



Description of the sensors

The sensors FK80J (humidity only) / TFK80J (humidity and temperature) measure the air humidity by means of a humidity-dependant condenser. The capacitive humidity measuring element, produced using thinfilm technology, consists of a base plate, on which the electrodes are housed and a hygroscopic polymer layer above it. The hygroscopic polymer layer absorbs water molecules from the medium to be measured (air) or releases them, thereby altering the capacity of the condenser. In a tandem-arranged electronic device, the change in capacity is processed via integrated signal preprocessing into signals **0..20mA or 0..10VDC or 4..20mA**.

The measuring element is protected by a protective guard. The sensors are designed for pressureless systems - the measuring medium is non-corrosive air.

The TFK80J sensors also contain a semi-conductor temperature sensor for simultaneous temperature measurement. Its measured values are likewise converted into standardised signals **0..20mA or 0..10VDC or 4..20mA**

The temperature coefficient as well as the self-heating of the electronic may vary according to the location and the application (especially with sensors where electronic and measuring system are integrated in one housing).

Maintenance - Application instructions - Influence of dirt

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 breake down. Direct sunlight should be avoided. 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.

Please consult the **application instructions** for the sensing elements (product info sheet no. A 1) or check with the manufacturer for further information which you need to bear in mind when using humidity sensors with capacitive sensing elements.

Humidity Sensor FK80J
 with capacitive measuring element
 with current or voltage output **0...20mA / 0...10VDC or 4...20mA** to determine relative air humidity in air channels

Humidity-Temperature Sensor TFK80J
 with capacitive measuring element
 with current or voltage output, **0...20mA / 0...10VDC or 4...20mA** to determine relative air humidity and temperature in air channels

Technical Data

measuring range **humidity** 0..100%RH
 sensing element capacitive FE09
 accuracy at 23°C (73,4°F) ±2.0%RH (40...60%RH)
 at 23°C (73,4°F) ±2.5%RH (otherwise)
 includes linearity and repeatability
 temperature effect typ. less 0,15%RH per °C /°F
 operating range 5...95%RH
 measuring medium air, pressureless, non-corrosive
 Response time (at calm air) < 20 s
 signal output **humidity** 0...10V or 0...20mA or 4...20mA

measuring range **temperature**
 0...+50°C; 32...+122 °F
 -10...90°C¹⁾; 14...194°F
 -30...60°C; -22...+140°F
 0...100°C¹⁾; 32...+212°F
 sensing element Pt100 Class B
 accuracy at 0...10V ±0.2K ±0.36°F
 at (0)4...20mA ±0.3K ±0.54°F
 operating range -30...+80°C (-22...176°F)
 signal output **temperature** 0...10V or 0...20mA or 4...20mA

Other signal output temperature
 NTC; PTC; KTY; LMx35; Pt100; Pt1000; Ni1000; AD592; LM34;
 BALKO 1kΩ; SILICON 2kΩ;
 SEMICONDUCTOR 559 mVDC @23°C (75°F)
 Thermistors @ 25°C (77°F) 1,8kΩ; 2,252kΩ; 3kΩ; 5kΩ; 10kΩ;
 1,8kΩ (Type II; III, CSI); 20kΩ; 100kΩ

power supply 15..30V DC / 24VAC ± 10%
 electromagnetic compatibility EMC
 resistance to interference EN 50 082-2
 interference emission EN 50 081-2
 max. load Ω = $\frac{\text{supply} - 10 \text{ VDC}}{0,02 \text{ amps}}$
 (current output only)
 min load (voltage output only) 10kΩ
 power consumption less 5 mA
 permissible ambient temperature -40...+80°C (-40...176°F)
 at the housing -10...+60°C (14...140°F)
 admitted air speed 15 m/sec (50 ft/sec)
 Minimum air speed (across the sensor):
 output 0...10V, 2x0...1V ≥0.5m/s
 4...20mA, 2x0...10V ≥1m/s
 2x4...20mA ≥1.5m/s
 probe length 200mm (7,87")
 probe material aluminium, electrolytically oxidized
 for channel mounting perforation in the case
 mounting position as you like
 contacting connecting terminals in the housing
 connecting terminal conductor cross sections
 1.5mm² (0,023"²)
 housing polystyrol-ABS
 protective system IP64
 weight approx. 0.3kg (0.6 lbs)

¹⁾ please observe working range "subject to technical modifications"

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 : August 2008 valid until 31.12.2009 FK80_E. Subject to modifications, current version available at www.galltec.de. This issue supersedes all previous technical leaflets.

