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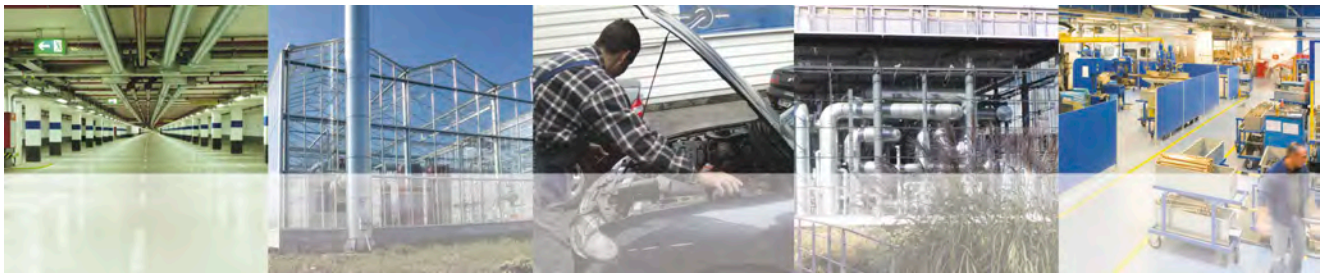
Specialists by Competence.

Product information

Flow – rotor, inline model



Characteristics

System
- Flow rotor

Evaluation
- Display, Switching, Measurement

Nominal widths
- DN 8..40

Range
- 0,1..100 l/min

Media
- Water, Aqueous emulsions, Aggressive media

Pressure resistance
- Max. 100 bar

Medium temperature
- -20..+200 °C

Applications

- **Industrial metering and monitoring technology**
- **Welding cooling**
- **Machine tools for emulsion control**
- **Laser coolant monitoring**
- **Monitoring of radio or x-ray tubes**

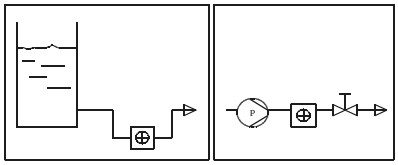
Function and benefits
- Uncomplicated measurement of flows
- No magnets with the plastic types (with inductive sensor)
- Modular system in mechanics and electronics
- Long service life due to high-quality ceramic axle and special plastic bearing
- Output signal PNP, NPN, push-pull or NAMUR
- Run-in and run-out sections are not necessary
- Intrinsically safe behaviour
- Modular construction with the widest range of connection systems
- male and female connections
- Options with stop valve, filter, flow constants in the connections

The sensor is comprised of an impeller, which is set in rotation by the flow speed. The rotation is proportional to the flow value per time. The recording of the rotation speed takes place through various sensor systems, due to the various materials of the housing. With some sensors an LED indicator is integrated in the sensor, which primarily signals by blinking on startup of the sensor that the rotor inside is turning.

Benefits of installation
The sensors are installed in the pipework with the help of the rotating adapter pieces. If the adapter is separated from the body in the process, it must be ensured that the adapter and the mount are clean before re-inserting (briefly run your finger through the mount hole of the housing). Carefully install the adapter (by turning) in the housing in order to avoid damaging the O-ring. Run-in and run-out sections are not necessary with this flow sensor. However, it must be ensured that the flow sensor is always filled with medium and remains filled. Any arbitrary installation position is possible, however, the best-possible bleeding position should be selected (flow from left to right or from bottom to top).
Attention: Air bubbles have a significant, negative impact of the measurement results.

The valve should always be installed after the sensor for emptying processes. Factor in a start-up time (approx. 0.5 sec) and an after-run time (approx. 3 sec).

Installation method:



Rotor always under liquid | Rotor before valve

All converters which accept a frequency signal as an input signal (see frequency range of the various areas) can be combined with a electronic evaluation. See also device overview.

Programmability of parameters

All RR.. can be combined with the intelligent sensor families OMNI, FLEX and LABO. These sensors have a microcontroller which enables a multitude of parameter changes. By standard, all three main electronics have the capability of making local changes. In addition, a device configurator (ECI-1) can be used to change all saved parameters of a device at any time, if desired or necessary.

LABO-RR..-
I / U / F / C /S

Pulse programming on pin 2:
Apply the supply voltage level for one second and save the current value as the final value (for analog outputs) or as a switching value (for limit value switches).

FLEX-RR..

Programming with magnet clip:
Hold the magnet to the marking for 1 second and save the present value as the final value (for analog outputs) or as a switching value (for limit value switches).

OMNI-RR..

Programming with magnet ring:
With the aid of the display and of the movable ring, numerous parameters can be conveniently set on the spot.

ECI-1

If required, all parameters can be set at any time on all intelligent sensors, using the ECI-1 device configurator.

Universal-Schaltausgänge

Die Push-Pull-Transistorausgänge ermöglichen einfachste Installation. Sie installieren den Ausgang wie einen NPN-Schalter, und es ist ein NPN-Schalter, Sie installieren den Ausgang wie einen PNP-Schalter, und es ist ein PNP-Schalter, ohne Programmierung oder Drahtbrücken.
Kurzschlussfestigkeit und Verpolungssicherheit sind sichergestellt, und bei einer OMNI-Elektronik wird zusätzlich eine Überlast oder ein Kurzschluss im Display angezeigt.

Device overview

Device	Connection material	Range l/min	Pressure resistance in bar	Medium temperature	Supply voltage	Display	Output signal		Page
							Switching	Measuring	
PO	PPS	0,1..100	PN 16	0..60 °C	-	analog	-	-	6
WR1	Brass / stainless steel	0,7..100	PN 16	20..+100 °C	-	analog	-	-	7
FR	Gunmetal	2,5..65	PN 16	0..100 °C	-	analog	-	-	8
RM	Gunmetal / stainle	0,7..60	PN 16	0..200 °C	-	analog	-	-	9
RRI	PPS	0,1..100	PN 16	0..60 °C	10..30 V DC	Signal LED	-	Frequency	10
RRH	Stainless steel /brass nickelled	0,1..100	PN 100	0..60 °C (100 °C)	10..30 V DC	Signal LED	-	Frequency	12
LABO-RRI-..S	PPS	0,1..100	PN 16	0..60 °C	10..30 V DC	Signal LED	1 x Push-Pull	-	14
LABO-RRI-..I	PPS	0,1..100	PN 16	0..60 °C	10..30 V DC	Signal LED	-	4..20 mA	17
LABO-RRI-..U	PPS	0,1..100	PN 16	0..60 °C	10..30 V DC	Signal LED	-	0..10 V	17
LABO-RRI-..F	PPS	0,1..100	PN 16	0..60 °C	10..30 V DC	Signal LED	-	Frequency 0..2 kHz	17
LABO-RRI-..C	PPS	0,1..100	PN 16	0..60 °C	10..30 V DC	Signal LED	-	Pulse / quantity	17
LABO-RRH-..S	Stainless steel / brass nickelled	0,1..100	PN 100	0..60 °C (100 °C)	10..30 V DC	Signal LED	1 x Push-Pull	-	21
LABO-RRH-..I	Stainless steel / brass nickelled	0,1..100	PN 100	0..60 °C (100 °C)	10..30 V DC	Signal LED	-	0/4..20 mA	24
LABO-RRH-..U	Edelstahl / Messing vernickelt	0,1..100	PN 100	0..60 °C (100 °C)	10..30 V DC	Signal LED	-	0..10 V	24
LABO-RRH-..F	Stainless steel / brass nickelled	0,1..100	PN 100	0..60 °C (100 °C)	10..30 V DC	Signal LED	-	Frequency 0..2 kHz	24
LABO-RRH-..C	Stainless steel / brass nickelled	0,1..100	PN 100	0..60 °C (100 °C)	10..30 V DC	Signal LED	-	Puls / Menge	24
FLEX-RRI	PPS	0,1..100	PN 16	0..60 °C	18..30 V DC	Signal LED	1 x Push-Pull		28

Device overview

Device	Connection material	Range l/min	Pressure resistance in bar	Medium temperature	Supply voltage	Display	Output signal		Page
							Switching	Measuring	
FLEX-RRH	Stainless steel / brass nickelled	0,1..100	PN 100	0..60 °C (100 °C)	18..30 V DC	Signal LED	1 x Push-Pull	0/4..20 mA or 0..10 V and Frequenc	33
OMNI-RRI	PPS	0,1..100	PN 16	0..60 °C	18..30 V DC	Graphic LCD illuminated transflective and signal LED	1 x Push-Pull	0/4..20 mA or 0..10 V	38
OMNI-RRH	Stainless steel / brass nickelled	0,1..100	PN 100	0..60 °C	18..30 V DC	Graphic LCD illuminated transflective and signal LED	2 x Push-Pull	0/4..20 mA or 0..10 V	42
Counter-OPTION-C	Preset Counter with external reset facility, anti-complementary switching outputs and actual value display.								46
Counter-OPTION-C1	Instantaneous value display with analog output, pulse output and volume totalizer.								50
ECI-1	All LABO, FLEX, and OMNI parameters can be set or modified using the ECI-1 configurator.								53
ESA1	PA6.6								54
ESK2	PA6.6								56
ESK3	PA6.6								58
Options	○ LABO transmitter – Temperature up to 150 ° ○ OMNI – Tropical model								60
Accessories	○ Type ZV / ZE (Filter) ○ KB.... (Round plug connector 4/5-pin) ○ OMNI-TA (Panel meter) ○ OMNI-remote								61

Errors and technical modifications reserved.

Flow Indicator PO

- **Simple flow display**
- **Rotatable connections**
- **Removable connections thanks to clip-fitting**
- **Different connection possible on each side**

Characteristics

Mechanical flow indicator, for fluid media, with rotor for quantitative flow display. The rotor turns in proportion to the flow.

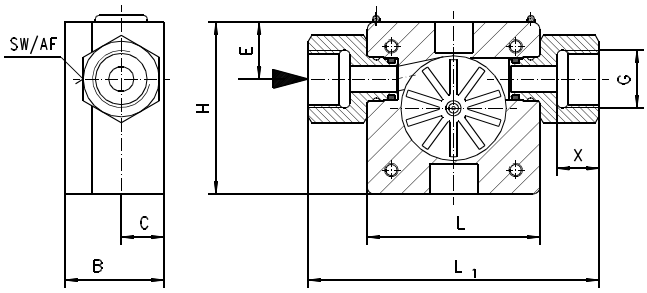
Technical data

Nominal width	DN 10, DN 25	
Process connection	female thread G $^3/_8$, G 1	
Display range	0.1..100 l/min	for details see table "Ranges and weights"
$Q_{max.}$	to 100 l/min	
Pressure resistance	PN 16 bar	
Medium temperature	0..60 °C	
Ambient temperature	0..60 °C	
Materials medium-contact	PPS, PSU Ultrason, PVDF, ceramic ZrO_2-TZP, Iglidur X, FKM	
Medium	water (oils have a tendency to a higher running-up value)	
Weight	see table "Ranges and weights"	
Installation location	as desired, except for inwards flow from above	

Ranges and weights

G	Types	PN bar	Range l/min H_2O	Weight kg
G $^3/_8$	PO-010GVA020	16	0.1 - 1.5	0.1
	PO-010GVA050		0.2 - 10.0	
	PO-010GVA070		0.4 - 12.0	
G 1	PO-025GVA080	16	2.0 - 30.0	0.4
	PO-025GVA120		3.0 - 60.0	
	PO-025GVA160		4.0 - 100.0	

Dimensions



G	H	L	L1	B	C	E	SW	X
G $^3/_8$	50	50	84	29	12.5	16.5	22	12
G 1	70	70	110	53	23.0	27.5	38	18

Handling and operation

Installation

Installation location as desired (please ensure best possible venting).
Because of the rotatable connections, no further adapter is required.

Ordering code

	1.	2.	3.	4.	5.	6.
PO-		**G**		**A**		

❍=Option

1.	**Nominal width**			
	010		DN 10 – G $^3/_8$	
	025		DN 25 – G 1	
2.	**Mechanical connection**			
	G		female thread	
3.	**Connection material**			
	V		PVDF	
	M	❍	CW614N	
	K	❍	stainless steel	
4.	**Housing material**			
	A		PPS with transparent polysulfone cover	
5.	**Inwards flow drilling**			
	020		Ø 2	●
	050		Ø 5	●
	070		Ø 7	●
	080		Ø 8	●
	120		Ø 12	●
	160		Ø 16	●
6.	**Seal material**			
	V		FKM	
	E	❍	EPDM	
	N	❍	NBR	

Flow Indicator WR1-...GM / K

- **Internal wiper provides ability to clean the glass without removing the device.**
- **Sliding bearing made from PEEK for liquids, or grease-free ball bearing for air and gases**
- **Rotor visible from 360 °**

Characteristics

Mechanical flow indicator, for fluid media, with rotor for quantitative flow display. The rotor turns in proportion to the flow. Robust construction in brass or stainless steel.

Technical data

Nominal width	DN 8..40	
Process connection	female thread G $^1/_4$..G 1$^1/_2$	
Display range	0.7..700 l/min	for details see table "Ranges"
$Q_{max.}$	to 700 l/min	
Pressure resistance	PN 16 bar	
Medium temperature	0..+100 °C	
Ambient temperature	0..+70 °C	
Materials medium-contact	*Brass construction*: CW614N nickelled, borosilicate glass, NBR *DN 8..25:* POM red *DN 32..40:* Nylon white *for fluids:* PEEK *for gases:* Steel 100 CR 6 chrome coated	*Stainless steel construction:* 1.4305, borosilicate glass, FKM
Medium	water, gases (oils have a tendency to a higher running-up value)	
Weight	see table "Dimensions and weights"	
Installation location	as desired, except for inwards flow from above	

Ranges

Fluids

G	Start-up quantity for rotor, l/min			$Q_{max.}$ recommended	Types
	H_2O	40 mm²/s	41..150 mm²/s		
G $^1/_4$	0.7	1.5	2.7	4	WR1-008G.W
G $^3/_8$	0.8		2.8	8	WR1-010G.W
G $^1/_2$	1.4	1.8	3.2	12	WR1-015G.W
G $^3/_4$		2.7	5.9	25	WR1-020G.W
G 1	1.7	3.0	7.0	40	WR1-025G.W
G 1$^1/_4$	8.0	5.9	7.9	80	WR1-032G.W
G 1$^1/_2$		7.3		100	WR1-040G.W

Special ranges are available.

