Humidity module type FM80H

with resistance output to determine relative air humidity, in built-in design.

Humidity-Temperature module type TFM80H

with resistance output to determine relative air humidity and temperature, in built-in design.

Description of the module

The humidity measuring element, produced by Galltec under the name Polyga®, consists of several synthetic fabric bands each with 90 individual fibres with a diameter of 3 μm. A special process gives the fibre hygroscopic properties. The measuring element absorbs and desorbs humidity. The swelling effect, which is predominantly in a lengthways direction, is sensed by means of a suitable fine loop resistor. The coil and slide contact of the fine loop resistor consist of a gold wire alloy. Minimum contact resistance and safe contact are guaranteed.
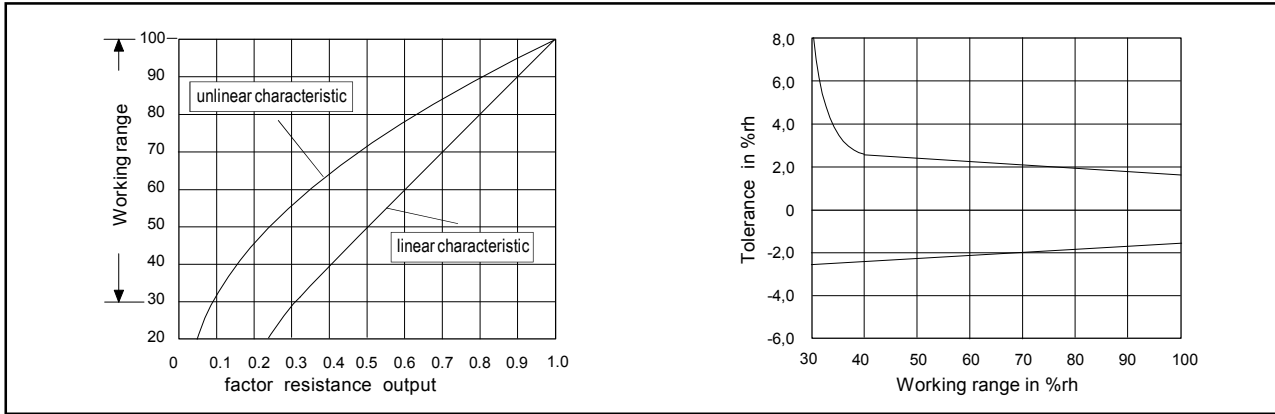
The fan shaped measuring element is protected by a perforated sensor tube. The modules are designed for pressureless systems. Pt100 resistance temperature sensors are mounted in the TFM80H module for simultaneous temperature acquisition. Other temperature measuring systems can be supplied on request.
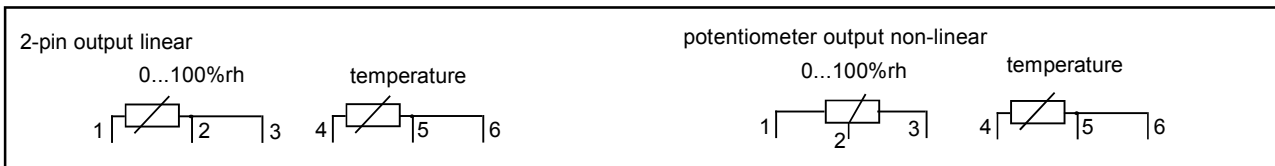
Technical Data

humidity	measuring range	0...100%rh
	measuring accuracy	
	... >40%rh	±2.5%rh
	... <40%rh ... according to tolerance diagram	
	working range	30...100%rh
temperature	working range	-30...+80°C
	measuring accuracy	±0.5°C

measuring medium .... air, pressureless, not aggressive
permissible ambient temperature
         at the case ....0...50°C
         at the probe ....-40...+80°C
medium temp. coefficient .... -0,1%/K at 20°C and 50%rh
adjustment .... at average air pressure 430m NN
permissible air speed 8m/sec
         with protective gauze (ord.no. 20.014) 15m/sec
t_{05} at v=2m/sec 1.2min
probe length; probe material .... 220mm; highgrade steel
position .... probe vertically downwards or horizontally
connecting terminal .... for conductor cross section 0.5mm^2
electromagnetic compatibility EMC
       immunity ....to EN 50 082-2
       emission ....to EN 50 081-2
protective system IP00
weight (approx.) ....0.6 kg
humidity output 1.................................. 0...100 ohms linear 2-wire
                    .... 0...200 ohms linear 2-wire
                    .... 0...200 ohms linear 2-wire
                    .... 0...1000 ohms linear 2-wire
                    ....100...138.5 ohms linear 2-wire
                    ....5..100..5 ohms nonlinear 3-wire
                    further resistance ranges on request
permissible load ....1.0 Watt
max. voltage .... 42 V
insulation resistance ....10 MOhms
temperature output 2 (TFG80H)...Pt100 in acc. with DIN EN 60751
permissible load for air 1m/sec and t=0,1K ....2 mA
"subject to technical modifications"

