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Flow Transmitter LABO-MID1-I / U / F / C

- **For all electrically conductive fluids**
- **Electrical outputs configurable (4..20 mA, 0..10 V, frequency, pulse / xl / min)**
- **No moving parts in the area of flow**
- **High overload protection**
- **Low pressure loss**
- **Compact design**
- **0..10 V , 4..20 mA , frequency/pulse output, completely configurable.**

Characteristics

The MID1 system consists of a number of sensors which measure the flow speed of a flowing fluid according to the principle of Faraday's law of induction. For this, the fluid must have a minimum electrical conductivity of 50 µS/cm. The speed is converted to a flow quantity in proportion to the cross-section of the measurement pipe. Three nominal widths are available.
The sensors are available with different evaluation electronics, which vary in type and number of outputs, and in operating convenience.
The LABO electronics make various output signals available:

- Analog signal 0/4..20 mA (LABO-I)
- Analog signal 0/2..10 V (LABO-U)
- Frequency signal (LABO-F) or
- A value signal Pulse / x Litres (LABO-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".

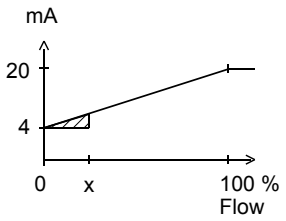
Technical data

Sensor	magnetic-inductive	
Nominal width	DN 8..25	
Process connection	male thread R 1/4 ", R 1/2 ", R 1 "	
Metering ranges	0.05..60 l/min	for details, see table "Ranges"
Measurement accuracy	0.05..1.5 l/min	
Electrical Minimum conductivity (medium)	50 µS/cm	
Pressure resistance	PN 10 bar	
Pressure loss	max. 0.3 bar at max. flow	
Medium temperature	0..+60 °C (avoid frost and dew)	
Operating temperature	0..+70 °C (Electronics)	
Storage temperature	-20..+80 °C	
Materials medium-contact	stainless steel 1.4404, PPS, FKM	
Materials, non-medium-contact	Sensor tube:	CW614N nickelled
	Adhesive:	Epoxy resin
Supply voltage	18..30 V DC	
Power consumption	< 1 W (for no-load outputs)	
Output data:	all outputs are resistant to short circuits and reversal polarity protected	
Current output:	4..20 mA (0..20 mA available on request)	
Voltage output:	0..10 V (2..10 V available on request) output current max. 20 mA	
Frequency output:	Transistor output "push-pull" I_{out} = 100 mA max.	
Pulse output:	transistor output "push-pull" I_{out} = 100 mA max. pulse width 50 ms pulse per volume is to be stated	
Display	yellow LCD shows operating voltage (LABO-XF-I / U) or output status (LABO-XF-F / C) or (rapid flashing = Programming)	
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 64	
Weight	R 1/4 "	approx. 0.2 kg
	R 1/2 "	approx. 0.2 kg
	R 1 "	approx. 0.3 kg
Conformity	CE	

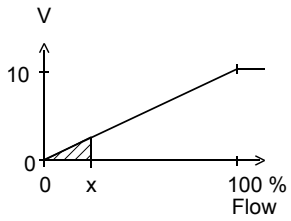
Signal output curves

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

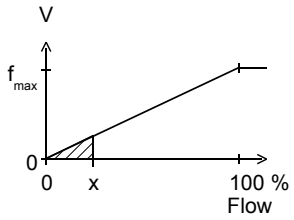
Current output



Voltage output



Frequency output



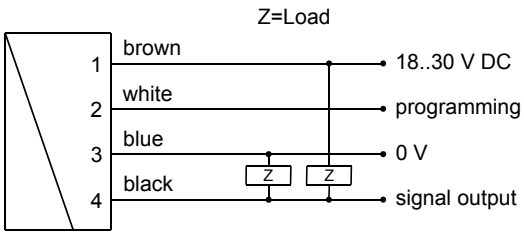
f_{max} selectable in the range of up to 2000 Hz

Other characters on request.