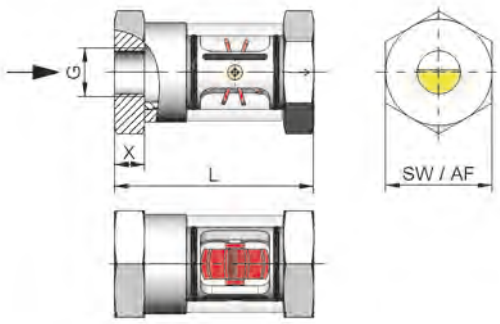
Air / gases

G	Running-up amount for rotor l/min 1 bar abs 20 °C	$Q_{max.}$ recommended	Types
G $^1/_4$	18	60	WR1-008G.G
G $^3/_8$	20	150	WR1-010G.G
G $^1/_2$	25	250	WR1-015G.G
G $^3/_4$	25	250	WR1-020G.G
G 1	35	350	WR1-025G.G
G 1$^1/_4$	60	600	WR1-032G.G
G 1$^1/_2$	70	700	WR1-040G.G

Special ranges are available.

Dimensions and weights

G	Types	L	SW	X	Weight kg
G $^1/_4$	WR1-008G.	71	36	9	0.35
G $^3/_8$	WR1-010G.				
G $^1/_2$	WR1-015G.	86	46	13	0.65
G $^3/_4$	WR1-020G.	94		16	
G 1	WR1-025G.	104			
G 1$^1/_4$	WR1-032G.	120	65	19	1.60
G 1$^1/_2$	WR1-040G.	130		20	1.70



Ordering code

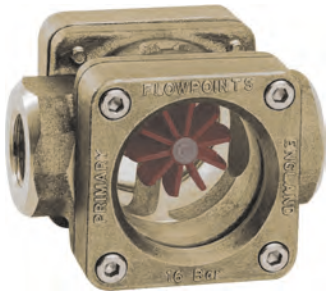
	1.	2.	3.	4.
WR1 -		**G**		

1.	**Nominal width**	
	008	DN 8 - G $^1/_4$
	010	DN 10 - G $^3/_8$
	015	DN 15 - G $^1/_2$
	020	DN 20 - G $^3/_4$
	025	DN 25 - G 1
	032	DN 32 - G 1$^1/_4$
	040	DN 40 - G 1$^1/_2$
2.	**Process connection**	
	G	female thread
3.	**Connection material**	
	M	brass
	K	stainless steel
4.	**For medium**	
	W	fluids
	G	air and gases

Options

- smaller start-up quantities / special diaphragm
- Wiper seal made from EPDM

Flow Indicator FR-...GR



- **Rotor on both sides directly behind natural glass**
- **Installation location as desired**

Characteristics

Mechanical flow indicator, for fluid media, with twin rotor for quantitative flow display. The rotor turns in proportion to the flow. Robust construction in red bronze/brass

Technical data

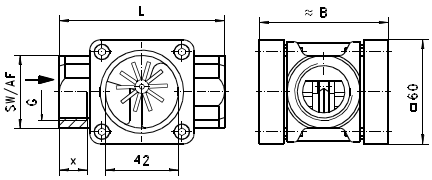
Nominal width	DN 15..25	
Process connection	female thread G $^1/_2$..G 1	
Display range	2.5..65 l/min	for details see table "Ranges"
$Q_{max.}$	to 65 l/min	
Pressure resistance	PN 16 bar	
Medium temperature	0..+100 °C	
Ambient temperature	0..+100 °C	
Materials medium-contact	Rg 5, CW614N, soda lime glass, POM Klingersil C4400	
Medium	water (oils have a tendency to a higher running-up value)	
Weight	see table "Dimensions and weights"	
Installation location	as desired, except for inwards flow from above	

Ranges

G	Types	Running-up amount for rotor l/min H_2O	$Q_{max.}$ recommended
G $^1/_2$	FR-015GR	2.5	25
G $^3/_4$	FR-020GR	3.0	45
G 1	FR-025GR	5.0	65

Dimensions and weights

G	Types	L	B	SW	X	Weight kg
G $^1/_2$	FR-015GR	85	68	34	14	1.20
G $^3/_4$	FR-020GR					1.10
G 1	FR-025GR	95	74	40	16	1.25



Ordering code

	1.	2.	3.
FR -		**G**	**R**

1.	**Nominal width**	
	015	DN 15 - G $^1/_2$
	020	DN 20 - G $^3/_4$
	025	DN 25 - G 1
2.	**Process connection**	
	G	female thread
3.	**Connection material**	
	R	red bronze

Flow Indicator RM

- **Good view of rotor**
- **High temperature resistance**
- **Dome form**

Characteristics

Mechanical flow indicator, for fluid media, with rotor for quantitative flow display. The rotor turns in proportion to the flow. Robust construction using red bronze / brass or stainless steel.

Technical data

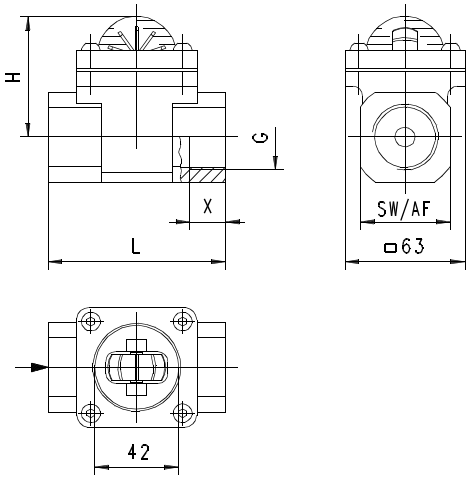
Nominal width	DN 8.0.25	
Process connection	female thread G 1/4..G 1	
Display range	0.7..60 l/min	for details see table "Ranges"
Pressure loss	up to 0.7 bar	
$Q_{max.}$	to 60 l/min	
Pressure resistance	PN 16 bar	
Medium temperature	0..+100 °C water 0..+200 °C oils	
Ambient temperature	0..+200 °C	
Materials medium-contact	*red bronze model:* Rg, CW614N, borosilicate glass, 1.4301, PPS, Klingersil C-4400	*Stainless steel construction:* 1.4408, CW614N, borosilicate glass, 1.4301, PPS Klingersil C-4400
Medium	water (oils have a tendency to a higher running-up value)	
Weight	see table "Dimensions and weights"	
Installation location	as desired, except for inwards flow from above	

Ranges

G	Types	Running-up amount for rotor l/min H_2O	$Q_{max.}$ re-com-men ded	Pressure loss bar at $Q_{max.}$ H_2O
G 1/4	RM-008G.	0.7	8	0.20
G 3/8	RM-010G.	0.8	10	0.15
G 1/2	RM-015G.	1.0	20	0.40
G 3/4	RM-020G.	1.2	40	0.25
G 1	RM-025G.	1.5	60	0.70

Dimensions and weights

G	Types	L	H	SW	X	Weight kg
G 1/4	RM-008G.	76	53	28	12	0.70
G 3/8	RM-010G.				16	0.65
G 1/2	RM-015G.				14	
G 3/4	RM-020G.	89	66	45	18	1.25
G 1	RM-025G.					1.20



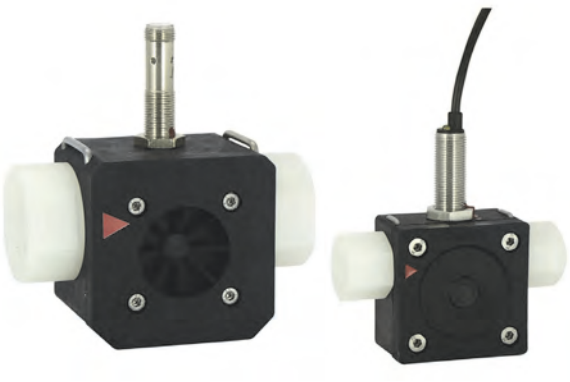
Ordering code

	1.	2.	3.
RM -		**G**	

❍=Option

1.	**Nominal width**		
	008		DN 8 - G 1/4
	010		DN 10 - G 3/8
	015		DN 15 - G 1/2
	020		DN 20 - G 3/4
	025		DN 25 - G 1
2.	**Process connection**		
	G		female thread
3.	**Connection material**		
	R		red bronze
	K	❍	stainless steel

Flow Transmitter RRI



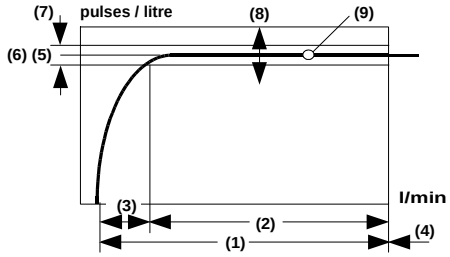
- **Uncomplicated measurement of flow rates**
- **No magnets; uses inductive sensor**
- **Long working life thanks to high quality ceramic axis and special plastic bearing**
- **Run-in and run-out sections are not necessary.**
- **Modular construction with various connection systems**
- **Plug-in and rotatable connections**
- **Output signal PNP or NPN**
- **Intrinsically safe behaviour**
- **Optionally, non-return valve, filter, constant flow rate device in the connections**

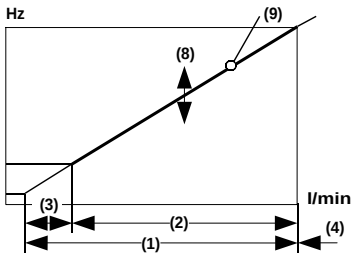
Characteristics

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.

Technical data

Sensor	inductive	
Nominal width	DN 10 (RRI-010) DN 25 (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)	
Pressure resistance	PN 16 bar	
Medium temperature	0..60 °C	
Materials medium-contact	Housing	PPS, PVDF (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	PVC cable, 1.4305, 1.4301, CW614N nickelled	
Current consumption at rest	10 mA / NAMUR max. 7 mA	
Output current max.	200 mA / NAMUR max. 7 mA	
Electrical connection Sensor	cable 2 m or for round plug connector M12x1, 4-pole	
Resistant to short circuits	yes	
Reversal polarity protected	yes	
Ingress protection	IP 67	
Weight	RRI-010	approx. 0.2 kg
	RRI-025	approx. 0.5 kg
Conformity	CE	



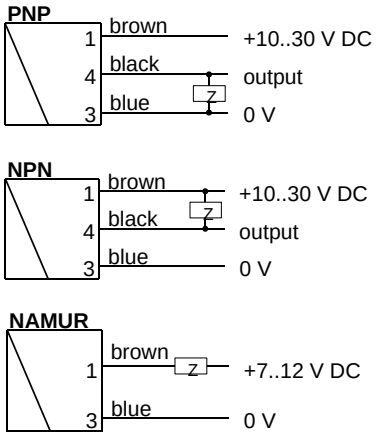


(1) Complete metering range
(2) Specific metering range
(3) Start-up range
(4) Extended operating range, increased wear, Dp > 0.5 bar
(5) Pulses / litre (details on label)
(6) Average pulses / litre
(7) Tolerance ±3 % of the measured value
(8) Scatter ±10 % of the pulses / litre value (5) in the batch
(9) Reproducibility (±1 % of the full scale value) is the repeat accuracy of a frequency, relative to l/min
(10) Max. frequency, related to the relevant metering range up to approx. 0.5 bar pressure drop across the flow meter

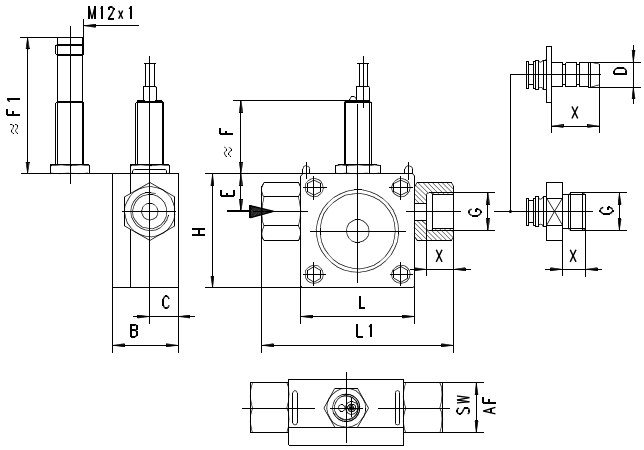
Types	Q_{max}	Metering range			pulses / litre	frequency
RRI-	l/min H_2O	l/min H_2O				Hz EW
		(1)	(2)	(3)	(6)	(10)
010...020	1.8	0.1.. 1.5	0.5.. 1.5	0.1..0.5	10200	255
010...050	12.0	0.2.. 10.0	2.0.. 10.0	0.2..2.0	3345	558
010...070	14.4	0.4.. 12.0	2.0.. 12.0	0.4..2.0	1755	351
025...080	36.0	2.0.. 30.0	3.0.. 30.0	2.0..3.0	1216	608
025...120	72.0	3.0.. 60.0	5.0.. 60.0	3.0..5.0	607	607
025...160	120.0	4.0..100.0	6.0..100.0	4.0..6.0	252	420

The measured values were determined using a standing sensor in a horizontal flow of water at 25 °C.

