# EFK2, EFKP/EFKM, LABO-F012-S, I, U, F, C, FLEX-F, FLEX-FIN, OMNI-F, OMNI-FIN

### Калориметрические датчики потока

### **GHM MESSTECHNIK**



### Технические характеристики

Архангельск (8182)63-90-72 Иваново (4932)77-34-06 Липецк (4742)52-20-81 Пенза (8412)22-31-16 Ставрополь (8652)20-65-13 Астана (7172)727-132 Сургут (3462)77-98-35 Ижевск (3412)26-03-58 Магнитогорск (3519)55-03-13 Пермь (342)205-81-47 Москва (495)268-04-70 Иркутск (395)279-98-46 Тверь (4822)63-31-35 Астрахань (8512)99-46-04 Ростов-на-Дону (863)308-18-15 Мурманск (8152)59-64-93 Рязань (4912)46-61-64 Томск (3822)98-41-53 Барнаул (3852)73-04-60 Казань (843)206-01-48 Калининград (4012)72-03-81 Набережные Челны (8552)20-53-41 Самара (846)206-03-16 Тула (4872)74-02-29 Белгород (4722)40-23-64 Калуга (4842)92-23-67 Санкт-Петербург (812)309-46-40 Тюмень (3452)66-21-18 Нижний Новгород (831)429-08-12 Брянск (4832)59-03-52 Ульяновск (8422)24-23-59 Новокузнецк (3843)20-46-81 Саратов (845)249-38-78 Владивосток (423)249-28-31 Кемерово (3842)65-04-62 Yda (347)229-48-12 Новосибирск (383)227-86-73 Севастополь (8692)22-31-93 Киров (8332)68-02-04 Волгоград (844)278-03-48 Хабаровск (4212)92-98-04 Вологда (8172)26-41-59 Краснодар (861)203-40-90 Омск (3812)21-46-40 Симферополь (3652)67-13-56 Челябинск (351)202-03-61 Воронеж (473)204-51-73 Красноярск (391)204-63-61 Орел (4862)44-53-42 Смоленск (4812)29-41-54 Череповец (8202)49-02-64 Екатеринбург (343)384-55-89 Курск (4712)77-13-04 Оренбург (3532)37-68-04 Сочи (862)225-72-31 Ярославль (4852)69-52-93

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### Calorimetric Flow Switch EFK2



- Very small installation width, therefore very narrow pipework is possible
- Mo moving parts in the medium being monitored
- Installation largely independent of nominal width

#### **Characteristics**

The EFK2 flow switch controls the flow speed of fluid media. Its compact form combines the built-in sensor, a two-colour LED status display, and a switching point which can be set using a potentiometer; it has push-pull or relay output. A flexible gooseneck can be installed between the sensor and the electronics housing, so that the best possible view of the flow switch display is provided even in awkward installation locations.

#### **Technical data**

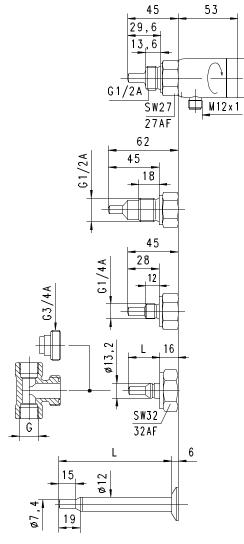
Sensor	calorimetric measurement principle
Process	screw-in thread G <sup>1</sup> / <sub>4</sub> AG <sup>1</sup> / <sub>2</sub> A,
connection	push-in sensor Ø12 mm
Metering range	water 2150 cm/s or 3300 cm/s
	oil available on request
Measurement	±10 % of full scale value
accuracy	
Dynamics	13 seconds in water
Pressure	PN 100 bar optionally PN 200 bar
resistance	
Media	070 °C
temperature	
Ambient	-20+70 °C
temperature	
Temperature	4 K/s
gradient	
Supply voltage	24 V DC / AC ±10 %
Current	max. 70 mA
consumption	
Switching output	galvanically separated relay contact or
	"push-pull" transistor output (resistant to
	short circuits and reversal polarity protected)
Output loading	2 A / 30 V DC/AC max. for relay,
	100 mA / 24 V max. for transistor output
Display	red / green LED
A .11	(red < limit value, green > limit value)
Adjustment potentiometer	as input
Electrical	for round plug connector M1041 A
connection	for round plug connector M12x1, 4-pole
Resistant to short	yes
circuits	

#### **Sensors and Instrumentation**

ø35

Reversal polarity protected	yes
Ingress protection	IP 65
Materials medium-contact	1.4571
Materials, non- medium-contact	1.4305
Weight	approx. 0.3 kg
Conformity	CE

#### Dimensions



#### **Gooseneck option**



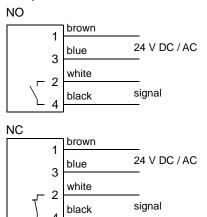
A gooseneck (optional) between the electronics head and the primary sensor provides complete freedom in the orientation and reading direction of the sensor.

#### Product Information Wiring

Push-pull (Z-Load)

#### PNP brown 1 + black 4 output blue 0 V 3 NPN brown 1 black 4 output blue 0 V 3

#### **Relay contact**



The switching outputs are self-configuring, depending on whether they are connected as PNP or NPN switches.

#### Handling and operation

#### Installation

Installation must be such that the flow impinges on the marking (X) on the sensor. For sensors with screw-in threads, PTFE tape or sealing paste can be used for the seal. The installation location should be selected so that reproducible flow conditions are achieved (sufficient run-in length, wherever possible no valves, kinks, bends, etc directly ahead of the sensor. A sieve just upstream of the sensor may have a beneficial effect on reproducibility.

#### Operation

The flow is raised to the limit value, and the switching point is determined by turning the potentiometer to the point where the LED just switches from red to green (teaching).

LED red: Flow rate < Limit value

LED green: Flow rate > Limit value

#### Sensors and Instrumentation

Orderin	g co	ae					
	1.	2.	3.	4.	5.	6.	
EFK2 -			Κ			S	

O=Option

1.	Connection size			
	008	connection G <sup>1</sup> / <sub>4</sub> A		
	015	connection G <sup>1</sup> / <sub>2</sub> A		
	013	system fastener Ø13.2		
	012	push-in sensor Ø12	2	
2.	Process co	nection		
	Н	male thread	•	
	т	for insertion into the T-piece	e system	
	V	push-in sensor with insertion depth	variable	
3.	Connection	material		
	К	stainless steel 1.45	571 • •	
4.	Sensor			
	028		28.0 mm	
	029	sensor length	29.6 mm •	
	045 O		45.0 mm •	
	031	sensor for T-piece	G <sup>3</sup> / <sub>8</sub> G <sup>1</sup> / <sub>2</sub>	
	037	sensor for t-piece	G <sup>3</sup> / <sub>4</sub> G 2	
	050		50 mm 🔸	
	070		70 mm •	
	100	insertion sensor	100 mm •	
	150		150 mm •	
	200		200 mm •	
5.	Switching o	utput		
	0	relay contact NO (normally open / open when there is no flow)		
	С	relay contact NC (normally closed / closed when there is no flow)		
	Т	push-pull output		
6.	Electrical co	onnection		
	S	for round plug conn	ector M12x1, 4-pole	
7.	Optional			
	H Q	model with gooseneck		

#### Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- made-up cable
- T-pieces for system connection Ø13.2
- Weld-on adapter for insertion sensor Ø12
- Compression fitting for insertion sensor Ø12 Flange for insertion sensor Ø12

#### **Product Information**

### Flow Switch EFKP / EFKM



- Flow and temperature monitoring
- Moving parts in the medium being monitored
- Installation largely independent of nominal width

#### **Characteristics**

The flow switch EFKP / EFKM monitors the flow rate and optionally the temperature of fluid media. Its compact form combines the builtin sensor, an LED trend display (for FLOW) with two-colour status display, and a switching point which can be set using a potentiometer; it has PNP or NPN output. A temperature limit can also optionally be set and monitored using a PNP or NPN output. In addition, a flexible gooseneck can be installed between the sensor and the electronics housing, so that the best possible angle of view of the flow switch display is provided even in awkward installation locations.

