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Flow Transmitter FLEX-MID1

- **For all electrically conductive fluids**
- **No moving parts in the area of flow**
- **Analog output (4..20 mA or 0..10 V)**
- **1 x switching output (push-pull) or widely programmable frequency output**
- **High overload protection**
- **Low pressure loss**
- **Compact design**

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. 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 FLEX transducer on the sensor has an analog output (4..20 mA or 0..10 V) and one switching output, which can be configured as a limit switch for monitoring minimal or maximal, or as a frequency output.

The switching output is designed as a push-pull driver, and can therefore be used both as a PNP or an NPN output. The state of the switching output is signalled with a yellow LED in the switching outlet; the LED has all-round visibility.
The sensor is configured in the factory, or alternatively this can be done with the aid of the optionally available ECI-1 device configurator (USB interface for PC). A selectable parameter can be modified on the device, with the aid of the magnet clip provided. In this case, the current measured value is saved as the parameter value. Examples of these parameters are the switching value or the metering range end value.
The stainless steel electronics housing is rotatable, so it is possible to orient the cable outlet after installation.

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	
Repeatability	1 %	
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)	
Ambient temperature	0..60 °C	
Storage temperature	-20..+80 °C	
Materials medium-contact	stainless steel 1.4404, PPS, FKM	
Materials, non-medium-contact	Electronic housing	Stainless steel 1.4305
	Connection plate	CW614N nickelled
Supply voltage	18..30 V DC	
Current consumption	approx. 120 mA	
Analog output	4..20 mA or 0..10 V DC	
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.	
Switching hysteresis	adjustable (please state when ordering)	
Display	yellow LED (On = Normal / Off = Alarm)	
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 64	
Weight	R 1/4 "	approx. 0.32 kg
	R 1/2 "	approx. 0.32 kg
	R 1 "	approx. 0.42 kg
Conformity	CE	

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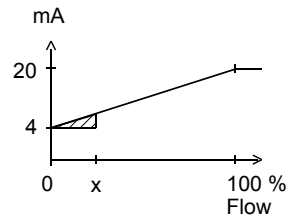
Product Information

FLEX-MID1

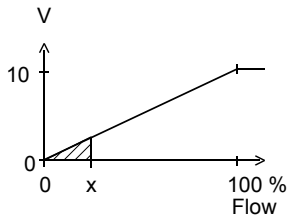
Signal output curves

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

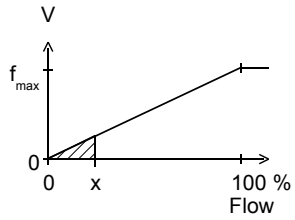
Current output



Voltage output



Frequency output



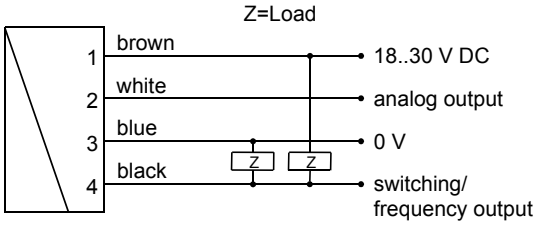
f_{max} selectable in the range of up to 2000 Hz

Other characters on request.

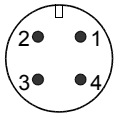
Ranges

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



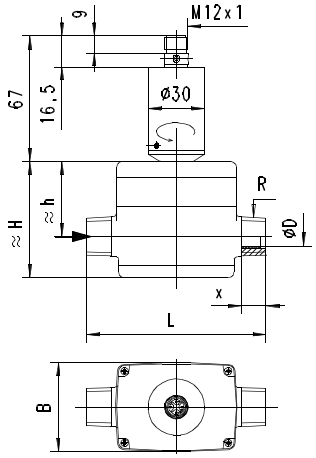
Connection example: PNP NPN



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

It is recommended to use shielded wiring.
The push-pull output 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.
The electronics head is supplied mounted on the sensor body.

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.

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).

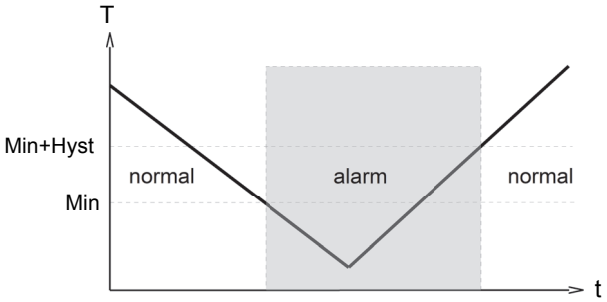
After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an 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".

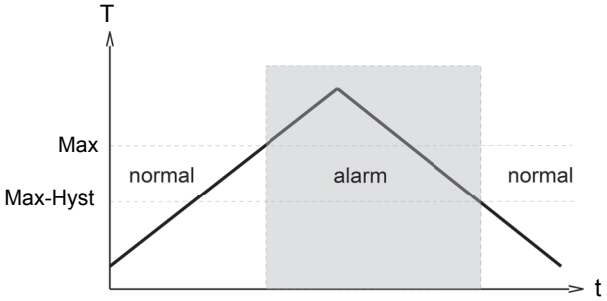
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

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

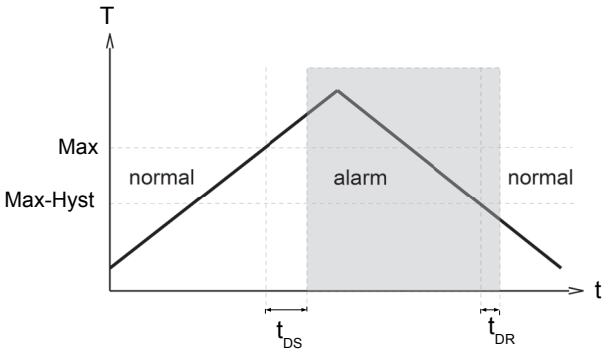
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



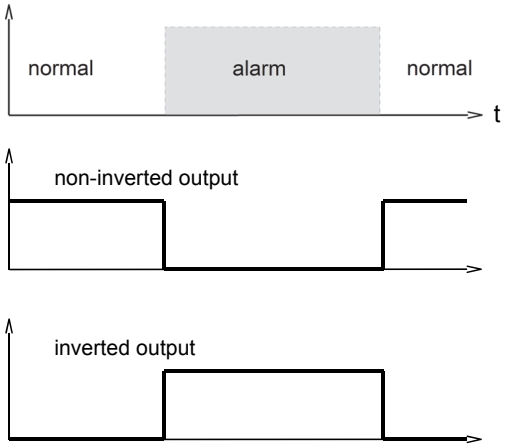
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



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.

Ordering code

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

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

	6.	7.	8.	9.
FLEX-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.	**Analog output**				
	I	current output 4..20 mA			
	U	voltage output 0..10 V			
8.	**Functioning of the switching output**				
	L	minimum switch			
	H	maximum switch			
	R	frequency output			
9.	**Switching signal**				
	O	standard output			
	I	inverted output			

Options for FLEX

Special range for analog output: l/min
(not greater than the sensor's working range)

Special range for frequency output: l/min
(not greater than the sensor's working range)

End frequency (max. 2000 Hz) Hz

Switching delay s
(from Normal to Alarm)

Switchback delay s
(from Alarm to Normal)

Power-On delay (0..99) s
(time after power on, during which the outputs are not actuated)

Switching output fixed l/min

Special hysteresis (standard = 2% EW) %

Options

- Housing material PEEK

Accessories

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