

## Flow - rotor probe form



### Characteristics

<b>System</b>	Flow rotor Probe form
<b>Evaluation</b>	Display Switching Measurement
<b>Nominal widths</b>	DN 32 - 150
<b>Range</b>	15..1000 l/min
<b>Media</b>	Water Aqueous emulsions Aggressive media
<b>Pressure resistance</b>	Max. 10 bar
<b>Medium temperature</b>	0..95 °C

### Applications

- Industrial metering and monitoring technology
- Coolant fluid monitoring in large pipes
- Electroplating applications
- Cooling of gas scrubbers

**Product Information**

**Sensors and Instrumentation**

**Function and benefits**

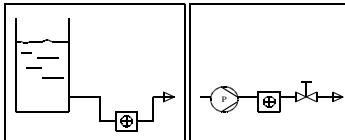
- **Uncomplicated monitoring of flows**
- **No magnets with the plastic types (with inductive sensor)**
- **Modular system in mechanics and electronics**
- **Long service life due to high-quality ceramic axle and special plastic bearing**
- **Output signal PNP, NPN, push-pull or NAMUR**
- **Intrinsically safe behavior**

The sensor is comprised of an impeller, which is set in rotation by the flow speed. The rotation speed 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.

Since the sensor only detects the flow in the area of the impeller (probe), it requires a good calming section in the feed and overrun.

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 configurator interface (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 1 second and save the current 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 switching outputs**

The push-pull transistor outputs of the OMNI electronics enable the simplest installation. The outputs can be connected like a PNP or an NPN switch and behave accordingly, without programming or wire breaks.

You are assured of resistance to short circuits and pole reversal. Overloads or short circuits are shown in the display.

## Device overview

Device	Range l/min	Pressure resistance	Medium temperature	Supply voltage	Display	Output signal		Page
						Switching	Measuring	
<b>RR.-032</b> 	30..1000	PN 10	0..60 °C	5..30 V DC 7..12 V DC 10..30 V DC	-	-	Frequency	4
<b>LABO-RR-032-S</b> 	15..1000	PN 10	0..95 °C	10..30V DC 15..30 V DC	Signal LED	1 x Push-Pull	-	7
<b>LABO-RR-032-..I</b> 	15..1000	PN 10	0..95 °C	10..30V DC 15..30 V DC	Signal LED	-	4..20 mA	12
<b>LABO-RR-032-..U</b> 	15..1000	PN 10	0..95 °C	10..30V DC 15..30 V DC	Signal LED	-	0..10 V	12
<b>LABO-RR-032-..F</b> 	15..1000	PN 10	0..95 °C	10..30V DC 15..30 V DC	Signal LED	-	Frequency 0..2 kHz	12
<b>LABO-RR-032-..C</b> 	15..1000	PN 10	0..95 °C	10..30V DC 15..30 V DC	Signal LED	-	Pulse / quantity	12
<b>OMNI-RR-032</b> 	15..1000	PN 10	0..95 °C	18..30 V DC	Graphics LCD illuminated transflective and signal LED	2 x Push-Pull	0/4..20 mA or 0..10 V	16
<b>ECI-1</b>	All LABO, FLEX, and OMNI parameters can be set or modified using the ECI-1 configurator.							21
<b>Options</b>	<ul style="list-style-type: none"> <li>● LABO transmitter – Temperature up to 150 °</li> <li>● OMNI – Tropical model</li> </ul>							22
<b>Accessories</b>	<ul style="list-style-type: none"> <li>● Type ZV / ZE (Filter)</li> <li>● KB.... (Round plug connector 4/5-pin)</li> <li>● OMNI-TA (Panel meter)</li> <li>● OMNI-C-TA (Panel counter)</li> <li>● OMNI-remote</li> <li>● EEZ-904 (External universal counter)</li> </ul>							23

Errors and technical modifications reserved.

**Product Information**

**Sensors and Instrumentation**

**Flow Transmitter  
 RR.-032**



- Simple and economical flow transmitter for piping diameters from 32 mm to 150 mm
- Made from plastic (optionally stainless steel)
- With tapping sleeve fixing for very rapid installation  
 Retro-fitting also easily possible

**Characteristics**

The flow meter consists of a spinner which is rotated by the flow speed. The rotational speed is proportional to the flow rate. The rotational speed can be recorded using various sensor systems, depending on the different materials for the housing.

**Technical data**

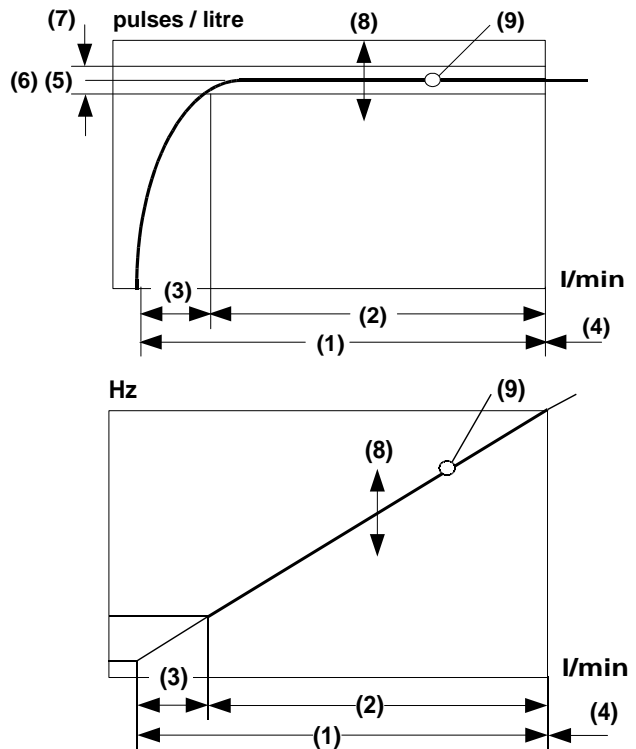
	RRI (inductive sensor)	RRH (Hall sensor)
<b>Nominal widths</b>	DN 32..150	
<b>Mechanical Connection</b>	welded-on nozzle, DN 50..150 tapping sleeve, DN 32..150 glue socket, crew-in probe	
<b>Metering range</b>	30..1000 l/min for details, see table "Ranges"	
<b>Measurement accuracy</b>	±5 % of full scale value	
<b>Repeatability</b>	±1 % measured value	
<b>Medium temperature</b>	0..60 °C, type RRH as screw-in probe or with welded-on nozzle 0..95 °C	
<b>Pressure resistance</b>	PN 10	
<b>Supply voltage</b>	PNP / NPN 5..30 V DC NAMUR 7..12 V DC	PNP / NPN 10..30 V DC
<b>Current consumption at rest</b>	10 mA / NAMUR max. 7 mA	30 mA
<b>Output current max.</b>	200 mA / NAMUR max. 7 mA	100 mA
<b>Electrical connection</b>	cable 2 m or for round plug connector M12x1, 4-pole	
<b>Resistant to short circuits</b>	yes	
<b>Reversal polarity protected</b>	yes	
<b>Materials medium-contact</b>		
Housing	PVC	1.4305
Tapping sleeve	PP	PP
Rotor	PVDF / 1.4310 or Titanium	PVDF / Magnets
Bearing	Iglidur X	Iglidur X
Axis	Ceramic ZrO2-TZP	Ceramic ZrO2-TZP
Seal	FKM	FKM

