



HONSBERG

INDUSTRIAL FLUIDCONTROL

BASIC

Main Catalogue



Flow • Level • Temperature • Pressure • Filtration

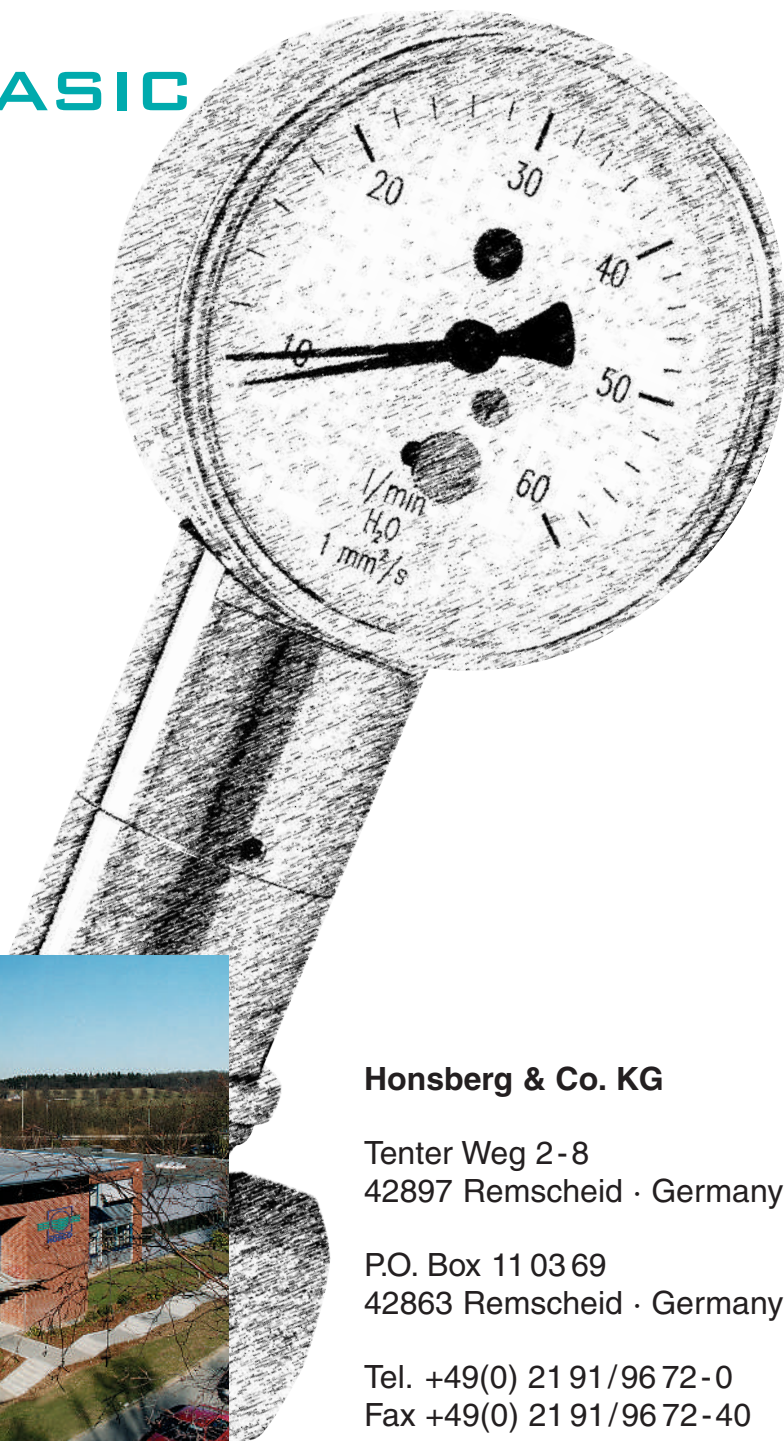


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Flow • Level • Temperature • Pressure • Filtration

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Honsberg & Co. KG

Tenter Weg 2-8
42897 Remscheid · Germany

P.O. Box 11 03 69
42863 Remscheid · Germany

Tel. +49(0) 21 91/96 72-0
Fax +49(0) 21 91/96 72-40

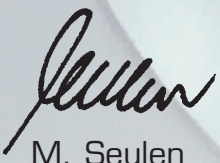
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info@honsberg.com

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Welcome to Honsberg!

As a family controlled enterprise, we welcome you and appreciate your interest in our products for control and measurement of flow, level, temperature, pressure and filtration.

Sincerely



M. Seulen
Owner – Manager



The road to success

- 1963 The company is founded by Prof. G. W. Seulen as a manufacturer of mechanical flow control instruments.

- 1974 Michael Seulen joins the management. Product range is extended to include level, temperature and pressure. New premises in Remscheid Lennep, Tenter Weg.

- 1977 KTA approval and supplier of flow control technology for nuclear power plants

- 1980 Start of large-scale production of mechanical monitoring equipment for OEM customers.

- 1990 Extension of the product range to include electronic devices.

- 1995 Presentation of electronic metering converters for flow, level, temperature and pressure.

- 1996 Honsberg Smart transducer.
 Certification to ISO 9001.

- 1998 Presentation of the integrated transmitter system OMNI.

- 2000 Reorganisation and expansion of the production division. New office building.

- 2002 Focus on products and marketing

- 2004 ATEX certified company

- 2005 DIN-GOST certified company



The range















The Honsberg range of industrial instrumentation for

Flow
Level
Temperature
Pressure

Our aim is to provide industrial plant engineering and process technology with tried and trusted and economical solutions in the areas of:

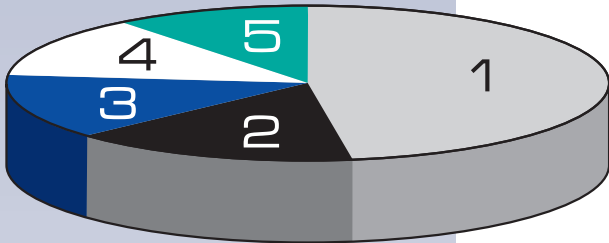
- **Monitoring**
threshold value when undercut or exceeded
- **Indicating**
visual control
- **Metering**
quantitative statement in the accuracy range of 3% or continuous signal recording and transmission in the accuracy range of 1%
- **Counting**
impulse output
- **Regulating**
flow limitation with orifice
- **Transducing**
signal transformation, signal processing
- **Filtering**
protection from dirt, filtration of fluids

Honsberg devices can be found in wide areas of industry and processing in a range of applications dealing with fluids, aggressive and viscous media as well as air and gases.

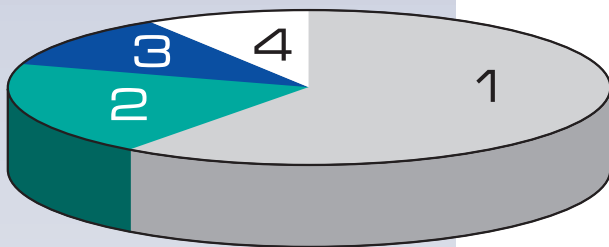
A		Piston, valve design	Monitoring, indicating, metering	15
B		Piston, inline design	Monitoring, indicating, metering	51
C		Variable area	Monitoring, indicating, metering	99
D		Paddle, dynamical flap	Monitoring, indicating, metering	127
E		Rotor, turbine, gear and oval wheel	Monitoring, indicating, metering, counting	161
F		Calorimetric, magnetic-inductive, vortex	Monitoring, metering	201
G		Sight glass, flap, sphere	Indicating	223
H		Orifice	Regulation, monitoring	235
I		Level	Monitoring, indicating, metering	243
J		Temperature	Monitoring, indicating, metering	269
K		Pressure	Monitoring, indicating, metering	279
L		Integrated systems Omni/Flex	Monitoring, indicating, metering	297
M		Transducers	Signal processing	311
N		Filters, accessories	Filters, supporting components	321

The market is the challenge

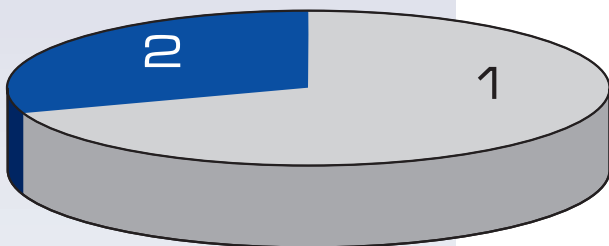
Honsberg sales structure



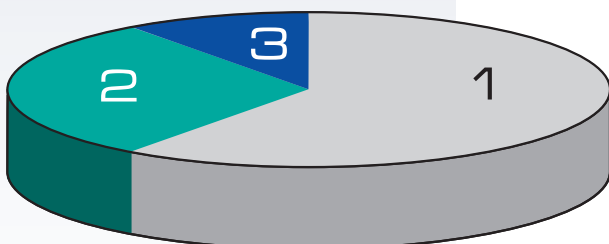
1. engineering
2. customized solutions, oem
3. (enduser)
4. process application
5. miscellaneous



1. flow
2. level
3. temperature
4. pressure



1. mechanical instrumentation
2. electronic instrumentation



1. domestic market
2. export europe
3. export world

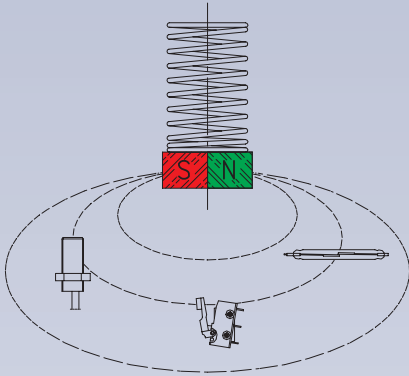
The systems

The HONSBERG range includes metering and monitoring equipment in the accuracy range of up to 0.1 % from the measured value. HONSBERG technology concentrates on specific mechanical and electronic systems which are integrated in a variety of systems, resulting in an extremely flexible range of applications.

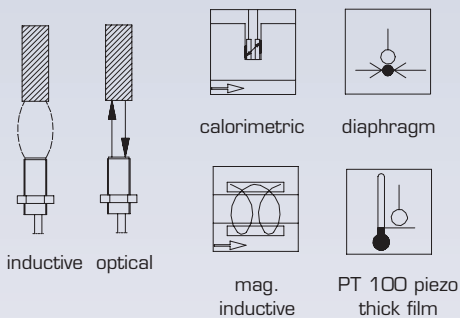
Advantages	Disadvantages	Application	Principle	
<ul style="list-style-type: none"> ● Sturdy mechanics ● Good repeatability 	<ul style="list-style-type: none"> ● High pressure loss 	Universal use for liquids and gases <ul style="list-style-type: none"> ● Industry, e.g. transfer lines 		Piston spring-supported (path recording)
<ul style="list-style-type: none"> ● Purely physical floating principle ● High accuracy 	<ul style="list-style-type: none"> ● Only for transparent media ● Defined installation position 	Metering of transparent liquids and gases <ul style="list-style-type: none"> ● Laboratory ● Medical technology 		Variable area (path recording)
<ul style="list-style-type: none"> ● Low pressure loss ● Dirt resistant ● Independent of nominal diameters 	<ul style="list-style-type: none"> ● Higher functional tolerance ● Sensitive with high flow velocities 	Yes/no control of liquid and gaseous media <ul style="list-style-type: none"> ● Heating technology ● Transformers 		Paddle spring-supported (path recording)
<ul style="list-style-type: none"> ● High accuracy 	<ul style="list-style-type: none"> ● Limited application for gases and viscous media 	Linear frequency signals <ul style="list-style-type: none"> ● Cooling systems 		Rotor, turbine (rotation)
<ul style="list-style-type: none"> ● High accuracy ● Volumetric, thus independent of viscosity 	<ul style="list-style-type: none"> ● High pressure loss 	Linear frequency signals <ul style="list-style-type: none"> ● Oil circulation ● Collet chuck 		Gear wheel, oval wheel (rotation)
<ul style="list-style-type: none"> ● No moving parts ● Independent of nominal diameters 	<ul style="list-style-type: none"> ● Limited application for gases and oils ● Inductive only for conductive liquids 	Sensor technology <ul style="list-style-type: none"> ● Welding robots ● Waste water systems 		Calorimetric, magnetic, inductive (temperature difference, inductive)
<ul style="list-style-type: none"> ● Linear method 	<ul style="list-style-type: none"> ● Sensitive to changes in density 	Level monitoring and metering <ul style="list-style-type: none"> ● Tanks 		Level Float, sight glass (path recording)
<ul style="list-style-type: none"> ● Proven method of monitoring and metering temperature 	<ul style="list-style-type: none"> ● Linearity deviation in the lower range 	Temperature monitoring and metering <ul style="list-style-type: none"> ● Industrial systems 		Temperature diaphragm, platinum, resistance-sensor
<ul style="list-style-type: none"> ● Linear transmission of motion 	<ul style="list-style-type: none"> ● Diaphragm sensitive to high pressures 	Pressure monitoring and metering <ul style="list-style-type: none"> ● Gears 		Pressure Piston, diaphragm, piezoresistive strain relief element

The Honsberg Technology

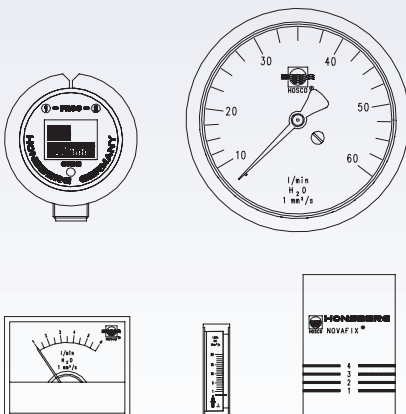
The technologies:



Spring-supported magnetic contact control



Display options:
Triggering of mechanical metering units or digital sensor systems



Flow l/min	Level mm	Temperature °C	Pressure bar
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The Honsberg technology for monitoring and metering flow, level, temperature and pressure is based on the principle of inductive magnetic coupling of movement of a spring-supported base or rotating element fitted with a magnet. This unit is located in the hydraulic area and actuates contacts, display units or integrated electronic circuits outside the media space according to specific parameters.

Using this method, switch contacts are triggered, dials actuated, visual display elements activated or continuous output produced in a pre-defined position which corresponds to the operating parameter required.

This technology results in significant advantages during operation:

- No sealing problems thanks to inductive triggering from within the media space
- Installation can be in any position thanks to spring support
- High pressure and temperature load
- Straightforward servicing since separated from hydraulic and electric components

Other technologies include the metallic activation of an inductive proximity switch, activation of an optical sensor, electronic evaluation of temperature and pressure sensors or the direct triggering of a switch contact, metering unit or integrated electronic circuits.

The components

Component	Task	Design	Advantages
Magnet	Triggering	Ring, cylinder	Inductive triggering
Spring	Deflection, reset guarantee	Tension or pressure spring	Reliable resetting
Reed-switch	Threshold contact, break contact, make contact or changeover contact	Magnetic triggering	Low hysteresis, no mechanical triggering components
Mikro-switch	Threshold contact, changeover contact	Mechanical or magnetic triggering	Spring-supported switching characteristics, high switching capacity
Hall-Sensor	Sensor signal PNP NPN	Magnetic activation	Sensor in metal housing for high pressures
Inductive proximity switch		Metallic activation	Universal applications, without magnetic triggering components
Optical sensor		Optical activation	Sensor without additional triggering components
Mechanical dial unit	Dial display	Dial unit with magnetic or mechanical triggering	Reliable high-resolution mechanical scale system
Integrated systems	LCD display Threshold values 0..10 V, 0(4)..20 mA		Compact design for displaying threshold values and continuous paging

Handling

One important requirement of product development is simple and safe product handling. On the one hand, this refers to the installation in mechanical, electrical and electronic terms, and on the other the calibration and setting of the instruments.

Mechanical installation

The following standard options are available in housing form:

- Female threads
- Flanges

The following standard options are available in stub-connection form:

- Male threads
- Flanges
- Solder, welded stub-connections

Electrical installation

Standard installation of the devices is via plug or cable. Wiring is according to the connection diagram provided.

Reed, micro-switches

The reed switch consists of contact tongues arranged in a pipe either evacuated or filled with inert gas, the micro-switch works on the basis of mechanical contact control.

When connecting the switch it is mandatory that a consumer is connected in series. It must be guaranteed that the given values for voltage, current and capacity are not exceeded.

- Switching voltage V AC
- Switching current A
- Capacity VA

Contact material

- Reed switch Ruthenium, rhodium, tungsten
- Micro-switch Silver, gold

Electronic sensors

- Inductive proximity switches Triggered by metal
- Hall sensors Triggered by magnet
- Optical sensor Optical triggering

NPN/PNP electrical data according to data sheet

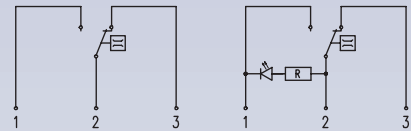
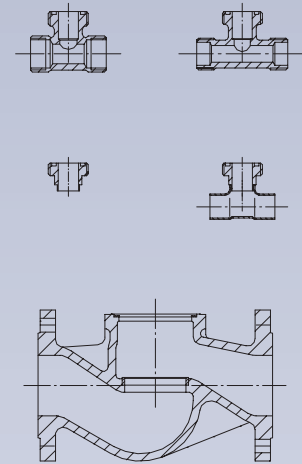
Calibration

The devices can either be factory-adjusted with documentation or calibrated during customer commissioning.

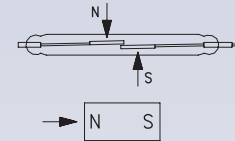
Bus applications

The Honsberg oil distribution system is compatible to mostly any BUS Systems via the "Murr Cube System". Please contact us to get detailed information.

4..20mA => cube 67 (analog input) =>
Bus interface => reduce 16 wires to one

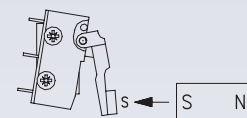


Reed switch



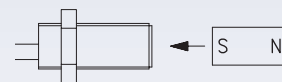
- high switching speed
- tight hysteresis

Micro-switch

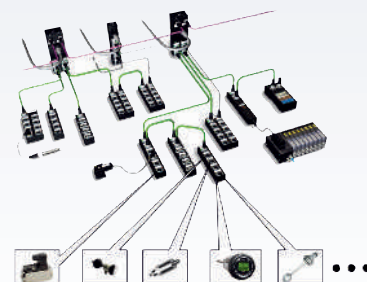


- mechanical step characteristics
- high switching power

Hall sensor

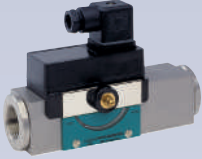















- wear-free
- high responsiveness



The variety

The Honsberg range has an extremely modular structure and makes flexible adaptation of applications for our devices possible thanks to the combination of standard components.





Working principle	Basic device	Variations	
Piston	Monitor Adjustable contact of a reed or micro-switch 	Magnetically coupled dial for local measurement 	Magnetically triggered transducer with switch PNP and NPN, 4[0]..20 mA and LCD display 
Paddle	Monitor Adjustable contact of a reed or micro-switch 	Magnetically coupled dial for local measurement with adjustable integrated threshold 	
Rotor	Frequency-transmitting transmitter 	Sensor options switch, 4... 20 mA output 	Integrated transducer with switch PNP and NPN, 4[0]..20 mA and LCD display 
Calorimetric	Monitor with LED indication and potentiometer setting 	Transmitter with switch PNP or NPN, 4[0]..20 mA or 0 ... 10 V with and without LCD display  	
Level	Transmitter with 4 ... 20 mA 	Transmitter with switch PNP or NPN, 4[0]..20 mA or 0 ... 10 V with and without LCD display  	
Temperature			
Pressure			

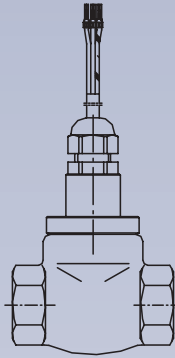
Application Commands Selection

The Honsberg range of devices has a modular structure and this offers a wide range of applications.

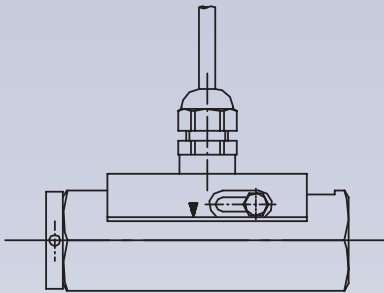
Flow

Specification	Chapter	Systems	Equipment
Large nominal sizes >DN50	<ul style="list-style-type: none"> ● A ● D ● E ● F ● F 	<ul style="list-style-type: none"> ● Piston valve design ● Paddle ● Rotor ● Calorimetric ● Magnetic-inductive 	<ul style="list-style-type: none"> ● PD, VI, TX, TZ1, VD, VDO, VM ● CM2K, CRG, UB1, UM3K, UR1, UR3K, VM, TZ1 ● RR.-032 ● EF ● FIS
Low flow rates < 1l/min	<ul style="list-style-type: none"> ● A ● B ● C ● E ● E ● E ● F ● F 	<ul style="list-style-type: none"> ● Piston valve design ● Piston inline design ● Variable area ● Rotor ● Turbine ● Gear wheel ● Oval wheel ● Calorimetric 	<ul style="list-style-type: none"> ● FF, FM, G ● FW3, FX, HD1K, HD2K, HM1K, MF, MR, MR1K, RVM, VF, VO ● GK, GR, MMF, UK, VL ● PO, RL, WR1, RA, RH, RRI, RRH, RRO ● RO ● VHZ ● VHO ● EF
High operating pressure >200 bar	<ul style="list-style-type: none"> ● B ● E 	<ul style="list-style-type: none"> ● Variable area ● Turbine 	<ul style="list-style-type: none"> ● HD1K, HD2K, HM1K, MR1K, RVM ● RT
High temperatures >120°C	<ul style="list-style-type: none"> ● A ● D ● E 	<ul style="list-style-type: none"> ● Piston valve design ● Paddle ● Turbine 	<ul style="list-style-type: none"> ● MX0, MXR, TX ● UB1 ● RT
Aggressive media NJ,	<ul style="list-style-type: none"> ● B ● C ● D ● E ● E ● F ● F ● G 	<ul style="list-style-type: none"> ● Piston inline design ● Variable area ● Paddle ● Rotor ● Turbine ● Calorimetric ● Magnetic-inductive ● Sphere 	<ul style="list-style-type: none"> ● HD1K, HD2K, HR1MV, MI, MR, MR1K, NJ, NO, VF, VO ● VL ● CRG, UB1 ● RRO ● RT ● EF ● FIS ● BL
Announcement of dirty media	<ul style="list-style-type: none"> ● A ● B 	<ul style="list-style-type: none"> ● Piston valve design ● Piston inline design 	<ul style="list-style-type: none"> ● MP, MX0, TZ1, VDO ● NJ, NJV, NO
Viscose media up to 350 mm ² /s	<ul style="list-style-type: none"> ● A ● B ● D 	<ul style="list-style-type: none"> ● Piston valve design ● Piston inline design ● Paddle 	<ul style="list-style-type: none"> ● FF, FM, G, MP, MXR, PD, TX, TZ1, VD, VDO, VI, VM ● FW1, HD1K, HD2K, HR1MV, MR, MR1K, NJ, NJV, VF, VO, MI ● CM2K, CRG, TZ1, UB1, UI, UM3K, UR1, UR3K, VM, UZ
Viscosity-compensated 1-200 mm ² /s	<ul style="list-style-type: none"> ● B 	<ul style="list-style-type: none"> ● Piston inline design 	<ul style="list-style-type: none"> ● HD2K, HR1MV
Viscosity-independent to 1000 mm ² /s	<ul style="list-style-type: none"> ● E ● E 	<ul style="list-style-type: none"> ● Gear wheel ● Oval wheel 	<ul style="list-style-type: none"> ● VHZ ● VHO
Air and gas	<ul style="list-style-type: none"> ● A ● B ● C ● D ● E ● G 	<ul style="list-style-type: none"> ● Piston valve design ● Piston inline design ● Variable area ● Paddle ● Rotor ● Sphere 	<ul style="list-style-type: none"> ● Alle ● FX, FW1, HD1K, HR1MV, MF, MI, MR, MR1K, NJ, NO, VF, VO ● Alle ● UI, UM3K, UR1, UR3K, YR ● PO, WR1, RRI, RRH, RRO ● BL

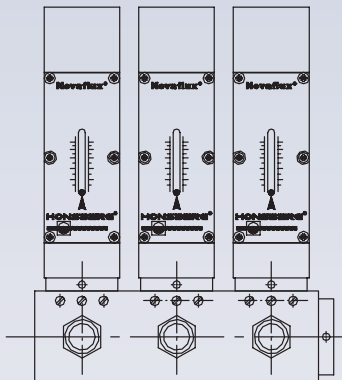
Approvals	Chapter	Systems	Equipment
Atex I M1 EEx ia I II 1G EEx ia IIC T4 II 1D EEx iaD 20 T135 	<ul style="list-style-type: none"> ● A ● B ● D ● I 	<ul style="list-style-type: none"> ● Piston valve design ● Piston inline design ● Paddle ● Float 	<ul style="list-style-type: none"> ● VD, VM ● HD1K, HD1KV, HR1MV ● UR1, VM ● NW1
Atex II 2G EEx D IIC T6 	<ul style="list-style-type: none"> ● A ● D 	<ul style="list-style-type: none"> ● Piston valve design ● Paddle 	<ul style="list-style-type: none"> ● VM ● VM
GL - Germanischer Lloyd 	<ul style="list-style-type: none"> ● A ● B 	<ul style="list-style-type: none"> ● Piston valve design ● Piston inline design 	<ul style="list-style-type: none"> ● G, VD ● HD1K
TÜV 	<ul style="list-style-type: none"> ● A ● D ● D 	<ul style="list-style-type: none"> ● Piston valve design ● Paddle ● Paddle 	<ul style="list-style-type: none"> ● TX ● CRG ● UB1



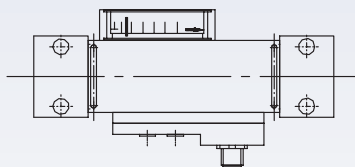
Compressor



High Pressure Cleaners



Paper Machine



Machine Tool

Honsberg at work

Honsberg products can be found in a wide variety of applications and as original equipment components in industrial plant engineering.

	Flow	Level	Temperature	Pressure	Filtration
Application	Equipment	Chapter / System			
● clamping cylinder	● VHZ	● E gear Wheel			
● compressor	● FF	● A piston valve design			
● construction machines	● NR	● H level			
● cooling circuit	● RRI	● E rotor			
● cooling unit	● FW1 ● RRI	● B piston inline design ● E rotor			
● dental chair	● MF	● B piston inline design			
● diesel engines	● G	● A piston valve design			
● earth moving machinery	● NR	● H level			
● gearing mechanism	● NJ, NJV	● B piston inline design			
● power generation	● VD	● A piston valve design			
● heating engineering	● UM3, UR1 UR3	● D paddle			
● high pressure cleaners	● MR	● B piston design			
● induction hardening equipment	● RRI	● E rotor			
● industrial furnaces	● KM	● I orifice			
● injection moulding machine	● ZE	● N filter			
● laboratory equipment	● UK	● C variable area			
● laser technology	● RRI	● E rotor			
● machine tool	● MR	● B piston inline design			
● medical technology	● MMF	● C float			
● mobile automatic welders	● FX	● A piston valve design			
● multi-circuit system	● RRI	● E rotor			
● oil circulation	● HD2K	● B piston inline design			
● oxygen supply	● MMF	● C variable area			
● paint finishing system	● MR1K	● B piston inline design			
● paper machine	● NJ, NJV	● B piston inline design			
● printing machine dehumidifier	● FW1, OT ● UR	● B piston inline design ● D paddle			
● pressure increasing system	● TF1	● J temperature			
● printing machine pollinator	● PM	● K pressure			
● sewage technology	● FIS	● F magnetic-inductive			
● steel mill	● UZ	● D paddle			
● swimming pool	● UR	● D paddle			
● transformer	● UB1, CM2K	● D paddle			
● tunnelling machine	● omni-F	● F calorimetric			
● vacuum pumps	● PM	● K pressure			
● welding robots	● EFK	● F calorimetric			

Piston valve design

- Monitoring of coolant in cold compressors

Piston inline design

- Protection against no-flow conditions e.g. high-pressure cleaners
- Monitors emulsion supply e.g. tool machines
- Monitors and measures oil supply to large-scale gear systems e.g. paper machines
- Monitors multi-circuit systems

Paddles

- Monitors oil flow in transformers
- Flow-dependent control of gas valves, combination boilers
- Monitors the addition of chemicals e.g. in swimming pools

Rotors

- Measures and monitors in semi-conductor technology
- Measures and monitors multi-circuit systems
- Measures and monitors cooling circuits

Gear wheel

- Hydraulic monitoring of clamping cylinders

Calorimetric

- Monitoring of cooling for welding lance in welding robots

Variable area

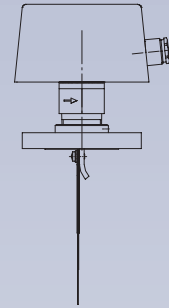
- Monitoring and measurement of water, oil and diesel in construction machinery

Bi-metal

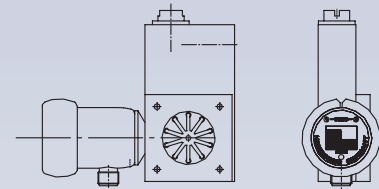
- Monitoring temperature in booster systems

Diaphragm

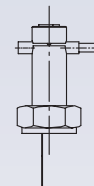
- Monitoring of exhaust pressure in vacuum pumps



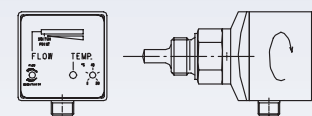
Transformers



Semi-conductor industry

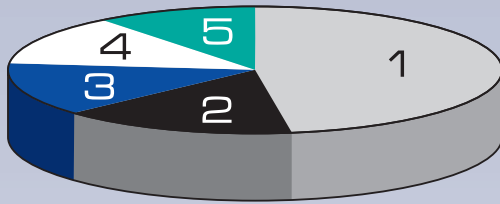


Swimming pools



Welding robots

Honsberg market positioning



With its very extensive breadth and depth, the market for measurement and control technology is split into various segments. Each of these has its own particular requirements and therefore forces small and medium-sized suppliers in particular to specialise and focus on just a few, in order to optimally position themselves on the market.

- 1 Process measuring equipment
- 2 Industrial measurement and control systems
- 3 Medical equipment
- 4 Chemicals and food
- 5 Other

For many years now, Honsberg has been an established name on the market for industrial measuring and monitoring systems, and supplies industrial plant engineering manufacturers with both standard products and also customised solutions. However, also in this specific market segment, there are various customer profiles whose needs have to be individually matched in terms of product portfolio, supply capability, level of after sales service, etc.



**Honsberg customer:
End user**

chooses individual items from the complete product range; expects product advice and delivery at short notice.

**Honsberg customer:
Industrial original
equipment manufacturer**

has specified a particular Honsberg product for his plant. This is very often a joint development or a modified series unit. Customer expects a high level of technical support, reliable delivery and comprehensive after sales service.

**Honsberg customer:
Series original
equipment manufacturer**

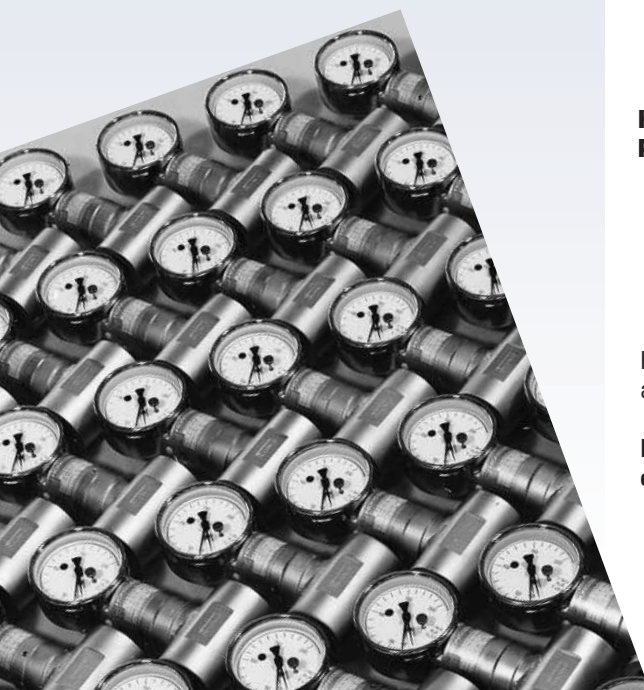
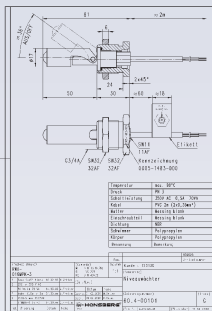
fits a specific Honsberg to his series products. This kind of customer makes very high demands in all areas of development, testing, production, documentation, quality organisation and punctual delivery, as well as advice and after sales service.

**Honsberg customer:
Retailer/distributor**

selects certain items from the complete product range in order to include them in his own sales range. Usually expects a proprietary label and reliable delivery. Technical advice plays a less prominent role.

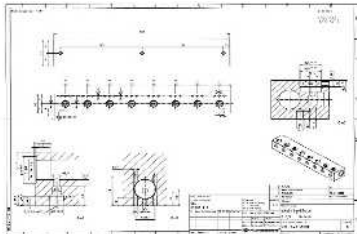
Honsberg has specialised in meeting the challenges of these segments and is equipped to fulfil their needs to a specially high degree.

Honsberg - Technical and logistical partner for the industrial plant engineering sector.



Honsberg Produktion

Modern machine tools manufacture the Honsberg specific components.



milling machine

The assembly is organised on basis of specific rig assisted stations partly in the format of assembly cells. Honsberg exercises the FVS system (Full Value Stream), which implies a full chain of value generation in the cell environment.

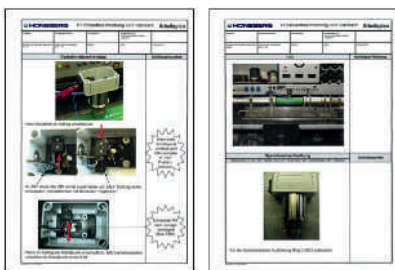


Integrated assembly, testing and packing



cell assembly

Order processing and shipment data are registered by a visual system and are instantly available.



test rig

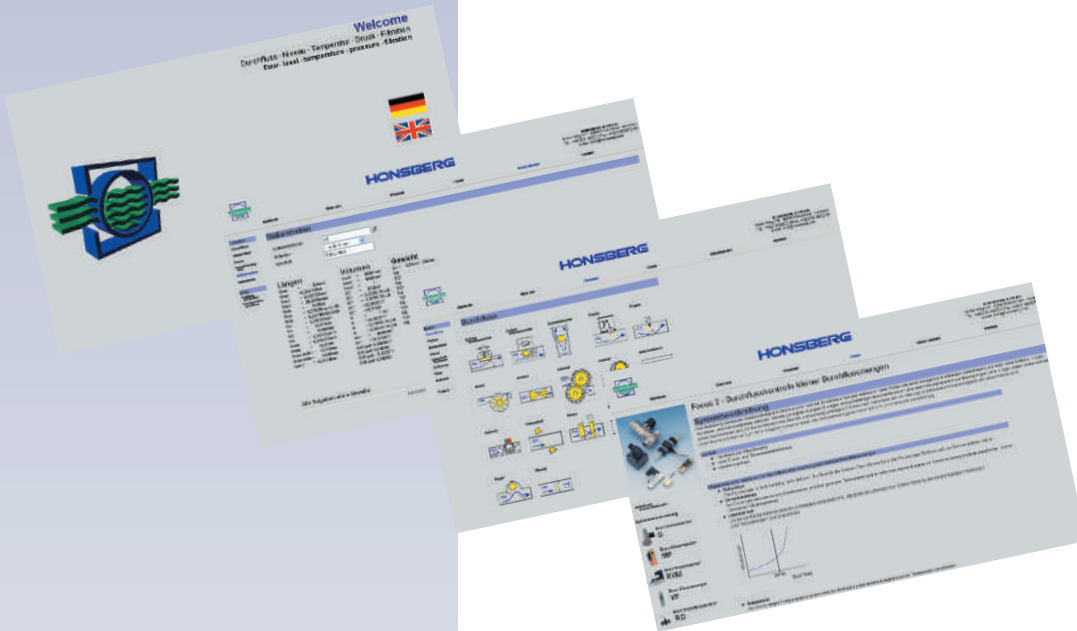
Subsequent to a 100 % functional test the finished product is assigned to a product identification number which allows constant traceability. The completion is either customer- or stock related. Honsberg keeps a comprehensive level of finished products in order to ship ex stock if required. The shipment of Honsberg products is assigned to certified transport organisations.



labeling

Honsberg Digital

All up-to-date information is available as PDF files on our website www.honsberg.com.

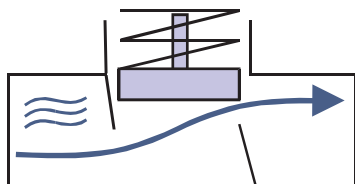


In addition, the product CD is available, including information as Excel and PDF files.



Piston valve design

The technology



Magnet-equipped, spring-supported piston triggers flow-dependent inductively adjustable threshold contacts or dial units.

Applications

- Industrial metering and monitoring technology
- Cooling systems
- Lubrication circuits

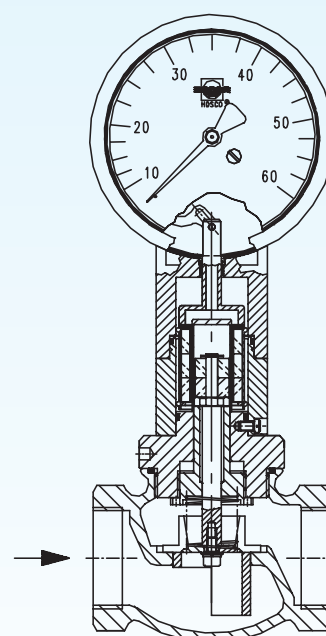
Advantages

- Dirt resistant
- High switching capacity
- Various materials
- Nominal diameters DN 8 to DN 300



Contents

System description	
Device system	16
Function and advantages	16
Metering materials and accuracy	17
Handling and operation	18
Device descriptions	19



- Switching
- Indicating
- Metering

Technical data

Concept	piston, valve design
Nominal diameter	8 - 300
Connection	female thread, flange, adhesive fitting, adhesive stub-connection
PN	10 - 200
Max. temperature	350 °C
Signal	threshold, optical display, potentiometer
Adjustable	yes
Materials	red bronze, stainless steel, cast steel, cast iron, PVC
Installation position	any
Metering materials	liquids or gases

System description

Device system

The piston system with valve design is of particular advantage for metering and monitoring jobs in the area of liquid and gaseous metering materials.

A magnet-equipped piston rests in the valve seat of a housing and is moved vertically by the flowing medium, whereby the path of the piston is directly proportional and linear to the flow rate.

Since the piston works against the force of a supporting spring, the devices can be installed in any position and reset safely when the volume flow diminishes.

Functions and advantages

The device system can be used for metering and monitoring tasks within the context of the basic design.

It is based on the non-contact coupling of the magnet-equipped piston in the hydraulic system to external hermetically separated threshold contacts or metering devices. In this way, threshold signals are produced or visual displays activated.

Since the contact unit is usually arranged adjustably, an adjustment range for the switching point is realised in the ratio 1:10, which enables users to set the required value continuously on site with the aid of scale information. The adjustment path is significantly extended by a coiled groove and displayed on a greatly lengthened scale [VD, VDO, VM].

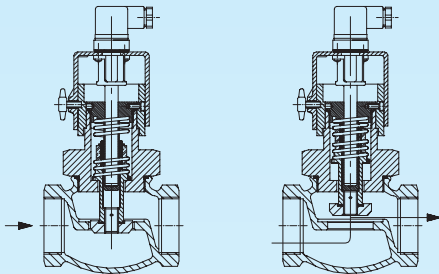
In the case of metering devices [TZ1] the piston movement is linked magnetically to an actuator part which activates a pointer metering unit and this makes a display on a 320° scale possible.

In the case of more straightforward versions [MP, VDO] the pointer mechanism is replaced by a magnetic ring pointer which is moved by the primary piston.

The advantages of the piston system are in its particularly sturdy design, high temperature and pressure resistance and simple yet safe handling during calibration.

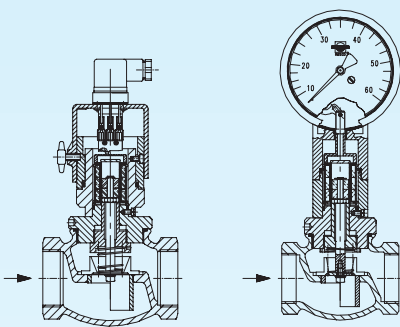
The application advantages can be summarised as follows:

- High pressure and temperature resistance
- Good soiling resistance
- Linear function
- Exact calibration
- Low pressure loss



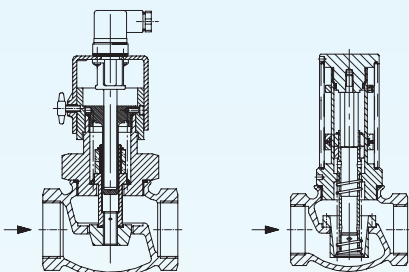
No flow

Flow



Micro-switch
VM

Dial
TZ1



Reed switch
VD

Magnetic ring
MP

Metering materials and accuracy

The devices are designed for liquid metering materials as standard and the functional data are specified for water.

The devices can also be used for viscous media and gaseous metering materials.

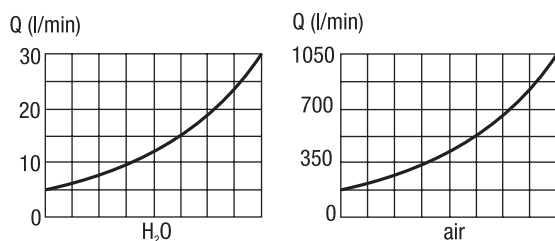
As far as viscosity is concerned, it must be noted that the metering values decrease as viscosity increases, as shown in the table below

	Water	Viscosity mm ² /s			
		30	60	115	220
VD	4	2	0.8	0.6	0.25
	8	6	4	3	1.5
	10	9	8	6	3
	20	18	17	14	10
VM	4	4	4	3	2.5
	8	8	8	7.5	6
	10	10	9	7	6
	20	19	18	17	14
MP	4	4	4	3	2
	8	8	7	6	4
	10	10	9	8.5	8
	20	19	18	17.5	17
TZ1	4	4	4	3.5	3
	8	8	7.5	7	6
	10	10	9.5	9	8
	20	20	19	18.5	18

In the case of air and gases, the functional ratio in relation to water is approx. 1:35, i.e. 1 l/min water corresponds to approx. 35 NI/min air, whereby temperature, density and operating pressure play a special role here.

In these cases the devices are tailor-made according to customer specifications, whereby the mechanical moving parts are equipped with additional absorption.

We will be happy to give you special advice in these cases.



Devices with a temperature range of up to 350 °C are available for higher temperatures.

Type	Temperature up to °C	Switching	Indication
MXR	160	+	-
MXO	160	optional	+
TX	350	+	+



MP



VDO



MXR



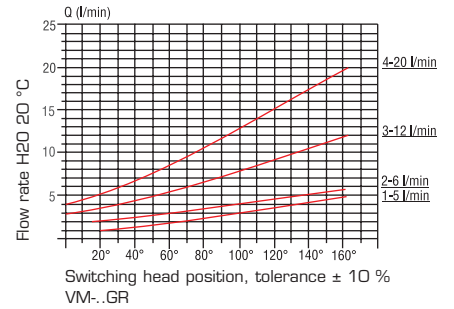
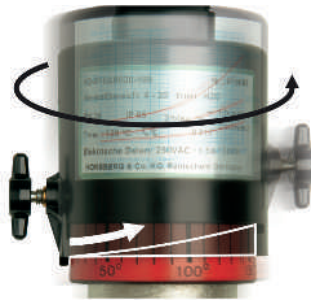
MXO

Handling and operation

If the switching point needs to be set, this can be done by adjusting the switching head in a coiled groove [Type VD, VDO, VM] or by longitudinal adjustment [TX, MX], with the position being chosen with the aid of a setting diagram and/or a scale.



VD



TZ1

The function of the threshold valve [TZ1] is either signalled by the system or, as an option, can be confirmed by an LED display.



	type	nominal diameter	connection	control	indication	output signal	on site metering	max. pressure bar	max. temperature °C	water	oil	gas/air	aggressive	miscellaneous	page
standard application	FF	8 - 40	female thread brass	●				200	110	●	✓	✓			20
	FM	8 - 15	female thread bronze	●				200	90	●	✓	✓			22
	G	8 - 15	female thread bronze	●				16	80	●	✓	✓		GL	24
	VD	8 - 80	female thread bronze	●				25	120	●	✓	✓		Ex GL	26
		8 - 50	female thread stainless steel	●				100	120	●	✓	✓	✓	Ex GL	28
	VM	8 - 80	female thread bronze	●				100	90	●	✓	✓	✓	Ex	30
		8 - 50	female thread stainless steel	●				100	90	●	✓	✓	✓	Ex	32
	VDO	8 - 80	female thread bronze	●	●			100	120	●	✓	✓			34
	MXR	8 - 80	female thread bronze	●	○			100	160	●	✓	✓			36
	MXO	8 - 80	female thread bronze	○	●			100	160	●	✓	✓			37
	MXM	8 - 80	female thread bronze	●	●			100	160	●	✓	✓			37
	TX	15-200	flange cast steel	●	●			40	350	●	✓	✓		Vd TÜV	38
	MP	8 - 80	female thread bronze		●			100	100	●	✓	✓			40
	TZ1	8 - 80	female thread bronze	○	●		●	100	90	●	✓	✓			42
		8 - 50	female thread stainless steel	○	●		●	100	90	●	✓	✓	✓		44
additional features			●	●	●	●								46	
PD	8 - 80	glue fitting PVC	●				10	60	●	✓	✓	✓		47	
	8 - 50	lue socket PVC	●				10	60	●	✓	✓	✓		47	
	8 - 80	flange PVC	●				10	60	●	✓	✓	✓		47	
special application	VD	15-100	flange bronze	●				16	120	●	✓	✓		Ex GL	47
		15-300	flange cast iron	●				16	120	●	✓	✓		Ex GL	47
		15-300	flange cast steel	●				40	120	●	✓	✓		Ex GL	47
		15-150	flange stainless steel	●				40	120	●	✓	✓	✓	Ex GL	47
	VM	15-200	flange cast iron	●				16	90	●	✓	✓		Ex	47
	VI	8 - 80	female thread bronze	●				16	60	●	✓	✓			48
	TZ1	65-200	flange cast iron	○	●		●	16	90	●	✓	✓			48

● standard ○ standard option □ special option

all data sheets available under www.honsberg.com

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media, with spring-supported piston and magnetic triggering of a reed switch. Rugged design in brass / bronze combination.

- * fixed switch value
- * high pressure duty
- * good repeatability
- * dirt-resistant
- * high switch capability

Female thread G1/4 to G1/2 bronze



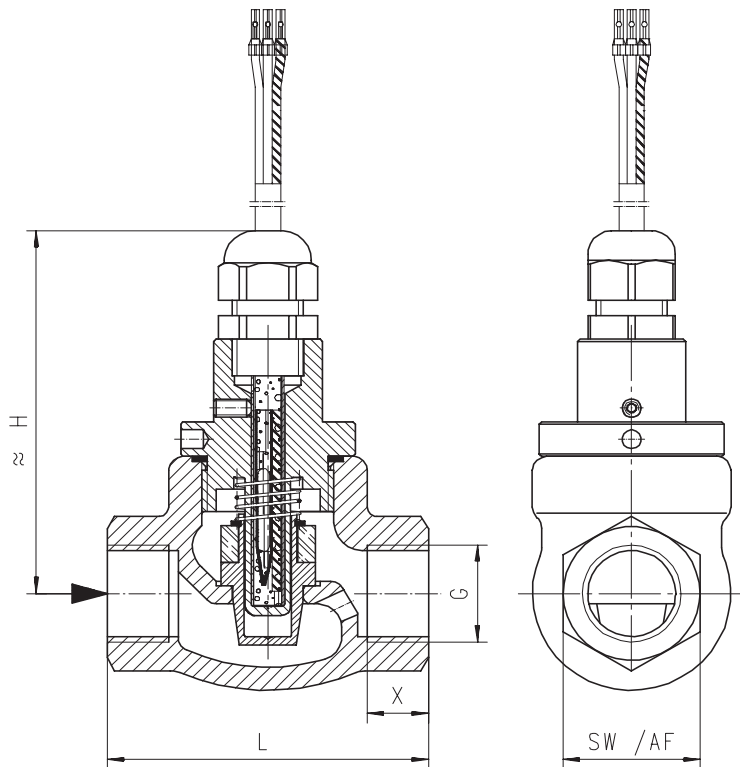
FF-025GR040S

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	switch value l/min H ₂ O selectable range for fixed switch	L mm	H mm	SW mm	X mm	weight kg
bronze	G 1/4	FF-008GR009.	200	10	0,4 - 9	68	79	29	12	0,6
	G 3/8	FF-010GR010.	200	15	0,4 - 10	68	79	29	12	0,6
	G 1/2	FF-015GR012.	200	20	0,4 - 12	68	79	29	13	0,6
	G 3/4	FF-020GR025.	25	40	0,6 - 25	73	79	32	11	0,7
	G 1	FF-025GR040.	25	60	1,5 - 40	87	90	41	14	1,0
	G 1 1/4	FF-032GR060.	16	100	2 - 60	98	94	52	14	1,5
G 1 1/2	FF-040GR090.	16	150	3 - 90	113	95	59	14	2,0	

Switch value is indicated for horizontally decreasing flow.

tolerance ±0.3 l/min
 media temperature max. 110°C
 average pressure loss 0.4 bar at Qmax.
 hysteresis depending on switch value
 minimum 0.4 l/min.



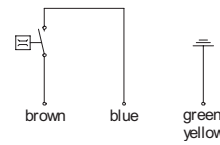
MATERIALS

housing bronze Rg5 nickel plated
 body brass Ms58 nickel plated
 piston stainless steel 1.4305
 spring stainless steel 1.4310
 magnet bariumferrite
 seals NBR

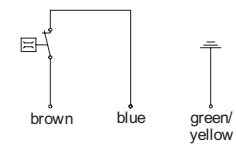
ELECTRICAL DATA

reed switch
230 V AC 1 A 50 VA
cable 1,5 m
protection class IP 65

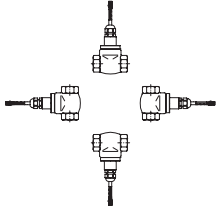
wiring 0.212 n.o.



wiring 0.214 n.c.

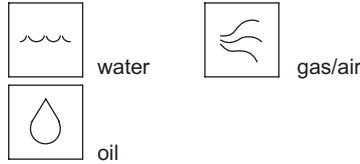


MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

FF-	008	G	R	009	S	basic type specification
	008				●	nominal diameter DN 8 - G1/4
	010				●	nominal diameter DN 10 - G3/8
	015				●	nominal diameter DN 15 - G1/2
	020				●	nominal diameter DN 20 - G3/4
	025				●	nominal diameter DN 25 - G1
	032				●	nominal diameter DN 32 - G1 1/4
	040				●	nominal diameter DN 40 - G1 1/2
		G			●	female thread
			R		●	bronze
				009	●	selectable range 0.4 - 9 l/min
				010	●	'selectable range 0,4 - 10 l/min
				012		'selectable range 0,4 - 12 l/min
				025		'selectable range 0,6 - 25 l/min
				040		'selectable range 1,5 - 40 l/min
				060		'selectable range 2 - 60 l/min
				090	●	'selectable range 3 - 90 l/min
					S ●	wiring 0.212 n.o.
					O ●	wiring 0.214 n.c.
Special option VARIO					□	switch values for oil or gas special switch points nominal diameter DN 50 - 80

Installation position horizontal H₂O.
Please indicate switch point with your order.

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and switch value with your order.
- With viscous liquids please indicate viscosity, temperature and quality of flow (switch value on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (switch value on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media, with spring-supported piston and magnetic triggering of a micro switch. Rugged design in brass / bronze combination.

- * fixed switch point
- * high pressure duty
- * good repeatability
- * dirt-resistance
- * high switch capability

Female thread G1/4 to G1/2 bronze



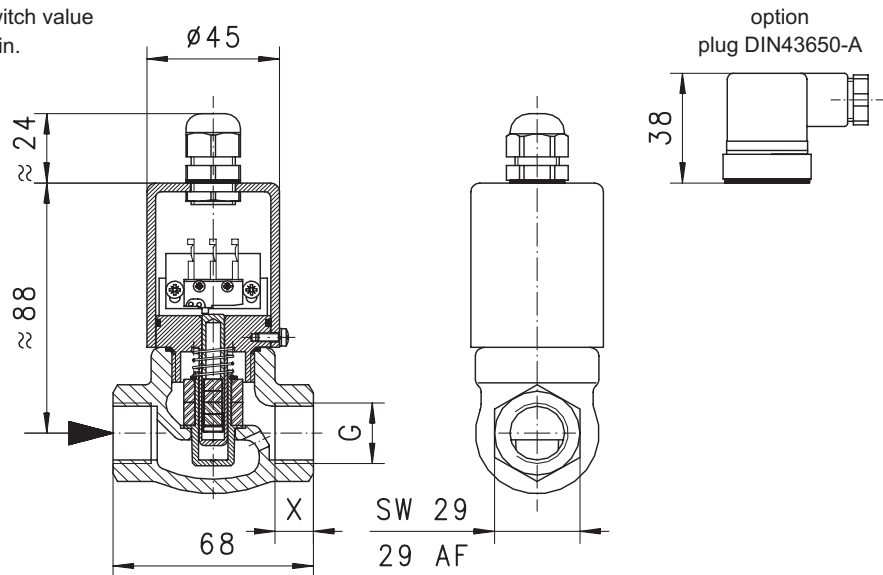
FM-010GR010

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	switch value l/min H ₂ O selectable range for fixed switch	X mm	weight kg
bronze	G 1/4	FM-008GR009	200	10	0.4 - 9	12	0.70
	G 3/8	FM-010GR010	200	15	0.4 - 10	12	0.65
	G 1/2	FM-015GR012	200	20	0.4 - 12	13	0.60

Switch value is indicated for horizontally decreasing flow.

tolerance ±0.3 l/min
media temperature max. 90°C
average pressure loss 0.4 bar at Qmax.
hysteresis depending on switch value
minimum 0.5 l/min.

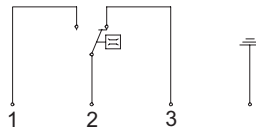


MATERIALS

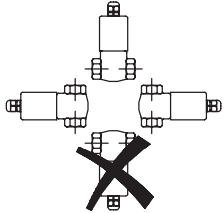
housing bronze Rg5 nickel plated
body brass Ms58 nickel plated
piston brass Ms58
spring stainless steel 1.4310
magnet bariumferrite
seals NBR
cap PS

ELECTRICAL DATA

micro switch - wiring 0.213 change over
250 V AC 6 A
plug connection to micro switch 2,8x0,5
cable gland Pg9
protection class IP 65



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water



gas/air



oil

NOMENCLATURE

For combinations see table "technical data"

FM-	008	G	R	009	basic type	
	008				●	nominal diameter DN 8 - G1/4
	010				●	nominal diameter DN 10 - G3/8
	015				●	nominal diameter DN 15 - G1/2
		G			●	female thread
			R		●	bronze
				009	●	selectable range 0.4 - 9 l/min
				010	●	selectable range 0.4 - 10 l/min
				012	●	selectable range 0.4 - 12 l/min
Programme option					○	cable
BASIC						plug DIN 43650-A
Special option					□	switch values with oil or gas
VARIO						special switch value
						nominal diameter DN 20 - 80

Installation position horizontal H2O.
Please indicate switch point with your order.

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and switch value with your order.
- With viscous liquids please indicate viscosity, temperature and quality of flow (switch value on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (switch value on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Spheres fitted with magnets are lifted relative to volume against the field produced by magnetics of opposite polarity thus opening reed switch.

- * low pressure loss
- * fixed switch value

Female thread G1/4 to G1/2 bronze



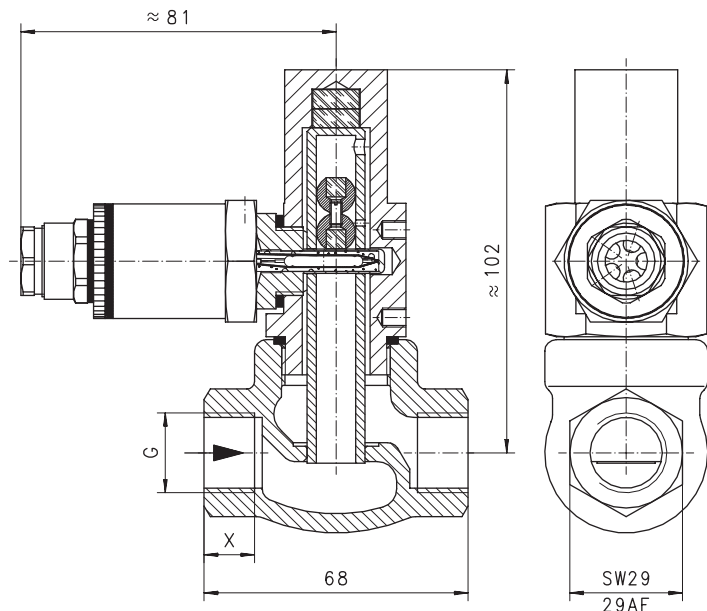
G-015GR

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	switch value l/min H ₂ O selectable range for fixed switch	X mm	weight kg
bronze	G 1/4	G-008GR	16	4	0.015 - 0.4	12	0.6
	G 3/8	G-010GR	16	8	0.015 - 0.4	12	0.6
	G 1/2	G-015GR	16	12	0.015 - 0.4	13	0.6

Adjustable range is indicated for horizontally decreasing flow.

tolerance	±10 %
media temperature	max. 80°C
average pressure loss	0.02 bar at Qmax.
hysteresis	depending on switch value minimum 0.2 l/min.

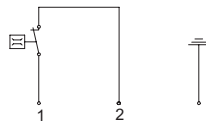


MATERIALS

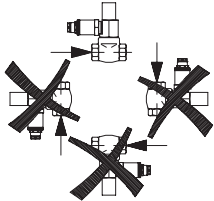
housing	bronze Rg5 nickel plated
body	brass Ms58 nickel plated
sphere	POM
magnet	bariumferrite
seal	Klingerit C-4400

ELECTRICAL DATA

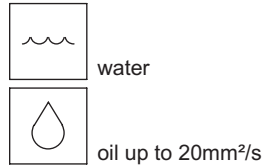
reed switch - wiring 0.214 n.c.
250 V AC 1 A 50 VA
cable gland Pg 9 (cable not included)
protection class IP 65



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

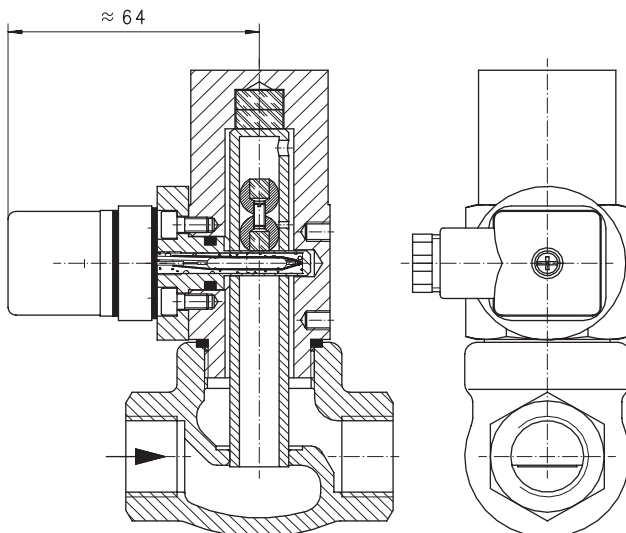
G-	008	G	R	basic type specification
	008			● nominal diameter DN 8 - G1/4
	010			● nominal diameter DN 10 - G3/8
	015			● nominal diameter DN 15 - G1/2
		G		● female thread
			R	● bronze
Programme option BASIC				○ plug DIN 43650-A cable gland Pg 11 (cable not included) change over approval Germanischer Lloyd (GL)
Special option VARIO				□ setting / adjustable ranges for oil or gas special setting

IMPORTANT FOR YOUR ORDER

- Please indicate metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)

OPTION

plug DIN43650-A



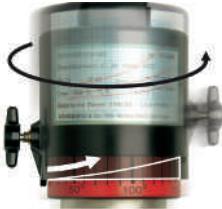
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

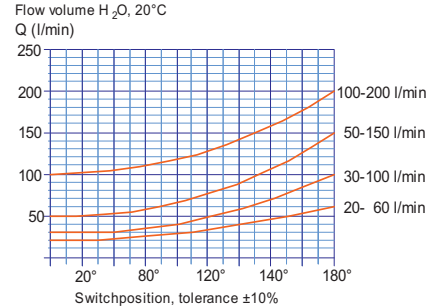
GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media, with contactless triggering of an adjustable reed switch. Rugged design in brass / bronze combination.

- * good repeatability
- * dirt-resistant
- * exact setting of switch via scale



Female thread G1/4 to G3 bronze



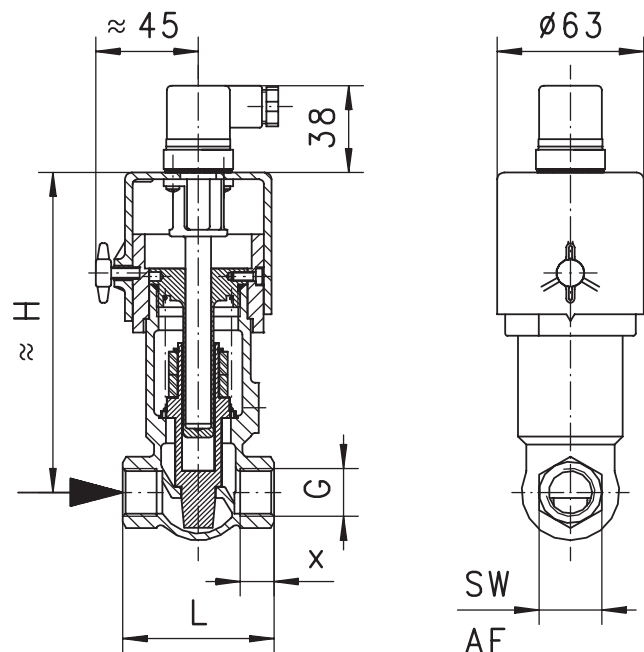
VD-008GR010

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O		adjustable range l/min H ₂ O		H mm	L mm	AF mm	X mm	weight kg
bronze	G 1/4	VD-008GR010	25	15		1 - 10		150	65	29	12	1.0
	G 3/8	VD-010GR010	25	15		1 - 10		150	65	29	12	1.0
	G 1/2	VD-015GR...	25	20	30	1 - 10	4 - 20	150	65	29	14	1.0
	G 3/4	VD-020GR...	25	40	60	4 - 20	10 - 40	150	80	32	16	1.1
	G 1	VD-025GR...	25	60	85	10 - 40	20 - 60	150	80	41	18	1.3
	G 1 1/4	VD-032GR...	16	100	145	20 - 60	30 - 100	156	98	52	13	2.1
	G 1 1/2	VD-040GR...	16	150	220	30 - 100	50 - 150	156	113	59	14	2.8
	G 2	VD-050GR...	16	250	290	50 - 150	100 - 200	156	137	72	17	4.0
	G 2 1/2	VD-065GR...	16	400	475	100 - 200	180 - 330	156	160	85	26	4.0
	G 3	VD-080GR...	16	600	720	180 - 330	300 - 600	156	148	100	23	7.0

Adjustable range is indicated for horizontally decreasing flow.

tolerance	±5% of full scale
media temperature	max. 120°C
average pressure loss	0.5 bar at Qmax.
hysteresis	depending on switch value minimum 0.3 l/min.

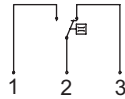


MATERIALS

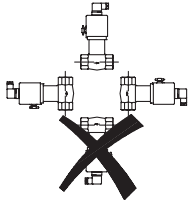
housing	bronze Rg5/Rg6 nickel plated
piston	DN 8-25 POM glass-fibre enforced DN 32-80 POM
spring	stainless steel 1.4310
piston guide	brass Ms58
seal	NBR
magnet	bariumferrite
cap	ABS

ELECTRICAL DATA

reed switch - wiring 0.213 change over
250 V AC 1.5 A 50 VA
plug DIN 43650-A
protection class IP 44



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water



gas/air



oil

NOMENCLATURE

For combination see table "technical data"

VD-	008	G	R	010			basic type specification
	008					●	DN 8 - G1/4
	010					●	DN 10 - G3/8
	015					●	DN 15 - G1/2
	020					●	DN 20 - G3/4
	025					●	DN 25 - G1
	032					●	DN 32 - G1 1/4
	040					●	DN 40 - G1 1/2
	050					●	DN 50 - G2
	065					●	DN 65 - G2 1/2
	080					●	DN 80 - G3
		G				●	female thread
			R			●	bronze
				010		●	1 - 10 l/min
				020		●	4 - 20 l/min
				040		●	10 - 40 l/min
				060		●	20 - 60 l/min
				100		●	30 - 100 l/min
				150		●	50 - 150 l/min
				200		●	100 - 200 l/min
				330		●	180 - 330 l/min
				600		●	300 - 600 l/min
					A	○	switch ATEX (product information 92.1.V1)
Programme option BASIC						○	signal lamp temperature indicator 0-120°C protection class IP 65 material certification
Special option VARIO						□	setting / adjustable ranges for oil or gas selected hysteresis rhodium contact temperature control 30-95°C wetted parts in brass or stainless steel temperature up to +150°C damping for gas control approval Germanischer Lloyd type VR

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

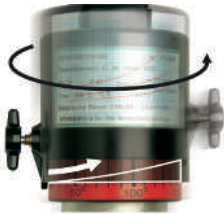
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media, with contactless triggering of an adjustable reed switch. Rugged design in stainless steel.

- * good repeatability
- * dirt-resistant
- * exact setting of switch via scale



Female thread G1/2 to G2 stainless steel



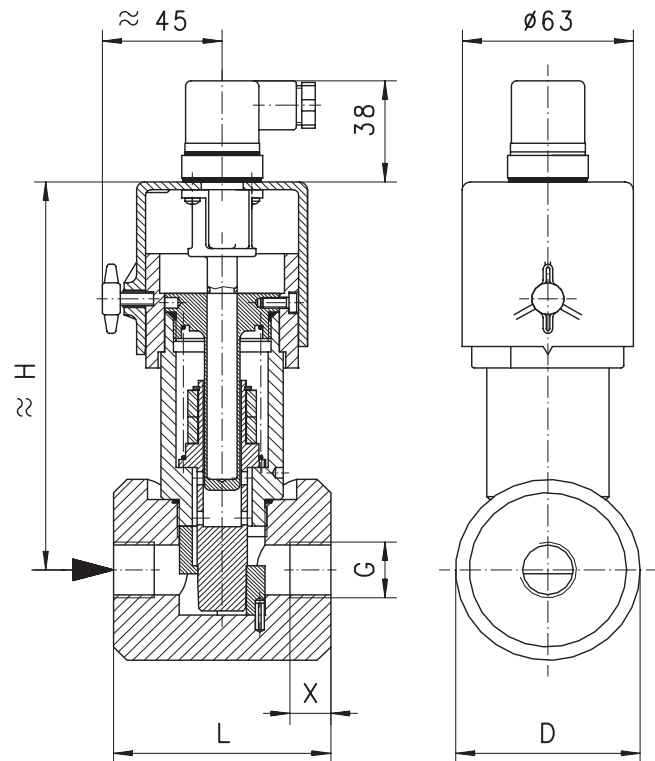
VD-020GK020

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom.		adjustable range		H mm	L mm	D mm	X mm	weight kg
				l/min H ₂ O		l/min H ₂ O						
stainless steel	G 1/2	VD-015GK...	100	20	30	1 - 10	4 - 20	166	80	68	15	2.8
	G 3/4	VD-020GK...	100	40	60	4 - 20	10 - 40	166	80	68	16	2.6
	G 1	VD-025GK...	100	60	85	10 - 40	10 - 60	166	80	68	18	2.5
	G 1 1/4	VD-032GK...	100	100	145	20 - 60	20 - 100	180	95	78	24	3.7
	G 1 1/2	VD-040GK...	100	150	220	30 - 100	50 - 150	186	105	88	25	4.8
	G 2	VD-050GK...	100	250	290	50 - 150	100 - 200	194	120	102	27	7.0

Adjustable range is indicated for horizontally decreasing flow.

tolerance ±5% of full scale
 media temperature max. 120°C
 average pressure loss 0.5 bar at Qmax.
 hysteresis depending on switch value
 minimum 0.3 l/min.

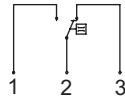


MATERIALS

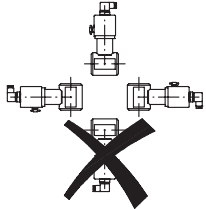
housing	stainless steel 1.4305
piston	stainless steel 1.4571
spring	stainless steel 1.4310
piston sleeve	stainless steel 1.4571
seal	viton
magnet	bariumferrite (PTFE plated)
cap	ABS

ELECTRICAL DATA

reed switch - wiring 0.213 change over
250 V AC 1.5 A 50 VA
plug DIN 43650-A
protection class IP 44



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water



gas/air



oil



aggressive liquids

NOMENCLATURE

For combination see table "technical data"

VD-	015	G	K	010			basic type
	015				●	nominal diameter	specification
	020				●		DN 15 - G1/2
	025				●		DN 20 - G3/4
	032				●		DN 25 - G1
	040				●		DN 32 - G1 1/4
	040				●		DN 40 - G1 1/2
	050				●		DN 50 - G2
		G			●		female thread
			K		●		housing stainless steel
				010	●	adjustable range H ₂ O horizontal	1 - 10 l/min
				020	●		4 - 20 l/min
				040	●		10 - 40 l/min
				060	●		(10) 20 - 60 l/min
				100	●		(20) 30 - 100 l/min
				150	●		50 - 150 l/min
				200	●	100 - 200 l/min	
					A ○		switch ATEX (product information 92.1.V1)
Programme option BASIC					○		signal lamp temperature indicator 0-120°C protection class IP 65 material certification
Special option VARIO					□		setting / adjustable ranges for oil or gas selected hysteresis rhodium contact temperature control 30-95°C wetted parts in brass or stainless steel temperature up to +150°C damping for gas control approval Germanischer Lloyd type VR

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

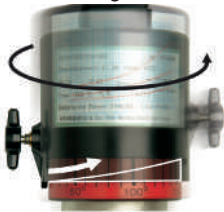
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

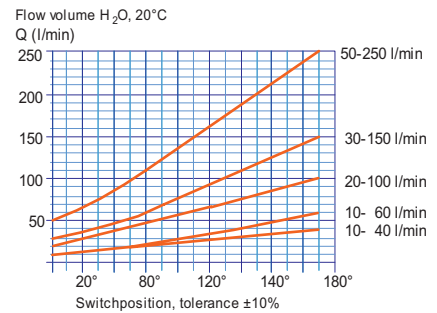
GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media, with contactless triggering of an adjustable micro switch. Rugged design in bronze.

- * good repeatability
- * dirt-resistant
- * high switch capability
- * exact setting of switch via scale



Female thread G1/4 to G3 bronze



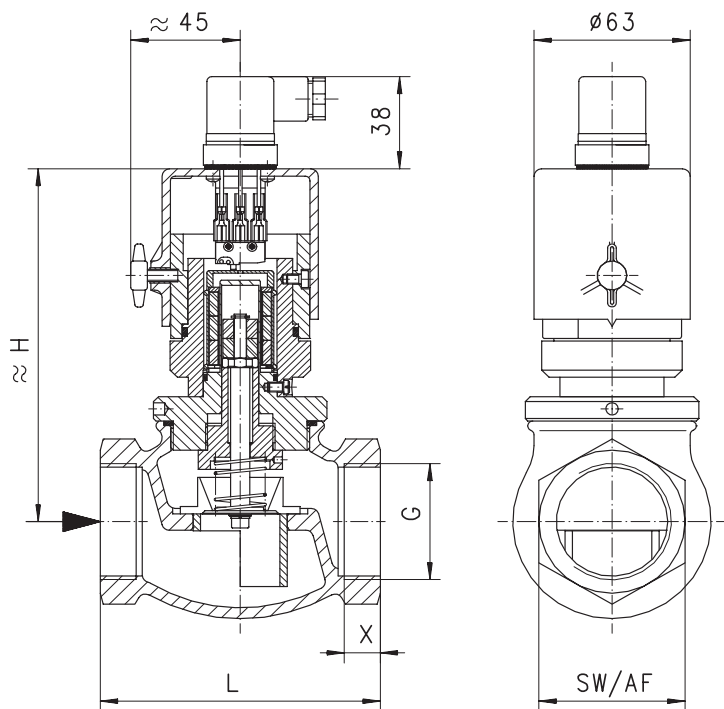
VM-020GR040

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O		adjustable range l/min H ₂ O		H mm	L mm	AF mm	X mm	weight kg
bronze/brass	G 1/4	VM-008GR...	100	8	15	1 - 5	3 - 12	144	68	29	12	1.2
	G 3/8	VM-010GR...	100	10	15	2 - 6	3 - 12	144	68	29	12	1.3
	G 1/2	VM-015GR...	100	15	30	2 - 6	4 - 20	144	68	29	13	1.4
	G 3/4	VM-020GR...	25	40	50	4 - 12	10 - 40	144	73	32	11	1.5
	G 1	VM-025GR060	25	70			10 - 60	144	87	41	12	1.7
	G 1 1/4	VM-032GR100	16	120			20 - 100	155	98	52	13	2.3
	G 1 1/2	VM-040GR150	16	180			30 - 150	156	113	59	14	3.0
	G 2	VM-050GR250	16	300			50 - 250	164	137	72	17	4.3
	G 2 1/2	VM-065GR400	16	480			50 - 400	195	160	85	26	5.8
	G 3	VM-080GR600	16	720			100 - 600	195	148	100	23	7.0

Adjustable range is indicated for horizontally decreasing flow.

tolerance ±5% of full scale
 media temperature max. 90°C
 average pressure loss 0.25 bar at Qmax.
 hysteresis depending on switch value
 minimum 0.6 l/min.

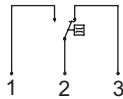


MATERIALS

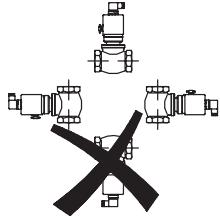
housing	bronze Rg5/Rg6 nickel plated
piston	brass Ms58
spring	stainless steel 1.4310
piston guide	brass Ms58
seal	NBR
magnet	bariumferrite
cap	ABS

ELECTRICAL DATA

micro switch - wiring 0.213 change over
250 V AC 6 A
plug DIN 43650-A
protection class IP 44



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water



gas/air



oil

NOMENCLATURE

For combinations see table "technical data"

VM-	008	G	R	005			basic type
	008					●	specification
	010					●	DN 8 - G1/4
	015					●	DN 10 - G3/8
	020					●	DN 15 - G1/2
	025					●	DN 20 - G3/4
	032					●	DN 25 - G1
	040					●	DN 32 - G1 1/4
	050					●	DN 40 - G1 1/2
	065					●	DN 50 - G2
	080					●	DN 65 - G2 1/2
		G				●	DN 80 - G3
			R			●	female thread
				005		●	bronze
				006		●	1 - 5 l/min
				012		●	2 - 6 l/min
				020		●	3 - 12 l/min
				040		●	(3) 4 - 20 l/min
				060		●	10 - 40 l/min
				100		●	10 - 60 l/min
				150		●	20 - 100 l/min
				250		●	30 - 150 l/min
				400		●	50 - 250 l/min
				600		●	50 - 400 l/min
					A	○	100 - 600 l/min
						○	switch ATEX (product information 92.1.V2 and 92.1.V3)
	Programme option BASIC					○	signal lamp temperature indicator 0-120°C protection class IP 65 material certification
	Special option VARIO					□	setting / adjustable ranges for oil or gas gold-plated micro switch temperature up to 150°C

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media, with contactless triggering of an adjustable micro switch. Rugged design in bronze.

- * good repeatability
- * dirt-resistant
- * high switch capability
- * exact setting of switch via scale



Female thread G1/2 to G2 stainless steel



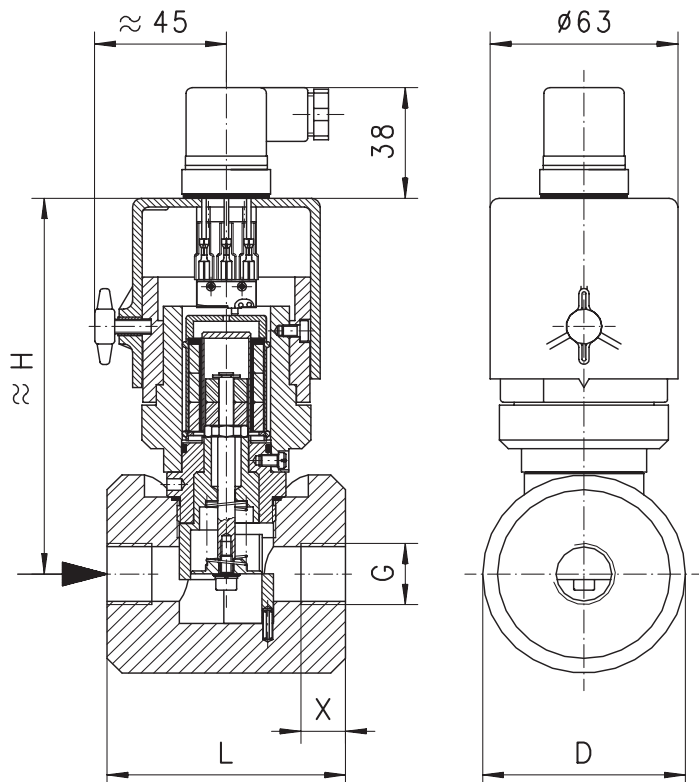
VM-015GK020

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom.		adjustable range		H mm	L mm	D mm	X mm	weight kg
				l/min H ₂ O		l/min H ₂ O						
stainless steel	G 1/2	VM-015GK...	100	15	30	2 - 6	4 - 20	139	80	68	15	2.8
	G 3/4	VM-020GK...	100	40	50	4 - 12	10 - 40	139	80	68	16	2.6
	G 1	VM-025GK060	100		70		10 - 60	139	80	68	18	2.5
	G 1 1/4	VM-032GK100	100		120		20 - 100	141	95	78	24	3.5
	G 1 1/2	VM-040GK150	100		180		30 - 150	152	105	88	25	4.5
	G 2	VM-050GK250	100		300		50 - 250	154	120	102	27	6.7

Adjustable range is indicated for horizontally decreasing flow.

tolerance	±5% of full scale
media temperature	max. 90°C
average pressure loss	0.25 bar at Qmax.
hysteresis	depending on switch value minimum 0.6 l/min.

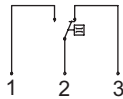


MATERIALS

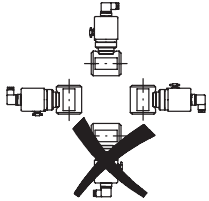
housing	stainless steel 1.4305
piston	stainless steel 1.4571
spring	stainless steel 1.4310
piston sleeve	stainless steel 1.4571
seal	viton
magnet	bariumferrite (PTFE plated)
cap	ABS

ELECTRICAL DATA

micro switch - wiring 0.213 change over
250 V AC 6 A
plug DIN 43650-A
protection class IP 44

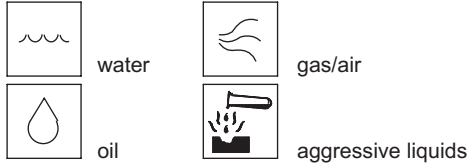


MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

VM-	015	G	K	006			basic type
	015				●	nominal diameter	specification
	020				●		DN 15 - G1/2
	025				●		DN 20 - G3/4
	032				●		DN 25 - G1
	040				●		DN 32 - G1 1/4
	040				●		DN 40 - G1 1/2
	050				●		DN 50 - G2
		G			●	female thread	
			K		●	housing stainless steel	
				006	●	adjustable range H ₂ O horizontal	2 - 6 l/min
				012	●		4 - 12 l/min
				020	●		4 - 20 l/min
				040	●		10 - 40 l/min
				060	●		10 - 60 l/min
				100	●		20 - 100 l/min
				150	●		30 - 150 l/min
				250	●	50 - 250 l/min	
				A	○		switch ATEX (product information 92.1.V2 and 92.1.V3)
Programme option	BASIC				○		signal lamp temperature indicator 0-120°C protection class IP 65 material certification
Special option	VARIO				□		setting / adjustable ranges for oil or gas gold-plated micro switch temperature up to 150°C

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

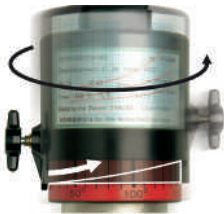
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media, with contactless triggering of an adjustable reed switch. Rugged design in brass / bronze combination.

- * control and indication
- * good repeatability
- * dirt-resistant
- * also for dark and/or contaminated liquids
- * no pressurized or wetted glass parts
- * exact setting of switch via scale



Female thread G1/4 to G3 bronze



VDO-015GR010

TECHNICAL DATA

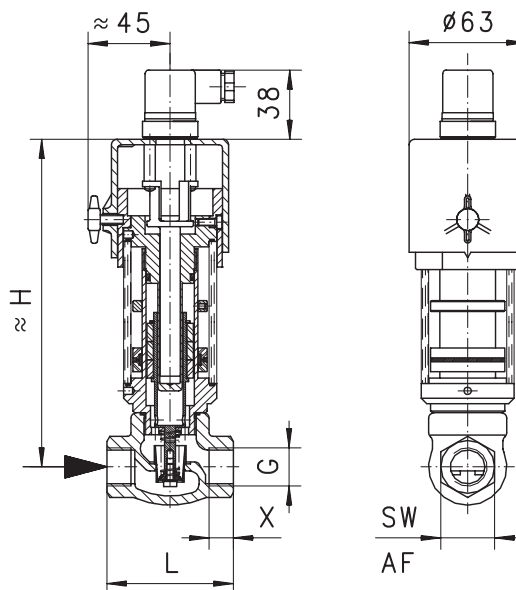
	G	Type	PN bar	Qmax. recom. l/min H ₂ O		adjustable range l/min H ₂ O		H mm	L mm	AF mm	X mm	weight kg
						standard	programme option					
bronz/brass	G 1/4	VDO-008GR010	100	15		2 - 10		183	68	29	12	1.3
	G 3/8	VDO-010GR010	100	15		2 - 10		183	68	29	12	1.3
	G 1/2	VDO-015GR...	100	20	30	2 - 10	4 - 20	183	68	29	13	1.4
	G 3/4	VDO-020GR...	25	40	60	4 - 20	10 - 40	184	73	32	11	1.5
	G 1	VDO-025GR...	25	60	85	10 - 40	20 - 60	188	87	41	12	1.7
	G 1 1/4	VDO-032GR...	16	100	145	20 - 60	30 - 100	190	98	52	13	2.2
	G 1 1/2	VDO-040GR...	16	150	220	30 - 100	50 - 150	195	113	59	14	2.9
	G 2	VDO-050GR...	16	250	290	30 - 100	100 - 200	203	137	72	17	4.2
	G 2 1/2	VDO-065GR...	16	400	475	100 - 200	180 - 330	224	160	85	26	5.8
	G 3	VDO-080GR...	16	600	720	180 - 330	400 - 600	224	148	100	23	7.8

Adjustable range is indicated for horizontally decreasing flow.

tolerance	±5% of full scale
media temperature	max. 120°C
average pressure loss	0.5 bar at Qmax.
hysteresis	depending on switch value minimum 0.5 l/min.

MATERIALS

housing	bronze Rg5/Rg6 nickel plated
piston	Ms58
spring	stainless steel 1.4310
piston guide	brass Ms58
seal	NBR
magnet	bariumferrite
cap	ABS
tube	acrylic (XT)

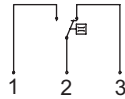


scale increments

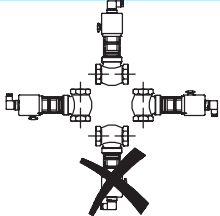


ELECTRICAL DATA

reed switch - wiring 0.213 change over
250 V AC 1.5 A 50 VA
plug DIN 43650-A
protection class IP 44

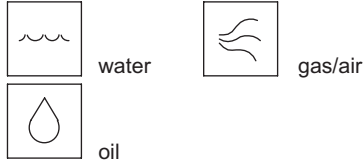


MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

For combination see table "technical data"

VDO-	008	G	R	010	basic type	
	008				●	DN 8 - G1/4
	010				●	DN 10 - G3/8
	015				●	DN 15 - G1/2
	020				●	DN 20 - G3/4
	025				●	DN 25 - G1
	032				●	DN 32 - G1 1/4
	040				●	DN 40 - G1 1/2
	050				●	DN 50 - G2
	065				●	DN 65 - G2 1/2
	080				●	DN 80 - G3
		G			●	female thread
			R		●	bronze
				010	●	2 - 10 l/min
				020	●	4 - 20 l/min
				040	●	10 - 40 l/min
				060	●	20 - 60 l/min
				100	●	30 - 100 l/min
				150	●	50 - 150 l/min
				200	●	100 - 200 l/min
				330	●	180 - 330 l/min
				600	●	400 - 600 l/min
Programme option BASIC					○	signal lamp temperature indicator 0-120°C protection class IP 65 material certification flange version in cast iron/bronze/cast steel or stainless steel
Special option VARIO					□	setting / adjustable ranges for oil or gas selected hysteresis rhodium contact temperature control 30-95°C wetted parts in brass or stainless steel temperature up to +150°C damping for gas control

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The flow switches type MXR are employed for the monitoring of liquids in temperature ranges of 160°C. The instruments operate according to the proven piston system. In a no flow situation the piston rests in the valve seat and will be dislocated relevant to the flow rate. This movement is linear magnetically to an externally arranged switch unit. Due to the distance between flow and switch area the sensitive electrical components are seeing only 70°C max. with liquid temperature of 160°C max.

* media temperature 160°C

female thread G1/4 to G3 bronze



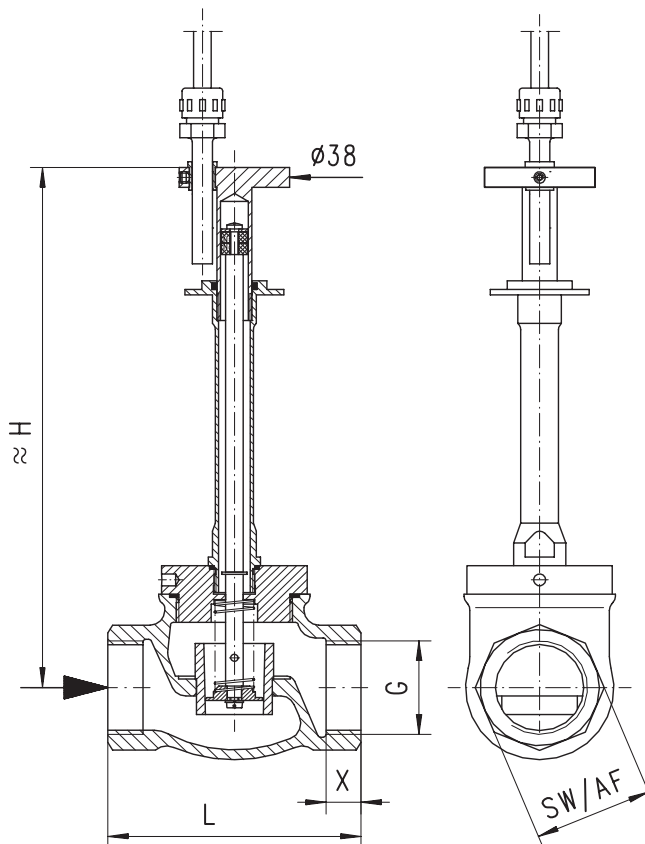
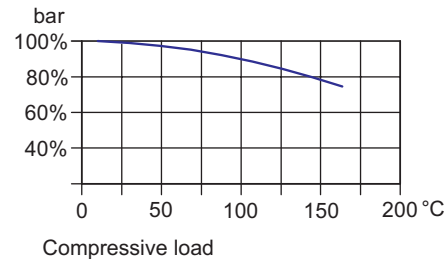
MXR-025GR100

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	adjustable range l/min H ₂ O	H mm	L mm	SW mm	X mm	weight kg
bronze	G 1/4	MXR-008GR...	100	6	1.5 - 6	194	68	29	12	1.1
	G 3/8	MXR-010GR...	100	10	2.5 - 10	194	68	29	12	1.1
	G 1/2	MXR-015GR...	100	20	5 - 20	194	68	29	13	1.1
	G 3/4	MXR-020GR...	25	40	10 - 40	194	73	32	11	1.2
	G 1	MXR-025GR...	25	60	20 - 100	198	87	41	12	1.4

Adjustable range is indicated for horizontally decreasing flow.

tolerance ±10% of full scale
media temperature max. 160°C
average pressure loss 0.7 bar at Qmax.



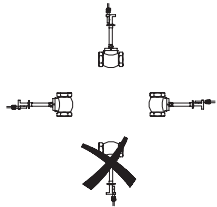
MATERIALS

housing bronze Rg5/Rg6 nickel plated
piston stainless steel 1.4305
spring stainless steel 1.4310
piston guide stainless steel 1.4305
seal Kalrez / Viton

ELECTRICAL DATA

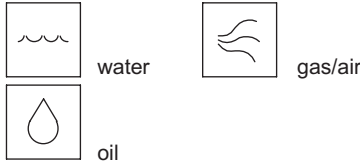
reed switches
wiring 0.2
250 V AC
cable 1.5
protection class II

MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

For combination see table "technical data"

MXR-	008	G	R	006	●	nominal diameter	basic type
MXR-	008						●
	010				●		flow switch
	015				●		DN 8 - G1/4
	020				●		DN 10 - G3/8
	025				●		DN 15 - G1/2
		G			●		DN 20 - G3/4
			R		●		DN 25 - G1
				006	●	adjustable range H ₂ O horizontal	female thread
				010	●		housing Rg5/Rg6
				020	●		1.5 - 6 l/min
				040	●		2.5 - 10 l/min
				100	●		5 - 20 l/min
Programme option					○		10 - 40 l/min
BASIC							20 - 100 l/min
Special option					□		housing stainless steel
VARIO							special cable length

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

SPECIAL APPLICATIONS



MXO
indicate 20-100%
option switch head



MXM
micro switch 230V 6A
indicate 20-100%

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

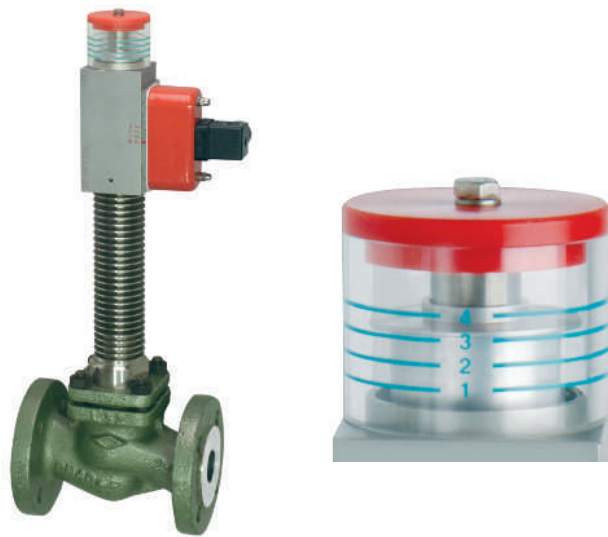
GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media, with contactless triggering of an adjustable micro switch. Rugged design in cast steel.

- * control an indicating
- * media temperature 350°C
- * good repeatability
- * dirt-resistant
- * high switch capability
- * DIN flange housing



Flange DN 15-200 cast steel



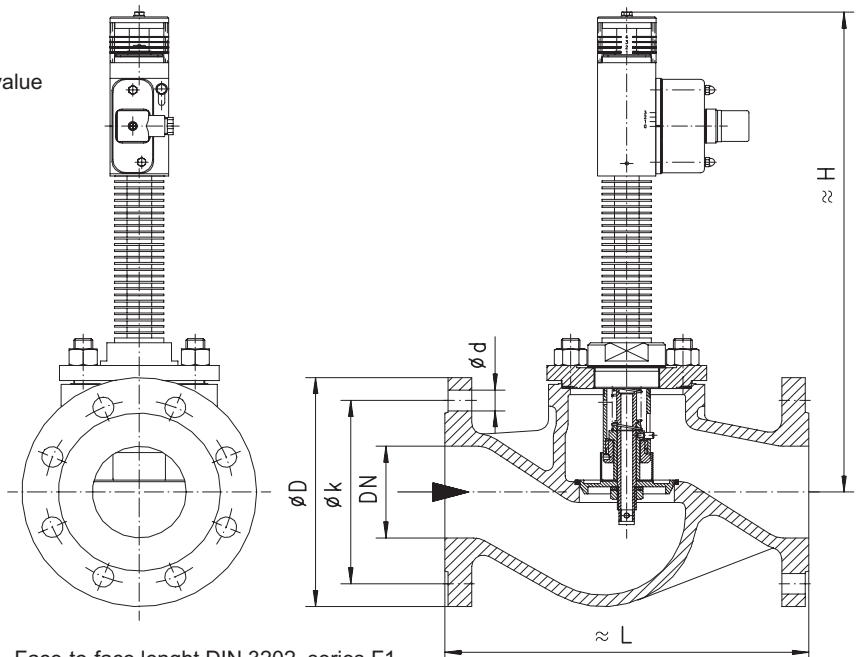
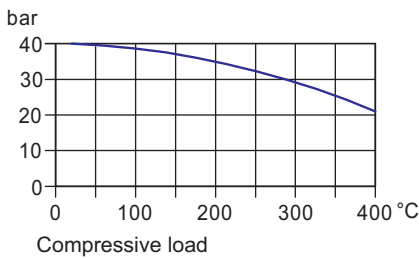
TX-015FT020K

TECHNICAL DATA

	DN	Type	PN bar	Qmax. rec.		adjustable range		H mm	L mm	D mm	k mm	d mm	weight kg
				l/min H ₂ O		l/min H ₂ O							
cast steel	15	TX-015FT...	40	20	30	2 - 8	4 - 20	370	130	95	65	4x14	6.0
	20	TX-020FT...	40	40	55	4 - 20	10 - 40	370	150	105	75	4x14	6.5
	25	TX-025FT...	40	60	80	10 - 40	20 - 60	380	160	115	85	4x14	8.5
	32	TX-032FT...	40	100	135	20 - 60	30 - 100	380	180	140	100	4x18	10.5
	40	TX-040FT...	40	150	270	30 - 100	50 - 200	390	200	150	110	4x18	13.0
	50	TX-050FT...	40	270	340	50 - 200	100 - 250	390	230	165	125	4x18	15.5
	65	TX-065FT...	40		400	100 - 250	150 - 300	410	290	185	145	8x18	25.5
	80	TX-080FT...	40		600	150 - 300	300 - 450	430	310	200	160	8x18	31.0
	100	TX-100FT...	40		950	200 - 400	350 - 500	450	350	235	190	8x22	38.0
	150	TX-150FT...	40		2000	600 - 750	700 - 950	510	480	300	250	8x26	87.0
200	TX-200FT...	40		4000	850 - 1050	1050 - 1250	580	600	375	320	12x30	154.0	

Adjustable range is indicated for horizontally decreasing flow.

- Tolerance ±5% of full scale
- Media temperature max. 350°C
- Average pressure loss 0.5 bar at Qmax.
- Hysteresis depending on switch value
minimum 0.3 l/min.



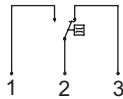
Face-to-face length DIN 3202, series F1
Flange DIN 2545 PN 40
Flange dimension DIN 2501 PN 40
Types of contact faces DIN 2526 Form C

MATERIALS

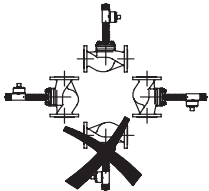
- housing cast steel GSC 25
- body stainless steel 1.4571
- piston stainless steel 1.4301 ; 1.4305 ; 1.4571
- spring stainless steel 1.4310
- piston sleeve stainless steel 1.4571
- seal sigraflex V20011Z31
- viton
- magnet bariumferrite
- tube acrylic (XT)

ELECTRICAL DATA

micro switch - wiring 0.213 change over
250 V AC 6 A
plug DIN 43650-A
protection class IP 44

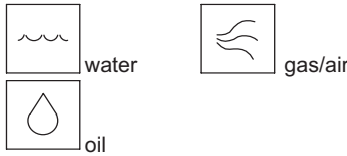


MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

TX-	015	F	T	008	B		basic type specification
	015					●	DN 15
	020					●	DN 20
	025					●	DN 25
	032					●	DN 32
	040					●	DN 40
	050					●	DN 50
	065					●	DN 65
	080					●	DN 80
	100					●	DN 100
	150					●	DN 150
	200					●	DN 200
		F				●	flange
			T			●	housing cast steel
				008		●	2 - 8 l/min
				020		●	4 - 20 l/min
				040		●	10 - 40 l/min
				060		●	20 - 60 l/min
				100		●	30 - 100 l/min
				200		●	50 - 200 l/min
				250		●	100 - 250 l/min
				300		●	150 - 300 l/min
				400		●	200 - 400 l/min
				450		●	300 - 450 l/min
				500		●	350 - 500 l/min
				750		●	600 - 750 l/min
				950		●	700 - 950 l/min
				1050		●	850 - 1050 l/min
				1250		●	1050 - 1250 l/min
					B	●	plug DIN 43650-A
					K	●	cable gland Pg9 with 2.5 metre cable and TÜV-approval TÜV.SW.02-021
Programme optionen BASIC						○	housing stainless steel

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for liquids or gaseous media, with spring-supported piston. Piston is magnetically linked to an indicator element. Rugged design in bronze / brass combination.

- * good repeatability
- * dirt resistance
- * for dark and/or contaminated liquids
- * turnable scale
- * no pressurized or wetted glass parts

Female thread G1/4 to G3 bronze



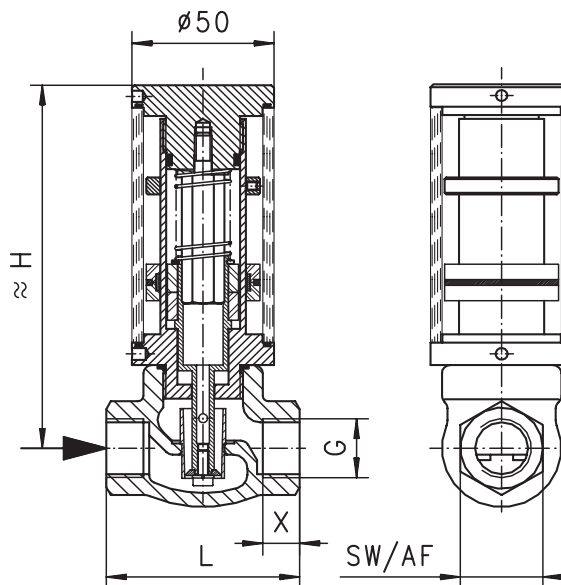
MP-015GR020

TECHNICAL DATA

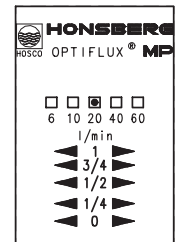
	G	Type	PN bar	Qmax. recom. l/min H ₂ O		indicating range l/min H ₂ O			H mm	L mm	AF mm	X mm	weight kg
						Standard	Programme option						
bronze/brass	G 1/4	MP-008GR...	100	6	10	1.5 - 6	2.5 - 10		130	68	29	12	1.1
	G 3/8	MP-010GR...	100		10	2.5 - 10	1.5 - 6		130	68	29	12	1.1
	G 1/2	MP-015GR...	100		20	5 - 20	1.5 - 6	2.5 - 10	130	68	29	13	1.1
	G 3/4	MP-020GR...	25		40	10 - 40	2.5 - 10	5 - 20	133	73	32	11	1.2
	G 1	MP-025GR...	25		60	10 - 40	2.5 - 10	5 - 20	136	87	41	12	1.4
	G 1 1/4	MP-032GR...	16		100	20 - 100	12 - 60		150	98	52	13	2.0
	G 1 1/2	MP-040GR150	16		150	30 - 150			154	113	59	14	2.6
	G 2	MP-050GR...	16		250	50 - 250	30 - 150		184	137	72	17	4.2
	G 2 1/2	MP-065GR...	16		400	80 - 400	50 - 250		200	160	85	26	5.6
	G 3	MP-080GR...	16		600	120 - 600	80 - 400		200	148	100	23	8.3

Indicating range is calibrated for vertical upward increasing flow.

tolerance ±10% of full scale
media temperature max. 100°C
average pressure loss 0.7bar at Qmax.



indication scale
1 = 100% = 20l/min



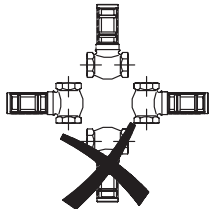
MATERIALS

housing bronze Rg5/Rg6 nickel plated
piston brass Ms58
spring stainless steel 1.4310
piston guide brass Ms58
tube acrylic (XT)

ELECTRICAL DATA

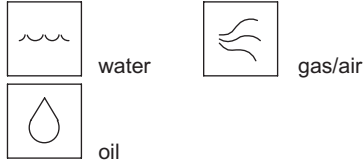
No electrical components

MOUNTING POSITION



Installation position may influence indicating range.

METERING SUBSTANCES



NOMENCLATURE

For combination see table "technical data"

MP-	008	G	R	006		basic type
	008				●	specification
	010				●	DN 8 - G1/4
	015				●	DN 10 - G3/8
	020				●	DN 15 - G1/2
	025				●	DN 20 - G3/4
	032				●	DN 25 - G1
	040				●	DN 32 - G1 1/4
	050				●	DN 40 - G1 1/2
	065				●	DN 50 - G2
	080				●	DN 65 - G2 1/2
		G			●	DN 80 - G3
			R		●	female thread
				006	●/○	housing bronze
				010	●/○	1.5 - 6 l/min
				020	●/○	2.5 - 10 l/min
				040	●	5 - 20 l/min
				060	○	10 - 40 l/min
				100	●/○	12 - 60 l/min
				150	●/○	20 - 100 l/min
				250	●/○	30 - 150 l/min
				400	●/○	50 - 250 l/min
				600	●	80 - 400 l/min
					○	120 - 600 l/min
Programme option					○	housing stainless steel
BASIC						
Special option					□	special range
VARIO						special scales

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and indicating range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (indicating range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (indicating range on request)

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flowmeter for liquids or gaseous media. With magnetic triggering of a metering unit with 270° of pointer range. Rugged design in bronze/brass combination.

- * local metering
- * good repeatability
- * dirt-resistant
- * low pressure loss
- * easy adjustment by indicating pointer



Female thread G1/4 to G3 bronze



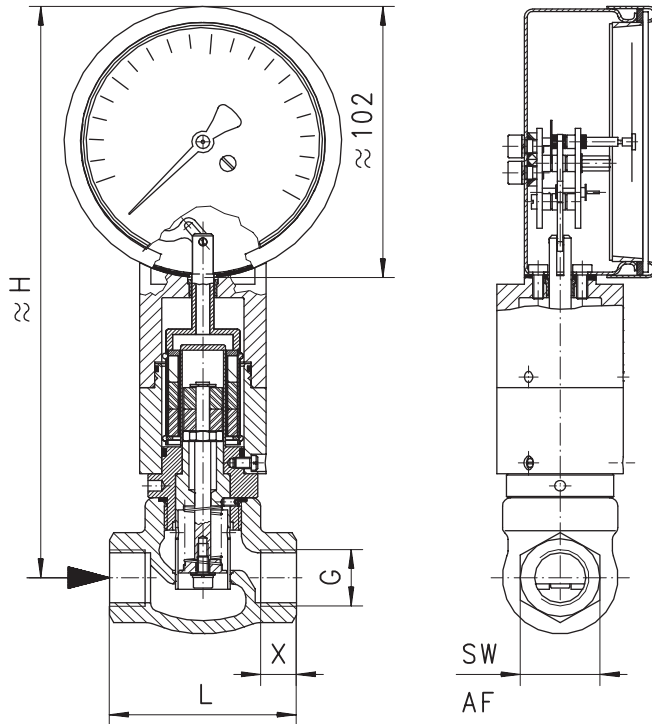
TECHNICAL DATA

TZ1-025GR060

	G	Type	PN bar	Qmax. rec. l/min H ₂ O		metering range l/min H ₂ O		H mm	L mm	AF mm	X mm	weight kg
bronze/brass	G 1/4	TZ1-008GR...	100	8	12	2 - 6	3 - 12	212	68	29	12	1.6
	G 3/8	TZ1-010GR...	100	10	12	2 - 6	3 - 12	212	68	29	12	1.6
	G 1/2	TZ1-015GR...	100	20		2 - 6	4 - 20	212	68	29	13	1.6
	G 3/4	TZ1-020GR...	25	40		4 - 20	10 - 40	212	73	32	11	1.7
	G 1	TZ1-025GR060	25	60		10 - 60		216	87	41	12	2.0
	G 1 1/4	TZ1-032GR100	16	100		10 - 100		226	98	52	13	2.6
	G 1 1/2	TZ1-040GR150	16	150		10 - 150		228	113	59	14	3.1
	G 2	TZ1-050GR250	16	250		20 - 250		236	137	72	17	6.4
	G 2 1/2	TZ1-065GR400	16	400		30 - 400		268	160	85	26	7.5
	G 3	TZ1-080GR600	16	600		30 - 600		268	148	100	23	8.7

Metering range is indicated for horizontally increasing flow.

tolerance ±3% of full scale
media temperature max. 90°C
average pressure loss 0.25bar at Qmax.



MATERIALS

housing bronze Rg5/Rg6 nickel plated
piston/disc brass Ms58
spring stainless steel 1.4310
piston sleeve brass Ms58
magnet bariumferrite
seal NBR

ELECTRICAL DATA

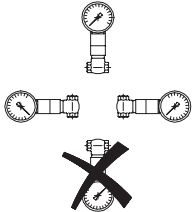
● **BASIC Standard**

No electrical components.

○ **BASIC Programme option**

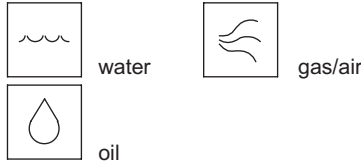
integrated micro switch
with front switch units
see data sheet 1.3.TZ1.ZE

INSTALLATION POSITIONS



Installation position may influence metering range.

METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data".

TZ1-	008	G	R	006		basic type
TZ1-					●	Flowmeter
TZ1M-					○	Flowmeter with integrated micro switch
	008				●	DN 8 - G1/4
	010				●	DN 10 - G3/8
	015				●	DN 15 - G1/2
	020				●	DN 20 - G3/4
	025				●	DN 25 - G1
	032				●	DN 32 - G1 1/4
	040				●	DN 40 - G1 1/2
	050				●	DN 50 - G2
	065				●	DN 65 - G2 1/2
	080				●	DN 80 - G3
		G			●	female thread
			R		●	housing bronze
				006	●	2 - 6 l/min
				012	●	3 - 12 l/min
				020	●	4 - 20 l/min
				040	●	10 - 40 l/min
				060	●	10 - 60 l/min
				100	●	10 - 100 l/min
				150	●	10 - 150 l/min
				250	●	20 - 250 l/min
				400	●	30 - 400 l/min
				600	●	30 - 600 l/min
Programme option					○	front switch unit with 10-kOhm-potentiometer
BASIC						diode
Special option					□	special range
VARIO						metering range for oil or gas front switch unit 2pol, n.o. or n.c.

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and metering range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (metering range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (metering range on request)
- For additional information concerning options micro switch and front switch see data sheet 1.3.TZ1.ZE.

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flowmeter for liquids or gaseous media. With magnetic triggering of a metering unit with 270° of pointer range. Rugged design in stainless steel.

- * local metering
- * good repeatability
- * dirt-resistant
- * low pressure loss
- * easy adjustment by indicating pointer



Female thread G1/2 to G2 stainless steel



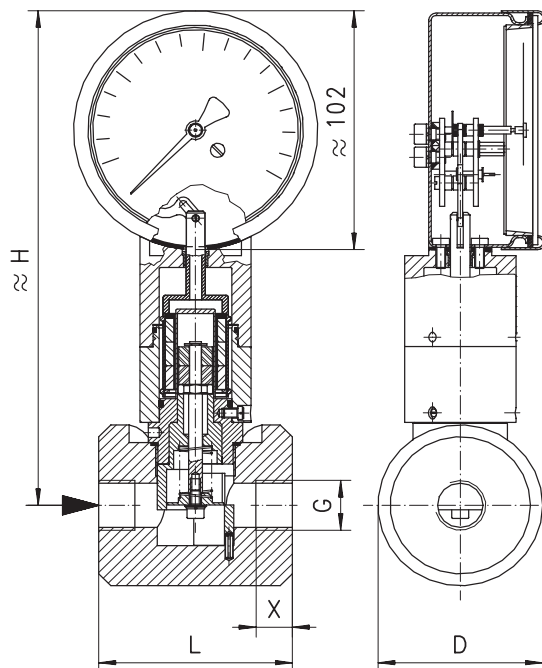
TZ1-015GK006

TECHNICAL DATA

	G	Type	PN bar	Qmax. rec. l/min H ₂ O	metering range l/min H ₂ O		H mm	L mm	D mm	X mm	weight kg
stainless steel	G 1/2	TZ1-015GK...	100	20	2 - 6	4 - 20	210	80	68	15	2.9
	G 3/4	TZ1-020GK...	100	40	4 - 20	5 - 40	210	80	68	16	2.8
	G 1	TZ1-025GK060	100	60	10 - 60		210	80	68	18	2.7
	G 1 1/4	TZ1-032GK100	100	100	10 - 100		210	95	78	24	3.4
	G 1 1/2	TZ1-040GK150	100	150	10 - 150		223	105	88	25	3.8
	G 2	TZ1-050GK250	100	250	20 - 250		225	120	102	27	5.1

Metering range is indicated for horizontally increasing flow.

tolerance ±3% of full scale
media temperature max. 90°C
average pressure loss 0.25bar at Qmax.



MATERIALS

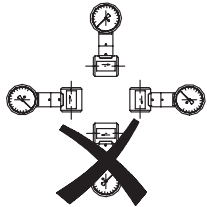
housing stainless steel 1.4305
piston/disc stainless steel 1.4571
spring stainless steel 1.4310
piston sleeve stainless steel 1.4571
magnet bariumferrite (PTFE plated)
seal viton

ELECTRICAL DATA

● **BASIC Standard**
No electrical components.

