



- \* compact, robust **flow switch/transmitter**
- \* possible combination with temperature switch or transmitter
- \* no movable parts in monitoring medium
- \* only a material in contact with media
- \* easy use
- \* very low pressure losses
- \* various sensing element lengths and designs
- \* fast reaction times for a calorimetric sensor
- \* infinitely rotatable cable outlet
- \* very low installation width;  
pipes requiring tight laying space are possible

**BENEFIT**

The **Flex-F flow sensor monitors liquid media**. In a compact design, it combines the installation sensing element and evaluation electronics that, according to the respective version, control a limit value output with a **PNP or NPN transistor output** or an **analogue output (4..20 mA or 0..10 V)** or both. The limit switch can alternatively be replaced by a frequency output.

The evaluation electronics record **two processing parameters: the flow speed of the medium and its temperature**. Both parameters can be assigned to the analogue output or the switching output.

The following output combinations are available:

flow		temperature	
analogue	switching output	analogue	switching output
•			
	•		
•	•		
•			•
	•	•	

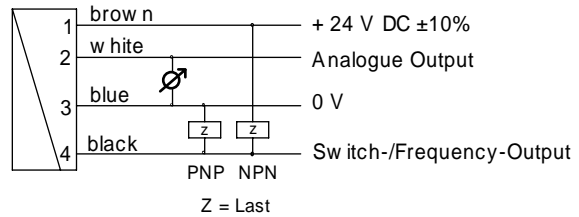
The analogue output can be designed as a 4..20 mA output or as a 0..10 V output.

The standard design of the switching output is as a limit switch (PNP or NPN). It can be ordered as a minimum switch or maximum switch. Alternatively, the switch is available as a frequency output.

For further options, see page 3

**TERMINAL ASSIGNMENT**

Before the electrical installation, make sure that the supply voltage corresponds to the data provided!



Please you use shielded cable, signal lines < 30m and power supply lines < 10m.

**MOUNTING**

To achieve the greatest possible sensitivity of the sensor (especial low flow speeds), the cross driven into the fastening nut must point towards the approaching flow. Seal the screw-in versions using sealing paste (e.g. LOCTITE 577).

During mounting, make sure that the front cylinder part is immersed completely in the flowing medium.

For further information, see the general description of calorimetric sensors.

A design with a bendable gooseneck between the sensing element of the sensor and the electronic housing is available to decouple the sensing element and the electronics thermally in case of media temperatures over 70°C.

**PROGRAMMING**

Designs with a limit switch have a magnetic contact by means of which the current measurement value can be assumed as a limit value. It is programmed by applying a magnet to the marking on the type plate for 0.5 to 2 seconds. If the contact time is too short or too long, no programming will take place (protection against magnetic fields). Immediately after programming, the switching output enters the OK state (LED on, output switched through, e.g. PNP = high or NPN = low).

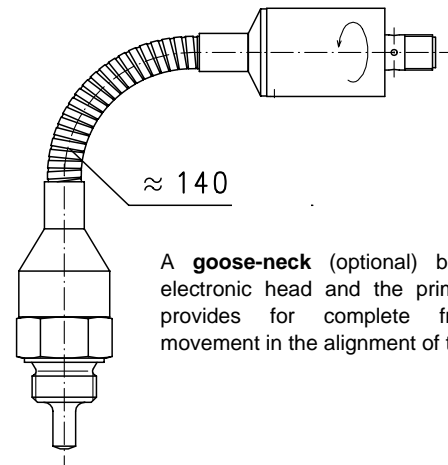
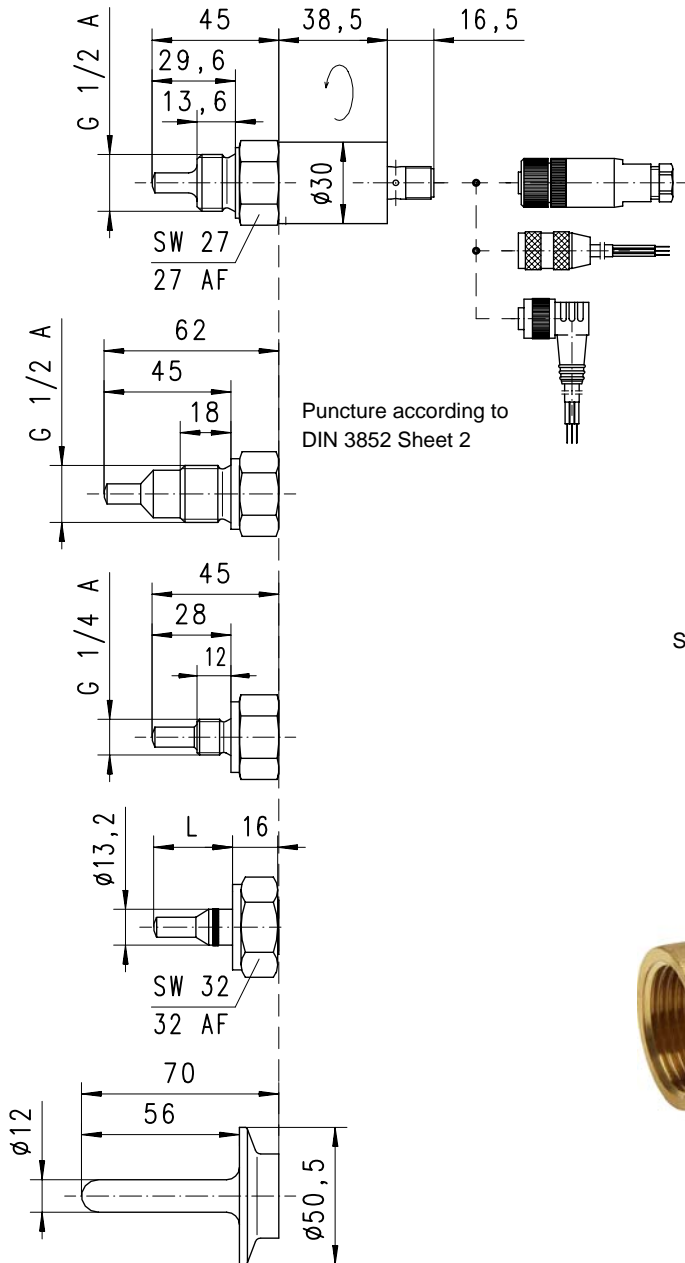


