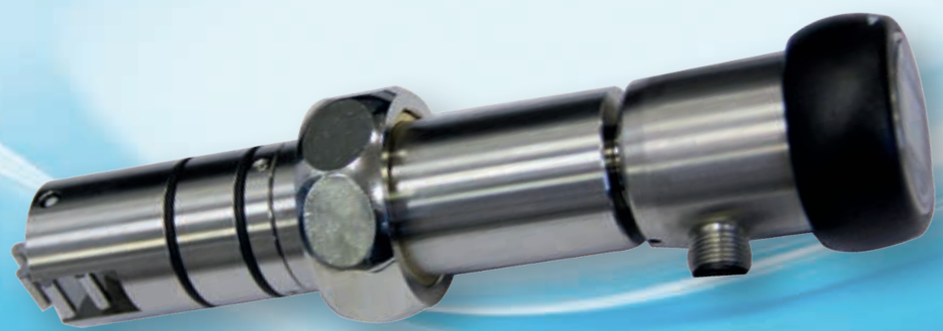
GHMGROUP
Specialists by Competence.



PRODUCT INFORMATION
GHM GROUP

Flow.
Rotor, probe form.

Characteristics

System
- Flow rotor, Probe form

Evaluation
- Display, Switching, Measurement

Nominal widths
- DN 32.. and bigger

Bereich
- 0,3..6 m/s

Range
- Water, Aqueous emulsions, Aggressive media

Pressure resistance
- max. 10 bar

Temperature
- 0..+60 °C (Plastic type)
- 0..+95 °C (Metal type with welding)

Funktion und Vorteile
- 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.

Applications

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

Device overview

Device	Range l/min	Pressure resistance in bar	Medium temperature	Supply voltage	Display	Output signal		Page
						Switching	Measuring	
RRI-032RMH	0,3...6 m/s	PN 10	0..+60 °C	Depending from output	-	1 x Push-Pull	Analogous frequency	4
RRH-032RMK	0,3...6 m/s	PN 10	0..+100 °C	Depending from output	-	1 x Push-Pull	Analogous frequency	6
OMNI-RRI-032RMH	0,3...6 m/s	PN 10	0..+60 °C	18..30 V DC	Graphic LCD illuminated transflective and LED indicator	2 x Push-Pull	0/4..20 mA or 0..10 V	8
OMNI-RRH-032RMK	0,3...6 m/s	PN 10	0..+100 °C	18..30 V DC	Graphic LCD illuminated transflective and LED indicator	2 x Push-Pull	0/4..20 mA or 0..10 V	11

Options		
OMNI-Counteroption-C	Preset counter with external reset, complementary switching outputs and flow rate display	14
OMNI-Counteroption-C1	Flow rate display with analog output, volume pulse output and totalizer	17
ECI-3	Optional to configure devices with output option I, U, F and S	20
OMNI - Tropical model	Electronic used when temperatures change quickly or for external installation	22

Accessories		
KB... / K...	Round plug connector 4 or 5 pin	23
MH-032H	Measuring tubes	24
BBI-032H	Tapping clamps	25
TS32	T-pieces	26
VKI-032K	Weld-on nozzle	27

Errors and technical modifications reserved.

Flow transmitter RRI-032RMH

- **Simple and affordable flow transmitter for pipe diameters of DN32 or larger**
- **Plastic version**
- **Suitable for retrofitting in existing pipelines with tapping clamps or weld-on nozzles**

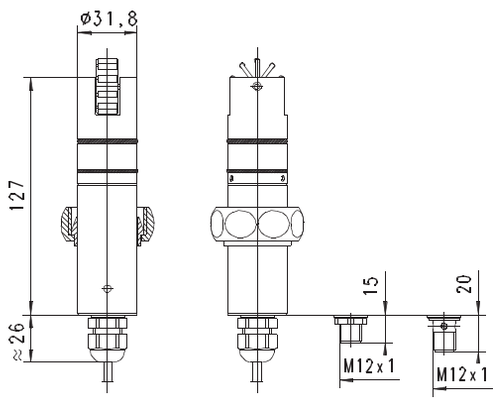
Technical data

Measuring principle	Paddle wheel
Nominal widths	DN32 and larger
Mechanical Connection	Insertion probe with union nut (welded-on nozzle and tapping clamps available as accessories)
Measuring range	0.3...6 m/s
Reproducibility	± 1 %
Media temperature	0...+60 °C
Pressure resistance	PN 10
Electrical connection	2 m cable or for round plug connector M12x1, 4-pin
Wetted materials	
Housing	PVC
Rotor	PVDF / 1.4310 or titanium
Bearing	Iglidur X
Axis	Ceramics Zr02-TZP
Seal	Fluororubber FKM
Weight	approx. 0.250 kg
Protection rating	IP 67
Conformity	CE

Electrical data

Signal outputs P and N	Output signal PNP/NPN Auxiliary voltage 5...30 V DC Quiescent current consumption 10 mA Output current max. 200 mA resistant to short-circuit proof, reverse polarity protected
Signal output A	NAMUR output circuit (2-wire) Voltage 7...12 V DC Current consumption max. 7 mA reverse polarity protected
Signal output I	Current output 4...20 mA Auxiliary voltage 10...30 V DC Quiescent current consumption max. 50 mA resistant to short-circuit proof, reverse polarity protected
Signal output U	Voltage output 0...10 V Auxiliary voltage 15...30 V DC Quiescent current consumption max. 50 mA Output current max. 20 mA short-circuit proof, reverse polarity protected
Signal output F	Frequency output programmable up to 2 kHz Auxiliary voltage 10...30 V DC Quiescent current consumption max. 50 mA Push-Pull output circuit Output current max. 100 mA resistant to short-circuit proof, reverse polarity protected
Signal output S	Limit switch Auxiliary voltage 10...30 V DC Quiescent current consumption max. 50 mA Push-Pull output circuit Output current max. 100 mA resistant to short-circuit proof, reverse polarity protected

Dimensions



Output signal	Cable 2 m	M12x1 without LED	M12x1 with LED
P/N	●	●	
A	●		
I/U/F/S			●

Ranges

The measuring range of the flow transmitter is 0.3 ... 6 m/s. This results in approximated flow rates in pipes of various nominal widths according to the following table (not considering the flow profile).

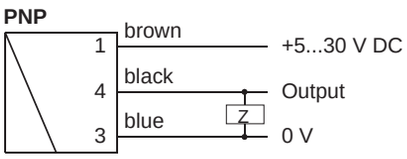
DN	Measuring range	
	l/min	m³/h
32	15… 300	18
40	23… 460	27
50	35… 700	42
65	60...1200	72
80	90...1800	108
100	140...2800	168
125	220...4400	264
150	315...6300	378

The output frequency of the non-adjustable frequency-producing sensors (version P, N or A) at full deflection is approx. 480 Hz. Versions with analog output (U or I) or adjustable frequency output (F) are available with limited measuring ranges (1, 2 and 4 m/s). The desired output frequency of the adjustable frequency output must be specified when placing an order (up to 2000 Hz).

Connection diagram

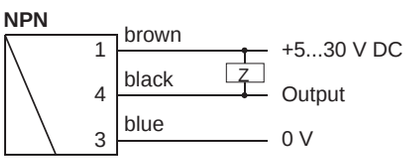
Signal output P

PNP



Signal output N

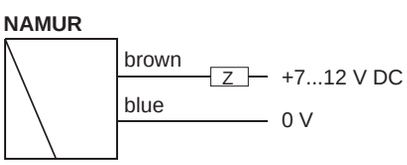
NPN



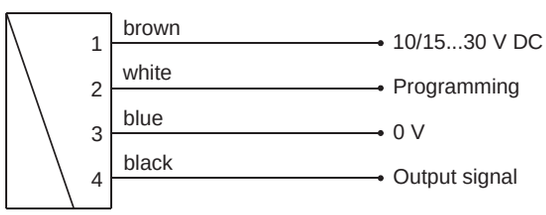
Z=Load

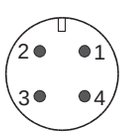
Signal output A

NAMUR



Signal output I/U/F/S

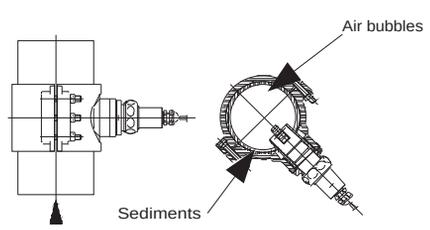




Plug connector M12x1

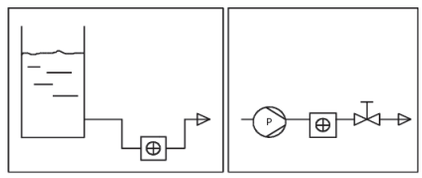
Installation notice

The sensor should be installed with run-in and run-out sections of 10 x D of the pipe diameter, in order to minimise the influence of vortices and turbulences.



