



# Newsletter **20**

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If you have a news item for the newsletter or want to share your experiences with Kipp & Zonen applications and contribute to our next issues, please e-mail the editor: [kelly.dalu@kippzonen.com](mailto:kelly.dalu@kippzonen.com)

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Kipp & Zonen B.V. - 2012

## A New Holiday Destination

Sometimes I'm amazed about people's creativity. Recently the German magazine 'Der Spiegel' said that travel guide publisher Karl Baedeker has issued 'Germany - Discover Renewable Energy'. It lists over 160 interesting sights related to solar energy. So it has now become a tourist attraction!

Renewable Energy is gaining ground in many fields, and also for Kipp & Zonen. Last year showed growing interest for solar monitoring with our instruments and 2012 is continuing this trend. With the pyranometers that include a smart interface launched last year, we further support this industry. The first deliveries of the SMP3 and SMP11 pyranometers are already in the field. The positive feedback encourages us to expand the range of smart instruments equipped with MODBUS® during the year. This will make future data acquisition very easy and cost effective.

The first deliveries of the LAS MkII Large Aperture Scintillometer have taken place in the US and the UK. The new scintillometer will be on display during the EGU conference and exhibition from 23<sup>rd</sup> to 26<sup>th</sup> of April in Vienna, Austria.

I have a question for you! Are you aware of the need to recalibrate our instruments from time to time? The maximum recommended interval between two calibrations is two years. As with all high accuracy measurement equipment, regular maintenance and recalibration is necessary to ensure the performance of the instrument and the quality of the data. In addition to the factory calibration facilities in Delft, Kipp & Zonen USA can also recalibrate most of our sensors. You can find more information about calibrations in the instrument manuals and on our website.

I wish you a happy Easter with some lovely spring weather. Please enjoy reading this newsletter.



Ben Dieterink, President  
Kipp & Zonen B.V.



# Solar Monitoring in Project PrédiSol

In April 2011 French companies TOTAL, Bertin Technologies and ARMINES signed an agreement to pull their skills to carry out research for the PrédiSol project. This focuses on improving the estimation tools for long term solar resource data derived from satellite imagery and specific campaigns of ground measurements in the Middle East region. The direct spatial and temporal correlation between satellite images and ground measurements will help in adjusting or modifying the model parameters in order to make the most of existing maps for the entire Arabian Peninsula.

The joint efforts will result in a methodology to accurately estimate solar resources that can be used by Concentrated Solar Power (CSP) or Concentrated Photovoltaic (CPV) plants and will also help decision making and to minimise the financial risks associated with the development of solar energy projects.

For the PrédiSol project, Bertin has developed a high quality solar monitoring station, that includes a Kipp & Zonen SOLYS 2 sun tracker with shading ball assembly, two CMP 11 pyranometers, for global and diffuse solar radiation measurement, and a CHP 1 pyrhelimeter for DNI (direct normal irradiance). The choice of these sensors is a technical and economic optimum which allows Bertin to test their satellite data processing algorithms by comparison with high quality intra-hourly ground-based measurements. The response time of the radiometers, to achieve a data sampling rate suitable to provide relevant statistical information, was also a selection criterion.



The first solar monitoring station was successfully put into operation in January 2012 in Madinat Zayed in the United Arab Emirates. Bertin Technologies has been providing service and technology development in the Renewable Energy sector for many years. It is known for its strong knowledge of data acquisition and weather instrumentation, especially solar radiation instruments, and the specific treatment of these measurements ■

# On the History of the Pyranometer

Currently there is a lot of interest in the history of scientific instruments and their measurements. The pyranometer is still one of Kipp & Zonen's core products today, but it dates back to the early years of the last century. Who better to ask than our senior engineer for radiometry Leo van Wely to reflect on this subject? Leo just retired, but is more than happy to keep involved with his passion for 33 years.



We would like to thank Leo for his dedication and great work throughout three decades. Passion for precision is our company's slogan, but that especially applies to someone like Leo. He will only deliver an instrument when it is completely refined and always focuses on quality, reliability and stability.

In his years at Kipp & Zonen he has always been open to new and alternative ideas and typically worked with pencil and paper to bring a problem back to its physical truth. Our future interns have missed the opportunity to learn from a remarkable man who is known for his open mind, ability to listen and informed discussions.

Leo is the first to write and publish a blog for Kipp & Zonen and will be followed by more colleagues throughout the year. We hope to provide you with interesting and helpful blogs on current subjects that matter to our shared field of expertise.

