rotronic
Humidity news
ISSUE 1/2005

Metamorphosis: From camper van to mobile

Calibration Laboratory

Plus

How ROTRONIC instruments help preserve rare species

HygroLog NT – success of a logger system

Win a HygroPalm 0 with docking station!

Leonhard Löw
Production Manager
ROTRONIC AG

Once again the latest issue of Humidity News is ready for distribution. It is my pleasure to present you the first one for 2005, which includes many interesting articles on special applications and new product innovations.

Our mobile calibration service is creating significant interest throughout Europe. It has been in operation for almost a year, and we are happy to know that it has been a huge success. Many customers appreciate the availability of on-site calibration of humidity and temperature, thanks to its convenience, and of course time and cost saving. More details can be found on page 11.

In the last issue of Humidity News, we introduced the HygroGen humidity and temperature calibrator. The unit has been an immediate success world-wide with many leading companies and calibration laboratories. On page 10 you will find updated information about this product, including new versions and features.

Last year, we also introduced the HygroLog NT logger series. This product, too, is selling very well. The article on pages 6 and 7 describes the options that have subsequently been included in its range of features to even further expand its range of application. The loggers can now be networked via Ethernet, and when an RS485 extended multi-drop network is used, up to 64 devices with 7 probes each may be operated via a single Ethernet master interface.

Eisbär is not only a white-furred carnivore of the arctic, but also a dynamic and customer oriented company with core businesses including building-drying and plant construction. The company also manufactures systems for process air conditioning in the plastics industry. ROTRONIC transmitters provide an important role in maintaining air quality. An article on page 9 describes how.

The HygroClip probes take to the air! Mounted on balloons, they form part of a system used to survey atmospheric conditions in the boundary layer between the atmosphere and the surface of the oceans. The data is transmitted via the ARGOS network and provides useful information about the interactions that occur between the oceans and the atmosphere. The article on pages 4 and 5 gives more information.

Global warming is a serious threat to the future of mankind. Fuel cells are one potential source of energy that operate almost without pollution. On page 8 you can read about how ROTRONIC probes are used in the research and testing of this energy source of the future.

So as you can see, this issue of Humidity News includes some really interesting articles, I hope you enjoy reading about them!

Leonhard Loew
Head of Production Dept.

PRESERVATION OF ENDANGERED BIRDS WITH ROTRONIC PRODUCTS

The white winged night jar Caprimulgus Candicans can be found in only two locations. Approximately 50 birds survive in Paraguay, and a few hundred in Brazil at the Parque das Emas, in the state Goiás. Researcher Mrs. Adriani Hass is coordinating a project studying biological, ecological and genetic data of this species, and with this information, is developing a management plan to preserve this rare species.

Mrs. Hass is using a HygroPalm 0 handheld instrument for measuring relative humidity and temperature in places where this bird is endemic, in order to relate its presence to the environmental conditions, but mostly to relative humidity, which seems to be significant to this species. The HygroPalm 0 is a well priced handheld instrument, but provides high accuracy of ±1.5 %rh, and excellent long term stability that is key to such research projects.

COMPETITION WINNER

The winner of last issue's competition is Mr. René Waldner of Liebherr Hausgeräte in Lienz, (Austria).

The photograph shows Mr. Waldner (to the left) with Ernst Aringer of our Austrian distributor presenting the prize, a HygroLog NT data logger with accessories. Liebherr Hausgeräte manufactures refrigerators and wine coolers. Their business covers a wide range of industrial sectors worldwide. The holding company of the group is Liebherr International AG in Bulle (Switzerland) with more than 21'000 employees.

ROTRONIC ROLINE CATALOGUE

NEW

In order to meet the ever increasing demand for low cost instrumentation for non-critical applications, ROTRONIC has introduced the new Roline catalogue, which contains a carefully selected range of instruments for the measurement of humidity, temperature, pressure, air velocity, voltage, current, light and sound.

EXHIBITIONS

Meet ROTRONIC at the following exhibitions:

04...06.05.2005
Meteorex
Bucharest, Romania

31.05...03.06.2005
Bulcontrola
Sofia, Bulgaria

17...19.07.2005
IFT 2005
New Orleans, USA

5...9.9.2005
Farmacia Y Biochimia
Buenos Aires, Argentina

6...9.9.2005
Ineltec
Basel, Switzerland

13...16.09.2005
DSEI
London, England

13...16.09.2005
Miconex
Shang Hai, China

27...29.09.2005
MESUREXPO
Porte de Versailles Paris, France

01...05.10.2005
5th Tehran International Industry Fair
Tehran, Iran

13...16.10.2005
Moldplas
Batalha, Portugal

26...30.10.2005
Concreta Porto
Porto, Portugal

14...18.11.2005
EXPOQUIMIA
Barcelona, Spain

HYGROCLIP TAKES TO THE AIR!