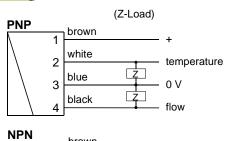
#### **Technical data**

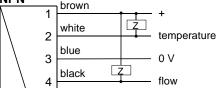
Sensor	calorimetric measurement principle
Process connection	screw-in thread G <sup>1</sup> / <sub>4</sub> AG <sup>1</sup> / <sub>2</sub> A, push-in sensor Ø12 mm
Metering range	water 2150 cm/s or 3300 cm/s oil available on request
Pressure resistance	PN 100 bar optionally PN 200 bar
Medium temperature	0+70 °C
Ambient temperature	-20+70 °C
Storage temperature	-20+80 °C
Temperature gradient	4 K/s
Display	9 LEDs (red = limit value, green 1-8 = flow rate minmax.)
Adjustment potentiometer	as input
Supply voltage	24 V DC ±10 %
Current consumption	80 mA

#### **Sensors and Instrumentation**

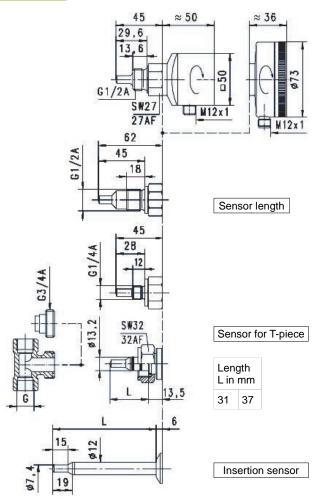
Output	PNP or NPN (Relais on request)
Output loading	200 mA max.
Electrical connection	for round plug connector M12x1, 4-pole
short circuit proof	yes
Reverse polarity protected	yes
Ingress protection	IP 60 plastic head IP 67 metal head
Materials medium-contact	1.4571
Materials, non- medium-contact	CW614N plated PA6.6 (only EFKP)
Weight	0.35 kg (EFKP-015HK028PS) 0.60 kg (EFKM-015HK028PS)
Conformity	CE

#### Wiring





#### Dimensions



#### **Gooseneck option**

A gooseneck (optional) between the electronics head and the primary sensor provides complete freedom in the orientation and reading direction of the sensor.

#### Handling and operation

#### Installation

Installation must be such that the flow impinges on the marking (X) on the sensor. For sensors with screw-in threads, PTFE tape or sealing paste can be used for the seal. The installation location should be selected so that reproducible flow conditions are achieved (sufficient run-in length, wherever possible no valves, kinks, bends, etc directly ahead of the sensor). A sieve just upstream of the sensor may have a beneficial effect on reproducibility.

#### **Sensors and Instrumentation**

#### Benefits of EFKM:

- robust metal housingIngress protection IP 67
- transparent mineral glass cover
- Optionally, opaque metal cover

-

#### Ordering code



### O=Option

1.	Function				
	Р	plastic head / flow			
	PT	plastic head / flow and	plastic head / flow and temperature		
	М	metal head / flow			
	MT	metal head / flow and	temperature		
2.	Connecti	n size			
	800	DN 8 - G 1/4 A			
	015	DN 15 - G 1/2 A			
	013	system fastener Ø13.2	2		
	012	push-in sensor Ø12			
3.	Process	connection			
	Н	male thread	• •		
	Т	for insertion into the sy			
	V	push-in sensor with va insertion depth			
4.	Connecti	on material			
	К	stainless steel 1.4571 • • •			
5.	Sensor le	ngth			
	028		28.0 mm •		
	029	sensor length	29.6 mm •		
	045 O		45.0 mm •		
	031	sensor for T-piece	G <sup>3</sup> / <sub>8</sub> G <sup>1</sup> / <sub>2</sub>		
	037		G <sup>3</sup> / <sub>4</sub> G 2		
	050		50 mm •		
	070		70 mm •		
	100	insertion sensor	100 mm •		
	150		150 mm •		
	200		200 mm •		
6.		ching output			
	Р	PNP			
	N	NPN			
		Relais			
7.		connection			
_	S	for round plug connect	tor M12x1, 4-pole		
8.	Optional				
	H O	model with gooseneck	-		

#### Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- T-pieces for system connection Ø13.2
- Weld-on adapter for insertion sensor Ø12
- Compression fitting for insertion sensor Ø12
- Flange for insertion sensor Ø12

Technical data

#### **Product Information**

## Flow Switch LABO-F012-S



- Complete flow switch in 12 mm housing
- Can be used for various tubing cross-sections
- Configurable switching point via plug pin (teaching)
   Simple to use
- Same form available for flow transmitter, temperature switch / transmitter or level switch

#### Characteristics

The sensors of the LABO-F012 family are used for monitoring non-viscous fluids (for oil or gases on request). They come complete with electronics, and are supplied installed inside a compact sensor housing of 12 mm diameter and with M12x1 round plug outlet. The 16-bit processor carries out temperature compensation and linearisation of the calorimetric signal (measurement of the heat removal at the sensor tip by the flowing medium; for this see also the general description for calorimetry).

The electronics of the LABO-F012-S are a flexibly configurable limit switch.

The switching value can be set by the user via teaching (see Handling and Operation). All other values have been preset at the factory, but can be modified by the user with the aid of the optionally available ECI-1 interface and a PC.

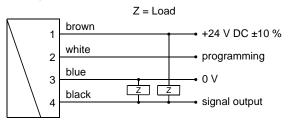
The adjustable parameters are:

- Switching value
- Hysteresis
- Minimum/maximum monitoring
- Switching delay
- Switchback delay
- Power-On delay
- Teach-offset

#### **Sensors and Instrumentation**

Technical data	
Sensor	calorimetric measurement principle
Process connection	push-in sensor Ø12 mm
Switching range	water 2150 cm/s or 3300 cm/s oil or gases available on request
Measurement accuracy	dependent on the installation location and flow conditions typically $\pm 10$ % of full scale value or 2 cm/s, of full scale value measured in the T-piece $\pm 5$ %
Repeatability	±1 %
Start-up time	10 sec. after application of the operating voltage
Response time	13 s
Pressure resistance	Stainless steel compression PN 40 bar fitting Plastic cone with union nut PN 10 bar
M a allo una	-20+ 70 °C
Medium temperature	-20+100 °C (extended temperature range)
Ambient temperature	0+60 °C
Temperature dependency	± 0.01 % / 1 K
Temperature gradient	4 K/s
Materials medium-contact	Housing 1.4571
Materials non- medium-contact	Plug PA6.6 gold-plated contacts
Supply voltage	24 V DC ±10 % (controlled)
Power consumption	< 2 W
LED	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)
Electrical connection	for round plug connector M12x1, 4-pole
Ingress protection	IP 67
Weight	approx. 0.05 kg (excluding screwed connection)
Conformity	CE

#### Wiring

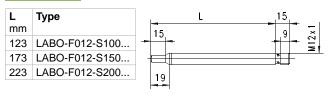


Connection example: PNP NPN

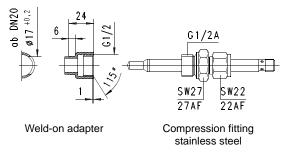


The use of shielded cabling is recommended.

#### Dimensions



#### **Optional accessories**



#### Handling and operation

#### Installation

There are various installation options available:

The stainless steel compression fitting is screwed into a G  $\frac{1}{2}$  threaded drilling. For this, a G  $\frac{1}{2}$  welded-on nozzle is also available. When a suitable seal is used, this arrangement can take pressures up to 10 bar. The stainless steel threaded connection is first tightened by hand, and then by  $\frac{1}{4}$  of a turn, using a spanner. The connection ring of the threaded connection can then no longer be removed from the sensor, and the immersion depth can therefore not be changed further.

The plastic cone is fitted to the separately available welded-on nozzle intended for this purpose, or to a suitable T-piece, using the union nut provided (available in brass or stainless steel). The union nut must be tightened to a torque of 20 Nm. It is possible to loosen the connection again, and so the immersion depth can be changed. This arrangement is suitable for pressures up to 10 bar.

When installing, it should also be noted that the sensors are directional (comply with the marking on the housing). The reduction of the sensor must be at  $1/_{3..}1/_{2}$  depth of the pipe diameter.

