



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 operation 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 (KOBOLD Instruments USA contact info below). 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

KOBOLD Instruments Inc.
1801 Parkway View Drive
Pittsburgh PA 15205-1422
Tel.: 412-788-2830
Fax: 412-788-4890
E-Mail: info.@koboldusa.com
Internet: <http://koboldusa.com>

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

19.10.2016

2.4. Version no.

File: BGN_BA_16.02_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.

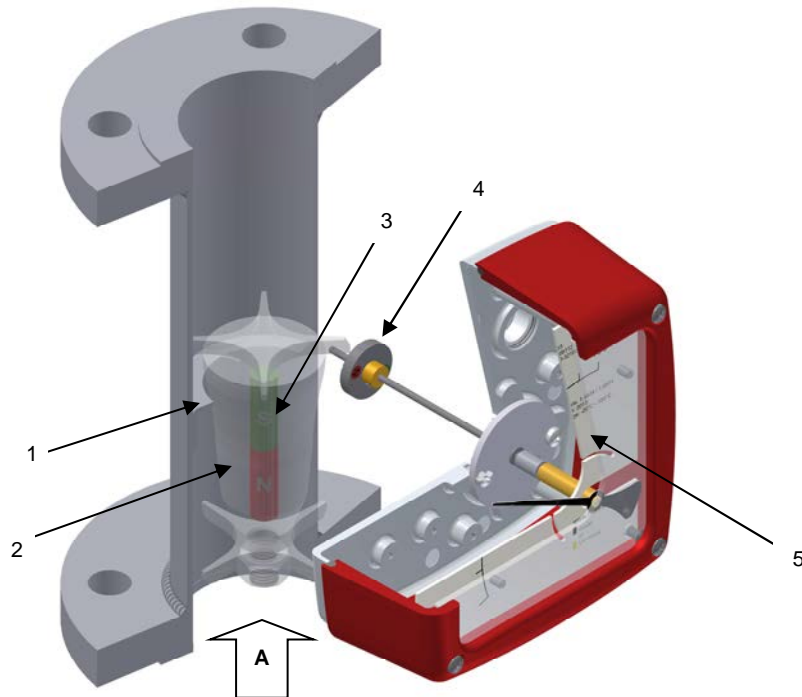
With the help of the delivery note enclosed in the packaging, check whether all technically relevant data correspond with your requirements.

Storage and installation must be done in a clean and dry area 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 pipe with flange or NPT threaded 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)
			B	1 - 10	l/h	0,030 - 0,30	m ³ /h	40	1) 2)
			C	1,6 - 16	l/h	0,045 - 0,48	m ³ /h	40	1) 2)
			D	2,5 - 25	l/h	0,075 - 0,75	m ³ /h	40	2)
			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	
			G	7 - 70	l/h	0,2 - 2,1	m ³ /h	40	
			H	10 - 100	l/h	0,3 - 3,0	m ³ /h	60	
			I	16 - 160	l/h	0,5 - 4,6	m ³ /h	60	
			J	25 - 250	l/h	0,7 - 7,0	m ³ /h	60	
			K	40 - 400	l/h	1,0 - 11	m ³ /h	70	
15 20 25 32	¾" 1"	S25	L	60 - 600	l/h	1,7 - 17	m ³ /h	80	
			M	100 - 1000	l/h	3 - 30	m ³ /h	60	5)
			N	160 - 1600	l/h	4 - 46	m ³ /h	70	5)
			P	250 - 2500	l/h	7 - 70	m ³ /h	100	5)
40	1 ½"	S40	Q	400 - 4000	l/h	11-110	m ³ /h	100	5)
			R	600 - 6000	l/h	17 - 170	m ³ /h	180	3)
			S	1000 - 10000	l/h	29 - 290	m ³ /h	110	
50 65	2" 2 ½"	S50	T	1600 - 16000	l/h	46 - 460	m ³ /h	230	
			U	2500 - 25000	l/h	70 - 700	m ³ /h	500	3) 4)
			V	4000 - 40000	l/h	110 - 1100	m ³ /h	350	3)
			W	6000 - 60000	l/h	170 - 1700	m ³ /h	360	
			X	8000 - 80000	l/h	240 - 2400	m ³ /h	600	3) 4)
80	3" 3 ½"	S80	2	10000 - 100000	l/h	-			3) 4) 6)
			Y	10000 - 100000	l/h	-			3) 4) 6)
			Z	10000 - 100000	l/h	-			3) 4) 6)
100 125	4" 5"	S1H	3	10000 - 100000	l/h	-			3) 4) 6)
			4	13000 - 130000	l/h	-			3) 4) 6)