Christophe Thubert
Sales Manager
ROTRONIC France

Aeroclipper: The ideal vehicle for the analysis of physical interactions between the oceans and the atmosphere.

70% of the earth's surface is covered by water. The oceans play a significant role in our planet's climate, but until now practically all physical information for the study of the interaction between the oceans and the boundary layers of the atmosphere has been derived from estimations and data collected by satellites. Whilst the temperature data has been shown to be quite accurate, measurements have been shown to be influenced by wind speed, direction and hygrometric turbulences in the boundary layer.

Aeroclipper is a joint development project between LMD (Laboratoire de Météorologie Dynamique) and CNES (Centre National d'Etudes Spatiales) in France. It consists of a helium filled balloon under which a gondola is suspended on a 60m rope. The gondola is fitted with floats that are submersed approximately 40cm into the water, and it is pulled through the water by the balloon. The aim is to show the correlation between simultaneous measurements in the boundary layer and on the surface of the water.

The fully autonomous system follows a so called «Lagrangienne» course. The tetrahedral shape of the balloon allows the Aeroclipper to move at the same speed as wind turbulences. Various sensors are placed in the gondola as well as in the floats. The floats contain sensors for the measurement of temperature and salinity of the water. These parameters are crucial for the evaporation rate of the water and the convection of the air in the boundary layer. The gondola is equipped with a complete meteorological station, measuring wind speed, wind direction, relative humidity, temperature and atmospheric pressure.

ROTRONIC humidity sensors were specified for the initial measurement trial of five Aeroclippers that took place in the open sea around the Seychelles in February 2005. This trial followed an initial test with three balloons with non-instrumented floats around the island of Madeira. The route taken by the three balloons is illustrated in the diagram on the right:

The HygroClip S3CO3 combined humidity and temperature measurement probe is integrated into a weather protection shield type AC1004 on the AeroClipper and has shown outstanding suitability for this application.

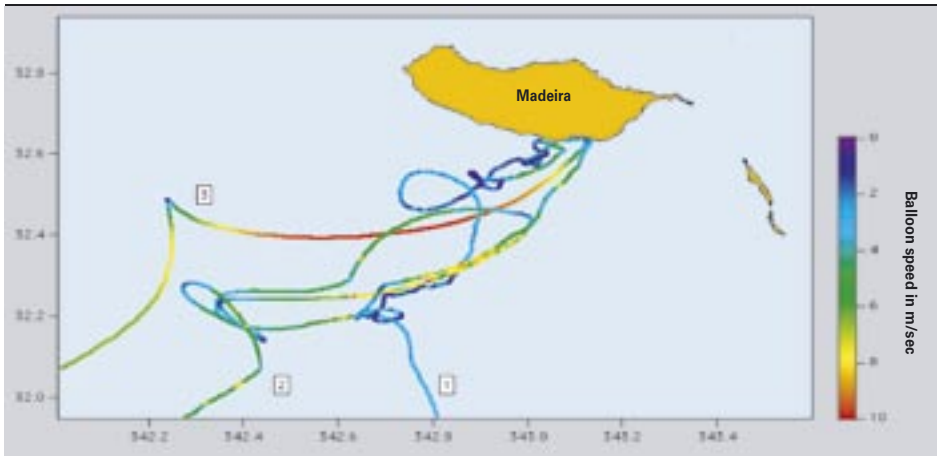
It's a compact and lightweight instrument that measures relative humidity from 0...100 % rh and temperature from -40...60 °C.

It is insensitive to condensation, and neither fog, rain nor salt affect the measurement performance.
The accuracy is ±1.5 %rh at 23 °C and the long term stability is better than 1 % rh per year. The probe can be adjusted via a digital calibration interface that allows single or multiple point calibration checks in the field if required, although we recommend calibration in a controlled laboratory environment for best results. The HygroClip's low power consumption of approximately 3 mA is a welcome feature in measurement flights that take up to 30 days.

Measurement values are logged and then transmitted to a satellite via an ARGOS radio buoy.
The success of these first trials is very encouraging and it is likely that the Aeroclippers will become an indispensable tool for better understanding of the phenomenon of inter-seasonal oceanic turbulences.

Twenty new Aeroclippers are due to start measurements during 2005 in the VASCO mission. The mission's aim is, amongst others, to determine and quantify the physical processes in the boundary layer between the ocean and atmosphere.

ROTRONIC has been proud to cooperate in this complex project, and will continue to support the meteorological industry with reliable measurement systems and application expertise. We hope that with better measurement data we can form a clearer understanding of the earth's climate.



HYGROLOG NT – VERSATILE AND EXPANDABLE

Peter Müller
Product Manager
ROTRONIC AG

The HygroLog NT Series of data loggers was introduced in the last issue of Humidity News.

