

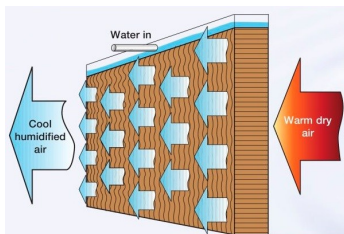
Ventilation systems

Facts & figures:

The Beverly Briley building in Nashville, Tennessee currently has the largest installed air handling unit in the world. It is capable of delivering 9,970 cubic metres per minute.



Direct steam injector



Contact humidifier principle

Humidity in ventilation systems

Ventilating is the process of changing or replacing air in any space to provide high indoor air quality. In order to maintain an office building within the comfort zone, or to maintain any application specific climate conditions, humidity plays a key role. Various modules can be added into air handling units to either remove or add moisture.

The most common way to **dehumidify** air in an air handling unit is to regulate the cooling coil below the dew point and remove humidity by condensation. In most cases it is necessary to reheat the air afterwards via a heating coil.

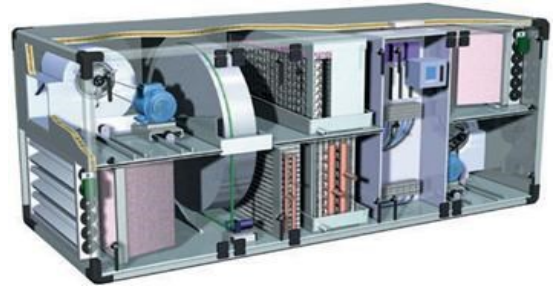
To increase humidity a **contact humidifier** can be used. It works in the same way as air flowing through a wet surface. A similar principle is used with an **air washer** unit where water nozzles directly insert water aerosol into the air stream. Water can also be added by an **ultrasonic humidifier** where a piezoelectric transducer creates a high frequency mechanical oscillation in a body of water. An extremely fine mist is emitted which is quickly absorbed into the air flow.

All these methods require frequent cleaning. Also, the passing air not only absorbs

humidity but also loses some heat energy (adiabatic cooling). Therefore, an additional heating coil after the humidifier is usually required.

Direct steam injection is the most common form of humidifier. They require very little maintenance because the steam supply acts as a cleaning agent. However, the steam production and distribution is expensive and is only cost effective for larger buildings.

For the accurate control of humidity, the distance between the humidifier and the measurement probe must be sufficient for the air to have mixed properly.



Discussed in this edition:

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Why the need to measure humidity?

Controlling not only the temperature but also the humidity levels in a building using an air handling unit will have an impact on the following:

- The humidity level plays an important role in the "felt temperature" also known as "heat index". Generally, the temperature feels colder when the humidity level is lower and vice versa.

- Humidity levels below 30%rh, that are particularly common

during the heating period, promote itchy and cracked skin, irritated eyes and chapped lips. Dry air also dries the shield of mucus in airways that protects against bacteria, viruses and airborne pollutants increasing the risk of infections.

- On the contrary, high humidity levels directly affect the amount of allergens in the indoor environment. In particular, high humidity caus-

es both dust mite populations and mould colonies to grow,

- 45...55%rh is considered an ideal humidity level for places where people live and work.

- Furthermore, dry air can cause wooden furniture to crack and paper to stick in printers, causing jams.

- Moist air can cause mildew on surfaces and with time and extreme levels, even concrete will start to dissolve.

What solution can Rotronic offer?

The heart of the latest humidity measurement products is the Rotronic capacitive sensor: HygroMer IN-1. This thick-film sensor, with the best long term stability on the market is ideal for

HVAC applications where probes don't usually get calibrated frequently.

All products with this logo contain an AirChip3000.



AirChip3000 advantages:

- Relative humidity, temperature and dew point outputs
- Can store 2'000 points
- Sensor self-test function



HF1 space mount transmitter

Rotronic products:

Humidity and temperature probes:

- **HC2-S**
Standard humidity sensor
-50...100 °C,
0...100 %rh,
±0.8 %rh and ±0.1 K
- **HC2-IC402**
-100...200 °C,
0...100 %rh,
Ø15 mm
±0.8 %rh and ±0.1 K
- **HC2-IC402-A**
-100...200 °C,
0...100 %rh,
Ø15/25 mm,
±0.8 %rh and ±0.1 K

Transmitters:

- **HF5 series**
For interchangeable probes,
Various analogue and digital
outputs, Display,
All psychrometric calculations
available...
- **HF3 series**
-40...60 °C, 0...100 %rh
±2 %rh and ±0.3 K
Various analogue outputs,
Display...
- **HF1 series**
0...50 °C, 5...95 %rh
±3 %rh and ±0.3 K
Various analogue outputs,
Display...

Handheld instruments:

- **HP22**
For interchangeable
probes,
High accuracy relative
humidity and tempera-
ture measurement,
Dew point and other
psychrometric calcula-
tions,
Display
- **HP23**
Same functionality as HP22
plus: two interchangeable probe
inputs, 20,000 data point me-
mory with real-time clock, Data
capture of 250 data points each
for up to 8 defined locations



HF1 duct mount transmitter



HP23 handheld device

Customer benefits:

Accuracy:

Choosing Rotronic products gives you the best accuracy on the market.

