

MEASUREMENT NEWS



Rausch
the power of herbs



In the service of health

Perfect conditions in cleanrooms thanks to validated data loggers



UKAS laboratory-Rotronic UK

The UKAS laboratory at Rotronic UK sets new standards



Competition

2013 winners and exhibition dates



James Pickering

Head of Sales,
Measurement Solutions

Dear Business Partners,

Our new sub-line “Measurement Solutions” has gained strength and developed well in the last 12 months. Following the launch of CO₂ measuring instruments, Rotronic now offers a broad range of differential pressure transmitters. While we are extending our measurement parameters we remain focused on leading the field in humidity measurement. Making us the ideal partner for your needs.

We work continuously on extending our product range to offer solutions for as many applications as possible.

Our efficient network of distributors worldwide is staffed by highly qualified experts, who, like everyone else at Rotronic, place great value on customer service. To help us offer even better service in Southeast Asia, we have **opened an office in Singapore**. The decision to do this underlines Rotronic's objective to grow in what is currently a difficult economic environment.

Rotronic's growth strategy is focussed strongly on the customer: our aim is to supply our partners with high-precision measurement systems for monitoring processes to ensure consistent product quality.

You can find further information on our **new measuring instruments** on **pages 12 and 13**. All product lines have been designed and improved to meet customer requirements.

Based on our clear commitment to the customer, we work untiringly on improving the service portfolio of our subsidiaries. For example, **Rotronic Instruments Ltd in Crawley, UK**, strives continuously to improve calibration measurement uncertainty in its ISO 17025 calibration laboratory. You can read more about this on **page 10**.

I wish you a pleasurable read of this issue of Measurement News and good luck in our traditional competition. We look forward to all feedback from our customers.

ROTRONIC AG

A handwritten signature in blue ink, appearing to read 'James Pickering', written over a light blue background.

James Pickering

Business Cases

**"AgriMet" – Crop specific water use****4**

The agricultural weather network

In the service of health**6**

Production monitoring at Dr. R. Pfleger GmbH

Rausch – the power of herbs**8**

Mapping for relevant measurements

New Products

**UKAS laboratory at Rotronic UK****10**

Reduction in calibration measurement uncertainty

Rotronic USA**11**

Calibration laboratory now ISO 17025 accredited

Aeolus tyres, China**11**

Rotronic ensures vehicle tyre quality

Our new products at a glance**12**

New products in the Rotronic family

Rotronic inside**14**

Brief news from Singapore, Italy and the UK

Competition

**Competition****15**

2013 winners and exhibition dates for 2014

AgriMet – Agricultural weather network for northwest USA

Serving the Pacific Northwest, a meteorological information system conserves energy and water through crop specific water use.



AgriMet station in Boise, Idaho.

The US Bureau of Reclamation, in cooperation with other sponsors, has developed an agricultural weather information system called “AgriMet” to promote energy and water conservation. AgriMet is a contraction of the words Agriculture and Meteorology. It is a network of over 50 automated weather stations that collect and transmit site-specific weather data.

AgriMet’s primary purpose is to model evapotranspiration (ET), i.e. the potential

amount of water used by a crop and evaporated out of the soil. However, there are many other uses for AgriMet data, including integrated pest management, frost protection and other crop management activities.

How does an AgriMet station work?

A data collection platform samples sensors every 15 minutes and stores the data until a Linux-based computer accesses the

data via a cellular modem. Every station is equipped to monitor air temperature, solar radiation, relative humidity, wind speed, wind direction, peak gust and precipitation. Additional sensors installed at some stations measure soil temperature at various depths, crop canopy temperature, diffuse solar radiation, pan evaporation and leaf wetness.

Air temperature and humidity measurements are key parameters required for the

computation of ET. The AgriMet program currently uses a Rotronic meteorological HygroClip HC2-S3 sensor at every station and a HygroGen2 humidity chamber for calibration. The filter caps on the sensors are changed every year and every other year each probe is swapped with a new probe calibrated using the humidity chamber.

AgriMet stations are self-contained units requiring no external power source: they are powered by storage batteries and are recharged by solar energy.