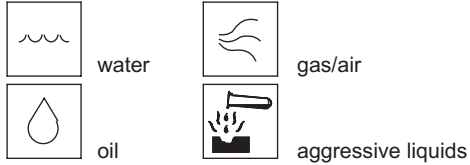
○ **BASIC Programme option**
integrated micro switch
with front switch units
see data sheet 1.3.TZ1.ZE

INSTALLATION POSITIONS



Installation position may influence metering range.

METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data".

TZ1-	015	G	K	006		basic type
TZ1-					●	Flowmeter
TZ1M-					○	Flowmeter with integrated micro switch
	015				●	nominal dia DN 15 - G1/2
	020				●	DN 20 - G3/4
	025				●	DN 25 - G1
	032				●	DN 32 - G1 1/4
	040				●	DN 40 - G1 1/2
	050				●	DN 50 - G2
		G			●	female thread
			K		●	housing stainless steel
			006		●	metering range H ₂ O horizontal 2 - 6 l/min
			020		●	4 - 20 l/min
			040		●	5 - 40 l/min
			060		●	10 - 60 l/min
			100		●	10 - 100 l/min
			150		●	10 - 150 l/min
			250		●	20 - 250 l/min
Programme option					○	front switch unit with 10-kOhm-potentiometer diode
BASIC						
Special option					□	special range
VARIO						metering range for oil or gas front switch unit 2pol, n.o. or n.c.

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and metering range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (metering range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (metering range on request)
- For additional information concerning options micro switch and front switch see data sheet 1.3.TZ1.ZE.

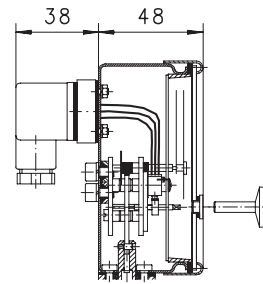
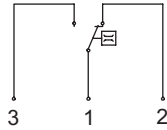
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

OPTION

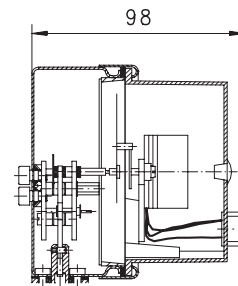
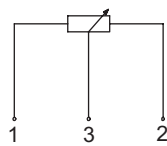
○ **TZ1M-** integrated micro switch

wiring 0.342 change over
250 V AC 5 A
plug DIN 43650-A
protection class IP 65



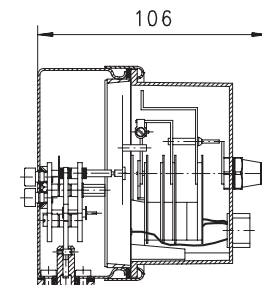
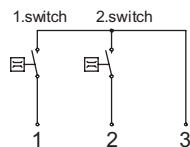
○ **TZ1P-** front switch unit with 10-kOhm- potentiometer

wiring 0.269
50 V DC 100 mA 1.5 W
resistance max. 10 kΩ
additional tolerance ±3 %
resistance tolerance ±1 %
linearity ±0.3 %
plug Hirschmann G4
protection class IP 60



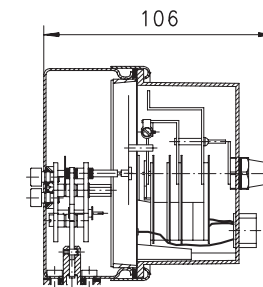
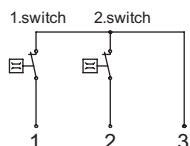
□ **TZ1M2-** switch unit with 2pole n.o.

wiring 0.268
250 V AC 0.6 A 50 VA
plug Hirschmann G4
protection class IP 60



□ **TZ1M3-** switch unit with 2pole n.c.

wiring 0.285
250 V AC 0.6 A 50 VA
plug Hirschmann G4
protection class IP 60



All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

Special applications

Flow control instruments PD...TH, PD...MH, PD...FH

PVC for aggressive media, non-compatible for metal materials

Mechanical flow control instrument for liquid or gaseous media, with non-contact triggering of an adjustable reed contact. Sturdy construction made of PVC.

- Adhesive fitting DN 15-80
Adhesive stub-connection
DN 15-50
- Flange DN 15-80
- Reed switch
- Ranges from 2-500 l/min
- Pressure rating PN 10
- Max. temperature 60 °C
- PVC material



Flow control instruments VD...FR, VD...FG, VD...FT, VD...FK

Flange version for process or large nominal diameters

Mechanical flow control instrument for liquid or gaseous media, with non-contact triggering of an adjustable reed contact. Sturdy construction made of cast iron.

- Flange DN 15-300
[stainless steel DN 15-150]
- Reed switch
- Ranges from 2-1600 l/min
- Pressure rating PN 16-40
- Max. temperature 120 °C
- Red bronze, cast iron, cast steel or stainless steel material



Flow control instruments VM...FG

Flange version for process or large nominal diameters

Mechanical flow control instrument for liquid or gaseous media, with non-contact triggering of an adjustable micro-switch. Sturdy construction made of cast iron.

- Flange DN 15-200
- Micro-switch
- Ranges from 5-4000 l/min
- Pressure rating PN 16
- Max. temperature 90 °C
- Cast iron material



Special applications

Flow control instruments VI-...GR



Without magnets for media with ferrite soiling

Mechanical flow control instrument for liquid or gaseous media, with non-contact triggering of an adjustable proximity switch. Sturdy construction made of red bronze/POM materials.

- Female thread DN 8-80
- Inductive proximity switch
- Ranges from 1-600 l/min
- Pressure rating PN 16
- Max. temperature 60 °C
- Red bronze/plastic material

Flow control instruments TZ1-...FG



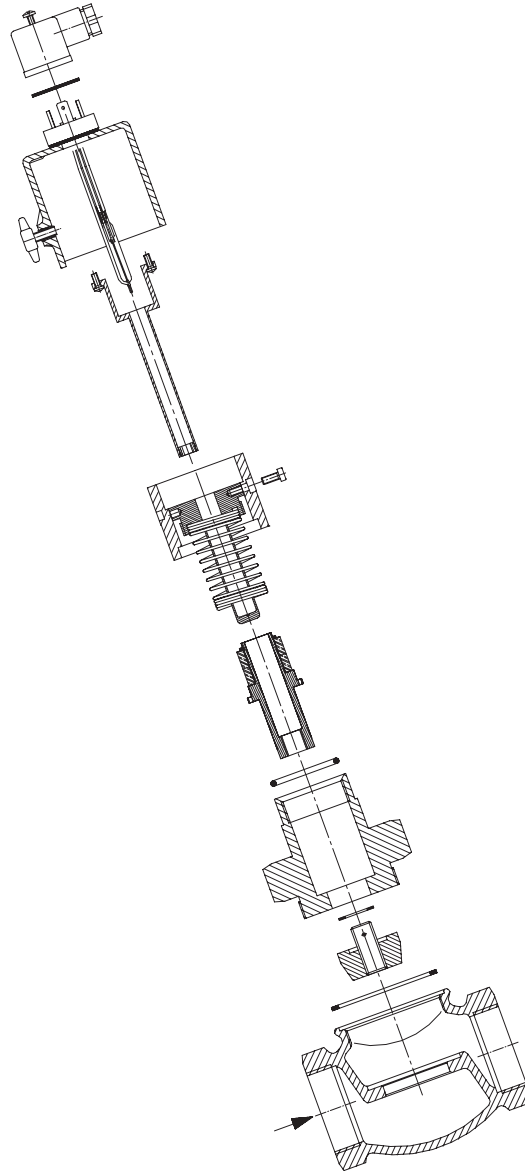
Flange version for process or large nominal diameters

Mechanical flow control instrument for liquid or gaseous media, with non-contact triggering of a dial with 270° pointer movement. Sturdy construction made of cast iron.

- Flange DN 65-200
- Dial unit
- Ranges from 50-4000 l/min
- Pressure rating PN 16
- Max. temperature 90 °C
- Cast iron material
- Option: cast steel
 stainless steel

Why to use a valve piston instrument

**info
point**



- **Complete separation of electrical and hydraulic component** → **maintenance advantage**
- **Switch selection by helix arrangement and scale** → **accurate setting**
- **Metal piston and protected twin magnet** → **rugged design for critical application**
- **Spring supported piston** → **optional installation**
- **Valve housing** → **low pressure loss**

Where to use a **HONSBERG** BASIC valve piston instrument

info
point

Market segments

- **Power plant**
- **Machine tools**
- **Welding technology**
- **Gears**
- **Heat transfer installation**
- **Pumps**

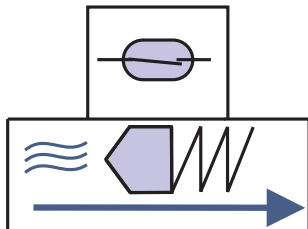


Application

- **Providing reliable flow situation in cooling system**
- **Controlling the emulsion supply for high performance tools**
- **Creating alarm in case of failures or drop of oil feed into gear boxes**
- **Running dry protection of pumps**

Piston inline design

The technology



Magnet-equipped, spring-supported piston triggers flow-dependent inductively adjustable threshold contacts or dial units.

Applications

- Industrial metering and monitoring technology
- Oil monitoring in gear systems
- Pump monitoring in high-pressure cleaners
- Checking emulsion in machine tools
- Applications in higher pressure ranges

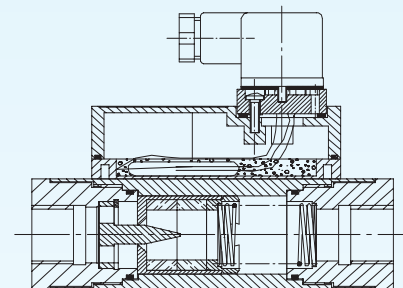
Advantages

- Dirt resistant
- High switching capacity
- Numerous materials
- High pressure resistance
- Nominal diameters DN 3 to DN 50
- Viscosity compensation possible



Contents

System description	
Device system	52
Function and advantages	52
Metering materials and accuracy	53
Handling and operation	54
Device descriptions	55



Technical data

Concept	piston, inline design
Nominal diameter	3 - 50
Connection	female thread, male thread
PN	6 - 300
Max. temperature	120 °C
Signal	threshold, optical display
Adjustable	yes
Materials	brass, stainless steel, plastic
Installation position	any
Metering materials	liquids or gases

- Switching
- Indicating
- Metering

System description

Device system

The piston system inline design is used for monitoring and indicating liquid and gaseous metering materials. A magnet-equipped and spring-supported piston moves in a linear-shaped body and is moved in the direction of flow by the flowing medium, whereby the path of the piston is directly proportional to the flow rate. Since the piston is spring-supported, the devices can be installed in any position and reset safely when the volume flow diminishes.

Function and advantages

The inline design of the devices makes a block assembly possible, where the body is manufactured from solid material and can thus withstand extremely high pressure loads. The switches are arranged outside the body. This feature provides advantages in particular with respect to the high pressure range or installations where compact dimensions are mandatory.

The switch units are horizontally adjustable and some are moved via pinion and scale [HD1K, HD1KV] which makes extremely accurate device setting possible. Thanks to the adjustment, a device working range of up to 1:10 is achieved.

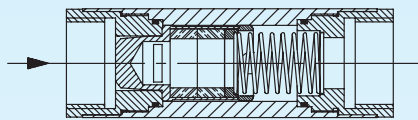
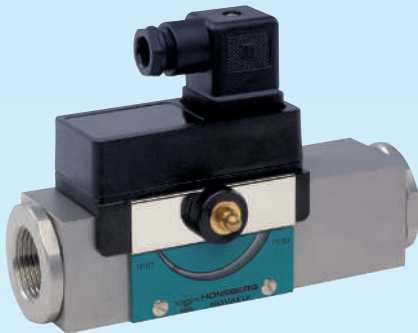
In case of an indication function, the primary piston is coupled to metering or indicating equipment which displays the current flow in this way. The display units are front faced or lateral mounted.

The new display designs for Honsberg inline piston meters

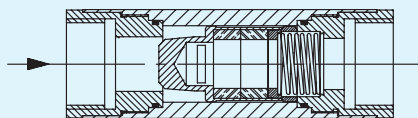
The uniform casing of the display unit allows for mounting on the side or front.

- Easy to mount
- Touchless needle coupling
- Good readability
- Mounting on the front or side

A simplified version of the MR1KJ display comes as a 10 -100 % magnet display.



no flow



flow



side display O1



front display Z1



display 10-100 % M1J

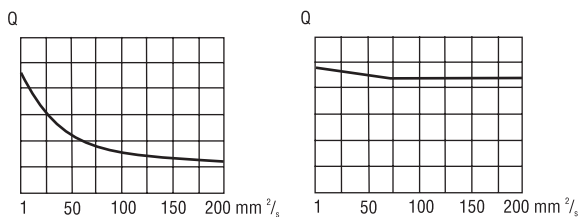
Metering materials and accuracy

The devices are designed for liquid metering materials as standard and the functional data are specified for water.

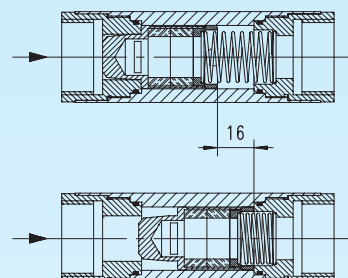
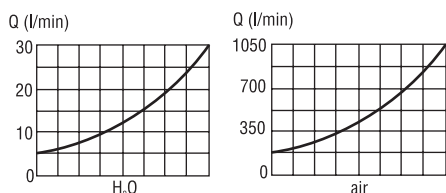
The instruments can also be used for viscous media and air or gases. The mechanical working method means that the device function depends on the kind of medium used. As viscosity increases, the functional range tends to decrease, in other words at very high viscosity only a fraction of the functional range is achieved in comparison with 1 mm²/s [water].

	Water	Viscosity mm ² /s			
		30	60	115	220
MR	4	3	1.4	1	-
	8	6	3	2	-
	10	8	5	4	2
	20	18	13	13	10
MR1K	4	1.9	1.3	0.8	-
	10	4.7	3.9	2.6	-
	30	24.6	24	23.3	22.7
	40	34.8	33.6	32.6	31.8
HD1K	5	2.1	1.6	0.8	-
	10	4.7	3.9	2.6	-
	30	24.6	24	23.3	22.7
	40	34.8	33.6	32.6	31.8

For this reason options have been developed which allow viscosity stability. These devices work in a certain viscosity range without exceeding the permitted tolerances. This is of particular interest for oils with different temperature ranges.

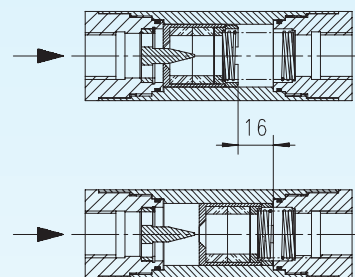


In the case of air and gases the device mechanisms must be equipped with additional absorption. The metering and monitoring ranges are extremely dependent on operating conditions such as pressure, density and temperature. The functional ratio in relation to water is approx. 1:35, i.e. 1 l/min water corresponds to approx. 35 NI/min air, whereby temperature, density and operating pressure play a special role here. We will be happy to give you special advice in these cases.



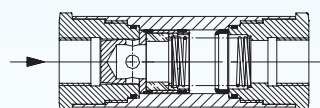
Example with viscosity compensation:

Path	Viscosity	Flow rate
16 mm	1 mm ² /s	5,0 l/min
16 mm	115 mm ² /s	0,8 l/min



Example with viscosity compensation:

Path	Viscosity	Quantity
16 mm	1 mm ² /s	5,0 l/min
16 mm	115 mm ² /s	4,9 l/min



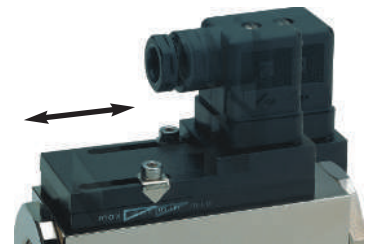
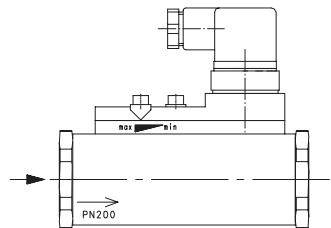
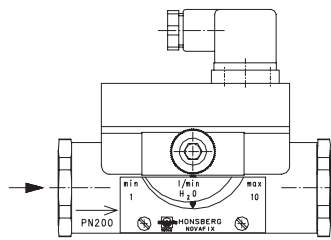
MR1K for air and gas control with anti-friction rubber rings and buffer



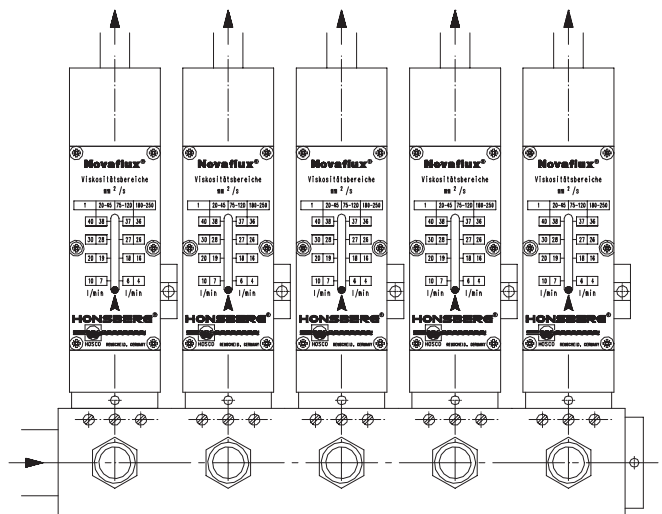
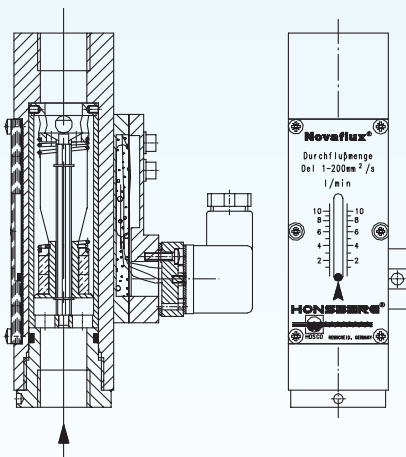
NJVK

Handling and operation

If the switch point needs to be set, this can be done by adjusting the switching head via a pinion setting [HD1K, HD1KV] or by longitudinal adjustment. When the switching point has been reached, the switching unit is fixed using an attachment screw.



The Honsberg magnetic displays [NJ, NJV] are mainly used in industry for non-transparent metering materials and/or higher pressures.



Five-channel manifold with switch support and diodes arranged on the front. Use of Honsberg valve strips [Type VB 1-8 stations] for separate and compact dosage and monitoring of large-scale gear systems.

	type	nominal diameter	connection	control	indication	output signal	on site metering	max. pressure bar	max. temperature °C	water	oil	gas/air	aggressive	miscellaneous	page
	FW1	8 - 25	female thread brass	●				10	90	●	✓	✓			56
		8 - 25	female thread plastic	●				100	90	●	✓	✓			
	FW3	8	female thread brass	●				100	90	●	✓	✓			58
	FX	15	male thread plastic	●				10	80	●		✓		filter	59
	HD1K	8 - 25	female thread brass	●	○		○	200	120	●	✓	✓	✓	Ex	61
			female thread stainless steel	●	○		○	200	120	●	✓	✓	✓		
	HD2K	8 - 25	female thread brass	●	○		○	200	120	●	●	✓	✓	GL	64
			female thread stainless steel	●	○		○	200	120	●	●	✓	✓		
	HM1K	8 - 25	female thread brass	●	○		○	200	70	●	✓	✓	✓		67
			female thread stainless steel	●	○		○	200	70	●	✓	✓	✓		
	HR1MV	32 - 50	female thread brass	●	○		○	200	120	●	✓	✓	✓	Ex	70
			female thread brass	●	○		○	200	120	●	✓	✓	✓		
	MF	3	female thread brass	●				6	80	●		●			73
		7	female thread brass	●				6	80	●		●			74
	MR	8 - 25	female thread brass	●	○		○	200	120	●	✓	✓	✓		75
			female thread stainless steel	●	○		○	200	120	●	✓	✓	✓		
	MR1K	8 - 25	female thread brass	●	○		○	200	120	●	✓	✓	✓		77
			female thread stainless steel	●	○		○	200	120	●	✓	✓	✓		
	RVM	8	female thread brass	●				300	100	●		✓	✓		79
			female thread stainless steel	●				300	100	●		✓	✓		
	NH1	15	female thread stainless steel	○	●			10	65	●					81
	NJ	8 - 25	female thread brass	○	●			100	100	●	✓	✓	✓		82
			female thread stainless steel	○	●			100	100	●	✓	✓	✓		
	NJV	8 - 25	female thread brass	○	●			100	100	●	●	✓			85
	MH	8 - 25	female thread aluminium	○	●			10	65	●	✓	✓			88
	VF	8	female thread brass	○	●			16	100	●	✓	✓	✓		90
			female thread stainless steel	○	●			16	100	●	✓	✓	✓		
	VO	15 - 25	female thread brass	○	●			16	100	●	✓	✓	✓		92
			female thread stainless steel	○	●			16	100	●	✓	✓	✓		
	NO	8 - 25	female thread brass	○	●		●	50	90	●	✓	✓	✓		94
			female thread stainless steel	○	●		●	50	90	●	✓	✓	✓		
	AR	10	female thread brass	●				150	80	●	✓	✓			96
	MI	8 - 25	female thread brass	●				16	60	●	✓	✓	✓		96
			female thread stainless steel	●				16	60	●	✓	✓	✓		
	OT	15 - 20	male thread brass		●			10	100	●	✓	✓		valve	96

● standard ○ standard option □ special option

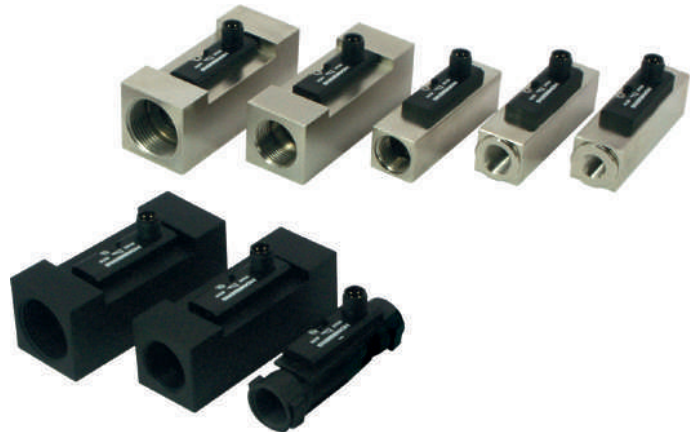
all data sheets available under www.honsberg.com

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquid or gaseous media, with spring-supported piston and magnetic triggering of a reed switch. Rugged design in plastic or brass.

- * minimal pressure loss
- * good repeatability
- * high switch capability
- * dirt-resistant
- * hermetic separation of mechanical and electrical component

Female thread G1/4 to G1 POM/brass



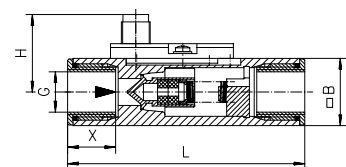
TECHNICAL DATA

	G	Type	PN bar	Qmax. rec. l/min H ₂ O	adjustable range l/min H ₂ O	L mm	H mm	B mm	AF mm	X mm	weight kg
POM	G 1/2	FW1-015GP006	10	20	1- 6	85	30	-	27	12	0.04
	G 3/4	FW1-020GP011	10	30	1- 11	100	30	36	-	18	0.13
	G 1	FW1-025GP011	10	30	1- 11	100	30	40	-	18	0.17
brass	G 1/4	FW1-008GM006	100	8	1- 6	89	30	25	-	18	0.33
	G 3/8	FW1-010GM006	100	10	1- 6	89	30	25	-	18	0.31
	G 1/2	FW1-015GM006	100	20	1- 6	85	30	25	-	12	0.28
	G 3/4	FW1-020GM011	100	30	1- 11	100	30	36	-	18	0.72
	G 1	FW1-025GM011	100	30	1- 11	100	30	40	-	18	0.83

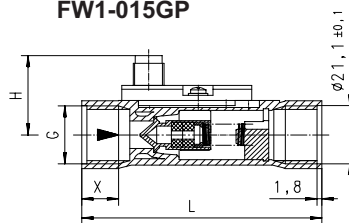
Adjustable range is indicated for horizontally decreasing flow.

tolerance ±10% of full scale
 media temperature max. 90°C
 average pressure loss 0.3 bar at 25 l/min
 hysteresis depending on the switching value minimum 0.5 l/min.

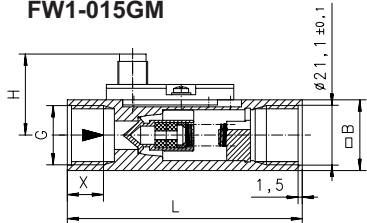
FW1-008GM - FW1-010GM



FW1-015GP



FW1-015GM

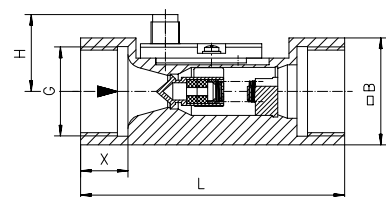


MATERIALS

FW1-...GP
 housing POM glass-fibre enforced
 piston POM
 spring stainless steel 1.4310
 magnet bariumferrite
 seals -
 switch head polycarbonate

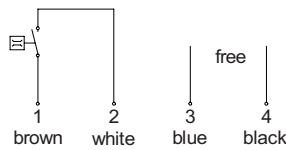
FW1-...GM
 brass Ms58 nickel plated
 piston POM
 spring stainless steel 1.4310
 magnet bariumferrite
 seals viton (DN8-10 only)
 switch head polycarbonate

FW1-020G. - FW1-025G.

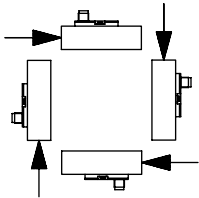


ELECTRICAL DATA

reed switch - wiring 0.378 n.o.
230 V AC 0,5 A 50 VA
contact for locking plug M 12x1, 4-pole
protection class IP 67

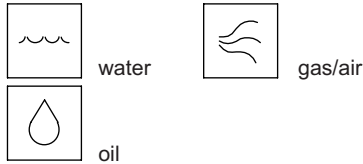


MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

For combination see table "technical data"

FW1-	008	G	P	006	basic type specification
	008				● nominal diameter DN 8 - G1/4 (only brass design)
	010				● nominal diameter DN 10 - G3/8 (only brass design)
	015				● nominal diameter DN 15 - G1/2
	020				● nominal diameter DN 20- G3/4
	025				● nominal diameter DN 25 - G1
		G			● female thread
			P		● plastic POM
			M		● brass
				006	● adjustable range 1- 6 l/min horizontal H ₂ O
				011	● adjustable range 1- 11 l/min horizontal H ₂ O
Special option VARIO					☐ switch values for oil or gas cable 3 m PN 500 (DN 15)

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

ACCESSORY

Locking plug M12x1

K	PU-	02	S	G	basic type specification
K					● ready-made cable
KB04					● self makable cable 4-pole
	PU-				● material PUR
		02			● length 2 m
		05			● length 5 m
		10			● length 10 m
			S		● moulded-on plug
				G	● straight plug
				W	● angled plug 90°



All technical changes reserved

●BASIC Standard ○BASIC Programme option ☐VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquid or gaseous media, with spring-supported piston and magnetic triggering of a reed switch. Rugged design in plastic or brass..

- * good repeatability
- * high switch capability
- * hermetic separation of mechanical and electrical component

Female thread G1/4 brass



FW3-008GM

TECHNICAL DATA

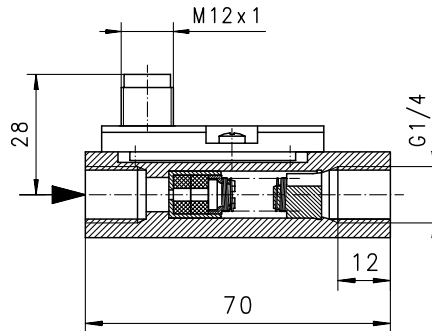
M	Type	PN bar	Qmax. recom. l/min	switch value l/min H ₂ O selectable range for fixed switcg	weight kg
brass G1/4	FW3-008GM	100	6	0.4 - 2.5	0.25

Switch value is indicated for horizontally decreasing flow.

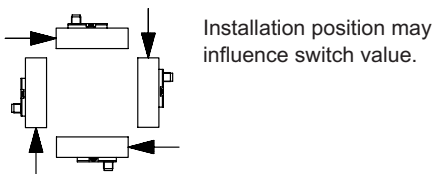
tolerance ±10% of full scale
media temperature max. 90°C

MATERIALS

housing	brass Ms58 nickel plated
piston	brass Ms58
piston stop	POM
spring	stainless steel 1.4310
magnet	bariumferrite
switch head	polycarbonate

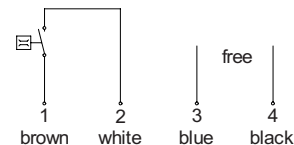


MOUNTING POSITION

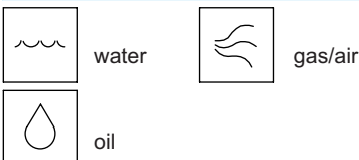


ELECTRICAL DATA

reed switch - wiring 0.378 n.o.
230 V AC 0,5 A 50 VA
contact for locking plug M 12x1, 4-pole
protection class IP 67



METERING SUBSTANCES



NOMENCLATURE

FW3-	008	G	M	Beispiel Beschreibung
		G		● female thread G 1/4
			M	● brass design
Programme option			○	○ cable 3 m

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquid or gaseous media, with magnetic triggering of a fixed reed switch. Plastic housing with integrated filter.

- * fixed switch value
- * integrated filter
- * control of small flow rates
- * high switch capability
- * flow regulator as option

Male thread G1/2A POM



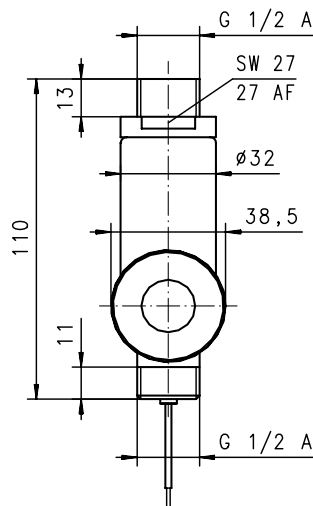
FX-015AP

TECHNICAL DATA

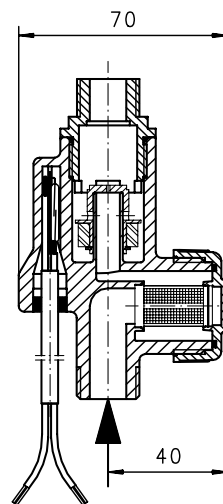
	G	Type	PN bar (20°C)	Qmax. recom. l/min H ₂ O	switch value l/min H ₂ O selectable range for fixed switch	weight kg
POM	G1/2A	FX-015AP	10	12	0.4 - 5	0.14
		FXF-015AP	10	12	2.0 - 12	0.15

Switch value is indicated for upward decreasing flow.

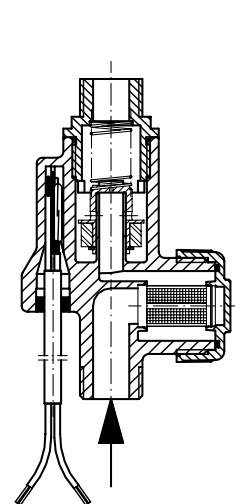
- | | |
|-----------------------|---|
| tolerance | ±15% of switch value |
| media temperature | max. 80°C at 6 bar |
| average pressure loss | FX 0.01 bar at 5 l/min
FXF 0.20 bar at 5 l/min |
| hysteresis | depending on the switch value minimum 0.3 l/min. |
| filter | 25 µm |



FX-015AP



FXF-015AP

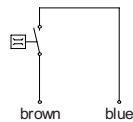


MATERIALS

	FX-015AP	FXF-015AP
body	POM glass-fibre	POM glass-fibre
piston	brass Ms58	brass Ms58
snap ring	CuSn8F70	CuSn8F70
spring	-	stainless steel 1.4310
magnet	bariumferrite	bariumferrite
seals	NBR	NBR
filter	nylon/POM	nylon/POM

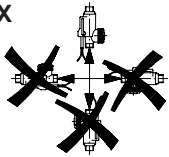
ELECTRICAL DATA

reed switch - wiring 0.212 n.o.
230 V AC 1 A 50 VA
cabel 0.5 m
protection class IP 65

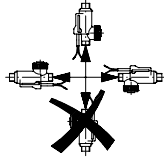


MOUNTING POSITION

FX



FXF



Position may influence switch value.

METERING SUBSTANCES



water



gas/air

NOMENCLATURE

FX-	015	A	P	basic type
FX-				specification
FXF-				● Flow Switch
	015			● Flow Switch with additional spring support
		A		● nominal diameter DN 15
			P	● male thread
				● plastic design
Programme option BASIC				○ integrated flow regulator

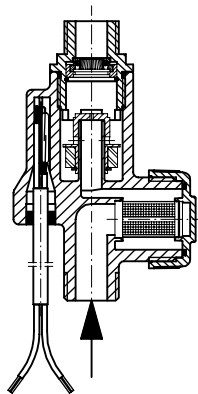
IMPORTANT ORDER DETAILS

- Please indicate flow direction, metering substance and switch value with your order.
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (switch value on request)

OPTIONS

- Flow Switch with integrating flow regulator

limiter flow rates 3,5,6,8,10,12 l/min H₂O.
tolerance from 2 bars ±15%
temperature max. 65°C



All technical changes reserved

IBASIC Standard BASIC Programme option VARIO Special option PLUS Accessories not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media with spring supported piston and magnetic actuation of a reed switch. Robust design, produced in materials brass or stainless steel.

- * good repeatability
- * dirt-resistance
- * high switch capability
- * hermetic separation of mechanical and electrical component
- * exact setting of switch via scale + gear



Female thread G1/4 - G1 brass/stainless steel



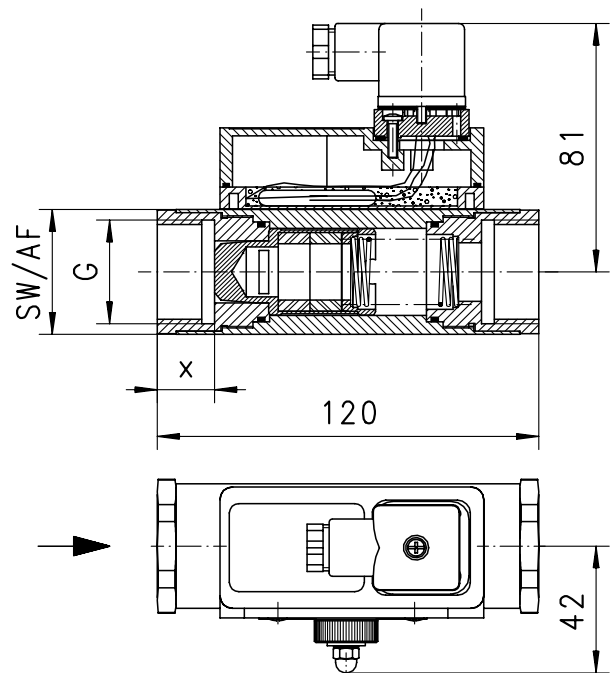
HD1K-020GM040

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	adjustable range l/min H ₂ O			AF mm	X mm	weight kg
brass	G 1/4	HD1K-008GM005	200	10	0.5 - 5			40	15	1.3
	G 3/8	HD1K-010GM...	200	20	0.5 - 5 1 - 10			40	15	1.3
	G 1/2	HD1K-015GM...	200	40	1 - 10 2 - 20 3 - 30			40	15	1.2
	G 3/4	HD1K-020GM...	200	60	3 - 30 4 - 40			40	18	1.2
	G 1	HD1K-025GM...	200	80	4 - 40 6 - 60			40	18	1.1
stainless steel	G 1/4	HD1K-008GK005	200	10	0.5 - 5			41	15	1.3
	G 3/8	HD1K-010GK...	200	20	0.5 - 5 1 - 10			41	15	1.3
	G 1/2	HD1K-015GK...	200	40	1 - 10 2 - 20 3 - 30			41	15	1.2
	G 3/4	HD1K-020GK...	200	60	3 - 30 4 - 40			41	18	1.2
	G 1	HD1K-025GK...	200	80	4 - 40 6 - 60			41	18	1.1

Adjustable range is indicated for horizontally decreasing flow.

tolerance ±5% of full scale
 media temperature max. 120°C
 average pressure loss 0.5 bar at Qmax.
 hysteresis depending on switch value
 minimum 0.7 l/min.

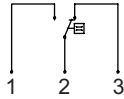


MATERIALS

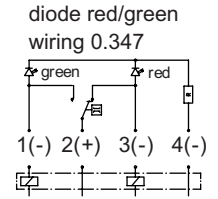
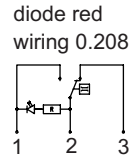
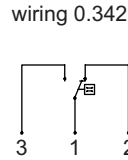
	HD1K-...GM	HD1K-...GK
body	brass Ms58 nickel plated	stainless steel 1.4571
piston	brass Ms58	stainless steel 1.4404
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	bariumferrite	bariumferrite PTFE plated
seals	NBR	viton
switch head	polycarbonate	polycarbonate

ELECTRICAL DATA

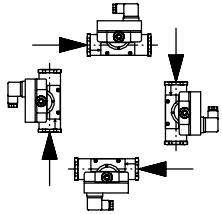
reed switch - wiring 0.213 change over
250 V AC 1.5 A 50 VA
plug DIN 43650-A
protection class IP 65



OBASIC
Programme-
options



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water



gas/air



oil



design stainless steel HD1K-...GK
for aggressive liquids

NOMENCLATURE

For combination see table "technical data"

HD1K	-	008	G	M	005				basic type
									specification
HD1K									Flow Switch
H1									Flow Indicator
	-								without metering unit
	O-								with lateral flow metering unit
	Z-								with front flow metering unit
		008							DN 8 - G1/4
		010						nominal diameter	DN 10 - G3/8
		015							DN 15 - G1/2
		020							DN 20 - G3/4
		025							DN 25 - G1
			G						
				M					brass
				K					stainless steel
					005			adjustable range H ₂ O horizontal	0.5 - 5 l/min
					010				1 - 10 l/min
					020				2 - 20 l/min
					030				3 - 30 l/min
					040				4 - 40 l/min
					060				6 - 60 l/min
						A			switch ATEX (produkt information 92.1.H1-1)
						E			connection by local electronic (e.g. omni-HD1K)
Programme option									wiring 0.342
BASIC									wiring 0.208 - diode red integrated in plug DIN 43650-A
									wiring 0.347 - diode red/green integrated in plug DIN 43650-A
Special option									high pressure PN 400 bar / 500 bar
VARIO									incremented scale
									switch head metal
									flat switch head plastic
									selected hysteresis / vibration-proof
									rhodium contact
									contact for locking plug M 12x1, 4-pole
									two to four independent switch heads
									setting / adjustable ranges for oil or gas
									special setting
									approval Germanischer Lloyd type HR

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

All technical changes reserved

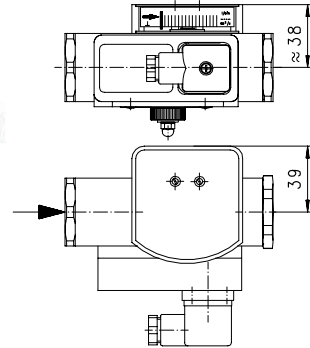
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

○ **HD1KO-** Flow Switch with lateral flow metering unit

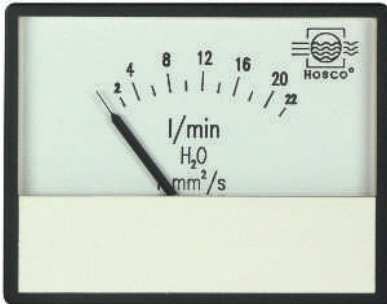


adjustable range l/min H ₂ O	metering range l/min H ₂ O
0,5 - 5	0,5 - 6
1 - 10	1 - 12
2 - 20	2 - 23
3 - 30	4 - 34
4 - 40	5 - 45
6 - 60	5 - 65

The metering range is indicated for horizontally increasing flow
protection class IP 60
additional weight 0.1kg

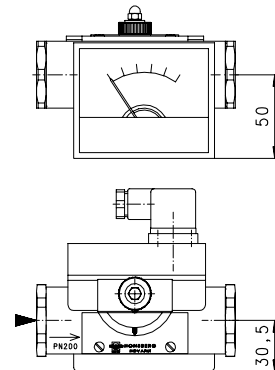


○ **HD1KZ-** Flow Switch with front flow metering unit



adjustable range l/min H ₂ O	metering range l/min H ₂ O
0,5 - 5	0,5 - 6
1 - 10	1 - 12
2 - 20	2 - 22
3 - 30	3 - 34
4 - 40	4 - 45
6 - 60	5 - 65

The metering range is indicated for horizontally increasing flow
media temperature max. 70°C
protection class IP 40
additional weight 0.1kg



EXAMPLES FOR FURTHER OPTIONS



switch head metal or flat switch head plastic, switch head ATEX



media temperaturer 150°C combinably with all Honsberg-electronics sensors or electronics heads



Flex-K-HD1K
switch- or frequency output 0..10V or 4..20mA PNP, NPN



omni-HD1K
2xNPN and PNP switch point 4(0)..20mA output graphical LCD display with flashing LED, program ring

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids media, with spring-supported piston and magnetic triggering of a reed switch. Rugged construction in brass or stainless steel with additional viscosity compensation.

- * viscosity compensation 30-330mm²/s
- * good repeatability
- * high switch capability
- * hermetic separation of mechanical and electrical component
- * exact setting of switch via scale + gear



Female thread G1/4 to G1 brass or stainless steel



HD2K-020GM040

TECHNICAL DATA

	G	Type	PN bar	minimum reachable adjusting range l/min oil 30-330mm ² /s					SW mm	X mm	weight kg
brass	G 1/4	HD2K-008GM...	200	0.5 - 8					40	15	1.3
	G 3/8	HD2K-010GM...	200	0.5 - 8	1.5 - 15			40	15	1.3	
	G 1/2	HD2K-015GM...	200	0.5 - 8	1.5 - 15	2.5 - 25		40	15	1.2	
	G 3/4	HD2K-020GM...	200	0.5 - 8	1.5 - 15	2.5 - 25	6 - 40	40	18	1.2	
	G 1	HD2K-025GM...	200	0.5 - 8	1.5 - 15	2.5 - 25	6 - 40	12 - 60	40	18	1.1
stainless steel	G 1/4	HD2K-008GK...	200	0.5 - 8					41	15	1.3
	G 3/8	HD2K-010GK...	200	0.5 - 8	1.5 - 15			41	15	1.3	
	G 1/2	HD2K-015GK...	200	0.5 - 8	1.5 - 15	2.5 - 25		41	15	1.2	
	G 3/4	HD2K-020GK...	200	0.5 - 8	1.5 - 15	2.5 - 25	6 - 40	41	18	1.2	
	G 1	HD2K-025GK...	200	0.5 - 8	1.5 - 15	2.5 - 25	6 - 40	12 - 60	41	18	1.1

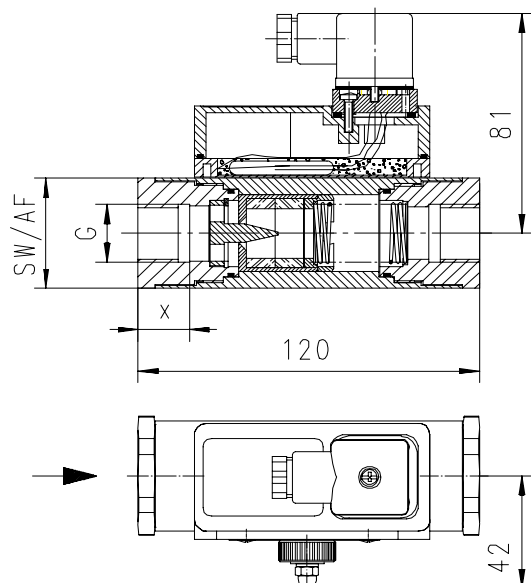
Adjustable range is indicated for horizontally decreasing flow. Calibration with oil ISO VG100.

adjustable range	Q _{max.}	viscosity stability	pressure loss [bar] at Q _{max.}				
			30	60	100	205	330
0,5 - 8	12	±8%, min. ±0,3 l/min	1.1	1.4	1.6	2.8	3.5
1,5 - 15	22	±8%, min. ±0,5 l/min	2.2	2.3	2.4	2.8	3.5
2,5 - 25	35	±8%, min. ±0,8 l/min	1.9	2.0	2.1	2.3	2.9
6 - 40	60	±8%, min. ±2,7 l/min	1.9	2.0	2.1	2.3	2.6
12 - 60	80	±8%, min. ±3,0 l/min	2.1	2.3	2.4	2.6	2.8

tolerance ±5% of full scale
media temperature max. 120°C
hysteresis depending on switch value
value minimum 0.5 l/min.

MATERIALS

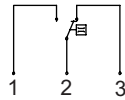
	HD2K-...GM	HD2K-...GK
body	brass Ms58 nickel plated	stainless steel 1.4571
piston	brass Ms58	stainless steel 1.4404
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	bariumferrite	bariumferrite
		PTFE plated
seal	NBR	viton
switch head	PC	PC



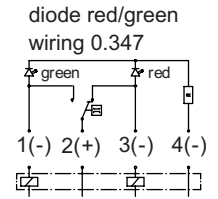
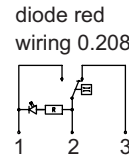
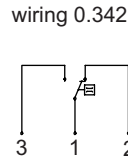
B

ELECTRICAL DATA

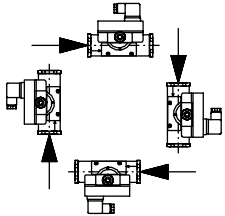
reed switch - wiring 0.213 change over
250 V AC 1.5 A 50 VA
plug DIN 43650-A
protection class IP 65



OBASIC Programme options



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



oil



design stainless steel HD2K-...GK for aggressive liquids



water

NOMENCLATURE

For combination see table "technical data"

HD2K	-	008	G	M	005			basic type specification
HD2K							●	Flow Switch
H2							○	Flow Indicator
	-						●	without metering unit
	O-						○	with lateral flow metering unit
	Z-						○	with front flow metering unit
		008					●	DN 8 - G1/4
		010					●	DN 10 - G3/8
		015					●	DN 15 - G1/2
		020					●	DN 20 - G3/4
		025					●	DN 25 - G1
			G				●	female thread
				M			●	brass
				K			●	stainless steel
					008		●	0.5 - 8 l/min
					015		●	1.5 - 15 l/min
					025		●	2.5 - 25 l/min
					040		●	6 - 40 l/min
					060		●	12 - 60 l/min
						A	○	switch ATEX (produkt information 92.1.H1-1)
						E	○	connection by local electronic (e.g. omni-HD2K)
Programme option							○	wiring 0.342
BASIC							○	wiring 0.208 - diode red integrated in plug DIN 43650-A
							○	wiring 0.347 - diode red/green integrated in plug DIN 43650-A
Special option							□	high pressure PN 500 bar
VARIO							□	incremented scale
							□	switch head metal / flat switch head plastic
							□	selected hysteresis / vibration-proof
							□	rhodium contact
							□	contact for locking plug M 12x1, 4-pole
							□	two to four independent switch heads
							□	temperature control 30-95°C / temperature indication 0-120°C
							□	special range / adjustable

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and type of liquid (e.g. ISO VG 68! Range upon request)

All technical changes reserved

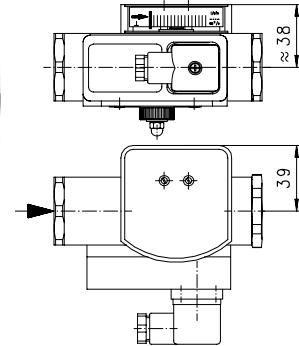
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

○ **HD2KO-** Flow Switch with lateral flow metering unit

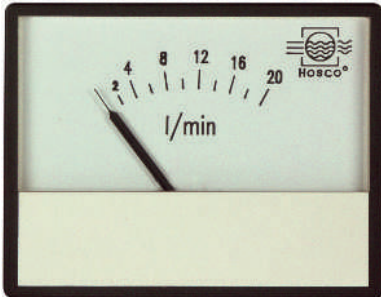


adjustable range	metering range
l/min	l/min
0.5 - 8	0.5 - 10
1.5 - 15	2 - 20
2.5 - 25	2.5 - 30
6 - 40	7.5 - 50
12 - 60	15 - 70

The metering range is indicated for horizontally increasing flow
protection class IP 60
additional weight 0.1kg

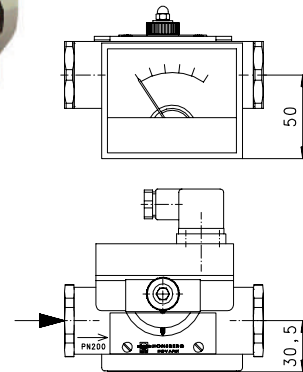


○ **HD2KZ-** Flow Switch with front flow metering unit



adjustable range	metering range
l/min	l/min
0.5 - 8	0.5 - 10
1.5 - 15	2 - 20
2.5 - 25	2.5 - 30
6 - 40	7.5 - 50
12 - 60	15 - 70

The metering range is indicated for horizontally increasing flow
media temperature
protection class IP 4 max. 70°C
additional weight 0.1kg



EXAMPLES FOR FURTHER OPTIONS



switch head metal or flat switch head plastic, switch head ATEX



media temperaturer 150°C combinably with all Honsberg-electronics sensors or electronics heads



Flex-K-HD2K switch- or frequency output 0..10V or 4..20mA PNP, NPN



omni-HD2K 2xNPN and PNP switch point 4(0)..20mA ouput graphical LCD display with flashing LED, program ring

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

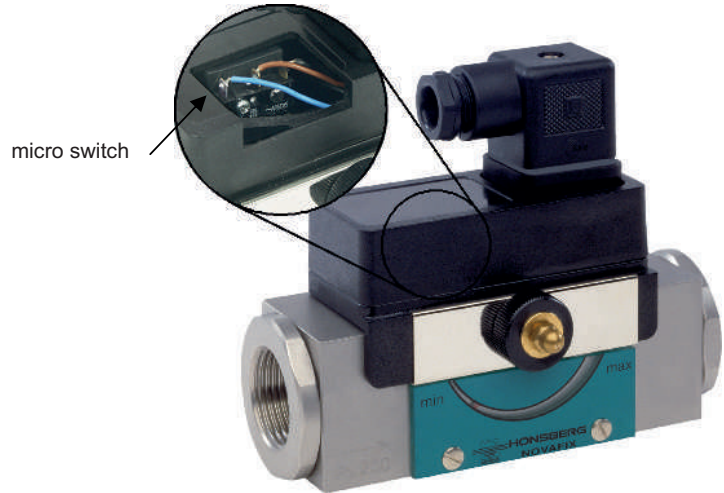
GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media with spring supported piston and magnetic actuation of a micro switch. Robust design, produced in materials brass or stainless steel.

- * good repeatability
- * dirt-resistance
- * high switch capability
- * hermetic separation of mechanical and electrical component
- * exact setting of switch via scale + gear



Female thread G1/4 - G1 brass/stainless steel



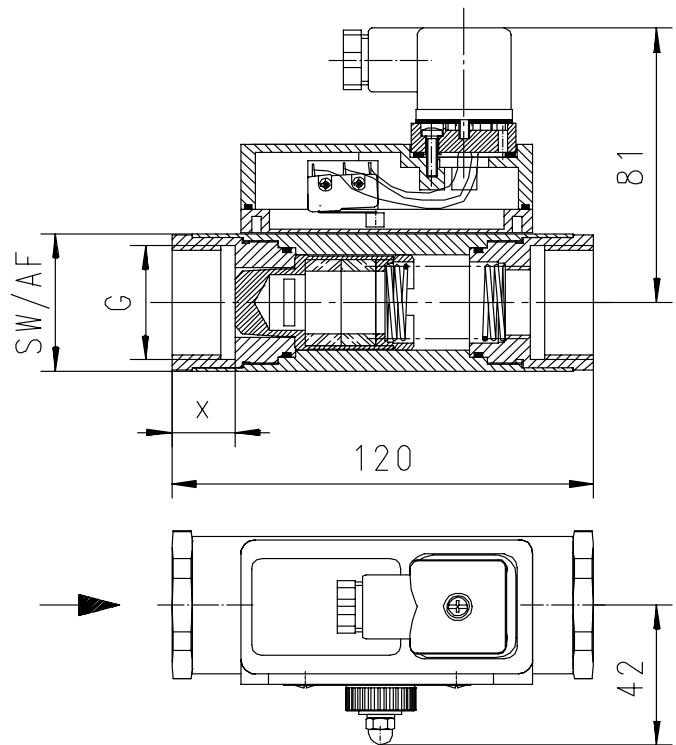
HM1K-020GM036

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	adjustable range l/min H ₂ O			AF mm	X mm	weight kg
brass	G 1/4	HM1K-008GM004	200	10	0.5 - 4			40	15	1.3
	G 3/8	HM1K-010GM...	200	20	0.5 - 4			40	15	1.3
	G 1/2	HM1K-015GM...	200	40	1 - 8	2 - 16	3 - 26	40	15	1.2
	G 3/4	HM1K-020GM...	200	60	3 - 26	4 - 36		40	18	1.2
	G 1	HM1K-025GM...	200	80	4 - 36	6 - 55		40	18	1.1
stainless steel	G 1/4	HM1K-008GK004	200	10	0.5 - 4			41	15	1.3
	G 3/8	HM1K-010GK...	200	20	0.5 - 4			41	15	1.3
	G 1/2	HM1K-015GK...	200	40	1 - 8	2 - 16	3 - 26	41	15	1.2
	G 3/4	HM1K-020GK...	200	60	3 - 26	4 - 36		41	18	1.2
	G 1	HM1K-025GK...	200	80	4 - 36	6 - 55		41	18	1.1

Adjustable range is indicated for horizontally decreasing flow.

tolerance ±5% of full scale
 media temperature max. 70°C
 average pressure loss 0.5 bar at Qmax.
 hysteresis depending on switch value
 minimum 1 l/min.

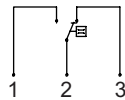


MATERIALS

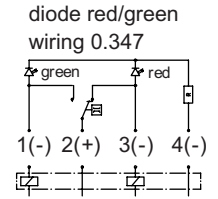
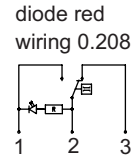
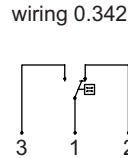
	HM1K-...GM	HM1K-...GK
body	brass Ms58 nickel plated	stainless steel 1.4571
piston	brass Ms58	stainless steel 1.4404
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	bariumferrite	bariumferrite
seals	NBR	PTFE plated viton
switch head	polycarbonate	polycarbonate

ELECTRICAL DATA

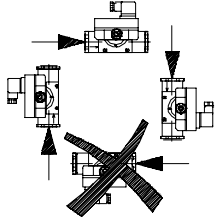
micro switch - wiring 0.371 change over
250 V AC 5 A
plug DIN 43650-A
protection class IP 65



OBASIC Programme-options



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water



gas/air



oil



design stainless steel HM1K-...GK for aggressive liquids

NOMENCLATURE

For combination see table "technical data"

HM1K-	008	G	M	005		basic type	
HM1K-					●	Flow Switch	
HM1KO-					○	Flow Switch with lateral flow metering unit	
HM1KZ-					○	Flow Switch with front flow metering unit	
	008				●	nominal diameter	
	010				●		DN 8 - G1/4
	015				●		DN 10 - G3/8
	020				●		DN 15 - G1/2
	025				●		DN 20 - G3/4
		G			●	DN 25 - G1	
			M		●	female thread	
			K		●	brass	
				004	●	stainless steel	
				008	●	adjustable range H ₂ O horizontal	
				016	●		0.5 - 4 l/min
				026	●		1 - 8 l/min
				036	●		2 - 16 l/min
				055	●		3 - 26 l/min
					●		4 - 36 l/min
Programme option BASIC					○	6 - 55 l/min	
Special option VARIO					□	wiring 0.342	
						wiring 0.208 - diode red integrated in plug DIN 43650-A	
						wiring 0.347 - diode red/green integrated in plug DIN 43650-A	
						incremented scale	
						switch head metal	
						contact for locking plug M 12x1, 4-pole	
						setting / adjustable ranges for oil or gas	
						special setting	

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

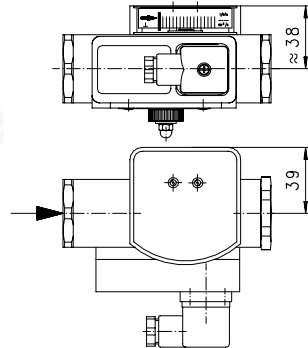
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

○ **HM1KO-** Flow Switch with lateral flow metering unit

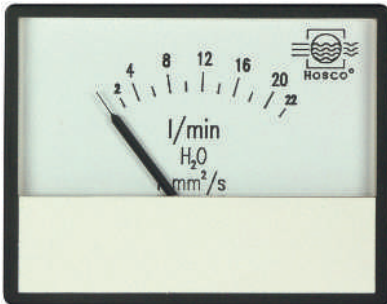


adjustable range l/min H ₂ O	metering range l/min H ₂ O
0.5 - 4	0,5 - 6
1 - 8	1 - 12
2 - 16	2 - 23
3 - 26	4 - 34
4 - 36	5 - 45
6 - 55	5 - 65

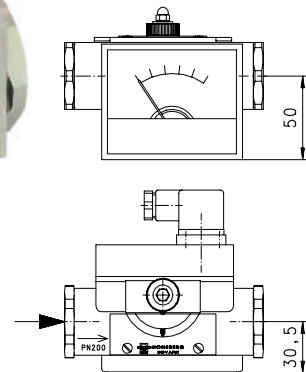


The metering range is indicated for horizontally increasing flow
protection class IP 60
additional weight 0.1kg

○ **HM1KZ-** Flow Switch with front flow metering unit



adjustable range l/min H ₂ O	metering range l/min H ₂ O
0.5 - 4	0,5 - 6
1 - 8	1 - 12
2 - 16	2 - 22
3 - 26	3 - 34
4 - 36	4 - 45
6 - 55	5 - 65



The metering range is indicated for horizontally increasing flow
media temperature max. 70°C
protection class IP 40
additional weight 0.1kg

EXAMPLES FOR FURTHER OPTIONS



switch head metal



media temperaturer 150°C
combinably with all
Honsberg-electronics sensors
or electronics heads



Flex-K-HD1K
switch- or frequency output
0..10V or 4..20mA
PNP, NPN



omni-HD1K
2xNPN and PNP switch point
4(0)..20mA ouput
graphical LCD display
with flashing LED, program ring

All technical changes reserved

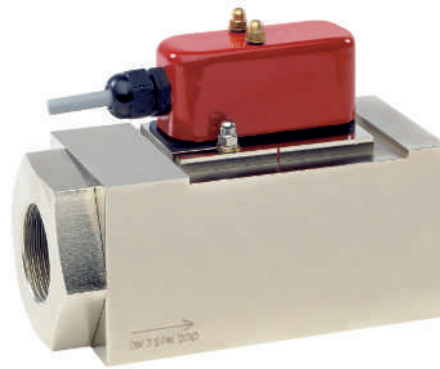
IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media, with spring-supported piston and magnetic triggering of a reed switch. Rugged construction in brass or stainless steel with additional viscosity compensation.

- * viscosity compensation 1-200mm²/s
- * robust metal switch head
- * good repeatability
- * dirt-resistance
- * high switch capability
- * hermetic separation of mechanical and electrical component

Female thread G1 1/4 to G2 brass/stainless steel



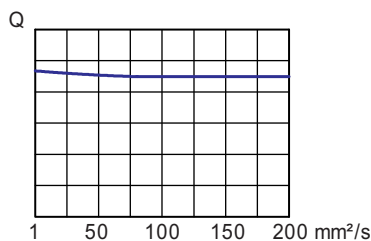
HR1MV-032GM060

TECHNICAL DATA

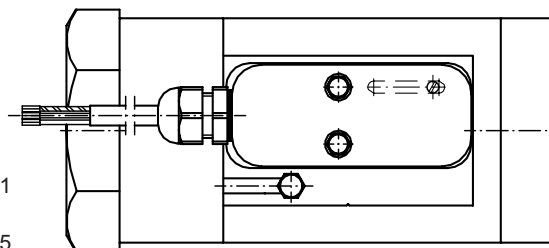
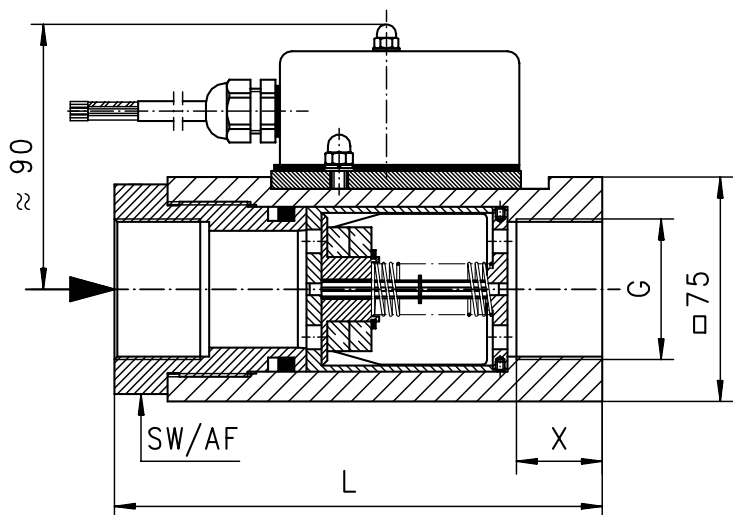
	G	Type	PN bar	Qmax. rec. l/min H ₂ O	adjustable range l/min oil 1-200mm ² /s		L mm	X mm	AF mm	weight kg
brass	G 1 1/4	HR1MV-032GM...	200	100	10 - 40	20 - 60	165	29	70	6.0
	G 1 1/2	HR1MV-040GM...	200	150	20 - 60	30 - 100	165	29	70	5.7
	G 2	HR1MV-050GM...	200	230	30 - 100	50 - 150	150	26	-	5.2
stainless steel	G 1 1/4	HR1MV-032GK...	200	100	10 - 40	20 - 60	165	29	70	6.0
	G 1 1/2	HR1MV-040GK...	200	150	20 - 60	30 - 100	165	29	70	5.7
	G 2	HR1MV-050GK...	200	230	30 - 100	50 - 150	150	26	-	5.2

Adjustable range is indicated for horizontally decreasing flow. Calibration with oil ISO VG64 - 80mm²/s.

viscosity stability ±3%
tolerance ±5% of full scale
media temperature max. 120°C
average pressure loss 0.5 bar at Qmax.
hysteresis depending on switch value value minimum 2 l/min.



Within the mechanical viscosity compensation the flow velocity in the piston area is increased sharply with the effect that the viscosity impact declines and the metering results stabilise even with changing viscosity ratings.

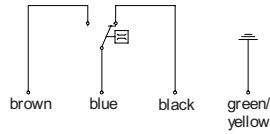


MATERIALS

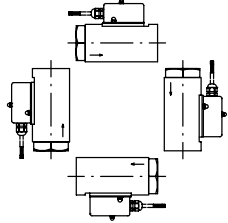
	HR1MV-...GM	HR1MV-...GK
body	brass Ms58 nickel plated	stainless steel 1.4571
metering unit	brass Ms58	stainless steel 1.4305
spring	1.4310	stainless steel 1.4310
magnet	hardferrite	hardferrite
seal	NBR (DN32-40 only)	viton (DN32-40 only)

ELECTRICAL DATA

reed switch - wiring 0.213 change over
250 V AC 1.5 A 50 VA
cable 2.5 m
protection class IP 65

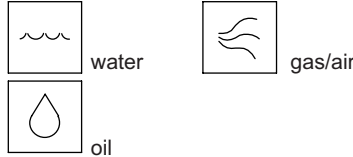


MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

For combination see table "technical data"

HR1MV	032	G	M	040			basic type	
HR1MV						●	Flow Switch	
H1V						○	Flow Indicator	
	-					●	without metering unit	
	O-					○	Flow Switch with lateral flow metering unit	
	Z-					○	Flow Switch with front flow metering unit	
	032					●	nominal diameter	
	040					●		DN 32 - G1 1/4
	050					●		DN 40 - G1 1/2
	065					○		DN 50 - G2
	080					○		DN 65 - G2 1/2
						○		DN 80 - G3
		G				●	female thread	
			M			●	brass	
			K			●	stainless steel	
				040		●	adjustable range	
				060		●		10 - 40 l/min
				100		●		20 - 60 l/min
				150		●		30 - 100 l/min
					A	○	switch ATEX (produkt information 92.1.H1-2)	
					E	○		connection by local electronic (e.g. omni-HR1MV)
Programme option BASIC						○	signal lamp / diode plug DIN 43650-A	
Special option VARIO						□	setting / special ranges selected hysteresis / vibration-proof rhodium contact temperature control 30 - 100 °C switch head contact for locking plug M 12x1, 4-pole Tuchel Harting two to four independent switch heads	

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids (>200mm²/s) please indicate viscosity, temperature and type of liquid (e.g. ISO VG 68! Range upon request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

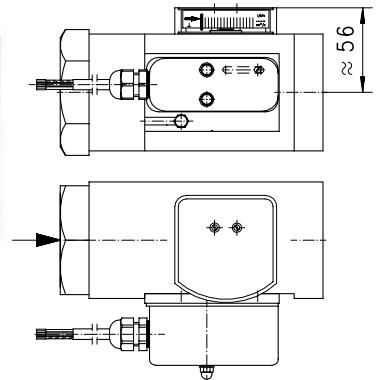
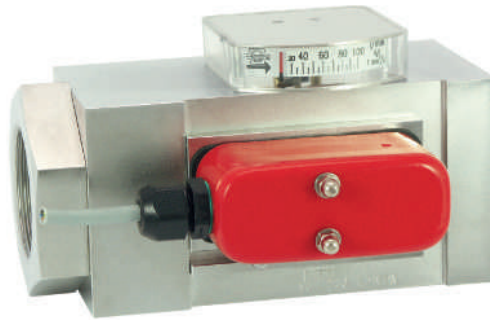
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

○ **HR1MVO-** Flow Switch with lateral flow metering unit



adjustable range l/min H ₂ O	metering range l/min H ₂ O
10 - 40	10 - 45
20 - 60	20 - 65
30 - 100	30 - 110
50 - 150	50 - 160

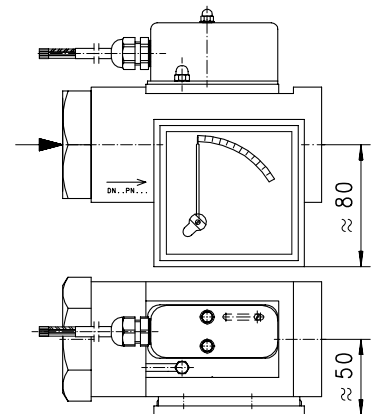


The metering range is indicated for horizontally increasing flow
protection class IP 60
additional weight 0.1kg

○ **HR1MVZ-** Flow Switch with front flow metering unit



adjustable range l/min H ₂ O	metering range l/min H ₂ O
10 - 40	10 - 45
20 - 60	20 - 65
30 - 100	30 - 110
50 - 150	50 - 160



The metering range is indicated for horizontally increasing flow
media temperature max. 70°C
protection class IP 40
additional weight 0.1kg

EXAMPLES FOR FURTHER OPTIONS



nominal diameter DN 65



switch head option
ATEX



Flex-K-HR1MV
switch- or frequency output
0..10V or 4..20mA
PNP, NPN



omni-HR1MV
2xNPN and PNP switch point
4(0)..20mA output
graphical LCD display
with flashing LED, program ring

All technical changes reserved

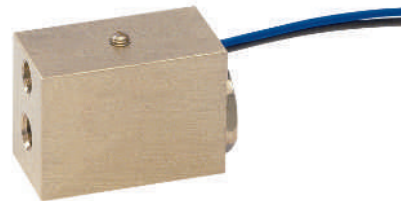
IBASIC Standard ○ BASIC Programme option □ VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for gaseous media, with magnetic triggering of a reed switch. Rugged design in brass.

- * compact dimensions
- * control of small flow rates

Female thread M5 brass



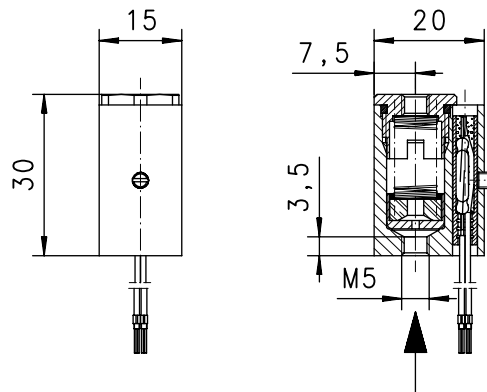
MF-003GM

TECHNICAL DATA

M	Type	PN bar	Qmax. recommended l/min	switch value l/min	weight kg
			air 1bar 20°C	selectable range for fixed switch	
brass	MF-003GM	6	100	air 1bar 20°C 1 - 100	0.06

Switch value is indicated for horizontally decreasing flow.

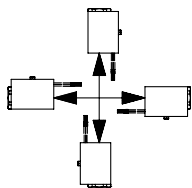
tolerance ±15% of full scale
media temperature max. 80°C



MATERIALS

body	brass Ms58
piston	brass Ms58
spring	stainless steel 1.4310
magnet	bariumferrite
seal	NBR

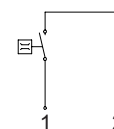
MOUNTING POSITION



Installation position may influence switch value.

ELECTRICAL DATA

reed switch - wiring 0.212 n.o.
125 V AC 0.5 A 10 VA
connection: two wires 170mm
protection class IP 65



METERING SUBSTANCES



NOMENCLATURE

MF-	003	G	M	basic type
		G		specification
			M	● female thread M5
				● brass

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and switch value with your order.
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (switch value on request)

All technical changes reserved

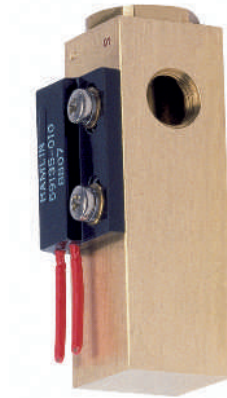
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for water, with magnetic triggering of a reed switch. Rugged design in brass.

- * control of small flow rates
- * adjustable switch value

Female thread M10x1 brass



MF-007GM

TECHNICAL DATA

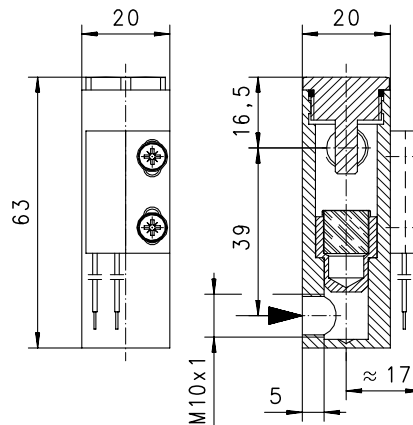
	M	Type	PN bar	Qmax. recommended l/min H ₂ O	switch value l/min H ₂ O selectable range for fixed switch	weight kg
brass	M10x1	MF-007GM	6	2	0.05 - 1.0	0.18

The switch value is valid for flow to up and decreasing flow.

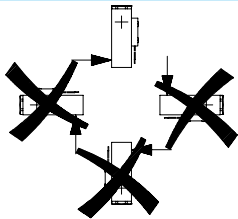
tolerance	±15% of full scale
media temperature	max. 80°C
average pressure loss	0.15 bar at Qmax.
hysteresis	depending on the switch value minimum 0.4 l/min.

MATERIALS

body	brass Ms58
piston	brass Ms58
spring	bariumferrite
seal	NBR

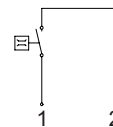


MOUNTING POSITION

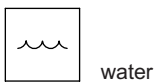


ELECTRICAL DATA

reed switch - wiring 0.212 n.o.
120 V AC 0.5 A 10 VA
connection 2 leads 300mm
protection class IP 65



METERING SUBSTANCES



NOMENCLATURE

MF-	007	G	M	basic type
		G		specification
				● female thread M10x1
				● brass

IMPORTANT FOR YOUR ORDER

- Please indicate switch value with your order.

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media with spring supported piston and magnetic actuation of a reed switch. Robust design, produced in materials brass or stainless steel.

- * compact dimension
- * good repeatability
- * dirt-resistance
- * high switch capability
- * hermetic separation of mechanical and electrical component

Female thread G1/4 to G1 brass/stainless steel



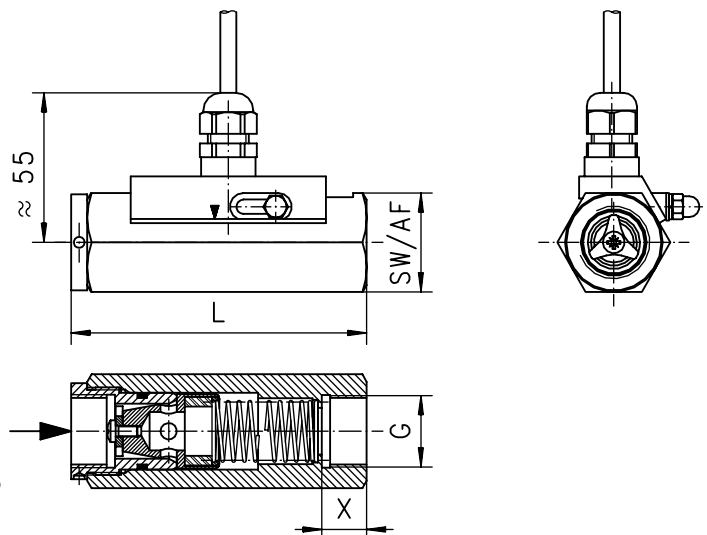
MR-020GM020

TECHNICAL DATA

	G	Type	PN bar	Qmax. rec. l/min H ₂ O	adjustable range l/min H ₂ O			L mm	H mm	AF mm	X mm	weight kg
brass	G 1/4	MR-008GM...	200	15	0.4 - 4	1 - 10		109	56	36	12	0.85
	G 3/8	MR-010GM...	200	20	0.4 - 4	1 - 10	5 - 20	109	56	36	12	0.85
	G 1/2	MR-015GM...	200	40	0.4 - 4	1 - 10	5 - 20	109	56	36	12	0.80
	G 3/4	MR-020GM...	200	60	1 - 10	5 - 20	10 - 40	109	56	36	12	0.80
	G 1	MR-025GM...	200	80	5 - 20	10 - 40	20 - 60	135	56	40	18	1.50
stainless steel	G 1/4	MR-008GK...	200	15	0.4 - 4	1 - 10		109	56	36	12	0.85
	G 3/8	MR-010GK...	200	20	0.4 - 4	1 - 10	5 - 20	109	56	36	12	0.85
	G 1/2	MR-015GK...	200	40	0.4 - 4	1 - 10	5 - 20	109	56	36	12	0.80
	G 3/4	MR-020GK...	200	60	1 - 10	5 - 20	10 - 40	109	56	36	12	0.80
	G 1	MR-025GK...	200	80	5 - 20	10 - 40	20 - 60	135	56	41	18	1.50

Adjustable range is indicated for horizontally decreasing flow.

tolerance ±5% of full scale
 media temperature max. 120°C
 average pressure loss 0.5 bar at Qmax.
 hysteresis depending on switch value
 minimum 0.5 l/min.

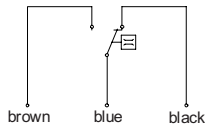


MATERIALS

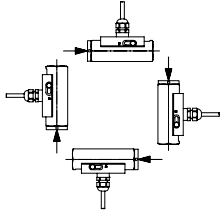
	MR-...GM	MR-...GK
body	brass Ms58 nickel plated	stainless steel 1.4305
piston	brass Ms58 stainless steel 1.4305; 1.4301	stainless steel 1.4571 stainless steel 1.4305; 1.4301
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	bariumferrite	bariumferrite PTFE plated
seal	NBR	viton
switch head	PA	PA

ELECTRICAL DATA

reed switch - wiring 0.213 change over
250 V AC 1.5 A 50 VA
cable 2.5 m
protection class IP 65

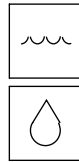


MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water
oil



gas/air
design stainless steel MR...GK for aggressive liquids

NOMENCLATURE

For combination see table "technical data"

MR-	008	G	M	004		basic type
MR-					●	Flow Switch
MRO-					□	Flow Switch with lateral flow metering unit (DN 8-20 - PN90)
	008				●	DN 8 - G1/4
	010				●	DN 10 - G3/8
	015				●	DN 15 - G1/2
	020				●	DN 20 - G3/4
	025				●	DN 25 - G1
		G			●	female thread
			M		●	brass
			K		●	stainless steel
				004	●	0.4 - 4 l/min
				010	●	1 - 10 l/min
				020	●	5 - 20 l/min
				040	●	10 - 40 l/min
				060	●	20 - 60 l/min
Special option					□	setting / adjustable ranges for oil or gas
VARIO						special ranges selected hysteresis / vibration-proof rhodium contact high pressure PN 400 bar plug DIN 43650-A connection for locking plug M12x1 , 4-pole

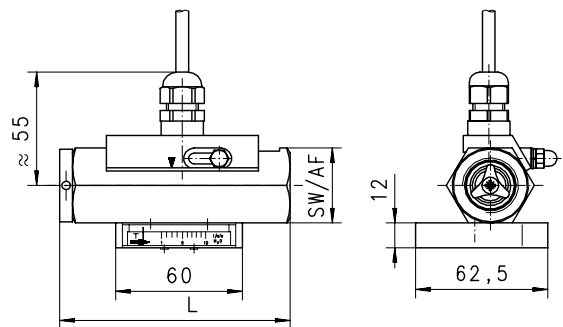
IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

OPTION

□ MRO- Flow Switch with lateral flow metering

adjustable range l/min H ₂ O	metering range l/min H ₂ O
0.4 - 4	0.5 - 5
1 - 10	1 - 12
5 - 20	5 - 25
10 - 40	5 - 40
20 - 60	20 - 60



The metering range is indicated for horizontally increasing flow

DN 8-20 PN 90 bar protection class IP 60
DN 25 PN 200 bar additional weight 0.1kg

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media with spring supported piston and magnetic actuation of a reed switch. Robust design, produced in materials brass or stainless steel.

- * compact dimension
- * good repeatability
- * dirt-resistance
- * high switch capability
- * hermetic separation of mechanical and electrical component

Female thread G1/4 to G1 brass/stainless steel



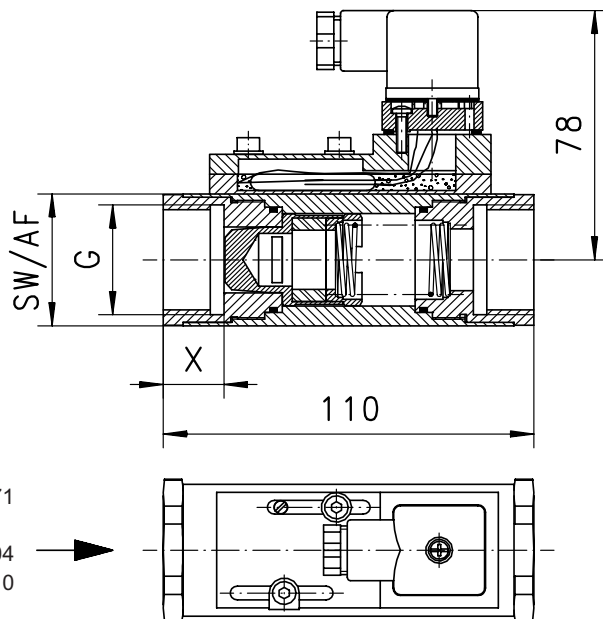
MR1K-010GM004

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	adjustable range l/min H ₂ O			AF mm	X mm	weight kg
brass	G 1/4	MR1K-008GM004	200	10	0.4 - 4			40	15	1.3
	G 3/8	MR1K-010GM...	200	20	0.4 - 4	1 - 10	3 - 30	40	15	1.3
	G 1/2	MR1K-015GM...	200	40	1 - 10	2 - 20		40	15	1.2
	G 3/4	MR1K-020GM...	200	60	3 - 30	4 - 40		40	18	1.2
	G 1	MR1K-025GM...	200	80	4 - 40	6 - 60	40	18	1.1	
stainless steel	G 1/4	MR1K-008GK004	200	10	0.4 - 4			41	15	1.3
	G 3/8	MR1K-010GK...	200	20	0.4 - 4	1 - 10	3 - 30	41	15	1.3
	G 1/2	MR1K-015GK...	200	40	1 - 10	2 - 20		41	15	1.2
	G 3/4	MR1K-020GK...	200	60	3 - 30	4 - 40		41	18	1.2
	G 1	MR1K-025GK...	200	80	4 - 40	6 - 60	41	18	1.1	

Adjustable range is indicated for horizontally decreasing flow.

tolerance ±5% of full scale
 media temperature max. 120°C
 average pressure loss 0.5 bar at Qmax.
 hysteresis depending on switch value
 minimum 0.5 l/min.

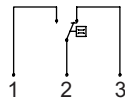


MATERIALS

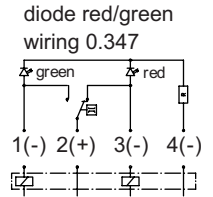
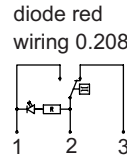
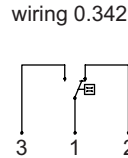
	MR1K-...GM	MR1K-...GK
body	brass Ms58 nickel plated	stainless steel 1.4571
piston	brass Ms58	stainless steel 1.4404
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	bariumferrite	bariumferrite
seal	NBR	PTFE plated viton
switch head	polycarbonate	polycarbonate

ELECTRICAL DATA

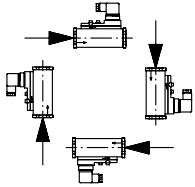
reed switch - wiring 0.213 change over
250 V AC 1.5 A 50 VA
plug DIN 43650-A
protection class IP 65



OBASIC
Programme-
options



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water



gas/air



oil



design stainless steel MR1K-...GK
for aggressive liquids

NOMENCLATURE

For combination see table "technical data"

MR1K-	008	G	M	004		basic type	
MR1K-					●	Flow Switch	
MR1KJ-					●	Flow Switch with magnetic indication	
MR1KO-					○	Flow Switch with lateral flow metering unit	
	008				●	nominal diameter	
	010				●		DN 8 - G1/4
	015				●		DN 10 - G3/8
	020				●		DN 15 - G1/2
	020				●		DN 20 - G3/4
	025				●		DN 25 - G1
		G			●	female thread	
			M		●	brass	
			K		●	stainless steel	
				004	●	adjustable range H ₂ O horizontal	
				010	●		0.4 - 4 l/min
				020	●		1 - 10 l/min
				030	●		2 - 20 l/min
				040	●		3 - 30 l/min
				060	●		4 - 40 l/min
					○	6 - 60 l/min	
					E ○	connection by local electronic (e.g. omni-MR1K)	
Programme option BASIC					○	wiring 0.342 wiring 0.208 - diode red integrated in plug DIN 43650-A wiring 0.347 - diode red/green integrated in plug DIN 43650-A	
Special option VARIO					□	setting / adjustable ranges for oil or gas special ranges / selected hysteresis / vibration-proof high pressure PN 500 bar two to four independent switch heads	

IMPORTANT FOR YOUR ORDER

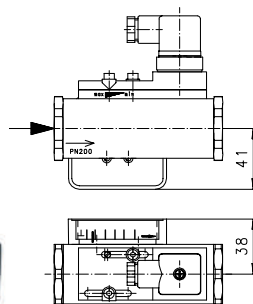
- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

OPTION

○ **MR1KO**

Flow Switch with lateral flow metering

adjustable range l/min H ₂ O	metering range l/min H ₂ O
0.4 - 4	0.5 - 5
1 - 10	1 - 12
2 - 20	2 - 23
3 - 30	4 - 34
4 - 40	5 - 45
6 - 60	5 - 65



○ **MR1KJ**

flow switch with magnetic indication 10-100%



Metering range is indicated for horizontally increasing flow. Protection class IP60 8o9. Additional weight 0.1kg

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media, with magnetic triggering of an adjustable reed switch. Rugged design in brass or stainless steel.

- * control of small flow rates
- * PN 300
- * hermetic separation of mechanical and electrical component

Female thread G1/4 brass/stainless steel

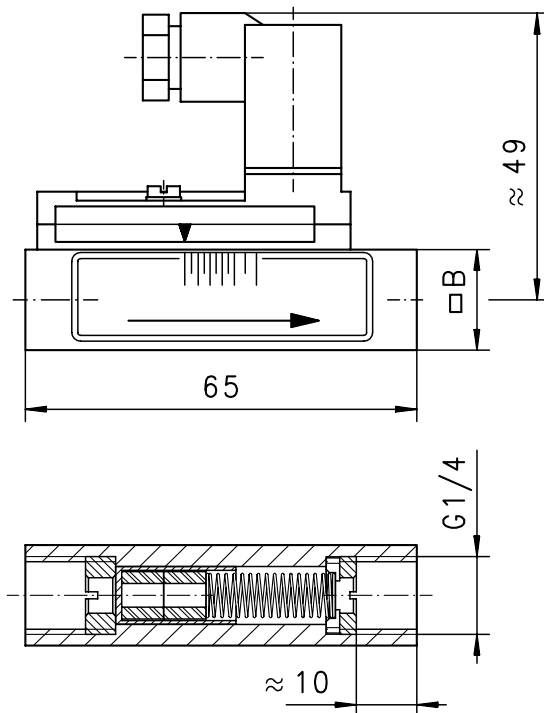


TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. H ₂ O	adjustable range H ₂ O	B mm	weight kg
brass	G1/4	RVM-008GM013	300	168 ml/min	40 - 130 ml/min	17	0.14
		RVM-008GM060	300	0.72 l/min	0.1 - 0.6 l/min	17	0.14
		RVM-008GM300	300	3.6 l/min	0.5 - 3.0 l/min	17	0.14
stain- less steel	G1/4	RVM-008GK013	300	168 ml/min	40 - 130 ml/min	18	0.15
		RVM-008GK060	300	0.72 l/min	0.1 - 0.6 l/min	18	0.15
		RVM-008GK300	300	3.6 l/min	0.5 - 3.0 l/min	18	0.15

Adjustable range is indicated for horizontally decreasing flow.

tolerance	±10% of full scale
media temperature	max. 100°C
average pressure loss	0.02-0.2 bar at Qmax.
hysteresis	depending on switch value minimum 1 ml/min.

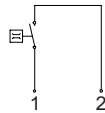


MATERIALS

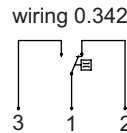
	RVM-008GM	RVM-008GK
body	brass Ms58 nickel plated	stainless steel 1.4571
piston	brass Ms58	stainless steel 1.4571
spring	stainless steel 1.4571	stainless steel 1.4571
magnet	hardferrite	hardferrite

ELECTRICAL DATA

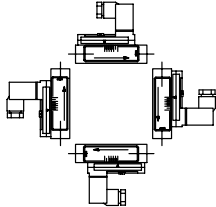
Reed switch - wiring 0.212 n.o.
200 V AC 1 A 20 VA
Plug DIN 43650-C
Protection class IP 65



○ BASIC
Programme
option



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water



design stainless steel RVM-...GK for aggressive liquids



gas/air

NOMENCLATURE

For combination see table "technical data"

RVM-	008	G	M	014	basic type
	008				specification
		G			● nominal diameter DN 8 - G1/4
			M		● female thread
			K		● brass
				013	● stainless steel
				060	● adjustable range 40 - 130 ml/min H ₂ O
				300	● adjustable range 0.1 - 0.6 l/min H ₂ O
					● adjustable range 0.5 - 3.0 l/min H ₂ O
Programme option					○ wiring 0.213, change over
BASIC					
Special option					□ setting / switch ranges for gas
VARIO					

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The flow indicator Visoflow NH provides a reliable indication of liquid, transparent substances. A spring controlled indicator is positioned by the liquid in a metering tube and allows the quantitative indication of the flow rate involved by reference to the flow rate scale of the metering tube. This plastic tube is fitted with a pigeon tail which offers the option of an alarm unit which is adjustable within the scale range of the instrument.

- * turnable scale / visible of piston 360°
- * good repeatability

Female thread G1/2 brass



NH1-015GM015

TECHNICAL DATA

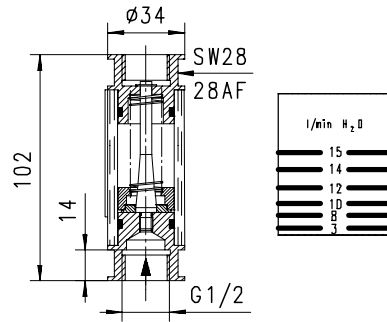
	G	Type	PN bar (20°C)	Qmax. recom. l/min H ₂ O	indicating range l/min H ₂ O	weight kg
brass	G1/2	NH1-015GM015	10	20	3 - 15	0.3

Indicating range is calibrated for vertical upward increasing flow.

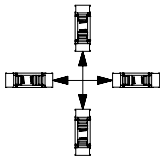
tolerance ±10% of full scale
media temperature max. 65°C

MATERIALS

connector brass Ms58 nickel plated
tube Acryl XT
piston POM
spring 1.4310
seal Viton

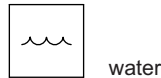


MOUNTING POSITION



Installation position may influence indication range. Indicate installation position in your order

METERING SUBSTANCES



water

NOMENCLATURE

NH1-	015	G	M	015	basic type specification
NH1-					● flow indicator
NH1K-					● flow indicator with switch unit plastic
	015				● nominal diameter DN 15
		G			● female thread
		A			○ male thread
			M		● connection brass
				015	● indicating range 3 - 15 l/min

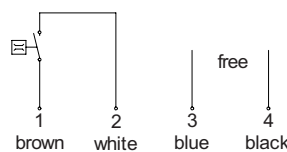
IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and indication range with your order.

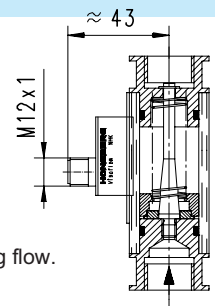
OPTIONS

○ NH1K- flow indicator with switch unit plastic

reed switch - wiring 0.212 n.o.
250 V AC 0.5 A 10 VA
contact for locking plug M 12x1, 4-pole
protection class IP 65



Switch range is indicated for horizontally decreasing flow. Additional weight 0.02kg



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for liquids or gaseous media, with spring-supported piston. Piston is magnetically linked to an indicator element. Rugged design in brass or stainless steel.

- * multiviscosity scale
- * for dark and/or contaminated liquids
- * good repeatability
- * dirt resistance

Female G1/4 to G1 brass/stainless steel



NJ-015GM040

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	indicating range l/min H ₂ O				weight kg
brass	G 1/4	NJ-008GM010	100	10	2 - 10				1.5
	G 3/8	NJ-010GM...	100	20	2 - 10 4 - 20				1.4
	G 1/2	NJ-015GM...	100	40	2 - 10 4 - 20 10 - 40				1.3
	G 3/4	NJ-020GM...	100	60	2 - 10 4 - 20 10 - 40				1.3
	G 1	NJ-025GM...	100	80	2 - 10 4 - 20 10 - 40 20 - 80				1.2
stainless steel	G 1/4	NJ-008GK010	100	10	2 - 10				1.5
	G 3/8	NJ-010GK...	100	20	2 - 10 4 - 20				1.4
	G 1/2	NJ-015GK...	100	40	2 - 10 4 - 20 10 - 40				1.3
	G 3/4	NJ-020GK...	100	60	2 - 10 4 - 20 10 - 40				1.3
	G 1	NJ-025GK...	100	80	2 - 10 4 - 20 10 - 40 20 - 80				1.2

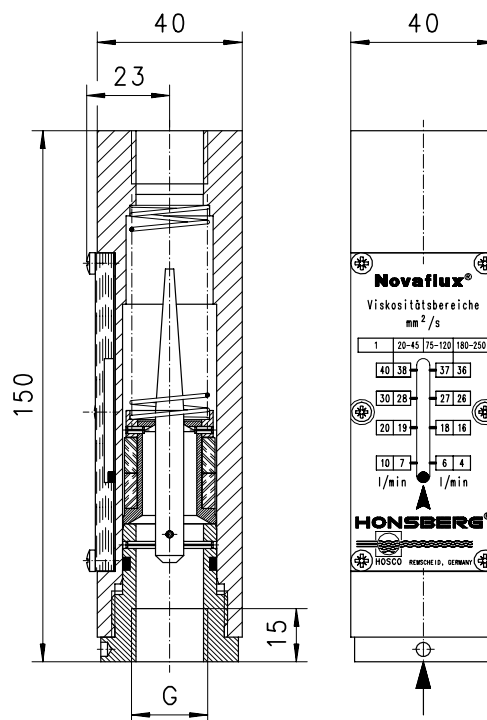
Indicating range is calibrated for vertical upward increasing flow.

tolerance ±8% of full scale min. 1l/min
media temperature max. 100°C
average pressure loss 0.5bar at Qmax.

indication range multi scale				
1	20-45	75-120	180-250	mm ² /s
2-10	0.6- 8	0.2- 7	0.1- 4	l/min
4-20	2 -19	1 -17	0.5-15	l/min
10-40	7 -38	6 -37	4 -36	l/min
20-80	19 -73	17 -68	13 -63	l/min

MATERIALS

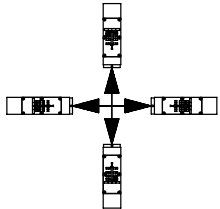
	NJ-...GM	NJ-...GK
body	brass Ms58 nickel plated	stainless steel 1.4571
piston	brass Ms58	stainless steel 1.4571 ; 1.4310
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	bariumferrite	bariumferrite PTFE plated
seals	NBR	viton
scale	acrylic (GS)	acrylic (GS)



ELECTRICAL DATA

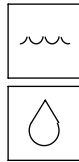
- **BASIC Standard**
No electrical components
- **BASIC Programme option**
switch heads
for descriptions see following page

MOUNTING POSITION



Installation position may influence indicating range. Scale arrangement for upward flow.

METERING SUBSTANCES



water



gas/air



oil



design stainless steel NJ-...GK for aggressive liquids

NOMENCLATURE

For combination see table "technical data"

NJ-	008	G	M	010		basic type	
NJ-					●	Flow Indicator	
NJM1-					○	Flow Indicator with switch head metal, wiring 0.333 (NJE100)	
NJM2-					○	Flow Indicator with switch head metal, wiring 0.215 (NJE200)	
NJK1-					○	Flow Indicator with switch head plastic, wiring 0.338 (NJE400)	
NJK2-					○	Flow Indicator with switch head plastic, wiring 0.215	
NJK3-					□	Flow Indicator with switch head plastic, wiring 0.347 (NJE400sp)	
	008				●	nominal diameter	
	010				●		DN 8 - G1/4
	015				●		DN 10 - G3/8
	020				●		DN 15 - G1/2
	025				●		DN 20 - G3/4
		G			●	DN 25 - G1	
		W			○	female thread	
			M		○	manifold block connector for 70.1.VB.	
			K		●	brass	
				010	●	indicating range	
				020	●		2 - 10 l/min
				040	●		4 - 20 l/min
				080	●		10 - 40 l/min
Programme option					○	20 - 80 l/min	
BASIC					○	signal lamp	
Special option					□	special range special scales	
VARIO							
Accessories					⊕	manifold block - data sheet 70.1.VB.	
PLUS							

H₂O upward flow

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and indicating range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (indicating range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (indicating range on request)

ACCESSORIES

Manifold
see datd sheet 70.1.VB.



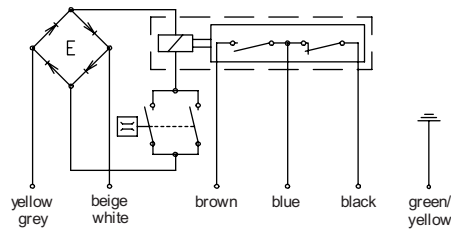
All technical changes reserved

- BASIC Standard
- BASIC Programme option
- VARIO Special option
- ⊕ PLUS Accessories
- ✗ not recommendable

OPTION

○ **NJM1-**

switch head metal
reed switch
wiring 0.333 (NJE100)
switching voltage 250 V AC 5 A
supply voltage 230 V AC
(option 115 V AC)
(option 24 V DC output circuit 10mA)
cable gland Pg9 with 2.5 metre cable
protection class IP 65
additional weight 0.45kg

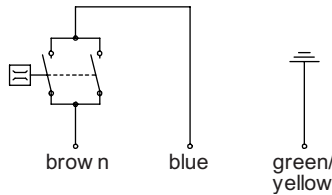


Attention! Only switch head grounded not body of Flow Indicator



○ **NJM2-**

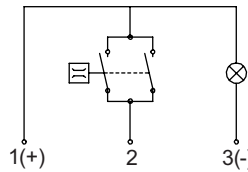
reed switch
wiring 0.215 (NJE200)
250 V AC 0.5 A 10 VA
cable gland Pg9 with 2.5 metre cable
protection class IP 65
additional weight 0.45kg



Attention! Only switch head grounded not body of Flow Indicator

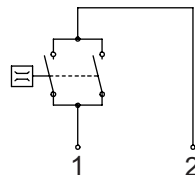
○ **NJK1-**

switch head plastic
reed switch
wiring 0.338 (NJE400)
250 V AC 0.5 A 10 VA
plug DIN 43650-A
protection class IP 65
additional weight 0.15kg



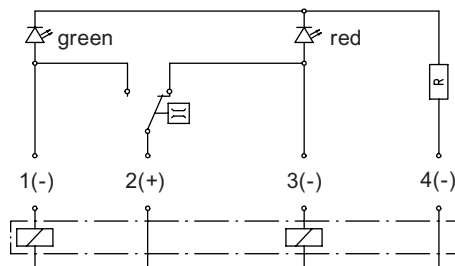
○ **NJK2-**

switch head plastic
reed switch
wiring 0.215
250 V AC 0.5 A 10 VA
plug DIN 43650-A
protection class IP 65
additional weight 0.15kg



□ **NJK3-**

switch head plastic
reed switch
wiring 0.347 (NJE400sp)
24 V DC
plug Hirschmann G4
protection class IP 65
additional weight 0.15kg



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for liquids or gaseous media, with spring-supported piston. Piston is magnetically linked to an indicator element. Rugged design in brass.

- * viscosity compensation 1-200mm²/s
- * for dark and/or contaminated liquids
- * good repeatability
- * dirt-resistance

Female thread G1/4 to G1 brass



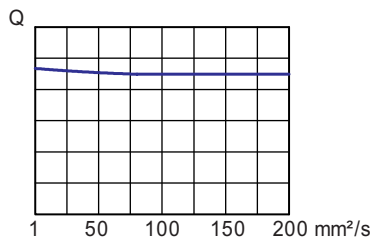
NJV-015GM040

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min oil 1-200mm ² /s	indicating range				weight kg
					l/min	oil	1-200mm ² /s		
brass	G 1/4	NJV-008GM010	100	10	2- 10				1.5
	G 3/8	NJV-010GM...	100	20	2- 10	4- 20			1.4
	G 1/2	NJV-015GM...	100	40	2- 10	4- 20	10- 40		1.3
	G 3/4	NJV-020GM...	100	60	2- 10	4- 20	10- 40	10- 60	1.3
	G 1	NJV-025GM...	100	80	2- 10	4- 20	10- 40	10- 60	1.2

Indicating range is calibrated for vertical upward increasing flow. Calibration with oil ISO VG64 - 80mm²/s.

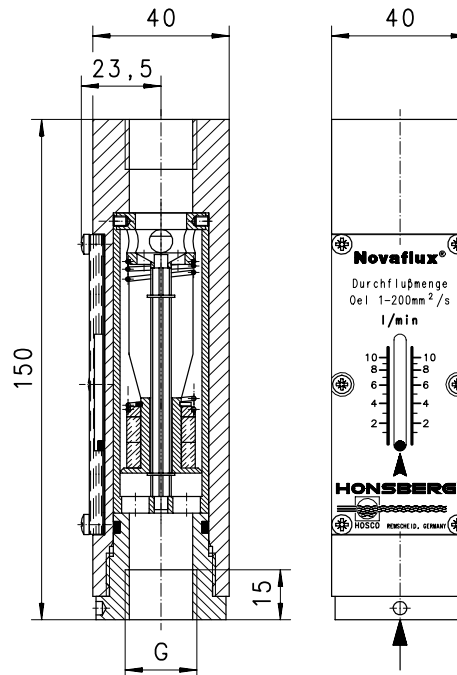
tolerance ±8% of full scale min. 1l/min
media temperature max. 100°C
average pressure loss 0.5bar at Qmax.



Within the mechanical viscosity compensation the flow velocity in the piston area is increased sharply with the effect that the viscosity impact declines and the metering results stabilise even with changing viscosity ratings.

MATERIALS

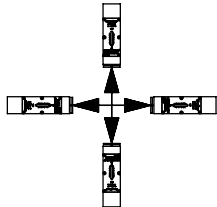
- body brass Ms58 nickel plated
- metering unit brass Ms58
- spring stainless steel 1.4310
- magnet neodym
- seal NBR
- scale acrylic (GS)



ELECTRICAL DATA

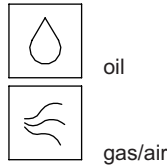
- **BASIC Standard**
No electrical components
- **BASIC Programme option**
switch heads
for descriptions see following page

MOUNTING POSITION



Installation position may influence indicating range. Scale arrangement for upward flow.

METERING SUBSTANCES



NOMENCLATURE

For combination see table "technical data"

NJV-	008	G	M	010	basic type specification	
NJV-					●	Flow Indicator
NJVM1-					○	Flow Indicator with switch head metal, wiring 0.333 (NJE100)
NJVM2-					○	Flow Indicator with switch head metal, wiring 0.215 (NJE200)
NJVK1-					○	Flow Indicator with switch head plastic, wiring 0.338 (NJE400)
NJVK2-					○	Flow Indicator with switch head plastic, wiring 0.215
NJVK3-					□	Flow Indicator with switch head plastic, wiring 0.347 (NJE400sp)
	008				●	nominal diameter
	010				●	
	015				●	
	020				●	
	025				●	
		G			●	female thread
		W			○	manifold block connector for 70.1.VB.
			M		●	brass
			K		○	stainless steel
				010	●	indicating range
				020	●	
				040	●	
				060	●	
Programme option					○	signal lamp
BASIC						
Special option					□	special ranges
VARIO						special scales
Accessories					⊕	manifold block - data sheet 70.1.VB.
PLUS						

oil 1-200mm²/s upward flow

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and indicating range with your order.
- With viscous liquids (>200mm²/s) please indicate viscosity, temperature and type of liquid (e.g. ISO VG 68! Range upon request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (indicating range on request)

ACCESSORIES

Manifold
see datd sheet 70.1.VB.



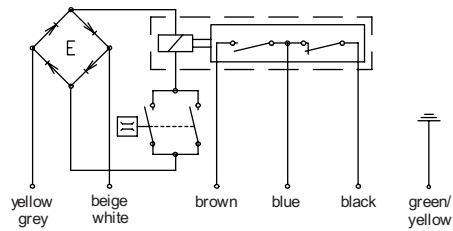
All technical changes reserved

- BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

OPTION

○ NJVM1-

switch head metal
reed switch
wiring 0.333 (NJE100)
switching voltage 250 V AC 5 A
supply voltage 230 V AC
(option 115 V AC)
(option 24 V DC output circuit 10mA)
cable gland Pg9 with 2.5 metre cable
protection class IP 65
additional weight 0.45kg

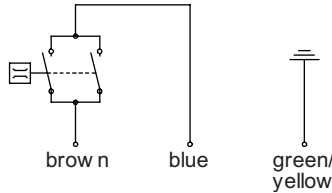


Attention! Only switch head grounded not body of Flow Indicator



○ NJVM2-

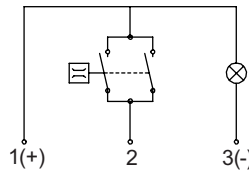
switch head metal
reed switch
wiring 0.215 (NJE200)
250 V AC 0.5 A 10 VA
cable gland Pg9 with 2.5 metre cable
protection class IP 65
additional weight 0.45kg



Attention! Only switch head grounded not body of Flow Indicator

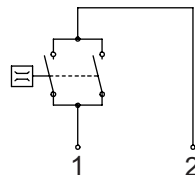
○ NJVK1-

switch head plastic
reed switch
wiring 0.338 (NJE400)
250 V AC 0.5 A 10 VA
plug DIN 43650-A
protection class IP 65
additional weight 0.15kg



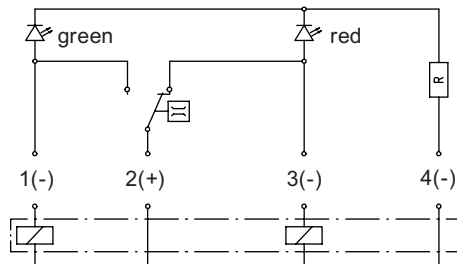
○ NJVK2-

switch head plastic
reed switch
wiring 0.215
250 V AC 0.5 A 10 VA
plug DIN 43650-A
protection class IP 65
additional weight 0.15kg



□ NJVK3-

switch head plastic
reed switch
wiring 0.347 (NJE400sp)
24 V DC
plug Hirschmann G4
protection class IP 65
additional weight 0.15kg



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The flow indicator MH indicates the actual flow rate by a flow scale and provides an accurate visual allocation of the flow conditions. Additionally a switch unit is available which is directly connected to the flow tube and may be adjusted within the relevant scale range. As such indication and alarm are combined into one unit.

- * robust aluminium housing
- * optional switch head MHK

Female thread G1/4 to G1 aluminium



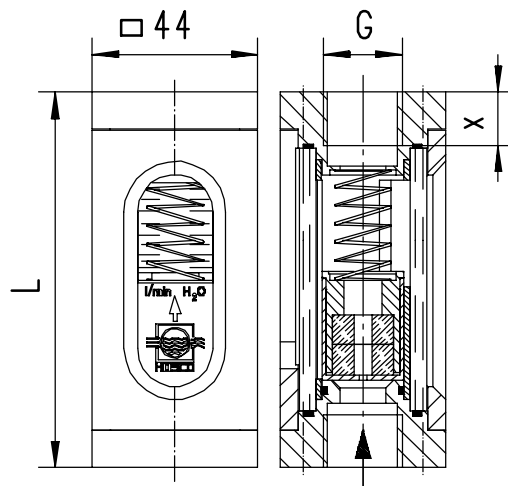
MH-015GA002

TECHNICAL DATA

	G	Type	PN bar (20°C)	Qmax. recom. l/min H2O	indicating range l/min H2O			L mm	X mm	weight kg
aluminium	G 1/4	MH-008GA...	10	8	0.2 - 2	0.6 - 6	0.8 - 8	100	14	0.45
	G 3/8	MH-010GA...	10	10	0.2 - 2	0.6 - 6	1 - 10	100	14	0.45
	G 1/2	MH-015GA...	10	20	0.6 - 6	1 - 10	2 - 20	100	14	0.45
	G 3/4	MH-020GA...	10	40	1 - 10	2 - 20	5 - 40	120	18	0.50
	G 1	MH-025GA...	10	60	2 - 20	5 - 40	10 - 50	120	18	0.50

Indicating range is calibrated for vertical upward increasing flow.

tolerance ±10% of full scale
media temperature max. 65°C



MATERIALS

connector aluminium
body aluminium
tube Acryl XT
piston POM
spring stainless steel 1.4310
seal Viton

ELECTRICAL DATA

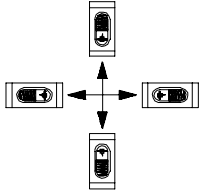
● **BASIC Standard**

No electrical components.

○ **BASIC programme options**

switch head plastic
see description NOK-

MOUNTING POSITION



Installation position may influence indication range.

Indicate installation position in your order

METERING SUBSTANCES



water



gas/air



oil

NOMENCLATURE

For combinations see table "technical data".

MH-	008	G	A	002		basic type
MH-					●	flow indicator
MHK-					○	flow indicator with switch unit plastic
	008				●	nominal diameter
	010				●	
	015				●	
	020				●	
	025				●	
		G			●	female thread
			A		●	housing aluminium
				002	●	0.2 - 2 l/min
				006	●	0.6 - 6 l/min
				008	●	0.8 - 8 l/min
				010	●	1 - 10 l/min
				020	●	2 - 20 l/min
				030	●	3 - 30 l/min
				040	●	5 - 40 l/min
				050	●	10 - 50 l/min
programme option					○	housing POM
BASIC						

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and indication range with your order.
- With viscous liquids please viscosity, temperature and metering substance (indication range on request)
- With gaseous media indicate pressure (relative and absolute), temperature and metering substance (indication range on request)

OPTIONS

○ **MHK-** flow indicator with switch unit plastic

reed switch - wiring 0.212 n.o.

250 V AC 0.5 A 10 VA

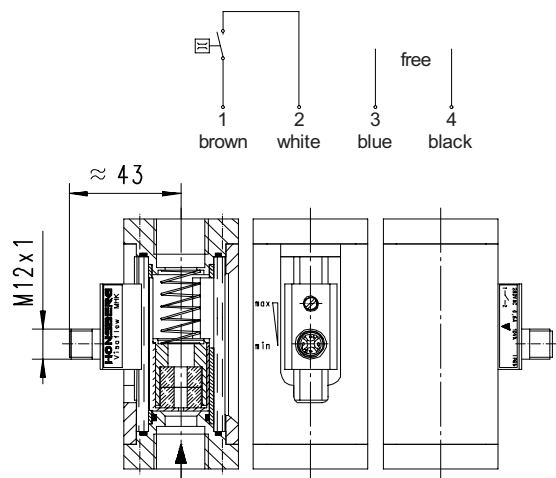
contact for locking plug M 12x1, 4-pole

protection class IP 65

indicating range	adjustable range
l/min H ₂ O	l/min H ₂ O
0.2 - 2	0.4 - 1.8
0.6 - 6	0.6 - 5.5
0.8 - 8	0.8 - 7.5
1 - 10	1 - 9
2 - 20	2 - 16
5 - 40	5 - 36
10 - 50	10 - 45

Switch range is indicated for horizontally decreasing flow.

Additional weight 0.02kg



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for a quantitative flow indication for liquids or gaseous media.