Since its launch, the NT has been a great success thanks to its wide range of features and the continued expansion of the range of options such as docking stations, probe input types and interface formats. It is now possible to measure using up to seven combined %rh/°C probes on one logger, from four, 4-wire PT100 probes, and also third party analogue probes using the NT's scaleable inputs. PC interface formats now available are RS232, RS485, USB and Ethernet. Up to 64 instruments can be networked using RS485. The HygroLog models NT1 and NT2 feature a single probe. The probe is fixed inside the housing of the NT1, while it can be interchanged on the NT2. The NT3 features an additional two probe inputs for interchangeable HygroClip probes. Via the docking stations, a further four probes can be connected. These probes can be either HygroClip combined %rh/°C probes or single analogue probes. It is also possible to connect up to four Pt100 RTD probes in 4-wire connection. In addition to the probe inputs, the docking stations also feature two digital inputs for the monitoring and logging of digital conditions such as door open or door closed.

The New HW4 PC software package developed specifically for the HygroLog NT enables configuration, networking and data acquisition functions. It is also written to conform with the requirements of data security demanded by compliance regimes such as CFR21 Part 11 and GAMP4.

Configuration of docking stations: ✔ = available ✘ = not available

Modell	External Supply	Digital / analogue probes	Pt100	Ethernet	USB	RS485	RS232	Digital inputs
DS-NT2	✔	✘	✘	✘	✘	✔	✔	✘
DS-NT3	✔	✘	✘	✘	✔	✔	✘	✘
DS-NT4	✔	✘	✘	✔	✘	✔	✘	✘
DS-U-1	✔	4	✘	✘	✘	✔	✔	2
DS-U-2	✔	4	✘	✘	✔	✔	✘	2
DS-U-4	✔	4	✘	✔	✘	✔	✘	2
DS-PT-2	✔	✘	4	✘	✔	✔	✘	2
DS-PT-4	✔	✘	2	✔	✘	✔	✘	2

DS-NT0 Bracket for wall mounting, no external connections.
DS-NT1 Bracket for wall mounting, connector for external supply, no probes, no interface.

The table overviews the features of the various docking stations. The probe connection possibilities are self explanatory, but it is worth expanding on some features of the networking capabilities of the HygroLog NT, as from initial experience with this instrument, this seems to be a key requirement.

