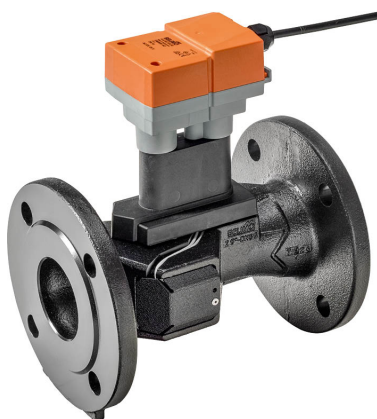


## Flow sensor

Calibrated ultrasonic flow sensor, temperature and glycol compensated. With DC 0.5...10 V output signal. This sensor can be used in closed cold and warm water systems and is robust against dirt and magnetite. There is also a low pressure drop across the sensor.



## Type Overview

Type	DN	DN	FS	$\Delta p$	PN	Output voltage
FM065F-SZ	65	2 1/2"	9.6 l/s	12 kPa	16	0.5...10 V
FM080F-SZ	80	3"	13.6 l/s	13 kPa	16	0.5...10 V
FM100F-SZ	100	4"	24.0 l/s	12 kPa	16	0.5...10 V
FM125F-SZ	125	5"	37.5 l/s	13 kPa	16	0.5...10 V
FM150F-SZ	150	6"	54.0 l/s	15 kPa	16	0.5...10 V

FS: Full scale, maximum measurable flow

$\Delta p$ : Pressure drop at FS

## Technical Data

<b>Electrical data</b>	Nominal voltage	AC/DC 24 V
	Nominal voltage frequency	50/60 Hz
	Nominal voltage range	AC 19.2...28.8 V / DC 21.6...28.8 V
	Power consumption AC	1 VA
	Power consumption DC	0.5 W
	Connection supply	Cable , 3 x 0.75 mm <sup>2</sup>
<b>Functional data</b>	Application	Water
	Output voltage range	0.5...10 V
	Output voltage note	0 V = Missing power supply 0.3 V = Sensor error 0.5 V = 0% of FS 10 V = 100% of FS max. load 1 mA
	Pipe connectors	Flange PN 16 according to EN 1092-2
<b>Measuring data</b>	Installation position	upright to horizontal
	Servicing	maintenance-free
	Measuring values	Volumetric flow
	Measuring fluid	Water and water glycol mixtures
	Measuring principle	Ultrasonic volumetric flow measurement
	Measuring accuracy flow	±6% of the measured value (20...100% FS) ±1.2% of FS (0...20% FS)
	Measuring accuracy flow note	±2% of the measured value (20...100% FS) @ 20°C / Glycol 0% vol. ±0.4% of FS (0...20% FS) @ 20°C / Glycol 0% vol.
	Flow Measurement Repeatability	±0.5%
	Min. flow measurement	1% of FS

<b>Materials</b>	Flow measuring pipe	EN-GJL-250 (GG 25), with protective paint
<b>Safety data</b>	Ambient humidity	Max. 95% r.H., non-condensing
	Ambient temperature	0...50°C [30...120°F]
	Fluid temperature	-20...120°C [-5...250°F]
	Storage temperature	-40...80°C
	Protection class IEC/EN	III Safety Extra-Low Voltage (SELV)
	Protection class UL	UL Class 2 Supply
	Certification IEC/EN	IEC/EN 60730-1:11 and IEC/EN 60730-2-15:10
	Degree of protection IEC/EN	IP54
	Degree of protection NEMA/UL	NEMA 2
	Enclosure	UL Enclosure Type 2
	EMC	CE according to 2014/30/EU
	Quality Standard	ISO 9001
	Mode of operation	Type 1
	Rated impulse voltage supply	0.8 kV

**Safety notes**


This device has been designed for use in stationary heating, ventilation and air-conditioning systems and must not be used outside the specified field of application, especially in aircraft or in any other airborne means of transport.

Outdoor applications: Only possible where (sea) water, snow, ice, sunlight or aggressive gases cannot interfere directly with the sensor and it can be guaranteed that the ambient conditions remain at all times within the thresholds according to the data sheet.

Only authorised specialists may carry out installation. All applicable legal or institutional installation regulations must be complied during installation.

The device contains electrical and electronic components and must not be disposed of as household refuse. All locally valid regulations and requirements must be observed.

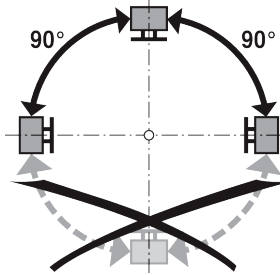
**Product Features**

**Mode of operation** The ultrasonic flow sensor is equipped with a flow pipe, four flow transmitters and an electronic circuit. A temperature sensor is mounted in the flow pipe to compensate the temperature effects.

