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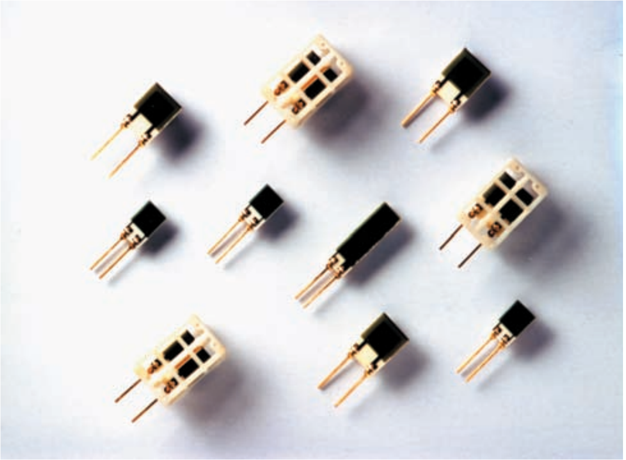


Product info sheet no. B 1.1
Humidity sensing elements, Modules

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***).

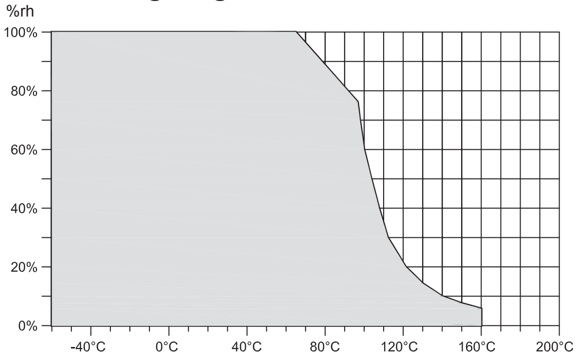
FE 09/2-type humidity sensing elements are very versatile elements which are also available with protective frames (***FE 09.R/2***).

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

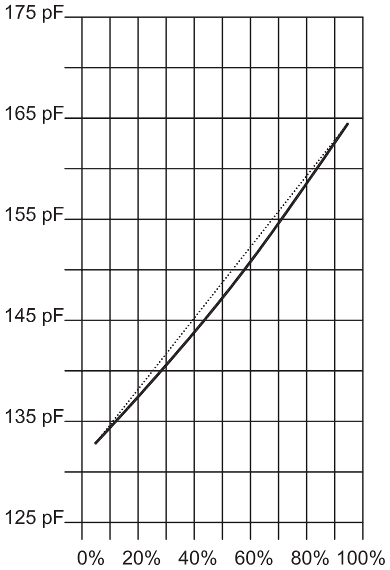


Technical data

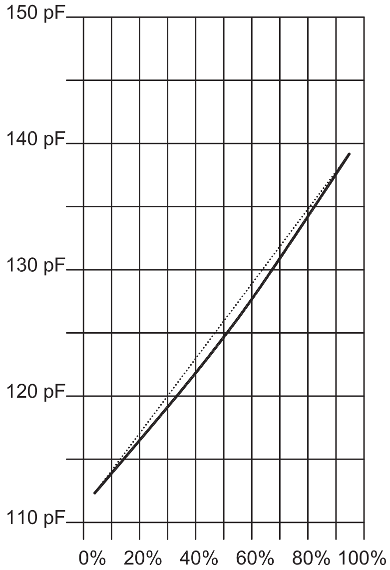
Type	FE 09/1, FE 09.R/1 FE09/2, FE 09.R/2	FE 09/4 FE 09.R/4
Working range	0...100 %rh	0...100%rh
Temperature resistance FE09/X	-60...200 °C	-60...200 °C
Temperature resistance FE09.R/X	-40...110 °C	-40...110 °C
Basic capacity	135±10 pF	115±15 pF
Change in capacity	0.3±0.05 pF/%rh	0.27±0.08 pF/%rh
Permissible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

Typical characteristic curve

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



FE 09/4, FE 09.R/4



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_2S	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.

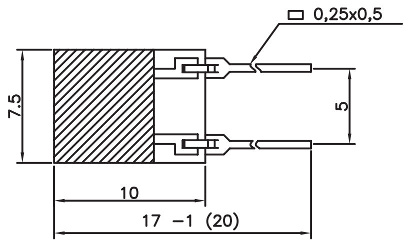
$$K = [A + a(T - 25)] . \sum_{i=0}^{2} b_i . T^i$$

K = corrected value
A = Output signal (0...100%)
T = temperature (°C)
$b_1 = 6 * 10^{-4}$

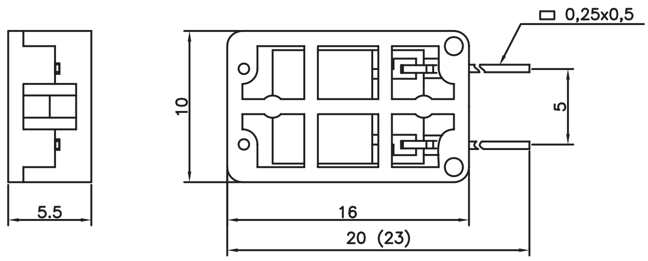
a = 0.04 (for T ≥ 25°C)
a = 0 (for T < 25°C)
$b_0 = 0.98125$
$b_2 = 6 * 10^{-6}$

Dimensions

FE09/1, FE09/2

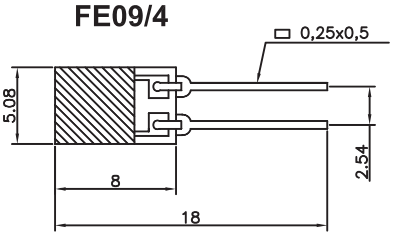


FE09.R/1, FE09.R/2



dimensions in brackets for types FE09/2 and FE09.R/2

FE09/4



FE09.R/4