Avoid bubbles or deposits on the sensor. It is therefore best to install at the side.







#### Sensors and Instrumentation

#### **Operation and programming**

The switching value can be set by the user by means of teaching. For this, proceed as follows:

- The flow which is to be set is applied to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

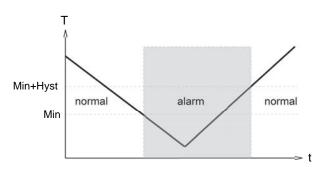
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

To avoid the need to transit to an undesired operating status for the purpose of teaching, the device can be provided ex-works with a teach-offset. The teach-offset point is added to the currently measured value before saving.

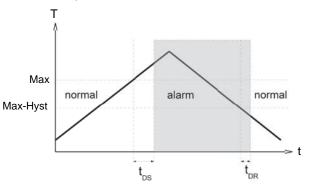
Example: The switching value is to be set to 80 cm/s, because at this flow rate a critical process status is to be notified. However, only 60 cm/s can be achieved without danger. In this case, the device would be ordered with a teach-offset of +20 cm/s. At 60 cm in the process, a switching value of 80 cm would then be stored during "teaching".

The LABO-F012-S limit switch can be used to monitor minimal or maximal.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



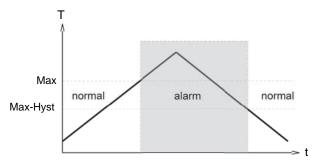
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



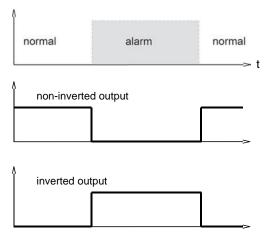


A changeover delay time  $(t_{\text{DS}})$  can be applied to switching to the alarm state. Equally, one switch-back delay time (tDR) of several can be applied to switching back to the normal state.

In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.



In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

#### Sensors and Instrumentation

7.

**Ordering code** 

2. 3. 4. 1. 5. 6.

LABO-F012 - S K	
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O=Option

1.	Switching output (Limit switch)	
	S	push-pull (compatible with PNP and NPN)
2.	Sensor leng	jth L
	100	123 mm
	150	173 mm
	200	223 mm
3.	Sensor mat	erial
	К	stainless steel 1.4571
4.	Programmi	ng
	N	cannot be programmed (no teaching)
	P O	programmable (teaching possible)
5.	Switching f	unction
	L	minimum switch
	Н	maximum switch
6.	Switching signal	
	0	standard
	I 0	inverted
7.	Optional	
	н о	extended temperature range

#### Options

<b>Switching delay period</b> (0.099.9 s) (from Normal to Alarm)	. S
<b>Switch-back delay period</b> (0.099.9 s) (from Alarm to Normal)	. S
<b>Power-On delay period</b> (099 s) (after connecting the supply, time during which the switching output is not activated)	S
Switching output fixed at	cm/s
<b>Switching hysteresis</b> Standard = 2 % of the metering range	%
<b>Teach-offset</b> (in percent of the metering range) <i>Standard</i> = 0 %	%

#### Accessories

- Cable/round plug connector (KB...) .
- see additional information "Accessories"
- ECI-1 device configurator (USB programming adapter)
- Weld-on adapter . Compression fitting
- Flange



#### **Product Information**

### Flow Transmitter LABO-F012-I / U / F / C



- Complete transmitter in 12 mm housing
- For various nominal tubing widths, the same transmitter
- Signal proportional to the flow speed
- 4..20 mA or 0..10 V or frequency output
- Adjustable working range
- User-configurable via plug pin (teaching)
- Can be used for various tubing cross-sections
- Very simple to use

#### **Characteristics**

The sensors of the LABO-F012 family are used for monitoring non-viscous fluids (for oil or gases on request). They come complete with electronics, and are supplied installed inside a compact sensor housing of 12 mm diameter and with M12x1 round plug outlet. The 16-bit processor carries out temperature compensation and linearisation of the calorimetric signal (measurement of the heat removal at the sensor tip by the flowing medium).

The LABO-F012 electronics transmit the result as:

- Analog 0/4...20 mA signal (LABO-F012-I)
- Analog 0/2..10 V signal (LABO-F012-U)
- Frequency signal (LABO-F012-F) or
- Pulse output, pulse / x litres (LABO-F012-C)

A model with switching output is available under designation LABO-F012-S.

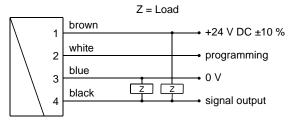
If desired, the range end value can be set to the currently existing flow using "teaching".

If the transmitter is ordered in a specific T-piece, it can also be adjusted in l/min. Here, it should be noted that the flow speed is measured at only one point in the tubing cross-section.

#### Sensors and Instrumentation

Technical data		
Sensor	calorimetric measurement principle	
Process connection	push-in sensor Ø12 mm	
Metering range	water 2150 cm/s or 3300 cm/s oil or gases available on request	
Measurement accuracy	depending on the installation location and flow conditions typically $\pm 10$ % of full scale value or 2 cm/s, of full scale value measured in the T-piece $\pm 5$ %	
Repeatability	±1 %	
Pressure resistance	stainless steel compression PN 40 bar fitting	
	plastic cone with union nut PN 10 bar	
Medium temperature	-20+70 °C -20+100 °C ( extended temperature range)	
Ambient temperature	0+60 °C	
Temperature dependency	±0.01 % / K	
Supply voltage	24 V DC ±10 % (controlled)	
Power consumption	< 2 W	
Analog output	420 mA / load max. 500 Ohm or 010 V / min. load 1 kOhm	
Frequency output	selectable, max. 2 kHz.	
Pulse output	selectable pulse per volume, details of Nominal pipework width required, pulse width 50 ms	
LED	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 67	
Materials medium-contact	Housing 1.4571	
Materials non- medium-contact	Plug PA6.6 gold-plated contacts	
Weight	approx. 0.05 kg (excluding screwed connection)	
Conformity	CE	

#### Wiring



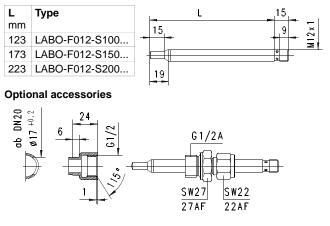
Connection example: PNP NPN



The use of shielded cabling is recommended.



#### Dimensions



Weld-on adapter

Compression fitting stainless steel

#### Handling and operation

#### Installation

There are various installation options available:

The stainless steel compression fitting s screwed into a G  $\frac{1}{2}$  threaded drilling. For this, a G  $\frac{1}{2}$  welded-on nozzle is also available. When a suitable seal is used, this arrangement can take pressures up to 10 bar. The stainless steel threaded connection is first tightened by hand, and then by  $\frac{1}{4}$  of a turn, using a spanner. The connection ring of the threaded connection can then no longer be removed from the sensor, and the immersion depth can therefore not be changed further!

The plastic cone is fitted to the separately available welded-on nozzle intended for this purpose, or to a suitable T-piece, using the union nut provided (available in brass or stainless steel). The union nut must be tightened to a torque of 20 Nm. It is possible to loosen the connection again, and so the immersion depth can be changed. This arrangement is suitable for pressures up to 10 bar.

When installing, it should also be noted that the sensors are directional (comply with the marking on the housing). The reduction of the sensor must be at  $1/_{3..}1/_{2}$  depth of the pipe diameter.



Avoid bubbles or deposits on the sensor. It is therefore best to install at the side.

Marking X Flow



#### Sensors and Instrumentation

#### Programming

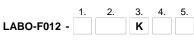
If desired, the metering range endpoint can be set by the user by means of teaching.

- For this, proceed as follows:
- Apply the flow rate end range to the device
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

The devices have a yellow LED which flashes during the programming pulse. During operation, the LED acts as a display for the operating voltage.

**Note:** Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed. See also programming options by PC for all parameters and for adjustment (accessory).

