Variable Area Flowmeter

V31

Operating Instructions

Please read the instruction manual and keep them in a safe place!

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Introduction

I. Shipping and storage; product inspection

Shipping and Storage

The device is to be safeguarded against moisture, dirt (especially the meters internal), impact and damage. The storage temperature limits are to be observed. Depending on the device size the area flowmeters float may be secured. This transport protection must be removed before the device is installed.

Product inspection

Upon receipt of the product, the consignment should be checked for completeness. The data of the device have to be compared with the packing slip and the order documents

Notify us of any shipping damage immediately upon receipt of the product. Any damage claim received at a later time will not be honoured.

II. Warranty

Your flow meter was manufactured in accordance with the highest quality standards and was thoroughly tested prior to shipment. However, in the event any problem arises with your device, we will be happy to resolve the problem for you as quickly as possible under the terms of the warranty which can be found in the terms and conditions of delivery. Your warranty will only be honoured if the device was installed and operated in accordance with the instructions for your device. Any mounting, commissioning and/or maintenance work is to be carried out by qualified and authorized technicians only.

III. Maintenance, Repair and Hazardous substances

When used in the intended manner no special maintenance is required. However, the flowmeter should be checked within the context of routine maintenance of the facility and the pipelines. Should a repair, calibration or maintenance become necessary, be sure to clean the device thoroughly and follow the steps in section 2.5, “Returning your flowmeter for servicing or calibration” before returning the device to Heinrichs Messtechnik. The operator is liable for any substance removal or personal damage costs arising from inadequate cleaning of a device sent for repair.

IV. Disposal

Observe the regulations applicable to disposal in the country of installation!

V. Supplementary operating instructions

Supplement operating manuals are available for special features, interfaces and operations relating to your device, request your copy from our service department.

VI. Operating manual of explosion-proof flowmeters

For installation of the flowmeter within hazardous areas read the operation manual of explosion-proof flowmeters. It contains all the EX-relevant information for your flowmeter.

Warning!

Only devices designated as EX-certified on their rating plates may be used in areas of potentially explosive atmospheres!

The use of standard equipment in EX-hazardous areas is strictly prohibited.

1. Steps Prior to Operation

These montage and operating instructions are provided to help aid in the correct installation as well as for the operation and maintenance of the meter. It is essential that you read these operating instructions before installing and operating the device. The device is to be installed and serviced by a qualified technician only. Special designs and applications are not included in this manual.

Although the materials in the present document were prepared with extreme care, errors cannot be ruled out. Hence, neither the company, the programmer nor the author can be held legally or otherwise responsible for any erroneous information and/or any loss or damage arising from the use of the information enclosed.

Heinrichs Messtechnik GmbH extends no express or implied warranty concerning the applicability of the present document for any purpose other than that described.

We plan to optimize and improve the products described and in so doing will incorporate not only our own ideas but also, and in particular, any suggestions for improvement made by our customers. If you feel that there is any way in which our products could be improved, please send your suggestions to the following address:

Company:
Heinrichs Messtechnik GmbH
HM-EE (R&D Department)
Robert-Perthel-Strasse 9
D-50739 Cologne
Germany

or:

via fax : +49 (221) 49708-178

via email: info@heinrichs.eu

NOTE

Note:
We reserve the right to change the technical data in this manual in the light of any technical progress that might be made.

For updates regarding this product, visit our website at www.heinrichs.eu, where you will also find contact information for the Heinrichs Messtechnik distributor nearest you. For information regarding our own sales operations, contact us at info@heinrichs.eu.

2. Safety Advisories

2.1 Installation, Commissioning, Operating Personnel

The present document contains the information that you need in order to operate the product described herein properly. This document is intended for use by qualified personnel. This means personnel who are qualified to operate the device described herein safely, including

- electronics engineers,
- electrical engineers, or
- service technicians

who are conversant with the safety regulations pertaining to the use of electrical and automated technical devices and with the applicable laws and regulations in their own country.

Such personnel must be authorized by the facility operator to install, commission and service the product described herein, and must have read and understood the contents of this operating instructions before working with the device.

2.2 Hazard Warnings

The purpose of the hazard warnings listed below is to ensure that device operators and maintenance personnel are not injured and that the flow meter and any devices connected to it are not damaged.

The safety advisories and hazard warnings in the present document that aim to avoid placing operators and maintenance personnel at risk and to avoid material damage are prioritized using the terms listed below, which are defined as follows in regard to these instructions herein and the advisories pertaining to the device itself:

Warning

means that failure to take the prescribed precautions **could result** in injury, substantial material damage or even death. Always comply to these warnings and proceed with caution.

Caution

means that failure to take the prescribed precaution **could result** in material damage or destruction of the device. We advice always to abide to these instructions!

Note

means that the accompanying text contains important information about the product, handling the product or about a section of the documentation that is of particular importance.

2.3 Proper Use of the Device

The Coriolis Mass Flow Sensor is intended for the sole use of direct and continuous mass flow measurement of liquids and gases.

To ensure safety for people and the environment adhere to the installation and operational instructions and warning in this manual.

Warning

The operator is responsible for ensuring that the material used in the sensor and housing are suitable and that such material meets the requirements for the process medium and the ambient site conditions.

The manufacturer accepts no responsibility for the selection of unsuitably materials.

Warning

Before using the meter with corrosive or abrasive media, the operator must check the suitability of all materials that come into contact with the media. In the case of special media, including cleaning media, we will be happy to help you check the corrosion resistance of materials. However, since small changes in the process temperature, concentration or the degree of contamination can result in changes in the corrosion resistance, the full responsibility must remain with the operator.

Caution

To ensure the device performs correctly and safely, it must be shipped, stored, set up, mounted, operated and maintained correctly.

2.4 Installation and servicing

The devices described in this manual are to be installed and serviced only by qualified technical personnel such as a qualified Heinrichs Messtechnik electronics engineer or service technician.

Heinrichs Messtechnik GmbH accepts no liability for any loss or damage of any kind arising from improper operation of any product, improper handling or use of any replacement part, or from external electrical or mechanical effects, overvoltage or lightning. Any such improper operation, use or handling shall automatically invalidate the warranty for the product concerned.

In the event a problem arises with your device, or if you need assistance in diagnosing a problem with your device, please contact us at one of the following numbers to arrange to have your device repaired:

+49 (0)221 49708-0 +49

(0)221 49708-178

2.5 Returning your flowmeter for servicing or calibration

Before sending your flowmeter back to us, for servicing or calibration, make sure it is completely clean. Any residues of substances that could be hazardous to the environment or human health are to be removed from all crevices, recesses, gaskets, and cavities of the housing before the device is shipped.

Warning

The operator is liable for any loss or damage of any kind, including personal injury, decontamination measures, removal operations and the like that are attributable to inadequate cleaning of the device.

Any device sent in for servicing is to be accompanied by a "Declaration of Decontamination", a template of which is provided in section 12.

When returned, the device is to be accompanied by a document describing the problems encountered. Please include in this document the name of a contact person whom our technical service department can contact to enable us to repair your device as expeditiously as possible and minimize the repair costs.

3. Identification

Manufacturer: Heinrichs Messtechnik GmbH
Robert-Perthel-Strasse 9
D-50739 Cologne
Germany

Phone: +49 221 49708-0
Fax: +49 221 49708-178
Internet: www.heinrichs.eu
Email: info@heinrichs.eu

Contact Information Importer

Product type: Variable area flow-meter

Product name: V31

File name: V31_BA_21.02_EN.DOC

Version:. 21.02

Publish date November 25, 2021

3.1 Designation / Rating Plate

The device and its specifications are presented as a model-code on the rating plate. The model-code consists of the prefix "V31" followed by an alpha-numerical code.

Refer to section 11 "Model Code V31" for a description of each position.

Example of a V31 rating plate.

Heinrichs KOBOLD Group www.heinrichs.eu	TYPE V31 MODEL-CODE	: XX-XX-XX-Muster	
	SER. NO.	: 123456	
	MAX. OPERATING PRESSURE	: X Bar	
	TEMP. RANGE	: -10°C to 80°C	
	MANUFACTURING DATE	: 09.2021	CE
	PED	: 1G/1L	

4. Application

The V31 variable area flow-meter is used for the flow metering of transparent liquid and gas media in pipes. The scale on the device indicates the flow rate expressed as a volume or mass per unit of time. Standard scales are available for liquids with a density of 1kg/l (62.43 lb/cu.ft). The scales must be recalculated for all other media depending on the physical characteristics.

The flow tube is optionally available with percentage or 2 mm (0.078 inch) scaling.

Applications: Flow metering, dosing, monitoring and control of liquid or gas media.
For the purpose of process monitoring, the device can be fitted with one or more limit switches.

