



Variable-Area Flow Meter

BGN

Installation and Operating Instructions



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1. Introduction

These Installation and Operating Instructions serve as a tool for the correct installation, operation and maintenance of the device. They are a supplement to the BGN Device Description. Read the manual carefully before the device is installed and put into use. It does not include special versions or applications.

All devices are thoroughly checked for order compliance and operability before delivery. Upon receipt, please conduct a visual inspection of possible damage that may be identified as having occurred during shipment. If you discover any defect, please contact our head office in Cologne or the local sales office responsible for your area (see the telephone directory at the end of this manual or on our Web site). Apart from a description of the error, we will need the equipment type and serial number of the delivery.

Heinrichs Messtechnik shall not furnish guarantee for any repair work done without prior notice. Unless otherwise agreed on, the rejected parts must be made available to us in case a claim is made.

2. Identification

2.1. Supplier/manufacturer

Heinrichs Messtechnik GmbH
Robert-Perthel-Str. 9
D-50739 Köln
Phone +49 (221) 49708 - 0
Fax +49 (221) 49708 - 178
Internet: <http://www.heinrichs.eu>
E-mail: info@heinrichs.eu

Instruments series BGN will be delivered without label stickers. All important informations such as:

- Measuring range
 - Manufacturer
 - Serial number
 - Model code
 - CE marking
 - Necessary Ex marking
- are printed on instrument scale and can be read from there.



2.2. Product type

Flow meter in all-metal design based on the variable area principle

2.3. Issue date

10.02.2020

2.4. Version no.

File: BGN_BA_20.02_en

3 Applications

The BGN meter is suitable for flow measurement of liquid or gaseous products in pipes. It shows the current flow rate in volume or mass per unit in time. Please consider also the provisions for the use in hazardous areas.

Applications: flow measurement, dosing, monitoring, adjusting and control of liquid and gaseous products. The meter's design makes it ideal for processes under difficult and adverse operating conditions.

The devices are available with additional electrical equipment for process monitoring and control.

4 Safety instructions

4.1 Intended use



The BGN variable-area flow meter may be used only for flow measurements of fluid and gaseous media. The manufacturer shall not be liable for damages that may result from unintended or inappropriate use.

When dealing with an aggressive medium, clarify the material resistance of all wetted parts.

When using the device in hazardous areas, follow the applicable national installation rules.

4.2 Installation, start-up and operating personnel



Only trained specialists authorized by the system operator may carry out the installation, electrical installations, start-up, maintenance and operation. They must read and understand the operating manual and follow its instructions. The required mounting, electrical installation, start-up and maintenance work may only be carried out by expert and authorized persons designated by the plant operator. Basically, follow the conditions and provisions applicable in your country.

5 Packaging, mounting and shipment

Carefully unpack the device to avoid damage. The float is secured against damage in transit depending on the device size. Remove this transport protection from the fitting. By pressing the float from the bottom upwards (using a wooden stick, for example), check whether the float can easily be moved upwards and slides back downwards. The pointer position of the indicator unit must follow the direction of movement of the float.

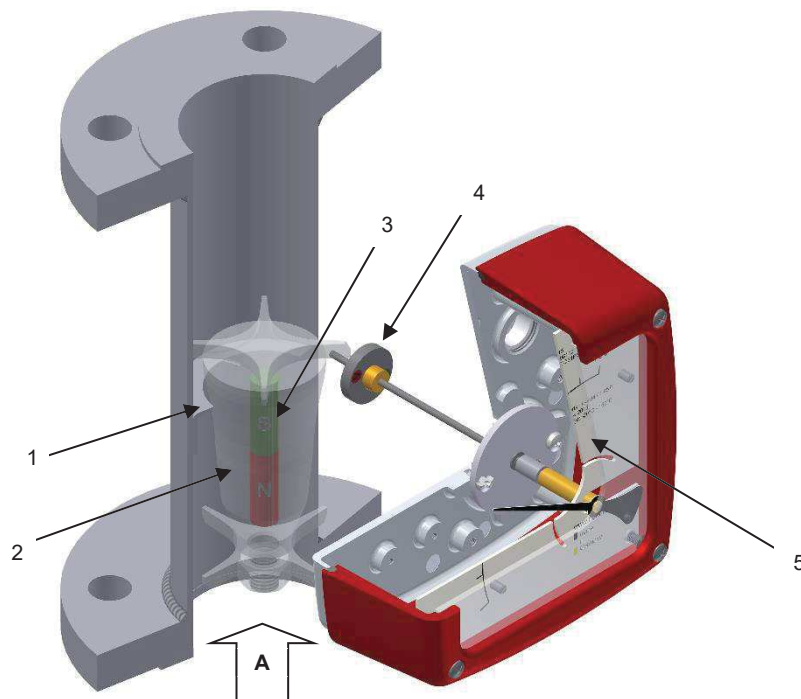
With the help of the delivery note enclosed in the packaging, check whether all technically relevant data correspond with your requirements.

Storage and installation must be done in a clean and dry room so that contamination – especially of the interior of the fitting – is avoided. Follow the limit values for ambient temperature. When transporting the device to a remote mounting location, we recommend that you reuse the factory-issued packaging and the transport protection.

6 Operational mode and system design

6.1 Measuring principle

The measuring element consists of a sharp-edged **measuring ring (1)** and a conical **float (2)**. A medium flows from the bottom to the top through the measuring ring, lifting the float until the **buoyancy force (A)** and the weight of the float establish equilibrium. As the height of the float varies, an annular clearance proportional to the flow appears between the float and the measuring ring. The height of the float in the measuring ring is a measure of the flow. The permanent **magnet (3)** embedded in the float then transmits this measure to the **scale (5)** and the optional electronic evaluators through a **magnet tracking system (4)**.



6.2 System design

The meter consists of a cylindrical fitting pipe with flange connections on both sides. For measuring ranges from 5 to 50 l/h on, a measuring ring is inserted in the tube in which a conical float can move with vertical freedom. For small measuring ranges of up to 4–40 l/h, the measuring cell consists of a conical measuring tube with cylindrical float.

The height of the float resulting from the flow rate is transmitted in a rotary motion by a built-in permanent magnet through a magnet tracking indicator system in a rotation to the pointer axis of the analog indicator unit.

7 Input

7.1 Measured variable

Volume flow

7.2 Measuring range (lower-range and upper-range value)

The lower-range value is considered 10% of the upper-range value.

Measuring range span: 10-100%¹

Smallest measuring range: 0.5-5.0 l/h water

Largest measuring range: 13.000 - 130.000 l/h water (stainless steel)

¹ for water like liquids

7.2.1. Measuring range chart

:Measuring range chart BGN									
DN ¹⁾⁸⁾ EN1092-1	ASME ⁸⁾ B16.5-2003	Flow Body S... st.st. P... PTFE H... Hastelloy	Range Code	Measuring range water (1000 kg/m ³ ; 1 mPas)		Measuring range air (1.013 bar abs., 20°C) ⁷⁾		Pressure loss (mbar)	Note
15 25	½" ¾" 1"	S10	A	0,5 - 5,0	l/h	0,015 - 0,15	m ³ /h	40	1) 2)
		S10	B	1 - 10	l/h	0,030 - 0,30	m ³ /h	40	1) 2)
		S10	C	1,6 - 16	l/h	0,045 - 0,48	m ³ /h	40	1) 2)
		S10	D	2,5 - 25	l/h	0,075 - 0,75	m ³ /h	40	2)
		S10	E	4 - 40	l/h	0,13 - 1,3	m ³ /h	40	2)
15 20 25 32	½" ¾" 1" 1 ¼"	S15	F	5 - 50	l/h	0,15 - 1,5	m ³ /h	40	
		S15	G	7 - 70	l/h	0,2 - 2,1	m ³ /h	40	
		S15	H	10 - 100	l/h	0,3 - 3,0	m ³ /h	60	
		S15	I	16 - 160	l/h	0,5 - 4,6	m ³ /h	60	
		S15	J	25 - 250	l/h	0,7 - 7,0	m ³ /h	60	
		S15	K	40 - 400	l/h	1,0 - 11	m ³ /h	70	
15 20 25 32	¾" 1"	S25	M	100 - 1000	l/h	3 - 30	m ³ /h	60	5)
		S25	N	160 - 1600	l/h	4 - 46	m ³ /h	70	5)
		S25	P	250 - 2500	l/h	7 - 70	m ³ /h	100	5)
		S25	Q	400 - 4000	l/h	11-110	m ³ /h	100	5)
40	1 ½"	S40	P	250 - 2500	l/h	7 - 70	m ³ /h	50	3)
		S40	Q	400 - 4000	l/h	11 - 110	m ³ /h	120	3)
		S40	R	600 - 6000	l/h	17 - 170	m ³ /h	180	3)
50 65	2" 2 ½"	S50	Q	400 - 4000	l/h	11 - 110	m ³ /h	80	
		S50	R	600 - 6000	l/h	17 - 170	m ³ /h	90	
		S50	S	1000 - 10000	l/h	29 - 290	m ³ /h	110	
		S50	T	1600 - 16000	l/h	46 - 460	m ³ /h	230	
		S50	U	2500 - 25000	l/h	70 - 700	m ³ /h	500	3) 4)
80	3" 3 ½"	S80	T	1600 - 16000	l/h	46 - 460	m ³ /h	70	
		S80	U	2500 - 25000	l/h	70 - 700	m ³ /h	100	
		S80	V	4000 - 40000	l/h	110 - 1100	m ³ /h	350	3)
100 125	4" 5"	S1H	V	4000 - 40000	l/h	110 - 1100	m ³ /h	120	
		S1H	W	6000 - 60000	l/h	170 - 1700	m ³ /h	360	
		S1H	X	8000 - 80000	l/h	240 - 2400	m ³ /h	600	3) 4)
		S1H	2	10000 - 100000	l/h	-			3) 4) 6)
150	6"	SH5	2	10000 - 100000	l/h	-			3) 4) 6)
		SH5	4	13000 - 130000	l/h	-			3) 4) 6)

Reference conditions: acc. IEC 770

Water 20 °C; air 1,013 bar abs.

- for BGN-P version (PTFE), float with tantalum collar, measuring cone made of borosilicate glass
measuring range: A 0.7–7.0 l/h, B 1.2–12 l/h, C 2.0–20 l/h
- gas throttle in S version for gas measurement included in price (pressure loss 200 mbar)
- not available in P version
- sizing for higher viscosities not possible
- only in S and H version, only with reduced sealing face
- gas measurement not possible
- with only atmospheric pressure a measurement is not possible. Indicated values are for orientation. For gas measurements a factor of 2-3 of the inlet pressure should be considered
- Restrictions for units with PTFE lining

8 Output signal / electrical equipment / options

Inside the indicator housing different electrical switches (max. 2) or transmitters may be mounted.

8.1 Binary output

By using the segment disks (double or single) for to adjust the proximity switches or by using excenter discs for to adjusted the micro switches, any switching point between 10% and 90% of the flow rate can be set.

8.1.1 KEI 1 or KEI 2 limit switches

1 or 2 limit transducers,

Model SJ 3,5N, manufacturer Pepperl & Fuchs (special switches e.g. safety technology or 3-wire version possible)

Safety class: PTB Nr. 99 ATEX 2219 X

PTB Nr. 00 ATEX 2048 X

BGN flow meters can be equipped with max. 2 switches

8.1.2 KEM 1 or KEM 2 limit transducers (special version)

SPDT micro switches whose switching point is activated by a cam plate.

KEM 1 = 1 SPDT micro switch

KEM 2 = 2 SPDT micro switches

Maximum switching capacity:

230 VAC 50/60Hz	6 A
24 VDC	0.5 A
110 VDC	0.2 A

The switch points are usually factory pre-set. The procedure to the customer adjustments see section 10.1.4.

8.2 Analog output with the-electronic transmitter

The electrical transmitter ES is factory-calibrated to the delivered scale values. The signal output can only be supplied in two-wire connection with 4-20 mA. The 4-20 mA signal includes HART® protocol; alternatively it can have PROFIBUS PA. or FIELDBUS FOUNDATION interface see Point 8.3

Additional options: 2 limit switches, alternatively 1 limit switch and 1 pulse output

The signal output and the limit switches can be configured using a HART® modem operating on the following configuration programs: PDM from Siemens or AMS from Rosemount. Furthermore, a HART® hand-held terminal (with DD software) can also be used. For more information about configuration, please refer to the separate Operating Instructions for the ES.

EX classification: DMT 00 ATEX 075 / II2G Ex ia IIC T6



When installing electrical equipment in hazardous areas, the conditions and provisions specified in the approval documents must be followed. See section 10.1.5.

8.3 Model ES-PPA and ES-FF

The ES-PPA and ES-FF transmitters are FISCO field devices that are connected via a two-wire field bus circuit according to the FISCO model.

The devices can also be connected to intrinsically safe fieldbus circuits which do not correspond to the FISCO model. In this case the electrical maximum values (U_i , I_i , P_i , L_i and C_i) must be observed.

