FLEX-RRI, FLEX-RRH, OMNI-RR-032

Роторные индикаторы и датчики потока с аналоговым сигналом

GHM MESSTECHNIK

Технические характеристики

Flow Transmitter / Switch FLEX-RRH

- **Uncomplicated measurement of flow rates**
- **Metal housing with Hall sensor**
- **Working pressure up to 100 bar**
- **Long working life thanks to high quality ceramic axis and special plastic bearing**
- **Run-in and run-out sections are not necessary.**
- **Modular construction with various connection systems**
- **Plug-in and rotatable connections**
- **Analog and switching output**
- **Designed for industrial use**
- **Small, compact construction**
- **Simple installation**
- **Simple to use**
- **Cable outlet infinitely rotatable**
- **Optionally, non-return valve, filter, constant flow rate device in the connections**

Characteristics

The flow meter consists of a spinner which is rotated by the flowing medium. The rotor's rotational speed is proportional to the flow volume per unit time. The rotor is fitted with magnets. A Hall sensor records the rotational speed, which is proportional to the flow rate.

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.

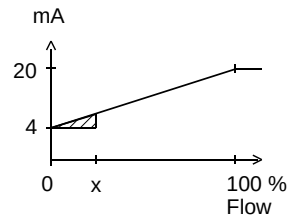
Technical data

Sensor	hall element	
Nominal width	DN 10 (FLEX-RRH-010) DN 25 (FLEX-RRH-025)	
Mechanical Connection	female thread G $^3/_8$, G 1 male thread G $^3/_8$ A, G 1 A hose nozzle Ø11, Ø30 (other threaded, crimped, and plug-in connections, connections with constant flow rate device or limiters available on request)	
Metering ranges	0.1..100 l/min for details, see table "Ranges"	
Measurement accuracy	±3 % of the measured value	
Repeatability	±1 % of full scale value	
Pressure loss	max. 0.5 bar	
Pressure resistance	PN 100 bar	
Medium temperature	0..+70 °C	
Storage temperature	-20..+80 °C	
Materials medium-contact	Housing	CW614N nickelled or 1.4305
	Rotor	PVDF with magnets, glued with epoxy resin
	Bearing	Iglidur X
	Axis	ceramic $Zr0_2$-TZP
	Seal	FKM
Materials, non-medium-contact	Clamps	1.4301
	Electronic adapter	CW614N nickelled
	Electronics housing	stainless steel 1.4305
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Analog output	4..20 mA / max. load 500 Ω or 0..10 V / min. load 1 kΩ	
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.	
Display	yellow warning LED in plug outlet	
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 67	
Weight	FLEX-RRH-010	approx. 0.8 kg
	FLEX-RRH-025	approx. 2.1 kg
Conformity	CE	

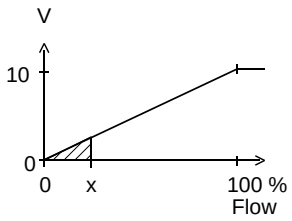
Signal output curves

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

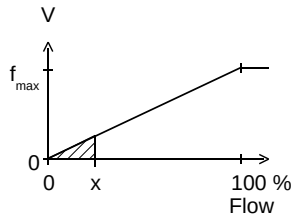
Current output



Voltage output



Frequency output



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

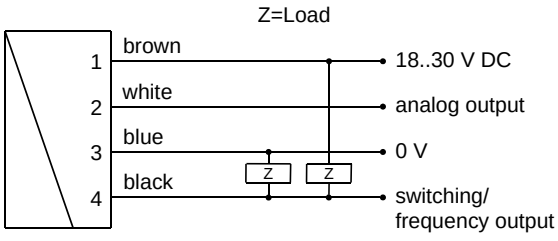
Other characters on request.

Ranges

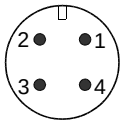
Metering range l/min (H_2O)	Types	Q_{max} l/min (H_2O)
0.1.. 1.5	FLEX-RRH-010...020	1.8
0.2.. 10.0	FLEX-RRH-010...050	12.0
0.4.. 12.0	FLEX-RRH-010...070	14.4
2.0.. 30.0	FLEX-RRH-025...080	36.0
3.0.. 60.0	FLEX-RRH-025...120	72.0
4.0.. 100.0	FLEX-RRH-025...160	120.0

The measured values were determined with horizontal flow (FLEX electronics upwards) using water at 25 °C.