The weather stations are located at sites that closely represent irrigated crop environments throughout the Pacific Northwest region. The network consists of more than 50 stations with future plans to cooperate with the ET networks of other states.

Why so much interest in evapotranspiration?

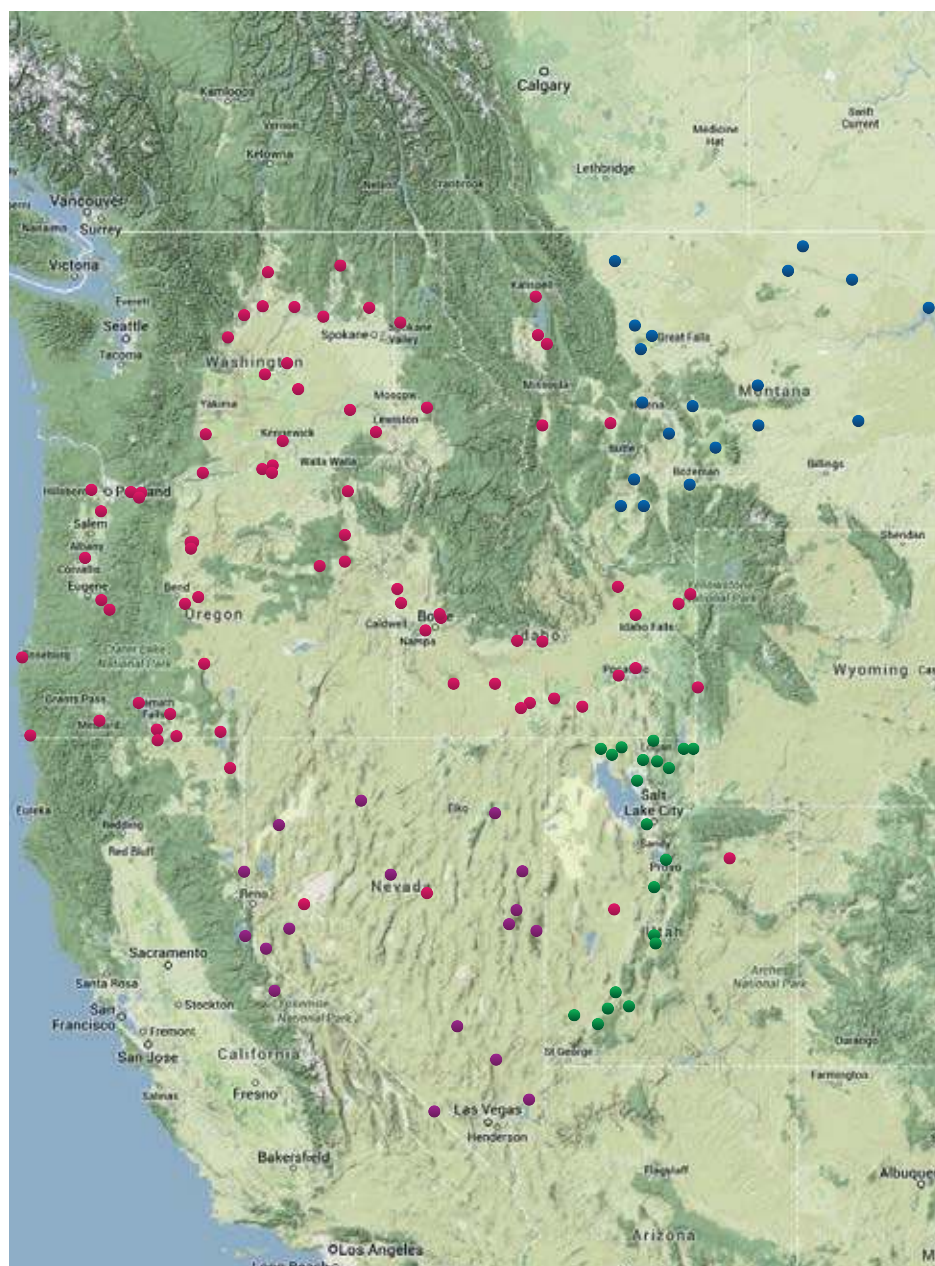
Agriculture accounts for 80 to 90 percent of all water use in the western states. Evapotranspiration is the amount of water lost to the atmosphere by direct evaporation of water from soil and plant surfaces, plus the transpiration from within the plant. Accurate modelling of ET can result in optimum water applications.