Details for the use and operation can be found in separate instruction manual ES-PPA and ES-FF

9 Characteristical values

9.1 Measuring accuracy

9.1.1 Reference conditions

Water 20°C

9.1.2 Measuring accuracy

BGN-S/H : $\pm 1,6\%$ of actual $q_G=50\%$ acc. VDI/VDE 3513-2 (for local indicator)

BGN-P: $\pm 2,0\%$ of actual $q_G=50\%$ acc. VDI/VDE 3513-2 (for local indicator)

Additional inaccuracy for electronic transmitter ES = $\pm 0,2\%$

9.1.3 Repeatability

$\pm 0,5\%$ of full scale

9.1.4 Influence of ambient temperature

1. Without electrical equipment and with limit transducer without influence
2. With transmitter ES $\pm 0,5\%$ / 10 K reference temperature 22°C

9.2 Influence of fluid temperature

Deviations in fluid temperature from the temperature observed during calibration can result in a proportional display fault because of the corresponding change in density. Changes in viscosity cause a non-linear display fault.

10 Conditions of use

For the use in any process the VDI/VDE guidelines 3513, sheet 3, must be observed. The meter is suitable for :

- 1) Liquids with sufficient flow capabilities, which are free of solids, do not bond and do not tend for deposits.
- 2) Gases with linear / laminar flow behavior and an adequate inlet pressure.

10.1 Mounting requirements

The mounting location must be suitable for a **vertical direction of flow from the bottom to the top**.



Important: If that is impossible, then the flow meter series **BGF** may be installed. This device can be used for both horizontal and vertical flow directions.

The limit values for temperature and air humidity at the mounting location must be maintained. Avoid corrosive atmospheres. If this cannot be avoided, ventilation must be installed.



Please ensure that there is adequate clearance from parts that might cause magnetic interferences such as solenoid valves and ferromagnetic components like steel brackets/supports. **We recommend the minimum lateral distance between two adjacently mounted devices to be 300 mm.** The devices can be mounted close together if vertically offset by one device length. The minimum lateral clearance for interfering steel parts should be **200 mm**. In case of doubt, check the interference by moving the device back and forth in the selected distance by about 200 mm and evaluate whether the pointer position changes.

Select the mounting location so as to enable a reliable reading of the scale values. Please take note as well of the space requirement for any possible disassembly of the device.

For process temperature $< -40\text{ °C}$ and/or $> +200\text{ °C}$ the instruments must be equipped with a displaced indication. Please consider the additional required space. (see also point 11.1)

Sample aluminum indicator displaced



Sample st.st. indicator displaced



As a rule, inlet and outlet sections in front of and behind the device are not necessary if the medium does have a linear flow profile. Avoid mounting accessories converging on one side in front of the device. However, if this is indispensable maintain a minimum device length of 250 mm as an inlet section.

The nominal size of the pipes to be connected must correspond to that of the meter. Avoid fittings converging on one side directly in front of the device. As a rule, install valves behind the measuring equipment if there are gases involved.

10.1.1 Mounting / start-up

The device must be mounted in accordance with the direction of flow from the bottom to the top (perpendicularly).

Please observe the prior reference to the BGF-type device.

The nominal size of the device and that of the pipes must be the same. The pressure rating and, hence, the dimensions of the flanges must coincide. The surface roughness of the flange sealing surface must be suitable for the prescribed gaskets.

Please check whether possible accessories like spring stops, gas/liquid-type dampers are still correctly sitting on the flange. Check whether the mounting clearance between the flanges of the pipes corresponds to the assembly dimension of the device plus two gaskets. **To achieve stress-free mounting, the flanges of the pipes must be aligned parallel to each other.**

Use connecting bolts and gaskets in the prescribed dimensions. The gaskets must be suitable for the operating pressure, the temperature and the measured medium. With PTFE-lined devices, use gaskets whose interior and exterior diameter correspond to the sealing strip of the device.

Tighten the screws crosswise so that the process connections are tight. Refer to the screw torques especially with PTFE-coated devices.

The maximum torques for PTFE-coated devices are:

DN15/DN25 = 14 Nm/DN50 = 25 Nm/DN80 = 35 Nm/DN100 = 42 Nm (following VDI/VDE Guideline 3513).

Please check whether the pipe is adequately fixed and stable to prevent vibration or swinging of the device. (Do not use steel mounting parts on the device.)

When used with gaseous medias the installation position of e.g. adjusting valve (e.g. special option). If the device is calibrated to more than 1.013 bars abs., the valve is usually installed at the flow meter outlet. At 1.013 bars abs. (free outlet) the valve is installed at the flow meter inlet.

If there is risk of dirt or solid matter penetrating the process pipes, flush them beforehand so that those materials do not get deposited in the device. Ferromagnetic solid matter such as weld spatters can lead to the breakdown of the device. If these materials cannot be excluded during normal operating conditions, mount a magnetic filter (accessory) in front of the device. When using liquids, flush to avoid a surge of gas bubbles. Slowly increase the supply pressure when using gases to prevent pressure surges. Basically, avoid activation using solenoid valves to prevent the float from shooting upwards.

10.1.1.1 Liquid Measurement / start up



When measuring liquids process pipes must be accurately vented to avoid water hammers through gas contents. To avoid float hammers the use of solenoid valves must be prevented.

10.1.1.2 Gas measurement / start up



When measuring gases, increase flow very slow to avoid float hammers inside the flow tube.. At the same time, vary the operating pressure through a setting valve so that the float will not be exposed by any flow hammer otherwise this would damage the float or measuring ring. Avoid fluid pulsation. On gas measurements flow meters with gas damping systems will be recommended

10.1.2 Device settings

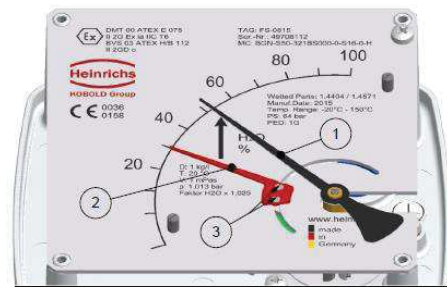
The measuring instrument is delivered ready for operation according to your order specifications. **The limit switches** are set to the desired values. If you have submitted no requirements, the basic settings are:

- 1 switch: Minimum contact switching point at 10% of descending flow (damped/closed-circuit principle).
- 2 switches: Minimum contact switching point at 10% of descending flow and maximum contact switching point at 90% of ascending flow.

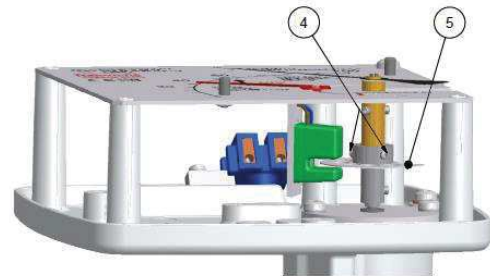
10.1.3 Adjusting the switch point for the inductive limit switch KEI

The inductive contact can be adjusted via a limit switch indicator (2) located at the front side of the scale

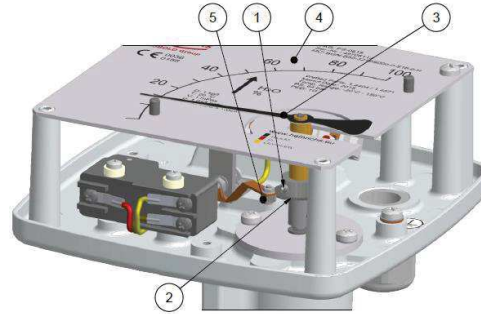
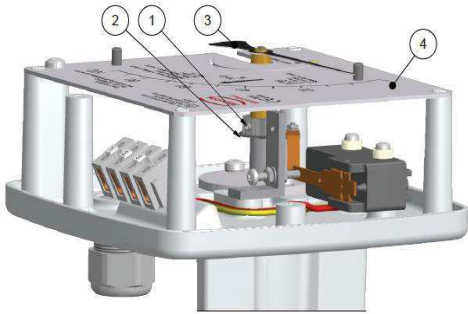
- 1) unscrew 4 screws of the front cover and lift off the cover
- 2) **!! do not remove the scale !!**
- 3) unfasten 2 locking screws (3) of the red limit switch indicator (2)
- 4) move the red switch indicator to the desired switch point on the scale and tighten the locking screws (3) again
- 5) mount the cover and tighten it's four screws again



- 1 Pointer
- 2 Limit switch indicator (fig. MIN)
- 3 Limit switch indicator locking screws
- 4 Locking screws switching disc
- 5 Single switching disc KEI



10.1.4 Adjusting the switch point of SPDT Micro Switches KEM



KEM 1 and KEM 2 limit switches do not have limit switch indic
Switch point(s) are normally factory set.

- 1 Locking screws switching disc
- 2 Switching disc
- 3 Pointer
- 4 Scale
- 5 Switching lever

To adjust the switch points use the following procedure:

- 1) Ensure that the supply lines are powerless and will not be switched active during operation.
- 2) unscrew 4 screws of the front cover and remove the cover
- 3) **!! do not remove the scale (4) !!**
- 4) Move the **pointer (3)** carefully in direction of the desired switch point
- 5) Unfasten the **screws (1)** of the **disc (2)** carefully and move the disc towards the switching point of the **micro switch**
- 6) Depending on the switching function (N/O or N/C) the switch must be activated (for N/C) or non activated (for N/O)

NOTE

Due to hysteresis of KEM switches they must not be used for ranges ≤ 250 l/h water

10.1.5 Installation in hazardous areas

Only devices with Ex-marking may also be operated in hazardous areas.



Ambient-Temp.	Process-Temp.	Marking	Z o n e	Description Max. Ambient temperature
-40°C .. +80 °C	-25°C .. +150 °C	II 2G Ex h IIC T6...T3 Gb II 2D Ex h IIIC T85°C...T200°C Db	1	With built-in switch max. 80°C. Observe type certificate of the contact manufacturer
	-25°C .. +200 °C		1	With built in ES max. 70°C
	-40°C .. +350 °C	II 2G Ex h IIC T6...T1 Gb II 2D Ex h IIIC T85°C...T350°C Db	1	Purely mechanical device max. 80°C

10.1.5.1 Without electrical equipment

The basic version of the flow meter is a *non-electrical device* without its own ignition sources and meets DIN EN 13463-1 requirements. It can be used in hazardous areas that require Category 2 equipment.

Marking:

II 2G Ex h IIC T6...T2 Gb
 II 2D Ex h IIIC 80°C...T295°C Db
 Reg. No.: BVS 03 ATEX H/B 112
 Tech. File Ref. 03-02 X

Since the device does not have its own power sources that would result in a temperature increase, the fluid temperature is decisive for the maximum surface temperature.



When used in potentially explosive dust atmospheres, the device must be cleaned regularly in order to avoid deposits exceeding 5 mm.

10.1.5.2 With built-in limit switches

When the limit switches are installed, the device becomes an electrical assembly and gets a marking in accordance with DIN EN 60079 of built-in electrical limit transducers.

The electrical and thermal data and the special conditions of the EU Type Examination Certificate of the built-in limit transducers must be observed (see also the diagram in Section 10.2.1).

The influence of the fluid temperature on the built-in limit transducers must be observed. The over-temperature of the maximum fluid temperature based on the maximum ambient temperature must be considered with a factor according to the following table:

Nominal size	Factor for standard version	Factor for instruments with the indicator on distance
DN15 and DN25 / 1/2" and 1"	0.2	0.07
DN40 and DN50 / 1,5" and 2"	0.25	0.085
DN80 and DN100 / 3" and 4"	0.3	0.1
DN150 / 6"		

Example for built-in limit switch at DN 15 (1/2") and DN 25 (1"):

Max. ambient temperature $T_{amb} = 40^{\circ}\text{C}$
 Max. fluid temperature $T_m = 120^{\circ}\text{C}$
 Factor for brought-in heat $F = 0.2$
 Temperature class T4

$T_{\ddot{u}}$ = Over-temperature
 T_a = Ambient temperature of limit switch

$$T_{\ddot{u}} = T_m - T_{amb} = 120^{\circ}\text{C} - 40^{\circ}\text{C} = 80^{\circ}\text{C}$$

$$T_a = T_{\ddot{u}} * F + T_{amb} = 80^{\circ}\text{C} * 0,2 + 40^{\circ}\text{C} = 56^{\circ}\text{C}$$

In accordance with the tables in the PTB 99 ATEX 2219 X EU Type Examination Certificate, the SJ 3,5-... N... inductive sensor must be operated in the T5 temperature class with an intrinsically safe circuit that does not exceed the maximum values of the Type 3 circuit.

When using the device in hazardous areas, follow the applicable national installation rules.

Example for calculating the max. fluid temperature based on the max. ambient temperature for the built-in sensor Type ES for DN 15/25.

$T_a = 70^{\circ}\text{C}$
 $T_{amb} = 60^{\circ}\text{C}$
 $F = 0.2$

$$T_m = \left(\frac{T_a - T_{amb}}{F} \right) + T_{amb} = \left(\frac{70^{\circ}\text{C} - 60^{\circ}\text{C}}{0,2} \right) + 60^{\circ}\text{C} = 110^{\circ}\text{C}$$

10.1.5.2.1 Marking for the device with built in SJ 3,5...N... limit switch

The built-in limit value transmitter from Pepperl & Fuchs is certified for the gas Ex area by the EU type examination certificate PTB 99 ATEX 2219 X and for the dust Ex area by the EU type examination certificate ZELM 03 ATEX 0128 X.



PTB 99 ATEX 2219 X
 II 2G EEx ia IIC T6
 ZELM 03 ATEX 0128 X
 II 1D Ex iaD 20 T108°C

10.1.5.2.2 Marking for the device with built in electric transmitter ES



DMT 00 ATEX 075
 II2G Ex ia IIC T6

10.1.5.3 Atmospheric conditions

In accordance with EN 1127, a "potentially explosive atmosphere" is defined as a mixture of air and combustible gases, vapour, mist or dust under atmospheric conditions. Such conditions are defined in EN 13463-1, para. 1, with values $T_{atm} = -20^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ and $P_{atm} = 0.8$ to 1.1 bar. Outside this range, safety parameters for most ignition sources are not available.

Usually, variable-area flow meters operate under operating conditions outside the atmospheric conditions of 0.8 to 1.1 bar. Irrespective of the zone classification – safety parameters of explosion protection – are basically not applicable to the inside of the measuring tube.



Therefore operation with combustible products is only allowed if a potentially explosive air mixture is not formed inside the flow meter. Where this condition are not met, the operator will need to assess the ignition hazard in each individual case and give due consideration to existing parameters (e.g. pressure, temperature, process product, materials of construction for the measuring tube).

10.1.5.4 Ground connection

In variable-area flow meters, in principal it is possible that through the flow of non-conductive liquids a charge separation occur inside the measuring tube. A dissipation of such charge carriers from the metal flow tube through earthing must be ensured by permanent earthing via process connections through the operator.

If grounding cannot be made via the process connections (plastic process connections or undefined connections), the flow meter must be connected to the local ground potential via the flanges. This connection only ensures electrostatic grounding of the device and does not meet the requirements for equipotential bonding.

10.2 Ambient conditions

10.2.1 Ambient temperature ranges

Without electrical accessories:

-40°C to +80°C

With limit switches:

-40 °C to +80°C : Observe the type certificate of the contact manufacturer!

With ES signal output:

-40°C to +70°C

For the hazardous area version, take note of the maximum ambient temperatures depending on the temperature class as specified on the Type Examination Certificate.

10.2.2 Storage temperature

The storage temperatures are identical to the ambient temperature ranges.

10.2.3 Climatic category

Weather-protected and/or unheated locations, class C according to IEC 654 Part 1

10.2.4 Degree of protection

IP 65 (Aluminum indicator unit)

IP 67 (Stainless steel indicator unit)

10.2.5 Shock resistance/vibration resistance

The meter should be protected from extreme shocks and vibrations, which could cause damage.

10.2.6 Electromagnetic compatibility

EN 61000-6-2:2011 Störfestigkeit Industriebereich / immunity industrial environment

EN 61000-6-3:2011 Störaussendung Wohnbereich / emission residential, commercial

EN 55011:2011 Gruppe 1, Klasse B , Funkstörungen / Group 1 Class B , ISM ratio-frequency equipment

EN61326-1:2013 EMV-Anforderungen / EMC requirements

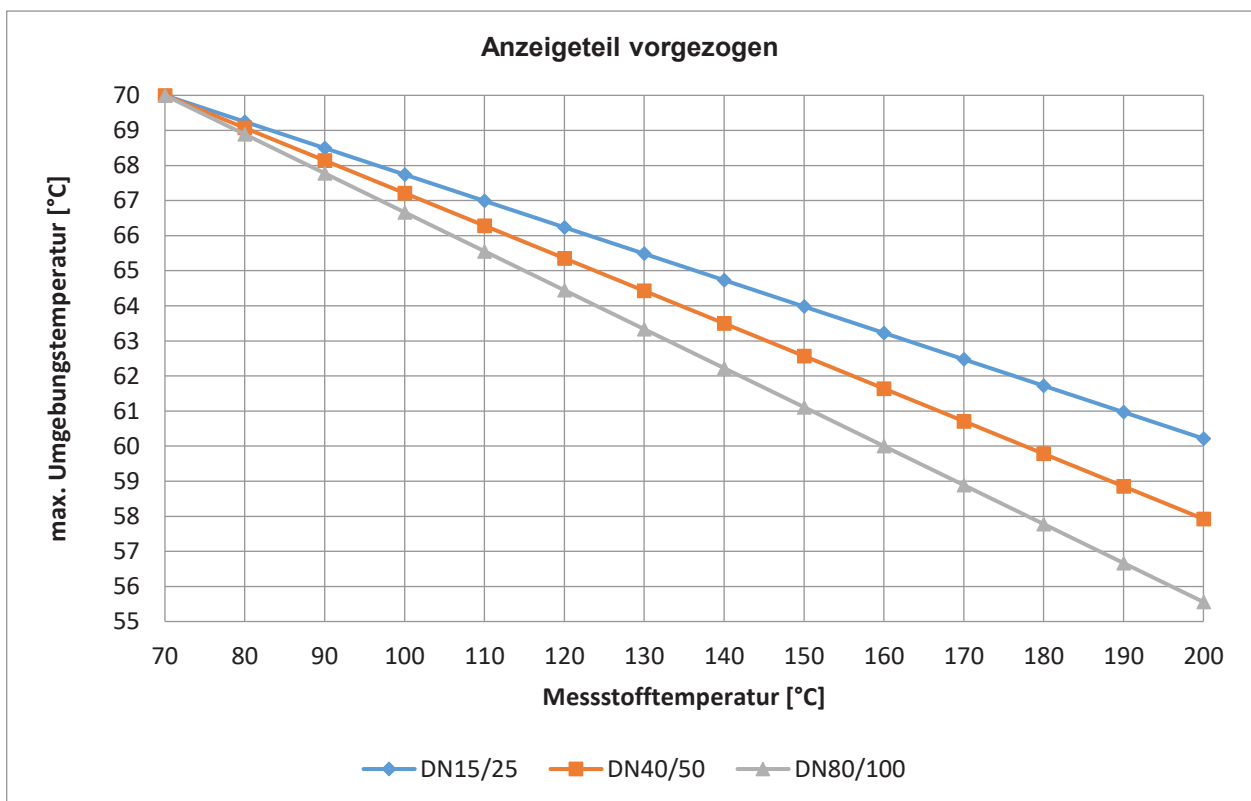
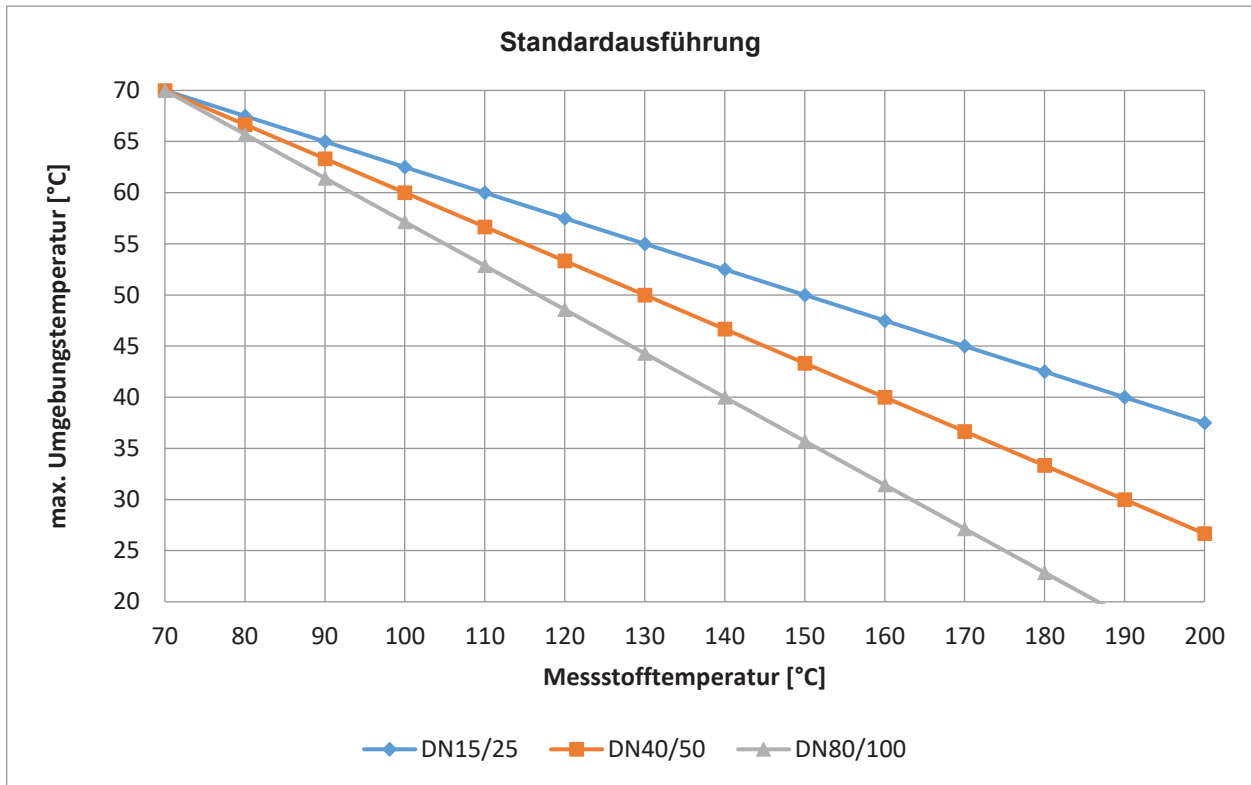
NAMUR recommendation NE 21Fluid conditions

10.2.7 Fluid temperature ranges

BGN-S/H : - 40°C to +200°C Special versions: -80°C to +350°C

BGN-P : - 20°C to +125°C

10.2.8 Diagrams: Max. ambient temperature dependent on fluid temperature for ES transmitter



10.2.9 Fluid pressure limit

Standard design BGN-S/H – DN 15/25/40/50/80 PN 40;
 DN 100 PN 16
 Special design – up to PN 400
 BGN-P – DN 15/25/50/80/100 PN 16

10.2.10 Inlet and outlet sections

Inlet and outlet straight are not required on a linear flow profile of the fluid. For an extremely non-linear flow profile (e.g. shut-off/control valves are located at the meter inlet), we recommend an inlet section with a mounting length of 250 mm (see also guidelines in accordance with VDI/VDE 3513).

10.2.11 Physical state

Liquid or gaseous

10.2.12 Density

Liquids: up to 2.0 kg/l
 Gases: no restrictions

10.2.13 Viscosity

The influence of viscosity depends on various factors. Therefore, it must be calculated for each application.

10.2.14 Pressure (for gas measurement)

The measured values only apply to the calibrated fluid data stated on the scale. Any change or deviation in pressure will cause a display fault.

10.2.15 Pressure loss

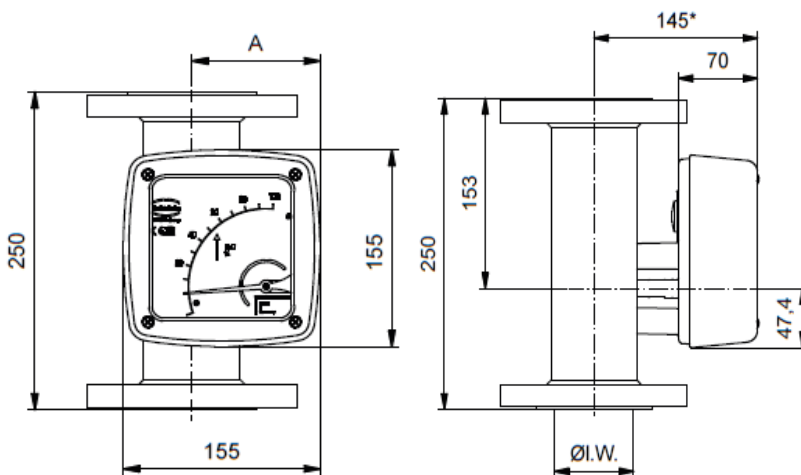
Depends on the meter size and the measuring range (see measuring range table page 6).

11 Construction details

11.1 Type of construction/dimensions

11.1.1 Aluminum indicator housing

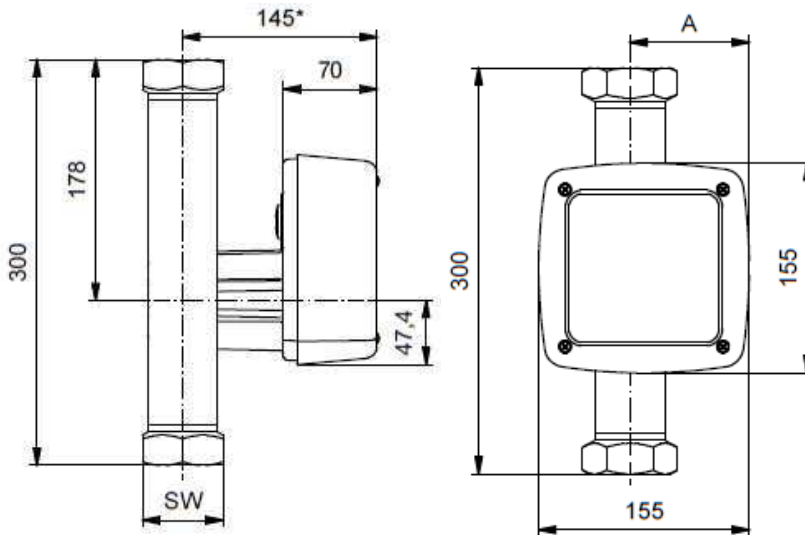
11.1.1.1 Version with flange connection



Pipe	Size DN / ANIS	PN / CL	Ø I.W (mm)	A (mm)
S15	15 / 1/2"	40 / 300	26	77,0
S25	25 / 1"	40 / 300	32	80,1
S40	40 / 1 1/2"	40 / 300	46	87,9
S50	50 / 2"	40 / 300	70	100,9
S80	80 / 3"	40 / 300	102	117,4
S1H	100 / 4"	16 / 300	125	130,1
SH5	150 / 6"	16 / 150	158	149,6

* =+100 mm for displaced indicator

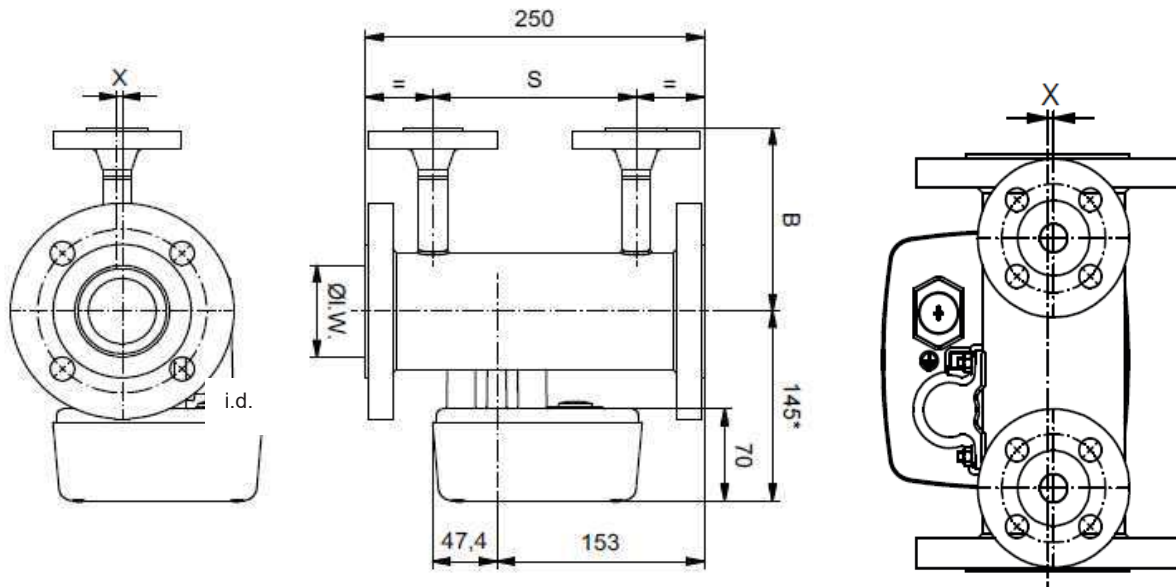
11.1.1.2 Version with threaded connection



Pipe	NPT(f) / G(f) (in)	PN/ CL	SW	A (mm)
S15	1/4-3/8-1/2-3/4	40 / 300	36	77,0
S25	1/4-3/8-1/2-3/4	40 / 300	36	80,1
S40	3/4-1-1 1/4	40 / 300	60	87,9
S50	1 1/4-1 1/2-2	40 / 300	80	100,9

* =+100 mm for displaced indicator

11.1.1.3 Dimensional drawing heating connection



DN / ASME	PN / CI	B (Flange) (mm)	B (Ermeto) (mm)	S (mm)	X (mm)
15 / 1/2"	40 / (150/300)	110	53	150	3,0
25 / 1"	40 / (150/300)	110	58,5	150	4,9
40 / 1 1/2"	40 / (150/300)	130	63	150	2,65
50 2"	40 / (150/300)	140	77,5	150	3,5
80 / 3"	16 / (150/300)	160	93,5	150	4,5
100 / 4"	16 / (150/300)	175	110	120	0

* =+100 mm for displaced indicator

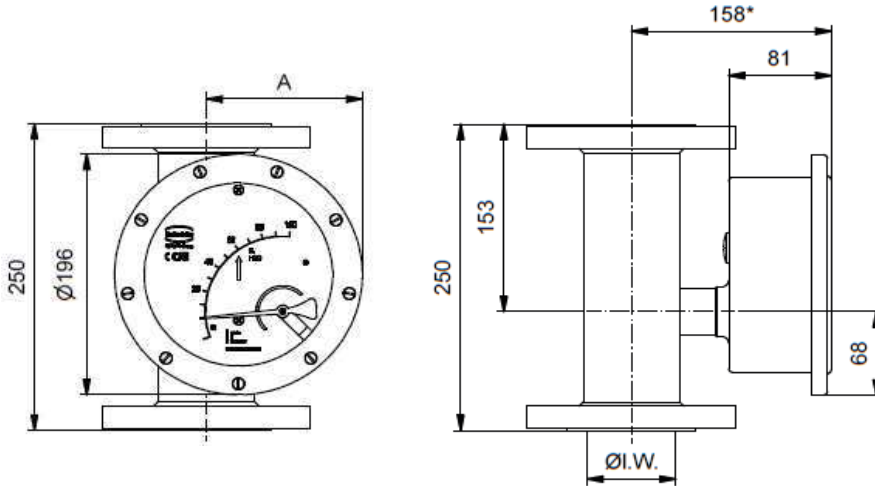
11.1.1.4 Connections for heating jacket

Pipe for	Ermeto 12 mm	
Flange in acc. with DIN / EN	DN 15 (1/2") or DN 25 ¹⁾ (1")	PN 40
Flange in acc. with ASME	1/2"	150 lbs

¹⁾ DN 25 flange is a special version

11.1.2 Indicator housing made of stainless steel

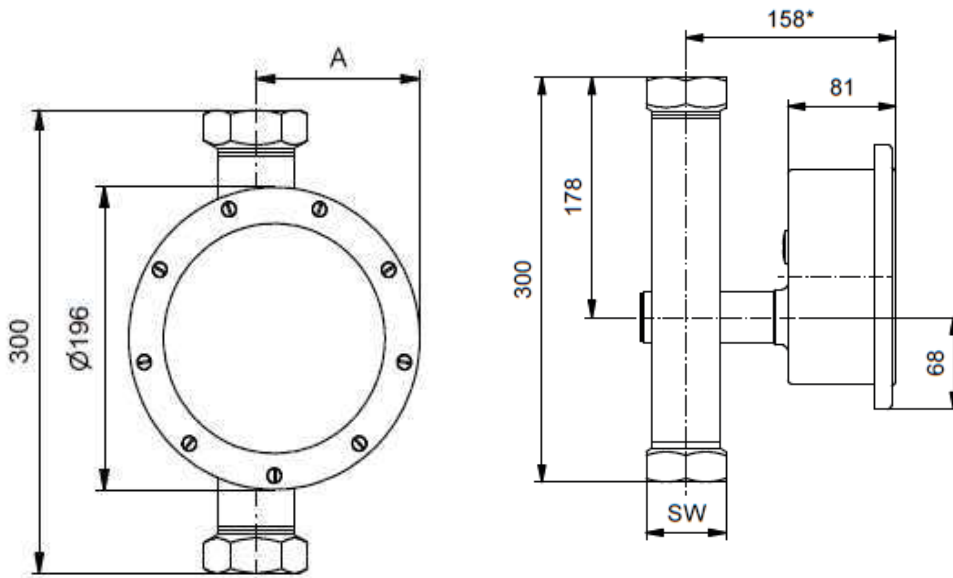
11.1.2.1 Version with flange connection



Pipe	Size DN / ANSI	PN / CL	Ø I. W. (mm)	A (mm)
S15	15 / 1/2"	40 / 300	26	99,5
S25	25 / 1"	40 / 300	32	102,6
S40	40 / 1 1/2"	40 / 300	46	110,4
S50	50 / 2"	40 / 300	70	123,4
S80	80 / 3"	40 / 300	102	139,7
S1H	100 / 4"	16 / 300	125	152,4
SH5	150 / 6"	16 / 150	158	170,2

* =+100 mm for displaced indicator

11.1.2.2 Version with threaded connection



Pipe	NPT(f) / G(f) (in)	PN /CL	SW	A (mm)
S15	1/4-3/8-1/2-3/4	40 / 300	36	99,5
S25	1/4-3/8-1/2-3/4	40 / 300	36	102,6
S40	3/4-1-1 1/4	40 / 300	60	110,4
S50	1 1/4-1 1/2-2	40 / 300	80	123,4

* =+100 mm for displaced indicator

11.2 Weights

Fitting	Nominal Size	Weight (kg) with Aluminum Indicator	Weight (kg) with St.st. indicator
S15	DN 15	3,3	4,0
S25	DN 25	4,2	4,9
S40	DN 40	6,5	7,2
S50	DN 50	8,7	9,4
S80	DN 80	13,8	14,5
S1H	DN 100	14,5	15,2
SH5	DN 150	32,0	32,4

Fitting	Nominal Size	Weight (kg) with Aluminum Indicator	Weight (kg) with St.st. indicator
S15	¾", 150 lbs, ASME B16.5	3,1	3,8
S25	1", 150 lbs, ASME B16.5	3,8	4,5
S40	1 ½", 150 lbs, ASME B16.5	5,2	5,8
S50	2", 150 lbs, ASME B16.5	7,4	8,1
S80	3", 150 lbs, ASME B16.5	13,0	13,7
S1H	4", 150 lbs, ASME B16.5	17,2	17,9
SH5	6", 150 lbs, ASME B16.5	33,5	34,0

Fitting	Nominal Size	Weight (kg) with Aluminum Indicator	Weight (kg) with St.st. indicator
S15	¾", 300 lbs, ASME B16.5	4,0	4,6
S25	1", 300 lbs, ASME B16.5	4,9	5,6
S40	1 ½", 300 lbs, ASME B16.5	7,4	8,1
S50	2", 300 lbs, ASME B16.5	8,9	9,6
S80	3", 300 lbs, ASME B16.5	16,2	16,9
S1H	4", 300 lbs, ASME B16.5	24,6	25,3
SH5	6", 300 lbs, ASME B16.5	49,7	50,2

Fitting	Thread NPT(f) / G(f) (in)	Weight (kg) with Aluminum Indicator	Weight (kg) with St.st. indicator
S15	1/4-3/8-1/2-3/4	2,3	3,0
S25	1/4-3/8-1/2-3/4	2,4	3,1
S40	3/4-1-1 1/4	3,4	4,1
S50	1 1/4-1 1/2-2	5,3	6,0

11.3 Material

Fitting

Type	Measuring tube	Lining of measuring tube	Flanges	Flange lining	Float
BGN – S	Stainless steel	none	Stainless steel	none	Stainless steel
BGN – P (Qmax. 5/10/16 l/h H ₂ O)	Stainless steel	PTFE / glass	Stainless steel	PTFE	PTFE / Tantalum
BGN – P	Stainless steel	PTFE	Stainless steel	PTFE	PTFE
BGN – H DN15/25 ¾"/1"	Hastelloy HC4	none	Hastelloy HC4	none	Hastelloy HC4
BGN – H > DN40 / 1 ½"	Hastelloy HC4	none	Stainless steel	Hastelloy HC4	Hastelloy HC4

Indicator units

Type	Base plate	Housing
BGN – S/P/H	Aluminium	Aluminium, safety glass window
Optional	Stainless steel	Stainless steel, safety glass window

11.4 Process connection

DIN	BGN-S/H	BGN-P
DN 15	PN 40	PN 16
DN 25	PN 40	PN 16
DN 40	PN 40	PN 16
DN 50	PN 40	PN 16
DN 80	PN 40	PN 16
DN 100	PN 16	PN 16
DN 150	PN16	--

ASME	BGN S/ H	BGN P
ANSI ¼" B16.5	150 lbs ¹⁾	300 lbs ¹⁾ 150 lbs ²⁾ 300 lbs ²⁾
ANSI 1" B16.5	150 lbs ¹⁾	300 lbs ¹⁾ 150 lbs ²⁾ 300 lbs ²⁾
ANSI 1 ½" B16.5	150 lbs ¹⁾	300 lbs ¹⁾ 150 lbs ²⁾ 300 lbs ²⁾
ANSI 2" B16.5	150 lbs ¹⁾	300 lbs ¹⁾ 150 lbs ²⁾ 300 lbs ²⁾
ANSI 3" B16.5	150 lbs ¹⁾	300 lbs ¹⁾ 150 lbs ²⁾ 300 lbs ²⁾
ANSI 4" B16.5	150 lbs ²⁾	300 lbs ²⁾ 150 lbs ²⁾ 300 lbs ²⁾
ANSI 4" B16.5	150 lbs	

¹⁾ Entire device PN 40 ²⁾ Entire device PN 16

Additional equipment:

special flanges (e.g. JIS), threaded connections, food connection (e.g. TriClamp), welding connection

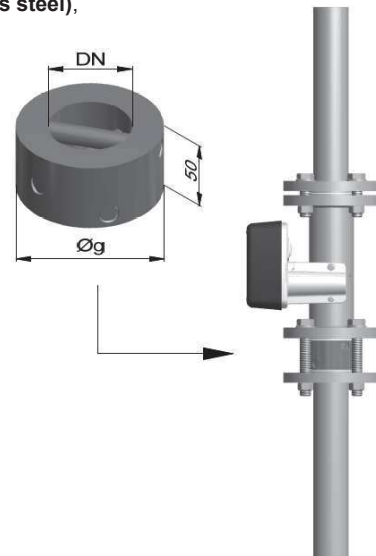
The S/H versions in special design are available for higher pressure on request.

