GRUNDFOS DATA SHEET

VFS 1-20

Vortex Flowsensor standard, 1-20 l/min



TM03 8208 0807

Fig. 1 VFS 1-20 sensor

Technical overview

Grundfos Direct Sensors[™], type VFS, is a series of combined flow- and temperature sensors (two-in-one) based on the principle of vortex shedding behind a bluff body. The VFS sensors are designed for high-volume production and are fully compatible with wet, aggressive media. The VFS sensor utilises MEMS sensing technology in combination with a novel packaging concept using corrosion-resistant coating on the MEMS sensor element. This makes the VFS sensor very robust and ideal for high-volume OEM applications. VFS sensors are available for flow ranges of 1-12, 1.3-20, 2-40, 5-100, 10-200 and 20-400 l/min.

The trademark Grundfos Direct Sensors ${}^{\rm TM}$ is owned and controlled by the Grundfos group.

Applications

- · thermal management in solar heating systems
- · industrial process flow control
- flow rate detection for pump controls
- · monitoring of pumps, valves and filters
- cooling and temperature control
- · domestic hot-water systems
- heat metering (solar heat pumps).

Features

- flow ranges: 1-12, 1.3-20, 2-40, 5-100, 10-200 and 20-400 l/min.
- based on vortex shedding
- voltage output (ratiometric, ideal for use with microprocessor and PLC)
- · compact and robust design
- approved for potable water: WRAS, KTW, W270, ACS.

Benefits

- · no moving parts
- flow and temperature sensor in one package (twoin-one sensor)
- fast temperature response (direct media contact)
- compatible with wet, aggressive media
- cost-effective and robust construction.

Specifications

Flow			
Measuring range	1.3 to 20 l/min		
Accuracy (±1ơ), 0 to 100 °C	±1.5 % FS		
Response time (63.2 %)	< 1s		
Resolution	0.1 l/min		
Temperature			
Measuring range	0 to 100 °C		
Accuracy (±1o), 25 to 80 °C	±1 °C		
Accuracy (±1o), 0 to 100 °C	±2 °C		
Response time (63.2 % at 50 % FS flow)	< 1s		
Resolution	0.5 °C		
Media and environment			
Media types	The sensor is compatible with liquids (kinematic viscosity ≤ 2 mm ² /s)		
Media temperature (operation)	0 to 100 °C		
Media temperature (peak)	–25 to 120 °C		
Ambient air temp. (operation)	–25 to 60 °C		
Ambient air temp. (peak)	–55 to 90 °C		
Humidity	0 - 95 % (relative), non-condensing		
System burst pressure	> 16 bar		
Electrical data			
Power supply	5 V DC (± 5 %). Grounding of the sensor supply is recommended (PELV)		
Output signals	Ratiometric		
Flow signal	0.35 - 3.5 V (Zero at 0.35 V)		
Temperature signal	0.5 - 3.5 V		
Power consumption	< 50 mW		
Load impedance	> 10 kΩ		
Sensor materials			
Sensing element	Silicon-based MEMS sensor		
Seal (sensor to housing)	EPDM rubber		
Housing	Composites (PPS, PA66)		
Flow pipe	PPA 40-GF		
Wetted materials	Corrosion-resistant coating EPDM, PPS, PPA 40-GF		
Environmental standards			
Enclosure class			
Enclosure class Temperature cycling	EPDM, PPS, PPA 40-GF		
	EPDM, PPS, PPA 40-GF IP44 (Not overmoulded IP20)		
Temperature cycling	EPDM, PPS, PPA 40-GF IP44 (Not overmoulded IP20) IEC 68-2-14		
Temperature cycling Vibration (non-destructive)	EPDM, PPS, PPA 40-GF IP44 (Not overmoulded IP20) IEC 68-2-14 20 - 2000 Hz, 10G, 4h		
Temperature cycling Vibration (non-destructive) Electromagnetic compatibility	EPDM, PPS, PPA 40-GF IP44 (Not overmoulded IP20) IEC 68-2-14 20 - 2000 Hz, 10G, 4h		

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.



Dimensions (in mm)

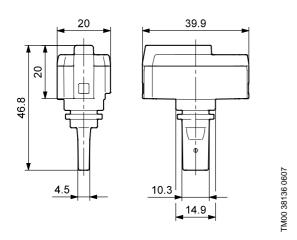


Fig. 2 Dimensional sketches of sensing element

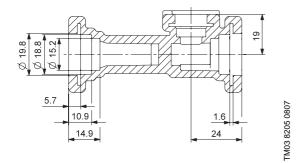


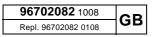
Fig. 3 Dimensional sketch of flow pipe

Type key

The sensor is labelled with a type designation.

	96xxxxxx	- XX	- XXX	XXXXX
Product number				
Revision				
Production year and week			_	
Consecutive number				-

For more information, see http://www.grundfos.com/directsensors.



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Electrical connections

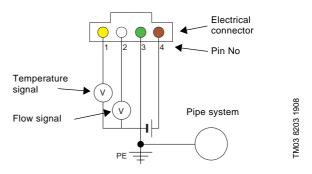


Fig. 4 Electrical connections

Pin	configuration	Colour
1	Temperature signal (0.5 to 3.5 V relative to pin 3)	Yellow
2	Flow signal (0.5 to 3.5 V relative to pin 3)	White
3	GND (0 V)	Green
4	Power supply (+5V DC), PELV	Brown

Power supply requirements

- 5 Vdc
- separated from hazardous live circuitry by double or reinforced insulation
- power limitation:150 VA; current limitation: 8 A.

Sensor output signals

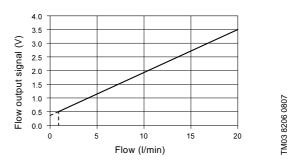


Fig. 5 Flow response

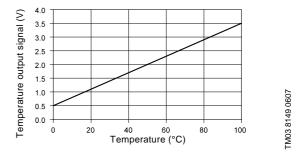


Fig. 6 Temperature response

Subject to alterations.