Overview of capacitive sensors power supply 15...30V DC (24V AC ±10 %)

FK80J DC-version	0...100%RH 0...100%RH 0...100%RH	0...10VDC 4...20mA 0...20mA				15...30VDC / 24 VAC 15...30VDC 15...30VDC	3/4wire 2wire 3/4wire	58014700 58014800 58013000
TFK80J	0...100%RH	0...10VDC	-30...+60°C	-22...+140°F	0...10VDC	15...30VDC / 24 VAC	3/4wire	58574747
	0...100%RH	0...10VDC	0...100°C*	32...+212°F**	0...10VDC	15...30VDC / 24 VAC	3/4wire	58544747
	0...100%RH	0...10VDC	0...+50°C	32...+122 °F	0...10VDC	15...30VDC / 24 VAC	3/4wire	58524747
	0...100%RH	0...10VDC	-10...+90°C	14...194°F**	0...10VDC	15...30VDC / 24 VAC	3/4wire	58624747
	0...100%RH	4...20mA	0...50°C	32...+122 °F	4...20mA	15...30VDC	2wire	58524848
	0...100%RH	4...20mA	-30...+60°C	-22...+140°F	4...20mA	15...30VDC	2wire	58574848
	0...100%RH	4...20mA	-20...+80°C	-4...+176°F	4...20mA	15...30VDC	2wire	58264848
	0...100%RH	4...20mA	-10...+90°C	14...194°F**	4...20mA	15...30VDC	2wire	58624848
	0...100%RH	4...20mA	0...100°C*	32...+212°F	4...20mA	15...30VDC	2wire	58544848
	0...100%RH	0...20mA	0...+50°C	32...+122 °F	0...20mA	15...30VDC	3/4wire	58523030
0...100%RH	0...20mA	-10...+90°C**	14...194°F**	0...20mA	15...30VDC	3/4wire	58623030	
0...100%RH	0...20mA	-30...+60°C	-22...+140°F	0...20mA	15...30VDC	3/4wire	58573030	
0...100%RH	0...20mA	0...100°C*	32...+212°F**	0...20mA	15...30VDC	3/4wire	58543030	
Speciality FK80JPt100	0...100%RH	0...20mA	PT100	Pt100	Resistance	15...30VDC	3/4wire	58703050
	0...100%RH	0...10VDC	PT100	Pt100	Resistance	15...30VDC	3/4wire	58704650
	0...100%RH	4...20mA	PT100	Pt100	Resistance	15...30VDC	2wire	58704850
TFK80xxx	0...100%RH	0...10VDC 4...20mA	NTC; PTC; KTY; LMx35; Pt1000; Ni1000; AD592; LM34; BALKO 1kΩ; SILICON 2kΩ; SEMICONDUCTOR 559 mVDC @23°C (75°F) Thermistoren @ 25°C (77°F) 1,8kΩ; 2,252kΩ; 3kΩ; 5kΩ; 10kΩ; 1,8kΩ (Type II; III, CSI); 20kΩ; 100kΩ					