Wiring

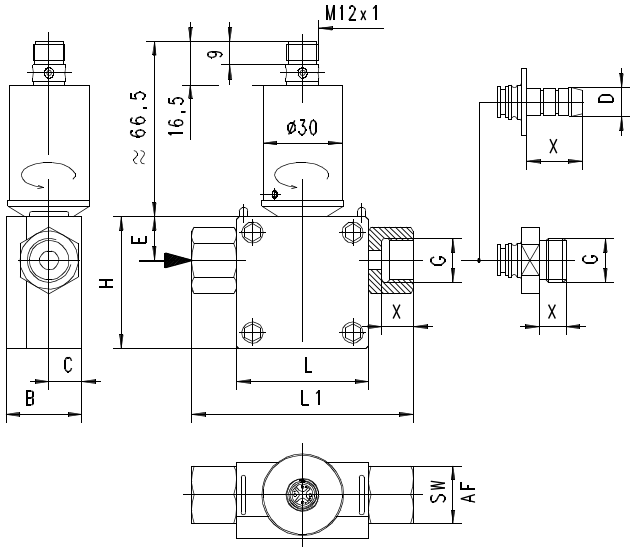


Connection example: PNP NPN



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



Threaded connection

G	DN	Types	H/L	L1	B	C	E	X	SW
G 3/8	10	RRH-010G	50	84	29	12.5	16.5	12	22
G 3/8 A		RRH-010A						14	
G 1	25	RRH-025G	70	110	53	23.0	27.5	18	38
G 1 A		RRH-025A		122					

Hose nozzle connection

D	DN	Types	H/L	L1	B	C	E	X
Ø11	10	RRH-010T	50	96	29	12.5	16.5	21
Ø30	25	RRH-025T	70	176	53	23.0	27.5	45

Handling and use

Installation

The Rototron device is installed in the pipework with the aid of the rotatable adapter pieces. If necessary, the adapters can be removed from the body of the housing after the stainless steel clips have been removed from the housing. Before reinstalling, it should be ensured that both the adapter with the O-ring and the sealing surface in the body are clean and undamaged. The adapters should be fitted carefully in the housing (it is best to turn them), so that the O-ring is not damaged.

With this flow sensor, there is no need for run-in and run-out sections. However, it should be ensured that the flow sensor is at all times filled with medium. Any preferred installation position is possible, but the best possible venting position should be chosen (rotor axis horizontal, flow horizontal or from bottom to top).

Air bubbles affect the measurement results. For filling processes, the valve should be installed behind the sensor. A running up time of approx. 0.5 seconds and a running down time of approx. 3 seconds should be noted.

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).

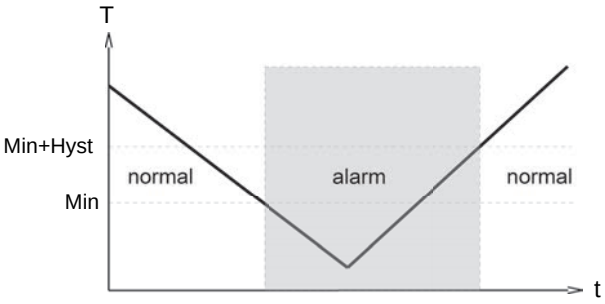
After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an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

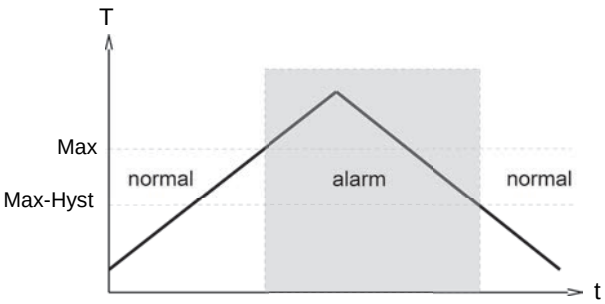
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

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

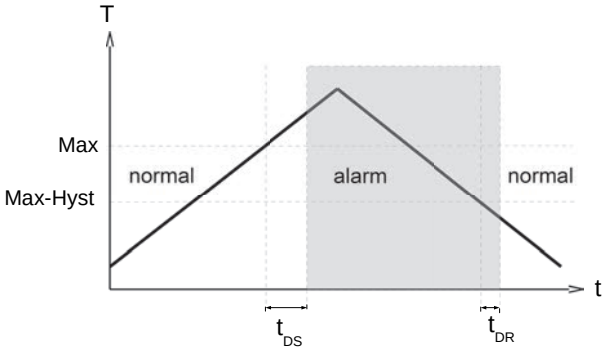
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



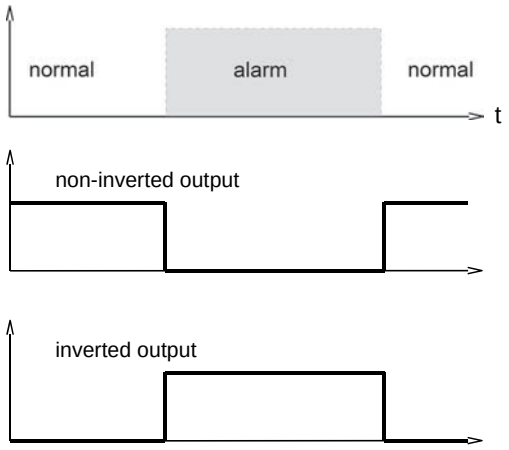
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



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. RRH-010...
with electronics e.g. FLEX-RRH-010...