Warning
The device is of limited use for the metering of potentially hazardous liquids and gases. It is essential that the operator takes appropriate steps to ensure that in the event of a glass tube breakage, no personnel are harmed and no equipment is damaged. The system operator is legally responsible for any effects provoked by operation of the device

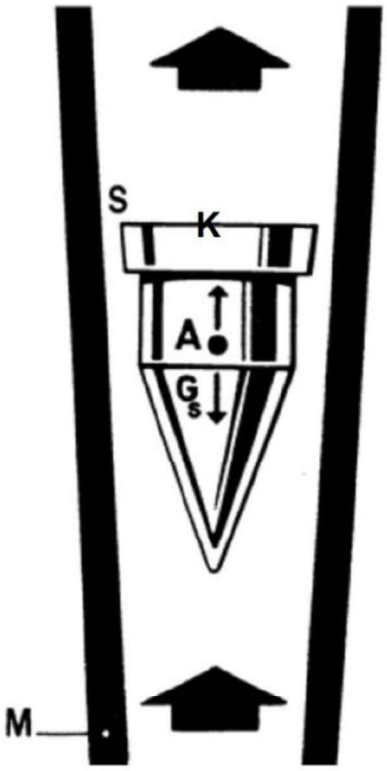
Warning

Only devices marked as Ex-devices on their rating plates may be used in EX hazardous locations. Standard equipment is not permitted for installation and operation in EX hazardous locations.

For installation within hazardous areas read the Ex-supplementary manual available at www.heinrichs.eu. It contains all EX-relevant parameters for the V31 flow-meter.

5. Operating Principle and System Configuration

The measuring instrument composes of a float and a conical glass tube (**M**)



A medium flows from the bottom to the top through the measuring ring, lifting the float in the process until the buoyancy force (**A**) and the weight of the float (**Gs**) establish equilibrium. As the height of the float varies, an annular clearance (**S**) proportional to the flow appears between the float and the measuring tube. The height of the float (**K**) in the measuring tube serves as the actual rate of the flow. The flow rate is read directly from the scale.

The readings obtained apply solely to the medium for which the device has been calibrated or for a medium with the same density and viscosity as the calibration medium.

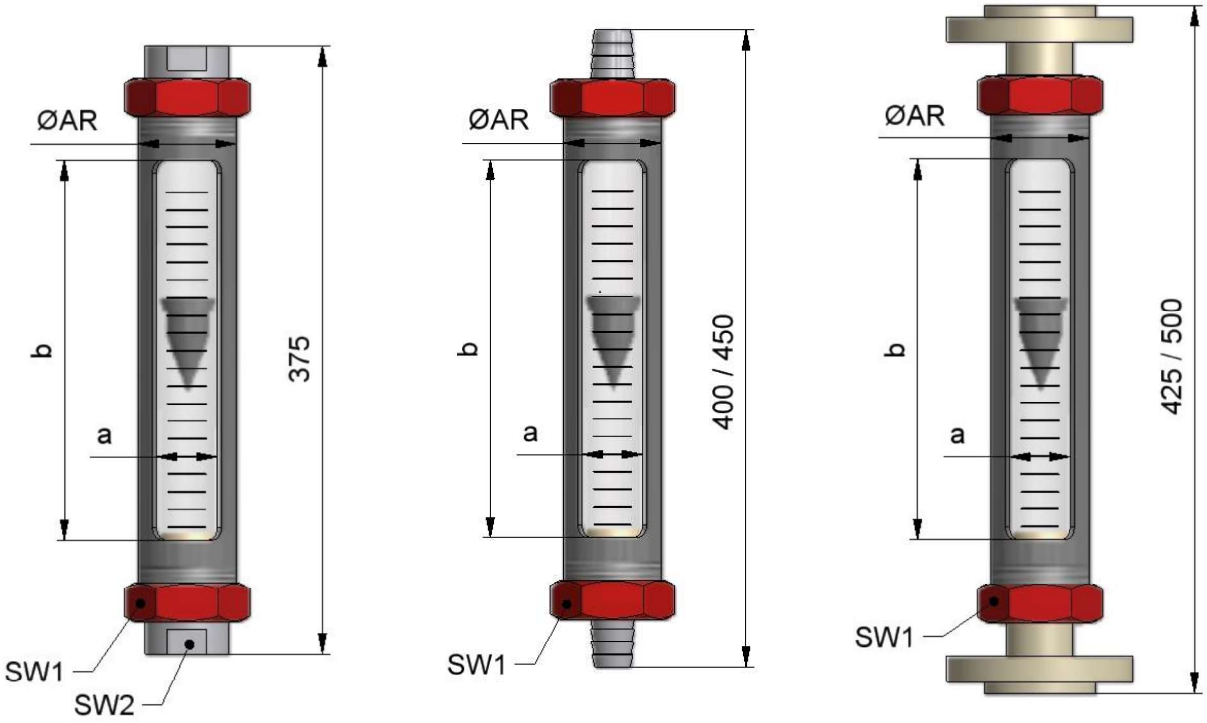
The float may also be optionally guided by a float guid rod. This option is recommended to increase the operational safety and to protect against glass breakage in particular operating environments, with the use of solenoid valve controls.

Bei certain levels of viscosity guided floats are essential. This option however cannot be combined with floats containing magnets or with PVDF coated floats.

For signalling specific flow rates, the variable area flowmeter can be outfitted with limit switches. This option is only available with floats which possess mounted magnets.

5.1 System Design

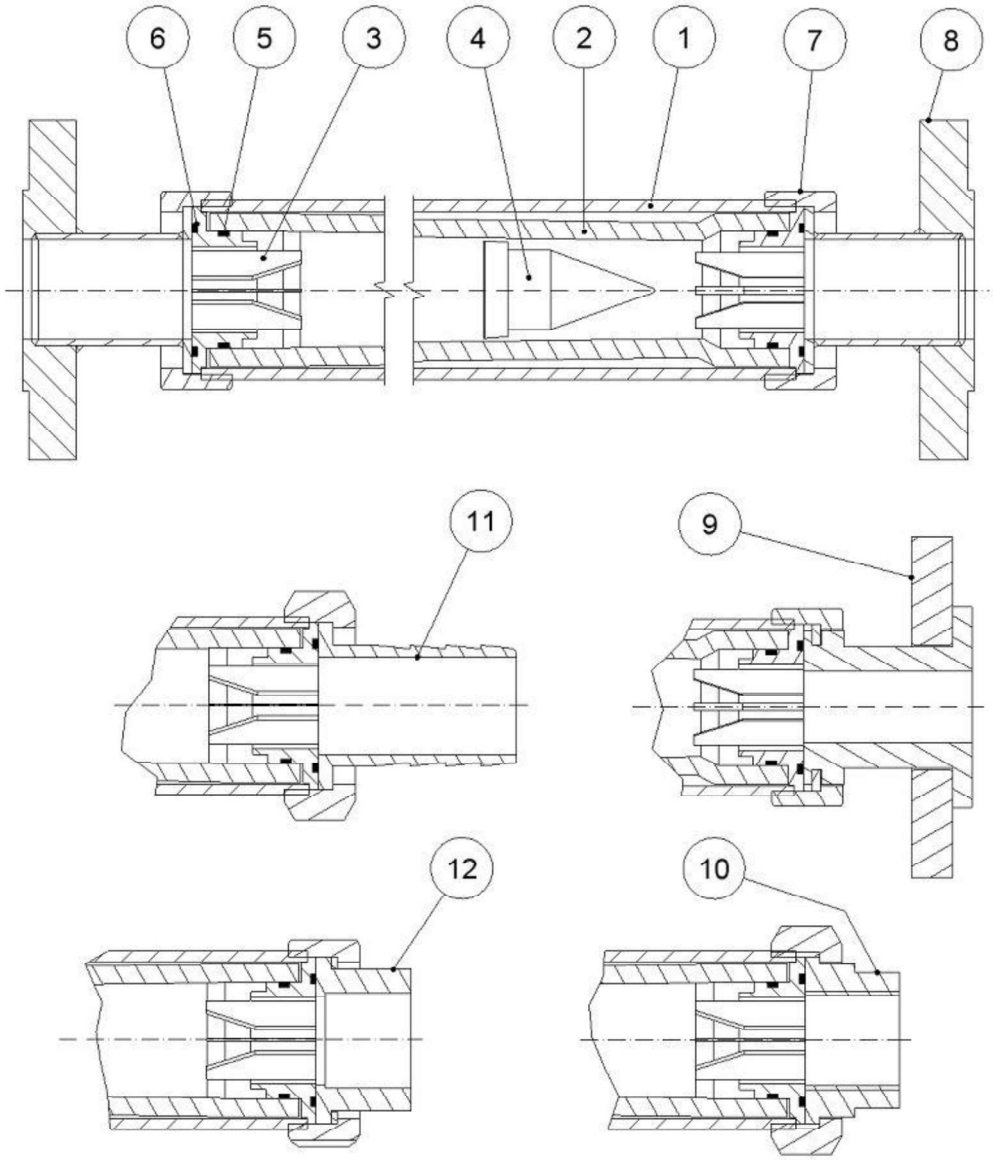
5.1.1 Construction / dimensions



V31	Sensor					Connection			
						Thread	Hose Connector	Flange	
Model	ØAR	a	b	SW1	SW2	G / NPT	Inner Diameter	DN EN1092-1, Form B1, PN40	ASME B16.5-2003, RF, Class 150
S04	Ø33,7	19	235	39	24	1/4", 3/8", 1/2"	Ø13, Ø17	10/15/20/25	1/2", 3/4", 1"
S05									
S06	Ø60,3	38	235	67	46	3/4", 1"	Ø19, Ø25, Ø38	25/40	1", 1½"
S07	Ø88,9	58	235	100	65	1¼", 1½", 2"	Ø50	40/50/65	1½", 2", 2½"

