



Duct sensor

QFM65

for relative humidity and temperature

Operating voltage AC 24 V

Signal output DC 0...10 V for relative humidity and temperature

Measurement accuracy ± 3 % r. h. within the comfort range

Use

In ventilation and air conditioning plants for acquiring

- the relative humidity and
- the temperature in air ducts

The QFM65 is used as a

- control sensor in the supply or extract air duct
- reference sensor, e.g. for shifting the dew point
- limit sensor, e.g. in connection with steam humidifiers
- limit sensor, e.g. for measured value indication or for interfacing with a building management system
- sensor for enthalpy and absolute humidity, together with the AQF61.1 (refer to Data Sheet 1899)

Ordering

When ordering, please give name and type reference: duct sensor **QFM65**

Equipment combinations

All systems and devices that are capable of acquiring and handling the sensor's DC 0...10 V output signals.

Mode of operation

Relative humidity

The sensor measures the relative humidity in the air duct with the help of a capacitive humidity sensing element whose electrical capacitance changes as a function of the relative humidity of the air.

The electronic measuring circuit converts the sensor's signal to a continuous DC 0...10 V signal, which corresponds to 0...100 % relative humidity. In the range of 1...9 V ($\hat{=}$ 10...90 % r. h.), the signal is linear to the measurement accuracy given in "Technical data", resulting in an effective measurement range of 10...90 % r. h.

Temperature

The sensor acquires the temperature with the aid of the Pt1000 thin-film measuring element whose electrical resistance changes in function of the temperature of the ambient air. The change in resistance is converted to two DC 0...10 V signals that act independently. One DC 0...10 V signal corresponds to the temperature range 0...50 °C, the other to -35...+35 °C.

Mechanical design

The duct sensor consists of housing, removable cover and immersion sensor tube.

The housing accommodates the measuring circuit and the connection terminals.

The cable is introduced through a threaded hole in the bottom for the Pg 11 cable gland (IP 42) supplied with the sensor or with another Pg 11 cable gland to DIN 46 320 (IP 54). The sensing elements are located at the tip of the immersion sensor tube and protected by a sleeve with a filter.

Immersion sensor tube and sensor housing are made of plastic and rigidly connected.

The sensor is secured with the help of screws. It can be fitted in 2 different ways:

- With the mounting flange supplied with the sensor; the flange is placed over the pocket and secured at the required immersion depth, or
- Without the mounting flange (making use of the maximum immersion depth); for that purpose, the housing has 4 holes

Accessories

(supplied with the sensor)

- Mounting flange
- Cable gland

Engineering notes

The transformer used must be suited for safety extra low voltage (SELV). It must have separate windings and be designed for 100 % duty. The transformer must be sized and fused in compliance with local safety regulations.

The power consumption of the QFM65 must be taken into consideration when sizing the transformer.

For wiring the sensor, refer to the Data Sheets of the units with which the sensor is used.

The permissible cable lengths must be observed.

Cable routing and
cable selection

When laying the cables, it must be observed that the longer the cables run side by side and the smaller the distance between them, the greater the electrical interference.

Twisted pairs of cables are required for the secondary supply lines as well as for the signal lines.

Mounting notes

To ensure degree of protection IP 42, the sensor must be fitted with the cable entry pointing downward!

The sensor must be mounted in locations where it can be easily accessed for service.

Note!

- If used in connection with steam humidifiers, the distance to the humidifier must be a minimum of 3 m. If permitted by the installation, the distance should be as great as possible, but no more than 10 m
- The sensing elements in the pocked are susceptible to impact and shock. Any impact or shock should therefore be avoided when mounting the sensor

If the application involves dew point shifting, the sensor must be mounted in the extract air duct.

Mounting Instructions are printed on the package.

Commissioning notes

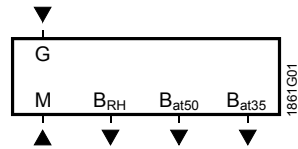
Check wiring before switching on power. No adjustments are required on the sensor itself. The calibration and test potentiometers are protected with a blob of paint. Their settings may not be changed!

Technical data

Humidity sensor	Range of use	10...90 % r. h.
	Measurement accuracy at 20 °C	
	20...90 % r. h.	±5 %
	40...60 % r. h.	±3 % (typically)
	Temperature dependency	≤0.1 % r. h. / °C
	Time constant	approx. 20 s, in moving air at 0...50 °C, 10...80 % r. h.
	Perm. air velocity	20 m/s
	Output signal, linear (terminal B _{RH})	DC 1...9 V ≅ 10...90 % r. h., max. ±1 mA
Temperature sensor	Range of use	0...50 °C and -35...+35 °C
	Sensing element	Pt1000 class B
	Measurement accuracy at 20 °C	
	with L&S Ni 1000 standard circuitry	±0.7 K
	Time constant	approx. 20 s in moving air
	Output signal, linear (terminal B _{at50})	DC 0...10 V ≅ 0...50 °C, max. ±1 mA
	Output signal, linear (terminal B _{at35})	DC 1...9 V ≅ -35...+35 °C, max. ±1 mA
General sensor data		
Power supply	Operating voltage	AC 24 V ±20 %
	Frequency	50/60 Hz
	Power consumption	≤0.5 VA
Cable lengths for the measuring signal	Perm. cable lengths with	
	0.6 mm dia. copper cable	50 m
	1 mm ² copper cable	150 m
	1.5 mm ² copper cable	300 m
Electrical connections	Terminals	screw terminals, max. 2 × 1.5 mm ²
	Cable gland	Pg 11
Degree of protection and safety class	Degree of protection of housing	
	With enclosed cable gland	IP 42 to IEC 529
	With cable gland to DIN 46 320	IP 54 to IEC 529
	Safety class	III to EN 60 730
Environmental conditions	Operation	to IEC 721-3-3
	Climatic conditions	class 3K5
	Temperature (housing with electronics)	-5...+50 °C
	Humidity	5...95 % r. h. (non-condensing)
	Transport	to IEC 721-3-2
	Climatic conditions	class 2K3
	Temperature	-25...+70 °C
Humidity	<95 % r. h.	
	Mechanical conditions	class 2M2