<b>Materials, non-medium-contact</b>	PVC cable, CW614N nickelled
<b>Ingress protection</b>	IP 67
<b>Conformity</b>	CE

**Ranges**

DN	Q <sub>max</sub> recommended l/min	Metering range l/min H <sub>2</sub> O			pulses/ litre (6)	frequency Hz at full scale value (10)
		(1)	(2)	(3)		
32	220	15.. 200	30.. 200	15.. 30	90.0	300
40	360	15.. 300	60.. 300	15.. 60	48.0	240
50	480	25.. 400	80.. 400	25.. 80	34.0	227
65	600	40.. 500	100.. 500	40..100	24.0	200
80	840	50.. 700	100.. 700	50..100	17.5	204
100	1200	85..1000	100..1000	85..100	10.5	175

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

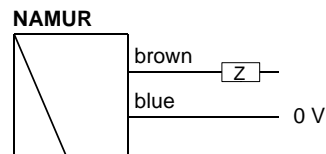
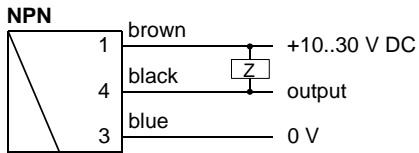
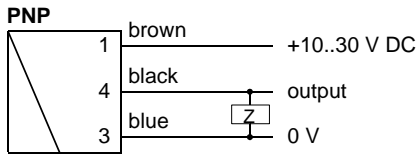


- (1) Complete metering range
- (2) Specific metering range
- (3) Start-up range
- (4) Extended operating range, increased wear, D<sub>p</sub> > 0.5 bar
- (5) pulses / litre (details on label)
- (6) Average pulses / litre
- (7) Tolerance ±5 % of the full scale value
- (8) Scatter ±10 % of the pulses / litre value (5) in the batch
- (9) Reproducibility (±1 % of the measured 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

**Product Information**

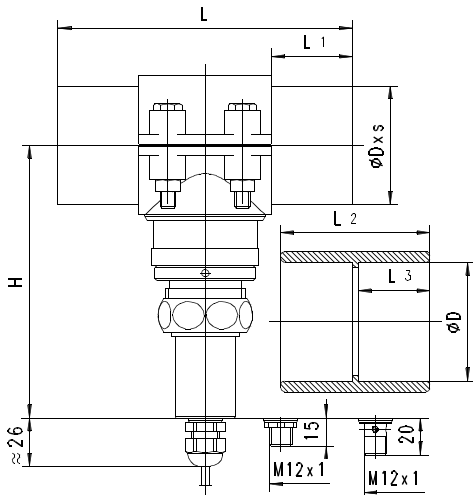
**Sensors and Instrumentation**

**Wiring**



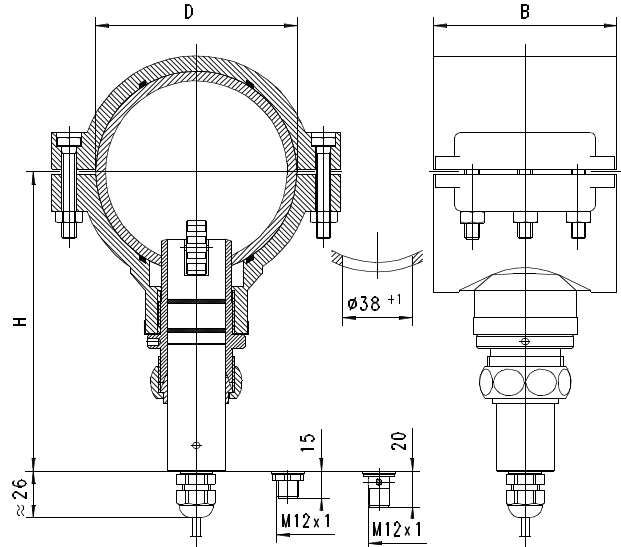
**Dimensions**

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



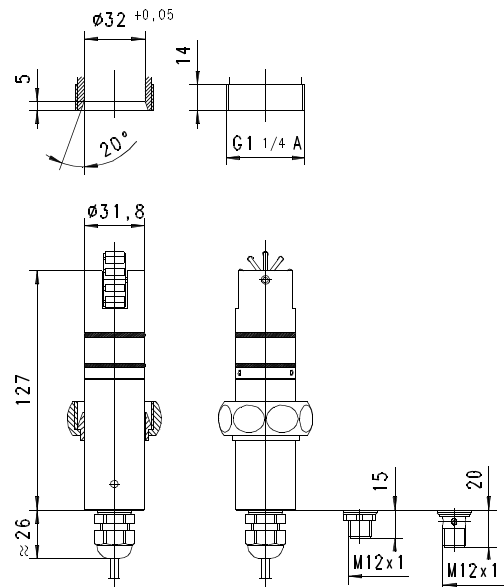
Nominal width	Type	ØD	s	H	L	L1	L2	L3
DN 32	RR.-032MH032.	40	1.9	145.0	132	31	55	26
DN 40	RR.-032MH040.	50	2.4		142	36	65	31
DN 50	RR.-032MH050.	63	3.0		156	43	79	38
DN 65	RR.-032MH065.	75	3.6	153.5	178	49	92	44
DN 80	RR.-032MH080.	90	4.3	156.0	202	56	107	51
DN 100	RR.-032MH100.	110	5.3	166.0	232	66	128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

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



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

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

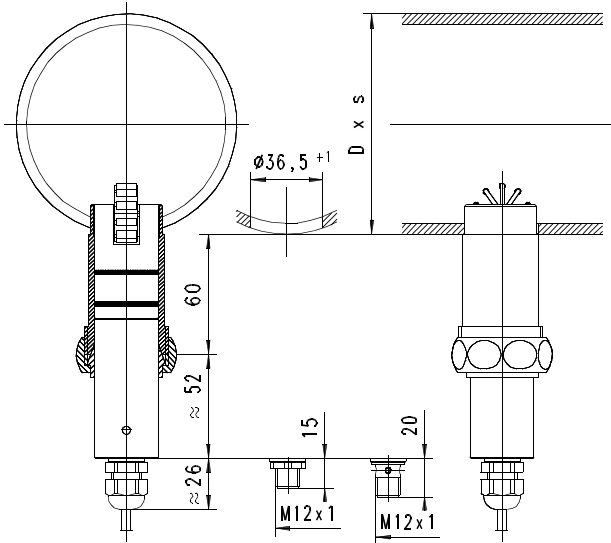


**Product Information**

**Sensors and Instrumentation**

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

**Ordering code**



1. 2. 3. 4. 5. 6. 7. 8. 9.  
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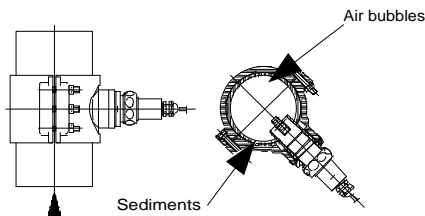
○=Option

**Handling and operation**

**Installation**

The flow meters are inserted in probe form in a tapping sleeve, and are marked with the correct insertion depth. The installation direction of the probe is lengthways to the spinner, and is indicated with arrows on the front of the flow meter. An angular deviation of ±3° has no effect on the measurement.