Weights	Connection thread		Connection Flange	
S04	G 1/2"	0,7 kg	DN 15	2,0 kg
S05	G 1/2"	0,7 kg	DN 15	2,0 kg
S06	G 1"	2,0 kg	DN 25	3,9 kg
S07	G 1"	4,0 kg	DN 50	8,9 kg

5.1.2 Materials



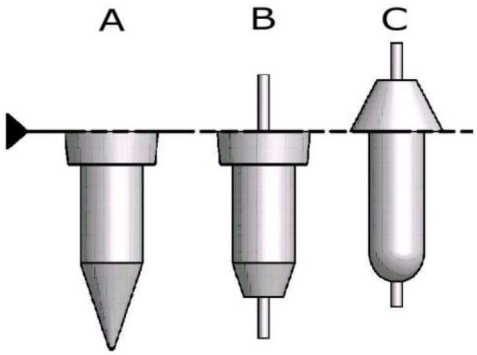
Item	Pieces	Description	Material
1	1	Enclosure	1.4301
2	1	Measuring tube	Borosilicate glass
3	2	Float Stop	PVDF
4	1	Float	1.4571, AL, PVDF
5	2	O-ring	EPDM, Viton, FEP/FFKM
6	2	O-ring	EPDM, Viton, FEP/FFKM
7	2	Union nut	AL, Stainless Steel
8	2	Flange	Stainless Steel
9	2	Flange	PVDF
10	2	Threaded Connection	PVDF, Stainless Steel
11	2	Hose Connector	PVDF, Stainless Steel
12	2	Bonded Connection	PVC

5.2 Float Types

There are three types of floats on offer:

A. Float without guide rod
B. Guided float
C. Viscosity stabile floats

Float Reading Edge



The following viscosity limits require a viscosity-stable float:

Model	Viscosity (mPas, cP)
S05	≥ 3
S06	≥ 5
S07	≥ 8

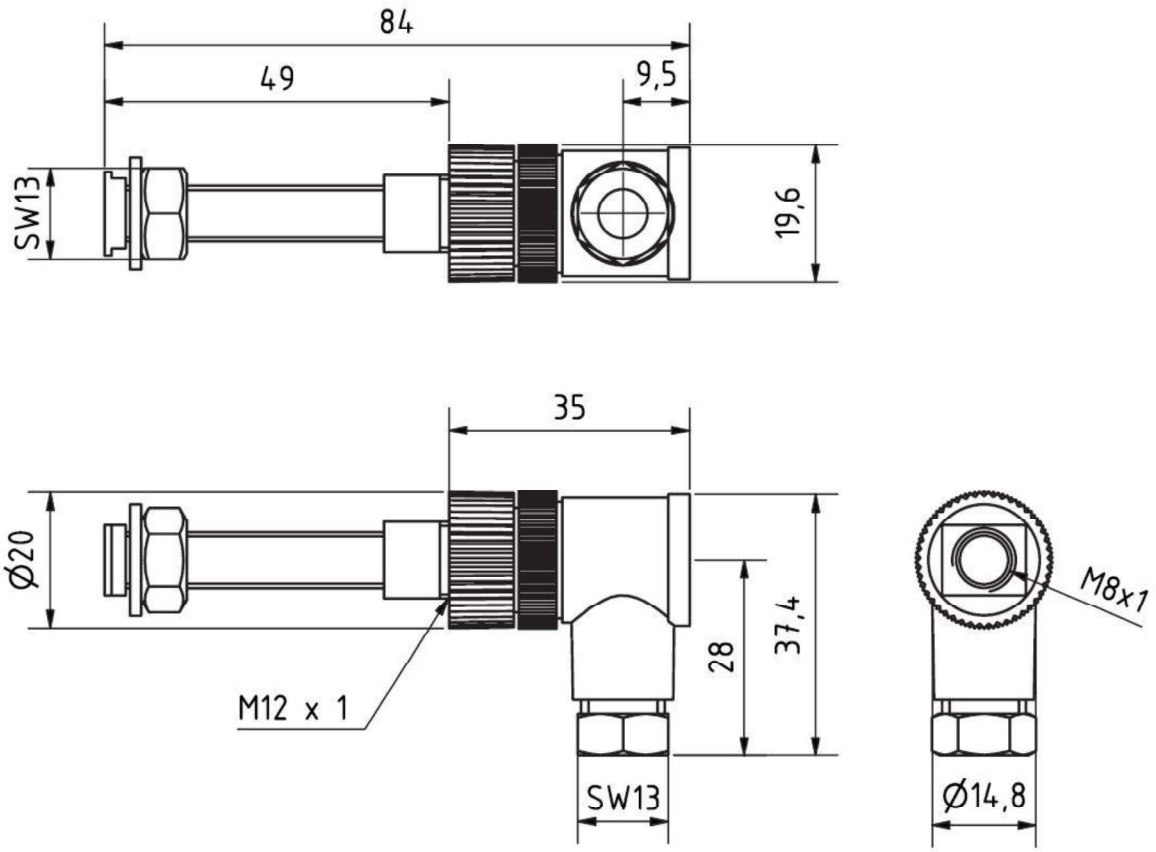
5.3 Contacts

The bistable magnetic contacts GWGA, GWGB and GWGW serve to indicate the position of the float, thus indicating the measured value in a non-reactive, contact-free means.

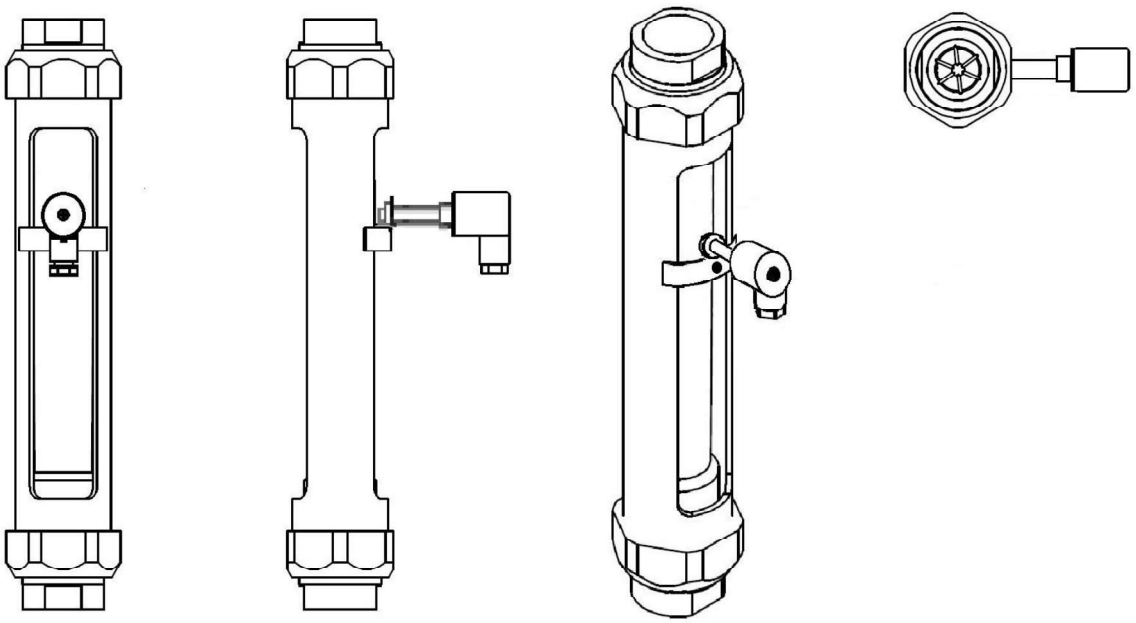
Features:

- Bi-stable behaviour
- Available as normally open, normally closed or change-over
- No power required for operation
- High vibration resistance
- Non-reactive switching
- No interaction between the contact
- Simple plug-in connector

5.3.1 Dimensions of the assembled GWG contacts [mm(inch)]



5.3.2 Mounting of the GWG limit switch series

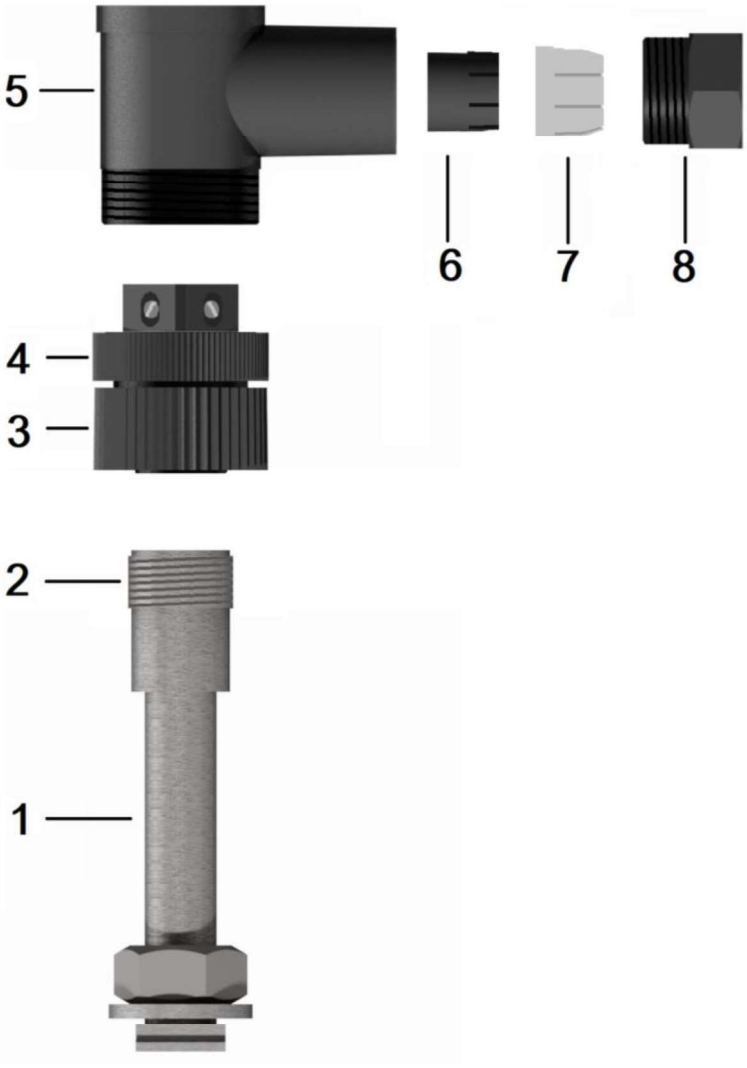


5.3.3 Adjusting and wiring of the limit switches

When ordered, the limit switches are factory set at the ordered values. They can however be adjusted to suit the operators requirements.

For re-adjusting an M4 nut (SW7) must be released until the clamping position can be adjusted. Now the limit switch can be slid into a its new position. After the switch has been positioned, tighten the nut /SW7) until the contact clamp is secured in place.

Cable mounting and wiring:

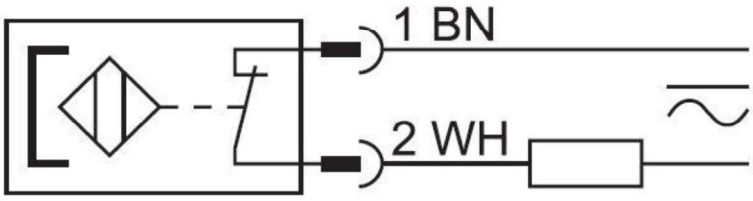


1. Unscrew Knurled locking screw (3) to remove the M12 connector housing from the magnetic field sensor (1)
2. Unscrew Knurled locking screw (4) to remove the main connector housing from the connector head (5)
3. Unscrew cable connection (8) using an spanner (across flats 13) from the main enclosure and remove sealing inserts (6, 7).
4. Feed connection cable Ø 4-6 mm through the cable connection (8) and insert sealing insert (6, 7) into the main enclosure (5). Remove the cables outer insulation and the wire strands insulation at the required length and affix ferrules to each wire strand. Finally wire-up to the terminals of the connector head (4) according to the wiring diagram.
5. The reassembly of the connector is performed in reverse order.
   Be careful when connecting the Knurled locking screw (3) to the thread of the sensor (2) not to tilt the housing so not to damage the thread of the M12 enclosure.
6. The enclosure (5) can be mounted in any direction so that the cable – after plugging – can be guided either to the left, the right, the top or the bottom.

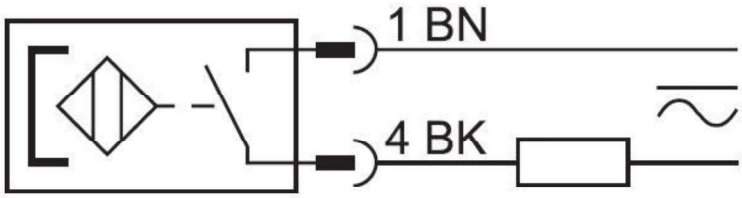
Caution:
Please note that the seal of the cable gland is correctly seated on the jacket of the cable!
Tighten the cable gland firmly!

Before commissioning, we recommend that the float is manually passed by the contact.
By this means, the correct start position of the contact can be ensured.

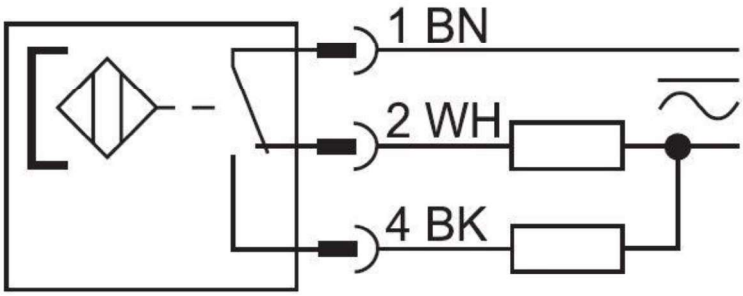
5.3.4 Wiring diagrams of the limit switches



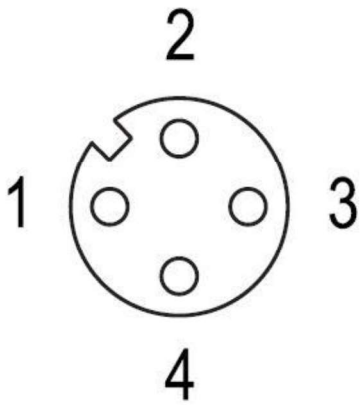
Electrical connection GWGA



Electrical connection GWGB



Electrical connection GWGW



Pin assignment of the M12 connector

6. Specifications

6.1 Mechanical Data

Measuring Range	**Turndown Ratio**		1:10
	Smallest Measuring Range	Water	3-30 l/h
		Air*	36-360 Nl/h
	Largest Measuring Range	Water	1.000-10.000 l/h
		Air*	18.000-180.000 Nl/h
		*) Referred to 0 °C and 1,013 bar abs.	
Accuracy Class (acc. VDE/VDI 3513, sheet 2)	Liquid		1,6 %
	Gas		2,5 %
			q_G 50 %
Flow Direction			From bottom to top
Materials	Measuring Tube		Borosilicate glass
	Connections		1,4571, PVDF, PVC
	Float		1.4571, Aluminium 3.1645, PVDF
	Float Guide		1.4571
	Gaskets		Viton, EPDM, FEP/FFKM
	Float Stop		PVDF / Stainless Steel
	Sensor Body		1.4301
	Shatter Protection		Plexiglas® GS
Anzeige			Measuring Range, Process Information
Ambient Conditions	Ambient Temperature		-20 ... +80 °C (-4...+176 °F)
	Ambient Temperature PVC		-10 ... +50 °C (+14 ... +122 °F)
	Storing Temperature		-20 ... +60 °C (-4 ... +140 °F)
	Climate Classification	Weatherproof and/or unheated operation site, class C according to DIN IEC 654 part 1	
	Shock/Vibration Resistance	The device should be protected against extreme shock and vibration, either of which could cause damage.	
Process Conditions	Pressure Resistance	Ranges B1 to C7	max. 15 bar (at max. 80 °C / 176 °F)
		Ranges D1 to D8	max. 10 bar (at max. 80 °C / 176 °F)
		Ranges E1 to E5	max. 6 bar (at max. 80 °C / 176 °F)
		Connections in PVDF / PVC	max. 10 bar (at max. 20 °C / 68 °F)
			max. 4 bar (at max. 40 °C / 104 °F)
			max. 2,5 bar (at max. 50 °C / 122 °F)
	Media Temperature	Float: 14571 / Alu	-10 ... +80 °C (+14 ... +176 °F)
		Float: PVDF	-10 ... +80 °C (+14 ... +176 °F)
		Adhesive connection: PVC	-10 ... +50 °C (+14 ... +122 °F)
	Media State		Liquid or gaseous
	Density	Liquid	≤ 2,0 kg/l
		Gas	- / -
Inlet and Outlet sections	Inlet and outlet sections are not required as long as the flow profile is laminar. On strongly non laminar flow profiles e.g. regulating and shuttoff devices inlet straight of 250 mm, see also directive VDI/VDE 3513		
Pressure Loss			See measuring ranges

6.2 Measuring Ranges

6.2.1 Water

Standard measurement ranges for liquid with density = 1 kg/l (62,43 lb/cu.ft) and Viscosity 1 mPas.

V31 Model	Measuring Range code	Pressure Loss.	Float 1.4571 with and without Guide rod.	Float 1.4571 with Magnet.	Float 1.4571 Viscosity stabilised	Float PVDF weighted with Magnet.
		[mbar] / [psi]	[l/h]	[l/h]	[l/h]	[l/h]
S04	B1W	10 / 0,145	3 - 30	n.v.	n.v.	1,1 - 11
	B2W		4 - 40	n.v.	n.v.	1,5 - 15
	B3W		5 - 50	n.v.	n.v.	2 - 20
	B4W		6,5 - 65	n.v.	n.v.	2,5 - 25
	B5W		8 - 80	n.v.	n.v.	3,2 - 32
	B6W		10 - 100	n.v.	n.v.	4 - 40
S05	C1W	20 / 0,290	12,5 - 125	12 - 120	10 - 100	6,5 - 65
	C2W		16 - 160	15 - 150	12,5 - 125	9 - 90
	C3W		20 - 200	18 - 180	16 - 160	11 - 110
	C4W		25 - 250	24 - 240	20 - 200	14 - 140
	C5W	40 / 0,580	31,5 - 315	30 - 300	24 - 240	17,5 - 175
	C6W		40 - 400	36 - 360	30 - 300	22 - 220
	C7W		50 - 500	48 - 480	36 - 360	25 - 250
S06	D1W	19 / 0,280	40 - 400	40 - 400	n.v.	32 - 320
	D2W		65 - 650	60 - 600	40 - 400	50 - 500
	D3W		80 - 800	75 - 750	50 - 500	60 - 600
	D4W		100 - 1000	95 - 950	60 - 600	75 - 750
	D5W		120 - 1200	120 - 1200	75 - 750	100 - 1000
	D6W	24 / 0,350	160 - 1600	150 - 1500	100 - 1000	125 - 1250
	D7W		200 - 2000	180 - 1800	120 - 1200	160 - 1600
	D8W	33 / 0,480	250 - 2500	240 - 2400	140 - 1400	200 - 2000
	D9W		300 - 3000	280 - 2800	180 - 1800	240 - 2400
S07	E1W	25 / 0,360	400 - 4000	380 - 3800	250 - 2500	320 - 3200
	E2W		500 - 5000	480 - 4800	300 - 3000	380 - 3800
	E3W		650 - 6500	640 - 6400	400 - 4000	500 - 5000
	E4W		800 - 8000	750 - 7500	450 - 4500	640 - 6400
	E5W		1000 - 10000	950 - 9500	550 - 5500	750 - 7500

6.2.2 Air

Standard measurement ranges for air at P_{abs} = 1,013 bar (14,69 psi), T = 20 °C (68 °F), Density = 1,293 kg/m³, Viscosity = 0,0181 mPas

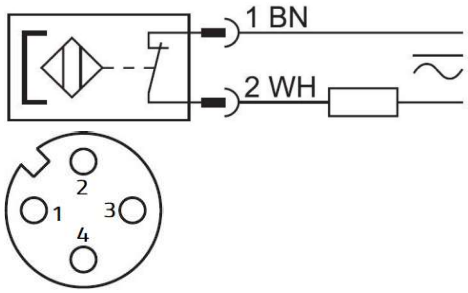
V31 Model	Measuring Range code	Pressure Loss.	Float Aluminium with and without Guide rod.	Float Aluminium with Magnet.	Float PVDF	Float PVDF weighted with Magnet.
		[mbar] / [psi]	[Nl/h]	[Nl/h]	[Nl/h]	[Nl/h]
S04	B1L	4 / 0,058	5 - 500	-	36 - 360	-
	B2L		65 - 650	-	50 - 500	-
	B3L		80 - 800	-	65 - 650	-
	B4L		110 - 1100	-	80 - 800	-
	B5L		140 - 1400	-	100 - 100	-
	B6L		160 - 1600	-	125 - 1250	-
S05	C1L	6,5 / 0,094	200 - 2000	250 - 2500	150 - 1500	200 - 2000
	C2L		300 - 3000	320 - 3200	200 - 2000	300 - 3000
	C3L		360 - 3600	400 - 4000	250 - 2500	360 - 3600
	C4L		400 - 4000	500 - 5000	300 - 3000	450 - 4500
	C5L	15 / 0,218	500 - 5000	640 - 6400	360 - 3600	600 - 6000
	C6L		640 - 6400	800 - 8000	500 - 5000	700 - 7000
	C7L		800 - 8000	1000 - 10000	550 - 5500	950 - 9500
S06	D1L	7 / 0,102	750 - 7500	850 - 8500	520 - 5200	750 - 7500
	D2L		1000 - 10000	1200 - 12000	800 - 8000	1000 - 10000
	D3L		1300 - 13000	1500 - 15000	900 - 9000	1300 - 13000
	D4L		1600 - 16000	2000 - 20000	1200 - 12000	1600 - 16000
	D5L		2000 - 20000	2400 - 24000	1500 - 15000	2000 - 20000
	D6L	9 / 0,131	2800 - 28000	3200 - 32000	2000 - 20000	2800 - 28000
	D7L		3600 - 36000	4000 - 40000	2500 - 25000	3600 - 36000
	D8L	12 / 0,174	4000 - 40000	5000 - 50000	3000 - 30000	4000 - 40000
	D9L		5000 - 50000	6000 - 60000	3600 - 36000	5000 - 50000
S07	E1L	10 / 0,145	6400 - 64000	7500 - 75000	5000 - 50000	6400 - 64000
	E2L		8000 - 80000	10000 - 100000	6500 - 65000	8000 - 80000
	E3L		10000 - 100000	12500 - 125000	8000 - 80000	10000 - 100000
	E4L		14000 - 140000	15000 - 150000	10000 - 100000	14000 - 140000
	E5L		16000 - 160000	18000 - 180000	12500 - 125000	16000 - 160000

6.3 Specifications – limit switches

6.3.1 GWGA – limit switches

Depending on position of installation, the electrical contact of the magnetic field switch is opened when the current value falls below or exceeds the limit value

Switching principle	Magnetic field switch, bistabil, **NC** - normally closed
Ambient temperature*	-20 °C to +90 °C
Enclosure material	PBT / PA
Sensor material	CuZn, Optalloy coated
Protection class	IP67
Max. switching rate	10 / min
Max. switching power	50 VAC / 0,5 A / 10 W
	75 VDC / 0,5 A / 10 W
dielectric strength	230 VAC/ 400 VDC



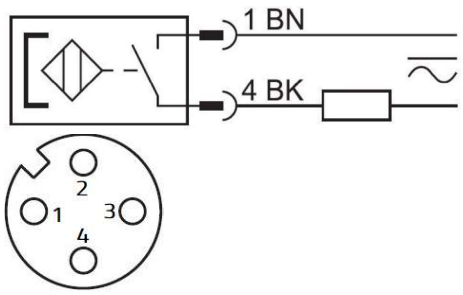
* The measuring range temperature of the flowmeter must be considered

Caution:
The maximum switching capacity and the maximum permissible peak inrush current must not be exceeded. Otherwise the contact reeds may weld together.
Such a contact welding constitutes the end-of-life of the switch.

6.3.2 GWGB – limit switches

Depending on position of installation, the electrical contact of the magnetic field switch is made when the current value falls below or exceeds the limit value.