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.

Installation method:



Rotor always under liquid

Rotor upstream from valve

Ordering code

RRI-032RMH 1. 2. 3. 4. 5.

1.	**Measuring range**								
	000	Adjustable in the device							
	001	fixed at 1 m/s							
	002	fixed at 2 m/s							
	004	fixed at 4 m/s							
	006	fixed at 6 m/s							
2.	**Seal material**								
	V	Fluororubber FKM							
	E	EPDM							
	N	NBR							
3.	**Rotor**								
	10K	with 10 stainless steel clamps							
	10T	with 10 titanium clamps							
4.	**Signal output**								
	P	PNP	●					●	●
	N	NPN	●					●	●
	A	NAMUR	●					●	
	I	Current output 4..20 mA	●	●	●	●	●		●
	U	Voltage output 0..10 V	●	●	●	●	●		●
	F	Frequency output programmable up to 2 kHz	●	●	●	●	●		●
	S	Limit switch					●		●
5.	**Electrical connection**								
	K	2 m cable							
	S	For round plug connector M12x1, 4-pin							

Accessories

- Round plug connector KB04 / cable K04PU
- Weld-on nozzle VKI-032K
- Tapping clamps BBI-032H
- Measuring tubes MH-032H
- Device configurator ECI-3

Options

- Special versions available on request

Flow transmitter RRH-032RMK

- **Simple and affordable flow transmitter for pipe diameters of DN32 or larger**
- **Stainless steel version**
- **Suitable for retrofitting in existing pipelines with tapping clamps or weld-on nozzles**

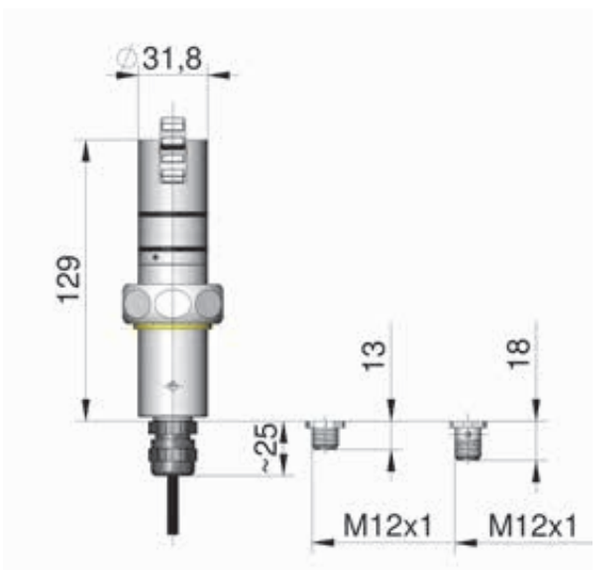
Technical data

Measuring principle	Paddle wheel
Nominal widths	DN 32 and larger
Mechanical Connection	Insertion probe with union nut (welded-on nozzle and tapping clamps available as accessories)
Measuring range	0.3... 6 m/s
Reproducibility	± 1 %
Media temperature	with tapping clamp 0...+60 °C, with weld-on nozzle 0...+95 °C
Pressure resistance	PN 10
Electrical connection	2 m cable or for round plug connector M12x1, 4-pin
Wetted materials	
Housing	1.4305
Rotor	PVDF / magnets / epoxy resin
Bearing	Iglidur X
Axis	Ceramics Zr02-TZP
Seal	Fluororubber FKM
Weight	approx. 0.720 kg
Protection rating	IP 67
Conformity	CE

Electrical data

Signal output T	Push-Pull output circuit Auxiliary voltage 10...30 V DC Quiescent current consumption 10 mA Output current max. 100 mA resistant to short-circuit proof, reverse polarity protected
Signal output I	Current output 4...20 mA Auxiliary voltage 10...30 V DC Quiescent current consumption max. 50 mA resistant to short-circuit proof, reverse polarity protected
Signal output U	Voltage output 0...10 V Auxiliary voltage 15...30 V DC Quiescent current consumption max. 50 mA Output current max. 20 mA resistant to short-circuit proof, reverse polarity protected
Signal output F	Frequency output programmable up to 2 kHz Auxiliary voltage 10...30 V DC Quiescent current consumption max. 50 mA Push-Pull output circuit Output current max. 100 mA resistant to short-circuit proof, reverse polarity protected
Signal output S	Limit switch Auxiliary voltage 10...30 V DC Quiescent current consumption max. 50 mA Push-Pull output circuit Output current max. 100 mA resistant to short-circuit proof, reverse polarity protected

Dimensions



Output signal	Cable 2 m	M12x1 without LED	M12x1 with LED
T	●	●	
I/U/F/S			●

Ranges

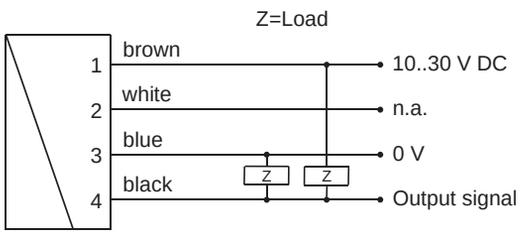
The measuring range of the flow transmitter is 0.3 ... 6 m/s.
This results in approximated flow rates in pipes of various nominal widths according to the following table (not considering the flow profile).

DN	Measuring range	
	l/min	m³/h
32	15… 300	18
40	23… 460	27
50	35… 700	42
65	60...1200	72
80	90...1800	108
100	140...2800	168
125	220...4400	264
150	315...6300	378

The output frequency of the non-adjustable frequency-producing sensor (version T) at full deflection is approx. 240 Hz.
Versions with analog output (U or I) or adjustable frequency output (F) are available with limited measuring ranges (1, 2 and 4 m/s).
The desired output frequency of the adjustable frequency output must be specified when placing an order (up to 2000 Hz).

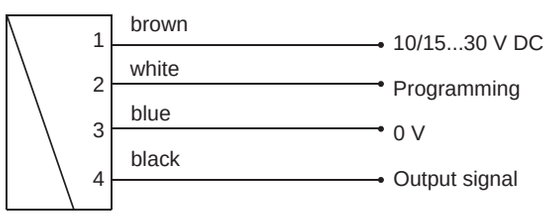
Wiring

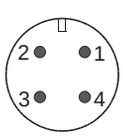
Signal output T



Connection example: PNP NPN

Signal output I/U/F/S

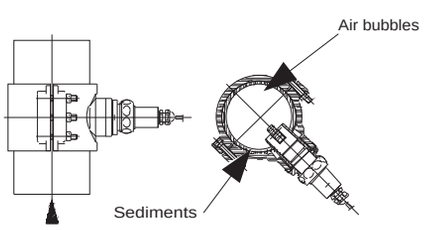




Plug connector M12x1

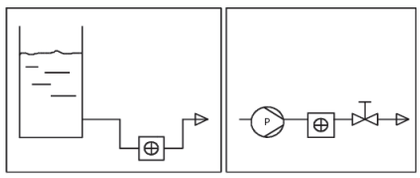
Installation notice

The sensor should be installed with run-in and run-out sections of 10 x D of the pipe diameter, in order to minimise the influence of vortices and turbulences.



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.

Installation method:



Rotor always under liquid

Rotor upstream from valve

Ordering code

RRH-032RMK 1. 2. 3. 4. 5.