Precise humidity measurement enables the ventilation units to work at their maximum performance

Communication:

Networking with Rotronic is an easy affair! With the wide range of communication interfaces available, from conventional analogue out-

put signals to USB, RS-485, Wireless and Ethernet RJ-45, Rotronic can provide the required interface to your DDC control system, or any third party monitoring system.

Long term stability:

With long term sensor stability of under 1 %rh per year (depending on the environment), Rotronic offers the possibility to "plug & play": install the device and leave it. We would recommend

regular spot checks between multi-point calibrations.

Calibration:

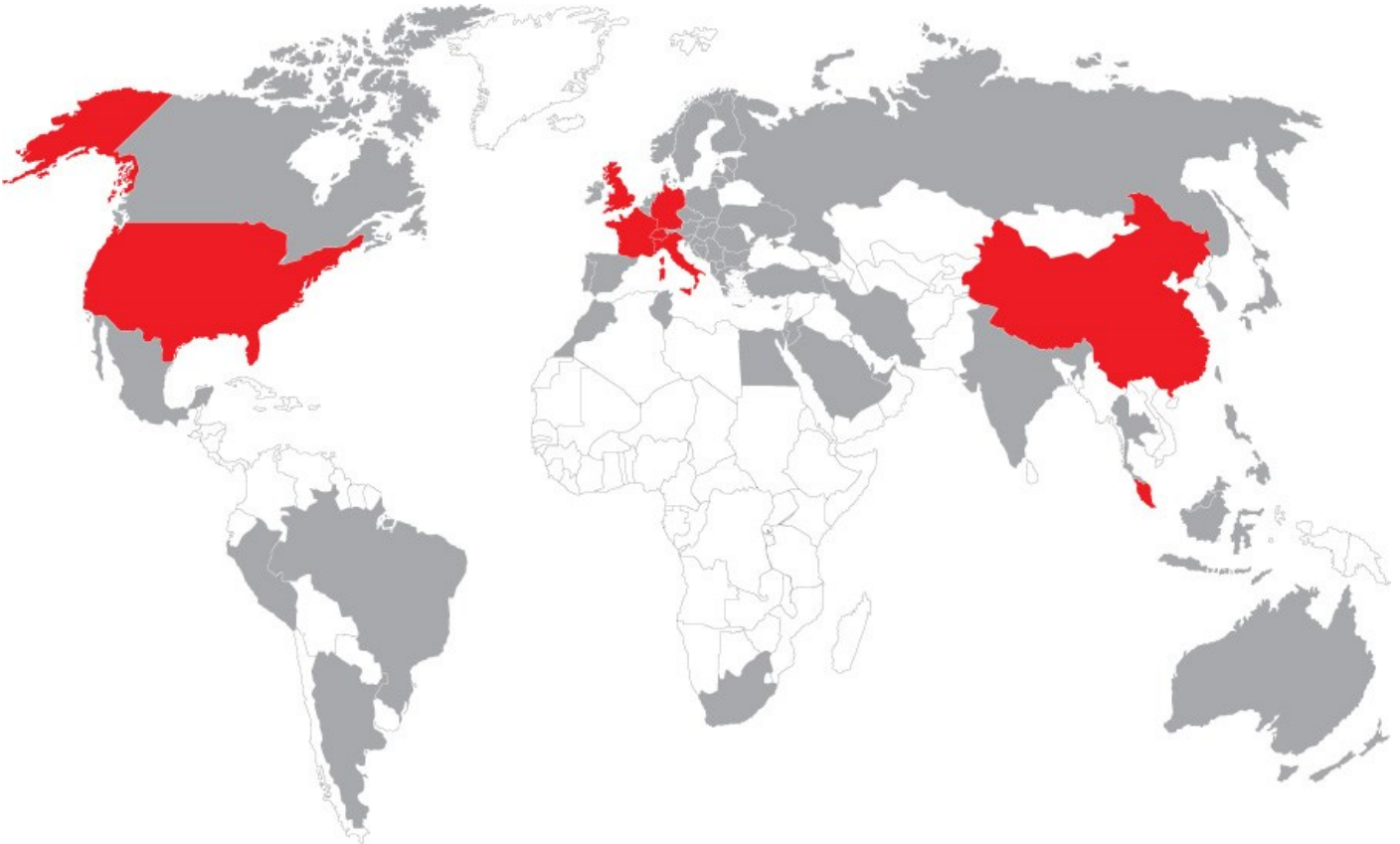
Rotronic offers a factory calibration certificate, and SCS certificate if required. The portable HygroGen temperature & humidity calibrator as well as traceable unsaturated humidity salts are available for on-site calibration. All HygroClip2 probes can be set with two fixed %rh / °C values to validate the loop to the controller.



HF5 wall mount transmitter in combination with extension cable

Contact us:

Rotronic is represented in more than 40 countries around the world. An up-to-date list of all our partners is available at www.rotronic.com



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