Switching principle	Magnetic field switch, bistabil, **NO** - Normally open
Ambient temperature*	-20 °C to +90 °C
Enclosure material	Connector enclosure: PBT / PA
Sensor material	CuZn, Optalloy coated
Protection class	IP67
Max. switching rate	10 / min
Max. switching power	50 VAC / 0,5 A / 10 W
	75 VDC / 0,5 A / 10 W
dielectric strength	230 VAC/ 400 VDC



* The measuring range temperature of the flowmeter must be considered

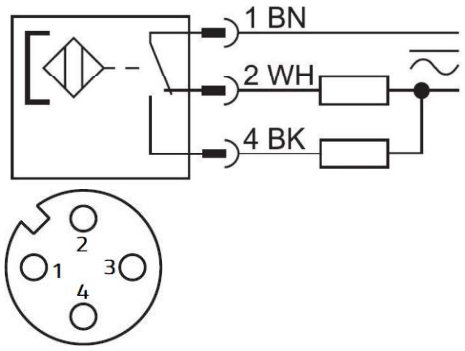
Caution:
The maximum switching capacity and the maximum permissible peak inrush current must not be exceeded. Otherwise the contact reeds may weld together.

Such a contact welding constitutes the end-of-life of the switch.

6.3.3 GWGW – limit switches

The electrical contact of the MSKW magnetic field switch is switched between the two output contact when the current value falls below or exceeds the limit value

Switching principle	Magnetic field switch, bistabil, Change-over contacts
Ambient temperature*	-20 °C to +90 °C
Enclosure material	Connector enclosure: PBT / PA
Sensor material	CuZn, Optalloy coated
Protection class	IP67
Max. switching rate	5 / min
Max. switching power	50 VAC / 0,5 A / 5 W
	75 VDC / 0,5 A / 5 W
dielectric strength	110 VAC/ 200 VDC



* The measuring range temperature of the flowmeter must be considered

Caution:
The maximum switching capacity and the maximum permissible peak inrush current must not be exceeded. Otherwise the contact reeds may weld together.

Such a contact welding constitutes the end-of-life of the switch.

7. Installation and Condition for use

7.1 Operating Conditions / Installation

7.1.1 Installation conditions

The device should be operated pursuant to the guidelines of VDE/VDI Code 3513, sh. 3.

- Measurable media are:
  1) Liquids that exhibit sufficient flowability are devoid of solids, do not bond and do not tend to settle.
  2) Gases that flow laminarly (laminar flow behavior) and are provided with sufficient pre-pressure.
- Mount the device vertically so as to allow for upward flow. Make sure to leave enough space for subsequent removal of the flowmeter.
- Inlet and outlet sections in front of and behind the device are generally unnecessary for laminar flows. Avoid installation of any components that narrow the flow on one side in front of the device. If this is not possible, implement a straight 5 x DN inlet section in front of the device.
- If possible, control valves should be installed behind the metering device in the direction of flow. Make sure that the float is not being shot against the upper float stop. For further information in this regard, see the installation recommendations in VDE/VDI Code 3513, sh. 3.

7.1.2 Start-up

Caution:

If there is a risk of dirt or solids in the process lines, these must be rinsed prior to start-up so that these particles cannot get lodged in the device. In particular, ferromagnetic solids such as welding beads can cause the device to fail. If such particles cannot be excluded even during normal operation, a magnetic filter should be installed in front of the device.

During commissioning, the valves must be opened slowly and the pipeline vented to avoid liquid hammering. For devices with flange connections, the cap nut must be tightened firmly **before** the flange connection is established.

7.1.3 Pumps

Do not mount the measuring unit into the suction side of any pumps (e.g. vacuum pumps).

7.1.4 Installation

Screws, bolts, nuts and seals are not supplied by Heinrichs Messtechnik GmbH and must therefore be provided by the operator. Install the sensor between the pipes. Mounted seals must not reach into the internal cross-section of the pipe

7.1.5 Gas metering

When metering gas, the operating pressure should be increased gradually. Use the control valve to vary the pressure in such a way that the float is not shock impacted against the side of the glass tube. Such an impact can result in a breakage of the glass-tube.

8. Maintenance

The device requires no servicing insofar as it is operated in accordance with the manufacturer's recommendations. If however, the float becomes clogged or the float needs to be cleaned, the service technician should take note of the following aspects:

- Before dismantling the device, check to ensure that all pipes are void of media, have been depressurised and have cooled down
- Should the inside of the device contain any foreign matter, it should be cleaned thoroughly with a brush and suitable cleaning agent. Deposits should be removed carefully.
- Before reassembly, any gaskets or O-rings shall be assessed for intactness.

9. CE Marking

The measuring system complies with the requirements of the following CE directives:

- 2014/68/EU Pressure Equipment Directive (PED)
- 2014/34/EU ATEX Directive Please refer to EX-supplement manual for further Information

  As well as for the mounted switches
- 2014/30/EU EMC Directive

As well as with the requirements of the following UKCA regulations:

- Pressure equipment Safety Regulations 2016
- Potentially Explosive Atmospheres Regulations 2016

  As well as for the mounted switches
- Electromagnetic Compatibility Regulations 2016

The application of the CE and/or UKCA marking indicates that the device complies with the aforementioned directives.

For details of conformity please refer also to section 13 "Declaration of Conformity".

10. Order Information

10.1 Basic data

All orders should contain the following information: Product data, specific weight, standard density (for gases), temperature, pressure, viscosity, material used, connection sizes, flow-rate range, and desired accessories.

10.2 Available accessories

- 1 or 2 limit switches
- Shatter protection (max. 80 °C)

11. Model Code V31

Meter Size S04				
V31-				
Process Connections				
	Threaded Connection		**Installation Length**	**Material, wetted parts**
40001F	G ¼"(F)		375 mm	PVDF
40001S	G ¼"(F)		375 mm	Stainless Steel
40101F	G ⅜"(F)		375 mm	PVDF
40101S	G ⅜"(F)		375 mm	Stainless Steel
40201F	G ½"(F)		375 mm	PVDF
40201S	G ½"(F)		375 mm	Stainless Steel
60101F	NPT ¼"(F)		375 mm	PVDF
60101S	NPT ¼"(F)		375 mm	Stainless Steel
60201F	NPT ⅜"(F)		375 mm	PVDF
60201S	NPT ⅜"(F)		375 mm	Stainless Steel
60301F	NPT ½"(F)		375 mm	PVDF
60301S	NPT ½"(F)		375 mm	Stainless Steel
	Flange		**Installation Length**	**Material, wetted parts**
301B3S	DN10 PN10/16/25/40 Form B1 EN1092-1		425 mm	Stainless Steel
301B5S	DN10 PN10/16/25/40 Form B1 EN1092-1		500 mm	Stainless Steel
305B3F	DN15 PN10/16/25/40 Form B1 EN1092-1		425 mm	PVDF
305B3S	DN15 PN10/16/25/40 Form B1 EN1092-1		425 mm	Stainless Steel
305B5F	DN15 PN10/16/25/40 Form B1 EN1092-1		500 mm	PVDF
305B5S	DN15 PN10/16/25/40 Form B1 EN1092-1		500 mm	Stainless Steel
3A5B3F	DN20 PN10/16/25/40 Form B1 EN1092-1		425 mm	PVDF
3A5B3S	DN20 PN10/16/25/40 Form B1 EN1092-1		425 mm	Stainless Steel
3A5B5F	DN20 PN10/16/25/40 Form B1 EN1092-1		500 mm	PVDF
3A5B5S	DN20 PN10/16/25/40 Form B1 EN1092-1		500 mm	Stainless Steel
309B3F	DN25 PN10/16/25/40 Form B1 EN1092-1		425 mm	PVDF
309B3S	DN25 PN10/16/25/40 Form B1 EN1092-1		425 mm	Stainless Steel
309B5F	DN25 PN10/16/25/40 Form B1 EN1092-1		500 mm	PVDF
309B5S	DN25 PN10/16/25/40 Form B1 EN1092-1		500 mm	Stainless Steel
201R3F	½" 150lbs RF ASME B16.5-2003		425 mm	PVDF
201R3S	½" 150lbs RF ASME B16.5-2003		425 mm	Stainless Steel
201R5F	½" 150lbs RF ASME B16.5-2003		500 mm	PVDF
201R5S	½" 150lbs RF ASME B16.5-2003		500 mm	Stainless Steel
202R3F	¾" 150lbs RF ASME B16.5-2003		425 mm	PVDF
202R3S	¾" 150lbs RF ASME B16.5-2003		425 mm	Stainless Steel
202R5F	¾" 150lbs RF ASME B16.5-2003		500 mm	PVDF
202R5S	¾" 150lbs RF ASME B16.5-2003		500 mm	Stainless Steel
203R3F	1" 150lbs RF ASME B16.5-2003		425 mm	PVDF
203R3S	1" 150lbs RF ASME B16.5-2003		425 mm	Stainless Steel
203R5F	1" 150lbs RF ASME B16.5-2003		500 mm	PVDF
203R5S	1" 150lbs RF ASME B16.5-2003		500 mm	Stainless Steel
	Hose Connector		**Installation Length**	**Material, wetted parts**
62102S	Hose connector ½"- inner diameter Ø13 mm		400 mm	Stainless Steel
62102F	Hose connector ½"- inner diameter Ø13 mm		400 mm	PVDF
62152S	Hose connector ⅜"- inner diameter Ø19 mm		400 mm	Stainless Steel
62152F	Hose connector ⅜"- inner diameter Ø19 mm		400 mm	PVDF
-				
Float				
	Material	**Viscosity stabile**	**Magnet / weighted**	**Guided. Guide Rod:1.4571**
01	1.4571 (316 TI)	-	-	-
06	PVDF	-	weighted	-
08	Aluminium 3.1645	-	-	-
99	Special	-	-	-
Measuring Range				
B1...B6	See measuring range tables			
Medium				
W-	Water			
L-	Air			
...	**continue with general section**			

