Baumer
Passion for Sensors

Flow measurement

FlexFlow PF20S

Flow sensor for industrial applications

Product highlights

- Parallel measurement of flow and temperature
- Flow measurement independent of the mounting position
- Large measuring range up to 400 cm/s
- Measurement at high media temperatures up to 125 °C
- High pressure resistance up to 100 bar
- One-piece, compact measuring probe
- Calibrated linear analog outputs for flow and temperature
- IO-Link interface combined with analogue or switching output (programmable)

User benefits

- Reduced installation effort with only one process connection
- Easy mounting without sensor alignment
- One sensor for all applications
- Less disturbance of process
- Increased process stability by linear regulation
- High acceptance of process connections

Application examples

- Monitoring of cooling circuits
- Spray jet monitoring in cleaning machines
- Dry run protection of pumps

Technical data

Housing	
Style	▪ Compact transmitter
Overall size	▪ Refer to section “Dimensional drawings“
Material	▪ Stainless steel
Electrical connection	
Connector	▪ M12, 4-pin
Ambient conditions	
Operating temperature range	▪ -25 … 80 °C
Storage temperature range	▪ -25 … 80 °C
Humidity	▪ ≤ 100% RH, condensing
Degree of protection (EN 60529)	▪ IP67 ▪ IP68 (30 min., 1 mH2O) ▪ IP69K (with appropriate cable)
Vibration (sinusoidal) (EN 60068-2-6)	▪ 5 g (10 … 2000 Hz)
Shock (EN 60068-2-27)	▪ 30 g / 11 ms, 6 impulses per axis and direction
Process connection	
Connection variants	▪ Refer to section “Dimensional drawings“
Mounting position	▪ Any (top, bottom, side)
Wetted parts material	▪ AISI 316L (1.4404)
Surface roughness wetted parts	▪ Ra < 0.8 µm

Process conditions	
Process temperature	▪ -25 … 150 °C ▪ -25 … 125 °C (Flow measurement)
Process pressure	▪ Refer to section “Process conditions“
Power supply	
Voltage supply range	▪ 12 … 32 V DC (2 x 4 … 20 mA) ▪ 18 … 30 V DC (IO-Link)
Current consumption (no load)	▪ < 45 mA typ.
Reverse polarity protection	▪ Yes
Power-up time	▪ 10 s max.
Output signal	
Current output	▪ 4 … 20 mA
Voltage output	▪ 0 … 10 V
Output type	▪ PNP ▪ NPN ▪ Digital (push-pull)
Switching logic	▪ Normally open (NO) ▪ Normally closed (NC) ▪ Active high ▪ Active low
Current rating	▪ 100 mA max.
Short circuit protection	▪ Yes
Voltage drop switching output	▪ < 2 V
Residual current	▪ < 250 µA
Interface	▪ IO-Link 1.1

EN/20.08.18

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Technical data

Performance characteristics

Measuring range flow	▪ 10 … 400 cm/s
Max. measuring error	▪ ± 2 % (± 8 cm/s)
Down time at temperature step	▪ < 10 s
Measuring range temperature	▪ -25 … 150 °C
Max. measuring error	▪ ± 1 °C
Response time T90	▪ < 5 s

Factory settings

Output range	▪ 10 … 400 cm/s ▪ -25 … 150 °C

Compliance and approvals

EMC	▪ 2014/30/EU
EAC (Eurasian Comformity)	▪ EAC (TR CU 020/2011)

Process conditions

Process connection	BCID	Ordering key	Sensor length mm	Process pressure bar
Sealing cone M18x1.5	T44	T445	50	-1 … 100
Sealing cone M18x1.5	T44	T447	100	-1 … 100
Compression fitting Ø 6	T52	T527	100	-1 … 100
Compression fitting Ø 6	T52	T528	200	-1 … 100
G 1/2 A ISO 228-1 with cone	G08	G081	16.4	-1 … 100
G 1/2 A ISO 228-1 with cone	G08	G085	50	-1 … 100

Note:
Information on product characteristics may relate to defined product options.