AgriMet uses the Penman Montith ET modelling procedure standardised by the American Society of Civil Engineers (ASCE). Since there are so many types of crops, alfalfa is used as a benchmark to calculate a standard reference ET. Individual crop ETs can then be determined by multiplying the reference ET with a crop coefficient.

Irrigators use this information to schedule irrigation water application. Knowing the water holding capacity of their soil, irriga-

tors track the modelled crop water use. When it reaches the maximum depletion level allowed, it's time to irrigate again.

Irrigation scheduling using AgriMet ET data can enable significant savings in water, pumping costs and fertilizer use.



Current AgriMet network.

- List of Weather Stations in the Pacific NW Region with location, elevation and installation date.
- List of Weather Stations in the Great Plains Region (Montana).
- List of Weather Stations in the Upper Colorado Region; these stations are a cooperation between the Utah Climate Center and USBR.
- List of Weather Stations in the Mid-Pacific Region; these stations are a cooperation between the Desert Research Institute and USBR.

In the service of health

Production monitoring and technical facility management at Dr. R. Pflieger GmbH.



Dr. R. Pflieger GmbH in Bamberg (Germany).

The German pharmaceutical manufacturer Dr. R. Pflieger GmbH applies special cleanroom techniques. It is very important for the company to monitor and verify pressure conditions as well as humidity and temperature measurement data in its cleanrooms. To meet this need, the company uses validated Rotronic data loggers of the

Dr. R. Pflieger GmbH

The pharmaceutical company Dr. R. Pflieger GmbH in Bamberg is one of the leading medium-sized manufacturers of medicinal products in Germany. It produces and markets a wide range of medical devices, primarily in the fields of urology and dermatology, as well as over-the-counter pharmaceuticals and body care products.

type HygroLog HL-NT series. Together with Rotronic's validated HW4 monitoring software, these data loggers deliver important information on the environments that have an influence on the production of pharmaceutical products. The Rotronic monitoring system has stood the test of time in the market over many years and undergone continuous development. It has been possible to connect instruments in a network via interfaces for more than 10 years now and, using suitable software, to store data permanently and visualise it. The HW4 software forms the heart of the system. It visualises and saves all data, configurations and user events and also triggers alarms. Its audit trail logs all data and activities in compliance with FDA21 CFR Part 11, GAMP5. Rotronic calibrated, qualified and validated Dr. R. Pflieger GmbH's monitoring system according to GMP requirements.

Overall control and regulation

The management system forms the basis for operation, monitoring and control of the technical facilities as well as for data and message management. Apart from the technical installations, the validated cleanroom monitoring system is implemented directly in FIS (OPC interface). Visualisation of the processing plant for purified water (Ph. Eur.), control and monitoring of the outdoor lighting and access control to the building and cleanroom air showers are also connected to the system. FIS therefore offers availability and management of all relevant data in a central software system.

HygroLog HL-NT data logger

The central acquisition unit is a HygroLog-HL-NT data logger. It provides digital inputs for HygroClip humidity and temperature

probes as well as Pt100 and 4...20 mA. The data logger is also equipped with a memory card on which not only the measurement data but also events in the instrument itself are stored.

HC2-S sensors

The digital HygroClip2 climate probes provide class leading precision and long-term stability. All calibration and adjustment data is stored in them. Their standard accuracy ex works is $\pm 0.8\%$ rh and ± 0.1 K. For more demanding tasks, sensors with an accuracy of $\pm 0.5\%$ rh can be supplied ex works.

Micatrone differential pressure transmitters

The MicaFlex MF-PFT differential pressure sensors boast accuracy of $\pm 0.5\%$ ± 0.5 pa with very low zero drift. The two analogue outputs were used in the project to operate monitoring and room pressure regulation from a transmitter.



Measurement equipment in switch cabinet.

Central installation of measurement equipment in a switch cabinet

All the differential pressure transmitters and data loggers are installed in eight separate monitoring sub-distributors connected to each other in a network. The signals from climate probe to data logger are transmitted digitally. The 4...20 mA inputs at the data logger are adjusted during start-up and are thus stable over the lifecycle.