1.	**Measuring range**								
	000	Adjustable in the device							
	001	fixed at 1 m/s							
	002	fixed at 2 m/s							
	004	fixed at 4 m/s							
	006	fixed at 6 m/s							
2.	**Seal material**								
	V	Fluororubber FKM							
	E	EPDM							
	N	NBR							
3.	**Rotor**								
	05M	With 5 magnets							
4.	**Signal output**								
	T	Push-Pull	●					●	●
	I	Current output 4..20 mA	●	●	●	●	●		●
	U	Voltage output 0..10 V	●	●	●	●	●		●
	F	Frequency output programmable up to 2 kHz	●	●	●	●	●		●
	S	Limit switch					●		●
5.	**Electrical connection**								
	K	2 m cable							
	S	For round plug connector M12x1, 4-pin							

Accessories

- Round plug connector KB04 / cable K04PU
- Weld-on nozzle VKI-032K
- Tapping clamps BBI-032H
- Measuring tubes MH-032H
- Device configurator ECI-3

Options

- Special versions available on request

Flow transmitter OMNI-RRI-032RMH

- **Flow transmitter with display**
- **for pipe diameters of DN32 or larger**
- **Plastic version**
- **Suitable for retrofitting in existing pipelines with tapping clamps**
- **Analog output 4..20 mA or 0..10 V**
- **Two programmable switches**
- **Selectable units in the display**
- **Parameter change via rotating ring**
- **Electronics housing with non-scratch, chemically resistant glass**
- **Rotatable electronic housing for best reading position**

Features

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 and two limit switches. Exceeding limit values is signalled by a red LED which is visible over a long distance, and by a message in text in the display.

The stainless steel housing 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 tight seal is permanently ensured.

By turning the ring to right or left, it is simple to modify the parameters.

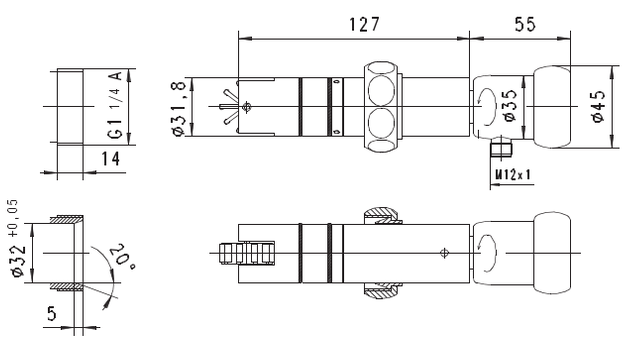
A preset counter (option C) enables totalisation of the flow rate quantity and signal output when the preset quantity is reached. It also offers an external reset option, antivalent switching outputs and a current value display.

A totaliser with pulse output (option C1) issues a pulse cyclically after a variable amount has flown. The current flow rate is shown in the display and on the analog output.

Technical data

Measuring principle	Paddle wheel	
Nominal widths	DN32 and larger	
Mechanical Connection	Insertion probe with union nut (welded-on nozzle and tapping clamps available as accessories)	
Measuring range	0.3...6 m/s	
Reproducibility	± 1 %	
Media temperature	0 – +60 °C	
Pressure resistance	PN 10	
Wetted materials	Housing	PVC
	Rotor	PVDF / 1.4310 (titanium available on request)
	Bearing	Iglidur X
	Axis	Ceramics Zr02-TZP
	Seals	Fluororubber FKM
Other materials	Electronics housing	Stainless steel 1.4305
	Glass	Mineral glass, hardened
	Magnet	Samarium Cobalt
	Ring	POM
Power supply	18..30 V DC	
Power requirement	< 2 W (for outputs not under load)	
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 reversed polarity) I_{out} = 100 mA max.	
Hysteresis	adjustable, position of the hysteresis depends on minimum or maximum	
Display	graphic LCD display, 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	
Protection rating	IP 67 / (IP 68 when oil-filled)	
Conformity	CE	
Weight	approx. 0.38 kg (incl. clamping ring and union nut)	

Dimensions



Gooseneck option

A gooseneck (option H) between the electronics head and the primary sensor provides freedom in the orientation of the sensor.

Ranges

The measuring range of the flow transmitter is 0.3 ... 6 m/s.
The result is approximate flow rates in pipes of various nominal widths according to the following table (not considering the flow profile).

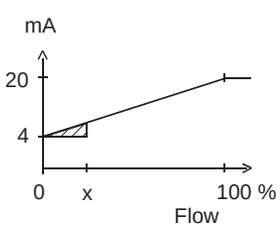
DN	Measuring range	
	l/min	m³/h
32	15… 300	18
40	23… 460	27
50	35… 700	42
65	60...1200	72
80	90...1800	108
100	140...2800	168
125	220...4400	264
150	315...6300	378

On request, the flow rate (in "l/min" or "m³/h", switchable on the device) can be displayed instead of the flow speed. For this purpose, specification of the inside pipe diameter is necessary when placing an order. If the inside pipe diameter is known, options C or C1 can also be selected, which enable counting and display of flow quantities.

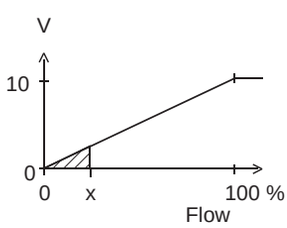
Signal output characteristic curves

Value x = beginning of the specified metering range
= not specified range

Current output

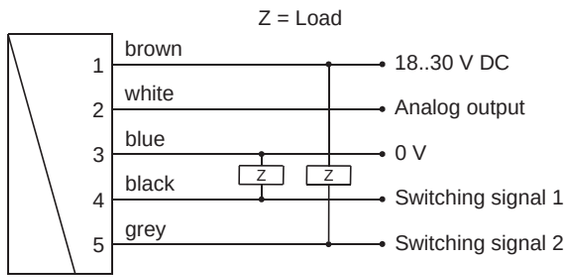


Voltage output

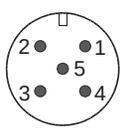


Connection diagram

The switching outputs are designed as push-pull drivers, and can therefore be used both as PNP and NPN outputs.



Connection example: PNP NPN



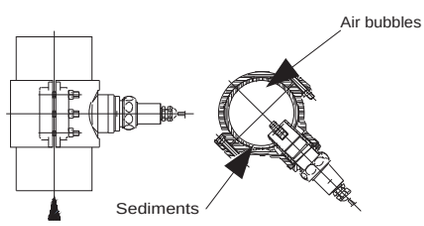
Plug connector M12x1
(view of connector plug)

See separate connection diagram of option C in the corresponding description.

Handling and operation

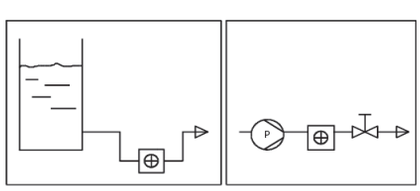
Assembly

The sensor should be installed with run-in and run-out sections of 10 x D of the pipe diameter, in order to minimise the influence of 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.

Installation method:



Rotor always under liquid

Rotor upstream from valve

Operation

Parameter change

The annular gap of the programming ring can be turned to positions 1 and 2 and thus replaces the function of two buttons

The following parameters can be changed in this manner:

- Switching values (in the display unit)
- Switching characteristics
  MIN = Monitoring of minimum value
  MAX = Monitoring of maximum value
- Hystereses (in the display unit)

After entering a code, further parameters can be adjusted:

- Filter (settling time of the display and output)
- Display unit (m/s; %; l/min; m³/h)
- Output: 0 or 4...20 mA and/or 0 or 2...10 V
- Scaling of the output

Operation is by dialogue with the display messages, which makes its use very simple.
The ring can be removed to act as a key, or turned 180° and returned to create a programming protector.

Alarm signal
If the adjusted switching values are exceeded or undercut, an alarm is indicated by the integrated red LED and a message in text in the display.

Overload display
The overload of a switching output is signalled by a display message and the blinking red LED. The relevant switching output is switched off and switched on again automatically after the fault has been rectified.

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...21.0 mA and/or 0...10 V 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.