**Patented Glycol Compensation** Glycol changes the viscosity of the heat transfer fluid and as a result affects the measured volumetric flow. Without glycol compensation, volumetric flow measurements can show errors of as much as 30 percent. The patented automatic glycol compensation significantly reduces the degree of measurement error.

Installation notes

**Recommended installation positions** The sensor can be installed upright to horizontal. The sensor may not be installed in a hanging position.



**Mounting position in the return** Installation in the return is recommended.

**Water quality requirements** The water quality requirements specified in VDI 2035 must be adhered to.

**Servicing** Sensors are maintenance-free.

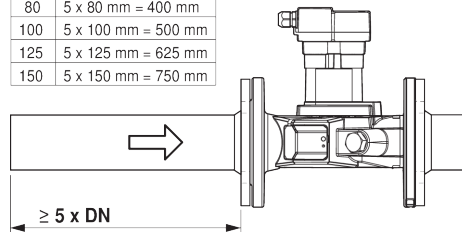
Before any service work on the sensor is carried out, it is essential to isolate the sensor from the power supply (by unplugging the electrical cables if necessary). Any pumps in the part of the piping system concerned must also be switched off and the appropriate slide valves closed (allow all components to cool down first if necessary and always reduce the system pressure to ambient pressure level).

The system must not be returned to service until the sensor has been correctly reassembled in accordance with the instructions and the pipeline has been refilled by professionally trained personnel.

**Flow direction** The direction of flow, specified by an arrow on the housing, is to be complied with, since otherwise the flow rate will be measured incorrectly.

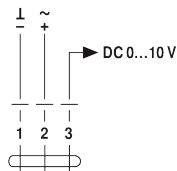
**Inlet section** In order to achieve the specified measuring accuracy, a flow-calming section or inflow section in the direction of the flow is to be provided upstream from the flow sensor. Its dimensions should be at least 5x DN.

DN	L min.
65	5 x 65 mm = 325 mm
80	5 x 80 mm = 400 mm
100	5 x 100 mm = 500 mm
125	5 x 125 mm = 625 mm
150	5 x 150 mm = 750 mm



Wiring diagram

AC/DC 24 V, Output signal

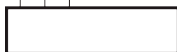


**Cable colours:**

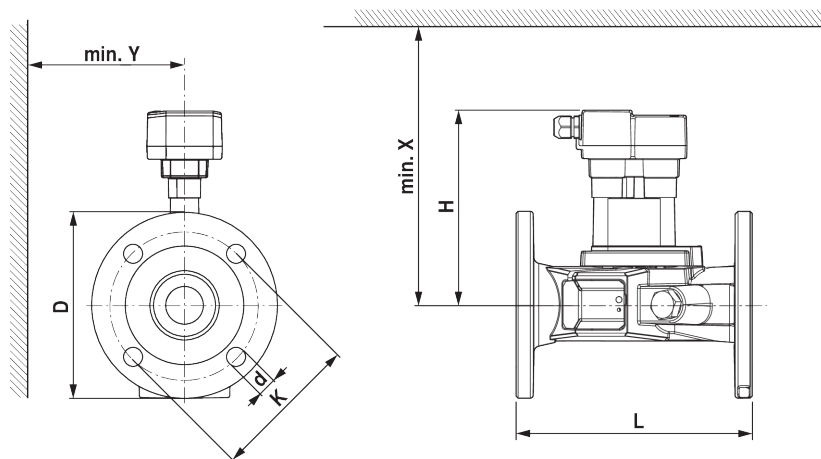
1 = black

2 = red

3 = white



## Dimensions



Type	DN	DN	L	H	D	d	K	X	Y	Weight
FM065F-SZ	65	2 1/2"	240 mm	193 mm	185 mm	4 x 19 mm	145 mm	263 mm	132 mm	13 kg
FM080F-SZ	80	3"	260 mm	200 mm	200 mm	8 x 19 mm	160 mm	270 mm	140 mm	15 kg
FM100F-SZ	100	4"	262 mm	202 mm	230 mm	8 x 19 mm	180 mm	272 mm	155 mm	18 kg
FM125F-SZ	125	5"	314 mm	209 mm	255 mm	8 x 19 mm	210 mm	279 mm	167 mm	24 kg
FM150F-SZ	150	6"	334 mm	219 mm	285 mm	8 x 23 mm	240 mm	289 mm	182 mm	30 kg