Please follow the QR-code to our website to read Leo's blog on the history of the pyranometer ■



# Italian Air Force Brewers

The Brewer spectrophotometer is a unique instrument that provides continuous, automatic and unmanned operation, to determine the amount of ozone present in the column of atmosphere above the place of measurement, the Total Ozone Column. The Italian Air Force Meteorological Centre owns a network of four MkIV Brewers, the first delivered in 1985 and the rest in 1990.



*Brewers in Vigna Di Valle, making their Ozone measurements. From left to right, Arjan Hoogendoorn (Kipp & Zonen), Emanuele Vuerich (Italian Air Force), Marco Mariano (Eurelettronica Icas)*

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The four Brewers are deployed at three different meteorological centres:

1. The Italian Air Force High Mountain Meteorological Centre (CAMM) on Monte Cimone, near Sestola in the Province of Modena - Brewer #063
2. The Italian Air Force Center for Meteorological Experimentation (ReSMA) in Vigna di Valle (Roma) - Brewers #024 and #062
3. Meteorological Observatory site in Messina, Sicily - Brewer #065

As these Brewers have been operating for more than two decades, the Logistic Command of the Italian Air Force requested Kipp & Zonen to carry out a complete service and revision of the instruments. This is to preserve the investment in the equipment and the continuity of important data on the amount of Ozone in the atmosphere and continuing to be part of the global observation network.

Kipp & Zonen carried out a complete inspection, service and functional test of each instrument at the factory in Delft, with replacement of any components necessary to ensure ongoing reliable operation. Each Brewer had a temperature test and a dispersion test carried out.

Upon completion of this work, the instruments were calibrated against the reference standard Brewer owned by Kipp & Zonen. This in accordance with the World Meteorological Organization recommendations that Brewer Spectrophotometers should be recalibrated at least every two years against a

‘travelling standard’ reference Brewer, with traceability of the calibration to the Reference Triad of Brewers maintained by Environment Canada.

During the re-calibration, the reference Brewer and the instrument that needs to be re-calibrated are operated side by side for a few days under good sky conditions to collect measurement data. After this, a process of analysis and evaluation by Kipp & Zonen’s Brewer specialist minimises the differences in the calculated Ozone and Sulfur Dioxide concentrations by adjusting the calibration constants.

The final work is the ultraviolet (UV) sensitivity calibration using a 1000 W reference lamp and preparation of the calibration reports.

After a Factory Acceptance Test (FAT) by the Italian Air Force, the four Brewers were returned to Italy and reinstalled. Following this, the Kipp & Zonen specialist visited all 3 sites to check that the instruments were working correctly.

“Now that the Brewers are back in their positions we can last another two decades of Ozone and UV measurements!” ■

Kipp & Zonen is represented in Italy by Eurelettronica Icas Srl.  
[www.eurelettronicaicas.com](http://www.eurelettronicaicas.com)  
Contact: Maria Rita Leccese

# Experience our new Smart SMP Pyranometer with the SMP Starter Set

The recently released SMP series of smart pyranometers offers a lot of extra features compared to the CMP series because of the integrated micro-controller and the RS-485 interface with MODBUS® protocol. We have received many enquiries from customers who would like to evaluate the possibilities available, or to be able to use the new pyranometers in the field with a laptop computer to make comparisons with installed pyranometers, or for laboratory measurements and demonstrations.

To facilitate these applications we have created the SMP3 Starter Set that is perfect for demonstration, evaluation and testing. The SMP3 Starter Set has a convenient carrying case with the smart pyranometer and everything that you need to connect it to a USB port of your computer.

The Starter Set is also available without a smart pyranometer so that you can choose your own combination of radiometer and cable length, or so that you can use one starter set with several smart pyranometers (for example to configure them).

To demonstrate a reasonable signal from the SMP pyranometer when using artificial light, a halogen desk lamp is advised. The average light level in an office or laboratory environment is less than 10 W/m<sup>2</sup>. A 20 Watt halogen lamp at a distance of 10-20 cm can give you an irradiance of 500 W/m<sup>2</sup> or more, as shown below.

RS-485 MODBUS® communication allows access to instrument configuration, measurement data, instrument status, operating parameters and calibration history. The Smart Interface also corrects for sources of inaccuracy inherent in thermopile pyranometers.

The SMP3 Starter Set, including all the items listed, is part number 0374901.

The SMP Starter Set, including all the items listed but without a smart pyranometer is part number 0374902.