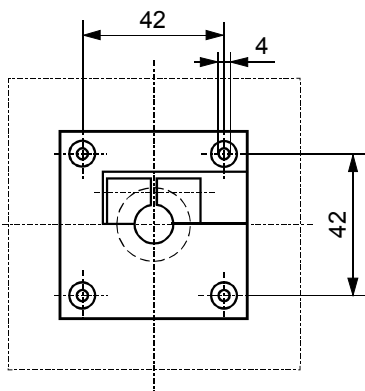
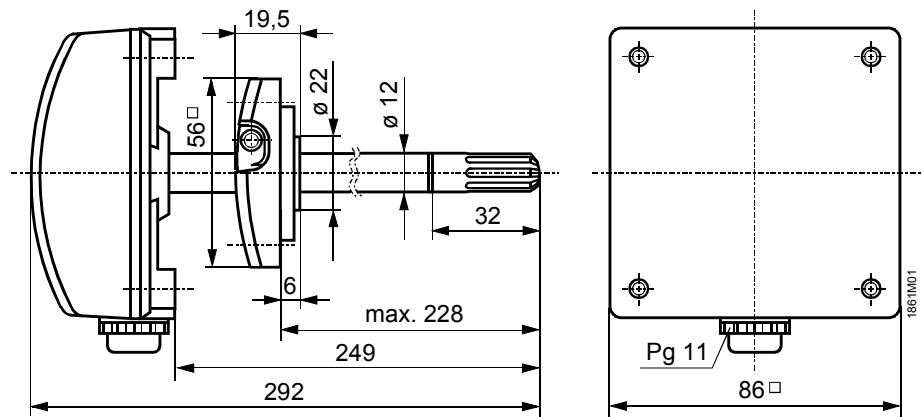
Materials and colors	Base	Polycarbonate, RAL 7001 (silver-grey)
	Cover	Polycarbonate, RAL 7035 (light-grey)
	Sensor tube	Polycarbonate, RAL 7001 (silver-grey)
	Sensor head	Polycarbonate, RAL 7035 (light-grey)
	Mounting flange	Polycarbonate, RAL 7001 (silver-grey)
	Sensor (entirely)	silicon-free
	Packaging	corrugated cardboard
Norms and standards	Product safety	
	Automatic electrical controls for household and similar use	EN 60 730-1
	Electromagnetic compatibility	
	Immunity	EN 61 000-6-2
	Emissions	EN 50 081-1
	CE conformity to	
	EMC directive	89/336/EEC
Low voltage directive	73/23/EEC	
Weight	CE conformity to Australian EMC Framework Radio Interference Emission Standard	Radio communication act 1992 AS/NZS 3548
	Incl. packing	approx. 0.275 kg

Connection terminals

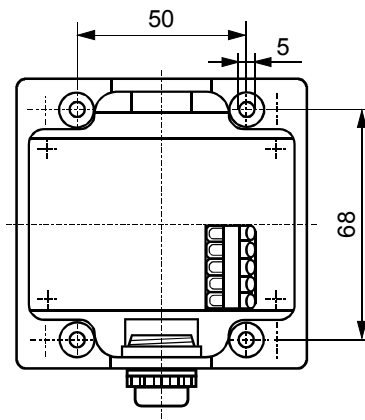


- G, M Operating voltage AC 24 V (SELV)
- G System potential (SP)
- M System neutral (SN), measuring neutral
- B_{RH} Signal DC 1...9 V for 10...90 % r.h.
- B_{at50} Signal DC 0...10 V for temperature measuring range 0...50 °C
- B_{at35} Signal DC 0...10 V for temperature measuring range -35...+35 °C

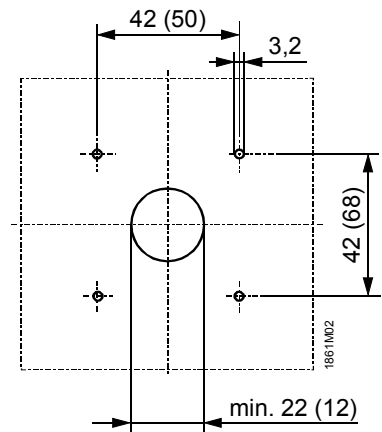
Dimensions (in mm)



Mounting with mounting flange



Mounting without mounting flange



Drilling template with (without) mounting flange