A row of MS-80S Class A pyranometers

Smart performance

It was a great pleasure for us at PES to speak with Kees Hoogendijk, Managing Director, EKO Europe. Accuracy is of paramount importance to this company and now they have made improvements to their already world famous pyranometer and launched the new MS-80S, with multiple added aspects of value for their customers. To produce the smartest, most innovative, accurate, and best in class sensors on the market remains their quest, so we're sure we can expect more in the future.

PES: Hi Kees, welcome back to PES Solar. We have worked with EKO for many years and it's good to have the chance to speak with you. For the benefit of our new readers could you give us a brief overview of EKO? What products are you best known for?

Kees Hoogendijk: EKO Instruments was founded in Japan over 90 years ago, and develops industry-leading solar energy sensors, and scientific instruments for environmental research.

One of our most famous products is the MS-80 pyranometer. We launched it in 2016 and until recently it was the only ISO 9060:2018 Class A solar sensor on the market in the top tier 'fast-response' and 'spectrally flat' sub-categories. We've since launched the MS-80S so there are now two best in class pyranometers, both made by EKO.

PES: We know that EKO's monitoring systems and pyranometers are renowned for their accuracy, how did this come about?

KH: Over the years the solar energy industry has evolved to pay much closer attention to the small details, the environmental and atmospheric conditions that can impact on PV performance and energy yield fluctuations. The smallest change can, over time, add up to a big loss or gain in terms of output or efficiency. So, accuracy is fundamental to the economic viability and success of solar power today.

At EKO we have a commitment to accuracy that is rooted in our history as a Japanese company, it's at the heart of what we do. The

Kees Hoogendijk

Japanese obsession with quality and craftmanship has been strengthened by the contributions of our global team, and customers, who bring different perspectives and ideas to the table. Together, that insight and commitment drive us to develop the best sensors possible.

PES: With this in mind, we are eager to hear more about the latest version of your industry leading Class A MS-80 pyranometer, the MS-80S. Could you give us some background on the MS-80 and a run-down of the additional features, technologies and performance improvements offered by the MS-80S?

KH: The MS-80 is an ISO 9060:2018 Class A pyranometer, 'Spectrally flat' and 'Fast response'. We built it, based on an innovative patented design, with a state-of-the-art thermopile detector and Quartz diffusor technology, to achieve best in class accuracy, speed and reliability.

With the MS-80S we wanted to build on the proven standards and technology of the MS-80, and, by listening to our customers, add features that would help them.

So, we looked at how pyranometers are used in the field, the different applications, and market needs. There are many ways to use a pyranometer in a PV monitoring setup for example, and we learnt a lot by analysing these applications.

We determined that output flexibility, the option to connect with any type of data acquisition system, whether the connection is analogue or digital, would really help our customers to get the most out of their pyranometer. With the MS-80S the user can select from Modbus 485 RTU, and SDI-12 for digital output; and r 4-20mA, and 0-10mA (0-1V) analogue options, so the system integrator or EPC can choose how the pyranometer will be interfaced.

Some of the added benefits of our new digital connection options include ease of use and, besides irradiance data, access to additional information called meta-data. Another key point is that engineers or technicians are able to connect to the MS-80S using a standard laptop.

We believe that pyranometers will, and must continue, to get smarter. As a manufacturer we are always innovating, learning, and applying new ideas to help our customers to get more reliable data. Our goal is to continue developing the most accurate, and reliable sensors possible.

PES: Other pyranometers require a separate data-logger to access their data

MS-80S Class A pyranometer & MS-80S with MV-01 All-Weather Heater & Ventilator

but you mentioned that it is possible to access data from the MS-80S using a regular laptop. How is this possible?

KH: When using the digital output options, the user will no longer need an additional device, known as an 'analogue data logger' or 'voltage measurement device', to access the data. With the MS-80S, users can connect using a standard laptop and 'Hibi'; a new, custom built programme developed by EKO to give users real-time access to the internal diagnostics, custom settings, and data on irradiance, humidity, internal temperature and tilt angle from the sensor.

This data can also be acquired when the pyranometer is connected through the datalogger digital serial communication port. Each pyranometer has its own unique communication address so in this way, multiple pyranometers can be connected in a network; and identified, managed and analysed individually or as a group.

PES: Why did you decide to include this feature?

KH: We have been working to combine 'trust' with 'smart', taking our existing range of ISO:9060 Class pyranometers, proven over time and around the world, and adding new 'smart' features. Simply put, we want to add value.

EKO sensors are already trusted to be accurate, with second-to-none build quality. Now, new diagnostic functions like the ability to self-monitor tilt angle, temperature and inside humidity monitoring, and onboard diagnostics are making our sensors smarter.