Reference conditions: acc. IEC 770

Water 20 °C; air 1,013 bar abs.

- 1) 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
- 2) gas throttle in S version for gas measurement included in price (pressure loss 200 mbar)
- 3) not available in P version
- 4) sizing for higher viscosities not possible
- 5) only in S and H version, only with reduced sealing face
- 6) gas measurement not possible
- 7) 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
- 8) 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) to adjust the proximity switches or by using the switching lever for adjusting 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. 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 (Ui, Ii, Pi, Li and Ci) 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 : ±1,6% of actual qG=50% acc. VDI/VDE 3513-2 (for local indicator)

BGN-P: ±2,0% of actual qG=50% acc. VDI/VDE 3513-2 (for local indicator)

Additional inaccuracy for electronic transmitter ES = +/- 0.2%

9.1.3 Repeatability

±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 to deposit.
- 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 used. The BGF 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 $> +200\text{ °C}$ (392°F) the instruments must be equipped with a displaced indicator (Assembled at Distance). Please consider the additional required space. (see also point 11.1)

Sample aluminum indicator displaced



Sample st.st. indicator displaced



Inlet and outlet straight piping runs before and after the device are not necessary if the medium has a linear flow profile. Avoid mounting accessories at the inlet of the device.

If this is not possible maintain a minimum straight piping length of 250 mm at the inlet.

The nominal size of the pipes to be connected must correspond to that of the meter. Install valves behind the measuring equipment for gas applications.

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 see the prior reference to the BGF if this is not possible.

The nominal size of the device and that of the pipes must be the same. The pressure rating and 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 media, 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 spatter 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 hammer 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, this would damage the float or measuring ring. Avoid fluid pulsation. On gas measurements flow meters with gas damping systems are recommended.

10.1.2 Device settings

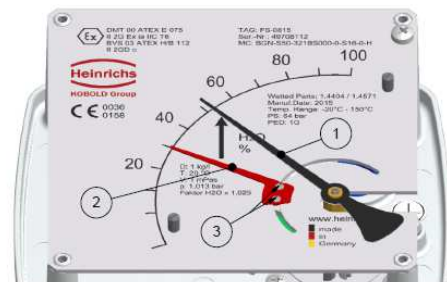
The measuring instrument is delivered ready for operation according to your order specifications. **The limit switches** are set to the desired values. If you have submitted no requirements, the basic settings are:

- 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.

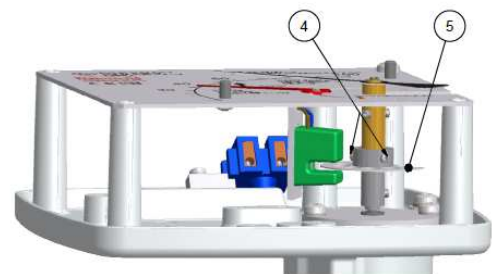
10.1.3 Adjusting the switch point for the inductive limit switch KEI

