

**Product information**

**LABO-FG-I / U / F / C**

**Gas Flow Transmitter  
LABO-FG-I / U / F / C**



- Flow transmitter for gaseous media
- Complete transmitter in 12 mm housing
- Present value or measurement of consumption
- Broad working range
- Can be configured on-site via connector pin (teaching)
- A device for piping of various cross-sections

**Characteristics**

The LABO-FG family of sensors can be used for measuring flow speeds of non-aggressive gases. They come complete with electronics, and are supplied installed inside a compact sensor housing of 12 mm diameter and with a M12x1 round plug connector. The integrated 16-bit processor carries out temperature compensation and linearisation of the calorimetric signal (measurement of the heat removal at the sensor elements by the flowing gas).

The LABO-FG electronics make various output signals available:

- analog 0/4..20 mA signal (LABO-FG-I)
- analog 0/2..10 V signal (LABO-FG-U)
- Frequency signal (LABO-FG-F) or as
- a value signal Pulse / x Litres (LABO-FG-C)

A model with switching output is also available.

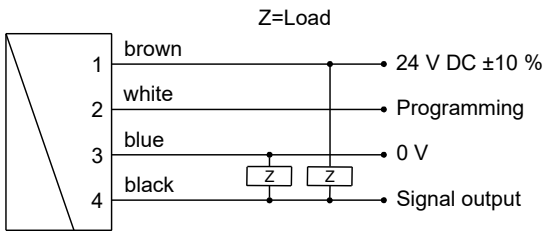
If desired, the range end value can be set to the currently existing flow using "teaching".

**Technical data**

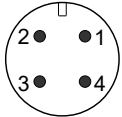
<b>Sensor</b>	calorimetric	
<b>Process connection</b>	see under "Dimensions"	
<b>Nominal width</b>	DN 8 to DN 300 (others available on request)	
<b>Metering range Flow</b>	Air up to 60 m/s (based on normal conditions: 20 °C / 1013.25 hPa) others ranges available on request	
<b>Measurement uncertainty</b>	±5 % of full scale value in range 10..100 %, tested with 10 x D in inlet and outlet	
<b>Response time</b>	approx. 2 s	
<b>Repeatability</b>	±2 %	
<b>Temperature dependency</b>	±0,01 % / 1 K	
<b>Pressure</b>	Crimp screw joint stainless steel	PN 10
	Flanged screw connection Plastic	PN 01
	Plastic cone with union nut	PN 10
<b>Medium temperature</b>	-20..+70 °C	
<b>Ambient temperature</b>	0..60 °C	
<b>Media</b>	non-aggressive gases	
<b>Materials medium-contact</b>	casing	1.4571
	sensor holder	FKM
	sensor	Al <sub>2</sub> O <sub>3</sub> with glass passivation
	casting	Epoxy resin
<b>Materials non-medium-contact</b>	plug contacts	PA66 gold-plated
<b>Power supply</b>	24 V DC ±10 % (controlled)	
<b>Power consumption</b>	< 2 W (for no-load outputs)	
<b>Analog output (LABO-FG-I / U)</b>	4..20 mA / load max. 500 Ohm or 0..10 V	
<b>Switching output (LABO-FG-F / C)</b>	transistor output "push-pull" (resistant to short circuits and polarity reversal) I <sub>out</sub> = 100 mA max.	
<b>Frequency (LABO-FG-F)</b>	selectable, max. 0..2 kHz.	
<b>Pulse duration (LABO-FG-C)</b>	50 ms	
<b>Display</b>	yellow LCD shows operating voltage (LABO-FG-I / U) or output status (LABO-FG-F / C) (rapid flashing = Programming)	
<b>Electrical connection</b>	for round plug connector M12x1, 4-pole	
<b>Protection type</b>	IP 67	
<b>Weight</b>	approx. 0.05 kg	
<b>Conformity</b>	CE	

**Product information**

**Connection diagram**

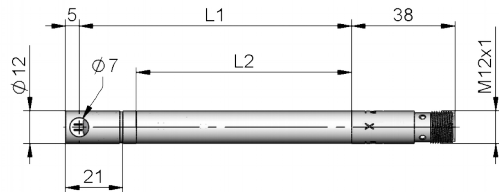


Connection example: PNP NPN

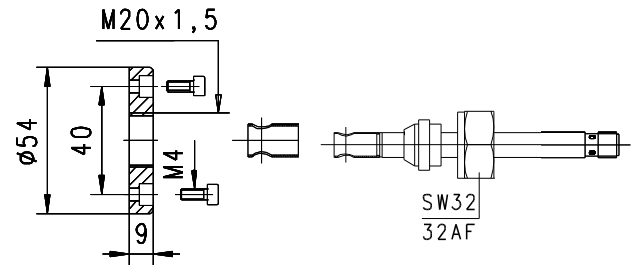


The use of screened cabling is recommended.