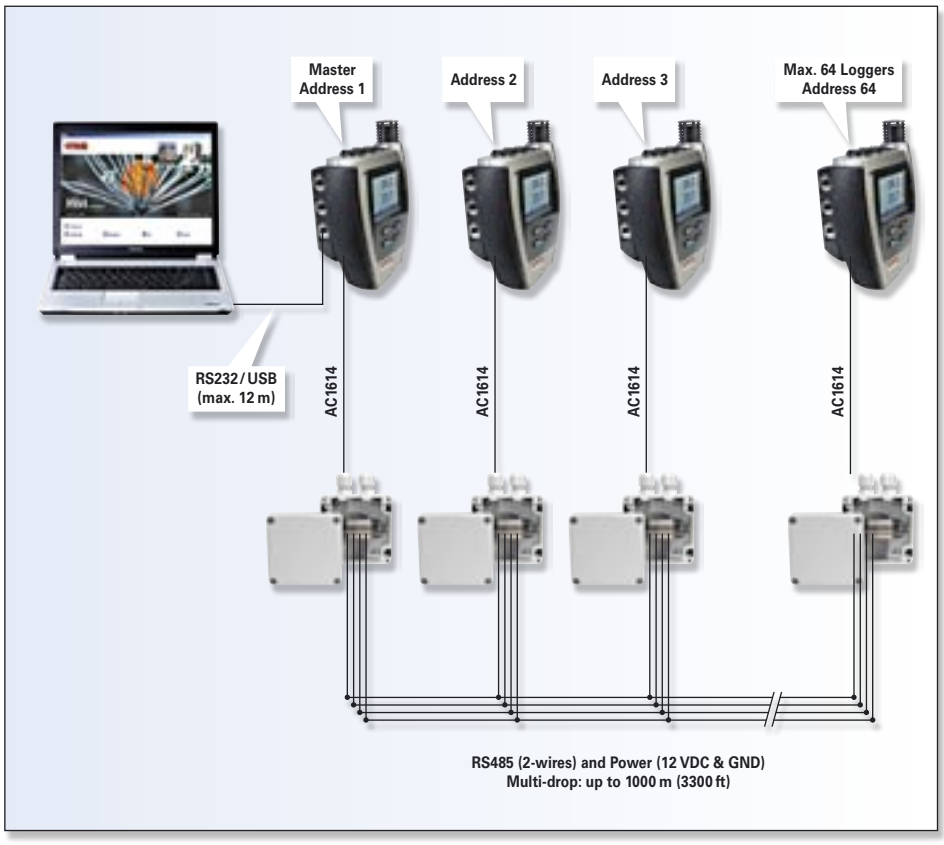
Networking

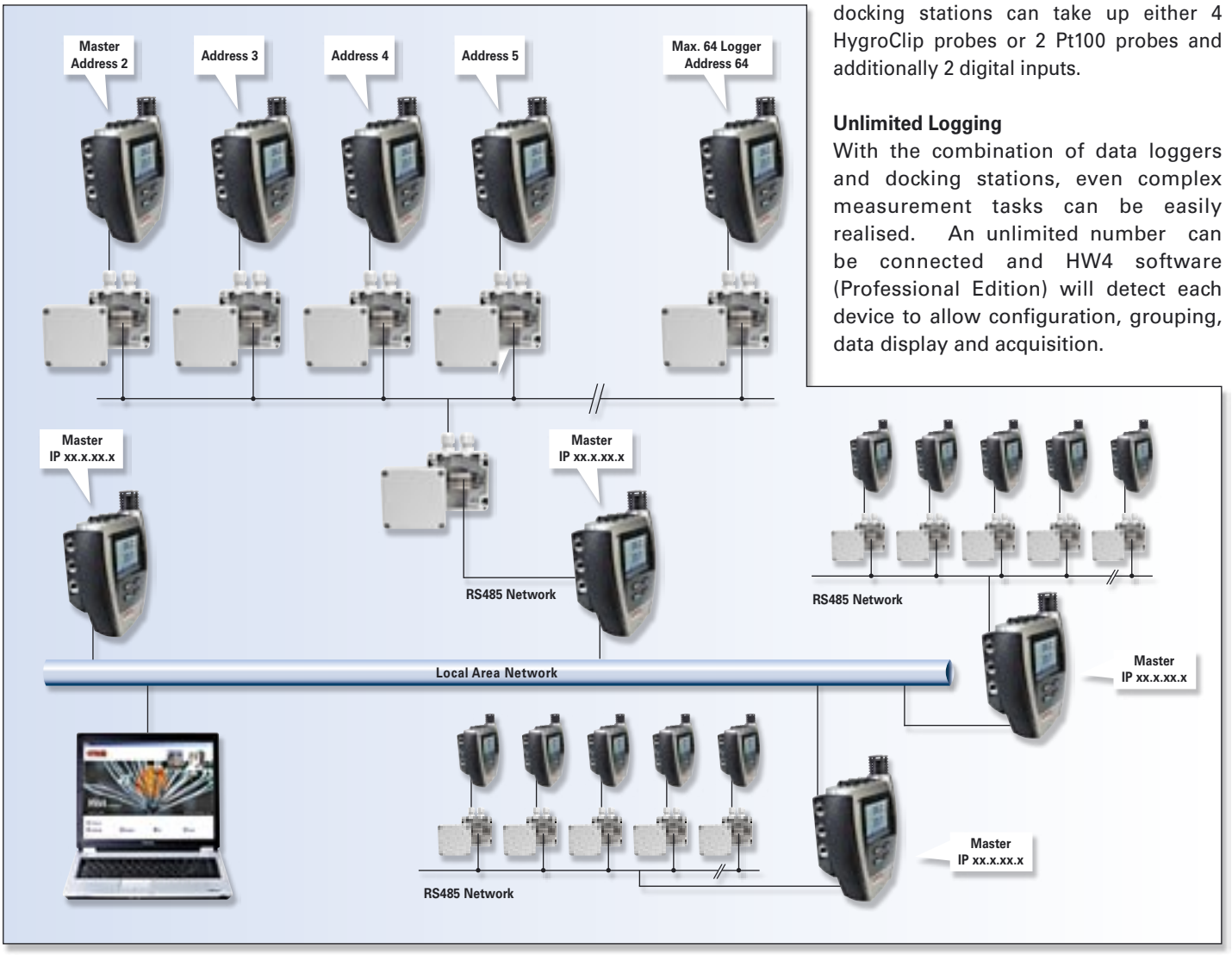
When the data loggers are networked, a theoretically unlimited number of loggers may be connected with a PC or Local Area Network (LAN). The device which is directly connected to the PC, regardless of the model, is automatically considered by HW4 software to be the master. Using the RS485 multi drop network, a maximum of 1 master and 63 slaves can be connected.

If an Ethernet docking station is used, it is automatically configured as the master. When additional devices are connected via the RS485 interface on the Ethernet equipped docking stations, they are automatically configured as slaves.