**TECHNICAL DATA**

<b>measurement range speed</b>	water <b>20-50 cm/s</b> (1-150) oil (on request) standard values shown bold
<b>accuracy</b>	±10% of final value, tested with 10xD for approach & exit distances with rising pipe (water medium)
<b>reproducibility</b>	±1%
<b>temperature gradient</b>	4°C/s
<b>measurement range temperature</b>	15..70°C (other temperature on request)
<b>storage temperature</b>	-20..80°C
<b>materials</b>	in contact with media: 1.4571 Other: 1.4305
<b>operating pressure</b>	max. 100 bar, optional: 200 bar
<b>operating temperature</b>	0..70°C (electronics)

<b>connection</b>	at locking plug M 12x1, 4-pole
<b>protection class</b>	IP 67
<b>weight</b>	approx. 200 g (standard design)
<b>supply voltage</b>	24 VDC ±10%
<b>power consumption</b>	max. 100mA
<b>switching output</b>	transistor output, PNP or NPN (short circuit proof/ reverse polarity protected) I <sub>out</sub> = 100mA max.
<b>switching hysteresis</b>	flow: 4% F.S. temperature: approx. 2°C
<b>display (only in case of switching output)</b>	yellow LED (ON = OK /OFF = alarm)
<b>adjustment</b>	Via magnet
<b>analogue output</b>	4..20 mA, max. load 500 Ohm or 0..10V, min load 1 kOhm

**DIMENSIONS**



A **goose-neck** (optional) between the electronic head and the primary sensor provides for complete freedom of movement in the alignment of the sensor.

System fastening with sleeve nut (width against flats of SW32) for system T-pieces (in brass or stainless steel)  
Pressure-resistant up to 25 bar  
L1= 48mm, for nominal widths G3/8 through G1/2  
L2= 54mm, for nominal widths G3/4 through G2  
See separate data sheet 71.1, "TS".



**NOMENCLATURE**

Example:

Flex-F 015 H K 029 I F P T R O  
A B C D E F G H I J K

<b>A</b> sensor family:	Flex-F calorimetric sensor	●
<b>B</b> connection size:		
008	G1/4	●
015	G1/2	●
013	system fastening Ø13.2	●
038	foodgrade flange, ISO 2852, Size 38	○
<b>C</b> type of connection:		
H	outer thread	●
T	for insertion into system T-piece	●
L	foodgrade flange	○
<b>D</b> material (in contact with media):		
K	stainless steel 1.4571	●
T	PTFE (Teflon)	○
<b>E</b> length of sensing element:		
028	28 mm (G1/4)	●
029	29.6 mm (G1/2)	●
045	45 mm (G1/2)	●
050	56 mm (foodgrade flange)	●
<b>F</b> analogue output:		
I	current output 4..20 mA	●
U	voltage output 0..10 V	●
K	no analogue output	●
<b>G</b> the analogue output is actuated by the following:		
F	flow	●
T	temperature	●
<b>H</b> switching output:		
P	switching output PNP	●
N	switching output NPN	●
M	switching output NPN (open collector)	○
K	no switching output	●
<b>I</b> the switching output is actuated by the following:		
F	flow	●
T	temperature	●
<b>J</b> switching signal:		
L	minimum switch	●
H	maximum switch	○
R	frequency output	●
K	no switching output	●
<b>K</b> inversion of output:		
O	standard output	●
I	inverted output	●

**Options:**

**special measurement range, flow:**  cm/s  
max. 300 cm/s (standard = 150 cm/s)

**special measurement range, temperature:**  °C  
maximum 120°C (standard = 70°C)

minimum -20°C (standard = 0°C)  °C

**special range - analogue output:**  cm/s  
<= meas. range (standard = meas. range) °C

**special range - frequency output:**  cm/s  
<= meas. range (standard = meas. range) °C

**end frequency (max. 2000 Hz)**  Hz

**turn-on delay (from alarm to OK)**  s

**turn-off delay (from OK to alarm)**  s

**power-on delay**  s  
(time after the supply is created; in this time the switching output is not activated)

**switching output with permanent setting**  cm/s  
°C

**special hysteresis**  %  
(standard = empirical value of 4%)

**goose-neck**   
(recommended for application temperatures over 70°C)

*In case of empty fields, the standard setting will be selected automatically.*

**ACCESSORIES**

**Locking plug M12x1**

K	PU-	02	S	G	S	basic type specification
K						● assembled
KB04						● self makable cable 4-pole
	PU-					● material PUR
		02				● length 2 m
		05				● length 5 m
		10				● length 10 m
			S			● moulded-on plug
				G		● straight plug
				W		● angled plug 90°
					S	● shielded



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable