



Product info sheet no. B 1.1 Humidity sensing elements, Modules

Description

The MELA®-humidity sensing elements are used for measuring relative humidity in air and other non-aggressive gases and operates according to the principle of capacitive measurement.

There is a system of electrodes and a humidity-sensitive polymer layer on a glazed ceramic substrate. This layer system constitutes a humidity-dependent capacitor, whose capacity is a measure of the ambient relative humidity.

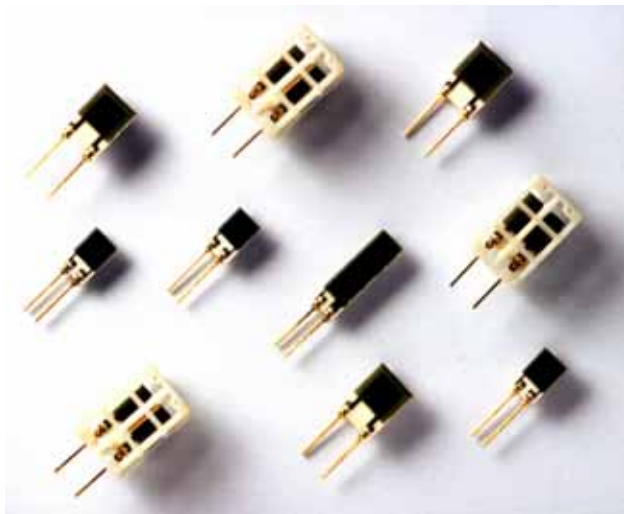
Various types of humidity sensing elements are created with different layer structures and different dimensions. These different types differ from one another primarily in terms of their resistance to external influences and different capacities. This means that they are suitable for a variety of different applications. All the sensing elements possess very good dynamic properties, display long-term stability and are waterproof, which means that the sensing element is also immune to the effects of dew deposits.

FE09/4-type humidity sensing elements are low-cost, very compact elements, which are ideal for a variety of different applications and which are also available with protective frames (**FE09.R/4**).

FE 09/1000 -type humidity sensing elements are characterised by an extremely high basic capacity and by a double layer structure, which makes the element resistant to external mechanical influences. This high basic capacity significantly reduces the influence of disruptive capacities. This means that it can also be used separate from the electronics without any problem, in drying systems for example.

FE 09/2-type humidity sensing elements are very versatile elements which are also available with protective frames (**FE 09.R/2**).

The only difference between **FE 09/1-type humidity sensing elements** and the FE09/2-type is the double layer structure, which makes the elements more resistant to external mechanical influences. They are also available as **FE 09.R/1-types** with protective frames.

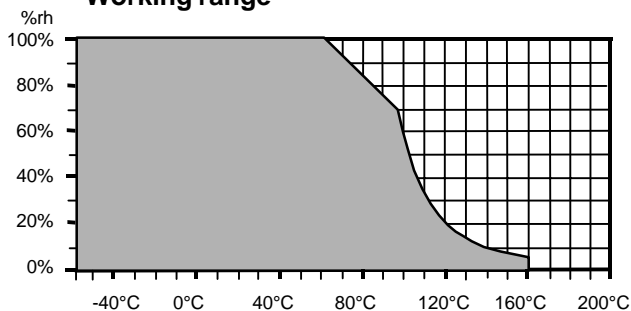


User instructions

Never touch the active surface of the highly sensitive sensing element. Use extra-low voltage soldering copper for soldering in the sensing element (soldering temperature 240°C, max. soldering time 2 seconds). Remove flux residue. Clean the sensing elements by carefully blowing off residue. They can also be washed in distilled water. This does not affect the characteristic curve. However, exact measurement readings are only possible once the sensing elements have been dried completely. This also applies if dew deposits form.

For further information, please refer to the **applications instructions** on sensing elements (product info sheet no. A 1).