Sophisticated software and clear presentation

The HW4 software saves the measurement data, alarms and events in a protected binary format. Manipulations are detected and the data record then marked as corrupt. Instruments are organised in groups and shown in the room layout. Colour changes make alarms and disturbances easy to see. The personnel in the production area are informed of the status by traffic light displays.

Evaluation and archiving

A data file is created for every measuring point. The MKT value is calculated from this raw data. The evaluation also contains alarm times and deviations and is presented in the form of a table with statistical values. Thanks to the high level of integration of the hardware in HW4, virtually all Rotronic instruments can be implemented in the existing monitoring system.

Customer benefits

The automation, management and monitoring solution implemented by Hermos and Rotronic offers a consistent solution for technical facility management and thus the prerequisite for cost-optimised plant operation. Since all main and secondary installations and the monitoring system itself are integrated in the FIS management system, they can be monitored and controlled via a central software platform. Due to the open structure of the system and clean separation of the monitoring system, plants from the production area as well as plants in the existing building can in future be integrated in the central monitoring and control system seamlessly. The monitoring system can be extended at any time without additional licence fees or external programming.



Technician checking the alarm schematic.

Mapping: the basis for meaningful measured values

Rausch AG in Kreuzlingen, Switzerland, has researched and used herbs and their extracts to manufacture high quality, innovative and near-natural products for hair and body care since 1890. It plans to install a logger system from Rotronic to ensure that raw and end products are stored in the right place and under ideal environmental conditions.



For every product the right storage place.

The company decided to evaluate and replace the instruments for measurement of temperature and air humidity in its high-bay stores and production rooms more than a year ago. Due to references and the convincing concept proposed, Rausch AG opted for Rotronic as partner for this project.

To improve the quality of data, a real-time online monitoring system on the LAN is to be installed. The system can also send alarms by SMS or email when temperature and/or humidity variations move outside the defined tolerance range. To install this system for the best possible

benefits, Rotronic recommended heat mapping to Rausch AG.

Heat mapping serves to collect environmental data in various rooms before a project is actually started in order to find out where the loggers should be installed and where there are critical points, or so-called hot and cold spots.

Essences and products in the right place

There is, however, another benefit to mapping. Dr Philippe Ch. Auderst, Technical Director, explains that the essences and dry and fresh herbs have always been of

the highest quality and that their correct storage is therefore vital.



Rausch philosophy: only use the best herbs.

José Trujillo, Head of Quality Management, adds: “The mapping will also tell us if we store our raw and end products in the right place.” Some essences need to mature in containers for months before they are ready for use in production. This requires not only far-sighted planning, but also a well-organized store with optimum environmental conditions.

Installation of the new measurement system

In the first phase Rotronic will install data loggers from the HygroLog HL-NT series in the high-bay stores. The packaging of premium products is their 'calling card'. Labels must therefore be attached perfectly and must not come off during transport or after opening of the packaging. Optimum storage is therefore a must. Air humidity should range between 40 and 60 percent and temperature from 16 °C to 24 °C.

In a further installation phase the satellite site in Bottighofen will also be equipped with new probes and a LAN-based measurement system.

The challenges of mapping

These lay in the step-by-step execution of the mapping project, and especially in the weather influences. José Trujillo: “Rotronic’s flexibility was an important criterion for me in awarding them the contract.” Future challenges were also taken into account in the mapping. José Trujillo: “Our aim with the mapping was to create clear bases for decision making and to obtain details on our building infrastructure and air streams. In addition to this, the new measurement system will also prepare us for possible new legal regulations.” Dr Philippe Ch. Auderset explains the legal aspect: “The quality of our products is high. To ensure we can

prove this when need be, we store at least one reference sample of every production series under optimum conditions

for a period of five years.”



Dr Philippe Ch. Auderset, Technical Director, and José Trujillo, Head of Quality Management.

When and how is mapping used?