#### **Ordering code**



**O**=Option

1.	Electrical output				
	1	current output 420 mA			
	U	voltage output 010 V			
	F	frequency output			
	С	pulse output (x litre/ pulse relative to nominal pipework width, see "Option")			
2.	Sensor length L				
	100	123 mm			
	150	173 mm			
	200	223 mm			
3.	Sensor mat	erial			
	К	stainless steel 1.4571			
4.	Programmi	ng			
	N	cannot be programmed (no teaching)			
	P O	programmable (teaching possible)			
5.	Optional				
	н о	extended temperature range			



**Sensors and Instrumentation** 

#### **Product Information**

#### **Required ordering information**

#### For LABO-F012-F:

Output frequency at full scale Maximum value: 2,000 Hz

#### For LABO-F012-C:

For LABO-F012-C, the volume must be stated (with numerical value and unit) which will correspond to one pulse. Because the adjustment depends on the inner diameter of the piping, this model is supplied only with a T-piece (which must be ordered separately).

#### Volume per pulse (numerical value)

Volume per pulse (unit)

#### Options

**Special range for analog output:** <= Metering range (Standard=Metering

range) Special range for frequency output:

<= Metering range (Standard=Metering
range)</pre>

Power-On delay period (0..99 s)

(time after applying power during which the outputs are not activated or set to defined values)

Further options available on request

#### Accessories

- Cable/round plug connector (KB...) see additional information "Accessories"
- Device configurator ECI-1
- Weld-on adapter
- Compression fitting
- flange

Hz

cm/s

cm/s

s

• External display OMNI-TA or OMNI Remote

### Flow Transmitter / Switch FLEX-F



- Compact robust flow switch / transmitter
- Combination with temperature switch or transmitter possible
- Mo moving parts in the medium being monitored
- Only one medium-contact material
- Simple to use
- Very low pressure loss
- Various sensor lengths and models
- Short response times for a calorimetric sensor
- Cable outlet infinitely rotatable
- Small installation width, therefore very narrow pipework

#### Characteristics

The FLEX-F flow sensor monitors fluid media. Its compact form combines the built-in sensor and converter / counter which, depending on the model, trigger a limit value output (push-pull, compatible with PNP and NPN) or an analog output (4..20 mA or 0..10 V) or both. The limit switch can optionally also be operated as frequency output.

The converter / counter record two process parameters: the flow speed of the medium and its temperature. Both parameters can be assigned to the analog output or to the switching output. The following output combinations are available:

Flo	w	Temper	ature
Analog output	Switching output	Analog output	Switching output
•			
	•		
•	•		
•			٠
	•	•	

The switching output can be ordered as a minimum or a maximum switch.

## HONSBERG

#### **Sensors and Instrumentation**

#### **Technical data**

Sensorcalorimetric measurement principleProcessscrew-in thread G ¼AG ¼AG ¼AGconnectionPush-in sensor Ø12 mmMetering rangewater 2.150 cm/s or 3300 cm/s oil available on requestMeasurement accuracydepending on the installation location and flow conditions typically ±10 % of full scale value or 2 cm/s, measured in the T-piece ±5 % of full scale valueRepeatability±1 %Operating pressurePN 100 bar, 200 bar available on requestMetering range pressure0+70 °C (high temperature model 0+70 °C with gooseneck)Operating presture0+70 °CStorage gradient-20+80 °CMaterials, non- medium-contactSensor1.4571Naterials medium-contactMaterials, non- medium-contactSensorAdjustmentby means of magnetSupply voltage24 V DC ±10 %Current requirementmax. 100 mASwitching output hour apid flashing = Programming)Analog output output420 mA / Load 500 Ohm max. or 010 VElectrical connectionfor round plug connector M12x1, 4-poleMaterials repressionFrogramming)Analog output hysteresis420 mA / Load 500 Ohm max. or 010 VElectrical connectionfor round plug connector M12x1, 4-poleMaterials repressionFrogramming)Analog output connection420 mA / Load 500 Ohm max. or 010 VElectrical connectionfor round plug connector M12x1, 4-pole					
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Analog output       420 mA / Load 500 Ohm max. or 010 V         Electrical connection       for round plug connector M12x1, 4-pole         Weight       approx. 0.2 kg (standard version)         Ingress protection       IP 67	Display				
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	Weight	approx. 0.2 kg (standard ve	ersion)		
Conformity CE	Ingress protection	IP 67			
	Conformity	CE			

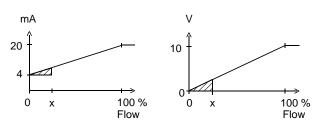
#### Product Information

#### Signal output curves

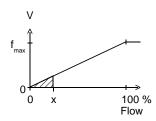
Value x = Begin of the specified range

Current output

Voltage output



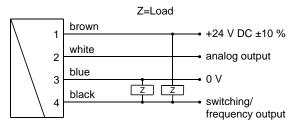
Frequency output



 $f_{\text{max}}$  selectable in the range of up to 2000 Hz

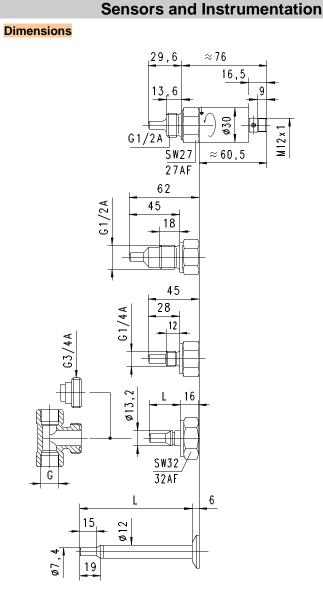
Other characters on request.

#### Wiring



Connection example: PNP NPN





#### **Gooseneck option**

A gooseneck (optional) between the electronics head and the primary sensor provides complete freedom in the orientation and reading direction of the sensor.

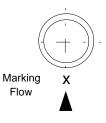
#### Handling and operation

#### Installation

Before the electrical installation, it must be ensured that the supply voltage corresponds with the data sheet.

In order to ensure the sensor's maximum insensitivity to interference, the flow should run from bottom to top (best degassing even at the slowest flow speed).

Screw-in sensors are to be sealed using Teflon tape, so that the inwards flow is directed to the incised cross. This is the position at which measurement is undertaken in the factory, and which guarantees the best results. The sensor must be screwed in using its hexagonal spanner only.



There are various options for installing the 12 mm push-in sensors (OMNI-F012):

The stainless steel crimp screw jointis screwed into a G  $^{1}/_{2}$  threaded drilling. For this, a G  $^{1}/_{2}$  welded-on nozzle is also available. When a suitable seal is used, this arrangement can take pressures up to 40 bar. The stainless steel threaded connection is first tightened by hand, and then by  $^{1}/_{4}$  of a turn, using a spanner. The connection ring of the threaded connection can then no longer be removed from the sensor, and the immersion depth can therefore not be changed further.

The plastic cone is fitted to the separately available welded-on nozzle intended for this purpose, or to a suitable T-piece, using the union nut provided (available in brass or stainless steel). The union nut must be tightened to a torque of 20 Nm. It is possible to loosen the connection again, and so the immersion depth can be changed. This arrangement is suitable for pressures up to 10 bar.

When installing the push-in sensors, it should also be noted that the sensors are directional (comply with the marking on the housing).

For all types of installation, the reduction of the sensor tip must lie completely in the open flow cross-section, wherever possible at a depth of  $1/_3$ .. $1/_2$  of the pipe diameter.

Run-in and run-out sections of 10 x D should be provided.

#### Programming

The electronics contain a magnetic contact, with the aid of which different parameters can be programmed. Programming takes place when a magnet clip is applied for a period between 0.5 and 2 seconds to the marking located on the label. If the contact time is longer or shorter than this, no programming takes place (protection against external magnetic fields).





#### Sensors and Instrumentation

After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.

The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

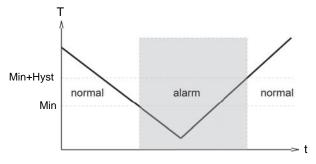
In order to avoid the need to transit to an undesired operating status during "teaching", the device can be provided ex-works with a "teach-offset". The "teach-offset" value is added to the currently measured value before saving (or is subtracted if a negative value is entered).

Example: The switching value is to be set to 70 % of the metering range, because at this flow rate a critical process status is to be notified. However, only 50% can be achieved without danger. In this case, the device would be ordered with a "teach-offset" of +20 %. At 50 % in the process, a switching value of 70 % would then be stored during "teaching".