- * good repeatability
- * optional switch head VFR-

Female thread G1/4 brass/stainless steel



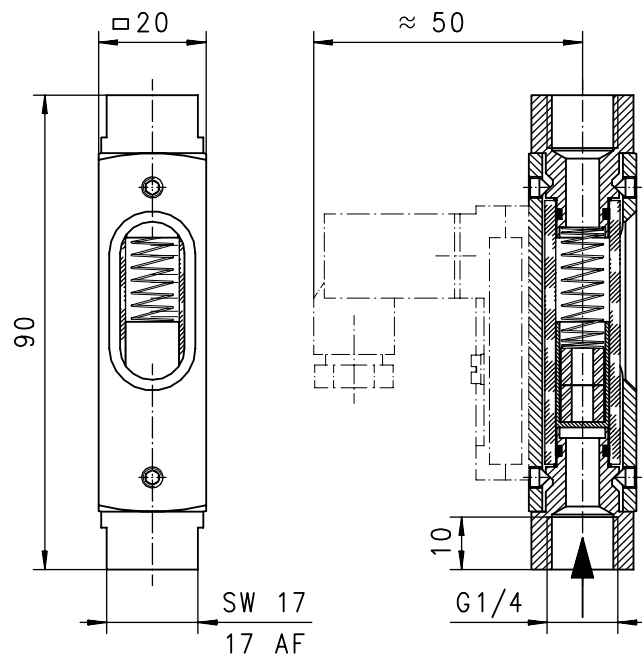
VFR-008GA014

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. H ₂ O	indicating range H ₂ O	weight kg
brass	G1/4	VF-008GA006	16	60 ml/min	5 - 60 ml/min	0.14
		VF-008GA013	16	130 ml/min	25 - 130 ml/min	0.14
		VF-008GA060	16	0.6 l/min	0.1 - 0.6 l/min	0.14
		VF-008GA300	16	3 l/min	0.5 - 3 l/min	0.14
		VF-008GA500	16	5 l/min	1 - 5 l/min	0.14
stainless steel	G1/4	VF-008GK006	16	60 ml/min	5 - 60 ml/min	0.14
		VF-008GK013	16	130 ml/min	25 - 130 ml/min	0.14
		VF-008GK060	16	0.6 l/min	0.1 - 0.6 l/min	0.14
		VF-008GK300	16	3 l/min	0.5 - 3 l/min	0.14
		VF-008GK500	16	5 l/min	1 - 5 l/min	0.14

Indicating range is calibrated for vertical upward increasing flow.

tolerance ±10% of full scale
media temperature max. 100°C
average pressure loss 0.02-0.2 bar at Qmax.



dotted lines: option switch head VFR-

MATERIALS

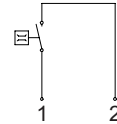
	VF-008GA	VF-008GK
housing	aluminium anodized	aluminium anodized
connectors	brass Ms58 nickel plated	stainless steel 1.4571
glass	duran 50	duran 50
piston	brass Ms58 nickel plated	stainless steel 1.4571
spring	stainless steel 1.4571	stainless steel 1.4571
magnet	hardferrite	hardferrite
seal	NBR	viton

ELECTRICAL DATA

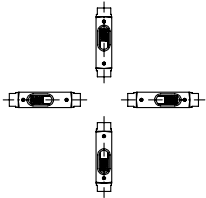
- **BASIC Standard**
No electrical components

○ **BASIC Programme option**

reed switch - wiring 0.212 n.o.
200 V AC 1 A 20 VA
plug DIN 43650-C
protection class IP 65
adjustable range complies to indicating range
additional weight 0.02kg



MOUNTING POSITION



Installation position may influence indicating range. Scale arrangement for upward flow.

METERING SUBSTANCES



water



gas/air



oil



design stainless steel VF-...GK for aggressive liquids

NOMENCLATURE

For combination see table "technical data"

VF-	008	G	A	006		basic type
VF-					●	Flow Indicator
VFR-					○	Flow Indicator with switch head
	008				●	nominal diameter DN 8 - G1/4
		G			●	female thread
			A		●	connector material brass
			K		●	connector material stainless steel
				006	●	5 - 60 ml/min
				013	●	25 - 130 ml/min
				060	●	0.1 - 0.6 l/min
				300	●	0.5 - 3 l/min
				500	●	1 - 5 l/min
Programme option					○	wiring 0.342 - change over
BASIC						
Special option					□	setting / switch ranges for oil or gas
VARIO						scale 0 - 100%
						special scale, special ranges

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and indicating range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (indicating range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (indicating range on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for a quantitative flow indication for liquids or gaseous media.

- * good repeatability
- * optional switch head VOR-

Female thread G1/2 to G1 brass/stainless steel



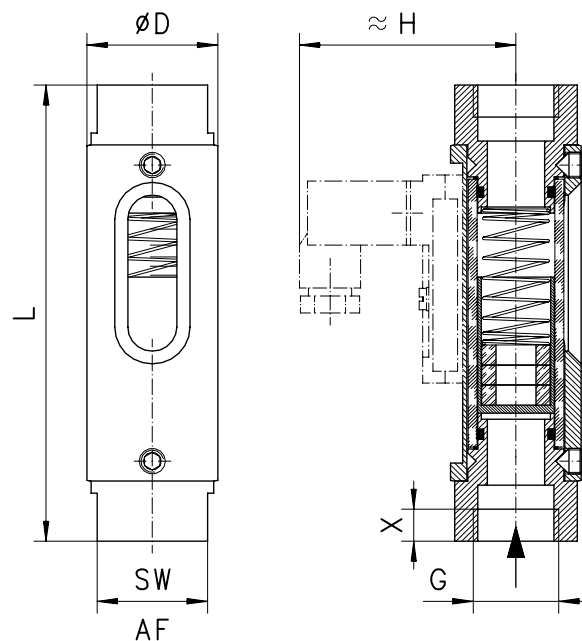
VOR-015GA0040

TECHNICAL DATA

G	Type	PN bar	Qmax. rec. l/min H ₂ O	indicating range H ₂ O	D mm	H mm	L mm	X mm	AF mm	weight kg
G1/2	VO-015G.0005	10	0.5	0.1 - 0.5 l/min	32	53	114	8	27	0.3
	VO-015G.0010	10	1	0.2 - 1.0 l/min						
	VO-015G.0016	10	1.6	0.4 - 1.6 l/min						
	VO-015G.0040	10	4	1 - 4 l/min						
	VO-015G.0080	10	8	2 - 8 l/min						
	VO-015G.0220	10	22	5 - 22 l/min						
	VO-015G.0280	10	28	6 - 28 l/min						
G1	VO-025G.0450	10	45	15 - 45 l/min	50	77	158	10	41	1.0
	VO-025G.0900	10	90	30 - 90 l/min						
	VO-025G.1500	10	150	60 - 150 l/min						

Indicating range is calibrated for vertical upward increasing flow.

tolerance ±10% of full scale
media temperature max. 100°C
average pressure loss 0.02-0.4 bar at Qmax.



dotted lines: option switch head VFR-

MATERIALS

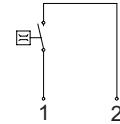
	VO-...GA	VO-...GK
housing	aluminium anodized	aluminium anodized
connectors	brass Ms58 nickel plated	stainless steel 1.4571
glass	duran 50	duran 50
piston	brass Ms58 nickel plated	stainless steel 1.4571
spring	stainless steel 1.4571	stainless steel 1.4571
magnet	hardferrite	hardferrite
seal	NBR	viton

ELECTRICAL DATA

- **BASIC Standard**
No electrical components

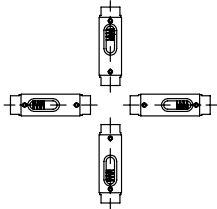
OBASIC
Programme
option

reed switch - wiring 0.212 n.o.
DN 15 230 V AC 3 A 60 VA
plug DIN 43650-C
DN 25 230 V AC 1 A 50 VA
plug DIN 43650-A



adjustable range complies to indicating range
protection class IP 65 additional weight 0.02kg

MOUNTING POSITION



Installation position may influence indicating range. Scale arrangement for upward flow.

METERING SUBSTANCES



water



gas/air



oil



design stainless steel VO-...GK for aggressive liquids

NOMENCLATURE

For combination see table "technical data"

VO-	015	G	A	0005		basic type
VO-					●	Flow Indicator
VOR-					○	Flow Indicator with switch head
	015				●	nominal diameter DN 15 - G1/2
	025				●	nominal diameter DN 25 - G1
		G			●	female thread
		W			○	manifold block connector for 70.1.VB.
			A		●	connector material brass
			K		●	connector material stainless steel
				0005	●	0.1 - 0.5 l/min
				0010	●	0.2 - 1.0 l/min
				0016	●	0.4 - 1.6 l/min
				0040	●	1 - 4 l/min
				0080	●	2 - 8 l/min
				0220	●	5 - 22 l/min
				0280	●	6 - 28 l/min
				0450	●	15 - 45 l/min
				0900	●	30 - 90 l/min
				1500	●	60 - 150 l/min
Programme option					○	wiring 0.342 - change over
BASIC						
Special option					□	setting / switch ranges for oil or gas
VARIO						scale 0 - 100%
						special scale, special ranges
Accessories					⊕	manifold block - data sheet 70.1.VB.
PLUS						

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and indicating range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (indicating range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (indicating range on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flowmeter with spring-supported piston, for liquids or gaseous media. The triggering of the indication ring is realised by means of a magnetic link between the indication ring and wetted piston. Rugged design in brass or stainless steel.

- * local metering
- * also for dark and/or contaminated liquids
- * turnable scale
- * no pressurized or wetted glass parts
- * optional switch head

Female thread G1/4 to G1 brass/stainless steel



NO-015GM030

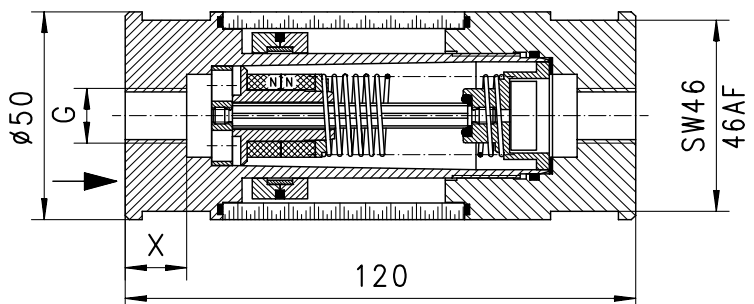
TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	indicating range l/min H ₂ O	X mm	weight kg
brass	G 1/4	NO-008GM015	50	15	3 - 15	13	1.25
	G 3/8	NO-010GM015	50	15	3 - 15	13	1.20
	G 1/2	NO-015GM030	50	30	5 - 30	15	1.20
	G 3/4	NO-020GM050	50	50	5 - 50	18	1.10
	G 1	NO-025GM060	50	60	10 - 60	18	1.00
stainless steel	G 1/4	NO-008GK015	50	15	3 - 15	13	1.25
	G 3/8	NO-010GK015	50	15	3 - 15	13	1.20
	G 1/2	NO-015GK030	50	30	5 - 30	15	1.20
	G 3/4	NO-020GK050	50	50	5 - 50	18	1.10
	G 1	NO-025GK060	50	60	10 - 60	18	1.00

Indicating range is calibrated for horizontally decreasing flow.

tolerance ±5% of full scale
minimal 1l/min
media temperature max. 90°C
average pressure loss 0.7bar at Qmax.

Avoid instant flushing of instrument beyond max scale increment.
Contact technical sales service!



MATERIALS

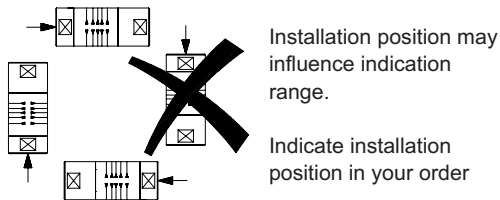
	NO-...GM	NO-...GK
housing	brass Ms58 nickel plated	stainless steel 1.4305
piston	brass Ms58	stainless steel 1.4305
spring	stainless steel 1.4310	stainless steel 1.4310
support	PVDF	PVDF
magnet	oxyd 300	oxyd 300
seal	NBR / viton	viton
tube	acrylic (XT)	acrylic (XT)

ELECTRICAL DATA

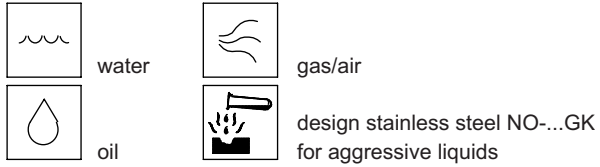
● **BASIC Standard**
No electrical components.

○ **BASIC programme options**
switch head plastic
see description NOK-

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data".

NO-	008	G	M	015		basic type specification
NO-					●	Flowmeter
NOK-					○	Flowmeter with switch unit plastic
	008				●	nominal diameter
	010				●	
	015				●	
	020				●	
	025				●	
		G			●	female thread
			M		●	housing Ms58
			K		●	housing stainless steel
				015	●	indicating range H ₂ O
				030	●	
				050	●	
				060	●	

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and indication range with your order.
- With viscous liquids please viscosity, temperature and metering substance (indication range on request)
- With gaseous media indicate pressure (relative and absolute), temperature and metering substance (indication range on request)

OPTIONS

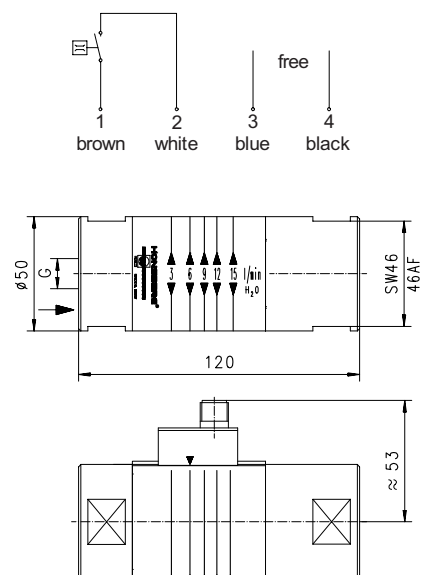
○ **NOK-** Flowmeter with switch unit plastic
reed switch - wiring diagram 0.212 n.o.
250 V AC 1 A 15 VA
contact for locking plug M 12x1, 4-pole
protection class IP 65

indicating range	adjustable range
l/min H ₂ O	l/min H ₂ O
3- 15	3- 12
5- 30	5- 25
5- 50	5- 40
10- 60	10- 50

Swich range is indicated for horizontally decreasing flow.
Additional weight 0.02kg



- switch unit fixed to pigeon tail
- direct scale reference

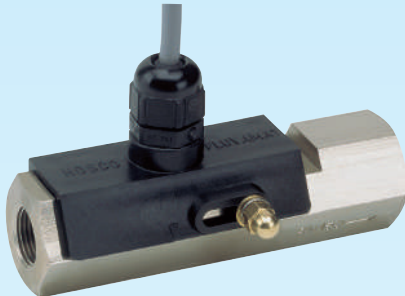


All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

Special applications

Flow control instruments AR-010GM

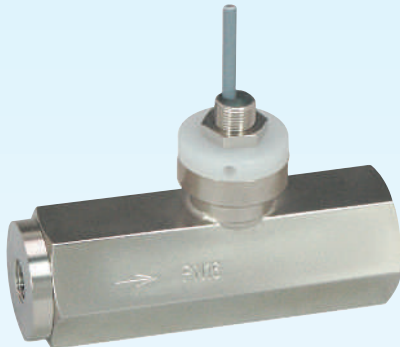


Flow control instrument for processes and original equipment

Mechanical flow control instrument for liquid or gaseous media, with spring-supported piston and magnetic triggering of a reed switch. Sturdy construction made of brass.

- Inner thread DN 10
- Reed switch
- Ranges from 2-4 l/min
- Pressure rating PN 150
- Max. temperature 80 °C
- Brass material

Flow control instruments MI-...GM



Without magnets for media with ferrite soiling

Mechanical flow control instrument for liquid or gaseous media, with spring-supported piston for triggering an inductive proximity switch for signal transmission. For materials with ferrite abrasion. Sturdy construction made of brass.

- Female thread DN 8-25
- Inductive proximity switch
- Ranges from 0.4-60 l/min
- Pressure rating PN 16
- Max. temperature 60 °C
- Brass or stainless steel material

Flow control instruments OT-...AM



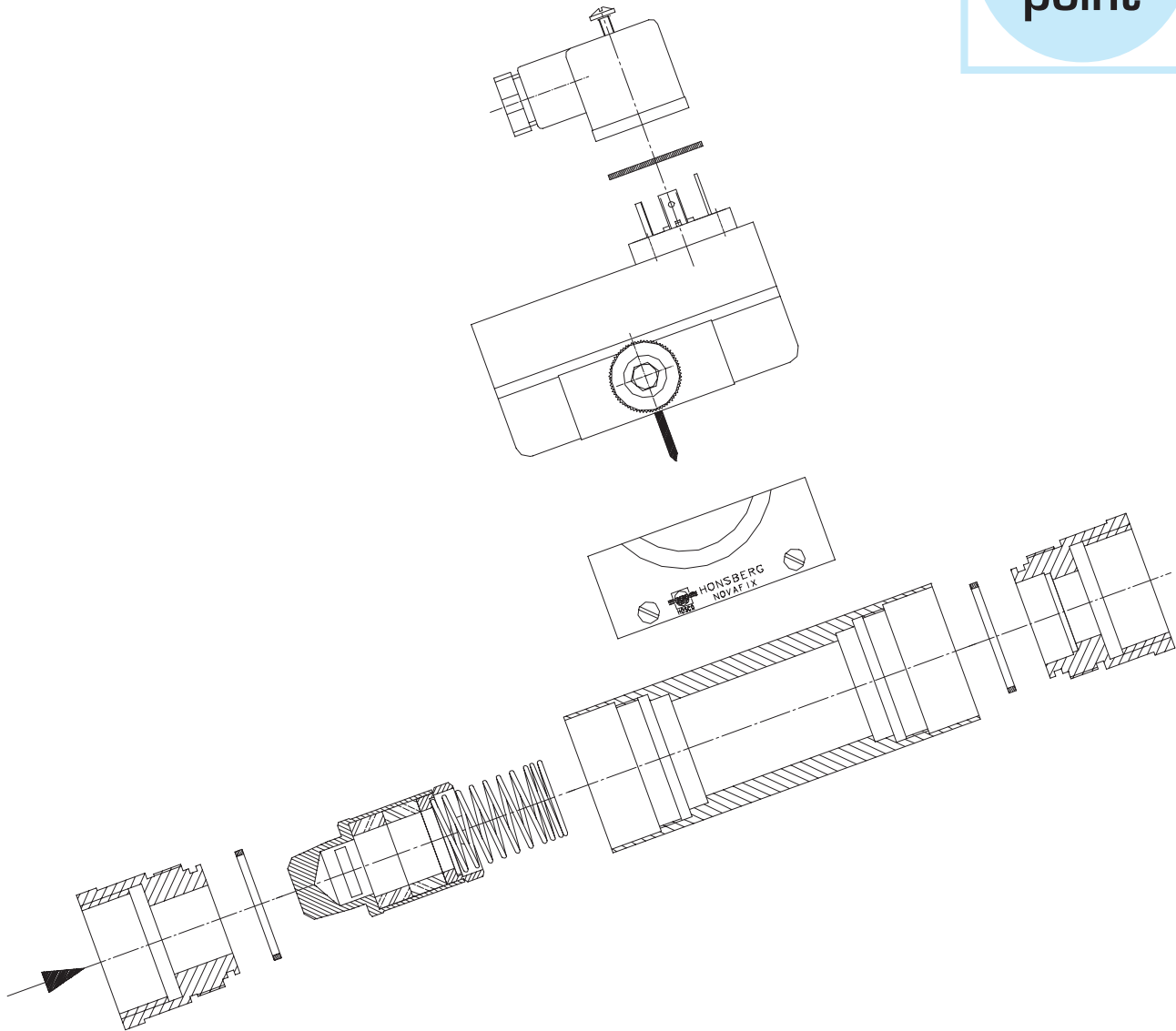
Device for heating and energy technology

The mechanical flow control instrument makes a quantitative flow display possible. Water quantities are set exactly and conveniently using the compensation valve.

- Male thread G $\frac{1}{2}$ -G $\frac{3}{4}$
- Ranges from 0.60-60 l/min
- Pressure rating PN 10
- Max. temperature 100 °C
- Brass material

Why to use a **HONSBERG**^{BASIC} inline piston instrument

**info
point**



- **Complete separation of electrical and hydraulic component** → **maintenance advantage**
- **Switch selection by gear arrangement and scale** → **accurate setting**
- **Metal piston and protected twin magnet** → **rugged design for critical application**
- **Spring supported piston** → **optional installation**
- **Inline machined housing** → **high pressure areas and variety of materials**

Where to use a **HONSBERG** BASIC inline position instrument

info
point

Market segments

- **High pressure cleaners**
- **Oil separators**
- **Lubrication**
- **Cooling installations**
- **Painting robots**
- **Paper machines**

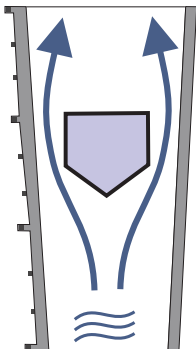


Application

- **Pump and gun control in cleaner devices**
- **Control of oil/water mix in separation processes**
- **Air control in automatic painting installations**
- **Manifold control and indication for oil feed to roller gears**

Variable area

The technology



The float moves dependent on the flow in the transparent conical metering tube, indicating the actual flow rate on the housing scale.

Application

- Laboratory technology
- Chemical industry
- Process technology
- Industrial metering tasks

Advantages

- Purely physical metering principle
- High accuracy

Technical data

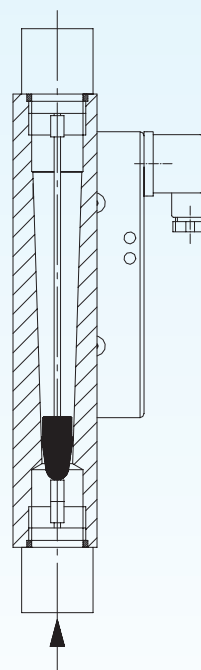
Concept	Glass or plastic tube; optional valve
Nominal diameter	4 - 50
Connection	female thread, male thread
PN	6 - 16
Max. temperature	120 °C
Signal	optional threshold
Adjustable	yes
Materials	acrylic, trogamide, polysulfone, glass
Installation position	vertical
Metering materials	liquids or gases

C

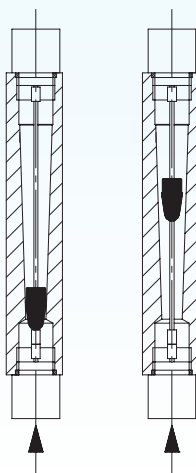
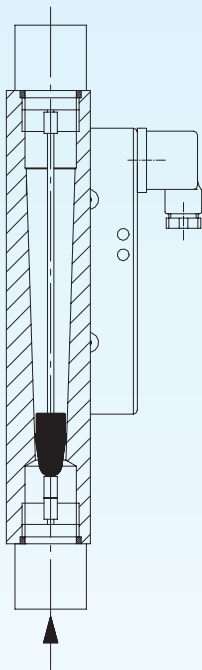
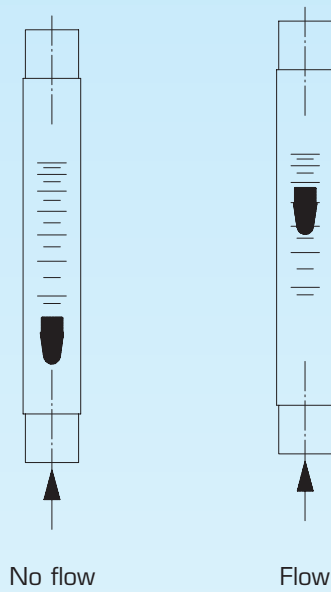


Contents

System description	100
Device descriptions	101



- Switching
- Indicating
- Metering



System description

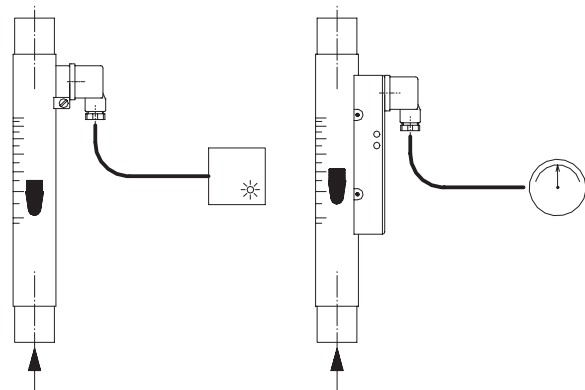
Device system

The float metering principle is a tried and trusted method of accurately measuring liquid and gaseous metering materials. The float moves vertically in a transparent tube and indicates the current flow rate by its respective position on the housing scale.

The devices can only be installed vertically and require a transparent medium which allows a complete view of the float element.

Function and advantages

The direct indication of the position without further functional components allows an extremely accurate metering result. In case magnets are integrated in the float, triggering of threshold contacts or sensors arranged outside the metering tube is possible. To this extent the float system also represents an option for monitoring the flow or producing a linear continuous output signal.



Metering materials and accuracy

The devices are suitable for liquid and gaseous metering materials. The scales as well as the float shapes and weights are designed accordingly. The floats are partly stabilised by additional guide rods and are thus also suitable for non-laminar flows. The accuracy is 1 % of the scale end value.

Handling and operation

The threshold contacts are attached on the tube by pigeon tail. This effects the option of a continuous setting of min. or max. alarm.

	type	nominal diameter	connection	control	indication	output signal	on site metering	max. pressure bar	max. temperature °C	water	oil	gas/air	aggressive	miscellaneous	page
glass	GR-065	4	female thread stainless steel		●		●	10	90	●		●		valve	90
	GR-150	4	female thread stainless steel		●		●	10	90	●		●		valve	91
glass	VL	15 - 25	female thread brass	○	●		●	10	100	●	✓	✓			92
		15 - 25	female thread stainless steel	○	●		●	10	100	●	✓	✓	✓		
plastic	UK-200	8	female thread brass		●		●	6	65	●		●		valve	94
		8	female thread stainless steel		●		●	6	65	●		●		valve	
plastic	UK-040	8	female thread brass		●		●	6	65	●		●		valve	96
		8	female thread stainless steel		●		●	6	65	●		●		valve	
plastic	UK-044	8	male thread plastic		●		●	6	65	●		●			98
plastic	UK-047	15	female thread plastic		●		●	6	65	●		●			100
plastic	UK-048	20	female thread plastic		●		●	6	65	●		●			102
plastic	UK-050	25	female thread plastic		●		●	6	65	●		●		valve	104
plastic	GK	10 - 25	female thread cast iron	○	●		●	6	60	●		●			106
	GKL	25 - 50	female thread cast iron	○	●		●	6	60	●		●			109
plastic	MMF	4	female thread brass		●		●	6	65	●		✓			112

● standard ○ standard option □ special option

all data sheets available under www.honsberg.com

GENERAL CHARACTERISTICS

Flowmeter operates according to the variable area principle with a ball float moving flow-dependently in a conical metering tube.

- * turnable magnifying glass optimizes reading comfort
- * glass tube

Female thread NPT1/8" stainless steel



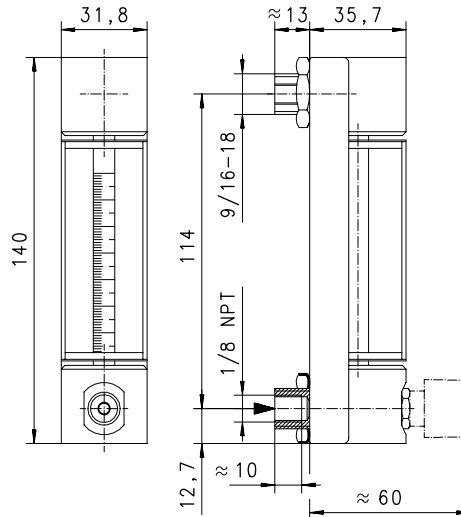
TECHNICAL DATA

GR-065AK0005G

	NPT	Type	PN bar	metering range air Ncm ³ /min	metering range water cm ³ /min	weight kg
float glass	NPT 1/8"	GR-065GK0005G	10	2 - 51		0.5
		GR-065GK0010G	10	5 - 103		
		GR-065GK0040G	10	20 - 400		
		GR-065GK0090G	10	20 - 900	0.2 - 18.2	
		GR-065GK0258G	10	100 - 2580	2 - 55	
		GR-065GK0393G	10	100 - 3930	2 - 90	
		GR-065GK0600G	10	100 - 6000	2 - 130	
		GR-065GK1010G	10	150 - 10100	3 - 235	
		GR-065GK1575G	10	800 - 15750	10 - 375	
		GR-065GK2500G	10	700 - 23640	10 - 570	
float stainless steel	NPT 1/8"	GR-065GK0015K	10	5 - 153		0.5
		GR-065GK0029K	10	10 - 298		
		GR-065GK0085K	10	40 - 855	0.9 - 21	
		GR-065GK0180K	10	50 - 1800	1 - 50	
		GR-065GK0503K	10	277 - 5030	3.27 - 144	
		GR-065GK0751K	10	300 - 7510	5 - 220	
		GR-065GK1145K	10	250 - 11450	5 - 335	
		GR-065GK1896K	10	400 - 18960	10 - 660	
		GR-065GK2940K	10	2000 - 29400	40 - 880	
		GR-065GK4334K	10	2000 - 43340	50 - 1305	

Scale in mm-increments. Conversion diagram mm/flowrate subject of to delivery.

tolerance ±5% off full scale
media temperature max. 90°C



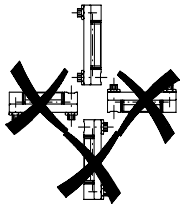
MATERIALS

metering tube natural glass
float glass or stainless steel
connector stainless steel
seal viton

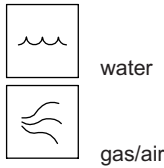
ELECTRICAL DATA

No electrical components.

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data".

GR-	065	G	K	0005	G	basic type specification
GR-						● Flowmeter
GRV-						● Flowmeter with valve
	065					● scale length 65mm
		G				● female thread
			K			● stainless steel
			A			○ aluminium
			M			○ brass
				0005		● 2 - 51 Ncm ³ /min air
				0010		● 5 - 103 Ncm ³ /min air
				0015		● 5 - 153 Ncm ³ /min air
				0029		● 10 - 298 Ncm ³ /min air
				0040		● 20 - 400 Ncm ³ /min air
				0085		● 40 - 855 Ncm ³ /min air
				0090		● 20 - 900 Ncm ³ /min air
				0180		● 50 - 1800 Ncm ³ /min air
				0258		● 100 - 2580 Ncm ³ /min air
				0393		● 100 - 3930 Ncm ³ /min air
				0503		● 277 - 5030 Ncm ³ /min air
				0600		● 100 - 6000 Ncm ³ /min air
				0751		● 300 - 7510 Ncm ³ /min air
				1010		● 150 - 10100 Ncm ³ /min air
				1145		● 250 - 11450 Ncm ³ /min air
				1575		● 800 - 15750 Ncm ³ /min air
				1896		● 400 - 18960 Ncm ³ /min air
				2364		● 700 - 23640 Ncm ³ /min air
				2940		● 2000 - 29400 Ncm ³ /min air
				4334		● 2000 - 43340 Ncm ³ /min air
					G	● glass float
					K	● stainless steel float
Special option VARIO						□ scale with direct range reading float sapphire, tantal or carbon precision valve

IMPORTANT FOR YOUR ORDER

- With gaseous media indicate pressure (relative or absolute), temperature and metering substance, e.g. air, (metering range on request)

SPECIAL APPLICATION



GR-150
Design with scale length 150mm
ranges on request

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Flowmeter operates according to variable area principle with a cylindrical float moving flow-dependently in a conical metering tube.

- * good repeatability
- * optional with limit switch

Female thread G1/2 to G1 stainless steel



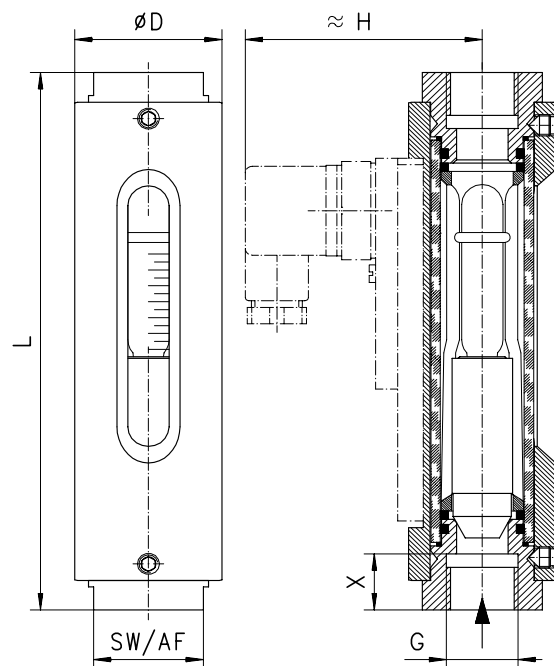
VLR-015GA018

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	metering range l/min H ₂ O	D mm	H mm	L mm	X mm	AF mm	weight kg
brass	G1/2	VL-015GA002	10	1,5	0.1 - 1.5	43	73	132	13	32	0.63
		VL-015GA003	10	3	0.2 - 3	43	73	135	13	32	0.63
		VL-015GA008	10	8	0.3 - 8	43	73	135	13	32	0.63
		VL-015GA012	10	12	1 - 12	43	73	135	13	32	0.63
		VL-015GA018	10	18	2 - 18	43	77	163	13	32	0.65
	G1	VL-025GA035	10	35	3 - 35	50	76	184	17	41	1.00
		VL-025GA050	10	50	4 - 50	50	76	184	17	41	1.00
stainless steel	G1/2	VL-015GK002	10	1,5	0.1 - 1.5	43	73	132	13	32	0.63
		VL-015GK003	10	3	0.2 - 3	43	73	135	13	32	0.63
		VL-015GK008	10	8	0.3 - 8	43	73	135	13	32	0.63
		VL-015GK012	10	12	1 - 12	43	73	135	13	32	0.63
		VL-015GK018	10	18	2 - 18	43	77	163	13	32	0.65
		G1	VL-025GK035	10	35	3 - 35	50	76	184	17	41
VL-025GK050			10	50	4 - 50	50	76	184	17	41	1.00

Metering range is indicated for vertical upward increasing flow.

tolerance ±5% of full scale
media temperature max. 100°C
average pressure loss 0.01-0.2 bar at Qmax.



MATERIALS

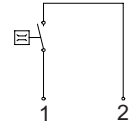
	VL...GA	VL...GK
housing	aluminium anodized	aluminium anodized
connectors	brass Ms58 nickel plated	stainless steel 1.4571
glass float	duran 50 brass Ms58 nickel plated	duran 50 stainless steel 1.4571
magnet seal	hardferrite NBR	hardferrite viton

ELECTRICAL DATA

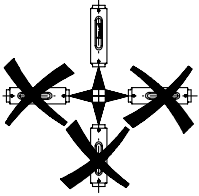
- **BASIC Standard**
No electrical components

OBASIC
Programme
option

reed switch - wiring 0.212 n.o.
230 V AC 1 A 50 VA
DN 15 plug DIN 43650-C
DN 25 plug DIN 43650-A
adjustable range complies to metering range
protection class IP 65
additional weight 0.02kg



MOUNTING POSITION



METERING SUBSTANCES



water



gas/air



oil



design stainless steel VL-...GK
for aggressive liquids

NOMENCLATURE

For combination see table "technical data"

VL-	015	G	A	002		basic type
VL-					●	Flowmeter
VLR-					○	Flowmeter with switch head
	015				●	nominal diameter DN 15 - G1/2
	025				●	nominal diameter DN 25 - G1
		G			●	female thread
		W			○	manifold block connector for 70.1.VB.
			A		●	connector material brass
			K		●	connector material stainless steel
				002	●	0.1 - 1.5 l/min
				003	●	0.2 - 3 l/min
				008	●	0.3 - 8 l/min
				012	●	1 - 12 l/min
				018	●	2 - 18 l/min
				035	●	3 - 35 l/min
				050	●	4 - 50 l/min
Programme option					○	wiring 0.342 - change over
BASIC						
Special option					□	setting / ranges for oil or gas
VARIO						scale 0 - 100% special scale, special ranges

IMPORTANT FOR YOUR ORDER

- Please indicate metering substance and metering range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (metering range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (metering range on request)

All technical changes reserved

IBASIC Standard ○OBASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Flowmeter operates according to the variable area principle with a ball float moving flow-dependently in a conical metering tube.

- * full face scale print
- * optional adjustment valve

Female thread NPT1/8" brass/stainless steel

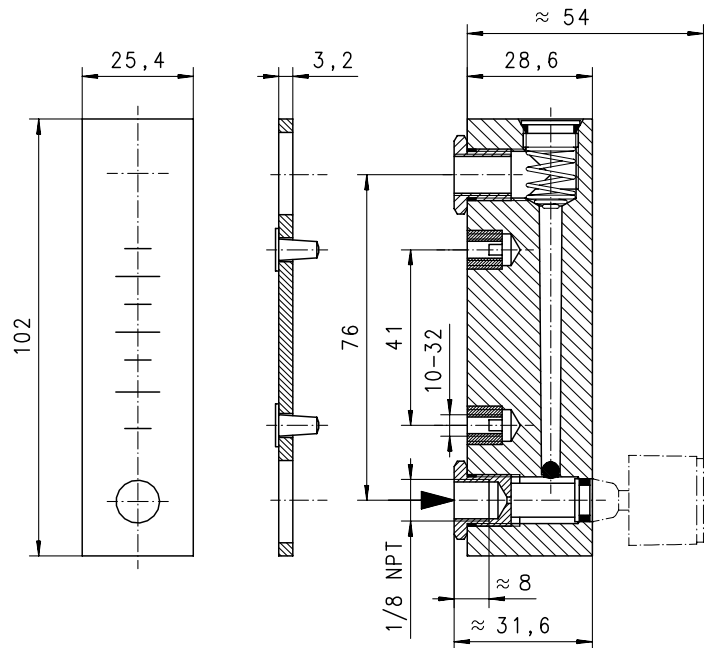


UKV-020GML0005

TECHNICAL DATA

	NPT	Type	PN bar	Qmax. recom.	metering range	weight kg
H ₂ O	NPT 1/8"	UK.-020G.W0050	6	6 l/min	5 - 50 cm ³ /min	0.13
		UK.-020G.W0100	6	6 l/min	10 - 100 cm ³ /min	
		UK.-020G.W0240	6	6 l/min	20 - 240 cm ³ /min	
		UK.-020G.W0003	6	6 l/min	0.2 - 3 l/h	
		UK.-020G.W0006	6	6 l/min	0.5 - 6 l/h	
		UK.-020G.W0015	6	6 l/min	1 - 15 l/h	
		UK.-020G.W0040	6	6 l/min	4 - 40 l/h	
		UK.-020G.W0080	6	6 l/min	10 - 80 l/h	
air	NPT 1/8"	UK.-020G.L0000	6	0.7 NI/min	0.04 - 0.5 NI/min	0.13
		UK.-020G.L0001	6	1.2 NI/min	0.1 - 1 NI/min	
		UK.-020G.L0005	6	6.0 NI/min	0.4 - 5 NI/min	
		UK.-020G.L0025	6	30.0 NI/min	2 - 25 NI/min	

tolerance ±5% of full scale
media temperature max. 65°C



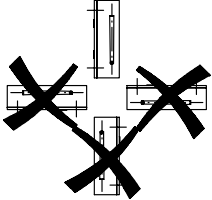
MATERIALS

	UK-020GM	UK-020GK
housing	acrylic	acrylic
float	glass/stainless steel	glass/stainless steel
buffers	stainless steel	stainless steel
connectors	brass	stainless steel
seal	NBR	viton
valve	brass/NBR	stainless steel/viton

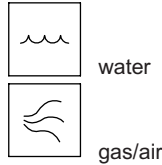
ELECTRICAL DATA

No electrical components.

MOUNTING POSITION



METERING SUBSTANCES



water

gas/air

NOMENCLATURE

For combinations see table "technical data".

UK-	020	G	M	W0050		basic type
UK-					●	Flowmeter
UKV-					●	Flowmeter with valve
	020				●	instrument series 020 , NPT 1/8"
		G			●	female thread
			M		●	brass
			K		●	stainless steel
				W0050	●	5 - 50 cm ³ /min
				W0100	●	10 - 100 cm ³ /min
				W0240	●	20 - 240 cm ³ /min
				W0003	●	0.2 - 3 l/h
				W0006	●	0.5 - 6 l/h
				W0015	●	1 - 15 l/h
				W0040	●	4 - 40 l/h
				W0080	●	10 - 80 l/h
				L0000	●	0.04 - 0.5 NI/min
				L0001	●	0.1 - 1 NI/min
				L0005	●	0.4 - 5 NI/min
				L0025	●	2.0 - 25 NI/min
Special option					□	seal Viton
VARIO						special scales

IMPORTANT FOR YOUR ORDER

- With gaseous media indicate pressure (relative or absolute), temperature and metering substance, e.g. air (metering range on request)

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Flowmeter operates according to the variable area principle with a ball float moving flow-dependently in a conical metering tube.

- * full face scale print
- * optional adjustment valve

Female thread NPT1/8" brass/stainless steel

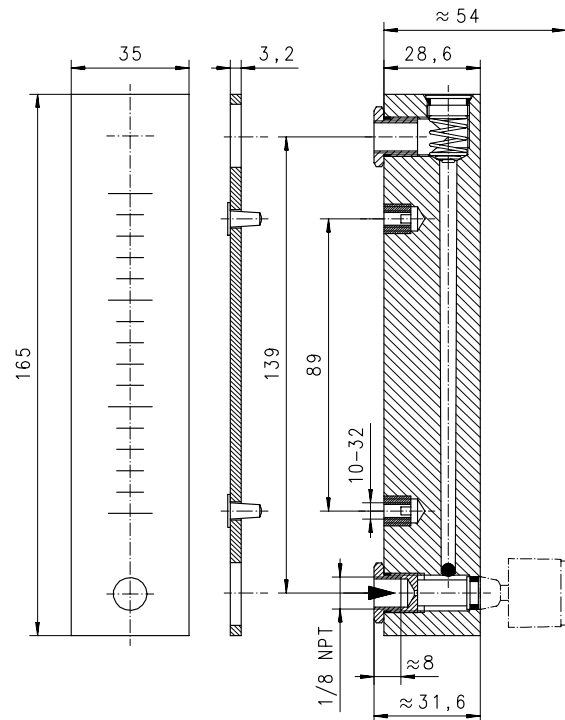


UKV-040GML0010

TECHNICAL DATA

	NPT	Type	PN bar	Qmax. recom.	metering range	weight kg
H ₂ O	NPT 1/8"	UK.-040G.W0003	6	6 l/min	0.2 - 3 l/h	0.24
		UK.-040G.W0008	6	6 l/min	0.6 - 8 l/h	
		UK.-040G.W0014	6	6 l/min	1 - 14 l/h	
		UK.-040G.W0040	6	6 l/min	4 - 40 l/h	
		UK.-040G.W0080	6	6 l/min	8 - 80 l/h	
		UK.-040G.W0220	6	6 l/min	20 - 220 l/h	
air	NPT 1/8"	UK.-040G.L0001	6	1.2 NI/min	0.1 - 1 NI/min	0.24
		UK.-040G.L0005	6	6.0 NI/min	0.4 - 5 NI/min	
		UK.-040G.L0010	6	12.0 NI/min	1 - 10 NI/min	
		UK.-040G.L0020	6	24.0 NI/min	2 - 20 NI/min	
		UK.-040G.L0030	6	36.0 NI/min	3 - 30 NI/min	
		UK.-040G.L0050	6	60.0 NI/min	4 - 50 NI/min	
		UK.-040G.L0100	6	120.0 NI/min	10 - 100 NI/min	

tolerance ±3% of full scale
media temperature max. 65°C



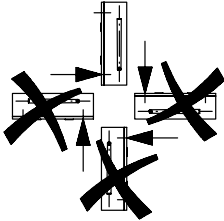
MATERIALS

	UK-040GM	UK-040GK
housing	acrylic	acrylic
float	glass/stainless steel	glass/stainless steel
buffers	stainless steel	stainless steel
connectors	brass	stainless steel
seal	NBR	viton
valve	brass/NBR	stainless steel/viton

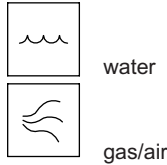
ELECTRICAL DATA

No electrical components.

MOUNTING POSITION



METERING SUBSTANCES



water

gas/air

NOMENCLATURE

For combinations see table "technical data".

UK-	040	G	M	W0003		basic type
UK-					●	Flowmeter
UKV-					●	Flowmeter with valve
	040				●	instrument series 040 , NPT 1/8"
		G			●	female thread
			M		●	brass
			K		●	stainless steel
				W0003	●	0.2 - 3 l/h
				W0008	●	0.6 - 8 l/h
				W0014	●	1 - 14 l/h
				W0040	●	4 - 40 l/h
				W0080	●	8 - 80 l/h
				W0220	●	20 - 220 l/h
				L0001	●	0.1 - 1 NI/min
				L0005	●	0.4 - 5 NI/min
				L0010	●	1 - 10 NI/min
				L0020	●	2 - 20 NI/min
				L0030	●	3 - 30 NI/min
				L0050	●	4 - 50 NI/min
				L0100	●	10 - 100 NI/min
Special option					□	seal Viton
VARIO						special scales

IMPORTANT FOR YOUR ORDER

- With gaseous media indicate pressure (relative or absolute), temperature and metering substance, e.g. air (metering range on request)

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Flowmeter operates according to the variable area principle with a ball float moving flow-dependently in a conical metering tube.

- * full face scale print

male thread NPT1/4" PVC

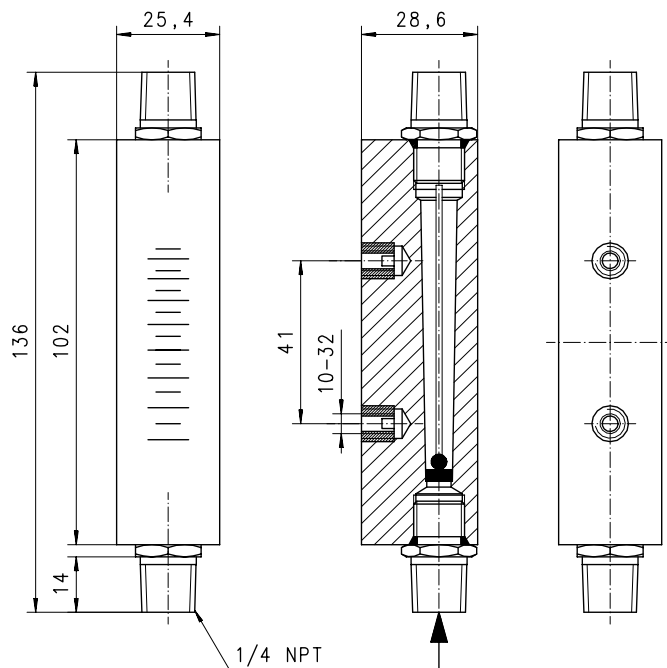


UK-044AHW0050

TECHNICAL DATA

	NPT	Type	PN bar	metering range	weight kg
H ₂ O	NPT 1/4"	UK-044AHW0050	6	4 - 50 l/h	0.1
		UK-044AHW0100	6	15 - 100 l/h	
		UK-044AHW0230	6	30 - 230 l/h	
air	NPT 1/4"	UK-044AHL1700	6	200 - 1700 NI/h	0.1
		UK-044AHL3000	6	500 - 3000 NI/h	
		UK-044AHL8500	6	1000 - 8500 NI/h	

tolerance ±5% of full scale
media temperature max. 65°C



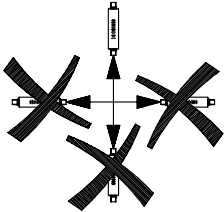
MATERIALS

- housing acrylic
- float aluminum
- buffers stainless steel
- connectors PVC
- seal NBR

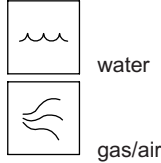
ELECTRICAL DATA

No electrical components.

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data".

UK-	044	A	H	W0050		basic type	
UK-					●	specification	
	044				●	Flowmeter	
		A			●	instrument series 044 , male thread NPT 1/4"	
			H		●	male thread	
				W0050	●	PVC	
				W0100	●	metering range	
				W0230	●		4 - 50 l/h water
				L1700	●		15 - 100 l/h water
				L3000	●		30 - 230 l/h water
				L8500	●		100 - 1700 NI/h air
					●		500 - 3000 NI/h air
					●	1000 - 8500 NI/h air	
Special option					□	seal Viton	
VARIO						special scales	

IMPORTANT FOR YOUR ORDER

- With gaseous media indicate pressure (relative or absolute), temperature and metering substance, e.g. air (metering range on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Flowmeter operates according to variable area principle with a cylindrical float moving flow-dependently in a conical metering tube.

- * dual scale LPM and LPH
- * full face scale print

female thread NPT1/2" PVC

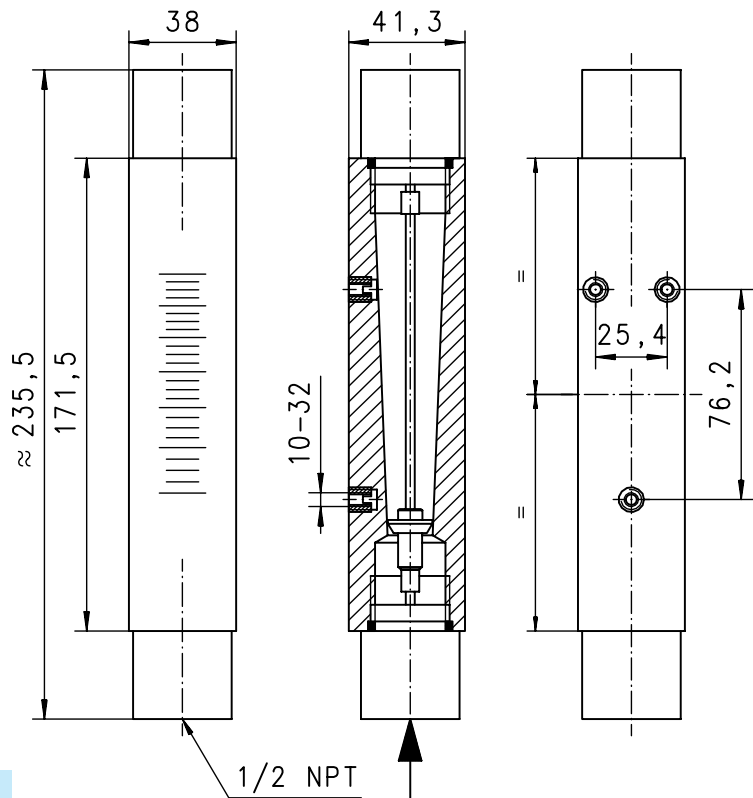


UK-047GHL0070

TECHNICAL DATA

	NPT	Type	PN bar	metering range dual scale LPM and LPH		weight kg
H ₂ O	NPT 1/2"	UK-047GHW0010	6	2 - 10 l/min	120 - 600 l/h	0.35
		UK-047GHW0020	6	2 - 20 l/min	120 - 1200 l/h	
		UK-047GHW0040	6	4 - 40 l/min	240 - 2400 l/h	
air	NPT 1/2"	UK-047GHL0034	6	80 - 340 NI/min	4800 - 20400 NI/h	0.35
		UK-047GHL0070	6	100 - 700 NI/min	6000 - 42000 NI/h	
		UK-047GHL0150	6	150 - 1500 NI/min	9000 - 90000 NI/h	

tolerance ±3% of full scale
media temperature max. 65°C



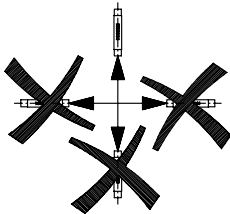
MATERIALS

- housing acrylic
- float aluminum / stainless steel
- connectors PVC
- seal NBR

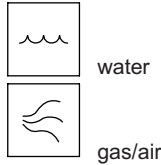
ELECTRICAL DATA

No electrical components.

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data".

UK-	047	G	H	W0010		basic type	
UK-					●	specification	
	047				●	Flowmeter	
		G			●	instrument series 047 , female thread NPT 1/2"	
			H		●	female thread	
					●	PVC	
				W0010	●	metering range	
				W0020	●		2 - 10 l/min water 120 - 600 l/h water
				W0040	●		2 - 20 l/min water 120 - 1200 l/h water
				L0034	●		3 - 40 l/min water 240 - 2400 l/h water
				L0070	●		80 - 340 NI/min air 4800 - 20400 NI/h air
				L0150	●		100 - 700 NI/min air 3600 - 36000 NI/h air
					●	150 - 1500 NI/min air 2000 - 72000 NI/h air	
Special option					□	seal Viton	
VARIO						special scales	

IMPORTANT FOR YOUR ORDER

- With gaseous media indicate pressure (relative or absolute), temperature and metering substance, e.g. air (metering range on request)

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Flowmeter operates according to variable area principle with a cylindrical float moving flow-dependently in a conical metering tube.

- * dual scale LPM and LPH
- * full face scale print

female thread NPT3/4" PVC

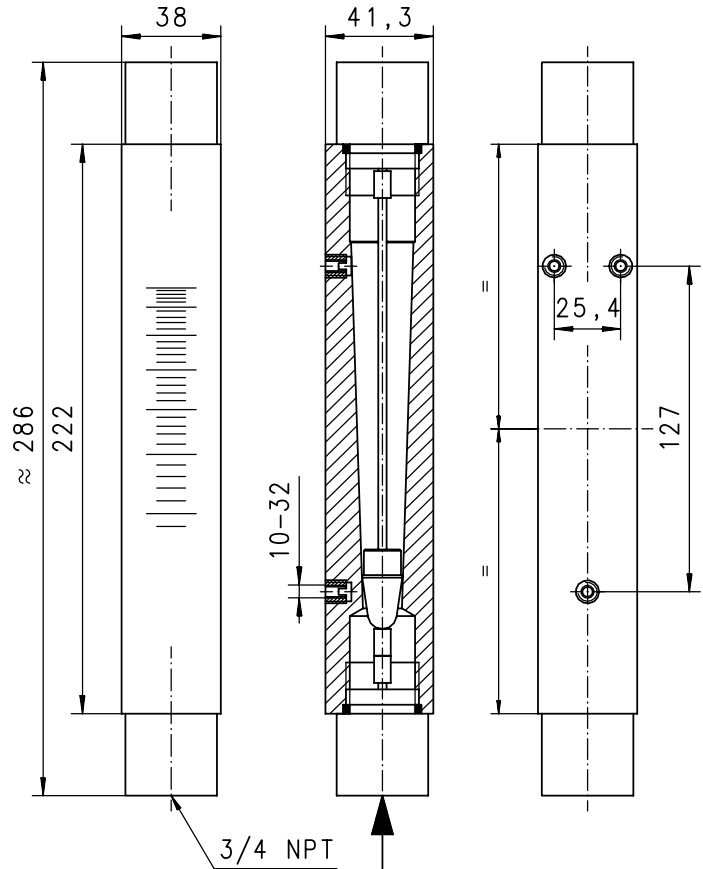


UK-048GHW0045

TECHNICAL DATA

	NPT	Type	PN bar	metering range dual scale LPM and LPH			weight kg
H ₂ O	NPT 3/4"	UK-048GHW0045	6	5 - 45 l/min	300 - 2700 l/h	0.45	
		UK-048GHW0060	6	6 - 60 l/min	360 - 3600 l/h		
		UK-048GHW0070	6	8 - 70 l/min	480 - 4200 l/h		
air	NPT 3/4"	UK-048GHL0140	6	150 - 1400 NI/min	9000 - 84000 NI/h	0.45	
		UK-048GHL0180	6	200 - 1800 NI/min	12000 - 108000 NI/h		
		UK-048GHL0220	6	200 - 2200 NI/min	12000 - 132000 NI/h		

tolerance ±3% of full scale
media temperature max. 65°C



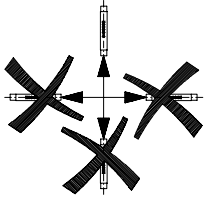
MATERIALS

housing acrylic
float aluminum / stainless steel
connectors PVC
seal NBR

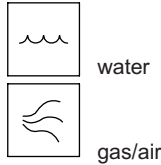
ELECTRICAL DATA

No electrical components.

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data".

UK-	048	G	H	W0010		basic type	
UK-					●	specification	
	048				●	Flowmeter	
		G			●	instrument series 048 , female thread NPT 3/4"	
			H		●	female thread	
					●	PVC	
				W0045	●	metering range	
				W0060	●		5 - 45 l/min water 300 - 2700 l/h water
				W0070	●		6 - 60 l/min water 360 - 3600 l/h water
				L0140	●		8 - 70 l/min water 480 - 4200 l/h water
				L0180	●		150 - 1400 NI/min air 9000 - 84000 NI/h air
				L0220	●		200 - 1800 NI/min air 12000 - 108000 NI/h air
					●	200 - 2200 NI/min air 12000 - 132000 NI/h air	
Special option VARIO					<input type="checkbox"/>	seal Viton	
						special scales	

IMPORTANT FOR YOUR ORDER

- With gaseous media indicate pressure (relative or absolute), temperature and metering substance, e.g. air (metering range on request)

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Flowmeter operates according to variable area principle with a cylindrical float moving flow-dependently in a conical metering tube.

- * full face scale print
- * optional adjustment valve

Female thread NPT 1" PVC

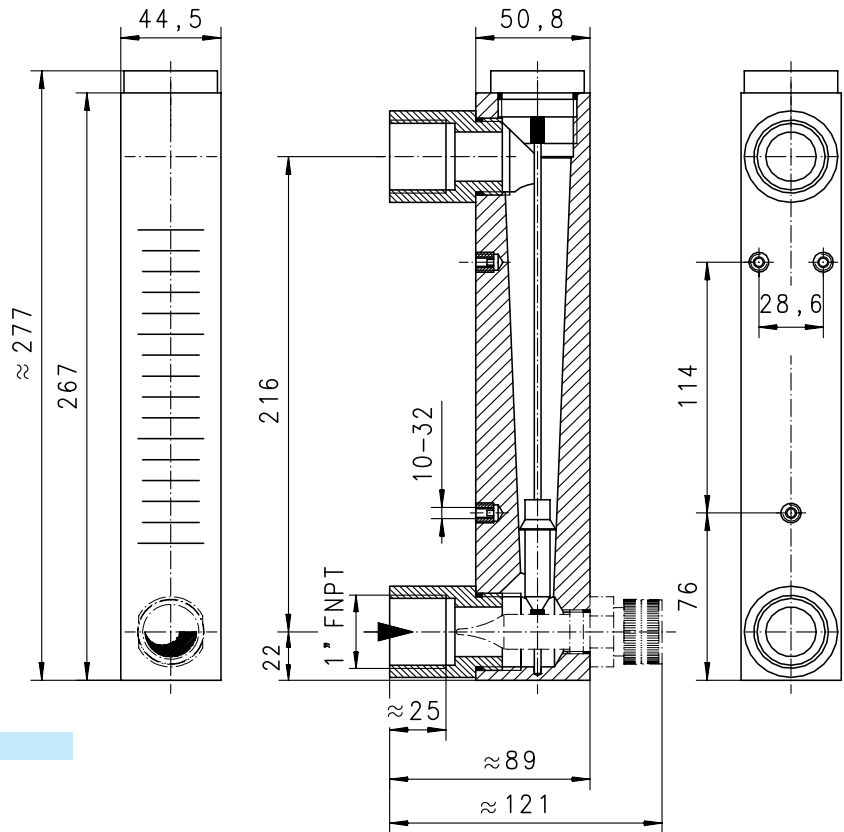


UKV-050GHW0036

TECHNICAL DATA

	NPT	Type	PN bar	Qmax.recom.	metering range	weight kg
H ₂ O	NPT 1"	UK.-050GHW0019	6	21 l/min	1 - 19 l/min	0.8
		UK.-050GHW0036	6	44 l/min	4 - 36 l/min	
		UK.-050GHW0075	6	90 l/min	5 - 75 l/min	
air	NPT 1"	UK.-050GHL0700	6	850 NI/min	100 - 700 NI/min	0.8
		UK.-050GHL1400	6	1700 NI/min	100 - 1400 NI/min	
		UK.-050GHL3000	6	4000 NI/min	400 - 3000 NI/min	

tolerance ±2% of full scale
media temperature max. 65°C



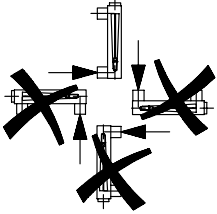
MATERIALS

- housing acrylic
- float stainless steel
- buffers stainless steel
- connectors PVC
- seal NBR

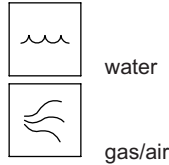
ELECTRICAL DATA

No electrical components.

MOUNTING POSITION



METERING SUBSTANCES



water

gas/air

NOMENCLATURE

For combinations see table "technical data".

UK-	050	G	H	W0019			basic type	
UK-					●		specification	
UKV-					●		Flowmeter	
	050				●		Flowmeter with valve	
		G			●		instrument series 050 , NPT 1"	
			H		●		female thread	
				W0019	●	metering range	PVC	
				W0036	●		H ₂ O	1 - 19 l/min
				W0075	●			4 - 36 l/min
				L0700	●			5 - 75 l/min
				L1400	●		air	100 - 700 NI/min
				L3000	●		100 - 1400 NI/min	
					□		400 - 3000 NI/min	
Soocial option							seal viton	
VARIO							special scales	

IMPORTANT FOR YOUR ORDER

- With gaseous media indicate pressure (relative or absolute), temperature and metering substance, e.g. air (metering range on request)

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Flowmeter operates according to variable area principle with a cylindrical float moving flow-dependently in a conical plastic tube.

- * comfortable scale reading with good resolution
- * actual flow rate indicator min/max

Female thread Rp3/8 to Rp1cast iron



GK-010GTW0160PO

TECHNICAL DATA

	Rp	Type	metering range - float				L mm	L1 mm	L2 mm	G	SW mm	X mm	weight kg
			polypropylene		stainless steel								
			without magnet	with magnet	without	with magnet							
H ₂ O	Rp 3/8	GK-010GTW0025	2 - 25	2 - 25	-	l/h	207	180	165	3/4	32	12	0.18
		GK-010GTW0040	2 - 40	2 - 40	4 - 40	l/h							
		GK-010GTW0060	5 - 60	5 - 60	5 - 60	l/h							
		GK-010GTW0100	10 - 100	10 - 100	10 - 100	l/h							
		GK-010GTW0160	15 - 160	15 - 160	15 - 160	l/h							
	Rp 1/2	GK-015GTW0160	15 - 160	15 - 160	15 - 160	l/h	215	185	170	1	41	13	0.30
		GK-015GTW0250	20 - 250	20 - 250	20 - 250	l/h							
	Rp 3/4	GK-020GTW0160	15 - 160	15 - 160	-	l/h	230	201	185	1 1/4	50	16	0.50
		GK-020GTW0250	20 - 250	20 - 250	20 - 250	l/h							
		GK-020GTW0400	40 - 400	40 - 400	40 - 400	l/h							
		GK-020GTW06..	60 - 640	60 - 640	60 - 600	l/h							
	Rp 1	GK-025GTW0250	20 - 250	20 - 250	-	l/h	250	219	200	1 1/2	55	19	0.65
GK-025GTW0400		40 - 400	40 - 400	40 - 400	l/h								
GK-025GTW06..		60 - 640	60 - 640	50 - 650	l/h								
air	Rp 3/8	GK-010GTL0360	20 - 360	-	-	Nl/h	207	180	165	3/4	32	12	0.18
		GK-010GTL0550	50 - 550	-	-	Nl/h							
		GK-010GTL0900	100 - 900	-	-	Nl/h							
		GK-010GTL0015	0.15- 1.5	-	-	Nm ³ /h							
		GK-010GTL0024	0.2 - 2.4	-	-	Nm ³ /h							
	Rp 1/2	GK-015GTL0038	0.4 - 3.8	-	-	Nm ³ /h	215	185	170	1	41	13	0.30
		GK-015GTL0048	0.4 - 4.8	-	-	Nm ³ /h							
	Rp 3/4	GK-020GTL0025	0.2 - 2.5	-	-	Nm ³ /h	230	201	185	1 1/4	50	16	0.50
		GK-020GTL0037	0.25- 3.75	-	-	Nm ³ /h							
		GK-020GTL00..	0.5 - 5.5	0.75- 6.5	-	Nm ³ /h							
	Rp 1	GK-025GTL0040	0.4 - 4	-	-	Nm ³ /h	250	219	200	1 1/2	55	19	0.65
		GK-025GTL0060	0.5 - 6	-	-	Nm ³ /h							
		GK-025GTL0100	1 - 10	1 - 10	-	Nm ³ /h							
		GK-025GTL0160	1 - 16	2 - 16	-	Nm ³ /h							

pressure PN15
tolerance ±1% of full scale
and ±3% of measured value
media temperature max. 60°C
pressure loss max. 20mbar

tube	temperature °C										
	-20	0	20	30	40	50	60	70	80	90	100
trogamid	15	15	15	13,5	12	10,7	9,5	-	-	-	-
polysulfon	15	15	15	14	13	12	11	9,7	8,5	7,7	6,0

bar

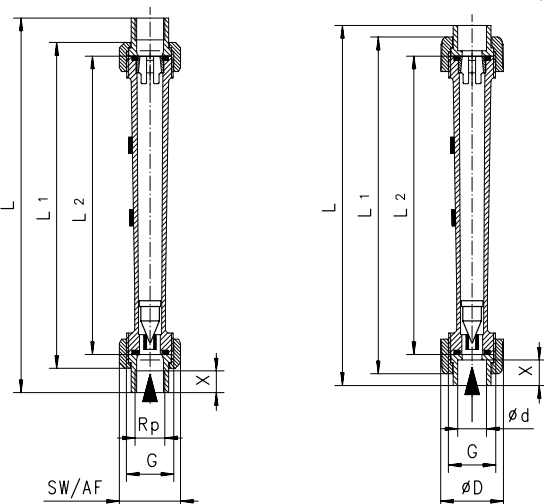
MATERIALS

tube trogamid
float polypropylene
connector cast iron
seal viton

GK-...G

GK-...M

Measurements on request



ELECTRICAL DATA

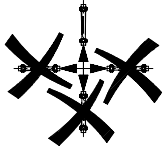
● **BASIC Standard**

No electrical components.

⊕ **PLUS accessories**

Switch units or continuous signal converters see description next page

MOUNTING POSITION



METERING SUBSTANCES



water



gas/air

For combinations see table "technical data".

NOMENCLATURE

GK-	010	G	T	W0025	PO	basic type specification
	010				●	nominal diameter DN 10 - Rp3/8
	015				●	nominal diameter DN 15 - Rp1/2
	020				●	nominal diameter DN 20 - Rp3/4
	025				●	nominal diameter DN 25 - Rp1
		G			●	female thread Rp cast iron, PN15
		M			○	threaded connector with glue fittings PVC, PN10
			T		●	measuring tube trogamid
			P		○	measuring tube polysulfon (max. temperature 100°C)
				W0025	●	2 - 25 l/h
				W0040	○	2 - 40 l/h
				W0060	●	4 - 40 l/h
				W0100	●	5 - 60 l/h
				W0160	●	10 - 100 l/h
				W0250	●	15 - 160 l/h
				W0400	●	20 - 250 l/h
				W0600	○	40 - 400 l/h
				W0640	●	60 - 600 l/h
				W0650	○	60 - 640 l/h
				L0360	●	50 - 650 l/h
				L0550	●	20 - 360 NI/h
				L0900	●	50 - 550 NI/h
				L0015	●	100 - 900 NI/h
				L0024	●	0.15- 1.5 Nm ² /h
				L0025	●	0.2 - 2.4 Nm ² /h
				L0037	●	0.2 - 2.5 Nm ² /h
				L0038	●	0.25- 3.75 Nm ² /h
				L0040	●	0.4 - 3.8 Nm ² /h
				L0048	●	0.4 - 4 Nm ² /h
				L0055	●	0.4 - 4.8 Nm ² /h
				L0060	●	0.5 - 5.5 Nm ² /h
				L0065	○	0.5 - 6 Nm ² /h
				L0100	●	0.75- 6.5 Nm ² /h
				L0160	○	1 - 10 Nm ² /h
					●	1 - 16 Nm ² /h
					○	2 - 16 Nm ² /h
				PO	●	float polypropylene without magnet
				PM	○	float polypropylene with magnet
				KO	○	float stainless steel without magnet
				KM	○	float stainless steel with magnet
				Programme option BASIC	○	scale in %
				Special option VARIO	□	actual metering ranges referring to pressure and temperature special scales
				Accessories PLUS	⊕	switch unit contin.signal convert.
						Only for float with magnet. Description see next page.

IMPORTANT FOR YOUR ORDER

- With gaseous media indicate pressure (relative or absolute), temperature and metering substance, e.g. air (metering range on request)

All technical changes reserved

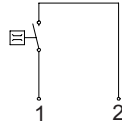
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

ACCESSORIES

⊕ **GKEH-1256**

for DN 10-20

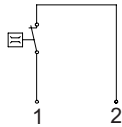
maximum switch unit plastic
bistable reed switch
wiring diagram 0.212 n.o.
250 V AC 0.2 A 10 VA
plug DIN 43650-B
protection class IP 65
additional weight 0.035 kg



⊕ **GKEL-1257**

for DN 10-20

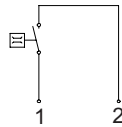
minimal switch unit plastic
bistable reed switch
wiring diagram 0.214 n.c.
250 V AC 0.2 A 10 VA
plug DIN 43650-B
protection class IP 65
additional weight 0.035 kg



⊕ **GKEH-1251**

for DN 25

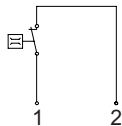
maximum switch unit plastic
bistable reed switch
wiring diagram 0.212 n.o.
250 V AC 0.2 A 10 VA
plug DIN 43650-B
protection class IP 65
additional weight 0.075 kg



⊕ **GKEL-1252**

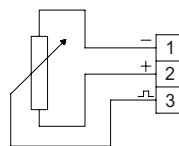
for DN 25

minimal switch unit plastic
bistable reed switch
wiring diagram 0.214 n.c.
250 V AC 0.2 A 10 VA
plug DIN 43650-B
protection class IP 65
additional weight 0.075 kg



⊕ **GKK-1271**

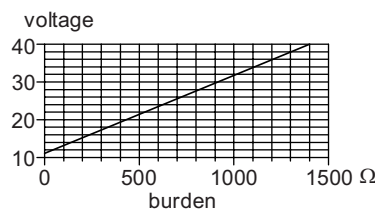
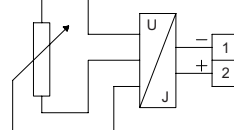
continuous signal converter plastic
reed switch chain
24 V DC
exit signal: 0 - 10 k-Ohm
plug DIN 43650-B
protection class IP 65
additional weight 0.07 kg



⊕ **GKI-1273 / GKI-1273-1**

Type GKI-1273 for DN10-20
Type GKI-1273-1 for DN25

continuous signal converter plastic
reed switch chain with integrated signal convertor
supply 11-40 V DC depending on ohmic resistance
ohmic resistance max. 1500 Ω
exit signal: 4 - 20 mA
plug DIN 43650-B
protection class IP 65
additional weight 0.08 kg



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Flowmeter operates according to variable area principle with a cylindrical float moving flow-dependently in a conical plastic tube.

- * comfortable scale reading with good resolution
- * extended scale length
- * actual flow rate indicator min/max

Female thread Rp1 to Rp2 cast iron



GKL-050GTW0064PO

TECHNICAL DATA

	Rp	Type	metering range - float			L mm	L1 mm	L2 mm	G	SW mm	X mm	weight kg	
			polypropylene		stainless steel								
			without magnet	with magnet	without/with magnet								
H ₂ O	Rp 1	GKL-025GTW1000	100 - 1000	100 - 1000	100 - 1000	l/h	402	369	350	1 1/2	55	17	0.75
	Rp 1 1/4	GKL-032GTW1000	100 - 1000	100 - 1000	-	l/h	410	370	350	2	66	19	1.25
		GKL-032GTW1600	150 - 1600	150 - 1600	150 - 1600	l/h							
	Rp 1 1/2	GKL-040GTW1600	200 - 1600	200 - 1600	-	l/h	414	372	350	2 1/4	74	20	1.75
		GKL-040GTW2500	300 - 2500	300 - 2500	200 - 2500	l/h							
		GKL-040GTW3300	300 - 3300	300 - 3300	-	l/h							
Rp 2	GKL-050GTW0025	0.2 - 2.5	0.2 - 2.5	-	m ³ /h	420	374	350	2 3/4	90	24	2.40	
	GKL-050GTW0040	0.4 - 4	0.4 - 4	0.4 - 4	m ³ /h								
	GKL-050GTW0064	0.6 - 6.4	0.6 - 6.4	0.6 - 6.4	m ³ /h								
air	Rp 1	GKL-025GTL0100	1 - 10	1.25- 10	-	Nm ³ /h	402	369	350	1 1/2	55	17	0.75
		GKL-025GTL0160	1.5 - 16	1.5 - 16	-	Nm ³ /h							
		GKL-025GTL0250	-	3 - 25	-	Nm ³ /h							
	Rp 1 1/4	GKL-032GTL0160	1.5 - 16	-	-	Nm ³ /h	410	370	350	2	66	19	1.25
		GKL-032GTL0250	2 - 25	-	-	Nm ³ /h							
		GKL-032GTL0400	4 - 40	4 - 40	-	Nm ³ /h							
		GKL-032GTL0640	-	6 - 64	-	Nm ³ /h							
	Rp 1 1/2	GKL-040GTL0250	2 - 25	-	-	Nm ³ /h	414	372	350	2 1/4	74	20	1.75
		GKL-040GTL0400	4 - 40	-	-	Nm ³ /h							
		GKL-040GTL0500	5 - 50	-	-	Nm ³ /h							
		GKL-040GTL0600	-	5 - 60	-	Nm ³ /h							
	Rp 2	GKL-050GTL0400	4 - 40	-	-	Nm ³ /h	420	374	350	2 3/4	90	24	2.4
GKL-050GTL0640		6 - 64	-	-	Nm ³ /h								
GKL-050GTL1000		10 - 100	-	-	Nm ³ /h								
GKL-050GTL1500		-	15 - 160	-	Nm ³ /h								
GKL-050GTL2500		-	20 - 250	-	Nm ³ /h								

GKL-...G

GKL-...M

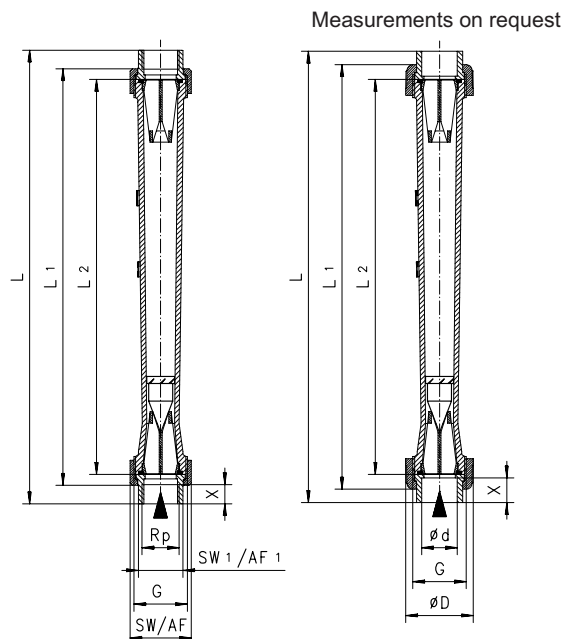
pressure tolerance: PN15
 ±1% of full scale and ±3% of measured value
 media temperature: max. 60°C
 pressure loss: max. 20mbar

tube	temperature °C										
	-20	0	20	30	40	50	60	70	80	90	100
trogamid	15	15	15	13,5	12	10,7	9,5	-	-	-	-
polysulfon	15	15	15	14	13	12	11	9,7	8,5	7,7	6,0

bar

MATERIALS

tube: trogamid
 float: polypropylene
 connector: cast iron
 seal: viton

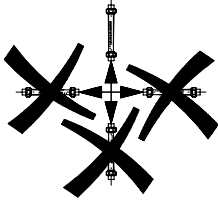


ELECTRICAL DATA

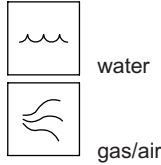
● **BASIC Standard**
No electrical components.

⊕ **PLUS accessories**
Switch units or continuous signal converters
see description next page

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data".

GKL-	025	G	T	W1000	PO	basic type specification	
	025					●	nominal diameter DN 25 - Rp1
	032					●	nominal diameter DN 32 - Rp1 1/4
	040					●	nominal diameter DN 40 - Rp1 1/2
	050					●	nominal diameter DN 50 - Rp2
		G				●	female thread Rp cast iron, PN15
		M				○	threaded connector with glue fittings PVC, PN10
			T			●	measuring tube trogamid
			P			○	measuring tube polysulfon (max. temperature 100°C)
				W1000		●	100 - 1000 l/h
				W1600		●	150 - 1600 l/h
				W2500		○	200 - 2500 l/h
				W3300		●	300 - 2500 l/h
				W0025		●	300 - 3300 l/h
				W0040		●	0,2 - 2,5 m³/h
				W0064		●	0,4 - 4 m³/h
				L0100		○	0,6 - 6,4 m³/h
				L0160		●	1 - 10 Nm³/h
				L0250		●	1,25- 10 Nm³/h
				L0400		●	1,5 - 16 Nm³/h
				L0500		●	2 - 25 Nm³/h
				L0600		○	3 - 25 Nm³/h
				L0640		○	4 - 40 Nm³/h
				L1000		●	5 - 50 Nm³/h
				L1500		●	5 - 60 Nm³/h
				L2500		●	6 - 64 Nm³/h
					PO	●	float polypropylene without magnet
					PM	○	float polypropylene with magnet
					KO	○	float stainless steel without magnet
					KM	○	float stainless steel with magnet
Programme option BASIC						○	scale in %
Special option VARIO						□	actual metering ranges referring to pressure and temperature special scales
Accessories PLUS						⊕	switch unit contin.signal convert.
							Only for float with magnet. Description see next page.

IMPORTANT FOR YOUR ORDER

- With gaseous media indicate pressure (relative or absolute), temperature and metering substance, e.g. air (metering range on request)

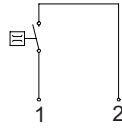
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

ACCESSORIES

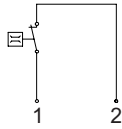
⊕ GKEH-1251

maximum switch unit plastic
bistable reed switch
wiring diagram 0.212 n.o.
250 V AC 0.2 A 10 VA
plug DIN 43650-B
protection class IP 65
additional weight 0.075 kg



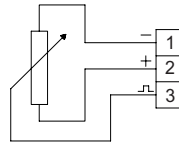
⊕ GKEL-1252

minimal switch unit plastic
bistable reed switch
wiring diagram 0.214 n.c.
250 V AC 0.2 A 10 VA
plug DIN 43650-B
protection class IP 65
additional weight 0.075 kg



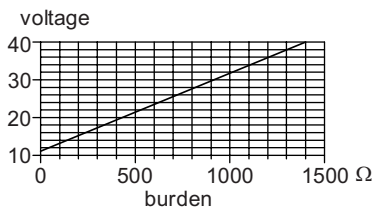
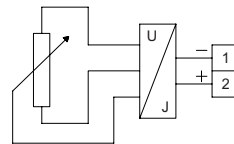
⊕ GKK-1270

continuous signal converter plastic
reed switch chain
24 V DC
exit signal: 0 - 10 k-Ohm
plug DIN 43650-B
protection class IP 65
additional weight 0.07 kg



⊕ GKI-1272

continuous signal converter plastic
reed switch chain with integrated signal converter
supply 11-40 V DC depending on ohmic resistance
ohmic resistance max. 1500 Ω
exit signal: 4 - 20 mA
plug DIN 43650-B
protection class IP 65
additional weight 0.08 kg



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

Special applications

Flow meter MMF

Flow meter for respiratory air and oxygen in medical applications.

- Accurate and reliable metering and display by float
- Metering tube shielded by additional protective tube
- Precision valve for extremely accurate and leak-free flow control and dosage
- Brass body with high-shine finish
- Display pressure-compensated 3.5 bar
- FDA approval
- Filter in the inlet



Block assembly with one input and 2 or 3 outputs

The flow meters of the Med-Flow series have been specially developed for use in medical environments. The devices provide an extremely accurate and reliable method of metering and dosing respiratory air or oxygen.

The sturdy brass base and LEXAN metering and protective tubes contribute to this performance. The precision stainless steel valve makes exact setting and reliable blocking possible.

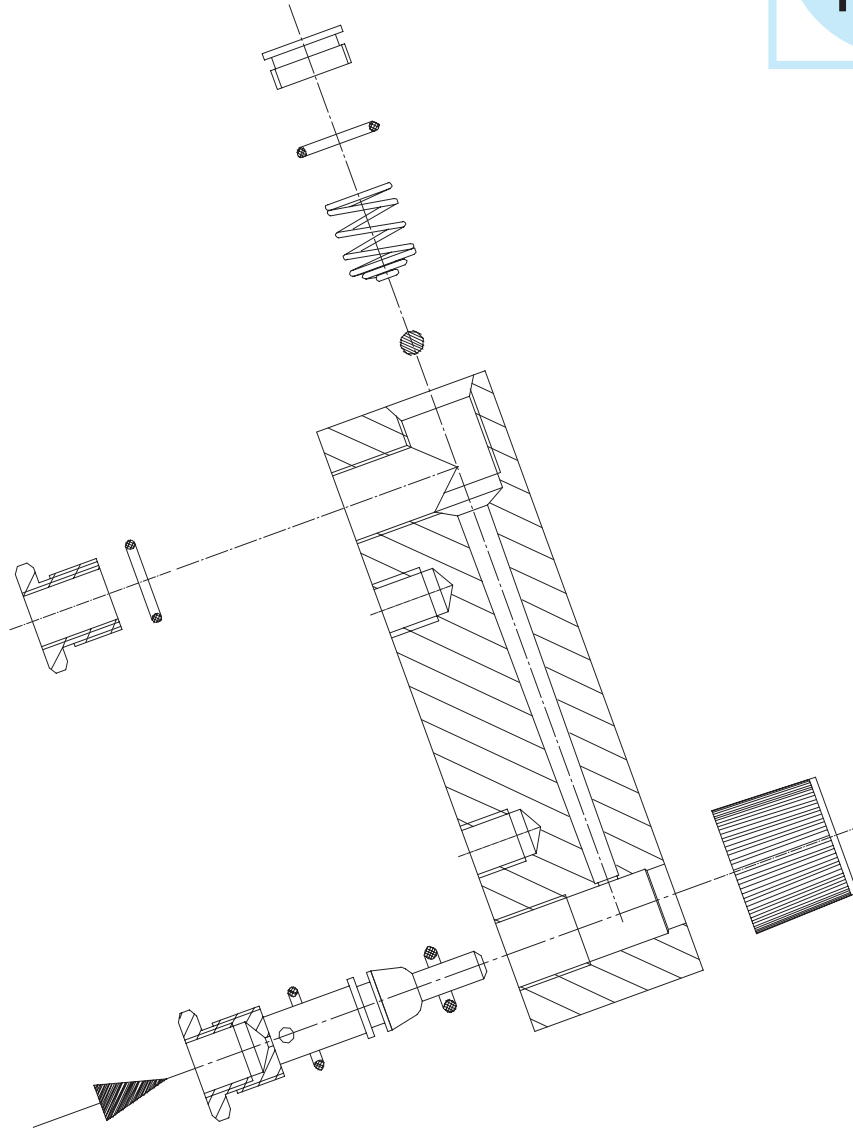
The metering ranges have been designed for an operating pressure of 3.5 bar. Other calibration is available on request.

- Ranges up to 15 l/min
- Temperature max. 65 °C
- Pressure max. 6.9 bar
- Materials Lexan, brass, stainless steel, NBR

Type	Range NI/min	Oxygen	Air	Accuracy NI/min
MMF-003	0.125 - 3.5	+	-	0.2
MMF-008	0.25 - 8	+	+	0.4
MMF-015	0.5 - 15	+	+	0.6

Why to use a variable area instrument

**info
point**



- **Full acrylic or glass body** → **optimal visibility**
- **Variety of float materials** → **versatility**
- **Guiding rod for float** → **stability**
- **Buffer spring** → **protection at max flow rate**
- **Full space scale print** → **good readability**
- **Optional valve integrated** → **regulation**

Where to use a **HONSBERG** BASIC variable area instrument

info
point

Market segments

- **Oxygen generator**
- **Medical installation**
- **Dosage**
- **Welding**

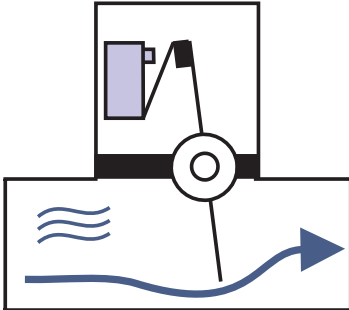


Application

- **Monitoring of oxygen supply or output**
- **Measurement of breathing air**
- **Measurement of substances in mixing operations**
- **Monitoring of gas supplies during welding**

Paddle

The technology



Flow-dependent paddle movement is transformed magnetically contactless to adjustable contacts and/or pointer metering units.

Application

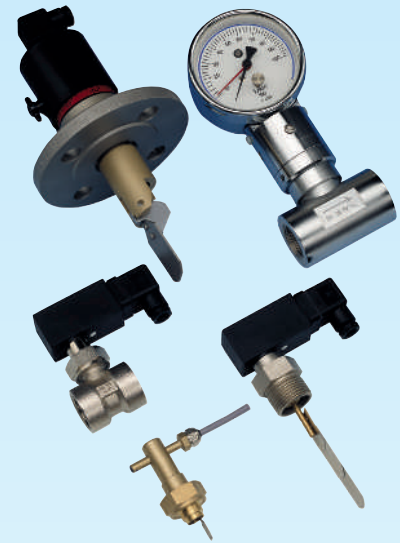
- Pump monitoring
- Run dry protection

Advantages

- Nominal diameters DN 10 to DN 300
- Low pressure loss
- Dirt-resistant

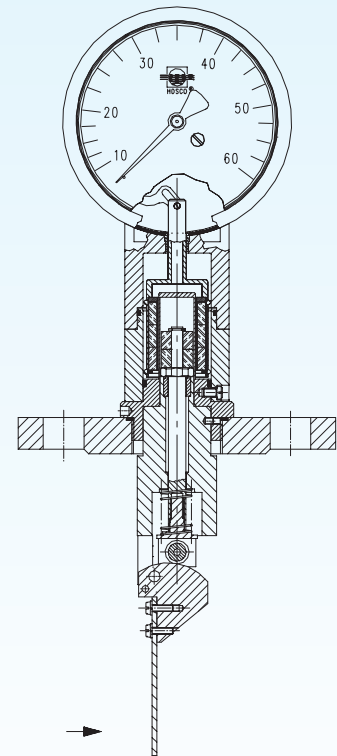
Technical data

Concept	housing or direct installation
Nominal diameter	10 - 300
Connection	female thread or stub-connection
PN	6 - 25
Max. temperature	120 °C
Signal	threshold, optical display
Adjustable	yes
Materials	brass, stainless steel, plastic
Installation position	horizontal, flow from below
Metering materials	liquids or gases



Contents

Paddle	128
dynamic flap	129
Device descriptions	131



- Switching
- Metering

System description

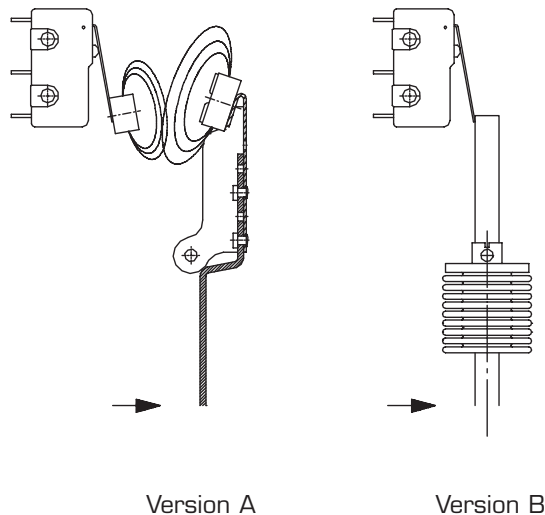
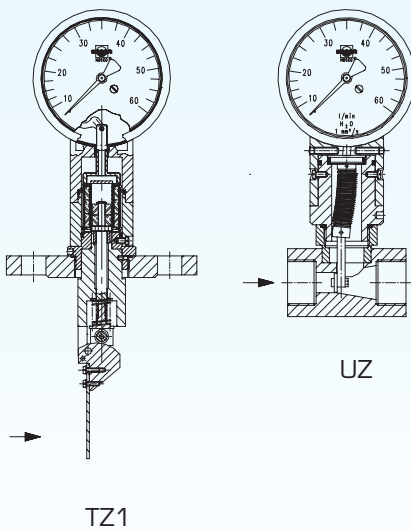
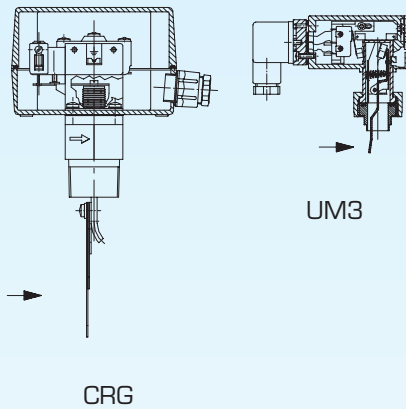
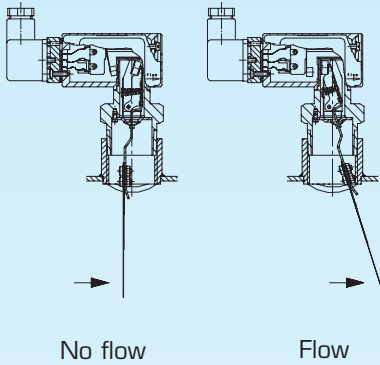
Device system

The Honsberg paddle system for monitoring and metering liquid and gaseous materials represents an economical alternative with high operational safety for monitoring and metering flow quantities in industrial plant construction.

Function and advantages

A spring-supported paddle is situated in the volume flow and moves a distance proportional to the flow rate. In devices designed according to the principle illustrated below as Version A, the paddle is connected to a permanent magnet which is coupled to an external threshold contact. When the selected flow rate is reached the threshold contact is triggered.

Changing the position of the contact in relation to the magnetic field achieves a continuous adjustment possibility for the switching point. As an alternative to magnetic switching, mechanical triggering of micro-switches can be chosen, where the paddle movement is guided outwards via bellows (illustration Version B) and acts on the contact via a spring-supported lever arrangement.

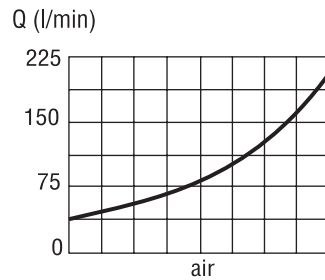
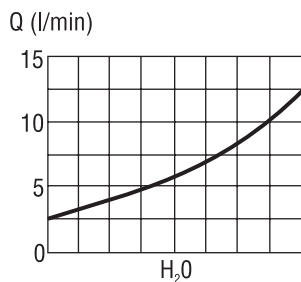


In place of contacts, paddle movements can be used to trigger metering units. In this case the proportional paddle path is transferred magnetically or mechanically to a pointer metering unit and thus indicates the flow rate on a 320° pointer scale. These pointer metering units are equipped with integrated adjustable threshold contacts which can be used to adjust the scale division.

Metering materials and accuracy

Paddle devices are mainly used with liquid metering materials. The influence of viscosity is lower compared to piston systems. The minimal intrusion of the free pipe diameter results in good dirt resistance and minimum pressure losses. The screw-in devices can be used independent of nominal diameters, with a selection possibility of certain paddle lengths which is simple to create using a segment paddle system (CM2K, CRE, UB1).

	Water	Viscosity mm ² /s			
		30	60	115	220
UM/UR	4	4	3.8	3.5	3
	8	8	7.6	7	6.6
	10	10	9	8.5	8
	20	20	19	18	17.5
CRG/UB1	60	58	55	53	48
	80	78	74	70	64
	100	96	92	87	81
	120	117	111	107	96



With air and gases, the functional ratio in relation to water is approx. 1:15, i.e. 1 l/min of water corresponds to approx. 15 NI/min of air, whereby temperature, density and operating pressure play a special role here.

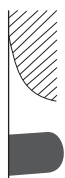
In these cases the devices are made according to customer specification.

We will be happy to provide advice where needed.

There are devices with additional soiling protection for the functional parts available for soiled media.

Dynamic flap

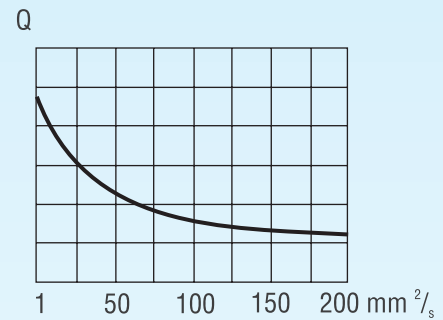
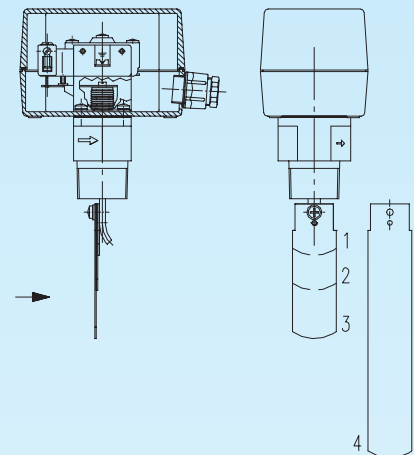
The flowing liquids move a thin springy flap that covers the entire flow area. A magnet on the flap creates a changing magnetic field, which is detected by a Hall sensor, when the flap is moved. Due to the spring-like quality of the flap and the molded stop, even strong impacts caused by the water are absorbed well. The low number of parts that are touched by the liquids ensure less contamination und smooth operation.



no flow

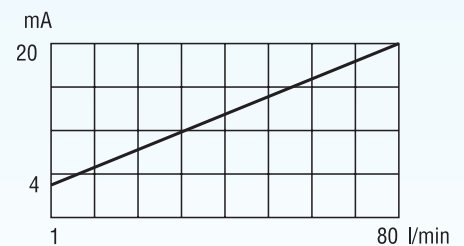


flow



Example:

Viscosity	Flow rate
1 mm ² /s	4.0 l/min
115 mm ² /s	3.5 l/min



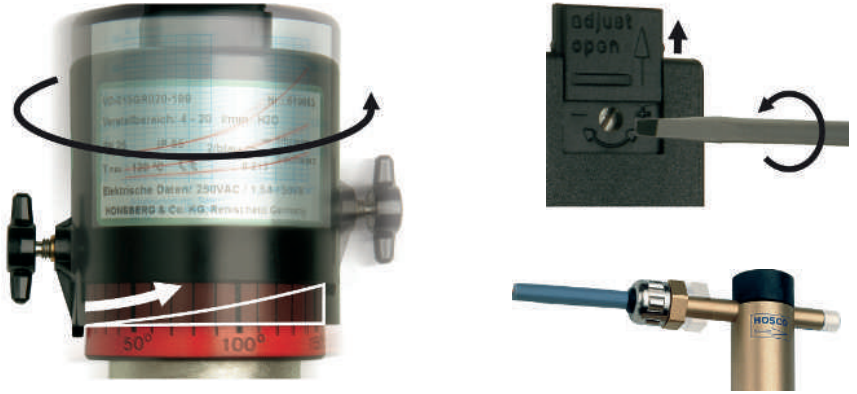
Handling and operation

The devices do not make any particular demands during operation.

If the switching point needs to be set, this can be done by adjusting the switching head in a coiled groove [VM], by using a potentiometer [UM3, UR3, CM2K] or by longitudinal adjustment [UB1, UR1, UR2].



TZ1



Further setting of the switch point is achieved by changing the spring characteristics [CRG], in other words as spring force increases a greater flow rate is required to trigger the contact.



UZ



The function of the threshold [TZ1, UZ] is indicated via a trailing pointer or can optionally be confirmed by an LED display.



	type	nominal diameter	connection	control	indication	output signal	on site metering	max. pressure bar	max. temperature °C	water	oil	air/gas	aggressive	miscellaneous	page		
Paddle	UR3K	10 - 50	female thread brass	●				25	110	●	✓	✓		Honsberg combination System	132		
		10 - 50	female thread stainless steel	●				25	110	●	✓	✓			134		
		15 - 80	soldering socket brass	●				25	110	●	✓	✓			136		
		15 - 80	welding socket stainless steel	●				25	110	●	✓	✓			138		
	UMK3	10 - 50	female thread brass	●				25	110	●	✓	✓			140		
		10 - 50	female thread stainless steel	●				25	110	●	✓	✓			142		
		15 - 80	soldering socket brass	●				25	110	●	✓	✓			141		
	15 - 80	welding socket stainless steel	●				25	110	●	✓	✓				144		
		UR1/UR2	10 - 50	female thread brass	●				25	110	●	✓	✓			Ex	140
			10 - 50	female thread stainless steel	●				25	110	●	✓	✓				142
	15 - 80		soldering / welding socket	●				25	110	●	✓	✓			141		
	UI	10 - 50	female thread brass	●				16	60	●	✓	✓				141	
	UB1	25-200	male thread brass	●				16	140	●	✓					144	
		25-200	male thread stainless steel	●				16	140	●	✓		✓			144	
		40-200	flange brass	●				16	140	●	✓					146	
40-200		flange stainless steel	●				16	140	●	✓		✓		146			
CM2K	25-200	male thread brass	●				25	110	●	✓				148			
	25-200	male thread stainless steel	●				25	110	●	✓				148			
CRG	25-200	male thread brass	●				11	110	●	✓	○YR		Vd TÜV	148			
	25-200	male thread stainless steel	●				11	110	●	✓		✓		150			
VM	40-200	flange brass	●				16	90	●	✓			Ex	150			
	40-200	flange stainless steel	●				16	90	●	✓				152			
TZ1	40-100	flange brass	○	●		●	16	90	●	✓				152			
	40-100	flange stainless steel		○	●		●	16	90	●	✓			154			
UZ	15 - 50	female thread brass	○	●		●	6	100	●	✓				154			
	15 - 50	female thread stainless steel	○	●		●	6	100	●	✓		✓		156			
Dynamic flap	XF	8 - 20	female thread brass	●		●	○	16	70	●					156		
		8 - 20	female thread stainless steel	●		●	○	16	70	●			✓		156		
		8 - 20	female thread plastic	●		●	○	16	70	●					156		

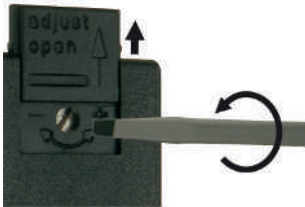
● standard ○ standard option □ special option

all data sheets available under www.honsberg.com

GENERAL CHARACTERISTICS

Instruments operate by a spring-supported paddle with magnetic triggering of a reed switch.

- * good repeatability
- * low pressure loss
- * dirt resistant
- * hermetic separation of electrical and hydraulic components
- * easy adjustment of switch



Female thread G3/8 to G2 brass/stainless steel



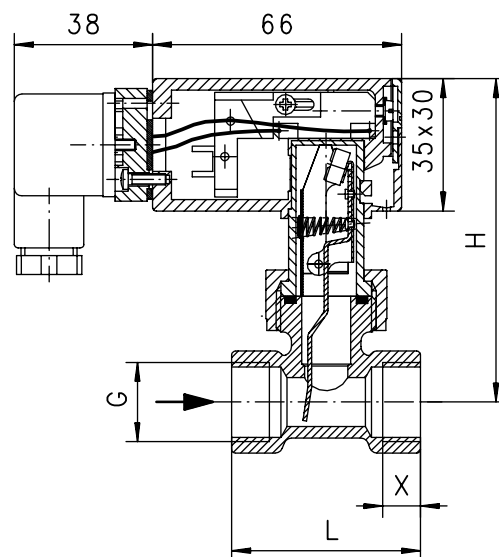
UR3K-015GM065

TECHNICAL DATA

	G	Type	PN bar	Qmax.recom. l/min H ₂ O	adjustable range l/min H ₂ O	H mm	L mm	X mm	weight kg
brass	G 3/8	UR3K-010GM050	25	10	3.5 - 5	87	50	10	0.35
	G 1/2	UR3K-015GM065	25	20	5 - 6.5	87	50	10	0.35
	G 3/4	UR3K-020GM085	25	40	6 - 8.5	88	50	12	0.35
	G 1	UR3K-025GM150	25	60	12 - 15	92	50	12	0.40
	G 1 1/4	UR3K-032GM270	25	80	20 - 27	96	50	12	0.55
	G 1 1/2	UR3K-040GM440	25	100	34 - 44	99	50	12	0.60
	G 2	UR3K-050GM690	25	150	54 - 69	108	50	12	1.00
stainless steel	G 3/8	UR3K-010GK050	25	10	3.5 - 5	87	50	10	0.40
	G 1/2	UR3K-015GK065	25	20	5 - 6.5	87	50	10	0.41
	G 3/4	UR3K-020GK085	25	40	6 - 8.5	88	50	12	0.35
	G 1	UR3K-025GK150	25	60	12 - 15	92	50	12	0.45
	G 1 1/4	UR3K-032GK270	25	80	20 - 27	96	50	12	0.55
	G 1 1/2	UR3K-040GK440	25	100	34 - 44	99	50	12	0.70
	G 2	UR3K-050GK690	25	150	54 - 69	108	50	12	1.00

Adjustable range is indicated for horizontally decreasing flow.

tolerance	±15% of full scale
media temperature	max. 110°C
average pressure loss	0.01bar at Qmax.
hysteresis	depending on switch value minimum 0.7 l/min.

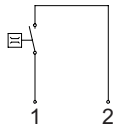


MATERIALS

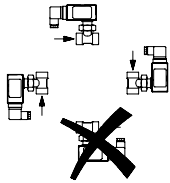
	UR3K-...GM	UR3K-...GK
housing	brass Ms58 nickel plated	stainless steel 1.4305
body	brass Ms58 nickel plated	stainless steel 1.4571
paddle	stainless steel 1.4301 ; 1.4571	stainless steel 1.4301 ; 1.4571
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	oxyd 300	oxyd 300
seal	NBR	viton

ELECTRICAL DATA

reed switch - wiring 0.372 n.o.
230 V AC 1A 50VA
plug DIN 43650-A
protection class IP 65

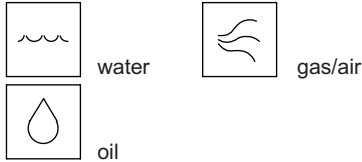


MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

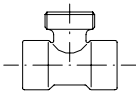
UR3K-	010	G	M	050	basic type specification	
	010				nominal diameter	DN 10 - G3/8
	015					DN 15 - G1/2
	020					DN 20 - G3/4
	025					DN 25 - G1
	032					DN 32 - G1 1/4
	040					DN 40 - G1 1/2
	050					DN 50 - G2
		G				
			M			brass design
			K			stainless steel design
				050	adjustable range H ₂ O horizontal	3.5 - 5 l/min
				065		5 - 6.5 l/min
				085		6 - 8.5 l/min
				150		12 - 15 l/min
				270		20 - 27 l/min
				440		34 - 44 l/min
				690	54 - 69 l/min	
Special option VARIO					<input type="checkbox"/>	setting / adjustable ranges for oil or gas contact for locking plug M12x1, 4-pole minimal flow range

IMPORTANT FOR YOUR ORDER

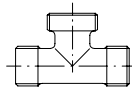
- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

HONSBERG COMBINATION SYSTEM

connection types for UR3K



female thread
brass
stainless steel



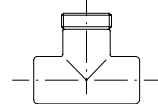
male thread
brass
POM



**welding, soldering
glue socket**
brass, stainless steel, PVC



solder fitting
copper



glue fitting
PVC

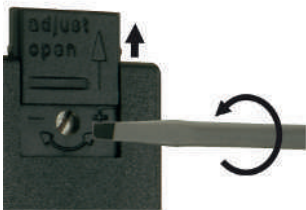
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Instruments operate by a spring-supported paddle with magnetic triggering of a reed switch.

- * good repeatability
- * low pressure loss
- * dirt resistant
- * hermetic separation of electrical and hydraulic components
- * easy adjustment of switch



Welding/soldering socket DN15 to DN 80 brass/stainless steel



UR3K-025VM

TECHNICAL DATA

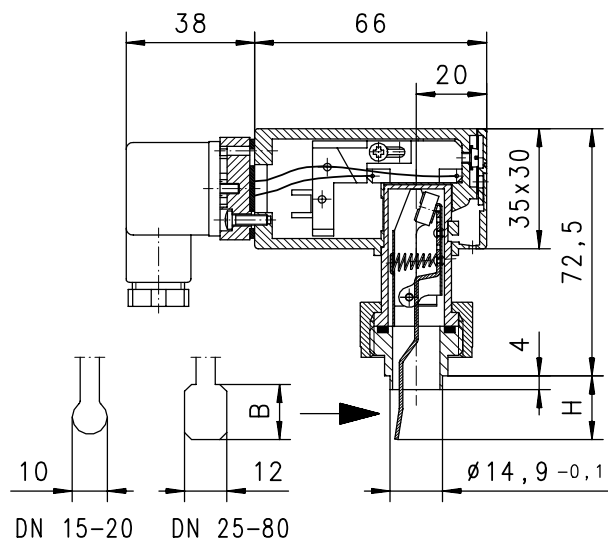
	DN	Type	PN bar	Qmax. recom. l/min H ₂ O	adjustable range l/min H ₂ O	H mm	D mm	A mm	B mm	weight kg
brass	15	UR3K-015VM	25	20	8.5 - 11	18.5	10	-	-	0.21
	20			40	14 - 19					
	25	UR3K-025VM	25	80	15 - 20	27.0	-	12	16	0.22
	32			100	39 - 52					
	40			150	49 - 64					
stainless steel	50	UR3K-050VM	25	200	68 - 84	40.5	-	12	19	0.23
	65			400	127 - 163					
	80			600	189 - 248					
	15	UR3K-015VK	25	20	8.5 - 11	18.5	10	-	-	0.21
	20			40	14 - 19					
	25	UR3K-025VK	25	80	15 - 20	27.0	-	12	16	0.22
	32			100	39 - 52					
40			150	49 - 64						
50	UR3K-050VK	25	200	68 - 84	40.5	-	12	19	0.23	
65			400	127 - 163						
80			600	189 - 248						

Adjustable range is indicated for horizontally decreasing flow. Calibrated in tube DIN2448 standard wall thickness.

tolerance	±15% of full scale
media temperature	max. 110°C
average pressure loss	0.01bar at Qmax.
hysteresis	depending on switch value minimum 0.7 l/min.

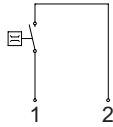
MATERIALS

	UR3K-...VM	UR3K-...VK
socket	brass Ms58	stainless steel 1.4305
body	brass Ms58	stainless steel 1.4571
paddle	nickel plated stainless steel 1.4301 ; 1.4571	stainless steel 1.4301 ; 1.4571
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	oxyd 300	oxyd 300
seal	NBR	viton

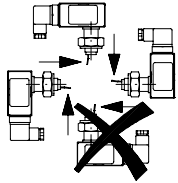


ELECTRICAL DATA

reed switch - wiring 0.372 n.o.
230 V AC 1A 50VA
plug DIN 43650-A
protection class IP 65



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water



gas/air



oil

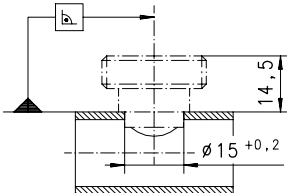
NOMENCLATURE

UR3K-	015	V	M	basic type
	015			● nominal diameter DN 15-20
	025			● nominal diameter DN 25-40
	050			● nominal diameter DN 50-80
		V		● welding socket
			M	● brass design
			K	● stainless steel design
Special option				<input type="checkbox"/> setting / adjustable ranges for oil or gas
VARIO				<input type="checkbox"/> contact for locking plug M12x1, 4-pole
				<input type="checkbox"/> minimal flow range

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

INSTALLATION RECOMMENDATIONS



Tube DIN 2448
standard wall thickness

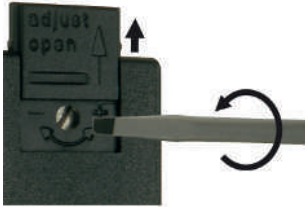
All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Instruments operate by a spring-supported paddle with magnetic triggering of a micro switch.

- * good repeatability
- * low pressure loss
- * dirt resistant
- * hermetic separation of electrical and hydraulic components
- * high switch capability



Female thread G3/8 to G2 brass/stainless steel



UM3K-015GM065

TECHNICAL DATA

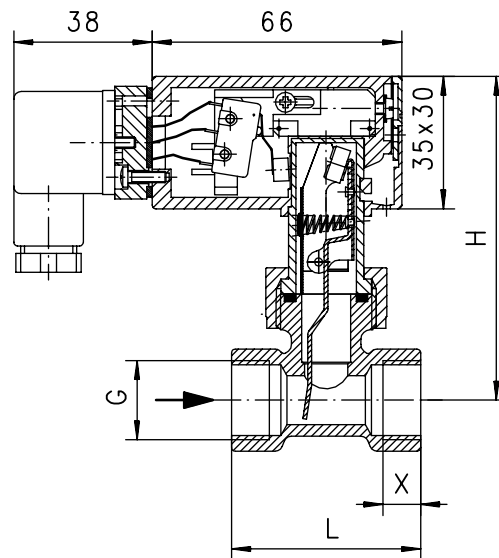
	G	Type	PN bar	Qmax. recom. l/min H ₂ O	adjustable range l/min H ₂ O	H mm	L mm	X mm	weight kg
brass	G 3/8	UM3K-010GM055	25	10	4 - 5.5	87	50	10	0.35
	G 1/2	UM3K-015GM070	25	20	5.5 - 7	87	50	10	0.35
	G 3/4	UM3K-020GM100	25	40	7.5 - 10	88	50	12	0.35
	G 1	UM3K-025GM180	25	60	14 - 18	92	50	12	0.40
	G 1 1/4	UM3K-032GM300	25	80	22 - 30	96	50	12	0.55
	G 1 1/2	UM3K-040GM500	25	100	37 - 50	99	50	12	0.60
	G 2	UM3K-050GM930	25	150	67 - 93	108	50	12	1.00
stainless steel	G 3/8	UM3K-010GK055	25	10	4 - 5.5	87	50	10	0.40
	G 1/2	UM3K-015GK070	25	20	5.5 - 7	87	50	10	0.41
	G 3/4	UM3K-020GK100	25	40	7.5 - 10	88	50	12	0.35
	G 1	UM3K-025GK180	25	60	14 - 18	92	50	12	0.45
	G 1 1/4	UM3K-032GK300	25	80	22 - 30	96	50	12	0.55
	G 1 1/2	UM3K-040GK500	25	100	37 - 50	99	50	12	0.70
	G 2	UM3K-050GK930	25	150	67 - 93	108	50	12	1.00

Adjustable range is indicated for horizontally decreasing flow.

tolerance	±15% of full scale
media temperature	max. 110°C
average pressure loss	0.01bar at Qmax.
hysteresis	depending on switch value minimum 0.7 l/min.

