

# Pyranometer calibration – cost effective - worldwide

Customers prefer Hukseflux pyranometers because our affordable calibration services result in lowest total cost of ownership

*Pyranometers must be calibrated every 2 years. Such recalibration is considered good practice for any measuring instrument and is required by ISO, IEC and WMO standards covering PV system performance - and meteorological monitoring. Cost of recalibration however can be high. Hukseflux helps you to reduce these costs. Pyranometer users prefer Hukseflux pyranometers for their unsurpassed measurement accuracy and their lowest total cost of ownership.*

## Introduction

Did you know that Hukseflux offers worldwide calibration services for pyranometers? Users prefer Hukseflux instruments not only for their quality, but also for this cost-saving support.

## Requirements of ISO, IEC and WMO

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

## Calibration determines cost-over-life

High-accuracy calibration of pyranometers is not easy. It is therefore expensive. Hukseflux helps you to reduce costs.

A total cost of EUR 500 for handling, transport plus calibration is a realistic estimate for calibration of a single pyranometer with a better than 1.5 % uncertainty. Over a 15 year life, the cost of 7 calibrations totals EUR 3500 - comparable to the instrument purchase costs. We help you attain lowest total cost of ownership in 2 ways:

- Hukseflux has calibration facilities in the main global economies. In many cases it is possible to avoid cross-border transport, and all associated paperwork, for example to get permission for tax-free export and import.
- attractive quantity discounts



**Figure 1** Pyranometer and pyr heliometer users are supported by the worldwide Hukseflux calibration and servicing organisation.



**Figure 2** Calibration of all major pyranometer brands and models.

## Sensor calibration service capabilities

**Table 1** Hukseflux' most popular calibration services

<b>HUKSEFLUX' MOST COMMON CALIBRATION SERVICES</b>			
<b>calibration item</b>	<b>brand and model</b>	<b>calibration method</b>	<b>comment</b>
Pyranometers and pyrhemometers	Hukseflux LP, SR, DR series Kipp & Zonen CMP, SMP, CHP, SHP series	Pyranometers: conform ISO 9847:1992 Solar energy - Calibration of field pyranometers by comparison to a reference pyranometer, type IIC Pyrhemometers: laboratory developed method, based on the same standard as for pyranometers.	Hukseflux has limited repair possibilities for other than Hukseflux brand sensors.
amplifiers	Hukseflux –TR amplifiers Kipp & Zonen AMPBOX series	Calibration and re-programming. Calibration traceable to traceable voltage and current standards.	

## Checklist / requirements for recalibration of sensors

**Table 2** Checklist for calibration services

<b>HUKSEFLUX CALIBRATION SERVICES</b>		
<b>subject</b>	<b>responsible party</b>	<b>responsibility</b>
contact our Service desk / Service form	customer	Before service, contact <a href="mailto:service@hukseflux.com">service@hukseflux.com</a> . 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.
prices / quantity discounts	customer and Hukseflux	Increase efficiency; ask for our quantity discounts for batches of 3 or more pyranometers in one order. Please note that your shipment costs per instrument also benefit from batch processing. Cost of calibration for other-than-Hukseflux brand sensors may be higher than that of Hukseflux brand sensors.
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 pyrhemometer 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-xyy-20, 21 and 18 with xx < 100 and yy void or "SB", GTW-7-32, GTW-10-32 (also with extension 485A)
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.

### Services: what we do

- perform accurate calibration of solar radiation sensors
- work according to established standards
- calibrate major brands
- in EU and USA we also calibrate pyrhemometers

### Capabilities and restrictions

See the tables on the previous page for solar sensor calibration capabilities and restrictions. Please contact us for more details. In case other-than-Hukseflux brand sensors need extensive

servicing or repair, we recommend obtaining this service from the manufacturer.

### 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.

### 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.

Would you like more information?  
E-mail us at: [info@hukseflux.com](mailto:info@hukseflux.com)