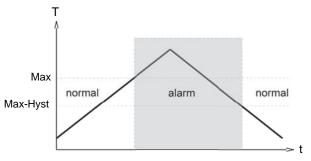
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

The limit switch can be used to monitor minimal or maximal.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



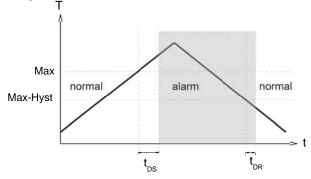
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



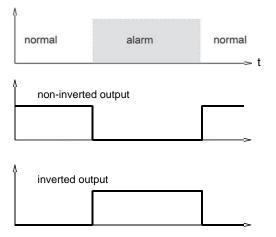


A switchover delay time  $(t_{\text{DS}})$  can be applied to the switchover to the alarm state. Equally, one switch-back delay time  $(t_{\text{DR}})$  of several can be applied to switching back to the normal state.

In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.



In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

#### **Sensors and Instrumentation**

#### **Ordering code**

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
FLEX-F			Κ							

O=Option

1.	Connection size						
	008 connection G <sup>1</sup> / <sub>4</sub> A						
	015	connection G <sup>1</sup> / <sub>2</sub> A					
	013	system fastener Ø1	3.2				
	012	push-in sensor Ø12	2				
2.	Process co	nnection					
	Н	male thread	•				
	т	for insertion into the T-piece	e system				
	V	push-in sensor with insertion depth	variable •				
3.	Connection	material					
	К	stainless steel 1.45	571 • • •				
4.	Sensor						
	028		28.0 mm				
	029	sensor length	29.6 mm •				
	045 O		45.0 mm •				
	031	concor for T picco	G <sup>3</sup> / <sub>8</sub> G <sup>1</sup> / <sub>2</sub>				
	037	sensor for T-piece	G <sup>3</sup> / <sub>4</sub> G 2				
	050		50 mm 🔸				
	070		70 mm 🔸				
	100	insertion sensor	100 mm •				
	150		150 mm 🔹				
	200	_	200 mm •				
5.	Unit for ana	log output					
	F	flow rate to analog	output				
	T O	temperature to ana	log output				
6.	Analog output						
	1	current output 420	) mA				
	U O	Voltage output 010	0 V				
7.	Switching c	•					
	Т	switching output pu					
	M O	switching output NF	PN (open collector)				
8.	Measurement parameter to switching output						
	F	flow to switching ou					
		temperature to swit	ching output				
9.	Function fo	r switching output					
	L	minimum switch					
	Н	maximum switch					
		frequency output					
10.	Switching o						
	0	standard output					
	I 0	inverted output					

Options

Н	0	N	5	B	
INE	<b>STR</b>	UM	IEN	ITS	

#### **Sensors and Instrumentation**

Special measuring range for flow: Max. 300 cm/s (standard = 150 cm/s)	cm/s
<b>Special measuring range for temperature:</b> Maximum 120 °C (standard = 70 °C)	٥°
Minimum -20 °C (standard = 0 °C)	°C
Special range for analog output: <= Metering range (standard = metering range)	cm/s °C
Special range for frequency output: <= Metering range (Standard = Metering range)	cm/s °C
End frequency (max. 2000 Hz)	Hz
Switching delay (from Normal to Alarm)	. S
Switchback delay (from Alarm to Normal)	S .
<b>Power-On delay (099 s)</b> (time after power on, during which the outputs are not actuated)	S
Switching output fixed	cm/s °C
Special hysteresis (standard = 4 % EW)	%
Gooseneck (recommended at operating temperatures	

operating temp above 70 °C)

If the field is not completed, the standard setting is selected automatically.

#### Accessories

- Device configurator ECI-1
- T-pieces for system connection Ø13.2
- Weld-on adapter for insertion sensor Ø12 •
- Compression fitting for insertion sensor Ø12
- Flange for insertion sensor Ø12
  Cable/round plug connector (KB...) see additional information "Accessories"



### Flow Transmitter / Switch FLEX-FIN



- Flow switch / transmitter for small flows
- Combination with temperature switch or transmitter possible
- No moving parts in the medium being measured
- Only one medium-contact material
- Simple to use
- Low pressure loss
- Various nominal widths
- Short response times for a calorimetric sensor
- Linearised and temperature compensated
- Simultaneous measurement of flow and temperature is possible

#### **Characteristics**

The FLEX-FIN flow sensor monitors fluid media. Its compact form combines the measurement tube and converter / counter which, depending on the model, trigger an adjustable limit value with transistor output or an analog output (4..20 mA or 0..10 V) or both. In addition, the limit switch can alternatively be replaced by a frequency output or a Pulse output.

The converter / counter record two process parameters: the flow speed of the medium and its temperature. Both parameters can be assigned to the analog output or to the switching output.

The following output combinations are available:

FI	ow	Tempe	rature
Analog	Switching output	Analog	Switching output
•			
	•		
•	•		
•			•
	•	•	

The switching output is a "push-pull" transistor output and provides PNP and NPN inputs equally. It can be offered as a minimum switch or a maximum switch, or as a frequency output or a Pulse output.

#### **Sensors and Instrumentation**

#### **Technical data**

0	
Sensor	calorimetric measurement principle
Nominal widths	DN 610
Process	smooth tube for crimp connector or hose
connection	connection
Metering ranges (for water)	6 mm tube: (0.001) 0.012 l/min 8 mm tube: 0.0255 l/min 10 mm tube: 0.0510 l/min
	Special ranges available on request
Measurement accuracy	$\pm 3$ % of the measured value (H <sub>2</sub> O dist.)
Repeatability	$\pm 1$ % of the measured value (H <sub>2</sub> O dist.)
Temperature gradient	4 K/s
Pressure resistance	PN 10 bar
Medium temperature	0+70 °C (-20+100 °C available on request)
Operating temperature	-20+70 °C (electronics)
Storage temperature	-20+80 °C
Pressure loss	max. 0.3 bar at max. flow
Supply voltage	24 V DC ±10 %
Current consumption	max. 100 mA
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I <sub>out</sub> = 100 mA max.
Switching hysteresis	flow 1 % of full scale value Temperature: approx. 1 °C
Pulse output	pulse width 50 ms
	$\rightarrow$ max. output frequency < 20 Hz
Display (only with switching output)	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)
Adjustment	by means of magnet
Analog output	420 mA / Load 500 Ohm max. or 010 V / Load min. 1 kOhm
Ingress protection	IP 65
Electrical connection	for round plug connector M12x1, 4-pole
Materials medium-contact	stainless steel 1.4571
Materials, non- medium-contact	PPS, PA6.6, CW614N
Weight	approx. 0.2 kg
Conformity	CE

Sensors and Instrumentation

#### **Product Information**

#### Signal output curves

Current output

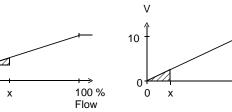
mΑ

20

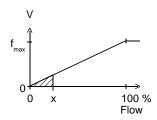
4

0





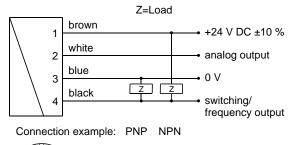
Frequency output



 $f_{\text{max}}$  selectable in the range of up to 2000 Hz

Other characters on request.

#### Wiring





Before the electrical installation, it must be ensured that the supply voltage corresponds with the data sheet.

It is recommended to use shielded wiring.

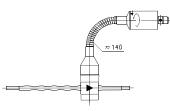
## 

**Gooseneck option** 

Dimensions

100 %

Flow



A gooseneck (optional) between the electronics head and the primary sensor provides freedom in the orientation of the sensor.

#### Handling and operation

#### Installation

In order to ensure the sensor's maximum insensitivity to interference, the flow should run from bottom to top (best degassing even at the slowest flow speed). Standard crimp connectors, hoses with crush protection, or the crimp connectors provided by HONSBERG can be used for the connection.

The insulation hoses offer the best possible insulation against the surroundings, and must therefore not be removed.

There is a marking on the rear of the housing. The sensor should be fixed there using a sheet metal screw. The penetration depth of the screw must not exceed 5 mm.