11.5 Magnetic filter

The BGN flow meter is sensitive to impure media. Before installing the device, clean the pipes of dirt, spatter and other foreign matter. If the medium comes with solid particles, connect a suitable filter in series. When dealing with flow media with ferrous particles, we recommend the connection of a magnetic filter.

To protect both magnetic filter types, **MF-S (stainless steel)** and **MF-P/S (PTFE/stainless steel)**, from corrosion, encapsulated permanent magnets are laid out in spiral form. The spiral mounting produces optimum effect at small pressure loss.

The filter can be supplied with groove or tongue, projection or return, other standards or special connections according to customer demand.



Dimensions:

DN / inch	g (mm)
15 / 1/2"	45
25 / 1"	68
40 / 1 1/2"	88
50 / 2"	102
65 / 2 1/2"	122
80 / 3"	138
100 / 4"	158

11.6 Electrical connection

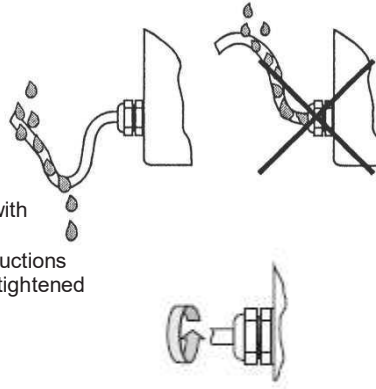
Wiring

To connect the power supply, remove the indicator cover, insert the connector cable into the cable gland and attach it to the terminals according to the terminal diagram. Tighten the cable gland securely, remount the indicator cover and close it tightly.

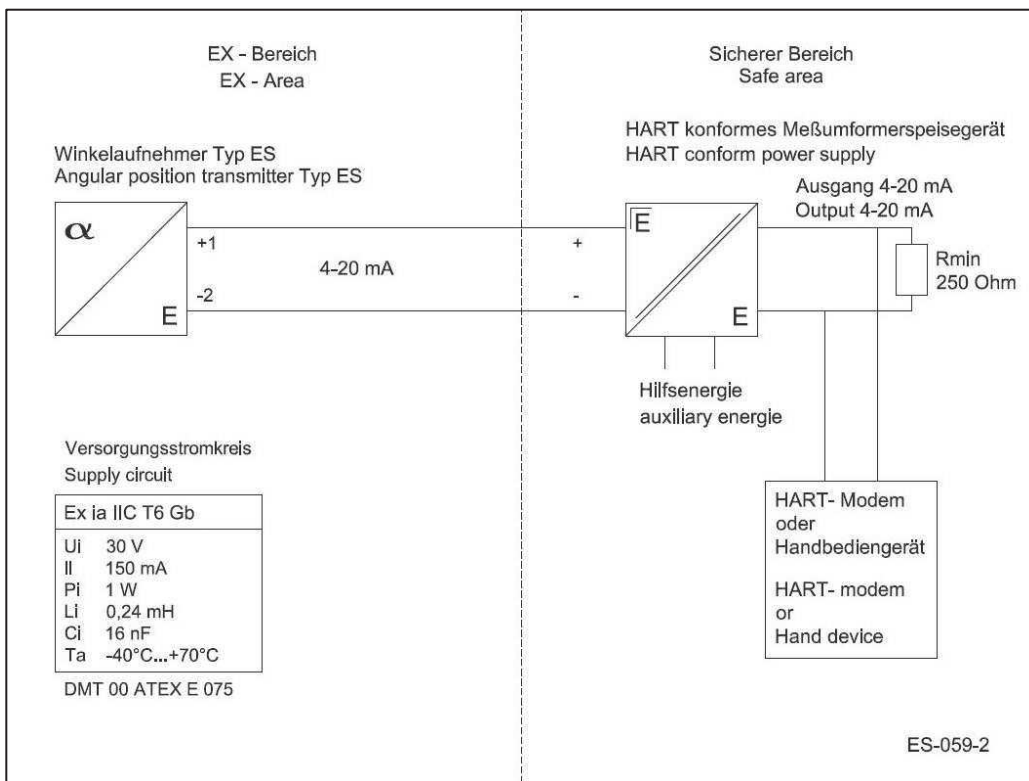


Please observe the following wiring instruction carefully.(Improper wiring will cause loss of guarantee)

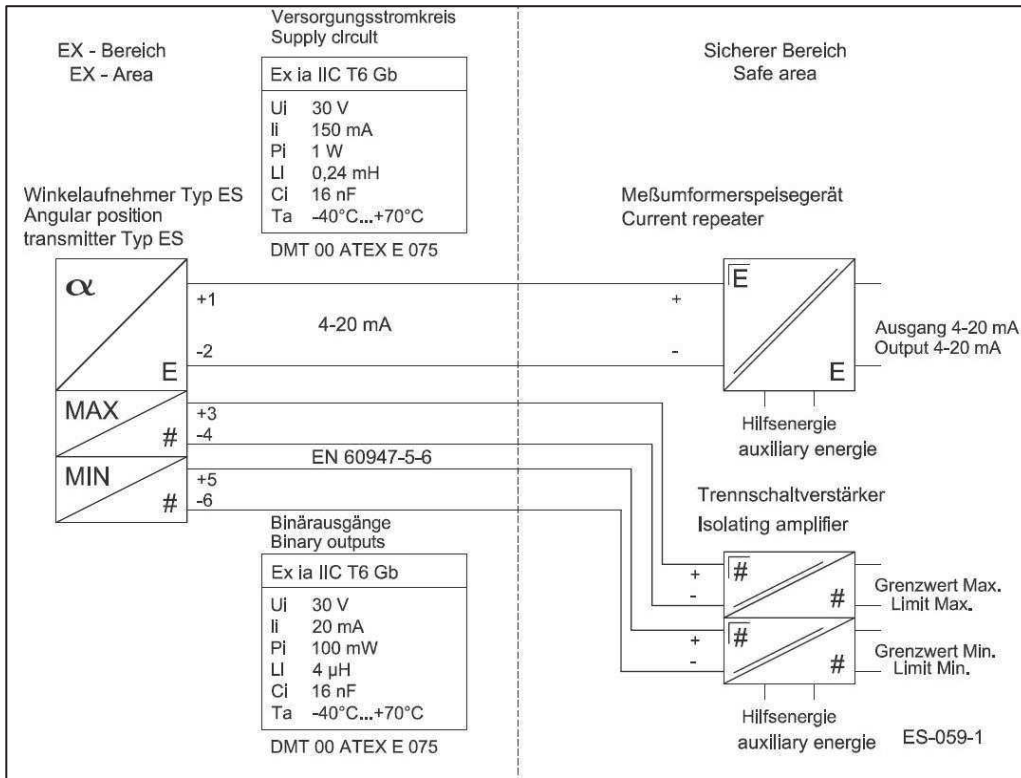
- Cable glands are not part of the delivery
- The cable gland must the specified outer diameter
- The cable gland must fit to the diameter of the cable
- The cable must form a pig tale in front of the gland to avoid water ingress - see sketch on the right
- Cable glands must not point upward
- The delivered cable gland connection sealing screw - delivered with instruments with no signal transmitter - must be removed
- The sealing of the cable glands must correspond with the instructions of the original cable gland manufacturer. Wrongly or incorrect tightened cable glands will cause water ingress into the indicator housing



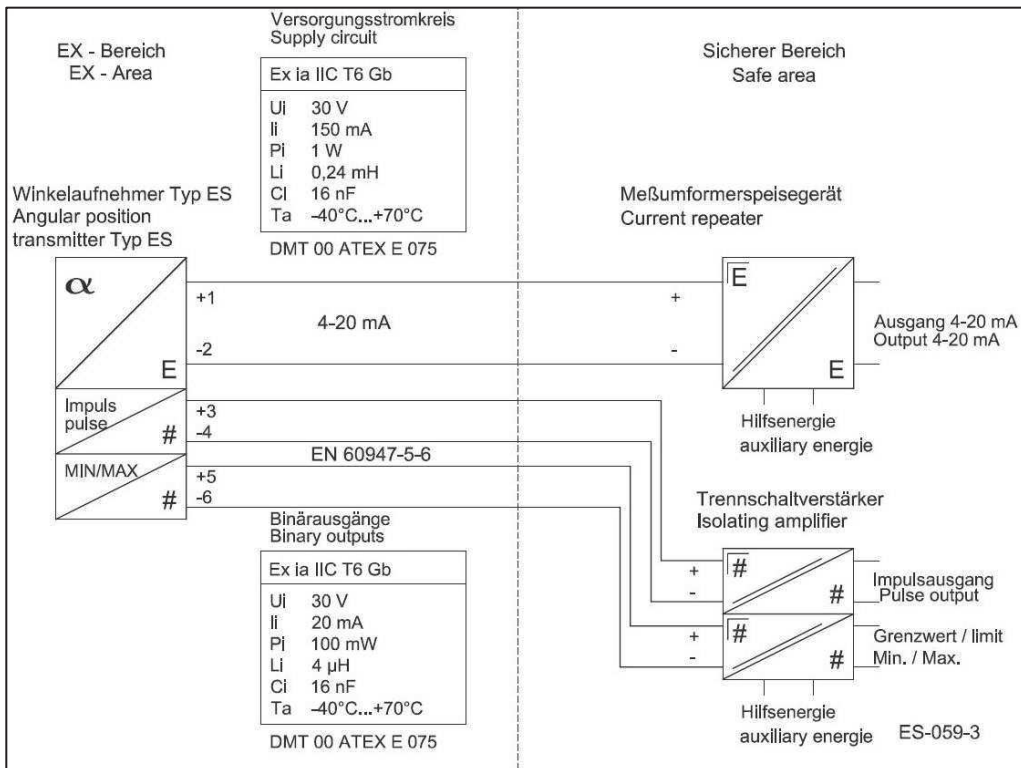
11.6.1 Wiring diagram for ES transmitter (signal output 4-20 mA with HART®)



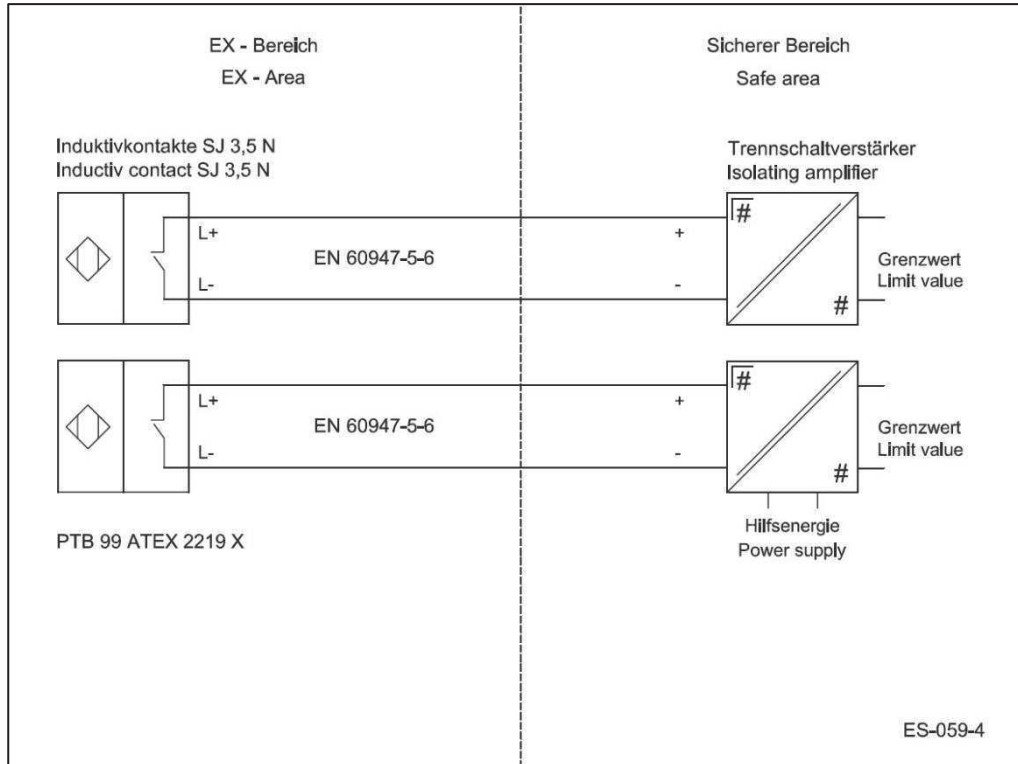
11.6.2 Wiring diagram for ES transmitter with 4-20 mA output and 2 limit switches



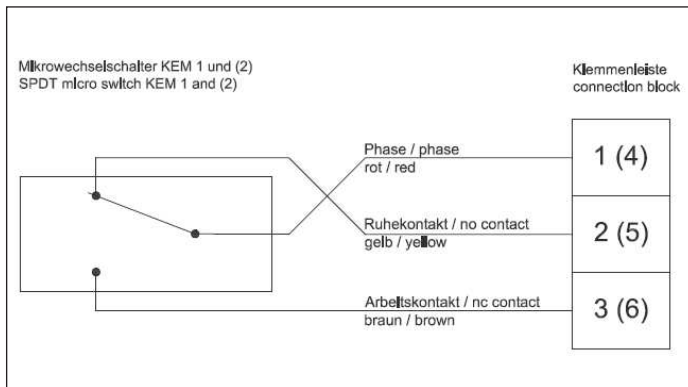
11.6.3 Wiring diagram for ES transmitter with 4- 20 mA output, pulse output and limit switches



11.6.4 Wiring diagram for inductive limit switches KEI



11.6.5 Wiring diagram for KEM 1 and KEM 2 micro switches



11.6.6 Devices with unconnected cable end

For simple electrical connection, especially at the units with stainless steel display housing, the device can be supplied with a cable end (silicon cable). The standard cable length is 2.5 m. The cable has 7 wires, yellow / green for earth and 6 black wires with white numbers 1-6. The function of the wires (1-6) corresponds to the terminal numbers.

If the connection is made in a hazardous area, the cable must be connected in a housing that meets the requirements according to IEC EN 60079-14.

12 Indicator unit

- Analog indicator approx. 90° with pointer
- Customized product scale
double scale possible (please tell process data)
- ES transmitter with freely programmable user interface
- Parameters may be changed based on the ES Operating Instructions.

13 Power supply

see Electrical connection

14 CE-Marking

The measuring system meets the legal requirements of the following EU directives:

Ex-directive 2014/34/EU (ATEX), der EMC-directive 2014/30/EU (EMC) and the Pressure Equipment Directive 2014/68/EU (PED). Heinrichs Messtechnik confirms the conformity with the directives by attaching the CE mark.

15 Order information

Please include the following information in your order: Product data, specific weight, temperature, pressure, viscosity, material design, connection size, measuring range, desired accessories, required approvals and material certificates.

See **Device selection by model code**.

16 Standards and directives, certificates and approvals

See EU Declaration of Conformity Point 24

17 Maintenance

The device requires no maintenance if used according to its intended purpose. However, if cleaning is necessary to remove dirt from the measuring ring or the float, take note of the following aspects:

- Please take note that, with devices with built-in electrical equipment, removing the indicator cover restricts the EMC protection.
- Before removing a device, make sure that the pipeline is free from the product, is pressureless and has cooled down.
- Fittings with the insides coated may be carefully cleaned after removal with a brush and the appropriate cleansing agent. Carefully clean the float from possible coating.



- Attention: do not treat the measuring ring/cone and float with hard objects Do not treat the measuring pipe with hammering from outside (see Removing/installing the cone/float).

- The switch points of the limit switches are adjustable. To do this, remove the indicator cover, unfasten the contact point indicator located on the scale and readjust it. After the adjustment, reattach the bolts of the contact point indicator. Reinstall and tighten the indicator cover.
- The parameterization of the ES is possible and is done via HART®. Please refer to the separate Operating Instructions for the ES.
- The gas and viscous damping cylinders can be checked for dirt (see Installing/removing the damping sets).

18 Installing and removing cone, float, damping sets/spring stop

To remove the float (cone/float), remove the instrument from the pipe. Then clamp the device horizontally in a vise, making sure that fitting is not damaged.

Device with measuring ring:

By using a suitable tool on secure the guiding star of the float from contortion from above in the fitting, and remove the lower guiding star's retaining screw an remove the entire float bottom up.

Device with cone:

Unscrew the cone with the float using a suitable tool through the lower cone thread, and take out the float after removing the top cone stabilizer.



Important! Avoid damaging the float/measuring ring and cone. On some instrument versions e.g. threaded connections - a removal of the float is not possible

From measuring range 5-50 l/h water on the float of the device can be removed.. On the BGN S-type up to 40 l/h water. the float can be changed including the cone.

The gas and viscous damping cylinders as well as the spring stop for the float can be removed from the top after the device has been removed. Proceed in reverse order when reinstalling these parts.

19 Trouble shooting

Diagnosis	Possible reason	Corrective action
Indicator window steamed	Indicator cover damaged Indicator sealing damaged Cable gland not tightened high temperature differences aggressive ambient atmosphere	- change indicator cover - tighten cable gland - indicator with pressure relief - install rinsing connection for N2 gas
Indicator cover untight	indicator sealing damaged	- change indicator cover - fasten indicator cover screws
Indicator window icy	ambient temperature too low	- install N23 rinsing connection - change to high tem. distance housing
Instrument shows wrong measuring values	- calibration does not meet process conditions pointer de-adjusted	- review operating conditions, on deviations new calibrations from manufacturer is recommended - re-adjust pointer (RP on meas. scale)
No reaction on pointer despite flow	pointer is behind the stopper (RP) float is stucked (pollution)	- remove cover, re-adjust pointer - remove instrument from process and clean float and all inner parts carefully - if sticking parts in the process use of magnet filter recommended
Float is stucked	pollution / residues in the process Measuring pipe damaged gas or liquid damping system damaged by the process	- remove instrument from the process and clean carefully - resend the instrument to the manufacturer for evaluation
Pointer indication is pulsating	Inlet pressure too low	- increase inlet pressure, instrument for recalibration back to manufacturer (gases) or - use of instrument with low pressure loss - re-equip with double turbulent flow damping - locate valves, gate valves etc. after the instrument
Electrical equipment e.g. transducer, limit swithes without function	wrong wiring defective el. parts	- check wiring diagram acc. instruction manual - change el. parts (e.g. limit switches) or sent the instrument back to manufacturer
Un-known		Sent the instrument back to the manufacturer and include a detailed failure description

20 Returning devices for repair and service

Note: In accordance with the applicable German waste disposal legislation, the owner/client is responsible for the disposal of special waste and hazardous materials. Consequently, all devices sent to us for repair must be free of any hazardous materials. This also applies to possible hollow spaces and fissures in the devices. If repair is necessary, confirm the above-mentioned item in writing (please use the form in the Appendix).

If hazardous materials remain in or on the device after it has been returned, Heinrichs Messtechnik shall be authorized to remove them at the client's expense without further inquiry.

21. Replacement parts

Group	Description	Info
Anzeigeteil	Indicator cover aluminum c/w window/gasket/screws	
	Scale, blank	
	Scale incl customer operating values	
	Indicator unit(B)-aluminum, c/w. mit blank-scale	
	Indicator unit(B)-aluminum, c/w. limit switches KE11 (SJ3,5-N)	
	Indicator unit(B)-aluminum, c/w. limit switches KE12 (SJ3,5-N)	
	Switching disc for KE1	
	El. transducer ES, 4-20mA, Hart®	
	Indicator unit(B)-aluminum, c/w. el. transmitter ES	
	Bearing unit c/w (B)-standard c/w.axle, bearings and magnets	
	Bearing unit (B) for indicator on distance	
	Pointer unit complete. (standard)	
	Pointer unit complete fol el. transducer ES	
	Base plate(B)-aluminum, c/w cover screw for cable entry(standard)	
	Base plate(B)-aluminum, c/w cover screw for cable entry(standard) for indicator on distance	
	Cable gland M20x1,5, grau, Polyamid	
Cable gland M20x1,5, blue, Polyamid		
Flow tube	Float st.st. c/w guiding star	on request
	Float st.st. c/w guiding star, and liquid or gas damping system	on request
Mounting sets	Retrofit set for KE11 (SJ3,5-N)	
	Retrofit set for KE12 (SJ3,5-N)	

NOTE:

When ordering spare parts please always mention the serial number of the instrument.

If the float is being removed we recommend a new calibration of the instrument always. Without new calibration additional measuring errors must be considered.

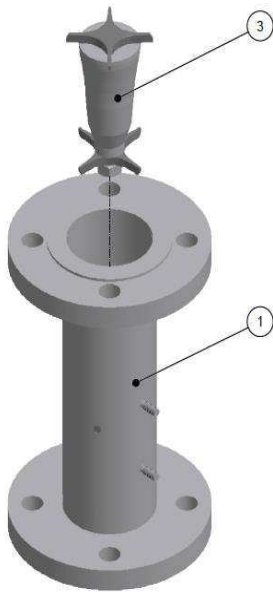
For further instruction on spare parts please contact the Heinrichs Messtechnik GmbH service department

22 Exploded views

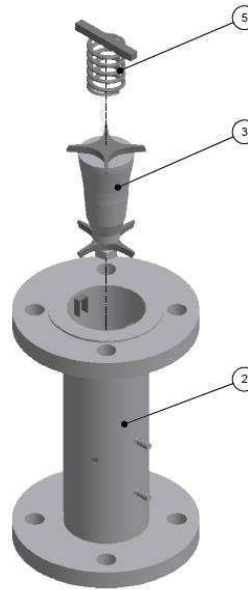
22.1 Fitting with measuring element

Name (Figures 12-15)	Part no.
BGN - Fitting	1
BGN - Fitting with Spring stop for float	2
Float	3
Float with damping piston	4
Spring stop	5
gas damping	6
gas damping with Spring stop	7

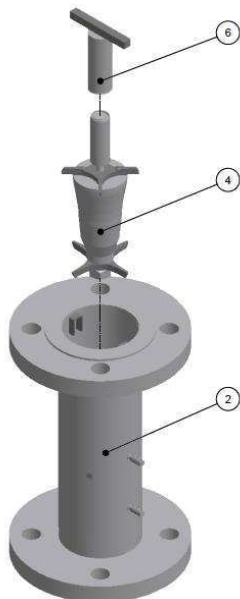
22.1.1 BGN-.... Standard version



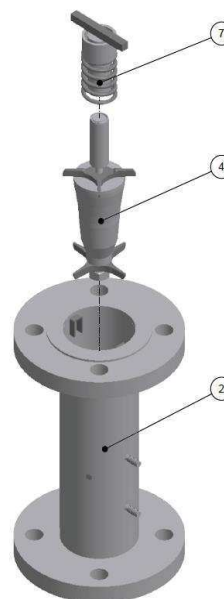
22.1.2 BGN-.... with spring stop



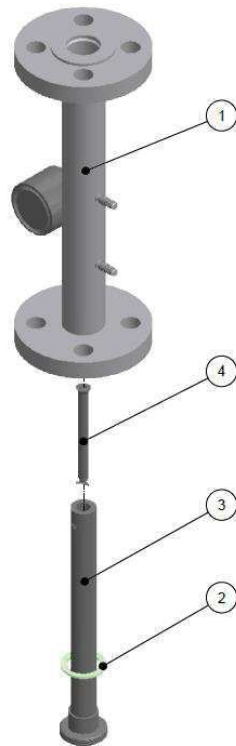
22.1.3 BGN-.... with damping piston



22.1.4 BGN-.... with damping piston and spring stop



22.1.5 BGN-.... small measuring ranges



Name (Figures 16)	Part no.
Fitting for small measuring range	1
gasket	2
Cone with spring stop	3
Float	4

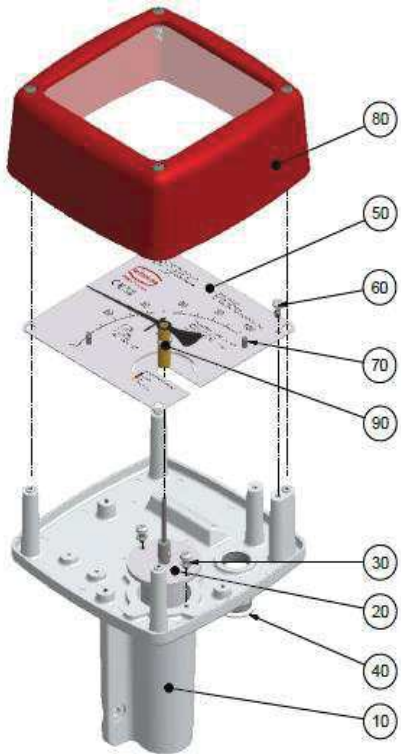
Information about replacing of measuring cones on low volume meters

Depending on the unit version and ranges screwed cones (changable) or welded cones (non changable) are used. For further informations regarding replacability please contact service department.

