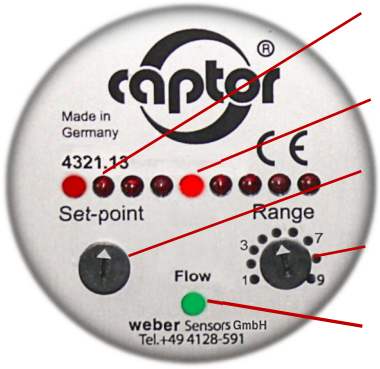
Flow switch for oil-based media

flow-captor 4321.1x/xx

The flow-captor type 4321.1x/xx is a flow monitor which is used in automation processes and other industrial applications where liquid media need to be monitored. The 432x-series offers “inline-models” that have been specially designed for installation in smaller pipe diameters. The sensor works according to the calorimetric measuring principle. The detection takes place inside the inline tube, whereby the sensor measures the flow velocity of the medium and converts it into an electrical signal.

- for small pipe sizes from OD6 up to OD28
- precise switching flow monitor with high accuracy even with very slow flows
- fully electronic
- analogue display of the flow condition and adjusted switch-point via LED chain
- separate adjustment of flow range and switching point
- no mechanically moved parts
- **ISO 9001:2015**

Control and display panel



LED chain for display of flow speed

Flashing LED for display of adjusted set-point

Potentiometer for set-point adjustment

Potentiometer for range adjustment from .3 to 3 m/s.

LED to indicate the switching status

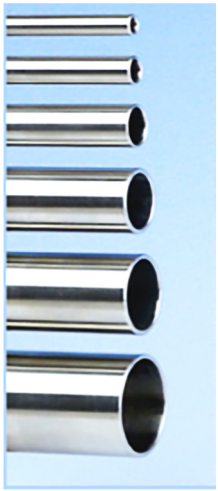
example of operation

Measuring range adjusted to 3 m/s = 100 % (9. LED)

Set-point adjusted to 50 % of end value (5. LED)

Flow speed equates 75 % (7. LED)

Green LED is **ON**:
Flow rate is above the adjusted set-point



The sensor tube

The sensor tube (length 200 mm) is made of stainless steel 316 and is an integral part of the inline flow-captor.

This series is available with sensor tubes in different sizes as 6 x 1, 8 x 1, 12 x 1, 18 x 1.5, 22 x 1.5 as well as 28 x 1.5 mm.

For aggressive media other material can be offered on request.

Free flow

The sensor element of the inline flow-captor is fitted to the out-side of the sensor tube. Since there is no element inside the tube, the sensor is non-intrusive to the flow. The robust housing is constructed of glass fibre reinforced PBTP (Ultradur ®). The electronics housing includes a full resin encapsulation.

Mechanical connection

Cutting ring couplings, to be ordered separately, have proven their value when mounting the sensor into pipe systems. By slightly tightening the swivel nut the v-shaped ring inside of the coupling cuts into the sensor tube wall and thus ensures a dense and reliable form closure.

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flow-captor 4321.1x/xx

Technical data						
Type	**4321.1x/xx**					
Medium	oil-based					
Sensor data						
Measuring range	0 - 30 cm/s to 0 - 300 cm/s, continuously adjustable *					
Flow volume at 300 cm/s related to tube inner diameter	8 x 1 mm 5,1 l/min	12 x 1 mm 14,1 l/min	18 x 1,5 mm 31,8 l/min	22 x 1,5 mm 51 l/min		
Measuring range	0 - 20 cm/s to 0 - 200 cm/s, cont. adjustable *					
Flow volume at 200 cm/s related to tube inner diameter	6 x 1 mm 1,5 l/min			28 x 1.5 mm 58.9 l/min		
Set-point range	approx. 15 % - 90 % of measuring range setting					
Medium temperature	-20 °C to +80 °C					
Ambient temperature	-20 °C to +70 °C					
Pressure	max. 30 bar (3000 kPa)					
Response time	2 sec. to 10 sec. (according to range setting)					
Linearity deviation	< 5 % *					
Repeatability	< 2 %					
Hysteresis	ca. 10 %					
Temperature drift	< 0.3 % K					
Mechanical data						
Protection rate	IP65					
Material housing	PBTP, glass fibre reinforced (Ultradur ®)					
Material inline tube	stainless steel 316 (other material on request)					
Torsion between pipe and housing	≤ 10 Nm ≤ 80 °C					
Pipe sizes OD x wall thickness	6 x 1 mm	8 x 1 mm	12 x 1 mm	18 x 1,5 mm	22 x 1,5 mm	28 x 1,5 mm
Electrical connection	Integrated plug connection with PG9 coupling, 2 m oilflex cable 3 x 0,5 mm²					
Sensor dimensions	see drawing on next page					
Electrical data						
Operating voltage	18 to 30 VDC, incl. residual ripple					
Current consumption	max. 150 mA (pulsed)					
Power consumption	approx. 1 W					
Switching current	≤ 400 mA					
Circuit protection	reverse polarity / short circuit / overload					
Voltage drop	< 2 V at max. load					
State of readiness	approx. 10 sec. after connection of power					

Electrical output	**.12**	**.13**
Switching condition with flow < switching point	energized, switched	currentless, not switched
LED	off	off
Switching condition with flow > switching point	currentless, not switched	energized, switched
LED	green	green