Ordering code

OMNI-RRI-032RMH

1.	2.	3.	4.
	S		

1.	**Analog output**			
	I	Current output 0/4..20 mA		●
	U	Voltage output 0/2..10 V		●
	K	without	●	
2.	**Electrical connection**			
	S	For round plug connector M12x1, 5-pin		
3.	**Options 1**			
	H	Gooseneck model		
	O	Tropical version, oil-filled version		
4.	**Options 2**			
	C	Counter C		
	C1	Counter C1		

Options

- Counter C (hardware and software option):
  Preset counter with external resetting option, antivalent switching outputs and current value display
  (modified wiring!)

- Counter C1 (software option):
  Current value display with analog output, volume pulse output and totaliser

See separate information for counter option C and C1.

- The housing is filled with out in the **tropical version** and thereby safely prevents the penetration of moisture under extreme climatic conditions.

- Additional special versions available on request

Accessories

- Round plug connector KB05 / cable K05PU
- Weld-on nozzle VKI-032K
- Tapping clamps BBI-032H
- Measuring tubes MH-032H
- Device configurator ECI-3

Flow transmitter OMNI-RRH-032RMK

- **Flow transmitter with display**
- **for pipe diameters of DN 32 or larger**
- **Stainless steel version**
- **Suitable for retrofitting in existing pipelines with tapping clamps**
- **Analog output 4..20 mA or 0..10 V**
- **Two programmable switches**
- **Selectable units in the display**
- **Parameter change with rotating ring**
- **Electronics housing with non-scratch, chemically resistant glass**
- **Rotatable electronic housing for best reading position**

Features

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 and two limit switches. Exceeding limit values is signalled by a red LED which is visible over a long distance, and by a message in text in the display.

The stainless steel housing 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 tight seal is permanently ensured.

By turning the ring to right or left, it is simple to modify the parameters.

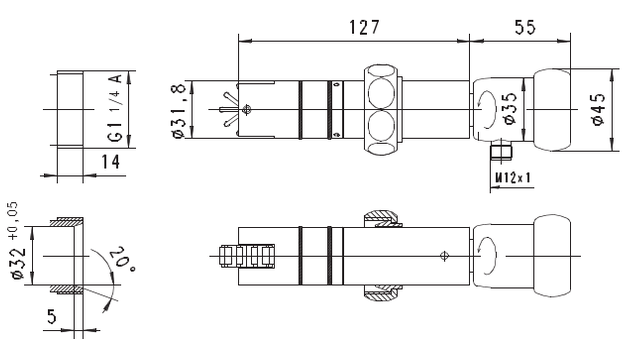
A preset counter (option C) enables totalisation of the flow rate quantity and signal output when the preset quantity is reached. It also offers an external reset option, antivalent switching outputs and a current value display.

A totaliser with pulse output (option C1) issues a pulse cyclically after a variable amount has flown. The current flow rate is shown in the display and on the analog output.

Technical data

Measuring principle	Paddle wheel	
Nominal widths	DN32 and larger	
Mechanical Connection	Insertion probe with union nut (welded-on nozzle and tapping clamps available as accessories)	
Measuring range	0.3...6 m/s	
Reproducibility	± 1 %	
Media temperature	0...+60 °C with welded-on nozzles 0...+95 °C	
Pressure resistance	PN 10	
Wetted materials	Housing Rotor Bearing Axis Seals	1.4305 PVDF / magnets / epoxy resin Iglidur X Ceramics Zr02-TZP Fluororubber FKM
Other materials	Electronics housing Glass Magnet Ring	Stainless steel 1.4305 Mineral glass, hardened Samarium Cobalt POM
Power supply	18..30 V DC	
Power requirement	< 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 reversed polarity) I_{out} = 100 mA max.	
Hysteresis	adjustable, position of the hysteresis depends on minimum or maximum	
Display	graphic LCD display, 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	
Protection rating	IP 67 / (IP 68 when oil-filled)	
Conformity	CE	
Weight	approx. 0,86 kg (incl. clamping ring and union nut)	

Dimensions



Gooseneck option

A gooseneck (option H) 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

Ranges

The measuring range of the flow transmitter is 0.3 ... 6 m/s.
This results in approximated flow rates in pipes of various nominal widths according to the following table (not considering the flow profile).

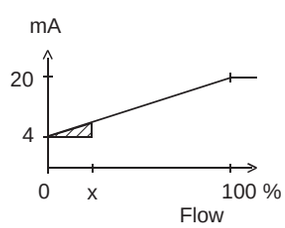
DN	Measuring range	
	l/min	m³/h
32	15… 300	18
40	23… 460	27
50	35… 700	42
65	60...1200	72
80	90...1800	108
100	140...2800	168
125	220...4400	264
150	315...6300	378

On request, the flow rate (in "l/min" or "m³/h", switchable on the device) can be displayed instead of the flow speed. For this purpose, specification of the inside pipe diameter is necessary when placing an order. If the inside pipe diameter is known, options C or C1 can also be selected, which enable counting and display of flow quantities.

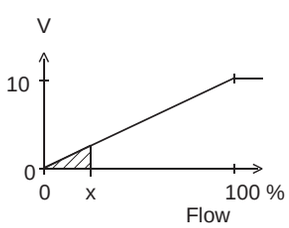
Signal output characteristic curves

Value x = beginning of the specified metering range
▱ = not specified range

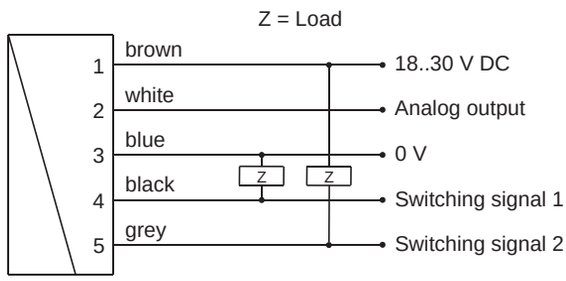
Current output



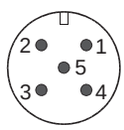
Voltage output



Connection diagram



Connection example: PNP NPN

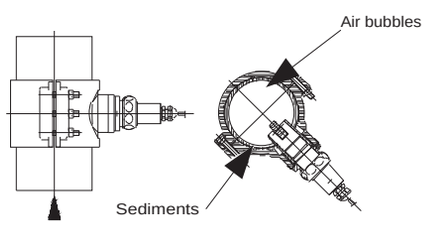


Plug connector M12x1
(view of connector plug)

Handling and operation

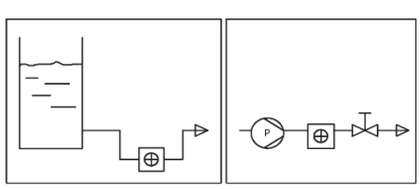
Assembly

The sensor should be installed with run-in and run-out sections of 10 x D of the pipe diameter, in order to minimise the influence of vortices and turbulences.



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.

Installation method:



Rotor always under liquid

Rotor upstream from valve

Programming

Parameter change

The annular gap of the programming ring can be turned to positions 1 and 2 and thus replaces the function of two buttons

The following parameters can be changed in this manner:

- Switching values (in the display unit)
- Switching characteristics
  MIN = Monitoring of minimum value
  MAX = Monitoring of maximum value
- Hystereses (in the display unit)

After entering a code, further parameters can be adjusted:

- Filter (settling time of the display and output)
- Display unit (m/s; %; l/min; m³/h)
- Output: 0 or 4...20 mA and/or 0 or 2...10 V
- Scaling of the output

Operation is by dialogue with the display messages, which makes its use very simple.
The ring can be removed to act as a key, or turned 180° and returned to create a programming protector.

Alarm signal
If the adjusted switching values are exceeded or undercut, an alarm is indicated by the integrated red LED and a message in text in the display.

Overload display
The overload of a switching output is signalled by a display message and the blinking red LED. The relevant switching output is switched off and switched on again automatically after the fault has been rectified.

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...21.0 mA and/or 10...V 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.

Ordering code

	1.	2.	3.	4.
OMNI-RRH-032RMK		**S**		

1.	**Analog output**			
	I	Current output 0/4..20 mA		●
	U	Voltage output 0/2..10 V		●
	K	without	●	
2.	**Electrical connection**			
	S	For round plug connector M12x1, 5-pin		
3.	**Options 1**			
	H	Gooseneck model (recommended for media temperatures >60°C)		
	O	Tropical version, oil-filled version		
4.	**Options 2**			
	C	Counter C		
	C1	Counter C1		

Options

- Counter C (hardware and software option):
  Preset counter with external resetting option, antivalent switching outputs and current value display
  (modified wiring!)