The sensor must be installed with run-in and run-out sections of 10 x D of the pipe diameter, in order to prevent vortices and turbulence.



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

<b>1. Flow meter</b>								
RRH	with inductive sensor							
RRH	with Hall sensor							
<b>2. Union nut</b>								
032	G 1 1/4							
<b>3. Mechanical connection</b>								
MH	tapping sleeve with piping section and PVC glue sockets							
BB	○ PP tapping sleeve							
RM	screw-in probe G 1 1/4 with clamping ring and union nut							
VK	○ welded-on nozzle 1.4305							
<b>4. Material for probe</b>								
H	PVC							
K	stainless steel 1.4305							
<b>5. Nominal width</b>								
000	screw-in probe / welded-on nozzle							
032	DN 32							
040	DN 40							
050	DN 50							
065	DN 65							
080	DN 80							
100	DN 100							
125	DN 125							
150	DN 150							
<b>6. Seal material</b>								
V	FKM							
E	○ EPDM							
N	○ NBR							
<b>7. Rotor</b>								
10K	with 10 stainless steel clamps (RRI)							
10T	○ with 10 titanium clamps (RRI)							
05M	with 5 magnets (RRH)							
<b>8. Switching output</b>								
P	PNP							
N	NPN							
A	○ NAMUR							
<b>9. Electrical connection</b>								
K	2 m cable							
S	○ for round plug connector M12x1, 4-pole							

**Accessories**

- Cable/round plug connector (KB...) see additional information "Accessories"
- Evaluation electronics OMNI-TA

**Product Information**

**Sensors and Instrumentation**

**Flow Switch**  
**LABO-RR.032-S**



- Simple and economical flow meter for piping diameters from 32 mm to 150 mm
- Made from plastic (optionally stainless steel)
- With tapping sleeve fixing for very rapid installation Retro-fitting also easily possible
- 0..10 V , 4..20 mA , frequency/pulse output, completely configurable

**Characteristics**

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

The LABO 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**

<b>Sensor</b>	LABO-RRi      inductive sensor LABO-RRH      hall sensor
<b>Nominal widths</b>	DN 32..150
<b>Mechanical Connection</b>	welded-on nozzle, DN 50..150 tapping sleeve, DN 32..150 glue socket, screw-in probe
<b>Switching range</b>	15..1000 l/min For details, see table "Ranges"
<b>Measurement accuracy</b>	±5 % of full scale value
<b>Repeatability</b>	±1 % measured value
<b>Medium temperature</b>	0..60 °C, type RRH as screw-in probe or with welded-on nozzle 0..95 °C
<b>Pressure resistance</b>	PN 10
<b>Pressure loss</b>	typically < 0.1 bar

<b>Materials medium-contact</b>	LABO-RRi	LABO-RRH
Housing	PVC	1.4305
Tapping sleeve	PP	PP
Rotor	PVDF / 1.4310 or titanium	PVDF / Magnets
Bearing	Iglidur X	Iglidur X
Axis	Ceramic Zr02-TZP	Ceramic Zr02-TZP
Seal	FKM	FKM
<b>Materials, non-medium-contact</b>	Sensor tube: CW614N nickelled	
	Adhesive: epoxy resin	
	Flange bolts: stainless steel	
<b>Supply voltage</b>	10..30 V DC at voltage output 10 V: 15..30 V DC	
<b>Power consumption</b>	< 1 W (for no-load outputs)	
<b>Output data:</b>	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 <sub>out</sub> = 100 mA max.	
Pulse output:	transistor output "push-pull" I <sub>out</sub> = 100 mA max. pulse width 50 ms pulse per volume is to be stated	
<b>Display</b>	yellow LCD shows operating voltage (LABO-XF-I / U) or output status (LABO-XF-F / C) or (rapid flashing = Programming)	
<b>Electrical connection</b>	for round plug connector M12x1, 4-pole	
<b>Ingress protection</b>	IP 67	
<b>Conformity</b>	CE	

**Ranges**

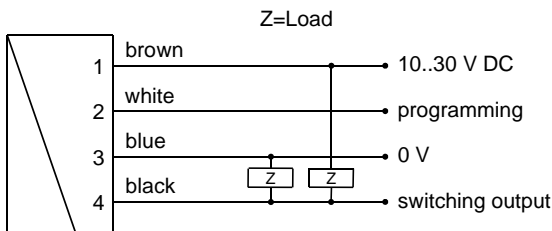
Nominal width	Switching range	Q <sub>max</sub>
	l/min H <sub>2</sub> O	l/min
DN 32	15.. 200	220
DN 40	15.. 300	360
DN 50	25.. 400	480
DN 65	40.. 500	600
DN 80	50.. 700	840
DN 100	85..1000	1200

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

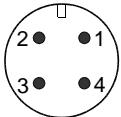
**Product Information**

**Sensors and Instrumentation**

**Wiring**



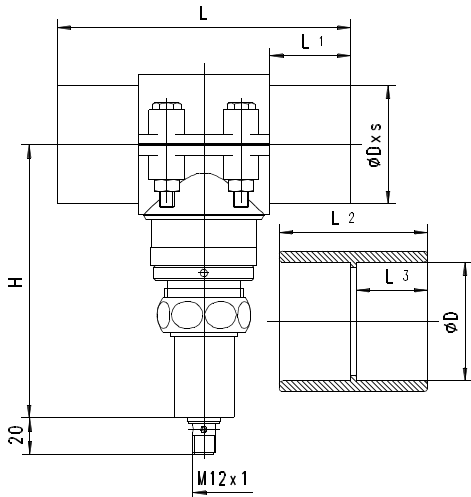
Connection example: PNP NPN



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

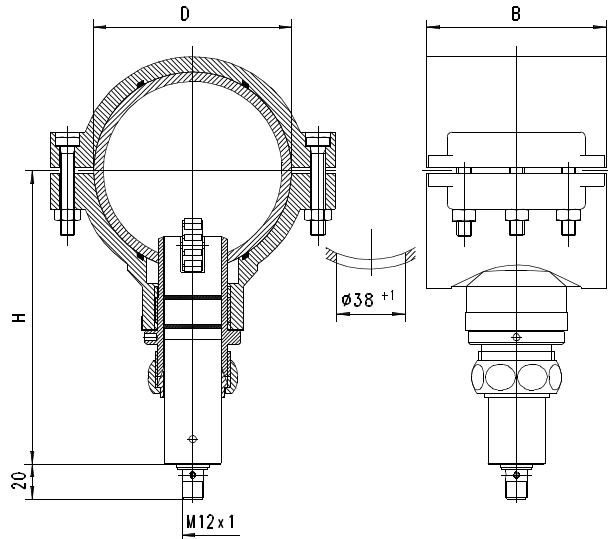
**Dimensions**

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



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

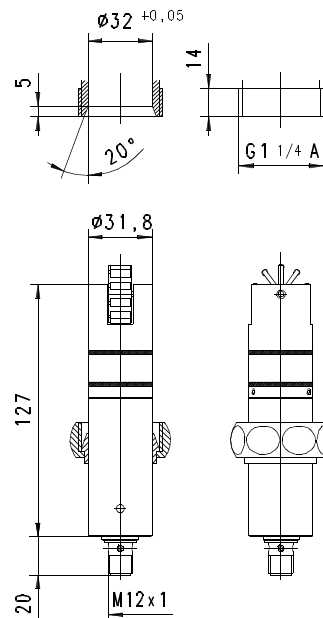
Connection: tapping sleeve RR.-032BB... (optionally)



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

Connection: screw-in probe RR.-032RM000.