	1.	2.	3.	4.	5.	6.	7.	8.	9.
RRH-								**V**	**E**

	10.	11.	12.	13.	14.
FLEX-RRH-					

❍=Option

1.	**Nominal width**			
	010	DN 10		
	025	DN 25		
2.	**Mechanical connection**			
	G	female thread		
	A	male thread		
	T	hose nozzle		
3.	**Connection material**			
	M	CW614N nickelled		
	K	1.4305		
4.	**Housing material**			
	M	CW614N		
	K	1.4305		
5.	**Inwards flow drilling**			
	020	Ø 2.0		●
	050	Ø 5.0		●
	070	Ø 7.0		●
	080	Ø 8.0	●	
	120	Ø12.0	●	
	160	Ø16.0	●	
6.	**Seal material**			
	V	FKM		
	E ❍	EPDM		
	N ❍	NBR		
	K ❍	Kemraz		
7.	**Rotor**			
	05	with 5 magnets		
	02 ❍	with 2 magnets		
8.	**Rotor material**			
	V	PVDF		
9.	**Connection for**			
	E	electronics		

10.	**For nominal width**			
	010	DN 10		●
	025	DN 25	●	
11.	**Analog output**			
	I	current output 4..20 mA		
	U	voltage output 0..10 V		
	K	no analog output		
12.	**Switching output**			
	T	push-pull		
	M ❍	NPN (open collector)		
	K	no switching output		

13.	**Switching function**	
	L	minimum-switch
	H	maximum-switch
	R	frequency output
	K	no switching output
14.	**Switching signal**	
	O	standard
	I ❍	inverted

Options for FLEX

Special range for analog output: ___ l/min
<= metering range (standard = metering range)

Special range for frequency output: ___ l/min
<= metering range (standard = metering range)

End frequency (max. 2000 Hz) ____ Hz

Switching delay ___.__ s
(from Normal to Alarm)

Switchback delay ___.__ s
(from Alarm to Normal)

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

Switching output fixed ___ l/min

Special hysteresis __ %
(standard = 2 % of end value)

Options

- Transparent cover DN 10
- Air or gas model

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Device configurator ECI-1
- Mechanical connection pieces with non-return valve, filter, constant flow device or customer-specific requirements available on request

Flow Transmitter / Switch FLEX-RRI

- **Uncomplicated measurement of flow rates**
- **No magnets; uses inductive sensor**
- **Long working life thanks to ceramic axis and special plastic bearing**
- **Run-in and run-out sections are not necessary.**
- **Modular construction with various connection systems**
- **Plug-in and rotatable connections**
- **Analog output and switching output**
- **Designed for industrial use**
- **Small, compact construction**
- **Simple installation**
- **Simple to use**
- **Cable outlet infinitely rotatable**
- **Optionally, non-return valve, filter, constant flow rate device in the connections**

Characteristics

The flow meter consists of a spinner which is rotated by the flowing medium. The rotor's rotational speed is proportional to the flow volume per unit time. The rotor is fitted with stainless steel clamps (optionally titanium or Hastelloy®). An inductive proximity switch records the rotational speed, which is proportional to the flow rate.

The FLEX transformer 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.

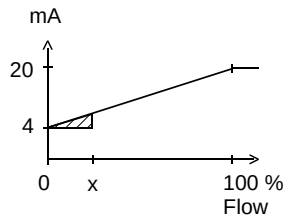
Technical data

Sensor	inductive	
Nominal width	DN 10 (FLEX-RRI-010) DN 25 (FLEX-RRI-025)	
Mechanical Connection	female thread G $^3/_8$, G 1 male thread G $^3/_8$ A, G 1 A hose nozzle Ø11, Ø30 (other threaded, crimped, and plug-in connections, connections with constant flow rate device or limiters available on request)	
Metering ranges	0.1..100 l/min for details, see table "Ranges"	
Measurement accuracy	±3 % of the measured value	
Repeatability	±1 % of full scale value	
Pressure loss	max. 0.5 bar	
Pressure resistance	PN 16 bar	
Medium temperature	0..60 °C	
Storage temperature	-20..+80 °C	
Materials medium-contact	Housing	PPS (Fortron 1140L4)
	Rotor	PVDF
	Clamps	1.4310 optionally: titanium or Hastelloy®
	Bearing	Iglidur X
	Axis	ceramic ZrO_2-TZP
	Seal	FKM
Materials, non-medium-contact	Clamps	1.4301
	Electronic adapter	CW614N nickelled
	Electronics housing	stainless steel 1.4305
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Analog output	4..20 mA / max. load 500 Ω or 0..10 V / min. load 1 kΩ	
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.	
Display	yellow warning LED in plug outlet	
Electrical connection	for round plug connector M 12x1, 4-pole	
Ingress protection	IP 67	
Weight	FLEX-RRI-010	approx. 0.4 kg
	FLEX-RRI-025	approx. 0.7 kg
Conformity	CE	

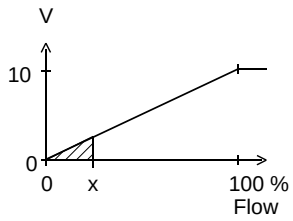
Signal output curves

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

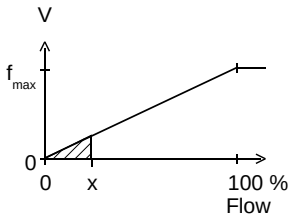
Current output



Voltage output



Frequency output



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

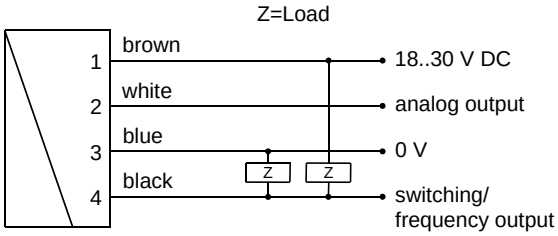
Other characters on request.

Ranges

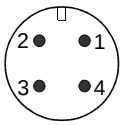
Metering range l/min (H_2O)	Types	Q_{max} l/min (H_2O)
0.1.. 1.5	FLEX-RRI-010...020	1.8
0.2.. 10.0	FLEX-RRI-010...050	12.0
0.4.. 12.0	FLEX-RRI-010...070	14.4
2.0.. 30.0	FLEX-RRI-025...080	36.0
3.0.. 60.0	FLEX-RRI-025...120	72.0
4.0.. 100.0	FLEX-RRI-025...160	120.0

The measured values were determined with horizontal flow (FLEX electronics upwards) using water at 25 °C.

Wiring

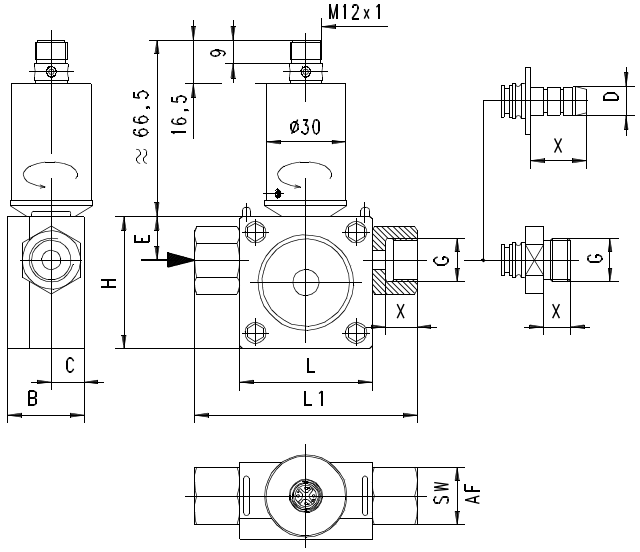


Connection example: PNP NPN



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



Threaded connection

G	DN	Types	H/L	L1	B	C	E	X	SW
G 3/8	10	RRI-010G	50	84	29	12.5	16.5	12	22
G 3/8 A		RRI-010A						14	
G 1	25	RRI-025G	70	110	53	23.0	27.5	18	38
G 1 A		RRI-025A		122					

Hose nozzle connection

D	DN	Types	H/L	L1	B	C	E	X
Ø11	10	RRI-010T	50	96	29	12.5	16.5	21
Ø30	25	RRI-025T	70	176	53	23.0	27.5	45

Handling and operation

Installation

The Rototron device is installed in the pipework with the aid of the rotatable adapter pieces. If necessary, the adapters can be removed from the body of the housing after the stainless steel clips have been removed from the housing. Before reinstalling, it should be ensured that both the adapter with the O-ring and the sealing surface in the body are clean and undamaged. The adapters should be fitted carefully in the housing (it is best to turn them), so that the O-ring is not damaged.

With this flow sensor, there is no need for run-in and run-out sections. However, it should be ensured that the flow sensor is at all times filled with medium. Any preferred installation position is possible, but the best possible venting position should be chosen (rotor axis horizontal, flow horizontal or from bottom to top).

Air bubbles affect the measurement results. For filling processes, the valve should be installed behind the sensor. A running up time of approx. 0.5 seconds and a running down time of approx. 3 seconds should be noted.

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).

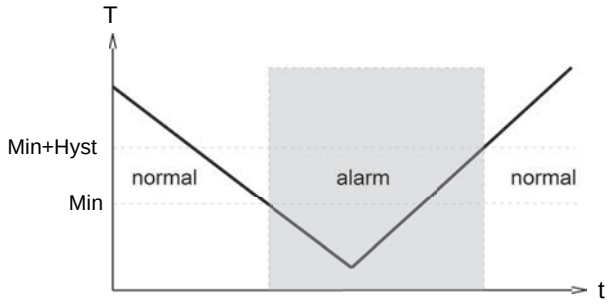
After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an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

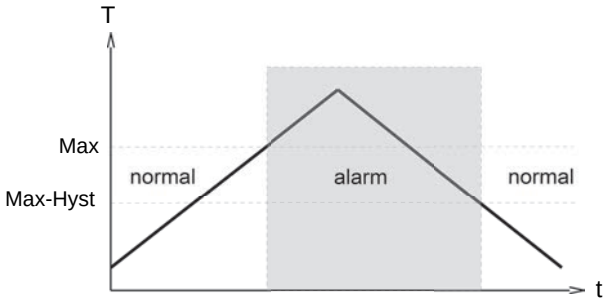
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

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

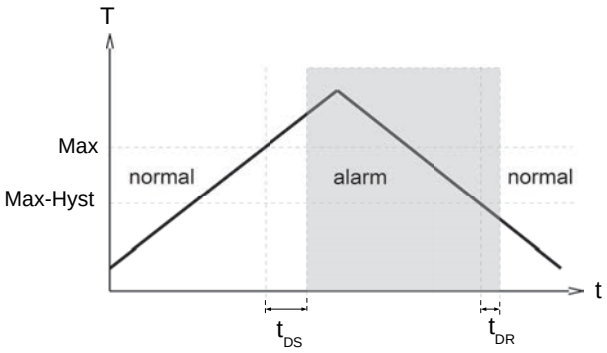
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



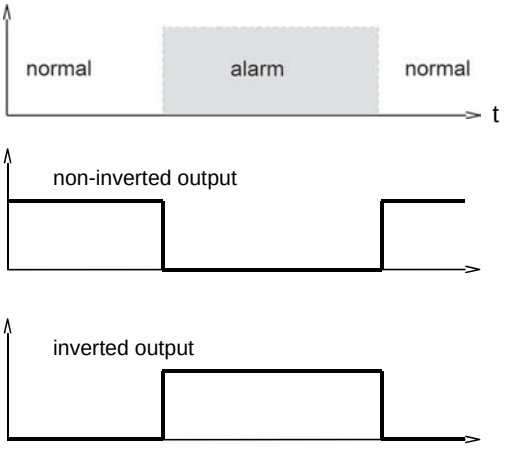
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



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. RRI-010...
with electronics e.g. FLEX-RRI-010...

	1.	2.	3.	4.	5.	6.	7.	8.	9.
RRI-									**E**

	10.	11.	12.	13.	14.
FLEX-RRI-					

❍=Option

1.	**Nominal width**		
	010	DN 10	
	025	DN 25	
2.	**Mechanical connection**		
	G	female thread	
	A	male thread	
	T	hose nozzle	
3.	**Connection material**		
	V	PVDF	
	M ❍	CW614N nickelled	
	K ❍	1.4305	
4.	**Housing material**		
	Q	PPS	
	V	PVDF	
	A ❍	PPS with transparent cover PSU	
5.	**Inwards flow drilling**		
	020	Ø 2.0	●
	050	Ø 5.0	●
	070	Ø 7.0	●
	080	Ø 8.0	●
	120	Ø12.0	●
	160	Ø16.0	●
6.	**Seal material**		
	V	FKM	
	E ❍	EPDM	
	N ❍	NBR	
7.	**Rotor**		
	10	with 10 clamps	
	02 ❍	with 2 clamps	
	05 ❍	with 5 clamps	
8.	**Material for clamps**		
	K	1.4310	
	T ❍	titanium	
	H ❍	hastelloy®	
9.	**Connection for**		
	E	electronics	

10.	**For nominal width**		
	010	DN 10	●
	025	DN 25	●
11.	**Analog output**		
	I	current output 4..20 mA	
	U	voltage output 0..10 V	
	K	no analog output	
12.	**Switching output**		
	T	push-pull	
	M ❍	NPN (open collector)	
	K	no switching output	

13.	**Switching function**	
	L	minimum-switch
	H	maximum-switch
	R	frequency output
	K	no switching output
14.	**Switching signal**	
	O	standard
	I ❍	inverted

Options for FLEX

Special range for analog output: ___ l/min
<= metering range (standard = metering range)

Special range for frequency output: ___ l/min
<= metering range (standard = metering range)

End frequency (max. 2000 Hz) ____ Hz

Switching delay ___.__ s
(from Normal to Alarm)

Switchback delay ___.__ s
(from Alarm to Normal)

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

Switching output fixed ___ l/min

Special hysteresis __ %
(standard = 2 % of end value)

