Hukseflux
Thermal Sensors

Worldwide calibration services

Sensors must be recalibrated - Hukseflux services are at your disposal

Hukseflux is a leading manufacturer of heat flux sensors and pyranometers. Such sensors are usually recalibrated every 2 years. Our calibration expertise is at your disposal.

Introduction: requirements of ISO, IEC and WMO

Quality management systems such as ISO 9001 require regular calibration of all traceable measuring instruments. At Hukseflux we recommend recalibration at least every 2 years. IEC 61724-1, a standard covering PV system performance monitoring, requires pyranometer calibration every 2 years. The WMO manual, describing best practices in meteorological observations, requires the same.

Services: what we do

- perform accurate calibration of solar radiation, heat flux, and longwave radiation sensors
- work according to established standards

Why work with us

- well established and traceable calibration methods
- fast turnaround times
- including uncertainty evaluation
- calibration references for many brands and models of pyranometers, heat flux sensors and amplifiers
- calibration facilities in the EU, USA, Japan, China, Australia, Singapore and Brazil

Figure 1 *calibration of all major pyranometer brands*

Certificate

With its products or as part of calibration services, Hukseflux Delft issues calibration certificates with content limited as per ISO / IEC 17025-7.8.1.3. Such a certificate contains the calibration result, an uncertainty, a description of the calibration procedure and the traceability. In case an earlier certificate is supplied with the instrument, we include a reference in our calibration certificate to this earlier certificate. As an option, a certificate including name and contact information of the customer may be ordered.

Figure 2 *calibration certificate with each sensor documenting traceability and uncertainty evaluation*

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Sensor calibration service capabilities

Table 1 *Hukseflux calibration services*

HUKSEFLUX CALIBRATION SERVICES			
calibration item	**brand and model**	**calibration method**	**comment**
heat flux sensors (high flux)	Hukseflux SBG series Medtherm Schmidt Boelter and Gardon type sensor	ISO TS 14934 Fire tests - calibration of heat flux meters - Part 3 secondary calibration method. Transfer calibration by comparison to a secondary standard under a radiant source calibration may be performed at multiple flux levels, also for one sensor. Calibration up to 1000 x 10^3 W/m^2	Concerning heat flux sensors, Hukseflux is not an ISO/IEC 17025 accredited laboratory; users may need calibration of their local reference measurement standard at an accredited laboratory for certified fire testing: https://www.ri.se/en Hukseflux' calibration reference standard is calibrated up to 75 x 10^3 W/m^2
heat flux sensors (low flux)	Hukseflux HFP series	Hukseflux internal method HFPC. This method is validated against ASTM C1130 Standard Practice for Calibrating Thin Heat Flux Transducers	
pyranometers	Hukseflux LP, SR series Kipp & Zonen CMP, SMP series	Pyranometers: conform ISO 9847:1992 Solar energy - Calibration of field pyranometers by comparison to a reference pyranometer, type IIc	Servicing and repair or desiccant replacement of other-than-Hukseflux brands cannot be carried out by Hukseflux
pyrheliometers	Hukseflux DR series Kipp & Zonen CH series	Pyrheliometers: laboratory developed method, based on the same standard as for pyranometers. This laboratory-developed method is validated against results obtained by ISO 9059:1990 Solar energy - Calibration of field pyrheliometers by comparison to a reference pyrheliometer	
pyrgeometers	Hukseflux IR series	Hukseflux internal laboratory-developed method IRC under a blackbody source relative to a reference traceable to WRR For IR20: under outdoor clear sky conditions relative to a reference traceable to WRR	There is no standard practice available from ISO or ASTM for pyrgeometer calibration
net radiometers	Hukseflux NR01	See pyranometers and pyrgeometers	NR01 consists of 2 pyranometers and 2 pyrgeometers
amplifiers	Hukseflux –TR amplifiers Kipp & Zonen AMPBOX series	Calibration and re-programming. Calibration traceable to traceable voltage and current standards.	