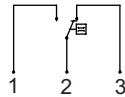
MATERIALS

	UM3K-...GM	UM3K-...GK
housing	brass Ms58 nickel plated	stainless steel 1.4305
body	brass Ms58 nickel plated	stainless steel 1.4571
paddle	stainless steel 1.4301 ; 1.4571	stainless steel 1.4301 ; 1.4571
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	oxyd 300	oxyd 300
seal	NBR	viton

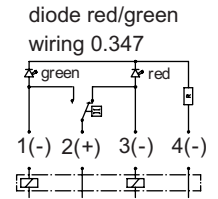
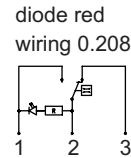
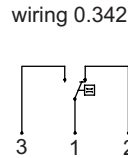


ELECTRICAL DATA

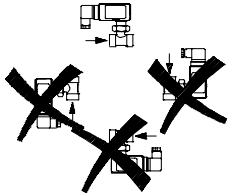
micro switch - wiring 0.371 change over
250 V AC 5 A
plug DIN 43650-A
protection class IP 65



OBASIC
Programme options

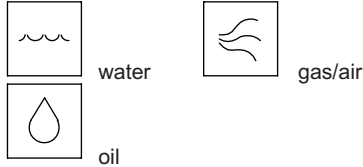


MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

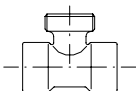
UM3K-	10	G	M	050		basic type
	10				●	specification
	15				●	DN 10 - G3/8
	20				●	DN 15 - G1/2
	25				●	DN 20 - G3/4
	32				●	DN 25 - G1
	40				●	DN 32 - G1 1/4
	50				●	DN 40 - G1 1/2
		G			●	DN 50 - G2
			M		●	female thread
			K		●	brass design
				055	●	stainless steel design
				070	●	4 - 5.5 l/min
				100	●	5.5 - 7 l/min
				018	●	7.5 - 10 l/min
				300	●	14 - 18 l/min
				500	●	22 - 30 l/min
				930	●	37 - 50 l/min
					○	67 - 93 l/min
Programme option					○	wiring 0.208 - diode red integrated in plug DIN 43650-A
BASIC					○	wiring 0.347 - diode red/green integrated in plug DIN 43650-A
					○	wiring 0.342
					○	gold-plated micro switch 125 V AC / 30 V DC / 100mA
Special option					□	setting / adjustable ranges for oil or gas
VARIO					□	contact for locking plug M12x1, 4-pole
					□	minimal flow range

IMPORTANT FOR YOUR ORDER

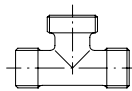
- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

HONSBERG COMBINATION SYSTEM

connection types for UM3K



female thread
brass
stainless steel



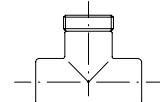
male thread
brass
POM



**welding, soldering
glue socket**
brass, stainless steel, PVC



solder fitting
copper



glue fitting
PVC

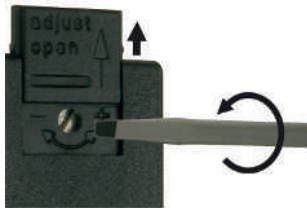
All technical changes reserved

IBASIC Standard ○OBASIC Programme option □VARIO Special option ⊕PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Instruments operate by a spring-supported paddel with magnetic triggering of a micro switch.

- * good repeatability
- * low pressure loss
- * dirt resistant
- * hermetic separation of electrical and hydraulic components
- * high switch capability
- * easy adjustment of switch



Welding/soldering socket DN15 to DN 80 brass/stainless steel



TECHNICAL DATA

UM3K-015VM

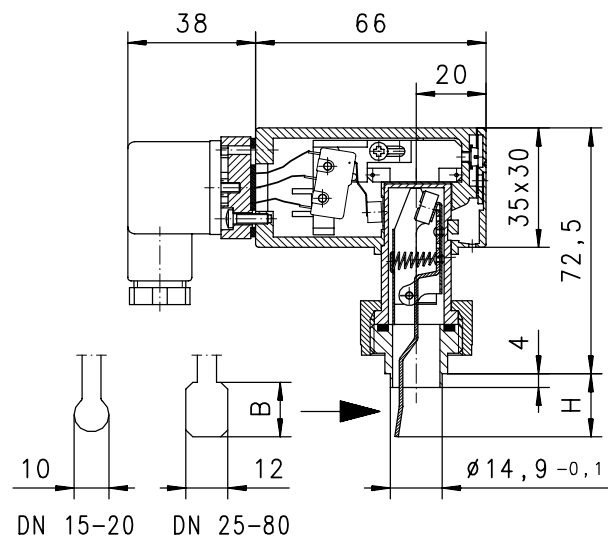
	DN	Type	PN bar	Qmax. recom. l/min H2O	adjustable range l/min H2O	H mm	D mm	A mm	B mm	weight kg
brass	15	UM3K-015VM	25	20	10 - 13	18.5	10	-	-	0.21
	20			40	17.5 - 22					
	25	UM3K-025VM	25	80	18 - 22.5	27.0	-	12	16	0.22
	32			100	44 - 55.5					
	40			150	55.5 - 72					
stainless steel	50	UM3K-050VM	25	200	75 - 90	40.5	-	12	19	0.23
	65			400	151 - 186					
	80			600	228 - 268					
	15	UM3K-015VK	25	20	10 - 13	18.5	10	-	-	0.21
	20			40	17.5 - 22					
	25	UM3K-025VK	25	80	18 - 22.5	27.0	-	12	16	0.22
	32			100	44 - 55.5					
40			150	55.5 - 72						
50	UM3K-050VK	25	200	75 - 90	40.5	-	12	19	0.23	
65			400	151 - 186						
80			600	228 - 268						

Adjustable range is indicated for horizontally decreasing flow. Calibrated in tube DIN2448 standard wall thickness.

tolerance	±15% of full scale
media temperature	max. 110°C
average pressure loss	0.01bar at Qmax.
hysteresis	depending on switch value minimum 0.7 l/min.

MATERIALS

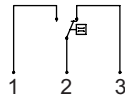
	UM3K-...VM	UM3K-...VK
socket	brass Ms58	stainless steel 1.4305
body	brass Ms58 nickel plated	stainless steel 1.4571
paddle	stainless steel 1.4301 ; 1.4571	stainless steel 1.4301 ; 1.4571
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	oxyd 300	oxyd 300
seal	NBR	viton



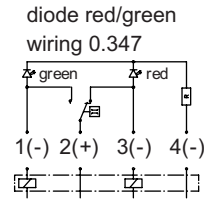
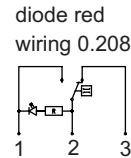
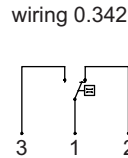
DN 15-20 DN 25-80

ELECTRICAL DATA

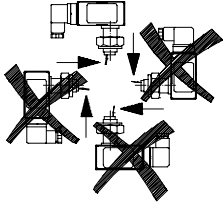
micro switch - wiring 0.371 change over
250 V AC 5 A
plug DIN 43650-A
protection class IP 65



OBASIC
Programme options



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water



gas/air



oil

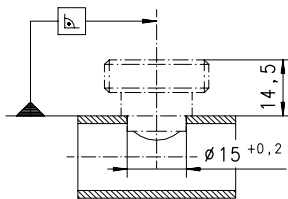
NOMENCLATURE

UM3K-	015	V	M	basic type specification
	015			● nominal diameter DN 15-20
	025			● nominal diameter DN 25-40
	050			● nominal diameter DN 50-80
		V		● welding socket
			M	● brass design
			K	● stainless steel design
Programme option BASIC				○ wiring 0.208 - diode red integrated in plug DIN 43650-A wiring 0.347 - diode red/green integrated in plug DIN 43650-A wiring 0.342 gold-plated micro switch 125 V AC / 30 V DC / 100mA
Special option VARIO				□ setting / adjustable ranges for oil or gas contact for locking plug M12x1, 4-pole minimal flow range

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

INSTALLATION RECOMMENDATIONS



Tube DIN 2448
standard wall thickness

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Instruments operate by a spring-supported paddle with magnetic triggering of a reed switch.

- * good repeatability
- * low pressure loss
- * dirt resistant
- * hermetic separation of electrical and hydraulic components
- * stress free fixation of switch unit by plastic cap

Female thread G3/8 to G2 brass/stainless steel



UR1-020GM

TECHNICAL DATA

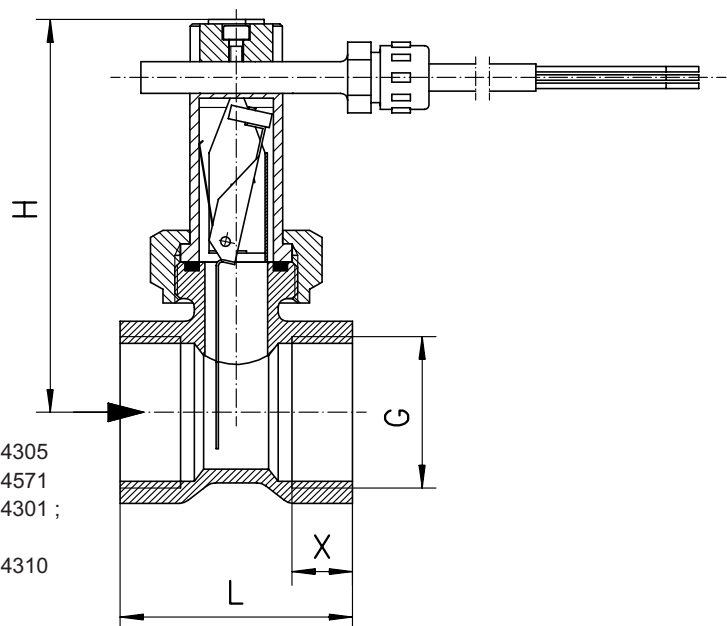
	G	Type	PN bar	Qmax.recom. l/min H ₂ O	adjustable range l/min H ₂ O	H mm	L mm	X mm	weight kg
brass	G 3/8	UR.-010GM	25	10	2.5 - 3.5	81	50	10	0,35
	G 1/2	UR.-015GM	25	20	4 - 4.5	81	50	10	0,35
	G 3/4	UR.-020GM	25	40	5 - 6	82	50	12	0,35
	G 1	UR.-025GM	25	60	9.5 - 11.5	86	50	12	0,40
	G 1 1/4	UR.-032GM	25	80	13.5 - 17.5	90	50	12	0,55
	G 1 1/2	UR.-040GM	25	100	30 - 38	93	50	12	0,60
	G 2	UR.-050GM	25	150	42 - 53	102	50	12	1,00
stainless steel	G 3/8	UR.-010GK	25	10	2.5 - 3.5	81	50	10	0,40
	G 1/2	UR.-015GK	25	20	4 - 4.5	81	50	10	0,41
	G 3/4	UR.-020GK	25	40	5 - 6	82	50	12	0,35
	G 1	UR.-025GK	25	60	9.5 - 11.5	86	50	12	0,45
	G 1 1/4	UR.-032GK	25	80	13.5 - 17.5	90	50	12	0,55
	G 1 1/2	UR.-040GK	25	100	30 - 38	93	50	12	0,70
	G 2	UR.-050GK	25	150	42 - 53	102	50	12	1,00

Adjustable range is indicated for horizontally decreasing flow.

tolerance	±15% of full scale
media temperature	max. 110°C
average pressure loss	0.01bar at Qmax.
hysteresis	depending on switch value minimum 0.7 l/min.

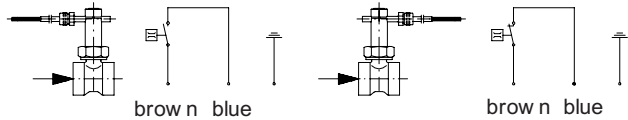
MATERIALS

	UR.-...GM	UR.-...GK
housing	brass Ms58	stainless steel 1.4305
body	brass Ms58	stainless steel 1.4571
paddle	stainless steel 1.4301 ; 1.4571	stainless steel 1.4301 ; 1.4571
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	oxyd 300	oxyd 300
seal	NBR	viton



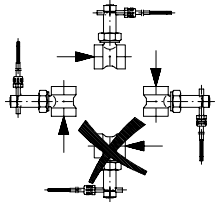
ELECTRICAL DATA

reed switch
wiring 0.225
n.c. or n.o. depending on installation position
230 V AC 1A 50VA
1.5 m cable
protection class IP 65



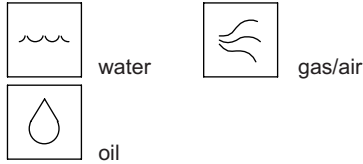
type UR2 (plastic switching unit) without earth

MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

UR1-	010	G	M			basic type
UR1-					●	switch unit brass
UR2-					○	switch unit and body plastic (PN10 - Tmax. 80°C - cable 0,5 m)
	010				●	nominal diameter DN 10 - G3/8
	015				●	DN 15 - G1/2
	020				●	DN 20 - G3/4
	025				●	DN 25 - G1
	032				●	DN 32 - G1 1/4
	040				●	DN 40 - G1 1/2
	050				●	DN 50 - G2
		G			●	female thread
			M		●	brass design
			K		●	stainless steel design
				A	○	⚠ switch unit ATEX (product information 92.1.U1)
Special option					☐	setting / adjustable ranges for oil or gas
VARIO						special cable length

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

SPECIAL APPLICATIONS



UR2 plastic
with fitting male thread plastic or brass G1/2A
or fitting female thread G3/8 - G2



UI without magnet for liquid substances
with ferrite contamination
with fitting male thread plastic or brass G1/2A
or fitting female thread G3/8 - G2

All technical changes reserved

●BASIC Standard ○BASIC Programme option ☐VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Instruments operate by a spring-supported paddel with magnetic triggering of a reed switch.

- * good repeatability
- * low pressure loss
- * dirt resistant
- * hermetic separation of electrical and hydraulic components
- * stress free fixation of switch unit by plastic cap

Welding/soldering socket DN15 to DN 80 brass/stainless steel



UR1-015VM

TECHNICAL DATA

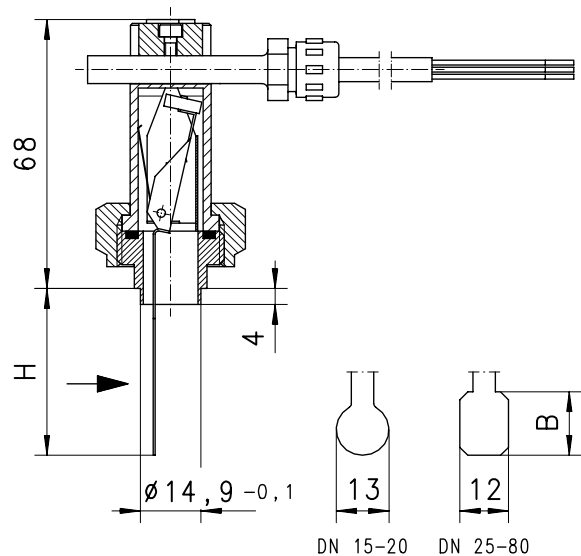
	DN	Type	PN bar	Qmax. recom. l/min H ₂ O	adjustable range l/min H ₂ O	H mm	D mm	A mm	B mm	weight kg
brass	15	UR.-015VM	25	20	5 - 6.5	18.0	13	-	-	0.21
	20			40	10 - 15.5					
	25	UR.-025VM	25	80	11 - 13	27.5	-	12	16	0.22
	32			100	26 - 33					
	40			150	37 - 42.5					
	50	UR.-050VM	25	200	47.5 - 60	42.0	-	12	19	0.23
stainless steel	65			400	95 - 117					
	80			600	147 - 179					
	15	UR.-015VK	25	20	4.6 - 6.3	18.0	13	-	-	0.21
	20			40	9.1 - 12					
	25	UR.-025VK	25	80	10 - 12.8	27.5	-	12	16	0.22
	32			100	23.7 - 32					
	40			150	33.7 - 41.2					
	50	UR.-050VK	25	200	43.2 - 58.2	42.0	-	12	19	0.23
65			400	86.5 - 113						
80			600	134 - 174						

Adjustable range is indicated for horizontally decreasing flow.
Calibrated in tube DIN2448 standard wall thickness.

tolerance	±15% of full scale
media temperature	max. 110°C
average pressure loss	0.01bar at Qmax.
hysteresis	depending on switch value minimum 0.7 l/min.

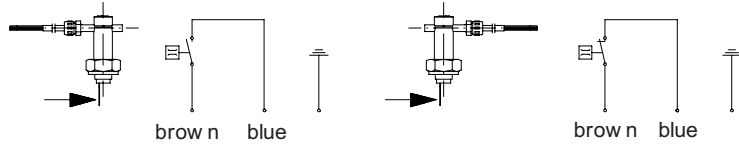
MATERIALS

	UR.-...VM	UR.-...VK
socket	brass Ms58	stainless steel 1.4305
body	brass Ms58	stainless steel 1.4571
paddle	stainless steel 1.4301 ; 1.4571	stainless steel 1.4301 ; 1.4571
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	oxyd 300	oxyd 300
seal	NBR	viton



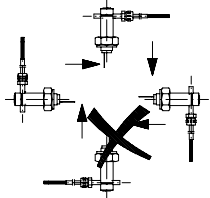
ELECTRICAL DATA

reed switch
wiring 0.225
n.c. or n.o. depending on installation position
230 V AC 1A 50VA
1.5 m cable
protection class IP 65



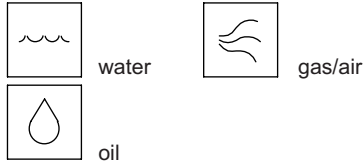
type UR2 (plastic switching unit) without earth

MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



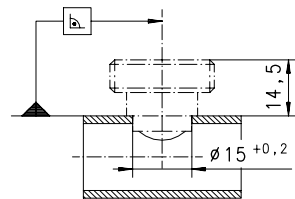
NOMENCLATURE

UR1-	015	V	M		basic type
UR1-					● switch unit brass
UR2-					○ switch unit and body plastic (PN10 - Tmax. 80°C - cable 0,5 m)
	015				● nominal diameter DN 15-20
	025				● nominal diameter DN 25-40
	050				● nominal diameter DN 50-80
		V			● welding socket
			M		● brass design
			K		● stainless steel design
				A	○ switch unit ATEX (product information 92.1.U1)
Special option					□ setting / adjustable ranges for oil or gas
VARIO					special cable length

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)
- With gaseous media indicate pressure (relative or absolute), temperature and metering substance (adjustable range on request)

INSTALLATION RECOMMENDATIONS



Tube DIN 2448
standard wall thickness

SPECIAL APPLICATIONS



UR1-015HM
body male thread G1/2A

UR1-032HM
body with union and
male thread G1/2A

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media. A bellow-supported paddle activates an adjustable micro switch.

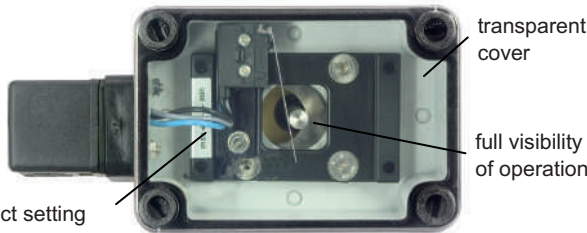
Male thread R1" brass/stainless steel
Socket flange DN32 brass/stainless steel

- * operational range a diameter 25-200
- * micro switch with "combination contact" gold coating for small currents and silver coating for larger currents
- * low pressure loss
- * visual functions control by transparent cover



UB1-032EM

UB1-025HM

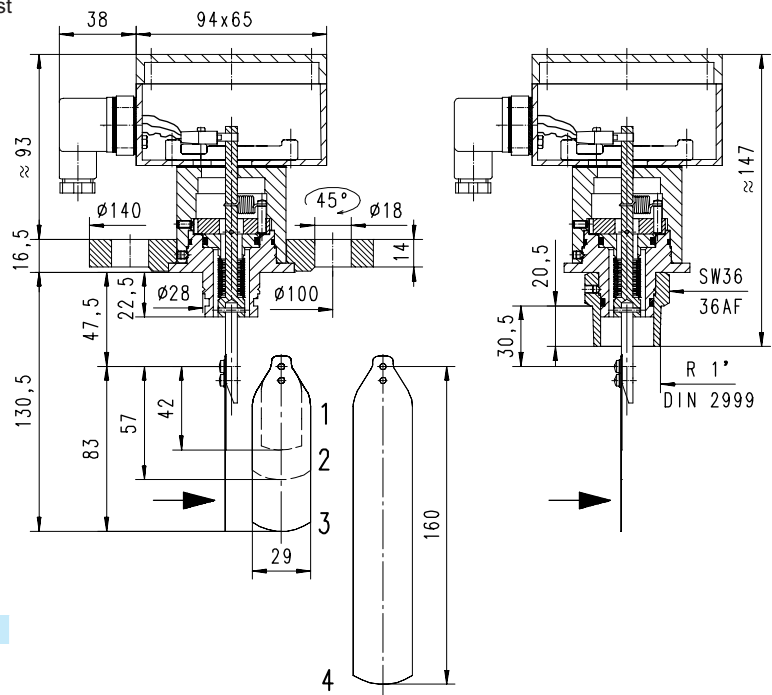


TECHNICAL DATA

DN	PN bar	Qmax. recom. m³/h H₂O	adjustable range m³/h H₂O			
			Paddel 1	Paddel 1,2	Paddel 1,2,3	Paddel 1,2,3,4
25	16	4	1.2 - 2.0	-	-	-
32	16	8	1.4 - 2.5	-	-	-
40	16	12	2.3 - 3.8	-	-	-
50	16	20	5.1 - 7.9	1.9 - 3.4	-	-
65	16	30	9.5 - 16.7	4.7 - 8.3	-	-
80	16	45	16.0 - 24.9	8.7 - 14.1	4.4 - 8.0	-
100	16	75	21.6 - 34.0	12.8 - 20.1	8.4 - 13.9	7.0 - 12.4

Adjustable range is indicated for horizontally decreasing flow.
DN 25-32 only male thread design, DN 125-200 on request

media temperature	max. 140°C
ambient temperature	-20..+70°C
tolerance	±15% of full scale
average pressure loss	0,08 bar at Qmax.
hysteresis	depending on switch value
weight	minimum 0.1 m³/h
	1.3 kg male thread design
	2.5 kg socket flange design



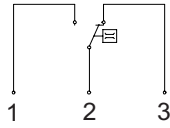
Attention! Paddle fixation not secured.
With critical conditions (i.e. vibration) please protect paddle screws.

WERKSTOFFE

	UB1-....M	UB1-....K		
housing	brass Ms58	s.s. 1.4305	Paddel 1 to adjusting for DN25	flange DIN 2527 nominal
paddle	s.s. 1.4305/1.4310	s.s. 1.4305/1.4310	Paddel 4 may be adjusted to pipe size	pressure 16 nominal diameter 32
bellow	s.s. 1.4541	s.s. 1.4541	DN 100 paddle lenght 92	sealing surface DIN 2526 form C
cap	PC	PC	DN 125 paddle lenght 117	Attention! Flange seal is not
flange/socket	Rg5/Ms	s.s. 1.4305	DN 150 paddle lenght 143	included in standard
seal	NBR	viton	from DN 175 original paddle lenght	shipment.

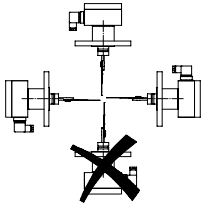
ELECTRICAL DATA

Micro switch with "combination contact" gold coating for small currents and silver coating for larger currents wiring 0.371 change over plug DIN 43650-A protection class IP 65



		A max. resistive	A max. inductive	A min.	
max.	250V AC/DC	6A	1,5A	min.	4V
	125V AC/DC	6A	2A		1mA
	24V DC	6A	5A		
	12V DC	6A	6A		

MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water



design stainless steel for aggressive liquids



oil

NOMENCLATURE

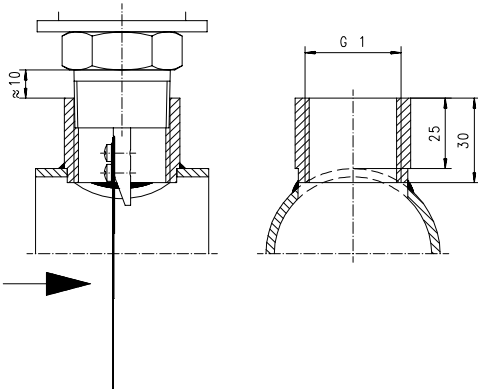
UB1-	025H	M	basic type specification
	025H		● male thread DN25 - R1"
	032E		● socket flange DN32
		M	● brass design
		K	● stainless steel design
Programme option BASIC			○ TÜV-approval 0000021402 contact for locking plug M12x1, 4-pole protection class IP 67 opaque cover

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)

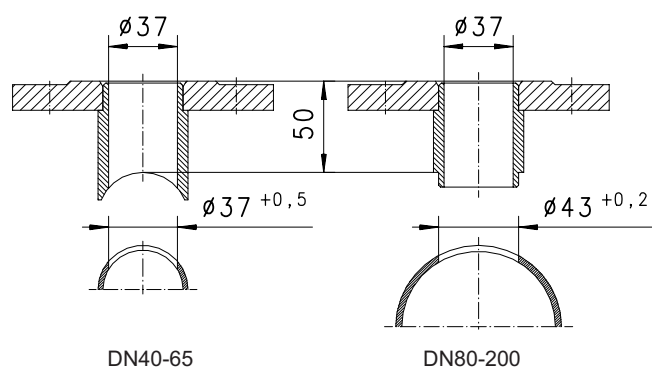
INSTALLATION RECOMMENDATIONS

Male thread design



tube DIN 2448 standard wall thickness

Socket flange design



tube DIN 2448 standard wall thickness

ACCESSORIES

The socket flanges as indicated in the installation recommendations are available in the Honsberg accessory range See product information 71.1 FL.



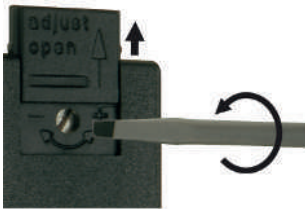
All technical changes reserved

- BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The instruments are working according to the technology of a spring and bellow supported paddle. Electrical contact effected by a micro switch.

- * nominal diameter 25-100
- * hermetic separation of electrical and hydraulic components
- * protection of functional components from liquid by rubber bellow
- * easy adjustment of switch



Male thread R1" brass/stainless steel



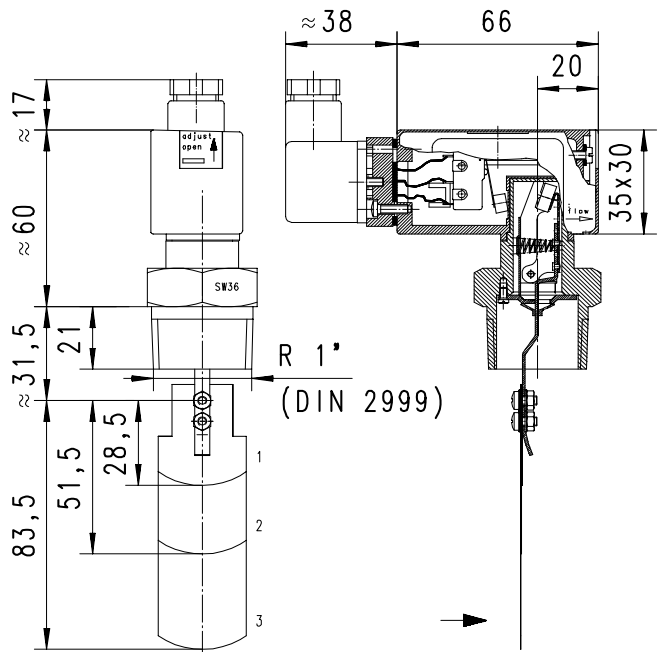
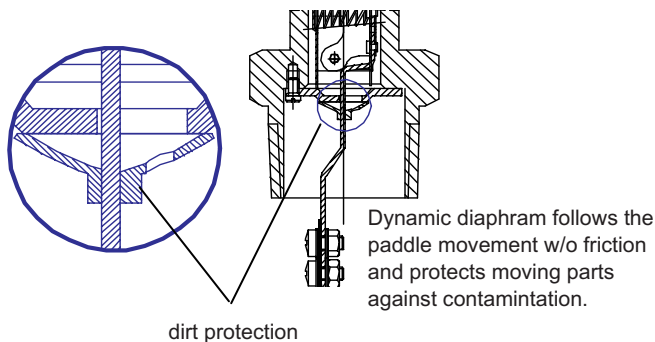
CM2K-025HM

TECHNICAL DATA

DN	PN bar	Qmax. recom. m³/h H₂O	adjustable range m³/h H₂O			
			paddle 1	paddle 1,2	paddle 1,2,3	paddle 1,2,3,4
25	25	3.6	0.9 - 1.0	-	-	-
32	25	6	2.3 - 2.7	-	-	-
40	25	9	2.8 - 3.4	-	-	-
50	25	15	6.5 - 7.5	1.9 - 2.4	-	-
65	25	24	11.4 - 13.3	4.8 - 5.7	-	-
80	25	36	16.5 - 18.9	7.6 - 8.9	2.7 - 3.5	-
100	25	60	26.3 - 30.3	13.3 - 15.3	6.7 - 8.4	5.4 - 6.7

Adjustable range is indicated for horizontally decreasing flow.

- tolerance ±15 % of full scale
- media temperature max. 110°C
- average pressure loss 0.15 bar at Qmax.
- hysteresis depending on switch value minimum 5 l/min.
- weight 0.35kg



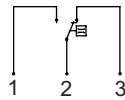
MATERIALS

	CM2K-025HM	CM2K-025HK
housing	brass Ms58 nickel plated	stainless steel 1.4571
paddle	stainless steel 1.4301 ; 1.4571	stainless steel 1.4301 ; 1.4571
bellow	NBR	NBR
protection	POM	POM
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	oxyd 300	oxyd 300

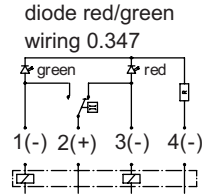
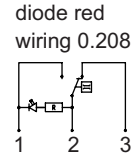
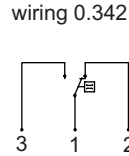
Attention! Paddle fixation not secured. With critical conditions (i.e. vibration) please protect paddle screws.
Paddel 1 to adjusted for DN25
Paddel 4 may be adjusted to pipe size DN 100 paddle lenght 92

ELECTRICAL DATA

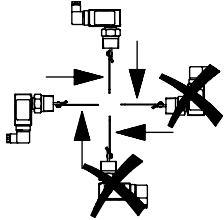
micro switch - wiring 0.371 change over
250 V AC 5 A
plug DIN 43650-A
protection class IP 65



OBASIC
Programme options

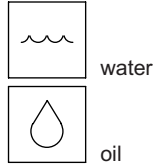


MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

CM2K-	025	H	M	basic type
	025			specification
		H		● connection thread DN25 - R1"
			M	● socket thread
			K	● brass design
				● stainless steel design
Programme option BASIC				○ wiring 0.208 - diode red integrated in plug DIN 43650-A wiring 0.347 - diode red/green integrated in plug DIN 43650-A wiring 0.342 gold-plated micro switch 125 V AC / 30 V DC / 100mA
Special option VARIO				□ setting / adjustable ranges for oil contact for locking plug M12x1, 4-pole

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Switch for liquids or gaseous media. A bellow-supported paddle activates an adjustable micro switch. Rugged design in brass or stainless steel.

- * operational range a diameter 25-200
- * good repeatability
- * low pressure loss

Male thread R1" brass/stainless steel



CRG-025HM

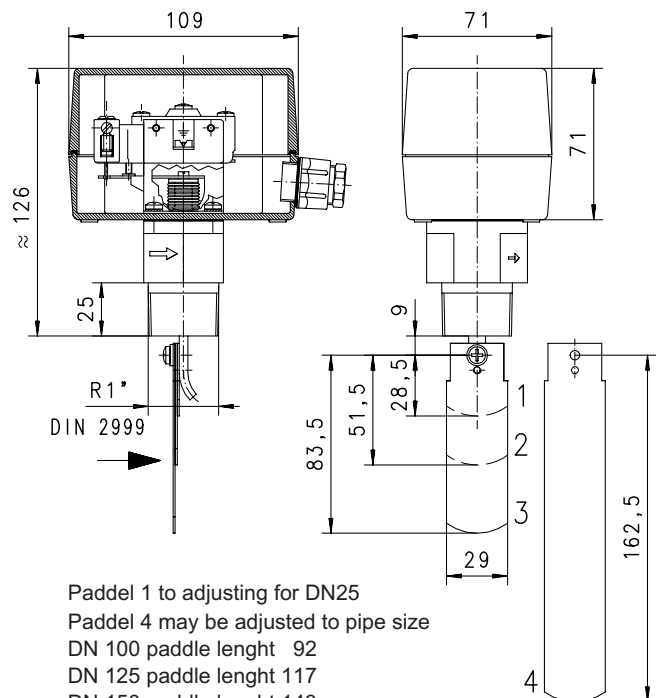
TECHNICAL DATA

DN	Qmax. recom. m³/h H₂O	adjustable range m³/h H₂O	adjustable range reduced m³/h H₂O	paddle
25	3.6	0.6 - 2.0	0.2 - 1.0	1
32	6	0.8 - 2.8	0.25- 1.4	1
40	9	1.1 - 3.7	0.5 - 1.9	1
50	15	2.2 - 5.7	0.9 - 3.6	1,2
65	24	2.7 - 6.5	1.2 - 4.9	1,2
80	36	4.3 - 10.7	2.1 - 7.4	1,2,3
100	60	11.4 - 27.7	4.9 - 17.1	1,2,3
	60	6.1 - 17.3	3.3 - 11.6	1,2,3,4
150	120	35.9 - 81.7	16.6 - 47.6	1,2,3
	120	12.3 - 30.6	6.1 - 21.4	1,2,3,4
200	240	72.6 - 165.7	25.7 - 90.1	1,2,3
	240	38.6 - 90.8	21.7 - 55.3	1,2,3,4

Adjustable range is indicated for horizontally decreasing flow.

pressure	CRG-025HM	11 bar static 11 bar dynamic
	CRG-025HK	30 bar static 11 bar dynamic
media temperature	max. 120°C	
average pressure loss	0.08bar at Qmax.	
hysteresis	depending on switch value minimum 0.1 l/min.	
weight	CRG-025HM	0.90kg
	CRG-025HK	0.95kg

Attention! Paddle fixation not secured.
With critical conditions (i.e. vibration) please
protect paddle screws.



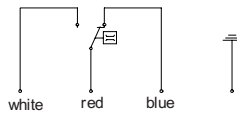
Paddel 1 to adjusting for DN25
Paddel 4 may be adjusted to pipe size
DN 100 paddle lenght 92
DN 125 paddle lenght 117
DN 150 paddle lenght 143
from DN 175 original paddle lenght

MATERIALS

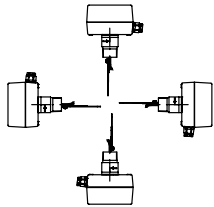
	CRE-025HM	CRE-025HK
housing	brass Ms58	stainless steel 1.4571
paddle	stainless steel 1.4571	stainless steel 1.4571
bellow	tombak	stainless steel 1.4571
cap	ABS	ABS

ELECTRICAL DATA

micro switch - wiring 0.374 change over
250 V AC 15(8) A
cable gland Pg11
protection class IP 65



MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



water
oil



design stainless steel CRG-025HK for aggressive liquids

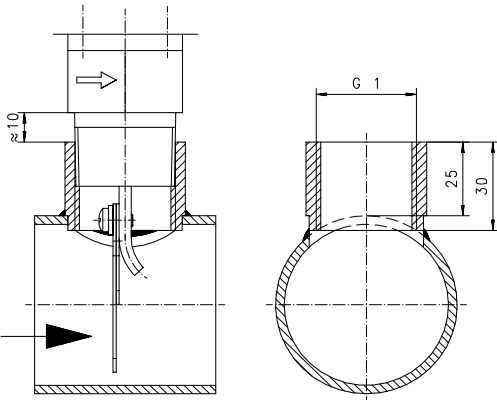
NOMENCLATURE

CRG-	025	H	M	S	basic type
	025				specification
		H			● connection thread DN25 - R1"
			M		● socket thread
			K		● brass design
				S	● stainless steel design
					● cable gland in cap
				R	○ reduced adjustable range
Special option					□ gold contacts 125 V AC / 1 A
VARIO					adjustment

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)

INSTALLATION RECOMMENDATIONS



tube DIN 2448 standard wall thickness

SPECIAL APPLICATIONS

flow switch
TÜV-approval



Request please the data sheet
3.1.CRE.

wind vane switch



Request please the data sheet
3.1.YR.



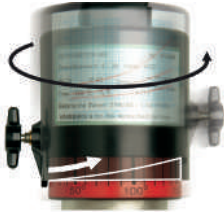
All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Instruments operate with a spring-supported paddle and magnetical triggering of an adjustable micro switch.

- * low pressure loss
- * high switch capability
- * exact setting of switch via scale



Socket flange DN40 to DN200 brass/stainless steel



VM-050EM300

TECHNICAL DATA

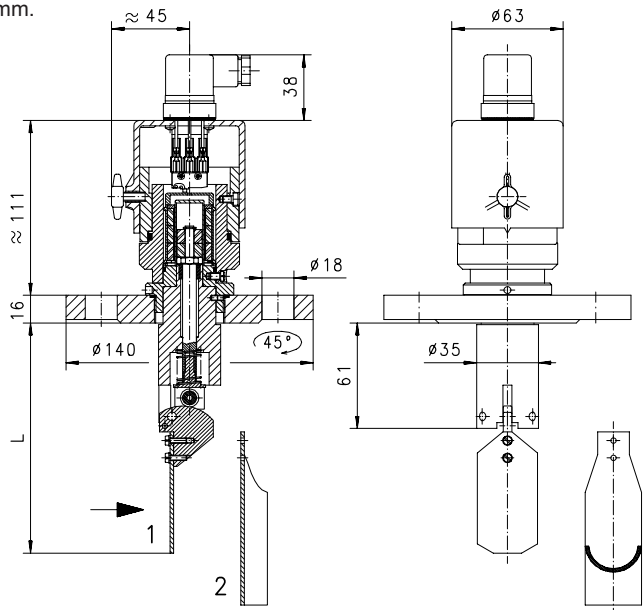
	DN	Type	PN bar	Qmax. recom. l/min H ₂ O	adjustable range l/min H ₂ O	paddle-form	L approx mm	weight kg
brass / stainless steel	40	VM-040E.150	16	250	40 - 150	1	93	3.0
	50	VM-050E.150	16	450	50 - 150	1	104	3.0
		VM-050E.300	16	450	100 - 300	1	96	3.0
	65	VM-065E.300	16	550	100 - 300	1	115	3.0
		VM-065E.375	16	550	125 - 375	1	90	3.0
	80	VM-080E.450	16	900	150 - 450	1	118	3.0
		VM-080E.600	16	900	200 - 600	1	115	3.0
	100	VM-100E.750	16	1400	250 - 750	2	158	3.0
		VM-100E.900	16	1400	300 - 900	2	122	3.0
	150	VM-150E.1500	16	2700	500 - 1500	2	198	3.0
		VM-150E.1800	16	2700	600 - 1800	2	198	3.0
	200	VM-200E.3000	16	5400	1000 - 3000	2	213	3.5
		VM-200E.3600	16	5400	1200 - 3600	2	213	3.5

Adjustable range is indicated for horizontally decreasing flow.
Calibrated in tube DIN2448 standard wall thickness, socket height 50mm.

tolerance	±5% of full scale
media temperature	max. 90°C
average pressure loss	0.1bar at Qmax.
hysteresis	depending on switch value minimum 5 l/min.

MATERIALS

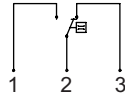
	VM-...EM	VM-...EK
flange	bronze Rg5	stainless steel 1.4571
body	brass Ms58 nickel plated	stainless steel 1.4305
paddle	stainless steel 1.4305 ; 1.4301	stainless steel 1.4305 ; 1.4301
components	up to DN 80 - stainless steel 1.4571 from DN100 - brass Ms58	
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	oxyd 300	oxyd 300
seal	NBR	viton



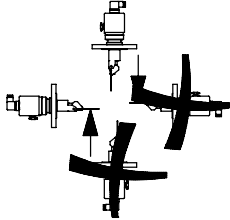
flange DIN 2527 nominal pressure 16 nominal diameter 32
sealing surface DIN 2526 form C
Attention! Flange seal is not included in standard shipment.

ELECTRICAL DATA

micro switch - wiring 0.213 change over
250 V AC 6 A
plug DIN 43650-A
protection class IP 44

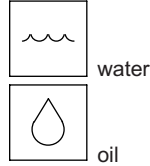


MOUNTING POSITION



Installation position may influence switch value.

METERING SUBSTANCES



NOMENCLATURE

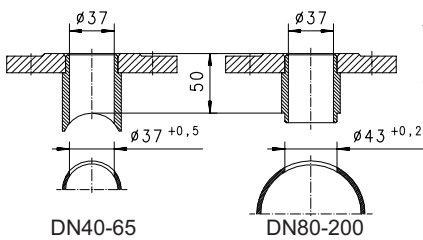
For combinations see table "technical data"

VM-	040	E	M	150		basic type
	040				●	specification
	050				●	DN 40
	065				●	DN 50
	080				●	DN 65
	100				●	DN 80
	150				●	DN 100
	200				●	DN 150
					●	DN 200
		E			●	socket flange
			M		●	brass design
			K		●	stainless steel design
				150	●	40(50) - 150 l/min
				300	●	100 - 300 l/min
				375	●	125 - 375 l/min
				450	●	150 - 450 l/min
				600	●	200 - 600 l/min
				750	●	250 - 750 l/min
				900	●	300 - 900 l/min
				1500	●	500 - 1500 l/min
				1800	●	600 - 1800 l/min
				3000	●	1000 - 3000 l/min
				3600	●	1200 - 3600 l/min
					A ○	switch head ATEX (product information 92.1.V2 + 92.1.V3)
Programme option					○	protection class IP 65
BASIC						nominal diameter DN 250-500
						gold-plated micro switch
						signal lamp
Special option					□	special flanges
VARIO						temperature up to 250°C (stainless steel) / up to 200°C (brass) type VMX

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and adjustable range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (adjustable range on request)

INSTALLATION RECOMMENDATIONS



tube Din 2448
standard
wall thickness

ACCESSORIES

The socket flanges as indicated in the installation recommendations are available in the Honsberg accessory range. See product information 71.1 FL.



All technical changes reserved

- BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flowmeter for liquids or gaseous media. With mechanical triggering of a metering unit with 270° of pointer range. Robust design, produced in materials brass or stainless steel.

- * local metering
- * low pressure loss
- * easy adjustment by indicating pointer



Socket flange DN40 to DN100 brass/stainless steel



TZ1-050EM300

TECHNICAL DATA

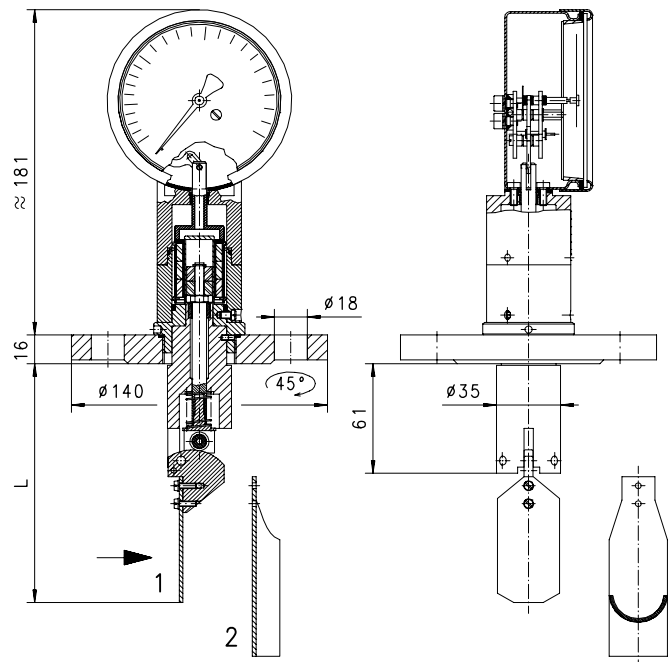
	DN	Type	PN bar	Qmax. recom. l/min H ₂ O	metering range l/min H ₂ O	paddle-form	L approx mm	weight kg
brass / stainless steel	40	TZ1-040E.250	16	450	50 - 250	1	93	3
		TZ1-040E.350	16	450	100 - 350	1	87	3
	50	TZ1-050E.350	16	450	80 - 350	1	98	3
		TZ1-050E.450	16	450	100 - 450	1	98	3
	65	TZ1-065E.350	16	550	100 - 350	1	111	3
		TZ1-065E.500	16	550	150 - 500	1	101	3
	80	TZ1-080E.450	16	900	130 - 450	1	126	3
		TZ1-080E.600	16	900	200 - 600	1	112	3
	100	TZ1-100E.800	16	1400	300 - 800	2	158	3
		TZ1-100E.1050	16	1400	350 - 1050	2	148	3

Metering range is indicated for horizontally increasing flow.
Calibrated in tube DIN2448 standard wall thickness, socket height 50mm.

tolerance	±5% of full scale
media temperature	max. 90°C
average pressure loss	0.1bar at Qmax.
hysteresis	depending on switch value minimum 5 l/min.

MATERIALS

	VM-...EM	VM-...EK
flange	bronze Rg5	stainless steel 1.4571
body	brass Ms58	stainless steel 1.4305
	nickel plated	
paddle	stainless steel 1.4305 ; 1.4301	stainless steel 1.4305 ; 1.4301
components	up to DN 80 - stainless steel 1.4571 from DN100 - brass Ms58	
spring	stainless steel 1.4310	stainless steel 1.4310
magnet	oxyd 300	oxyd 300
seal	NBR	viton



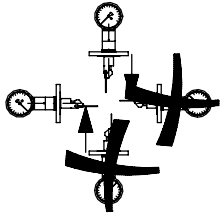
flange DIN 2527 nominal pressure 16 nominal diameter 32
sealing surface DIN 2526 form C
Attention! Flange seal is not included in standard shipment.

ELECTRICAL DATA

● **BASIC Standard**
No electrical components.

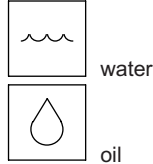
○ **BASIC Programme option**
integrated micro switch
with front switch units
see data sheet 1.3.TZ1.ZE

MOUNTING POSITION



Installation position may influence metering range.

METERING SUBSTANCES



water
oil

NOMENCLATURE

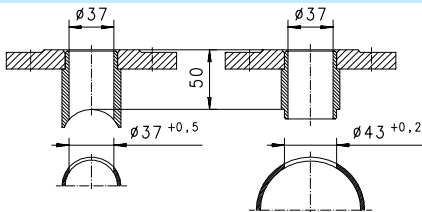
For combinations see table "technical data".

TZ1-	040	E	M	250		basic type
TZ1-					●	Flowmeter
TZ1M-					○	Flowmeter with integrated micro switch
	040				●	DN 40
	050				●	DN 50
	065				●	DN 65
	080				●	DN 80
	100				●	DN 100
		E			●	socket flange
			M		●	brass design
			K		●	stainless steel design
				250	●	50 - 250 l/min
				350	●	(80) 100 - 350 l/min
				450	●	(100) 130 - 450 l/min
				500	●	150 - 500 l/min
				600	●	200 - 600 l/min
				800	●	300 - 800 l/min
				1050	●	350 - 1050 l/min
Programme option					○	front switch unit with 10-kOhm-potentiometer
BASIC						diode
						nominal diameter DN 125-500
Special option					□	special ranges
VARIO						metering range for oil
						front switch unit 2pol, n.o. or n.c.

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and metering range with your order.
- With viscous liquids please indicate viscosity, temperature and metering substance (metering range on request)
- For additional information concerning options micro switch and front switch see data sheet 1.3.TZ1M.ZE.

INSTALLATION RECOMMENDATIONS



DN40-65

DN80-200

tube Din 2448
standard wall thickness

ACCESSORIES

The socket flanges as indicated in the installation recommendations are available in the Honsberg accessory range. See product information 71.1 FL.



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flowmeter for liquids. A bellow-supported paddle activates a metering unit with a pointer range of 270°. Rugged design in brass or stainless steel.

- * local metering
- * low pressure loss
- * good repeatability
- * dirt-resistant
- * easy adjustment by indicating pointer



Female thread G1/2 to G2 brass/stainless steel

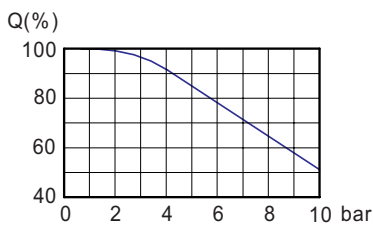


TECHNICAL DATA

UZ-025GM100

	G	Type	Qmax. recom. l/min H ₂ O	metering range l/min H ₂ O ; 1bar abs				H mm	L mm	AF mm	X mm	weight kg
				flow from								
				left		right (optional)						
brass	G 1/2	UZ-015GM...	60	3 - 50		2 - 35		201	70	30	16	2.0
	G 3/4	UZ-020GM...	100	4 - 60		4 - 45	6 - 70	206	74	36	18	2.0
	G 1	UZ-025GM...	200	4 - 60	10 - 100	4 - 50	10 - 100	201	87	46	19	2.5
	G 1 1/4	UZ-032GM...	300	10 - 100	20 - 200	10 - 100	20 - 200	209	104	55	22	3.0
	G 1 1/2	UZ-040GM...	400	20 - 200	10 - 300	20 - 200	10 - 300	215	111	65	24	4.5
	G 2	UZ-050GM...	600	20 - 300	30 - 500	60 - 300	100 - 500	227	130	70	28	5.0
stainless steel	G 1/2	UZ-015GK...	60	3 - 50		2 - 35		201	70	30	16	2.0
	G 3/4	UZ-020GK...	100	4 - 60		4 - 45	6 - 70	206	74	36	18	2.0
	G 1	UZ-025GK...	200	4 - 60	10 - 100	4 - 50	10 - 100	201	87	46	19	2.5
	G 1 1/4	UZ-032GK...	300	10 - 100	20 - 200	10 - 100	20 - 200	209	104	55	22	3.0
	G 1 1/2	UZ-040GK...	400	20 - 200	10 - 300	20 - 200	10 - 300	215	111	65	24	4.5
	G 2	UZ-050GK...	600	20 - 300	30 - 500	60 - 300	100 - 500	227	130	70	28	5.0

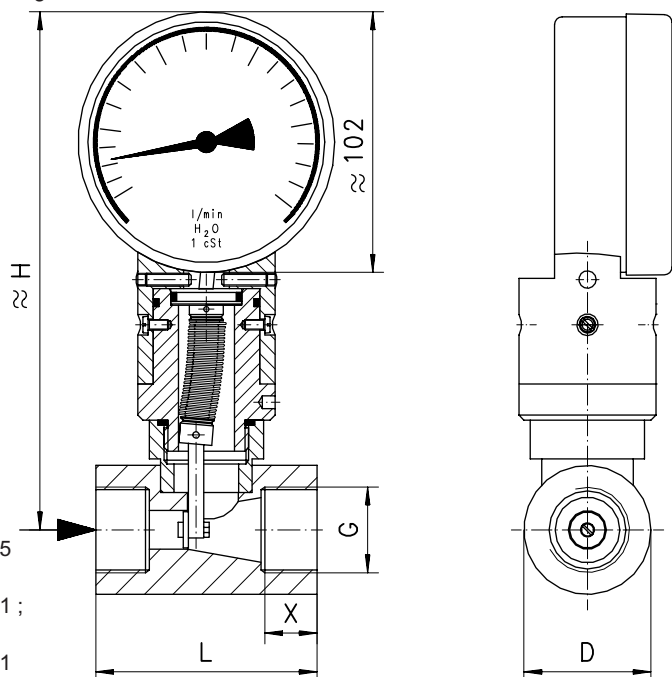
Metering range is indicated for horizontally increasing flow.
Please notice the pressure-dependent deviation of the indication range.



- tolerance ±3% of full scale
- pressure range 16 bar static
6 bar dynamic
- media temperature max. 100°C
- average pressure loss 0.2 bar at Qmax.

MATERIALS

	UZ-...GM	UZ-...GK
housing	brass Ms58 nickel plated	stainless steel 1.4305
paddle	stainless steel 1.4571 ; 1.4305	stainless steel 1.4571 ; 1.4305
bellow	stainless steel 1.4571	stainless steel 1.4571



ELECTRICAL DATA

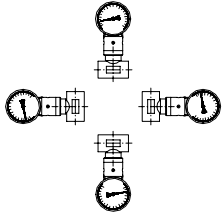
● **BASIC Standard**

No electrical components.

○ **BASIC Programme option**

integrated micro switch
with front switch units
see next page.

MOUNTING POSITION



Installation position may influence metering range.

METERING SUBSTANCES



water

oil

NOMENCLATURE

For combinations see table "technical data".

UZ-	015	G	M	035		basic type
UZ-					●	Flowmeter
UZM-					○	Flowmeter with integrated micro switch
	015				●	DN 15 - G1/2
	020				●	DN 20 - G3/4
	025				●	DN 25 - G1
	032				●	DN 32 - G1 1/4
	040				●	DN 40 - G1 1/2
	050				●	DN 50 - G2
		G			●	socket flange
			M		●	brass design
			K		●	stainless steel design
				035	○	35 l/min of full scale
				045	○	45 l/min of full scale
				050	●	50 l/min of full scale
				060	●	60 l/min of full scale
				070	○	70 l/min of full scale
				100	●	100 l/min of full scale
				200	●	200 l/min of full scale
				300	●	300 l/min of full scale
				500	●	500 l/min of full scale
Programme option					○	front switch unit with 10-kOhm-potentiometer
BASIC						
Special option					□	metering range for oil or gas
VARIO						front switch unit 2pol, n.o. or n.c. flange design

IMPORTANT FOR YOUR ORDER

- Please indicate flow direction, metering substance and metering range with your order
With pressure >1 bars abs please require metering range.
- With viscous liquids please indicate viscosity, temperature and metering substanc, e.g. ISO VG 68 (metering range on request)

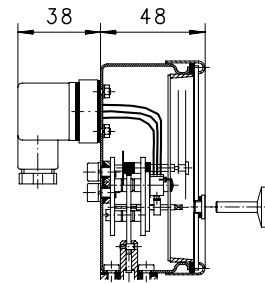
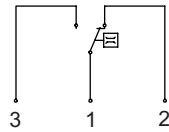
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

OPTION

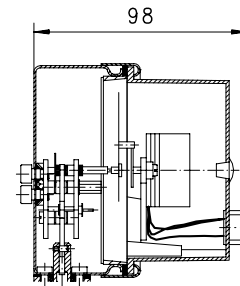
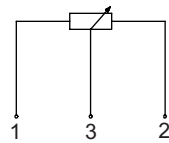
○ **UZM-** integrated micro switch

wiring 0.342 change over
250 V AC 5 A
plug DIN 43650-A
protection class IP 65



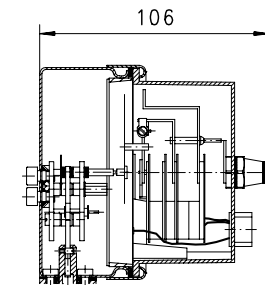
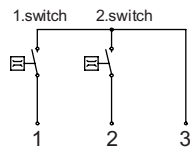
○ **UZP-** front switch unit with 10-kOhm- potentiometer

wiring 0.269
50 V DC 100 mA 1.5 W
resistance max. 10 kΩ
additional tolerance ±3 %
resistance tolerance ±1 %
linearity ±0.3 %
plug Hirschmann G4
protection class IP 60



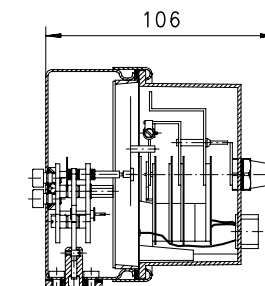
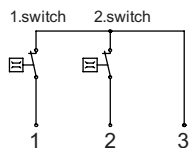
□ **UZM2-** switch unit with 2pole n.o.

wiring 0.268
250 V AC 0.6 A 50 VA
plug Hirschmann G4
protection class IP 60



□ **UZM3-** switch unit with 2pole n.c.

wiring 0.285
250 V AC 0.6 A 50 VA
plug Hirschmann G4
protection class IP 60



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

A thin, spring-mounted shutter that covers the entire flow cross-section is displaced by the flow of the liquid. The shutter has a magnet that creates a changing magnetic field when the shutter is displaced. This field is detected by an analogue hall-sensor. Due to the spring properties of the shutter and a molded stop, even strong water impacts can be withstood. The low number of parts coming into contact with media guarantees low soiling properties and reliable operation.

- * fast response time
- * large overload security
- * measurement range 1:80!
- * low pressure loss
- * compact dimension

Female thread G1/4 to G3/4 brass



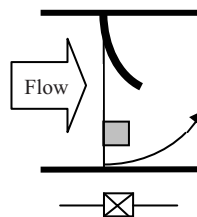
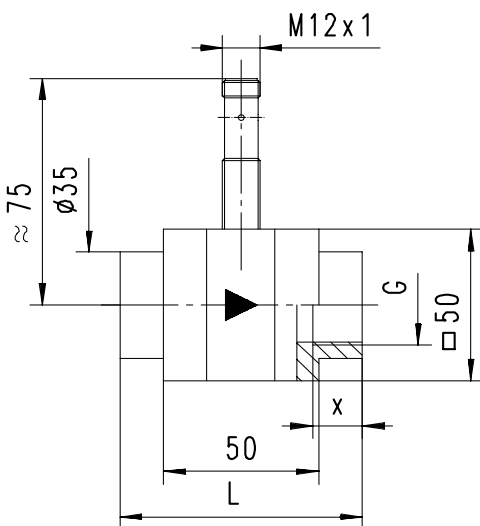
XF-020GMI080S

TECHNICAL DATA

G	Type	PN bar	range l/min H ₂ O	L mm	X mm	weight kg
G 1/4	XF-008GM.	16	1 - 15 l/min	74	12	0.60
G 3/8	XF-010GM.	16	1 - 25 l/min	74	12	0.60
G 1/2	XF-015GM.	16	1 - 50 l/min	78	14	0.60
G 3/4	XF-020GM.	16	1 - 80 l/min	82	16	0.65

tolerance 3% of measured value
minimum 0.25 l/min
media temperature 0..70°C
average pressure loss 0.5 bar at top of range

Since the shutter functions only through bending without a rotary bearing, there are no friction effects and thus a very small hysteresis and good reproducibility of the measurement results or switching point. The low mass and evaluation of the entire flow cross-section are responsible for the fast response time and unproblematic pipeline routing.



The extremely bendable shutter is flush with a stop and can thus never be overstretched by water impacts.

OPERATION

It has to be observed, that the sensor is installed in the direction of the flow arrow. Despite its low mass, the shutter is very robust. In case of disassembly or mounting, however, it still should not be forcibly bent or compressed.

The housing screws go through the entire housing and have to be removed completely when the sensor head is exchanged. After that, the body, as usual in the case of a flange part, can be removed without loosening the screw connection. If return flows occur, please ask about alternatives!

MATERIAL

housing PPS
connection brass nickel plated
flap s.s. 1.4031k
flap fastener PVDF
indicator cobalt samarium
sealing viton

ELECTRICAL DATA

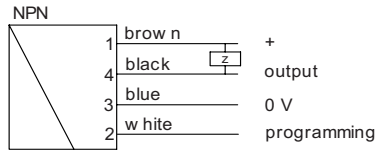
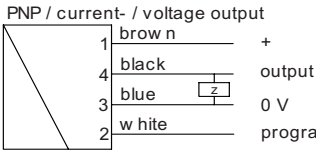
supply voltage 10..30 V DC
connection for locking plug M12x1, 4-pole
short-circuit proof yes
reverse polarity proof yes
protection class IP 67

current - / voltage output

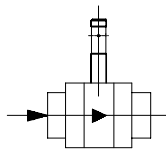
idle current 100 mA
output current 4..20 mA
output voltage 0..10V

frequency output / programmable switch

idle current < 20 mA (without load)
output push-pull (PNP and NPN)
output frequency 10..2000 Hz



MOUNTING POSITION



The sensor can be operated in any position. The shutter has the lowest tendency towards soiling, however, when it swings from the bottom to the top. The installation position influences the adjusting range!

METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data".

XF-	008	G	M	R	015	S	basic type specification
	008						● nominal diameter DN 8
	010						● nominal diameter DN 10
	015						● nominal diameter DN 15
	020						● nominal diameter DN 20
		G					● female thread
		A					○ male thread
			M				● connection material brass
			K				○ connection material stainless steel
			P				○ connection material POM
				U			● voltage output 0..10V
				I			● current output 4..20mA
				F			● frequency output
				S			● programmable switch (push-pull = PNP and NPN)
				E			● output at suburb electronics (e.g. omni-XF)
				R			○ reed switch change over (on request)
				P			○ proximity switch PNP n.o. (on request)
				N			○ proximity switch NPN n.o. (on request)
					015		● range 1 - 15 l/min
					025		● range 1 - 25 l/min
					050		● range 1 - 50 l/min
					080		● range 1 - 80 l/min
						S	● connection at locking plugs M12x1, 4-pole

COMBINATIONS

omni-XF

local electronic unit,
2x push-pull-switch
4(0)..20mA output
graphical LCD display with flashing LED
program ring



Flex-XF

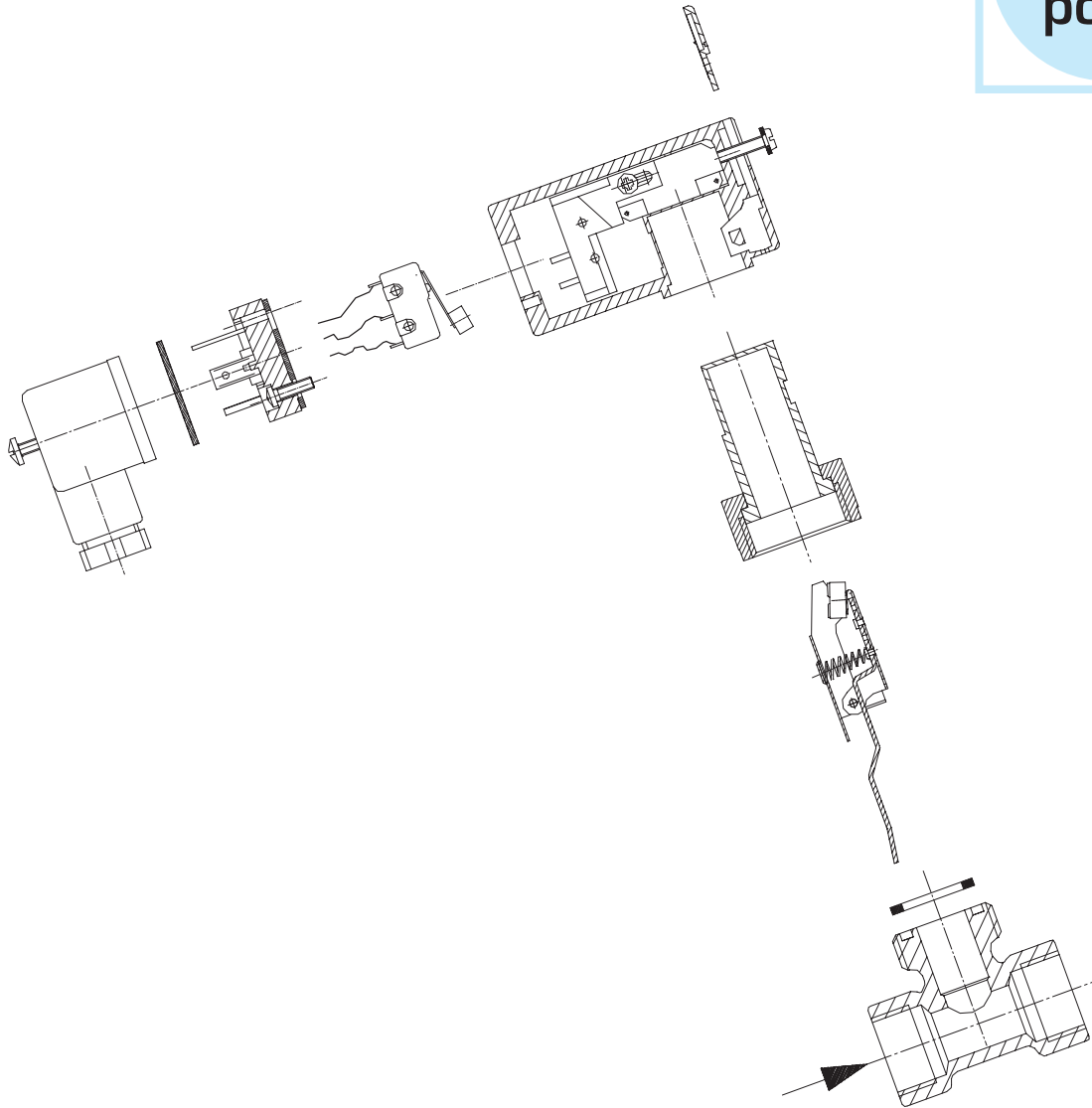
switching and frequency output
0..10V or 4..20mA
pnp, npn



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

Why to use a paddle instrument



- **Magnetic triggering of a fully separated micro switch**
 - **Stainless steel paddle and spring support**
 - **Magnetic link**
 - **optional fitting or cap nut**
- **high switch performance, no relays**
 - **versatility in installation and liquid selection**
 - **without mechanical interference**
 - **for direct pipe installation**

Where to use a **HONSBERG BASIC** paddle instrument

info
point

Market segments

- **Boilers**
- **Transformers**
- **Swimming pools**
- **Pumps**
- **Burners**
- **Engine**
- **High transportation speed**

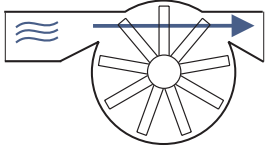


Application

- **Command of the diverter valve in combi boilers**
- **Alarm in transformers in case of missing oil lubrication**
- **Control of chemical additives in commercial pools**
- **Shut off burners in case of water failure**

Rotor, turbine, gear wheel, oval wheel

The technology



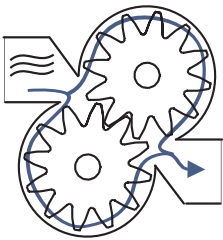
Rotor

The medium drives the rotor in a housing. A proximity switch (in the form of a Hall, inductive or optical sensor depending on the housing) detects the rotor blade tips which are equipped with metal or magnets. The flow speed is proportional to the detected frequency.



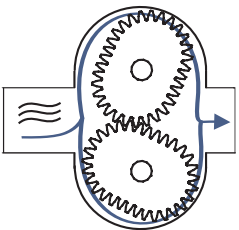
Turbine

The medium drives the turbine in a housing. A down-flow Hall sensor detects the ferromagnetic blades of the turbine. The flow speed is proportional to the detected frequency.



Gear wheel

The medium fills the defined space between the gear wheels and turns the toothed wheels depending on the volume flow. A down-flow Hall sensor detects one pulse per gear wheel volume space transported. The volume is proportional to the detected frequency.



Oval wheel

The medium fills the defined space between the oval wheels and turns the toothed wheels depending on the volume flow. An inductive sensor detects one pulse per gear wheel volume space transported. The volume is proportional to the detected frequency.

Application

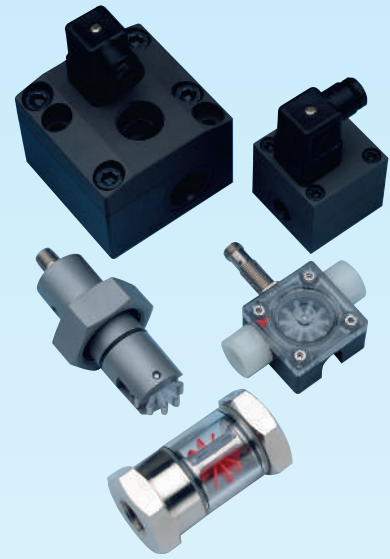
- Use as flow transmitter for liquid metering materials and viscous media in industrial applications
- Visual flow control of liquids and gases

Advantages

- Simple, reliable structure
- Pulse transmission

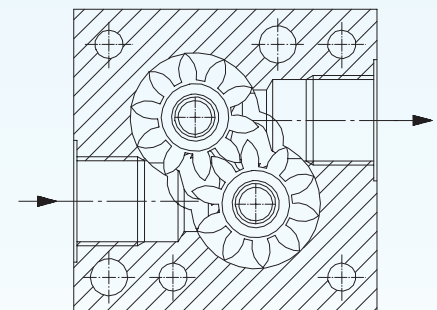
Technical data

Concept	Housing or probe
Nominal diameter	6 - 150
Connection	female thread, hose nozzle or stub-connection
PN	6 - 250
Max. temperature	100 °C
Signal	frequency, current, voltage
Adjustable	-
Materials	brass, stainless steel, aluminium, plastic
Enstallation position	any
Metering materials	liquids, optional air/gases

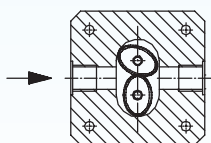
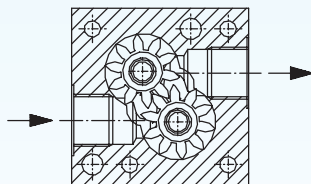
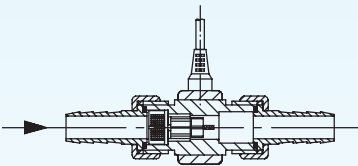
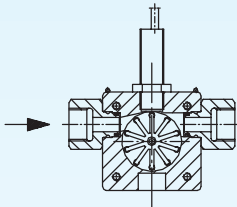
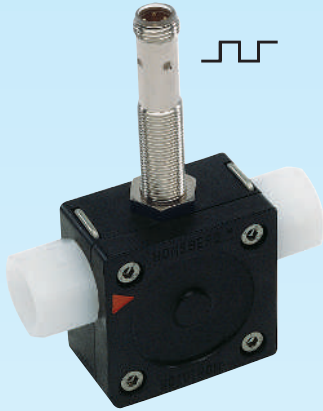


Contents

System description	
Device systems	162
Output signals	163
Function and advantages	163
Metering materials and accuracy	164
Handling and operation	164
Combination with transducers	164
Device descriptions	165



- Switching
- Indicating
- Metering



System description

Device systems

The Honsberg device systems rotor, turbine, gear wheel and oval wheel are used for flow indication systems and continuous flow metering. The primary component is the rotor or turbine, gear wheel or oval wheel situated in the liquid chamber. What these primary elements have in common is that the medium which enters the space causes the element to revolve directly proportionally to the flow rate, thus allowing visual indication of the flow rate via the revolution or producing a linear output signal dependent on the flow by activating sensors.

Appropriately integrated circuits used in place of basic sensors produce frequency modulating signals, switching signals or 4...20 mA outputs.

	Rotor	Turbine	Gear wheel	Oval wheel
Accuracy	± 3% Measured value	± 1% Final value	± 3% Measured value	± 2.5% Final value
Liquids	+	+	+	+
Gases	optional	optional	-	-
Viscosity compensated	up to 10 mm ² /s	up to 15 mm ² /s	+	+
Ranges l/min	0.1-1000	0.1-1130	0.02-1501	0.3-40
Max. Temperature °C	100	90	120	60

Rotor

The rotor is a rotary element positioned frontally arranged with positive locking on a bearing-supported axis. It is set in rotary motion by the flow.

Turbine

The turbine is a rotary element with linear blade orientation to flow direction and rotate proportionally to the flow around an axis positioned in flow direction.

Gear wheel

A metal pair of gear wheels rotates around a metal axis in a metal housing. Viscosity stability is given thanks due to volumetric operation.

Oval wheel

A plastic pair of oval wheels rotates around a metal axis. Viscosity stability is given due to volumetric operation.

Output signals

Display

The medium enters the device housing and causes the visible rotor to rotate. The revolution frequency can be used to make an indicative statement about the current flow rate. Some of the primary components are bedded friction-free in high-quality plastic bearings and are also used for gases if the shaft is arranged into mini ball bearings.

Sensors

	Inductive	Hall	Optical
No magnets in the wetted area	+	-	+
No metals in the wetted area	-	-	+
High pressure stages	-	+	-

Inductive

A rotor/turbine/oval wheel with metal fittings is bedded via a ceramic axis in ceramic bearings. The revolutions are picked up by the external inductive sensor and thus produce a linear frequency signal which corresponds to the flow rate.

Hall

This is a magnetically triggered sensor which can be used in cases when a metal housing has to be used on account of the existing pressure conditions. For this purpose the rotor/turbine/gear wheel/oval wheel are fitted with magnets which trigger the Hall sensor.

Optical

When an optical sensor is used, the rotation frequency of the rotor blades is detected without further triggering elements being necessary. On account of the material choice, these devices are usually used for problematic metering material environments.

Function and advantages

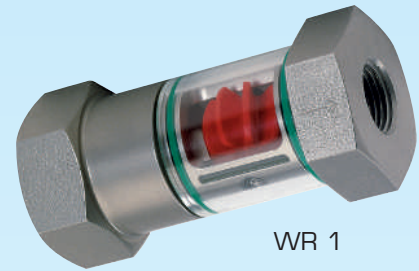
The devices detect the revolution of the flow-dependent primary element using matching mechanical and sensor components.

The devices have the advantage of being able to be used for a very wide range of industrial metering applications.

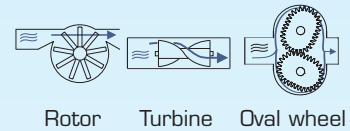
Numerous materials and sensor systems provide the solution of such different metering problems as:

- aggressive metering materials
- high pressure ranges
- changes in viscosity

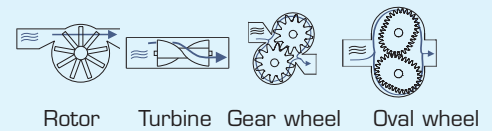
The devices cover a measuring range of 0.02 - 1130 l/min in the nominal diameters 8 - 150.



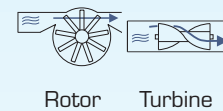
WR 1



Rotor Turbine Oval wheel



Rotor Turbine Gear wheel Oval wheel



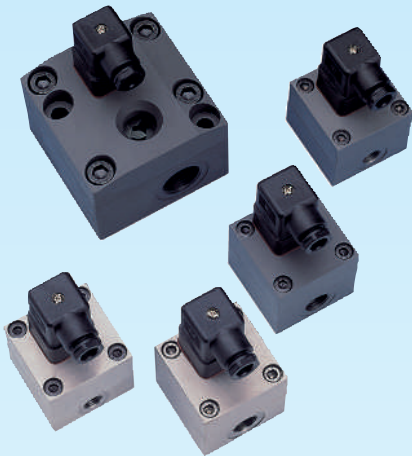
Rotor Turbine



RO



RRI-O32
DN 65



VHZ group

Metering materials and accuracies

The products described are primarily used with liquids. Volumetric systems such as gear wheel or oval wheel should be chosen for viscous metering materials from 10 mm²/s.

Gear wheel / oval wheel = volumetric system

The liquid volume per tooth does not depend on viscosity, making the metering result independent of viscosity.

Example:

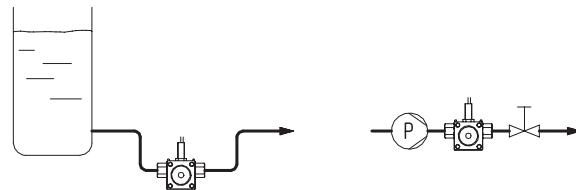
Volume	Viscosity	Flow rate
30 cm ³	1 mm ² /s	5.0 l/min
30 cm ³	115 mm ² /s	5.0 l/min

no deviation

Accuracies are in the range of 1-3 % depending on the specific version used.

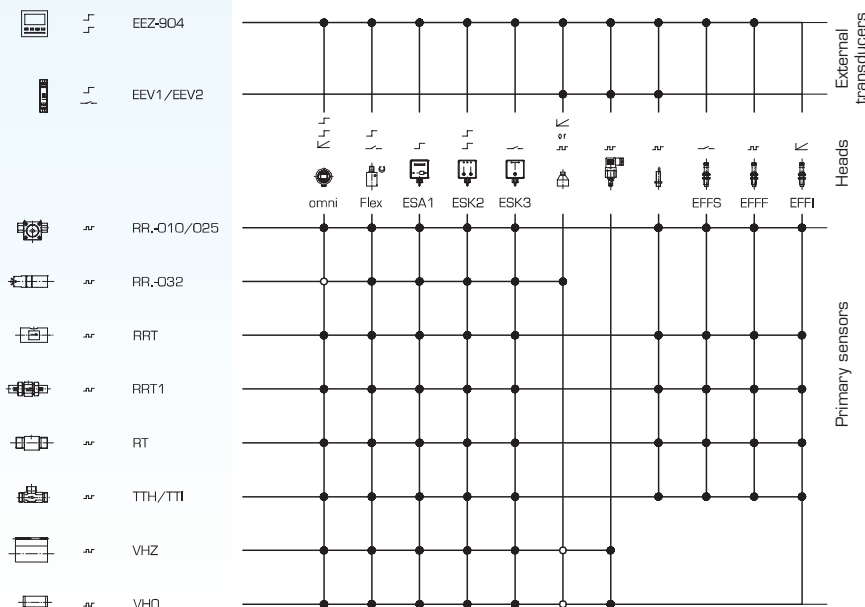
Handling and operation




















For rotors and turbines, the inner diameter of the connection pipe always has to be greater than the inlet port of the flow meter. It is mandatory that the flow meter is always filled with medium, and remains filled. Any installation position is possible, but the position which allows the best possible venting should be chosen [flow horizontal or from bottom to top]. Note! Air bubbles have a great influence on metering results, as with any flow meter!



Always keep the rotor under medium

Combination with transducers



	type	nominal diameter	connection	control	indication	output signal	on site metering	max. pressure bar	max. temperature °C	water	oil	gas/air	aggressive	miscellaneous	page
rotor	 PO	10 - 25	female thread plastic		●			16	60	●	✓	□			166
	 FR	15 - 25	female thread bronze		●			16	100	●	✓				167
	 RM	8 - 25	female thread bronze		●			16	100	●	✓				168
	 WR1	8 - 40	female thread brass female thread stainless steel			●		16 16	100 100	●	✓	□			169
	 RA	8	male thread POM male thread HALAR	●				10 10	55 55	●	✓				170
	 RH	8	male thread POM nozzle Ø8 POM	●				10 5	80 80	●	✓				172
	 RRI	10 - 25	female thread plastic	○	○	●	○	16	60	●	✓	□			174
	 RRH	10 - 25	female thread brass female thread stainless steel	○	○	●	○	100 100	100 100	●	✓	□			176
	 RRO	10 - 25	female thread plastic	○	○	●	○	16	60	●	✓	□	✓		178
	 RR.-32	32 - 150 50 - 150	pipe PVC assembly clamp saddle PP assembly screwed-in probe welded socket VA	○		●		10 10 10 100	60 60 60 100	●	✓	□			180
turbine	 HV	8 - 25	female thread brass		●			10	100	●	✓				183
	 RO	5 - 15	nozzle plastic		●		6	85	●	✓			filter	184	
	 RRF	10	female thread plastic			●		14	100	●	✓				185
	 RRT	20	female thread plastic female thread brass	○		●	○	10 100	90 90	●	✓				187
	 RRT1	10	female thread plastic female thread brass	○		●	○	10 100	90 90	●	✓			flow regulator, filter check, valve	188
	 RT	15 - 50	male thread stainless steel	○		●	○	250	85	●	✓		✓		190
	 VHZ	8 10 20 25	female thread Al/stainless steel female thread Al/stainless steel female thread Al/stainless steel female thread Al/stainless steel	○		●	○	200 200 200 100	85 85 85 85	●	●				192
gear wheel	 VHO	15 - 20	female thread plastic	○	●	●	○	10	60	●	●				196
oval wheel															

● standard ○ standard option □ special option

all data sheets available under www.honsberg.com

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for liquids with twin rotors for quantitative flow indication. The rotor provides a directly flow-proportional indication of the actual flow rate.

* optional installation

Female thread G3/8 to G1 POM



PO-010GVA

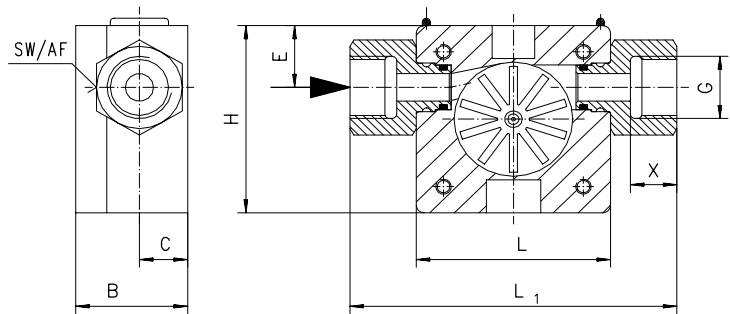
TECHNICAL DATA

	G	Type	PN bar	Qmax. rec. l/min H ₂ O	range l/min H ₂ O	H mm	L mm	L1 mm	B mm	C mm	E mm	SW mm	X mm	weight kg
Questra	G 3/8	PO-010GVA020	16	1.5	0,1 - 1,5	50	50	84	29	12,5	16,5	22	12	0.1
	G 3/8	PO-010GVA050	16	10	0,2 - 10									
	G 3/8	PO-010GVA070	16	12	0,4 - 12									
	G 1	PO-025GVA080	16	30	2 - 30	70	70	110	53	23	27,5	38	18	0.4
	G 1	PO-025GVA120	16	60	3 - 60									
	G 1	PO-025GVA160	16	100	4 - 100									

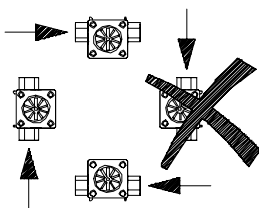
media temperature max. 60°C

MATERIALS

	DN 10	DN 25
body	PPS (Fortron 1140L4)	Questra
cover	PSU Ultrason	PC transparent
rotor	PVDF	PVDF
axle	ceramic	ceramic
bearings	iglidur X	iglidur X
seal	viton	viton



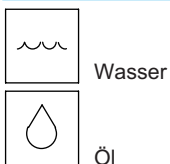
MOUNTING POSITION



NOMENCLATURE

PO-	010	G	V	A	020	basic type specification
	010					● nominal diameter DN 10 - G3/8
	025					● nominal diameter DN 25 - G1
		G				● female thread
			V			● connection material PVDF
			M			○ connection material brass
				A		housing material
						● Questra / PPS with transparent cover
					020	● flow diameter Ø 2
					050	● flow diameter Ø 5
					070	● flow diameter Ø 7
					080	● flow diameter Ø 8
					120	● flow diameter Ø12
					160	● flow diameter Ø16

METERING SUBSTANCES



With higher viscosity instruments tend to higher starting values for rotor.

All technical changes reserved

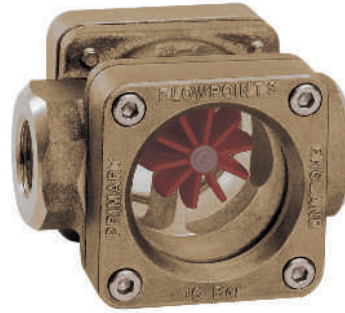
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for liquids with twin rotors for quantitative flow indication. The rotor provides a directly flow-proportional indication of the actual flow rate. Rugged design in bronze/brass combination.

- * double-faced windows for comfortable reading
- * optional installation

Female thread G1/2 to G1 bronze



FR-015GR

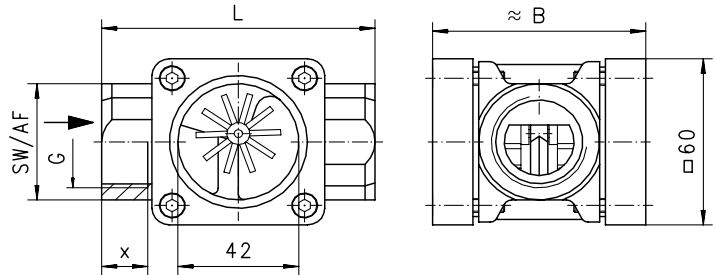
TECHNICAL DATA

	G	Type	PN bar	start of rotor l/min H ₂ O	Qmax. recom. l/min H ₂ O	L mm	B mm	AF mm	X mm	weight kg
bronze	G 1/2	FR-015GR	16	2.5	25	85	68	36	14	1.20
	G 3/4	FR-020GR	16	3.0	45	85	68	36	14	1.10
	G 1	FR-025GR	16	5.0	65	95	74	42	16	1.25

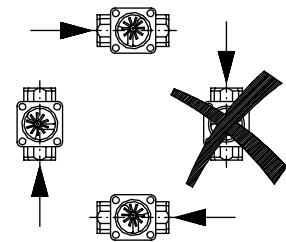
media temperature max. 100°C
average pressure loss 0.09 bar at Qmax.

MATERIALS

body	bronze Rg5
ring	brass Ms58
window	soda-lime natural glass
bolt	stainless steel 1.4305
rotor	POM
seal	klingersil C4400



MOUNTING POSITION



NOMENCLATURE

FR-	015	G	R	basic type specification
	015			● nominal diameter DN 15 - G1/2
	020			● nominal diameter DN 20 - G3/4
	025			● nominal diameter DN 25 - G1
		G		● female thread
			R	● bronze

SPECIAL DESIGNS

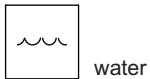
type RS...GR
female thread G1/4 bis G2
rotor brass
housing bronze

type RS...FG
flange DN 25 to 80
rotor brass
housing cast iron



RS-040FG

METERING SUBSTANCES



water



oil With higher viscosity instruments tend to higher starting values for rotor.

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for liquids for quantitative flow indication. The rotor, which is arranged in a dome for good visibility, provides a directly flow- proportional indication of the actual flow rate. Rugged design in bronze/brass or stainless steel.

- * good rotor sight
- * high temperature duty
- * dome-shaped

Female thread G1/4 to G1 bronze / stainless steel



RM-015GK

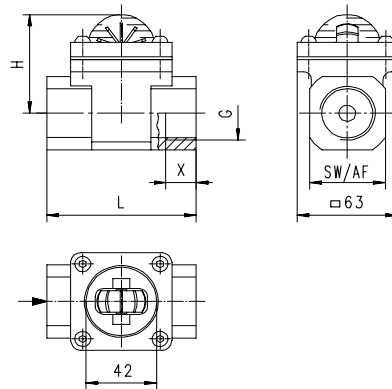
TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	start of rotor l/min H ₂ O	pressure loss at Qmax.	L mm	H mm	SW mm	X mm	weight kg
bronze / s.s.	G 1/4	RM-008G.	16	8	0.7	0.20	76	53	28	12	0.70
	G 3/8	RM-010G.	16	10	0.8	0.15	76	53	28	16	0.65
	G 1/2	RM-015G.	16	20	1.0	0.40	76	53	28	14	0.65
	G 3/4	RM-020G.	16	40	1.2	0.25	89	66	45	18	1.25
	G 1	RM-025G.	16	60	1.5	0.70	89	66	45	18	1.20

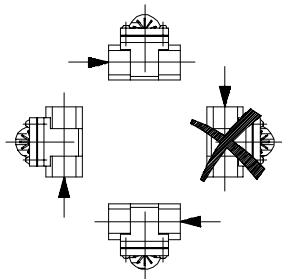
media temperature max. 100°C

MATERIALS

	RM-...GR	RM-...GK
body	bronze	stainless steel
ring	brass	stainless steel
dome	borosilikate	borosilikate
shaft	stainless steel	stainless steel
rotor	PPS	PPS
seal	Klingsil C-4400	Klingsil C-4400



MOUNTING POSITION



NOMENCLATURE

RM-	008	G	R	nominal diameter	basic type specification
	008		●		DN 8 - G1/4
	010		●	DN 10 - G3/8	
	015		●	DN 15 - G1/2	
	020		●	DN 20 - G3/4	
	025		●	DN 25 - G1	
		G	●		female thread
			R	●	bronze
			K	○	stainless steel

METERING SUBSTANCES



water



oil

With higher viscosity instruments tend to higher starting values for rotor.

All technical changes reserved

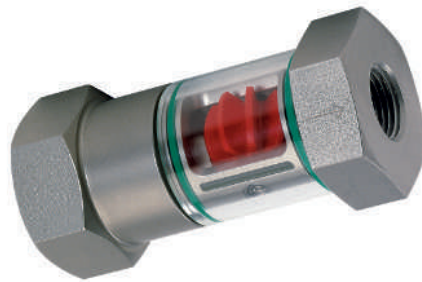
IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for liquids, with a rotor for quantitative flow indication in a special tube-shaped glass housing. A signal-red rotor provides a directly flow-proportional indication of the momentary flow-rate. Rugged design in brass or stainless steel.

- * cleaning mechanism of the internal surface of the glass
- * visibility of rotor 360°
- * floating bearing for liquids
- * grease-free ball bearing for gaseous media

Female thread G1/4 to G1 1/2 brass/stainless steel

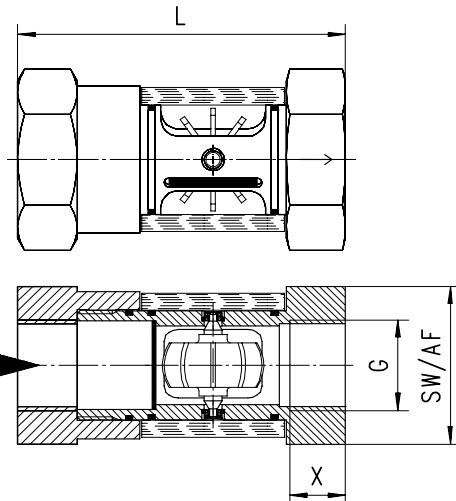


TECHNICAL DATA

WR1-015GK

G	Type	Qmax. recom. l/min H ₂ O	start of rotor l/min			L mm	SW mm	X mm	weight kg
			H ₂ O	40 mm ² /s	41-150 mm ² /s				
G 1/4	WR1-008G.	4	0.7	1.5	2.7	71	36	9	0.35
G 3/8	WR1-010G.	8	0.8	1.5	2.8	71	36	9	0.35
G 1/2	WR1-015G.	12	1.4	1.8	3.2	86	46	13	0.65
G 3/4	WR1-020G.	25	1.4	2.7	5.9	94	46	16	0.65
G 1	WR1-025G.	40	1.7	3.0	7.0	104	46	16	0.65
G 1 1/4	WR1-032G.	80	8.0	5.9	7.9	120	65	19	1.60
G 1 1/2	WR1-040G.	100	8.0	7.3	7.9	130	65	20	1.70

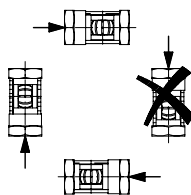
pressure PN 16
media temperature max. 100°C
average pressure loss 0.25 bar at Qmax.



MATERIALS

	WR1-...GM	WR1-...GK
housing	brass Ms58 nickel plat.	stainless steel 1.4305
rotor	DN 8-25 POM red DN 32-40 nylon white	DN 8-25 POM red DN 32-40 nylon white
tube	borosilicate glass	borosilicate glass
axle	stainless steel 1.4541	stainless steel 1.4541
bearing	PEEK	PEEK
wiper	NBR	viton
seal	NBR	viton

MOUNTING POSITION



METERING SUBSTANCES



With higher viscosity instruments tend to higher starting values of the rotor.

NOMENCLATURE

WR1-	008	G	M	W	basic type specification
	008				● nominal diameter
	010				● DN 8 - G1/4
	015				● DN 10 - G3/8
	020				● DN 15 - G1/2
	025				● DN 20 - G3/4
	032				● DN 25 - G1
	040				● DN 32 - G1 1/4
					● DN 40 - G1 1/2
		G			● female thread
			M		● brass design
			K		● stainless steel design
				W	● liquids
				G	□ air/gasses
					○ seal / wiper EPDM
					Programme option BASIC
					Special option VARIO
					□ low flow rates

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The instruments are used for liquids while a rotor in full-plastic housing generates flow-dependent revolutions which are detected optically.

- * compact dimension
- * programmable limits
- * control of small flow rates
- * max. viscosity 10mm²/s
- * magnet isolated
- * signal output 4..20 mA

Male thread G1/4A POM / ECTFE (halar)



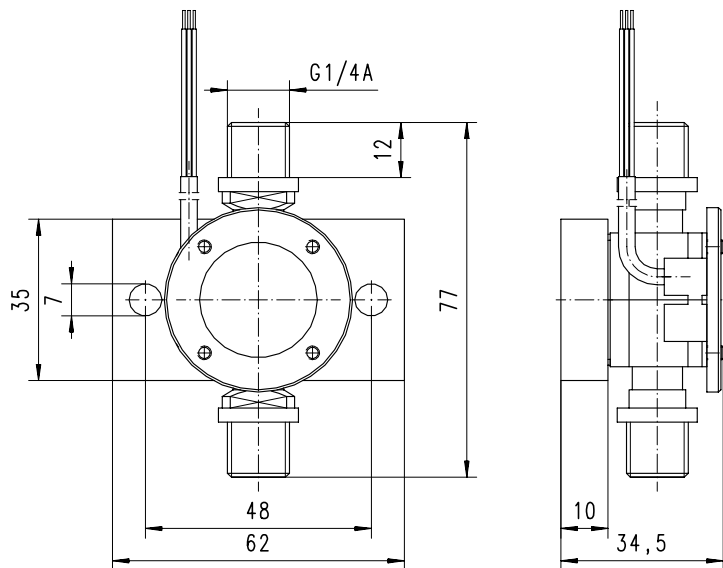
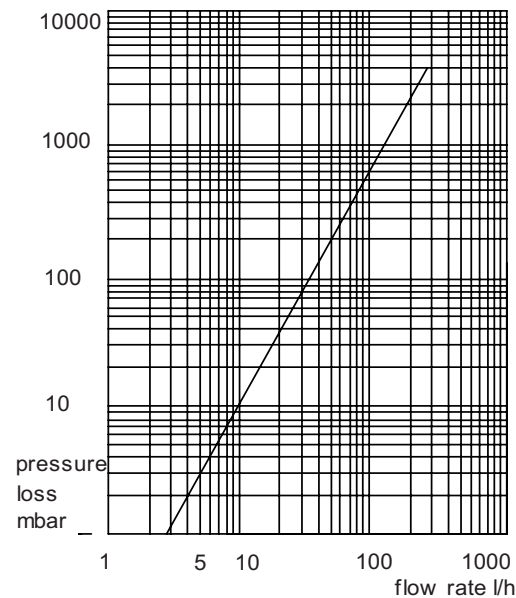
RA-008AP100

TECHNICAL DATA

	G	Type	PN	Qmax. recom. l/h H ₂ O	metering range l/h H ₂ O	pulse/ litre	frequency Hz of full scale	weight g
POM	G 1/4A	RA-008AP100	10	100	1.5 - 100	8400	233	100
ECTFE (Halar)	G 1/4A	RA-008AH100	10	100	1.5 - 100	8400	233	100

tolerance ±2%
repeatability <0.8%
media temperature -10.. +55 °C

PRESSURE LOSS

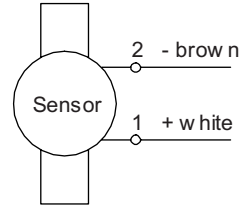


MATERIALS

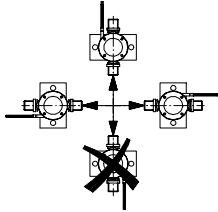
	RA-...AP	RA-...AH
body	POM	ECTFE (halar)
rotor	POM	ECTFE (halar)
bearings	POM	rubin
axle	nivapoint	saphir
magnet	hardferrite	cobald-somarium
seal	viton	viton

ELECTRICAL DATA

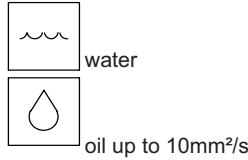
inductive
supply: 24 VDC
exit signal: 4..20mA
cable 3x0,14° Liyy - 1m
cable allocation arbitrary



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

RA-	008	A	P	100	basic type
	008				specification
		A			● DN 8 - G1/4A
			P		● male thread
			H		● POM
				100	● halar
					● metering range 1.5 - 100
Programme option					○ seal NBR, EPDM
BASIC					
Special option					□ seal Kalrez
VARIO					

PROGRAMMING

The integrated micro controller computes each flow between the two measuring limit values 4mA and 20mA. For this, each measuring limit value must assigned (programmed) a flow. The following operational sequence describes this procedure:

- 1.) Adjust the desired flow for the 4mA measuring border.
- 2.) Operate briefly the reed switch (hold briefly the magnet pin to the reed switch).
(red LED shines and orange LED is out)
- 3.) after an firmly adjusted time the red LED shines and the orange LED flashes with about 4Hz. Now adjust the desired flow for the 20mA measuring border.
- 4.) Operate briefly the reed switch again (hold briefly the magnet pin to the reed switch).
(red LED shines and orange LED is out)
- 5.) after an firmly adjusted time the red and orange LED do not shine any longer. The micro controller check and save the adjusted worth. Afterwards the program starts with the "new" worth.

INDICATE

The yellow LED is shining in the operation. The brightness is dependent on the output current.
If the both measuring limit values are zero, then the two LED's (red and orange) flash with about 4Hz.
If the flow is lower as the calibrated flow for the 4mA-border, then the orange LED flash with about 8Hz and the red LED is out.
During the normal enterprise (flow between the two limit values) shines the orange LED and the red LED is out.
If the flow is higher as the calibrated flow for the 20mA-border, then the orange LED flash with about 4Hz and the red LED is out.
The red LED shines only during the Programming modus (see also Programming of the two measuring borders).

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

The instruments are used for liquids while a rotor in full-plastic housing generates flow-dependent revolutions which are detected optically.

- * compact dimension
- * control of small flow rates
- * max. viscosity 10mm²/s
- * magnet isolated

Nozzle Ø6/ Male thread G1/4A POM



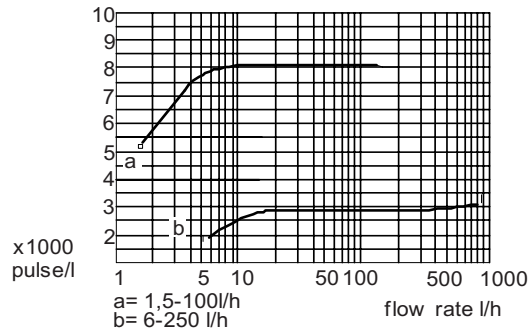
RH-006TP100

TECHNICAL DATA

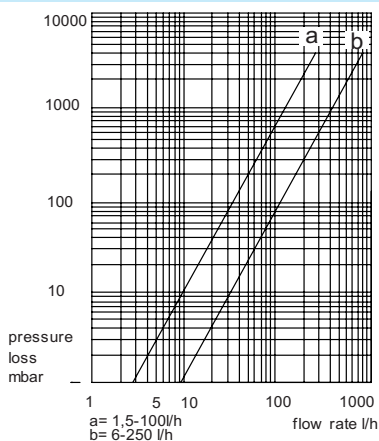
	G	Type	PN	Qmax. recom. l/h H ₂ O	metering range l/h H ₂ O	pulse/ litre	frequency Hz of full scale	weight g
POM	Nozzle Ø6	RH-006TP100	5	100	1.5 - 100	8400	233	50
POM	G 1/4A	RH-008AP100	10	100	1.5 - 100	8400	233	50
		RH-008AP250		250	6.0 - 250	3400	236	50

tolerance ±2%
repeatability <0.8%
media temperature -10..+80 °C

LINEARITY

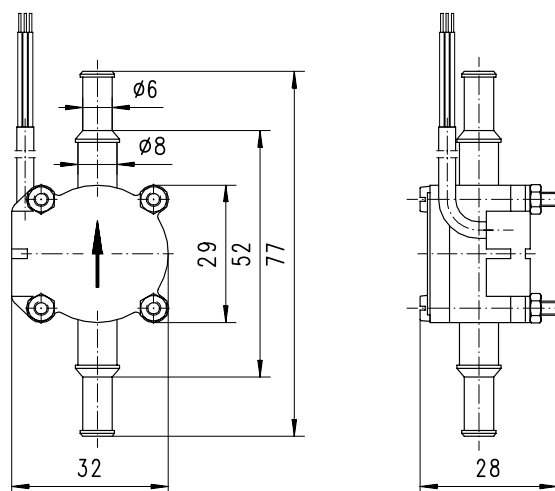
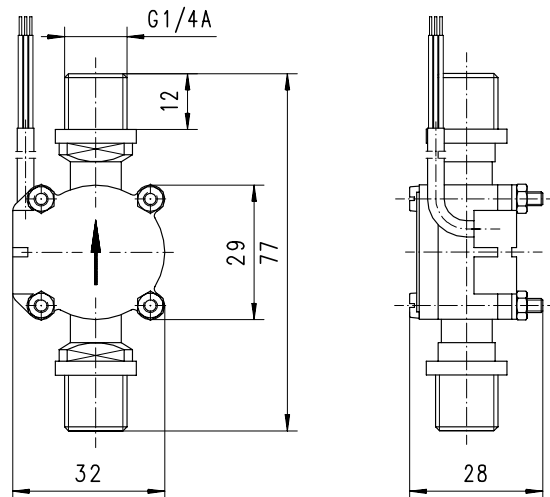


PRESSURE LOSS



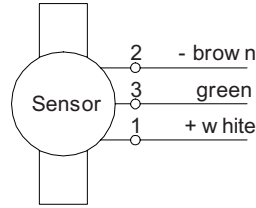
MATERIALS

- body POM
- rotor POM
- bearings POM
- axle nivapoint
- magnet hardferrite
- seal viton

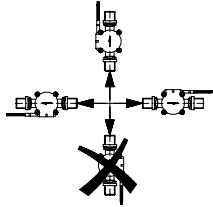


ELECTRICAL DATA

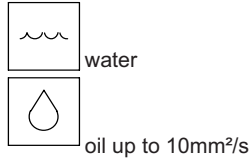
hall sensor, contactless
supply: 4,5..24 VDC / I - out 15 mA of 24 V output
exit signal: precise rectangle
cable 3x0,14° Liyy - 1m



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

RH-	006	T	P	100	basic type specification
	006				● DN 6 - nozzle Ø6
	008				● DN 8 - G1/4A
		T			● nozzle
		A			● male thread
			P		● POM
				100	● metering range 1.5 - 100
				250	● metering range 6.0 - 250
Programme option					○ seal NBR, EPDM
BASIC					
Special option					□ seal Kalrez
VARIO					

All technical changes reserved

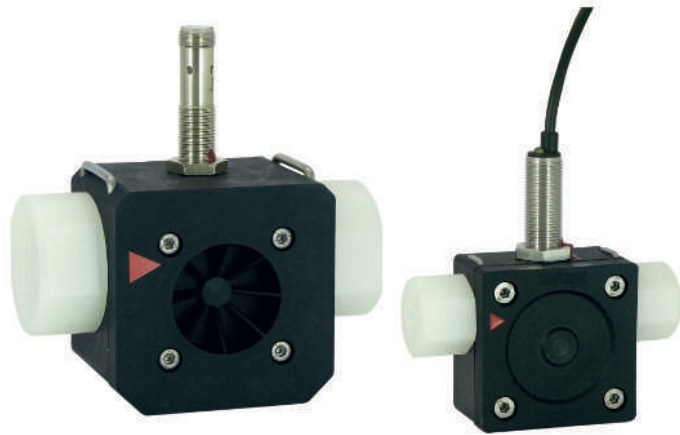
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

The sensor consists of a rotor vane that is rotated by the speed of the flowing medium. The speed of rotation is proportional to the volume flow per unit time. The rotation of the rotor is detected by an inductive sensor.

- * no magnet parts
- * large wear liberty by high-quality ceramic axle and ceramic bearings
- * output circuit PNP, NPN or Namur
- * no straight line in-out necessary
- * easy measurement of flow rates
- * inherently safe properties
- * modular construction with the most versatile connection systems
- * connections can be plugged and rotated

Female- / male thread G3/8 / G1, nozzle Ø11 PVDF



RRI-025GVQ

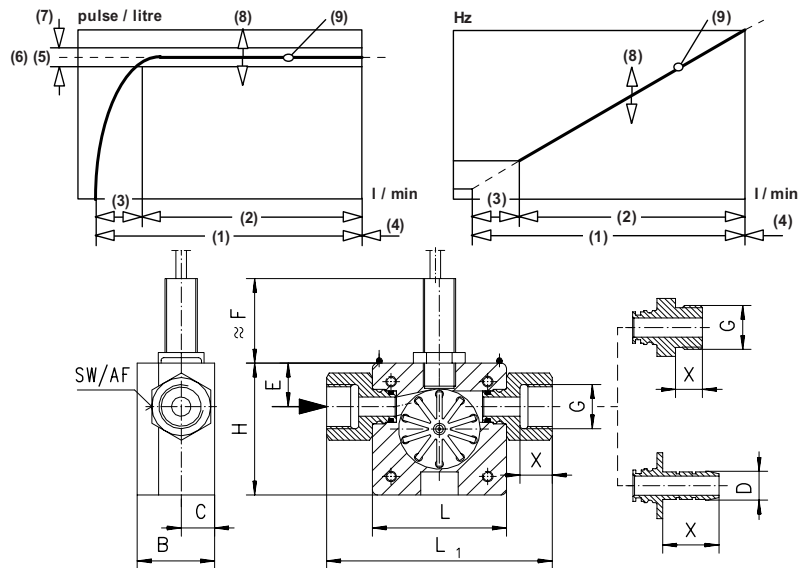
RRI-010GVQ

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	metering range l/min H ₂ O			pulse/ litre (6)	frequency Hz of full scale (10)	weight kg
					(1)	(2)	(3)			
DN10	G3/8	RRI-010...020	16	1.8	0.1- 1.5	0.5- 1.5	0.1-0.5	10200	255	0.20
		RRI-010...050	16	12	0.2-10	2.0-10	0.2-2	3345	558	0.20
		RRI-010...070	16	16.8	0.4-12	2.0-12	0.4-2	1755	351	0.20
DN25	G1	RRI-025...080	16	36	2- 30	3- 30	2- 3	1216	608	0.55
		RRI-025...120	16	72	3- 60	5- 60	3- 5	607	607	0.55
		RRI-025...160	16	120	4-100	6-100	4- 6	252	420	0.55

The measurements were taken from left to right with the sensor stationary using water at 25°C.

- (1) **measuring range total**
- (2) **measuring range specified**
- (3) **measuring range non linear**
- (4) **extended operating range**
increase abrasion, $\Delta p > 0.5$ bar
- (5) **pulse/litre** (specification on the identification plate on each sensor)
- (6) **average pulse/litre**
- (7) **tolerance $\pm 3\%$** of the measured value
- (8) **variation $\pm 10\%$** of pulse/litre data (5) in the charge
- (9) **reproducibility ($\pm 1\%$ of full scale)**
is the repetitive accuracy of frequency related to l/min
- (10) **frequency max.** related to the applicable measuring range up to approx 0.5 bar pressure loss over the Sensor



media temperature max. 60 °C

MATERIALS

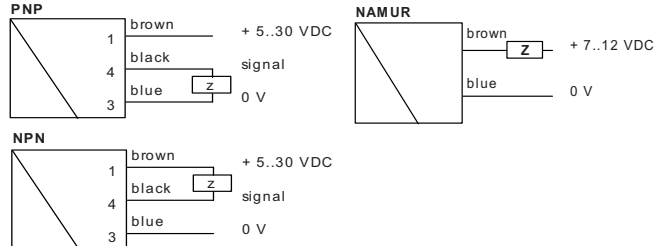
		G	Type	H mm	L mm	L1 mm	B mm	C mm	D mm	E mm	F* mm	SW mm	X mm	
housing	Questra / PPS (Fortron 1140L4)													
rotor	PVDF / 1.4310													
bearings	Iglidur X													
axle	ceramic ZrO ₂ -TZP													
seal	viton													
no medium contact	PVC cable 1.4305, 1.4301													
		DN10	G3/8	RRI-010G	50	50	84	29	12,5	-	16,5	38	22	12
				RRI-010A	50	50	84	29	12,5	-	16,5	38	22	14
				RRI-010T	50	50	96	29	12,5	11	16,5	38	-	21
		DN25	G1	RRI-025G	70	70	110	53	23	-	27,5	33	38	18
				RRI-025A	70	70	122	53	23	-	27,5	33	38	18
				RRI-025T	70	70	176	53	23	30	27,5	33	38	45

* dimension F at Namur 8 mm cancel!

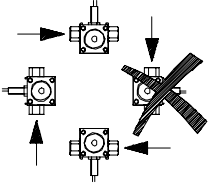
material options see nomenclature

ELECTRICAL DATA

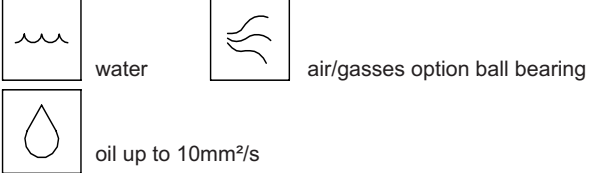
quiescent current consumption 10mA / Namur max. 7mA
 max. output current 200mA / Namur max. 7mA
 sensor connection 2m cable or conection at locking plugs M12x1, 4-pole
 short-circuit proof yes
 reverse polarity proof yes
 protection class IP67



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

RRI-	010	G	V	Q	020	V	10	K	P	K	basic type specification
	010										● DN 010
	025										● DN 025
		G									● female thread
		A									○ male thread
		T									○ hose nozzle
			V								● connection material PVDF
			M								○ connection material brass Ms58 nickel plated
			K								○ connection material stainless steel 1.4305
				Q							● housing material Questra/PPS
				V							● housing material PVDF
				A							○ DN 10 housing material PPS with transparent cover PSU
					020						○ DN 25 housing material Questra with transparent cover PC
					050						● flow diameter Ø 2
					070						● flow diameter Ø 5
					080						● flow diameter Ø 7
					120						● flow diameter Ø 8
					160						● flow diameter Ø12
						V					● flow diameter Ø16
						E					● seal viton
						N					○ seal EPDM
							10				○ seal NBR
							02				● rotor with 10 clamp
							05				○ rotor with 2 clamp
								K			○ rotor with 5 clamp
								T			● clamp materal stainless steal 1.4310
									P		○ clamp materal titanium
									N		● PNP output
									A		● NPN output
									E		○ Namur output
											● ouput at suburb electronics (e.g. omni-RR)
										K	● 2 m cable
										S	○ connection at locking plugs M12x1, 4-pole

special applications: Switching output, frequency converter, current output and omni/flex processor

COMBINATIONS

omni-RR

local electronic unit,
 2xNPN and PNP switch
 4(0)..20mA output
 graphical LCD display
 with flashing LED
 program ring



further transformers

Flex switching and frequency exit, 0..10V or 4..20mA, pnp, npn
 ESA1 electronic monitoring unit
 ESK2 2 switchpoints - supply 24 V DC
 ESK3 1 switchpoint - supply 230 V AC
 conceived for safety-relevant applications
 EFFS switch output
 EFFI current output 4(0)..20mA
 EFFF frequency output



All technical changes reserved

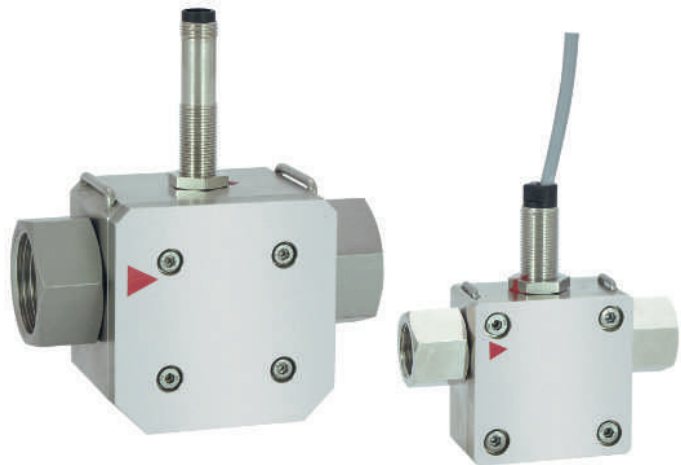
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The sensor consists of a rotor vane that is rotated by the speed of the flowing medium. The speed of rotation is proportional to the volume flow per unit time. The rotation of the rotor is detected by a Hall-sensor.