The simplest way to install an RS485 network is the use of a terminal box. The connection cable type AC1614 is equipped with the connector for the RS interface of the docking station at one end, while the other end has bare wire strands for the connection to the terminal box.

For the Ethernet connections, use standard straight RJ45 Ethernet patch cables. If a docking station is connected directly to a PC, a crossed cable must be used. Ethernet





docking stations can take up either 4 HygroClip probes or 2 Pt100 probes and additionally 2 digital inputs.

Unlimited Logging

With the combination of data loggers and docking stations, even complex measurement tasks can be easily realised. An unlimited number can be connected and HW4 software (Professional Edition) will detect each device to allow configuration, grouping, data display and acquisition.

HOW HUMIDITY IS USED IN FUEL CELL RESEARCH

S. Ikawa
Shinyei Kaisha

A fuel cell is a powergenerating device using materials such as natural gas, methanol, petroleum, coal, gas or biomass.

Since the fuel cell is based on the reverse reaction of the electrolysis of water, it does not require the combustion of fuel like typical thermal power generation methods. Therefore, it has attracted considerable attention as a high efficiency power generator with low environmental impact. In addition, since heat is produced by the chemical reaction, the fuel cell can supply both electricity and heat simultaneously. Fuel cells are intended not only for large scale power plants, but also as a power source for homes, office buildings, hospitals, cars and buses etc. The power output can be from tens to tens of thousands of kW.

Why the dew point is measured?

A fuel cell requires high temperature and high dew point values for efficient power generation. When testing fuel cells, monitoring of temperature and dew point is required to determine the best atmosphere for power generation. Usually, dew point is measured at the inlet and outlet of hydrogen rich gas and air circuits. Measurements are generally performed at four points on each testing machine.

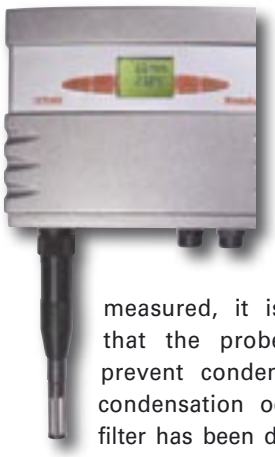
The challenge of measurement in fuel cell testing

Fuel cell testing machines are operated between 80...150 °C and 90...100 % relative humidity. The dew point can reach almost 90 °C! The atmosphere is demanding for humidity sensors. During testing, the humidity sensors are exposed to extreme conditions, where condensation may easily occur.

Additionally, the sensors must withstand pressure. Fuel cell testing machines supply minute molecular gases like hydrogen. Therefore, it is very important that the probes are pressure tight. The leakage of hydrogen will result in pressure changes, which in turn affect the test results of the fuel cells.

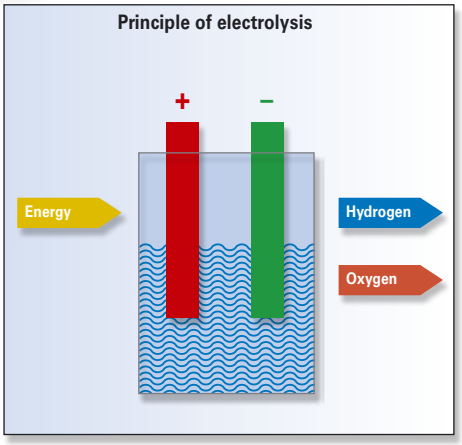
Which instrument is suitable?

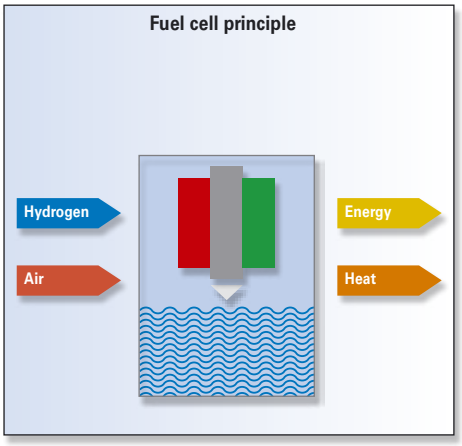
As mentioned above, the atmosphere of the fuel cell testing machine sometimes reaches 150 °C. The product of choice is a HygroFlex 3 transmitter with an analogue output of the calculated dew point signal to the control system of the fuel cell testing equipment. The recommended probe is a customized HygroClip IE-X/M screw-in pressure probe with an operating range of -50...200 °C. This probe can withstand both high temperature and pressure up to 50 bar. To ensure that the application is successfully measured, it is recommended that the probe is heated to prevent condensation. In case condensation occurs, a special filter has been designed to allow the condensate to flow away. The high tolerance of ROTRONIC's Hygromer series to high humidity, high temperature and saturation conditions, means that it is one of the few available methods for measurement in this application.



Who are the customers?

