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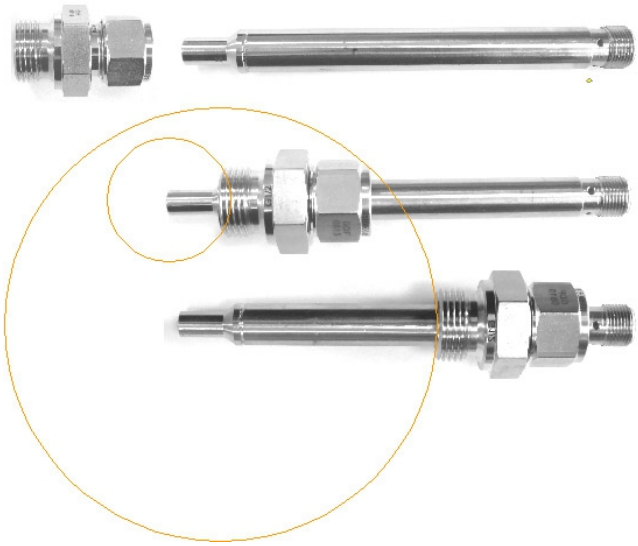
Flow Transmitter LABO-F012-I / U / F / C



- **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.

Technical data

Sensor	calorimetric measurement principle
Process connection	push-in sensor Ø12 mm
Metering range	water 2..150 cm/s or 3..300 cm/s oil or gases available on request
Measurement accuracy	depending on the installation location and flow conditions typically ±10 % of full scale value or 2 cm/s, of full scale value measured in the T-piece ±5 %
Repeatability	±1 %
Pressure resistance	stainless steel compression fitting PN 40 bar
	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	4..20 mA / load max. 500 Ohm or 0..10 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

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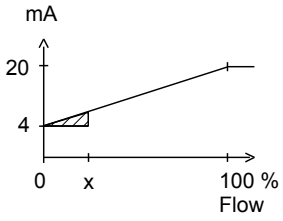
Product Information

LABO-F012-I / U / F / C

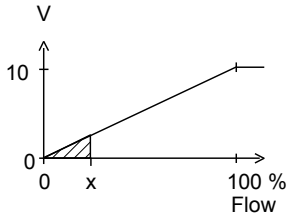
Signal output curves

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

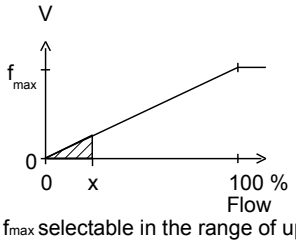
Current output



Voltage output

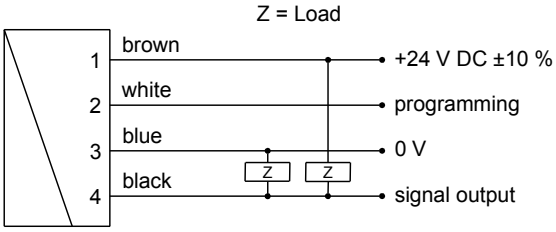


Frequency output

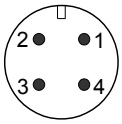


f_{max} selectable in the range of up to 2000 Hz

Wiring



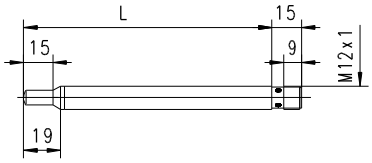
Connection example: PNP NPN



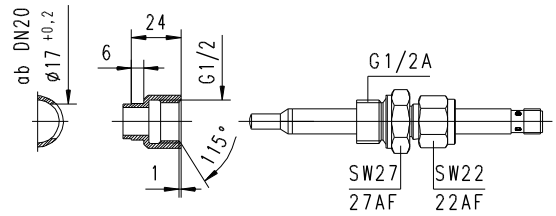
The usage of shielded cables is recommended

Dimensions

L mm	Type
123	LABO-F012-.100...
173	LABO-F012-.150...
223	LABO-F012-.200...



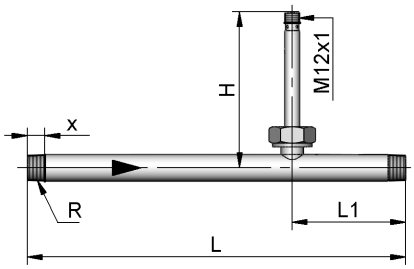
Optional accessories



Weld-on adapter

Compression fitting stainless steel

LABO-F012… with measuring tube



DN	15	25	40	50
Process connection R	1/2"	1"	1 1/2 "	2"
X	14	18	22	24
L	300	475	475	475
L1	90	100	200	200
H	124	126	128	130

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Handling and operation

Installation

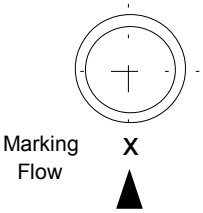
There are various installation options available:

The stainless steel compression fittingis 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 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.



Plug-in sensors with a measuring tube are delivered mounted in a measuring section. Since the adjustment was made in the factory in this measuring section, this version offers the lowest measurement uncertainty (typically ±5%).
The measuring sections are available in different nominal widths (DN15..DN50). They have an external thread on both sides for mounting in the application.
The sensor and the measuring section can be separated from each other, e.g. for cleaning. To do this, the union nut is loosened (only if the pipeline is pressure-free!) and the sensor is pulled out of the hole. The sensor has a permanently attached cone with an O-ring and a groove into which a pin engages on the opposite side. This prevents twisting and the sensor can only be inserted in one position in the measuring section.

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

	1.	2.	3.	4.	5.
LABO-F012 -			**K**		

❍=Option

1.	**Electrical output**		
	I		current output 4..20 mA
	U		voltage output 0..10 V
	F		frequency output
	C		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 material**		
	K		stainless steel 1.4571
4.	**Programming**		
	N		cannot be programmed (no teaching)
	P	❍	programmable (teaching possible)
5.	**Optional**		
	H	❍	extended temperature range

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Product Information

Required ordering information

For LABO-F012-F:

Output frequency at full scale ☐☐☐☐ Hz
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: ☐☐☐ cm/s
<= Metering range (Standard=Metering range)

Special range for frequency output: ☐☐☐ cm/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

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Device configurator ECI-3
- Weld-on adapter
- Compression fitting
- flange
- measuring tube (DN15...DN50)
- safety chain kit