Wiring



Dimensions



Threaded connection

G	DN	Types	H/L	L1	B	C	E	F	F1	X	SW
G 3/8	10	RRI-010G	50	84	29	12.5	16.5	32	60	12	22
G 3/8 A		RRI-010A								14	
G 1	25	RRI-025G	70	110	53	23.0	27.5	27	55	18	38
G 1 A		RRI-025A		122							

NPT threads on request

Hose nozzle connection

D	DN	Types	H/L	L1	B	C	E	F	F1	X
Ø11	10	RRI-010T	50	96	11	12.5	16.5	32	60	21
Ø30	25	RRI-025T	70	176	30	23.0	27.5	27	55	45

Custom specific connectors on request

Handling and operation

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.

Ordering code

RRI- 1. 2. 3. 4. 5. 6. 7. 8. 9. 10.

❍=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		●
	050		Ø 5		●
	070		Ø 7		●
	080		Ø 8	●	
	120		Ø12	●	
	160		Ø16	●	
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.	**Signal output**				
	P		PNP		
	N		NPN		
	A	❍	NAMUR		
10.	**Electrical connection**				
	K		2 m cable		
	S	❍	for round plug connector M12x1, 4-pole		

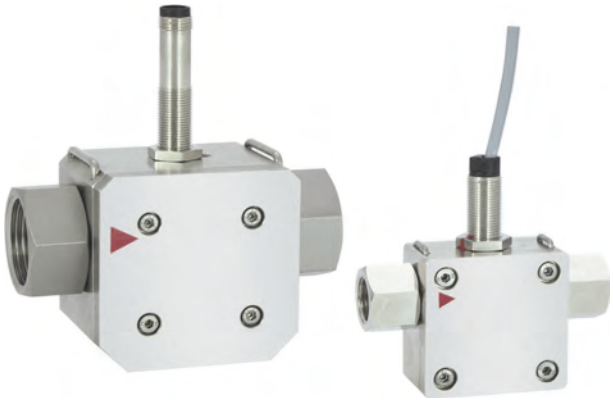
Options

- Rotor with titanium clamps

Accessories

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

Flow Transmitter 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**
- **Output signal PNP or NPN**
- **Intrinsically safe behaviour**
- **Optionally, non-return valve, filter, constant flow rate device in the connections**

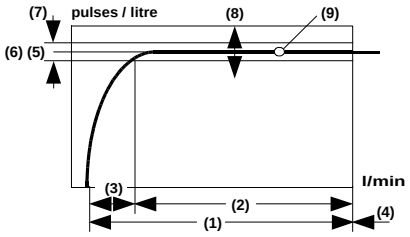
Characteristics

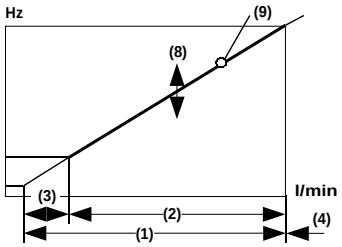
The flow meter consists of a spinner which is rotated by the flowing medium. The rotor's rotational speed is proportional to the flow volume per unit time. The rotor is fitted with magnets. A Hall sensor records the rotational speed, which is proportional to the flow rate.

Technical data

Sensor	hall element	
Nominal width	DN 10 (RRH-010) DN 25 (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)	
Pressure resistance	PN 100 bar	
Metering ranges	see table "Ranges"	
Medium temperature	0..100 °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	PVC cable 1.4305, 1.4301, CW614N nickelled	
Current consumption	30 mA	
Output current	max. 100 mA	
Electrical connection	cable 2 m or for Round plug connector M12x1, 4-pole	
Resistant to short circuits	yes	
Reversal polarity protected	yes	
Ingress protection	IP 67	
Weight	RRH-010	approx. 0.6 kg
	RRH-025	approx. 1.9 kg
Conformity	CE	





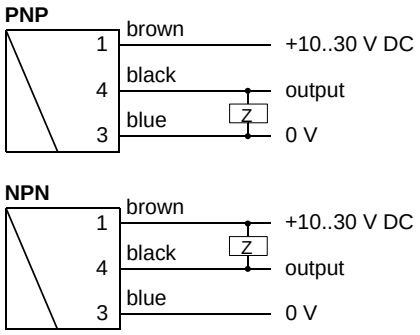
(1) Complete metering range
(2) Specific metering range
(3) Start-up range
(4) Extended operating range, increased wear, Dp > 0.5 bar
(5) Pulses / litre (details on label)
(6) Average pulses / litre
(7) Tolerance ±3 % of the measured value
(8) Scatter ±10 % of the pulses / litre value (5) in the batch
(9) Reproducibility (±1 % of the full scale value) is the repeat accuracy of a frequency, relative to l/min
(10) Max. frequency, related to the relevant metering range up to approx. 0.5 bar pressure drop across the flow meter

Ranges

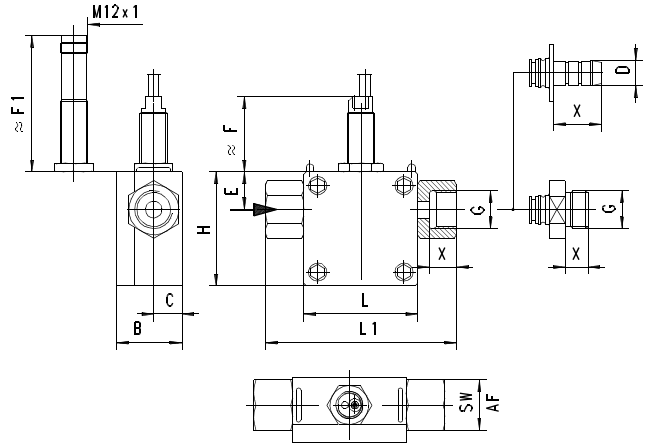
Types	Q_{max}	Metering range			Pulses / litre	frequency
RRH-	l/min H_2O	l/min H_2O				Hz EW
		(1)	(2)	(3)	(6)	(10)
010...020	1.8	0.1.. 1.5	0.5.. 1.5	0.1..0.5	4955	124
010...050	12.0	0.2..10.0	2.0.. 10	0.2..2.0	1632	272
010...070	14.4	0.4..12.0	2.0.. 12	0.4..2.0	860	172
025...080	36.0	2.0..30.0	3.0.. 30	2.0..3.0	544	272
025...120	72.0	3.0..60.0	5.0.. 60	3.0..5.0	295	295
025...160	120.0	4.0.. 100	6.0..100	4.0..6.0	126	210

The measured values were determined using a standing sensor in a horizontal flow of water at 25 °C.

Wiring



Dimensions



Threaded connection

G	DN	Types	H/L	L1	B	C	E	F	F1	X	SW
G 3/8	10	RRH-010G	50	84	29	12.5	16.5	33	60	12	22
G 3/8 A		RRH-010A								14	
G 1	25	RRH-025G	70	110	53	23.0	27.5	28	55	18	38
G 1 A		RRH-025A		122							

NPT threads on request

Hose nozzle connection

D	DN	Types	H/L	L1	B	C	E	F	F1	X
Ø 11	10	RRH-010T	50	96	29	12.5	16.5	33	60	21
Ø30	25	RRH-025T	70	176	53	23.0	27.5	28	55	45

Custom specific connectors on request

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.

Ordering code

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
RRH-								V		

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.	**Signal output**			
	P		PNP	
	N		NPN	
10.	**Electrical connection**			
	K		2 m cable	
	S	❍	for round plug connector M12x1, 4-pole	

Options

- Transparent cover DN 10
- Air or gas model

Accessories

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

Flow Switch LABO-RRI-S

- **Uncomplicated monitoring of flow rates**
- **No magnets; uses inductive sensor**
- **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**
- **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 LABO-RRI electronics make available an electronic switching output (push-pull) with adjustable characteristics (minimum/maximum) and hysteresis, which responds when an adjustable limit is fallen short of or exceeded.
If desired, the switching value can be set to the currently existing flow using "teaching".
Models with analog or pulse output are also available.

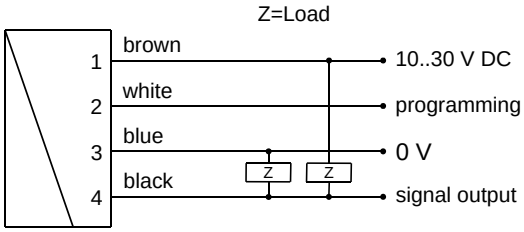
Technical data

Sensor	inductive	
Nominal width	DN 10 (LABO-RRI-010) DN 25 (LABO-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)	
Switching 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 $Zr0_2$-TZP
	Seal	FKM
Materials, non-medium-contact	Clamps	1.4301
	Electronic housing	CW614N nickelled
Supply voltage	10..30 V DC at voltage output 10 V: 15..30 V DC	
Power consumption	< 1 W (for no-load outputs)	
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.	
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 67	
Weight	LABO-RRI-010	approx. 0.2 kg
	LABO-RRI-025	approx. 0.5 kg
Conformity	CE	

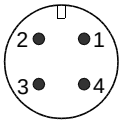
Ranges

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

Wiring



Connection example: PNP NPN

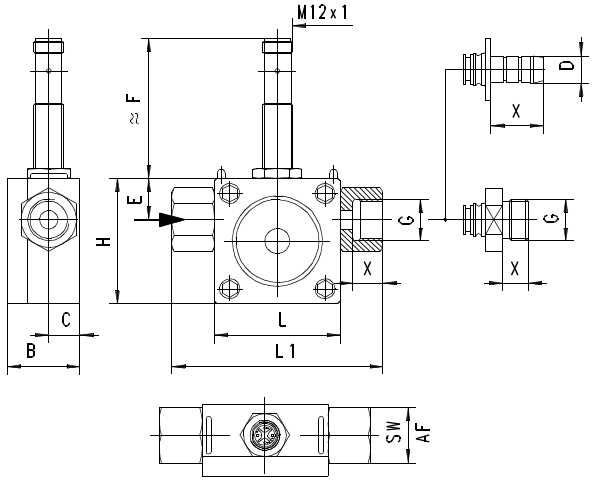


Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring.

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

Dimensions



Threaded connection

G	DN	Types	H/L	L1	B	C	E	F	X	SW
G $^3/_8$	10	RRI-010G	50	84	29	12.5	16.5	56	12	22
G $^3/_8$ A		RRI-010A							14	
G 1	25	RRI-025G	70	110	53	23.0	27.5	51	18	38
G 1 A		RRI-025A		122						

NPT threads on request

Hose nozzle connection

D	DN	Types	H/L	L1	B	C	E	F	X
Ø11	10	RRI-010T	50	96	29	12.5	16.5	56	21
Ø30	25	RRI-025T	70	176	53	23.0	27.5	51	45

Custom specific connectors on request

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.

Note

The switching value can be programmed by the user via "teaching". If desired, programmability can be blocked by the manufacturer.

The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

Operation and programming

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

- The flow rate 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 %.

Ordering code

The basic device is ordered e.g. RRI-010xxx with electronics e.g. LABO-RRI-010xxx

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

	10.	11.	12.	13.	14.	15.
LABO- RRI-		**S**				**S**

❍=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.	**Switching output (Limit switch)**			
	S	push-pull (compatible with PNP and NPN)		
12.	**Programming**			
	P	programmable (teaching possible)		
	N ❍	cannot be programmed (no teaching)		
13.	**Switching function**			
	L	minimum-switch		
	H	maximum-switch		
14.	**Switching signal**			
	O	standard		
	I ❍	inverted		
15.	**Electrical connection**			
	S	for round plug connector M12x1, 4-pole		

Options for LABO

Switching delay period (0.0..99.9 s) ___.___ s
(from Normal to Alarm)

Switch-back delay period (0.0..99.9 s) ___.___ s
(from Alarm to Normal)

Power-On delay period (0..99 s) ___ s
(after connecting the supply, time during which the switching output is not activated)

Switching output fixed at ___ l/min

Switching hysteresis ___ %
standard = 2 % of the metering range

Teach-offset ___ %
(in percent of the metering range)
standard = 0 %

Further options available on request.

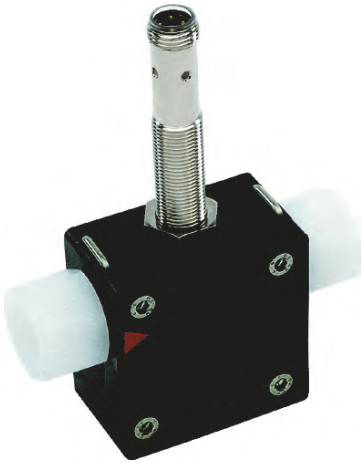
Options

- Rotor with titanium clamps

Accessories

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

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



- **Uncomplicated measurement of flow rates**
- **No magnets; uses inductive sensor**
- **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**
- **0..10 V, 4..20 mA , frequency/pulse output, completely configurable**
- **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 LABO-RRI electronics make various output signals available:

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

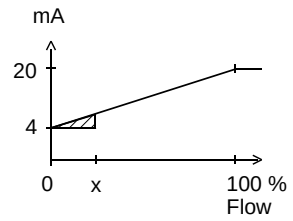
Technical data

Sensor	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 $Zr0_2$-TZP
	Seal	FKM
Materials, non-medium-contact	Clamps	1.4301
	Electronic housing	CW614N nickelled
Supply voltage	10..30 V DC at voltage output 10 V: 15..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. output frequency dependent on metering range, standard 500 Imp/l (corresponds to 666.7 Hz at 80 l/min) Rrange for small values: 5000 Imp/l (corresponds to 500 Hz at 6 l/min) (other frequencies available on request)	
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-RRI-I / U) or output status (LABO-RRI-F / C) (rapid flashing = Programming)	
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 67	
Weight	LABO-RRI-010	approx. 0.2 kg
	LABO-RRI-025	approx. 0.5 kg
Conformity	CE	

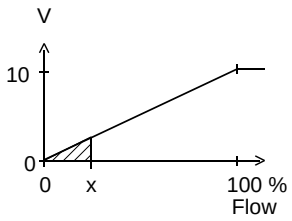
Signal output curves

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

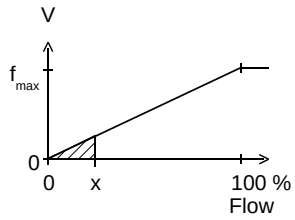
Current output



Voltage output



Frequency output



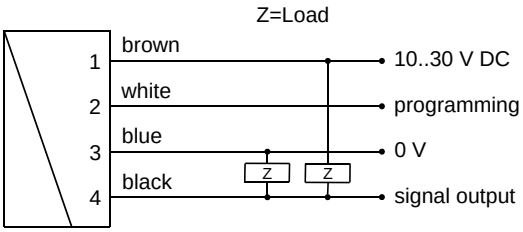
f_{max} selectable in the range of up to 2000 Hz

Other characters on request.