Provided by customer

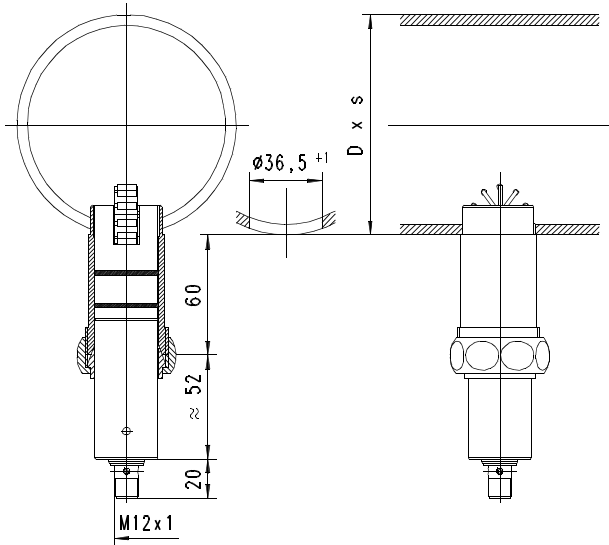




**Product Information**

**Sensors and Instrumentation**

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

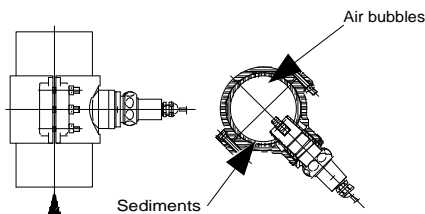


**Handling and operation**

**Installation**

The flow meters are inserted in probe form in a tapping sleeve, and are marked with the correct insertion depth. The installation direction of the probe is lengthways to the spinner, and is indicated with arrows on the front of the flow meter. An angular deviation of  $\pm 3^\circ$  has no effect on the measurement.

The sensor must be installed with run-in and run-out sections of  $10 \times D$  of the pipe diameter, in order to prevent vortices and turbulence.



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

**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 switching value is set as follows:

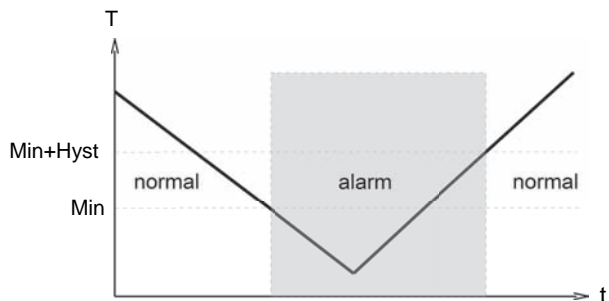
- Apply the flow rate to be set to the device.
- Apply an impulse of at least 0.5 seconds and max. 2 seconds duration to pin 2 (e.g. via a bridge to the supply voltage or a pulse from the PLC), in order to accept the measured value.
- When the teaching is complete, pin 2 should be connected to 0 V, so as to prevent unintended programming.

The device has a yellow LED which flashes during the programming pulse. During operation, the LED serves as a status display for the switching 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 switching value should be set to 80 %. However, it is possible only to reach 60 % without problems. 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 %.*

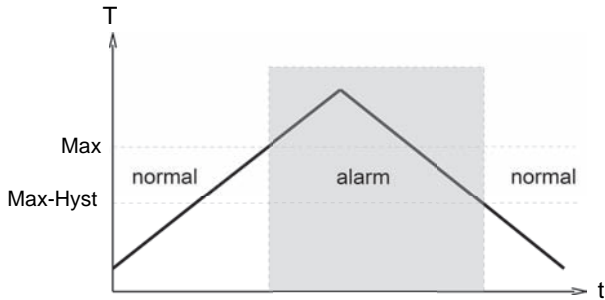
The limit switch can be used for monitoring minima or maxima. With a minimum-switch, falling below the limit value causes a switchover to the alarm state. Return to the normal state occurs when the limit value plus the set hysteresis is once more exceeded.



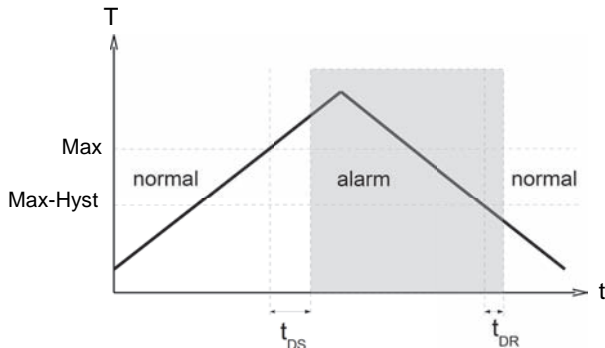
**Product Information**

**Sensors and Instrumentation**

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.

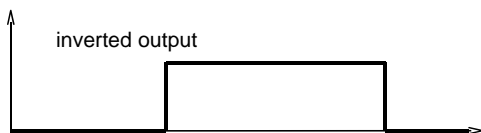
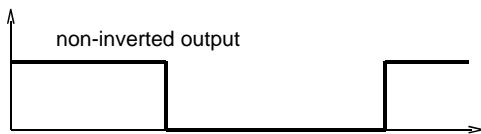


A changeover delay time ( $t_{DS}$ ) can be applied to switching to the alarm state. Equally, one switch-back delay time ( $t_{DR}$ ) of several can be applied to switching back to the normal state.



In the normal state the integrated LED is on, in the alarm state it is off, and this corresponds to its status when there is no supply voltage.

In the non-inverted (standard) model, while in the normal state the switching output is at the level of the supply voltage; in the alarm state it is at 0 V, so that a wire break would also display as an alarm state at the signal receiver. Optionally, an inverted switching output can also be provided, i.e. in the normal state the output is at 0 V, and in the alarm state it is at the level of the supply voltage.



A Power-On delay function (ordered as a separate option) makes it possible to maintain the switching output in the normal state for a defined period after application of the supply voltage.

**Ordering code**

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

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

LABO-RR  9.  10. **S**  11.  12.  13.  14. **S**  15.