The piping must not be bent or deformed.

When testing, use only hoses, because the transmitter can no longer be returned if the connection pieces have been crimped.

#### Programming

The electronics contain a magnetic contact, with the aid of which different parameters can be programmed. Programming takes place when a magnet clip is applied for a period between 0.5 and 2 seconds to the marking located on the label. If the contact time is longer or shorter than this, no programming takes place (protection against external magnetic fields).





After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.

The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.

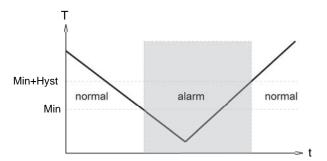
In order to avoid the need to transit to an undesired operating status during "teaching", the device can be provided ex-works with a "teach-offset". The "teach-offset" value is added to the currently measured value before saving (or is subtracted if a negative value is entered).

Example: The switching value is to be set to 70 % of the metering range, because at this flow rate a critical process status is to be notified. However, only 50% can be achieved without danger. In this case, the device would be ordered with a "teach-offset" of +20 %. At 50 % in the process, a switching value of 70 % would then be stored during "teaching".

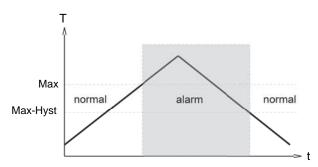
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

The limit switch can be used to monitor minimal or maximal.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



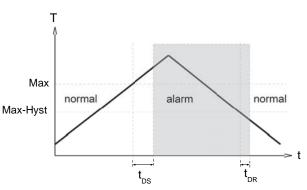
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



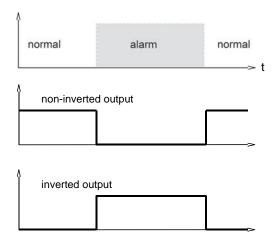
#### Sensors and Instrumentation

A switchover delay time ( $t_{DS}$ ) can be applied to the switchover to the alarm state. Equally, one switch-back delay time ( $t_{DR}$ ) of several can be applied to switching back to the normal state.

In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.



In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.



Ord	ering code	•	
FLE	1. EX-FIN	2. 3. 4. 5. <b>R</b>	6. 7. 8. 9.
<b>)=0</b>	ption		
1.	Connection	size	
	006	tube Ø	6 mm
	008	in mm / 0.5 mm	8 mm
	010	wall thickness	10 mm
2.	Process con	nnection	
	R	tube	
3.	Connection	material	
	К	stainless steel 1.4	571
	Н О	Hastelloy®	
4.	Unit for ana	log output	
	F	flow rate to analog	output
	Т	temperature to ana	alog output
5.	Analog outp	out	
	1	current output 42	
	U	voltage output 01	0 V
6.	Switching o	utput	
	Т	switching output p	•
	Μ		PN (open collector)
7.		nt parameter to sw	• •
	F	flow to switching o	
	Т	temperature to sw	• •
8.		r switching output	
	L	minimum switch	
		maximum switch	
	R	frequency output	
_	С	Pulse output	
9.	Switching o	•	
	0	standard output	
	1	inverted output	

#### **Required ordering information**

#### For FLEX-FIN-C:

For the pulse output version, the volume (with numerical value and unit) which will correspond to one pulse must be stated.

Volume per pulse (numerical value)

Volume per pulse (unit)

#### **Sensors and Instrumentation**

#### Options

Special measuring range for flow: Metering range start value	,			l/n
Metering range end value	,			l/r
Filter time (standard = 0.5 s) Possible values:				S
OFF/0.2/0.5/1/2/4/8/16/32 s.				
Special measuring range for temperature:				
Maximum 100 °C (standard = 70 °C)				°C
Minimum -20 °C (standard = 0 °C)				°C
Special range for analog output: <= Metering range (standard =				cr
metering range)				°C
Special range for frequency output:				
<= Metering range (standard = Metering range)				°C
End frequency (max. 2000 Hz)				H:
Switching delay				S
(from Normal to Alarm)				
Switchback delay			-	S
(from Alarm to Normal)				
Power-On delay (099 s)				S
(time after power on, during which the outputs are not actuated)				
Switching output fixed				cn °C
Special hysteresis				%
(standard = 1 % of full scale value)				
Gooseneck				
If the field is not completed, the s automatically.	tandard	setting	is s	selec
Accessories				

- Crimp connector
- Connector / made-up cable
- Device configurator ECI-1
- Cable/round plug connector (KB...) see additional information "Accessories"

### Flow Transmitter / Switch OMNI-F



- Flow indicator for industrial use, without moving parts
- Short response times for a calorimetric sensor
- · Medium comes into contact with only one material
- Analog output 4..20 mA or 0..10 V
- Two programmable switches (push-pull)
- Graphical LCD display, backlit
- (transreflective), can be read in sunlight and in the darkProgrammable parameters via rotatable,
- removable ring (programming protection)
  Full metal housing with non-scratch, chemically
- resistant glass
- Rotatable electronic head for best reading position
- Small, compact construction
  Simple installation

#### Characteristics

The calorimetric sensor measures the flow speed in aqueous fluids. The display shows the measured value in a range from 0..100 % as a digital value and as a bar graph. The measured value is output as a 0/4..20 mA value. Both the 0/4 mA and the 20 mA value can be programmed via a scaling of the display range, and so the sensor can be adapted to any flow speed lying within the overall range.

Measurement is supported in terms of temperature compensation and signal processing (linearistion, interpolation, amplification) by the use of a microcontroller.

Because a conclusion on the whole cross-section is drawn based on a point measurement in a pipe, the accuracy achievable is not so good as with a flow sensor in a permanently installed tube (OMNI-FIN or FLEX-FIN).

By turning the programming ring to right or left, it is simple to modify the parameters (e.g. switching point, hysteresis...). To protect from unintended programming, it can be removed, turned through 180 °, and replaced, or completely removed, thus acting as a key.





#### Sensors and Instrumentation

#### OPTION C:

Preset Counter with external reset option, complementary switching outputs and actual value display.

#### **OPTION C1:**

Instantaneous value display with analogue output, pulse-volume output and totalizer

#### **Technical data**

Sensor	calorimetric mea	surement principle	
Process	screw-in thread G <sup>1</sup> / <sub>4</sub> AG <sup>1</sup> / <sub>2</sub> A,		
connection	push-in sensor Ø12 mm		
Metering range	water 2150 cm/s range, 3300 cm/s available on request oil (available on request)		
Measurement accuracy	dependent on the installation location and flow conditions typically $\pm 10$ % of full scale value or 2 cm/s, of full scale value measured in the T-piece $\pm 5$ %		
Repeatability	±1 %		
Dynamics	in water (25 °C) at average flow speed of approx. 1-2 s		
Hysteresis	adjustable, position of hysteresis depends on min. or max. switching value		
Pressure resistance	PN 100 bar (PN 200 bar available on request)		
Medium temperature	0+70 °C		
Ambient temperature	-20+70 °C		
Storage temperature	-20+80 °C		
Materials medium-contact	stainless steel 1.4571		
Materials non-medium- contact	Housing Glass Magnet Ring	Stainless steel 1.4305 Mineral glass, hardened Samarium-Cobalt POM	
Supply voltage	24 V DC ±10 %		
Analog output	0/420 mA or 0/2	210 V	
Power consumption	< 1 W		
Switching outputs S1 and S2	transistor output "push-pull" (resistant to short circuits and polarity reversal) l <sub>out</sub> = 100 mA max. per output		
Display	backlit graphical LCD-Display (transreflective), extended temperature range -20+70 °C, 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with simultaneous message on the display.		
Electrical connection	for round plug connector M12x1, 5-pole		
Ingress protection	IP 67		
Weight	approx. 0.25 kg		
Conformity	CE	CE	

## IM

**Sensors and Instrumentation** 

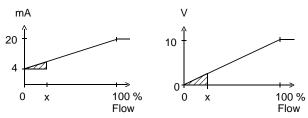
#### **Product Information**

#### Signal output curves

Value x = Begin of the specified range = not specified range

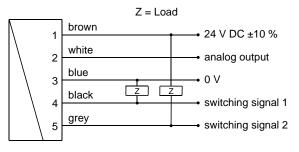
Current output

Voltage output



Other characters on request.