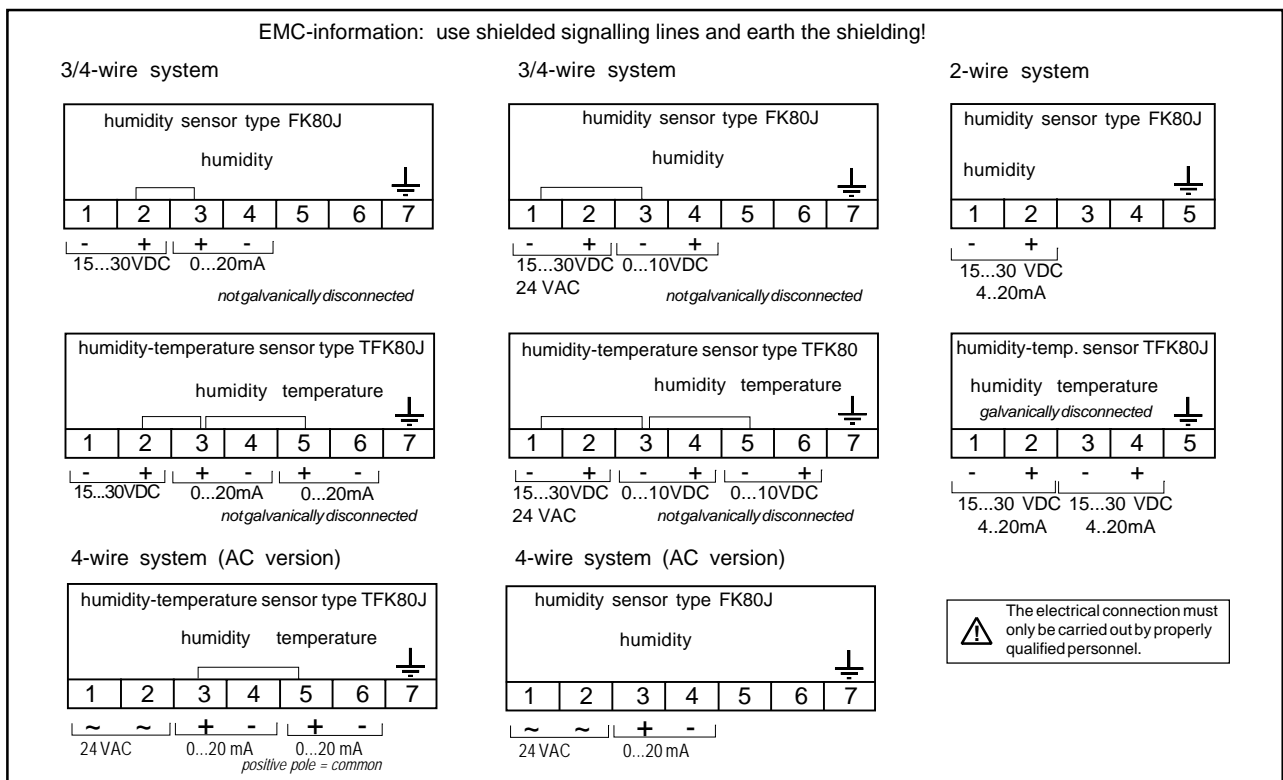
Overview of capacitive sensors power supply 24V AC ±10 %

FK80J AC-version	0...100%RH 0...100%RH	0...10VDC 0...20mA				15...30VDC / 24VAC 24VAC	3/4wire 4wire	58014700 58014200
TFK80J	0...100%RH	0...10VDC	0...+50°C	32...+122 °F	0...10VDC	15...30VDC / 24 VAC	3/4wire	58524747
	0...100%RH	0...10VDC	-30...+60°C	-22...+140°F	0...10VDC	15...30VDC / 24 VAC	3/4wire	58574747
	0...100%RH	0...10VDC	-10...+90°C	14...194°F**	0...10VDC	15...30VDC / 24 VAC	3/4wire	58624747
	0...100%RH	0...10VDC	0...100°C*	32...+212°F	0...10VDC	15...30VDC / 24 VAC	3/4wire	58544747
	0...100%RH	0...20mA	0...50°C	32...+122 °F	0...20mA	24VAC	4wire	58524242
	0...100%RH	0...20mA	-30...+60°C	-22...+140°F	0...20mA	24VAC	4wire	58574242
0...100%RH	0...20mA	-10...+90°C	14...194°F**	0...20mA	24VAC	4wire	58624242	
0...100%RH	0...20mA	0...100°C*	32...+212°F	0...20mA	24VAC	4wire	58544242	