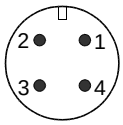
Ranges

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

Wiring



Connection example: PNP NPN

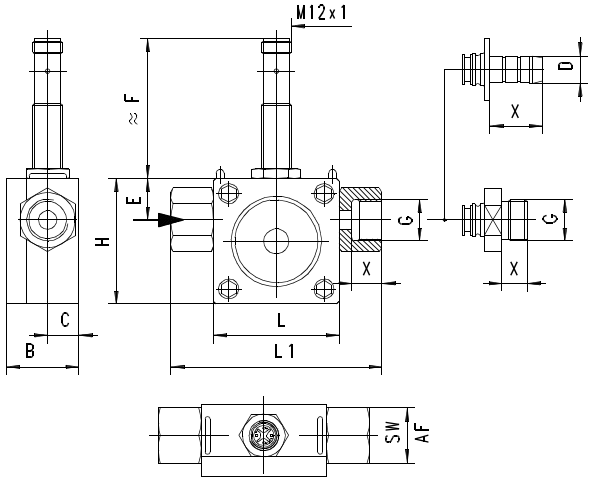


Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

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



Threaded connection

G	DN	Types	H/L	L1	B	C	E	F	X	SW
G 3/8	10	RRI-010G	50	84	29	12.5	16.5	56	12	22
G 3/8 A		RRI-010A							14	
G 1	25	RRI-025G	70	110	53	23.0	27.5	51	18	38
G 1 A		RRI-025A		122						

NPT threads on request

Hose nozzle connection

D	DN	Types	H/L	L1	B	C	E	F	X
Ø11	10	RRI-010T	50	96	29	12.5	16.5	56	21
Ø30	25	RRI-025T	70	176	53	23.0	27.5	51	45

Custom specific connectors on request

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.

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 flow rate 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 %.

If necessary, a far greater number of parameters can also be programmed using the ECI-1 device configurator.

Ordering code

The basic device is ordered e.g. RRI-010xxx with electronics e.g. LABO-RRI-010xxx

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

	10.	11.	12.
LABO-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.	**Signal output**		
	I		current output 4..20 mA
	U		voltage output 0..10 V
	F		frequency output (see "Ordering information")
	C		pulse output (see "Ordering information")
11.	**Programming**		
	N		cannot be programmed (no teaching)
	P	❍	programmable (teaching possible)
12.	**Electrical connection**		
	S		for round plug connector M12x1, 4-pole

Required ordering information

For LABO-RRI-F:

Output frequency at full scale ☐☐☐☐ Hz

Maximum value: 2.000 Hz

For LABO-RRI-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

- Rotor with titanium clamps

Accessories

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

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Flow Switch LABO-RRH-S

- **Uncomplicated monitoring 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**
- **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 LABO-RRH electronics make available an electronic switching output (push-pull) with adjustable characteristics (minimum/maximum) and hysteresis, which responds when an adjustable limit is fallen short of or exceeded.
If desired, the switching value can be set to the currently existing flow using "teaching".
Models with analog or pulse output are also available.

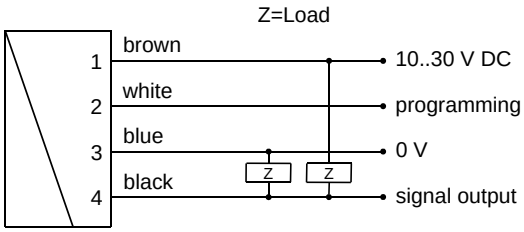
Technical data

Sensor	hall element	
Nominal width	DN 10 (LABO-RRH-010) DN 25 (LABO-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)	
Switching 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..60 °C, optionally 0..100 °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 housing	CW614N nickelled
Supply voltage	10..30 V DC at voltage output 10 V: 15..30 V DC	
Power consumption	< 1 W (for no-load outputs)	
Switching output	transistor output "push-pull" (resistant to short circuits and polarity reversal) I_{out} = 100 mA max.	
Display	yellow LED (On = Normal / Off = Alarm / rapid flashing = Programming)	
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 67	
Weight	LABO-RRH-010	approx. 0.6 kg
	LABO-RRH-025	approx. 1.9 kg
Conformity	CE	

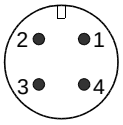
Ranges

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

Wiring



Connection example: PNP NPN

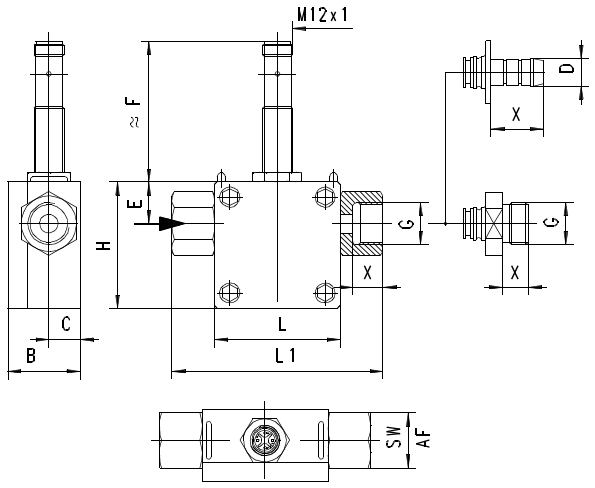


Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

It is recommended to use shielded wiring.

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

Dimensions



Threaded connection

G	DN	Types	H/L	L1	B	C	E	F	X	SW
G 3/8	10	RRH-010G	50	84	29	12.5	16.5	56	12	22
G 3/8 A		RRH-010A							14	
G 1	25	RRH-025G	70	110	53	23.0	27.5	51	18	38
G 1 A		RRH-025A		122						

NPT threads on request

Hose nozzle connection

D	DN	Types	H/L	L1	B	C	E	F	X
Ø11	10	RRH-010T	50	96	29	12.5	16.5	56	21
Ø30	25	RRH-025T	70	176	53	23.0	27.5	51	45

Custom specific connectors on request

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.

Note

The switching value can be programmed by the user via "teaching". If desired, programmability can be blocked by the manufacturer.

The ECI-1 device configurator with associated software is available as a convenient option for programming all parameters by PC, and for adjustment.

Operation and programming

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

- The flow rate 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).

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 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 %.

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Product Information

LABO-RRH-S

Ordering code

The basic device is ordered e.g. RRH-010xxx with electronics e.g. LABO-RRH-010xxx

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

	10.	11.	12.	13.	14.	15.	16.
LABO - RRH-		**S**				**S**	

❍=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.	**Switching output (Limit switch)**				
	S		push-pull (compatible with PNP and NPN)		
12.	**Programming**				
	P		programmable (teaching possible)		
	N	❍	cannot be programmed (no teaching)		
13.	**Switching function**				
	L		minimum-switch		
	H		maximum switch		
14.	**Switching signal**				
	O		standard		
	I	❍	inverted		
15.	**Electrical connection**				
	S		for round plug connector M12x1, 4-pole		
16.	**Optional**				
	H	❍	100 °C version (with 300 mm cable)		

Options for LABO

Switching delay period (0.0..99.9 s) ___.___ s
(from Normal to Alarm)

Switch-back delay period (0.0..99.9 s) ___.___ s
(from Alarm to Normal)

Power-On-Delay period (0..99 s) ___ s
(after connecting the supply, time during which the switching output is not activated)

Switching output fixed at ___ l/min

Switching hysteresis ___ %
standard = 2 % of the metering range

Teach-offset ___ %
(in percent of the metering range)
Standard = 0 %

Further options available on request.

Options

- Transparent cover DN 10
- Air or gas model

Accessories

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

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

- **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**
- **0..10 V, 4..20 mA , frequency/pulse output, completely configurable**
- **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 LABO-RRH electronics make various output signals available:

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

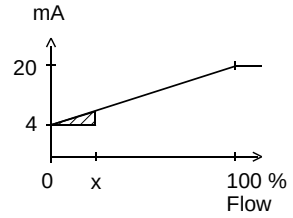
Technical data

Sensor	hall element	
Nominal width	DN 10 (LABO-RRH-010) DN 25 (LABO-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..60 °C, optionally 0..100 °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 housing	CW614N nickelled
Supply voltage	10..30 V DC at voltage output 10 V: 15..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. output frequency dependent on metering range, standard 500 Imp/l (corresponds to 666.7 Hz at 80 l/min) range for small values: 5000 Imp/l (corresponds to 500 Hz at 6 l/min) (other frequencies available on request)	
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-RRH-I / U) or output status (LABO-RRH-F / C) (rapid flashing = programming)	
Electrical connection	for round plug connector M12x1, 4-pole	
Ingress protection	IP 67	
Weight	LABO-RRH-010	approx. 0.6 kg
	LABO-RRH-025	approx. 1.9 kg
Conformity	CE	

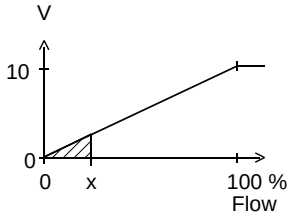
Signal output curves

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

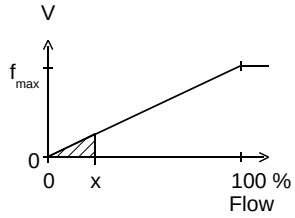
Current output



Voltage output



Frequency output



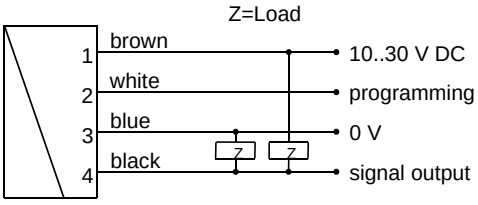
f_{max} selectable in the range of up to 2000 Hz

Other characters on request.

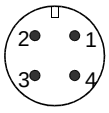
Metering ranges

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

Wiring



Connection example: PNP NPN

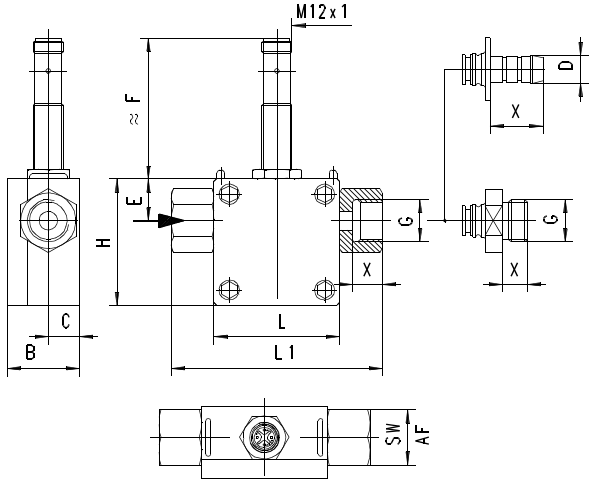


Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.

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



Threaded connection

G	DN	Types	H/L	L1	B	C	E	F	X	SW
G 3/8	10	RRH-010G	50	84	29	12.5	16.5	56	12	22
G 3/8 A		RRH-010A							14	
G 1	25	RRH-025G	70	110	53	23.0	27.5	51	18	38
G 1 A		RRH-025A		122						

NPT threads on request

Hose nozzle connection

D	DN	Types	H/L	L1	B	C	E	F	X
Ø11	10	RRH-010T	50	96	29	12.5	16.5	56	21
Ø30	25	RRH-025T	70	176	53	23.0	27.5	51	45

Custom specific connectors on request

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.

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 flow rate 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 %.

If necessary, a far greater number of parameters can also be programmed using the ECI-1 device configurator.

Ordering code

The basic device is ordered e.g. RRH-010xxx
with electronics e.g. LABO-RRH-010xxx

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

	10.	11.	12.	13.	14.
LABO-RRH-				**S**	

❍=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.	**Signal output**			
	I	current output 4..20 mA		
	U	voltage output 0..10 V		
	F	frequency output (see "Ordering information")		
	C	pulse output (see "Ordering information")		
12.	**Programming**			
	N	cannot be programmed (no teaching)		
	P ❍	programmable (teaching possible)		
13.	**Electrical connection**			
	S	for round plug connector M12x1, 4-pole		
14.	**Optional**			
	H ❍	100 °C version (with 300 mm cable)		

Required ordering information

For LABO-RRH-F:

Output frequency at full scale ☐☐☐☐ Hz

Maximum value: 2.000 Hz

For LABO-RRH-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

- Transparent cover DN 10
- Air or gas model

Accessories

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

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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.

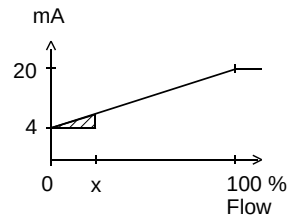
Technical data

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 $Zr0_2$-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 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	

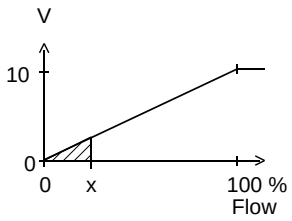
Signal output curves

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

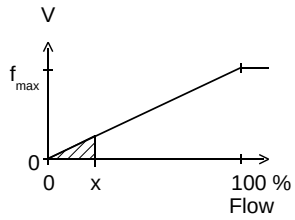
Current output



Voltage output



Frequency output



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

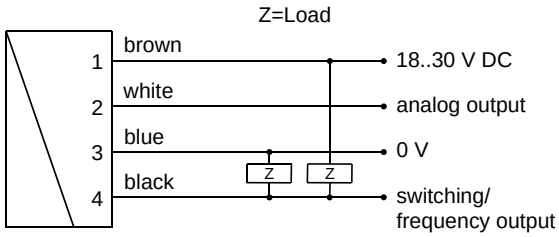
Other characters on request.

Ranges

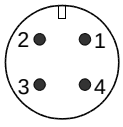
Metering range l/min (H_2O)	Types	Q_{max} l/min (H_2O)
0.1.. 1.5	FLEX-RRI-010...020	1.8
0.2.. 10.0	FLEX-RRI-010...050	12.0
0.4.. 12.0	FLEX-RRI-010...070	14.4
2.0.. 30.0	FLEX-RRI-025...080	36.0
3.0.. 60.0	FLEX-RRI-025...120	72.0
4.0.. 100.0	FLEX-RRI-025...160	120.0

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

Wiring

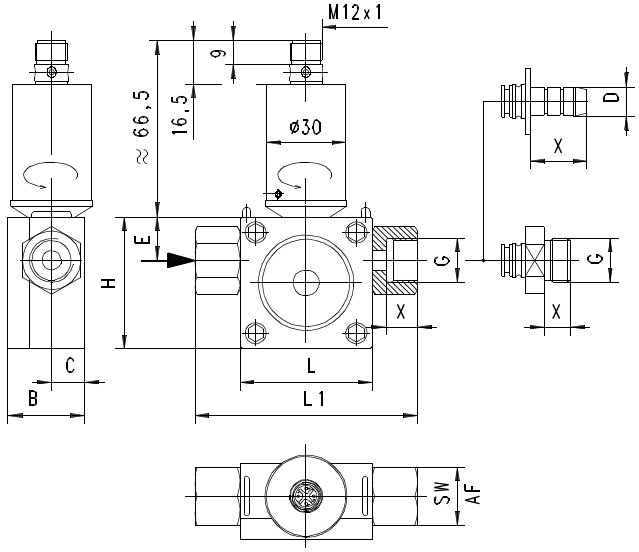


Connection example: PNP NPN



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					

NPT threads on request

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

Custom specific connectors on request

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).

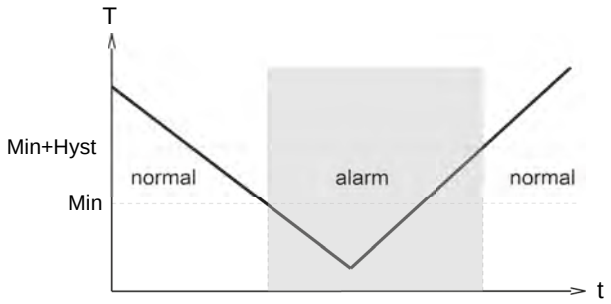
After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an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

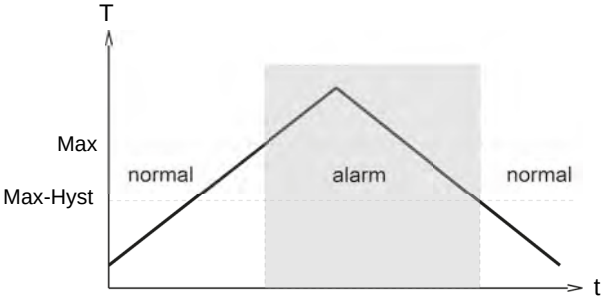
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

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

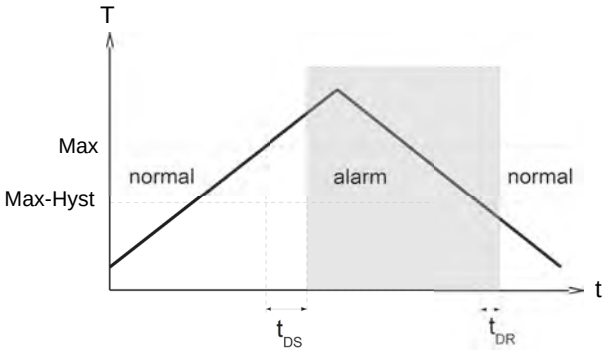
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



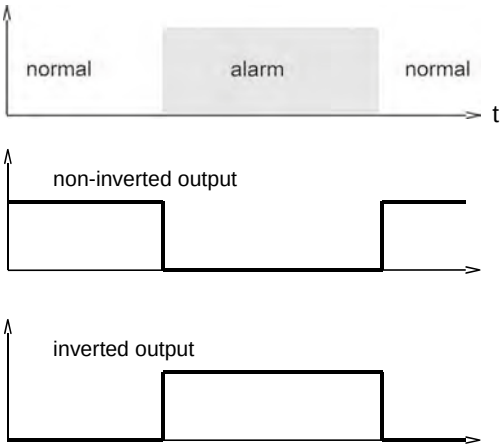
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



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.

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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

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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 $Zr0_2$-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 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	

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.

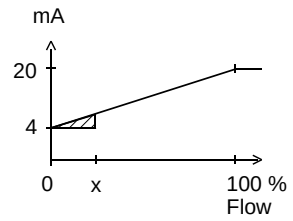
Technical data

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	

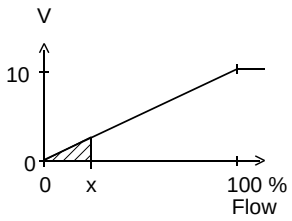
Signal output curves

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

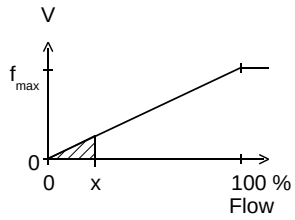
Current output



Voltage output



Frequency output



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

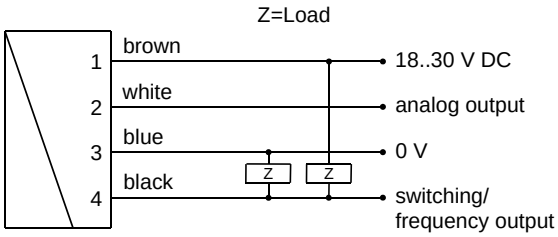
Other characters on request.

Ranges

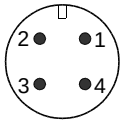
Metering range l/min (H_2O)	Types	Q_{max} l/min (H_2O)
0.1.. 1.5	FLEX-RRH-010...020	1.8
0.2.. 10.0	FLEX-RRH-010...050	12.0
0.4.. 12.0	FLEX-RRH-010...070	14.4
2.0.. 30.0	FLEX-RRH-025...080	36.0
3.0.. 60.0	FLEX-RRH-025...120	72.0
4.0.. 100.0	FLEX-RRH-025...160	120.0

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

Wiring

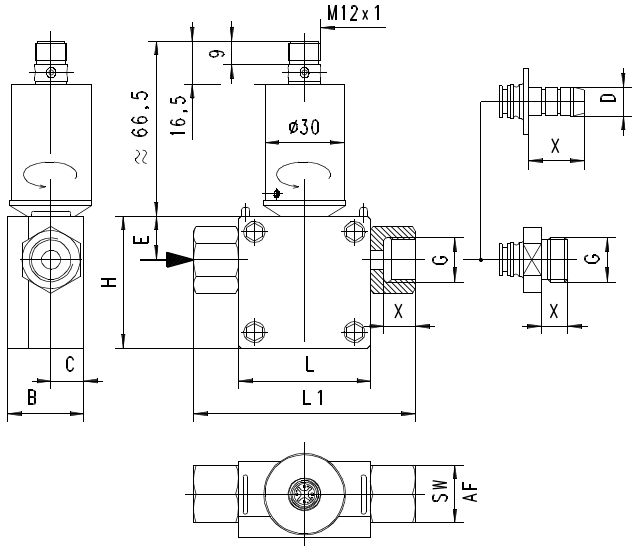


Connection example: PNP NPN



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					

NPT threads on request

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

Custom specific connectors on request

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).

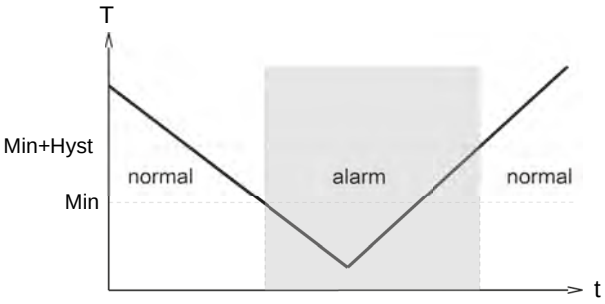
After the programming ("teaching"), the clip can either be left on the device, or removed to protect data.
The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching output.
In order to avoid the need to transit to an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

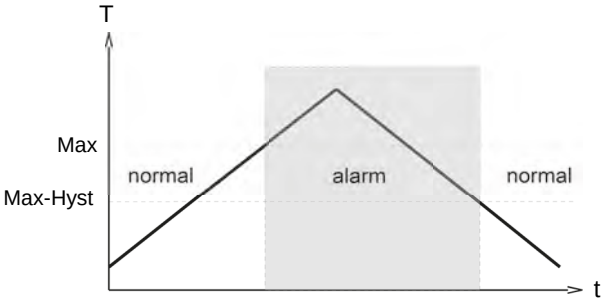
Normally, programming is used to set the limit switch. However, if desired, other parameters such as the end value of the analog or frequency output may also be set.

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

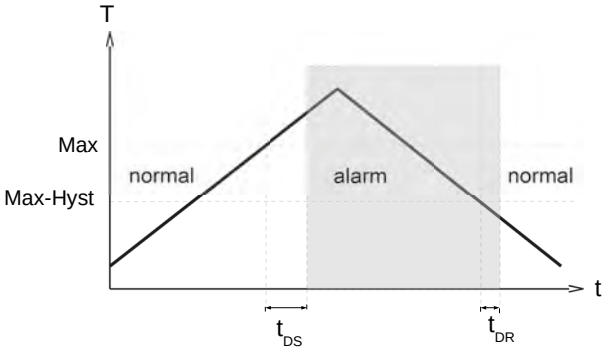
With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is again exceeded.



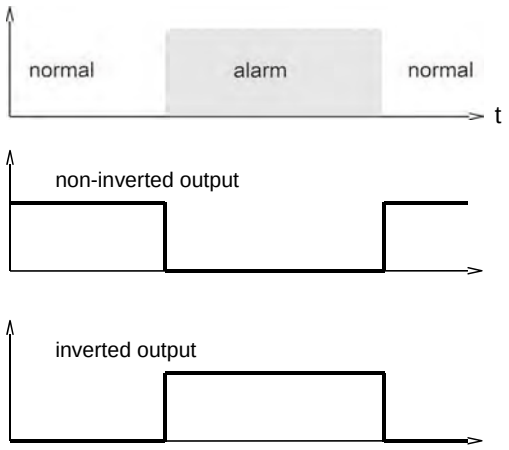
With a maximum-switch, exceeding the limit value causes a switchover to the alarm state. Return to the normal state occurs when the measured value once more falls below the limit value minus the set hysteresis.



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-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	

Flow Transmitter / Switch OMNI-RRI

- **Uncomplicated measurement of flow rates**
- **No magnets; uses inductive sensor**
- **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 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**
- **Designed for industrial use**
- **Small, compact construction**
- **Simple installation**
- **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 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.

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

Technical data

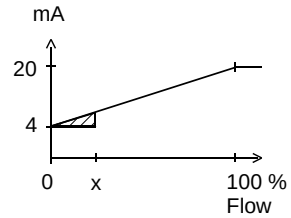
Sensor	inductive	
Nominal width	DN 10 (OMNI-RRI-010) DN 25 (OMNI-RRI-025)	
Mechanical Connection	female thread G $^3/_8$, G 1 male thread G $^3/_8$ A, G 1 A hose nozzle Ø11, Ø30 (other threaded, crimped, and plug-in connections, connections with constant flow rate device or limiters available on request)	
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 $Zr0_2$-TZP
	Seal	FKM
Materials, non-medium-contact	Clamps	1.4301
	Electronic adapter	CW614N nickelled
	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)
Weight	OMNI-RRI-010 approx. 0.4 kg OMNI-RRI-025 approx. 0.7 kg
Conformity	CE

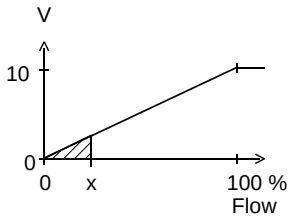
Signal output curves

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

Current output



Voltage output



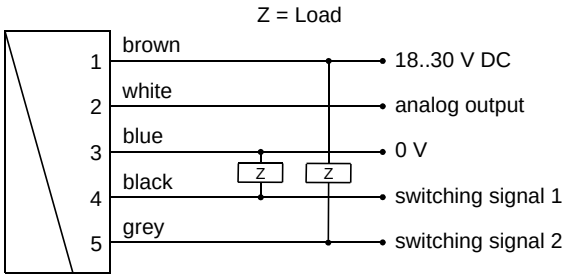
Other characters on request.