○=Option

<b>1. Sensor</b>									
I	with inductive sensor								
H	with Hall sensor								
<b>2. Union nut</b>									
032	G 1 1/4								
<b>3. Mechanical connection</b>									
MH	tapping sleeve with piping section and PVC glue sockets								
BB	○ PP tapping sleeve								
RM	screw-in probe G 1 1/4 with clamping ring and union nut								
VK	○ welded-on nozzle 1.4305								
<b>4. Material for probe</b>									
H	PVC								
K	stainless steel 1.4305								
<b>5. Nominal width</b>									
000	screw-in probe / Welded-on nozzle								
032	DN 32								
040	DN 40								
050	DN 50								
065	DN 65								
080	DN 80								
100	DN 100								
125	DN 125								
150	DN 150								
<b>6. Seal material</b>									
V	FKM								
E	○ EPDM								
N	○ NBR								
<b>7. Rotor</b>									
10K	with 10 stainless steel clamps (RRI)								
10T	○ with 10 titanium clamps (RRI)								
05M	with 5 magnets (RRH)								
<b>8. Connection for</b>									
E	electronics								
<b>9. Sensor</b>									
I	with inductive sensor								
H	with Hall sensor								
<b>10. Signal output</b>									
S	push-pull (compatible with PNP and NPN)								
<b>11. Programming</b>									
N	cannot be programmed (no teaching)								
P	○ programmable (teaching possible)								

**Product Information**

**Sensors and Instrumentation**

<b>12. Switching function</b>		
	L	minimum switch
	H	maximum switch
<b>13. Switching signal</b>		
	<input type="radio"/>	Standard
	I <input type="radio"/>	Inverted
<b>14. Electrical connection</b>		
	S	For round plug connector M12x1, 4-pole
<b>15. Optional</b>		
	H <input type="radio"/>	100 °C version (with 300 mm cable)

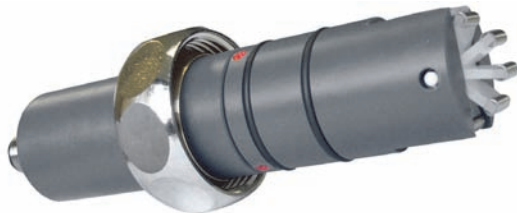
**Accessories**

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

**Product Information**

**Sensors and Instrumentation**

**Flow Transmitter**  
**LABO-RR.032-I / U / F / C**



- Simple and economical flow meter for piping diameters from 32 mm to 150 mm
- Made from plastic (optionally stainless steel)
- With tapping sleeve fixing for very rapid installation  
Retro-fitting also easily possible
- 0..10 V , 4..20 mA , frequency/pulse output, completely configurable

**Characteristics**

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

The LABO electronics make various output signals available:

- Analog signal 0/4...20 mA (LABO-RR.-032-I)
- Analog signal 0/2..10 V (LABO-RR.-032-U)
- Frequency signal (LABO-RR.-032-F) or
- A value signal Pulse / x Litres (LABO-RR.-032-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**

<b>Sensor</b>	LABO-RRi inductive sensor LABO-RRH hall sensor
<b>Nominal widths</b>	DN 32..150
<b>Mechanical Connection</b>	welded-on nozzle, DN 50..150 tapping sleeve, DN 32..150 glue socket, screw-in probe
<b>Metering range</b>	15..1000 l/min for details, see table "Ranges"
<b>Measurement accuracy</b>	±5 % of full scale value
<b>Repeatability</b>	±1 % measured value
<b>Medium temperature</b>	0..60 °C, type RRH as screw-in probe or with welded-on nozzle 0..95 °C
<b>Pressure resistance</b>	PN 10
<b>Pressure loss</b>	typically < 0.1 bar

<b>Materials medium-contact</b>	Housing PVC 1.4305 Tapping sleeve PP Rotor PVDF / 1.4310 or PVDF / Magnets Titanium Bearing Iglidur X Iglidur X Axis Ceramic Zr02-TZP Ceramic Zr02-TZP Seal FKM FKM
<b>Materials, non-medium-contact</b>	Sensor tube: CW614N nickelled Adhesive: epoxy resin Flange bolts: stainless steel
<b>Supply voltage</b>	10..30 V DC at voltage output 10 V: 15..30 V DC
<b>Power consumption</b>	< 1 W (for no-load outputs)
<b>Output data:</b>	all outputs are resistant to short circuits and reversal polarity protected Current output: 4..20 mA (0..20 mA available on request) Voltage output: 0..10 V (2..10 V available on request) output current max. 20 mA Frequency output: transistor output "push-pull" $I_{out} = 100$ mA max. Pulse output: transistor output "push-pull" $I_{out} = 100$ mA max. Pulse width 50 ms Pulse per volume is to be stated
<b>Display</b>	yellow LCD shows operating voltage (LABO-XF-I / U) or output status (LABO-XF-F / C) or (rapid flashing = Programming)
<b>Electrical connection</b>	for round plug connector M12x1, 4-pole
<b>Ingress protection</b>	IP 67
<b>Conformity</b>	CE

**Ranges**

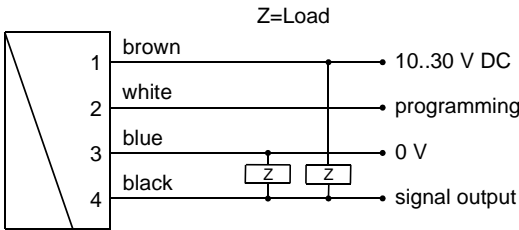
Nominal width	Metering range l/min H <sub>2</sub> O	Q <sub>max</sub> l/min
DN 32	15.. 200	220
DN 40	15.. 300	360
DN 50	25.. 400	480
DN 65	40.. 500	600
DN 80	50.. 700	840
DN 100	85..1000	1200