Mapping is performed when installing complex measurement systems or where law dictates. Mapping is primarily used in the pharmaceutical and food industries and in any premises where correct climate is critical. To obtain accurate measurement

data, it is vital to evaluate the premises and position the loggers correctly. Mapping can also be used for existing measurement systems to check that the loggers are always installed at the right measuring points.

Reduction in calibration uncertainty has top priority

The UKAS laboratory at Rotronic UK has long made a name for itself in high quality calibrations and, thanks to constant improvements in measurement procedures, is growing into one of the most advanced commercial facilities in this specialised field.



Chris Aicken, laboratory manager, Rotronic UK at a MBW dew point mirror.

The ISO 17025 accredited calibration of humidity and temperature sensors and dew point instruments confirms performance and is increasingly a requirement of industry regulations and company quality management systems. The UKAS laboratory at Rotronic UK has spent the last two years increasing confidence in the calibrations performed and as a consequence lowering the Calibration and Measurement Capability (CMC) of the laboratory.

Significant improvements have been made in the measurement procedures for dew point and temperature in air, enabling the following projected CMCs in future:

Dew/Frost point measurement (°Cdp/fp)

- -60 to -40 °Cfp; uncertainty ± 0.15 °Cfp (currently ± 0.30 to ± 0.22 °Cfp)
- -40 °Cfp to +60 °Cdp; uncertainty ± 0.11 °Cdp (currently ± 0.22 to ± 0.30 °Cdp)
- +60 °Cdp to 70 °Cdp; uncertainty ± 0.13 °Cdp (currently ± 0.30 °Cdp)

Temperature in air/ °C

- 0 °C to +70 °C; uncertainty ± 0.05 °C (currently ± 0.17 to ± 0.26 °C)

Relative Humidity (RH)/%rh

In the laboratory RH is derived from vapour pressure formulations. Improvements

in dew point and temperature in air CMCs therefore affect the RH CMCs profoundly. The projected improvement lies in the range 0 to 70 °C; in the worst case RH CMC will be ± 1 %rh. In all parts of the HC2-S specified range covered by the accreditation the CMC is projected to be better than the specification of the probe. This is the first time this has been achieved.

The future

Within the next 12 months the temperature in air range will be extended from -60 °C to +150 °C, with a projected CMC at ± 0.1 °C. The dew/frost point measurement range will go down to -90 °Cdp and up to +90 °Cdp in combination with RH calibration in an extended range up to 90 °C and 95 %rh.

For example, at the new upper limit of 90 °C/95 %rh the projected CMC is anticipated to be ± 2 %rh and with these levels of calibration measurement uncertainty and range of accredited calibration services the purpose-built calibration laboratory at Rotronic UK will be one of the most advanced commercial facilities in the world.



Tests in the climate chamber.

Rotronic USA – Calibration Lab – now ISO 17025 accredited

ROTRONIC is pleased to announce the addition of another ISO 17025 accredited calibration laboratory to the ROTRONIC group.

Our subsidiary in the United States has recently earned NVLAP accreditation for its calibration laboratory in Hauppauge, New York. The laboratory has been deemed compliant to ISO/IEC 17025:2005 and ANSI/NCSL Z540-1-1994 standards for humidity and temperature calibration. The scope of accreditation for humidity falls in four different ranges with four correspondingly different measurement uncertainties. Nominal RH values for the laboratory are 0.5 %,

11 %, 35 % and 80 %rh. The uncertainties for these values are ± 0.21 %, ± 0.22 %, ± 0.29 % and ± 0.49 %rh with a K=2 respectively. Additional work is underway to expand the scope of accreditation into other humidity and temperature values. The calibration laboratory is in a climate controlled area with the humidity and temperature maintained and constantly monitored. The calibration process is constantly monitored by sophisticated

software algorithms to insure stable and reliable calibrations. Now with the accreditation, ROTRONIC USA further extends its support of key customer groups and industries. Customers can rest assured that the manufacturer of the product is now also providing accredited calibrations and, in the event of an issue with an instrument, in-house repair or exchange. Thereby reducing the amount of time an instrument is out of service.

Rotronic ensures vehicle tyre quality in China

Temperature and humidity play an important role in the manufacture of steel radial tyres. Rotronic ensures ideal conditions for production.