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Field of application

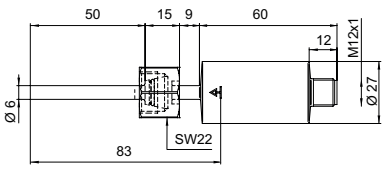
The FlexFlow sensor detects the flow rate of aqueous media (e. g. CIP cleaning agents, beverages, cooling agents without oil content, water-glycol mixtures and cooling emulsions) in contained systems. The sensor operates on the calorimetric principle and besides flow measurements will also detect the media temperature.Two variants are available, with either two analog outputs or one IO-Link interface and one configurable switching or analog output.

Measuring principle

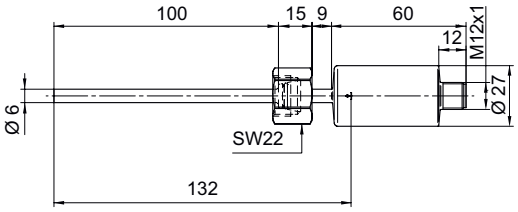
The sensor tip integrates both a temperature sensing and heating element warming up the tip at regular intervals. After the heating phase, the media-specific cooling behavior is identfied under consideration of temperature drop, reference temperature and the medium's heating capacity. The measured result is proportional to the flow rate of the medium. It is either provided at the analog output or may serve as switching ouput trigger.

Dimensional drawings

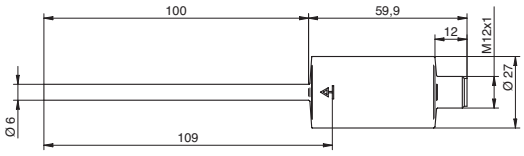
Process connection



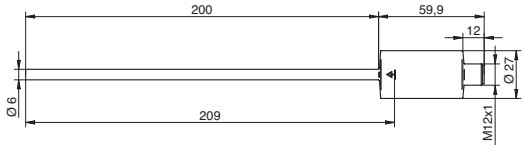
Sealing cone M18x1.5,
Sensor length 50 mm
T44-T445



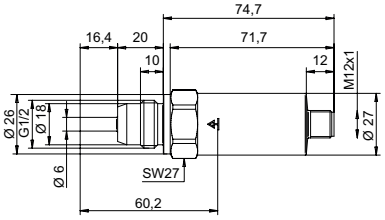
Sealing cone M18x1.5,
Sensor length 100 mm
T44-T447



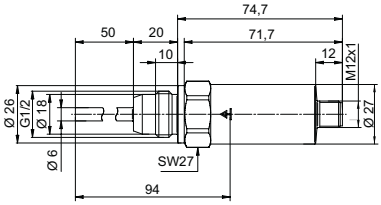
Compression fitting Ø 6,
Sensor length 100 mm
T52-T527



Compression fitting Ø 6,
Sensor length 200 mm
T52-T528



G 1/2 A ISO 228-1 with cone,
Sensor length 16.4 mm
G08-G081

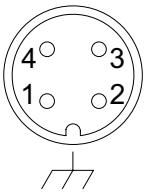


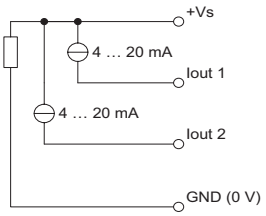
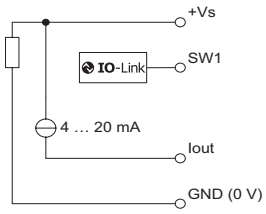
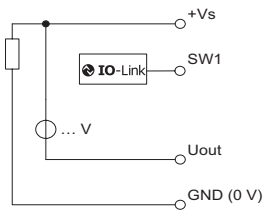
G 1/2 A ISO 228-1 with cone,
Sensor length 50 mm
G08-G085

Note:
Information in format AXX-X... relates to „Baumer Connection Identifier“ (BCID) and dedicated ordering code.