High temperature version		
Type	**432x.1x/xx S107**	
Medium temperature in relation to ambient temperature	Medium temperature max.	Ambient temperature max.
	130 °C	30 °C
	120 °C	40 °C
	110 °C	50 °C
	100 °C	60 °C
	90 °C	70 °C
	Medium temperature min.	Ambient temperature min.
	– 20 °C	– 20 °C
	– 30 °C	– 10 °C

* calibrated with insulation oil type "Shell Diala S4 ZX-I"

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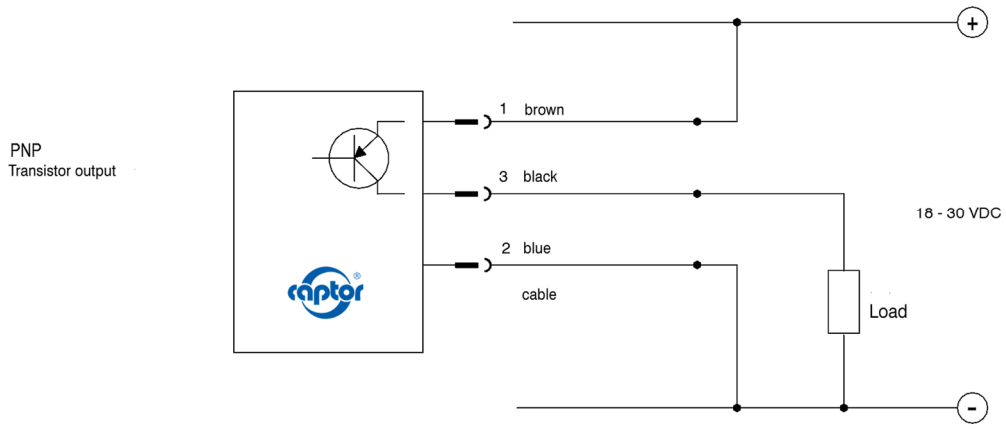
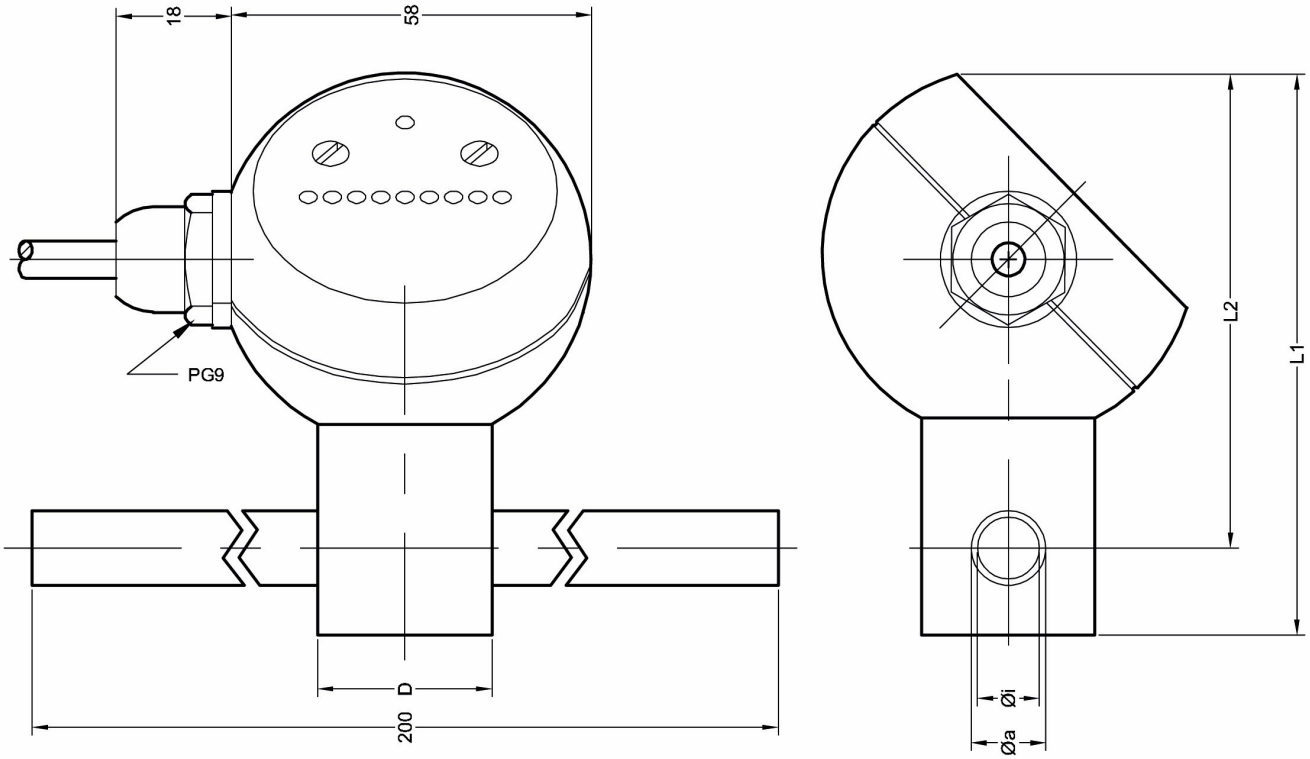
Connection diagram





Maße / dimensions in mm

da	di	L1	L2	D
6	4	84.5	71.5	30
8	6	85.5	72.5	30
12	10	88.5	74.5	30
18	15	94	77	30
22	19	99	82	30
28	25	96	74	38

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