Around the world, car manufacturers, electric power, gas, fuel companies and universities are rushing into the development of fuel cells. Many manufacturers of testing machinery are approaching the fuel cell developers with different testing designs and a variety of measurement requirements. One of ROTRONIC's strengths is our flexibility to customize products exactly to the customer's needs and in this complex and demanding application, we are often specified as the product of choice.



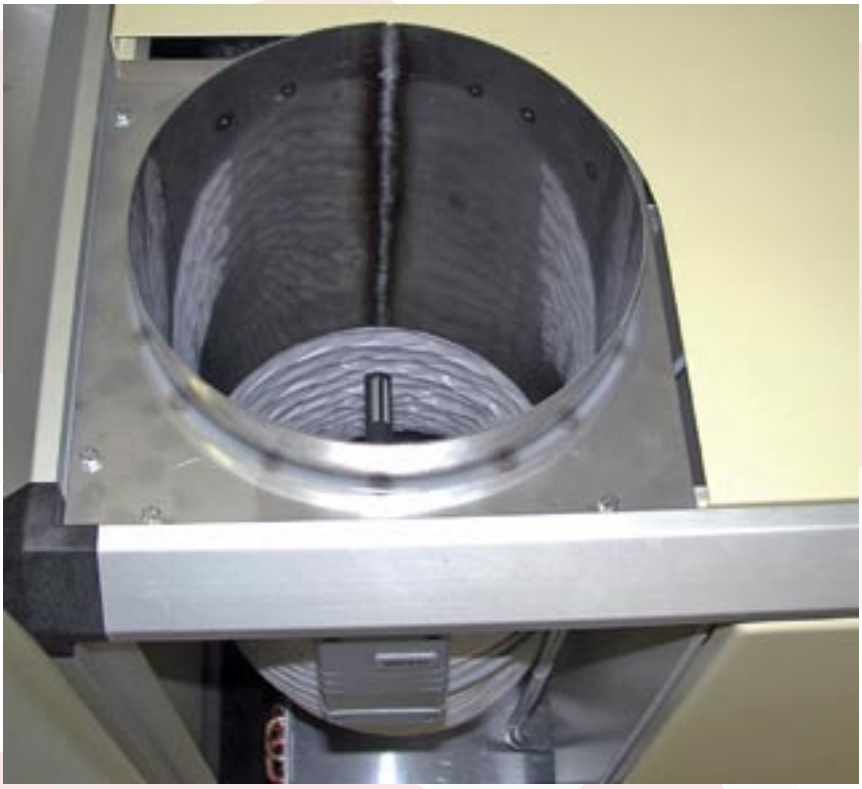


HYGROCLIP PROBES AND THE QUALITY OF PLASTIC MOULDING

Ernst Aringer
Head of Department
MEPA GmbH

For maximum output and reliable quality, injection moulding machinery must be constantly cooled. If condensation occurs on the surface of the cooled moulds, this affects the quality of both product and moulds.

Eisbär Trockentechnik GmbH in Götzis (Austria) operate in the building drying and plant construction sector of the plastics industry. They are specialists in air drying systems that are used with injection moulding machines, and for film cooling in extrusion plants. The common requirement of these machines is their constant need for very dry air to maintain high standards of quality and productivity. In order to avoid condensation on the moulds, the dry air of the DAS-devices (Dry Air System) is blown into the partitioned tool section of the machines in exactly the right volume. To ensure that condensation does not occur, temperature and humidity in the tooling section are constantly measured. This allows adjustment of the dryer performance and optimizes energy consumption.



The second point of humidity measurement is at the process air outlet of the dryer system. It provides for permanent control of dryer performance which brings additional benefit for the customer in terms of simplified support and maintenance.
The interaction of these two measurements guarantees condensation free tools with minimal energy consumption, and ensures continuously high surface quality of the products with maximum productivity. In combination with a customized version of an M23 duct mount transmitter, the ROTRONIC HygroClip probes are mounted directly in the output duct of the DAS system and into the tool section of the injection moulding machine. The interchangeability of the probes ensures practically uninterrupted operation even during maintenance, whilst the probe key features of accuracy and stability helps to ensure consistent air quality.

Advantages from the customer's point of view

The competitiveness in the plastics industry, and especially in the PET industry, is determined by the so called cycle time. This describes the time elapsing from closing the tools, injection of liquid plastic, cooling down and hardening of the moulded part, opening of the tools and ejection of the part. The major part of the cycle time is usually taken by cooling and hardening of the moulded part. It is therefore obvious that the industry tries to reduce this time to a minimum. Reducing the cycle time can be achieved by cooling the tools (usually with water). In extreme cases the cooling can be close to nearly freezing, and this results in condensation of the humidity from the surrounding air on the tool's surfaces. This is disastrous because it results in damage to the tools (by corrosion) and product's surface by water marks.