Electrical connection

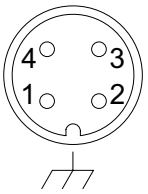
Pin assignment

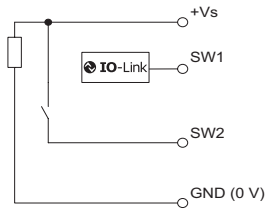
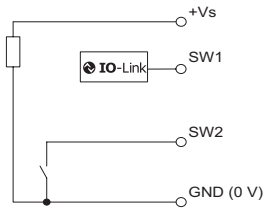
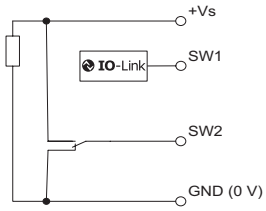


Output signal	Equivalent circuit	Function	M12-A, 4-pin, X04-000
Multi-parameter output 4 … 20 mA (3-wire) (flow) 4 … 20 mA (3-wire) (temperature)		+Vs Iout 1 (flow) Iout 2 (temperature) GND (0 V) Frame ground	1 2 4 3 Plug thread
Programmable output **Factory setting with IO-Link** IO-Link 4 … 20 mA (3-wire) (programmable)		+Vs SW1 (IO-Link) Iout GND (0 V) Frame ground	1 4 2 3 Plug thread
Programmable output **Configuration programmable by customer** IO-Link 0 … 10 V (programmable)		+Vs SW1 (IO-Link) Uout GND (0 V) Frame ground	1 4 2 3 Plug thread

Electrical connection

Pin assignment



Output signal	Equivalent circuit	Function	M12-A, 4-pin, X04-000
Programmable output Configuration programmable by customer IO-Link PNP (programmable)		+Vs	1
		SW1 (IO-Link)	4
		SW2	2
		GND (0 V)	3
		Frame ground	Plug thread
Programmable output Configuration programmable by customer IO-Link NPN (programmable)		+Vs	1
		SW1 (IO-Link)	4
		SW2	2
		GND (0 V)	3
		Frame ground	Plug thread
Programmable output Configuration programmable by customer IO-Link Digital (push-pull) (programmable)		+Vs	1
		SW1 (IO-Link)	4
		SW2	2
		GND (0 V)	3
		Frame ground	Plug thread

FlexFlow PF20S

Flow sensor for industrial applications

Ordering information

Ordering key

			PF20S	-	1	1	.	010	.	xxxx	2	x	.	x	-	0	xx	0	.	x
Product line																				
Flow sensor for industrial applications			PF20S																	
Version																				
Standard				1																
Housing																				
Stainless steel, AISI 316L (1.4404)					1															
Electrical connection		**BCID**																		
M12-A, 4-pin, stainless steel		X04						010												
Process connection	**Sensor length**	**BCID**																		
Sealing cone M18x1.5	50	T44								T445										
Sealing cone M18x1.5	100	T44								T447										
Compression fitting Ø 6	100	T52								T527										
Compression fitting Ø 6	200	T52								T528										
G 1/2 A ISO 228-1 with cone	16,4	G08								G081										
G 1/2 A ISO 228-1 with cone	50	G08								G085										
Wetted parts material																				
AISI 316L (1.4404)											2									
Gasket																				
Without [1]												0								
FKM (Viton®) [2]												3								
Output signal																				
Multi-parameter output, 2 x 4 … 20 mA (3-wire)													0							
Programmable output, IO-Link													1							
Explosion protection																				
Without															0					
Industrial approvals																				
Standard																00				
EAC																01				
Special approvals																				
Standard																		0		
Configuration																				
Factory settings																				0
Customer-specific																				1

[1] Available for “Process connection“ T527, T528, G081, G085. Not available for “Process connection“ T445, T447.
[2] Available for “Process connection“ T445, T447. Not available for “Process connection“ T527, T528, G081, G085.