Working range



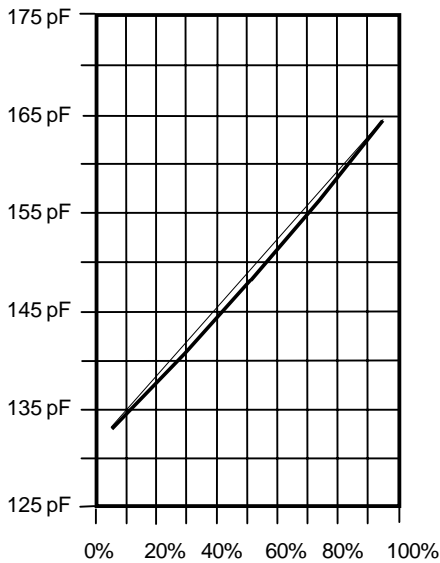
Technical data

Type	FE 09/1, FE 09.R/1 FE 09/2, FE09.R/2	FE 09/4 FE 09.R/4	FE 09/1000
Working range	0...100%rh	0...100%rh	0...100%rh
Temperature resistance FE09/X	-60...200°C	-60...200°C	-60...200°C
Temperature resistance FE09.R/X	-40...110°C	-40...110°C	
Basic Capacity	135±10pF	115±15pF	1050±50pF
Change in capacity	0.3±0.05pF/%rh	0.27±0.08pF/%rh	2.5±0.5pF/%rh
Permissible voltage	max. 3V without DC	max. 3V without DC	max. 3V without DC
Measured frequency	5...200kHz	5...200kHz	5...100kHz
Loss factor	<0.03 (at 10kHz)	<0.03 (at 10kHz)	<0.05 (at 10kHz)
Response time	10s	10s	10s
Hysteresis (MR 5...95%rh)	<1.5%rh	<1.5%rh	<1.5%rh
Linearity (MR 5...95%rh)	<1.5%rh	<1.5%rh	<1.5%rh
Long term stability	<1%rh/a	<1%rh/a	<1.5%rh/a

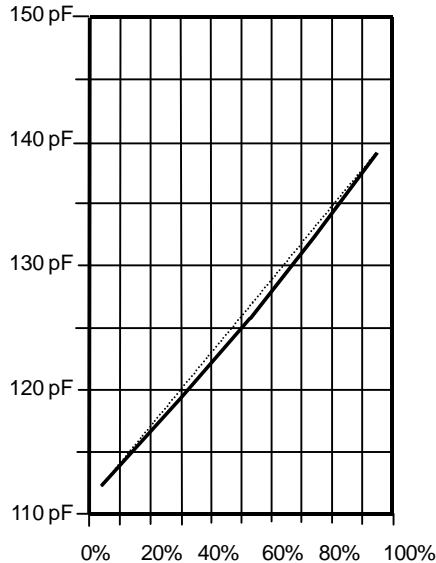
This information is based on current knowledge and is intended to provide details of our products and their possible applications. It does not, therefore, act as a guarantee of specific properties of the products described or of their suitability for a particular application. It is our experience that the equipment may be used across a broad spectrum of applications under the most varied conditions and loads. We cannot appraise every individual case. Purchasers and/or users are responsible for checking the equipment for suitability for any particular application. Any existing industrial rights of protection must be observed. The perfect quality of our products is guaranteed under our General Conditions of Sale. Issue : March 2004 valid until 31.12.2009 B11_E. Subject to modifications, current version available at www.galltec.de. This issue supersedes all previous technical leaflets.

Typical characteristic curve

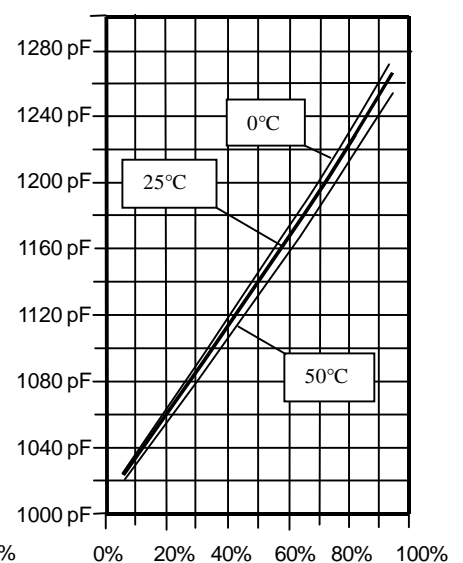
**FE 09/1, FE 09.R/1,
FE 09/2, FE 09.R/2**



FE 09/4, FE 09.R/4



FE 09/1000



Harmful substance test

No damage to the humidity sensing elements after 3 months' exposure

Harmful substance	Concentration
NH ₃ (only for a short time)	100 ppm (2 x MAK)
H ₂ S	20 ppm (2 x MAK)
SO ₂	3,7 ppm (10 x MIK)
No _x	1,0 ppm (10 x MIK)
O ₃	0,6 ppm (10 x MIK)
Cl ₂	no influence

Temperature-dependence

The following correction algorithm can be used to calculate the temperature-dependence of the humidity sensing elements.

$$K = [A + a(T - 25)] \cdot \sum_{i=0}^2 b_i \cdot T^i$$

K = corrected value

A = Output signal (0...100%)

T = Temperature (°C)

b₁ = 6 * 10⁻⁴

a = 0,04 (for T ≥ 25°C)

a = 0 (for T < 25°C)

b₀ = 0,98125

b₂ = 6 * 10⁻⁶

Dimensions