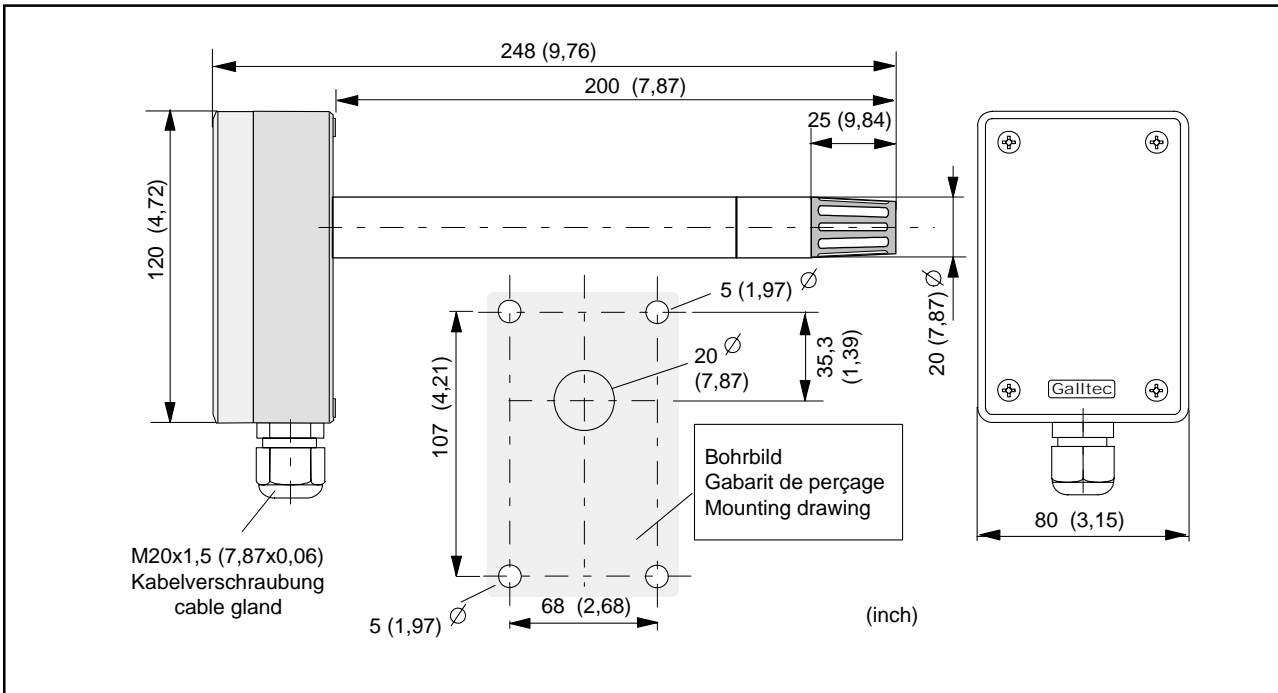
* observe max. temperature range

** suitable for EDJ controller

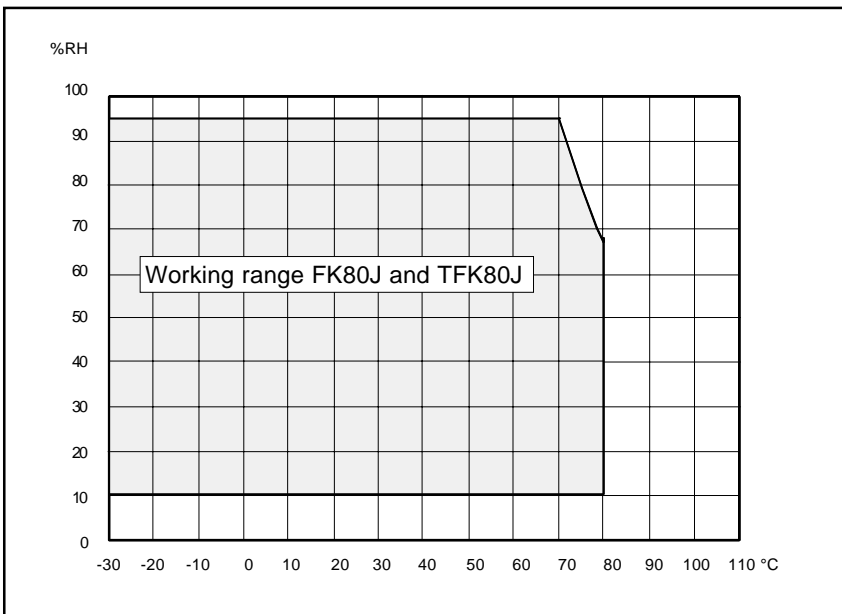
Connection diagram



Dimensions diagram



Working range



Cleaning-instruction

The surface of the measuring element must not be touched.

To clean the measuring element, its surface can be rinsed, however should only be moistened with water drops; immersing into distilled water is possible but pressure should be avoided.

Solvents cannot be used for this purpose.

Correct measuring values will be regained as soon as the measuring element is dry.

The measuring elements can also be blown off carefully; do not use compressed air.

