HUKX

Sensor
Technology

Brochure

Water-cooled high heat flux sensor engineered for harsh industrial environments

HFS01

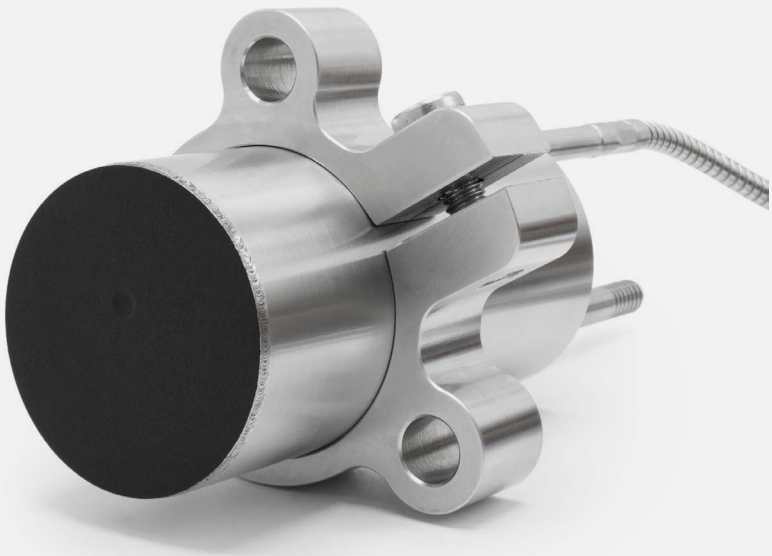
HFS01
Water-cooled heat flux sensor

HFS01 is an industrial water-cooled heat flux sensor engineered to withstand extreme radiative and convective heat flux levels. Its robust, all-metal body, high-temperature cabling, and IP67 rating deliver dependable measurements to withstand challenging conditions in industrial applications. A removable mounting flange simplifies robust, repeatable installation. It is designed for applications like metal furnaces, refractories, and concentrated solar power. To measure even higher heat flux levels, see also our GG01 sensor.

HFS01 measures heat flux in the range of (0 to 800) x 10^3 W/m^2, the extremely high fluxes in industrial applications. Equipped with a black absorber and water-cooled, it is designed to measure heat flux from radiative as well as convective sources. HFS01's thermopile sensor generates an output voltage proportional to the total absorbed heat flux. Also, a Type K thermocouple is included, to measure the sensor body temperature.

The sensor body must be kept cool. This is typically done by connecting it to tap water. The section of cabling closest to the sensor is a special high-temperature metal-sheathed cable with an interlocked spiral stainless-steel armor capable of withstanding temperatures up to 900 °C.

Figure 1 HFS01 water-cooled high heat flux sensor.



- water-cooled
- all-metal body
- for harsh conditions
- for high temperatures

The low-temperature extension cable has a jacket of PTFE-type plastic. A removable flange can be used for mounting and is supplied with the sensor.

HFS01 can also be ordered without the black coating to reduce the sensor's absorption of radiation, while remaining sensitive to convective radiation.

Common industrial applications

– metal furnaces
– refractories
– concentrated solar power

Next-level technology

HFS01 has several advantages:

– very robust all-metal instrument body and sensor for harsh conditions
– high-temperature signal cable to withstand extreme temperatures up to 900 °C
– signal wires electrically insulated from both the sensor body and cooling water