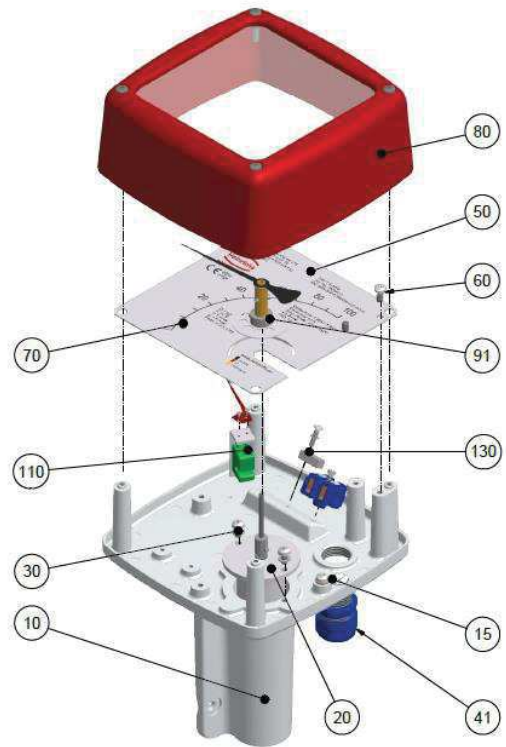
22.2 Indicator unit

Name	Part no.
Indicator base plate 1 x M 20 x 1.5	10
Inner earthing connection	15
Bearing assembly	20
Fixing screws for bearing unit	30
Dummy plug M 20 x 1.5 c/w o-ring	40
Cable gland blue (intrinsically safe) c/w o-ring M20 x 1,5	41
Cable gland grey (ATEX) c/w o-ring M20 x 1,5	42
Scale, blank	50
Fixing screw for the scale	60
Zero-point screw with nut	70
Indicator cover with glass window, gasket, screws	80
Scale pointer	90
Scale pointer c/w 1 switching disc KEI	91
Scale pointer c/w 2 switching discs KEI	92
Scale pointer c/w 1 switching disc KEM	93
Scale pointer c/w 2 switching discs KEM	94
Scale pointer c/w ES position magnet	95
1. SJ 3,5 N limit switch c/w limit value indicator incl. c/w mounting parts	110
1 SPDT micro switch KEM 1 c/w mounting parts	114
2. SJ 3,5 N limit transducer with limit value indicator	120
2 SPDT micro switches KEM 2 c/w mounting parts	124
Distortion lock c/w screw	130
Installation assembly for 1 micro switch KEM 1	131
Installation assembly for 2 micro switches KEM 2	132
ES HART® transmitter c/w fixing screws	140

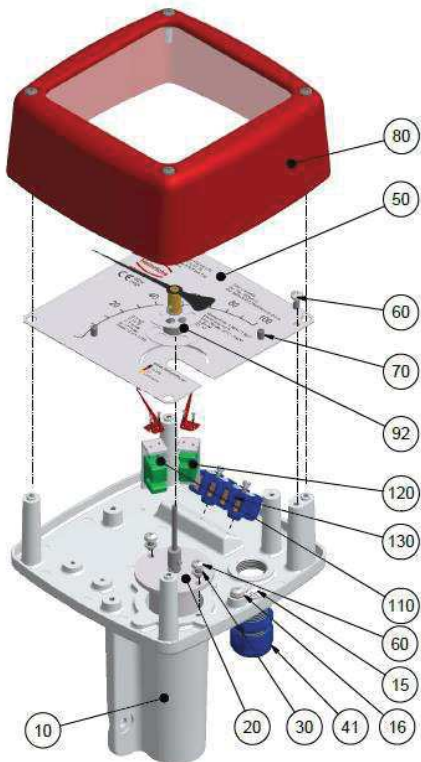
**22.2.1 Complete indicator unit,
with local scale**



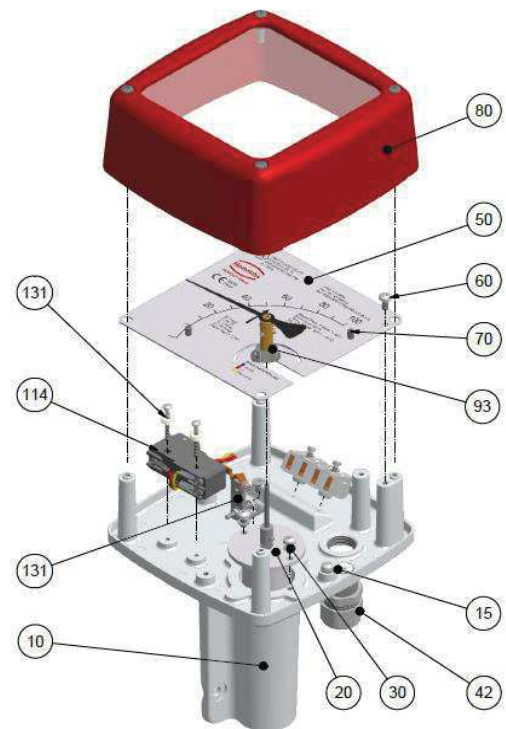
**22.2.2 Complete indicator unit,
c/w 1 pc limit switch SJ 3,5-N**



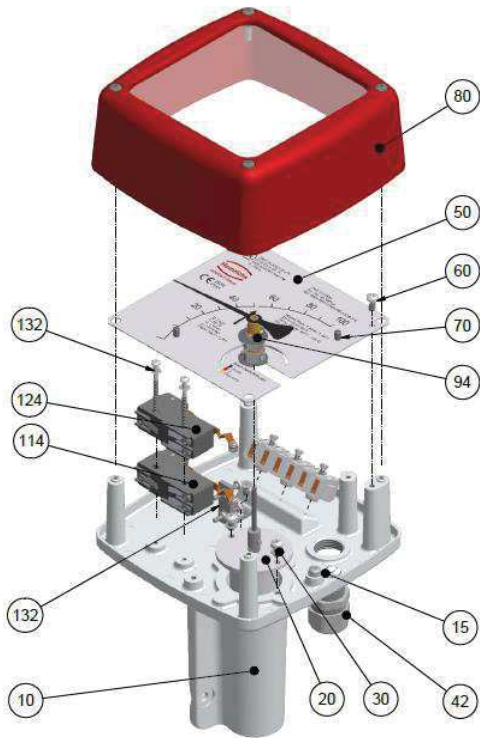
**22.2.3 Complete Indicator unit with 2 pcs
limit switches SJ 3,5-N**



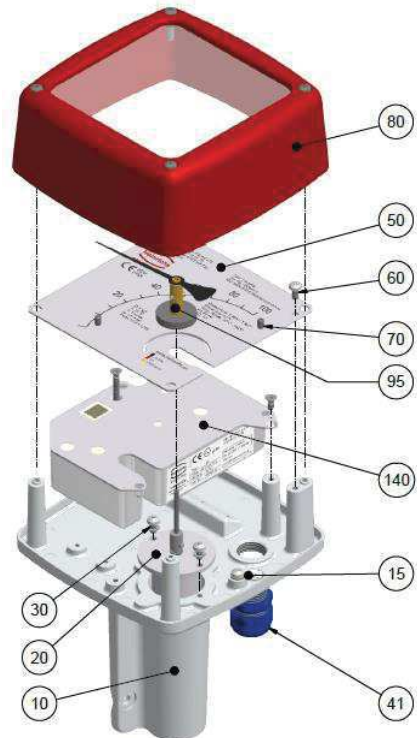
**22.2.4 Complete indicator unit with
1 pc SPDT micro switch KEM**



22.2.5 Complete indicator unit with
2 pcs SPDT micro switches KEM



22.2.6 Complete Indicator unit with
transmitter ES Ex HART®



22.3. Model Code

BGN -			
Material			
S	Stainless Steel, process temperature ≤ 350°C		
P	Stainless Steel, Wetted Parts PTFE, process temperature ≤ 125°C, process pressure max. 16 bar (not for size "H5" available)		
H	Hastelloy C22, process temperature ≤ 350°C (not for size "10" available)		
Nominal Device-Size		Measuring Range-Code	
10	1/4"	Measuring ranges see table	A-F
15	1/2"	Measuring ranges see table	F-L
25	1"	Measuring ranges see table	M-Q
40	1 1/2"	Measuring ranges see table	P-R
50	2"	Measuring ranges see table	Q-U
80	3"	Measuring ranges see table	T-V
1H	4"	Measuring ranges see table	V-2
H5	6"	Measuring ranges see table	2-4
Flange connections			
(10)	305B	DN15 PN40 Form B1 DIN EN 1092-1	202R 3/4" Class 150 RF ASME B16.5-2003
	305D	DN15 PN40 Form D DIN EN 1092-1	222R 3/4" Class 300 RF ASME B16.5-2003
	309B	DN25 PN40 Form B1 DIN EN 1092-1	203R 1" Class 150 RF ASME B16.5-2003
	309D	DN25 PN40 Form D DIN EN 1092-1	223R 1" Class 300 RF ASME B16.5-2003
	201R	1/2" Class 150 RF ASME B16.5-2003 (reduced raised face diameter)	203J 1" Class 150 RTJ ASME B16.5-2003
	221R	1/2" Class 300 RF ASME B16.5-2003 (reduced raised face diameter)	223J 1" Class 300 RTJ ASME B16.5-2003
Flange connections			
(15)	305B	DN15 PN40 Form B1 DIN EN 1092-1	203R 1" Class 150 RF ASME B16.5-2003
	3A5B	DN20 PN40 Form B1 DIN EN 1092-1	223R 1" Class 300 RF ASME B16.5-2003
	309B	DN25 PN40 Form B1 DIN EN 1092-1	204R 1 1/4" Class 150 RF ASME B16.5-2003
	309D	DN25 PN40 Form D DIN EN 1092-1	224R 1 1/4" Class 300 RF ASME B16.5-2003
	313B	DN32 PN40 Form B1 DIN EN 1092-1	406R 15A 10K RF JIS B2220
	313D	DN32 PN40 Form D DIN EN 1092-1	407R 15A 16K RF JIS B2220
	201R	1/2" Class 150 RF ASME B16.5-2003 (reduced raised face diameter)	406F 15A 10K FF JIS B2220
	221R	1/2" Class 300 RF ASME B16.5-2003 (reduced raised face diameter)	407F 15A 16K FF JIS B2220
	202R	3/4" Class 150 RF ASME B16.5-2003	
	222R	3/4" Class 300 RF ASME B16.5-2003	
Thread connections (installation length: 300mm, float not removable)			
	4000	G1/4" female thread	6030 1/2" NPT(f)
	4010	G3/8" female thread	6040 3/4" NPT(f)
	4020	G1/2" female thread	6832 DN25 TriClamp ISO 2852
	4030	G3/4" female thread	6830 DN25 TriClamp DIN 32676
	6010	1/4" NPT(f)	6630 RD52x1/6" DIN11851
	6020	3/8" NPT(f)	
Flange connections			
(25)	305B	DN15 PN40 Form B1 DIN EN 1092-1 (reduced raised face diameter)	204R 1 1/4" Class 150 RF ASME B16.5-2003
	3A5B	DN20 PN40 Form B1 DIN EN 1092-1 (reduced raised face diameter)	224R 1 1/4" Class 300 RF ASME B16.5-2003
	309B	DN25 PN40 Form B1 DIN EN 1092-1	205R 1 1/2" Class 150 RF ASME B16.5-2003
	309D	DN25 PN40 Form D DIN EN 1092-1	225R 1 1/2" Class 300 RF ASME B16.5-2003
	313B	DN32 PN40 Form B1 DIN EN 1092-1	416R 25A 10K RF JIS B2220
	313D	DN32 PN40 Form D DIN EN 1092-1	417R 25A 16K RF JIS B2220
	202R	3/4" Class 150 RF ASME B16.5-2003 (reduced raised face diameter)	416F 25A 10K FF JIS B2220
	222R	3/4" Class 300 RF ASME B16.5-2003 (reduced raised face diameter)	417F 25A 16K FF JIS B2220
	203R	1" Class 150 RF ASME B16.5-2003	
	223R	1" Class 300 RF ASME B16.5-2003	
Thread connections (installation length: 300mm, float not removable)			
	4000	G1/4" female thread	6030 1/2" NPT(f)
	4010	G3/8" female thread	6040 3/4" NPT(f)
	4020	G1/2" female thread	6842 DN25 TriClamp ISO 2852
	4030	G3/4" female thread	6840 DN25 TriClamp DIN 32676
	6010	1/4" NPT(f)	6640 RD52x1/6" DIN11851
	6020	3/8" NPT(f)	
Flange connections			
(40)	317B	DN40 PN 40 Form B1 DIN EN 1092-1	426R 40A 10K RF JIS B2220
	317D	DN40 PN 40 Form D DIN EN 1092-1	427R 40A 16K RF JIS B2220
	205R	1 1/2" 150 lbs RF ASME B16.5-2003	426F 40A 10K FF JIS B2220
	225R	1 1/2" 300 lbs RF ASME B16.5-2003	427F 40A 16K FF JIS B2220
Thread connections (installation length: 300mm, float not removable)			
	4030	G3/4" female thread	6060 1-1/4" NPT(f)
	4040	G1" female thread	6862 DN50 TriClamp ISO 2852