#### Wiring



Connection example: PNP NPN



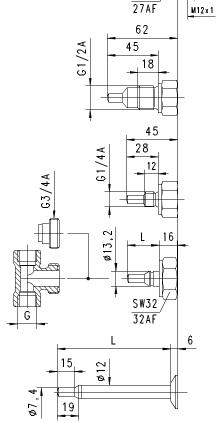
connector M12x1

See separate wiring at C and C1 option in the separate descriptions.

Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

The use of shielded cabling is recommended.

#### Dimensions 53 45 29,6 G1/2A 6 13 ø35 Ø45 SW27 Ð



#### **Gooseneck option**



A gooseneck (optional) between the electronics head and the provides primary sensor complete freedom the in orientation and reading direction of the sensor.

#### Handling and operation

#### Installation

In order to ensure the sensor's maximum insensitivity to interference, the flow should run from bottom to top (best degassing even at the slowest flow speed).

Screw-in sensors are to be sealed using Teflon tape, so that the inwards flow is directed to the incised cross. This is the position at which measurement is undertaken in the factory, and which guarantees the best results. The sensor must be screwed in using its hexagonal spanner only.

A gooseneck (optional)

between the electronics head and the primary sensor provides freedom in the alignment and reading direction of the sensor. This option simultaneously provides thermal decoupling between the two units

There are various options for installing the 12 mm push-in sensors (OMNI-F012):

The stainless steel compression fittingis screwed into a G 1/2 threaded drilling. For this, a G  $\frac{1}{2}$  welded-on nozzle is also available. When a suitable seal is used, this arrangement can take pressures up to 40 bar. The stainless steel threaded connection is first tightened by hand, and then by  $\frac{1}{4}$  of a turn, using a spanner. The connection ring of the threaded connection can then no longer be removed from the sensor, and the immersion depth can therefore not be changed further.

The plastic cone is fitted to the separately available welded-on nozzle intended for this purpose, or to a suitable T-piece, using the union nut provided (available in brass or stainless steel). The union nut must be tightened to a torque of 20 Nm. It is possible to loosen the connection again, and so the immersion depth can be changed. This arrangement is suitable for pressures up to 10 bar.

When installing the push-in sensors, it should also be noted that the sensors are directional (comply with the marking on the housing).

For all types of installation, the reduction of the sensor tip must lie completely in the open flow cross-section, wherever possible at a depth of  $\frac{1}{3}$ ... $\frac{1}{2}$  of the pipe diameter. Run-in and run-out sections of 10 x D should be provided.

After installation, the OMNI head can be aligned in the best reading position, thanks to its rotatability.

#### Programming

The annular gap of the programming ring can be turned to positions 1 and 2. The following actions are possible:



= continue (STEP) = modify (PROG)

Neutral position between 1 and 2

The ring can be removed to act as a key, or turned through 180 ° and replaced to create a programming protector.

Operation is by dialog with the display messages, which makes its use very simple.

Starting from the normal display (currently measured value with unit), if 1 (STEP) is repeatedly selected, then the display shows the following information in this order:

#### Display of the parameters, using position 1

- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristic of S1
- (MIN = monitoring of minimum value, hysteresis greater than switching value.
- MAX = monitoring of maximum value, hysteresis less than



#### Sensors and Instrumentation

switching value)

- Hysteresis 1 (hysteresis value of S1 in the set unit)
- Switching value S2
- Switching characteristic of S2
- Hysteresis 2
- Code:
- After entering the code 111, further parameters can be defined:
- . Filter (settling time of the display and output)
- Units: e.g. I/min or %
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (flow rate corresponding to 0/4 mA)
- 20 mA (flow rate corresponding to 20 mA) •

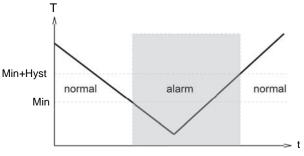
#### Edit, using position 2

If the currently visible parameter is to be modified:

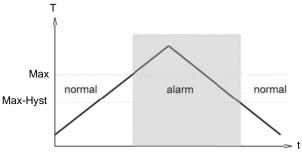
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the next digit is reached.
- Leave the parameter by turning to position 1 (until the cursor leaves the row); this accepts the modification.
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.

The limit switches S1 and S2 can be used to monitor minimal or maximal.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



The change to the alarm state is indicated by the integrated red LED and a cleartext in the display.

While in the normal state the switching outputs are at the level of the supply voltage; in the alarm state they are at 0 V, so that a wire break would also display as an alarm state at the signal receiver.

#### **Overload display**

Overload of the switching output is detected, indicated on the



display ("Check S 1 / S 2"), and the switching output is switched off.

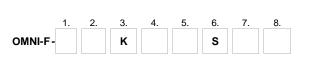
#### Simulation mode

To simplify commissioning, the sensor supports a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26.0 mA at the output (without modifying the process variable). This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning. This is mode is accessed by means of **Code 311**.

#### **Factory settings**

After modifying the configuration parameters, it is possible to reset them to the factory settings at any time using **Code 989**.

#### Ordering code



#### O=Option

1.	Connection	size			
	008	connection G <sup>1</sup> / <sub>4</sub> A			
	015	connection G <sup>1</sup> / <sub>2</sub> A			
	013	system fastener Ø13.2			
	012	push-in sensor Ø12			
2.	Process co	inection			
	Н	male thread			
	т	for insertion into the system T-piece			
	V	push-in sensor with variable insertion depth			
3.	Connection	material			
	К	stainless steel 1.4571 • • •			
4.	Sensor				
	028		28.0 mm		
	029	sensor length	29.6 mm •		
	045 O	-	45.0 mm •		
	031	sensor for T-piece	G <sup>3</sup> / <sub>8</sub> G <sup>1</sup> / <sub>2</sub>		
	037		G <sup>3</sup> / <sub>4</sub> G 2		
	050		L=73 •		
	070		L=93 •		
	100	sensor length L	L=123 •		
	150		L=173 •		
	200		L=223 •		
5.	Analog output				
	1	Current output 0/4.	Current output 0/420 mA		
	U <b>O</b>	Voltage output 0/210 V			
	К	without			
6.	Electrical co	nnection			
	S	for round plug conn	for round plug connector M12x1, 5-pole		
7.	Options 1				
	Н О	model with gooseneck			
8.	Options 2				
	C 0	counter C			
	C1 O	counter C1			

#### **Sensors and Instrumentation**

#### Options

**Counter C** (hardware and software option): Preset Counter with external reset option, complementary switching outputs and actual value display (modified wiring diagram!)

Counter C1 (software option):

Instantaneous value display with analogue output, pulse-volume output and totalizer

#### Accessories

- ECI-1 device configurator (USB programming adapter)
- Cable / round plug connector (KB...)
- see additional information "Accessories"
- T-pieces for system connection Ø13.2
- Weld-on adapter for insertion sensor Ø12
- Compression fitting for insertion sensor Ø12
- Flange for insertion sensor Ø12

### Flow Transmitter / Switch OMNI-FIN



- For foodstuffs use
- Analog output 0/4..20 mA or 0/2..10 V
- Two programmable switches (push-pull)
- Graphical LCD display, backlit
- (transreflective), can be read in sunlight and in the darkProgrammable parameters via rotatable,
- removable ring (programming protection)
   Full metal housing with non-scratch, chemically resistant glass
- Physical unit in the display (selectable)
- Rotatable electronic head for best reading position
- Connection to USB interface for setting parameters

#### **Characteristics**

The OMNI-FIN calorimetric sensor measures small fluid flows, and has been designed specially for use in the foodstuffs industry (for the measurement principle, see also "General description: calorimetric sensors").

The integrated transducer has a backlit graphics LCD display which is very easy to read both in the dark and in bright sunlight. The graphics display allows the presentation of measured values and parameters in a clearly understandable form. The measured values are displayed to 4 places, together with their physical unit, which may also be modified by the user. The electronics have an analog output (4..20 mA or 0..10 V) and two switching outputs, which can be used as limit switches for monitoring minimal or maximal, or as two-point controllers. The switching outputs are designed as pushpull drivers, and can therefore be used both as PNP and NPN outputs. Exceeding limit values is signalled by a red LED which is visible over a long distance, and by a cleartext in the display. The stainless steel case has a hardened non-scratch mineral glass pane. It is operated by a programming ring fitted with a magnet, so there is no need to open the operating controls housing, and its leakproofness is permanently ensured.