Aeolus is a Chinese manufacturer of steel radial tyres and one of the leading tyres manufacturers in the world. The temperature in the steel wire tyre production area must be kept at 22 ± 2 °C and humidity levels in the wire spindle housing and cutting area of the factory at under 50 %rh.

To ensure the environmental conditions meet the required tolerances at all times, an air conditioning system is necessary for consistent temperature and humidity control.

Rotronic sensors and transmitter products ensure precise temperature and humidity

measurement and control throughout the entire production process. Rotronic China proposed installation of 96 wall-mount and 130 duct-mount HygroFlex3 measurement transmitters with analogue outputs.

The transmitters were installed horizontally on support columns and the sensors positioned a certain distance away from them to ensure correct monitoring of the environmental conditions. Thanks to the professional experience and support of Rotronic, the system has been working well for more than two years with consistent measurement accuracy and reliable performance.



In the manufacturing process for steel radial tyres, multiple components are assembled using a special moulding machine. The environment in this area must be kept at 25 ± 3 °C and 55 ± 8 %rh.

Our new products at a glance

Flexible CO₂ measuring instrument

CL11 Benchtop Display Unit

Ideal for indoor applications.

Product information:

- Measures and logs CO₂, relative humidity and temperature
- 40,000 data point memory for CO₂, humidity and temperature values
- Displays maximum, minimum and average values
- Adjustable audible and visual CO₂ alarm
- Includes readout and configuration software, power adapter



Inexpensive transmitter

HygroFlex1

The HygroFlex1 series is perfect for the field of building management.

Product information:

- Measures relative humidity and temperature
- Hygromer® IN-1 humidity sensor
- Adjustable at 35 % / 80 %rh
- Two freely scalable analogue voltage or current outputs
- USB service interface
- Small size
- Easy mechanical mounting



Robust transmitter

HF5 Metal

Perfect for use in HVAC, industrial and pharmaceutical applications.

Product information:

- Measures relative humidity, temperature and dew point
- Capable of all psychrometric calculations
- Freely scalable analogue signals
- Digital outputs for network connection
- Mains and low voltage versions
- Updates via internet possible



Heated sensor

HC2-S-Heated & HM4

Suitable for use wherever high humidity prevails for a short or long time – particularly in tunnels, caves, cheese cellars and the like.

Product information:

- Measures relative humidity, temperature and dew point
- Automatic heating function
- No long-term condensation on sensor possible anymore
- SMD thermal sensor element
- Outstanding accuracy and repeatability



For perfect indoor air quality

CO₂ Display

Inexpensive display unit that simultaneously measures and records CO₂, humidity and temperature.

Product information:

- Measures CO₂, relative humidity and temperature
- Available as wall-mount or benchtop display unit
- Accuracy $\pm 2.5\%$ rh / $\pm 0.3\text{ K}$ / $\pm 30\text{ ppm} + 5\%$ of measured value
- ROTRONIC HYGROMER® IN-1 humidity sensor
- 18,000 data point memory for CO₂, humidity and temperature values
- Large, easy-to-read display
- USB for data downloads



The all-rounder Rotronic probe

HygroClip XD Industrial Probe

This OEM probe is available as a standard probe or as an industrial probe with remote sensor.

Product information:

- Measures relative humidity and temperature
- Calculates dew and frost point
- Power supply range: 5...16 VAC / 5...24 VDC
- Voltage outputs configurable via software
- Digital interface for calibration and measurement processing



For small pressure differences

PF4 Pressure Transmitter

Perfect for use in applications (e.g. cleanrooms) where minor differences in pressure have a big effect.

Product information:

- Fast response time and low hysteresis
- Freely configurable analogue signals
- Integrated relay switch contact
- High immunity to dust and humidity in the medium
- Measurement range $\pm 25\text{...}500\text{ pa}$
- Accuracy $\pm 1.0\%$ of end value at $23\text{ °C} \pm 3\text{ K}$



Rotronic technology in demand worldwide

Rotronic HF5 transmitters for Globalfoundries

GLOBALFOUNDRIES Inc. is one of the largest manufacturers of semi-conductor products worldwide. Aiming to standardise its humidity and temperature transmitters, the company contacted various suppliers, including Rotronic. Globalfoundries in Singapore showed keen interest in Rotronic's HF5 transmitters with HC2 probes. This series allows "hot swap" calibration, is easy to install and saves time and money when it comes to replacing instruments.