- * metal housing, with Hall-Sensor
- * large wear liberty by high-quality ceramic axle and ceramic bearings
- * output circuit PNP, NPN or Namur
- * no straight line in-out necessary
- * easy measurement of flow rates
- * inherently safe properties
- * modular construction with the most versatile connection systems
- * connections can be plugged and rotated

Female- / male thread G3/8 / G1 brass / stainless steel



RRH-025GMM

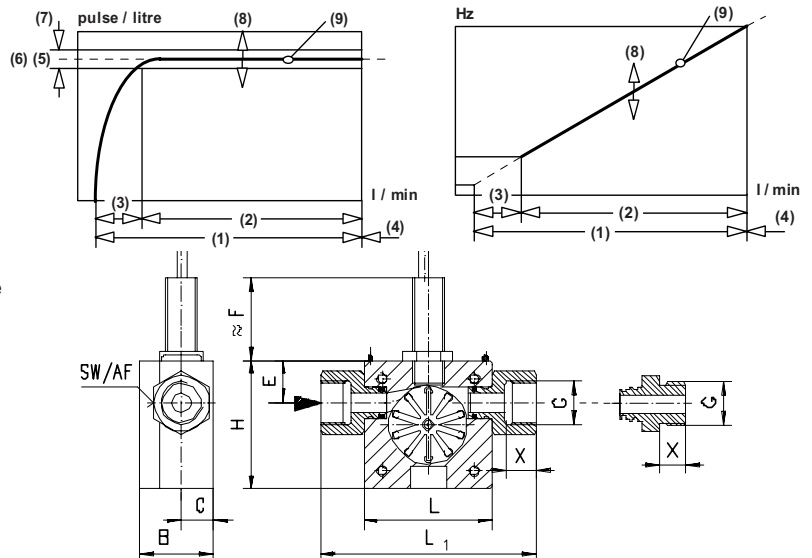
RRH-010GMM

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	metering range l/min H ₂ O			pulse/ litre (6)	frequency Hz of full scale (10)	weight kg
					(1)	(2)	(3)			
DN10	G3/8	RRH-010...020	100	1.8	0.1- 1.5	0.5- 1.5	0.1-0.5	4955	124	0.60
		RRH-010...050	100	12	0.2-10	2.0-10	0.2-2	1632	272	0.60
		RRH-010...070	100	16.8	0.4-12	2.0-12	0.4-2	860	172	0.60
DN25	G1	RRH-025...080	100	36	2- 30	3- 30	2- 3	544	272	1.90
		RRH-025...120	100	72	3- 60	5- 60	3- 5	295	295	1.90
		RRH-025...160	100	120	4-100	6-100	4- 6	126	210	1.90

The measurements were taken from left to right with the sensor stationary using water at 25°C.

- (1) **measuring range total**
- (2) **measuring range specified**
- (3) **measuring range non linear**
- (4) **extended operating range**
increase abrasion, $\Delta p > 0.5$ bar
- (5) **pulse/litre** (specification on the identification plate on each sensor)
- (6) **average pulse/litre**
- (7) **tolerance $\pm 3\%$** of the measured value
- (8) **variation $\pm 10\%$** of pulse/litre data (5) in the charge
- (9) **reproducibility ($\pm 1\%$ of full scale)**
is the repetitive accuracy of frequency related to l/min
- (10) **frequency max.** related to the applicable measuring range up to approx 0.5 bar pressure loss over the Sensor



media temperature max. 100 °C

MATERIALS

housing	Ms58 nickel plat. or 1.4305
rotor	PVDF with magnet
bearings	Iglidur X
axle	ceramic ZrO ₂ -TZP
seal	viton
no medium contact	PVC cable 1.4305, 1.4301

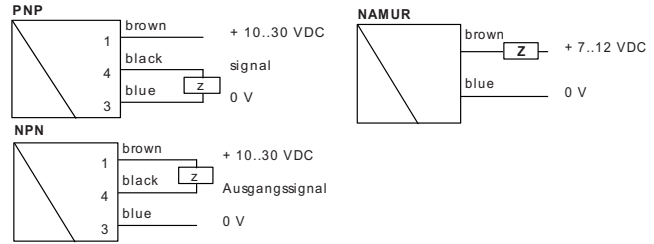
DN	G	Type	H mm	L mm	L1 mm	B mm	C mm	E mm	F* mm	SW mm	X mm
10	G3/8	RRH-010G	50	50	84	29	12,5	16,5	38	22	12
		RRH-010A	50	50	84	29	12,5	16,5	38	22	14
25	G1	RRH-025G	70	70	110	53	23	27,5	33	38	18
		RRH-025A	70	70	122	53	23	27,5	33	38	18

* dimension F at Namur 8 mm cancel!

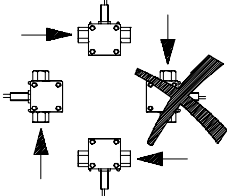
material options see nomenclature

ELECTRICAL DATA

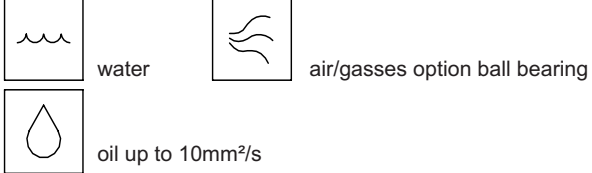
quiescent current consumption 30mA
max. output current 100mA
sensor connection 2m cable or conection at locking plugs M12x1, 4-pole
short-circuit proof ja
reverse polarity proof ja
protection class IP67



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

RRH-	010	G	M	M	020	V	05	V	P	K	basic type specification
	010										● DN 010
	025										● DN 025
		G									● female thread
		A									○ male thread
			M								● connection material brass Ms58 nickel plated
			K								● connection material stainless steel 1.4305
				M							● housing material brass Ms58 nickel plated
				K							● housing material stainless steel 1.4305
					020						● flow diameter Ø 2
					050						● flow diameter Ø 5
					070						● flow diameter Ø 7
					080						● flow diameter Ø 8
					120						● flow diameter Ø12
					160						● flow diameter Ø16
						V					● seal viton
						E					○ seal EPDM
						N					○ seal NBR
						K					□ seal Kemraz
							05				● rotor with 5 magnet
							02				○ rotor with 2 magnet
								V			● rotor material PVDF
									P		● PNP output
									N		● NPN output
									A		○ Namur output
									E		● ouput at suburb electronics (e.g. omni-RR)
										K	● 2 m cable
										S	○ connection at locking plugs M12x1, 4-pole

special applications: Switching output, frequency converter, current output and omni/flex processor

COMBINATIONS

omni-RR

local electronic unit,
2xNPN and PNP switch
4(0)..20mA output
graphical LCD display
with flashing LED
program ring



further transformers

Flex switching and frequency exit, 0..10V or 4..20mA, pnp, npn
ESA1 electronic monitoring unit
ESK2 2 switchpoints - supply 24 V DC
ESK3 1 switchpoint - supply 230 V AC
conceived for safety-relevant applications
EFFS switch output
EFFI current output 4(0)..20mA
EFFF frequency output



All technical changes reserved

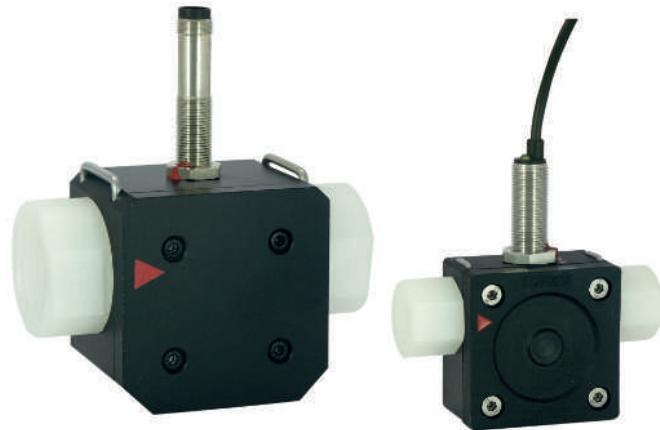
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The sensor consists of a rotor vane that is rotated by the speed of the flowing medium. The speed of rotation is proportional to the volume flow per unit time. The rotation of the rotor is detected by an optical sensor.

- * with optical sensor
- * large wear liberty by high-quality ceramic axle and ceramic bearings
- * output circuit PNP or NPN
- * no straight line in-out necessary
- * easy measurement of flow rates
- * inherently safe properties
- * modular construction with the most versatile connection systems
- * connections can be plugged and rotated

Female- / male thread G3/8 / G1, nozzle Ø11 PVDF



RRO-025GVV

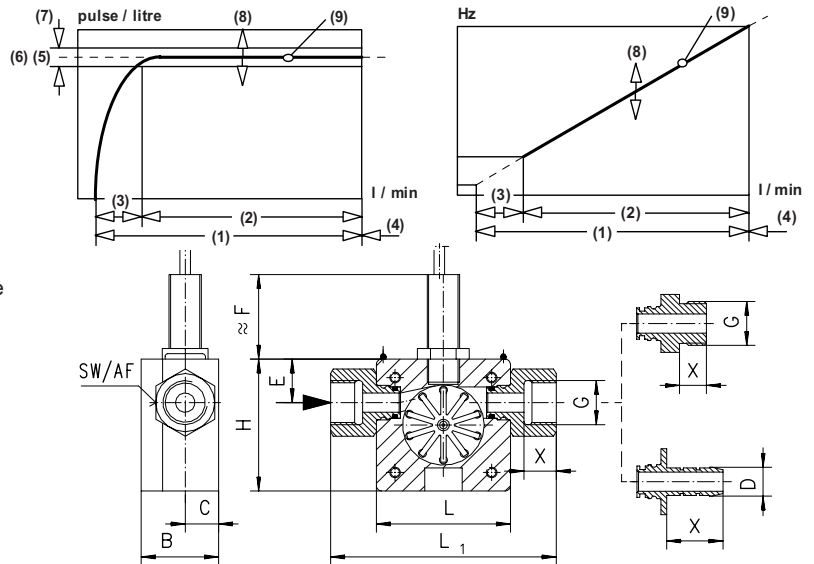
RRO-010GVV

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	metering range l/min H ₂ O			pulse/ litre (6)	frequency Hz of full scale (10)	weight kg
					(1)	(2)	(3)			
DN10	G3/8	RRO-010...020	16	1.8	0.1- 1.5	0.5- 1.5	0.1-0.5	11720	293	0.20
		RRO-010...050	16	12	0.2-10	2.0-10	0.2-2	2960	493	0.20
		RRO-010...070	16	16.8	0.4-12	2.0-12	0.4-2	1703	341	0.20
DN25	G1	RRO-025...080	16	36	2- 30	3- 30	2- 3	1090	545	0.55
		RRO-025...120	16	72	3- 60	5- 60	3- 5	588	588	0.55
		RRO-025...160	16	120	4-100	6-100	4- 6	265	442	0.55

The measurements were taken from left to right with the sensor stationary using water at 25°C.

- (1) **measuring range total**
- (2) **measuring range specified**
- (3) **measuring range non linear**
- (4) **extended operating range**
increase abrasion, Δp > 0.5 bar
- (5) **pulse/litre** (specification on the identification plate on each sensor)
- (6) **average pulse/litre**
- (7) **tolerance ±3%** of the measured value
- (8) **variation ±10%** of pulse/litre data (5) in the charge
- (9) **reproducibility (±1% of full scale)**
is the repetitive accuracy of frequency related to l/min
- (10) **frequency max.** related to the applicable measuring range up to approx 0.5 bar pressure loss over the Sensor



media temperature max. 60 °C

MATERIALS

housing	PVDF
rotor	PVDF
bearings	Iglidur X
axle	ceramck ZrO ₂ -TZP
seal	viton
no medium contact	PVC cable 1.4305, 1.4301

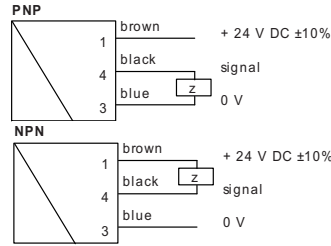
	G	Type	H mm	L mm	L1 mm	B mm	C mm	D mm	E mm	F* mm	SW mm	X mm
DN10	G3/8	RRO-010G	50	50	84	29	12,5	-	16,5	38	22	12
		RRO-010A	50	50	84	29	12,5	-	16,5	38	22	14
		RRO-010T	50	50	96	29	12,5	11	16,5	38	-	21
DN25	G1	RRO-025G	70	70	110	53	23	-	27,5	33	38	18
		RRO-025A	70	70	122	53	23	-	27,5	33	38	18
		RRO-025T	70	70	176	53	23	30	27,5	33	38	45

material options see nomenclature

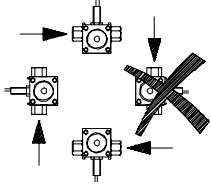
* dimension F at Namur 8 mm cancel!

ELECTRICAL DATA

quiescent current consumption	30mA
max. output current	100mA
sensor connection	2m cable or conection at locking plugs M12x1, 4-pole
short-circuit proof	yes
reverse polarity proof	yes
protection class	IP67



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

RRO-	010	G	V	V	020	V	P	K	basic type specification
	010								● DN 010
	025								● DN 025
		G							● female thread
		A							○ male thread
		T							○ hose nozzle
			V						● connection material PVDF
			M						○ connection material brass Ms58 nickel plated
			K						○ connection material stainless steel 1.4305
				V					● housing material PVDF
					020				● flow diameter Ø 2
					050				● flow diameter Ø 5
					070				● flow diameter Ø 7
					080				● flow diameter Ø 8
					120				● flow diameter Ø12
					160				● flow diameter Ø16
						V			● seal viton
						E			○ seal EPDM
						N			○ seal NBR
						K			□ seal Kemraz
							P		● PNP output
							N		● NPN output
							E		● ouput at suburb electronics (e.g. omni-RR)
								K	● 2 m cable
								S	○ connection at locking plugs M12x1, 4-pole

special applications: Switching output, frequency converter, current output and omni/flex processor

COMBINATIONS

omni-RR

local electronic unit,
2xNPN and PNP switch
4(0)..20mA output
graphical LCD display
with flashing LED
program ring



further transformers

- Flex switching and frequency exit, 0..10V or 4..20mA, pnp, npn
- ESA1 electronic monitoring unit
- ESK2 2 switchpoints - supply 24 V DC
- ESK3 1 switchpoint - supply 230 V AC
conceived for safety-relevant applications
- EFFS switch output
- EFFI current output 4(0)..20mA
- EFFF frequency output



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

The sensor consists of a rotor vane that is rotated by the speed of the flowing medium. The speed of rotation is proportional to the volume flow per unit time. The signals are relayed by a variety of sensors, depending on the housing materials employed.

- * simple and economical flowmeter for pipe diameters from 32mm to 150mm
- * produced in plastic (stainless steel optional)
- * Quickly fitted using the clamp mount. Even retrospective fitting is easy!

Assembly clamp, assembly screwed-in probe, assembly welded pruning



RRI-032RMH000



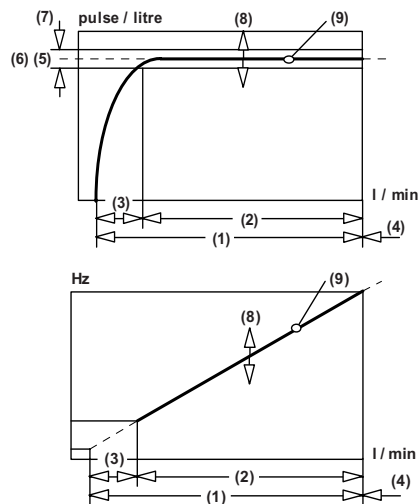
RRI-032MHH065

TECHNICAL DATA

DN	Type	Qmax. recom. l/min	metering range l/min H ₂ O			pulse/ litre (6)	frequency Hz of full scale (10)	weight kg
			(1)	(2)	(3)			
32	RR.-032MH032	220	15 - 200	30 - 200	15 - 30	90	300	0.8
40	RR.-032MH040	360	15 - 300	60 - 300	15 - 60	48	240	0.8
50	RR.-032MH050	480	25 - 400	80 - 400	25 - 80	34	227	0.9
65	RR.-032MH065	600	40 - 500	100 - 500	40 - 100	24	200	1.2
80	RR.-032MH080	840	50 - 700	100 - 700	50 - 100	17,5	204	1.3
100	RR.-032MH100	1200	85 - 1000	100 - 1000	85 - 100	10,5	175	1.4

The measurements were taken from left to right with the sensor stationary using water at 25°C.

- (1) **measuring range total**
- (2) **measuring range specified**
- (3) **measuring range non linear**
- (4) **extended operating range**
increase abrasion, $\Delta p > 0.5$ bar
- (5) **pulse/litre** (specification on the identification plate on each sensor)
- (6) **average pulse/litre**
- (7) **tolerance $\pm 3\%$** of the measured value
- (8) **variation $\pm 10\%$** of pulse/litre data (5) in the charge
- (9) **reproducibility ($\pm 1\%$ of full scale)**
is the repetitive accuracy of frequency related to l/min
- (10) **frequency max.** related to the applicable measuring range up to approx 0.5 bar pressure loss over the Sensor



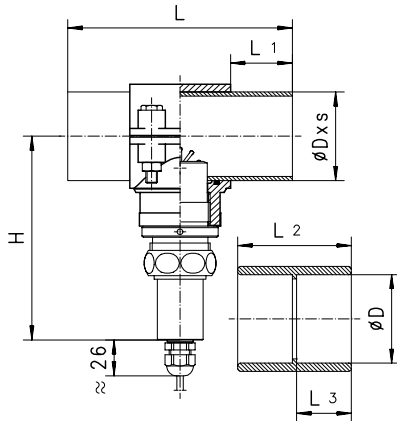
media temperature plastic max.60°C , stainless steel max.100°C
pressure PN10

MATERIALS

	RRI (induktive sensor)	RRH (hall sensor)
housing	plastic PVC	stainless steel 1.4305
assembly clamp	plastic PP	plastic PP
rotor	PVDF / stainless steel 1.4310	PVDF / magnet
bearings	Iglidur X	Iglidur X
axle	ceramic Zr02-TZP	ceramic Zr02-TZP
seal	viton	viton
no medium contact	PVC cable	PVC cable
	brass Ms58 nickel plated	brass Ms58 nickel plated

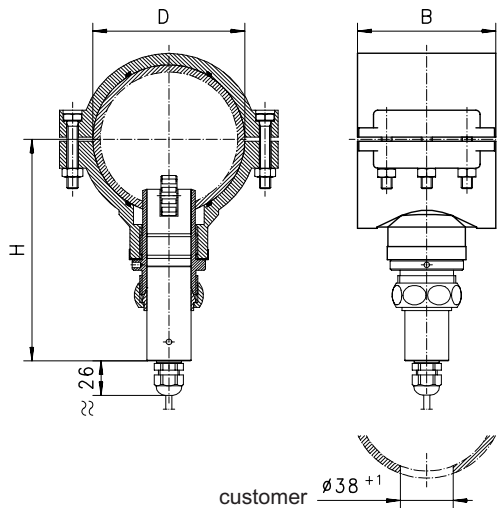
DIMENSIONS

assembly clamp saddle with pipe and sleeve RR.-032MH...



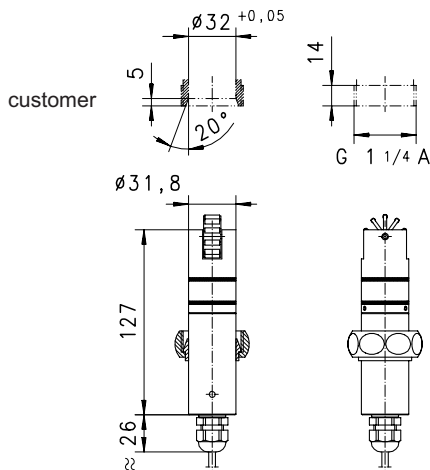
nominal diameter	D	s	H	L	L1	L2	L3
DN 32	40	1,9	145	132	31	55	26
DN 40	50	2,4	145	142	36	65	31
DN 50	63	3,0	145	156	43	79	38
DN 65	75	3,6	154	178	49	92	44
DN 80	90	4,3	156	202	56	107	51
DN 100	110	5,3	166	232	66	128	61
DN 125	140	6,7	172	287	81	159	76
DN 150	160	7,7	180	312	91	180	86

assembly clamp saddle RR.-032BB...

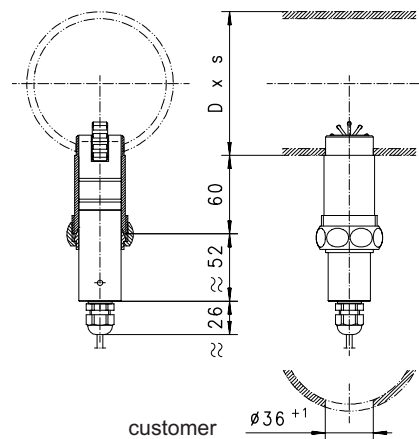


nominal diameter	D	B	H
DN 50	63	70	145
DN 65	75	80	164
DN 80	90	90	156
DN 100	110	100	166
DN 125	140	125	172
DN 150	160	130	180

assembly welded pruing RR.-032RM...



assembly screwed-in probe RR.-032VK...



MOUNTING

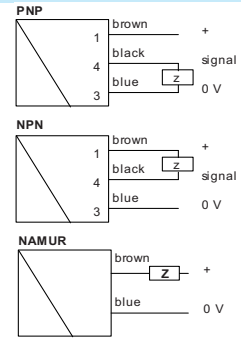
The Flowmeters are mounted as probes in a T-piece or in a mounting clamp; and marked for the correct insertion depth. The sensor mounting direction is longitudinally to the turbine wheel and is marked with arrows on the face of the probe. (With the electronics mounted, the direction of flow is longitudinal to the electronics housing. A deviation of up to $\pm 3^\circ$ in the angular orientation does not affect the measurement. The sensor must be mounted with inlet and outlet sections of approx. 10 x the pipe diameter to avoid swirls and turbulence. The best mounting orientation (low contamination, good venting) is for upward flow direction or horizontal pipe route and an inclined sensor position of 45° .

ELECTRICAL DATA

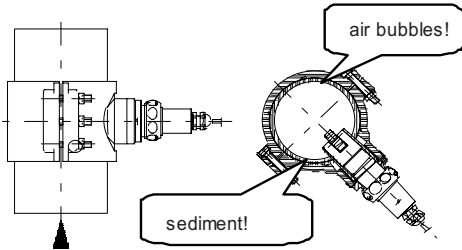
supply voltage
quiescent current consumption
max. output current
sensor connection
short-circuit proof
reverse polarity proof
protection class

RRI (inductive sensor)
PNP/NPN 5..30 VDC
Namur 7..12 VDC
10mA / Namur max. 7mA
200mA / Namur max. 7mA
2m cable or connection at locking plugs M12x1, 4-pole
yes
yes
IP67

RRH (hall sensor)
PNP/NPN 10..30 VDC
Namur 7..12 VDC
30mA
100mA
2m cable or connection at locking plugs M12x1, 4-pole
yes
yes
IP67



MOUNTING POSITION



The pipe which accepts the Flowmeter should be completely filled under all operating conditions since air bubbles significantly affect the measurement results. With filling processes the valve should be fitted after the sensor. You should allow for a run-up time of approx. 0.5 s and a delay time of several seconds.

METERING SUBSTANCES



NOMENCLATURE

RRI-	032	MH	H	032	V	10K	P	K	basic type specification
RRI-									● Flowmeter with inductive sensor
RRH-									● Flowmeter with hall sensor
	032								● screwed cap G1 1/4
		MH							● clamp saddle with pipe and sleeve at PVC
		RM							● screwed-in probe G1 1/4 with clamp ring and screwed cap
		BB							○ clamp saddle PP
		VK							○ welded pruning stainless steel 1.4305
			H						● probe material PVC
			K						● probe material stainless steel 1.4305
				000					● (at screwed-in probe or welded pruning)
				032					● DN 032
				040					● DN 040
				050					● DN 050
				065					● DN 065
				080					● DN 080
				100					● DN 100
				125					● DN 125
				150					● DN 150
					V				● seal Viton
					E				○ seal EPDM
					N				○ seal NBR
						10K			● rotor with 10 stainless steel clamps (RRI)
						10T			○ rotor with 10 titanium clamps (RRI)
						05M			● rotor with 5 magnet (RRH)
							P		● PNP output
							N		● NPN output
							A		○ Namur output
							E		● output at suburb electronics (e.g. omni-RR)
								K	● 2 m cable
								S	○ connection at locking plugs M12x1, 4-pole

special applications: Switching output, frequency converter, current output and omni/flex processor

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The flow indicators Visoflow provide a reliable indication of transparent liquids. A signal red turbine wheel is driven by the flow and by the relevant revolutions offers indicative information of the momentary flow rate involved. The instruments offer a 360° view and promise long operational life span due to the design of turbine wheel and bearing concept.

- * bidirectional
- * visibility of turbine 360°

Female thread G1/4 to G1 brass



TECHNICAL DATA

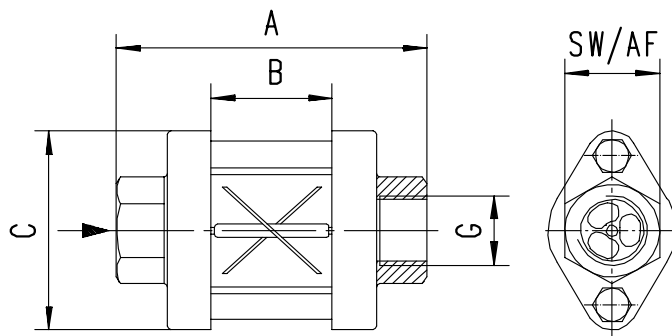
HV-015GM

	G	Type	Qmax. rec. l/min H ₂ O	start of turbine l/min			A mm	B mm	C mm	SW mm	weight kg
				H ₂ O	40 mm ² /s	41-150 mm ² /s					
brass	G 1/4	HV-008GM	6	0.6	2.5	3.5	66	22	44	20	0.11
	G 3/8	HV-010GM	10	1.2	3.0	4.0	92	36	60	28	0.18
	G 1/2	HV-015GM	15	1.2	3.0	4.0	92	36	60	28	0.18
	G 3/4	HV-020GM	30	2.1	3.7	5.0	114	46	70	46	0.60
	G 1	HV-025GM	50	2.1	3.7	5.0	114	46	70	46	0.60

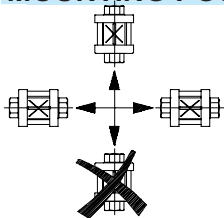
pressure PN 10
media temperature max. 100°C
average pressure loss 0.2 bar at Qmax.

MATERIALS

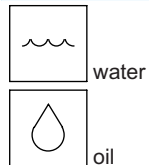
housing PA 66
connector brass
turbine PA 66 red
axle PA 66
bearing stainless steel sphere
glass tempered glass
seal NBR



MOUNTING POSITION



METERING SUBSTANCES



With higher viscosity instruments tend to higher starting values of the turbine.

NOMENCLATURE

HV-	008	G	M	basic type specification	
	008			nominal diameter	DN 8 - G1/4
	010				DN 10 - G3/8
	015				DN 15 - G1/2
	020				DN 20 - G3/4
	025				DN 25 - G1
		G			female thread
			M		brass connector

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The instruments are used for liquids while a turbine in full-plastic housing generates flow-dependent revolutions which are detected optically.

- * not straight inline/ outline requirement
- * full-plastic design
- * for transparent liquids
- * integrated filter

Nozzle Ø6.9 up to Ø16 PVDF

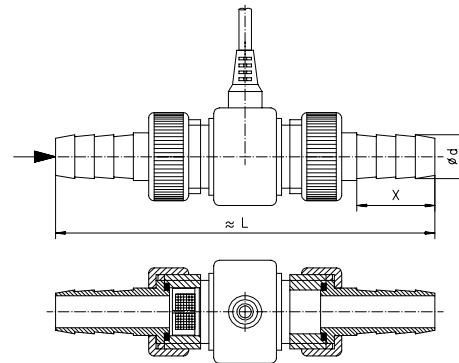


RO-012TV015

TECHNICAL DATA

Type	PN bar	Qmax. recom. l/min H ₂ O	metering range l/min H ₂ O	filter µm	pulse/ litre	d mm	X mm	L mm	weight kg
RO-007TV002	6	1.5	0.1 - 2	-	36000	6.9	20	95	0.06
RO-010TV009	6	8	0.3 - 9	60	8000	10	22	112	0.09
RO-012TV015	6	12	0.5 - 15	60	3200	12	24	112	0.10
RO-016TV030	6	23	1.0 - 30	60	1200	16	28	137	0.12

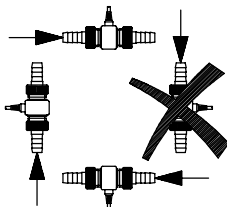
tolerance ±1%
 linearity ±1%
 repeatability ±1%
 media temperature max. 85°C
 average pressure loss 0.5 to 1bar at Qmax.



MATERIALS

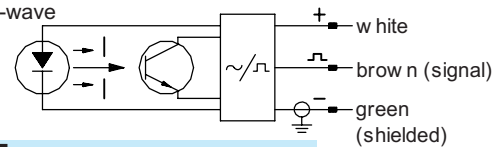
wetted parts PVDF
 seal polymere
 bearings PVDF

MOUNTING POSITION



ELECTRICAL DATA

infra red-opto-electric
 supply 5..12 V DC 6..33 mA
 with integrated wiring protection
 exit signal 5..11 V square-wave
 frequency 20-800 Hz
 cable 1 metre



METERING SUBSTANCES



Attention! For transparent liquids only.

NOMENCLATURE

RO-	007	T	V	002	basic type specification
	007				● nozzle Ø 6.9
	010				● nozzle Ø10
	012				● nozzle Ø12
	016				● nozzle Ø16
		T			● nozzle
			V		● PVDF
				002	● metering range 0.1 - 2 l/min
				009	● metering range 0.3 - 9 l/min
				015	● metering range 0.5 - 15 l/min
				030	● metering range 1.0 - 30 l/min

ACCESSORIES

For type RO-007TV a filtre FRP4174 is compulsory for protection of the moving parts. Please order separately.

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

The Hall effect flow rate sensor consists of a full plastic enclosure and linear turbine wheel. The revolutions of the turbine are magnetically sensed by an external hall sensor and processed to a stable frequency output. The advantage of this principle is the independence from pressure conditions and the optional mounting position.

- * high accuracy, low cost
- * optional installation

Male thread G3/8A PA

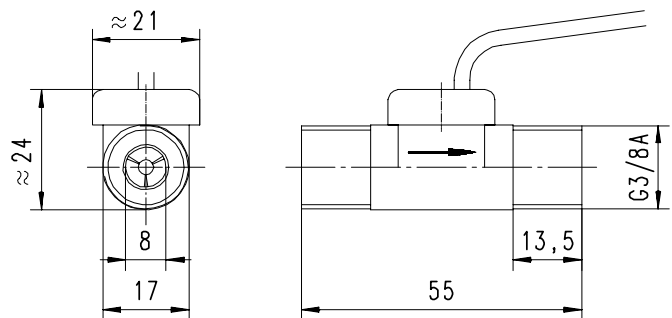
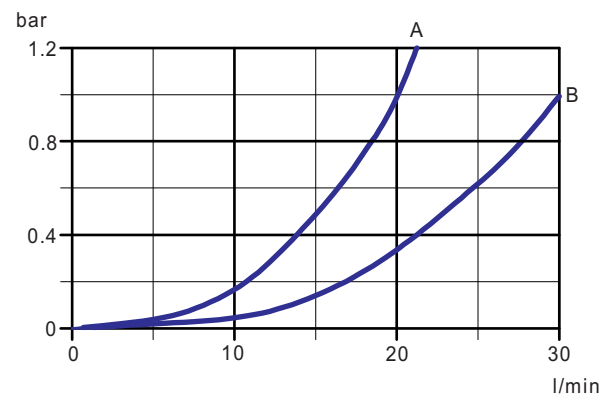


TECHNICAL DATA

G	Type	PN bar	metering range l/min H ₂ O	pulse / litre	frequency output Hz	pressure loss code	weight g
G3/8A	RRF-010AN005	14	0.5 - 5	6900	58 - 575	A	40
G3/8A	RRF-010AN010	14	1.0 - 10	3300	55 - 550	A	40
G3/8A	RRF-010AN015	14	1.0 - 15	2200	37 - 550	A	40
G3/8A	RRF-010AN030	14	2.0 - 30	1000	33 - 500	B	40

tolerance ±3% of reading
 repeatability ±0,5% full scale
 media temperature -20..100°C
 ambient temperature max. 80°C

PRESSURE LOSS

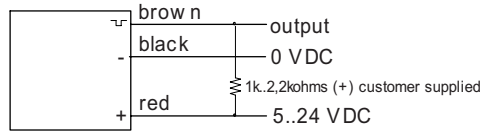


MATERIALS

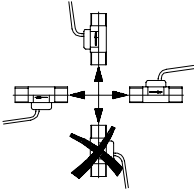
housing PA 12
 turbine PA 12
 bearings PTFE 15% graphite

ELECTRICAL DATA

input power 5..24VDC at 8mA
output NPN sinking open collector at 50mA max.
(1 to 2,2K Ohm Pull-Up Resistor Required)
(frequency output)
cable 1 m or spade terminals 2.8/6.3 x 0.8mm
protection class cable IP 65
spade terminals IP 00



MOUNTING POSITION



METERING SUBSTANCES



water

a filter < 50µm is recommended



oil up to 16mm²/s

NOMENCLATURE

For combinations see table "technical data"

RRF	010	A	N	005	K	basic type specification
	010					● nominal diameter DN 10 - G3/8A
		A				● male thread
			N			● housing material nylon
				005		● metering range 0,5- 5 l/min
				010		● metering range 1,0-10 l/min
				015		● metering range 1,0-15 l/min
				030		● metering range 1,0-30 l/min
					K	● cable
					F	○ spade terminals

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

In a metal enclosure a plastic turbine is arranged in saphire cups and provides flow-dependent revolutions which are magnetically detected by an externally arranged Hall sensor.

- * two different turbine applications
- * metal or plastic
- * long life stability
- * large dynamic (range)

female thread G3/4 POM / brass

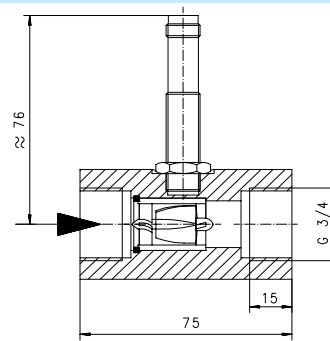


RRT-020GM

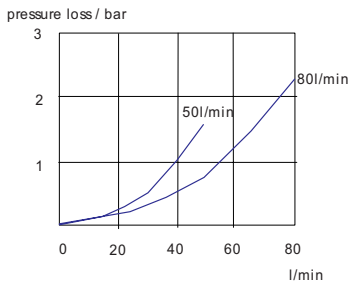
TECHNICAL DATA

Type	PN bar	metering range l/min H ₂ O	impulse/litre	weight kg
RRT-020GP050	10	1 - 50	100	0.15
RRT-020GP080	10	2 - 80	150	0.15
RRT-020GM050	100	1 - 50	100	0.60
RRT-020GM080	100	2 - 80	150	0.60

tolerance ±3% EW
media temperature -25..90°C
ambient temperature -25..60°C

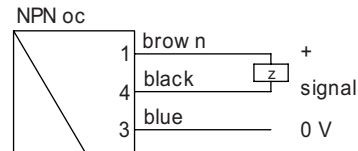


PRESSURE LOSS



ELECTRICAL DATA

Hall-sensor
NPN, NPN open collector
supply voltage 5..24 VDC; max 26.4 VDC
quiescent current consumption 10mA
connection at locking plugs M12x1, 4-pole
protection class IP67



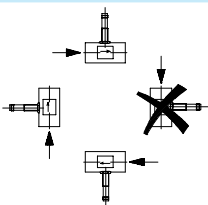
MATERIALS

housing POM or brass nickel plated
turbine ULTEM 1000 nature, PEI
Rubin DU-B , strotzium ferrite
1.4125, Bronze bridges PTFE plated

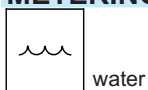
NOMENCLATURE

RRT-	020	G	P	050	P	S	basic type specification
	020						● nominal diameter DN20 - G3/4
		G					● female thread
			P				● housing POM
			M				● housing brass
				050			● range 1 - 50 l/min
				080			● range 2 - 80 l/min
					M		● electronic output NPN oc
					N		● electronic output NPN
					A		○ electronic output Namur (only for housing plastic)
					Z		○ electronic output 2-Leiter
					E		● electronic output by local electronic (e.g.omni-RRT)
						S	● connection at locking plugs M12x1, 4-pole
						-	● electronic output by local electronic (e.g.omni-RRT)

MOUNTING POSITION



METERING SUBSTANCES



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

In a metal enclosure a plastic turbine is arranged in sapphire cups and provides flow-dependent revolutions which are magnetically detected by an externally arranged Hall sensor.

- * modular system with two different turbine applications
- * easy for installation and service
- * modular system with check valve, filter and/or flow regulator
- * large dynamic (range)

female thread G3/8 POM / brass



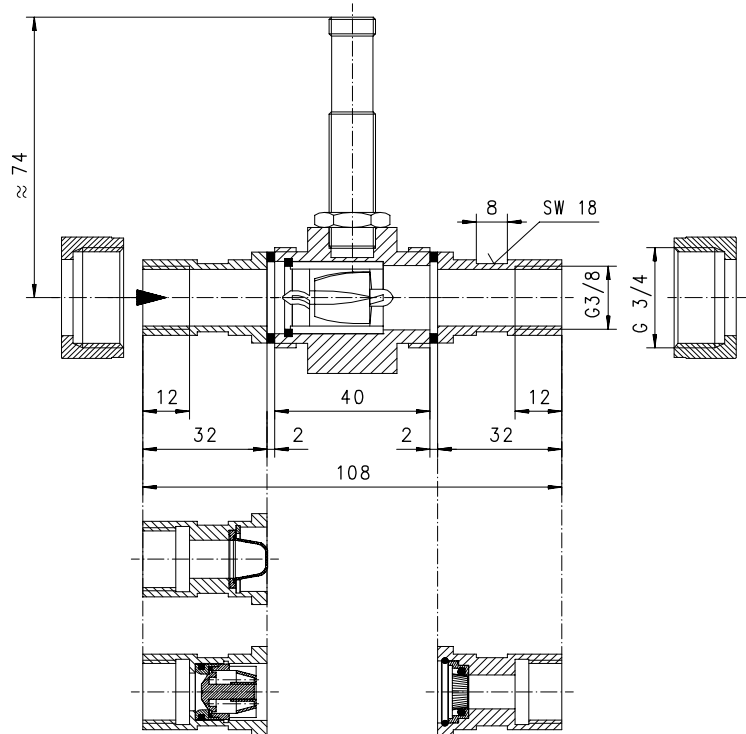
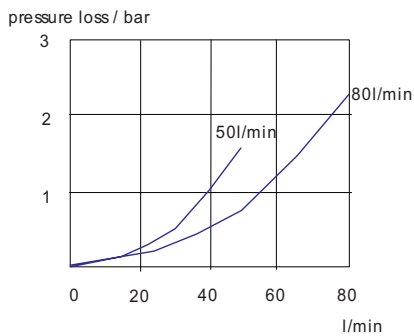
RRT1-010GM

TECHNICAL DATA

Type	PN bar	metering range l/min H ₂ O	impulse/litre	weight kg
RRT1-010GP050	10	1 - 50	100	0.10
RRT1-010GP080	10	2 - 80	150	0.10
RRT1-010GM050	100	1 - 50	100	0.50
RRT1-010GM080	100	2 - 80	150	0.50

tolerance ±3% EW
media temperature -25..90°C
ambient temperature -25..60°C

PRESSURE LOSS

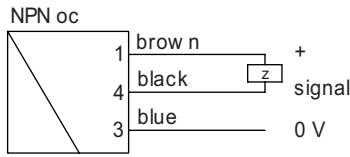


MATERIALS

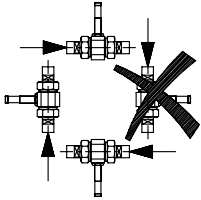
housing POM or brass nickel plated
turbine ULTEM 1000 nature, PEI
Rubin DU-B , strotzium ferrite
1.4125, Bronze bridges PTFE plated

ELECTRICAL DATA

Hall-sensor
NPN, NPN open collector
supply voltage 5..24 VDC; max 26.4 VDC
quiescent current consumption 10mA
connection at locking plugs M12x1, 4-pole
protection class IP67



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

RRT1-	010	G	M	P	050	V	P	S	O	O	basic type specification
	010										● nominal diameter DN 10 - G3/8
		G									● female thread
			M								● connection brass
			P								● connection plastic POM
				M							● housing brass
				P							● housing plastic POM
					050						● range 1 - 50 l/min
					080						● range 2 - 80 l/min
						V					● seal Viton
						E					○ seal EPDM
						N					○ seal NBR
							M				● electronic output NPN open collector
							N				● electronic output NPN
							A				○ electronic output Namur (only for housing plastic POM)
							Z				○ electronic output 2-wire
							E				○ electronic output by local electronic (e.g. omni-RRT1)
								S			● connection at locking plugs M12x1, 4-pole
								-			● connection by local electronic (e.g. omni-RRT1)
									O		● connection pure
									F		○ connection with Filter (intake)
									R		○ connection with check valve (intake)
										O	● connection pure
										03	○ connection with flow regulator 3 l/min (outlet)
										05	○ connection with flow regulator 5 l/min (outlet)
										06	○ connection with flow regulator 6 l/min (outlet)
										08	○ connection with flow regulator 8 l/min (outlet)
										10	○ connection with flow regulator 10 l/min (outlet)
										12	○ connection with flow regulator 12 l/min (outlet)
										15	○ connection with flow regulator 15 l/min (outlet)

special applications: Switching output, frequency converter, current output and omni/flex processor

OPTION

Flow regulator (options)

limiter flow rates	3 ; 5 ; 6 ; 8 ; 10 ; 12 ; 15
pressure range	2 - 10 bar
max. differential pressure	16 bar
tolerance	±15%
materials	POM, NBR, stainless steel 1.4571

Check valve (options)

materials	POM, NBR
-----------	----------

Filter (options)

mesh size	250µm
materials	POM, stainless steel 1.4301

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

In a full stainless steel enclosure a stainless steel turbine arranged in sapphire cups provides flow-proportional revolutions which are detected by a pre-triggered Hall sensor.

- * high accuracy
- * no magnetic bearings in the wetted chamber
- * high pressure duty

Male thread G1/2A to G2A stainless steel



RT-020AK004P

TECHNICAL DATA

Type	PN	metering range (1..5 mm ² /s)		pulses/ litre ±10%	G	H mm	L mm	X mm	weight kg
		l/min	m ³ /h						
RT-015AK001.	250	1.8 - 18	0.11 - 1.1	2900	G 1/2 A	71	64	19	0.30
RT-020AK002.	250	3.7 - 37	0.22 - 2.2	1700	G 3/4 A	74	64	19	0.40
RT-020AK004.	250	6.7 - 67	0.40 - 4.0	1100	G 3/4 A	74	64	19	0.40
RT-020AK008.	250	13.3 - 133	0.80 - 8.0	400	G 3/4 A	74	83	22	0.40
RT-025AK016.	250	26.7 - 267	1.60 - 16.0	190	G 1 A	78	88	23	0.60
RT-040AK034.	250	56.7 - 567	3.40 - 34.0	60	G 1 1/2 A	84	114	28	1.40
RT-050AK068.	250	113.3 - 1133	6.80 - 68.0	24	G 2 A	89	132	29	1.90

tolerance ±1% of full scale
 <10 to 100% of metering range
 inclusive linearity and repeatability

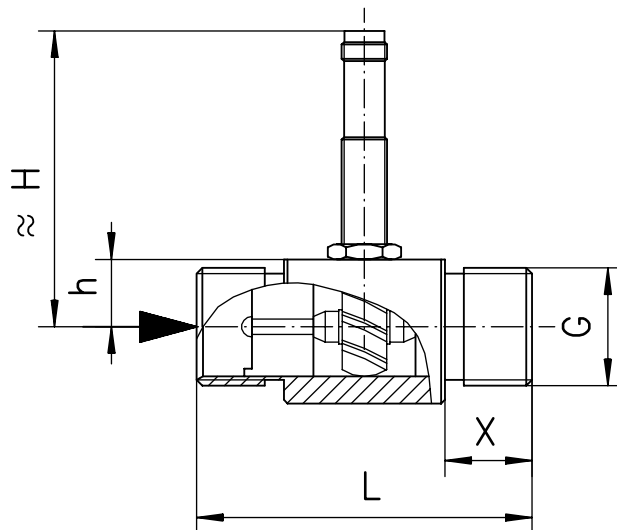
media temperature max. 85°C

tolerated particles 0.5mm

average pressure loss 0.3bar at Qmax.

OPTION

media temperature 150°C compatible to all
 Honsberg-electronics sensors or electronics heads



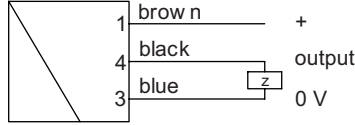
MATERIALS

housing stainless steel
 turbine stainless steel
 bearings wolfram carbit
 ball bearings stainless steel

ELECTRICAL DATA

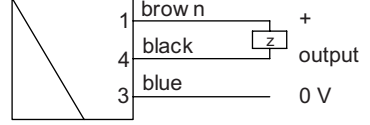
hall sensor, pre-triggered
voltage range 10-30 V DC
current 20 mA without load
max. load 100 mA
contact for locking plug M12x1 , 4-pole
protection class IP 67

wiring 0.319
PNP

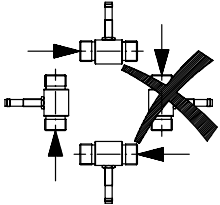


z=load

NPN



MOUNTING POSITION



10 x diam. as smoothing
section on inlet and
outlet

METERING SUBSTANCES



water



aggressive liquids



oil up to 5mm²/s

NOMENCLATURE

For combinations see table "technical data".

RT-	015	A	K	001	P	basic type specification
	015				●	nominal \square di
	020				●	DN 15 - G1/2A
	025				●	DN 20 - G3/4A
	040				●	DN 25 - G1A
	050				●	DN 40 - G1 1/2A
		A			●	DN 50 - G2A
			K		●	male thread
				001	●	stainless steel design
				002	●	0.11 - 1.1 m ³ /h
				004	●	0.22 - 2.2 m ³ /h
				008	●	0.40 - 4.0 m ³ /h
				016	●	0.80 - 8.0 m ³ /h
				034	●	1.60 - 16.0 m ³ /h
				068	●	3.40 - 34.0 m ³ /h
					●	6.80 - 68.0 m ³ /h
					●	metering range (1-5mm ² /s)
					●	PNP
					●	NPN
					●	exit by local electronic (e.g. omni-TTH)
Programme option					○	flange design
BASIC						temperature max. 120°C (NPN)
Special option					□	DN 80-300 PN16
VARIO						design for air/gas
						range from 0.05 m ³ /h
Accessories					⊕	EX amplifier EEV1 product information 80.1.EEV1.
PLUS						Counter EEZ904 product information 83.1.EEZ904.

special applications: Switching output, frequency converter, current output and omni/flex processor

COMBINATIONS

omni-RT

local electronic unit,
2xNPN and PNP switch
4(0)..20mA output
graphical LCD display
with flashing LED
program ring



further transformers

- Flex switching and frequency exit, 0..10V or 4..20mA, pnp, npn
- ESA1 electronic monitoring unit
- ESK2 2 switchpoints - supply 24 V DC
- ESK3 1 switchpoint - supply 230 V AC
conceived for safety-relevant applications
- EFFS switch output
- EFFI current output 4(0)..20mA
- EFFF frequency output



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕PLUS Accessories ✗not recommendable

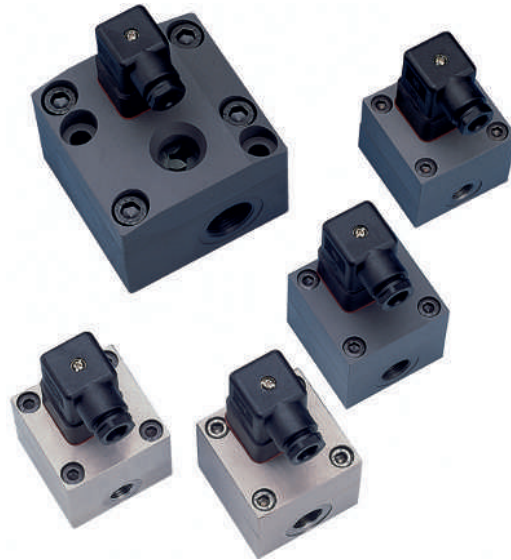
GENERAL CHARACTERISTICS

The Flowmeter VHZ was especially developed for the metering of viscous liquids. The units work volumetrically as gear transmitters with high accuracy and full viscosity stability.

Gear wheel flow meter, with provides a linear frequency signal by flow proportional revolution of a gear wheel and sensing by a field biased Hall sensor. Viscosity compensated by volumetric operation.

- * operation independent of viscosity
- * light and compact design
- * for cost sensitive application

Female thread G1/4 - G1 aluminium / stainless steel



TECHNICAL DATA

	G	Type	PN bar	metering range l/min	frequency	weight kg
aluminium	G1/4	VHZ-008GA	200	0.02 - 2	0.04cm ³ =1Puls - max.833 Hz at 2l/min	0.5
	G3/8	VHZ-010GA	200	0.1 - 6	0.20cm ³ =1Puls - max.500 Hz at 6l/min	0.5
	G3/4	VHZ-020GA	200	0.5 - 50	2.00cm ³ =1Puls - max.417 Hz at 50l/min	1.6
	G3/4	VHZO-020GA	100	0.5 - 50	2.00cm ³ =1Puls - max.417 Hz at 50l/min	1.6
	G1	VHZ-025GA	100	3.0 - 150	5.22cm ³ =1Puls - max.479 Hz at 150l/min	6.3
s.s.	G1/4	VHZ-008GK	160	0.02 - 2	0.02cm ³ =1Puls - max.833 Hz at 2l/min	1.5
	G3/8	VHZ-010GK	200	0.1 - 6	0.20cm ³ =1Puls - max.500 Hz at 6l/min	1.5

accuracy ±3 % full scale
(in reference to 20 mm²/s)

reproducebility ±0.3%

media temperature -25..80°C
optionally -25..120°C
(only 2-wire-execution DN10-25)

MOUNTING

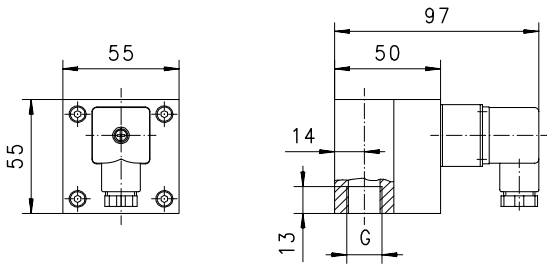
Any installation position is possible and the the flow direction is independent.
Take care of a clean pipe line. With larger particles in flow the employment of a filter of 30µm for protection is recommended.

MATERIALS

	VHZ-...GA	VHZ-010-025GK	VHZ-008GK
housing	aluminium anodized	stainless steel 1.4404	stainless steel 1.4404
gear and axle	stainless steel 1.4462	stainless steel 1.4462	stainless steel 1.4462
bearings	Iglidur X	Iglidur X	stainless steel 1.4037/1.4016 /PVD plated
seal	viton	viton	Viton
sight glass	glass (only VHZO)		

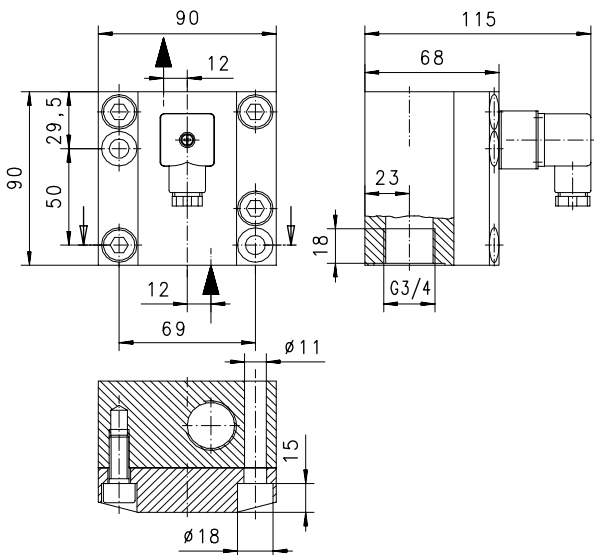
DIMENSIONS

VHZ-008 / VHZ-010

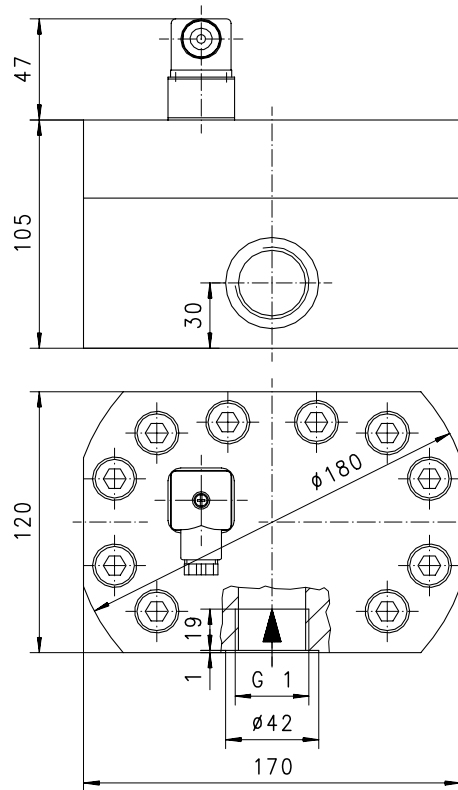


VHZ-008 G1/4
VHZ-010 G3/8

VHZ-020



VHZ-025



FUNCTIONAL DIAGRAMS

Noise level / flow rate

VHZ-008

The noise level of the VHZ-008 is <50db (A) in case of 2 l/min.

VHZ-010

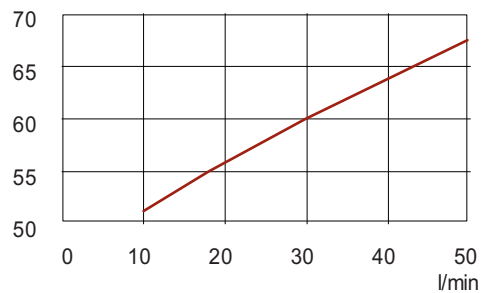
The noise level of the VHZ-010 is <50db (A) in case of 6 l/min.

VHZ-025

The noise level of the VHZ-025 is <70db (A) in case of 150 l/min.

VHZ-020

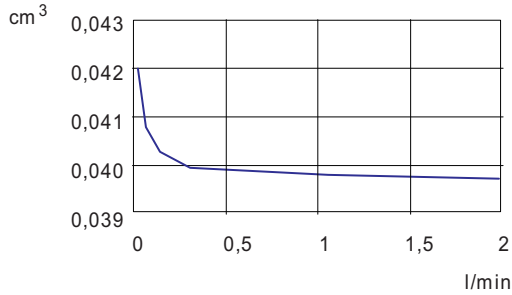
db (A)



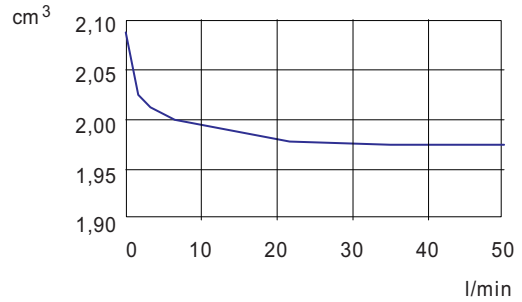
Gearwheel volume / flow rate

The volumetric displacement per gearwheel is a dimension for the functional accuracy of the unit. The max. tolerance related to full range is $\pm 3\%$. All diagrams are based on a viscosity of $20\text{mm}^2/\text{s}$.

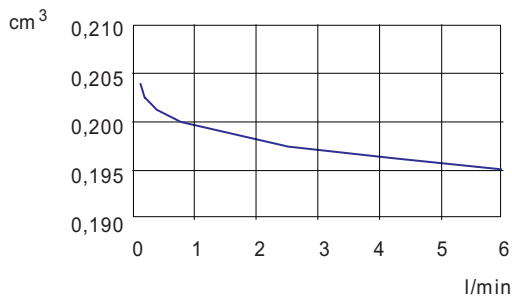
VHZ-008



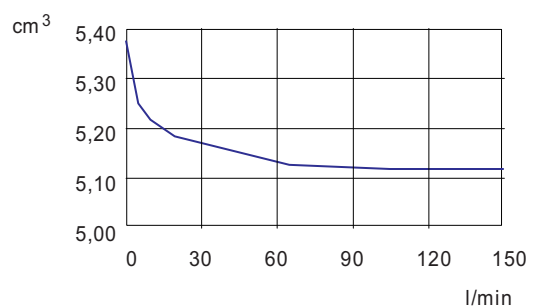
VHZ-020



VHZ-010

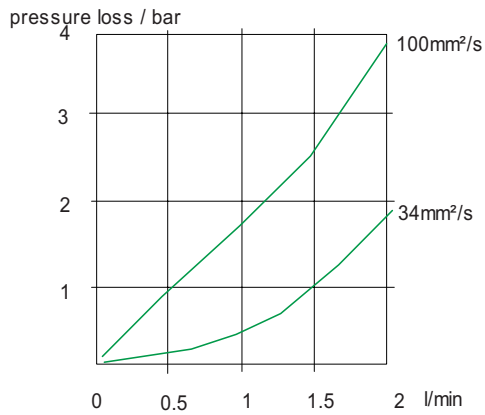


VHZ-025

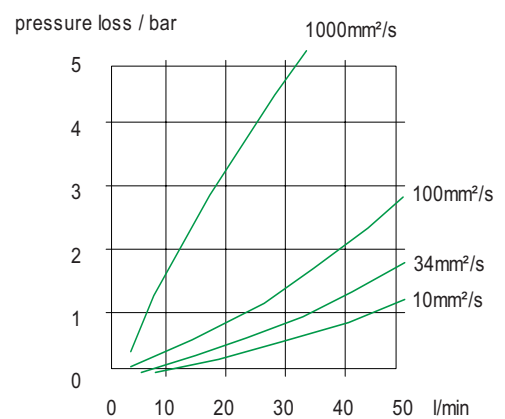


pressure loss / viscosity / flow rate

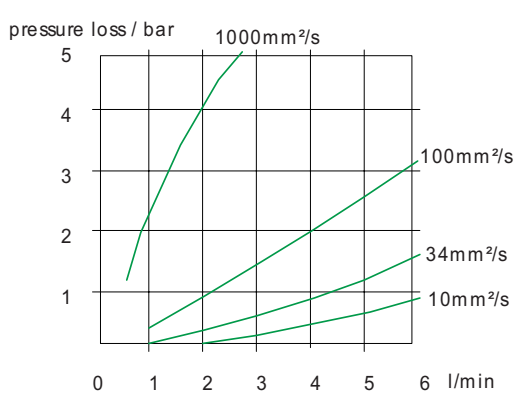
VHZ-008



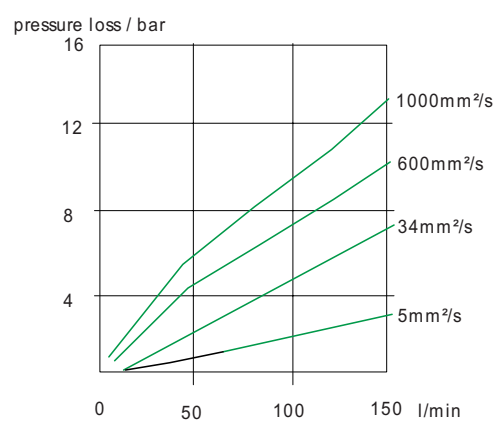
VHZ-020



VHZ-010



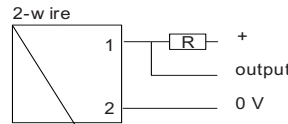
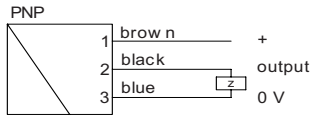
VHZ-025



ELECTRICAL DATA

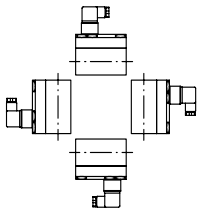
PNP/NPN-Execution	VHZ-010 to 025	VHZ-008
supply voltage	10..30 V DC	24V±10%
quiescent current	<25mA without load	<30mA without load
short-circuit proof	yes	yes
Kurzschlussfest	yes	ja
connection	plug DIN 43650-A	
Schutzart	IP 65	

2-Wire-Execution	VHZ-010 to 025	VHZ-008
supply voltage	4,5..24 VDC (V ₁₂)	12 VDC
quiescent current	low 6mA exemplary high 6mA + V ₁₂ /330Ohm	7mA 14mA
short-circuit proof	yes	no
connection	plug DIN 43650-A	
Schutzart	IP 65	

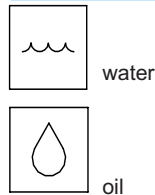


Please be sure that there is the right power supply before you connect the device.

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combination see table "technical data"

VHZ-	008	G	A	002	P	basic type specification
VHZ-						● Flowmeter
VHZO-						● Flowmeter with sight glass (only VHZO-020 - 100 bar)
	008					● nominal diameter DN 8 - G1/4
	010					● nominal diameter DN 10 - G3/8
	020					● nominal diameter DN 20 - G3/4
	025					● nominal diameter DN 25 - G1
		G				● female thread
			A			● aluminium
			K			○ stainless steel DN 8 (160 bar) and DN 10
				002		● 0.02 - 2 l/min (VHZ-008)
				006		● 0.1 - 6 l/min (VHZ-010)
				050		● 0.5 - 50 l/min (VHZ-020)
				150		● 3 - 150 l/min (VHZ-025)
					P	● PNP output
					N	● NPN output
					Z	○ 2-wire
					E	● output at suburb electronics (for examples omni-VHZ)
Sonderoption						○ media temperature -20°C..120°C
VARIO						(only 2-Wire-Execution VHZ-010 and VHZ-020 without sight glass)
Zubehör						⊕ EX amplifier EEV1 product information 80.1.EEV1.
PLUS						Universal preset counter EEZ904 product information 83.1.EEZ904.

special applications: Switching output, frequency converter, current output and omni/flex processor

COMBINATIONS

omni-VHZ

local electronic unit,
2xNPN and PNP switch
4(0)..20mA output
graphical LCD display
with flashing LED
program ring



further transformers

- Flex switching and frequency exit, 0..10V or 4..20mA, pnp, npn
- ESA1 electronic monitoring unit
- ESK2 2 switchpoints - supply 24 V DC
- ESK3 1 switchpoint - supply 230 V AC
conceived for safety-relevant applications
- EFFS switch output
- EFFI current output 4(0)..20mA
- EFFF frequency output



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The oval wheel flowmeters are used to measure, monitor and meter viscous liquids.

- * compact
- * viscosity range 10-800mm²/s
- * option transparent cover

Female thread G1/4 to G3/4 POM

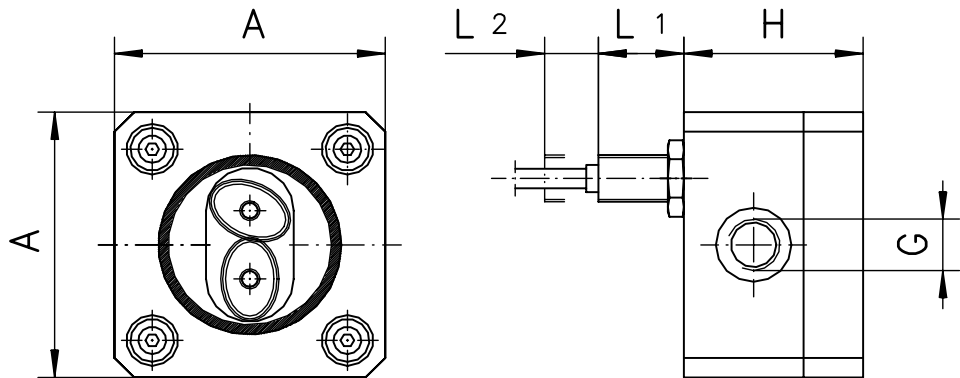


VHO-008GPT

TECHNICAL DATA

	G	Type	PN bar	Qmax. rec. l/min	measuring range l/min				pulse/litre	weight kg
					10mm ² /s	100mm ² /s	320mm ² /s	800mm ² /s		
POM	G 1/4	VHO-008GP.080	10	12	0.3 - 8.0	0.3 - 8.0	0.2 - 5.0	0.1 - 2.0	429	0.4
	G 1/4	VHO-008GP.100	10	12	0.4 - 10.0	0.4 - 10.0	0.3 - 8.0	0.15 - 4.0	224	0.4
	G 1/2	VHO-015GP.250	10	30	1.0 - 25.0	1.0 - 25.0	1.0 - 25.0	0.4 - 10.0	52,5	0.7
	G 3/4	VHO-020GP.400	10	50	1.6 - 40.0	1.6 - 40.0	1.6 - 40.0	0.95 - 24.0	28	1.1

tolerance ±2,5% off full scale
media temperature -10...+60°C
average pressure loss 1bar at max. nominal flow rate



MATERIALS

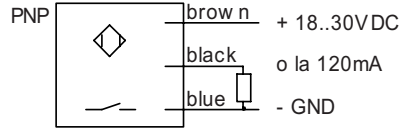
housing	POM
cover	POM, option PMMA (transparent)
oval wheel	POM
signal initiator	1.4301
axle	1.4301
seal	NBR

Type	G	A mm	H mm	L1 mm	L2 mm
VHO-008GP.080	G 1/4	68	45	21,5	13,5
VHO-008GP.100	G 1/4	68	49	21	14
VHO-015GP.250	G 1/2	99	71 *	19	16
VHO-020GP.400	G 3/4	119	84,5 *	17	18

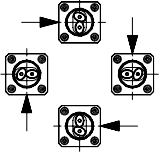
* with transparent covers +3mm

ELECTRICAL DATA

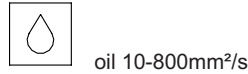
inductive sensor
PNP, asymmetrically 18..30 V DC max. 120mA (typ. 10mA)
cable 2 m
protection class IP 65



MOUNTING POSITION



METERING SUBSTANCES



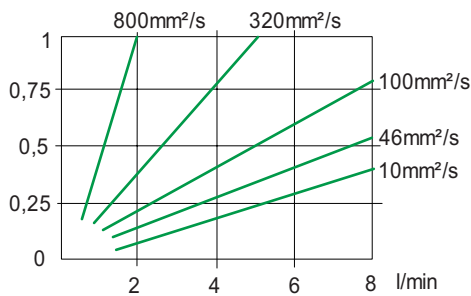
NOMENCLATURE

VHO-	008	G	P	P	080	P	basic type specification
	008						● nominal diameter DN 8 - G1/4
	015						● nominal diameter DN 15 - G1/2
	020						● nominal diameter DN 20 - G3/4
		G					● female thread
			P				● housing material POM
			A				○ housing material Aluminium
				P			● cover material POM
				T			○ cover material PMMA (transparent)
				A			○ cover material Aluminium
					080		● measuring range 0.3 - 8 l/min
					100		● measuring range 0.4 - 10 l/min
					250		● measuring range 1.0 - 25 l/min
					400		● measuring range 1.6 - 40 l/min
						P	● exit PNP
						A	○ exit Namur

PRESSURE LOSS

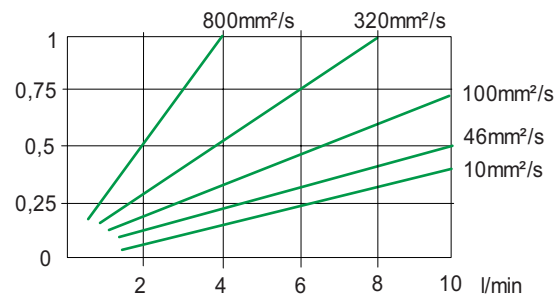
VHO-008GP.080

pressure loss / bar



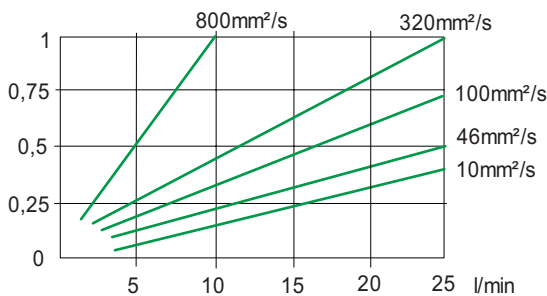
VHO-008GP.100

pressure loss / bar



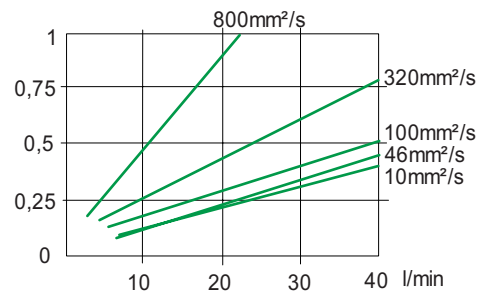
VHO-015GP.250

pressure loss / bar



VHO-020GP.400

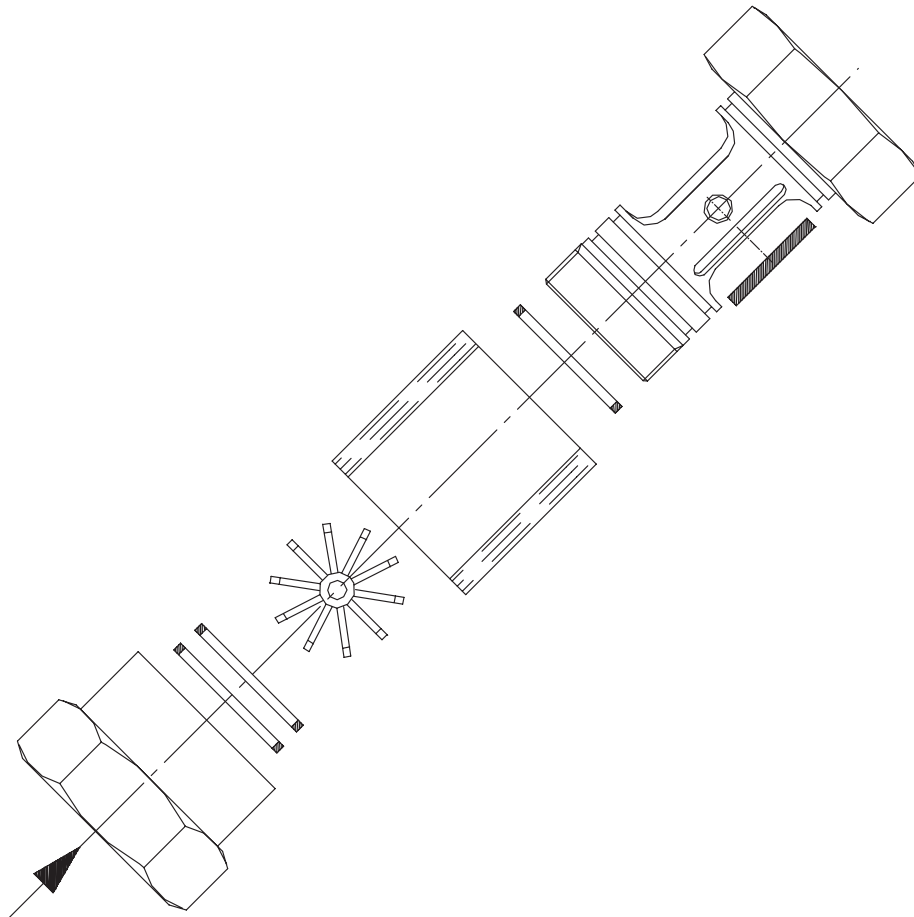
pressure loss / bar



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

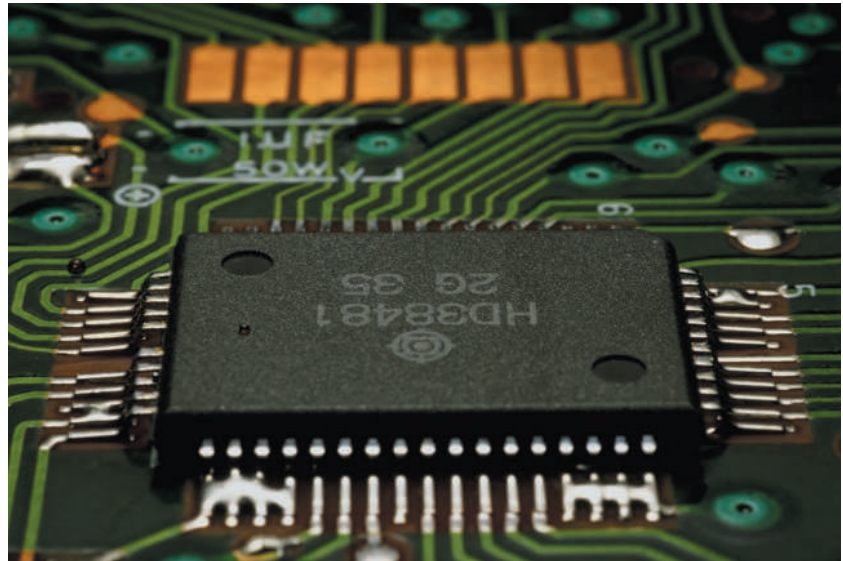
Why to use a **HONSBERG BASIC** rotor instrument



- **Housing in plastic or metal with turnable connector** → **installation comfort**
- **Cover transparent** → **additional visual control**
- **Sensor option** → **inductive, optical or magnetic**
- **Rotor with magnetic or stainless steel tips** → **contactless actuation**
- **Ceramic shaft and high grade plastic bushing** → **wear free operation**

Market segments

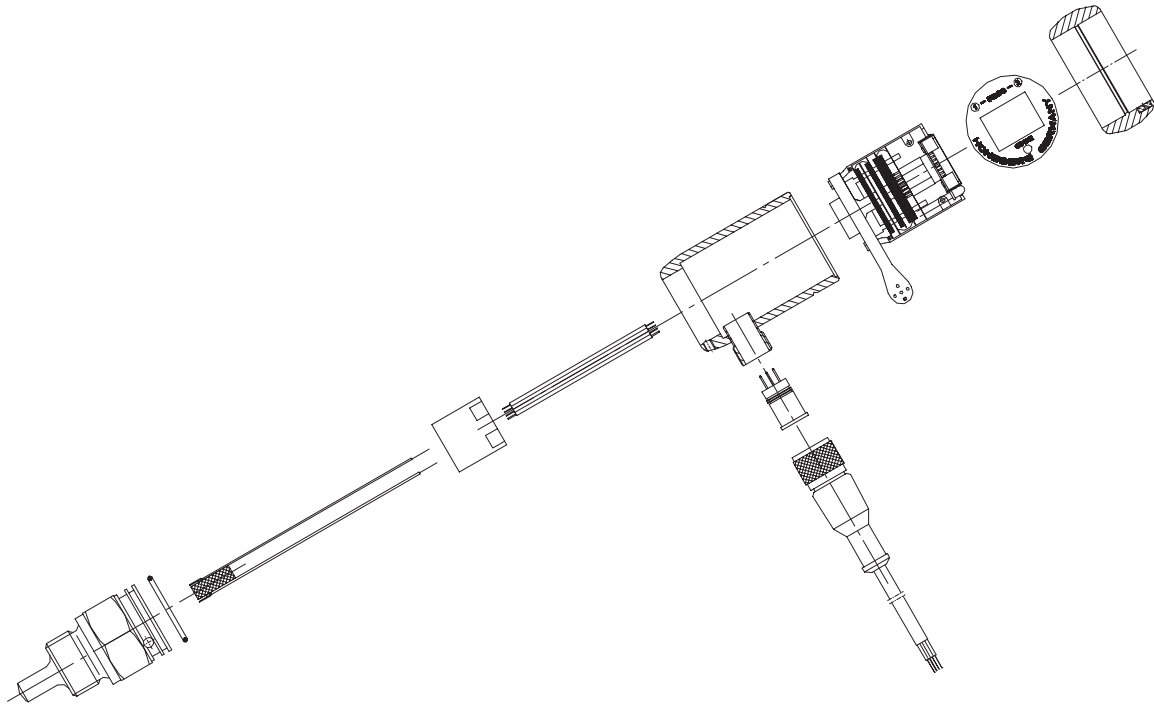
- **Semiconductor**
- **Medical installation**
- **Welding**



Application

- **Continuous flow related signals in wafer production**
- **Continuous flow signals in cooling panels for X-ray installations**
- **Continuous signals to command cooling rate in welding automates**

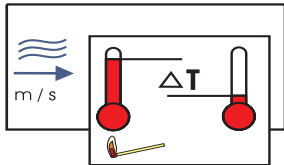
Why to use a **HONSBERG BASIC** electronic flow instrument



- **Stainless steel sensor**
 - **No moving parts**
 - **For all diameters**
 - **Thermal and inductive principle**
 - **LED chain or LCD display**
 - **Magnetic calibration**
- **for aggressive liquids**
 - **reliable**
 - **versatile**
 - **for water and viscosities**
 - **clear visual impression**
 - **easy programming on location**

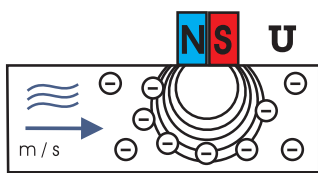
Calorimetric, magnetic inductive

The technology



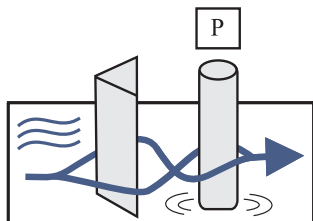
Calorimetric

The difference in temperature between two temperature sensors is directly proportional to the flow rate and/or flow speed if one of the temperature sensors is heated.



Magnetic inductive

The conductive metering medium moves vertically to a magnetic field and thus induces a metering voltage which is directly proportional to the flow speed.



Vortex

A small triangular piece that covers the entire cross-section of the flowmeter creates a vortex in the flow. The vortex frequency is proportional to the flow rate and is detected by a Piezo sensor that is located behind the triangular piece.

Application

- Flow monitoring and material using sensor technology
- No moving parts inside

Advantages

- Simple structure and installation
- Independent of nominal diameters
- Wear-free and low pressure loss function

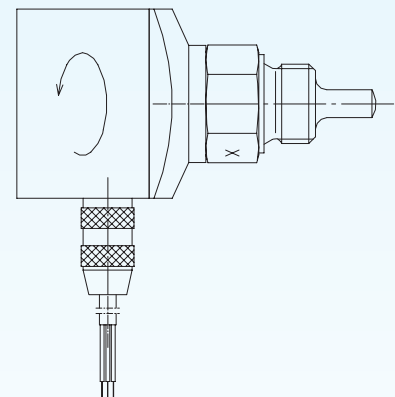
Technical data

Concept	Probe
Nominal diameter	15 - 400
Connection	stub-connection
PN	6 - 25
Max. temperature	120 °C
Signal	threshold, 4 [0]..20 mA
Adjustable	yes
Materials	stainless steel
Installation position	any
Metering materials	liquids

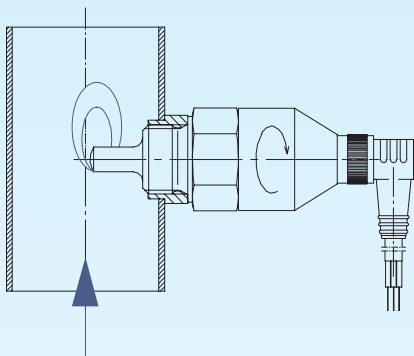


Contents

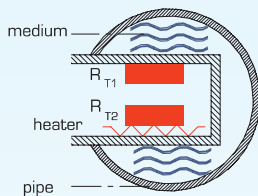
Calorimetric	202
magnetic inductive	205
Vortex	206
Gerätebeschreibungen	207



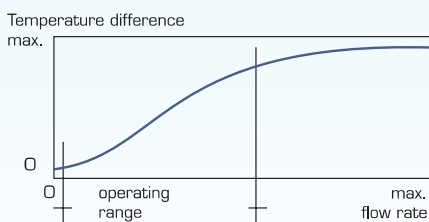
- Switching
- Indicating
- Metering



extraction of heat by current



basic arrangements of the sensor elements



The slope of the curve for a calorimetric sensor becomes less as the flow rate increases, which means that the difference signal to be evaluated becomes increasingly smaller.

Calorimetric

The Honsberg calorimetric flow switches monitor a variety of substances.

Advantages:

- no moving parts (versus turbine or variable area)
- unity of wetted material spec
- compact design
- one sensor for all diameters
- low pressure loss
- high operational pressures
- optional integrated temperature control

The variety of sensor options fits almost all operational conditions. If not we are in the position to adjust our instrument to the individual application.

Fields of use

- **Metal processing industry:**
control of coolants and lubricants
- **Steel industry:**
circuits for cooling agents
- **Chemical industry:**
protecting pumps against running dry,
monitoring for leaks, supervising levels
- **Beverage industry:**
monitoring cleaning operations
- **Air conditioning and ventilation industry:**
controlling fans and aeration / ventilation systems

Principle

The calorimetric system is based two temperature sensors which are positioned within good temperature conductivity versus the liquid involved.

One sensor is permanently heated with the effect that a constant temperature difference between the sensors will be established. In case of a velocity of the liquid this temperature difference is modified. This modification is the measure for the flow control.

The unheated sensor registers the liquid temperature and triggers a temperature compensation. This effects a stability of temperature behaviour with flow velocity and an accurate flow control.

Influence of Medium and Materials

Various liquids and different sensor housing materials affect the response time, because the thermal conductivity is changing. Generally, the lower the thermal conductivity of the medium and the housing material, the higher the medium flow rate must be to receive satisfactory results.

- medium water - sensor stainless steel - heat conductivity high => low flow rate required approx. 1..150 cm/s
- Medium oil r - sensor stainless steel - heat conductivity medium => medium flow rate required approx. 3..300 cm/s

The operation of the thermal metering and control principle is depending on the liquid quality and temperature of the metering substance.

Thermal standard instrumentation is calibrated for water in temperature ranges of 15..70°C.

With diverging liquid quality f.i. discourses, air temperature environment of more than 70°C or less than 15°C an individual advice of the manufactures is recommended.

Different Designs and Options

Calorimetric sensors are manufactured by Honsberg in probe configuration. The probe type is suitable for use with a wide range of pipe cross-sections. Both designs are manufactured either as compact sensors with integral electronic units or as sensors for use with external electronic units.

This temperature switch can be used as a safety switch for prohibitive temperature ranges (please take into account an accuracy of 10%, reproducibility of 1% and hysteresis of 10%).

Explanation of Terms Related

Temperature gradient = change of medium temperature per time unit [K/min]. When rapid temperature changes occur in the medium, they can only be compensated within a certain range. Correct operation is guaranteed in the specification range quoted. If the temperature of the medium exceeds this temperature, the system may generate a fault indication for a short time. Of course, such fault signal can be filtered by switching delays, compromising the standard on-off response time.

The stand-by time is the time for the sensor to reach its specified operating mode. With a supply voltage, all the indicating LEDs illuminate. After approx. 3 s the display changes to the range set via the potentiometer. Then the switch-off range can be defined by turning the potentiometer.

The switch-on and switch-off times are the periods after which the regular measuring variable is acquired following a rapid increase or decrease in the flow rate. With a medium temperature of approx. 25 °C and with a stainless steel sensor used in water, the average switch-on and switch-off times are approx. 2 s. Please bear in mind that this time depends on the operating conditions. In cases where the media or sensor materials are poor thermal conductors, the switching times might increase.

The temperature range of the medium is the range of medium temperature in which the calorimetric sensor works without problem.

The ambient temperature is the temperature surrounding the sensor. This mainly involves devices and equipment generating or dissipating heat in the vicinity of the sensor.

The housing material is the material exposed to the medium. Critical issues for instrument selection:

- the chemical compatibility of wetted materials
- abrasive properties of the material
- reaction time of the sensor
- pressure and temperature characteristics



compact types in the form of probes



sensors in the form of probes external transmitters



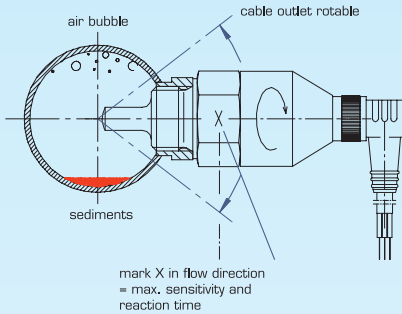
sensors in form with electronic and display (omni-F)



sensor with switching and frequency exit 4..20mA / 0..10V (Flex-F)

Mounting instructions

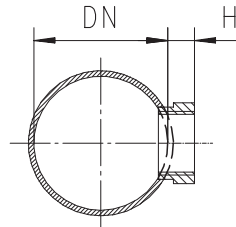
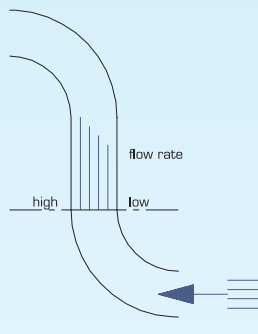
In principal all installation locations are feasible where the sensor housing may be positioned into circumferent contact with the liquid (see drawing):



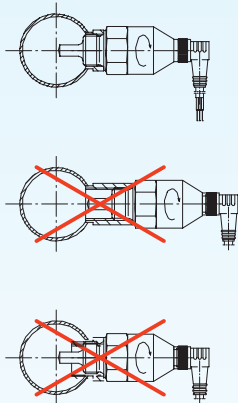
Contamination and air bubbles should be avoided. In case of bending tube sectors the liquid conditions may change which might cause flow whirls and other instability affecting the quality of emitted signals.

After insertion and sealing (e.g. using a Sikurit seal) all sensors can be rotated with continuous adjustment of the head. This feature facilitates the precise orientation of the cable and, for the compact-type of sensor, the easy alignment of the indicating head.

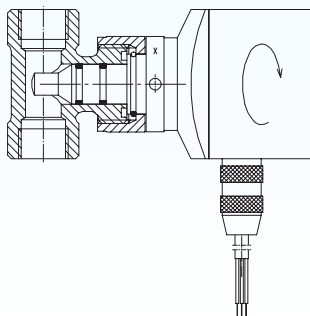
socket and nominal size (standard):



Installation position and consideration of different flow rates



thread projection of the sensor



G	probe-length	Type	nominal diameter DN	socket dimension H
G1/4A	28	...-008HK028	DN 10-15 DN 20-25	20 15
G1/2A	29,6	...-015HK029	DN 15-32	18
G1/2A	45	...-015HK045	DN 25-....	32

As accessories for direct installation by female thread fittings (type TS) in brass and stainless steel are available.



Electrical Installation

Probe-type sensors without integral evaluation units are supplied with a cable of length 2 m (0.25 mm²) as standard. This cable cross-section is used if the external electronic units are less than 20 m away. If longer distances need to be covered, the use of an extension cable with full shielding is recommended, along with the selection of an appropriate diameter corresponding to the cable length.

Instructions for Handling and Calibration

Subsequent to power access the instrument will display full scale operation (all LED's lit) for approx. 3 sec.

Once resuming operational temperature the instrument displays a flow rate which is referring to the setting position of the potentiometer.

If you have provided the required flow velocity in your system, select a potentiometer position which keeps the red LED in operation while all green LED's are off duty.

Turning the potentiometer counter clock wise you determine the sensitivity of the sensor of the calibration setting effects few LED's only the threshold contact will be triggered by minor changes in flow velocity, if a chain of green LED's is activated minor flow changes are required to create the alarm.

Attention! Please avoid any mechanical strain to the 360° potentiometer.



Potentiometer min
(turn counter clock)
low flow indication, sensitivity low
and no green LED's activated.
(Temperature alarm activated)



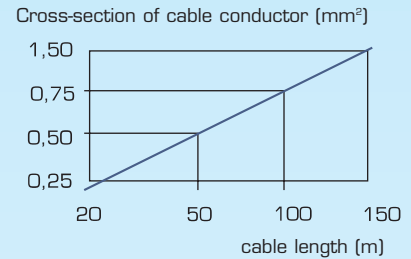
Potentiometer max
(turn clock wise)
high flow indication, sensitivity
high and chain of green LED's
activated.
(Temperature alarm activated)

Magnetic inductive

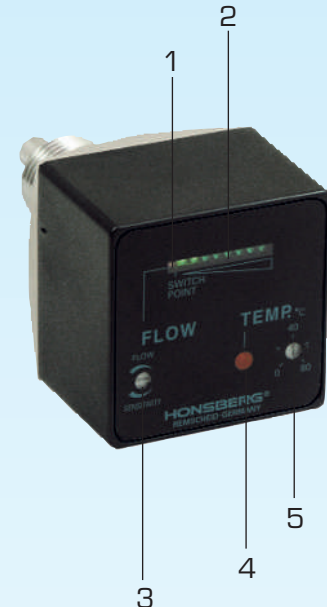
The magnetic-inductive probe is assembled into the pipe by support of a sleeve welded into the relevant pipe to receive the sensor (min. pipe diameter DN 50). For installation position and depth see diagrams alternatively a clamp saddle arrangement may be used.

Advantage

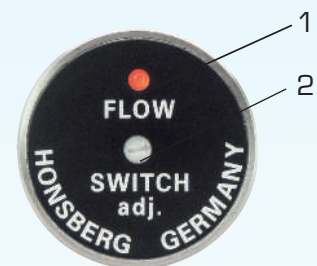
- no moving parts
- one sensor for a wide range of pipe diameters
- low pressure loss



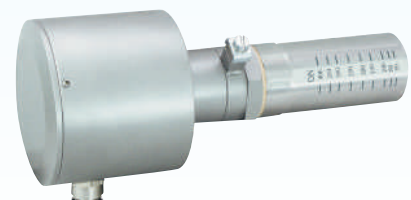
recommended cable cross-section
for various lengths

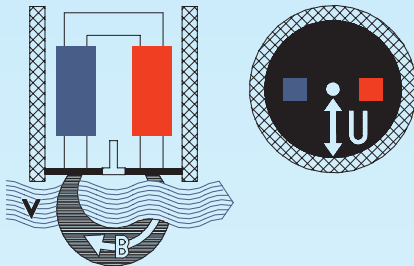


- (1) switch-point indicator for flow (red)
- (2) trend indicator for flow (green 8 LED's)
- (3) switch-point setting for flow
- (4) switch-point setting for the temperature (only with EFKT)
- (5) overtemperature indicator (red)



- (1) switch-point indicator for flow (red)
- (2) switch-point setting for flow





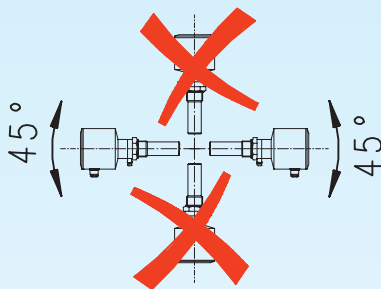
Principle

If a conductor moves vertically in relation to a magnetic field, the movement will induce an electrical potential U in the conductor. In this measuring principle the electrically conductive measuring medium is the conductor. The magnetic field B is produced at right angles to the flow. The induced electrical potential U is directly proportional to the local speed of flow v .

$$U = k \cdot B \cdot v \cdot D$$

k = constant for the instrument
 B = strength of magnetic field
 v = local speed
 D = distance between electrodes

The potential U is tapped at the electrodes, midpoint and earth (tube) electrodes, and converted to a proportional 4(0)-20 mA signal.

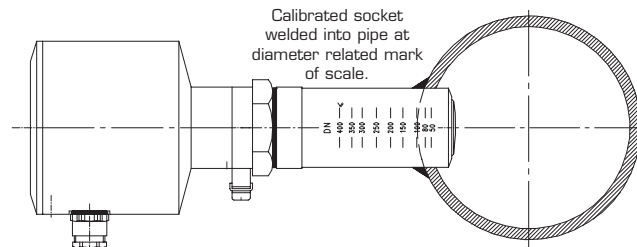


The positions vertical are not recommended due to air bubbles or sediments in pipe.

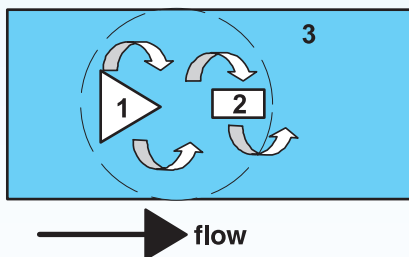
Mounting

The magnetic-inductive FIS probe is assembled into the pipe by support of a sleeve welded into the relevant pipe to receive the sensor (min. pipe diameter DN 50). For installation position and depth see diagrams alternatively a clamp saddle arrangement may be used.

Inlet and outlet sections must be $\geq 10x$ diameter of pipe. Weld the connector sleeve vertically to the centre of the pipe according to the pipes nominal diameter (see marking = external pipe diameter). Do not use force! The Probe must be screwed in hand tight.



After putting in place, the probe can be aligned by rotation (see electrical connection). The complete measuring probe is removable without damaging the carrier, so that the electronic part can be exchanged in case of defect.











Vortex

A small triangular piece (1) that covers the entire cross-section of the flowmeter creates a vortex in the flow (Karmann vortex, vortex effect). The vortex frequency is proportional to the flow rate and is detected by a Piezo sensor (2) that is located behind the triangular piece. The entire unit, vortex piece and sensor, is designed as a module (3) and is inserted into the meter. Thus, the flowmeter and the entire measuring unit can be separated quickly.

Advantages

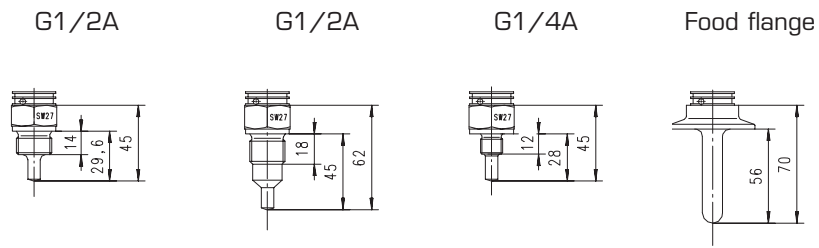
- No moving parts in the flow (e.g. a turbine or floating meter)
- Very exact
- High protection in case of excess loads

	type	nominal diameter	connection	control	indication	output signal	on site metering	max. pressure bar	max. temperature °C	water	oil	gas/air	aggressive	miscellaneous	page
calorimetric	 EFKP	10-400 50-400	male thread stainless steel foodstuffs sensor	●	●			100 100	70 70	●	✓		✓		208
	 EFKM	10-400 50-400	male thread stainless steel foodstuffs sensor	●	●			100 100	70 70	●	✓		✓		208
	 EFK2	10-400 50-400	male thread stainless steel foodstuffs sensor	●	●			100 100	70 70	●	✓		✓		210
	 Flex-FIN	6 - 10	pipe stainless steel	●	●			100	70	●	✓		✓		212
	 EFKS	10-400 50-400	male thread stainless steel foodstuffs flange	●	●			100 100	70 70	●	✓		✓		215
	 EEFK		converter						60						215
indukti-	 FIS	25-400 50-150	welding socket stainless steel assembly clamp saddle PP	●				25 10	150 150	●			✓		217
	Vortex	 CF	8 - 32 8 - 32 8 - 32	female thread brass female thread stainless steel female thread plastic	●				16 16 16	80 80 80	●	✓			

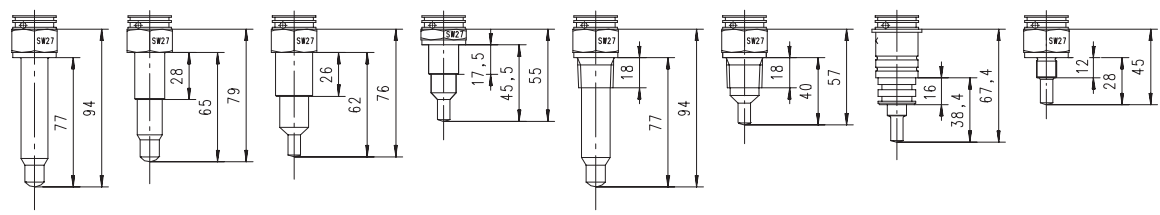
F

HONSBERG KOMBISYSTEM

Standard sensor



Special sensors for system connections or special threads and lengths



● standard ○ standard option ◻ special option current data sheets can be found under www.honsberg.com

GENERAL CHARACTERISTICS

The EFKP/M... Flow Switch monitor liquid and gaseous media. In a compact design they combine the integral probe, an LED trend display (for FLOW) with two-colour status indicator and a switching point with PNP or NPN output, adjustable via a potentiometer. Optionally, an additional temperature limit can be set and monitored with a PNP or NPN output. Similarly, there is also the possibility of inserting a flexible swan-neck between the sensor probe and the electronics housing to provide the best angle for viewing the sensor display even at awkward mounting points.

- * both flow and temperature monitoring possible
- * no moving parts in the medium being monitored
- * mounting largely independent of pipe diameter

Male thread G1/4A bis G1/2A stainless steel



TECHNICAL DATA

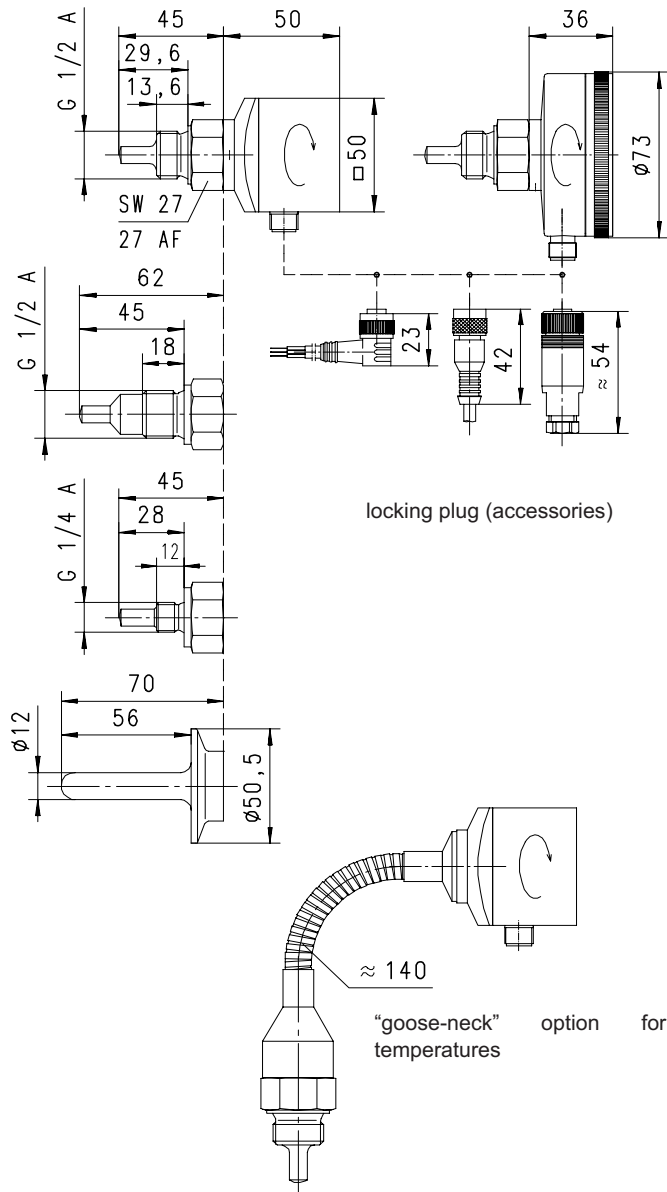
operating ranges	water 20-50 cm/s (1-150) oil (on request) standard values shown bold
operating pressure	max. 100 bar, option 200 bar foodstuffs sensor 60bar
operating temperature	15..70°C (other temperature on request)
temperature gradient	4°C/s
weight	0.35 kg (EFKP-015HK028PS) 0.60 kg (EFKM-015HK028PS)

MONTAGE

If you would like to exploit the highest possible sensor sensitivity (for particularly low flow rates or for use in gases), orientate the cross on hexagonal body of probe(liquids) or the red dot (gases) into a position against flow direction (flow meets cross or dot). See also the general description on calorimetric sensors.

Advantages EFKM:

- durable metal housing
- protection class IP 67
- transparent nature glass cover
- option opac metal covers



locking plug (accessories)

"goose-neck" option for higher temperatures

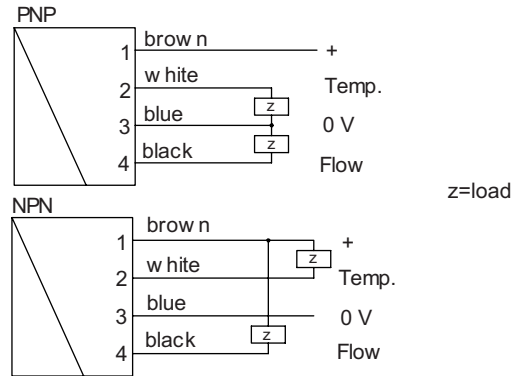
MATERIALS

medium contact	stainless steel 1.4571
other	brass nickel plated PA6.6 only EFKP

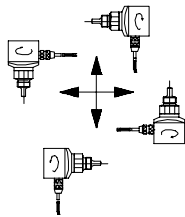
ELECTRICAL DATA

display	9 LED's (red = limit, green 1-8 = min.-max. flow)
setting potentiometer	single-threaded
supply voltage	24 V DC ±20%
current consumption	70mA
signal	PNP or NPN
load	200mA max.
connection	at locking plug M12x1, 4-pole
short-circuit proof	yes
reverse polarity proof	yes
protection class	EFKP IP 60, EFKM IP 67

temperature output only with EFKT



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

EFKP-	015	H	K	029	P	S		basic type specification
EFKP-								● with plastic head
EFKPT-								● calorimetric
EFKM-								● Flow Switch
EFKMT-								● with plastic head and temperatur switch
								● with metal head
								● with metal head and temperatur switch
	008							● connection G1/4A
	015							● connection G1/2A
	038							○ connection footstuffs sensor ISO 2852 size 38
		H						● socket thread
		L						○ footstuffs sensor
			K					● stainless steel 1.4571
				029				● probe length 29.6mm
				028				○ probe length 28mm
				045				● probe length 45mm
				056				○ probe length 56mm
					P			● PNP output
					N			● NPN output
						S		● Locking plug KPU-02SG
								○ M12x1, 4-pole, cable 2 m, straight plug
							H	○ with goose-neck

ACCESSORY

Locking plug M12x1

K	PU-	02	S	G	basic type specification
K					● ready-made cable
KB04					● self makable cable 4-pole
	PU-				● material PUR
		02			● length 2 m
		05			● length 5 m
		10			● length 10 m
			S		● moulded-on plug
				G	● straight plug
				W	● angled plug 90°



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

The Flow Switch EFK 2 controls liquid and gaseous substances. The instrument combines compact dimensions, an easy switch setting by potentiometer, a dual colour LED and a Galvanic insulated switch signal (NO) or transistor outputs (PNP/NPN). As option, an inclineable swan neck is available as a connection of sensor to housing to receive higher temperature ratings and better reading possibilities.

- * compact Flow Switch
- * no moving parts in the medium being monitored
- * mounting largely independent of pipe diameter

Male thread G1/4A or G1/2A stainless steel

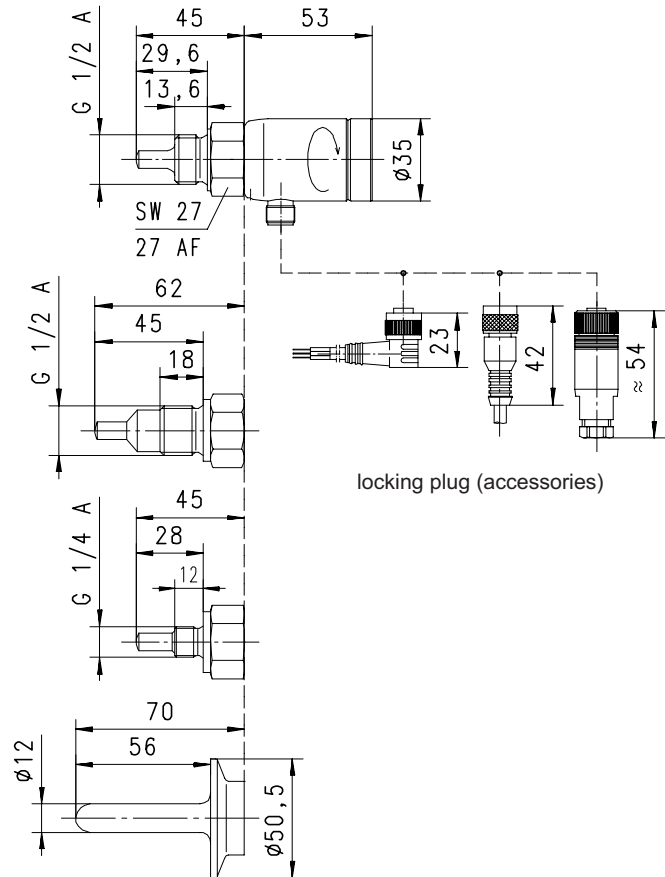
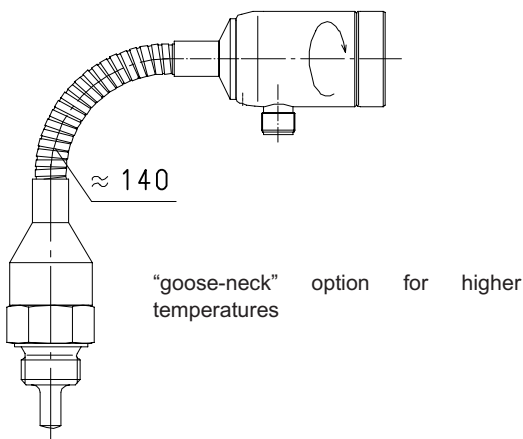


TECHNICAL DATA

operating ranges	water 20-50 cm/s (1-150) oil (on request) standard values shown bold
operating pressure	max. 100 bar, option 200 bar foodstuffs sensor 60bar
operating temperature	15..70°C (other temperature on request)
temperature gradient	4°C/s
weight	0.3 kg

MOUNTING

If you would like to exploit the highest possible sensor sensitivity (for particularly low flow rates or for use in gases), orientate the cross on hexagonal body of probe(liquids) or the red dot (gases) into a position against flow direction (flow meets cross or dot). See also the general description on calorimetric sensors.

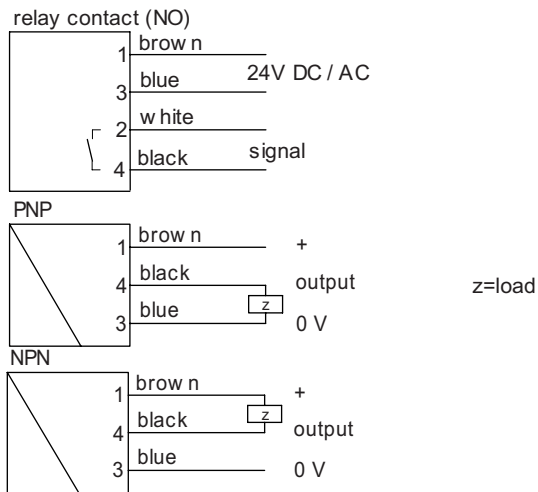


MATERIALS

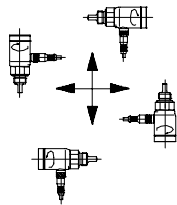
medium contact	stainless steel 1.4571
other	stainless steel 1.4305

ELECTRICAL DATA

display	red/green LED (red < limit value, green > limit value)
setting potentiometer	single-threaded
supply voltage	24 V DC / AC ±10%
current consumption	max. 70mA
signal	galvanic separation, Relais contact (NO) or transistor PNP/NPN
load	2A / 30 V DC/ AC (Relais) 24V 100 mA (Transistor)
connection	at locking plug M12x1, 4-pole
short-circuit proof	yes
reverse polarity proof	yes
protection class	IP65



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

EFK2-	015	H	K	029	O	S		basic type specification
EFK2-								● calorimetric Flow Switch
	008							● connection G1/4A
	015							● connection G1/2A
	038							○ connection footstuffs sensor ISO 2852 size 38
		H						● socket thread
		L						○ footstuffs sensor
			K					● stainless steel 1.4571
				029				● probe length 29.6mm
				028				○ probe length 28mm
				045				● probe length 45mm
				056				○ probe length 56mm
					O			● relay contact (NO)
					C			● relay contact (NC)
					P			● PNP output
					N			● NPN output
						S		● Locking plug KPU-02SG M12x1, 4-pole, cable 2 m, straight plug
						H		○ with goose-neck

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable



- * flow switch/transmitter of low flow rates
- * possible combination with temperature switch or transmitter
- * no movable parts in monitoring medium
- * only a material in contact with media
- * easy use
- * low pressure losses
- * different nominal diameter
- * very fast reaction times for a calorimetric system
- * linearized and temperature-compensated

BENEFIT

The Flex-FIN flow sensor monitors liquid media. In a compact design, it combines the installation sensing element and evaluation electronics that, according to the respective version, control a limit value output with a PNP or NPN transistor output or an analogue output (4..20 mA or 0..10 V) or both. The limit switch can alternatively be replaced by a frequency output. The evaluation electronics record two processing parameters: the flow speed of the medium and its temperature. Both parameters can be assigned to the analogue output or the switching output.