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

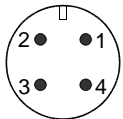
**Product Information**

**Sensors and Instrumentation**

**Wiring**



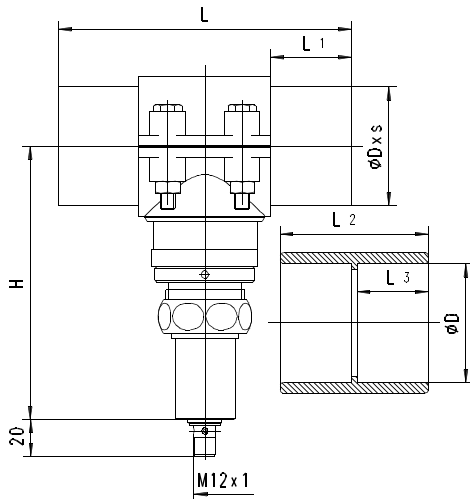
Connection example: PNP NPN



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

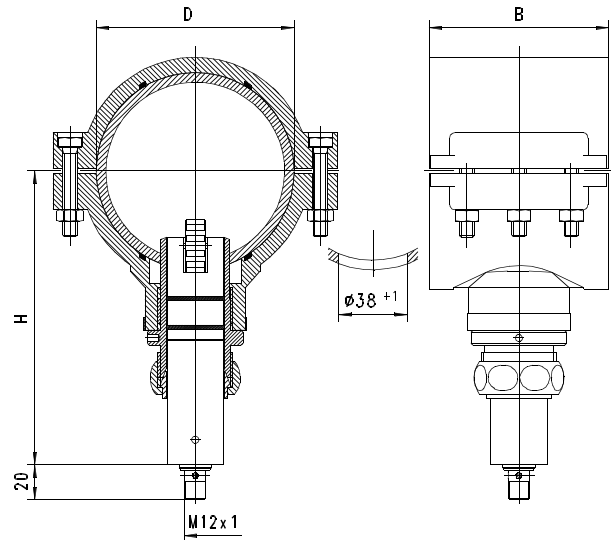
**Dimensions**

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



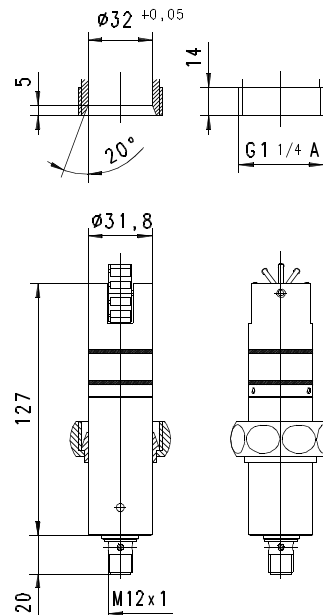
Nominal width	Type	ØD	s	H	L	L1	L2	L3
DN 32	RR.-032MH032.	40	1.9	145.0	132	31	55	26
DN 40	RR.-032MH040.	50	2.4		142	36	65	31
DN 50	RR.-032MH050.	63	3.0		156	43	79	38
DN 65	RR.-032MH065.	75	3.6	153.5	178	49	92	44
DN 80	RR.-032MH080.	90	4.3	156.0	202	56	107	51
DN 100	RR.-032MH100.	110	5.3	166.0	232	66	128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

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



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

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

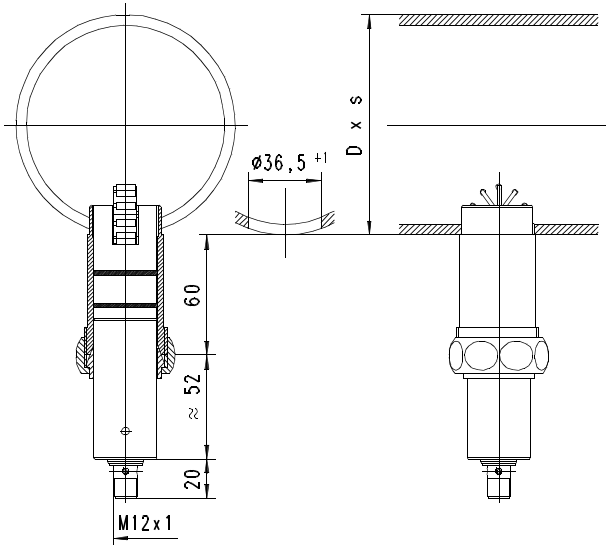


**Product Information**

**Sensors and Instrumentation**

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

**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 %.*

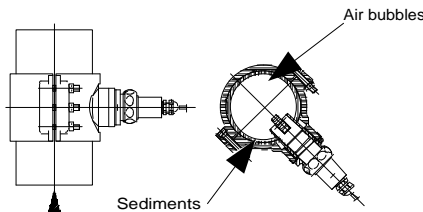
**Handling and operation**

**Installation**

The flow meters are inserted in probe form in a tapping sleeve, and are marked with the correct insertion depth. The installation direction of the probe is lengthways to the spinner, and is indicated with arrows on the front of the flow meter. An angular deviation of  $\pm 3^\circ$  has no effect on the measurement.

The sensor must be installed with run-in and run-out sections of  $10 \times D$  of the pipe diameter, in order to prevent vortices and turbulence.

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



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

**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.

**Product Information**

**Sensors and Instrumentation**

**Ordering code**

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

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

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

○=Option

<b>1. Sensor</b>								
I	with inductive sensor							•
H	with Hall sensor							•
<b>2. Union nut</b>								
032	G 1 1/4							
<b>3. Mechanical connection</b>								
MH	tapping sleeve with piping section and PVC glue sockets							
BB	○ PP tapping sleeve							
RM	screw-in probe G 1 1/4 with clamping ring and union nut							
VK	○ welded-on nozzle 1.4305							
<b>4. Material for probe</b>								
H	PVC							•
K	stainless steel 1.4305							•
<b>5. Nominal width</b>								
000	screw-in probe / Welded-on nozzle						•	•
032	DN 32							•
040	DN 40							•
050	DN 50							•
065	DN 65							•
080	DN 80							•
100	DN 100							•
125	DN 125							•
150	DN 150							•
<b>6. Sealing material</b>								
V	FKM							
E	○ EPDM							
N	○ NBR							
<b>7. Rotor</b>								
10K	with 10 stainless steel clamps (RRI)							•
10T	○ with 10 titanium clamps (RRI)							•
05M	with 5 magnets (RRH)							•
<b>8. Connection for</b>								
E	electronics							
<b>9. Sensor</b>								
I	with inductive sensor							•
H	with Hall sensor							•
<b>10. Signal output</b>								
I	4..20 mA							
U	0..10 V							
F	frequency output							
C	pulse output							

<b>11. Programming</b>	
N	cannot be programmed (no teaching)
P	○ programmable (teaching possible)
<b>12. Electrical connection</b>	
S	for round plug connector M12x1, 4-pole
<b>13. Optional</b>	
H	○ 100 °C version (with 300 mm cable)

**Accessories**

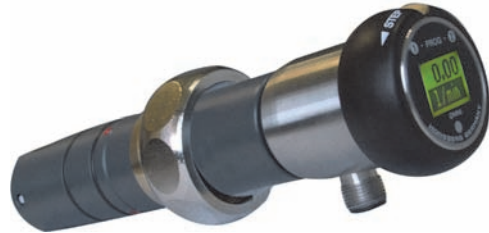
- Cable/round plug connector (KB...) see additional information "Accessories"
- Device configurator ECI-1

**Product Information**

**Sensors and Instrumentation**

**Flow Transmitter /  
 Switch OMNI-RR..32**

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.



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

**Characteristics**

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

The OMNI transducer located on the sensor has a backlit graphics LCD display which is very easy to read, both in the dark and in bright sunlight. The graphics display allows the presentation of measured values and parameters in a clearly understandable form. The measured values are displayed to 4 places, together with their physical unit, which may also be modified by the user. The electronics have an analog output (4..20 mA or 0..10 V) and two switching outputs, which can be used as limit switches for monitoring minima or maxima, 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.

