

# SR300-D1, SR200-D1, SR100-D1

## Industrial series Class A and Class B pyranometers

*Hukseflux 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 the utmost reliability and measurement accuracy.*

- the right pyranometer for every application and budget
- main applications: PV system performance monitoring and meteorology
- integrated surge protection, designed to withstand the extreme conditions encountered on PV power plants, upgradable to 4 kV with optional SPD01 Surge Protection Device
- RS-485 isolation: Galvanic isolation, for reliable operation and flexibility in system design
- compliant with IEC 61326-1 "Industrial equipment" – rated for Industrial Electromagnetic Environments
- enables system designers to comply with local safety regulations
- designed to minimise integration costs
- supported by a worldwide calibration organisation for the lowest total cost of ownership



**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 blue status LED. Left and right the non-heated Class A model SR200-D1 and Class B model SR100-D1.

### Industrial-grade, high-accuracy and reliable

SR300-D1, SR200-D1 and SR100-D1 may look like their predecessors, but in many ways they are completely 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, greatly improving measurement reliability. Ease of operation is further enhanced through extended functionality and diagnostics. See Table 1 for a comparison.

### SR300-D1

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

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

<b>INSTRUMENT SPECIFICATIONS</b>			
	<b>SR300-D1</b>	<b>SR200-D1</b>	<b>SR100-D1</b>
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, 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)	•	-	-

### 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, SR200 for climates in which dew and frost are not an issue. SR100-D1 complies with 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, and another mounted horizontally for Global Horizontal Irradiance (GHI) measurement.

### Immunity to high voltages and currents -surges

SR300-D1, SR200-D1 and SR100-D1 are tested and classified for 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 be used instead. 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



**Figure 3** The SPD01 Surge Protection Device.

### RS-485 isolation

The RS-485 interface of the industrial pyranometers is galvanically isolated from the internal electronics as well as from 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, SR200-D1 and SR100-D1 feature a dedicated earthing terminal for connection to protective earth. When the pyranometer is isolated from the mounting platform, it should 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)

### Lowest total cost of ownership

Customers prefer Hukseflux 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 sensor calibration.

- coordinating internal and external protection and isolation reduces the requirements and costs for added protection devices
- preventive measures such as surge protection and dome protection help reduce the risk of accidental damage
- pyranometers must be calibrated every 2 years. Our worldwide calibration organisation helps reduce calibration costs by simplifying return logistics and turnaround times. Learn more about [pyranometer calibration services](#)
- O & M saves time using built-in remote and on-site sensor diagnostics and spring-loaded levelling

### SR300-D1, SR200-D1 and SR100-D1 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 with optional SPD01*	Level 2, test level 1 kV Level 4, test level 4 kV

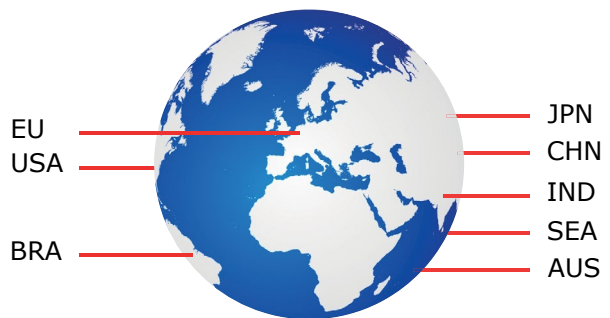
### Electrical Safety in the workplace

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

### 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



**Figure 4** Lowest cost of ownership: make use of the worldwide Hukseflux calibration organisation.

## 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 Isolation Disc, electrically insulating the instrument from the mounting platform, spring-loaded for easy levelling
- **LM01** spring-loaded levelling mount; a practical mount for easy mounting, levelling, and instrument exchange on flat surfaces
- **TLM01** tube levelling 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 spring-loaded levelling and tube mount for SR300-D1, SR200-D1 and SR100-D1. LM01 levelling mount (one part), TLM01 tube mounted (2 parts). Spring-loaded levelling is a major time-saver during installation.*

## See also

- consult our [pyranometer selection guide](#)
- introduction of SR300-D1 on [our YouTube channel](#)
- why [ventilate and heat 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.*

## About Hukseflux

Hukseflux is the leading expert in measurement of energy transfer. We design and manufacture sensors and measuring systems that support the energy transition. We are market leaders in solar radiation and heat flux measurement. Customers are served through our headquarters in the Netherlands, and locally owned representative sales offices in the USA, Brazil, India, China, Southeast Asia and Japan.

Are you interested in this product?  
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