One big advantage is that the new transmitters can be calibrated in Singapore and therefore integrated in the operating process again quickly. Globalfoundries intends to switch to Rotronic products step-by-step and ultimately also buy Rotronic's portable HygroGen2 temperature and humidity calibrator.

Rotronic probes in use for safety and protection.



CAE headquarters in Bologna (Italy).

CAE was established in 1977. Its aim: to supply advanced technologies to public and private institutions to monitor environmental risks attributable to natural and especially hydro-meteorological phenomena.

CAE and Rotronic Italia, which together with its Italian partner EP Sas has developed a solution for measurement of temperature and relative humidity, cooperate under these conditions.

CAE has opted for the probe HC2-CP03-ACT-PT13 because of its long-term stability and analogue and digital outputs and because it is easy to calibrate thanks to the HygroGen2 generator. In short: a flexible product that can be integrated in the various CAE weather stations without any problems.

David Cameron visits Meaco Measurement & Control



Even British prime minister David Cameron knows the HygroClip2 probes from Rotronic.

Meaco Measurement & Control has been using Rotronic temperature and humidity sensors for more than 20 years. Meaco helps clients such as museums to store their collections under perfect conditions. They use HC2-S standard sensors in wireless monitoring systems and control instruments. Meaco works with conservation organizations throughout Europe and with the National Library in Cairo. To monitor valuable artefacts discretely, sensors can be connected to extension cables.

2013 competition winners

Congratulations to the winners of the “Measurement News” competition 2013.
We hope you enjoy your “Swatch watch”!

Winner France

Laurence Flêchon, Centre Technique
Fromage de Compté Poligny, Jura

Winner Switzerland

Daniel Wüthrich, Emmi AG,
Kirchberg

Winner Egypt

Mohamed Gamal Saad Zaghloul,
Egyptair M&E, Calibration Department

Take part and win

Answer the following three questions correctly and win one of three
“stylish backpacks”!

**1 Which Swiss company uses
“mapping”?**

- a) Déesse
- b) Rausch
- c) Nivea

**2 On which page do we report
on vehicle tyres in China?**

- a) 4
- b) 7
- c) 11

**3 How many new products does
Rotronic present in this edition?**

- a) 6
- b) 7
- c) 8

Send the answers (e.g. 1a / 2b / 3c) either by email to
kow@rotronic.ch or enter them in the **boxes** below, add your
contact details and fax to +41 44 838 13 07.

Answers:

