HUKX

Sensor
Technology

Brochure

Pyrgeometer with heater

# IR02

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# Pyrgeometer with heater

IR02 is a pyrgeometer used for longwave irradiance measurements in meteorological applications. The instrument can be heated, which improves measurement accuracy by mitigating dew and frost deposition on its window. Because of features like this, IR02 is popular and often used in agricultural networks.

IR02 measures the longwave or far-infrared radiation (FIR) received by a plane surface, in $W/m^2$, from a field of view angle of approximately 150 °. Longwave radiation is the portion of atmospheric radiation not emitted by the sun.

While the actual field of view angle is not the ideal 180 °, the reduction makes it possible to offer IR02 at an attractive price level with only a minor loss in accuracy. IR02 has a window with a cut-on at $4.5 \times 10^{-6}$ m, making it suitable for both day and night observations.

**Figure 1** IR02 pyrgeometer with integrated heater.

basic pyrgeometer

with heating

analog output

## Benefits

The IR02 pyrgeometer has a high sensitivity. With sufficient input signal, a typical data logger no longer contributes to the uncertainty of the measurement. It also houses an on-board heater that prevents condensation on the pyrgeometer window, which can otherwise cause significant measurement errors.

## Operation

Using IR02 is easy. It connects directly to commonly used data logging systems. The irradiance in $W/m^2$ is calculated by dividing the IR02 output, a small voltage, by the sensitivity while also accounting for the irradiated heat by the sensor itself (Stefan-Boltzmann law). The sensitivity is provided on IR02's product certificate.

## Standards

Calibration of pyrgeometers used for downward longwave radiation is traceable to the World Infrared Standard Group (WISG). This calibration takes into account the spectral properties of downward longwave radiation.

## IR02 design

IR02 pyrgeometer employs a thermal sensor with black coating, a flat silicon window with a solar-blind filter, and an anodized aluminum body.

## Suggested use

- general meteorological observations
- climatological networks
- agricultural warning networks (frost)

**Figure 2** Application example: Solar sensor used for greenhouse climate control (pyrgeometers can also be used).

## Options

– longer cable, in multiples of 5 m
– IR02-TR, with 4–20 mA output

## See also

– alternative instrument: IR20 for higher-accuracy longwave radiation measurements
– NR01 4-component net radiometer, employing 2 pyrgeometers similar to IR02
– Pyrgeometers are often used in combination with pyranometers for solar radiation (shortwave) measurement. View our complete product range of solar sensors.


**Figure 3** IR02's side profile.

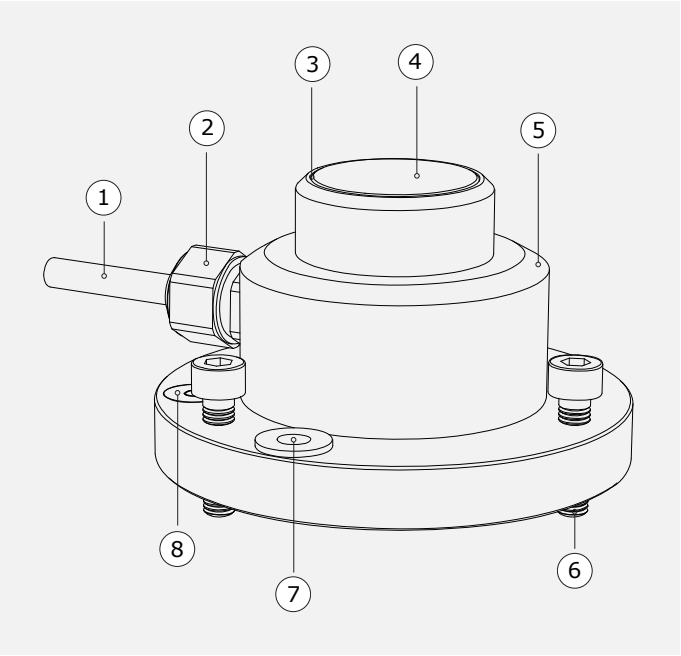


**Figure 4** Overview of IR02:

1. cable
2. cable gland
3. window with solar-blind filter
4. sensor (below window)
5. sensor body
6. leveling feet
7. mounting hole
8. bubble level

# IR02 specifications

## General specifications

| | |
|---|---|
| measurand | longwave radiation |
| optional measurand | sky temperature |
| optional measurand | surface temperature |
| spectral range | 4.5 to 42 x $10^{-6}$ m |
| field of view angle | 150 ° |
| response time (95 %) | 18 s |
| sensitivity (nominal) | 15 x $10^{-6}$ V/(W/$m^2$) |
| rated operating temperature range | -40 to +80 °C |
| temperature dependence | < ±3 % (-10 to +40 °C) |
| calibration traceability | to WISG |
| optional traceability | to blackbody (ITS-90) |
| temperature sensor | Pt100 |
| heater | 12 VDC, 1.5 W |
| standard cable length | 5 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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