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

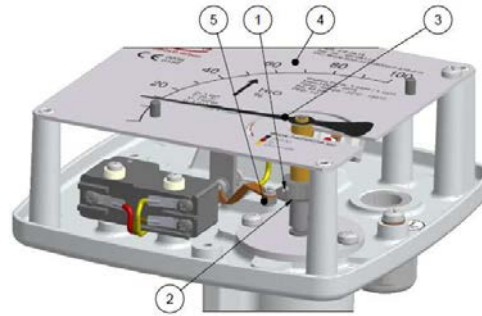
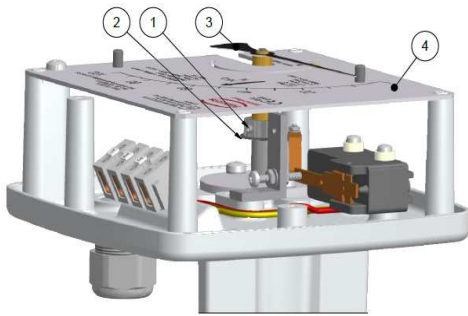
- 1) Remove **4 screws** of the front cover and lift off the cover
- 2) **!! do not remove the scale !!**
- 3) Loosen **2 locking screws (3)** of the red **limit switch indicator (2)**
- 4) Move the red switch indicator to the desired switch point on the scale and tighten the locking screws (3)
- 5) Mount the cover and tighten the four screws



- 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 indicators. 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) Remove 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

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 2GD c

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 EC 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

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

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

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

In accordance with the tables in the PTB 99 ATEX 2219 X EC 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

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, vapor, 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 is 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 can 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 +65°C