1

2

3

First name

Surname

Company

Job title

Address

Post code/Country

email



Entry conditions

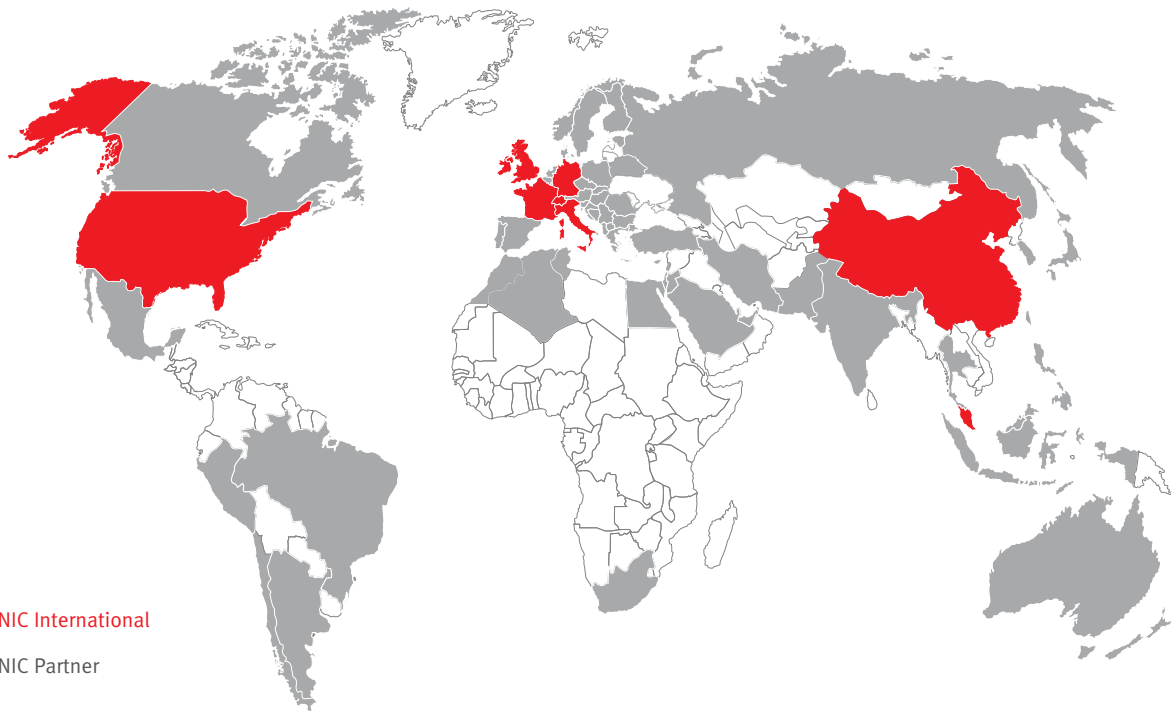
The closing date for entries is 30 June 2014. The winners will be notified in person by 18 July 2014, names may be published. Entry is free-of-charge and without obligation. No cash alternative is available. No correspondence will be entered into regarding the competition and the decision is final. ROTRONIC employees and their families are not permitted to enter the competition. Personal data will be treated as confidential and not passed on to third parties.

We will exhibit at the following trade fairs during 2014:

Trade fair	Place	Date
Interphex 2014	New York (USA)	18 March – 20 March 2014
InterMET Asia	Singapore (SG)	02 June – 03 June 2014
Sensor + Test 2014	Nuremberg (D)	03 June – 05 June 2014
Lounges 2014	Stuttgart (D)	03 June – 06 June 2014
Meteorological Technology World Expo 2014	Brussels (B)	21 October – 23 October 2014

ROTRONIC worldwide

ROTRONIC is present in more than 40 countries worldwide. You can find a complete up-to-date list of all our partners at www.rotronic.com/distributor.



Switzerland

ROTRONIC AG

Grindelstrasse 6
CH-8303 Bassersdorf
Phone +41 44 838 11 44
Fax +41 44 838 14 83
www.rotronic.ch

Germany

ROTRONIC Messgeräte GmbH

Einsteinstrasse 17-23
D-76275 Ettlingen
Phone +49 7243 383 250
Fax +49 7243 383 260
www.rotronic.de

USA

ROTRONIC Instrument Corp.

Suite 150, 135 Engineers Road,
Hauppauge, NY 11788
Phone +1 631 427 3898
Fax +1 631 427 3902
www.rotronic-usa.com

France

ROTRONIC Sarl

56, Bld. de Courcerin
F-77183 Croissy-Beaubourg
Phone +33 1 60 95 07 10
Fax +33 1 60 17 12 56
www.rotronic.fr

Italy

ROTRONIC Italia srl

Via Repubblica di San Marino 1
I-20157 Milano
Phone +39 02-39.00.71.90
Fax +39 02-33.27.62.99
www.rotronic.it

UK

ROTRONIC Instruments (UK) Ltd.

Crompton Fields, Crompton Way
Crawley, West Sussex RH10 9EE
Phone +44 1293 57 10 00
Fax +44 1293 57 10 08
www.rotronic.co.uk

Singapore

ROTRONIC Instrument PTE Ltd.

1003 Bukit Merah Central
#06-31 Inno Centre
Singapore 159836
Phone +65 6376 2107
Fax +65 6376 4439
www.rotronic.sg

China

ROTRONIC Shanghai Rep. Office

2B, Zao Fong Universe Building
No. 1800 Zhong Shan West Road
Shanghai 200233, China
Phone +86 40 0816 2018
Fax +86 10 8225 4374
www.rotronic.cn

rotronic
MEASUREMENT SOLUTIONS