, and safety requirements for use in these outdoor industrial environments, significantly improving measurement reliability.

Ease of operation is further enhanced through advanced functionality and diagnostics.

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

SR300-D1 complies with IEC requirements for “Class A” PV system performance monitoring, without the need for additional accessories. It includes:

– built-in heating: effective dew and frost mitigation
– high-accuracy calibration: ensures compliance within the required uncertainty limits
– calibrated tilt sensor: accurate within ± 1 °, as required for single-axis tracker fault detection and pyranometer tilt measurement

Figure 2 Two SR300-D1 pyranometers—one tilted for Plane of Array (POA) measurement (left) and another mounted horizontally for Global Horizontal Irradiance (GHI) measurement (right).

Figure 3 The SPD01 Surge Protection Device.

Surge protection in industrial environments: immunity to high-impulse voltages & currents

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

With the optional Surge Protection Device SPD01, this immunity can be increased to 4 kV. Up to three 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 onboard 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 workplace environment. To comply with safety regulations, SR300-D1 features a dedicated 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 allows 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)

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 on-site status-LED diagnostics.

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

Figure 5 Heating counters frost and dew deposition: clear difference between a heated (right) and non-heated (left) pyranometer.

Heated for high data availability, operation in 3 power modes

The SR300-D1 features a built-in heater for dew and frost mitigation, leading to high data availability in most climate types.

SR300-D1 can be operated in 3 power modes. In all 3 modes, the sensor will comply with ISO 9060 Class A classification criteria. This allows users to conserve power and continue the measurement, even when the system operating power is limited.

- normal: < 3 W, heated and ventilated for optimal dew and frost mitigation
- medium: < 1 W, unheated and ventilated for high accuracy measurement, when dew and frost are not an issue
- low: < 0.5 W, unheated and unventilated to save power

Tilt angle measurement

For PV systems with single-axis trackers, IEC 61724-1:2021 Class A systems require a tilt angle measurement. The sensor used for this is an accelerometer. Every SR300-D1 accelerometer is individually calibrated and temperature compensated from -30 °C to +50 °C, resulting in high accuracy measurement in compliance with the required accuracy of ± 1 °. The acceleration components—x, y, and z—can be read out separately to provide additional information about the instrument orientation.

Remote diagnostics

In addition to solar irradiance, SR300-D1 outputs several alerts and measurements for remote use, most importantly:

- alert: instrument leakage
- alert: change of tilt and rotation
- alert: heating malfunction
- internal humidity
- internal pressure
- instrument tilt and rotation

Remote diagnostics reduce the need for (un)scheduled field inspection

On-site diagnostics: status LED

The status LED provides visual feedback to a local operator. On-site, you have immediate information on instrument power and data traffic. This is especially useful during installation and field inspections.

Figure 6 The SR300-D1 is equipped with a status LED, providing visual feedback on sensor diagnostics.

Optional accessories

We offer accessories for use with the SR300-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 7 Optional LM01 spring-loaded leveling mount (one part) and TLM01 tube leveling mount (2 parts) for SR300-D1. Spring-loaded leveling is a major time-saver during installation.

Figure 8 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.

See also

- Check out the SRA300-D1 albedometer consisting of two SR300-D1 pyranometers and one AMF03 mounting kit.
- Consult our pyranometer selection guide.
- Learn more about SR300-D1 on our YouTube channel.
- Understand the importance of ventilating and heating pyranometers.
- View our complete range of solar sensors.

SR300-D1 specifications

General specifications

measurand	hemispherical solar radiation
measurand	sensor tilt angle (3 components x, y, z)
ISO 9060:2018 classification	spectrally flat Class A
IEC 61724-1:2021 compliance	meets class A PV monitoring system requirements – for solar irradiance for all locations and climatic conditions – for single-axis tracker and pyranometer tilt angle measurement
dome protector	included (model DP01)
status LED	power & communication
instrument diagnostics	leakage, tilt, rotation, heating, internal humidity
heating	included
calibration certificate	included (content limited according to ISO/IEC 17025, Section 7.8.1.3)
temperature response test of individual instrument	report included
temperature response	< ± 0.4 % (-30 to +50 °C)
directional response test of individual instrument	report included to 95 °
accelerometer test of individual instrument	report included
tilt measurement uncertainty	± 1 ° (0 to 180 °) (-30 to +50 °C)
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

Electrical Safety in the workplace

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

Operation in 3 power modes **

normal - heated, ventilated	< 3 W
medium - unheated, ventilated	< 1 W
low - unheated, unventilated	< 0.5 W

Digital communication

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

* at cable length of 3 m
** @24 VDC

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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