Hukseflux
Thermal Sensors

FHF01

Foil heat flux sensor – flexible - 50 x 50 mm – with temperature sensor

FHF01 is a thin and flexible sensor for general-purpose heat flux measurement. FHF01 is very versatile: it has an integrated temperature sensor and a flexible sensor body fitting flat and curved surfaces. It is applicable over a temperature range from –40 to + 150 °C. FHF01 measures heat flux from conduction, radiation and convection. It is often applied as part of a larger test- or measuring system.

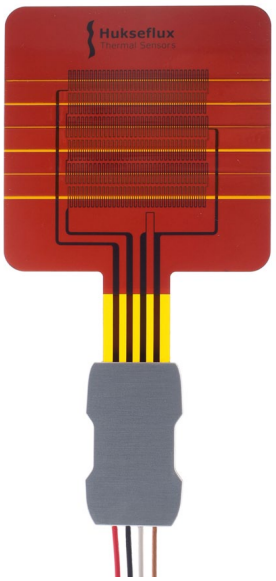

Figure 1 *FHF01 heat flux sensor: thin, flexible, versatile*

Figure 2 *FHF01 being installed on a tube*

Introduction

FHF01 is a sensor for general-purpose heat flux measurement. It is thin, flexible and versatile. FHF01 measures heat flux through the object in which it is incorporated or on which it is mounted, in W/m^2. The sensor in FHF01 is a thermopile. This thermopile measures the temperature difference across the flexible body of FHF01. A type T thermocouple is integrated as well. The thermopile and thermocouple are passive sensors; they do not require power.

Using FHF01 is easy. It can be connected directly to commonly used data logging systems. The heat flux in W/m^2 is calculated by dividing the FHF01 output, a small voltage, by the sensitivity. The sensitivity is provided with FHF01 on its product certificate.

Unique features and benefits

- flexible (bending radius ≥ 25 x 10^{-3} m)
- low thermal resistance
- wide temperature range
- fast response time
- large guard area
- integrated type T thermocouple
- robustness, including wiring with strain relief block
- IP protection class: IP67 (essential for outdoor application)

Robust and stable

Equipped with wires with strain relief, protective covers on both sides and potted so that moisture does not penetrate the connection block, FHF01 has proven to be very robust and stable.

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Calibration

FHF01 calibration is traceable to international standards. The factory calibration method follows the recommended practice of ASTM C1130 - 07.

Working with heat flux sensors

If the sensitivity of a single sensor is too low, two or more sensors can electrically be put in series, creating an amplified single output signal. The user should analyse his own experiment and make his own uncertainty evaluation.

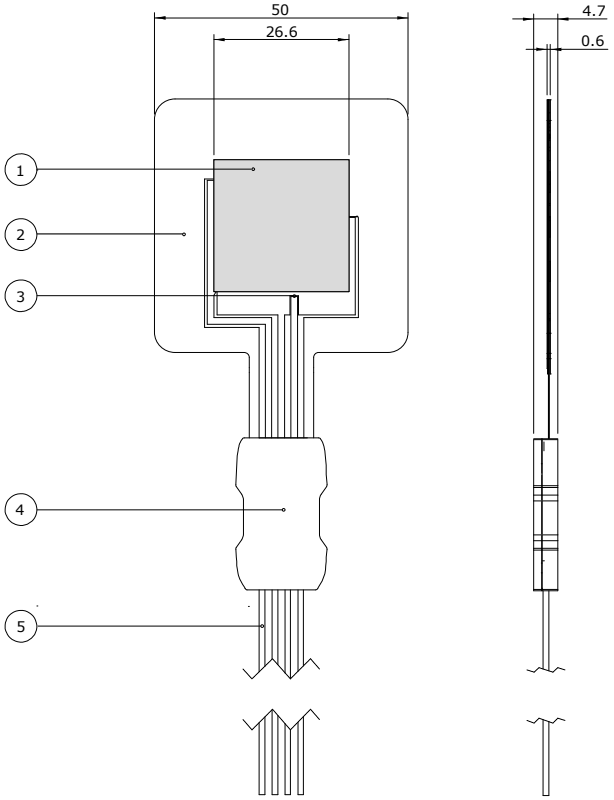

Figure 3 *FHF01 heat flux sensor: (1) sensing area, (2) passive guard, (3) type T thermocouple, (4) strain relief block, (5) wires, standard length is 1.5 m. Dimensions in x 10^{-3} m*

Figure 4 *FHF01 fits flat and curved surfaces*

FHF01 specifications

Measurand	heat flux
Measurand	temperature
Temperature sensor	type T thermocouple
Rated bending radius	≥ 25 x 10^{-3} m
Rated load on a single wire	≤ 1.6 kg
Sensing area	6.9 x 10^{-4} m^2
Sensor thermal resistance	24 x 10^{-4} K/(W/m^2)
Sensor resistance range	50 to 100 Ω
Sensor thickness	0.6 x 10^{-3} m
Uncertainty of calibration	± 5 % (k = 2)
Measurement range	(-10 to +10) x 10^3 W/m^2
Sensitivity (nominal)	4.5 x 10^{-6} V/(W/m^2)
Operating temperature range	-40 to +150 °C
IP protection class	IP67
Standard wire length	1.5 m
Options	longer wire length upon request

Options

- longer wire length
- LI19 hand-held read-out unit / datalogger

See also

- model HFP01 for increased sensitivity (also consider putting two or more FHF01's electrically in series)
- view our complete range of heat flux sensors

About Hukseflux

Hukseflux Thermal Sensors offers measurement solutions for the most challenging applications. We design and supply sensors as well as test & measuring systems, and offer related services such as engineering and consultancy. With our laboratory facilities, we provide testing services including material characterisation and calibration. Our main area of expertise is measurement of heat transfer and thermal quantities such as solar radiation, heat flux and thermal conductivity. Hukseflux is ISO 9001 certified. Hukseflux sensors, systems and services are offered worldwide via our office in Delft, the Netherlands and local distributors.

Interested in this product?
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