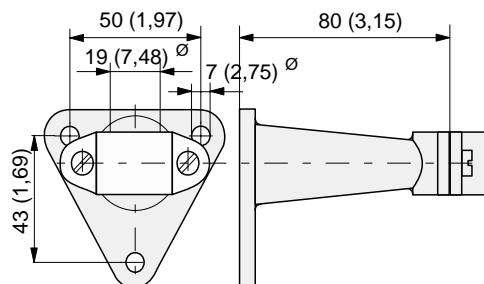
On manipulation of the interior parts warranty will expire

Accessories



Ventilated sensor tube for improved air flow
item no. 20.022

Console for wall mounting item no. 20.009



Checking calibration

It is possible to use sensor checks in order to test the humidity sensors from time to time for accuracy. The physical process is described in detail in **DIN 50 008, IEC Publikation 260, ISO/R 483-1966**. In the air space above an aqueous saturated saline solution an ambient climate is formed whose air humidity is dependant on the water vapour pressure of the saline solution.

The Galltec+Mela sensor checks are designed so that a foil permeable to vapour is positioned between the saline solution and the air space (space in which the measuring element is located). This makes carrying out the sensor checks a very straightforward procedure as follows:

Remove the protective cap of the sensor check while opening the PG screw and introduce the sensor duct up to the mark. Tie the sensor in the PG screw. Please make sure that the sensor check is well tight and air-sealed while carrying out your measurement. If you are using a sensor with a "Polyga" measuring element, ensure particularly that the lid of the sensor is well tight and that the cable duct is well sealed.

Sensor check 33%RH							
°F	34	37	40	43	45	48	
°C	5	10	15	20	25	30	
%RH	34	34	34	33	33	33	
Screw the check firmly onto the humidity sensor. Wait for 2 hours. Ensure that the temperature is kept constant. Take humidity reading according to temperature.							

Sensor check 55%RH							
°F	34	37	40	43	45	48	
°C	5	10	15	20	25	30	
%RH	58	57	56	55	53	52	
Screw the check firmly onto the humidity sensor. Wait for 2 hours. Ensure that the temperature is kept constant. Take humidity reading according to temperature.							

Sensor check 76%RH							
°F	34	37	40	43	45	48	
°C	5	10	15	20	25	30	
%RH	76	76	76	76	76	75	
Screw the check firmly onto the humidity sensor. Wait for 2 hours. Ensure that the temperature is kept constant. Take humidity reading according to temperature.							

After a certain period of time, a constant humidity builds up between the saline solution and the air space in which the humidity measuring element is located. Depending on the type of saline solution and the sensor check, humidity values range from 33%RH to 98%RH. The standard values of the Galltec+Mela sensor checks are 33%RH, 55%RH, 76%RH and 98%RH. We recommend a compensation period of about 2 hours. Please ensure that there are no major fluctuations in temperature during this period. Temperature fluctuations severely disturb the equilibrium.

The equilibrium moisture content is dependent on the temperature - according to the type of salt. The corresponding values are given in a correction table located on the sensor check.

It is important that you replace the sealing cap of the sensor check after use, otherwise the water of the saline solution will evaporate and the check will become unusable.

Guide to installation

Interference is often to be encountered during installation. The correct installation procedure can prevent interference to a very large extent. However, some ground rules should be observed.

To avoid interference, suppression should be carried out in accordance with VDE 0875 and VDE 0874

(VDE - this is assumed to be the *Vorschriftenwerk Deutscher Elektrotechniker* - regulations governing German electrical engineers).

Fundamentally, interference must be removed at its source, where suppressor material is most effective. Interference can, however, also result from electromagnetic fields via signalling lines. The EMV law determines the corresponding protective measures. All Galltec+Mela equipment is designed in accordance with European standards EN 50081-2 and EN 50082-2 (for industrial locations). In addition, further protective measures must be observed.

Unavoidable sources of interference should be kept at a good distance from the control systems.

Data and signalling lines should not be used in parallel with control, networking and power lines.

For data and signalling lines, shielded cable should be used, and the shielding must be applied to the earth terminal. Ensure that earth circuits and fault currents do not arise as a result of a second earth connection.

For equipment with a network connection, it is recommended that a separate network circuit is used.

During the switch process, electrical power consumers such as switch contactors, magnetic valves etc. produce induction voltages that can cause interference. In the trade there is an abundance of protective and suppressor component parts that are most effective when applied directly to the source of the trouble. A suitable suppressor has the added advantage that components such as relays, microswitches etc. have a longer service life.

Further difficulties during installation can arise if signalling lines are joined together with common lines. It is essential to check whether this is permissible. Interference is particularly likely when installing using equipment of different makes. Here, too, the trade offers isolating amplifiers that overcome the problem.