- Counter C1 (software option):
  Current value display with analog output, volume pulse output and totaliser

- The housing is filled with oil in the **tropical version** and thereby safely prevents the penetration of moisture under extreme climatic conditions.

See separate information for counter option C and C1.

- Additional special versions available on request

Accessories

- Round plug connector KB05 / cable K05PU
- Weld-on nozzle VKI-032K
- Tapping clamps BBI-032H
- Device configurator ECI-3

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.

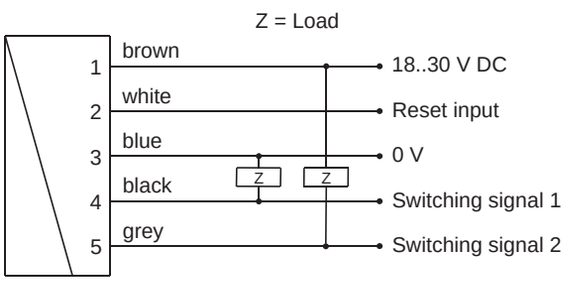
The state of the counter is indicated in an LCD display with only four digits. Here, the number of decimal places and the unit displayed is continuously matched to the current state of the counter. In this case, the smallest value which can be displayed is 0.001 ml (= 1 µl), and the largest is 9999 m³. 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.

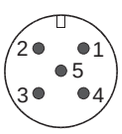
Technical data

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..	

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.

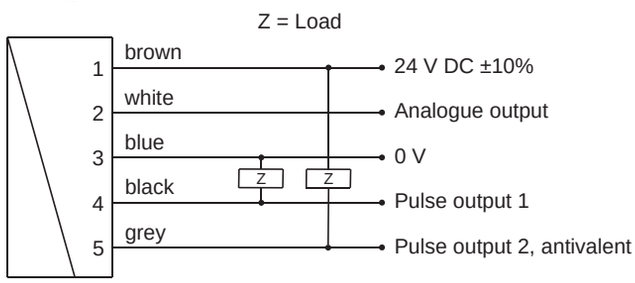
Counter C:

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.

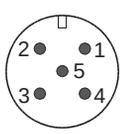
Technical data

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..	

Configuration Interface ECI-3

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

Characteristics

The ECI-3 configuration interface enables connection of GHM HONSBERG sensors to the USB port of a computer.
All sensors of the OMNI, FLEX, and LABO families, as well as other sensors which contain a microcontroller are supported.

Both 2-wire and 3-wire sensors are supported.

In combination with the 'HI-Tools' Windows software, 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

Auxiliary voltage	Supply of the interface via USB 3-wire sensors also require a supply according to the sensor specifications in the range of 10 – 30 V (Observe the sensor data sheet!)
Connections	
Sensor	Device socket M12x1, 5-pin
Supply	Device connector M12x1, 5pole
USB	USB jack type B
Operating temperature	0..+50 °C
Storage temperature	-20..+80 °C
Dimensions	109 mm (W) x 67.5 mm (D) x 34 mm (H)
Housing material	Aluminium
Ingress protection	IP 40
Weight	0.16 kg (interface without accessories) 1.02 kg (case, incl. contents)
Conformity	CE

Handling and operation

Operating and display elements

Front:

LED	Meaning
USB	Illuminates with established USB connection
COMM	Blinks during USB communication
SUPPLY	Indicates that the supply voltage is present at the sensor connection
BYPASS	Illuminates when there is no communication, pins of sensor and supply connection are connected to each other
3-WIRE (A)	MODE LEDs indicate the current operating mode of the interface. This depends on the connected sensor and is automatically adjusted by the software.
3-WIRE (B)	
2-WIRE	

Rear side:

SENSOR	M12x1 socket, 5-pin for sensor connection
SUPPLY	M12x1 plug connector, 5-pin for supply line connection (only for 3-wire sensors) Pin 1 = +V Pin 3 = 0 V The assignment of the remaining pins depends on the connected sensor
USB	USB B-socket for connection to the USB port of the computer

Commissioning

The configuration interface is intended for temporary connection to the application. Permanent installation in the system is not intended.

The interface is initially connected to the USB port of the computer using the supplied USB cable. The power supply of the interface takes place via the USB port. Additional auxiliary voltage is not necessary at first. The drivers required for operation are provided on the supplied USB stick and are installed in the usual manner.

Connection of the sensors takes place at the 'Sensor' port with the supplied M12x1 extension cable. The supplied adapter can be used for connection of sensors with a valve connector.

No additional connections are necessary for operation with **2-wire sensors**. The supply of sensors and interface takes place from the USB port.

An amperemeter can be connected to Pin 1 and 2 of the SENSOR socket to measure the loop current. If the BYPASS LED on the front illuminates, the current can be read here. It must be ensured that the voltage drop-off at the amperemeter is not higher than 0.5 V, which means the internal resistance of the measuring device may not be higher than 25 Ohm. Modern multimeters with a digital display normally satisfy this requirement. No damage can occur with high voltages within the supply voltage area, but the display of the loop current becomes faulty.

With **3-wire sensors** the supply voltage of the sensor must be connected to the 'Supply' connection. For this purpose, the available supply line of the sensor or an optionally available power supply plug can be used. The supply voltage must match the specifications of the connected sensor. If the supply line has a 4-pin M12x1 round plug connector without middle hole, the supplied adapter K04-05 must be used; otherwise connection with the 5-pin plug of the interface is not possible. 4-pole leads with a middle hole can be used without an adapter.
In the inactive state (without communication), the interface behaves entirely neutral (BYPASS LED on the front illuminates). All signals of the sensor are still available to the application. During communication between computer and sensor, the signal lines are separated in the interface, so that in this state the sensor's output signals are not available.

Operation of the interface takes place using the HI-Tools program package. The software is provided in the latest respective version on the supplied USB stick. Updates can be downloaded free of charge from the download area of the GHM website .www.ghm-messtechnik.de.

The software can be used for all standard sensors. Special software is available under certain circumstances for customer-specific sensors or for special requirements. In case of uncertainty, contact GHM Sales.

Ordering code

Configuration Interface (for scope of delivery, see the diagram below)	**ECI-3**

Scope of delivery:
1. ECI-3 configuration interface
2. 1.8 m USB cable
3. 500 mm M12x1 extension
4. Valve connector adapter
5. Adapter K04-05
6. SUB stick with driver software
7. Carry case

A mains connector is not included in the scope of delivery.

Accessories:

Mains connector 24 V DC / 0.75 A with round plug connector M12x1 incl. interchangeable adapters for universal use		**EPWR24-1**
Mains connector 24 V DC / 0.5 A with round plug connector M12x1 with Euro plug		**EPWR24**

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

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 °

Round plug connector 4-pin

1 ⟷ brown
2 ⟷ white
3 ⟷ blue
4 ⟷ black

Ordering code

Packaged

	1.	2.	3.	4.	5.
K	**04**	**PU-**			

❍= Option

1.	Number of pins	
	04	4-polig
2.	**Cable material**	
	PU-	PUR
3.	**Cable length**	
	02	2 m
	05	5 m
	10	10 m
		Others on request
4.	**Shielding**	
	S	shielding applied to coupling
	U	unshielded
	N ❍	shielding not applied to coupling
5.	**Steckerabgang**	
	G	straight
	W	elbow 90 °

Round plug connector 5-pin

1 ⟷ brown
2 ⟷ white
3 ⟷ blue
4 ⟷ black
5 ⟷ grey

Ordering code

Packaged

	1.		2.	3.	4.	5.
K	**05**	**-**	**PU-**			

❍= Option

1.	Number of pins	
	05	5-polig
2.	**Cable material**	
	PU-	PUR
3.	**Cable length**	
	02	2 m
	05	5 m
	10	10 m
		Others on request
4.	**Shielding**	
	S	shielding applied to coupling
	U	unshielded
	N ❍	shielding not applied to coupling
5.	**Steckerabgang**	
	G	straight
	W	elbow 90 °

Measuring tubes MH-032H

MH-032H040

MH-032H050

Features

Measuring tubes are available for installation of impeller probes of the series RR.-032 in industrial PVC-U pipelines. They can be adhered to the pipeline, for example, with a double sleeve.
Measuring tubes with outer diameters 40 mm and 50 mm have a cone on the inlet side for flow conditioning. The measuring result is stabilised in the process.
Thus the inlet section can be reduced to 5 times of the inner pipe diameter. The measuring tubes require a tapping clamp BBI-032H-... for installation of the impeller probe (accessory, ordered separately).