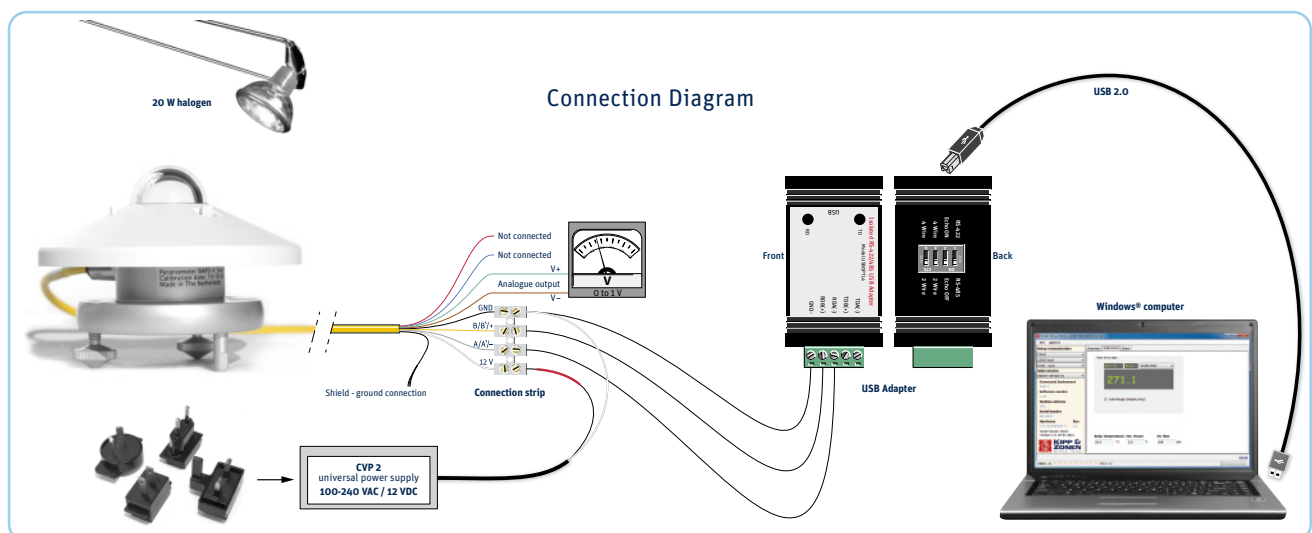
Both Sets are available for delivery now ■



## The SMP3 Starter Set contains:

- SMP3-V pyranometer with 10 m cable
- Instruction sheet SMP3
- Calibration certificate SMP3
- Product documentation CD with manuals, software, etc.
- Cleaning cloth
- RS-485/USB isolated interface
- CD with USB driver and installation instructions
- USB cable
- CVP 2 universal 12 VDC power supply
- Connection strip SMP/CVP/Interface
- Connection diagram
- Carrying case

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# Turkey's Growing Research in Solar Energy

Solar energy is becoming increasingly important in Turkey, along with other renewable sources such as hydro and wind power. There is no grid connected system yet, but an infrastructure is planned to be realised very soon.



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*Basic solar monitoring station with two CMP 11's in Konya City*

Turkey is located in an advantageous geographical position for solar power. Therefore, the energy market regulatory authority has prepared targets for solar energy investment. The goal is for 600 MW of solar electricity production plant investment by the end of 2013. Once the 600 megawatt capacity facilities are completed and producing electricity, the government plans to authorise further investments according to a structured plan.

This Authority is also working on determining standards for solar measurements. Pro-actively, some investors have already started setting up measurement stations for research and site prospecting. One of the applications is shown in the picture. This basic solar monitoring station has been installed in Konya City, Central Anatolia by a consulting company for PV panel applications. This station includes two CMP 11 pyranometers to measure horizontal global radiation and tilted global radiation.

For the measurement of solar energy resources Elite AS have been installing solar energy measurement stations for investors and consulting companies in Turkey. The most commonly used instrument is the CMP 11 pyranometer, for the measurement of

global radiation for fixed PV panel applications. When the measurement of direct solar radiation is needed, for CSP applications, we have installed complete solar monitoring stations with a SOLYS 2 sun tracker, CMP 11 pyranometer and CHP 1 pyrliometer.

Elite AS has been working on measurements for meteorology and environment in Turkey for 25 years and has installed hundreds of measurement stations and systems at various sites across the country. Applications include; research, general meteorology, renewable energy and agriculture. Elite supplies and supports the best quality sensors and systems for such applications including, of course, Kipp & Zonen.