By turning the ring to right or left, it is simple to modify the parameters (e.g. switching point, hysteresis...). To protect from unintended programming, it can be removed, turned through 180 ° and replaced, or completely removed, thus acting as a key.



## HONSBERG

#### **Sensors and Instrumentation**

#### **OPTION C:**

Preset Counter with external reset option, complementary switching outputs and actual value display.

#### **OPTION C1:**

Instantaneous value display with analogue output, pulse-volume output and totalizer

#### **Technical data**

Sensorcalorimetric measurement principleNominal widthsDN 6.10Processsmooth tube for crimp connector or hoseconnection6 mm tube(for water)6 mm tube8 mm tube0.0255 l/min10 mm tube0.0255 l/min10 mm tube0.0255 l/minaccuracy±3 % of the measured value (H <sub>2</sub> O dist.)Repeatability±1 % of the measured value (H <sub>2</sub> O dist.)Temperature4 K/sgradient10 sec. after application of operating voltageResponse timein water (25 °C) at average Flow speed of approx. 1-2 sec.Pressure resistancePN 10 barMedia temperature0+100 °COptionally with spacer: 130 °C, 45 minutes max.Ambient temperature-20+70 °CStorage temperature-20+80 °CSupply voltage24 V DC ±10 %Analog output out_2.10 VPower consumption<1 WSwitching outputstransistor output "push-pull", compatible with PNP and NPN, (resistant to short circuits, and reversal polarity protected) lout = 100 mA max.Hysteresis depends on minimum or maximum switching valueSackilt graphical LCD-Display (transreflective), extended temperature range-2070 °C, 32 x 16 pixels, background illumination, displays value and unit, flashing LED signal lamp with simultaneous message on the display.Ingress protection Materials medium-contactFor round plug connector M12x1, 5-poleNon-medium- contact Ring:POMWeightapprox. 0.25 kgC	Technical Uala			
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0/210 VPower consumption< 1 W	Supply voltage	24 V DC ±10 %		
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medium-contact       Housing:       stainless steel 1.4305         Non-medium- contact materials       Housing:       stainless steel 1.4305         Glass:       mineral glass, hardened         Magnet:       samarium-Cobalt         Ring:       POM         Weight       approx. 0.25 kg		for round plug connector M12x1, 5-pole		
contact materials       Glass:       mineral glass, hardened         Magnet:       samarium-Cobalt         Ring:       POM         Weight       approx. 0.25 kg		stainless steel 1.4571		
Magnet:     samarium-Cobalt       Ring:     POM       Weight     approx. 0.25 kg		Ŭ		
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Weight approx. 0.25 kg		0		
Conformity CE				
	Conformity	CE		

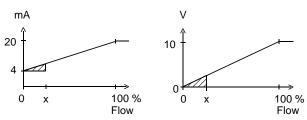
#### Sensors and Instrumentation

#### **Product Information**

#### Signal output curves

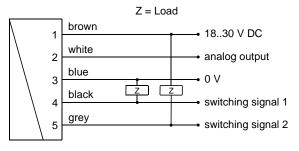
Current output

Voltage output



Other characters on request.

#### Wiring



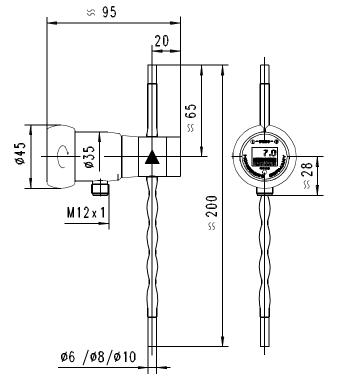
Connection example: PNP NPN



connector M12x1

See separate wiring at C and C1 option in the separate descriptions.

Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet. The use of shielded cabling is recommended.



A spacer between the electronics head and the medium-contact measurement tube provides thermal decoupling between the two units. The media temperature may be raised for 45 min. to 130 °C.

#### Handling and operation

#### Installation

Dimensions

In order to ensure the sensor's maximum insensitivity to interference, the flow should run from bottom to top (best degassing even at the slowest flow speed). Standard crimp connectors, hoses with crush protection, or the crimp connectors provided by HONSBERG can be used for the connection.

The insulation hoses provide the best possible insulation from the environment, and should therefore not be removed.

It must be ensured that the calming section with the static mixer is not kinked.

#### Programming

The annular gap of the programming ring can be turned to positions 1 and 2. The following actions are possible:



Set to 1 = continue (STEP) Set to 2 = modify (PROG)

Neutral position between 1 and 2

The ring can be removed to act as a key, or turned through 180  $^\circ$  and replaced to create a programming protector.

Sensors and Instrumentation

#### **Product Information**

Operation is by dialog with the display messages, which makes its use very simple.

Starting from the normal display (present value and unit), if 1 (STEP) is repeatedly selected, then the display shows the following information in this order:

#### Display of the parameters, using position 1

- Switching value S1 (switching point 1 in the selected unit)
- Switching characteristic of S1 MIN = Monitoring of minimum value
- MAX = Monitoring of maximum value Hysteresis 1 (hysteresis value of S1 in the set
- unit)Switching value S2
- Switching value 32
   Switching characteristic of S2
- Hysteresis 2
- Code
- After entering the **code 111**, further parameters can be defined:
- Filter (settling time of the display and output)
- Physical unit (Units)
- Output: 0..20 mA or 4..20 mA
- 0/4 mA (measured value corresponding to 0/4 mA)
- 20 mA (measured value corresponding to 20 mA)

For models with a voltage output, replace 20 mA accordingly with 10 V.

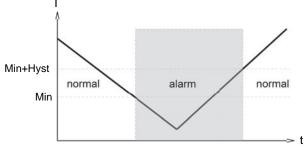
#### Edit, using position 2

If the currently visible parameter is to be modified:

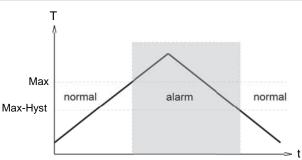
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the cursor moves to the next digit.
- Leave the parameter by turning to position 1 (until the cursor leaves the row); this accepts the modification.
- If there is no action within 30 seconds, the device returns to the normal display range without accepting the modification.

The limit switches S1 and S2 can be used to monitor minimal or maximal.

With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



The change to the alarm state is indicated by the integrated red LED and a cleartext in the display.

While in the normal state the switching outputs are at the level of the supply voltage; in the alarm state they are at 0 V, so that a wire break would also display an alarm state at the signal receiver.

#### **Overload display**

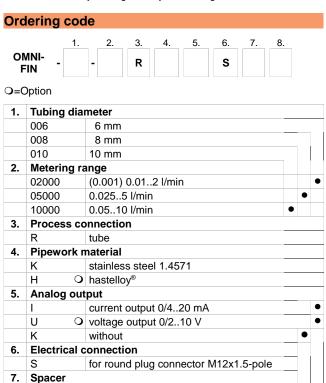
Overload of a switching output is detected and indicated on the display ("Check S 1 / S 2"), and the switching output is switched off.

#### Simulation mode

To simplify commissioning, the sensor provides a simulation mode for the analog output. It is possible to create a programmable value in the range 0..26.0 mA at the output (without modifying the process variable). This allows the wiring run between the sensor and the downstream electronics to be tested during commissioning. This mode is accessed by means of code **311**.

#### **Factory settings**

After modifying the configuration parameters, it is possible to reset them to the factory settings at any time using **code 989**.



 H
 140 °C, 45 minutes max.

 8. Options
 C

 C
 O

 C1
 O

 Counter C1

## 

#### Sensors and Instrumentation

#### Options

Counter C (hardware and software option): Preset Counter with external reset option, complementary switching outputs and actual value display (modified wiring diagram!)

Counter C1 (software option): Instantaneous value display with analogue output, pulse-volume output and totalizer

#### Accessories

- ECI-1 device configurator (USB programming adapter) .
- Process adapter
- Cable/round plug connector (KB...) see additional information "Accessories"

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