Ranges

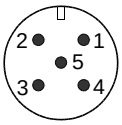
Metering range l/min (H_2O)	Types	Q_{max} l/min (H_2O)
0.1.. 1.5	OMNI-RRI-010...020	1.8
0.2.. 10.0	OMNI-RRI-010...050	12.0
0.4.. 12.0	OMNI-RRI-010...070	14.4
2.0.. 30.0	OMNI-RRI-025...080	36.0
3.0.. 60.0	OMNI-RRI-025...120	72.0
4.0.. 100.0	OMNI-RRI-025...160	120.0

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

Wiring



Connection example: PNP NPN

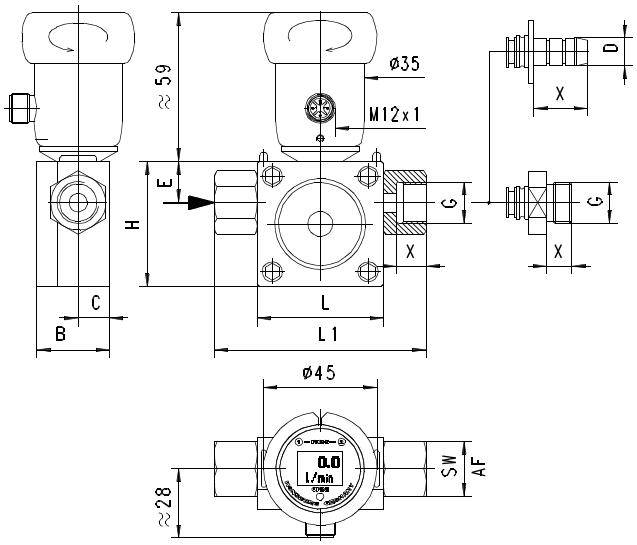


connector M12x1

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



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					

NPT threads on request

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

Custom specific connectors on request

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 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 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.

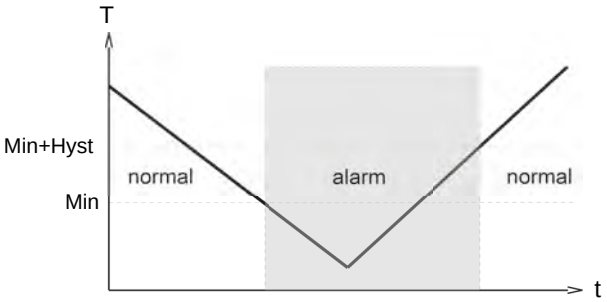
Edit, using position 2

If the currently visible parameter is to be modified:

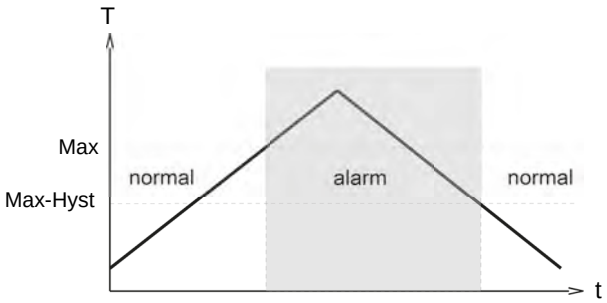
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the cursor moves to the next digit.
- Leave the parameter by turning to position 1 (until the 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-010...
with electronics e.g. OMNI-RRI-010...

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

	10.	11.	12.	13.	14.
OMNI-RRI-			**S**		

❍=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 0/4..20 mA		●
	U ❍	voltage output 0/2..10 V		●
	K	ohne	●	
12.	**Electrical connection**			
	S	for round plug connector M12x1, 5-pole		
13.	**Option**			
	H	gooseneck		
	O ❍	tropical model - oil-filled version for heavy duty or external use		
14.	**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

- 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-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 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**
- **Designed for industrial use**
- **Small, compact construction**
- **Simple installation**
- **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 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.

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

Technical data

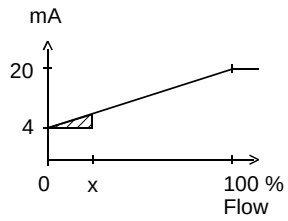
Sensor	Hall element	
Nominal width	DN 10 (OMNI-RRH-010)	
	DN 25 (OMNI-RRH-025)	
Process connection	female thread G $^3/_8$, G 1 male thread G $^3/_8$ A, G 1 A hose nozzle Ø11, Ø30 (other threaded, crimped, and plug-in connections, connections with constant flow rate device or limiters available on request)	
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, with gooseneck 0..+100 °C	
Storage temperature	-20..+70 °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
	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)
Weight	OMNI-RRH-010 approx. 0.8 kg OMNI-RRH-025 approx. 2.1 kg
Conformity	CE

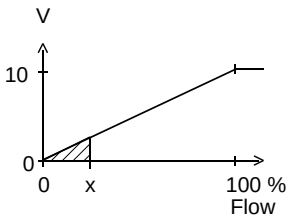
Signal output curves

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

Current output



Voltage output



Other characters on request.

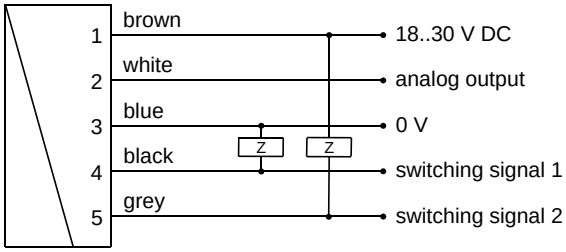
Ranges

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

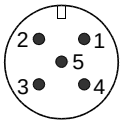
The measured values were determined with horizontal flow (OMNI electronics upwards) using water at 25 °C.

Wiring

Z = Load



Connection example: PNP NPN

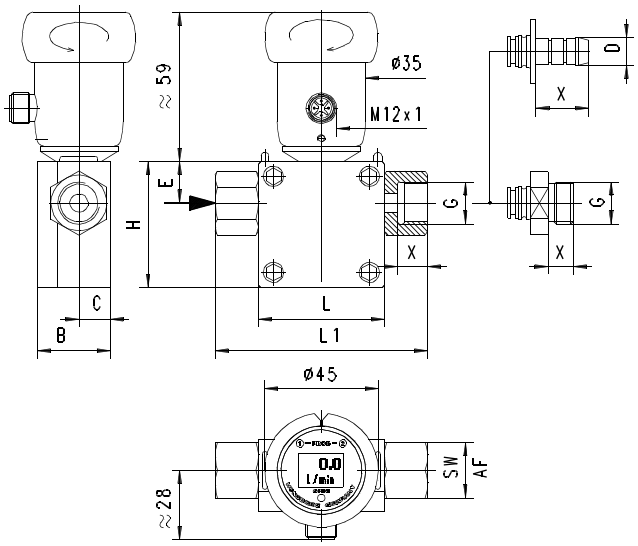


connector M12x1

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



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					

NPT threads on request

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

Custom specific connectors on request

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 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 significantly. 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 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.

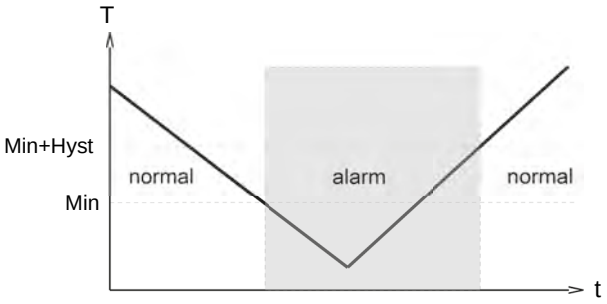
Edit, using position 2

If the currently visible parameter is to be modified:

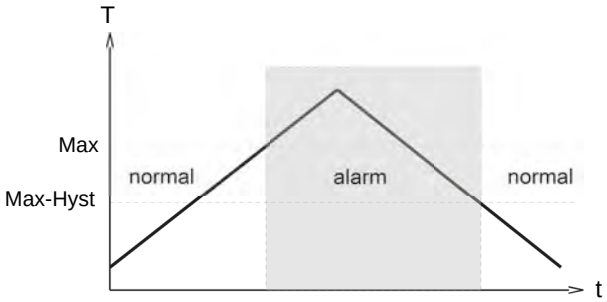
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the cursor moves to the next digit.
- Leave the parameter by turning to position 1 (until the 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. RRH-010...
with electronics z.B. OMNI-RRH-010...

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

	10.	11.	12.	13.	14.
OMNI-RRH-			**S**		

❍=Option

1.	**Nominal width**			
	010		DN 10 - G 3/8	
	025		DN 25 - G 1	
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 - G 3/8	●
	025		DN 25 - G 1	●
11.	**Analog output**			
	I		current output 0/4..20 mA	●
	U	❍	voltage output 0/2..10 V	●
	K		without	●
12.	**Electrical connection**			
	S		for round plug connector M12x1, 5-pole	
13.	**Option 1**			
	H		gooseneck	
	O	❍	tropical model oil-filled version for heavy duty or external use	
14.	**Option 2**			
	C	❍	Counter C	
	C1	❍	Counter C1	

OMNI-C Counter

Counter for flow transmitters:
- Piston
- Dynamic diaphragm
- Rotor
- Turbine
- Gear
- Screw
- Calorimetry
- MID
- Vortex

- **Simple totalisation**
- **Simple filling counter with programmable end signal**
- **Control switchover at present value**
- **Automatic, dynamic change of display unit and decimal places in the graphics display**
- **Antivalent outputs**
- **Simple guided menu via graphics display**

Characteristics

The totaliser of the OMNI flow rate system enables a totalisation or measurement of consumption for all HONSBERG device families (for fluids and gases) with which the OMNI system is compatible; this is independent of the input signal, pulse or analogue input, and of the measurement process.

Simple filling control is also possible. Here, the counter can be set to count upwards or downwards.
When the preset point is reached, a switching signal is emitted which is available in antivalent form to two outputs.
Resetting can be carried out by means of a signal input or also by a programming ring.

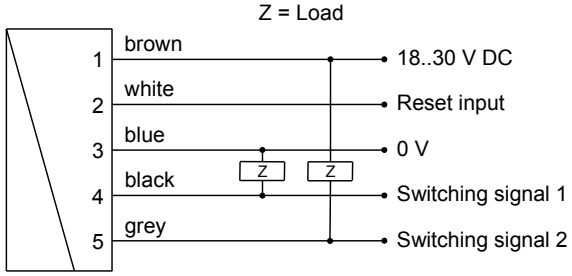
The state of the counter is indicated in an LCD display with only four digits. Here, the number of decimal places and the unit displayed is continuously matched to the current state of the counter. In this case, the smallest value which can be displayed is 0.001 ml (= 1 µl), and the largest is 9999 m³. The counter therefore has 13 places, of which the four most significant are displayed at any one time. The display resolution at all times is therefore at least 1 per thousand of the displayed value, or better, and this generally exceeds the accuracy of the connected flow transmitter. The non-displayed digits of the counter are in that case irrelevant to the accuracy of the measurement.
The automatic dynamic changeover of units in the display in relation to the state of the counter makes the value easy to read in spite of a display with only four digits. In addition, user configuration of the counter is unnecessary.

In addition to the totalised value, the present flow rate can be displayed.

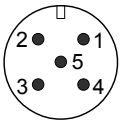
Technical data

Counter range	0.000 ml to 9999 m³ with automatic setting of the decimal places and of the applicable unit.
Switching signal outputs (Pin 4 + 5)	2 x pushpull output, max. 100 mA, resistant to short circuits and polarity reversal, antivalent states, configurable on the device as a wipe or edge signal
Counter reset signal (Pin 2)	Input 18..30 V resistant to short circuits and reversed polarity PIN 2, wiper signal, positive or negative edge can be selected locally

Wiring



Connection example: PNP NPN



Before the connecting the supply voltage, it must be ensured that this corresponds with the data sheet! The use of shielded cabling is recommended

Sensor connection to OMNI-C-TA, see dimensions.

Handling and operation

Installation

For assembly, please observe the handling instructions for the different device versions.

After assembly, it is possible to move the sensor head to the most optimal reading position opposite the sensor part using its rotating function.

Programming

On the display, the counter indicates the state of the totaliser as a value and unit. The units ml, L, m³ are set automatically.

For operation as a totaliser, no configuration by the user is necessary.

To use the other functions, configuration may be required. This is carried out using the programming ring located on the device.

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 dialogue with the display messages, which makes its use very simple.

The control display of the present flow rate depends on the metering range of the selected flow transmitter, and has already been set appropriately in the factory (ml/min, l/min, l/h, m³/h).
It is activated by turning the ring to position 1
After 10 seconds, the display automatically returns to the totaliser mode.

For operation as a preset counter, the following must be set:

1. The preset point
2. The type of output signal ("Preset has been reached"):
   Signal edge / wiper pulse
   width of the wiper pulse, if required
3. The unit of the preset point:
   (ml, litre, m³).

Starting from the normal display (total and unit), if 1 (Step) is selected repeatedly, then the counter shows the following information:

- Normal display is total and unit (e.g. litre)
- Display of present value (e.g. l/min)
- Preset point incl. type of switching output.
- Code

The code gives access to various input levels into which parameters can be entered (so that this does not occur inadvertently, the code must be entered!).

Code 111:

- Gate time (available only for sensors which transmit frequency)
- Filter time
- Direction of count (pos / neg)
- Unit for switching value reset point
- Decimal place for switching value / reset point
- Switching type for switching value (edge / wiper signal)
- Pulse duration (for wiper signal)
- Reset method (manual / via signal)

Code 100:

- Manual reset for totaliser

The detailed flow chart for operation is available in the "Operating instructions for OMNI-C".

Combination examples

Vortex CF..	
Calorimetric F.. (separate data sheet)	
Calorimetric FG.. (separate data sheet)	
Calorimetric FIN..	
Magnetic inductive FIS.. (separate data sheet)	
Piston HD.. HR.. MR..	
Magnetic inductive MID1..	
Panel mounting **OMNI-TA** (separate data sheet)	
Rotor RR..	
Turbine RT..	
Screw VHS..	