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 21 Fluid conditions

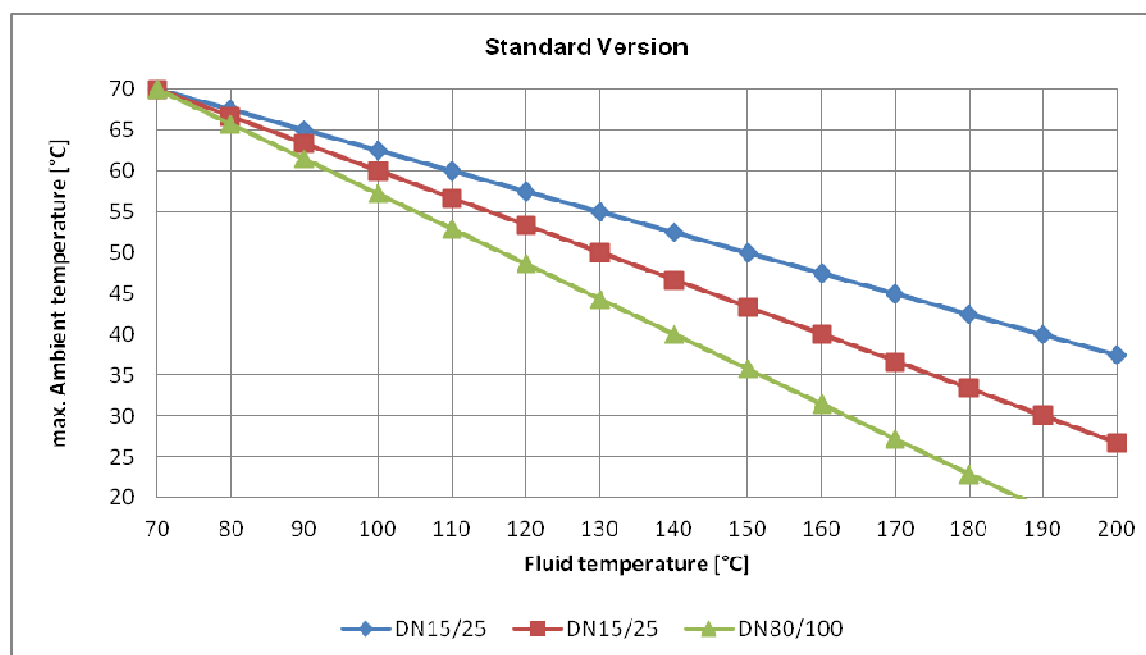
10.2.7 Fluid temperature ranges

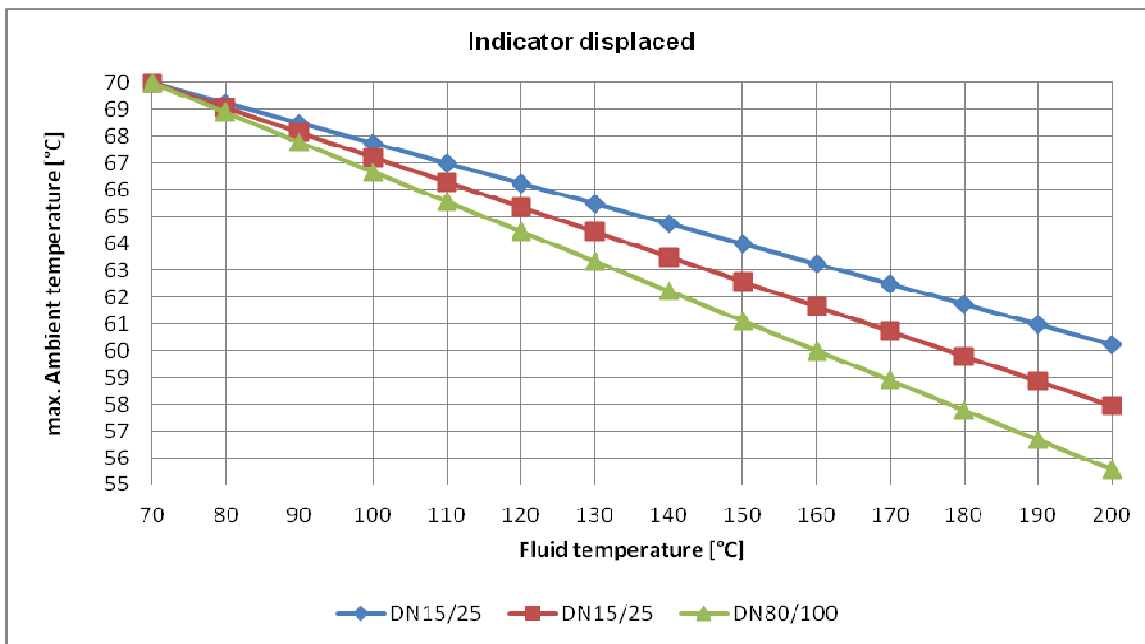
BGN-S/H : - 40°C to +200°C

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 piping runs 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 media data stated on the scale. Any change or deviation in pressure will cause a display fault.

10.2.15 Pressure loss

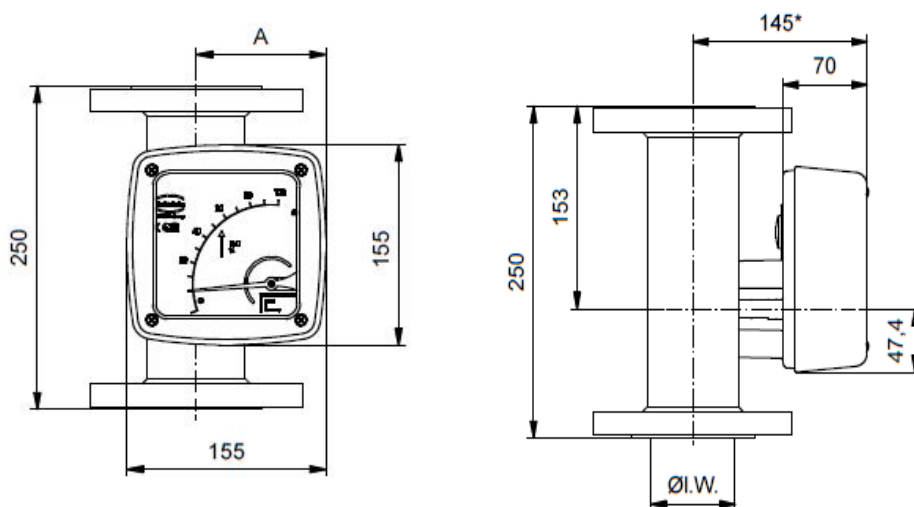
Depends on the meter size and the measuring range (see measuring range table page 6).