**Technical data**

<b>Sensor</b>	OMNI-RR1 OMNI-RRH	inductive sensor hall sensor
<b>Nominal widths</b>	DN 32..150	
<b>Mechanical Connection</b>	welded-on nozzle, DN 50..150 tapping sleeve, DN 32..150 glue socket, Screw-in probe	
<b>Metering range</b>	15..1000 l/min for details, see table "Ranges"	
<b>Measurement accuracy</b>	±5 % of full scale value	
<b>Repeatability</b>	±1 % measured value	
<b>Medium temperature</b>	0..60 °C, type RRH as screw-in probe or with welded-on nozzle 0..95 °C	
<b>Pressure resistance</b>	PN 10	
<b>Pressure loss</b>	typically < 0.1 bar	
<b>Materials medium-contact</b>	Housing	PVC 1.4305
	Tapping sleeve	PP
	Rotor	PVDF / 1.4310 or Titanium PVDF / Magnets
	Bearing	Igildur X
	Axis	Ceramic ZrO2-TZP
	Seal	FKM
<b>Materials, non-medium-contact</b>	Electronics housing	stainless steel 1.4305
	Glass	mineral glass hardened
	Magnet Ring	samarium-Cobalt POM
<b>Supply voltage</b>	18..30 V DC	
<b>Power consumption</b>	< 1 W	
<b>Analog output</b>	4..20 mA / max. load 500 Ω or 0..10 V / min. load 1 kΩ	
<b>Switching output</b>	transistor output "push-pull" (resistant to short circuits and polarity reversal) I <sub>out</sub> = 100 mA max.	
<b>Hysteresis</b>	adjustable, position of the hysteresis depends on minimum or maximum	
<b>Display</b>	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.	



**Product Information**

**Sensors and Instrumentation**

<b>Electrical connection</b>	for round plug connector M12x1, 5-pole
<b>Ingress protection</b>	IP 67 / (IP 68 when oil-filled)
<b>Conformity</b>	CE

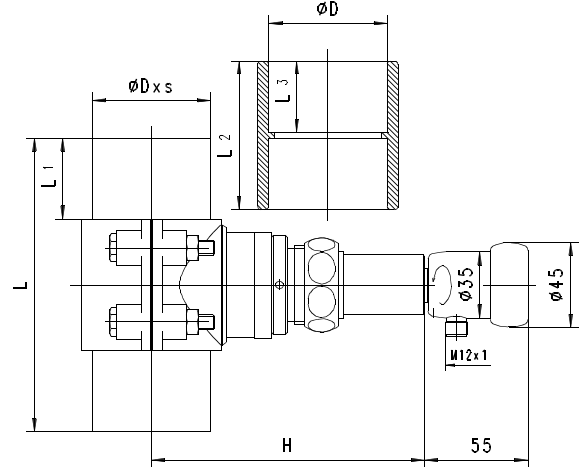
**Dimensions**

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

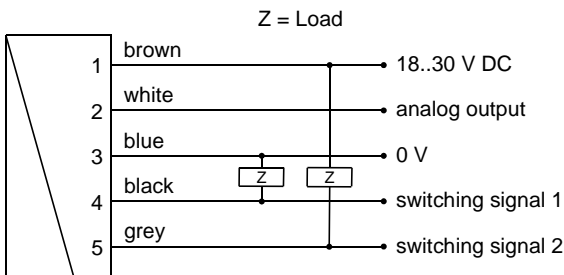
**Ranges**

Nominal width	Metering range l/min H <sub>2</sub> O	Q <sub>max</sub> l/min
DN 32	15.. 200	220
DN 40	15.. 300	360
DN 50	25.. 400	480
DN 65	40.. 500	600
DN 80	50.. 700	840
DN 100	85..1000	1200

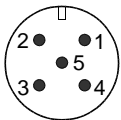
The measured values were determined using a standing sensor in a flow of water from left to right at 25 °C and with 10 x D run-in and run-out sections.



**Wiring**



Connection example: PNP NPN



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

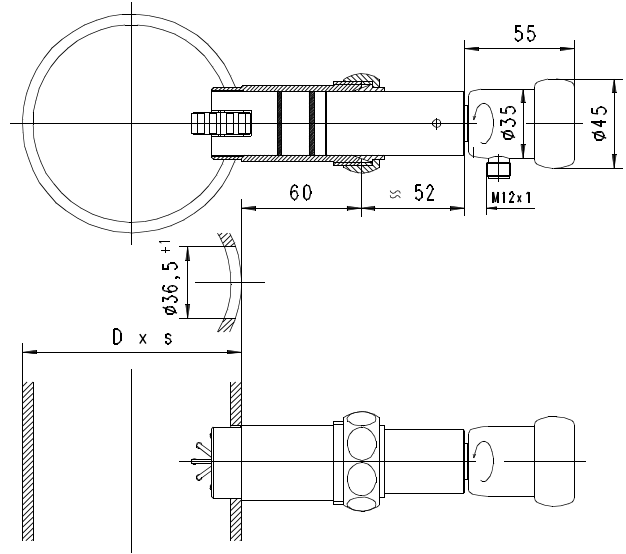
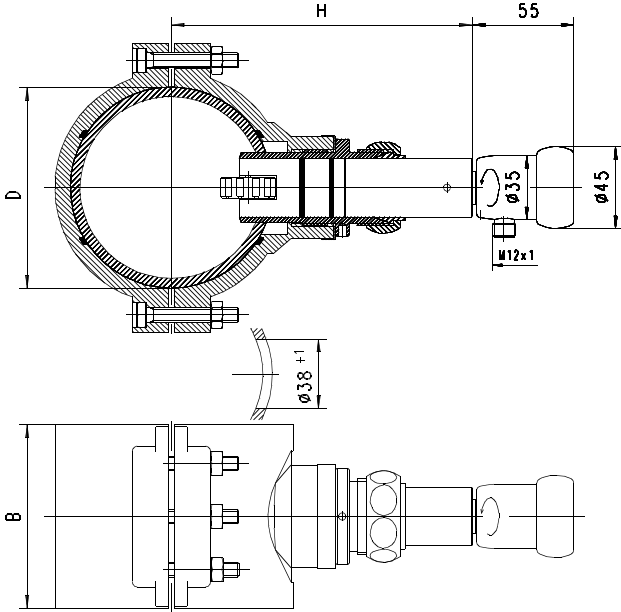
Before the electrical installation, it must be ensured that the supply voltage corresponds to the data sheet.  
The use of shielded cabling is recommended.

**Product Information**

**Sensors and Instrumentation**

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

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



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

**Gooseneck option**



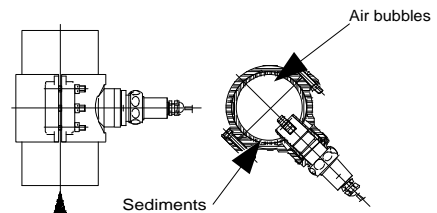
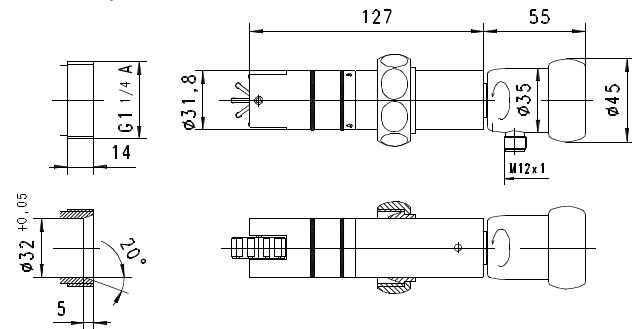
A gooseneck (optional) between the electronics head and the primary sensor provides freedom in the orientation of the sensor. This option simultaneously provides thermal decoupling between the two units.