	4050	G1-1/4" female thread	6860	DN50 TriClamp DIN 32676	
	6040	3/4" NPT(f)	6660	RD78x1/6" DIN 11851	
	6050	1" NPT(f)			
(50)	Flange connections				
	321B	DN50 PN40 Form B1 DIN EN 1092-1	207R	2½" Class 150 RF ASME B16.5-2003	
	321D	DN50 PN40 Form D DIN EN 1092-1	227R	2½" Class 300 RF ASME B16.5-2003	
	325B	DN65 PN16 Form B1 DIN EN 1092-1	431R	50A 10K RF JIS B2220	
	325D	DN65 PN16 Form D DIN EN 1092-1	432R	50A 16K RF JIS B2220	
	326B	DN65 PN40 Form B1 DIN EN 1092-1	431F	50A 10K FF JIS B2220	
	326D	DN65 PN40 Form D DIN EN 1092-1	432F	50A 16K FF JIS B2220	
	206R	2" Class 150 RF ASME B16.5-2003			
	226R	2" Class 300 RF ASME B16.5-2003			
	Thread connections (installation length: 300mm, float not removable)				
	4050	G1-1/4" female thread	6060	1-1/4" NPT(f)	
	4060	G1-1/2" female thread	6070	1-1/2" NPT(f)	
	4070	G2" female thread	6080	2" NPT(f)	
(80)	Flange connections				
	330B	DN80 PN16 Form B1 DIN EN 1092-1	209R	3½" Class 150 RF ASME B16.5-2003	
	330D	DN80 PN16 Form D DIN EN 1092-1	229R	3½" Class 300 RF ASME B16.5-2003	
	331B	DN80 PN40 Form B1 DIN EN 1092-1	441R	50A 16K FF JIS B2220	
	331D	DN80 PN40 Form D DIN EN 1092-1	442R	50A 16K FF JIS B2220	
	208R	3" Class 150 RF ASME B16.5-2003	441F	50A 16K FF JIS B2220	
	228R	3" Class 300 RF ASME B16.5-2003	442F	50A 16K FF JIS B2220	
	Thread connections (installation length: 300mm, float not removable)				
		4070	G2" female thread	6080	2" NPT(f) (350mm)
		4080	G2-1/2" female thread	6090	2-1/2" NPT(f) (350mm)
	4090	G3" female thread	6092	3" NPT(f) (350mm)	
(1H)	Flange connections				
	335B	DN100 PN16 Form B1 DIN EN 1092-1	341B	DN125 PN40 Form B1 DIN EN 1092-1	
	335D	DN100 PN16 Form D DIN EN 1092-1	341D	DN125 PN40 Form D DIN EN 1092-1	
	336B	DN100 PN40 Form B1 DIN EN 1092-1	210R	4" Class 150 RF ASME B16.5-2003	
	336D	DN100 PN40 Form D DIN EN 1092-1	230R	4" Class 300 RF ASME B16.5-2003	
	340B	DN125 PN16 Form B1 DIN EN 1092-1	211R	5" Class 150 RF ASME B16.5-2003	
	340D	DN125 PN16 Form D DIN EN 1092-1	231R	5" Class 300 RF ASME B16.5-2003	
(H5)	Flange connections				
	345B	DN150 PN16 Form B1 DIN EN 1092-1	346D	DN150 PN40 Form D DIN EN 1092-1	
	345D	DN150 PN16 Form D DIN EN 1092-1	212R	6" Class 150 RF ASME B16.5-2003	
	346B	DN150 PN40 Form B1 DIN EN 1092-1	232R	6" Class 300 RF ASME B16.5-2003	
Measuring ranges (Water 20°C, 1 mPas)					
A	Model S: 0,5 - 5 l/h		Model P: 0,7 - 7 l/h		
B	Model S: 1 - 10 l/h		Model P: 1,2 - 12 l/h		
C	Model S: 1,6 - 16 l/h		Model P: 2 - 20 l/h		
D	2,5 - 25 l/h				
E	4 - 40 l/h				
F	5 - 50 l/h				
G	7 - 70 l/h				
H	10 - 100 l/h				
I	16 - 160 l/h				
J	25 - 250 l/h				
K	40 - 400 l/h				
L	60 - 600 l/h				
M	100 - 1000 l/h				
N	160 - 1600 l/h				
P	250 - 2500 l/h				
Q	400 - 4000 l/h				
R	600 - 6000 l/h				
S	1000 - 10000 l/h				
T	1600 - 16000 l/h				
U	2500 - 25000 l/h				
V	4000 - 40000 l/h				
W	Model S: 6000 - 60000 l/h		Model P: 5500 - 55000 l/h		
X	8000 - 80000 l/h				
2	10000 - 100000 l/h				
4	13000 - 130000 l/h				
Heating / cooling					
0	without heating / Cooling				
1	Heating / cooling, connection EO12 mm		(stainless steel)		
2	Heating / cooling, connection DN15, PN 40		(stainless steel)		
3	Heating / cooling, connection ½" Class 150 ANSI		(stainless steel)		

4	Heating / cooling, connection ½" NPT (F)	(stainless steel)
Damping / spring stop		
0	without	
F	with liquid damping	
G	Gas damping	
A	Spring stop	
S	Gas damping and spring stop	
Self draining		
0	without	
L	with self draining body	
-	Certificates	
0	without	
1	Certificate of compliance with the order 2.1	
2	Test report 2.2	
B	Inspection certificate 3.1 with material certificate (DIN EN 10204:2004)	
C	Inspection certificate 3.2 with material certificate (DIN EN 10204:2004)	
N	Material certificate NACE	
-	Display	
S	Standard display housing, Process temperature ≤ 150°C for electrical output, Process temperature ≤ 200°C for local indication	
V	Standard display housing forward advanced, process temperature ≤ 350°C	
E	Stainless steel display housing IP67, working temperature ≤ 150°C	
H	Stainless steel display housing IP67 forward advanced, process temperature ≤ 350°C	
T	Standard display housing with pressure compensation, Process temperature ≤ 150°C for electrical output, Process temperature ≤ 200°C for local indication	
W	Standard display housing with pressure compensation forward advanced, process temperature ≤ 350°C	
Scale		
1	%-Scale (Water)	
2	Measuring range-Scale (Water)	
F	Double-scale (acc. customer preference)	
4	%-Scale (Media)	
5	Measuring range-Scale (Media)	
Switches / electrical output		
0	without	
1	1 x inductive switch, Type SJ 3,5 N	
2	2 x inductive switch, Type SJ 3,5 N	
3	1 x inductive switch, Type SJ 3,5 SN (safety design)	
4	2 x inductive switch, Type SJ 3,5 SN (safety design)	
6	Transmitter ES with HART-protocol, 4-20 mA, EEx ia	
7	Transmitter ES with HART-protocol, 4-20 mA, EEx ia / 2x NAMUR-switch	
8	Transmitter ES with HART-protocol, 4-20 mA, EEx ia / 1x NAMUR-switch, 1x pulse output	
9	Transmitter ES with Profibus PA, EEx ia	
C	1 x microswitch	
D	2 x microswitch	
E	1 x inductive switch, Type SB 3,5-E2, three wire	
F	2 x inductive switch, Type SB 3,5-E2, three wire	
G	1 x induktiver Grenzkontakt NCB2-12GM40-Z0	
I	Transmitter ES with HART-protocol and counter module	
K	Transmitter ES with Foundation Fieldbus	
-	Accessories	
0	without	
X	special (separate specification necessary)	
-	Design	
H	Heinrichs	
K	Kobold	

23 Decontamination certificate for device cleaning

Company: Name:

Street: Tel.-Nr.:

PLZ/ postal code..... / Town:

The enclosed Variabel Area Flow Meter Model

Comm.-Nr. / Ser.-Nr.:	
------------------------------	--

has been used with media :.....

As the used media is :

- harmless
- toxic
- harmful
- caustic
- radioactive
- explosive
- oxidizing
- biological harmful
- other

we have carried out the following things:

- all cavities have been tested to be free the used process media
- all cavities are rinsed and neutralized
- all sealing surfaces and wetted parts have been cleaned
- instrument housing and surfaces have been completely cleaned

We herewith confirm that due to the re-delivery of the above mentioned instrument there is no danger for human and environment which may be caused by residues of the process media.

Date:

Signature:

Stamp



EU-Konformitätserklärung
EU-Declaration of Conformity



Nº. 20-4111-01

Hersteller: Heinrichs Messtechnik GmbH
Manufacturer: Robert-Perthel-Strasse 9
50739 Köln

Produktbeschreibung: **Schwabekörper-Durchflussmessgerät vom Typ BG***
Product description: **Variable Area Flowmeter Model BG***

Hiermit erklären wir, in alleinige Verantwortung, dass das oben genannte Messsystem den Anforderungen der folgenden EU-Richtlinien, einschließlich allen bis heute veröffentlichten Änderungen bzw. Nachträgen entspricht:

We declare herewith, in sole responsibility, that the product described above is conform with the provisions of the following EU-directives, including all published changes and amendments as of today:

- | | |
|--------------------------|--|
| 2014/30/EU (EMC) | EU-Richtlinie über die Elektromagnetische Verträglichkeit
<i>EU-Directive relating to electromagnetic compatibility</i> |
| 2014/34/EU (ATEX) | EU-Richtlinie über Geräte zur Bestimmungsgemäße Verwendung in explosionsgefährdeten Bereichen.
<i>EU-Directive relating to electrical equipment intended for use in potentially explosive atmospheres</i> |
| 2014/35/EU (LVD) | EU-Richtlinie über die Bereitstellung elektrischer Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen auf dem Markt
<i>EU-Directive relating to the making available on the market of electrical equipment designed for use within certain voltage limits</i> |
| 2014/68/EU (PED) | EU-Richtlinie zur Harmonisierung der Rechtsvorschriften der Mitgliedstaaten über die Bereitstellung von Druckgeräten auf dem Markt
<i>EU-Directive on the harmonisation of the laws of the Member States relating to the making available on the market of pressure equipment</i> |

Anhang N und X sind ein integraler Bestandteil dieser Erklärung
Annex N and X are an integral part of this declaration

Köln, den 01.04.2020

Joseph Burke
(Explosionsschutzbeauftragter /
Explosion Protection Representative)

Michael Manderfeld
(Druckgerätebeauftragter /
PED Representative)

Guido Thometzki
(Geschäftsführung / Managing Director)

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Web: www.heinrichs.eu



**Anhang N zur EU-Konformitätserklärung
Annex N of the EU-Declaration of Conformity**



Nº. 20-4111-01

Produktbeschreibung: Schwebekörper-Durchflussmessgerät vom Typ BG*
*Product description: Variable Area Flowmeter Model BG**

Durch diese Erklärung wird die Konformität mit den auf Seite 1 genannten Richtlinien sowie die Einhaltung der folgenden Normen bestätigt (gegebenenfalls abhängig von Gerätevariante):
Conformity to the Directives referred to on Page 1 of this Declaration is assured through the application of the following standards (possibly dependent on version of device):

Richtlinie Directive	Norm –Ref. Nr. Standard / Ref. Nº.	Ausgabe Edition	Norm Beschreibung Standard Description			
	DIN EN -			ES	BGN	BGF
2014/30/EU	61000-6-2	2011-06	Immunity Industrial environment	X		
	61000-6-3	2012-11	Emission residential environment	X		
	55011	2011-04	Radio frequency disturbance	X		
	61326-1	2011-07	EMC requirements	X		
2014/34/EU	60079-0	2012+A11	General requirements	X		
	60079-11	2012	Intrinsic Safety „i“	X		
	80079-36	2016	General requirements non electrical devices		X	X
	80079-37	2016	Protection by constructional safety „c“		X	X
2014/35/EU	61010-1	2011-07	Safety requirements	X		
2014/68/EU	AD 2000-Merkblätter		Module H		X	X

X: Zutreffende Norm / Applicable Standard

Name und Anschrift der Notifizierte Stelle / Name and Address of the Notified Body

TÜV-SÜD Industrie Service GmbH
TÜV SÜD Gruppe
Westendstraße 199
D-80686 München
ID-Nr. / ID-Nº.: L 2014/68/EU: 0036

DEKRA Testing and Certification GmbH
Carl-Beyling-Haus
Dinnendahlstraße 9
D-44809 Bochum
ID-Nr. / ID-Nº.: RL 2014/34/EU: 0158





Anhang X zur EU-Konformitätserklärung
Annex X of the EU-Declaration of Conformity



Nº. 20-4111-01

Produktbeschreibung: **Schwabekörper-Durchflussmessgerät vom Typ BG***
 Product description: **Variable Area Flowmeter Model BG***

Gerät Zulassungen / Device certification

EU-Baumusterprüfbescheinigung <i>EU-type examination certificate</i>	Nachtrag <i>Supplement</i>	Kennzeichnung <i>Marking</i>	ES	BGN	BGF
DMT 00 ATEX E 075	2	II 2G	X		
BVS 03 ATEX H/B 112	1	II 2G II 2D		X	X
<i>Tech. File Ref.</i>	-	03-02 X		X	X

X: Zutreffende Norm / Applicable Standard

Konformitätserklärungen für die als Option verwendeten Schalter werden vom Hersteller auf deren Homepage bereitgestellt.

For proximity switches offered as an option in conjunction with the above-mentioned products, the Declarations of Conformity are provided by the switch manufacturer on their homepage.

Die oben genannten Produkte entsprechen der Richtlinie 2014/34/EU. Neue Editionen können bereits eine oder mehrere der in den jeweiligen EU-Baumusterprüfbescheinigungen genannten Normen ersetzt haben. Der Hersteller erklärt, dass alle in dieser Konformitätserklärung erwähnt Produkte auch die Anforderungen der neuen Ausgaben einhalten, da die veränderten Anforderungen der neuen Ausgaben entweder keinen Einfluss auf das Produkt haben, oder das Produkt die Anforderungen erfüllt.

The above-mentioned products comply with the Directive 2014/34/EU. New editions may have already replaced one or more of the Standards stated in the respective EU-Type-examination certificates. The manufacturer declares that all products mentioned in this Declaration of Conformity also comply with the requirements of the new editions since either the changed requirements of the new editions do not affect the product, or the product also fulfills the requirements.

Heinrichs Messtechnik GmbH

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 50739 Köln
 Telefon 0221/49708-0
 Telefax 0221/49708-178
<http://www.heinrichs.eu>
info@heinrichs.eu

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 BLZ 370 800 40
 Konto-Nr. 0955 051300
 IBAN :
 DE58 3708 0040 0955 0513 00
 SWIFT-BIC: DRES DE FF 370

Erfüllungsort und Gerichtsstand:

Köln
 Amtsgericht Köln HRA 37040

Ust.IDNr.: DE813416533
 Steuer-Nr.: 217/5743/0386

Geschäftsführer

Dipl. Ing. (FH)
 Guido Thometzki