11 Construction details

11.1 Type of construction/dimensions

11.1.1 Aluminum indicator housing

11.1.1.1 Version with flange connection

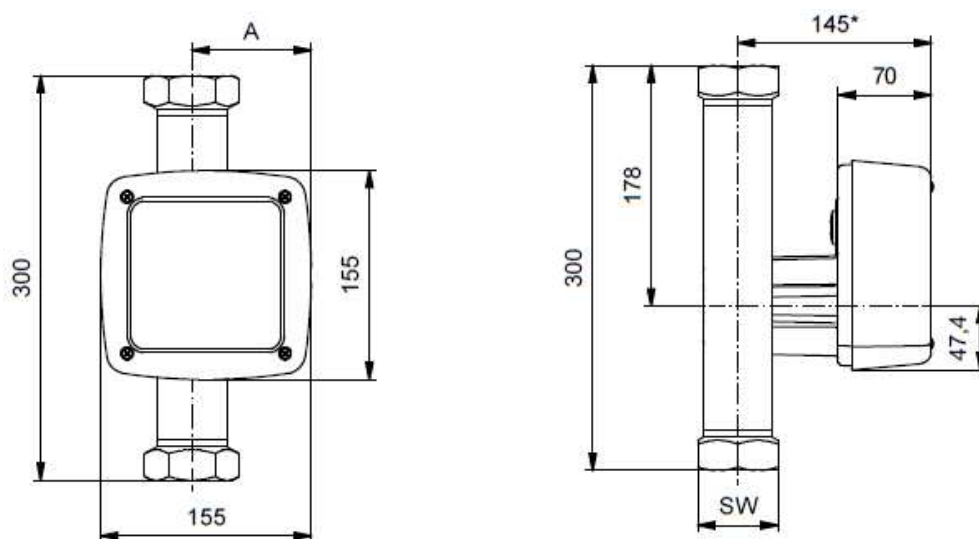


Dimensions

Pipe	Size DN / ANSI	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

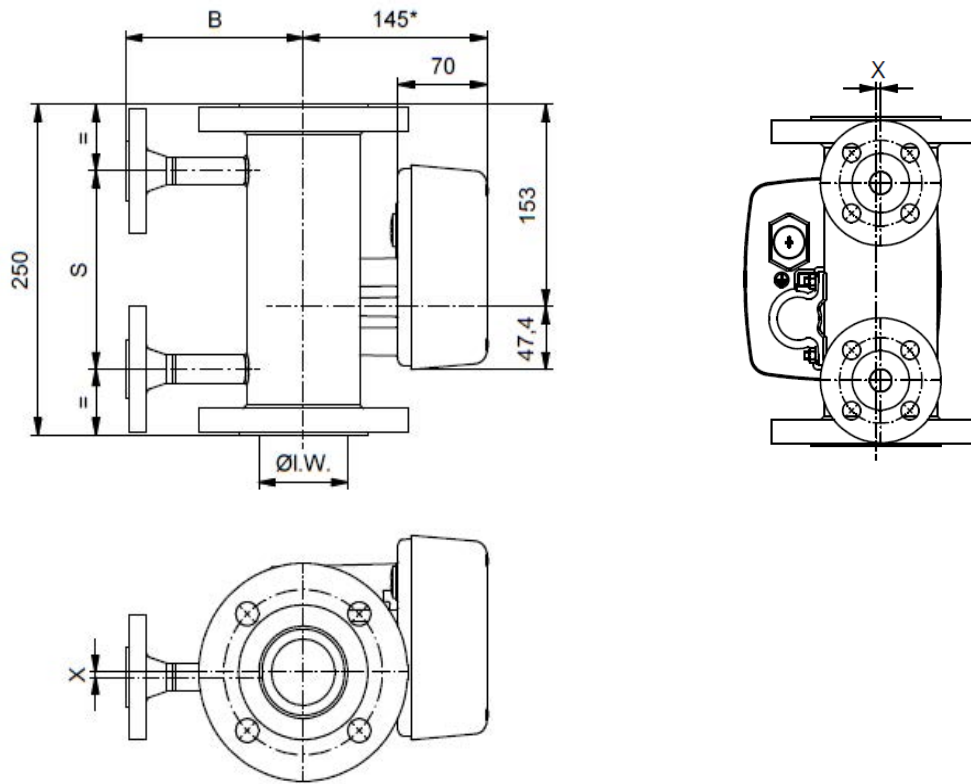


Dimensions

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

11.1.2 Dimensional drawing heating connection



Dimensions

DN / ANSI	PN / Cl	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

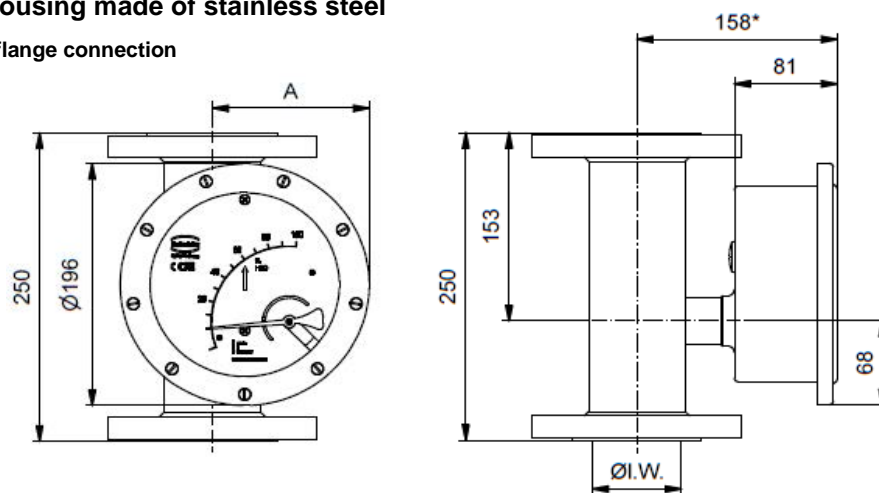
11.1.2.1 Connections for heating jacket

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

11.1.3 Indicator housing made of stainless steel

11.1.3.1 Version with flange connection

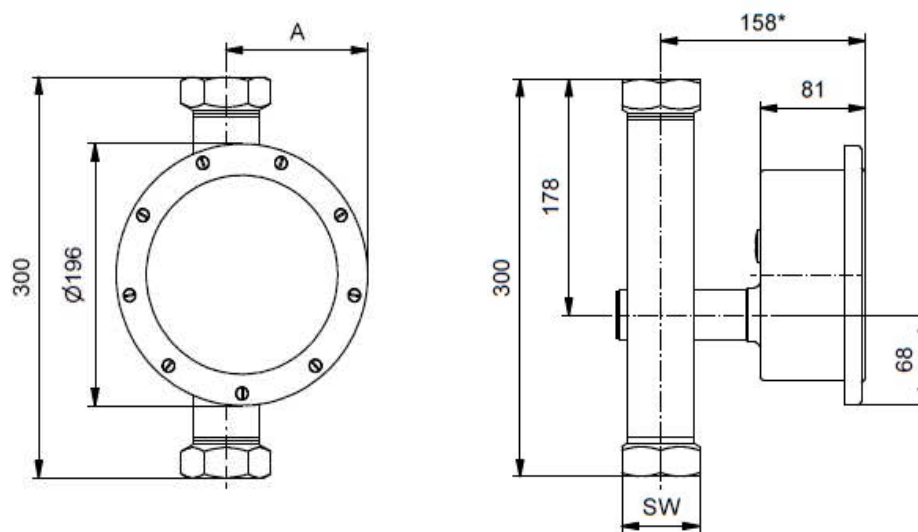


Dimensions

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

11.1.3.2 Version with threaded connection



Dimensions

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 3/4" 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 1/2" 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

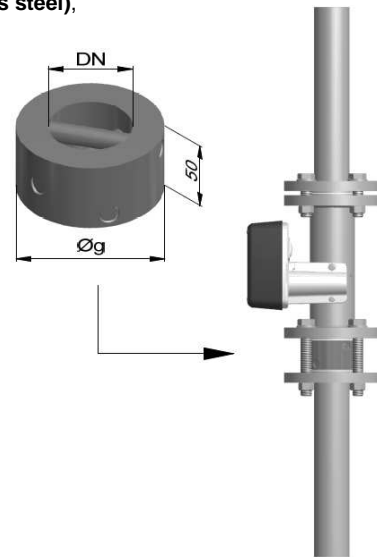
The S/H versions in special design are available for higher pressure on request.