Accessories

	Industrial weld-in sleeves for „Process connection“ G081, G085 (G 1/2 A ISO 228-1 with cone, BCID: G08)	
	Description	Ordering information
	**Universal use**	
	Ø 35 x 20, AISI 316L (1.4404)	ZPW1-121
	Ø 35 x 20, AISI 316L (1.4435)	ZPW1-131
	Industrial weld-in sleeves for „Process connection“ T445, T447 (Sealing cone M18x1.5, BCID: T44)	
	Description	Ordering information
	**Universal use**	
	Taper Ø 16, AISI 316Ti (1.4571))	ZPW1-E71
	Thread adapters for „Process connection“ T445, T447 (Sealing cone M18x1.5, BCID: T44)	
	Description	Ordering information
	**Industrial interfacing**	
	G 1/4 A ISO 228-1, AISI 316Ti (1.4571)	ZPI1-E7H
	G 1/2 A ISO 228-1, AISI 316Ti (1.4571)	ZPI1-E7A
	G 1 A ISO 228-1, AISI 316Ti (1.4571)	ZPI1-E7B
	Thread adapters for „Process connection“ T527, T528 (Compression fitting Ø 6, BCID: T52)	
	Description	Ordering information
	**Industrial interfacing**	
	G 1/4 A ISO 228-1, AISI 316Ti (1.4571)	ZPI1-C7H
	G 1/2 A ISO 228-1, AISI 316Ti (1.4571)	ZPI1-C7A
	Thread adapters for „Process connection“ T527, T528 (Compression fitting Ø 6, BCID: T52)	
	Description	Ordering information
	**Industrial interfacing**	
	G 1/4 A ISO 228-1, AISI 316Ti (1.4571)	ZPI1-D7H
	G 1/2 A ISO 228-1, AISI 316Ti (1.4571)	ZPI1-D7A

Accessories

Connectors with stainless steel knurl for demanding applications, protection up to IP69K (M12-A, 4-pin, BCID: X04)

	Description	Ordering information
	**Female connector straight with attached cable**	
	2 m, TPE	ESG 34AY0200
	5 m, TPE	ESG 34AY0500
	10 m, TPE	ESG 34AY1000
	25 m, TPE	ESG 34AY2500
	**Female connector angular with attached cable**	
	2 m, TPE	ESW 33AY0200
	5 m, TPE	ESW 33AY0500
	10 m, TPE	ESW 33AY1000
	25 m, TPE	ESW 33AY2500

Industrial connectors, protection up to IP67 (M12-A, 4-pin, BCID: X04)

	Description	Ordering information
	**Female connector straight with attached cable**	
	2 m, PUR	ESG 34AH0200
	5 m, PUR	ESG 34AH0500
	10 m, PUR	ESG 34AH1000
	**Female connector angular with attached cable**	
	2 m, PUR	ESW 33AH0200
	5 m, PUR	ESW 33AH0500
	10 m, PUR	ESW 33AH1000
	15 m, PUR	ESW 33AH1500
	20 m, PUR	ESW 33AH2000
	**Female connector straight with attached cable, shielded**	
	2 m, PUR	ESG 34AH0200G
	5 m, PUR	ESG 34AH0500G
	10 m, PUR	ESG 34AH1000G
	**Female connector angular with attached cable, shielded**	
	2 m, PUR	ESW 33AH0200G
	5 m, PUR	ESW 33AH0500G
	10 m, PUR	ESW 33AH1000G
	**Female connector straight with screw terminals**	
	PG7, PBT	ES 18A PG7
	**Female connector angular with screw terminals**	
	PG7, PBT	ES 14A PG7

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Accessories

	Interfaces	
	Description	Ordering information
	**T-junction** M12-A, 4-pin with signal extraction	T-junction 4-pol M12 signal extraction

	Interfaces	
	Description	Ordering information
	**USB IO-Link Master** Kit for sensor parameterization, including programming interface with USB, connecting cables and PC software	11048016