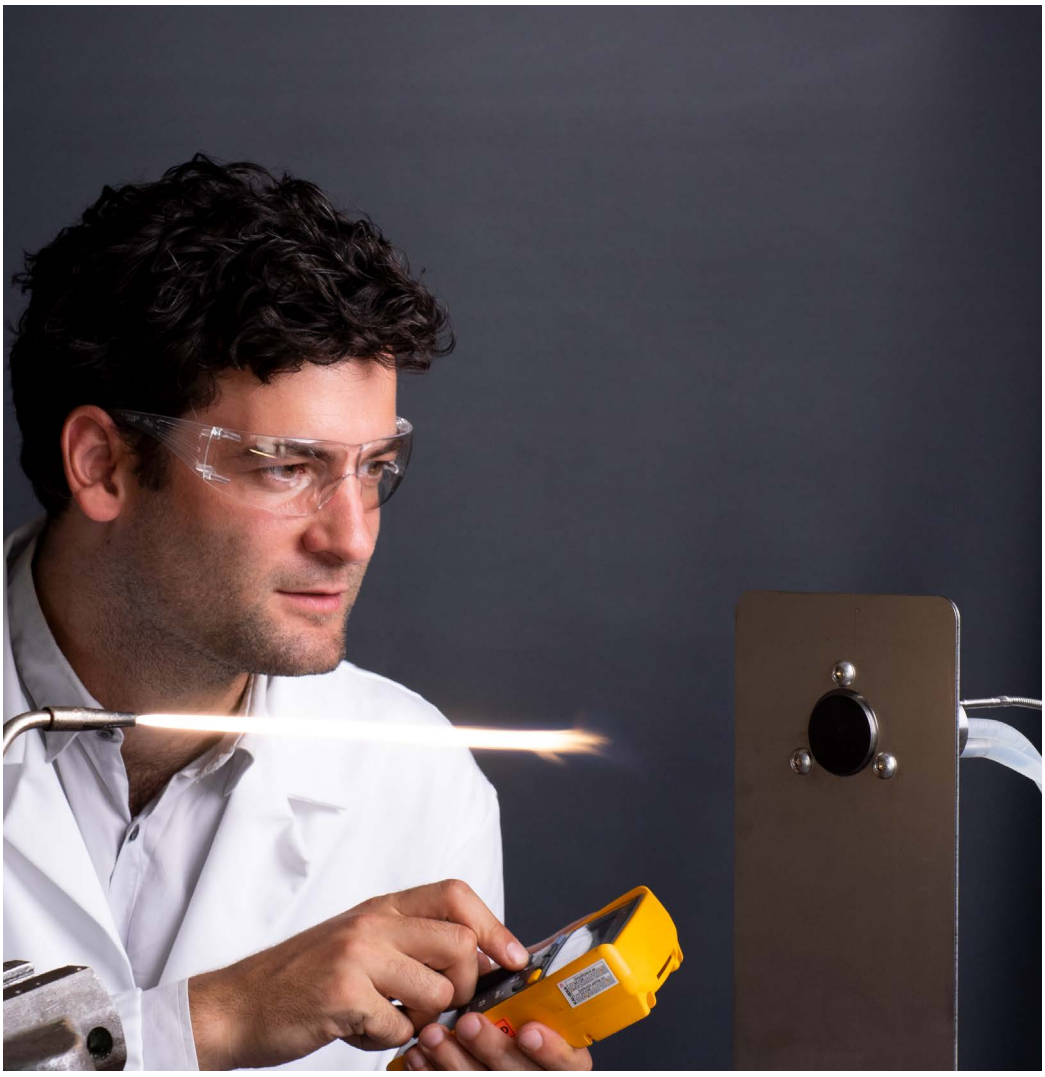


Figure 2 HFS01 is the sensor of choice for challenging environments in industrial applications.

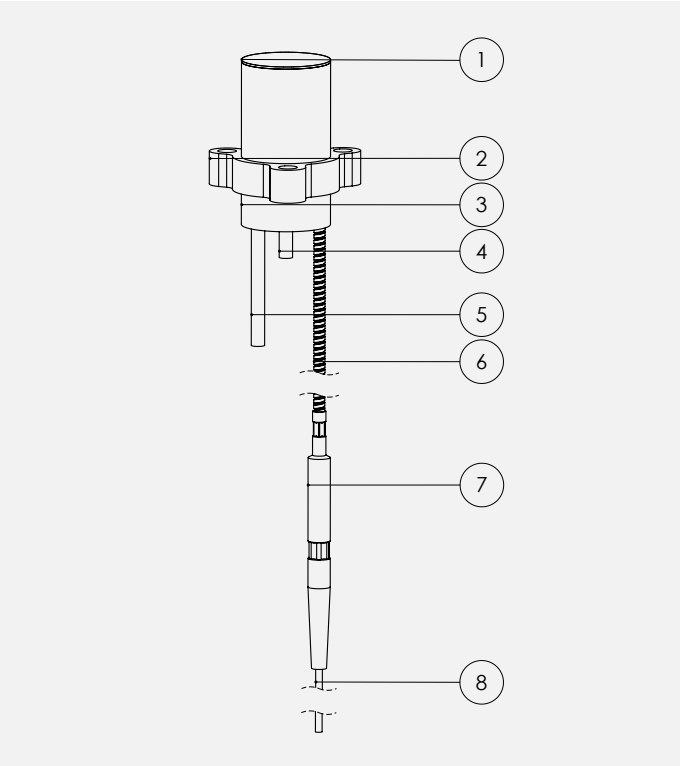


Figure 3 Overview of HFS01: (1) black-coated sensor surface, (2) removable flange, (3) sensor body, (4) cooling water inlet (5) cooling water outlet, (6) high-temperature cable, (7) transition piece, and (8) low-temperature extension cable.

Calibration

HFS01 calibration is traceable to international standards. The factory calibration method follows the recommended practice of ASTM C1130-07 (2012).

Easy operation

Using HFS01 is simple. It connects directly to commonly used data logging systems. The heat flux (in W/m^2) is calculated by dividing the sensor's output, a small voltage, by the sensitivity, which is provided on its product certificate. HFS01 is equipped with heavy-duty cabling and a fully stainless steel casing, ensuring reliable performance in demanding environments.

Figure 4 HFS01, pictured without flange and with cabling.

Options

– longer cable (specify total length for both cable types in meters)
– connector at the HFS01 cable end
– chassis connector with wiring (color-coded to match the cable)
– low-temperature extension cable with 2 connectors: matching the cable connector and the chassis connector
– blank metal sensor surface (no coating)

See also

– GG01 Gardon gauge water-cooled high heat flux sensor for measurements up to 2500 x 10^3 W/m^2
– SBG04 water-cooled sensor—for cone calorimeters
– SBG01 water-cooled heat flux sensor with a 1-inch body for measurements < 200 x 10^3 W/m^2

HFS01 specifications

General specifications

measurand	heat flux
measurand in SI units	heat flux density / irradiance in W/m^2
measurand	temperature
heat flux sensor	thermopile
temperature sensor	thermocouple type K
sensitivity (nominal)	9×10^{-9} V/(W/m^2)
calibration traceability	to SI units
measurement range	(0 to 800) x 10^3 W/m^2
rated operating temperature ranges:	
sensor and black coating	-30 to +650 °C
high-temperature cable	-30 to +900 °C
low-temperature extension cable	-30 to +240 °C
IP protection class	IP67
standard cable lengths: – high-temperature cable – low-temperature extension cable	 1 m (see options) 3 m (see options)
rated cooling water temperature range	10 to 30 °C
rated cooling water flow	> 30 l/h (0.01 l/s), preferably 100 l/h (0.03 l/s)
output signal	DC voltage
output signal range	10×10^{-3} V at rated measurement range
spectral range	0 to 50 x 10^{-6} m
full field of view angle	180°
black coating emissivity	0.92 (estimate)
order code	HFS01 - high-temperature cable length in m - low-temperature extension cable length in m

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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