The following output combinations are available:

flow		temperature	
analogue	switching output	analogue	switching output
•			
	•		
•	•		
•			•
	•	•	

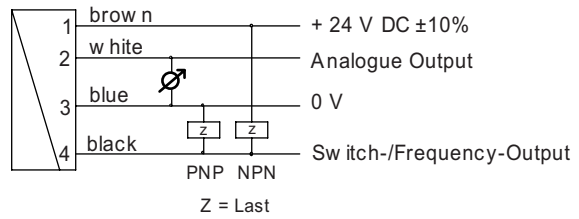
The analogue output can be designed as a 4..20 mA output or as a 0..10 V output.

The standard design of the switching output is as a limit switch Push-pull (PNP or NPN). It can be ordered as a minimum switch or maximum switch. Alternatively, the switch is available as a frequency output.

For further options, see page 3

TERMINAL ASSIGNMENT

Before the electrical installation, make sure that the supply voltage corresponds to the data provided!



Please use shielded cable, signal lines < 30m and power supply lines < 10m.

MOUNTING

To maintain the greatest possible interference insensitivity of the sensor, the flow should be from the bottom to the top (best ventilation even in case of the lowest flow velocity). For the connection, conventional crimp connectors, hoses with crimp fasteners, or Honsberg's own crimp connectors can be used. For the best possible insulation from the outside environment, insulating hoses that may not be removed can be used.

PROGRAMMING

Designs with a limit switch have a magnetic contact by means of which the current measurement value can be assumed as a limit value. It is programmed by applying a magnet to the marking on the type plate for 0.5 to 2 seconds. If the contact time is too short or too long, no programming will take place (protection against magnetic fields). Immediately after programming, the switching output enters the OK state (LED on, output switched through, e.g. PNP = high or NPN = low).

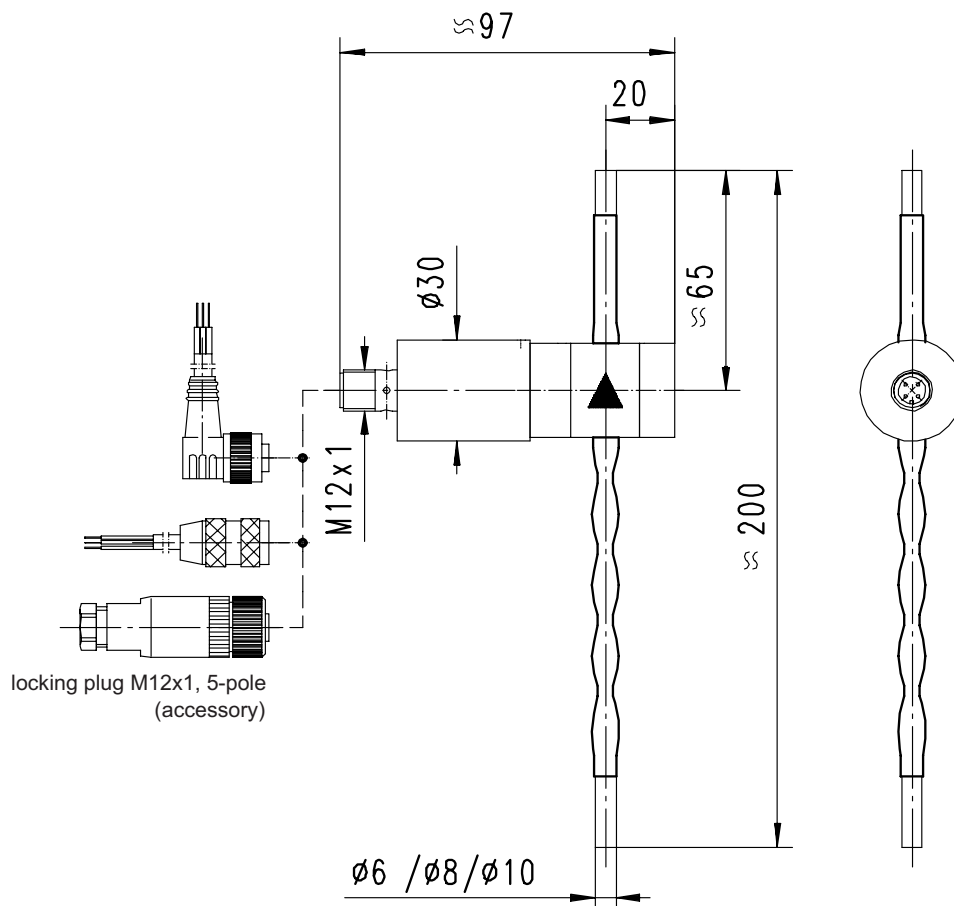


TECHNICAL DATA

range (water)	6 mm-pipe	(0.001) 0.01..2 l/min
	8 mm-pipe	0.025..5 l/min
	10 mm-pipe	0.05..10 l/min
		() = special range on request
temperature gradient	4°C/s	
measurement range	0..70°C	
temperature	(-20..100°C on request)	
storage temperature	-20..80°C	
pressure	max. 10 bar (other on request)	
pressure loss	max. 0.3 bar at max. flow	
connection	at locking plug M 12x1, 5-pole	
protection class	IP65	
weight	appr. 200 g	

supply voltage	24 VDC ±10%
power consumption	max. 100 mA
switching output	transistor output "push pull" short circuit proof, reverse polarity protected, $I_{out} = 100\text{mA max.}$
switching hysteresis	flow: 4% F.S. temperature: approx. 2°C
display (only in case of switching output)	yellow LED (ON = OK /OFF = alarm)
adjustment	via magnet
analogue output	4..20 mA, max. load 500 Ohm or 0..10V, min load 1 kOhm
materials	media contact stainless steel 1.4305 other: PPS, PA66, brass nickel plated

DIMENSIONS



F

NOMENCLATURE

Example: Flex-FIN 006 R K I F U F L O
A B C D E F G H I J

A sensor family:	Flex-FIN	calorimetric sensor inline design	●
B connection size:	006	pipe Ø 6 mm / 0.5 mm wall thickness	●
	008	pipe Ø 8 mm / 0.5 mm wall thickness	●
	010	pipe Ø 10 mm / 0.5 mm wall thickness	●
	xxx	other pipe on request	○
C type of connection:	R	pipe	●
D material (in contact with media):	K	stainless steel 1.4571	●
E analogue output:	I	current output 4..20 mA	●
	U	voltage output 0..10 V	●
	K	no analogue output	●
F the analogue output is actuated by the following:	F	flow	●
	T	temperature	●
G switching output:	U	push pull PNP and NPN	●
	K	no switching output	●
H the switching output is actuated by the following:	F	flow	●
	T	temperature	●
I switching signal:	L	minimum switch	●
	H	maximum switch	○
	R	frequency output	●
	K	no switching output	●
J inversion of output:	O	standard output	●
	I	inverted output	●

Options:

special measurement range, flow:	
measurement range initial value	□□ , □□□ l/min
measurement range final value	□□ , □□□ l/min
filter time (standard = 0.5 sec.)	
Possible values: off/0.2/0.5/1/2/4/8/16/32 sec.	□□□ s
special measurement range, temperature:	
maximum 120°C (standard = 70°C)	□□□ °C
minimum -20°C (standard = 0°C)	□□□ °C
special range - analogue output:	
<= meas. range (standard = meas. range)	□□□ cm/s °C
special range - frequency output:	
<= meas. range (standard = meas. range)	□□□ cm/s °C
end frequency (max. 2000 Hz)	□□□□ Hz
turn-on delay (from alarm to OK)	□□ s
turn-off delay (from OK to alarm)	□□ s
power-on delay	□□ s
(time after the supply is created; in this time the switching output is not activated)	
switching output with permanent setting	□□□ cm/s °C
special hysteresis (standard = 1% full scale)	□□ %

In case of empty fields, the standard setting will be selected automatically.

ACCESSORIES

Locking plug M12x1

K	PU-	02	S	G	S	basic type specification
K						● assembled
KB04						● self makable cable 4-pole
	PU-					● material PUR
		02				● length 2 m
		05				● length 5 m
		10				● length 10 m
			S			● moulded-on plug
				G		● straight plug
				W		● angled plug 90°
					S	● shielded



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The EFKS... Flow Switch are compact screw-in submersible probes which incorporate the temperature sensors and the heater. They are intended for operation only with the appropriate EEFK... External Evaluation Units and are employed where application of sensors in the compact range would not be practicable (e.g. no access required or possible).

The sensors are available with various lengths and thread connections.

- * mounting largely independent of pipe diameter
- * no moving parts in the medium being monitored
- * mounting largely independent of pipe diameter

Male thread G1/4A bis G1/2A stainless steel



EFKS



EEFK

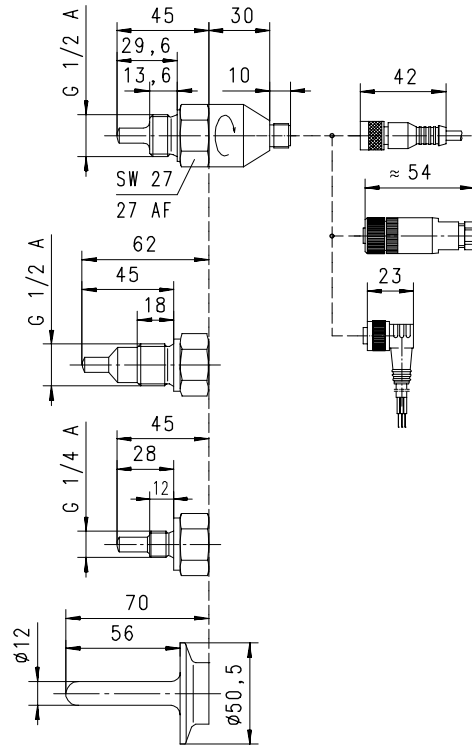
TECHNICAL DATA

operating ranges	water 20-50 cm/s (1-150) oil (on request) standard values shown bold
operating pressure	max. 100 bar, option 200 bar foodstuffs sensor 60bar
operating temperature	15..70°C (other temperature on request)
temperature gradient	4°C/s
weight	0.12 kg EFKS 0.35 kg EEFK

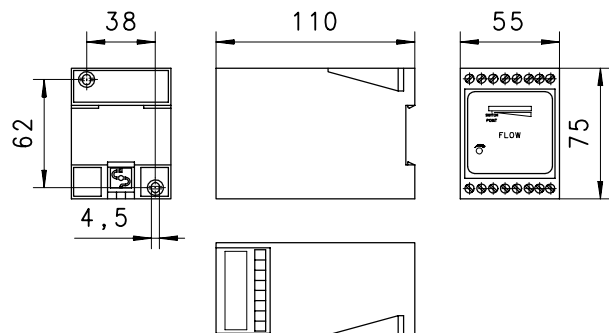
MOUNTING

If you would like to exploit the highest possible sensor sensitivity (for particularly low flow rates or for use in gases), orientate the cross on hexagonal body of probe(liquids) or the red dot (gases) into a position against flow direction (flow meets cross or dot). See also the general description on calorimetric sensors.

EFKS



EEFK



MATERIALS

medium contact	stainless steel 1.4571
other	stainless steel 1.4305
electronic housing	polycarbonate / ABS / makrolon

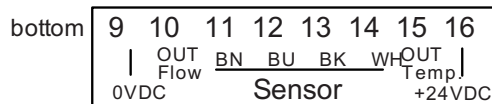
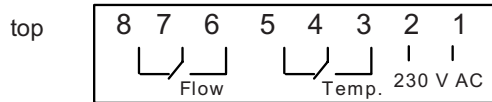
ELEKTRISCHE DATEN

display	red/green LED (red < limit value,
setting potentiometer	single-threaded
supply voltage	24 V DC ±20% / 70mA for unloaded output 230 VA / 7 VA
signal flow	PNP or NPN / 200mA add. change over contacts 230V AC 5A (only for 230 VDC types)
signal Temp. temperature (EEFKT)	PNP or NPN / 200mA add. change over contacts 230V AC 5A (only for 230VDC types)
housing mounting	floor mounting or clip fastening on mounting rails (DIN EN 50 022)
connection EFKS	at locking plug M12x1, 4-pole
connection EEFK	screw terminals
wire-core cross-section	< 1.5mm ² with wire-end ferrules
short-circuit proof	yes
reverse polarity proof	yes
protection class	IP 67 EFKS IP 30 EEFK front

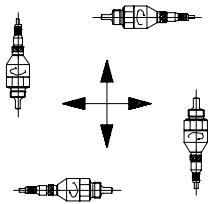
BK= black (yellow) WH= white
BN= brown BU= blue (green)
(only for DIN colours!) Temp. outputs only with EEFK



(only for DIN colours!)



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

EFKS-	015	H	K	029	S	basic type specification
EFKS-	008					● calorimetric Flow Switch
	015					● connection G1/4A
	038					○ connection footstuffs sensor ISO 2852 size 38
		H				● socket thread
		L				○ footstuffs sensor
			K			● stainless steel 1.4571
				029		● probe length 29.6mm
				028		● probe length 28mm
				045		● probe length 45mm
				056		○ probe length 56mm
					S	● Locking plug KPU-02SG - M12x1, 4-polr, cable 2 m, straight plug

EEFK-	015	H	basic type specification
EEFK-			● external evaluation units at calorimetric sensors
EEFKT-			● external evaluation units at calorimetric sensors with temperature switch
	024		● 24 V DC (only PNP or NPN)
	230		● 230 V AC (additional change-over contacts)
		P	● output PNP
		N	● output NPN

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The magnetic-inductive FIS probe is assembled into the pipe by support of a sleeve welded into the relevant pipe to receive the sensor (min. pipe diameter DN 50). For installation position and depth see diagrams Alternatively a clamp saddle arrangement may be used.

- * measurement of conductive liquids
- * one sensor for a wide range of pipe diameters
- * high grate materials
- * no moving parts
- * changeable sensor with no lost of liquid

assembly welded pruning, assembly clamp DN 50-150



TECHNICAL DATA

measuring ranges	end range 1 to 8 m/s in steps of 1 m/s
accuracy	±5 % of measured value (calibration on site + 2 % of measured value)
reproducibility	±2 % of measurement value
time constant	5 second fixed
measurement substance	lagely homogeneous fluids, pastes can also include solid Particles
media conductivity	min. 20 µS/cm
flow temperature	-25..150°C
ambient temperature	-25..60°C
system pressure	max. 25 bar welded tube max. 10 bar clamp saddle
weight	2.4kg without clamp saddle

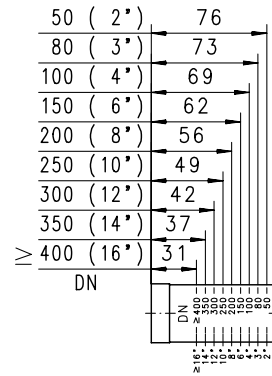
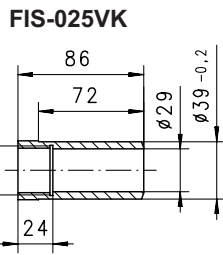
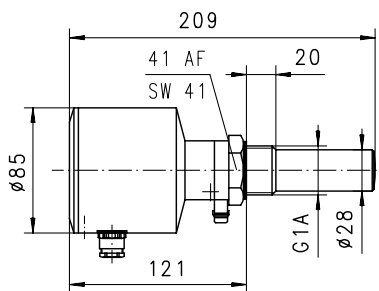
PRINCIPLE

If a conductor moves vertically in relation to a magnetic field, the movement will induce an electrical potential U in the conductor. In this measuring principle the electrically conductive measuring medium is the conductor. The magnetic field B is produced at right angles to the flow. The induced electrical potential U is directly proportional to the local speed of flow v.

$$U = k \cdot B \cdot v \cdot D$$

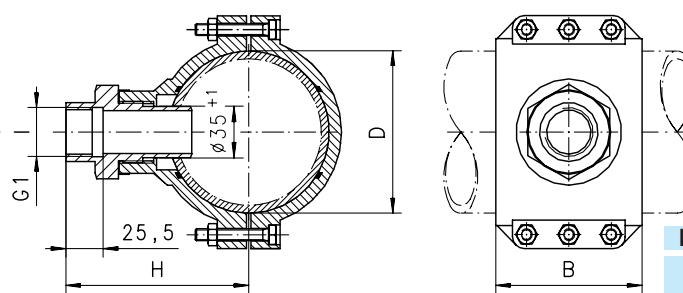
- k = constant for the instrument
- B = strength of magnetic field
- v = local speed
- D = distance between electrodes

The potential U is tapped at the electrodes, midpoint and earth (tube) electrodes, and converted to a proportional 4(0)-20 mA signal.



Maße ab Außendurchmesser Rohr

FIS-...BB



MATERIALS

- probe: stainless steel 1.4435
- isolation: ceramic (zirkonium oxide)
- clamp saddle: PP, 1.4305
- housing: stainless steel 1.4305
- viton, klingerit

DN	D	H	B
50	63	110	70
65	75	113	80
80	90	120	90
100	110	125	100
125	140	135	125
150	160	143	130

MOUNTING

The magnetic-inductive FIS probe is assembled into the pipe by support of a sleeve welded into the relevant pipe to receive the sensor (min. pipe diameter DN 50). For installation position and depth see diagrams Alternatively a clamp saddle arrangement may be used. Inlet and outlet sections must be $\geq 10x$ diameter of pipe. Weld the connector sleeve vertically to the centre of the pipe according to the pipes nominal diameter (see marking = external pipe diameter). Do not use force! The Probe must be screwed in handtight. After putting in place, the probe can be aligned by rotation (see electrical connection). The complete measuring probe is removable without damaging the carrier, so that the electronic part can be exchanged in case of defect.

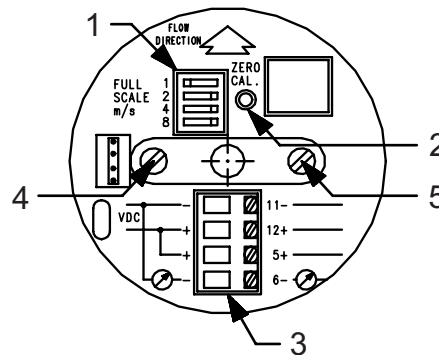
ELECTRICAL DATA

supply voltage	24V DC \pm 10%
current consumption	50mA (bei 24VDC und 20°C)
output	4..20mA (passiver Stromausgang) Lastwiderstand max. 500 W
protection class	IP 65 cable gland IP 67 locking plug

To make the electrical connection, open the cover (held by security band) and remove the 3 hexagonal head screws inside (take care not to loose the screws!) The arrow on the electronics unit must point into the direction of the flow release screw (19) 2 turns.

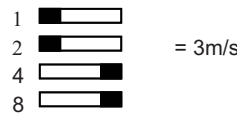
Do not unscrew completely! Rotate the electronics unit as appropriate, then tighten the screws again. The direction of the arrow is not asserted to the alignment of the housing.

Output signals are set using the DIP switch (1,2,3,4,5,6,7,8 m/s, see sketch).



- 1** DIP switch for end of scale
- 2** Push bottom for zero-adjustment
- 3** Terminal block

Sample : to the DIP switch



Power supply (24V DC) at the terminals 12 and 11 with max 1.5mm² Current consumption at 24V DC max 50mA (at 20°C) Current output : 24V DC (terminals 6 (-) and 5 (+). Check polarity! Max load 500 Ohm.

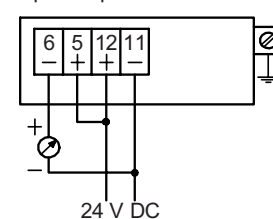
Zero setting: Fill pipe completely with measuring substance. Flow speed in the pipeline must be "zero"! Press button marked "ZERO CAL". After a minute, the device will have self-calibrated.

An automatic self-test will be carried out when the device

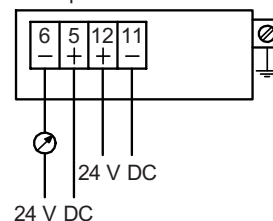
no error : measurement activity, current output 0(4)-20 mA

error : current output reads 3 mA, error!

separate power connection



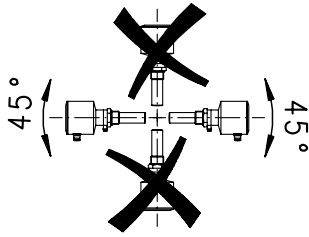
same power connection



FE<10 Ohm
Earth

Must be installed!

MOUNTING POSITION



The positions vertical are not recommended due to air bubbles or sediments in pipe

METERING SUBSTANCES



water



for aggressive liquids

measurement of conductive liquids

NOMENCLATURE

FIS-	025	V	K	001	G	basic type specification	
	025				●	DN 025 (welded tube)	
	050				●	DN 050	
	065				●	DN 065	
	080				●	DN 080	
	100				●	DN 100	
	125				●	DN 125	
	150				●	DN 150	
		V			●	welded tube	
		B			●	clamp saddle	
			K		●	stainless steel (welded tube)	
			B		●	PP (clamp saddle)	
			001		●	end of scale 1 m/s	
			002		●		2 m/s
			003		●		3 m/s
			004		●		4 m/s
			005		●		5 m/s
			006		●		6 m/s
			007		●		7 m/s
			008		●		8 m/s
				G	●	cable gland Pg9 (cable not included)	
				S	○	connection at locking plugs M12x1, 4-pole	

special application smart-FIS

The FIS transducer is also available with a smart-electronic cover. This electronic includes a display, two programmable switch points, frequency output, progr. filter, linearisation, memory of extrem values, totaliser, choiseable unit on the display.

ACCESSORY

Locking plug M12x1

K	PU-	02	S	G	basic type specification
K				●	ready-made cable
KB04				●	self makable cable 4-pole
	PU-			●	material PUR
		02		●	length 2 m
		05		●	length 5 m
		10		●	length 10 m
			S	●	moulded-on plug
				G	straight plug
				W	angled plug 90°



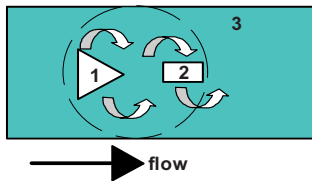
counter EEZ904, product information 83.1.EEZ904.

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

A narrow, triangular body (1) that goes through the entire cross-section of the meter tube creates a vortex when a flow is present (Kármán's vortex effect). The frequency of the vortex is proportional to flow and is detected by a piezo sensor (2) lying behind the triangular body. The entire unit, vortex body, and detector as designed as a module (3). They are inserted into the tube. The meter tube and the entire measuring unit can thus be separated from each other extremely quickly.



- * high accuracy
- * large overload security
- * no moving parts
- * fast installation and removal by clamp attachment
- * modular construction with the most versatile connection systems

Female thread G1/4 to G1 1/4 brass/stainless steel/plastic



CF-025GMM135UIS

TECHNICAL DATA

G	Type	PN bar	Qmax. recom. l/min H ₂ O	range l/min H ₂ O	H mm	L mm	X mm	SW mm
G 1/8	CF-006GM.	16	7	0.6 - 7 l/min	114	88	12.5	38
G 1/4	CF-008GM.	16	15	1.0 - 15 l/min	114	88	12.5	38
G 3/8	CF-010GM.	16	30	2.5 - 30 l/min	114	88	12.5	38
G 1/2	CF-015GM.	16	50	4.5 - 50 l/min	114	92	14.5	38
G 3/4	CF-020GM.	16	85	6.0 - 85 l/min	114	96	16.5	38
G 1	CF-025GM.	16	135	8.5 - 135 l/min	114	100	18.5	38
G 1 1/4	CF-032GM.	16	240	15 - 240 l/min	114	108	22.5	46

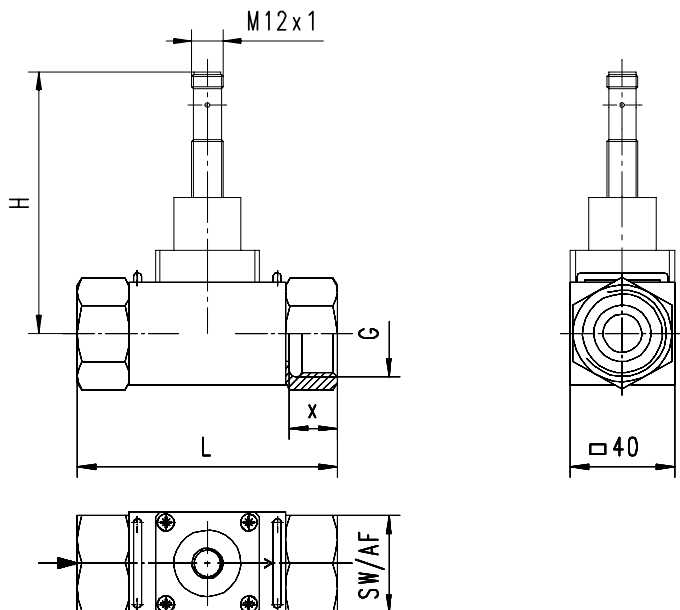
- tolerance ±2% of measured value
- media temperature 5..80°C
- storage temperature -25..80°C
- cavitation not with P_{withdrawal} / P_{difference} 5.5
- average pressure loss 0.1 bar at Qmax.

OPERATION

The vortex flowmeter requires a feed distance of 5 - 10xD to achieve its nominal precision. If deposits are feared, the sensor should not be installed with the electronics pointing downward. Please observe that the sensor is installed in the direction of the flow arrow. For possible cleaning of the sensor, loosen the clamps and remove the device (in the process, the line should be depressurized). Make sure that the vortex does not expose the oscillating body to impacts (the spraying unit contains a very sensitive ceramic piezo transducer that can break).

MATERIALS

- housing brass nickel plated, s.s.1.4571 or POM GF
- connectors brass nickel plated, s.s.1.4571 or POM
- detector ETFE PA6T6I 40%GF
- seal EPDM



ELECTRICAL DATA

supply voltage 10..30 V DC
connection for locking plug M12x1, 4-pole
short-circuit proff yes
reverse polarity proff yes
protection class IP 67

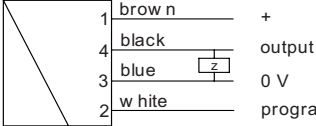
current - / voltage output

idle current 100 mA
output current 4..20 mA
voltage output 0..10V

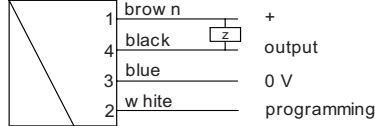
frequency output / programmable switch

idle current < 20 mA (without load)
output PNP and NPN
10..2000 Hz

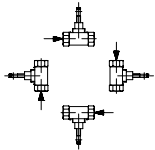
PNP / current- / voltage output



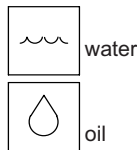
NPN



MOUNTING POSITION



METERING SUBSTANCES



At a viscosity of >1mm²/s (water), the response threshold rises since the vortex forms at a higher flow speed.

NOMENCLATURE

For combinations see table "technical data".

CF-	006	G	M	M	007	E	U	S	basic type specification
	006								● nominal diameter DN 006
	008								● nominal diameter DN 008
	010								● nominal diameter DN 010
	015								● nominal diameter DN 015
	020								● nominal diameter DN 020
	025								● nominal diameter DN 025
	032								● nominal diameter DN 032
		G							● female thread
		A							○ male thread
		T							○ nozzle
			M						● connection material brass Ms 58 nickel plated
			K						○ connection material stainless steel 1.4571
			P						○ connection material POM
				M					● housing material brass Ms 58 nickel plated
				K					● housing material stainless steel 1.4571
				P					○ housing material POM
					007				● range 0.6 - 7 l/min
					015				● range 1.0 - 15 l/min
					030				● range 2.5 - 30 l/min
					050				● range 4.5 - 50 l/min
					085				● range 6.0 - 85 l/min
					135				● range 8.5 - 135 l/min
					240				● range 15 - 240 l/min
						E			● seal EPDM
						V			○ seal Viton
						N			○ seal NBR
							U		● voltage output 0..10V
							I		● current output 4..20mA
							F		● frequency output
							S		● programmable switch (push pull PNP and NPN)
							E		● output at suburb electronics (e.g. omni-CF)
								S	● connection at locking plugs M12x1, 4-pole

COMBINATIONS

omni-CF

local electronic unit,
2xNPN and PNP switch
4(0)..20mA output
graphical LCD display with flashing LED
program ring



Flex-CF

switching and frequency exit
0..10V or 4..20mA
pnp, npn



All technical changes reserved

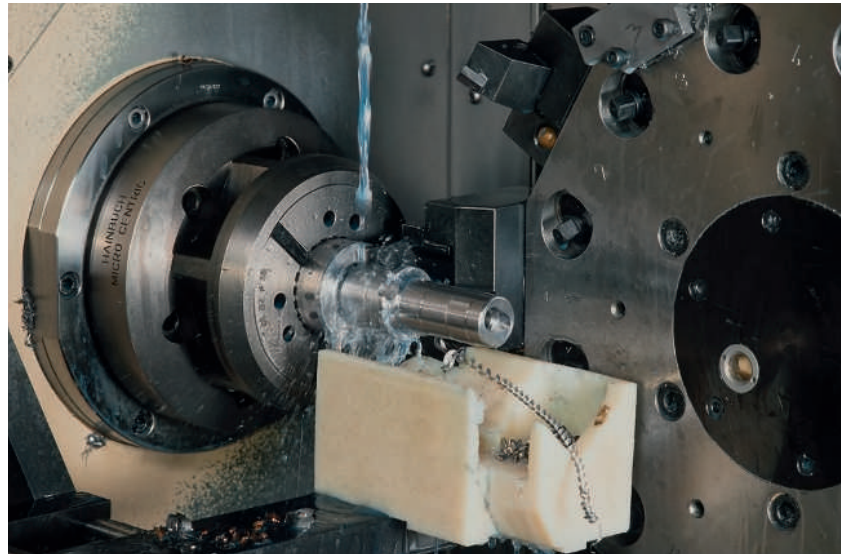
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

Where to use a **HONSBERG** BASIC INDUSTRIAL FLUIDCONTROL electronic flow instrument



Market segments

- **Machine tools**
- **Sewage**
- **Semi conductor industry**
- **Welding**
- **Low pressure cleaners**



Application

- **Flow rate monitoring and display in wafer production**
- **Flow rate alarm in control panels of robot welders**
- **Pump command in cleaning installations**

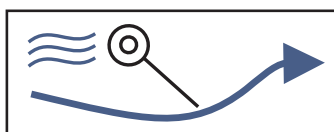
Sight glass, flap, sphere

The technology



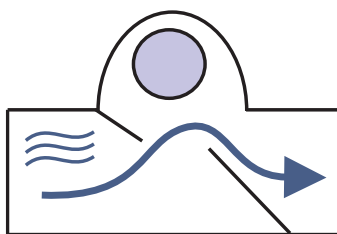
Sight glass

The liquid medium enters the sight glass and can thus be checked optically for quality and consistency.



Flap

The liquid medium enters the sight glass and can thus be checked optically for quality and consistency. Quantitative indication of the flow rate is possible depending on the flap's position in the glass.



Sphere

The liquid medium enters the sight glass and can thus be checked optically for quality and consistency. Quantitative indication of the flow rate is possible depending on the sphere's position in the glass.

Application

- Visual flow monitoring of liquids

Advantages

- Simple structure
- Double-faced viewing field
- Reliable function

Technical data

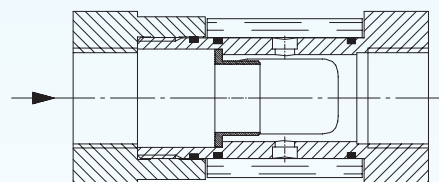
Concept	Housing with window or tube
Nominal diameter	8 - 50
Connection	female thread
PN	6 - 16
Max. temperature	200 °C
Signal	-
Adjustable	-
Materials	brass, stainless steel
Installation position	any or defined
Metering materials	liquids and gases



Contents

System description	224
Device descriptions	225

G



- Indicating

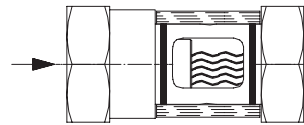
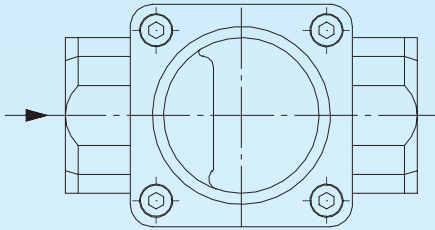
System description

Device systems

Sight glass

The medium enters the device body and is usually visible through double-faced glass windows.

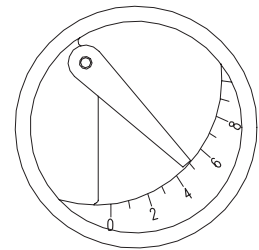
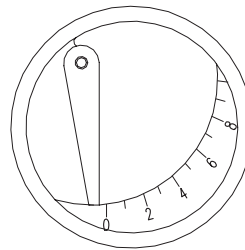
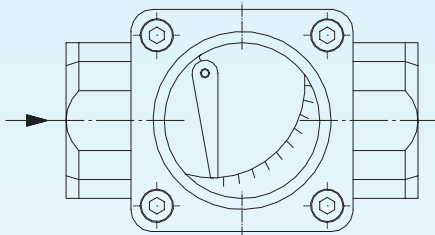
Function: sight glass only
Application: monitoring dark or coloured metering materials



Flap

The medium moves a flap built into the medium space. The position of the flap is an indication of flow rate.

Function: quantitative indication
Application: monitoring transparent, clean liquids

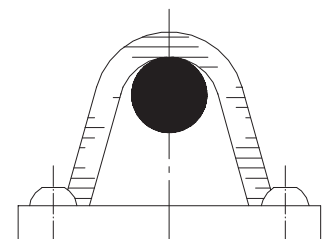
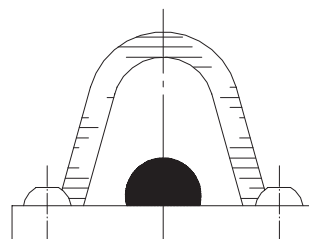
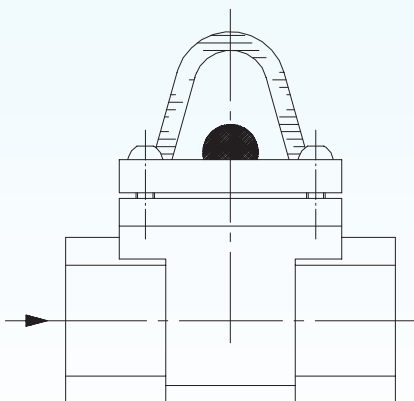


Flap indicates the position in the sight glass









Sphere

The position of the sphere in the glass dome indicates intensity of flow. It may be used for liquids and gases.

Function: yes/no display
Application: monitoring transparent liquids or gases



By its position in the sight glass the sphere shows a quantitative trend of flow rate.

	type	nominal diameter	connection	control	indication	output signal	on site metering	max. pressure bar	max. temperature °C	water	oil	gas/air	aggressive	miscellaneous	page
sight glass	 FH	15 - 25	female thread bronze		●			16	200	●	✓				226
	 ON	8 - 15	female thread brass		●			6	70	●	✓				227
	 OW	8 - 50	female thread brass		●			6	70	●	✓				228
	 WO1	8 - 40 8 - 40	female thread brass female thread stainless steel		● ●			16 16	100 100	● ●	✓ ✓				229
flap	 FK	15 - 50	female thread bronze		●			16	170	●	✓				230
	 FQ	15 - 25	female thread bronze		●			16	200	●	✓				231
	 SK	15 - 25	female thread bronze		●			16	200	●	✓				232
sphere	 BL	8 - 40	female thread stainless steel		●			16	200	●	✓	✓	✓		233

● standard ○ standard option □ special option

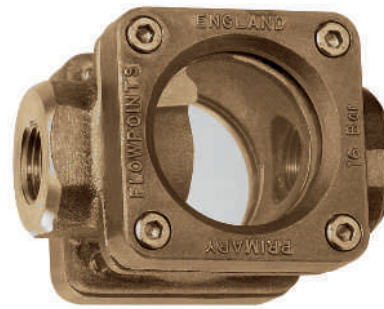
all data sheets available under www.honsberg.com

GENERAL CHARACTERISTICS

Mechanical Flow Indicator as sight glass for contaminated or coloured substances. Rugged design in brass / bronze combination.

- * no moving parts
- * optional installation
- * optical control of liquid quality
- * for contaminated or coloured liquids
- * double-faced, wide windows
- * natural glass

Female thread G1/2 to G1 bronze

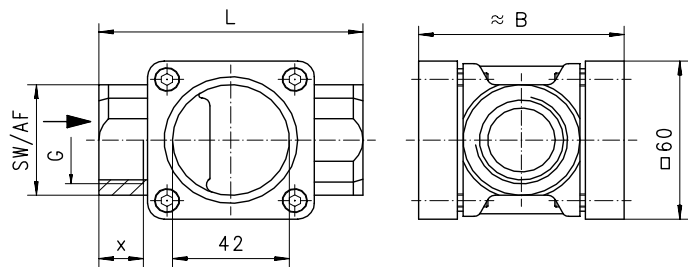


FH-015GR

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	L mm	B mm	AF mm	X mm	weight kg
bronze	G 1/2	FH-015GR	16	25	85	68	38	14	1.20
	G 3/4	FH-020GR	16	45	85	68	38	14	1.10
	G 1	FH-025GR	16	65	95	74	42	16	1.25

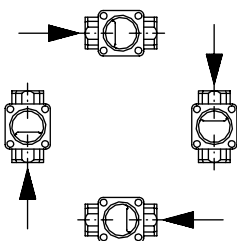
media temperature water max. 100°C
 oil max. 200°C
 average pressure loss 0.06bar at Qmax.



MATERIALS

body bronze Rg5
 ring brass Ms58
 window soda-lime glass
 seal klingersil C4400

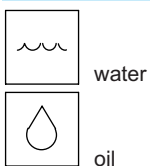
MOUNTING POSITION



NOMENCLATURE

FH-	015	G	R	basic type specification
	015			● nominal diameter DN 15 - G1/2
	020			● nominal diameter DN 20 - G3/4
	025			● nominal diameter DN 25 - G1
		G		● female thread
			R	● bronze

METERING SUBSTANCES



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator with sight glass for contaminated or coloured substances. Drip nose allows reliable flow indication even for low flow rates. Rugged design in brass.

- * no moving parts
- * for contaminated or coloured liquids
- * natural glass

Female thread G1/4 to G1/2 brass

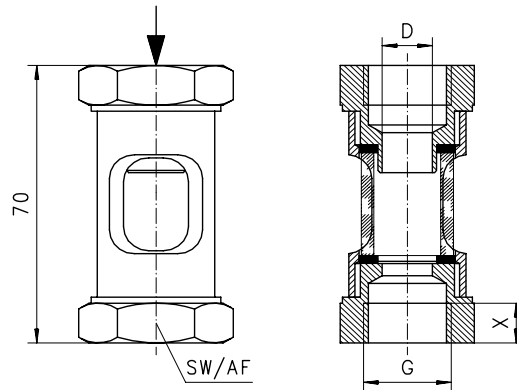


ON-015GM

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	D mm	AF mm	X mm	weight kg
brass	G 1/4	ON-008GM	6	15	5	19	11	0.08
	G 3/8	ON-010GM	6	20	8	27	11	0.16
	G 1/2	ON-015GM	6	40	12	32	10	0.20

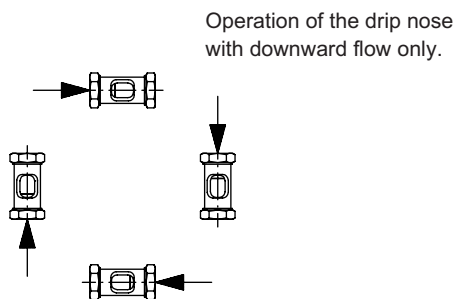
media temperature max. 70°C



MATERIALS

housing: stained brass
tube: natural glass

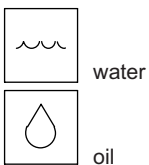
MOUNTING POSITION



NOMENCLATURE

ON-	008	G	M	basic type specification
	008			● nominal diameter DN 8 - G1/4
	010			● nominal diameter DN 10 - G3/8
	015			● nominal diameter DN 15 - G1/2
		G		● female thread
			M	● brass

METERING SUBSTANCES



All technical changes reserved

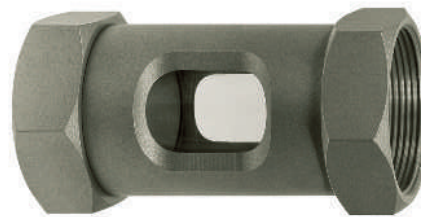
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator with sight glass for contaminated or coloured substances. Rugged design in brass.

- * no moving parts
- * optional installation
- * for contaminated or coloured liquids
- * natural glass

Female thread G1/4 to G2 brass

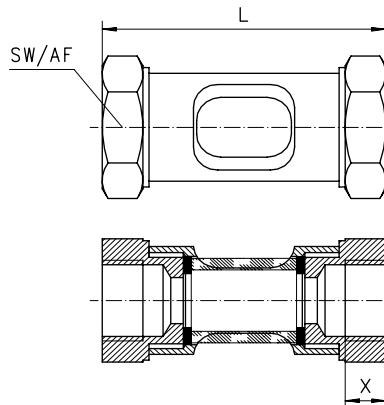


OW-025GM

TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	L mm	AF mm	X mm	weight kg
brass	G 1/4	OW-008GM	6	15	70	19	11	0.08
	G 3/8	OW-010GM	6	20	70	27	10	0.16
	G 1/2	OW-015GM	6	30	70	32	9	0.20
	G 1	OW-025GM	6	90	90	46	19	0.62
	G 1 1/2	OW-040GM	6	220	130	60	23	1.40
	G 2	OW-050GM	6	250	148	65	25	1.50

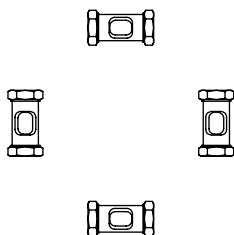
media temperature max. 70°C



MATERIALS

	G1/4-G1/2	G1-G2
body	stained brass	brass nickel plated
tube	natural glass	acrylic

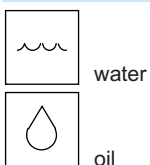
MOUNTING POSITION



NOMENCLATURE

OW-	008	G	M	basic type specification	
	008			nominal diameter	DN 8 - G1/4
	010				DN 10 - G3/8
	015				DN 15 - G1/2
	025				DN 25 - G1
	040				DN 40 - G1 1/2
	050				DN 50 - G2
		G			female thread
			M		brass

METERING SUBSTANCES



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator with sight glass for contaminated or coloured substances. Rugged design in brass or stainless steel.

- * optional installation
- * tube-shaped sight glass with internal cleaning wipers
- * for contaminated or coloured liquids
- * 360° visibility

Female thread G1/4 to G1 1/2 brass/stainless steel



WO1-010GM

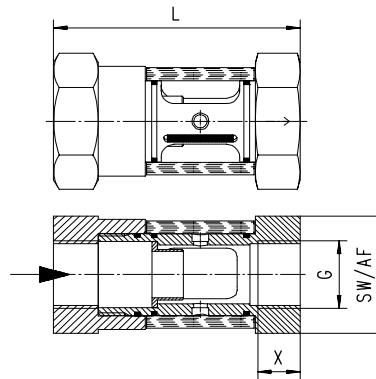
TECHNICAL DATA

G	Type	PN bar	Qmax. recom. l/min H ₂ O	L mm	SW mm	X mm	weight kg
G 1/4	WO1-008G.	16	15	71	36	9	0.3
G 3/8	WO1-010G.	16	20	71	36	9	0.3
G 1/2	WO1-015G.	16	30	86	46	13	0.6
G 3/4	WO1-020G.	16	60	94	46	16	0.6
G 1	WO1-025G.	16	90	104	46	16	0.6
G 1 1/4	WO1-032G.	16	150	120	65	19	1.6
G 1 1/2	WO1-040G.	16	220	130	65	20	1.6

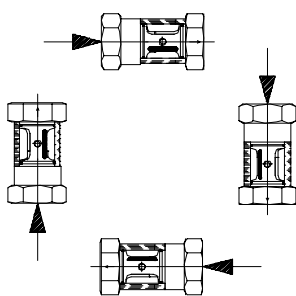
media temperature max. 100°C

MATERIALS

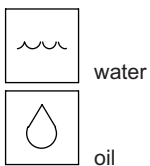
	WO1-...GM	WO1-...GK
housing	brass Ms58 nickel plated	stainless steel 1.4305
tube	duran glass	duran glass
wipers	NBR	viton
seal	NBR	viton



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

WO1-	008	G	M	basic type specification
	008		●	nominal diameter
	010		●	
	015		●	
	020		●	
	025		●	
	032		●	
	040		●	
		G	●	
			●	female thread
			●	brass design
			●	stainless steel design
			○	seal / wiper EPDM
Programme option BASIC				

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for liquids. A finger flap arranged in the flow chamber provides indication of the momentary flow rate. The partition into three finger elements makes a dynamic indication possible, as each light-weight finger-component reacts to the slightest change of flow characteristic. Rugged design in bronze or cast iron.

- * double-faced wide window
- * natural glass

Female thread G1/2 to G2 bronze/cast iron



FK-020GR

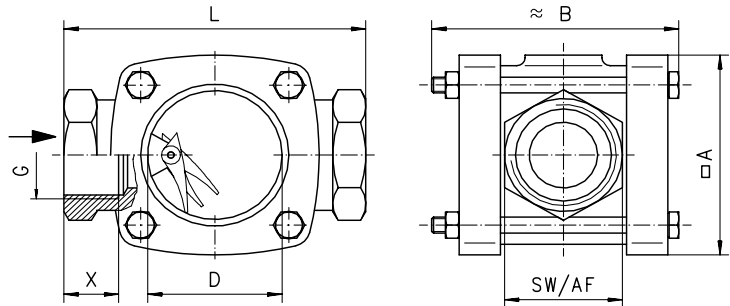
TECHNICAL DATA

	G	Type	PN bar	Qmax. recom. l/min H ₂ O	L mm	A mm	B mm	D mm	X mm	AF mm	weight kg
bronze/cast iron	G 1/2	FK-015GR	16	25	90	60	74	40	14	36	0.85
	G 3/4	FK-020GR	16	40	90	60	74	40	14	36	0.80
	G 1	FK-025GR	16	60	110	76	95	49	18	43	1.60
	G 1 1/2	FK-040GR	16	120	130	90	116	60	20	61	3.00
	G 2	FK-050GR	16	250	170	114	138	80	25	74	5.90

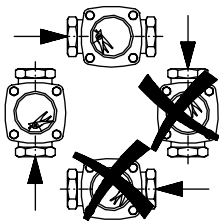
media temperature water max. 100°C
 oil max. 170°C
 average pressure loss 0.06bar at Qmax.

MATERIALS

body bronze / cast iron
 cover cast iron
 window hard glass
 seal flexicarb with metal enforcement
 body stainless steel 1.4436
 flap polysulfon



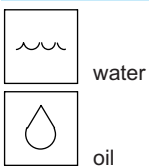
MOUNTING POSITION



NOMENCLATURE

FK-	015	G	R	basic type specification	
	015			nominal diameter	DN 15 - G1/2
	020				DN 20 - G3/4
	025				DN 25 - G1
	040				DN 40 - G1 1/2
	050				DN 50 - G2
		G			female thread
			R		bronze/cast iron

METERING SUBSTANCES



All technical changes reserved

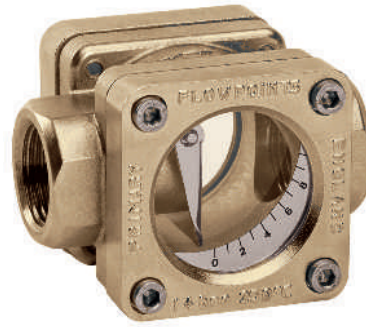
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for liquids. A solid stainless steel flap arranged in the wetted chamber is lifted by the incoming flow and indicates the actual flow rate on an external reading scale. Rugged design in bronze/brass combination.

- * high temperature duty
- * double-faced wide window
- * natural glass

Female thread G1/2 bis G1 bronze



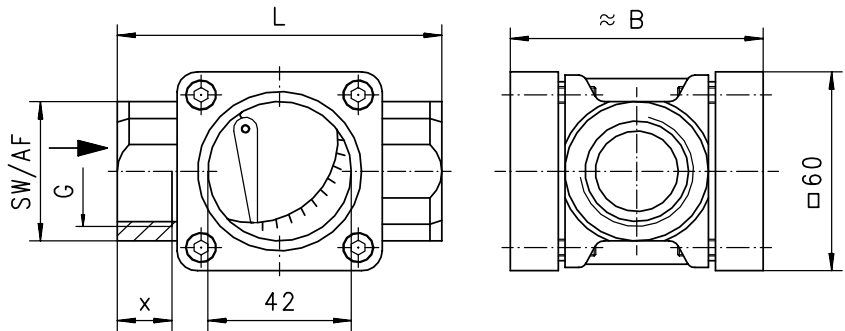
FQ-015GR017

TECHNICAL DATA

	G	Type	PN bar	indication range l/min H ₂ O	Qmax. recom. l/min H ₂ O	L mm	B mm	AF mm	X mm	weight kg
bronze	G 1/2	FQ-015GR017	16	2.1 - 17	25	85	68	36	14	1.20
	G 3/4	FQ-020GR020	16	2.1 - 20	45	85	68	36	14	1.10
	G 1	FQ-025GR024	16	2.1 - 24	65	95	74	42	16	1.25

Scale increments 1 to 10. Calibration see nomenclature.

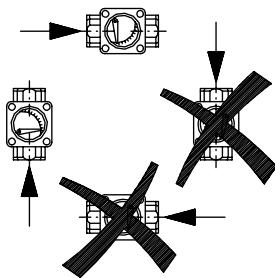
media temperature water max. 100°C
 oil max. 200°C
 average pressure loss 0.09bar at Qmax.



MATERIALS

body	bronze
ring	brass
window	soda-lime-glass
seal	klingersil C4400
bolt	stainless steel 1.4305
flap	stainless steel 1.4310
scale	stainless steel 1.4310

MOUNTING POSITION

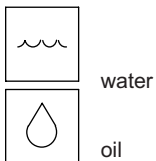


NOMENCLATURE

For combinations see table "technical data".

FQ-	015	G	R	017	basic type specification
	015				● nominal diameter DN 15 - G1/2
	020				● nominal diameter DN 20 - G3/4
	025				● nominal diameter DN 25 - G1
		G			● female thread
			R		● bronze
				017	● indication range 2.1- 17 l/min H ₂ O
				020	● indication range 2.1- 20 l/min H ₂ O
				024	● indication range 2.1- 24 l/min H ₂ O

METERING SUBSTANCES



Scale increments 1 to 10. Indication value is indicated for horizontally increasing flow.

indication range l/min H ₂ O	scale increments									
	1	2	3	4	5	6	7	8	9	10
2.1- 17	2.1	3.2	3.8	4.3	4.7	5.0	5.7	7.5	9.5	17
2.1- 20	2.1	3.2	4.5	5.2	5.6	6.3	7.5	8.9	11.6	20
2.1- 24	2.1	4.0	5.0	7.0	7.8	9.2	11.1	14.0	17.8	24

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for liquids. A solid stainless steel flap arranged in the wetted chamber is lifted by the incoming flow and indicates the actual flow rate on an internal reading scale. Rugged design in bronze/cast iron combination.

- * high temperature duty
- * double-faced wide window
- * dirt-resistant

Female thread G1/2 to G2 bronze/cast iron



SK-020GR025

TECHNICAL DATA

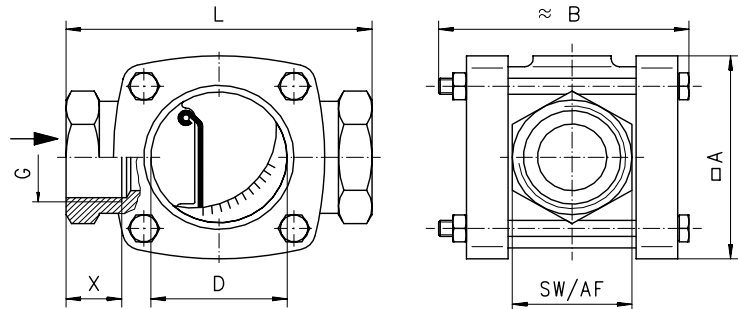
	G	Type	PN bar	indicating range l/min H ₂ O	Qmax. recom. l/min H ₂ O	L mm	A mm	B mm	D mm	AF mm	X mm	weight kg
bronze/cast iron	G 1/2	SK-015GR025	16	3 - 25	30	90	60	74	40	36	14	1.0
	G 3/4	SK-020GR025	16	3 - 25	40	90	60	74	40	36	14	1.0
	G 1	SK-025GR040	16	5 - 40	60	110	76	95	49	43	18	1.8
	G 1 1/2	SK-040GR076	16	10 - 76	120	130	90	116	60	61	20	3.4
	G 2	SK-050GR195	16	15 - 195	250	170	114	138	80	74	25	5.9

Scale increments 1 - 10. Calibration see nomenclature.

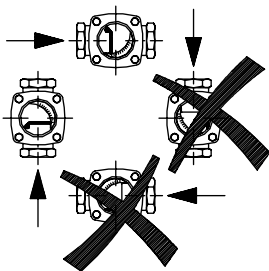
media temperature water max. 100°C
 oil max. 170°C
average pressure loss 0.07bar of full scale.

MATERIALS

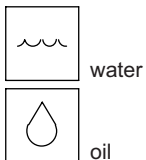
body	bronze / cast iron
cover	cast iron
window	crown hard glass
seal	flexicarb with metal enforcement
bolt	stainless steel 1.4436
flap	stainless steel 1.4436
scale	aluminium



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data".

SK-	015	G	R	025	basic type specification	
	015				nominal diameter	● DN 15 - G1/2
	020					● DN 20 - G3/4
	025					● DN 25 - G1
	040					● DN 40 - G1 1/2
	050					● DN 50 - G2
		G			● female thread	
			R		● bronze	
				025	● indicating range 3 - 25 l/min H ₂ O	
				040	● indicating range 5 - 40 l/min H ₂ O	
				076	● indicating range 10 - 76 l/min H ₂ O	
				195	● indicating range 15 - 195 l/min H ₂ O	
Special option VARIO					<input type="checkbox"/>	stainless steel design flange connector in cast iron flange connector in stainless steel

Scale increments 1 to 10. Indication value is indicated for horizontally increasing flow.

indicating range l/min H ₂ O	scale increments									
	1	2	3	4	5	6	7	8	9	10
3- 25	3	4	5	7	8	9	10	14	20	25
5- 40	5	7	9	10	13	15	18	21	28	40
10- 76	10	14	19	22	27	30	36	44	63	76
15- 195	15	23	29	35	41	46	59	79	118	195

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Indicator for liquids, gasses or aggressive metering substances. The liquid enters a valve housing and lifts the ball from the valve seat placed in glass dome. Rugged design in stainless steel.

* high temperature duty

Female thread G1/4 to G1 1/2 stainless steel

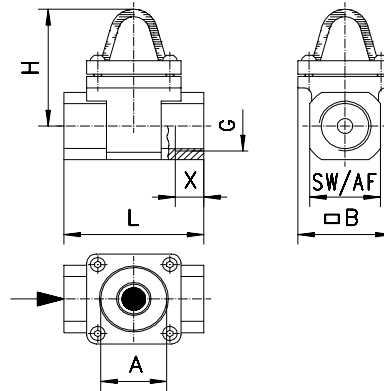


TECHNICAL DATA

BL-010GK

	G	Type	PN bar	sphere l/min H ₂ O		Qmax. recom. l/min H ₂ O	L mm	H mm	A mm	B mm	AF mm	X mm	weight kg
				fist movement	full visibility								
stainless steel	G 1/4	BL-008GK	16	0.3	1.5	4	76	67	42	60	28	12	0.8
	G 3/8	BL-010GK	16	0.3	1.5	8	76	67	42	60	28	16	0.7
	G 1/2	BL-015GK	16	0.3	1.5	12	76	67	42	60	28	14	0.7
	G 3/4	BL-020GK	16	2.5	5	25	89	78	42	60	45	18	1.4
	G 1	BL-025GK	16	4	8	40	89	78	42	60	45	18	1.3
	G 1 1/2	BL-040GK	16	11	23	60	118	95	50	77	62	30	2.5

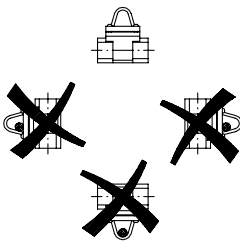
media temperature max. 200°C
average pressure loss 0.2bar at Qmax.



MATERIALS

housing stainless steel 1.4436, 1.4410
sphere PTFE
dome borosilikate
seal viton and klingsil C4400

MOUNTING POSITION



NOMENCLATURE

BL-	008	G	K	basic type specification	
	008		●	nominal diameter	DN 8 - G1/4
	010		●		DN 10 - G3/8
	015		●		DN 15 - G1/2
	020		●		DN 20 - G3/4
	025		●		DN 25 - G1
	040		●		DN 40 - G1 1/2
		G	●		female thread
			K	●	stainless steel

METERING SUBSTANCES



Not recommendable for dark or contaminated liquids.

All technical changes reserved

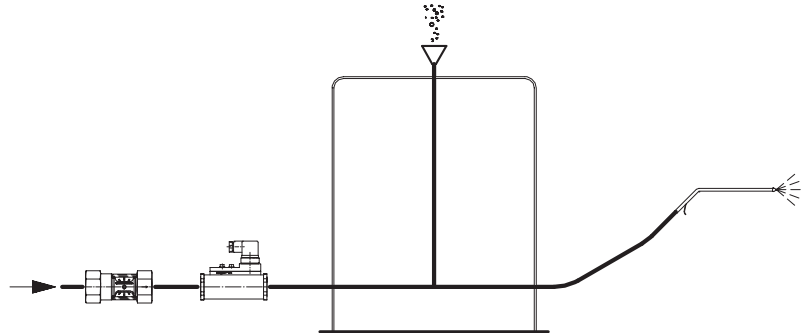
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

Honsberg at work



Monitoring and indicating air flow in painting systems

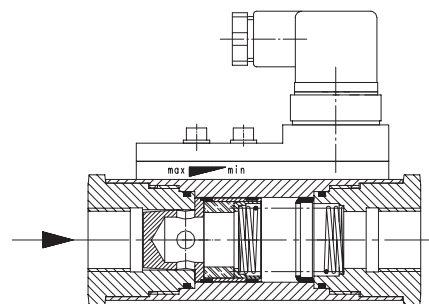
In painting machines, compressed air is used as a carrier for the paint. The constant air flow rate is decisive for the painting result. Honsberg components are used for such applications.



Flow control instrument MR1K

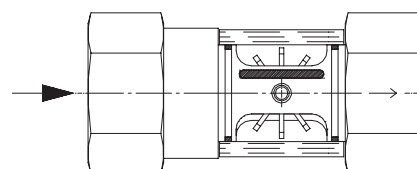
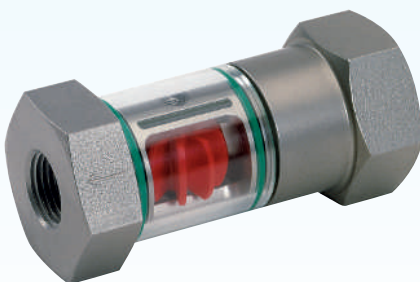
The flow meter monitors the homogenous air flow and immediately signals when this has been undercut or exceeded.

- Piston technology using special stainless steel pistons
- Additional movement damping
- Soft piston stop



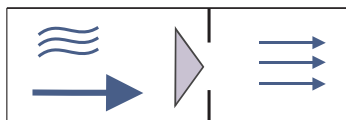
Flow indication instrument WR1

- Additional visual monitoring due to the rotation of a bright red rotor in a glass tube with an all-round view
- Special rotor bearing in ball bearings guarantees wear-free function and start-up even where minimum flow quantities are involved



Orifice

The technology



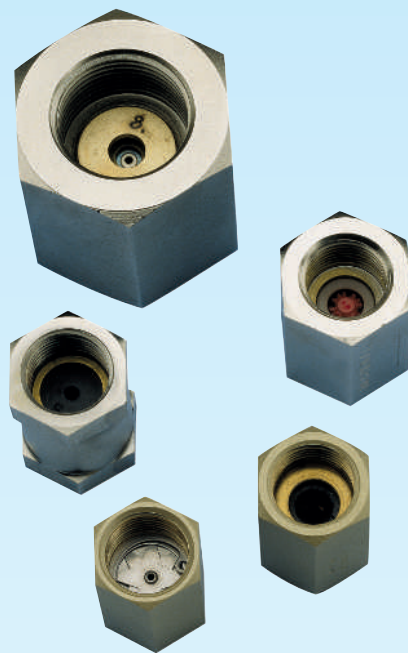
The dynamic orifice adapts the size of the cross-section on the basis of flow-dependent differential pressure, thus limiting the flow rate to a defined value.

Application

- Independent limitation of flow quantities without external power, for example during distribution of central feed among consumers.

Advantages

- Can be installed in any position
- No power required



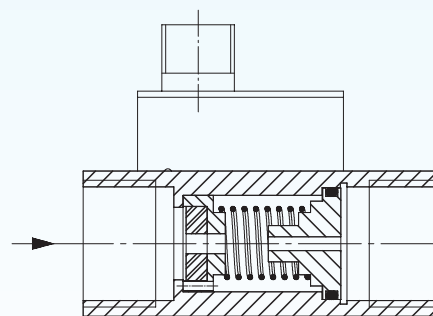
Contents

System description	236
Device descriptions	237

H

Technical data

Concept	Metal or elastomer orifice in the housing
Nominal diameter	10 - 25
Connection	female thread
PN	100 - 200
Max. temperature	300 °C
Signal	threshold
Adjustable	-
Materials	brass, stainless steel
Installation position	any
Metering materials	liquids



- Regulating
- Switching

System description

Device systems

Limiting liquid flow.

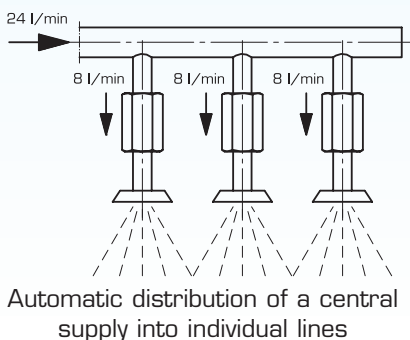
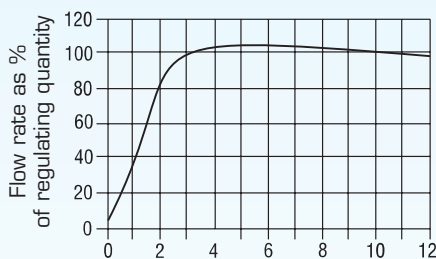
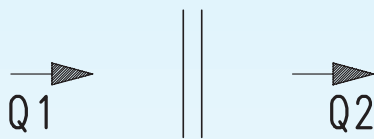
The medium produces a certain differential pressure at the orifice which leads to the metal or elastomer elements being pushed into a spherical cap. This effects a narrowing of the cross-section which limits the flow to a fixed value.

There are spring-supported orifices available for complex tasks. These move over a certain flow-dependent path and then rest against an end stop. The advantage of such devices is the greater load capacity with regard to the maximum differential pressure, which allows these devices to be used for limiting even very large flow quantities.

These flow limiters [KH] are optionally available with a threshold fixture which triggers a threshold contact at zero flow.



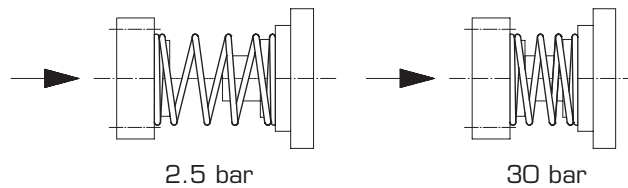
KHK



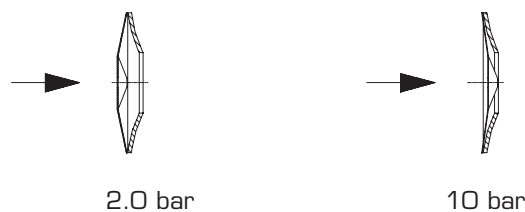
Type	Signal sensor	Full metal	Differential pressure bar	Max. pressure bar	Max. temperature °C
KH	+	-	2.5 - 30	200	110
KM	-	+	1.5 - 10	200	300
WK	-	-	2 - 10	100	65
WP	-	-	1.0 - 10	16	70
WT	-	-	1.5 - 8	100	100

Differential pressure:

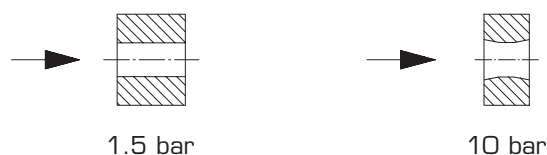
Dynamic orifice [KH]








Static metal orifice [KM, WM]



Static elastomer orifice [WK, WP, WT]



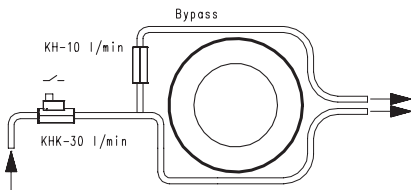
	type	nominal diameter	connection	control	indication	output signal	on site metering	max. pressure bar	max. temperature °C	water	oil	air/gas	aggressive	miscellaneous	page
metal		KH	15 female thread brass	●				200	120	●					238
			15 female thread stainless steel	●				200	120	●					
metal		KM	15 - 20 female thread brass					200	300	●	●				239
			15 - 20 female thread stainless steel					200	300	●	●				
elastomere		WK	15 - 25 female thread brass					100	65	●					240
			15 - 25 female thread stainless steel					100	65	●					
		WP	15 female thread brass					16	70	●					241
	WT	15 female thread brass					100	100	●					242	

Honsberg at work

Independent limitation of cooling systems in X-ray tubes and nuclear magnetic resonance tomographs

X-ray tubes and nuclear magnetic resonance tomographs require precise cooling systems to prevent the tubes from overheating.

Honsberg limiters guarantee independent limitation of the coolant quantity to the required flow rate in the cooling units on the basis of differential pressure, both in the main pipe and in the bypass.



Type KHK limitation in the main flow and additional threshold for interrupting the liquid flow.

Type KH for limitation within the bypass.

● standard ○ standard option ■ special option

current data sheets can be found under www.honsberg.com

GENERAL CHARACTERISTICS

The orifice moves against the force of a supporting spring in flow direction and reduces the free flow symmetry of the housing. By a variation of holes the maximal flow may be limited to a fixed rate.

- * metal design
- * optional installation
- * no additional power supply
- * switch head

Female thread G1/2 brass/stainless steel



KH-015GM006

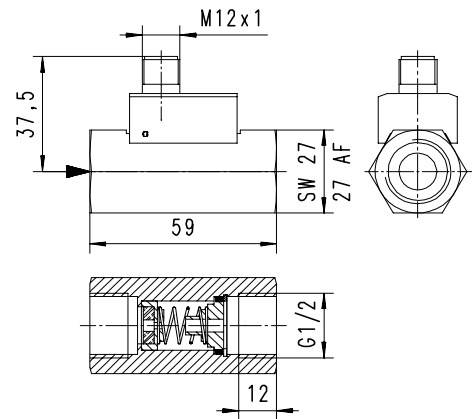
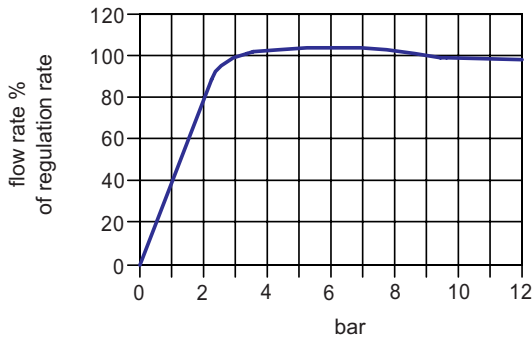
KHK-015GM006

TECHNICAL DATA

	G	Type	PN * bar	regulation rate l/min H ₂ O	L mm	SW mm	weight kg
Ms	G 1/2	KH.-015GM...	200	1,2,3,4,5,6,7,8,9,10,12,16,20,25,30	59	27	0.2
VA	G 1/2	KH.-015GK...	150	1,2,3,4,5,6,7,8,9,10,12,16,20,25,30	59	27	0.2

* Max. differential pressure 30 bar !

differential pressure 2.5 - 30 bar
tolerance ±15% minimum 1l/min
media temperature max. 120°C

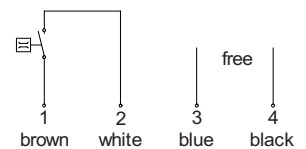


MATERIALS

	KH.-015GM...	KH.-015GK...
body	brass Ms58	s.s. 1.4305
orifice	brass Ms58	s.s. 1.4305
magnet	bariumferrite	bariumferrite
spring	s.s. 1.4310	s.s. 1.4310
snap ring	copper	s.s. 1.4310
seal	NBR	viton
switch head	POM	POM

ELECTRICAL DATA

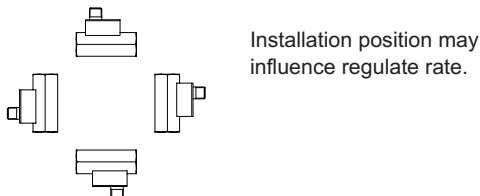
reed switch - wiring 0.378 n.o.
300 V AC 0.15 A 10 VA
Signal is activated by approx.30% of nominal flow rate
connection for locking plug M12x1, 4-pole protection class IP 65



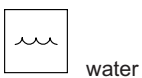
NOMENCLATURE

KHK- 015 G M 001	basic type specification
KH-	● flow regulator
KHK-	● flow regulator with switch head
015	● nominal diameter DN 15 - G1/2
G	● female thread
M	● brass design
K	○ stainless steel design
001	● regulation rate 001 - 030 l/min H ₂ O
...	● see table
030	●
Sonderoption VARIO	☐ special ranges entrance/male thread special thread

MOUNTING POSITION



METERING SUBSTANCES



All technical changes reserved

●BASIC Standard ○BASIC Programme option ☐VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Regulator. The regulator consists of a star shaped stainless steel diaphragm which is pressed into a metal funnel component according to flow-proportional differential pressure.

- * optional installation
- * no wear-parts
- * no additional power supply

Female thread G1/2 to G3/4 brass



KM-020GM016

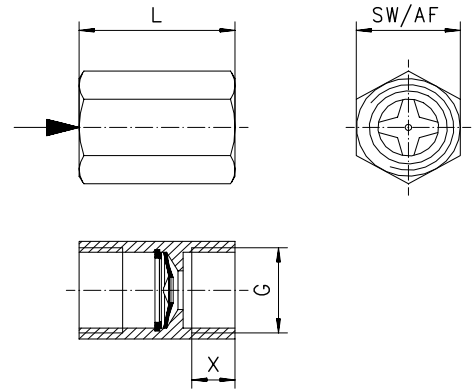
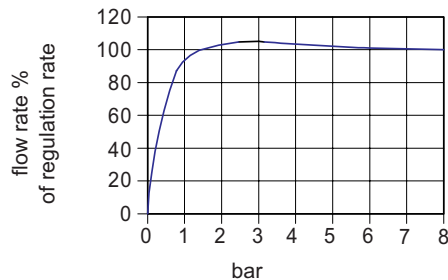
TECHNICAL DATA

	G	Type	PN * bar	regulation rate l/min H ₂ O	L mm	AF mm	X mm	weight kg
Ms	G 1/2	KM-015GM...	200	1 - 16	42	27	10	0.13
	G 3/4	KM-020GM...	200	4 - 30	50	36	14	0.30
VA	G 1/2	KM-015GK...	200	1 - 16	42	27	10	0.13
	G 3/4	KM-020GK...	200	4 - 30	50	36	14	0.30

* Max. differential pressure 16 bar !

differential pressure 1,5 - 10 bar
media temperature max. 300°C

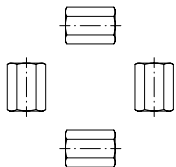
regulation rate	1	2	3	4	6	8	10	12	16	20	25	30	l/min
tolerance ±	0.2	0.2	0.4	0.4	0.5	0.5	0.7	0.7	1.2	1.2	1.5	1.5	l/min



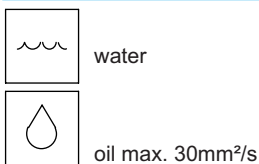
MATERIALS

	KM...GM	KM...GK
body	brass Ms58	s.s. 1.4301
orifice	s.s. 1.4310	s.s. 1.4310
insert	s.s. 1.4301	s.s. 1.4301
	s.s. 1.4122	s.s. 1.4122

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

KM-	015	G	M	001	basic type specification
	015				● nominal diameter DN 15 - G1/2
	020				● nominal diameter DN 20 - G3/4
		G			● female thread
			M		● brass design
			K		● stainless steel design
				001	● regulation rate 001 - 030 l/min H ₂ O
				...	● see table
				030	●
Special option VARIO					<input type="checkbox"/> special ranges entrance/female thread exit/male thread special thread

For combinations see table "technical data"

IMPORTANT FOR YOUR ORDER

- Please indicate metering substance and regulation quantity with your order.
- With viscous liquids indicate viscosity, temperature and metering substance (e.g. ISO VG68) (regulation rate on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Regulator for liquids. The regulator consists of a perforated plastic housing and an integrated o-ring which is pressed into a plastic housing according to flow-proportional differential pressure.

- * optional installation
- * no wear-parts
- * no additional power supply

Female thread G1/2 to G1 brass/stainless steel



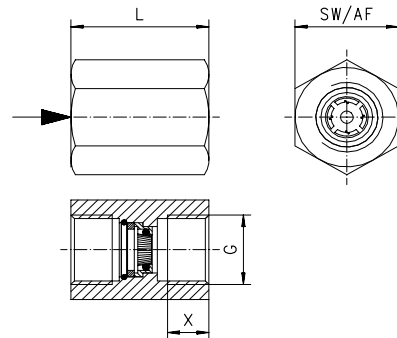
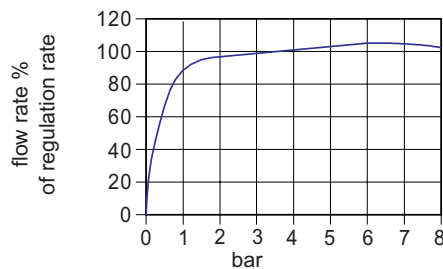
TECHNICAL DATA

WK-015GM012

	G	Type	PN *	regulation rate	L	AF	X	weight
			bar	l/min H ₂ O	mm	mm	mm	kg
brass	G 1/2	WK-015GM...	100	3,5,6,8,10	40	30	12	0.18
	G 3/4	WK-020GM...	100	6,8,10,12,15	40	36	12	0.18
	G 1	WK-025GM...	100	6,8,10,12,15	60	46	20	0.70
stainless	G 1/2	WK-015GK...	100	3,5,6,8,10	40	30	12	0.18
	G 3/4	WK-020GK...	100	6,8,10,12,15	40	36	12	0.18
	G 1	WK-025GK...	100	6,8,10,12,15	60	46	20	0.70

* Max. differential pressure 16 bar !

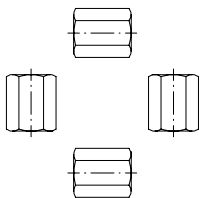
differential pressure 2 - 10 bar
tolerance ±15%
media temperature max. 65°C



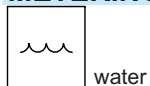
MATERIALS

	WK-...GM	WK-...GK
body	brass Ms 58	s.s. 1.4305
insert	POM	POM
o-ring	NBR	NBR
spacer	s.s. 1.4571	s.s. 1.4571

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

WK-	015	G	M	003	basic type
	015				● nominal diameter DN 15 - G1/2
	020				● nominal diameter DN 20 - G3/4
	025				● nominal diameter DN 25 - G1
		G			● female thread
			M		● brass design
			K		● stainless steel design
				003	● regulation rate H ₂ O 3 l/min
				005	● 5 l/min
				006	● 6 l/min
				008	● 8 l/min
				010	● 10 l/min
				012	● 12 l/min
				015	● 15 l/min
Special option					□ special ranges
VARIO					□ entrance/female thread
					□ exit/male thread

IMPORTANT FOR YOUR ORDER

- Please indicate metering substance and regulation quantity with your order.
- With viscous liquids indicate viscosity, temperature and metering substance (e.g. ISO VG68) (regulation rate on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Regulator for liquids. The regulation is provided by a modification of the flow symmetry during a restriction of the free rubber chord diameter of the regulator element.

- * optional installation
- * no wear-parts
- * no additional power supply

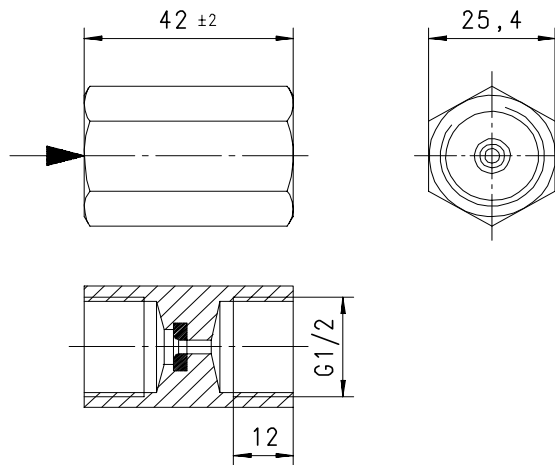
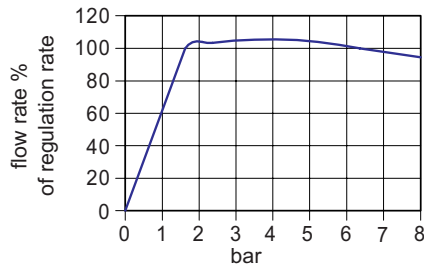
Female thread G1/2 brass



WP-015GM050

TECHNICAL DATA

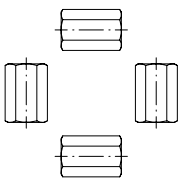
regulation rate	0.5 ; 1 ; 1.5 ; 2 ; 3,2 ; 4 ; 5 ; 7 ; 8 ; 10 ; 12 ; 15 ; 18 ; 20 l/min
system pressure	PN 16 bar
differential pressure	1 - 10 bar
tolerance	±10%
media temperature	max. 70°C
storage temperature	-25 to 100°C
weight	0.2 kg



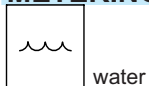
MATERIALS

body	brass
insert	NBR

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

WP-	015	G	M	005	basic type specification
	015				● nominal diameter DN 15 - G1/2
		G			● female thread
			M		● brass design
			K		□ stainless steel design
				005	● 0.5 l/min
				010	● 1.0 l/min
				015	● 1.5 l/min
				020	● 2 l/min
				032	● 3.2 l/min
				040	● 4 l/min
				050	● 5 l/min
				070	● 7 l/min
				080	● 8 l/min
				100	● 10 l/min
				120	● 12 l/min
				150	● 15 l/min
				180	● 18 l/min
				200	● 20 l/min

regulation rate H₂O

IMPORTANT FOR YOUR ORDER

- Please indicate metering substance and regulation quantity with your order.

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Flow Regulator for liquids. The regulation is provided by a modification of the flow symmetry during a restriction of the free rubber chord diameter of the regulator element.

- * optional installation
- * no wear parts
- * no additional power supply

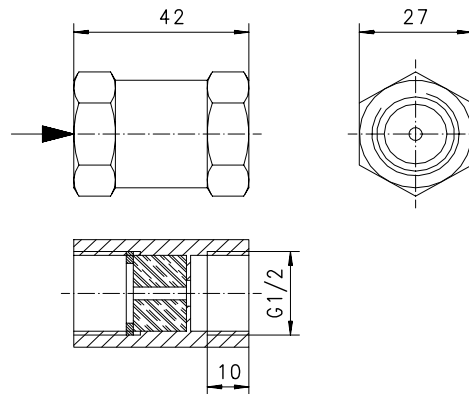
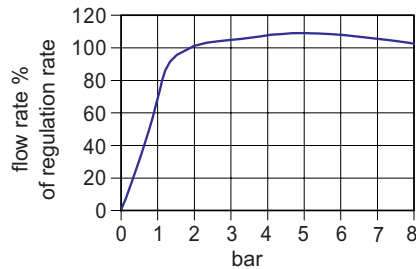
Female thread G1/2 brass



WT-015GM050

TECHNICAL DATA

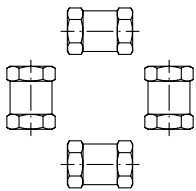
regulation rate 5 ; 7.5 ; 13.5 l/min
 system pressure PN 100 bar
 differential pressure 1.5 - 8 bar
 tolerance ±15%
 media temperature max. 100°C
 weight 0.2 kg



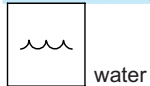
MATERIALS

body brass Ms58 nickel plated
 insert perbunan

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

WT-	015	G	M	050	basic type specification
	015				● nominal diameter DN 15 - G1/2
		G			● female thread
			M		● brass design
				050	● regulation rate 5.0 l/min H ₂ O
				075	● regulation rate 7.5 l/min H ₂ O
				135	● regulation rate 13.5 l/min H ₂ O

IMPORTANT FOR YOUR ORDER

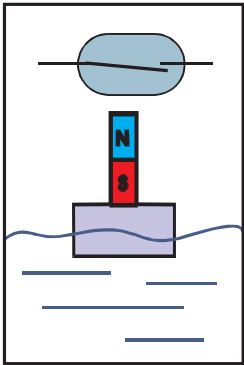
- Please indicate metering substance and regulation quantity with your order.
- With viscous liquids indicate viscosity, temperature and metering substance (e.g. ISO VG68) (regulation rate on request)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

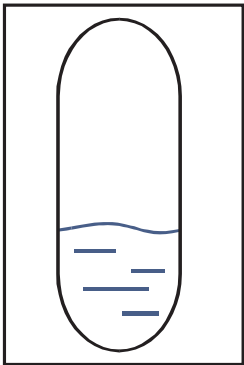
Level

The technology



Float

Magnetic-equipped float follows the level in the guide tube and triggers a threshold contact or reed switch chain.



Sight glass

Optical display of the filling level of a container

Application

- Liquid level monitoring
- Containers in vertical or horizontal installation positions

Advantages

- Simple device structure
- Adaptation of the device to individual applications
- Threshold value or measured value sensor

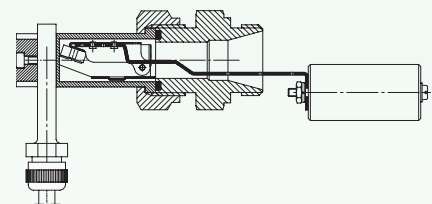
Technical data

Concept	sight glass, float, ultrasonic
Nominal diameter	1/8 to 2
Connection	screw-in thread, flange, female thread
PN	5 - 40
Max. temperature	200 °C
Signal	threshold, 4[0]..20 mA, Ω , 0..10 V
Adjustable	yes
Materials	brass, stainless steel, plastic
Installation position	cover or wall mounting
Metering materials	liquids or solids



Contents

System description	
Device systems	244
Function and advantages	245
Metering materials and accuracy	246
Handling and operation	247
Honsberg products in practical use	248
Device descriptions	249



- Switching
- Indicating
- Metering

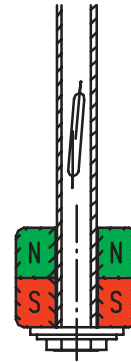
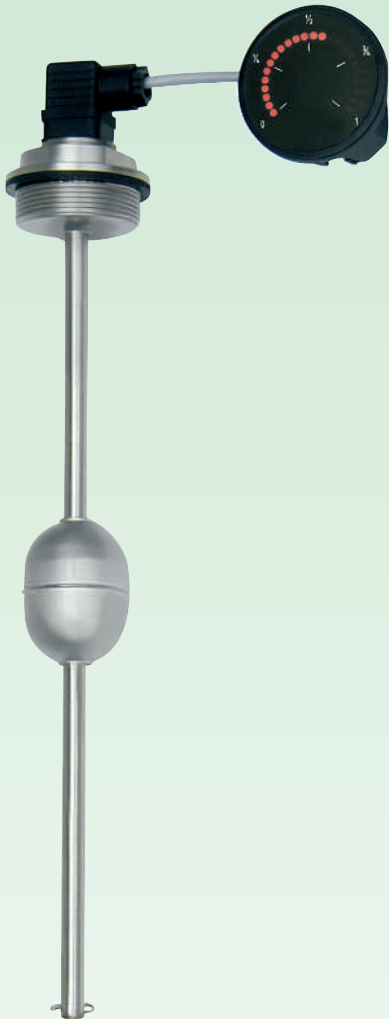
System description

Device system

Monitoring and metering levels using floats is a reliable method of monitoring and metering filling levels in containers and apparatus.

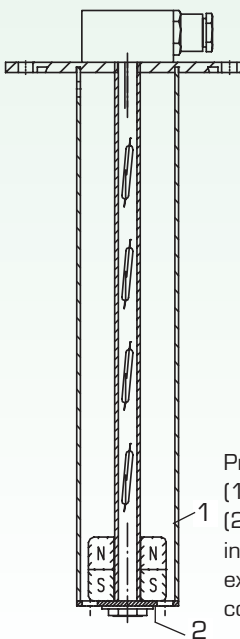
Vertical installation

The level sensor is installed in the required length and with the required number of contacts vertically in the container. The level moves a float which is equipped with a magnet, and in this way activates the reed contact which is hermetically sealed in the tube and triggers the threshold value.

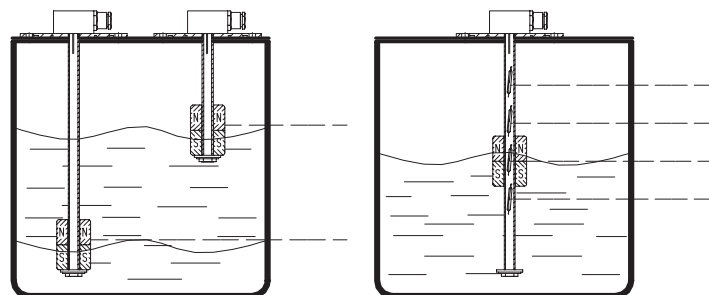


This may include a n.o. or n.c. contact or open contact depending on the required function, e.g. rising level or falling level is critical for the process.

In this way comprehensive monitoring can be established.



Protection tube
 (1) with basic disk
 (2) stabilises level
 indications in
 extreme working
 conditions.

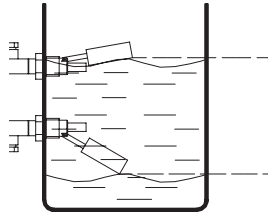


In case of vertical design, the switching point can be selected in those cases where the contact units have been arranged adjustably in the tube [NR].

In addition, the fixed-setting threshold contacts [NM, NMM, SB] are replaced by a resistor chain [LC] which creates a level-proportionate resistance signal through the magnetic field of the float, thus allowing continual level measurement in the container.

Horizontal installation

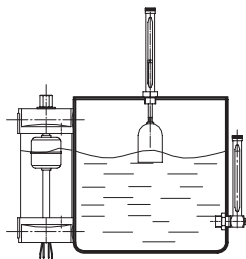
In the case of horizontal devices the monitor is installed in the wall at the same height of the level to be monitored. In this way different levels can be monitored by different devices arranged in different positions.



The devices can be operated as make contact or break contact depending on their installation position.

Sight glass

Sight glasses [NA, NB, NBS, NG] are available for optical monitoring.



Functions and advantages

The advantage of the system is the versatility to individual applications by choice of pipe length and the purely physical basis of the float operation. It is important for the float to be of the correct weight which has to be in relation to the density of the flow medium.

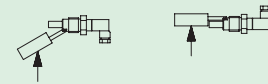
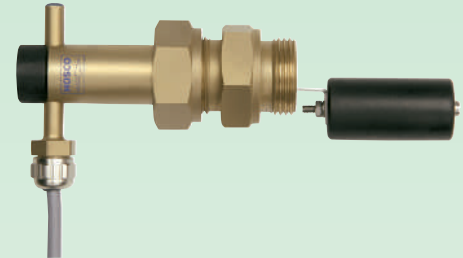
Metering materials and accuracy

The metering materials concentrate on all types of liquids, with a min. specific density of 0.34 g/cm³.

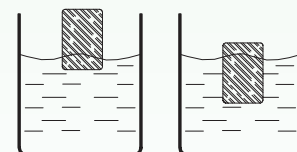
The accuracy of the threshold sensors is 1 %, partly depending on the contact bracket used in level transducers.

Handling and operation

Mechanical and electrical recommendations must be observed during installation. The devices are largely maintenance-free.



Make contact Break contact



high density low density

Honsberg products in practical use



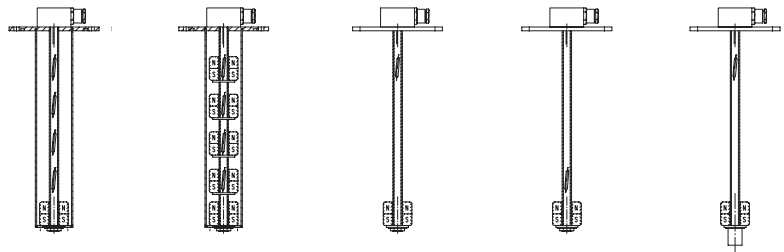
Level management in construction machinery

In construction machinery (wheeled loaders/chain movers etc.) reliable and sturdy monitoring of the water, oil and fuel situation plays a major role in load capacity and maintenance freedom of the drive unit.

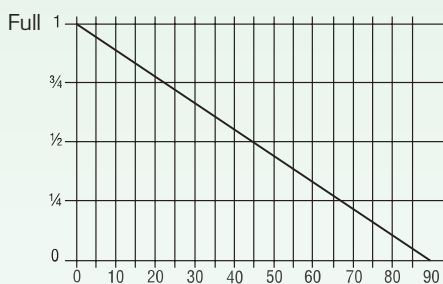
The demands made on relevant metering and monitoring devices are high on account of the special operating conditions in the construction machinery environment:

Impact, vibration, temperature and tilt.

Examples



Metering		Monitoring		
Single-float technology with surge pipe	Multiple-float technology with surge pipe	Max. level monitoring	Min. level monitoring	Max. level monitoring + temperature monitoring
Advantages: <ul style="list-style-type: none"> ● Close grid in metering chain ● Metering chain cast in plastic pipe ● Linear function optional temperature monitoring ● External assembly possible 		Advantages: <ul style="list-style-type: none"> ● Threshold value with optional temperature monitoring ● Contacts cast in plastic pipe ● Stable operation even in tilted positions 		

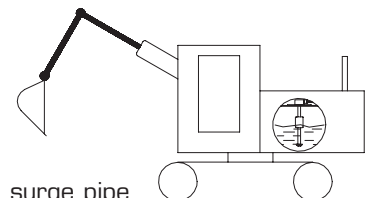













Linearized graph of tank level to resistance value

Honsberg is an original equipment manufacturer for important machinery manufacturers and supplies level-monitoring devices for oil and water as well as metering devices for fuel.

The monitoring devices work as minimum threshold level sensors and produce a warning signal when the minimum level is reached whereas the fuel sensors provide a continual level-dependent output which is transferred to a display instrument in the cockpit.

Types	NRK [fuel] NRW [water] NROE [oil]
Length	150 to 900 mm
Threshold value	min. and/or max.
Output signal	Ohm
Optional	Temperature monitor, surge pipe



	type	nominal diameter	connection	control	output signal	on site metering	max. pressure bar	max. temperature °C	water	oil	air/gas	aggressive	miscellaneous	page
float	 NM-..HP	male thread plastic	●				5	60	●	●				248
	NM-..HK	male thread stainless steel	●				15	105	●	●				248
	NMS-..HK	male thread stainless steel	●				40	105	●	●				248
		male thread stainless steel	●				12	105	●	●				249
	 SB-..HM	male thread brass	●				12	105	●	●				250
	NR	flange aluminium	●				15	100	●	●			1-4 switch	252
		male thread stainless steel	●				15	100	●	●		●	1-4 switch	
	LC	male thread brass	○	○	●	○	20	105	●	●				254
		male thread stainless steel	○	○	●	○	40	105	●	●		●		
		RW-..HK	male thread stainless steel	●				6	200	●	●			
RWI-..PP		male thread plastic	●				6	80	●	●				257
RWI-..PV		male thread plastic	●				6	130	●	●				257
	MW3/NW3	male thread brass	●				25	110	●	●				258
		male thread stainless steel	●				10	110	●	●		●		
	NW1	male thread brass	●				25	110	●	●				259
		male thread stainless steel	●				10	110	●	●		●		
	CWE	male thread brass	●				11	120	●	●				260
	MWI	male thread brass	●				15	180	●	●				261
		male thread stainless steel	●				15	180	●	●				
	NG	female thread aluminium	●	●			8	75	●	●				262
	NBS	male thread brass		●				50	●	●				263
sight glass	NA	male thread brass		●				80	●	●				264
	NB	male thread brass		●				80	●	●				264
infrared		NL	male thread steel	●				100	●	●				265
			male thread stainless steel	●				100	●	●		●		

● standard ○ standard option □ special option

all data sheets available under www.honsberg.com

GENERAL CHARACTERISTICS

Mechanical Level Switch for liquids. A magnet-equipped float triggers a reed switch in a pre-fixed position.

- * top or bottom assembly for min. or max. control
- * reliable
- * good repeatability

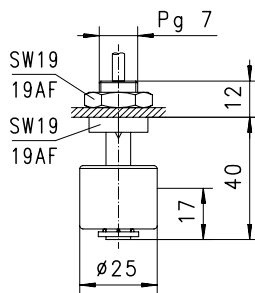
Male thread G1/8A - G1/4A stainless steel / Pg7 PP



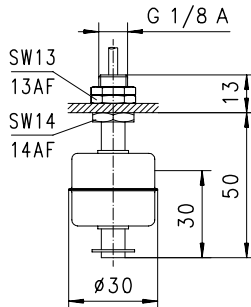
TECHNICAL DATA

	G	Type	liquid density g/cm ³	media temperature °C	PN bar	material	weight g
polypropylene	Pg7	NM-007HP	≥0.80	max. 60°C	5	PP / PA	40
stainless steel	G 1/8 A	NM-004HK2	≥0.70	max. 105°C	15	1.4571	60
stainless steel	G 1/4 A	NM-008HK	≥0.66	max. 105°C	40	1.4571	130

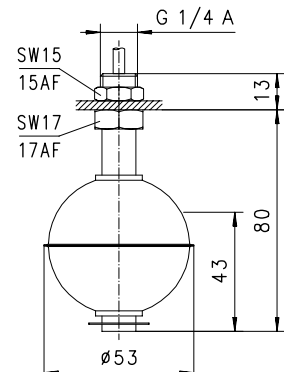
Instrument is supplied without seal!



NM-007HP

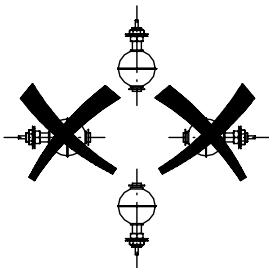


NM-004HK2



NM-008HK

MOUNTING POSITION

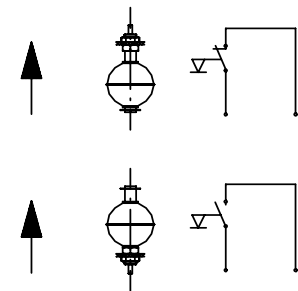


Installation position influences operation!

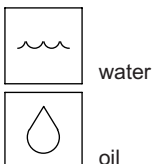
ELECTRICAL DATA

reed switch
wiring 0.225
n.c. or n.o. depending on installation position
cable 1,5 m
NM-007HP - 250 V AC 0,5 A 10 VA
NM-004HK2 - 300 V AC 0,5 A 50 VA
NM-008HK - 250 V AC 1,3 A 80 VA
protection class IP 65

Operation can be modified by reversing the position of the float.



METERING SUBSTANCES



NOMENCLATURE

NM-	007HP	Beispiel	Beschreibung
	007HP	●	male thread Pg7 connection thread plastic
	004HK2	●	male thread G1/8A connection thread stainless steel
	008HK	●	male thread G1/4A connection thread stainless steel

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Level Switch for liquids. A magnet-equipped float triggers a reed switch in a pre-fixed position.

- * top or bottom assembly for min. or max. control
- * reliable
- * good repeatability

Male thread G1/8A stainless steel/spansil



TECHNICAL DATA

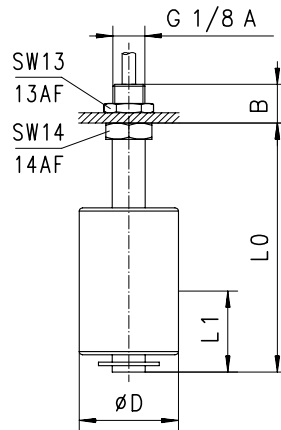
	G	Type	liquid density g/cm ³	PN bar	L0 mm	L1 mm	D mm	B mm	weight g
Messing	G 1/8 A	NMS-004HM40	≥0.40	12	40	20	30	10	55
	G 1/8 A	NMS-004HM47	≥0.38	12	47	20	20	12	65
	G 1/8 A	NMS-004HM77	≥0.34	12	77	34	30	10	75

NMS-004HM40

NMS-004HM47

NMS-004HM77

media temperature max. 105°C

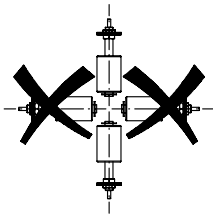


Instrument is supplied without seal!

MATERIAL

body brass Ms58
float spansil
nuts bronze / NMS-004HM47 stainless steel

MOUNTING POSITION

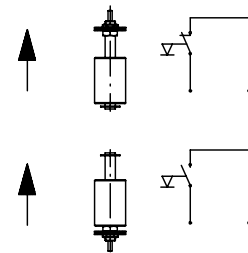


Installation position influences operation!

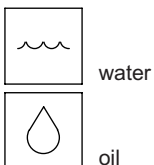
ELECTRICAL DATA

reed switch
wiring 0.225
n.c. or n.o. depending on installation position
cable 1.5 m
NMS-004HM40 - 300 V AC 0,5 A 70 VA
NMS-004HM47 - 300 V AC 0,5 A 70 VA
NMS-004HM77 - 250 V AC 1,3 A 80 VA
protection class IP 65

Operation can be modified by reversing the position of the float.



METERING SUBSTANCES



NOMENCLATURE

NMS-	004	H	M	40	Beispiel Beschreibung
	004				● male thread G1/8A
		H			● connection thread
			M		● brass
				40	● length 40 mm
				47	● length 47 mm
				77	● length 77 mm

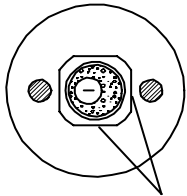
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

A magnet equipped float follows the liquid and activates a reed switch scaled into the tube in a fixed position.

* top assembly



punctual guidance of the plastic float
support reliable operation
even with contaminated liquids

Male thread G1A brass

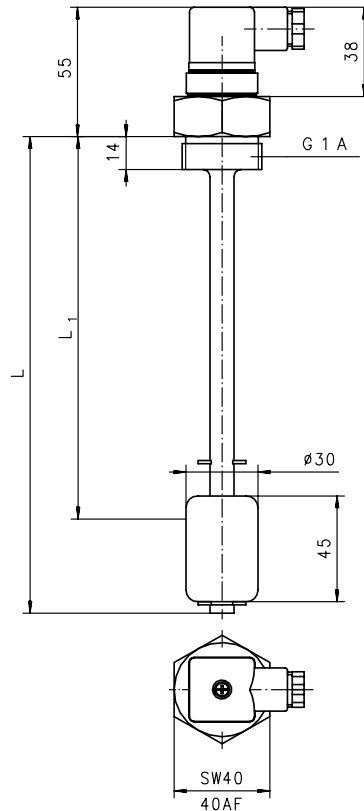


TECHNICAL DATA

SB-025HM0100

	G	Type	PN bar	liquid density g/cm ³	L mm	L1 mm	weight kg
brass	G1 A	SB-025HM0100	12	≥0.34	100	60	0.35
		SB-025HM0200	12	≥0.34	200	160	0.40
		SB-025HM0300	12	≥0.34	300	260	0.50
		SB-025HM0400	12	≥0.34	400	360	0.55
		SB-025HM0500	12	≥0.34	500	460	0.60

tolerance ±5mm
media temperature max. 105°C

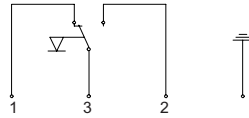


MATERIALS

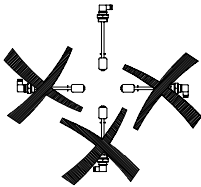
tube brass Ms58
float spasil
housing brass Ms58

ELECTRICAL DATA

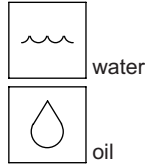
reed switch - wiring 0.280 change over
220 V AC 0.5 A 60VA
plug DIN 43650-A
protection class IP 65



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

SB-	025HM	0100	basic type specification
	025HM		● socket thread G1 A brass - float spansil
		0100	● tube length L= 100mm
		0200	● tube length L= 200mm
		0300	● tube length L= 300mm
		0400	● tube length L= 400mm
		0500	● tube length L= 500mm
Special option VARIO			○ special tube length temperature 120°C

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Level Switch for liquids in full metal design. A magnet-equipped float triggers adjustable reed switches.

Male thread G2A stainless steel
Flange Ø120 aluminium

- * top assembly
- * adjustable switch value in 10mm increments
- * up to 4 separate contacts

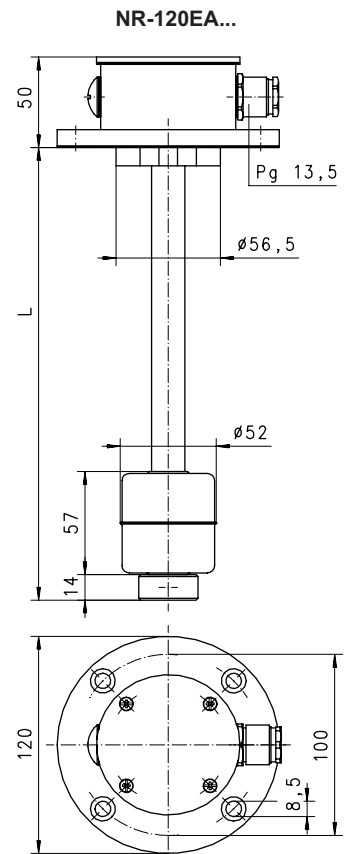
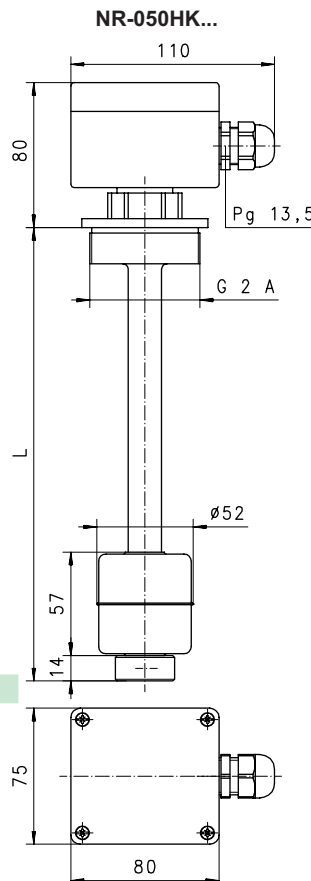


TECHNICAL DATA

NR-120EA1000

	G	Type	liquid density g/cm ³	PN bar	max. number of switch contacts (to order separately)	L mm	weight kg
stainless steel	G2A	NR-050HK0250	≥0.8	15	2	250	1.3
		NR-050HK0500	≥0.8	15	3	500	1.4
		NR-050HK0750	≥0.8	15	4	750	1.6
		NR-050HK1000	≥0.8	15	4	1000	1.7
aluminium	flange	NR-120EA0250	≥0.8	15	2	250	1.0
		NR-120EA0500	≥0.8	15	3	500	1.1
		NR-120EA0750	≥0.8	15	4	750	1.3
		NR-120EA1000	≥0.8	15	4	1000	1.4

media temperature max. 100°C



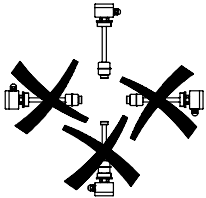
MATERIALS

	NR-050HK	NR-120EA
tube	s.s. 1.4571	brass
flange	-	aluminium
float	s.s. 1.4571	s.s. 1.4571
housing	aluminium	aluminium

ELECTRICAL DATA

See switch module.

MOUNTING POSITION



METERING SUBSTANCES



water



oil



design stainless steel NR-050HK
for aggressive liquids

NOMENCLATURE

NR-	050HK	0250		basic type specification
	050HK			● socket thread G2A stainless steel
	120EA			● flange Ø120 aluminium
		0250		● tube length L= 250mm
		0500		● tube length L= 500mm
		0750		● tube length L= 750mm
		1000		● tube length L=1000mm
			R	○ protection tube aluminium (flange design only)
Special option VARIO				○ special tube length up to 2500mm ○ combination flange and tube stainless steel

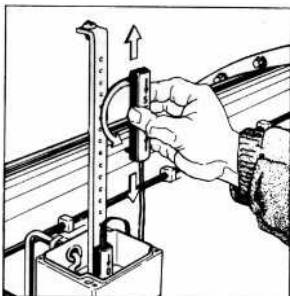
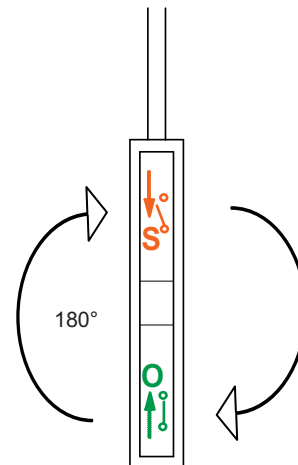
SWITCH MODULE

⊕ NR-000

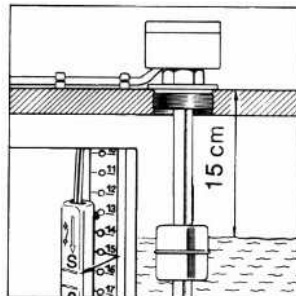
Switch modules to order separately.
Depending on tube length up to 4 contacts per instrument, see table "technical data"

reed switch
wiring 0.225 n.o. or n.c.
cable gland Pg13,5
250 V AC , 1 A , 250 VA
protection class IP 65

The switch modules can be operated as n.o. or n.c. by a turn of 180°. Minimal distance 80mm between moduls.



Pull installation rail out of the tube, position switch module into the rail holes and connect electrical connector in switch head



The markings on the rail allow a precise positioning of the switch module.

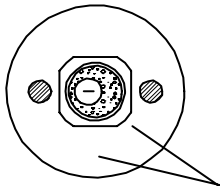
All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

A magnet equipped float activates a reed chain inside a tube which is connected to resistors comparable to a potentiometer. The gapless positioning of the sensors provides a continuous signal with good resolution and repeatability.

- * top assembly
- * selectable material combinations



punctual guidance of the plastic float support reliable operation even with contaminated liquids

Male thread G1A to G2A brass/stainless steel



LC-S45HM025



LC-K52HK0250

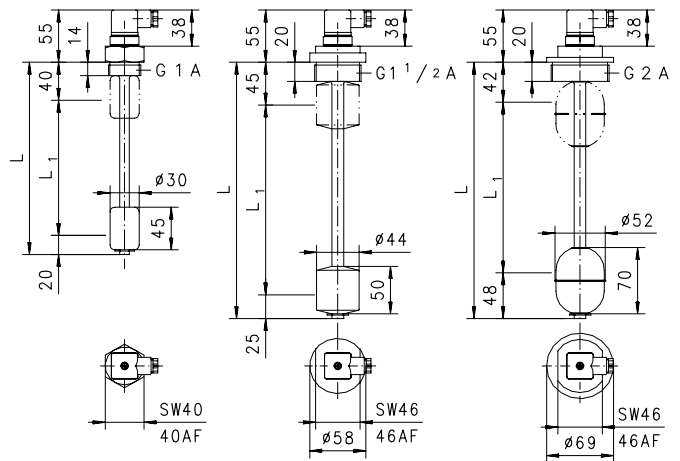
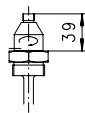
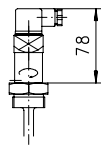
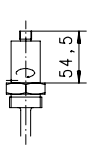
TECHNICAL DATA

	G	Type	PN bar	liquid density g/cm ³	reso- lution mm	resistor Ohm *	tolerance Ohm at max	L mm	L1 mm	weight kg
brass	G1 A	LC-S45HM0250	20	≥0.34	10	0 - 1800	±136	250	190	0.5
		LC-S45HM0500	20	≥0.34	10	0 - 4300	±186	500	440	0.6
		LC-S45HM0750	20	≥0.34	10	0 - 1503	± 52	750	690	0.6
		LC-S45HM1000	20	≥0.34	10	0 - 2055	± 64	1000	940	0.7
brass	G1 1/2 A	LC-S44HM1000	20	≥0.44	20	0 - 2295	± 95	1000	930	0.7
		LC-S44HM1500	20	≥0.44	20	0 - 3543	±121	1500	1430	0.8
		LC-S44HM2000	20	≥0.44	20	0 - 4790	±146	2000	1930	.08
stainless steel	G2 A	LC-K52HK0250	40	≥0.66	10	0 - 1500	±130	250	160	1.0
		LC-K52HK0500	40	≥0.66	20	0 - 4000	±280	500	510	1.0
		LC-K52HK0750	40	≥0.66	20	0 - 1647	± 83	750	690	1.0
		LC-K52HK1000	40	≥0.66	20	0 - 2246	± 94	1000	910	1.1
		LC-K52HK1500	40	≥0.66	20	0 - 3493	±120	1500	1410	1.1
		LC-K52HK2000	40	≥0.66	20	0 - 4741	±144	2000	1910	1.1

* +1000 Ohm series resistance

length tolerance ±5mm
media temperature max. 105°C resistance output max. 85°C 4..20mA, 0..10V

option	option	option	standard
4..20mA , 0..10V	4..20mA , 0..10V	resistor	resistor
locking plug	plug DIN 43650-A	locking plug	plug DIN 43650-A



MATERIALS

	LC-S4.HM	LC-K52HK
tube	Ms58	stainless steel 1.4571
float	Spansil	stainless steel 1.4571
housing	Ms58	stainless steel 1.4571

LC-S45

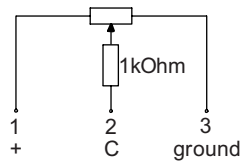
LC-S44

LC-K52

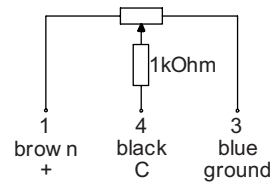
ELECTRICAL DATA

24 V DC 50 mA
resistance value see table 'technical data'
potentiometer resistance 500-2000Ω
protection class IP 65

plug DIN 43650-A



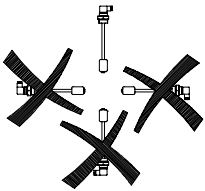
locking plug M12x1 - 4pole



option:

	4..20mA 2-wire		4..20mA 3-wire			0..10V		
	+(10-30VDC)	output	+(10-30VDC)	output	0V	+(10-30VDC)	output	0VDC
plug DIN 43650-A	1	2	1	2	3	1	2	3
locking plug	1	4	1	4	3	1	4	3
cable	brown	black	brown	black	blue	brown	black	blue

MOUNTING POSITION



METERING SUBSTANCES



water



oil



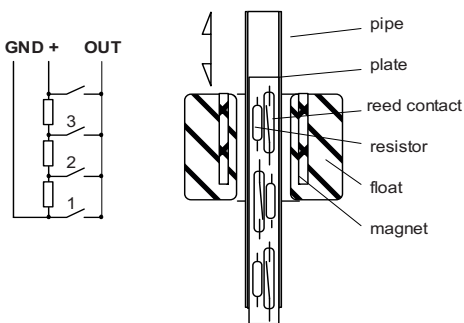
design stainless steel
for aggressive liquids

NOMENCLATURE

For combination see table "technical data"

LC-	S45HM	0250	W	B	basic type specification
	S45HM				● socket thread G1 A brass - float Spansil
	S44HM				● socket thread G1 1/2 A brass - float Spansil
	K52HK				● socket thread G2 A stainless steel
		0250			● tube length L= 250mm
		0500			● tube length L= 500mm
		0750			● tube length L= 750mm
		1000			● tube length L= 1000mm
		1500			● tube length L= 1500mm
		2000			● tube length L= 2000mm
			W		● resistor
			Z		○ 4..20mA output (2-wire)
			T		○ 4..20mA output (3-wire)
			V		○ 0..10V output
				B	● plug DIN 43650-A
				S	○ connection for locking plug M12x1 4-pole
Special option VARIO					○ special tube length temperature 120°C

PRINCIPLE



Switching sequence:
reed 1 switches
reed 1+2 switches
reed 2 switches
reed 2+3 switches

COMBINATIONS

omni-LC
local electronic unit,
2xNPN and PNP switch
4(0)..20mA output
graphical LCD display
with flashing LED
program ring

Flex-LC
switch- or frequency output
0..10V oder 4..20mA
PNP, NPN



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Level Switch in full metal design for liquids. A magnet-equipped float triggers a pre-fixed reed switch.