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Checklist / requirements for recalibration of sensors

Table 2 *Checklist for calibration services*

HUKSEFLUX CALIBRATION SERVICES		
subject	**responsible**	**responsibility**
contact our Service desk / Service form	customer	Before service, contact service@hukseflux.com Preferably, complete the Service (RMA) form and e-mail it to us. We need to know the sensor model(s), quantity and serial number(s), the sensor condition, and information what servicing is needed; often this is not only calibration but also repair.
calibration: list of permissible sensors	customer	Hukseflux can calibrate all sensors of the Hukseflux brand, except for DR01 with serial number <8200 and the discontinued model DR03. In case of other-than-Hukseflux brand sensors only: transmit the brand name and a scanned copy of the original calibration certificate. Hukseflux may (not) be capable of calibrating your sensor. Wait for our reply. We can calibrate the following pyranometer models of the Kipp & Zonen brand: CM11, CM21, CMP10, CMP11, CMP21, SMP10, SMP11, SMP21 - produced after 01-01-2008 CMP6, CM6B, SMP6 - produced after 01-01-2006 CM3, CMP3, CM3-P, SMP3 - produced after 01-01-2006 and the following pyrheliometer models of the Kipp & Zonen brand: CH1, CHP1, SHP1 - produced after 01-01-2011 Please contact us in case your sensor is produced before the production dates mentioned above. We can calibrate most heat flux sensors (gardon gauges and Schmidt-Boelter gauges) of the Medtherm brand with smooth 0.5 or 1 inch diameter housings. Calibration capabilities (see table 1 for details) include the following models: 64-xxyy-20, 21 and 18 with xx < 100 and yy void or "SB", GTW-7-32, GTW-10-32 (also with extension 485A)
calibration of other sensors	customer	To judge if we can calibrate other models or brands: please supply us with the brand name, model number, calibration certificate and a photograph.
options	customer	As an option, you may order a certificate including your name and contact information
conditions	customer	Only if different-than-usual: specify required calibration reference conditions.
logistics: supply	customer	Specify shipment responsibility. Usually the customer will be responsible for shipment both ways.
quotation	Hukseflux	The quotation will include a reference number. Possibly, in case of unclear condition of the sensor, the quotation includes a diagnostics fee. This fee must also be paid in case the sensor is irreparable. In case sensors are not clean, a cleaning fee may be charged per sensor.
order	customer	Include the Hukseflux reference number (usually our quotation/proforma invoice number)
confirmation	Hukseflux	Hukseflux will issue a confirmation with an estimated delivery time
calibration	Hukseflux	Typical processing time is 15 working days. This can be shortened upon request.
logistics: pickup	customer	Please follow Hukseflux shipment directions.

Figure 3 *a typical calibration system at Hukseflux*

Restrictions

- Hukseflux is ISO 9001 certified, and an accredited calibration laboratory according to ISO / IEC 17025 for pyranometers and pyrheliometers. In some applications, for example in fire testing, end-users may require accredited calibration for their local reference measurement standard.
- Hukseflux can calibrate sensors of other-than-Hukseflux brands. However, Hukseflux is not able to perform diagnostics and service of sensors of those brands. In case other-than-Hukseflux brand sensors need extensive servicing or repair which cannot be performed by the user, we recommend obtaining this service from the manufacturer.
- Not all brands offer access to the internal program running on their digital sensors. In case access to the sensor software is not allowed, Hukseflux will generate a "correction factor", specifying the ratio of the sensor output according to the new calibration to the output given by the sensor. It is up to the user how to treat this factor. It may be implemented into the SCADA system in which the sensor is applied. In case the correction factor differs less from the ideal factor 1 than the calibration uncertainty, most users will choose not to correct their data.

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.
Hukseflux products and services are offered worldwide via our office in Delft, the Netherlands and local distributors.
Contact Hukseflux for calibration. If we cannot offer you an acceptable solution ourselves, we will tell you who can.

Would you like more information?
E-mail us at: info@hukseflux.com