Gear VHZ..	
Dynamic diaphragm XF..	

OMNI-C Counter

Counter for flow transmitters:
- Piston
- Dynamic diaphragm
- Rotor
- Turbine
- Gear
- Screw
- Calorimetry
- MID
- Vortex

- **Simple totalisation**
- **Simple filling counter with programmable end signal**
- **Control switchover at present value**
- **Automatic, dynamic change of display unit and decimal places in the graphics display**
- **Antivalent outputs**
- **Simple guided menu via graphics display**

Characteristics

The totaliser of the OMNI flow rate system enables a totalisation or measurement of consumption for all HONSBERG device families (for fluids and gases) with which the OMNI system is compatible; this is independent of the input signal, pulse or analogue input, and of the measurement process.

Simple filling control is also possible. Here, the counter can be set to count upwards or downwards.
When the preset point is reached, a switching signal is emitted which is available in antivalent form to two outputs.
Resetting can be carried out by means of a signal input or also by a programming ring.

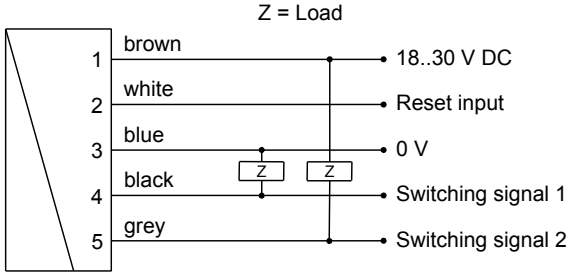
The state of the counter is indicated in an LCD display with only four digits. Here, the number of decimal places and the unit displayed is continuously matched to the current state of the counter. In this case, the smallest value which can be displayed is 0.001 ml (= 1 µl), and the largest is 9999 m³. The counter therefore has 13 places, of which the four most significant are displayed at any one time. The display resolution at all times is therefore at least 1 per thousand of the displayed value, or better, and this generally exceeds the accuracy of the connected flow transmitter. The non-displayed digits of the counter are in that case irrelevant to the accuracy of the measurement.
The automatic dynamic changeover of units in the display in relation to the state of the counter makes the value easy to read in spite of a display with only four digits. In addition, user configuration of the counter is unnecessary.

In addition to the totalised value, the present flow rate can be displayed.

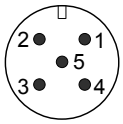
Technical data

Counter range	0.000 ml to 9999 m³ with automatic setting of the decimal places and of the applicable unit.
Switching signal outputs (Pin 4 + 5)	2 x pushpull output, max. 100 mA, resistant to short circuits and polarity reversal, antivalent states, configurable on the device as a wipe or edge signal
Counter reset signal (Pin 2)	Input 18..30 V resistant to short circuits and reversed polarity PIN 2, wiper signal, positive or negative edge can be selected locally

Wiring



Connection example: PNP NPN



Before the connecting the supply voltage, it must be ensured that this corresponds with the data sheet! The use of shielded cabling is recommended

Sensor connection to OMNI-C-TA, see dimensions.

Momentary value indicator, transmitter and meter OMNI-C1 electronics

Counter for flow transmitters:
- Piston
- Dynamic diaphragm
- Rotor
- Turbine
- Gear
- Screw
- MID
- Vortex

- **Momentary value indicator and totalisation**
- **Pulse output with adjustable pulse per volume**
- **Antivalent outputs**
- **Analogue output of the momentary value**
- **Simple guided menu via graphics display**

Characteristics

The local OMNI-C1 electronics offers a momentary value indicator and a totalisation of the flow rate quantity.

The momentary value is output at the analogue output as a 4..20 mA signal (or optionally as a 0..10 V signal).
In addition, the electronics has a pulse output, which outputs a pulse after a preset quantity with a duration of 36 ms. The pulse is available at two switching outputs in anitvalent form.

The primary displayed value is the flow rate. Using the programming ring, you can temporarily switch to the totalisation.

The state of the totalisation is indicated in an LCD display with only four digits. Here, the number of decimal places and the unit displayed is continuously matched to the current state of the counter. In this case, the smallest value which can be displayed is 0.001 ml (= 1 µl), and the largest is 9999 m³. The counter therefore has 13 places, of which the four most significant are displayed at any one time. The display resolution at all times is therefore at least 1 per thousand of the displayed value, or better, and this generally exceeds the accuracy of the connected flow transmitter. The non-displayed digits of the counter are in that case irrelevant to the accuracy of the measurement.
The automatic dynamic changeover of units in the display in relation to the state of the counter makes the value easy to read in spite of a display with only four digits. In addition, user configuration of the counter is unnecessary.

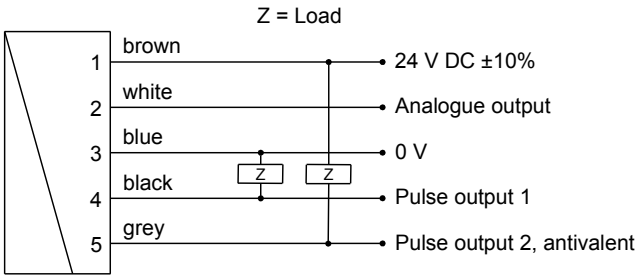
Counter C:

Instead of the counter option C1 the counter option C is available (see corresponding datasheet). It offers a totalizer with adjustable preset value and external reset. This allows to realize a filling control application for example. Additionally the actual flow rate value can be displayed, however without an analog output.

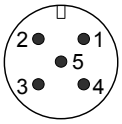
Technical data

Counter range	0.000 ml to 9999 m³ with automatic setting of the decimal places and of the applicable unit
Pulse outputs (Pin 4 + 5)	2 x pushpull output, max. 100 mA, resistant to short circuits and polarity reversal, antivalent statuses, pulse width 36 ms

Wiring



Connection example: PNP NPN



Plug connector M12x1

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

Handling and operation

Installation

For assembly, please observe the handling instructions for the different device versions.

After assembly, it is possible to move the sensor head to the most optimal reading position opposite the sensor part using its rotating function.

Programming

The resetting of the meter to zero takes place through the programming.

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.

On the display, the meter indicates the current flow rate as a value and unit. For this purpose, no adjustments by the user are necessary.

To use the other functions, configuration may be required. This is carried out using the programming ring located on the device.

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 dialogue with the display messages, which makes its use very simple.

Rotating the ring once to Pos. 1 displays the totaliser status. In the process, the unit is automatically set to the quantity already counted.
After 10 seconds, the display automatically returns to the momentary value mode.
If the ring is turned to position 1 again while the totaliser status is shown, the code input is reached.
The code gives access to various input levels into which parameters can be changed (so that this does not occur inadvertently, the code must be entered!).

Code 100:

Reset for totaliser

Code 111:

Filter	Enables the input of a filter time in multiple levels The filter time describes the time after which a volatile change in flow occurs until the display value has adopted the new value
PlsUnit	Enables the input of the unit of the pulse volume (pulse per volume), e.g. cm³, Litre, m³
PlsVal	Enables the input of the meter value of the pulse flow (0..9999)
Output	Enables switching of the analogue output between 0..20 mA and 4..20 mA (optionally (0..10 V and 2..10 V)
4 mA	Defines the momentary value at which 4 mA should be output
20 mA	Defines the momentary value at which 20 mA should be output

Combination examples

Vortex CF..	
Calorimetric F.. (separate data sheet)	
Calorimetric FG.. (separate data sheet)	
Calorimetric FIN..	
Magnetic inductive FIS.. (separate data sheet)	
Piston HD.. HR.. MR..	
Magnetic inductive MID1..	
Panel mounting **OMNI-TA** (separate data sheet)	
Rotor RR..	
Turbine RT..	
Screw VHS..	

Gear VHZ..	
Dynamic diaphragm XF..	

Gerätekonfigurator ECI-1

- **Vor Ort verwendbar für:**
  - **Parameteränderung**
  - **Firmware-Update**
  - **Justierung der Ein- und Ausgänge**
- **Anschließbar über USB**

Merkmale

Der Gerätekonfigurator ECI-1 ist ein Interface, das den Anschluss von mikrocontrollergesteuerten HONSBERG-Sensoren an den USB-Port eines Computers gestattet.
In Verbindung mit der Windows-Software "HONSBERG Device Configurator" ermöglicht er

- die Änderung aller Konfigurationseinstellungen des Sensors
- das Auslesen von Messwerten
- die Justage der Ein- und Ausgänge
- Firmware-Updates

Technische Daten

Hilfsspannung	12..30 V DC (abhängig vom angeschlossenen Sensor) und über USB
Leistungsaufnahme	< 1 W
Anschluss	
Sensor	Kabelbuchse M12x1, 5-polig, gerade Länge ca. 50 cm
Zuleitung	Gerätestecker M12x1, 5-polig
USB	USB-Buchse Typ B
Betriebstemperatur	0..+50 °C
Lagertemperatur	-20..+80 °C
Gehäuseabmessungen	98 mm (L) x 64 mm (B) x 38 mm (H)
Gehäusewerkstoff	ABS
Schutzart	IP 40

Handhabung und Betrieb

Anschluss

Der Gerätekonfigurator ist für den vorübergehenden Anschluss in der Applikation bestimmt. Er wird zwischen die vorhandene Zuleitung des Sensors und den Sensor geschaltet. Die Versorgung erfolgt über die Sensorversorgung und den USB-Port des Computers. Im inaktiven Zustand (ohne Kommunikation) verhält sich der Konfigurator völlig neutral, alle Signale des Sensors stehen der Applikation weiterhin zur Verfügung. Bei Kommunikation zwischen Computer und Sensor werden die Signalleitungen im Konfigurator aufgetrennt, so dass in diesem Zustand die Ausgangssignale des Sensors nicht zur Verfügung stehen.

Zum Anschluss 4-poliger Zuleitungen ohne Mittelbohrung an den eingebauten 5-poligen Gerätestecker wird der Adapter K04-05 mitgeliefert. 4-polige Zuleitungen mit Mittelbohrung können ohne Adapter verwendet werden.

Bestellschlüssel

Gerätekonfigurator (Lieferumfang siehe Abbildung unten)	**ECI-1**

Lieferumfang:

1. Gerätekonfigurator ECI-1
2. USB-Kabel
3. Adapter K04-05
4. Stecker KB05G
5. Kabel K05PU-02SG
6. Tragekoffer

(Software und Steckernetzteil sind nicht im Lieferumfang enthalten)

Zubehör:

Software 'Device Configurator 1.00' Beschreibung der Software siehe Datenblatt „EDC“	**EDC 1.00**
Steckernetzteil 24 V DC (mit montiertem Rundsteckverbinder, 5-polig) 	**EPWR24-1**

Ersatzteile:

M12x1-Adapter 4- / 5-polig	**K04-05**
PUR-Kabel, 5-polig, abgeschirmt mit Rundsteckverbinder M12x1	**K05PU-02SG**
Rundsteckverbinder M12x1, 5-polig (ohne Kabel)	**KB05G**

On Site Electronics ESA1

- **Compact local display and switching module for RRI / H Flow Sensors**
- **Switching point displayed optionally**
- **Switching point can be set without process condition**
- **Display of the switching value via red LED signal lamp**

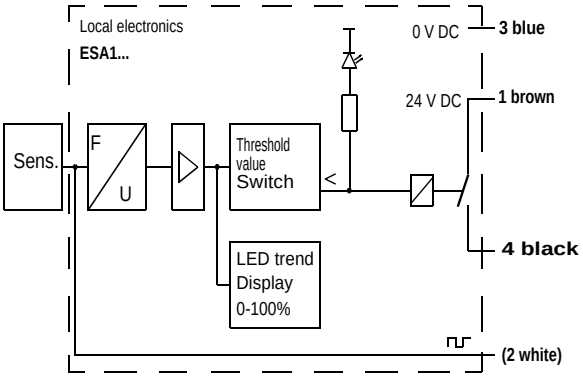
Characteristics

The electronics consist of a primary sensor, which is able to detect the rotor blade of the flow meter (inductive or Hall sensor depending on the material of the transmitter) and a calibratable F / U convertor, which presents the detected frequency on a trend display, and which allows the comparator and therefore the "min switching value" to be set via an adjustable potentiometer. Switch opens when there is a fault (< switching point)

Technical data

Sensor	see "Ordering code"
Working ranges	see relevant flow meter
Measurement accuracy	
Operating pressure	
Operating temperature for the electronics	max. 60 °C
Materials	PA6.6
Supply voltage	24 V DC ±10 %
Power consumption	1,5 W
Limit values	normally open (n.o.) (24 V DC, 24 W)
Hysteresis	set to 2 % at the factory
Display	12 LEDs (green)= current value and option to display switching value. LED (red) =< min
Electrical connection	for round plug connector M12x1, 4-pole, cable outlet optionally available
Ingress protection	IP 60

Terminal assignment

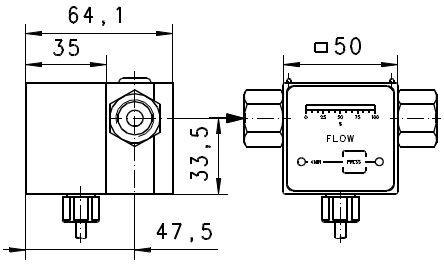


Before the electrical installation, it must be checked that the supply voltage corresponds with the data sheet. The "min." relay contact is to be used exclusively for signal voltages. If a higher powered relay is to be actuated, then connect a free-wheeling diode above the power relay, in order to reduce induction spikes.