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

**Handling and operation**

**Installation**

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



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

## Product Information

## Sensors and Instrumentation

### 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.

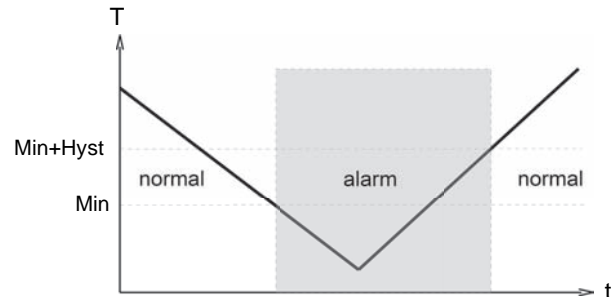
#### Edit, using position 2

If the currently visible parameter is to be modified:

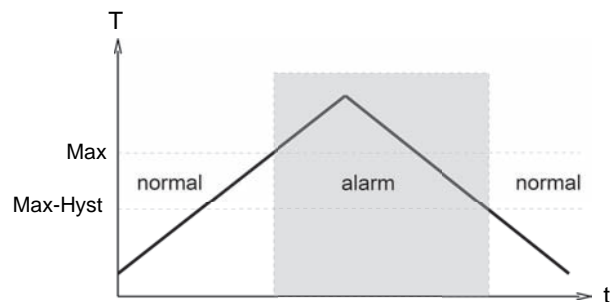
- Turn the annular gap to position 2, so that a flashing cursor appears which displays the position which can be modified.
- By repeatedly turning to position 2, values are increased; by turning to position 1, the cursor moves to the next digit.
- Leave the parameter by turning to position 1 (until the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

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**.

**Product Information**

**Sensors and Instrumentation**

**Ordering code**

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

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

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

○=Option

**Accessoires**

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

<b>1. Sensor</b>									
I	with inductive sensor								
H	with Hall sensor								
<b>2. Union nut</b>									
032	G 1 1/4								
<b>3. Mechanical connection</b>									
MH	tapping sleeve with piping section and PVC glue sockets								
BB	○ PP tapping sleeve								
RM	screw-in probe G 1 1/4 with clamping ring and union nut								
VK	○ welded-on nozzle 1.4305								
<b>4. Material for probe</b>									
H	PVC								●
K	stainless steel 1.4305								●
<b>5. Nominal width</b>									
000	screw-in probe / Welded-on nozzle							●	●
032	DN 32								●
040	DN 40								●
050	DN 50								● ●
065	DN 65								● ●
080	DN 80								● ●
100	DN 100								● ●
125	DN 125								● ●
150	DN 150								● ●
<b>6. Seal material</b>									
V	FKM								
E	○ EPDM								
N	○ NBR								
<b>7. Rotor</b>									
10K	with 10 stainless steel clamps (RRI)								●
10T	○ with 10 titanium clamps (RRI)								●
05M	with 5 magnets (RRH)								●
<b>8. Connection for</b>									
E	electronics								
<b>9. Sensor</b>									
I	with inductive sensor								●
H	with Hall sensor								●
<b>10. Analog output</b>									
I	current output 0/4..20 mA								
U	○ voltage output 0/2..10 V								
<b>11. Electrical connection</b>									
S	for round plug connector M12x1, 5-pole								
<b>12. Optional</b>									
H	○ gooseneck model								
O	○ tropical model								
	○ oil-filled version for heavy duty or external use								

**Product Information**

**Sensors and Instrumentation**

**Device Configurator  
 ECI-1**



- Can be used on site for:
  - parameter modification
  - firmware update
  - adjustment of inputs and outputs
- Can be connected via USB

**Characteristics**

The device configurator ECI-1 is an interface which allows the connection of microcontroller-managed HONSBERG sensors to the USB port of a computer. Together with the Windows software "HONSBERG Device Configurator" it enables

- the modification of all the sensor's configuration settings
- the reading of measured values
- the adjustment of inputs and outputs
- firmware updates

**Technical data**

<b>Supply voltage</b>	12..30 V DC (depending on the connected sensor) and via USB
<b>Power consumption</b>	< 1 W
<b>Connection</b>	
Sensor	cable bushing M12x1, 5-pole, straight length approx. 50 cm
Lead	device connector M12x1, 5-pole
USB	USB bushing type B
<b>Operating temperature</b>	0..50 °C
<b>Storage temperature</b>	-20..+80 °C
<b>Dimensions of housing</b>	98 mm (L) x 64 mm (W) x 38 mm (H)
<b>Housing material</b>	ABS
<b>Ingress protection</b>	IP 40

**Handling and operation**

**Connection**



The device configurator is intended for temporary connection to the application. It is connected between the the existing sensor lead and the sensor. Power supply is via the supply to the sensor and the computer's USB port. When inactive (no communication), the configurator behaves completely neutrally; all signals from the sensor remain available to the application. During communication between computer and sensor, the signal wirings are separated in the configurator, so that in this state the sensor's output signals are not available.

To connect 4-pole leads without a middle hole to the installed 5-pole device connector, adapter K04-05 is included. 4-pole leads with a middle hole can be used without an adapter.

**Ordering code**

<b>Device configurator</b> (for scope of delivery, see the diagram below)	<b>ECI-1</b>
------------------------------------------------------------------------------	--------------

**Scope of delivery**

1. Device configurator ECI-1
2. USB cable
3. Adapter K04-05
4. Plug KB05G
5. Cable K05PU-02SG
6. Carrying case



**Incl. software**

**Accessories:**

<b>Mains connector 24 V DC</b> (with fitted round plug connector, 5-pole, incl. international plug set)	<b>EPWR24-1</b>
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**Replacement parts:**

<b>M12x1 adapter 4- / 5-pole</b>	<b>K04-05</b>
<b>PUR cable, 5-pole, shielded</b> with round plug connector M12x1	<b>K05PU-02SG</b>
<b>Round plug connector M12x1, 5-pole</b> (without cable)	<b>KB05G</b>

## Options

### 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



- 1 → brown
- 2 → white
- 3 → blue
- 4 → black

- 1 → brown
- 2 → white
- 3 → blue
- 4 → black
- 5 → grey

### Ordering code

#### Self-assembly

1. 2.  
 KB

<b>1. Number of pins</b>	
04	4-pin
05	5-pin
<b>2. Connector output</b>	
G	straight
W	elbow 90 °

#### Packaged

1. 2. 3. 4. 5. 6.  
 **PU** -

<b>1. Number of pins</b>	
K	4-pin
K05	5-pin
<b>2. Cable material</b>	
PU	PUR
<b>3. Cable length</b>	
02	2 m
05	5 m
10	10 m
<b>4. Shielding</b>	
N	shielding not applied to coupling
S	shielding applied to coupling
<b>5. Connector output</b>	
G	straight
W	elbow 90 °
<b>6. Shielding</b>	
A	shielded

## Panel meter OMNI-TA



External converter with the same data as the electronics; can be mounted directly on the primary sensor, but as an external panel-mounting variant with IP 67 housing.

**Panel counter OMNI-C-TA**



External counter with the same data as the electronics; can be mounted directly on the primary sensor, but as an external panel-mounting variant with IP 67 housing.

**OMNI - Remote**



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

**EEZ-904**



External universal counter