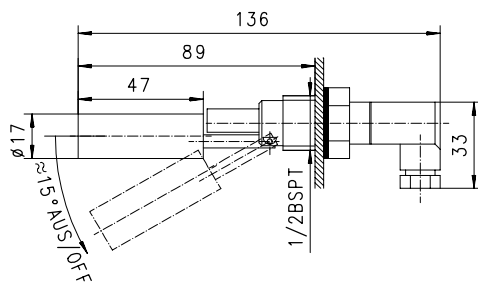
- * wall mounting
- * reliable
- * high temperature
- * good repeatability

Male thread 1/8 BSPP - 1/2 BSPT stainless steel

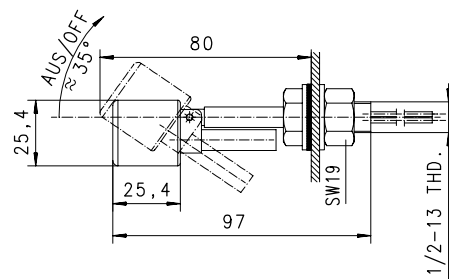


TECHNICAL DATA

	RW-015HKS
pressure	PN 5 bar
media temperature	max. 120°C
weight	110g
liquid density	≥0.75 g/cm³



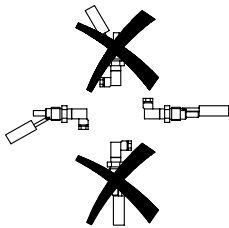
	RW-015HKL
pressure	PN 6 bar
media temperature	max. 200°C
weight	120 g
liquid density	≥0,70 g/cm³



MATERIALS

	RW-015HKS	RW-015HKL
body	stainless steel 1.4301	stainless steel 1.4571
float	stainless steel 1.4436	stainless steel 1.4571

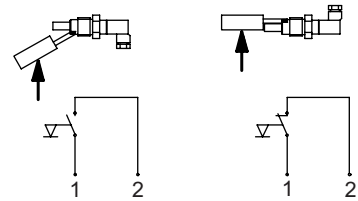
MOUNTING POSITION



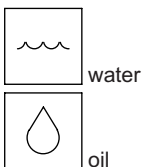
Installation position may influence operation!

ELECTRICAL DATA

reed switch	
wiring	0.225 n.c. or n.o. depending on installation position
plug design	250 V AC 0.5 A 50 VA plug similar to DIN 43650-C contact distance 9.4mm
lead design	220 V AC 0,28 A 30 VA lead 600 mm
protection class	IP 65



METERING SUBSTANCES



NOMENCLATURE

RW-	015	H	K	S	basic type
	015				specification
		H			● connection thread 1/2 BSPT
			K		● socket thread
				S	● stainless steel
				L	● plug (only RW-015)
					● leads

All technical changes reserved

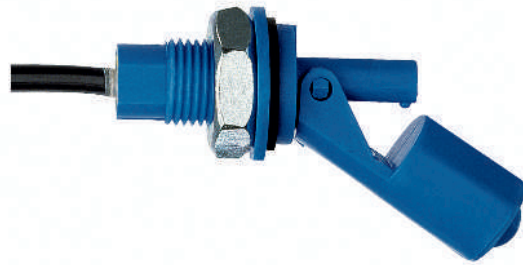
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Level Switch in full plastic for liquids. A magnet-equipped float triggers a pre-fixed reed switch.

- * assembly externally up to wall thickness of 4mm or internally up to wall thickness of 6 mm
- * wall mounting
- * reliable
- * good repeatability

Compression gland
Male thread M16x1,5 polypropylen/PVDF



RWI-016PP

TECHNICAL DATA

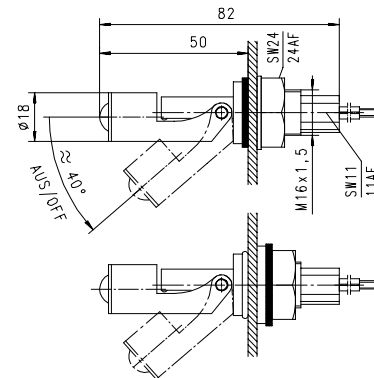
	M	Type	liquid density g/cm ³	PN bar	media temperature max °C	weight g
polypropylen	M16x1,5	RWI-016PP	≥0.6	3	90	75
PVDF	M16x1,5	RWI-016PV	≥0.75	6	130	75

MATERIALS

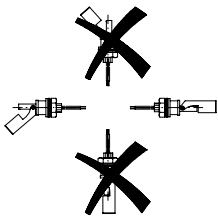
	RWI-016PP	RWI-016PV
body	polypropylen	PVDF
float	polypropylen	PVDF
seal	viton	viton

assembly internally
hole diameter 16.5

assembly externally
hole diameter 23



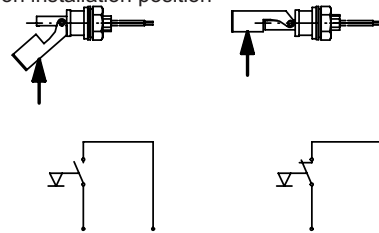
MOUNTING POSITION



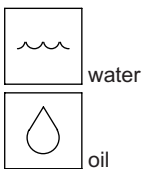
Installation position may influence operation!

ELECTRICAL DATA

reed switch
wiring 0.225 n.c. or n.o. depending on installation position
cable 0.5 m
250 V AC 0.5 A 50VA
protection class IP 65

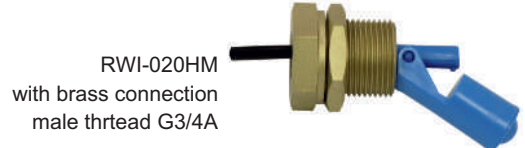


METERING SUBSTANCES



NOMENCLATURE

RWI-	016	P	P	K	basic type specification
		P			● compression gland
			P		● polypropylen PP
			V		● PVDF
				K	● cable
				F	○ faston clamp
BASIC Programme option					○ seal silikon
					change over 175 VAC 0.25 A 3VA



All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Level Switch for liquids with magnetic triggering of an adjustable micro switch or reed switch.

- * high switch capability
- * wall mounting
- * reliable
- * good repeatability

Male thread G3/4A brass/stainless steel

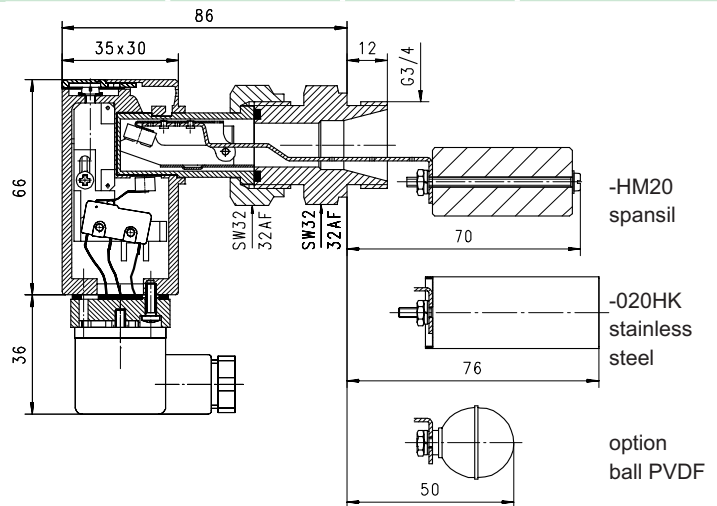


TECHNICAL DATA

NW3-020HM

	G	Type	liquid density g/cm ³	PN bar	L mm	weight kg
brass	G 3/4 A	MW3 / NW3-020HM	≥0.7	25	72	0.35
stainless steel	G 3/4 A	MW3 / NW3-020HK	≥0.9	10	76	0.35

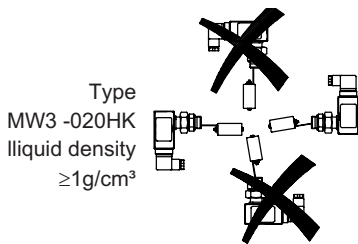
media temperature max. 110°C



MATERIALS

	MW3/NW3-020HM	MW3/NW3-020HK
housing	Ms58 nickel plated	stainless steel 1.4305
socket	Ms58 nickel plated	stainless steel 1.4571
wetted parts	stainless steel 1.4310 ; 1.4571	stainless steel 1.4310 ; 1.4571
float	spansil	stainless steel 1.4571
magnet	oxyd 300	oxyd 300
seal	NBR	viton

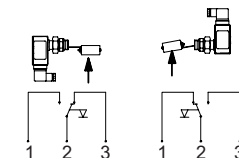
INSTALLATION POSITION



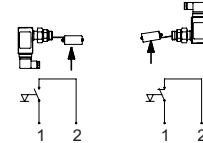
Installation position may influence operation!

ELECTRICAL DATA

MW3
micro switch
wiring 0.374 change over
250 V AC 5 A
plug DIN 43650-A
protection class IP 65



NW3
reed switch
wiring 0.225 n.c. or n.o. depending
on installation position
230 V AC 1 A 50 VA
plug DIN 43650-A
protection class IP 65



METERING SUBSTANCES



water



design stainless steel
MW3/NW3-020HK
for aggressive liquids



oil

NOMENCLATURE

MW3-	020	H	M	Beispiel Beschreibung
MW3-				● micro switch
NW3-				● reed switch
		H		● socket thread G3/4A
			M	● brass design
			K	● stainless steel design
Special option VARIO				☐ contact for locking plug M12x1, 4-pole float ball PVDF

All technical changes reserved

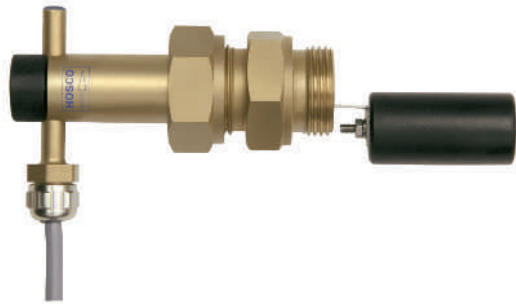
●BASIC Standard ○BASIC Programme option ☐VARIO Special option ⊕PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Mechanical Level Switch for liquids with magnetic triggering of an adjustable reed switch.

- * high switch capability
- * wall mounting
- * reliable
- * good repeatability

Male thread G3/4A brass/stainless steel



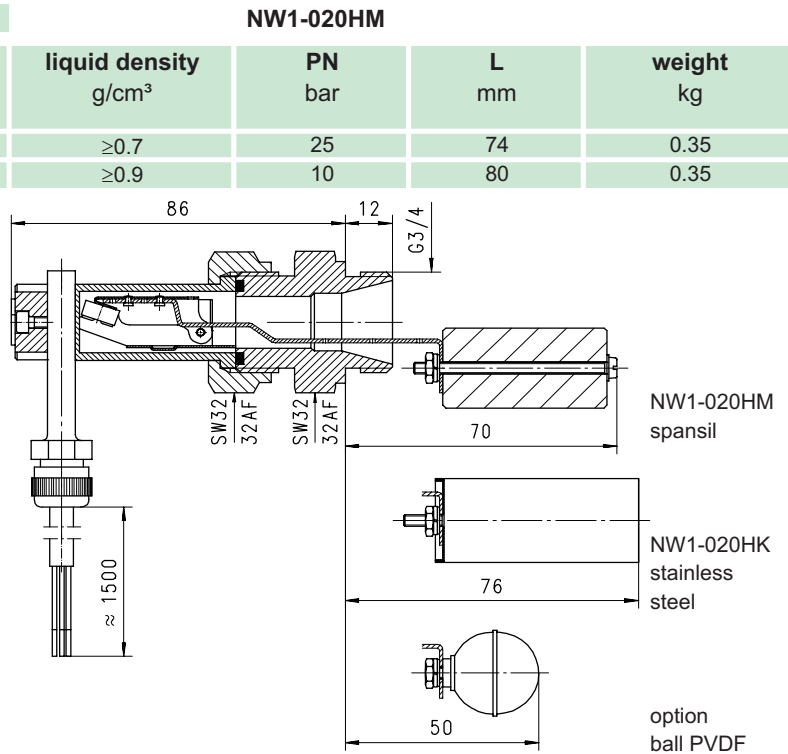
TECHNICAL DATA

	G	Type	liquid density g/cm ³	PN bar	L mm	weight kg
brass	G 3/4 A	NW1-020HM	≥0.7	25	74	0.35
stainless steel	G 3/4 A	NW1-020HK	≥0.9	10	80	0.35

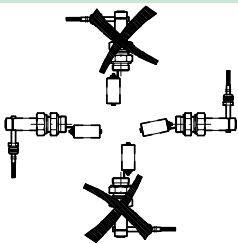
media temperature max. 110°C

MATERIALS

	NW1-020HM	NW1-020HK
housing	Ms58	stainless steel 1.4305
socket	Ms58	stainless steel 1.4571
wetted parts	stainless steel 1.4310 ; 1.4571	stainless steel 1.4310 ; 1.4571
float	spansil	stainless steel 1.4571
magnet	oxyd 300	oxyd 300
seal	NBR	viton



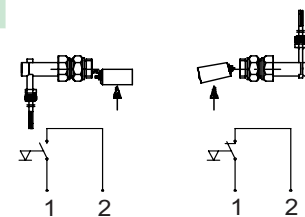
INSTALLATION POSITION



Installation position may influence operation!

ELECTRICAL DATA

reed switch
wiring 0.225 n.c. or n.o. depending
on installation position
230 V AC 1 A 50 VA
cable 1.5m
protection class IP 65



METERING SUBSTANCES



water



oil

design stainless steel
NW1-020HK
for aggressive liquids

NOMENCLATURE

MW1-	020	H	M		Beispiel
		H			Beschreibung
			M		● socket thread G3/4A
			K		● brass design
					● stainless steel design
Programme option				A	○ switch ATEX (product information 92.1.U1)
BASIC					□ special cable length
Special option					□ float ball PVDF
VARIO					

All technical changes reserved

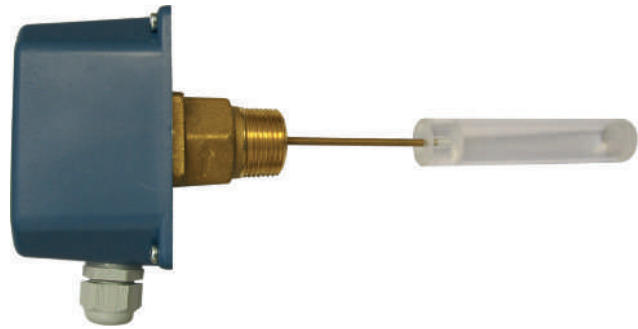
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Level Switch for liquids. A bellow-supported float triggers mechanically an adjustable micro switch.

- * high switch capability
- * wall mounting
- * reliable
- * good repeatability

Male thread R1" brass

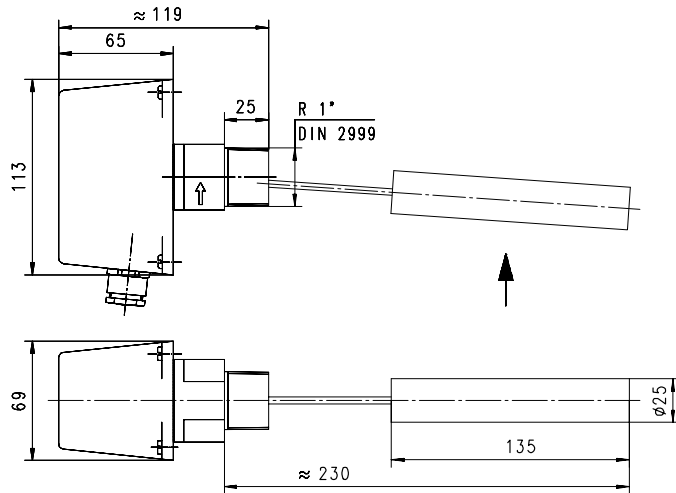


CWE-025HM

TECHNICAL DATA

	R	Type	liquid density g/cm ³	PN bar	L mm	weight kg
brass	R1"	CWE-025HM	≥0.9	11	232	0.8

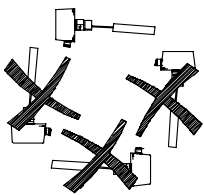
media temperature max. 85°C



MATERIALS

socket	brass Ms58
wetted parts	brass Ms58
float	polycarbonate
bellow	tombak
cap	ABS
plate	steel zinc coating

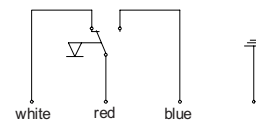
MOUNTING POSITION



Installation position may influence operation!

ELECTRICAL DATA

micro switch - wiring 0.391 change over
250 V AC 15(8) A
cable gland M20
protection class IP 65



METERING SUBSTANCES



NOMENCLATURE

CWE-	025	H	M	basic type specification
		H		● connection thread DN25 - R1"
			M	● brass design
Special option VARIO				□ gold contacts 125 V AC / 1 A

All technical changes reserved

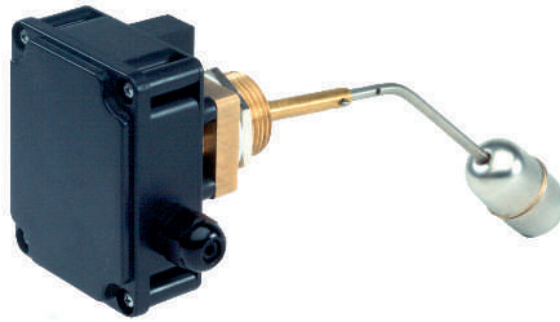
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Level Switch for liquids with magnetic triggering of an adjustable micro switch.

- * temperature 180°C
- * high switch capability
- * 2 micro switch, change over
- * wall mounting
- * reliable
- * good repeatability

Male thread G1A brass

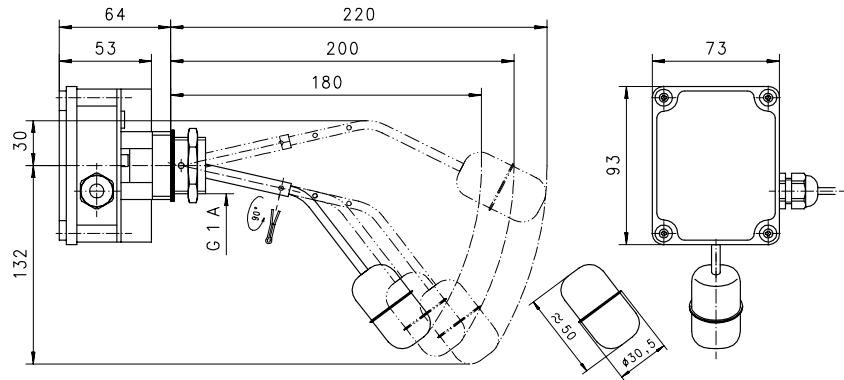


TECHNICAL DATA

MWI-025HM

	G	Type	liquid density g/cm ³	PN bar	hysteresis mm	weight kg
brass	G 1 A	MWI-025HM	≥0.7	15	20 - 30	1.3

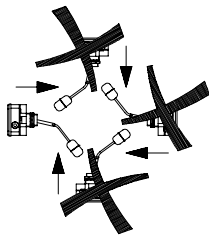
media temperature max. 180°C



MATERIALS

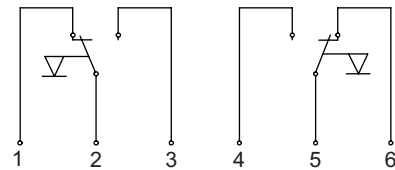
housing brass Ms58
float stainless steel 1.4571

MOUNTING POSITION

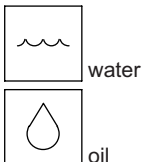


ELECTRICAL DATA

2 micro switch
wiring 0.392 change over
250 V AC 5 A
cable gland Pg 9
protection class IP 65



METERING SUBSTANCES



NOMENCLATURE

MWI-	025	H	M	basic type
		H		● specification
			M	● socket thread G1A
				● brass design

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Level Switch for liquids. In a transparent housing the magnet-equipped float follows the actual level of the liquid and magnetically triggers a reed switch in an identified and fixed position. Designed for bypass mounting.

- * level differences in bypass
- * reliable
- * good repeatability

Female thread 1/2"NPT aluminium



NG-015GA1

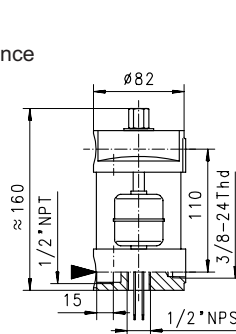
TECHNICAL DATA

	NPT	Type	liquid density g/cm ³	PN bar	weight kg
aluminium	1/2"NPT	NG-015GA1	≥0.8	8	0.8
		NG-015GA2	>0.8	8	0.9

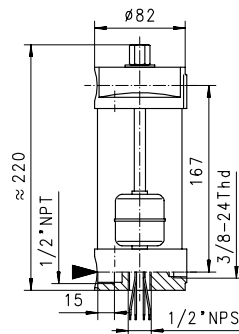
media temperature max. 75 °C
switch point 55mm middle thread entrance
ON (NG-015GA1)
NG-015GA2 see sketch

MATERIALS

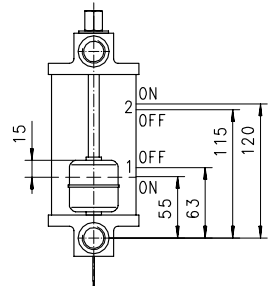
body aluminium
float stainless steel
glass acrylic
seal NBR



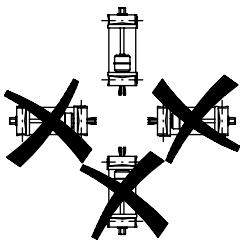
NG-015GA1



NG-015GA2

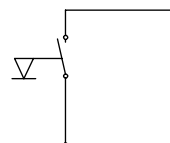


MOUNTING POSITION

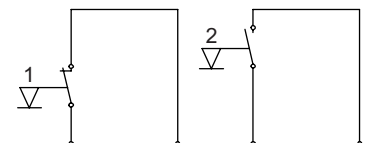


ELECTRICAL DATA

reed switch
leads 0.5 metre
120 V AC 0.4 A
140 V AC 0.2 A
24 V DC 1.0 A
120 V DC 0.4 A
220 V DC 0.2 A
protection class IP 65

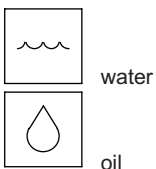


NG-015GA1
wiring 0.372



NG-015GA2
wiring 0.292

METERING SUBSTANCES



NOMENCLATURE

NG-	015	G	A	1	basic type specification
		G			● female thread
			A		● aluminium
				1	● 1 switch point
				2	● 2 switch points

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Level Indicator for liquids. In a sight glass a float optically indicates the actual level.

- * top assembly
- * direct indication

Male thread G3/8A brass



NBS-010HM080

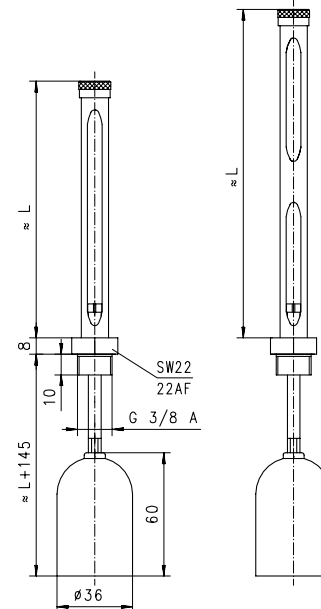
TECHNICAL DATA

media temperature	max. 50°C
weight	95g (NBS-010HM040) 195g (NBS-010HM300)

length 40-200

from length 250

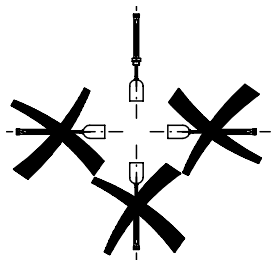
vent hole
in the cover



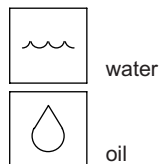
MATERIALS

body	brass
tube	natural glass
sight ring	PVC
rod	acrylic
float	spansil
buffer	NBR

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

NBS-	010	H	M	040	basic type specification
	010				● connection thread G3/8A
		H			● socket thread
			M		● brass
				040	● length 40 mm
				060	● length 60 mm
				080	● length 80 mm
				100	● length 100 mm
				125	● length 125 mm
				150	● length 150 mm
				200	● length 200 mm
				250	● length 250 mm
				300	● length 300 mm
Special option VARIO					□ length 50,70,90,175 and >300 mm connection thread G1/2A

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Level Indicator which displays the actual level directly in a tube shaped glass compartment.

- * no moving parts
- * wall mounting or top assembly

Male thread G3/8A brass



NA-010HM125



NB-010HM125

TECHNICAL DATA

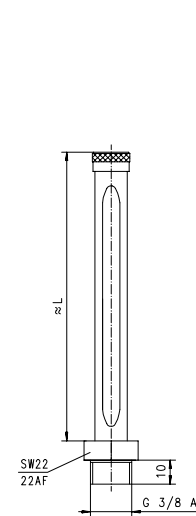
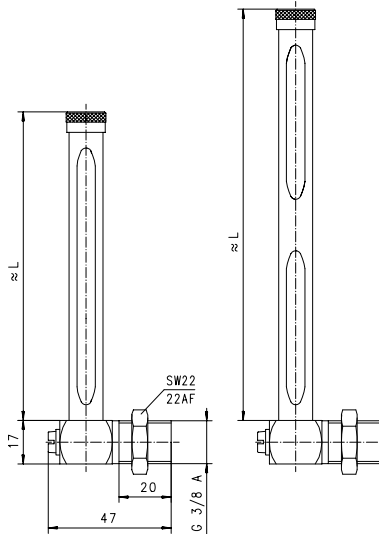
media temperature
weight

max. 80°C
90 g (NA-010HM040)
130 g (NA-010HM300)

NA-
length 40-200 from length 250

NB-
length 40-200 from length 250

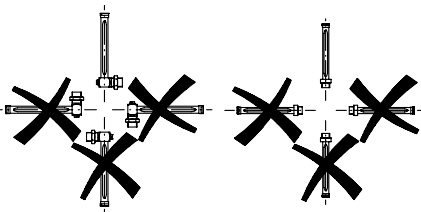
vent hole
in the cover



MATERIALS

body brass
tube natural glass

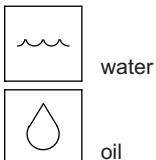
MOUNTING POSITION



NOMENCLATURE

NA-	010	H	M	040	basic type specification
NA-					● straight connect
NB-					● angled connect
	010				● connection thread G3/8A
		H			● socket thread
			M		● brass
				040	● length 40 mm
				060	● length 60 mm
				080	● length 80 mm
				100	● length 100 mm
				125	● length 125 mm
				150	● length 150 mm
				200	● length 200 mm
				250	● length 250 mm
				300	● length 300 mm
Special option VARIO					□ length 50,70,90,175 and >300 mm connection thread G1/2A

METERING SUBSTANCES



All technical changes reserved

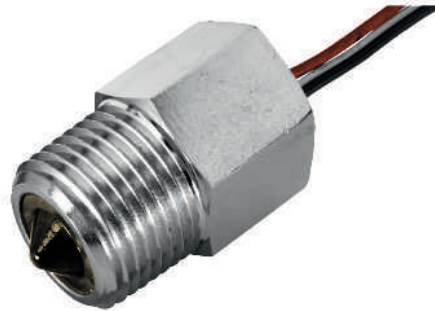
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The electro optical sensor consists of a robust metal housing and a fused glass prism which contains an infrared LED and a light receiver. When rising liquid immerses the prism the light is refracted out into the liquid leaving little or no light to reach the receiver. Sensing this change the receiver actuates electronic switching within the unit to operate an external alarm unit.

- * small size
- * solid state integrated electronics
- * no moving parts
- * simple installation

Male thread 1/2" NPT steel/stainless steel

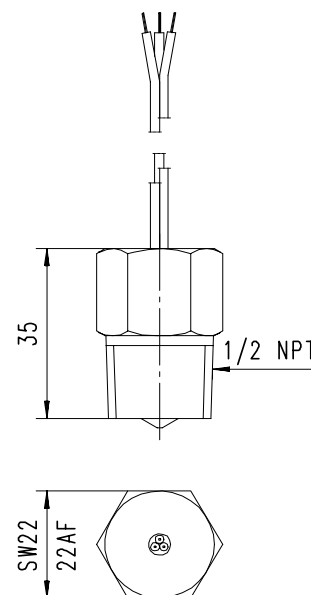
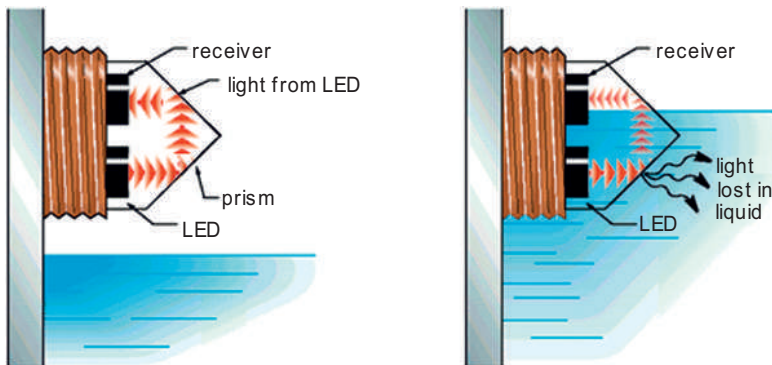


NL-015AKT05

TECHNICAL DATA

	NPT	Type	input power VDC	function	PN bar	media temperature °C *	repeat accuracy	weight g
steel	1/2" NPT	NL-015HST05	5	wet - signal when sensor has no contact to liquid	160	-40 .. 100	±1mm	75
		NL-015HST24	24	dry - signal when sensor has no contact to liquid	160	-40 .. 100	±1mm	75
		NL-015HSN05	5	wet - signal when sensor has contact to liquid	160	-40 .. 100	±1mm	75
		NL-015HSN24	24	dry - signal when sensor has contact to liquid	160	-40 .. 100	±1mm	75
s.s.	1/2" NPT	NL-015HKT05	5	wet - signal when sensor has no contact to liquid	160	-40 .. 100	±1mm	75
		NL-015HKT24	24	dry - signal when sensor has no contact to liquid	160	-40 .. 100	±1mm	75
		NL-015HKN05	5	wet - signal when sensor has contact to liquid	160	-40 .. 100	±1mm	75
		NL-015HKN24	24	dry - signal when sensor has contact to liquid	160	-40 .. 100	±1mm	75

* except freezing liquids

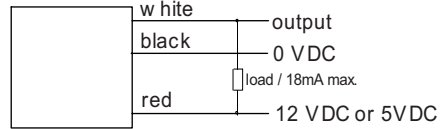


MATERIALS

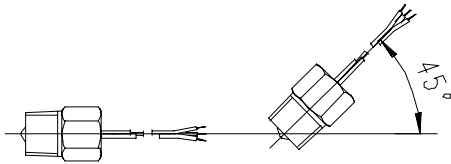
	NL-015HS.	NL-015HK.
body	steel nickel plated	stainless steel
glass	fused glass	fused glass

ELECTRICAL DATA

current consumption ca. 45 mA
 input power 5 VDC or 24 VDC (optional 12 VDC)
 output NPN open collector
 transistor output whit 10K pull up resistor
 may sink 18 mA max.
 wires 300mm
 protection class IP 64



MOUNTING POSITION



METERING SUBSTANCES



water



oil



design stainless steel
for aggressive liquids

functional limit

- crystalline liquids
- reflecting surfaces nearer than 50 mm
- freezing liquids (temperature range)

NOMENCLATURE

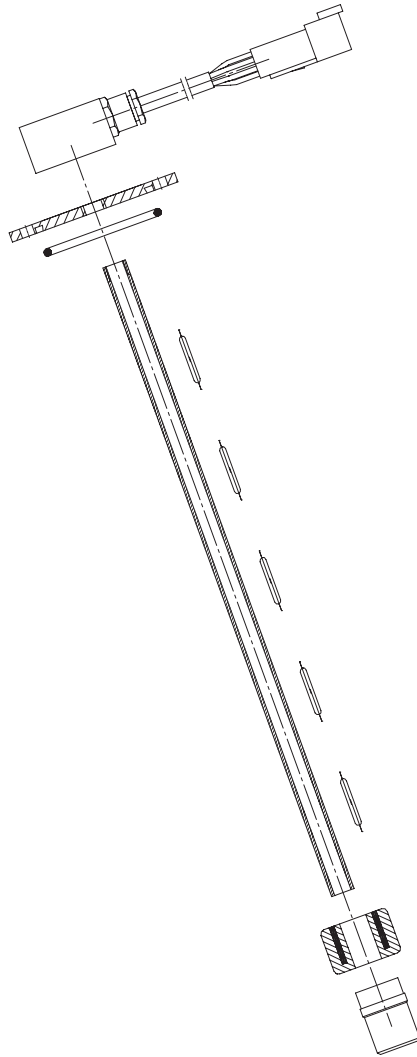
NL-	015	HS	T	05	basic type specification
	015				● male thread 1/2" NPT
		HS			● connection thread steel nickel plated
		HK			● connection thread stainless steel
			T		● wet - signal when sensor has no contact to liquid
			N		● dry - signal when sensor has contact to liquid
				12	○ 12 VDC
				24	● 24 VDC

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

Why to use a **HONSBERG BASIC** level instrument

**info
point**



- **Fully sealed enclosure** → **IP67**
- **Various electrical connectors** → **versatility**
- **Probe length 100 - 5000 mm** → **wide application**
- **contact structure alarm, reed chain, additional temperature sensor** → **combination of controls in one instrument**
- **Float symmetry and material** → **adjustment to low densities**

Where to use a **HONSBERG** BASIC level instrument

**info
point**

Market segments

- **Earth movers**
- **Air conditioners**
- **Motor technology**

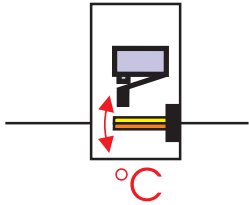


Application

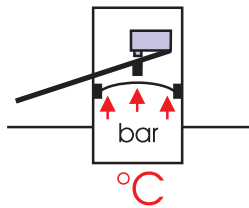
- **Level control of water, oil and gasoline tanks in construction machines**
- **Level control of condensate**
- **Level control of food oils**

Temperature

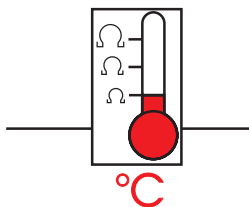
The technology



A **bimetal** element is triggered when a pre-set temperature threshold is reached.



A **diaphragm** with adjustable characteristic allows adjustable temperature control.



A **platinum resistance sensor [PT100/1000]** produces a linear temperature-dependent signal.

Application

- Temperature monitors and transmitters are used in wide areas of industrial plant construction as safety components to prevent prescribed operating temperatures being undercut or exceeded or as metering devices for the continual recording of temperature developments in processes.

Advantages

- Simple yes/no monitoring
- Extremely accurate temperature measurement

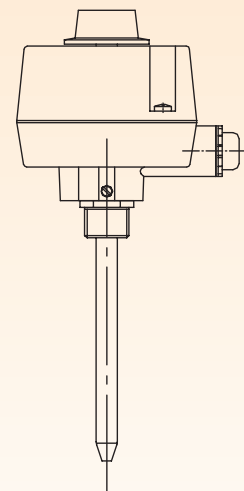
Technical data

Concept	Built-in housing
Connection:	Screw-in thread G1/2A to G3/4A, R1/2"
PN	16 - 200
Max. temperature	145 °C
Signal	threshold, 4[0]..20 mA
Adjustable	yes
Materials	brass, stainless steel
Installation position	any
Metering materials	liquids or gases



Contents

System description	270
Device descriptions	271



- Switching
- Metering

System description

Device system

Sturdy temperature monitors in brass or stainless steel housings are available for monitoring and metering temperature. Thanks to the stub-connection thread these can be installed directly in the pipeline.

Bimetal

A bimetal switch with a jump characteristic closes or opens when the pre-set temperature has been reached and triggers a threshold signal.

Diaphragm

A temperature probe filled with an expansion fluid is used for devices with an infinitely variable switching point that can be selected via a scale.

As temperature increases this metering material expands and acts on a spring-supported diaphragm which triggers a contact. A spring characteristic is changed via the setting, thus influencing the triggering of the threshold value. Greater preliminary tension makes a greater triggering force necessary which in turn occurs at a higher temperature value.

Platinum resistance sensor

The temperature transmitters comprise a temperature sensor PT100/1000 resistance sensor which shows good dynamic behaviour thanks to the small sensor diameter. The temperature-dependent change in resistance is transformed into a linear output signal 4[0].20 mA by the downstream electronics.

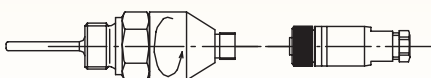
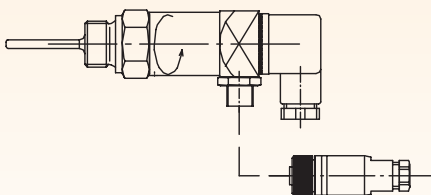
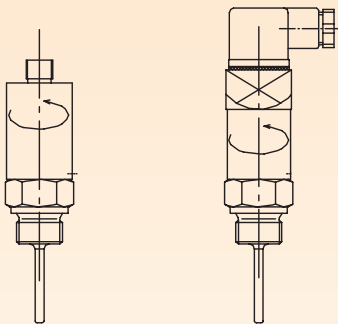
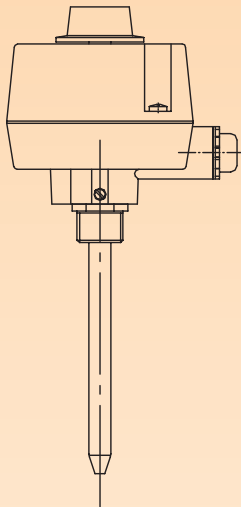
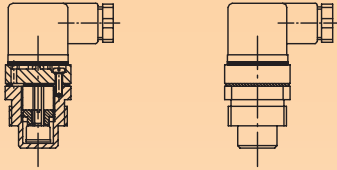
Function and advantages



The devices provide a wide range of problem solutions for temperature monitoring and metering.

The material alternatives brass or stainless steel make their use possible even in aggressive mediums.

Metering materials and accuracy

Both liquids and gases can be considered as metering materials. The tolerances of the monitoring devices are 5K of the final value, in the case of the temperature transmitters 1 % of the final value.

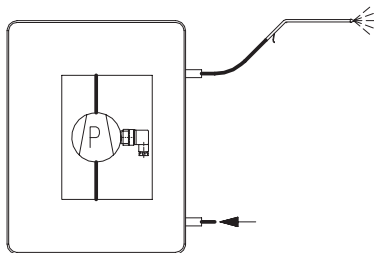
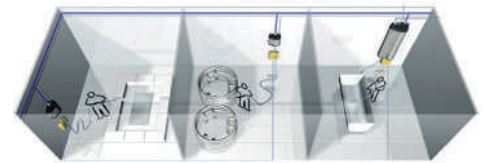


	type	nominal diameter	control	indication	output signal	on site metering	max. pressure bar	max. temperature °C	water	oil	gas/air	aggressive	miscellaneous	page
control	 TF1 male thread brass male thread stainless steel		●				100	140	●	●	●			272
			●				100	140	●	●	●	✓		
	 TR male thread brass		●				16	145	●	●	●		1-2 switch	273
measurement	 ETS male thread stainless steel		○	○	●	○	25	80	●	●	●	✓		274
		 ETSD male thread stainless steel				●		25	80	●	●	●	✓	differential

Honsberg at work

Temperature monitoring of pumps in high-pressure cleaners

Bimetal temperature switch TF1 installed in the pump housing of high-pressure/low-pressure cleaners as overheating protection, adjusted to 105 °C, to switch off if this is exceeded.



● standard ○ standard option □ special option

current data sheets can be found under www.honsberg.com

GENERAL CHARACTERISTICS

A totally sealed bimetal thermostat opens or closes when the pre-fixed switch value is overrated or undercut.

- * optional installation
- * compact dimensions
- * n.o. or n.c. position

Male thread G1/2A brass/stainless steel



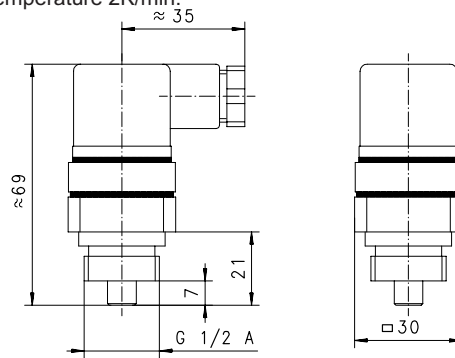
TECHNICAL DATA

TF1-040M015HS

	G	Type	PN bar	switch value °C in increments to 10°	hysteresis K	weight kg
brass	G 1/2 A	TF1-...M015H..	100	40 - 130	10 - 20	0.12
stainless steel	G 1/2 A	TF1-...K015H..	100	40 - 130	10 - 20	0.12

Sensor has to be fully wetted. Switch value is indicated for increasing temperature 2K/min.

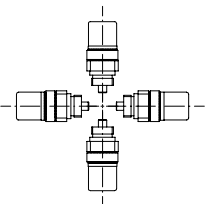
tolerance ±10°K
media Temperature switch value + 50°C



MATERIALS

	TF1-...M015H..	TF1-...K015H..
body	Ms58	1.4305
plug	PA6.6	PA6.6

MOUNTING POSITION

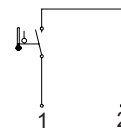


Sensor has to be fully wetted!

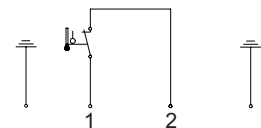
ELECTRICAL DATA

250 V AC 10 A
plug DIN 43650-A
protection class IP 65

wiring 0.212
n.o.



wiring 0.214
n.c.



METERING SUBSTANCES



water



gas/air



oil

NOMENCLATURE

TF1-	040	M	015	H	S	basic type specification
	040					● switch value 40 - 130°C in increments of 10°
	... 130					● brass design
		M				○ stainless steel design
		K				● connection thread G1/2A
			015			○ connection thread G3/4A (36 AF)
			020			● socket thread
				H		● wiring 0.212 n.o.
					S	● wiring 0.214 n.c.
					O	○ diode integrated in plug
Programme option BASIC						

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

The sensor probe contains a metering liquid which expands with increasing temperature and by means of a flexible diaphragm triggers an adjustable micro switch. The adjustment of the micro switch is provided by an external adjustment dial.

- * externally adjustable
- * optional installation

Male thread G1/2A brass

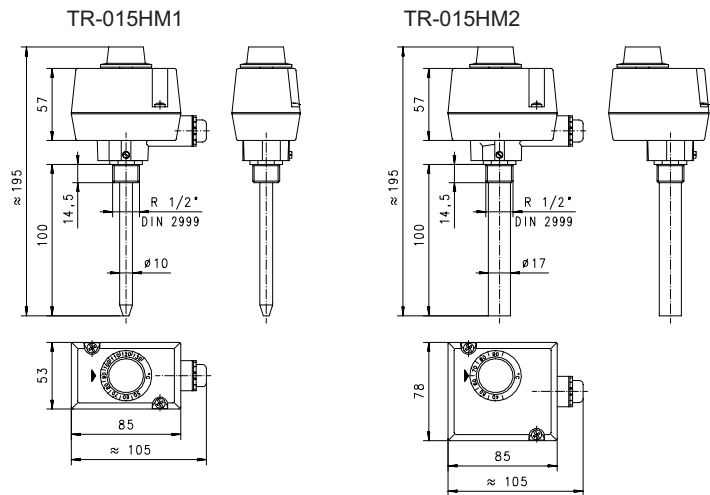


TR-015HM1

TECHNICAL DATA

adjustable range	TR-015HM1	externally adjustable	50 - 130°C
	TR-015HM2	externally adjustable	35 - 95°C
		internally adjustable	50 - 130°C

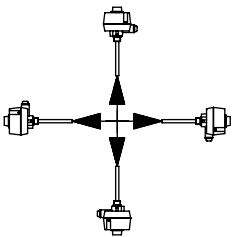
adjustment	in 5°C increments
tolerance	±5°K
pressure	PN 16 bar
media temperature	max. 145°C
ambient Temperature	max. 80°C
hysteresis	TR-015HM1 8K
	TR-015HM2 5K
weight	TR-015HM1 0.3kg
	TR-015HM2 0.5kg



MATERIALS

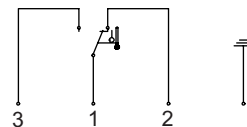
body	brass nickel plated
immersion sleeve	brass nickel plated
probe	copper nickel plated
cap	plastic

MOUNTING POSITION

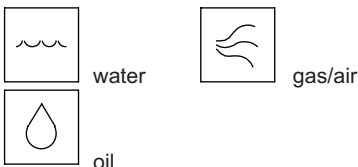


ELECTRICAL DATA

micro switch
wiring 0.342 change over
250 V AC 15 A (8 A inductive)
cable gland Pg13.5
protection class IP 43



METERING SUBSTANCES



NOMENCLATURE

TR-	015	H	M	1	basic type
	015				specification
		H			● connection thread R1/2"
			M		● socket thread
				1	● brass design
				2	● 1 contact
					● 2 contacts
Programme option BASIC					○ length of probe 200mm switch range on request
					probe stainless steel 1.4301
					protection class IP 54

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The Temperature Transmitter consists of a PT100 resistance sensor with very good dynamic behavior due to the small diameter of the measurement probe. The change in resistance generated by temperature is converted to a 4..20 mA signal proportional to temperature by the linearised electronic. As the sensor is supplied with < 4 mA a double wire connection could be realised. At the same time this type of sensor can be employed as an open circuit monitor.

The temperature probe is welded to the threaded housing. Because the whole upper housing can be rotated, you can orientate your cable connection in any position subsequent to final assembly.

- * 4..20 mA double wire transmitter
- * small probe dimensions
- * fast response time
- * rotating plug connection (infinitely variable)

male thread G1/2A stainless steel



TECHNICAL DATA

range	0..100°C
option	temperature <0°C
accuracy	1% FS
dynamics (τ)	5 s
operating pressure	max. 25 bar
operating temperature	max. 80°C (with "goose-neck" max. 250°C)
operating temperature of the electronic	0..80°C
weight	0.2kg

MOUNTING

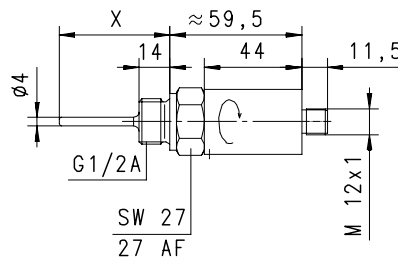
The sensors are installed with appropriate sealing (Teflon tape or triplex etc.) in a connection piece or a T-piece of the pipe. To tighten the sensor please use only the hexagonal key provided (AF27mm). The tip of the probe should be completely surrounded by the medium when in use. Please avoid installing in high temperature sites where the sensor housing is exposed to the convected heat of the pipe.

After sealing, you can turn the sensor into the correct cable input position. An over turn security limits the turn range to nearly 360°.

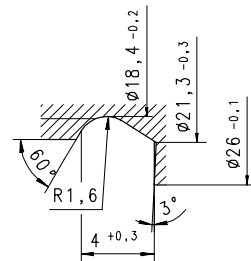
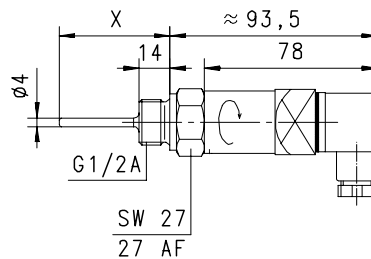
MATERIALS

temperature probe stainless steel 1.4571
other materials brass nickel plated, PP

with connection at locking plugs M12x1, 4pole

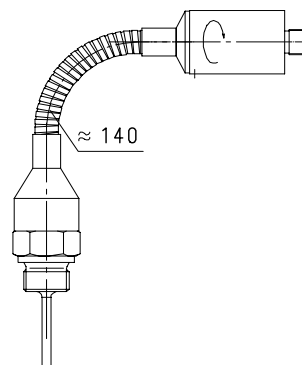


with plug DIN 43650-A



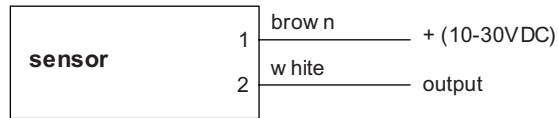
recess
DIN 3852 Bl.2

"goose-neck" option for higher temperatures



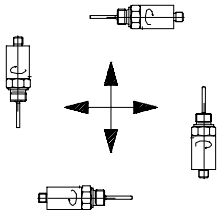
ELECTRICAL DATA

supply voltage	10..30 V DC ±10%
analogue output	4..20 mA
max. load	700W at 24 V (100W at 10V - 1K at 30V, linear to the operation voltage)
connection	for locking plug M12x1, 4pole or plug DIN 43650-A
protection class	IP 67 locking plug IP 65 plug DIN 43650-A

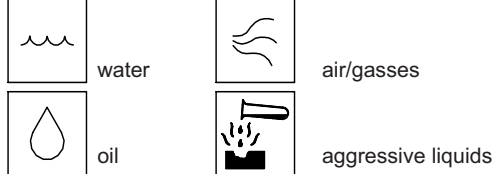


Before carrying out the electrical installation, make sure that the supply voltage corresponds to the data specification.

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

ETS-	100	K	015	B	050		basic type specification
	100						● range 0 - 100 °C
	250						○ range 0 - 250°C only with "goose-neck"
		K					● probe stainless steel 1.4571
			015				● connection G1/2A
				S			● connection at locking plugs M12x1, 4-pole
				B			● plug DIN 43650-A
					050		● probe length 50 mm
					100		● probe length 100 mm
					150		● probe length 150 mm
					200		● probe length 200 mm
						H	○ with goose-neck

ACCESSORY

Locking plug M12x1

K	PU-	02	S	G	basic type specification
K					● ready-made cable
KB04					● self makable cable 4-pole
	PU-				● material PUR
		02			● length 2 m
		05			● length 5 m
		10			● length 10 m
			S		● moulded-on plug
				G	● straight plug
				W	● angled plug 90°



COMBINATIONS

omni-T

local electronic unit,
2xNPN and PNP switch
4(0)..20mA output
graphical LCD display
with flashing LED
program ring



Flex-T

switch- or frequency output
0..10V or 4..20mA
PNP, NPN

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Measurement of differential temperature between two operating sites with lowest possible installation expense and a 4..20 mA two wire system which is complying to industrial standards. The sensing elements T1 and T2 measure the temperature at each location by a platinum resistance sensor at the same time. T1, as well as recording temperature, includes electronics which build up the differential of both temperatures (T1-T2) and emits this via a current amplifier as a proportional 4..20 mA signal. Two different characteristic curves are available as a standard. The electronic circuit involves a total of < 4 mA, so that a two wire system can be used.

- * simple recording of differential temperature
- * self assembly connectors
- * large distance possible between two sensing elements
- * variable rotating plug connection
- * different characteristic curves possible

Außengewinde G1/2A Edelstahl

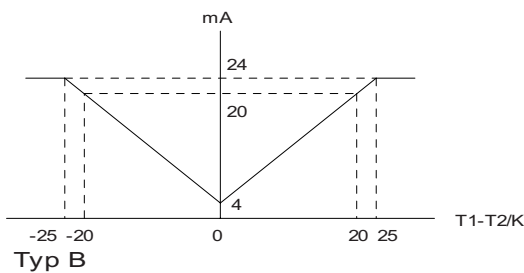


TECHNICAL DATA

differential temperature	T1-T2: 20, 30 or 50 Kelvin
accuracy	±1 Kelvin
transient time	2 min
max. pressure	max. 25 bar
operating temperature for electronics	0..80°C
measurement range T1	-20..80 °C optional -20..120 °C (goose-neck)
measurement range T2	-20..120 °C
weight	0.45kg

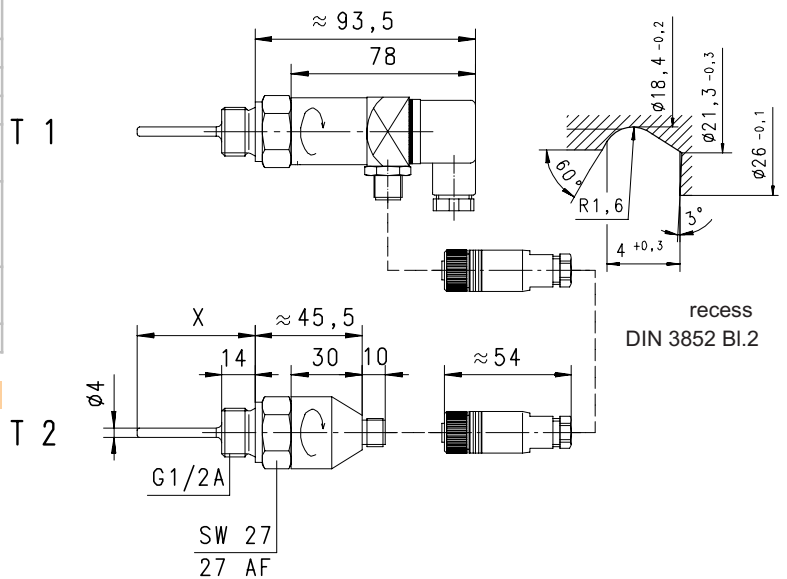
CHARACTERISTIC CURVES

Examples for measurement range 20 Kelvin differential temperature
Typ A

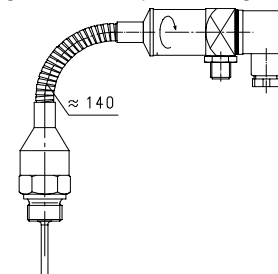


MATERIALS

temperature probe stainless steel 1.4571
other materials brass nickel plated, PP



"goose-neck" option for higher temperatures



MOUNTING

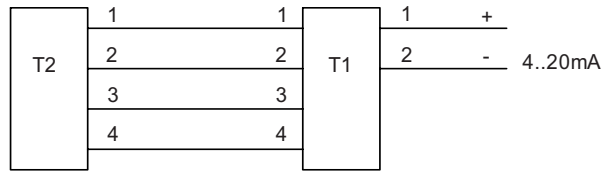
By means of the enclosed Sikurit seals the sensors are tightened into the T piece of the pipe. Please only use the hexagonal head for tightening! Take care to locate the tip of the sensing device fully into the flow area and avoid direct contact to pipe wall. Accordingly the upper part of the sensor with the plug connectors can be turned to any position in order to orientate proper with the cable connectors.

ELECTRICAL DATA

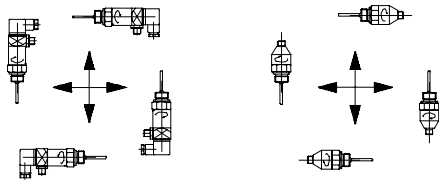
supply voltage	15..30 V DC
analogue output	4..20 mA (2-wire)
reverse polarity proof	yes up to 25V (pin 1..4) up to 40V (pin 1 and 2)
short circuit proof	yes
connection	plug DIN 43650-A
protection class	IP 65

locking plugs M12x1

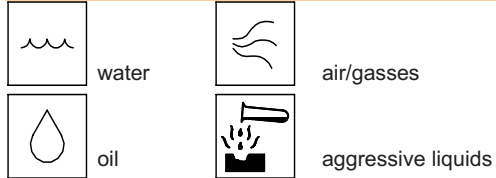
plug DIN 43650-A



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

ETSD1-	04-	020	K	050	A	basic type specification
ETSD1-						reference temperature sensor T1
	04-					difference 0 K corresponds with 4mA
		020				difference 20 K corresponds with 20mA
		030				difference 30 K corresponds with 20mA
		050				difference 50 K corresponds with 20mA
			K			material medium contact stainless steel 1.4571
				028		sensor length 28 mm
				029		sensor length 29.6 mm
				045		sensor length 45 mm
				050		sensor length 50 mm
				100		sensor length 100 mm
				150		sensor length 150 mm
				200		sensor length 200 mm
					A	characteristic curve type A
					B	characteristic curve type B
					H	option goose-neck

ETSD2-	K	050	basic type specification
ETSD2-			reference temperature sensor T2
	K		material medium contact stainless steel 1.4571
		028	sensor length 28 mm
		029	sensor length 29.6 mm
		045	sensor length 45 mm
		050	sensor length 50 mm
		100	sensor length 100 mm
		150	sensor length 150 mm
		200	sensor length 200 mm

For a complete temperature difference test station, sensor ETSD1 and ETSD2 must be ordered !
Attention! Use ETSD1 and ETSD2 with pairing serial number only.

ACCESSORIES

display connects with switch point GIA-0420VO product information 91.1.GIA.VO

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

Why to use a **HONSBERG** BASIC INDUSTRIAL FLUIDCONTROL temperature instrument



- **Versatile sensor configurations, variety of applications**
- **Fixed or selectable switch point**
- **Rugged stainless steel enclosures**
- **Variety of electrical connectors**

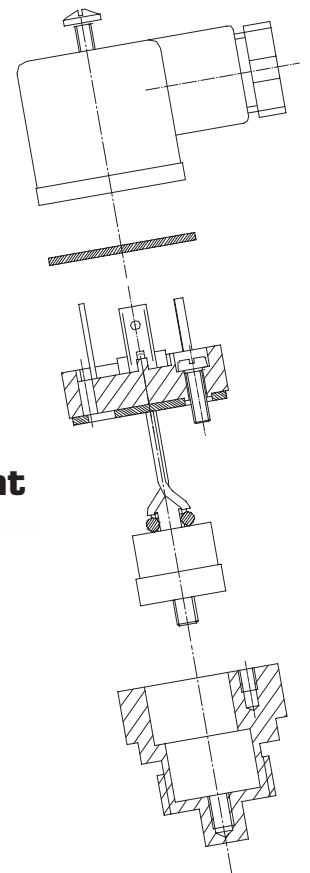
Where to use a **HONSBERG** BASIC INDUSTRIAL FLUIDCONTROL temperature instrument

Market segments

- **Pumps**
- **Gears**
- **Lubrication**
- **Water circuits**

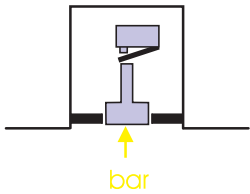
Application

- **Overheat protection in pumps**
- **Maximal temperature control in gears**
- **Continuous temperature monitoring in machine tools**

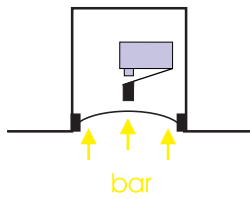


Pressure

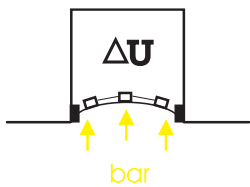
The technology



A **piston** moves dependent on pressure and transfers this movement to adjustable contacts.



A **diaphragm** moves dependent on pressure and transfers this movement to adjustable contacts.



A **piezoresistive strain relief** element produces a pressure-dependent linear output signal either as an open ceramic sensor or as a closed flush design.

Application

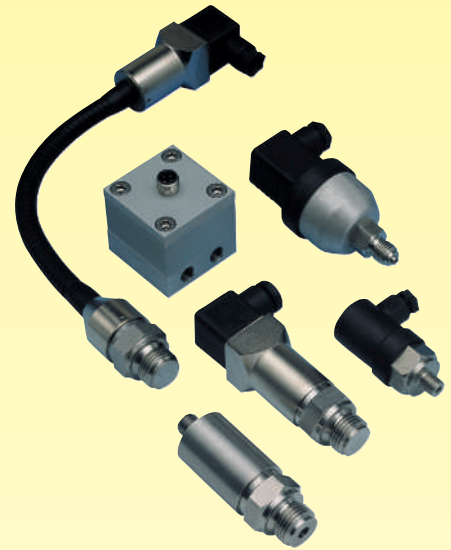
- Pressure transmitters take over complex metering tasks in pressure management and processes e.g. pressure-dependent valve control.

Advantages

- Tried and tested technology in pressure monitoring and material
- Direct evaluation of contact and sensor signals

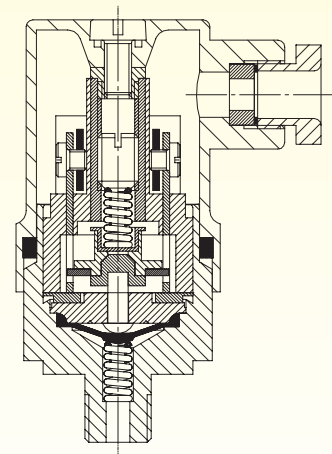
Technical data

Concept	built-in housing
Connection	screw-in thread R1/8 to R1/4, G1/8A to G1/2A
PN	0.3 - 600
Max. temperature	125 °C
Signal	threshold, 4[0]..20 mA, switch
Adjustable	yes
Materials	brass, stainless steel
Installation position	any
Metering materials	liquids or gases



Contents

System description	280
Device descriptions	281



- Switching
- Metering

System description

Device system

Sturdy devices made of brass and stainless steel are available for monitoring and metering pressure and are installed directly into the pipework thanks to a stub-connection thread. Pressure is applied to a diaphragm or a piston in the case of the higher pressure ranges, which move a certain defined path against spring force. This leads to a switch being triggered when the pre-set threshold has been reached.

Pressure transmitters work according to the tried and trusted system of strain gauge with piezoresistive sensor structure. Integrated linearized electronics produce pressure-related linear outputs of 4[0]..20 mA.

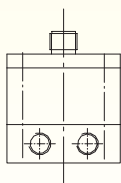
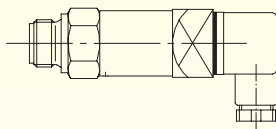
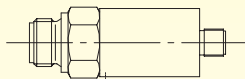
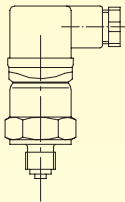
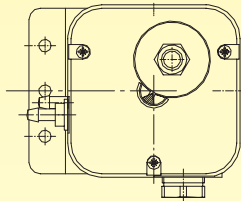
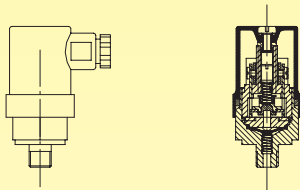
Brass and stainless steel materials allow possible applications even with critical metering materials.








Function and advantages

The devices represent an economical possibility of monitoring and metering pressure in a sturdy structure and with high excess pressure protection.

Metering materials and accuracy

Both liquids and gases can be considered as metering materials. In relation to the monitoring ranges, the tolerances of the monitoring devices are an average 0.5 bar. The metering devices work in an accuracy range of 1 % of the final value.

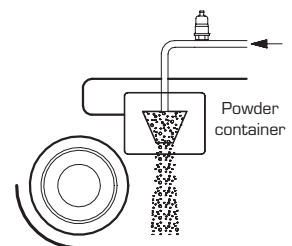


	type	nominal diameter	control	indication	output signal	on site metering	max. pressure bar	max. temperature °C	water	oil	gas/air	aggressive	miscellaneous	page	
control		PH male thread brass	●				30	60	●	●	✓			282	
		male thread steel	●				300	60	●	●	✓				
		male thread stainless steel	●				300	60	●	●	✓	✓			
	PM	male thread brass	●				30	60	●	●	✓			282	
		male thread steel	●				300	60	●	●	✓				
		male thread stainless steel	●				300	60	●	●	✓	✓			
	PI	male thread aluminium	●				600	60	●	●	✓			284	
	VP	male thread steel	●				20	60	●	●	✓		vacuum	285	
		male thread stainless steel	●				20	60	●	●	✓		vavuum		
	MD	nozzle	●				0,3	60			●		differential	286	
measurement		PS male thread stainless steel			●		200	125	●	●	✓			287	
			EPS male thread stainless steel	○	○	●	○	600	80	●	●	✓	✓		
			EPS1 male thread stainless steel	○	○	●	○	400	80	●	●	✓	✓		
			EDP1 female thread stainless steel	○	○	●	○	400	85	●	●	✓	✓		differential

Honsberg at work

Dosing powdered material in printing machines

In printing machines, the printed sheets are covered with a fine layer of powder to prevent them sticking to one another during stacking. The powder material is sprayed by an air carrier, whereby the pressure ratios are decisive for the homogeneity and thickness of the powder layer. In this process, Honsberg PM pressure switches are responsible for homogenous pressure data in the 0.8 bar range and a permissible tolerance of ± 0.1 bar



K

● standard ○ standard option □ special option

current data sheets can be found under www.honsberg.com

GENERAL CHARACTERISTICS

Mechanical Pressure Switch for liquids or gaseous media. A diaphragm (low pressure) or piston (high pressure) is pre-triggered via spring with the possibility to change the spring characteristic. During the modification a switch value can be selected within a certain range.

- * good repeatability
- * high pressure
- * low hysteresis

Male thread R1/8" brass/stainless steel/steel



PM-002K004HS



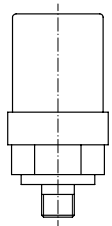
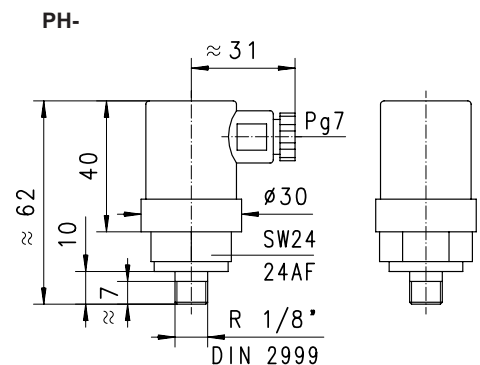
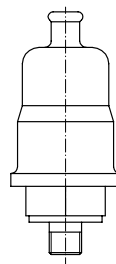
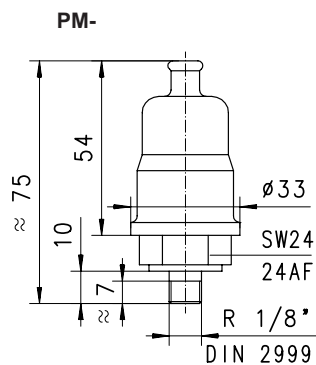
PH-002M004HS

TECHNICAL DATA

	R	Type	PN bar	adjustable range bar (rel.)	tolerance (25°C) bar	hysteresis (25°C) bar	operation principle	weight kg
brass	R1/8"	P.-002M004H.	80	0.15- 2	±0.2	0.15	diaphragm	0.08
		P.-010M004H.	80	2 - 10	±0.3	0.2	diaphragm	
steel	R1/8"	P.-020S004H.	300	10 - 20	±0.4	0.3	diaphragm	0.08
		P.-050S004H.	300	20 - 50	±1.0	0.8	diaphragm	
		P.-080S004H.	300	50 - 80	±2.0	5.5	diaphragm	
		P.-150S004H.	300	50 - 150	±5.0	10	piston	
stainless steel	R1/8"	P.-002K004H.	80	0.15- 2	±0.2	0.15	diaphragm	0.08
		P.-010K004H.	80	2 - 10	±0.3	0.2	diaphragm	
		P.-020K004H.	150	10 - 20	±0.4	0.3	diaphragm	
		P.-050K004H.	150	20 - 50	±1.0	0.8	diaphragm	
		P.-080K004H.	150	50 - 80	±2.0	5.5	diaphragm	
		P.-150K004H.	150	50 - 150	±5.0	10	piston	

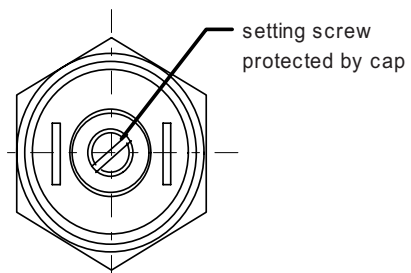
Adjustable range is indicated for increasing pressure.

media temperature max. 60°C



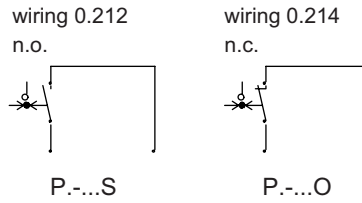
MATERIALS

	P.-002M to P.-010M	P.-020S to P.-150S	P.-...K..
body	brass	steel	stainless steel
diaphragm	NBR	NBR	NBR
piston	-	NBR	NBR
spring	s.s. 1.4310	s.s. 1.4310	s.s. 1.4310
cap /Typ PM	NBR	NBR	NBR
cap /Typ PH	nylon	nylon	nylon

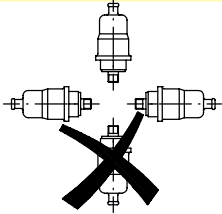


ELECTRICAL DATA

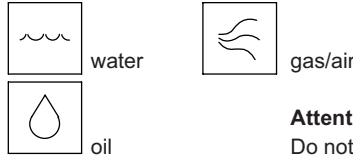
mechanical switch
48 V AC 0.5 A (0.2A inductive)
Typ PM- : plug 6.3 DIN 46224 form A
protection class IP 54
Typ PH- : induction clamp
protection class IP 65



MOUNTING POSITION



METERING SUBSTANCES



Attention!
Do not use steel
body for water

NOMENCLATURE

For combinations see table "technical data"

PM-	002	M	004	H	S	basic type specification	
PM-						● pressure switch with rubber cap	
PH-						● pressure switch with plastic cap	
	002					● adjustable range 0.15 - 2 bar (rel.) 2 - 10 bar (rel.) 10 - 20 bar (rel.) 20 - 50 bar (rel.) 50 - 80 bar (rel.) 50 - 150 bar (rel.)	
	010						
	020						
	050						
	080						
	150						
		M					● brass design (only 2 to 10 bar)
		S				● steel design (only 20 to 150 bar)	
		K				● stainless steel design	
			004			● connection thread R1/8"	
				H		● socket thread	
					S	● wiring 0.212 n.o.	
					O	● wiring 0.214 n.c.	
Programme option BASIC						□	mebran viton

All technical changes reserved

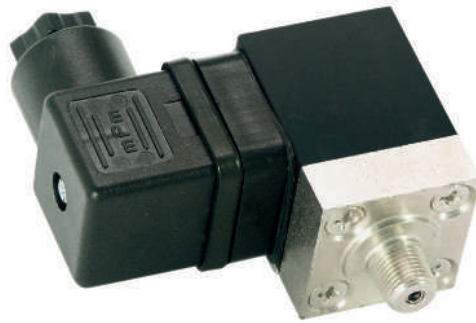
●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Mechanical Pressure Switch for liquids and gaseous media. A diaphragm (low pressure) or a piston (high pressure) is pre-triggered via spring with the possibility to change the spring characteristic. During this modification a switch point can be selected within a certain range.

- * compact dimensions
- * good repeatability

Male thread R1/8" to R1/4" aluminium



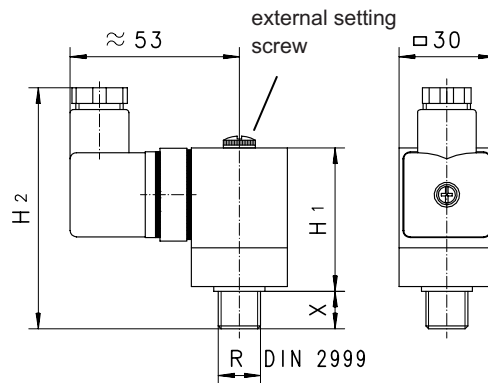
TECHNICAL DATA

PI-300A008H

	R	Type	PN bar	adjustable range bar (rel.)	tolerance (25°C) bar	operation principle	H ₁ mm	H ₂ mm	X mm	weight kg
aluminium	R1/8"	PI-005A004H	60	0.2 - 5	±0.1	diaphragm	44	75	10	0.10
		PI-010A004H	100	0.5 - 10	±0.2					
		PI-025A004H	100	10 - 25	±0.5					
		PI-080A004H	150	25 - 80	±1.0					
	R1/4"	PI-150A008H	600	30 - 150	±7.0	piston	46	78	12	0.22
		PI-300A008H	600	150 - 300	±7.0					

Adjustable range is indicated for increasing pressure.

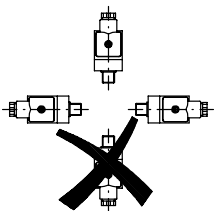
media temperature max. 60°C
hysteresis <30% from switch value



MATERIALS

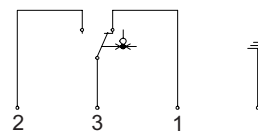
body aluminium
diaphragm NBR
piston brass
spring stainless steel 1.4310

MOUNTING POSITION



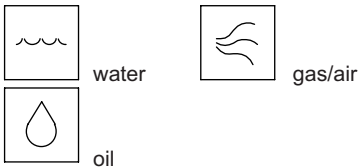
ELECTRICAL DATA

mechanical switch
wiring 0.280 change over
250 V AC 3A (2A inductive)
plug DIN 43650-A
protection class IP 65



For combinations see table "technical data".

METERING SUBSTANCES



NOMENCLATURE

PI-	005	A	004	H	basic type specification	
	005				adjustable range	0,2 - 5 bar (rel.)
	010					0,5 - 10 bar (rel.)
	025					10 - 25 bar (rel.)
	080					25 - 80 bar (rel.)
	150					30 - 150 bar (rel.)
	300					150 - 300 bar (rel.)
		A				aluminium
			004			connection thread R1/8"
			008			connection thread R1/4"
				H		socket thread

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Vacuum Pressure Switch for liquids or gaseous media. A diaphragm is pre-triggered via spring with the possibility to change the spring characteristic. During this modification a switch point can be selected within a certain range.

- * up to 0,2bar
- * good repeatability
- * compact dimensions
- * low hysteresis

Male thread R1/8" stainless steel/steel

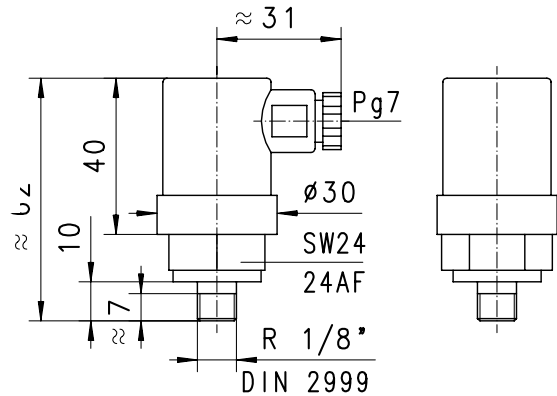
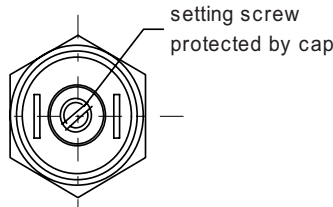


TECHNICAL DATA

VP-900S004HS

	R	Type	PN bar	adjustable range mbar	tolerance (25°C) mbar	hysteresis (25°C) mbar	weight kg
steel	R1/8"	VP-900S004H.	20	200 - 900	±50	20	0.07
stainless steel	R1/8"	VP-900K004H.	20	200 - 900	±50	20	0.07

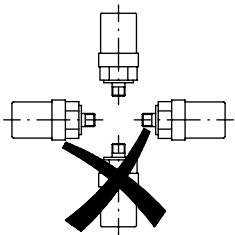
media temperature max. 60°C



MATERIALS

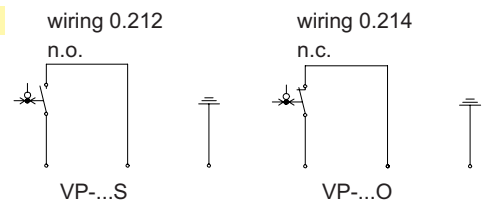
	VP-900S004H.	VP-900K004H.
body	steel	stainless steel
diaphragm	NBR	NBR
spring	s.s. 1.4310	s.s. 1.4310
cap	nylon	nylon

MOUNTING POSITION



ELECTRICAL DATA

mechanical switch
48 V AC 0.5 A (0.2A inductive)
induction clamp
protection class IP 65



METERING SUBSTANCES



water



gas/air



oil

Attention!
Do not use steel body for water

NOMENCLATURE

VP-	900	A	004	H	S	basic type specification
	900					● adjustable range 200 - 900 mbar
		S				● steel design
		K				● stainless steel design
			004			● connection thread R1/8"
				H		● socket thread
					S	● wiring 0.212 n.o.
					O	● wiring 0.214 n.c.

All technical changes reserved

IBASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

A diaphragm triggers a contact while reaching the pressure or differential pressure value selected. The switch point is adjusted by means of a calibrated dial which is arranged below the transparent cap.

- * optional installation
- * good repeatability
- * low pressure ranges

Nozzle Ø6,2 ABS



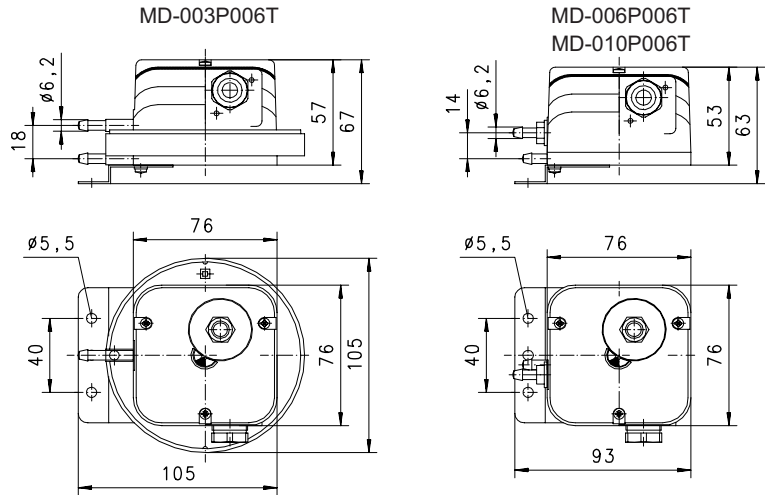
MD-006P006T

TECHNICAL DATA

	DN	Type	PN bar	adjustable range mbar (rel.)	hysteresis mbar	weight kg
ABS	6	MD-003P006T	0.15	0.2 - 3	0.1 - 0.15	0.30
		MD-006P006T	0.3	0.4 - 6	0.2 - 0.30	0.25
		MD-010P006T	0.3	1.0 - 10	0.2 - 0.35	0.25

Adjustable range is indicated for increasing pressure and vertical installation.

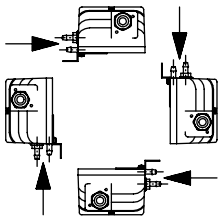
media temperature tolerance max. 80°C
±10%
of selected switch value



MATERIALS

body ABS
diaphragm NBR

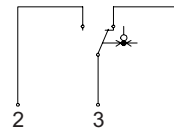
MOUNTING POSITION



Attention! During horizontal installation the selected switch point is reduced or extended by 0.2 mbar.

ELECTRICAL DATA

mechanical switch gold contact
wiring 0.280 change over
250 V AC 5(0.5)A
24 V AC 1(0.2)A
cable gland Pg 9
protection class IP 54



METERING SUBSTANCES



NOMENCLATURE

MD-	003	P	006	T	basic type specification
	003				● adjustable range 0.2 - 3 mbar (rel.)
	006				● adjustable range 0.4 - 6 mbar (rel.)
	010				● adjustable range 1.0 - 10 mbar (rel.)
		P			● ABS
			006		● nominal diameter DN 6
				T	● nozzle

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mechanical Pressure Switch for liquids or gasses. A thick film sensor provides a bridge signal which is converted by an integrated electronic into a pressure-proportional 4-20mA exit.

* mechanical protection of the pressure cell

Male thread G1/4A stainless steel

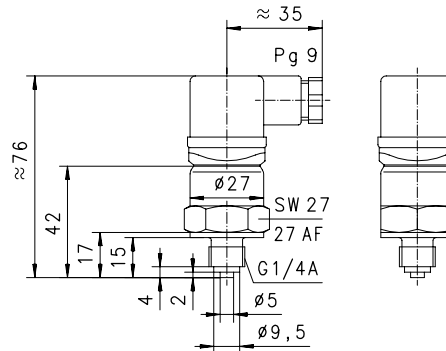


TECHNICAL DATA

PS-006K008H

G	Type	PN bar	measuring range bar (rel.)	weight kg
1.4305	PS-006K008H	18	0 - 6	0.15
	PS-010K008H	30	0 - 10	0.15
	PS-016K008H	48	0 - 16	0.15
	PS-025K008H	75	0 - 25	0.15
	PS-040K008H	120	0 - 40	0.15
	PS-100K008H	200	0 - 100	0.15

media temperature	max. 125°C
tolerance	±0.5%
hysteresis	<0.2%
repeatability	<0.5%
temperature compens.	<0.02%/K
delay	<3ms

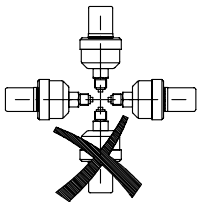


Please use the six-angular area to install the sensor into the socket.
Maximum torque 100Nm

MATERIALS

body stainless steel 1.4305

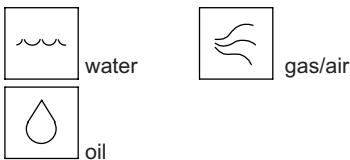
MOUNTING POSITION



ELECTRICAL DATA

supply	11.5..30 V DC
voltage deviation	<0.02%/V
nominal voltage	24V DC voltage peak
	4..20mA
	may not be surpassed
	(U-11.5V)/0.02A
burden	plug DIN 43650-A 1(+) and 2(-)
connection	IP 65
protection class	

METERING SUBSTANCES



NOMENCLATURE

PS-	006	K	008	H	basic type specification
	006			●	0 - 6 bar
	010			●	0 - 10 bar
	016			●	0 - 16 bar
	025			●	0 - 25 bar
	040			●	0 - 40 bar
	100			●	0 - 100 bar
		K		●	stainless steel 1.4305
			008	●	male thread G1/4A
				●	socket thread
Special option				□	male thread G1/2A
VARIO					

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The pressure sensor measures pressures in liquids and gases. The strong all-metal construction enables the device to be universally employed throughout industry. With flush membrane this sensor is suitable for applications with sticky fluids like glue components or other critical liquids. The pressure sensor consists of a measurement probe (four strain gauges in thin-film poly silicon technology accommodated on a monolithic silicon substrate, oil filled cavity with flush diaphragm) and the evaluation electronics which converts the bridge signal into a 4..20 mA signal proportional to the pressure. The sensor requires less than 2 mA for a supply so that a two-wire connection can be realised. This type of connection enables monitoring of cable defects.

- * 4..20 mA, two-wire connection
- * all stainless steel diaphragm
- * rotating plug connection (infinitely variable)

male thread G1/2A stainless steel



TECHNICAL DATA

measurement ranges	range	overload
relative pressure	0 - 1	4
overload limit (bar)	0 - 2,5	10
	0 - 6	24
	0 - 10	40
	0 - 25	100
	0 - 60	240
	0 - 100	400
	0 - 250	600
	0 - 400	600
options	additional measurement ranges absolute pressure metering (low limit 10mbar abs.)	
accuracy	1% / of 60°C 0,02% /°C	
reproducibility	0.5%	
operating temp. for electronics	0..80°C	
operating temperature	max. 80°C (with option goose-neck option 125°C max.)	
weight	0.3kg	

MOUNTING

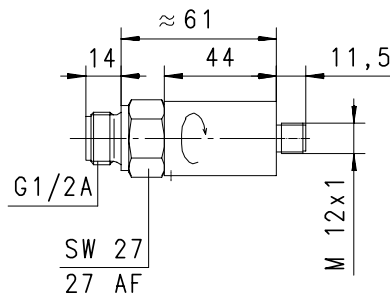
The sensors are screwed into a sleeve or a T-piece in the pipework using a suitable sealing material (Teflon tape, Sikurite seal, etc.). The mounting of the sensor should not cause any significant change of cross-section in the pipe system. When tightening the sensor, be sure to only use the proper hexagonal wrench (27mm AF). Avoid points of installation subject to high pressure shocks (see overload limit).

After sealing the sensor can be turned into the correct position for the cable connection. A mechanical block limits the total range turnable of 360°.

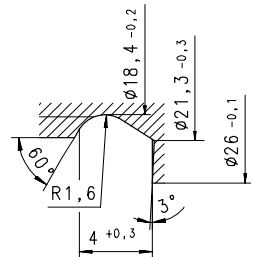
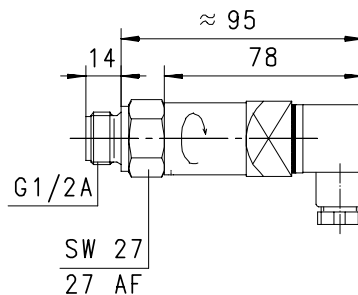
MATERIALS

pressure transducer stainless steel 1.4301
other materials brass nickel plated, PP, NBR

with connection at locking plugs M12x1, 4pole

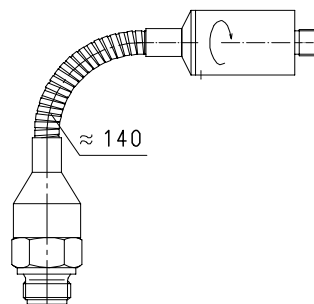


with plug DIN 43650-A



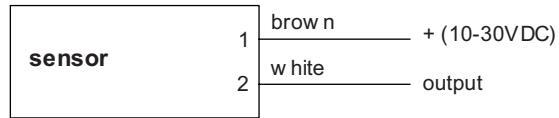
recess
DIN 3852 Bl.2

"goose-neck" option for higher temperatures



ELECTRICAL DATA

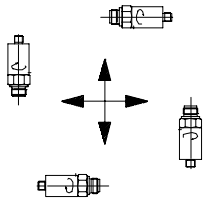
supply voltage	10..30 V DC ±10%
analogue output	4..20 mA
max. load	700Ω at 24 V (100Ω at 10V - 1K at 30V, linear to the operation voltage)
connection	for locking plug M12x1, 4pole or plug DIN 43650-A
protection class	IP 67 locking plug IP 65 plug DIN 43650-A



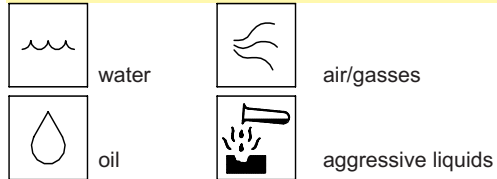
Before carrying out the electrical installation, make sure that the supply voltage corresponds to the data specification!

It is recommended to use shielded cable < 30 m, supply lines < 10 m

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

EPS-	006	R	K	015	S		basic type specification
	006					●	0 - 6 bar
	025					●	0 - 25 bar
	060					●	0 - 60 bar
	100					●	0 - 100 bar
	250					●	0 - 250 bar
	400					●	0 - 400 bar
		R				●	relative pressure
		A				○	absolute pressure
			K			●	material medium contact stainless steel 1.4301
				015		●	connection G1/2A
					S	●	connection at locking plugs M12x1, 4-pole
					B	●	plug DIN 43650-A
					H	○	with goose-neck

ACCESSORY

locking plug

K	PU-	02	S	G	basic type specification
K					● ready-made cable
KB04					● self makable cable 4-pole
	PU-				● material PUR
		02			● length 2 m
		05			● length 5 m
		10			● length 10 m
			S		● moulded-on plug
				G	● straight plug
				W	● angled plug 90°



COMBINATIONS

omni-P

local electronic unit,
2xNPN and PNP switch
4(0)...20mA output
graphical LCD display
with flashing LED
program ring



Flex-P

switch- or frequency output
0..10V or 4..20mA
PNP, NPN

K

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The pressure sensor measures pressures in liquids and gases. The strong allmetal construction enables the device to be universally employed throughout industry. The pressure sensor consists of a measurement probe (four strain gauges in thickfilm technology accommodated on a ceramic substrate) and the evaluation electronic which converts the bridge signal into a 4..20 mA signal proportional to the pressure. The sensor requires less than 2 mA for a supply so that a two-wire connection can be realised. This type of connection enables line breakage monitoring. Medium access to the diaphragm is provided by an 8mm diameter hole. The pressure cell is safely protected from mechanical damage by this method of construction.

- * 4..20mA, two-wire connection
- * ceramic measuring cell in Al_2O_3
- * strong all-metal housing
- * rotating plug connection (infinitely variable)

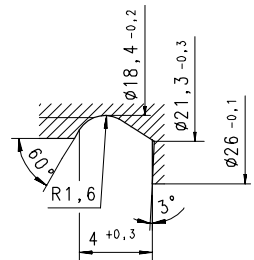
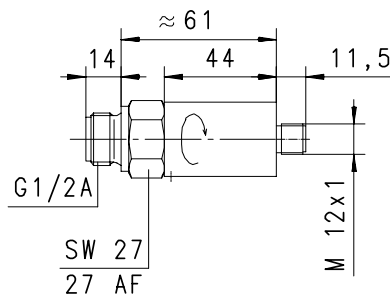
male thread G1/2A stainless steel



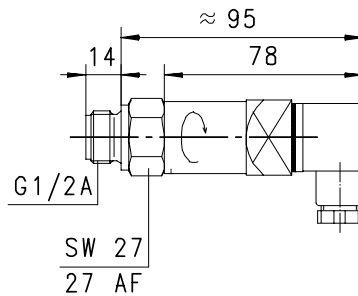
TECHNICAL DATA

measurement ranges	(relative pressure, differential pressure to environment)	
relative pressure	range	burst
	0 - 1	4
	0 - 2	6
burst pressure (bar)	0 - 5	15
	0 - 10	40
	0 - 20	60
	0 - 50	150
	0 - 100	280
	0 - 200*	400
	0 - 400*	1050
	* for gas applications only on request	
accuracy	1% / of 60°C 0,02% /°C	
reproduceability	0.5%	
operating temp. for electronics	0..80°C	
operating temperature	max. 80°C (with option goose-neck option 125°C max.)	
weight	0.3kg	

with connection at locking plugs M12x1, 4pole



with plug DIN 43650-A



recess
DIN 3852 Bl.2

MOUNTING

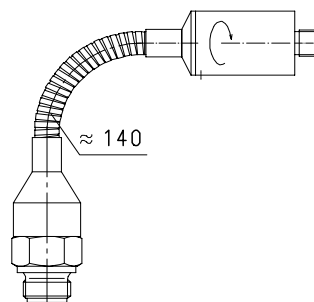
The sensors are screwed into a sleeve or a T-piece in the pipework using a suitable sealing material (Teflon tape, Sikurite seal, etc.). The mounting of the sensor should not cause any significant change of cross-section in the pipe system. When tightening the sensor, be sure to only use the proper hexagonal wrench (27mm AF). Avoid points of installation subject to high pressure shocks (see overload limit).

After sealing you can turn the sensor into the correct position for the cable connection. A mechanical block limits the total range turnable of 360°.

MATERIALS

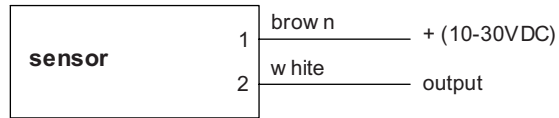
pressure transducer stainless steel 1.4571, Al_2O_3 , viton
other materials brass nickel plated, PP, NBR

"goose-neck" option for higher temperatures



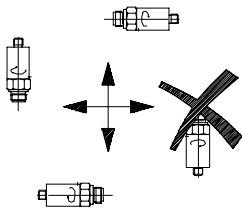
ELECTRICAL DATA

supply voltage	10..30 V DC ±10%
analogue output	4..20 mA
max. load	700Ω at 24 V (100Ω at 10V - 1kΩ at 30V, linear to the operation voltage)
connection	for locking plug M12x1, 4pole or plug DIN 43650-A
protection class	IP 67 locking plug IP 65 plug DIN 43650-A

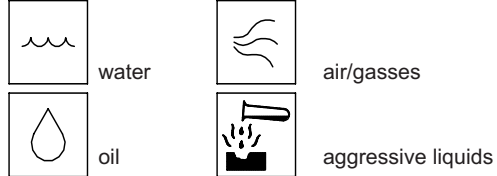


Before carrying out the electrical installation, make sure that the supply voltage corresponds to the data specification.

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

EPS1-	001	R	K	015	S			basic type specification
	001						●	0 - 1 bar
	002						●	0 - 2 bar
	005						●	0 - 5 bar
	010						●	0 - 10 bar
	020						●	0 - 20 bar
	050						●	0 - 50 bar
	100						●	0 - 100 bar
	200						●	0 - 200 bar
		R					●	relative pressure
			K				●	material medium contact stainless steel 1.4571
				015			●	connection G1/2A
					S		●	connection at locking plugs M12x1, 4-pole
					B		●	plug DIN 43650-A
						H	○	with goose-neck

ACCESSORY

locking plug

K	PU-	02	S	G		basic type specification
K					●	ready-made cable
KB04					●	self makable cable 4-pole
	PU-				●	material PUR
		02			●	length 2 m
		05			●	length 5 m
		10			●	length 10 m
			S		●	moulded-on plug
				G	●	straight plug
				W	●	angled plug 90°



COMBINATIONS

omni-P1

local electronic unit,
2xNPN and PNP switch
4(0)...20mA output
graphical LCD display
with flashing LED
program ring



Flex-P1

switch- or frequency output
0..10V or 4..20mA
PNP, NPN

K

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The differential pressure measurement cell is manufactured with two separate ceramic sensors in thick-film technology. The bridge signals are compensated for the relevant cell and are converted by an integrated signal converter to a 4..20 mA signal which is linear to the differential pressure. The values from the separate cells are accepted by a 14-bit converter and microcontroller and converted into the difference of the pressures. The microcontroller also permits special output signals to be employed (please inquire). Only high quality materials are exposed to the liquid. (s.s,Viton,Al₂O₃)

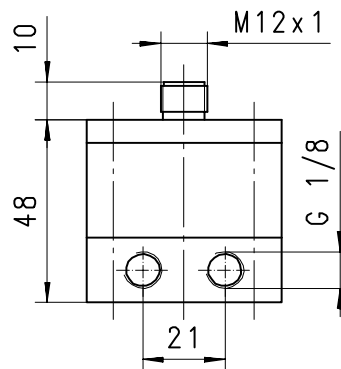
- * two-wire model for industrial applications
- * ideally suitable for liquid/liquid applications
- * can also be used for high differential pressures
- * high chemical resistance through the use of high quality materials

female thread G1/8 stainless steel



TECHNICAL DATA

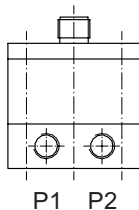
measurement ranges	range	burst
relative pressure	0 - 1	4
	0 - 2	6
	0 - 5	15
burst pressure (bar)	0 - 10	40
	0 - 20	60
	0 - 50	150
	0 - 100	280
differential pressure range	to be specified by customer minimum: 10% of operating range maximum: operating range	
accuracy	±1% of full scale	
temp.-coefficient	<0.05% / K	
operating temperature	-40..85°C	
weight	0.5 kg	



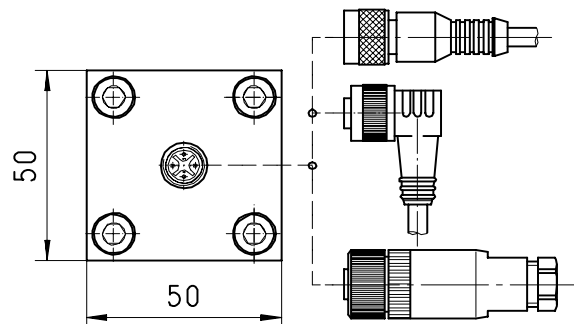
MOUNTING

Join your pipework to P1 and P2 (see also Accessories). When sealing, ensure cleanliness during assembly

The standard version is designed for P1>P2 (a defect does not occur if the connections are interchanged).



If you need to clean the pressure cells from the wetted side, you only have to undo the screws of the connector block, the electronic part is not involved. Cleaning is effected by soft cotton buds making sure that there are no residues left on the metering cell.

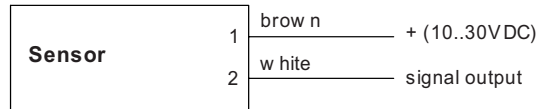


MATERIALS

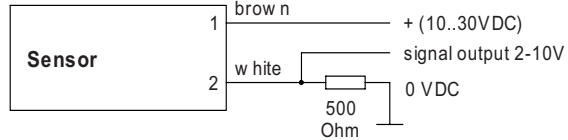
connection	stainless steel 1.4571
ceramics cell	Al ₂ O ₃
seal	Viton
other materials	anodised aluminium, stainless steel 1.4305

ELECTRICAL DATA

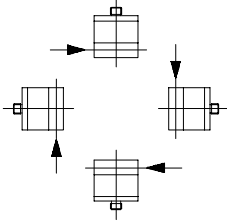
output signal	4..20 mA (two-wire)
supply voltage	10..30 V DC
connection	for locking plug M12x1, 4pole
short-circuit proof	yes
polarised	yes
protection class	IP 67



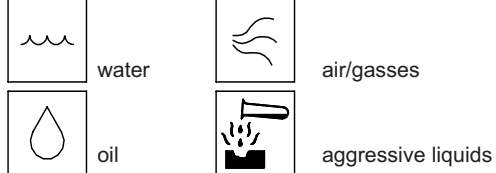
Do you want to adapt a voltage input:



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

EDP1-	001	R	0050	K	004	S	basic type specification
	001					●	0 - 1 bar
	002					●	0 - 2 bar
	005					●	0 - 5 bar
	010					●	0 - 10 bar
	020					●	0 - 20 bar
	050					●	0 - 50 bar
	100					●	0 - 100 bar
		R				●	Relativdruck
			0001			●	Differential pressure range - example 0055 = 5.5 bar (min. 10%, max. 100% of nominal pressure range)
			...			●	
			1000			●	
				K		●	material parts in contact with the medium stainless steel 1.4571
					004	●	connection G1/8
						S ●	connection for locking plug M12x1, 4pole

ACCESSORY

Locking plug M12x1

K	PU-	02	S	G	basic type specification
K					● ready-made cable
KB04					● self makable cable 4-pole
	PU-				● material PUR
		02			● length 2 m
		05			● length 5 m
		10			● length 10 m
			S		● moulded-on plug
				G	● straight plug
				W	● angled plug 90°



COMBINATIONS

omni-DP1
local electronic unit,
2xNPN and PNP switch
4(0)...20mA output
graphical LCD display
with flashing LED
program ring



K

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

Honsberg at work

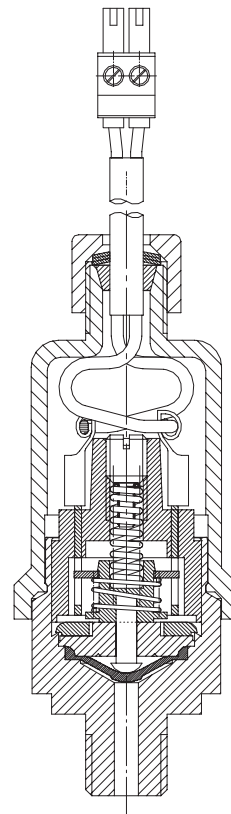
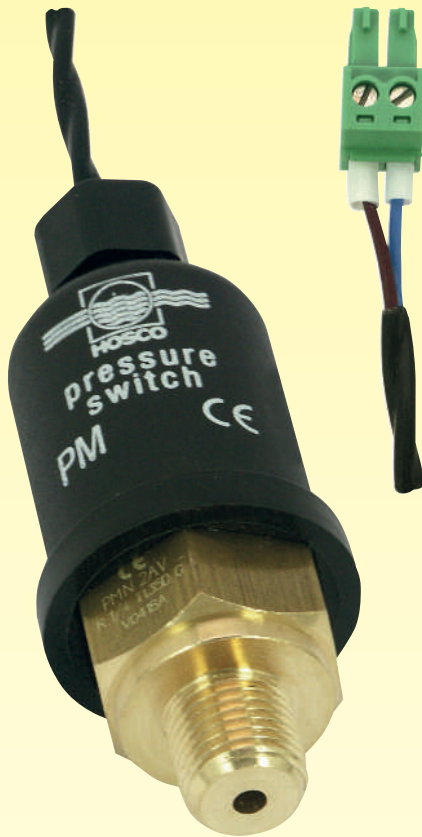
Monitoring exhaust gases in vacuum pumps

Special versions of the Honsberg pressure switches of the PM series are used for monitoring exhaust gases in vacuum pumps.

Pressure switch PM

The devices are calibrated to a fixed switching point of 1.5 bar_{abs}, with a permissible tolerance of 0.22 bar and are used on the basis of the following features:

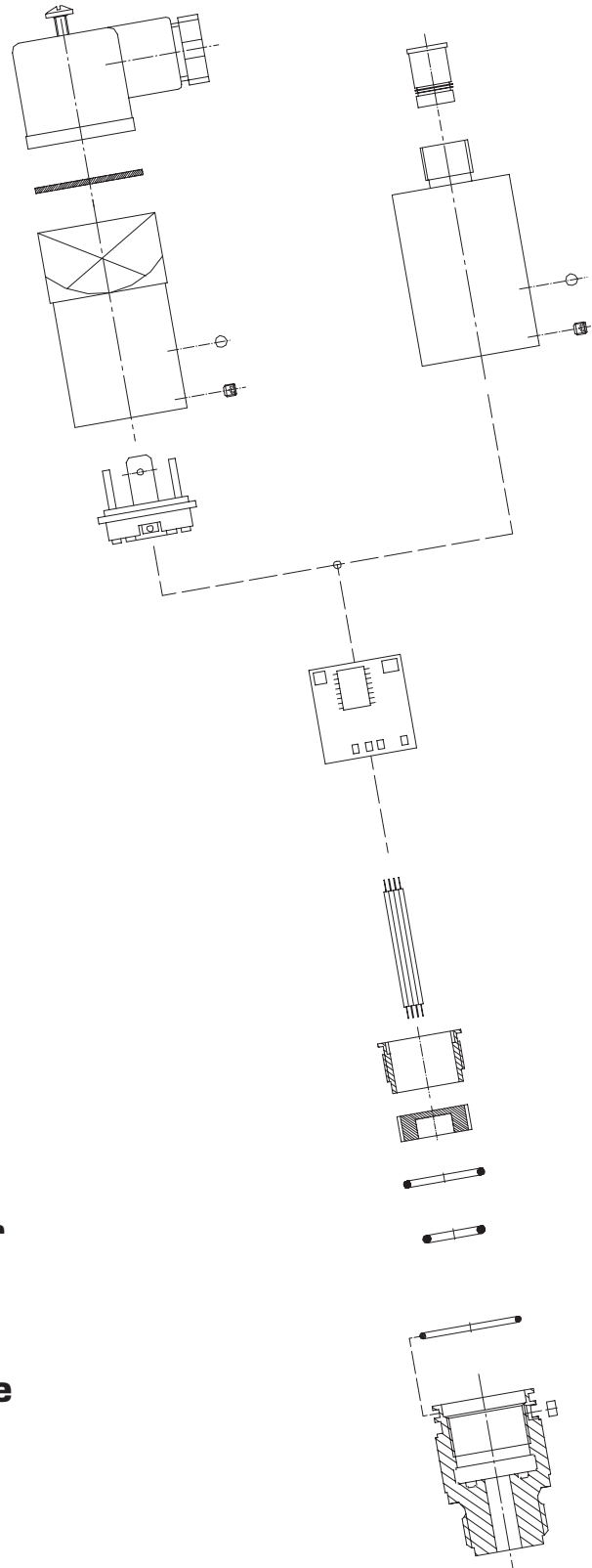
- Fixed setting of the switching point including sealing
- Good repeatability
- Very low hysteresis
- Protection cap
- Special lead and plug connection



On account of the media quality involved, the devices have Teflon diaphragms. Contacts with gold coating are used for very small switching capacities. This demanding application is mastered reliably by Honsberg pressure switches.

Why to use a HONSBERG^{BASIC} pressure instrument

**info
point**



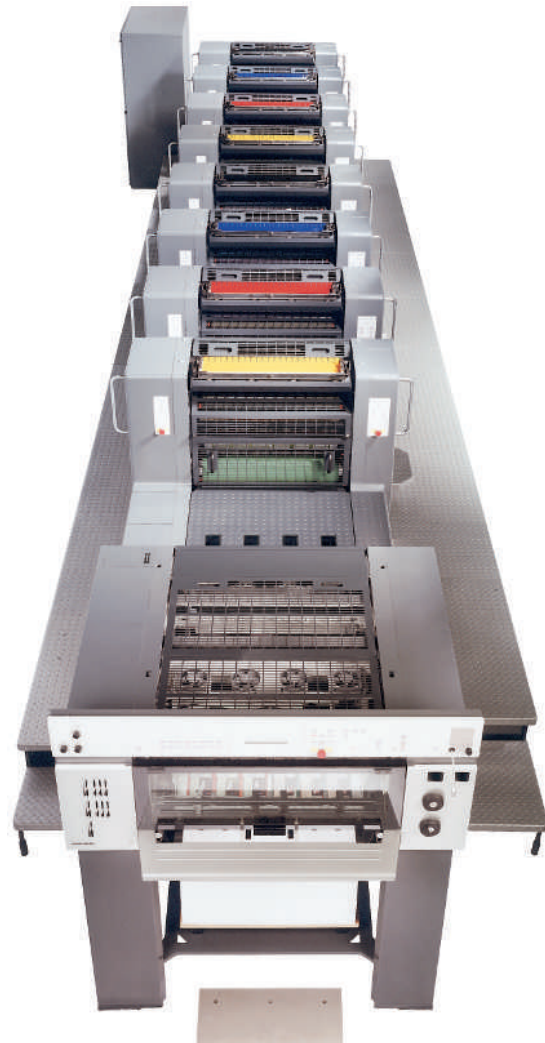
- Fully protected switch or transducer electronic
- Flushing stainless steel sensor
- Open ceramic sensor element
- Strain relief and piezo resistive operation

Where to use a **HONSBERG** BASIC pressure instrument

info
point

Market segments

- Vacuum pumps
- Printing machines
- Pressure generators
- Compressors, Filters



Application

- Monitoring of exhaust gas
- Pressure monitoring in paper powder coating
- Triggering second energy supply in dual cell compressors
- Monitoring differential pressure with filters

Integrated Systems

flow	level	temperature	pressure
------	-------	-------------	----------

Application

- Universal use as threshold alarm or/and transmitter.

Advantages

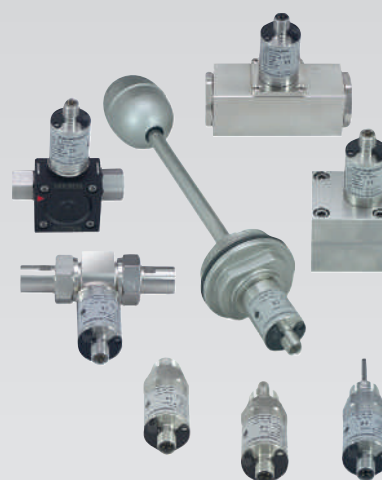
- The system comprises identical components for the various parameters in compact dimensions.

Omni

- two switching points
- 4(0)..20mA analogue output
- hysteresis selectable in magnitude and direction
- graphical LCD display (increased temperature range, illuminated, units in the display, incl. super-bright signalling LED)
- dialogue messages in the display
- programming ring (can be operated when wearing protective gloves)
- programming protection by turning through 180° or by removing programming ring
- stainless steel housing
- mineral glass (tempered, scratch and breakage proof) for covering the display
- M12x1 connector system
- system mounting to all HONSBURG primary sensors (rotatable)
- compact dimensions
- IP 67

Flex

- 4..20 mA or 0..10 V output
- switch or frequency output pnp, npn
- LED switch indicator surround
- hysteresis variable
- switch on delay variable
- switch off delay variable
- delay subsequent to supply
- high level of variation selection
- easy programming using magnet
- M12x1 connector system
- identical handling of different sensors
- system mounting to all HONSBURG primary sensors (rotatable)
- stainless steel housing
- compact dimensions
- IP 67



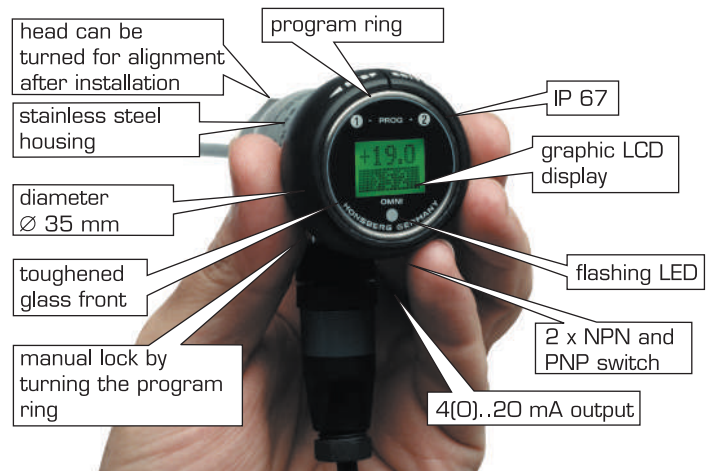
Contents

Omni	
General description	298
System of instruments	299
Handling and operation	300
Technical data	300
Terminal assignment	301
Mounting	301
Device description	301
Flex	
General description	305
System of instruments	306
Technical data	306
Terminal assignment	307
Mounting	307
Device description	307

- Switching
- Indicating
- Metering



Omni general description



2x NPN and PNP switches:

- Push pull driver offers easy set up. You set the interface as a PNP and it is a PNP. You connect it as a NPN and it is a NPN switch.