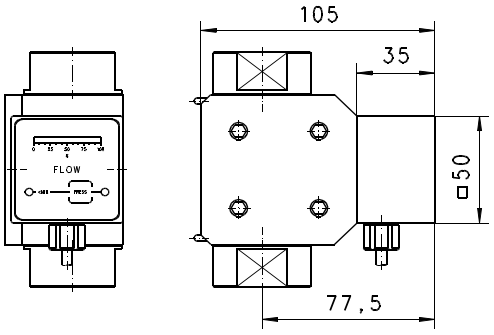
The changeover contact is depicted in the rest state (no supply voltage). The "in range" status accordingly corresponds to the tensed state. If the power to the sensor is lost, the relay then also returns to the rest state.

Dimensions

ESA1-RR.-010



ESA1-RR.-025



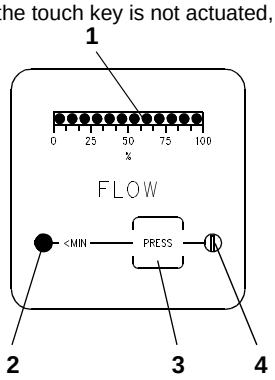
Handling and operation

Installation

It should be ensured that the flow meter and the ESA1 electronics are matched to each other (same production number).
The ESA1 electronics must be full inserted into the Rototron flow meter in order to detect the signal securely. For RR.25... there is the option of turning the converter by 90 ° in order to create the most suitable reading position. For RR.10... the position should be stated when ordering).
The stainless steel clamps prevent the electronics from coming away from the base unit, even if there is vibration.

Adjustment

Together with the corresponding flow meters, the ESA1 electronics create an adjustable flow meter with trend display (1). When the switching point is fallen short of, the output goes from 24 V DC to 0 V (open status).
The switching point can be displayed at any time by pressing the "Press" button (3) and can be adjusted by simultaneously turning the potentiometer (4). A red LED (2) indicates when the switching point has been fallen short of.
If the touch key is not actuated, the present value is displayed.



1. Trend display (12 x LED green)

2. <min. display (LED red)

3. Touch key (displays switching point)

4. Potentiometer for setting the min.-signal (simultaneously 3)

Ordering code

The base device is ordered, e.g. RRI-xxx with the signal output E and the evaluation electronics described here e.g. ESA1-RRI-xxx.

	1.	2.		3.	4.
ESA1-			-		

❍=Option

1.	**For types**	
	RR	for flow meter RR
2.	**Sensor**	
	I	inductive (for flow meter RRI)
	H	hall (for flow meter RRH)
3.	**Nominal width**	
	010	for flow meter size DN 10
	025	for flow meter size DN 25
4.	**Electrical connection**	
	S	for round plug connector M12x1, 4-pole
	K ❍	cable outlet 2 metres

Options

- Ingress protection IP 65

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Fixing clamps RR.-010
- Fixing clamps RR.-025

On Site Electronics ESK2

- **Controller electronics for RRI / H flow meter**
- **2 electronic switching outputs**
- **Setting the set points using a magnet**
- **Switching status display with LEDs**

Characteristics

With an inductive or a Hall sensor (with or without bias), the electronics record the rotational movements of a rotor blade. Here, the rotor's rotational speed is proportional to the flow rate. A microcontroller records the frequency, and if the minimum value is fallen short of (ALARM1) or the maximum value is exceeded (ALARM2), it changes over the relevant electronic output.

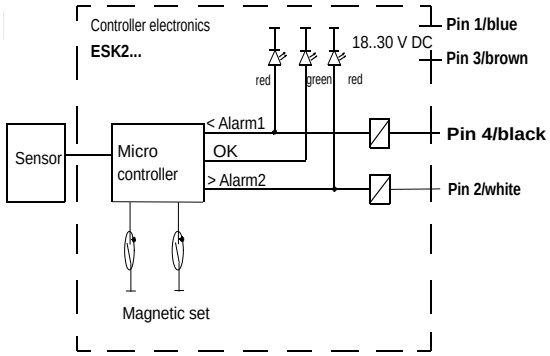
The transistor outputs are designed in such a way that they can be switched as both an NPN or as a PNP output, without needing to make a change on the device. The status of the outputs is indicated at the front of the device by two red and one green LEDs.

The compact electronics are connected directly to a suitable transmitter (see "Dimensions")

Technical data

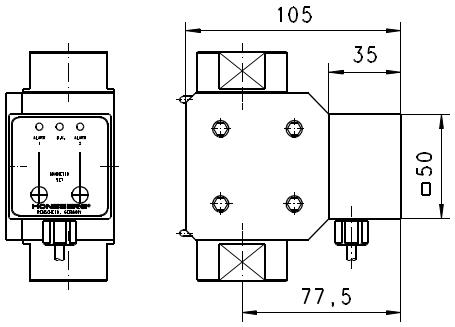
Sensor	inductive proximity switch
Working ranges	see relevant flow meter
Measurement accuracy	
Operating pressure	
Operating temperature for the electronics	-20..+80 °C
Operating temperature	max. 80 °C
Materials	PA6.6
Supply voltage	18..30 V DC
Current consumption	< 30 mA (outputs not connected)
Outputs	electronic, connectable as NPN / PNP
Current under load	max. 200 mA / output
Electrical connection	for round plug connector M12x1, 4-pole Optionally cable outlet
Ingress protection	IP 60

Terminal assignment



Dimensions

ESK2-RR025



Handling and operation

Installation

The ESA2 electronics must be fully inserted into the RR10 / 25 (Rototron) flow meter in order to detect the signal securely. For RR.25... there is the option of turning the converter by 90 ° in order to create the most suitable reading position. For RR.10... the position should be stated when ordering.
The function of the LEDs:

- The green LED lights when the flow rate is greater than alarm 1 and less than Alarm 2 (both outputs are at the supply voltage).
- A red LED lights when the minimum value is fallen short of (Alarm 1) or the maximum value is exceeded (Alarm 2) (associated output has 0 V)
- The red LEDs flash alternately when the microcontroller has a short circuit, or has detected an overload at one of the outputs or an internal error (both outputs show 0 V).

Adjustment

- There are two magnetic areas at the front (magnetic set), with the aid of which the minimum and the maximum values can be set:
- When a magnet is placed on one of the surfaces, the green and the related red LED then flash alternately for 4 seconds. Then both LEDs light simultaneously for 2 seconds.
- If the magnet is removed from the surface during the 2 second period, the currently existing flow rate is saved as the switching value.
- If the magnet is removed earlier or later, then the old value is retained without modification.

Ordering code

The base device is ordered, e.g. RRI-xxx with the signal output E and the electronics described here e.g.
ESK2-RRI- xxx.

	1.	2.		3.	4.
ESK2-			-		

❍=Option

1.	**For types**		
	RR		for flow meter RR
2.	**Sensor**		
	I		inductive sensor
	H		hall sensor
3.	**Nominal width**		
	010		for flow meter size DN 10
	020		for flow meter size DN 20
	025		for flow meter size DN 25
4.	**Electrical connection**		
	S		for round plug connector M12x1, 4-pole
	K	❍	cable outlet 2 m

Options

- Ingress protection IP 65

Accessories

- Cable/round plug connector (KB...)
  see additional information “Accessories”
- Fixing clamps RR.-010
- Fixing clamps RR.-025

Controller Electronics ESK3

- **Controller electronics with 230 V AC supply**
- **Switch contact for high loads**
- **Red / green switching status display**
- **Simple to use**

Characteristics

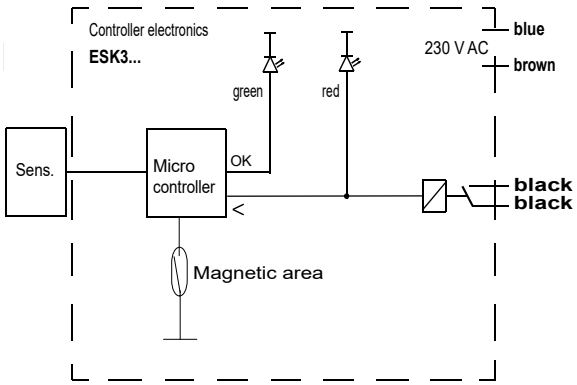
With an inductive or a Hall sensor (with or without bias), the electronics record the rotational movements of a rotor blade. The rotational speed is proportional to the flow rate, and is evaluated by a microcontroller which controls a relay. The present status is indicated by a red and a green LED. The electronics are designed in such a way that for almost any conceivable error, the relay always switches to the safe state (contact open = Alarm), ensuring intrinsic safety.

The controller receives frequency signals and, if the minimum value is fallen short of, it causes a relay to return to the rest state (contact open). The compact electronics are connected directly to a suitable transmitter (see "Dimensions").

Technical data

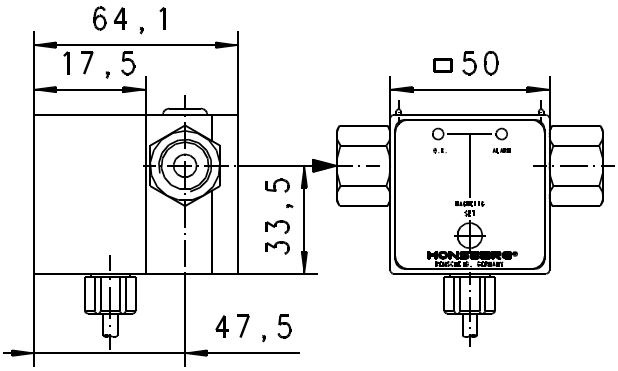
Sensor	inductive proximity switch
Working ranges	see relevant flow meter
Measurement accuracy	
Operating pressure	
Operating temperature for the electronics	-25..+60 °C
Materials	PA6.6
Supply voltage	230 V AC
Current consumption	< 4 mA
Output	relay contact
Switching voltage	Duration: 30 V DC / 250 V AC (cos φ=1) maximum: 380 V AC / 125 V DC
Switching current	2 A (higher values available on request)
Switch performance	1250 VA / 150 W (cos φ=1)
Electrical connection	Cable 4x0,5 mm²
Ingress protection	IP 64

Wiring

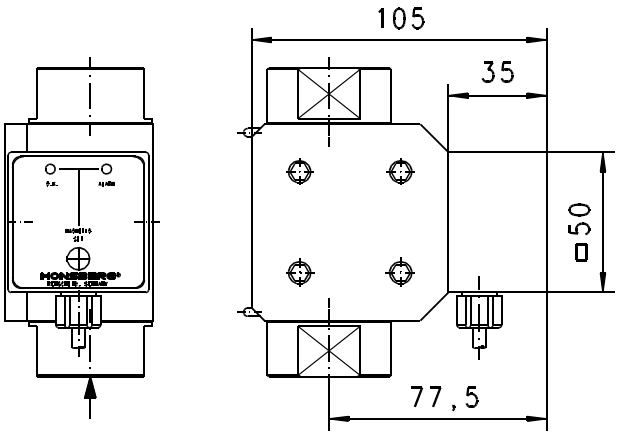


Dimensions

ESK3-RR010



ESK3-RR025



Handling and operation

Installation

The ESA3 electronics must be full inserted into the Rototron flow meter in order to detect the signal securely. For RR.25... there is the option of turning the converter by 90 ° in order to create the most suitable reading position. For RR.10... the position should be stated when ordering). The stainless steel clamp ensures that the electronics remain firmly attached even if there are vibrations.

There are a red and a green LED on the front of the device; they have the following function:

- The green LED lights when the flow rate exceeds the set minimum value (relay is pulled in = contact closed).
- The red LED lights when the minimum flow rate is fallen short of (relay is in rest state = contact open).
- The red LED flashes when an internal error is detected by the microcontroller (relay is in rest state = contact open).

Adjustment

There is a magnetic area on the front (magnetic set), with the aid of which the minimum value can be set as follows:

- When a magnet is placed on this surface, the red and the green LEDs then flash alternately for 4 seconds.
  Then both LEDs light simultaneously for 2 seconds.
- If the magnet is removed from the surface during the 2 second period, the currently existing flow rate is saved as the minimum value.
- If the magnet is removed earlier or later, then the old minimum value is retained without modification.

Ordering code

The base device is ordered, e.g. RRI-xxx with the signal output E and the evaluation electronics described here e.g. ESK3-RRI-10 xxx.

	1.	2.	3.	4.
ESK3-	**RR**			**K**

❍=Option

1.	**For types**	
	RR	for flow meter RR
2.	**Sensor**	
	I	inductive sensor
	H	hall sensor
3.	**Nominal width**	
	010	for flow meter size DN 10
	025	for flow meter size DN 25
4.	**Electrical connection**	
	K	cable outlet 1,2 m

Accessories

- Fixing clamps RR.-010
- Fixing clamps RR.-025

Option

LABO transmitter - Temperature up to 150 °C

All LABO transmitters can be used with electronics positioned in a separate area with media temperatures up to 150 °C.

OMNI - Tropical model

This OMNI electronic option should be used where temperatures change quickly, or for external installations (the device is filled with oil, and thus prevents condensate formation in the electronics housing, even under adverse circumstances)

Accessories

Filter

Type ZV

Type ZE

The HONSBERG filters are offered for the protection of the devices from dirt or as independent components for coarse and fine filtration of liquids.

For more information, see additional product information.

Round plug connector 4 / 5-pin

Ordering code

Self-assembly

	1.	2.
KB		

1.	**Number of pins**	
	04	4-polig
	05	5-polig
2.	**Steckerabgang**	
	G	gerade
	W	gewinkelt 90 °

Panel meter OMNI-TA

Primary Sensors
0..10 V
4..20 mA
Frequency

Converter with the same data as the OMNI in situ electronics; but as an external panel-mounting variant with IP 67 housing.

OMNI - Remote

Primary Sensors
0/2..10 V
4/0..20 mA
Frequency

Function is identical to OMNI-in situ. Connection to the sensor is, however, made by wire, and so the measurement point and display location can be apart

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