Find out more at [www.elite.com.tr](http://www.elite.com.tr) ■



*Installation on Erzurum Palandöken Mountain*

# Welcome Foeke Kuik, Our New Business Development Manager



We are delighted to introduce you to our new Business Development Manager, Foeke Kuik. As of January this year he has been involved with the strategy and business course of Kipp & Zonen and he will be a regular visitor to conferences and exhibitions. If you have the opportunity, shake his hand and have a chat.

“Originally I am a physicist with a PhD in the scattering of light by small particles in planetary atmospheres. After I finished my studies, I started working for the Dutch Meteorology Institute (KNMI), where I became acquainted with the Brewer and Kipp & Zonen’s radiometers. Eventually I became Senior Scientist of the Instrumentation Division.

In 2002 I was appointed managing director of a company called Almos Systems, located in Culemborg, the Netherlands. This company supplied the observation systems to KNMI and over the next 4 years we installed meteorological equipment at many European airports.

Almos Systems was sold to Telvent, a Spanish multi-national company, in 2005 and I took up the challenge to manage the global Weather Product Center, responsible for the product management of all supplied systems. When Telvent was taken over by Schneider Electric in August 2011, I started discussing a position in business development with Ben Dieterink, the president of Kipp & Zonen, and the result is that I started this new job on January 2nd 2012.

Business Development is becoming a critical activity and I am looking forward to working with all our representatives and customers to find new opportunities for Kipp & Zonen and to live up your expectations.“ ■

# Correction to CM 4 Calibration Table

After the publication of Newsletter 19 we found an error in the CM 4 calibration table. The CM 4 is actually calibrated at - 20 °C and from over the temperature range from 0 °C to +150 °C in 25 °C steps. The last row of the table in Newsletter 19 stated an operating temperature up to +125 °C that should have read +150 °C. The correct table can be found below. Depending on the application temperature interval the optimal sensitivity can be selected from the table as shown on the calibration certificate.

Pyranometer CM 4		Serial number 12xxxx
Calibration temperature (interval)	Sensitivity	Maximum temperature error
-20 to +25 °C	9.96 $\mu\text{V}/\text{W}/\text{m}^2$	<0.43 %
+25 °C	10.00 $\mu\text{V}/\text{W}/\text{m}^2$	<0.00 %
+25 to +75 °C	9.89 $\mu\text{V}/\text{W}/\text{m}^2$	<1.12 %
+25 to +100 °C	9.80 $\mu\text{V}/\text{W}/\text{m}^2$	<2.07 %
+75 to +100 °C	9.69 $\mu\text{V}/\text{W}/\text{m}^2$	<0.95 %
+100 to +150 °C	9.30 $\mu\text{V}/\text{W}/\text{m}^2$	<3.21 %

The sensitivities obtained at the different temperature steps are averaged, to obtain a sensitivity that is valid for a temperature range (column 1 in the table). The right (3<sup>rd</sup>) column gives the maximum deviation from the mean sensitivity within that temperature range.

The user can choose the sensitivity that matches best the temperature range of his application. For example, when the CM 4 is used at +88 °C, the sensitivity value of 9.80  $\mu\text{V}/(\text{W}/\text{m}^2)$  for the +25 °C to +100 °C interval could be applied, the maximum deviation is within 2.07%. However, when the value of the +75 °C to +100 °C temperature interval is chosen (9.69  $\mu\text{V}/\text{W}/\text{m}^2$ ) the maximum deviation is within 0.95%, so applying this sensitivity will lead to a more accurate irradiance value. The new way of characterizing the CM 4 gives the user a better insight in the accuracy of the irradiance measurement that can be obtained when using the CM 4 in a certain temperature range ■

## Fairs & Events

European Geosciences Union (EGU) General Assembly Vienna, Austria	23 - 26 April 2012
SNEC PV Power Expo Shanghai, China	16 - 18 May 2012
Intersolar Europe Munich, Germany	13 - 15 June 2012

# Passion for Precision

Kipp & Zonen is the leading company in measuring solar radiation and atmospheric properties. Our passion for precision has led to the development of a large range of high quality instruments, from all weather radiometers to complete measurement systems.

We promise our customers guaranteed performance and quality in; Meteorology, Climatology, Hydrology, Industry, Renewable Energy, Agriculture and Public Health.

We hope you will join our passion for precision.

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