Without any program settings !

- Independent hysteresis of switch 1 and 2.
- Two point regulator possible.
- Short circuit and reverse power protected.

4(0)...20mA output:

- The 3 wire design offers a 0...10V output, too.
- Programmable span for best fit to the application.
- Select 4 or 0...20mA with the parameter setting at the sensor (program ring).

flashing LED:

- Additional bright indicator, to read messages on the display.

graphic LCD display:

- Guarantee of best human interface and flexibility.
- Illuminated transparent-reflex design. Even good contrast in bright sun or in darkness.
- Best temperature range (-20...+70°C).
- Select units for US or European market.

Stainless steel housing with toughened glass front:

- Small (diameter 35mm) and rugged design, even for outdoor applications.
- IP 67
- Easy to keep the instrument clean (flush front)!
- Head can be turned for alignment after installation. A mechanical block limits the total range turnable of 360°.

program ring:

- No weak parts (as touch panels, potentiometers ...) to enter parameters
- Manual lock by turning the ring (easy!)



Systems of Instruments

Switching points can be set directly on site with these sensors for upward and downward excursions of process values. Using the display this setting can also be carried out without the process. The momentary values at the measuring point are always visible and all the important parameters can be called up at the point of measurement (this saves time during installation and set-up and when trouble-shooting in your process). The analogue current signal can be evaluated over long distances and the momentary value made available remotely. The sensor is configured to your specification. It is therefore immediately ready for use without you having to do any programming. If you need to change parameters, then you can do this directly on the sensor with the programming ring without any additional device or tool.

The complete omni sensor range is formed in an extremely modular way using a kit system (hardware and software). A 16-bit microcontroller with a 14-bit A/D converter and a 12-bit D/A converter provides the necessary processing speed and measurement accuracy. The signal is displayed with units using a back-lit LCD graphical display and converted to a 4(0)..20mA signal. Two switching points with alternatively a PNP or NPN output can be programmed over the complete range.

The switching point hystereses can be set separately in value and direction (min./max. switching value). Upward and downward crossings of switching points and error messages are shown in the display with a flashing red LED, easily visible at a distance, as well as a message. Other parameters can be changed using a code:

Signal filter, selectable unit (bar, psi ...) incl. automatic conversion of the values, selectable 0 or 4..20mA output, value assignment of 4(0) and 20 mA (setting of zero point and span).

The complete housing can be rotated about the mechanical connection so that the correct reading position can be set after sealing.

During commissioning the sensor supports a **simulation mode** of the analog signal. It is possible to create a programmable mA value related to the support signal. The range is **0..20** mA. Doing so the user may test the connection between sensors and electronic. Correction by **Code 311**.

Customer related **0 calibration** with pressure sensors. Customer programs 0 bar and selects the automatic 0 correction by **Code 211**. The sensor shifts the total diagramm related to new 0 position. Overrating of output will be detected, indicated on display and the output.

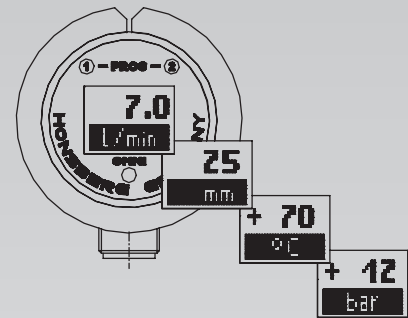
With this sensor it has been a primary objective to simplify the operation by establishing a dialogue with the display messages (this small sensor can also be set when wearing protective gloves if necessary).

Reset to factory setting possible by code 989.

The combination options of the omni transducer

The omni transducer is usable with a variety of mechanical sensor systems for flow, level, temperature and pressure. This has generated a sensor family which may serve miscellaneous applications.

Omni-converter

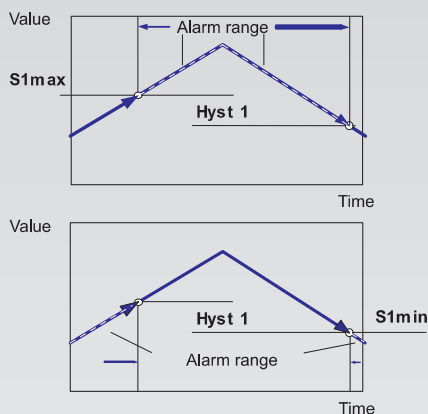


combination

flow	piston inline design	
	dynamic flap	
	rotor	
	turbine	
	gear wheel	
	calorimetric	
	Vortex	
level	float	
	ultrasonic	
temperature	PT100	
pressure differential-pressure	strain-gauge measuring bridge	



The programming ring can be swivelled to Pos. → and Pos. ←. The following are actions possible:



Example of hysteresis setting: S1 as max. switching point and as min. switching point:



The omni calibration ring with integrated magnet is responsible for the functional detection of the instrument.

By position the central partition of the ring to pos.1 or 2 a test signal is activated. The neutral position is the centre between pos. 1 + 2

principle:

Pos. 1 = look or next step
Pos. 2 = modification

Handling and Operation

The program ring can be geared into pos.1 or pos.2 the following performances can be selected:

Display of parameters with Pos. 1

- Switching points S 1 and S 2: Switching points in the selected unit.
- Hysteresis direction of S1 and S2:
Max = Hysteresis under S1 or S2
Min = Hysteresis above S1 or S2
- Hysteresis Hyst 1 and Hyst 2:
Hysteresis values of the switching points in the selected unit.
- Code:
After entering the code 111 other parameters can be set (should only occur if necessary):
- Filter: Selectable filter constant in s (affects display and output).
- Units: e.g. bar or psi ...
- Output: 0..20mA or 4..20mA
- 4 (0) mA: Value specification for 4 (0) mA
- 20mA: Value specification for 20mA

Editing with Pos. 2

- Turn the ring gap to Pos. 2 and a flashing "cursor" appears showing the position to be changed. By repeated turning to Pos. 2 the values are increased and by turning to Pos. 1 you obtain the next position. Each position can be edited in this way. If no action is made within 5 s, the device returns to the normal display section without the change being accepted.

Saving the change with Pos. 1

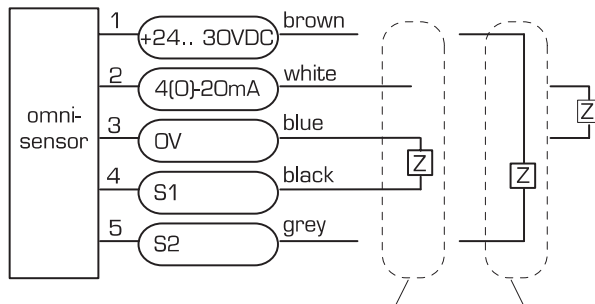
- Turning 1x to Pos. 1 after quitting the last value signifies acceptance of the change.

The programming ring can be pulled off, turned through 180° and replaced. Then programming is no longer possible on turning the ring further.

Technical Data

supply voltage	typically 18...30V (see separate data sheets)
power consumption	typically <1W (see separate data sheets)
measurement ranges	see separate data sheets
accuracy	typically 1% FS (see separate data sheets)
reproducibility	typically 0,1% FS (see separate data sheets)
operating temperature	-20..70 °C
storage temperature	-20..80 °C
signal output	4(0)-20mA, 2(0)-10V through 500 Ohm termination resistance
switching points S1 and S2	PNP or NPN selectable, 300mA load in sum max., programmable as min. or max. value, short-circuit proof, reverse-polarity proof
hysteresis	adjustable, position of hysteresis depends on min or max.
display	graphical LCD display extended temperature range -20 ... 70°C, 32x16 pixels, back-lit, shows value and units, LED signalling lamp with simultaneous message in display.
connection	at locking plug M 12x1,5 pole
protection	IP 67
material	see separate data sheets

Terminal assignment



Example: PNO or NPN
Z = load

The switchpoints are changing to PNP or NPN depending to your interface automatically. Please you use shielded cable, signal lines < 30m and power supply lines < 10m.

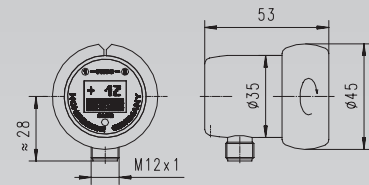
Mounting

Please refer to the separate sensor description

Device description

Please send for our Omni catalogue for detailed device description

Dimension



primary-sensor omni-electronic



Flow meters

omni MR1K/HD1K/ HD1KV/HR1M

A mechanical spring-supported piston is deflected by the flow. The flow-proportional position of the piston is transmitted to an analogue hall sensor via a magnet.

- Piston
- Female thread DN 8-50
- Hall-Sensor
- Ranges from 0.4-150 l/min
- Pressure stage PN 200
- Max. temperature 150 °C
- Brass material



omni-XF

The flowing liquids move a thin springy flap that covers the entire flow area. A magnet on the flap creates a changing magnetic field, which is detected by a Hall sensor, when the flap is moved. Due to the spring-like quality of the flap and the molded stop, even strong impacts caused by the water are absorbed well.

- Dynamic flap
- DN 8-20 internal thread
- Range: 1 - 80 l/min
- Max. temperature: 60 °C
- Material: brass/copper





omni-RR

This flow meter comprises a rotor which is set into motion by the flow speed. The number of resolutions is proportional to the flow rate per time unit. Rotation speed is recorded by different sensor systems depending on the different housing materials involved.

- Rotor
- DN 10-200
- Ranges from 0.5-60 l/min
- Temperature max. 100 °C
- Plastic PN 16
- Brass / stainless steel PN 100

omni-RRT

A turbine serves as the primary measured value recorder, with its number of rotations in linear proportion to the flow rate

- Turbine
- Female thread DN 25
- Ranges from 1-80 l/min
- Temperature max. 60 °C
- POM PN 10
- Brass PN 100

omni-RRT1

A turbine serves as the primary measured value recorder, with its number of rotations in linear proportion to the flow rate. Can be combined with adapters including check valve, flow limiter or filter.

- Turbine
- Female thread DN 25
- Ranges from 1-80 l/min
- Temperature max. 60 °C
- POM PN 10
- Brass PN 100
- Optional: filter, flow limiter, check valve

omni-RT

A turbine serves as the primary measured value recorder, with its number of rotations in linear proportion to the flow rate

- Turbine
- Female thread DN 15-50
- Ranges from 0.11-68 m³/h
- Pressure stage PN 250
- Temperature max. 150 °C
- Stainless steel material

omni-VHZ

The flow meter measures the flow according to the volumetric principle and is suitable for viscous, liquid, self-lubricating media. Also suitable for liquids containing water such as soaps, pastes, emulsions with non-abrasive properties.

- Toothed gear
- Female thread DN 8-25
- Ranges from 1-150 l/min
- Temperature max. 85 °C
- PN 100
- Aluminium or stainless steel material

omni-FIN

The calorimetric sensor measures low flow rates. The calorimetric concept of the flow sensors is based on the use of 2 temperature sensors. One of the sensors constantly maintains a level temperature, thereby creating a level difference in temperature between the two sensors when the liquid to be measured stands still.

- Calorimetric
- Meter diameter: 6 - 10
- Range: 0.01 - 10 l/min
- Max. temperature: 7 °C
- Material: stainless steel

omni-CF

A small triangular piece that covers the entire cross-section of the flowmeter creates a vortex in the flow (Karmann vortex, vortex effect). The vortex frequency is proportional to the flow rate and is detected by a Piezo sensor that is located behind the triangular piece. The entire unit, vortex piece and sensor, is designed as module and is inserted into the pipe. Thus, the flowmeter and the entire measuring unit can be separated quickly.

- Vortex
- DN 8-25 internal thread
- Range: 0.6 - 240 l/min
- Max. temperature: 80 °C
- Material: brass



omni-F

The calorimetric principle of flow monitoring is based on two temperature sensors. One of these sensors is heated constantly so that there is a constant difference in temperature between the two temperature sensors when the metering material is at a standstill.

- Calorimetric
- Nominal diameter from DN 10
- Ranges 1-150 cm/s
- Pressure range PN 200
- Temperature max. 70 °C
- Stainless steel material



Level meters

omni-LC

A float fitted with a magnet switches a reed chain within the slide pipe which is equipped with resistors like a potentiometer. Safe level detection is achieved thanks to the switching states overlapping. The resolution is up to 10-20 mm and has good repeatability qualities.

- Reed switch chain
- Length from 250-2000 mm
- Temperature max. 105 °C
- Brass/stainless steel material



omni-L

The sensor consists of the primary sensor, an ultrasonic sensor, which determines in a non-contact manner distances to materials of various types (liquids, bulk goods, solids) and the evaluation electronics. The ultrasonic sensor operates according to the principle of the measurement of propagation time. Transmitted ultrasonic pulses are reflected at the surface and arrive back at the converter after an echo period

- Ultrasonic
- Range from 100-2500 mm
- Temperature max. 70°C
- Material PET / POM



Temperature meters



omni-T

The primary sensor is a PT100 resistance sensor in thin-film technology which offers a very good response time thanks to the 4 mm lance thickness.

- PT100
- Ranges from 0-100 °C
- Temperature max. 100 °C
- Stainless steel material

Pressure meters



omni-P/P1

The pressure meters comprise a primary sensor and the integrated evaluation electronics. The primary sensor is available in two different technologies.

- Front-flush diaphragm/ceramic cell
- Range up to 400 bar
- Temperature max. 120 °C
- Stainless steel material

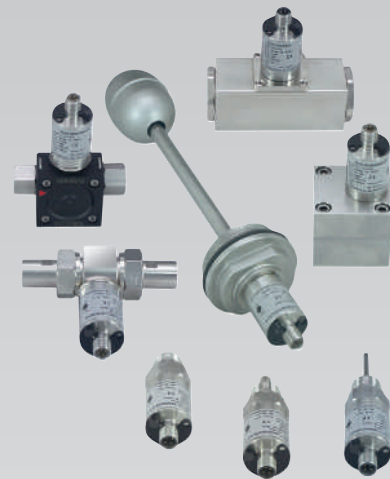
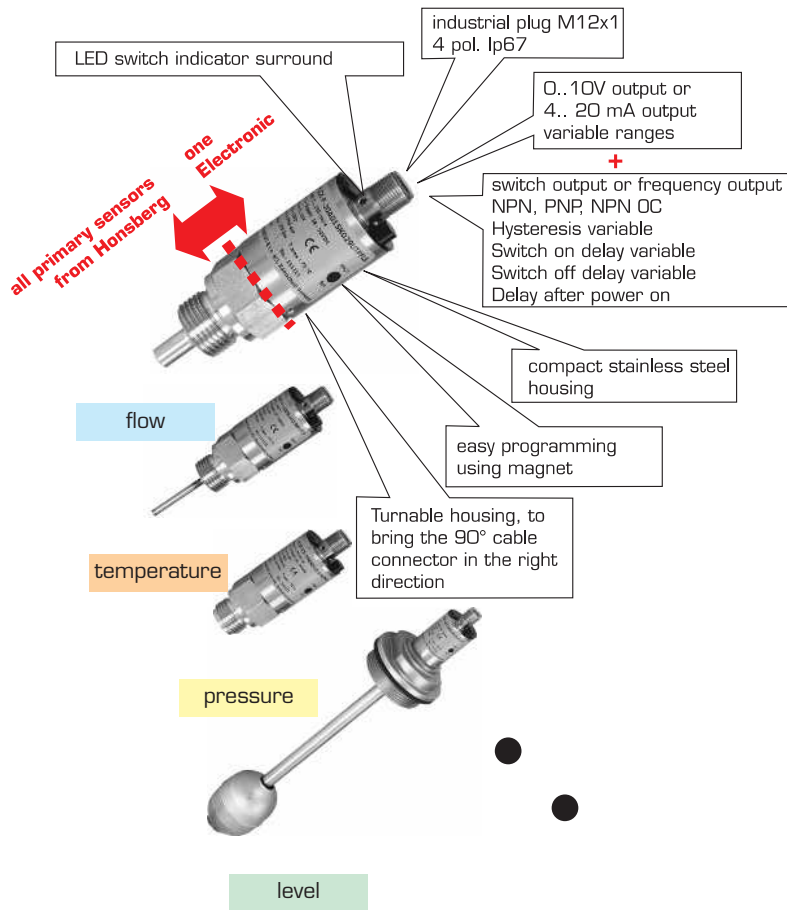


omni-DP1

The differential pressure measurement cell is manufactured with two separate ceramic sensors in thick-film technology. The bridge signals are temperature compensated on the relevant cell. The medium is exposed to high quality materials only such as Al₂O₃ ceramic, stainless steel and Viton O-rings and is therefore ideally suitable for liquid/liquid applications.

- Ceramic Cell
- Range from 200 bar
- Temperature max. 70 °C
- Stainless steel material

Flex general description



Hold magnet to the point and the actual value will be the switch point.

analogue output:

- 4..20 mA or 0..10 V

switch:

- PNP, NPN or NPN oc (open collector) switch
- min-, max-switch or frequency-output

flashing LED:

- yellow LED for switching output (ON = OK / OFF = alarm)

Programming

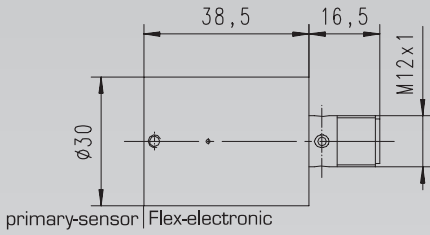
A calibration magnet pinched to the instrument may be used to select the switch point or full scale of the analogue output. The calibration spot is clearly identified on the label.



Hold magnet

L

Dimension



Flex-converter



combination

flow

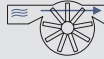
piston inline design



dynamic flap



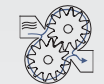
rotor



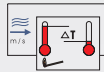
turbine



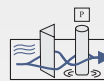
gear wheel



calorimetric

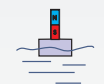


Vortex



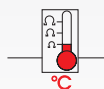
level

float



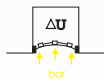
temperature

PT100



pressure

strain-gaue measuring bridge



System of Instruments

The Flex-electronic linearises and conditions the primary signal to a standard 4..20 mA or 0..10V output and offers a flexible switch alarm.

The sensor operate by a 16-bit processor, a 12-bit a/d and 12-bit d/a converter. Linearization and calibration is provided automatically. A flash memory guarantees interchange ability of all program parameters.

The signal options are pnp/npn transistor output or a frequency signal. The analogue output 4..20 mA or 0..10 V are available.

All signal configurations are subjected to highly modular selection schema by magnetic calibration.

Options available:

- variable span of analogue outputs
- variable hysteresis
- min or max switch
- inversion of output signal
- window function
- delay subsequent to voltage input
- switch delay (on/off)

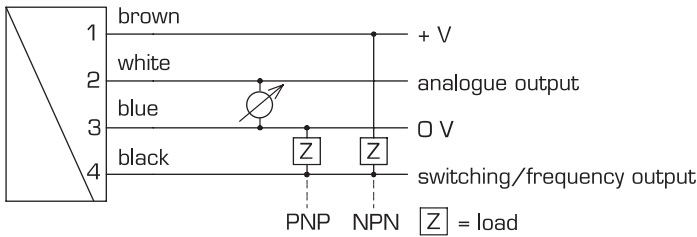
The combination options of the Flex transducer

The Flex transducer is usable with a variety of mechanical sensor systems for flow, level, temperature and pressure. This has generated a sensor family which may serve miscellaneous applications.

Technical Data

supply voltage	typically 18..30V (see separate data sheets)
power consumption	typically <100mA (see separate data sheets)
measurement ranges	see separate data sheets
accuracy	typically 1% FS (see separate data sheets)
reproducibility	typically 0,1% FS (see separate data sheets)
operating temperature	-20..70 °C
storage temperature	-20..80 °C
signal output	4..20 mA or 0..10 V DC
switching output	transistor output PNP or NPN (short circuit proof/reverse polarity protected) I out = 100mA max.
hysteresis	see separate data sheets
display	yellow LED for switching output (ON = OK /OFF = alarm)
connection	for locking plug M 12 x 1, 4-pol
protection class	IP 67
material	see separate data sheets

Pin configuration



Please use shielded cables, less than 30 m in length and supply lines < 10 m.

Installation

Please see the individual sensor descriptions.

Device description

Please send for our Flex catalogue for detailed device descriptions.

Flow meters

Flex-MR1K/HD1K/HD2K/HR1M

A mechanical spring-supported piston is deflected by the flow. The flow-proportional position of the piston is transmitted to an analogue Hall sensor via a magnet.

- Piston
- Female thread DN 8-50
- Hall-Sensor
- Ranges from 0.4 - 150 l/min
- Pressure stage PN 200
- Max. temperature 150 °C
- Brass material

Flex-XF

The flowing liquids move a thin springy flap that covers the entire flow area. A magnet on the flap creates a changing magnetic field, which is detected by a Hall sensor, when the flap is moved.

Due to the spring-like quality of the flap and the molded stop, even strong impacts caused by the water are absorbed well.

- Dynamic flap
- DN 8-20 internal thread
- Range: 1 - 80 l/min.
- Max. temperature: 60 °C
- Material: brass/plastic





Flex-RR

This flow meter comprises a rotor which is set into motion by the flow speed. The number of resolutions is proportional to the flow rate per time unit. Rotation speed is recorded by different sensor systems depending on the different housing materials involved.

- Rotor
- DN 10-200
- Ranges from 0.5-60 l/min
- Temperature max. 100 °C
- Plastic PN 16
- Brass/stainless steel PN 100



Flex-RRT

A turbine serves as the primary measured value recorder, with its number of rotations in linear proportion to the flow rate.

- Turbine
- Female thread DN 25
- Ranges from 1-80 l/min
- Temperature max. 60 °C
- POM PN 10
- Brass PN 100



Flex-RRT1

A turbine serves as the primary measured value recorder, with its number of rotations in linear proportion to the flow rate. Can be combined with adapters including check valve, flow limiter

- Turbine
- Female thread DN 25
- Ranges from 1-80 l/min
- Temperature max. 60 °C
- POM PN 10
- Brass PN 100
- Optional: filter, flow limiter, check valve



Flex-RT

A turbine serves as the primary measured value recorder, with its number of rotations in linear proportion to the flow rate.

- Turbine
- Female thread DN 15-50
- Ranges from 0.11-68 m³/h
- Pressure stage PN 250
- Temperature max. 150 °C
- Stainless steel material

Flex-VHZ

The flow meter measures the flow according to the volumetric principle and is suitable for viscous, liquid, self-lubricating media. Also suitable for liquids containing water such as soaps, pastes, emulsions with non-abrasive properties.

- Toothed gear
- Female thread DN 8-25
- Ranges from 1-150 l/min
- Temperature max. 85 °C
- PN 100
- Aluminium or stainless steel material



Flex-F

The calorimetric principle of flow monitoring is based on two temperature sensors. One of these sensors is heated constantly so that there is a constant difference in temperature between the two temperature sensors when the metering material is at a standstill.

- Calorimetric
- Nominal diameter from DN 10
- Ranges 1-150 cm/s
- Pressure range PN 200
- Temperature max. 70 °C
- Stainless steel material



Flex-FIN

The calorimetric sensor measures low flow rates. The calorimetric concept of the flow sensors is based on the use of 2 temperature sensors. One of the sensors constantly maintains a level temperature, thereby creating a level difference in temperature between the two sensors when the liquid to be measured stands still.

- Calorimetric
- Pipe diameter: 6 - 10
- Range: 0.01 - 10 l/min
- PN 200 pressure level
- Max. temperature: 70 °C
- Material: stainless steel



Flex-CF

A small triangular piece that covers the entire cross-section of the flowmeter creates a vortex in the flow (Karmann vortex, vortex effect). The vortex frequency is proportional to the flow rate and is detected by a Piezo sensor that is located behind the triangular piece. The entire unit, vortex piece and sensor, is designed as module and is inserted into the pipe. Thus, the flowmeter and the entire measuring unit can be separated quickly.

- Vortex
- DN 8-25 internal thread
- Range: 0.6 - 240 l/min
- Max. temperature: 80 °C
- Material: brass





Level meters

Flex-LC

A float fitted with a magnet switches a reed chain within the slide pipe which is equipped with resistors like a potentiometer. Safe level detection is achieved thanks to the switching states overlapping. The resolution is up to 10-20 mm and has good repeatability qualities.

- Reed switch chain
- Length from 250-2000 mm
- Temperature max. 105 °C
- Brass/stainless steel material



Temperature meters

Flex-T

The primary sensor is a PT100 resistance sensor in thin-film technology which offers a very good response time thanks to the 4 mm lance thickness.

- PT100
- Ranges from 0-100 °C
- Temperature max. 100 °C
- Stainless steel material



Pressure meters

Flex-P/P1

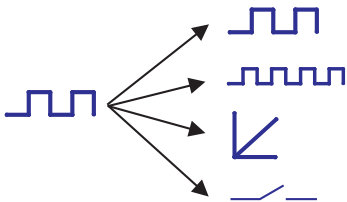
The pressure meters comprise a primary sensor and the integrated evaluation electronics.

The primary sensor is available in two different technologies.

- Front-flush diaphragm/ceramic cell
- Range up to 400 bar
- Temperature max. 120 °C
- Stainless steel material

Transducers

The technology



Honsberg supplies a range of signal transducers which can be used in combination with Honsberg devices or even as stand-alone units within the context of the metering task set.

Application

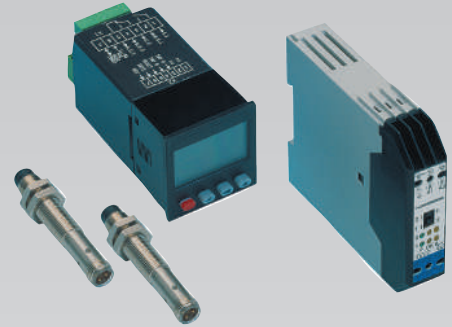
Evaluation or conversion of sensor signals

- Signal transducers
- Amplifiers
- EX-amplifiers
- Relays
- Counters
- Display units

Advantages

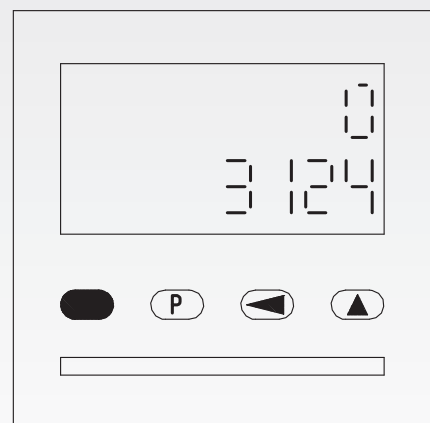
- These components have been designed to match Honsberg devices, and support operation and safety.

Input ⇒	Input
Frequency	⇒ Ex-separation [switch, threshold] 4[0]..20 mA, 0..10 V display, trend, frequency minimising linearizing
Analogue	⇒ Frequency switch, threshold normalisation, linearizing display, trend 4[0]..20 mA, 0..10 V



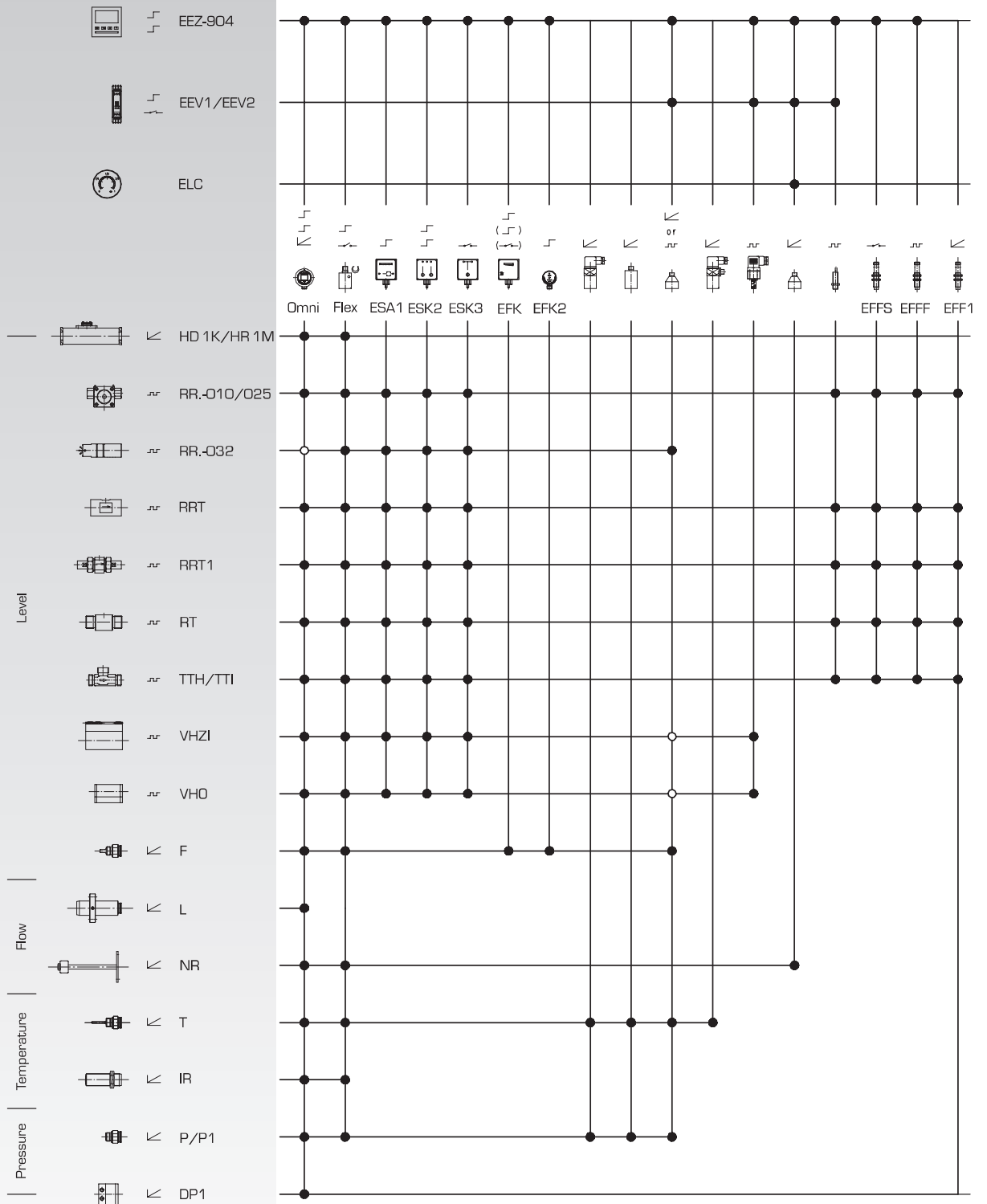
Contents

Summary	312
Device descriptions	313



- Signal processing

The combination



	type	description	page
	EFFS	frequency switch	314
	EFFI	frequency sensor with current output	315
	EFFF	frequency/frequency converter	316
	EFFU	frequency sensor with voltage output	317
	EEV1	Ex-amplifier 2-wire-sensors (I > Namur)	 318
	EEV2	Ex-amplifier Namur	318
	WE	Isolating switching amplifier with relay output	 319
	MSR010	Multifunction relay	319
	EEZ-904	Counter	319
	ESA1	Local electronic unit for frequency generating sensors	319
	ESK2	Local electronic unit for frequency generating sensors	320
	ESK3	Local electronic unit for frequency generating sensors	320
	GIA	Display with switching point	320
	ELC	Display for level meter LC	320

● standard ○ standard option □ special option

all data sheets available under www.honsberg.com



- * Sensor with adjustable frequency limit
- * Can be configured by user via pluggable pin (Teach-In)
- * LED indication of switch status
- * M12x1 industry locking plug system

ADVANTAGE

The converter can be screwed into all HONSBERG rotor and turbine flow meters which have an M12x1 screwed hole for the sensor. Using the integral sensor, it receives a frequency signal proportional to the flow and evaluates this signal. If the signal drops below the set limit, an alarm signal is produced and the yellow LED in the plug connector goes out.

PROGRAMMING

- Adjust set frequency (= set flow) in the system.
- Apply a pulse of at least 0.5 seconds duration on Pin 2 or white wire (for lead version), (e.g. by bridging to the supply voltage or pulse from PLC).

Immediately after programming, the sensor switches to the alarm state. The alarm is cancelled once the flow increases such that the threshold plus 12 Hz (= hysteresis) is reached.

After programming, Pin 2 (or the white wire) must either remain unconnected or be connected to 0V.

TECHNICAL DATA

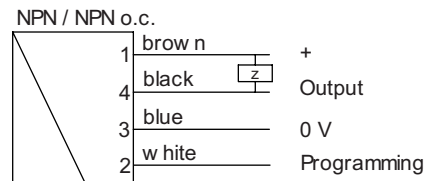
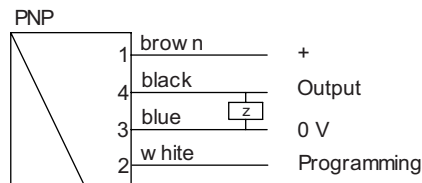
supply voltage	10..30 V DC
idle current	< 20 mA (without load)
output	NPN or PNP
short circuit current	max. 200 mA
frequency range	4..10000 Hz
connection	for locking plug M12x1, 4-pole Reservation according to DESINA
materials housing	nickel plated brass, PA66
protection class	IP67
operating temperature	0..70 °C
weight	approximately 25 g

MOUNTING

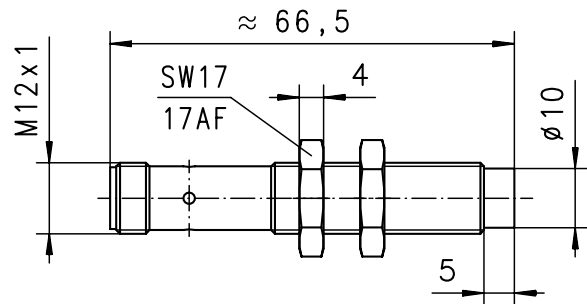
Screw the sensor into thread of the housing and turn it back a quarter of complete turn.

TERMINAL ASSIGNMENT

Before carrying out the electrical installation, make sure that the supply voltage corresponds to the data specification.



DIMENSIONS



NOMENCLATURE

EFFS-	H	P	L	S	basic type specification
	H				● Hall
	V				○ biased Hall
	I				○ inductive
		N			● NPN
		P			● PNP
		M			○ NPN open collector
			L		● min. switch
			H		○ max. switch
				S	● locking plug M12x1, 4pole

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable



- * Sensor with adjustable current output
- * Can be configured by user via pluggable pin (Teach-In)
- * M12x1 industry locking plug system

ADVANTAGE

The converter can be screwed into all HONSBERG rotor and turbine flow meters which have an M12x1 screwed hole for the sensor. Using the integral sensor, it receives a frequency signal proportional to the flow and converts it to a proportional output current of 0(4)..20 mA.

PROGRAMMING

- Adjust max frequency (= max flow) in the system.
- Apply a pulse of at least 0.5 seconds duration on Pin 2 or white wire (for lead version), (e.g. by bridging to the supply voltage or pulse from PLC).

Immediately after programming, the sensor puts out 20 mA. The current value for 0 Hz (0 or 20 mA) has to be specified with order and cannot be changed at the unit later.

After programming, Pin 2 (or the white wire) must be connected to 0V.

TECHNICAL DATA

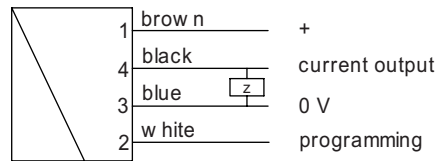
supply voltage	10..30 V DC
idle current	< 20 mA (without load)
current output	0..20 mA or 4..20 mA
frequency range	1..4095 Hz
connection	for locking plug M12x1, 4-pole
materials housing	nickel plated brass, PA66
protection class	IP67
operating temperature	0..70 °C
weight	approximately 25 g

MOUNTING

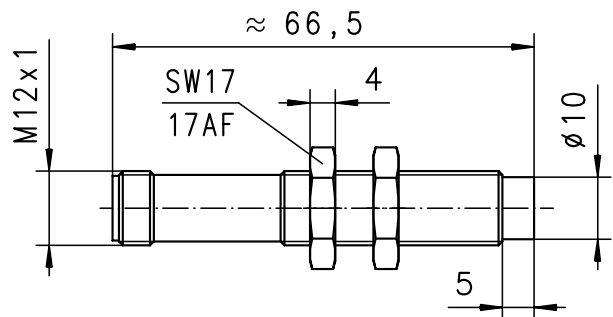
Screw the sensor into thread of the housing and turn it back a quarter of complete turn.

TERMINAL ASSIGNMENT

Before carrying out the electrical installation, make sure that the supply voltage corresponds to the data specification.



DIMENSIONS



NOMENCLATURE

EFFI-	H	I	0	S	basic type specification
	H				● Hall
	V				○ biased Hall
	I				○ inductive
		I			● current output
			0		● 0 .. 20 mA
			4		● 4 .. 20 mA
				S	● locking plug M12x1, 4pole

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable



- * Sensor with variable frequency output
- * Can be configured by user via pluggable pin (Teach-In)
- * LED indication for frequency output
- * M12x1 industry locking plug system

ADVANTAGE

The converter can be screwed into all HONSBERG rotor and turbine flow meters which have an M12x1 screwed hole for the sensor. Using the integral sensor, it receives a frequency signal proportional to the flow and calculates the output frequency. A yellow LED indicates the status of the output, i.e. it flashes in the rythm of the output frequency.

PROGRAMMING (only EFFF-xA)

- Adjust set frequency (= set flow) in the system.
- Apply a pulse of at least 0.5 seconds duration on Pin 2 or white wire (for lead version), (e.g. by bridging to the supply voltage or pulse from PLC).

Immediately after programming, the sensor shows the maximum output frequency which has to be specified with order.

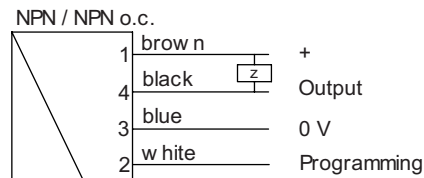
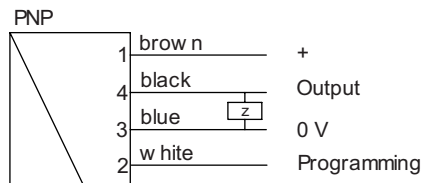
After programming, Pin 2 (or the white wire) must either remain unconnected or be connected to 0V.

MOUNTING

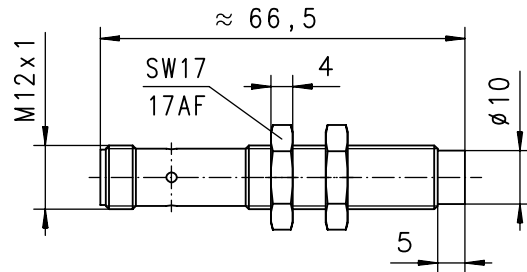
Screw the sensor into thread of the housing and turn it back a quarter of complete turn.

TERMINAL ASSIGNMENT

Before carrying out the electrical installation, make sure that the supply voltage corresponds to the data specification.



DIMENSIONS



TECHNICAL DATA

supply voltage	10..30 V DC
idle current	< 20 mA (without load)
output	NPN or PNP
short circuit current	max. 200 mA
input Frequency range	4..10000 Hz
output Frequency range	10..2000 Hz
connection	for locking plug M12x1, 4-pole Reservation according to DESINA
materials housing	nickel plated brass, PA66
protection class	IP67
operating temperature	0..70 °C
weight	approximately 25 g

NOMENCLATURE

EFFF-	H	10000	P	2000	P	S	basic type specification
	H						● Hall
	V						○ biased Hall
	I						○ inductive
		10000					● Input frequency (max. 10000, specificity only for fixed freq., otherwise 00000)
			P				● paired with HONSBERG unit
			F				● fixed input frequency
			A				● input frequency adjustable via program pin
				2000			● max. output frequency (max. 2000, specification required)
					N		● NPN
					P		● PNP
					M		○ NPN open collector
						S	● locking plug M12x1, 4pole

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable



- * Sensor with adjustable voltage output
- * Can be configured by user via pluggable pin (Teach-In)
- * M12x1 industry locking plug system

ADVANTAGE

The converter can be screwed into all HONSBERG rotor and turbine flow meters which have an M12x1 screwed hole for the sensor. Using the integral sensor, it receives a frequency signal and converts it to a flow-proportional output voltage of 0(2)..10 V (linearization of the flow meters curve is possible!).

PROGRAMMING

- Adjust max frequency (= max flow) in the system.
- Apply a pulse of at least 0.5 seconds duration on pin 2 or white wire (for lead version), (e.g. by bridging to the supply voltage or pulse from PLC).

Immediately after programming, the sensor puts out 10 V. The current value for 0 Hz (0 or 2 V) has to be specified with order and cannot be changed at the unit later.

After programming, pin 2 (or the white wire) must be connected to 0V.

Programming can be inhibited during manufacturing of the sensor. This has to be ordered explicitly.

TECHNICAL DATA

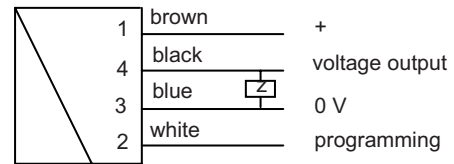
supply voltage	10..30 V DC
idle current	< 20 mA (without load)
voltage output	0..10 V or 2..10 V (other values on request)
frequency range	1..4095 Hz
connection	for locking plug M12x1, 4-pole
materials housing	nickel plated brass, PA66
protection class	IP67
operating temperature	0..70 °C
weight	approximately 25 g

MOUNTING

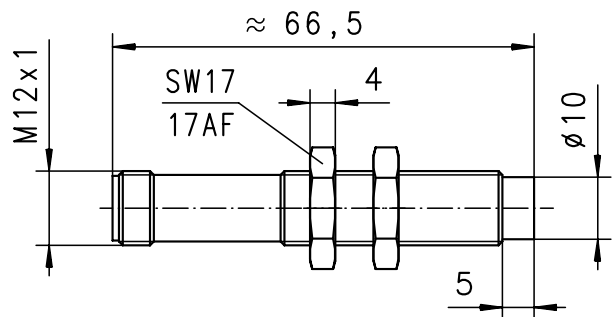
Screw the sensor into thread of the housing and turn it back a quarter of complete turn.

TERMINAL ASSIGNMENT

Before carrying out the electrical installation, make sure that the supply voltage corresponds to the data specification.



DIMENSIONS



NOMENCLATURE

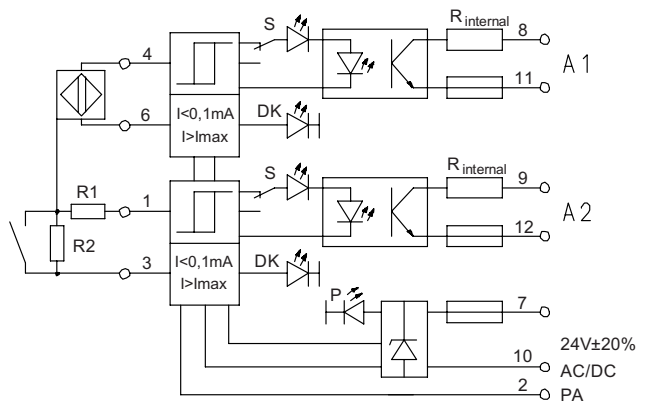
EFFU-	H	U	0	S	basic type specification
	H				● Hall
	V				○ biased Hall
	I				○ inductive
		U			● voltage output
			0		● 0 .. 10 V
			2		● 2 .. 10 V
			5		□ 0 .. 5 V
				S	● locking plug M12x1, 4pole

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable



WIRING DIAGRAM



$R1 > 1,8k\Omega$ / $R2 < 100k\Omega$
EEV1: $I_{max} = 30 \text{ mA}$

$R_{internal} = 510\Omega$
EEV2: $I_{max} = 6 \text{ mA}$

ADVANTAGE

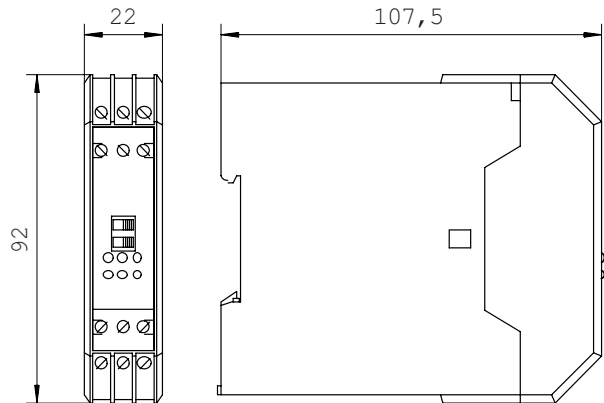
The two-channel separation circuit amplifiers with transistor output serve as an interface between electrical signals from the highly combustible range (ex area) and the not highly combustible range (non-ex area). The input signals (frequencies or switching signals) of NAMUR- and other 2-wire-sensors, as well as mechanical contacts or opto couplers are transferred to the outputs. The outputs are among themselves and from the remaining circuit galvanically separated. The electrical circuits of the sensor are galvanically connected with the power supply. The intrinsically safe electric circuits are suitable for zone 1, 2, 21 and 22.

Before start-up it is to be guaranteed that the clamp PA is connected with the potential equalization of the highly combustible range; when supplied with a safe galvanic separation the connection of the potential equalization can be omitted.

ASSEMBLY

The device is to be assembled onto a hat rail in a switch cabinet or a similar installation (min. IP20) outside the Ex-zone area.

DIMENSIONS



TECHNICAL DATA

		EEV1	EEV2
operating voltage		24 V AC/DC $\pm 20\%$	
power consumption DC		3,6 W	
no-load voltage		max. 10 V DC	
short-circuit current		max. 75 mA	max. 9,3 mA
output power		188 mW	24 mW
outer inductance	EEx ia IIC	3 mH	3 mH
	max. EEx ib IIC	6,7 mH	330 mH
outer capacitance	EEx ia IIC	475 nF	641 nF
	max. EEx ib IIC	4 μF	4 μF
actuating signal		< 7 mA > 14 mA	< 1,4 mA > 2,8 mA
outputs		2x open collector $U_{max} = 30 \text{ V AC/DC}$	
galvanic separation		up to a crest value of the nominal voltage of 60 V	
electrical connection		screw terminals	
connection diameter		< 1,5mm ² with end-sleeves	
material housing		PA66	
protection IEC 529		IP 30	
connectors		IP 20	
operating temperature		-25...+60°C	
conformity		PTB Nr. Ex-99.E.2073 X CE	

COMBINATION WITH FLOW METERS

Rotors	product information 4.2.RRI. 4.2.RRH. 4.2.RR.32
Turbines	5.1.RT.
Volumetric flow meters	6.1.VHZ.

EEV1 is applicable to 2-wire-sensors according to DIN EN 60947-5-6, 2-wire-Hall-sensors and floating mechanical contacts or opto-couplers.

EEV2 is applicable to NAMUR-sensors only.

All technical changes reserved

Device description

WE - Isolating switching amplifier with relay output

The residual current flow of 100 mA is monitored by an auxiliary circuit. In the event of a reduction in this current e.g. by a breakage in the control lead, the output relay is released.

- One- or two-channel
- Control current circuit [EEX ia] IIC



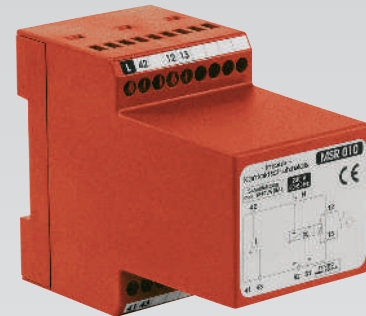
MSR - Multifunctional relay

Multifunctional relays are mono-stable contact protectors for connection to single contacts.

They increase switching safety and capacity of threshold instruments and reduce their contact load.

Unintentional switching of the device caused by vibration is significantly reduced by an off-delay.

- Increases switching capacity
- Off-delay



EEZ-904 - Counter

These devices can be programmed by the user to count time or pulses, as a position display or frequency counter and have two pre-selectable outputs. All the settings, including programming the pre-selected values, are carried out using just four keys on the front of the device and a plain text menu in the display.

- Current flow, filling, batch filling, difference monitoring
- A, B inputs, recognition of direction
- Displays [e.g. when counting totals in m² and litres]
- Simple to use
- Factor 0.0001...9.9999
- Data storage 10 years
- Adjustable thresholds [2]
- Relay outputs



ESA1 - Local electronic unit for frequency generating sensors

With the appropriate flow sensors, the ESA1 electronic unit forms an adjustable flow switch with trend indicator. When the switching point is undercut the output changes from 24 V DC to 0 V. The switching point can be adjusted at any time by pressing the "press" key and simultaneously turning the potentiometer. A red LED indicates undercutting of the switching point.

- Compact local display and switching module
- Switching point can be faded in
- Switching point can be set without process condition





ESK2 - Local electronic unit for frequency generating sensors

The monitoring unit acquires frequency signals [usually from flow meters] and switches the assigned output when it is below the minimum [ALARM1] or about the maximum value [ALARM2]. This compact electronic unit is inserted directly onto a suitable sensor or is installed rotatable.

- Monitoring electronics with 18..30 V DC supply
- 2 electronic switching outputs
- Setting of switching values using magnet
- Switch state indication using LEDs



ESK3 - Local electronic unit for frequency generating sensors

The monitoring unit acquires frequency signals [usually from flow meters] and releases a relay [contact open] when the flow is below the set minimum. This compact electronic unit is inserted directly onto a suitable sensor or is installed rotatable.

- Monitoring electronics with 230 V AC supply
- Switch contacts for high loads
- Red / green status display
- Extremely easy to use



GIA - Display with switching point

The display is provided as a local display. It shows all physical parameters [e.g. pressure, flow, temperature, filling level, distance ...] which are processed as 4-20 mA signals. The easily readable display can be adjusted to any metering parameter.

- Can be combined with sensors with 4-20 mA signal and DIN 43650-A plug
- Display with weighting factor possible directly indicates the physical parameters
- Freely selectable decimal point



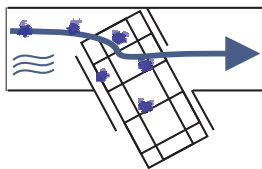
ELC - Display for level meter LC

Display instruments of the type ELC are available for standard openings of 60 mm and installation depths of 78 mm. The display is produced by a circular LED chain arrangement containing 24 LEDs. Zero point and maximum point can be set by the user.

- Connect universal display to operating voltage and level sensor
- Turn the "min." or "zero" button clockwise until you here it click [max. 20 turns].
- If the tank is full set the "max." or "span" button in such a way that the 24th LED is lit.
- If the tank is empty turn the "min." or "zero" anti-clockwise until the 2nd LED goes out (1 LED is always on as a "stand-by" indication).

Filters, accessories

The technology

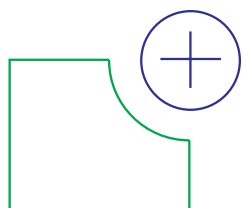


Filters

Dirt traps with magnetic separators for dirt protection and separation of ferrite sludge. Extremely fine filtration of liquids.

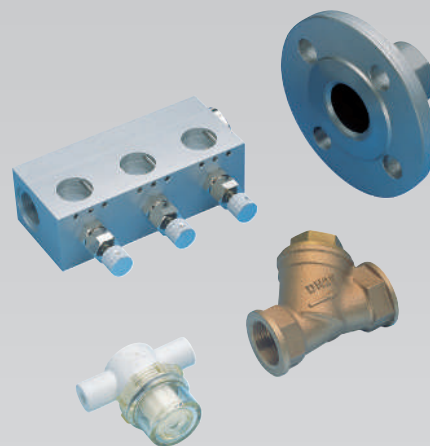
Accessories

The accessories range includes mechanical components such as valves [VC], valve strips [VB], fittings [TS] and flanges [FL] or electrical components as contact protection [HE].



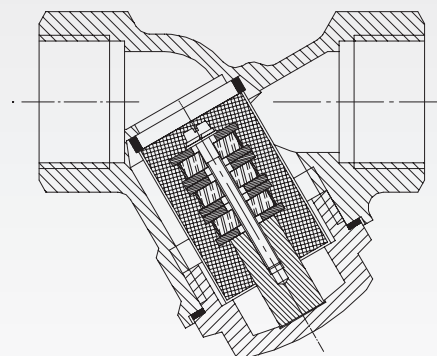
Application

- Soiling protection
- Regulating
- Contact to pipeline
- Contact protection



Contents

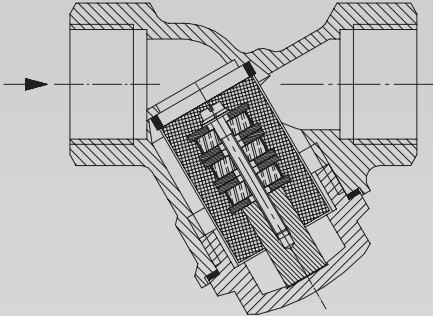
System description	322
Device descriptions	323



- Filtering
- Regulating

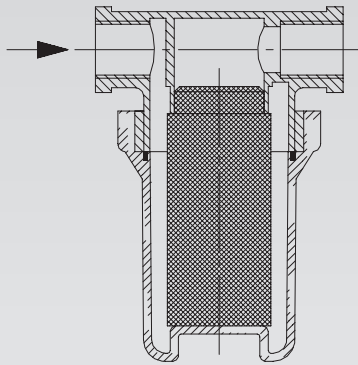
Filters

Honsberg filters are provided to protect Honsberg devices against soiling or as independent components for coarse and fine filtration of liquids.



The fine filters [ZE] have filter cartridges in a fineness range from 5-250 µm in metal or ceramic and are thus able to take over tasks which require extremely fine filtration.

A standard dirt trap is only able to achieve part of its protective function where ferrite abrasion is present in the medium, which is much smaller in grain size than the mesh of the dirt trap and is thus rinsed through it. For such cases, Honsberg magnetic filters [ZV] provide additional protection in that a magnetic rod which is equipped with shielded pairs of magnets is positioned in the centre of the dirt trap sieve and precipitates ferrite materials.

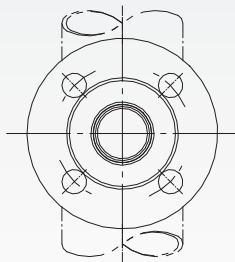
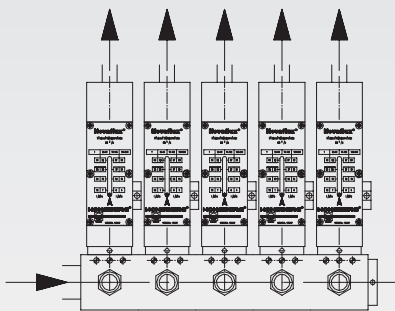









The individual pairs of magnets are poled in a certain way and shielded from one another by soft iron discs creating an optimum magnetic field in the area of the sieve, thus guaranteeing better efficiency.

The connection of the magnetic rod with the dirt trap cover leads to simple cleaning of the magnetic rod within the context of the specified maintenance intervals. The application ranges of Honsberg magnetic filters include industrial lubricating and cooling circuits as well as wherever the protection of high-quality metering devices such as heat counters etc. must be guaranteed, such as in the area of heating technology with boilers and radiators.

Accessories

The accessories range includes mechanical components such as valves [VC], valve strips [VB], fittings [TS] and flanges [FL] or electrical components as contact protection [HE].



	type	discription	nominal diameter	connections	max. pressure bar	max. temperature °C	water	oil	gas/air	miscellaneous	page
filter	 ZV	magnetic filter	15 - 80	female thread bronze	16	150	●	●	✓		324
	 ZEK	fine filter	4 - 15	female thread plastic	16	150	●	●	✓		325
	ZEL	fine filter	4 - 15	female thread plastic	16	150	●	●	✓		
ZEG	fine filter	10 - 20	female thread plastic	16	150	●	●	✓			
supporting components	 VB	manifold	20	female thread aluminium	25	100	●	●			327
	 TS	control valves	10 - 50	T-fitting	25		●	●	●	✓	328
	 VC	control valves	4	female thread stainless steel	13	120	●	●		✓	329
	 FL	flange connection	40-500	welding socket	16		●	●	●	✓	330
	 HE	spark protector				85					323

● standard ○ standard option □ special option

all data sheets available under www.honsberg.com



Spark protector HE100ZB

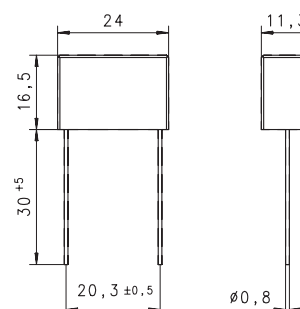
84.1
HE.



Technical data:

Capacity	0.047 - 0.47 µF
Capacity tolerance	±20%
Resistance range	22 - 470 Ω
Resistance tolerance	±30%
Voltage	250 V AC 50 Hz; 630 V DC
Peak voltage	1000 V
Power	0,5 W
Operating temperature	max. 85°C
Approval	S, N, D, FI, VDE, SEV, UL
Weight	0.01 kg

Dimensions



- * compact
- * economical

Principle

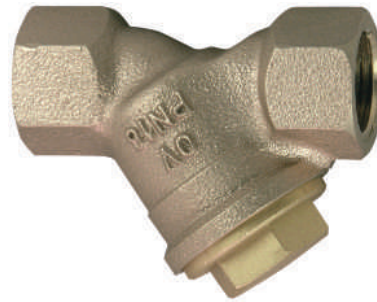
The reed switches or micro-switches used in Honsberg monitoring devices have a limited electrical switching capacity which can be taken from the descriptions for the individual devices. With higher switching values or if inductive loads or long line lengths are involved, a suppression circuit is recommended for the reed switch or micro-switch. The type HE100ZE is available for this purpose.

GENERAL CHARACTERISTICS

Magnetic Filters consist of a housing, a filter cartridge and a centrally arranged magnetic filter. The general parts are collected by the filter while ferrite parts gather around the magnetic separation candle.

- * combination of magnetic separator and filter
- * simple cleaning

Female thread Rp 1/2" to G3 bronze



ZV-025GR

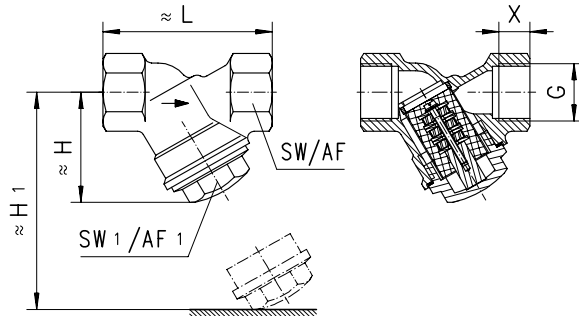
TECHNICAL DATA

	G	Type	PN bar	Qmax. rec. m ³ /h H ₂ O	number of magnets	H mm	L mm	H1 mm	AF mm	AF1 mm	X mm	weight kg
bronze	Rp 1/2"	ZV-015GR	16	2.3	2	42	66	84	25	22	11	0.30
	Rp 3/4"	ZV-020GR	16	2.7	3	50	77	100	31	27	14	0.40
	G 1	ZV-025GR	16	4.4	3	62	90	124	38	32	14	0.65
	G 1 1/4	ZV-032GR	16	5.1	3	78	112	156	47	41	16	1.05
	G 1 1/2	ZV-040GR	16	7	3	82	120	164	54	46	16	1.40
	G 2	ZV-050GR	16	11.9	4	95	150	190	66	56	20	2.20
	G 2 1/2	ZV-065GR	16	18.4	5	125	220	250	85	70	22	3.80
	G 3	ZV-080GR	16	30	4	140	250	280	100	75	25	5.80

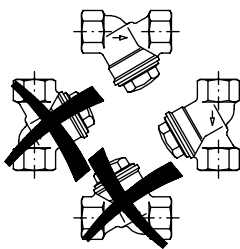
media temperature max. 150°C
average pressure loss 0.15bar at Qmax.
mesh size 600µm

MATERIALS

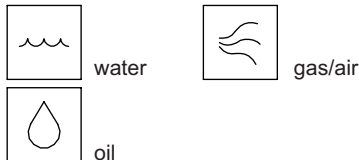
housing bronze Rg5/Rg6 ; brass
magnetic candle brass Ms58 ; steel St37
wema-koe-coated, bariumferrite
filter stainless steel 1.4301
seal lt400



MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

ZV-	015	G	R	basic type specification	
	015			nominal diameter	DN 15 - Rp1/2"
	020				DN 20 - Rp3/4"
	025				DN 25 - G1
	032				DN 32 - G1 1/4
	040				DN 40 - G1 1/2
	050				DN 50 - G2
	065				DN 65 - G2 1/2
	080				DN 80 - G3
		G			female thread
			R		housing bronze
Special option VARIO				<input type="checkbox"/>	filter mesh aperture 250µm flange housing cast iron

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

The Fine Filter is fitted with various filter elements in mesh size and material. Filters are employed for the cleaning of liquids and gases.

- * filter from 5 µm to 300 µm
- * simple cleaning
- * transparent or opaque cups

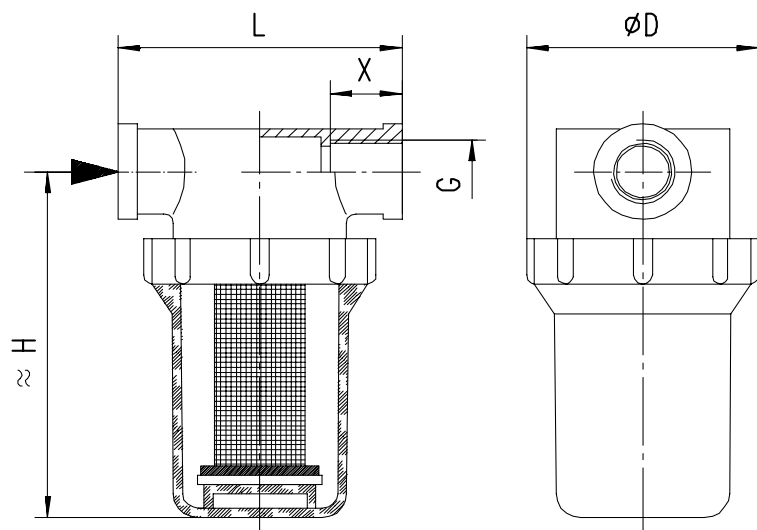
Female thread G1/8 to G3/4 PP



TECHNICAL DATA

	G	Type	H mm	L mm	D mm	X mm	weight kg
PP	G1/8	ZEK-004GP....	47	57.5	48.5	19	0.050
		ZEL-004GP....	84	57.5	48.5	19	0.075
	G1/4	ZEK-008GP....	50	74	48.5	19	0.050
		ZEL-008GP....	83	74	48.5	19	0.070
	G3/8	ZEK-010GP....	52	74	48.5	19	0.065
		ZEL-010GP....	86	74	48.5	19	0.085
		ZEG-010GP....	114	90	75	20	0.175
	G1/2	ZEK-015GP....	53	74	48.5	19	0.060
		ZEL-015GP....	87	74	48.5	19	0.080
		ZEG-015GP....	114	90	75	20	0.170
	G3/4	ZEG-020GP....	116	90	75	20	0.190

operational pressure 10 bar at 24°C
 7 bar at 52°C
 operational temperature max. 52°C



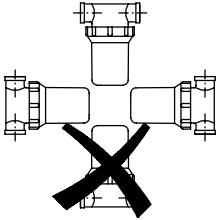
MATERIALS

housing PP
 cap PP or transparent nylon
 filter UHMW-PE sintered plastic or stainless steel
 seal NBR / Viton

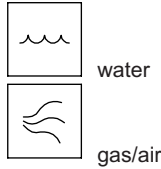
ELECTRICAL DATA

No electrical components.

MOUNTING POSITION



METERING SUBSTANCES



NOMENCLATURE

For combinations see table "technical data"

ZEK-	015	G	P	P	005	N		basic type specification
ZEK-							●	short filter Ø 18
ZEL-							●	longer filter Ø 18
ZEG-							●	large filter Ø 28
	004						●	DN 4 - G1/8
	008						●	DN 8 - G1/4
	010						●	DN 10 - G3/8
	015						●	DN 15 - G1/2
	020						●	DN 20 - G3/4
		G					●	female thread
			P				●	housing PP
				P			●	cap PP
				N			●	cap transparent nylon
					005		●	5 µm sintered plastic
					035		●	35 µm sintered plastic
					080		●	80 µm sintered plastic
					050		●	50 µm stainless steel
					100		●	100 µm stainless steel
					300		●	300 µm stainless steel
						N	●	seal NBR
						V	●	seal Viton

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

Manifold for single or multiple circuits. With integrated needle valve for manual flow control.

Female thread G1/2 up tp G3/4 aluminium/brass/stainless steel

Combination with the following flowmeters

- NJ-...W... - product information 1.2.NJ.
- NJV-...W... - product information 1.2.NJV.
- VO-...W... - product information 1.2.VO.
- VL-...W... - product information 2.3.VL.



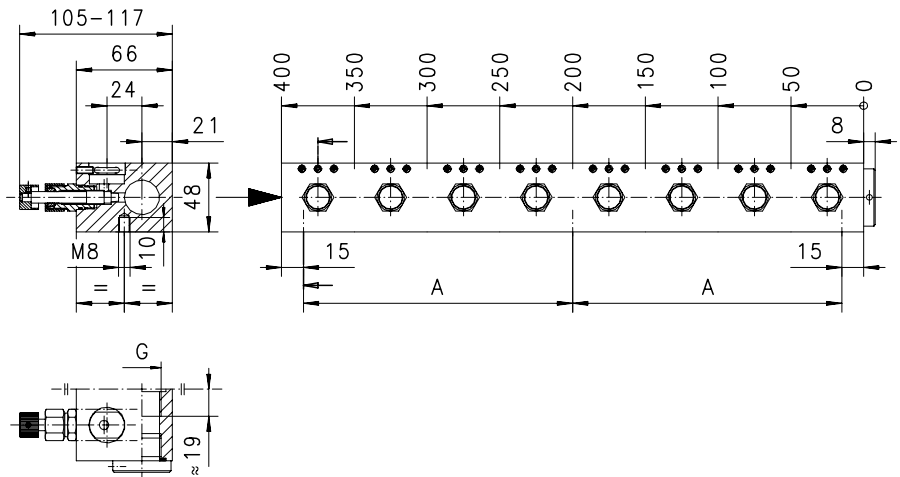
**VB-020GA3
mit NJV-015WM**

TECHNICAL DATA

Valve port	length mm (without plug)	number of fixing holes	A mm	weight kg (aluminium)
1	50	2	-	0.6
2	100	2	-	1.1
3	150	2	-	1.6
4	200	2	-	2.1
5	250	2	-	2.4
6	300	3	135	3.0
7	350	3	160	3.4
8	400	3	185	3.8

pressure PN 25 bar
media temperature max. 110°C

Attention! Observe nominal pressure and temperature of individual flow meters intalled!



MATERIALS

- VB-...GA**
- housing aluminium anodized
 - seal NBR
 - wetted parts brass, brass nickel plated
 - external parts Al, brass nickel plated

NOMENCLATURE

VB-	020	G	A	1	basic type specification
	015				○ nominal diameter DN15 - G1/2
	020				● nominal diameter DN20 - G3/4
		G			● female thread
			A		● aluminium
			K		□ stainless steel (wetted parts and housing 1.4305)
			M		□ brass (housing Ms58 nickel plated)
				1	● 1-fold port
				2	● 2-fold port
				3	● 3-fold port
				4	● 4-fold port
				5	● 5-fold port
				6	● 6-fold port
				7	● 7-fold port
				8	● 8-fold port

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

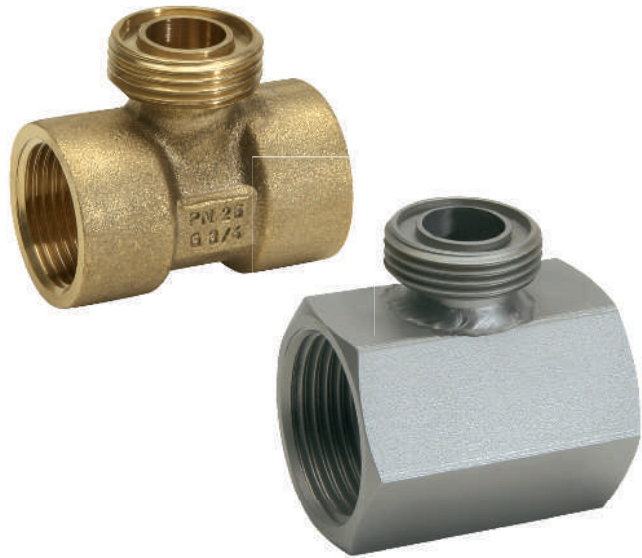
GENERAL CHARACTERISTICS

T-fittings to the direct installation in piping with G female thread in the materials brass or stainless steel.

female thread G3/8 to G2 brass/stainless steel

Combination with the following flowmeters

paddle UM3/UR1/UR2/UR3
calorimetric EFK... / Flex-F / omni-F



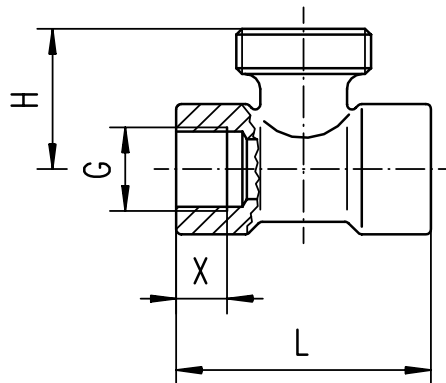
TECHNICAL DATA

pressure PN25

MATERIALS

TS-M... Ms58 nickel plated
TS-K... stainless steel 1.4305

Type	H mm	L mm	X mm
TS-.010	28	50	10
TS-.015	28	50	10
TS-.020	29	50	12
TS-.025	33	50	12
TS-.032	37	50	12
TS-.040	40	50	12
TS-.050	49	50	12



NOMENCLATURE

TS-	1	M	010		basic type specification
TS-				●	T-T-fittings
	1			●	for paddle switch (UM/UR)
	2			●	for calorimetric system liquid media
	3			●	for calorimetric system gaseous media (additional plastic)
		M		●	brass
		K		●	stainless steel 1.4305
			010	●	for nominal diameter DN 10 - G3/8
			015	●	DN 15 - G1/2
			020	●	DN 20 - G3/4
			025	●	DN 25 - G1
			032	●	DN 32 - G1 1/4
			040	●	DN 40 - G1 1/2
			050	●	DN 50 - G2

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗not recommendable

GENERAL CHARACTERISTICS

The Honsberg valves series VCS/VCP serve for the regulation of flows in liquid or gaseous form and create an reliable option to adjust processes.

Female thread NPT 1/8" stainless steel



VCS-004GK1R

VCP-004GK1S

TECHNICAL DATA

Valve	NPT	Type	taper size	maximum flow cm³/min		H1 mm	H2 mm	weight kg
				air *	water			
Standard	NPT 1/8"	VCS-004GK1.	1	13000	760	67	54	0.16
		VCS-004GK2.	2	46000	2150			
		VCS-004GK3.	3	68000	3550			
Precision	NPT 1/8"	VCP-004GK1.	1	253	17	77	64	0.18
		VCP-004GK2.	2	470	28			
		VCP-004GK3.	3	1100	74			
		VCP-004GK4.	4	3800	219			
		VCP-004GK5.	5	11900	722			
		VCP-004GK6.	6	21300	1255			

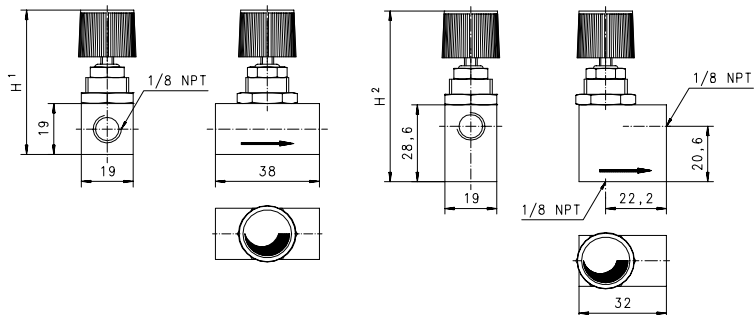
* based on 1bar rel. inlet pressure of air, exhausting to atmosphere

pressure
media temperature

PN 16 bar
max. 120°C

VC.-004GK.S sraight trough (180°)

VC.-004GK.A right angle (90°)



MATERIALS

housing stainless steel 1.4401
seal fluorocarbonat
orifice stainless steel 1.4401

NOMENCLATURE

VCS-	004	G	K	1	S	basic type
VCS-					○	standard valve 9 turns to full open
VCP-					●	precision valve 16 turns to full open
	004				●	DN 4 - NPT 1/8"
		G			●	female thread
			K		●	stainless steel
				1	●	1
				2	●	2
				3	●	3
				4	●	4
				5	●	5 only VCP-
				6	●	6
					S	sraight trough (180°)
					A	right angle (90°)

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

GENERAL CHARACTERISTICS

Mounting flange with weld-on connection piece for suitably mounting flow switches and meters.

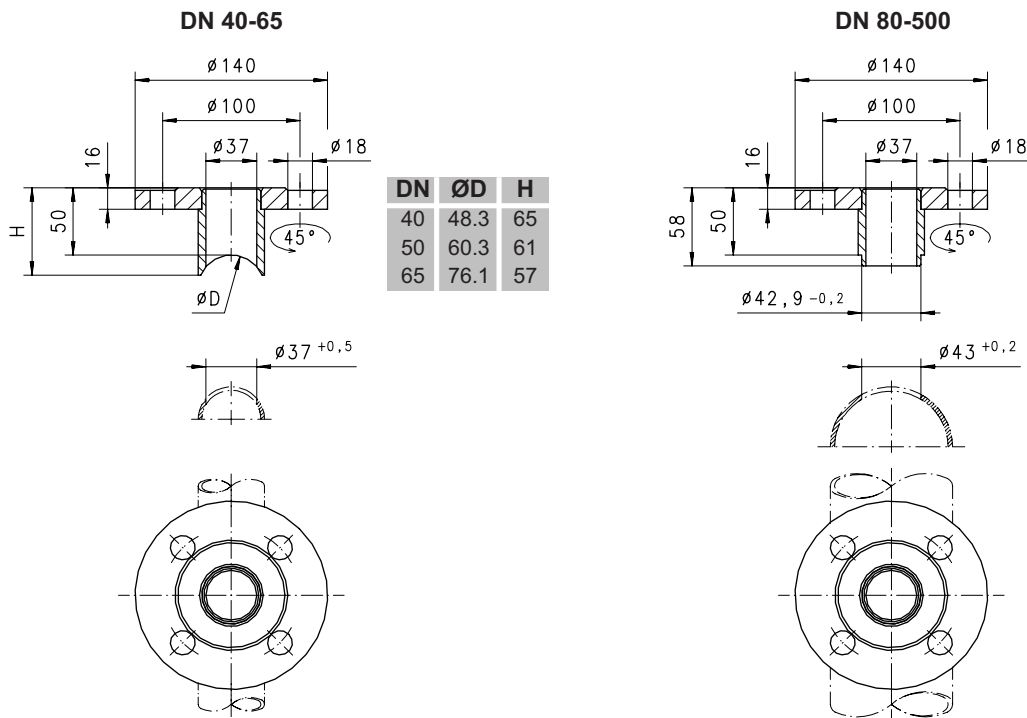
Flow Switch VM-...E. - product information 2.1.VM.E
Flowmeter TZ1-...E. - product information 2.3.TZ1.E

Flange DN32 steel/stainless steel



TECHNICAL DATA

Flange DIN 2527 PN 16 nominal diameter 32
Types of contact faces DIN 2526 Form C
Seal Ø82/43x2 Novapress 200
Hexagon head screws DIN EN 24017 M16x50-5.6
Hexagon nuts DIN EN 24032 M16-5



NOMENCLATURE

FL-	032	S	040	basic type
FL-				specification
			●	mounting flange, welded to connection piece including screw, nut and seal.
	032		●	DN 32
		S	●	steel
		K	○	stainless steel
		040	●	DN 40
		050	●	DN 50
		065	●	DN 65
		080	●	DN 80
		100	●	DN 100
		125	●	DN 125
		150	●	DN 150
		200	●	DN 200
		250	●	DN 250
		300	●	DN 300
		400	●	DN 400
		500	●	DN 500

for nominal diameter

All technical changes reserved

●BASIC Standard ○BASIC Programme option □VARIO Special option ⊕ PLUS Accessories ✗ not recommendable

Basis for business

Honsberg as partner of industrial plant construction

Independent development, competitive production and a customer-oriented sales philosophy makes Honsberg into a reliable partner of industrial plant construction and the processing industry. Our organisation is certified to ISO 9001/2000, guaranteeing product quality and first-rate processing.



Assembly

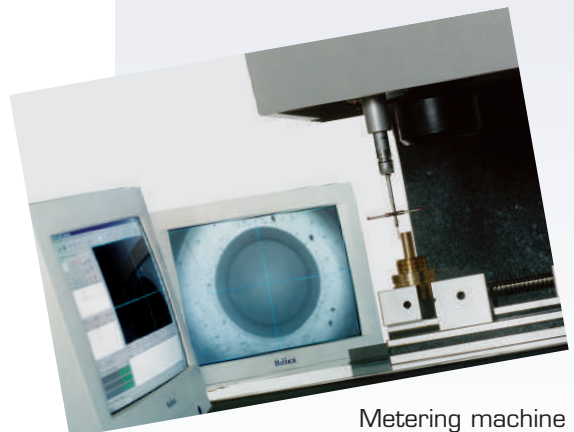


Design using 3D-CAD



Milling centre in the mechanical production

The Honsberg product you are using thus has the best possible pre-conditions for fulfilling its planned metering and monitoring task reliably over a long service life.



Metering machine



European approval
for electronic safety

Quality

General principles

A high and constant standard of quality is an important pre-requisite for a partner of industrial plant construction in sometimes safety-related applications. These requirements are implicated by Honsberg as follows:

- ISO 9000/2001 approval
- Independent QA organisation
- Regular auditing by independent institutes
- Regular internal training events and updating of workflows
- Regular auditing of our A-suppliers
- Traceability and electronic data archiving of the products delivered

Individual testing





Every order we are entrusted with is tested and released individually on the basis of the order data before dispatch.

System-related design

On account of operative requirements Honsberg units are optimised as early as the design stage and their basic function adapted to the task on hand.

- | | |
|------------------------|-------------------------------|
| ● Pressure loss | dependent on Q _{max} |
| ● Hysteresis | selection possible |
| ● Max. flow quantities | 2-3 m/s |
| ● Tolerance | 1-5% |
| ● Repetition accuracy | 1% |



-  Flow
0.01-5000 l/min
-  Level
20-2000 mm
-  Temperature
-40 ... +250 °C
-  Pressure
-1 ... +400 bar

Approvals



ATEX



GL



TÜV



DIN-GOST



KTA

Honsberg devices are handed over to reliable dispatch partners following a 100 % test and professional packaging for delivery to customers.

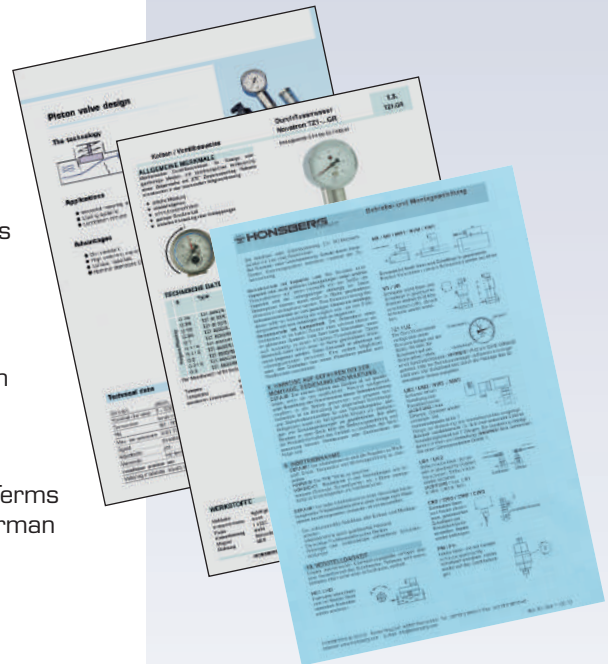
There are detailed instructions for initial operation included with every device system.

Warranty and service conditions can be found in our General Terms of Sale and the conditions of the Central Association of the German Electro-Industry [ZVEI] in the respective valid version.

Services include

- Support during initial operation
- Repair or replacement
- Application advice

Service telephone:
Tel.: +49 (0) 2191 / 9672-22



Safety first

Planning data for installation

Device description

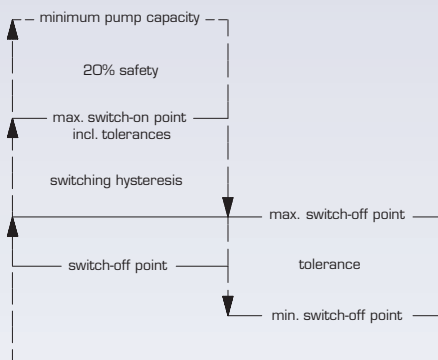
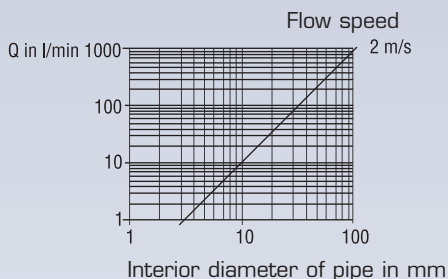
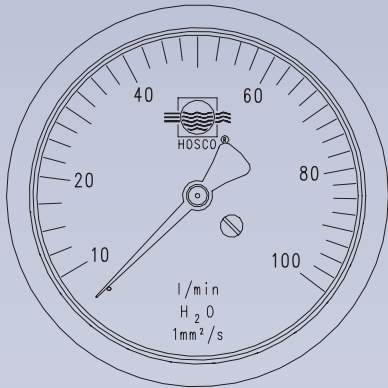
- **Monitor** - switching device
- **Pointer** - local or remote display in an accuracy range from 5 %
- **Meter** - local metering unit or continuous and linear signal generation in an accuracy range of up to 5 %

The device function

- **Measured value** - current display
- **Final value** - maximum display / switching value
- **Tolerance**
Tolerance is the extent of the deviation of a parameter from the normal status or normal dimension. Tolerance specifications are given within the context of the device description and can fluctuate under application conditions.
- **Repeating accuracy** - deviation during permanent function
- **Metering range**
The metering range describes the operative spread within which the device can be used. This can be the adjustment range for the switching point or the display range of a metering unit. We aim to make this spread as large as possible to extend the possibilities of each individual device. The working range is usually the factor 1:10 e.g. 10-100 l/min.

- **Flow rate**
Mechanical and electronic flow meters are designed for a certain flow rate or flow speed. We specify these data with a recommendation for a maximum flow speed in the area of 2-3 m/sec. or according to individual specifications for the respective product group. The maximum recommended flow rate can be exceeded. In this case increased pressure loss or heavier material wear must be expected.

- **Hysteresis**
The switching difference with switching devices and the display difference with display devices represent important operating data for the function of metering devices. The switching difference defines the difference between the switch-on and switch-off points with increasing or decreasing flow rate. This difference value is determined by the switching characteristic or the mechanical function of the metering unit. In the case of switching devices it must be ensured that the switch-on point is reached as a pre-condition for the contact function. In the case of display instruments there is a difference in display with increasing and decreasing flow rate.



Example:

Switch-off end	4.2 l/min
Tolerance	±0.3 l/min
Hysteresis	0.5 l/min
Functional amount	= 4.2 + 0.3 + 0.5 l/min = 5.0 l/min
Q _{min.}	= 5 l/min + 20 % safety = 6 l/min

- **Direction of flow**

The direction of flow must be observed, and is marked on every device.

- **Settling range**

The minimum length of the settling ranges depends on the respective application case. Basically, greater settling ranges are required when elbows or fittings are built into the intake side. Settling ranges of 5xDN are recommended.

- **Pressure loss**

The term pressure loss describes the drop in pressure caused by the device itself. This value depends largely on the device design. It is important that the system pressure is above the value of pressure loss in order to guarantee component function. The pressure loss values have been calculated on the basis of a flow speed of 2 m/sec. When this figure is exceeded, pressure loss increases disproportionately.

Electrical details

- **Make contact** - opened when at rest
- **Break contact** - closed when at rest
- **Changeover contact** - make and break contact
- **Output** - [0]4..20 mA, 0..10 V, PNP and/or NPN

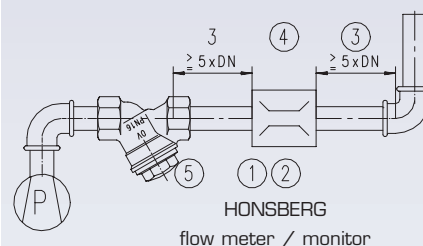
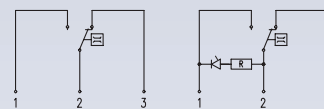
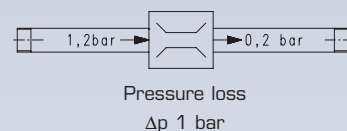
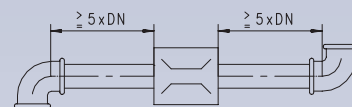
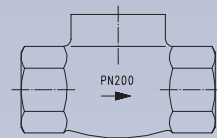
And finally ...

Initial operation

Certain basic principles must be taken into account during initial mechanical operation and electrical wiring. These are applicable for all HONSBURG products.

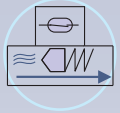
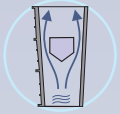

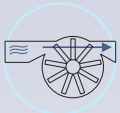
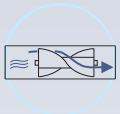
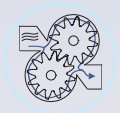
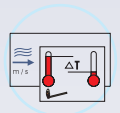
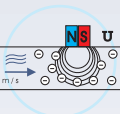

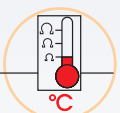
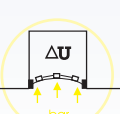
- (1) Pressure data must be observed according to device specification, as must the temperature range.
- (2) During installation, make sure the direction of flow is in the direction of the arrow symbol.
- (3) Straight stretches before and after the devices are beneficial to the device function in the sense of a laminar flow profile.
- (4) The circuit can either be seen on the device label or described in the delivery papers. In unfavourable cases [e.g. inductive or capacitive load], plan protective wiring
- (5) Clean the pipework system before installation. If permanent soiling occurs, use a magnetic filter [HONSBURG Volumat] or a dirt trap.

Customer service and sales office
Tel. +49 (0) 2191/9672-0



The substance is the objective

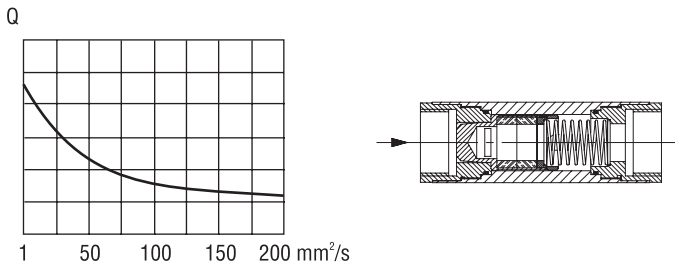
Viscosity / air / gas / temperature

Operation		H ₂ O	oil viscosity		air / gas 1 bar air
			100mm ² /s	200mm ² /s	
	piston	100%	40 - 99% see page 15 + 49		3500%
	float	100%	special scaling	special scaling	special scaling
	paddle	100%	70 - 80% see page 115		1500%
	rotor	100%	Oils to 10 mm²/s 80%		on request
	turbine	100%	Oils to 15 mm²/s 80%		on request
	gear wheel, oval wheel	100%	100%	100%	not recommendable
	calorimetric	100%	on request	on request	on request
	magnetic inductiv	100%	prohibitive	prohibitive	prohibitive
	level	100%	depending of liquid density		prohibitive
	temperature	independent of media			
	pressure	independent of media			

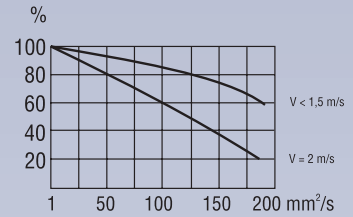
all data are approximate values

Viscosity

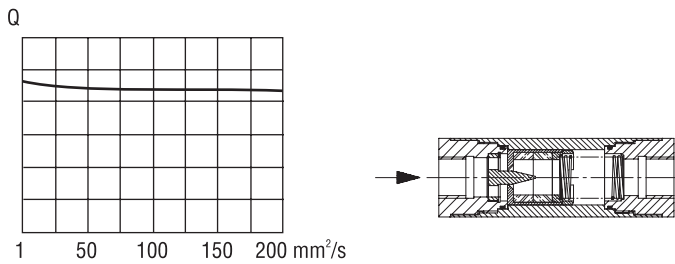
Function piston standard



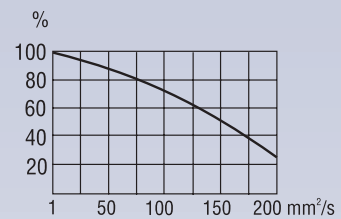
Switch point modification referring to viscosity and flow velocity



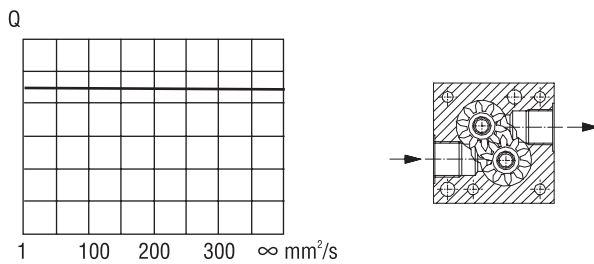
Function piston, viscosity compensated



Switch point, modification referring to viscosity

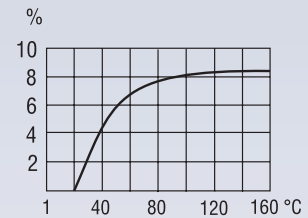


Function gear- oval wheel, viscosity-independently



Temperature

Switch point modification referring to temperature.



Material stability

brass bronze	cast iron	cast steel	stainless steel V2A	stainless steel V4A	measuring material
-	-	-	○	○	acetic acid
-	+	+	+	+	acetone
+	+	+	+	+	alcohol
○	+	+	+	+	alkalis
-	-	-	+	+	butyric acid
+	○	○	+	+	carbonic acid
○	○	○	○	○	chlorine
+	+	+	+	+	common salt
-	○	○	+	+	distilled water
-	-	-	+	+	glyceric acid
-	-	-	-	+	hydrochloric acid
+	+	+	+	-	lime water
+	+	+	+	+	mineral oil
+	+	+	+	+	natural gas
+	+	+	+	+	paraffin
+	+	+	+	+	petrol
+	+	+	-	+	steam
-	-	-	+	-	sulphuric acid

+ good ○ Sufficient - unsufficing

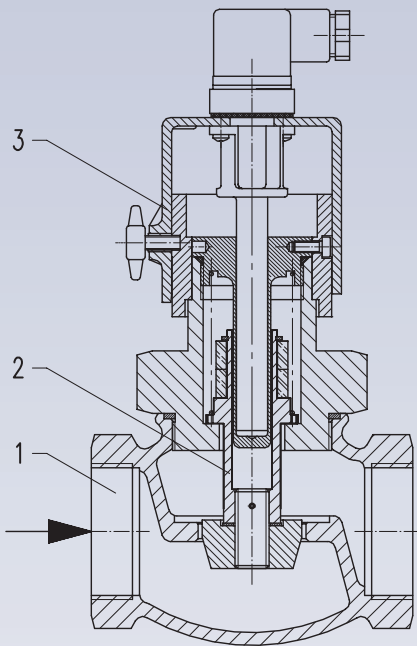
The basics are right

Materials

Material selection is divided into 3 classes:

1. wetted and pressurized
2. wetted non pressurized
3. neither wetted nor pressurized

The standard materials are

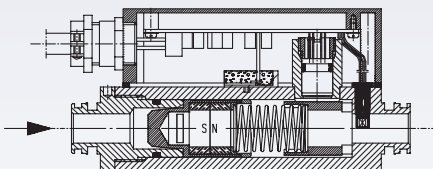


Class		
1	2	3
<ul style="list-style-type: none"> ● Brass ● Stainless steel ● Plastic ● Red bronze ● Cast iron ● Cast steel ● Glass ● Copper ● Sealing materials 	<ul style="list-style-type: none"> ● Brass ● Stainless steel ● Plastic ● Bronze ● Copper ● Magnetic materials 	<ul style="list-style-type: none"> ● Brass ● Stainless steel ● Plastic ● Steel ● Casting compound ● Copper ● Magnetic materials ● Glass ● Elastomers

Special options

The above device descriptions have conveyed a wide range of data and technical possibilities. If you have decided in favour of a HONSBERG product, our team is ready to process your order reliably.

Otherwise we recommend contacting HONSBERG for individual advice and project assistance within the context of the VARIO programme segment. Please let us have information about your case of application and the task to be solved.

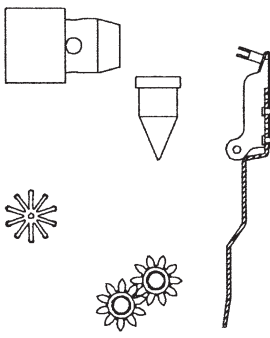
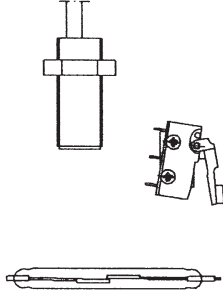


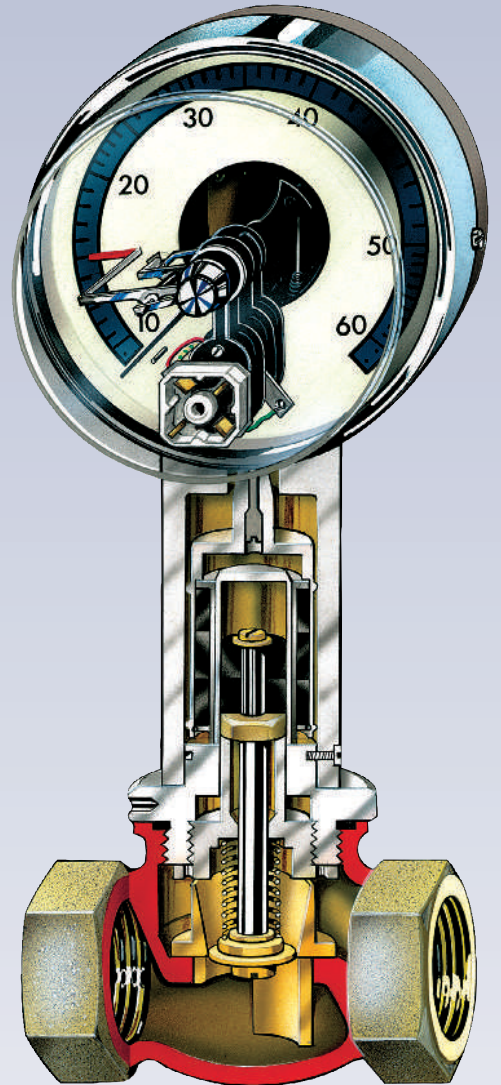
Mechanics	Electrics	Function
<ul style="list-style-type: none"> ● Pressure stage up to 500 bar ● Special thread ● Special flange ● Special materials ● Coating of the parts in contact with media ● Damping of moving parts (with air and gases) 	<ul style="list-style-type: none"> ● Specified switching differences ● Contact protection ● Special plug ● Temperature-resistant cable ● Gold-coating for contacts 	<ul style="list-style-type: none"> ● Version for specified metering materials ● Selected switching function ● Multi-function (integrated flow, temperature, pressure monitoring and metering)

Art of combination

The idea

Hermetical separation of primary measured value acquisition and secondary measured value evaluation.

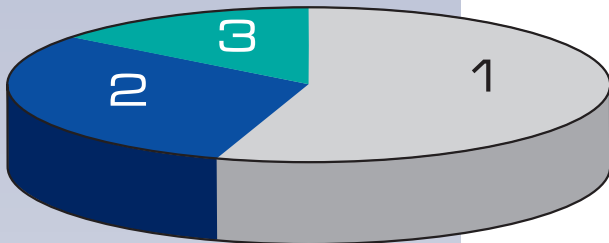
Primary measured value acquisition	h e r m e t i c a l s e p a r a t i o n	Secondary measured value evaluation
Piston Float Paddle Rotor Turbine Gear wheel Oval wheel Flap Sphere		Reed switch Micro-switch Hall sensor Inductive proximity switch Optical sensor Metering unit Temperature sensor Bimetal Pressure sensor
		



The advantages

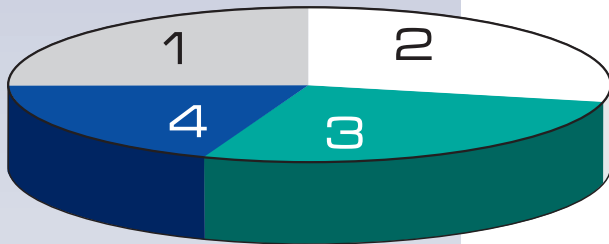
- Optimal matching of mechanical and electrical components
- Non-contact triggering of contacts and sensors
- Hermetic separation of mechanical and electrical components

The team is our strenght



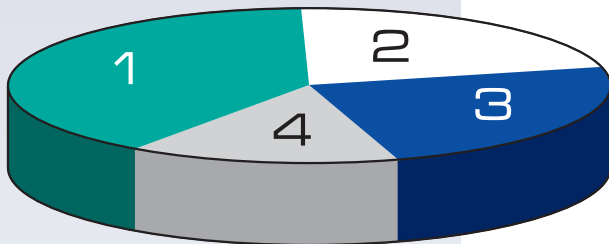
Honsberg staff structure

1. productive
2. technical administration
3. commercial administration



Honsberg periode of service (years)

1. 15+
2. 10+
3. 5+
4. <5



Honsberg age structure

1. - 30 Jahre
2. - 40 Jahre
3. - 50 Jahre
4. >50 Jahre



Honsberg Club 15

Team of staff members
 15 years and more.
 Appreciation & respect

Communication basics

The Honsberg documentation system



HONSBERG VIEW
INDUSTRIAL FLUIDCONTROL
Range summary,
company profile
31 pages

HONSBERG FOCUS
INDUSTRIAL FLUIDCONTROL
Application-related device
descriptions 12 to 24 pages



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price information



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INDUSTRIAL FLUIDCONTROL
Complete range catalogue

344 pages
Price list
40 pages



HONSBERG OMNI FLEX
INDUSTRIAL FLUIDCONTROL

Product catalogues
Integrated systems
Omni 40 pages
Flex 16 pages



HONSBERG CONTACT
INDUSTRIAL FLUIDCONTROL

Informative magazine for
customers and friends of
the company. Is distributed
at irregular intervals.



Data + details

flow

1 l/min	=	0.06	m ³ /h
1 l/min	=	0.21997	UK gal/min
1 l/min	=	0.26420	US gal/min
1 m ³ /h	=	16.6667	l/min
1 UK gal/min	=	4.546	l/min
1 US gal/min	=	3.785	l/min

length

1 feet	=	0.304799	m
1 feet	=	12	inch
1 inch	=	0.08333	feet
1 inch	=	25.39996	mm
1 km	=	1000	m
1 km	=	0.53960	naut.mile
1 km	=	0.62140	stat. mile
1 m	=	3.28085	feet
1 m	=	0.001	km
1 m	=	1000	mm
1 m	=	1.09362	yard
1 mm	=	0.03937	inch
1 mm	=	0.001	m
1 naut.mile	=	1.853	km
1 stat. mile	=	1.609	km
1 yard	=	0.91440	km

speed

1 ft/s	=	0.59252	knot
1 ft/s	=	0.30480	m/s
1 ft/s	=	0.68595	mile/h
1 knot	=	1.15767	mile/h
1 knot	=	1.68770	ft/s
1 knot	=	0.51441	m/s
1 m/s	=	3.28084	ft/s
1 m/s	=	1.94397	knot
1 m/s	=	2.25048	mile/h
1 mile/h	=	1.45784	ft/s
1 mile/h	=	0.86380	knot
1 mile/h	=	0.44435	m/s

pressure

1 bar	=	100000	Pa
1 bar	=	14.504	psi
1 N/m ²	=	1	Pa
1 Pa	=	0.00001	bar
1 Pa	=	1	N/m ²
1 psi	=	0.069	bar

volume

1 cm ³	=	1000	mm ³
1 dm ³	=	1000	cm ³
1 dm ³	=	1	l
1 ft ³	=	1728	in ³
1 ft ³	=	6.2282	UK gal
1 ft ³	=	7.4797	US gal
1 ft ³	=	0.02832	m ³
1 ft ³	=	28.3169	l
1 l	=	1	dm ³
1 l	=	0.03531	ft ³
1 l	=	0.21995	UK gal
1 l	=	0.26414	US gal
1 m ³	=	1000	dm ³
1 m ³	=	35.3146	ft ³
1 UK gal	=	0.16056	ft ³
1 UK gal	=	4.54656	l
1 US gal	=	0.1337	ft ³
1 US gal	=	3.78583	l

temperature

$$\text{temperature } ^\circ\text{C} = \frac{\text{temperature } ^\circ\text{F} - 32}{1.8}$$

$$\text{temperature } ^\circ\text{F} = \text{temperature } ^\circ\text{C} \times 1.8 + 32$$

weight

0.1 kg	=	3.53	oz	=	0	lb	3	oz
0.2 kg	=	7.05	oz	=	0	lb	7	oz
0.5 kg	=	17.64	oz	=	1	lb	1	oz
1.0 kg	=	35.27	oz	=	2	lb	3	oz
2.0 kg	=	70.54	oz	=	4	lb	6	oz
5.0 kg	=	176.35	oz	=	11	lb	0	oz

Viscosity

	mm ² /s	°E	RI sec	S. U.
			sec	sec
range gear wheel/oval wheel	1,0	1,0	28,5	-
	1,5	1,06	30	-
	2,0	1,12	31	32,6
	2,5	1,17	32	34,4
	3,0	1,22	33	36
	3,5	1,26	34,5	37,6
	4,0	1,3	35,5	39,1
	4,5	1,35	37	40,7
	5,0	1,4	38	42,3
	5,5	1,44	39,5	43,9
	6,0	1,48	41	45,5
	6,5	1,52	42	47,1
	7,0	1,56	43,5	48,7
	8,0	1,65	46	52
	10,0	1,83	52	58,8
	11,0	1,93	55	62,3
	13,0	2,12	61	69,6
	15,0	2,32	68	77,2
	17,0	2,55	75	85,1
	range piston/paddle	20,0	2,9	86
22,0		3,1	93	106
25,0		3,45	105	118,9
30,0		4,1	125	140,9
35,0		4,7	144	163,2
40,0		5,35	164	185,7
45,0		6,0	185	208,4
50,0		6,65	205	231,4
56,0		7,4	229	259
60,0		7,9	245	277,4
70,0		9,24	283,5	323,4
80,0		10,56	324	369,6
90,0		11,88	364,5	415,8
100,0		13,2	405	462
114,0		15	460,5	526,7
150,0		19,8	611	701
227,4		30	921	1053,3
303,2		40	1228	1404,4
379,0		50	1535	1755,5
400,0		52,8	1620	1848
1080,0	142,5	4435	5000	
2160,0	285	8870	10000	
8460,0	1140	35480	40000	

all information beyond our responsibility

Data + details

materials

stainless steel

No.	materials	VA	AISI	BS
1.4122	X 35 CrMo 17	2	-	-
1.4301	X 5 CrNi 18 10	2	304	304S15
1.4305	X 10 CrNiS 18 9	2	303	303S21
1.4310	X 12 CrNi 17 7	2	301	-
1.4404	X 2 CrNiMo 17 12	4	316L	316S12
1.4408	G-X 6 CrNiMo 18 10	-	CF-8M	-
1.4436	X 5 CrNiMo 17 13	4	316	316S16
1.4462	X 2 CrNiMoN 22 5	-	2205	-
1.4541	X 6 CrNiTi 18 11	2	321	321 S1 2

brass

No.	materials	Ms	DIN-EN
2.0230	CuZn10	Ms90	CW 501 L
2.0321	CuZn37	Ms63	CW 508 L
2.0360	CuZn40	Ms60	CW 509 L
2.0380	CuZn39Pb2	Ms59	CW 612 N
2.0402	CuZn40Pb2	Ms58	CW 617 N

cast iron

No.	materials
0.6026	GG-25

bronze

No.	materials	Rg
2.1096.01	G-CuSn5ZnPb	Rg5
2.1093.01	G-CuSn6ZnNi	Rg6

cast steel

No.	materials	GP
1.0619 N	GSC-25	GP 240 GH

plastic

ABS	acrylnitrile/butadiene/styrene
PA	polyamide
PC	polycarbonat
POM	polyoxymethylene
PP	polypropylen
PS	polystorol
PTFE	polytetrafluorineethylene (teflon)
PVC	polyvinyl chloride
PVDF	polyvinylidenfluoride

elast

DIN/ISO	ATSM	marking	commercial name
CR	CR	chloroprene-caoutchouc	neopren, baypren, butaclor, denka chloroprene
EPDM	EPDM	ethylene-propylene-diene-caoutchouc	dutral, keltran, vistalon, nordel, epsyn, buna AP
FPM	FKM	fluorine-caoutchouc	viton, flureol, tecnoflon, noxtite
NBR	NBR	acrylnitrile-butadiene-caoutchouc	perbunan, buna N, hycar, breon, butakon

flow
level
temperature
pressure



Index

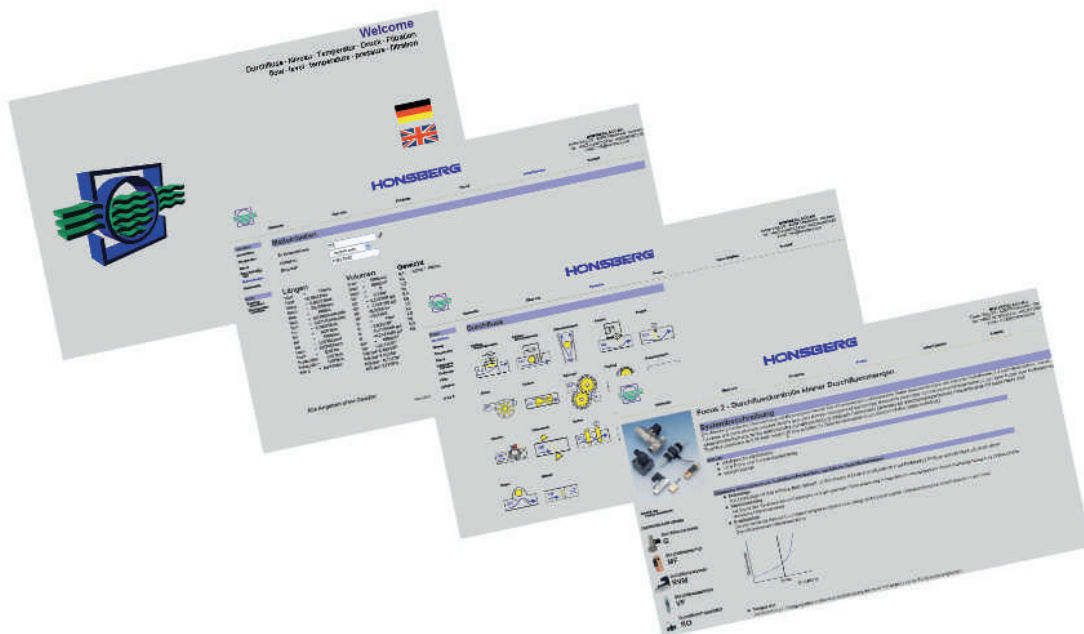
AR	96	MI	96	TZ1-...E	152
BL	233	MMF	124	TZ1-...F	48
CF	220	MP	40	TZ1-...GK	44
CM2K	146	MR	75	TZ1-...GR	42
CRG	148	MR1K	77	UB1	144
CWE	260	MSR	319	UI	141
EDP1	292	MW3	258	UK-020	106
EEFK	215	MWI	261	UK-040	108
EEV	318	MXM	37	UK-044	110
EEZ	319	MXO	37	UK-047	112
EEEE	316	MXR	36	UK-048	114
EFFI	315	NA	264	UK-050	116
EFFS	314	NB	264	UM3K-...GK	136
EFFU	317	NBS	263	UM3K-...GM	136
EFK2	210	NG	262	UM3K-...VK	138
EFKM	208	NH1	81	UM3K-...VM	138
EFKP	208	NJ	82	UR1-...GK	140
EFKS	215	NJV	85	UR1-...GM	140
ELC	320	NL	265	UR1-...VK	142
EPS	288	NM	248	UR1-...VM	142
EPS1	290	NMS	249	UR2-...GK	140
ESA1	319	NO	94	UR2-...GM	140
ESK2	320	NR	252	UR2-...VK	142
ESK3	320	NW1	259	UR2-...VM	142
ETS	274	NW3	258	UR3K-...GK	132
ETSD	276	Omni	297	UR3K-...GM	132
FF	20	ON	227	UR3K-...VK	134
FH	226	OT	96	UR3K-...VM	134
FIS	217	OW	228	UZ	154
FK	230	PD	47	VB	327
FL	330	PH	282	VC	329
Flex	297	PI	284	VD-...F	47
Flex-FIN	212	PM	282	VD-...GK	28
FM	22	PO	166	VD-...GR	26
FQ	231	PS	287	VDO	34
FR	167	RA	170	VF	90
FW1	56	RH	172	VHO	196
FW3	58	RM	168	VHZ	192
FX	59	RO	184	VI	48
G	24	RR-032	180	VL	104
GIA	320	RRF	185	VM-...E	150
GK	118	RRH-010/025	176	VM-...F	47
GKL	121	RRI-010/025	174	VM-...GK	32
GR	102	RR0-010/025	178	VM-...GR	30
HD1K	61	RRT	187	VO	92
HD2K	64	RRT1	188	VP	285
HE	323	RS	167	WE	319
HM1K	67	RT	190	WK	240
HR1MV	70	RVM	79	WO1	229
HV	183	RW	256	WP	241
KH	238	RWI	257	WR1	169
KM	239	SB	250	WT	242
LC	254	SK	232	XF	157
MD	286	TF1	272	YR	149
MF-003	73	TR	273	ZE	325
MF-007	74	TS	328	ZV	324
MH	88	TX	38		

Honsberg world wide

The description of our sales organisation is available under www.honsberg.com/contact



All up-to-date product information is available as PDF files on our website www.honsberg.com





HONSBERG & CO. KG
Tenter Weg 2 - 8 · 42897 Remscheid, Germany
P.O.Box 11 03 69 · 42863 Remscheid, Germany
Telefon +49 (0) 21 91 / 96 72-0
Telefax +49 (0) 21 91 / 96 72-40
info@honsberg.com
www.honsberg.com

Agent