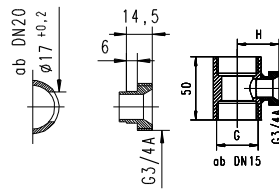
**Dimensions**



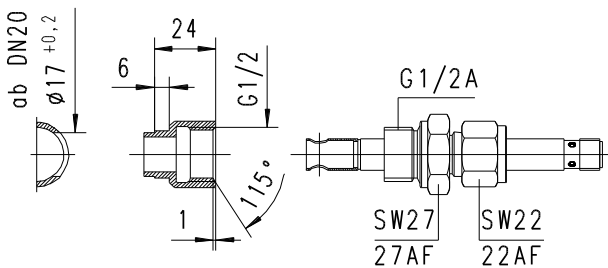
Length L1 and L2 see Ordering Code  
 (others models available on request)



Installation type: Plastic cone with union nut or T-piece (TS3)



Installation type: Stainless steel crimp-on threaded connection



Installation type: Plastic screw connection with flange

**Product information**

**Handling and operation**

**Installation**

There are several installation options available:

The stainless steel crimp-on threaded connection is 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 10 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 flange is screwed on using the three supplied bolts by means of a 13 mm minimum and 35 mm maximum drilling. The flange is not pressure-sealed. The sensor is screwed into the flange with a plastic threaded connection. The threaded connection can take pressures up to 1 bar.

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.

For all types of mounting, it must be ensured that the sensor cannot be forced out of the mounting hole by the pressure present, because otherwise damage and injuries could result from flying objects.

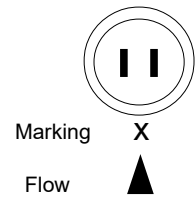
For this, a steel wire mesh or a circlip are available to prevent escape.

The circlip can be fitted in the groove provided for this purpose on the sensor lance within the flow space. After installing, the circlip can no more be removed. It is therefore necessary to specify the desired installation type when ordering. The steel wire mesh is fitted outside on the device in such a way that the sensor tip cannot leave the flow space. Its size depends on the length of the lance and the desired installation type.

Both types of protection are to be ordered separately as required, stating the desired installation type.

When removing a sensor, it must always be ensured that the pipework has been depressurised.

When installing, it must be ensured that the flow impinges on the sensors through the drilling in the measurement tip (take note of the X marking on the housing). The middle of the boring should be at an approximate depth of 1/3 of the pipework diameter.



**Note**

The measurement range end value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be taught. The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

The teaching option is not available for LABO-FG-C.

**Operation and programming**

The teaching process can be carried out by the user as follows:

- Apply the flow rate to be set 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 teaching has been successfully completed, 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 serves as an display for operating voltage (for analog output) or of switching status (for frequency or pulse 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 value is added to the currently measured value before saving. The offset value can be positive or negative.

*Example: The end of the metering range should be set to 60 m/s. However, only 40 m/s can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20°m/s. At a flow rate of 40 m/s in the process, teaching would then store a value of 60 m/s.*

**Ordering code**

LABO - FG -  1.  2.  3.  4.  5.  6.

○ = Option

<b>1. Signal output</b>	
I	4..20 mA
U	0..10 V
F	Frequency output (see "Ordering information")
C	Pulse output (see "Ordering information")
<b>2. Nominal length</b>	
100	L1 = 100 mm / L2 = 79 mm
150	L1 = 150 mm / L2 = 129 mm
200	L1 = 200 mm / L2 = 179 mm

**Product information**

**LABO-FG-I / U / F / C**

<b>3. Housing material</b>	
K	stainless steel
<b>4. Metering range</b>	
01000	10 m/s
02000	20 m/s
06000	60 m/s
XXXX	others on request
<b>5. Programming</b>	
P	programmable (teaching possible)
N	<input type="radio"/> cannot be programmed (no teaching). Still programmable with interface ECI1
<b>6. Electrical connection</b>	
S	for round plug connector M12x1, 4-pole

**Options**

**Special range for analog output:**       Nm/s  
 <= metering range (standard=metering range)

**Special range for frequency output:**       Nm/s  
 <= metering range (standard=metering range)

**Power-On delay period (0..99 s)**   s  
 (time after applying power during which the outputs are not activated or set to defined values)

Further options available on request.

**Required ordering information**

**For LABO-FG-F:**  
**Output frequency at full scale**     Hz  
 Maximum value: 2,000 Hz

**For LABO-FG-C:**  
 Here, the volume (with numerical value and unit) which will correspond to one pulse must be stated. 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)**

**Accessories**

- Round plug connector/cable
- converter / counter OMNI-TA
- Device configurator ECI-3
- Stainless steel crimp-on threaded connection G 1/2
- Welded-on nozzle G 1/2
- T-pieces (G 1/2)
- Plastic cone (with three different union nuts)
- Welded-on nozzle for plastic cone with union nut
- T-pieces for plastic cone with union nut (TS3)
- Steel wire mesh as escape protection
- Circlip as escape protection
- Plastic threaded connection
- Flange for plastic threaded connection