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 media contains solid particles, connect a suitable filter in series. When dealing with flow media with ferrous particles, we recommend using 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

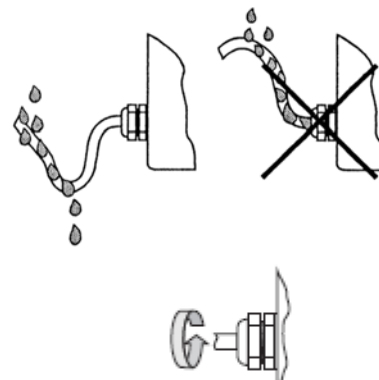
Wiring

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.

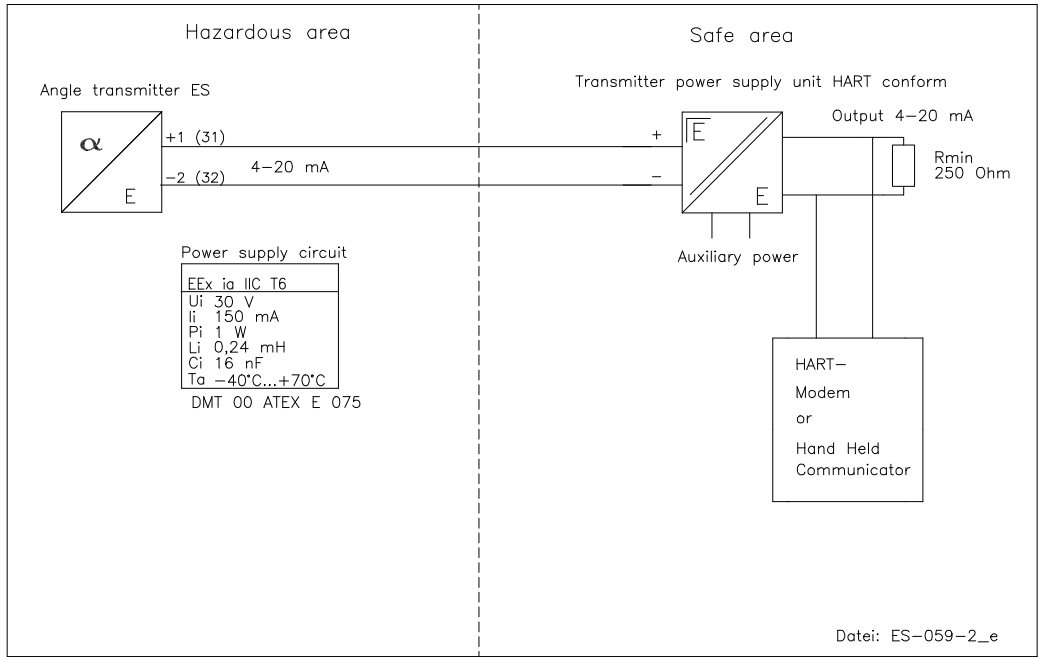


Please observe the following wiring instruction carefully. (Improper wiring will cause loss of guarantee)