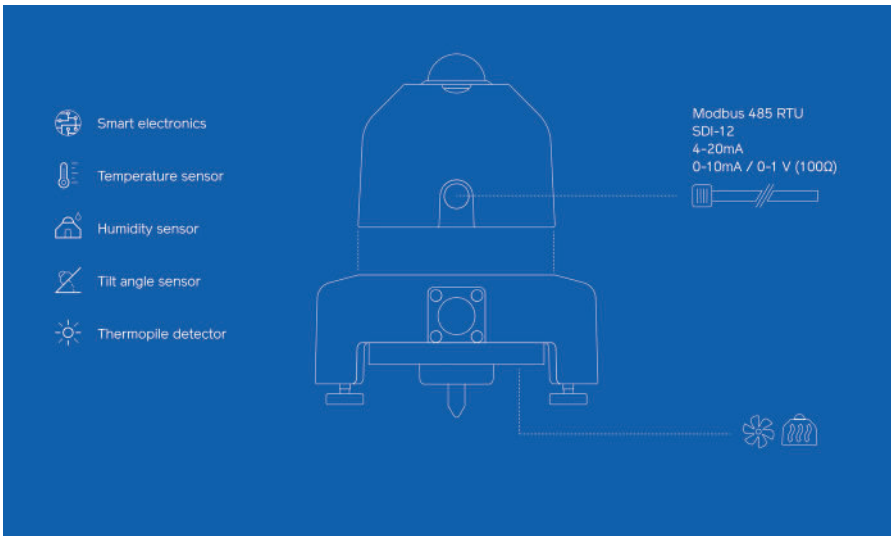

Illustration of MS-80S Class A Pyranometer with MV-01 All-Weather Heater & Ventilator

In combination, these qualities and features will help to prevent unplanned sensor and system downtime; in turn helping to significantly improve yield, efficiency, and performance for our customers applications.

PES: Is the MS-80S, easy to use and install, or do you supply and fit?

KH: Regardless of whether your PV solar plant is large or small, hi-tech or low, maximizing your energy yield ultimately depends on creating the perfect conditions. Many PV solar plants already have an onsite monitoring system, generating critical operating data about yield and performance-ratio, but with increasing energy demands, and increasing competition, its' time to consider upgrading to 'Smart Sensors'.

We designed the MS-80S to be easy to use, and install, and to integrate with any DAQ system; to help make upgrading as smooth as possible.

An EKO engineer installing a new MS-80S pyranometer at the EKO Inashiki solar park in Japan

Hibi software, demo screen

For the typical application of POA, GHI or BOA irradiance measurement mounts are available, along with standard interconnecting cables for building a pyranometer network.

PES: Do customers need any special training to use the MS-80S?

KH: The short answer is no. With a laptop connection, and our new Hibi software, it has never been easier to plug in and access your data.

The longer answer is still no, the MS-80S really is easy to use, but you must also consider how to mount the sensor, and how to integrate it into a wider system. Building redundancy into your measurement system for example, as advised under the IEC-61724-1 standard, allows you to cross compare and correlate data from multiple sensors, ensuring accuracy across a whole network.

So, in that regard, to ensure you get the most from your sensors, you should have, or be working with people who have, a good knowledge and experience of setting up and managing solar monitoring solutions.

We sell a variety of mounting solutions and are always happy to work with and advise our customers on the best options for their application.

PES: Are there any specific guidelines in terms of maintenance after installation?

KH: Maintenance is crucial, but with a 5-year warranty and, unique for a Class A pyranometer, 5-year recalibration interval, you will need to do much less than usual. And while cleaning is inevitable, with the onboard diagnostics of the MS-80S, you may be able to extend or re-target your cleaning regime for greater efficiency.

Even so, it is important to regularly check the data from your pyranometer and to be aware of weather or other anomalies that can occur. Even night-time data can help to indicate issues related to noise or offsets; though the MS-80S has electronic filtering components that are less susceptible to noise and grounding effects.

In summary, the MS-80S is easy to use, and easy to monitor. With all inputs and outputs protected, and potential EMI and EMC noise effects suppressed, it is extremely reliable and consistent in its accuracy; so, while no special treatment is required, if you look after it, it won't fail to deliver the most accurate results possible from a Class A pyranometer.

PES: You mentioned a 5-year recalibration interval. Is that standard for pyranometers?

KH: No.

Some manufacturers products require annual recalibration, though most recommend a two-year interval. We've been able to extend our recalibration interval for the MS-80S to five-years thanks to superior design and build quality.

Re-calibration is about re-checking the sensor against the harmonized Irradiance scale, and over time the MS-80 has continued to demonstrate consistent stability. We are able to commit to a 5-year interval for the MS-80S with confidence, thanks to the success and proven capabilities of the MS-80 on which it is based.

PES: What are your expectations with respect to the future of irradiance measurements?

KH: As a company we are always looking into new possibilities to improve the performance of our sensors, at ways to put more intelligence inside the device, and to make maintenance easier.

Personally, I am particularly interested in the challenge of keeping sensors clean. In future iterations of our pyranometers for example I would like to automate cleaning, or find a way to make cleaning unnecessary. If we can achieve this goal it would not only save our customers a lot of time and money in maintenance costs, it would also guarantee high-quality, consistent, measurements, whatever the weather.

At EKO I know we will continue investing in science and technology, that we will continue to reward the trust of our customers with the smartest, most innovative, accurate, and best in class sensors on the market. Watch this space!

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