Meter Size S05				
V31-				
Process Connections				
	Threaded Connection		**Installation Length**	**Material, wetted parts**
40001F	G ¼"(F)		375 mm	PVDF
40001S	G ¼"(F)		375 mm	Stainless Steel
40101F	G ⅜"(F)		375 mm	PVDF
40101S	G ⅜"(F)		375 mm	Stainless Steel
40201F	G ½"(F)		375 mm	PVDF
40201S	G ½"(F)		375 mm	Stainless Steel
60101F	NPT ¼"(F)		375 mm	PVDF
60101S	NPT ¼"(F)		375 mm	Stainless Steel
60201F	NPT ⅜"(F)		375 mm	PVDF
60201S	NPT ⅜"(F)		375 mm	Stainless Steel
60301F	NPT ½"(F)		375 mm	PVDF
60301S	NPT ½"(F)		375 mm	Stainless Steel
	Threaded Connection		**Installation Length**	**Material, wetted parts**
301B3S	DN10 PN10/16/25/40 Form B1 EN1092-1		425 mm	Stainless Steel
301B5S	DN10 PN10/16/25/40 Form B1 EN1092-1		500 mm	Stainless Steel
305B3F	DN15 PN10/16/25/40 Form B1 EN1092-1		425 mm	PVDF
305B3S	DN15 PN10/16/25/40 Form B1 EN1092-1		425 mm	Stainless Steel
305B5F	DN15 PN10/16/25/40 Form B1 EN1092-1		500 mm	PVDF
305B5S	DN15 PN10/16/25/40 Form B1 EN1092-1		500 mm	Stainless Steel
3A5B3F	DN20 PN10/16/25/40 Form B1 EN1092-1		425 mm	PVDF
3A5B3S	DN20 PN10/16/25/40 Form B1 EN1092-1		425 mm	Stainless Steel
3A5B5F	DN20 PN10/16/25/40 Form B1 EN1092-1		500 mm	PVDF
3A5B5S	DN20 PN10/16/25/40 Form B1 EN1092-1		500 mm	Stainless Steel
309B3F	DN25 PN10/16/25/40 Form B1 EN1092-1		425 mm	PVDF
309B3S	DN25 PN10/16/25/40 Form B1 EN1092-1		425 mm	Stainless Steel
309B5F	DN25 PN10/16/25/40 Form B1 EN1092-1		500 mm	PVDF
309B5S	DN25 PN10/16/25/40 Form B1 EN1092-1		500 mm	Stainless Steel
201R3F	½" 150lbs RF ASME B16.5-2003		425 mm	PVDF
201R3S	½" 150lbs RF ASME B16.5-2003		425 mm	Stainless Steel
201R5F	½" 150lbs RF ASME B16.5-2003		500 mm	PVDF
201R5S	½" 150lbs RF ASME B16.5-2003		500 mm	Stainless Steel
202R3F	¾" 150lbs RF ASME B16.5-2003		425 mm	PVDF
202R3S	¾" 150lbs RF ASME B16.5-2003		425 mm	Stainless Steel
202R5F	¾" 150lbs RF ASME B16.5-2003		500 mm	PVDF
202R5S	¾" 150lbs RF ASME B16.5-2003		500 mm	Stainless Steel
203R3F	1" 150lbs RF ASME B16.5-2003		425 mm	PVDF
203R3S	1" 150lbs RF ASME B16.5-2003		425 mm	Stainless Steel
203R5F	1" 150lbs RF ASME B16.5-2003		500 mm	PVDF
203R5S	1" 150lbs RF ASME B16.5-2003		500 mm	Stainless Steel
	Hose Connector		**Installation Length**	**Material, wetted parts**
62102S	Hose connector ½"- inner diameter Ø13 mm		400 mm	Stainless Steel
62102F	Hose connector ½"- inner diameter Ø13 mm		400 mm	PVDF
62152S	Hose connector ¾"- inner diameter Ø19 mm		400 mm	Stainless Steel
62152F	Hose connector ¾"- inner diameter Ø19 mm		400 mm	PVDF
-				
Float				
	Material	**Viscosity stabile**	**Magnet / weighted**	**Guided. Guide Rod:1.4571**
01	1.4571 (316 TI)	-	-	-
02	1.4571 (316 TI)	-	-	guided
03	1.4571 (316 TI)	-	with Magnet	-
04	1.4571 (316 TI)	≥ 3 mPas	-	guided
05	PVDF	-	-	-
06	PVDF	-	weighted	-
07	PVDF with Magnet	-	with Magnet	-
08	Aluminium 3.1645	-	-	-
09	Aluminium 3.1645	-	-	guided
10	Aluminium with Magnet	-	with Magnet	-
99	Special	-	-	-
Measuring Range				
C1...C7	See measuring range tables			
Medium				
W-	Water			
L-	Air			
...	**continue with general section**			

Meter Size S06				
V31-				
Process Connection				
	Threaded Connection		**Installation Length**	**Material, wetted parts**
40301F	G ¾"(F)		375 mm	PVDF
40301S	G ¾"(F)		375 mm	Stainless Steel
40401F	G 1"(F)		375 mm	PVDF
40401S	G 1"(F)		375 mm	Stainless Steel
60401F	NPT ¾"(F)		375 mm	PVDF
60401S	NPT ¾"(F)		375 mm	Stainless Steel
60501F	NPT 1"(F)		375 mm	PVDF
60501S	NPT 1"(F)		375 mm	Stainless Steel
	Flange		**Installation Length**	**Material, wetted parts**
309B3F	DN25 PN10/16/25/40 Form B1 EN1092-1		425 mm	PVDF
309B3S	DN25 PN10/16/25/40 Form B1 EN1092-1		425 mm	Stainless Steel
309B5F	DN25 PN10/16/25/40 Form B1 EN1092-1		500 mm	PVDF
309B5S	DN25 PN10/16/25/40 Form B1 EN1092-1		500 mm	Stainless Steel
317B3F	DN40 PN10/16/25/40 Form B1 EN1092-1		425 mm	PVDF
317B3S	DN40 PN10/16/25/40 Form B1 EN1092-1		425 mm	Stainless Steel
317B5F	DN40 PN10/16/25/40 Form B1 EN1092-1		500 mm	PVDF
317B5S	DN40 PN10/16/25/40 Form B1 EN1092-1		500 mm	Stainless Steel
203R3F	1" 150lbs RF ASME B16.5-2003		425 mm	PVDF
203R3S	1" 150lbs RF ASME B16.5-2003		425 mm	Stainless Steel
203R5F	1" 150lbs RF ASME B16.5-2003		500 mm	PVDF
203R5S	1" 150lbs RF ASME B16.5-2003		500 mm	Stainless Steel
205R3F	1½" 150lbs RF ASME B16.5-2003		425 mm	PVDF
205R3S	1½" 150lbs RF ASME B16.5-2003		425 mm	Stainless Steel
205R5F	1½" 150lbs RF ASME B16.5-2003		500 mm	PVDF
205R5S	1½" 150lbs RF ASME B16.5-2003		500 mm	Stainless Steel
	Hose Connection		**Installation Length**	**Material, wetted parts**
62202S	Hose connector-¾" inner diameter Ø19 mm		400 mm	Stainless Steel
62202F	Hose connector-¾" inner diameter Ø19 mm		400 mm	PVDF
62302S	Hose connector 1" - inner diameter Ø25 mm		400 mm	Stainless Steel
62302F	Hose connector 1" - inner diameter Ø25 mm		400 mm	PVDF
62404S	Hose connector 1½" - inner diameter Ø38 mm		400 mm	Stainless Steel
62404F	Hose connector 1½" - inner diameter Ø38 mm		400 mm	PVDF
-				
Float				
	Material	**Viscosity stabile**	**Magnet / weighted**	**Guided. Guide Rod:1.4571**
02	1.4571 (316 TI)	-	-	guided
03	1.4571 (316 TI)	-	with Magnet	-
04	1.4571 (316 TI)	≥ 3 mPas	-	guided
05	PVDF	-	-	-
06	PVDF	-	weighted	-
07	PVDF with Magnet	-	with Magnet	-
08	Aluminium 3.1645	-	-	-
09	Aluminium 3.1645	-	-	guided
10	Aluminium with Magnet	-	with Magnet	-
99	Special	-	-	-
Measuring Range				
D1...D9	See measuring range tables			
Medium				
W-	Water			
L-	Air			
...	**continue with general section**			