Technical data

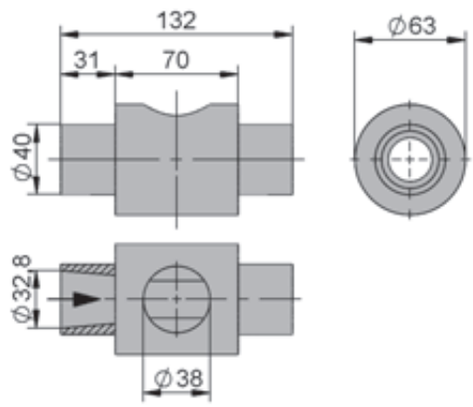
Wetted material	PVC-U
Compressive strength	PN10

Ordering code

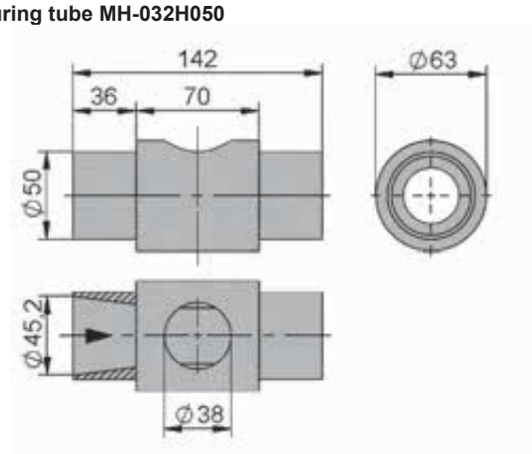
Ordering code	For PVC-U-pipe with outer diameter	Required Tapping clamp
MH-032H040	40 mm	BBI-032H-063
MH-032H050	50 mm	BBI-032H-063
MH-032H063	63 mm	BBI-032H-063
MH-032H075	75 mm	BBI-032H-075
MH-032H090	90 mm	BBI-032H-090
MH-032H110	110 mm	BBI-032H-110
MH-032H125	125 mm	BBI-032H-125
MH-032H140	140 mm	BBI-032H-140
MH-032H160	160 mm	BBI-032H-160

Dimensions

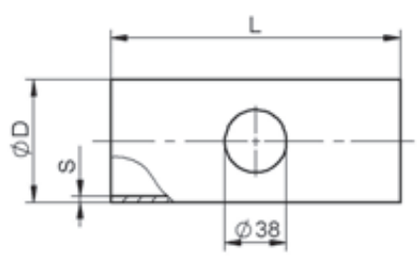
Measuring tube MH-032H040



Measuring tube MH-032H050



Measuring tube MH-032H...



Type	D	S	L
MH-032H063	63	3.0	156
MH-032H075	75	3.6	178
MH-032H090	90	4.3	202
MH-032H110	110	5.3	232
MH-032H125	125	6.0	260
MH-032H140	140	6.7	287
MH-032H160	160	7.7	312

Tapping clamps

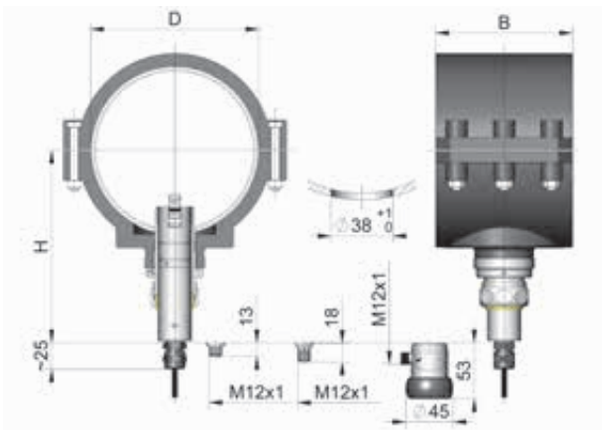
Features

The tapping clamps described below can be used for installation of impeller probes of the series RR.-032 in industrial PVC-U pipeline systems. Of course, they are also suitable for installation in pipeline systems made of other materials having the same outer diameters. They offer the advantage that they can be retrofitted without having to cut the pipeline or carry out welding work.
A bore hole diameter of only 38 mm is required. The nozzle of the tapping clamp immerses into this bore hole. The (curved) surface must be secured around the bore hole so that the seal is guaranteed by the O-ring affixed in the clamp.
Installation of the impeller probe in the clamp takes place with the clamping ring with union nut supplied with the probe.
The installation point should be chosen such that an uninterrupted (no valves, bends, edges, etc.) inlet and outlet section having a length of at least 10 times the inner diameter of the pipe is provided upstream and downstream from the probe.

Technical data

Wetted materials	Probe mount	PVC-U
	Clamp	Polypropylene
	Seal	Fluororubber FKM
Compressive strength	PN10	

Dimensions



Type	D	B	H
BBI-032H-063	63	71	145
BBI-032H-075	75	91	154
BBI-032H-090	90	91	156
BBI-032H-110	110	98	166
BBI-032H-125	125	101	167
BBI-032H-140	140	134	172
BBI-032H-160	160	137	180

Ordering code

BBI-032H- 1. ☐

1.	For outer pipe diameter	
	063	63 mm
	075	75 mm
	090	90 mm
	110	110 mm
	125	125 mm
	140	140 mm
	160	160 mm

T-pieces TS32

Features

The T-pieces are intended for use with flow transmitters of the series RRI-032/RRH-032.
The flow conditions in a T-piece are, by nature, less favourable than in a straight pipeline.
Several influential factors converge here:

- Expansion of the flow cross-section within the T-piece
- Undefined edges of pipe ends upstream and downstream from the measuring point
- Unknown inner diameter of connected pipelines
- Variable screw-in depth of connected pipelines

The flow pattern at the measuring point, therefore, is only conditionally predictable.

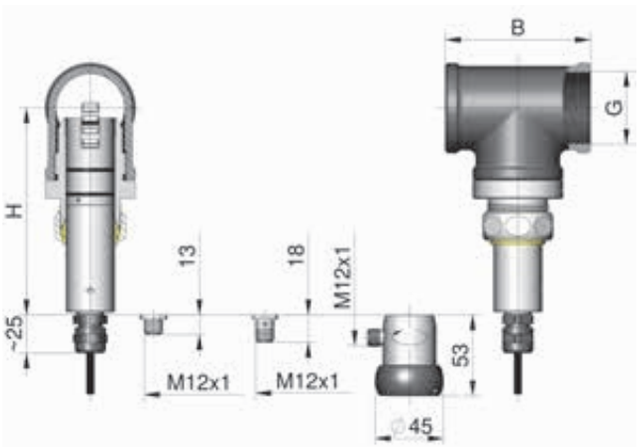
However, T-pieces can be used advantageously for applications with low requirements on reproducibility and stability:

- Available for metal pipelines with diameter DN32 or higher
- Installation is possible with ordinary tools (no boring or welding necessary).