FM80H
TFM80H

Maintenance

The measuring element is maintenance free when the surrounding air is clean. Agents that are corrosive and contain solvents, depending upon the type and concentration of the agent, can result in faulty measurements and cause the measuring element to break down. Substances deposited on the sensor are damaging as they eventually form a water-repellent film (this applies to all humidity sensors with hygroscopic measuring elements). Such substances are resin aerosols, lacquer aerosols, smoke deposits etc. The water-resistant property of the Galltec sensors allows for cleaning using water. Solvents cannot be used for this purpose. A light-duty detergent is recommended. Any detergent residue should, however, always be thoroughly washed out.

A special process ensures that Galltec sensors have good long-term stability. Regeneration is not necessary, but is also not harmful.

ATTENTION: No warranty will be guaranteed when inner parts of the device have been handled.

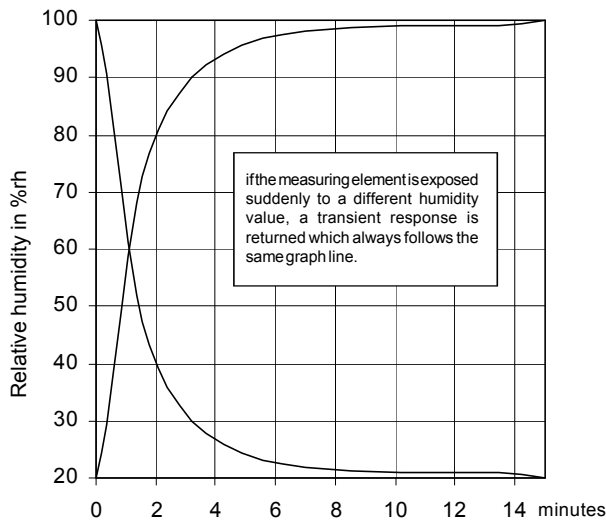## Humidity and tolerance diagram

Connection diagram for passive sensors with resistance output

Reaction of the sensor

Due to the law of diffusion, there is a time delay before the fibres are saturated during water absorption. This is a decisive factor when determining the reaction time. Thus, for one individual fibre with a diameter of 3 µm, a short saturation time (several seconds) can be measured. Empirical investigations show that bundled or woven fibres, as are used here in the Galltec sensor, give rise to a longer period prior to saturation. This is because the individual fibres impede each other during water absorption and/or water loss, and the ensuing humidity does not register until later. Measurements have shown that, at a wind speed of 2m / sec. the half-life period is 1.2 mins. This represents an effective period of approx. 30 - 40 mins.
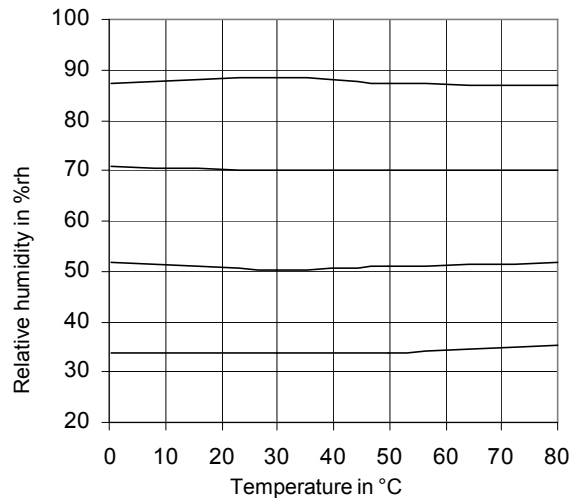
Half-life period

Transient response of the measuring element between 20 and 100% rh.

Thermal behaviour

The average deviation of temperature behaviour is 4%rh. the sensors are adjustd at 23°C. The following chart shows the temperature behaviour of the Polyga® measuring elements.

80° C is given as the maximum temperature value. Higher temperatures can only be tolerated for a short period of time. The eventual result is a change in the molecular structure which causes a constant error. The maximum temperature of 80° C only applies, however, if no harmful substances (acids, solvents etc.) are present in the medium.

Ageing

In order to maintain their long-term stability, it is important that the measuring elements undergo a special ageing process, details of which cannot be given here.