IEC 61724-1:2021

What is new in the 2021 version, a quick explanation

The 61724-1 standard for PV system performance monitoring has been revised. The latest version, released July 2021, defines 2 "accuracy classes". In conformity declarations, providers must state the accuracy class of the measurement. The class is not only determined by the hardware that is used, but also by quality checks and measurement procedures. The standard contains detailed specifications at monitoring system component level. This memo offers a general summary, and focuses on the choice of pyranometer. A separate memo offers comments on the consequences of the new standard concerning the selection of pyranometers.

Figure 1 *Cover of the new IEC 61724-1 standard, published in July 2021.*

Figure 2 *Two SR30 Class A pyranometers measuring GHI (Global Horizontal Irradiance) and POA (Plane of Array) in a PV performance monitoring system.*

Introduction

The first edition of IEC 61724-1: *Photovoltaic system performance monitoring – Guidelines for measurement, data exchange and analysis –*, dates from 2008. It has been updated twice. The new 2021 version of the standard is fundamentally different from the 2008 version and slightly changed relative to the 2017 version.

The new standard includes:

- 2 accuracy classes, A and B for monitoring systems, to be used in conformity declarations. The IEC 61724-1:2017 Class C is now Class B
- accuracy requirements for monitoring equipment per class
- required quality checks (i.e. calibration and maintenance) per class
- recommended minimum number of instruments used as a function of the PV system scale
- new in 2021: requirements for reflected radiation and albedo measurement
- requirements for tilt sensors included

The 2021 version of the standard recognises that the solar irradiance measurement is one of the weakest links in the measurement chain. For Class A systems, it specifies the Class of pyranometer that may be used, including requirements for dew and frost mitigation, azimuth and tilt angle accuracy. It also defines cleaning and calibration intervals for pyranometers. The standard also defines requirements for measurement of module- and air temperature, wind speed and direction, soiling ratio, and (AC and DC) current and voltage. Table 1 on the following page offers an overview of the main elements of the IEC 61724-1 monitoring classification system.

Hukseflux
Thermal Sensors

Table 1 *The main elements of the IEC 61724 -1: 2021 PV monitoring system classification system.*

	CLASS A	**CLASS B**	**CLASS C**
accuracy	high	medium	low
purpose	utility scale PV systems and large commercial	rooftop or small to medium size commercial	**new in 2021:** No longer used
irradiance and environmental measurement	specified sensor set specified number of sensors, also including POA, GHI wind, air - and panel temperature, soiling **new in 2021:** requirements for dew and frost mitigation of pyranometers depend on local climate **new in 2021:** recommendations for reflected irradiance and albedo Panel temperature: 3 sensors per station	**new in 2021:** Old (2017) Class C is new (2021) Class B POA measurement and panel temperature measurement are required GHI and other parameters may be derived by other means than on-site measurement such as satellite observation	
Tracker and POA tilt angle measurement	requirements for tilt measurement inluded		
electrical output measurement	specified array and system energy output measurements	system output power and energy measurement only	
quality checks and cleaning	calibration prior to use **new in 2021**: calibration for solar radiation sensors 1 x / 2 yr **new in 2021:** Cleaning 1 x / wk (unless it can be proven that this is not needed) system inspection 1 x / yr	calibration prior to use calibration schedule as recommended by manufacturer	

Hukseflux
Thermal Sensors

How many systems per PV power plant?

There is a large difference between IEC recommendations and Hukseflux's observations of common practice. Hukseflux sees many more stations at PV power plants than recommended by IEC.

In a nutshell: for a system above 20 MW Hukseflux observes:

- 3 systems as a minimum
- above 60 MW 1 system added at every 30 MW

For details, see our separate memo on the subject: *IEC 61724-1 2021 how many monitoring systems on a pv power plant.*

What is an accuracy class?

The concept of an accuracy class is defined by the *International Vocabulary of Metrology (VIM)*, paragraph 4.25, as "class of measuring instruments or measuring systems that meet stated metrological requirements that are intended to keep measurement errors or instrumental uncertainties within specified limits under specified operating conditions".

Compliance with an accuracy class is sufficient to claim a certain measurement uncertainty by comparison to other systems of the same class according to the *Guide to Expression of Uncertainty in Measurement (GUM)*, type B evaluation of uncertainty, see also VIM paragraph 2.29.

Where can I order the standard?

The standard can be purchased from *the IEC Webshop*.

More about compliance of pyranometers with the new IEC classification

Hukseflux is specialised in solar radiation measurement. A separate memo offers comments on the *consequences of the new standard concerning the selection of pyranometers.*

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.

Customers are served through our headquarters in the Netherlands, and locally owned representative sales offices in the USA, Brazil, India, China, Southeast Asia and Japan.

Interested in our products and services?
E-mail us at: info@hukseflux.com