Technical data

Nominal widths	DN32, DN40, DN50	
Wetted materials	Body	Cast iron (DN32) or Red bronze (DN40/DN50)
	Port	Brass nickel-plated
Compressive strength	PN10	

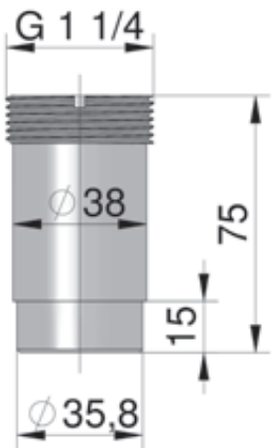
Dimensions and ordering code



Ordering code	Nominal size	G	B	H
TS32-032M	DN32	1 1/4"	90 mm	approx. 138 mm
TS32-040M	DN40	1 1/2"	108 mm	approx. 142 mm
TS32-050M	DN50	2"	122 mm	approx. 145 mm

Weld-on nozzle VKI-032K

Dimensions



Features

A weld-on nozzle is available for installation of impeller probes of the series RR.-032 in steel or stainless steel pipelines.
A bore hole in the pipeline with 36.5 mm diameter in which the weld-on nozzle is welded is required.
Installation of the impeller probe in the nozzle takes place with the clamping ring with union nut supplied with the probe.
The installation point should be chosen such that an uninterrupted (no valves, bends, edges, etc.) inlet and outlet section having a length of at least 10 times the inner diameter of the pipe is provided upstream and downstream from the probe.