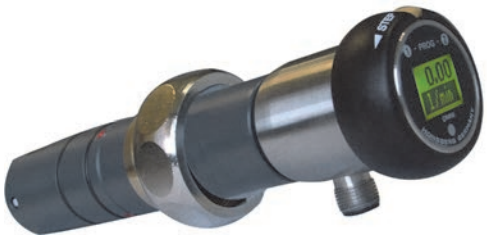
Options

- Rotor with titanium clamps

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Device configurator ECI-1
- Mechanical connection pieces with non-return valve, filter, constant flow device or customer-specific requirements available on request

Flow Transmitter / Switch OMNI-RR..32



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

- **Simple and economical flow meter for piping diameters from 32 mm to 150 mm**
- **Made from plastic (optionally stainless steel)**
- **With tapping sleeve fixing for very rapid installation Retro-fitting also easily possible**
- **Analog output 4..20 mA or 0..10 V**
- **Two programmable switches**
- **Graphical LCD display, backlit, can be read in sunlight and in the dark**
- **Selectable units in the display**
- **Programmable parameters via rotatable, removable ring (programming protection)**
- **Electronics housing with non-scratch, chemically resistant glass**
- **Rotatable electronic housing for best reading position**

Characteristics

The flow meter consists of a spinner which is rotated by the flow speed. The rotational speed is proportional to the flow rate. The rotational speed can be recorded using various sensor systems, depending on the different materials for the housing. With plastic housings, there are no magnets in the flow space.

The OMNI transducer located on the sensor 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 push-pull 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.

Technical data

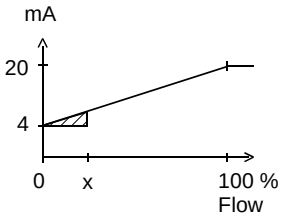
Sensor	OMNI-RRI	inductive sensor
	OMNI-RRH	hall sensor
Nominal widths	DN 32..150	
Mechanical Connection	welded-on nozzle, DN 50..150 tapping sleeve, DN 32..150 glue socket, Screw-in probe	
Metering range	15..1000 l/min for details, see table "Ranges"	
Measurement accuracy	±5 % of full scale value	
Repeatability	±1 % measured value	
Medium temperature	0..60 °C, type RRH as screw-in probe or with welded-on nozzle 0..95 °C	
Pressure resistance	PN 10 bar	
Pressure loss	typically < 0.1 bar	
Materials medium-contact		
Housing	PVC	1.4305
Tapping sleeve	PP	PP
Rotor	PVDF / 1.4310 or Titanium	PVDF / Magnets
Bearing	Iglidur X	Iglidur X
Axis	Ceramic Zr02-TZP	Ceramic Zr02-TZP
Seal	FKM	FKM
Materials, non-medium-contact	Electronics housing	stainless steel 1.4305
	Glass	mineral glass hardened
	Magnet	samarium-Cobalt
	Ring	POM
Supply voltage	18..30 V DC	
Power consumption	< 1 W	
Analog output	4..20 mA / max. load 500 Ω or 0..10 V / min. load 1 kΩ	
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.	
Hysteresis	adjustable, position of the hysteresis depends on minimum or maximum	

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 / (IP 68 when oil-filled)
Conformity	CE

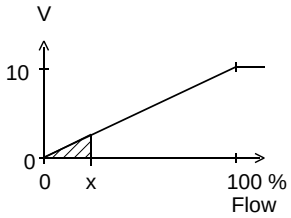
Signal output curves

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

Current output



Voltage output



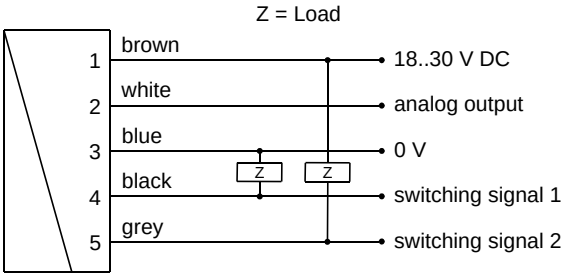
Other characters on request.

Ranges

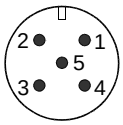
Nominal width	Metering range l/min H_2O	Q_{max} l/min
DN 32	15.. 200	220
DN 40	15.. 300	360
DN 50	25.. 400	480
DN 65	40.. 500	600
DN 80	50.. 700	840
DN 100	85..1000	1200

The measured values were determined using a standing sensor in a flow of water from left to right at 25 °C and with 10 x D run-in and run-out sections.

Wiring



Connection example: PNP NPN



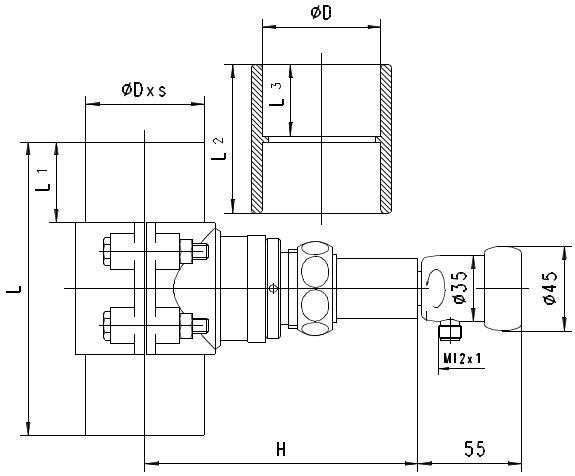
connector M12x1

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.

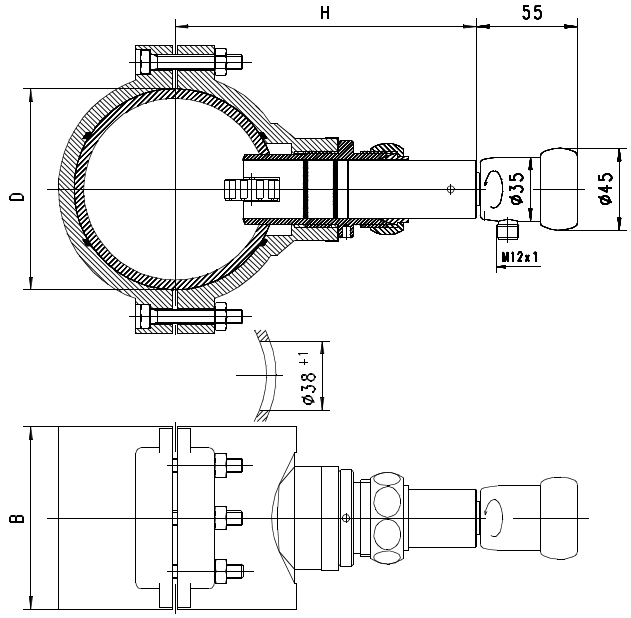
Dimensions

Connection: tapping sleeve with piping section and glue socket(s) RR.-032MH...



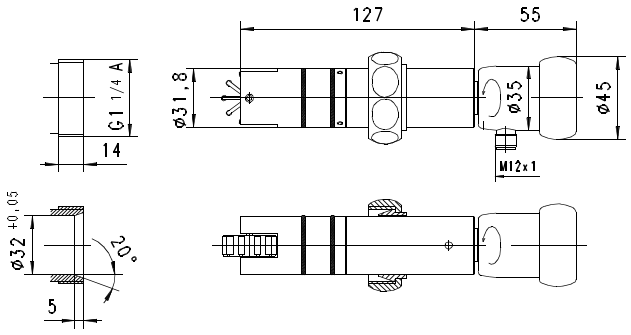
Nominal width	Type	ØD	s	H	L	L1	L2	L3
DN 32	RR.-032MH032.	40	1.9	145.0	132	31	55	26
DN 40	RR.-032MH040.	50	2.4		142	36	65	31
DN 50	RR.-032MH050.	63	3.0		156	43	79	38
DN 65	RR.-032MH065.	75	3.6	153.5	178	49	92	44
DN 80	RR.-032MH080.	90	4.3	156.0	202	56	107	51
DN 100	RR.-032MH100.	110	5.3	166.0	232	66	128	61
DN 125	RR.-032MH125.	140	6.7	172.0	287	81	159	76
DN 150	RR.-032MH150.	160	7.7	180.0	312	91	180	86

Connection: tapping sleeve RR.-032BB... (optionally)

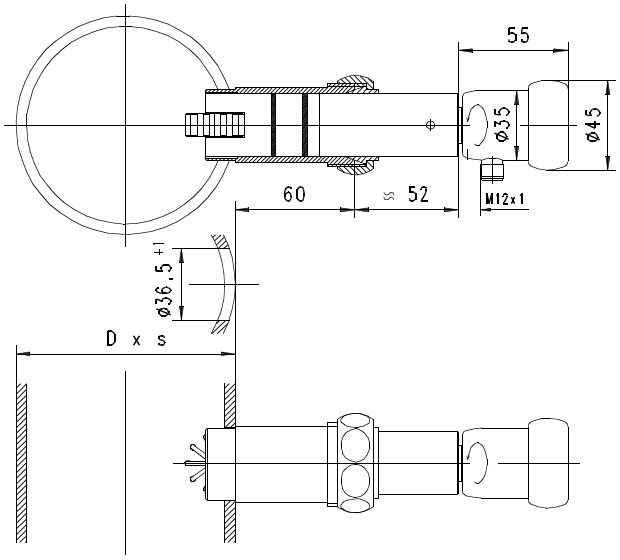


Nominal width	Type	D	B	H
DN 50	RR.-032BB050.	63	70	145.0
DN 65	RR.-032BB065.	75	80	153.5
DN 80	RR.-032BB080.	90	90	156.0
DN 100	RR.-032BB100.	110	100	166.0
DN 125	RR.-032BB125.	140	125	172.0
DN 150	RR.-032BB150.	160	130	180.0

Connection: screw-in probe RR.-032RM000.
Provided by customer



Connection: welded-on nozzle RR.-032VK000. (optionally)



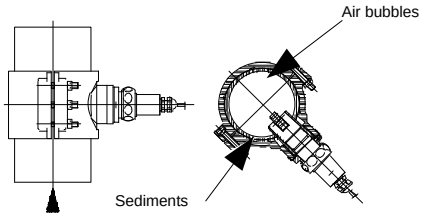
Gooseneck option

A gooseneck (optional) between the electronics head and the primary sensor provides freedom in the orientation of the sensor. This option simultaneously provides thermal decoupling between the two units.

Handling and operation

Installation

The flow meters are inserted in probe form in a tapping sleeve, and are marked with the correct insertion depth. The installation direction of the probe is lengthways to the spinner, and is indicated with arrows on the front of the flow meter. An angular deviation of ±3 ° has no effect on the measurement. The sensor must be installed with run-in and run-out sections of 10 x D of the pipe diameter, in order to prevent vortices and turbulence.



The best installation position (low contamination, good venting) is with the direction of flow from bottom to top, or in horizontal piping with the sensor at an angle of 45 ° downwards. The union nut must be tightened to a torque of 30 Nm.

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 ° 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 (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 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.

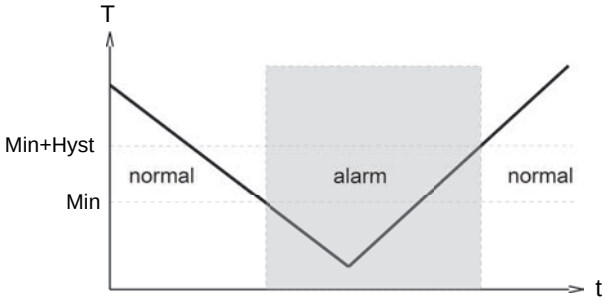
Edit, using position 2

If the currently visible parameter is to be modified:

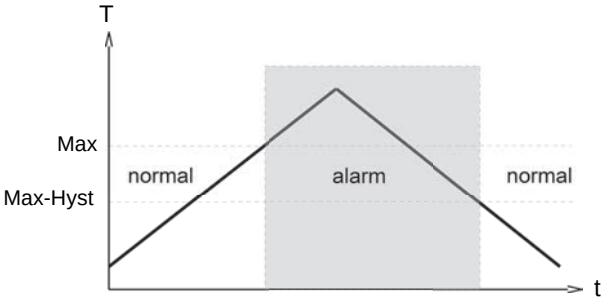
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the cursor moves to the next digit.
- Leave the parameter by turning to position 1 (until the 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 as 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**.

Ordering code

The basic device is ordered e.g. RRI-032...
with electronics e.g. OMNI-RRI-032...

	1.		2.	3.	4.	5.	6.	7.	8.
RR		**-**	**032**						**E**

	9.		10.	11.	12.	13.
OMNI-RR		**-**		**S**		

❍=Option

1.	**Sensor**									
	I		with inductive sensor							
	H		with Hall sensor							
2.	**Union nut**									
	032		G $1^1/_4$							
3.	**Mechanical connection**									
	MH		tapping sleeve with piping section and PVC glue sockets							
	BB	❍	PP tapping sleeve							
	RM		screw-in probe G $1^1/_4$ with clamping ring and union nut							
	VK	❍	welded-on nozzle 1.4305							
4.	**Material for probe**									
	H		PVC							●
	K		stainless steel 1.4305						●	
5.	**Nominal width**									
	000		screw-in probe / Welded-on nozzle	●	●					
	032		DN 32					●		
	040		DN 40					●		
	050		DN 50				●	●		
	065		DN 65				●	●		
	080		DN 80				●	●		
	100		DN 100				●	●		
	125		DN 125				●	●		
	150		DN 150				●	●		
6.	**Seal material**									
	V		FKM							
	E	❍	EPDM							
	N	❍	NBR							
7.	**Rotor**									
	10K		with 10 stainless steel clamps (RRI)							●
	10T	❍	with 10 titanium clamps (RRI)							●
	05M		with 5 magnets (RRH)						●	
8.	**Connection for**									
	E		electronics							

9.	**Sensor**									
	I		with inductive sensor							●
	H		with Hall sensor						●	

10.	**Analog output**		
	I		current output 0/4..20 mA ●
	U	❍	voltage output 0/2..10 V ●
	K		without ●
11.	**Electrical connection**		
	S		for round plug connector M12x1, 5-pole
12.	**Option 1**		
	H	❍	gooseneck model
	O	❍	tropical model oil-filled version for heavy duty or external use
13.	**Option 2**		
	C	❍	Counter C
	C1	❍	Counter C1

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

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