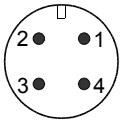
Ranges

R	Nominal width	Metering range l/min H2O	Measurement accuracy
R 1/4"	DN 8	0.05.. 1	2.5 % of the measured value, at least 0.005 l/min
R 1/2"	DN 15	0.50..10	2.5 % of the measured value, at least 0.05 l/min
R 1 "	DN 25	3.00..60	2.5 % of the measured value, at least 0.3 l/min

Wiring



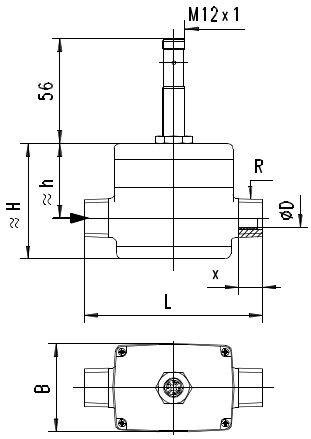
Connection example: PNP NPN



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

The push-pull output) of the frequency output version can as desired be switched as a PNP or an NPN output.

Dimensions



R	Types	L mm	H mm	h mm	x mm	B mm	D mm
R 1/4"	MID1-008	85	59	39	9	47	5
R 1/2"	MID1-015	95	63	42	13	47	10
R 1 "	MID1-025	110	72	45	16	49	20

Handling and operation

Installation

The device is screwed into the pipework by means of two male threads or into suitable connection pieces. Here, attention must be paid to the direction (arrow marked on the housing in the direction of flow). Seal using Teflon tape or a fluid seal.

Use the following torques:

R 1/4 ": 3 ±0.5 Nm
R 1/2 " 5 ±0.5 Nm
R 1 12 ±1,0 Nm

The sensor can be operated in any location. However, air bubbles should be avoided. Direction of flow from bottom to top is recommended.
Avoid angular loading of the sensor. Pipework in which sensors are installed should be permanently flooded. 10 x D should be used in the inlet and outlet.

Note

The metering range end value can be programmed by the user via "teaching". Requirement for programmability must be stated when ordering, otherwise the device cannot be programmed.
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 the pulse output version.

Operation and programming

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

- The measured value 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 devices have a yellow LED which flashes during the programming pulse. During operation, the LED serves as an

indicator of operating voltage (for analog output) or of switching status (for frequency or pulse output).

In order to avoid the need to transit to an undesired operating status during the teach-in, the device can be provided ex-works with a teach-offset. The teach-offset point is added to the currently measured value before saving. The offset point can be positive or negative.

Example: The end of the metering range should be set to 80 %. However, only 60 % can be achieved without problem. In this case, the device would be ordered with a "teach-offset" of +20 %. At a flow rate of 60 % in the process, teaching would then store a value of 80 %.

There are many more parameters which can be programmed by the ECI-1 device configurator if necessary.

Ordering code

The basic device is ordered e.g. MID1-xxx
with electronics e.g. LABO-MID-xxx

	1.	2.	3.	4.	5.
MID1-		**A**	**P**		**E**

	6.	7.	8.	9.
LABO- MID1-				

❍=Option

1.	**Nominal width**				
	008	DN 8 - R 1/4 "			
	015	DN 15 - R 1/2 "			
	025	DN 25 - R 1 "			
2.	**Process connection**				
	A	male thread			
3.	**Housing material**				
	P	PPS			
4.	**Metering range**				
	001	0.05.. 1 l/min			●
	010	0.50..10 l/min		●	
	060	3.00..60 l/min	●		
5.	**Connection for**				
	E	electronics			
6.	**For nominal width**				
	008	DN 8 - R 1/4 "			●
	015	DN 15 - R 1/2 "		●	
	025	DN 25 - R 1 "	●		
7.	**Signal output**				
	I	current output 4..20 mA			
	U	voltage output 0..10 V			
	F	frequency output			
	C	pulse output			
8.	**Programming**				
	P ❍	programmable (teaching possible)			
	N	cannot be programmed (no teaching)			
9.	**Electrical connection**				
	S	for round plug connector M12x1, 4-pole			

Required ordering information

For LABO-MID1-F:
Output frequency at full scale ☐☐☐☐ Hz
Maximum value: 2,000 Hz

For LABO-MID1-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) ☐☐☐

Options for LABO

Special range for analog output: ☐☐☐ l/min
<= Metering range (Standard=Metering range)
Special range for frequency output: ☐☐☐ l/min
<= 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.

Options

- Housing material PEEK

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Evaluation electronics OMNI-TA
- Device configurator ECI-1