The Eisbär DAS-Systems help prevent this by drying the supply air. Due to a slight overpressure in the tool section, humid ambient air cannot reach the tools section. In short, injection moulding is possible with the best possible capacity and quality anywhere in the world, regardless of the actual ambient conditions thanks to Eisbär systems and ROTRONIC probes.

Further applications for DAS-Systems:

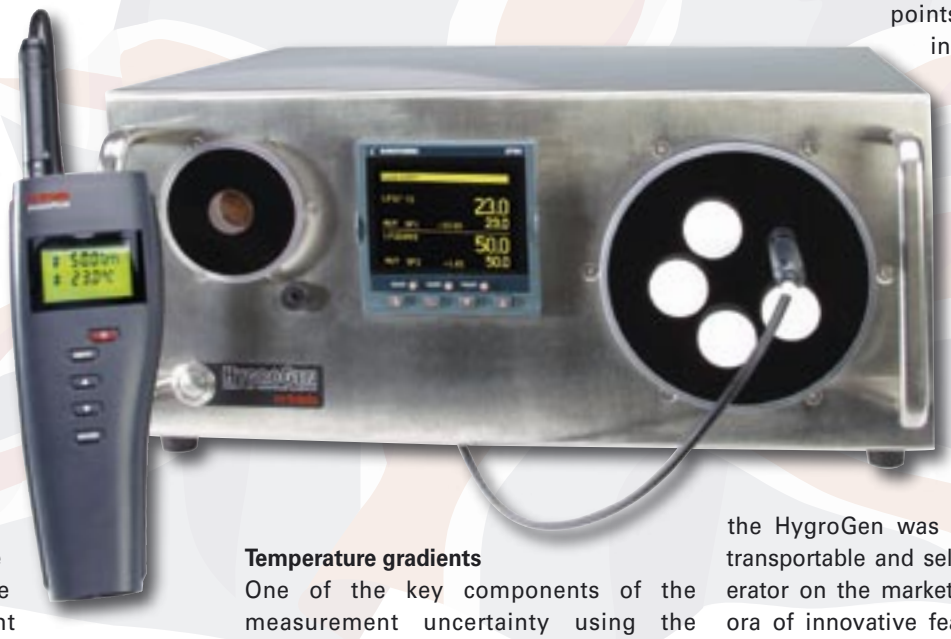
- Drying of plastic granulate
- Drying of material such as fertilizers, tobacco, varnish
- Food drying in silos, of sweets, dry vegetables
- Corrosion prevention in power stations, military facilities, water works etc.

HYGROGEN – THE EVOLUTION CONTINUES

Robin Farley
Business Development Manager
ROTRONIC AG

In the last issue of Humidity News we introduced the HygroGen, a transportable humidity and temperature generator, mostly used for the calibration of %rh probes.

Since its launch, the HygroGen has been sold to many leading companies across the world, and has been proven to offer excellent performance and reliability. As is always the case with a new product, end-users often discover application and operational issues not considered during development. The ROTRONIC sales support staff and our development team have been in constant communication to resolve any negative issues and, where possible, implement further enhancements that customer feedback should ideally resolve. The end result is customer satisfaction, and a product that provides even better levels of performance. Developments include:



Compatibility

The test chamber of the HygroGen is fitted with an insulated and removable door. These doors also serve as the interface between the probe to be calibrated, and the controlled environment that the HygroGen generates. As the customer base for the HygroGen grew, it became clear that the range of probe sizes needed to be extended, so we now have pre-defined doors to suit probes with diameters from 4 to 30 mm, and can produce doors to suit almost any users requirements.

Calibration reference instrument

Depending on the user's requirements, there are a number of routes to calibration traceability. A calibrated HygroClip control probe, a second calibrated probe or a chilled mirror dewpoint hygrometer are all options for traceable measurement of the HygroGen's stable environment. ROTRONIC offer a full range of options including certified calibration.

Temperature gradients

One of the key components of the measurement uncertainty using the HygroGen is the temperature gradients inside the calibration chamber. The careful design of the HygroGen's chamber and door means that these gradients across the unit's operational range are very small. Ongoing testing has shown that the original specifications stated for the HygroGen are exceeded, and we have data available to demonstrate this.

Operational range

Over the HygroGen's specified operating range we have continued testing to ensure that specifications are met. By further enhancement to the measurement and control system, the times to reach set-point and equilibrium have been improved at all points.

Simplified maintenance

The only maintenance requirement for the HygroGen is the filling and emptying of the water reservoir and the replenishment of the desiccant cell. The water fill and drain points are now unified in an easily accessed single front panel mounted valve. The desiccant cell can be more easily removed thanks to the use of softer sealing 'O' rings, and we now use molecular sieve as the desiccant media to provide the best possible performance.

