SIEMENS

1863

Duct Sensor

QFM66/C

for relative humidity and temperature
with calibration certificate

- **Operating voltage AC 24 V**
- **Output signal DC 0...10 V**
- **Very high measuring accuracy throughout the entire measuring range**
- **Capacitive humidity measurement**
- **Recalibration service**

Use

The QFM66/C sensor is used in ventilation and air-conditioning plants requiring:

- very high accuracy and reliability for measuring relative humidity and temperature
- regular recalibration and readjustment of the sensors

Examples:

- Storage and production facilities in the paper, textiles, pharmaceutical, chemical, electronics industries, etc.
- Laboratories
- Hospitals
- Computer centres
- Greenhouses

Ordering and delivery

Indicate device name and type designation on order: Duct Sensor **QFM66/C.**
The coupling of the circular connector (Lumberg RKC 50/11) and the installation flange are delivered uninstalled.

Equipment combinations

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

Technical design

Relative humidity

The sensor senses relative humidity via a capacitive humidity measuring element whose capacitance varies according to the relative humidity of the ambient air.
An electronic circuit converts the sensor's signal to a continuous DC 0...10 V signal, corresponding to a relative humidity of 0...100 %.

Temperature

The sensor senses the temperature via a Pt1000 thin-film measuring element whose electrical resistance varies according to the temperature of the ambient air.
This variation is converted to two mutually independent DC 0...10 V signals. One signal corresponds to the 0...50 °C temperature range, the other to the −35...+35 °C range.

Mechanical design

The duct sensor comprises a housing with a removable cover and an immersion sensor stem. The housing and stem are made of plastic and are inseparably connected to each other.
Between the housing and the cover there is a seal which is required to ensure degree of protection IP 65.
The sensing elements are installed in the end of the stem, protected by a screw-on cap with a Coretex filter.
The housing accommodates the measuring circuit and the connection terminals. The cable is connected via a circular connector with a screwed plug.
The connector consists of a built-in plug with Pg 11 screw connection and a coupling with a screw fastening. The built-in plug is installed on the housing and electrically connected inside.
The sensor is designed for duct mounting. It can be installed in either of the following ways:

- Using the installation flange supplied (flange is fitted over the stem and clamped at the required insertion depth)
- Without the installation flange (to utilise the maximum immersion depth)

Calibration certificate

The sensor is serialised, registered and calibrated before delivery. The corresponding calibration certificate is enclosed.

Engineering notes

Use a safety extra-low voltage (SELV) transformer that has separate windings and is designed for 100 % duty.
The mandatory safety specifications at the plant location shall apply to sizing and protecting the transformer.
The connection of the sensor is described in the data sheets of those devices it is to be connected to (connection of active sensors).
The maximum permissible cable lengths are mandatory.

Fitting notes

Location

Install the sensor at approximately the middle of the duct wall (ideal air mixture).
If the sensor is to be installed downstream of a steam humidifier, maintain a distance of at least 3 m from it. A bypass is recommended if space is limited.
For dew-point control, install the sensor in the extract air duct.
The sensor can be installed with or without the installation flange.
If the installation flange is used, the flange is installed on the duct wall. The sensor needs only to be inserted into the flange and clamped.
Install the cable on the removable plug connection of the sensor (see fitting instructions).

Caution!

- The seal between housing and cover must not be removed, or else degree of protection IP 65 will be no longer ensured.
- The measuring rod's sensing elements are sensitive to impact. Avoid any such impact on mounting.

Fitting instructions

The fitting instructions are enclosed with the sensor.

Commissioning notes

Perform a wiring check on commissioning. The settings required for air conditioning control, compensation and limitation are made at the devices to which the QFM66/C sensor is connected. Do not attempt to make adjustments to the sensor.

Rekalibrierservice

Siemens Building Technologies provides a recalibration service[1)] for used sensors.
The recalibration should be performed at 12 month intervals under "normal" conditions, i.e. within the comfort range for humidity and temperature, and at air contamination levels that are not above average.
(Re)calibrated sensors should not be stored longer than 12 months before commissioning.
Recalibration or readjustment with repair can be refused if a sensor is more than 10 years old and in poor condition.

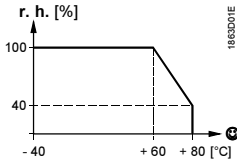
Services provided

The recalibration service[1)] includes the following:
Calibration[2)] with recording of values for humidity (B1) and temperature 0…50 °C (B2)

- Sensor test, including repair and replacement of wear parts; filter every time, sensor elements if required.
- If necessary, readjustment[3)] and repeat calibration
- Issue and enclosure of a new calibration certificate
- Shipping and registration (the customer gets the same sensor back)

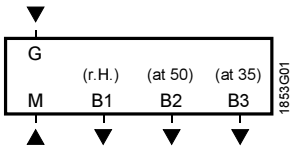
1) The recalibration service is performed and billed under the designation S/QFM66/C
2) The test candidate is connected to a measurement standard. Any deviations found are recorded but not corrected. Calibration is performed at three points for humidity and temperature.
3) The test candidate is connected to a measurement standard. Any deviations found are corrected.