Meter Size S07				
V31-				
Process Connection				
	Threaded Connection		**Installation Length**	**Material, wetted parts**
40501F	G 1¼"(F)		375 mm	PVDF
40501S	G 1¼"(F)		375 mm	Stainless Steel
40601F	G 1½"(F)		375 mm	PVDF
40601S	G 1½"(F)		375 mm	Stainless Steel
40701F	G 2"(F)		375 mm	PVDF
40701S	G 2"(F)		375 mm	Stainless Steel
60601F	NPT 1¼"(F)		375 mm	PVDF
60601S	NPT 1¼"(F)		375 mm	Stainless Steel
60701F	NPT 1½"(F)		375 mm	PVDF
60701S	NPT 1½"(F)		375 mm	Stainless Steel
60801F	NPT 2"(F)		375 mm	PVDF
60801S	NPT 2"(F)		375 mm	Stainless Steel
	Flange		**Installation Length**	**Material, wetted parts**
317B3F	DN40 PN10/16/25/40 Form B1 EN1092-1		425 mm	PVDF
317B3S	DN40 PN10/16/25/40 Form B1 EN1092-1		425 mm	Stainless Steel
317B5F	DN40 PN10/16/25/40 Form B1 EN1092-1		500 mm	PVDF
317B5S	DN40 PN10/16/25/40 Form B1 EN1092-1		500 mm	Stainless Steel
320B3F	DN50 PN10/16 Form B1 EN1092-1		425 mm	PVDF
320B3S	DN50 PN10/16 Form B1 EN1092-1		425 mm	Stainless Steel
320B5F	DN50 PN10/16 Form B1 EN1092-1		500 mm	PVDF
320B5S	DN50 PN10/16 Form B1 EN1092-1		500 mm	Stainless Steel
325B3F	DN65 PN10/16 Form B1 EN1092-1		425 mm	PVDF
325B3S	DN65 PN10/16 Form B1 EN1092-1		425 mm	Stainless Steel
325B5F	DN65 PN10/16 Form B1 EN1092-1		500 mm	PVDF
325B5S	DN65 PN10/16 Form B1 EN1092-1		500 mm	Stainless Steel
205R3F	1½" 150lbs RF ASME B16.5-2003		425 mm	PVDF
205R3S	1½" 150lbs RF ASME B16.5-2003		425 mm	Stainless Steel
205R5F	1½" 150lbs RF ASME B16.5-2003		500 mm	PVDF
205R5S	1½" 150lbs RF ASME B16.5-2003		500 mm	Stainless Steel
206R3F	2" 150lbs RF ASME B16.5-2003		425 mm	PVDF
206R3S	2" 150lbs RF ASME B16.5-2003		425 mm	Stainless Steel
206R5F	2" 150lbs RF ASME B16.5-2003		500 mm	PVDF
206R5S	2" 150lbs RF ASME B16.5-2003		500 mm	Stainless Steel
207R3F	2½" 150lbs RF ASME B16.5-2003		425 mm	PVDF
207R3S	2½" 150lbs RF ASME B16.5-2003		425 mm	Stainless Steel
207R5F	2½" 150lbs RF ASME B16.5-2003		500 mm	PVDF
207R5S	2½" 150lbs RF ASME B16.5-2003		500 mm	Stainless Steel
	Hose Connection		**Installation Length**	**Material, wetted parts**
62604S	Hose connection 2"- inner diameter Ø50 mm		450 mm	Stainless Steel
62604F	Hose connection 2"- inner diameter Ø50 mm		450 mm	PVDF
42501V	Adhered connection DN50 - d = 63 mm		375 mm	PVC
-				
Float				
	Material	**Viscosity stabile**	**Magnet / weighted**	**Guided. Guide Rod:1.4571**
02	1.4571 (316 TI)	-	-	guided
03	1.4571 (316 TI)	-	with Magnet	-
04	1.4571 (316 TI)	≥ 3 mPas	-	guided
05	PVDF	-	-	-
06	PVDF	-	weighted	-
07	PVDF with Magnet	-	with Magnet	-
08	Aluminium 3.1645	-	-	-
09	Aluminium 3.1645	-	-	guided
10	Aluminium with Magnet	-	with Magnet	-
99	Special	-	-	-
Measuring Range				
E1...E5	See measuring range tables			
Medium				
W-	Water			
L-	Air			
...	**continue with general section**			

General Section				
Gasket				
B	EPDM			
F	Viton® (FKM)			
V	FEP/Perfluor (FFKM)			
Float Stopper				
F	PVDF			
S	Stainless Steel			
X	Special Version			
Union Nut				
A	Aluminium painted			
S	Stainless Steel			
Shatter Protection				
0	without			
1	with	T_{Medium} max. 80 °C	Necessary for option ATEX	
Electrical Outputs				
0	without			
1	1x GSGA	Contact opens when set value is undershot / exceeded	Only possible with magnet weighted floats	not with S04
2	1x GSGB	Contact closes when set value is undershot / exceeded	Only possible with magnet weighted floats	not with S04
3	1x GSGW	Wechsler	Only possible with magnet weighted floats	not with S04
4	2x GSGA	Contacts open when set values are undershot / exceeded	Only possible with magnet weighted floats	not with S04
5	2x GSGB	Contacts close when set values are undershot / exceeded	Only possible with magnet weighted floats	not with S04
-				
Scale				
1	%-Scale (H2O)			
2	MB-Scale (H2O)			
3	%-Scale (Medium)			
4	MB-Scale (Medium)			
5	Engraved scale			
1				
Certificates				
0	without			
1	Certificate of Compliance	2.1 acc. EN10204		
2	acceptance certificate	3.1 with Material analysis (DIN EN 10204:2004) for stainless steel wetted parts		
Calibration certificate				
0	without			
1	Standard	Confirmation of Accuracy Class		
2	5-Point	5 Point Measurement protocol		
3	Special scaling	Measurement accuracy 1 %		
9	Special	According to customer request		
Cleaning acc. factory standards	(oil and grease free)			
0	without			
1	Cleaning Class VA- with labelling oil and grease free			
Pressure / leakage test				
0	without			
1	Pressure test acc. EN 10204 additionally to APZ 3.1			
2	Leakage test acc. to EN 10204 additionally to APZ 3.1			
Approvals				
0	without			
1	ATEX: II 2G Ex h IIC T6 Gb (BVS 10 ATEX H/B 119) ATEX: II 2D Ex h IIIC T85°C Db		Shatter protection is mandatory	
Markings				
0	without			
1	Stainless steel tag 40x20 mm			
supplementary equipment				
0	without			
1	with (separate specification required)			
-				
Version				
H	Heinrichs			
K	Kobold			

12. Declaration of Decontamination

Company name:..... Address:.....

Department:..... Name of contact person:.....

Phone: .....

Information pertaining to the enclosed V31

Model V31.....

Was operated using the following fluid: .....

In as much as this fluid is *:

☐ toxic ☐ health hazard- ☐ corrosive ☐ radioactive ☐ safe ☐ explosive ☐ combustible ☐ bio hazard

We have done the following:

- Checked all cavities in the device to ensure that they are free of fluid residues* ☐
- Washed and neutralized all cavities in the device* ☐
- Cleaned all seals / gaskets and other components that come into contact with the fluid* ☐
- Cleaned the housings and all surfaces* ☐

*cross all applicable items.

We hereby warrant that no health or environmental hazard will arise from any fluid residues on or in the enclosed device.

Date: ..... Signature: .....

Company Stamp

Version / Druck:

21.02 / 25.11.2021

Heinrichs Messtechnik GmbH
Robert-Perthel-Straße 9
D 50739 Köln
Telefon: +49 (221) 4 97 08 - 0
Telefax: +49 (221) 4 97 08 - 178
Internet: http://www.heinrichs.eu
e-mail : info@heinrichs.eu

File:
V31_BA_21.02_EN.DOC