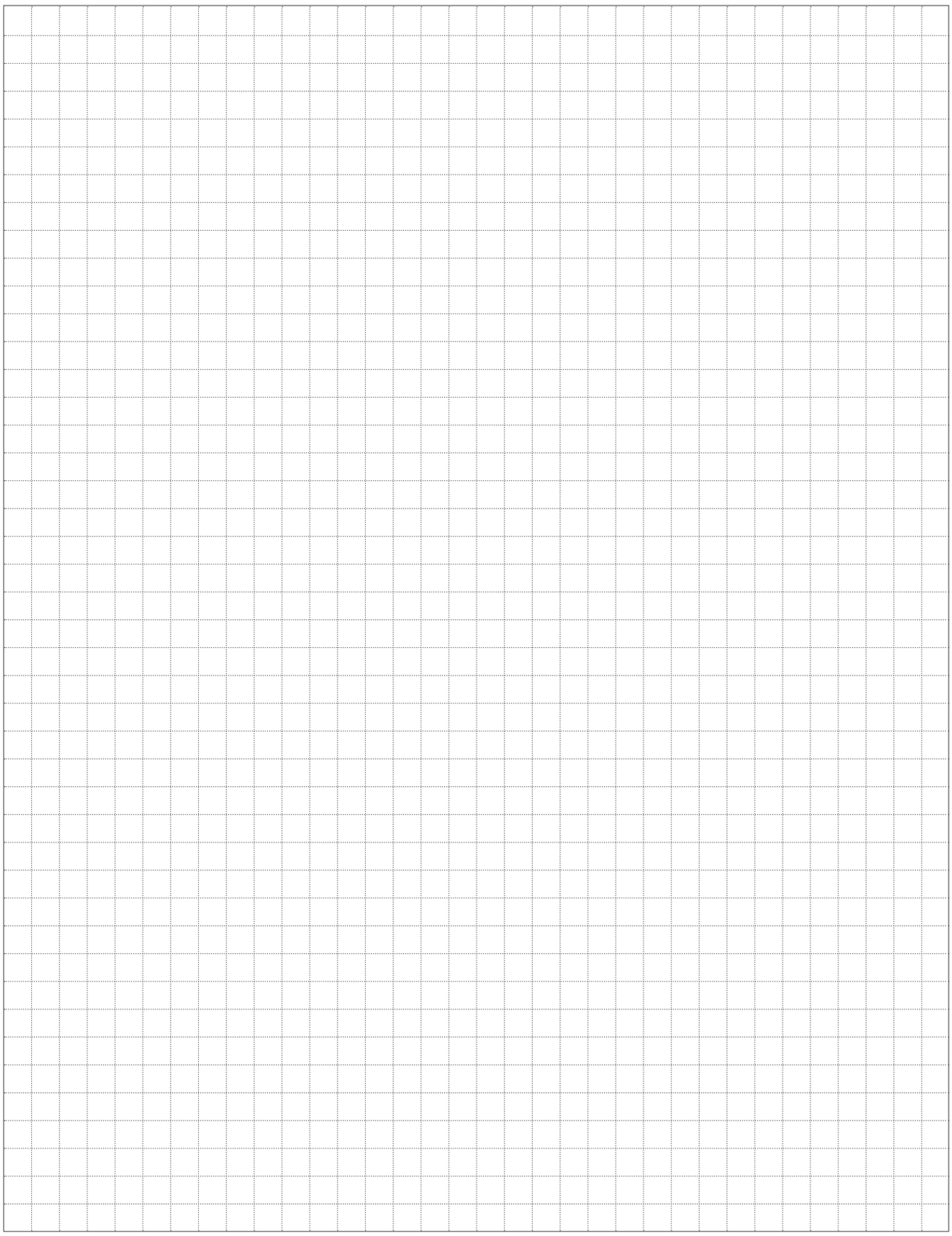
Technical data

Pipeline diameter	min. DN 40
Wetted materials	1.4305
Compressive strength	PN10

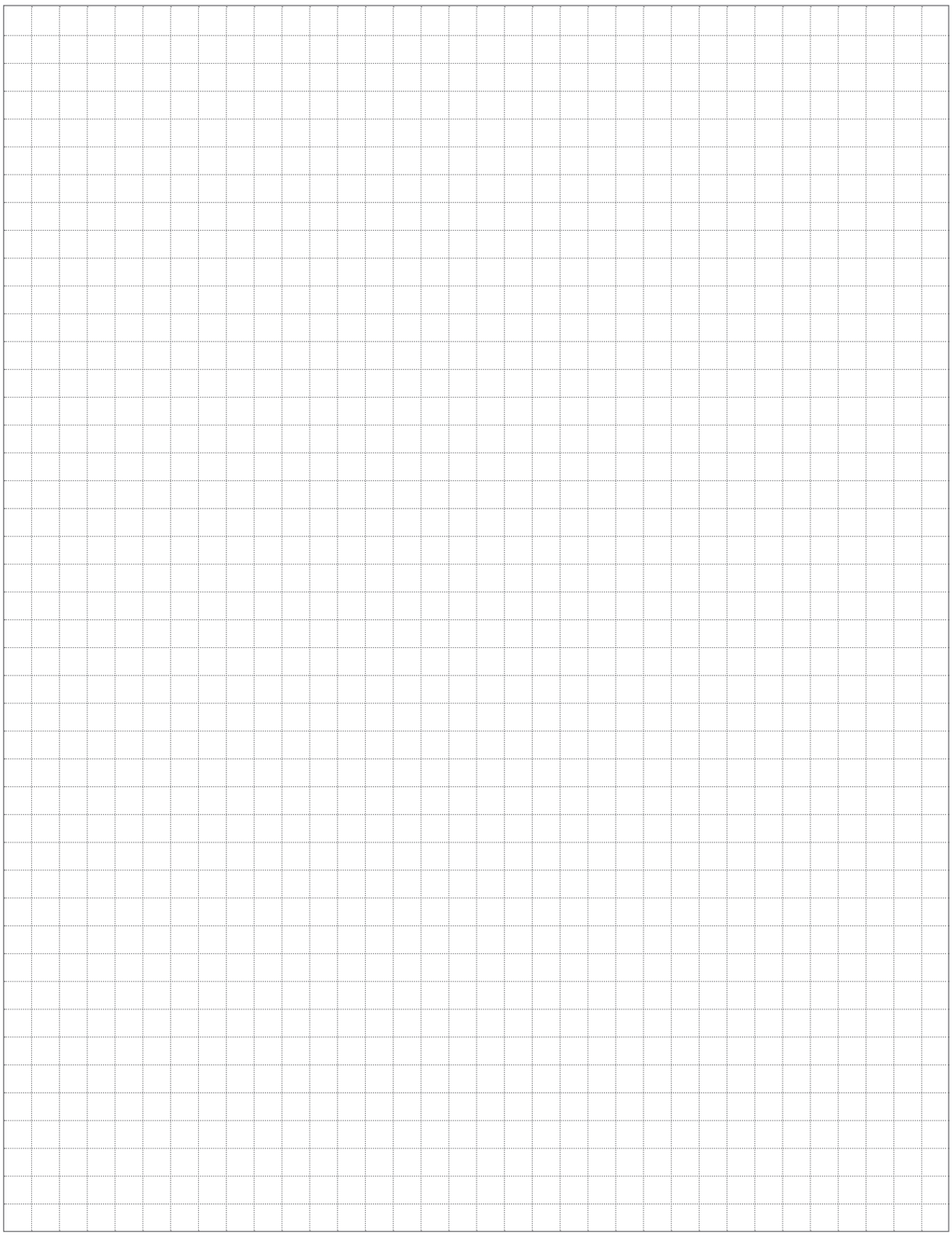
Ordering code

VKI-032K	Weld-on nozzle for RRI/RRH-032

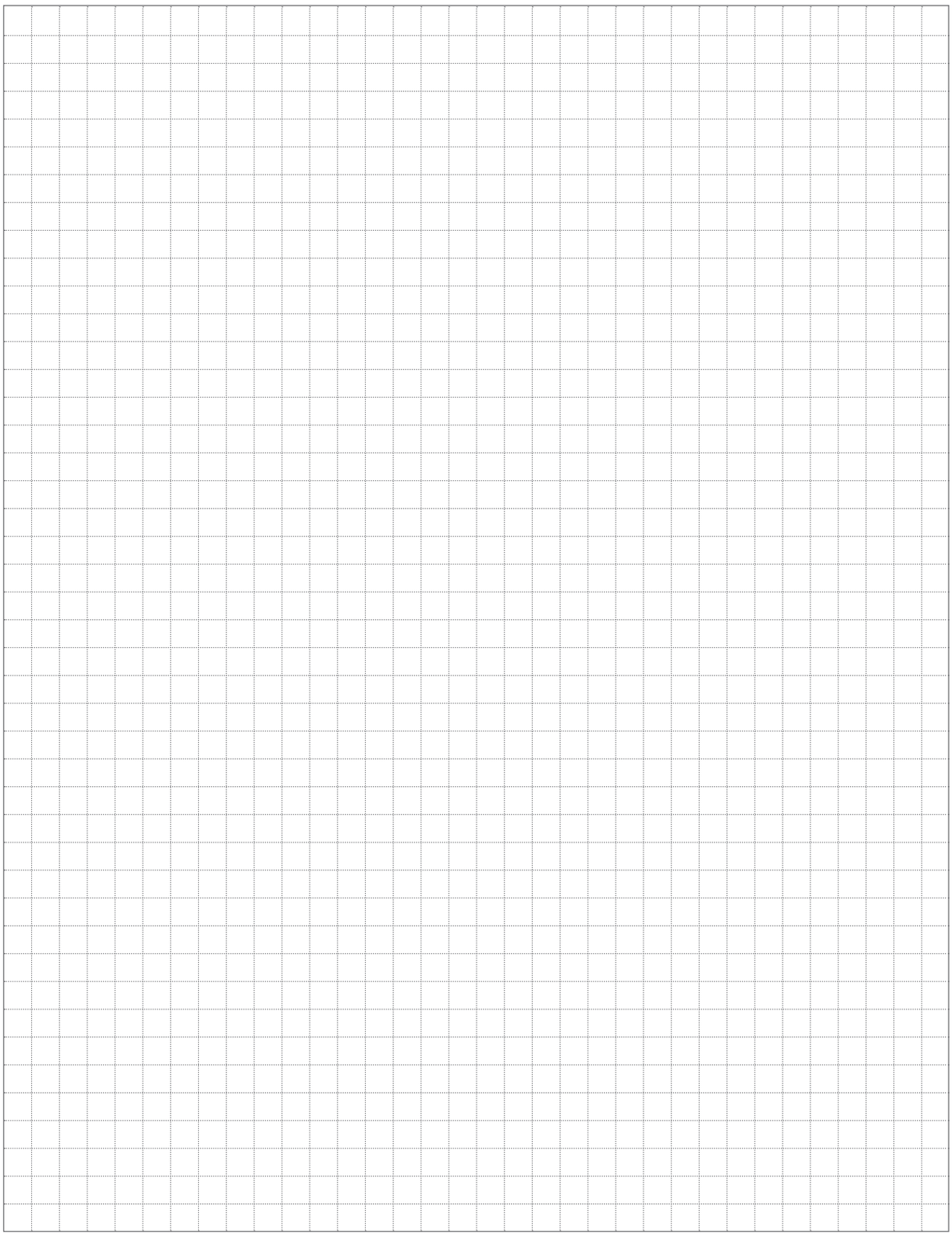
Notes



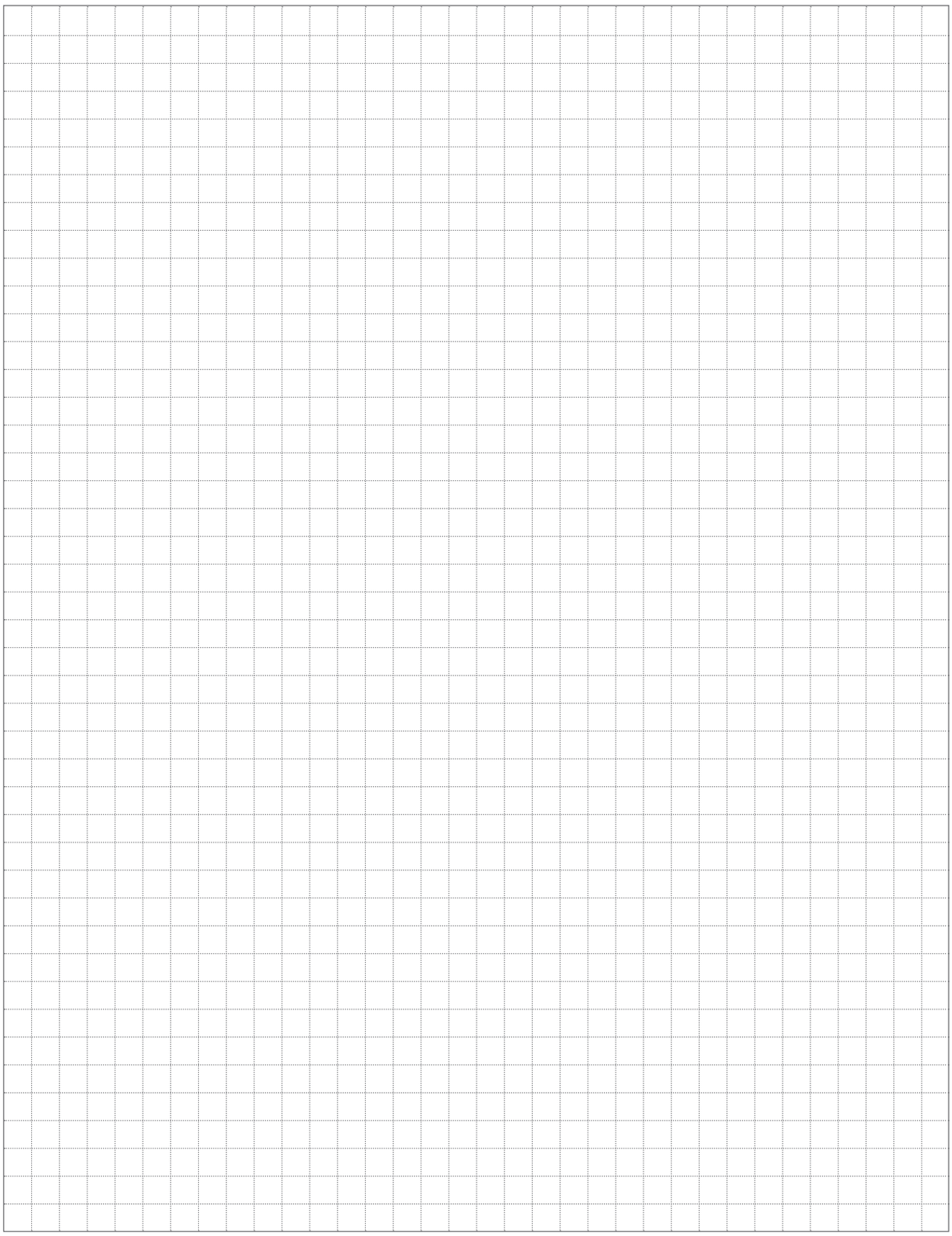
Notes



Notes



Notes



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