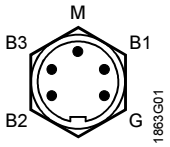
Technical data

Humidity sensor	Range of use	0...100 % r. h.
	Measuring accuracy at 20 °C	
	In the range 0...90 % r.h.	±2 %
	In the range 90...100 % r.h.	±3 %
	Temperature dependency	
	In the range −10...+50 °C	≤0,05 % r. h./K
	Reduction of the humidity measuring range	
	At temp. above 60 °C at sensor head	see illustration in margin
	Time constant t_{90}	approx. 20 s
Temperature sensor	Range of use	−35...+50 °C
	Measuring accuracy at 20 °C	±0.5 K
	Sensing element	Pt1000 Class A
	Time constant t_{63}	approx. 20 s
General data		
Supply	Operating voltage (SELV)	AC 24 V ±20 %
	Frequency	50/60 Hz
	Power consumption	≤1 VA
Functional data	Service life	10 years
Output signals	Humidity signal (terminal B1)	DC 0...10 V ≙ 0...100 % r. h., ±1 mA max.
	Temperature signal (terminal B2)	DC 0...10 V ≙ 0...50 °C, ±1 mA max.
	Temperature signal (terminal B3)	DC 0...10 V ≙ −35...+35 °C, ±1 mA max.
Perm. line lengths	Copper cable	
	0.6 mm dia.	50 m
	1 mm^2	150 m
	1.5 mm^2	300 m
Electric connection	Connection terminals for	2 × 1.5 mm^2 max.
	Rundsteckverbinder mit Kabelverschraubung	Pg 11
Prodective data	Housing protection	IP 65 to IEC 529
	Protection class	III to EN 60 730
Environmental conditions	Operation to	IEC 721-3-3
	Climatic conditions	class 3K5
	Temperature	
	Housing with electronics	−20...+60 °C
	Sensor head	−40...+80 °C
	Humidity	0...100 % r. h
	Transportation to	IEC 721-3-2
	Climatic conditions	class 2K3
	Temperature	−25...+70 °C
	Humidity	<95 % r. h.
	Mechanical ambient conditions	class 2M2
Material and colors	Housing base	polycarbonat, RAL 7001 (silver-grey)
	Housing cover	polycarbonat, RAL 7035 (light-grey)
	Sensor pipe	polycarbonat, RAL 7001 (silver-grey)
	Sensor head	polycarbonat, RAL 5014
	Mounting flange	polycarbonat, RAL 7001 (silver-grey)
	Sensor (entirely)	silicon-free
	Packaging	corrugated board

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	Excl. packaging	approx. 0.136 kg

Connection terminals

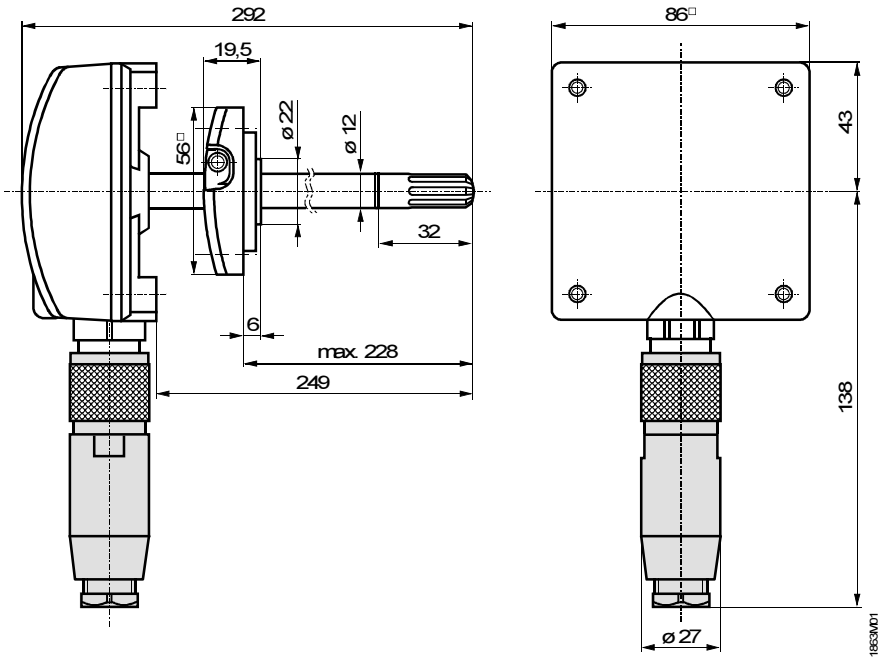


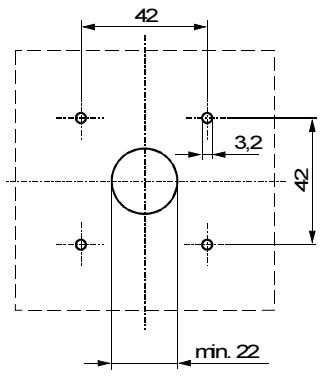


Front view:
Built-in plug

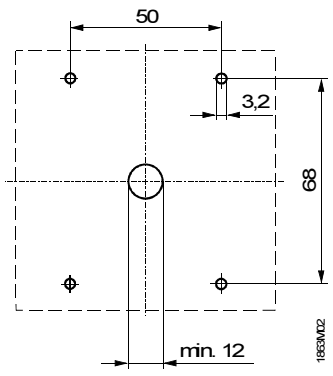
G	System potential AC 24 V (SELV)
M	Sytem neutral, measuring neutral
B1	Output for DC 0...10 V measuring signal (for 0...100 % r. h.)
B2	Output for DC 0...10 V measuring signal (for 0...50 °C)
B3	Output for DC 0...10 V measuring signal (for –35...+35 °C)

Dimensions (in mm)





Drilling scheme
with installation flange



Drilling scheme
without installation flange