Our objective with the HygroGen was to develop the best transportable and self-contained %rh generator on the market. Thanks to a plethora of innovative features, good design, and most importantly, attention to our customer's feedback, we are confident that the HygroGen meets or exceeds the requirements of the application for which it was developed – the calibration of %rh probes in the laboratory or on-site. For further information or to arrange a demonstration, visit www.hygrogen.com or contact your local ROTRONIC representative.

METAMORPHOSIS: FROM CAMPER VAN TO MOBILE CALIBRATION LABORATORY

Leonhard Löw
Production Manager
ROTRONIC AG

From camper van to mobile calibration laboratory! Eight months ago ROTRONIC extended its range of technical services to include a mobile calibration laboratory for humidity and temperature instruments.

A camper van was specially modified for the project, with the space normally occupied by beds, toilets, shower and fridge fitted with state-of-the-art calibration systems. Only one concession to comfort remains, a small seating area proves useful for discussions with customers, and keeps our technicians happier with life on the road!

The importance of calibration

Like all precision instruments, humidity and temperature measurement devices depend on calibration for precise and reliable results. Human comfort and safety, the production and storage of products, and meteorological research are examples of applications that depend on accurate data. Humidity sensors should be calibrated at least once each year; in critical or polluted applications this can be as often as every three months (for example, in applications where ammonia is present).

If an end-user wishes to calibrate instruments themselves, ROTRONIC can supply calibration accessories to suit most needs. An alternative is to send instruments to an accredited laboratory, such as ROTRONIC's SCS or UKAS facilities, or perhaps to a local distributor who can offer calibration services to the required standards. The third option is of course to have calibrations performed on-site using a mobile calibration laboratory, and this brings many advantages to the customer.

On-site calibration:

The mobile calibration laboratory is equipped with a dynamic humidity generator, type FG431, which was developed in-house by ROTRONIC. It is the same system that is used in our production and service departments, so the results are directly comparable. With the mobile calibration laboratory on site, customers are able to have their instruments calibrated to a traceable standard with very short down-time. Administration and shipping costs are of course more or less eliminated. A four-point calibration can be performed in as little as 10 minutes, and the mobile service includes the facilities for producing the associated calibration certificates.

It is possible to calibrate all types of humidity probes up to 25 mm diameter with the dynamic calibrator, and this includes products not manufactured by ROTRONIC.

An exceptional calibration range of 0.1 to 99 %rh is available, with measurement uncertainties of 0.5...1.5%rh depending on the %rh value. Calibrations are traceable to National Standards. (In Switzerland: Swiss Federal Office for Metrology and Accreditation, METAS). ROTRONIC is accredited by METAS as a calibration laboratory for relative humidity and temperature.

Even calibrations for temperature may be performed in the calibration mobile. Using a Fluorine-inert bath, even delicate combined %rh and temperature probes can be calibrated in the range of -25 to 125 °C with high precision. The range of measurement uncertainty is between 0.03 and 0.2 °C, depending on the sensor and measuring device.

Customer benefits

Initial feedback from customers has been highly encouraging, it seems that many users of humidity instrumentation have been waiting for an on-site calibration solution that provides high performance and fast calibration times.

On-site calibration has huge benefits in terms of time saving, administration and shipping, and the high performance of the ROTRONIC mobile calibration laboratory means this new solution provides an excellent new option for large users of humidity instrumentation. Please contact your local ROTRONIC distributor for details of availability in your region.

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FAX BACK INFORMATION COMPETITION / REQUEST ENTRY FORM

How many models of HygroLog NT docking stations are currently available?

- ☐ a) 3
- ☐ b) 5
- ☐ c) 10

How many HygroLog NT Loggers can be networked by RS485?

- ☐ a) 13
- ☐ b) 32
- ☐ c) 64

Are HygroLog NT data loggers FDA/GAMP compliant?

- ☐ a) yes
- ☐ b) no
- ☐ c) yes, with HW4 Professional Edition software

Which desiccant is used in the HygroGen humidity generator?

- ☐ a) Silica Gel
- ☐ b) Molecular sieve
- ☐ c) None, HygroGen dries the air by a heater

Which species is preserved with help from ROTRONIC products?

- ☐ a) Caprimulgus Candicans
- ☐ b) Carpe Diem Canadicus
- ☐ c) Cane Canidis

WIN a NEW HygroPalm 0 with docking station!

CONTACT INFORMATION

Name: **Telephone:**

Company: **Fax:**

Address: **Email:**

City: **Website:**

Country:

ACTION REQUEST

- ☐ Please send me your actual catalogue
- ☐ Please send price lists
- ☐ Please can your local sales representative contact me

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