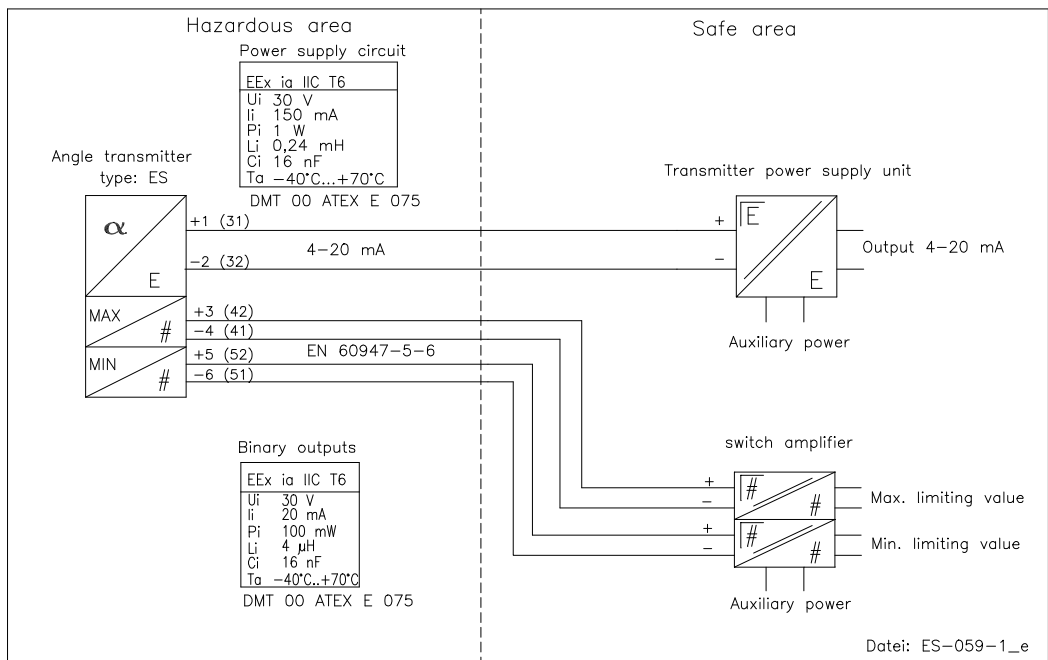
- Cable glands are not part of the delivery
- The cable gland must fit the indicator housing thread
- The cable gland must fit the diameter of the cable
- The cable must form a pig tail (drip leg) in front of the gland to avoid water ingress - see sketch on the right
- Cable glands must not point upward
- 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



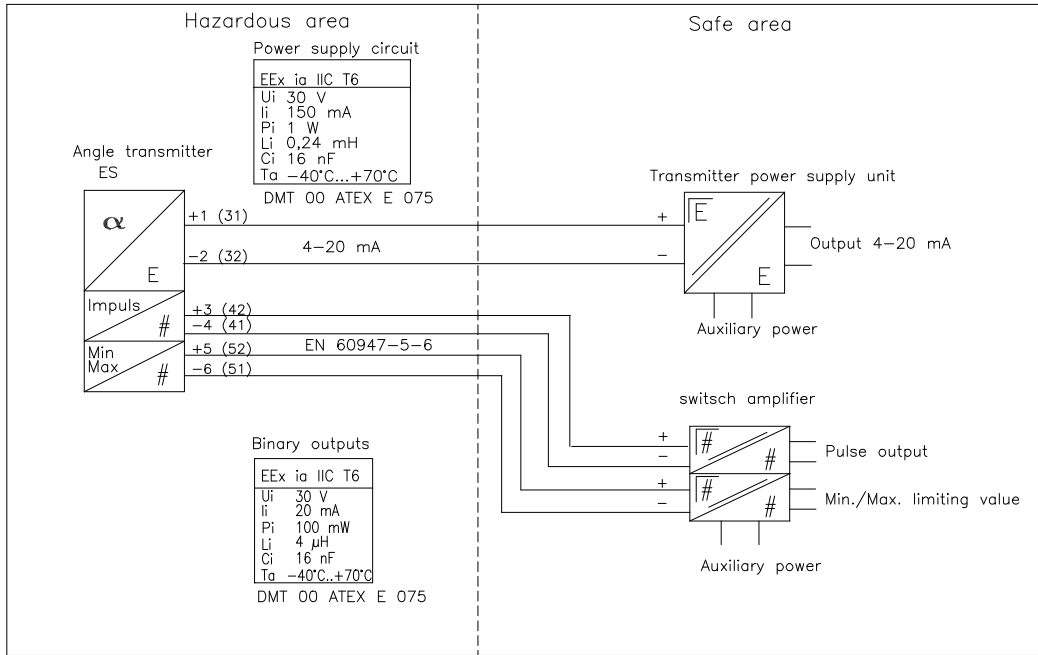
11.6.1 Wiring diagram for ES transmitter (signal output 4-20 mA with HART®)



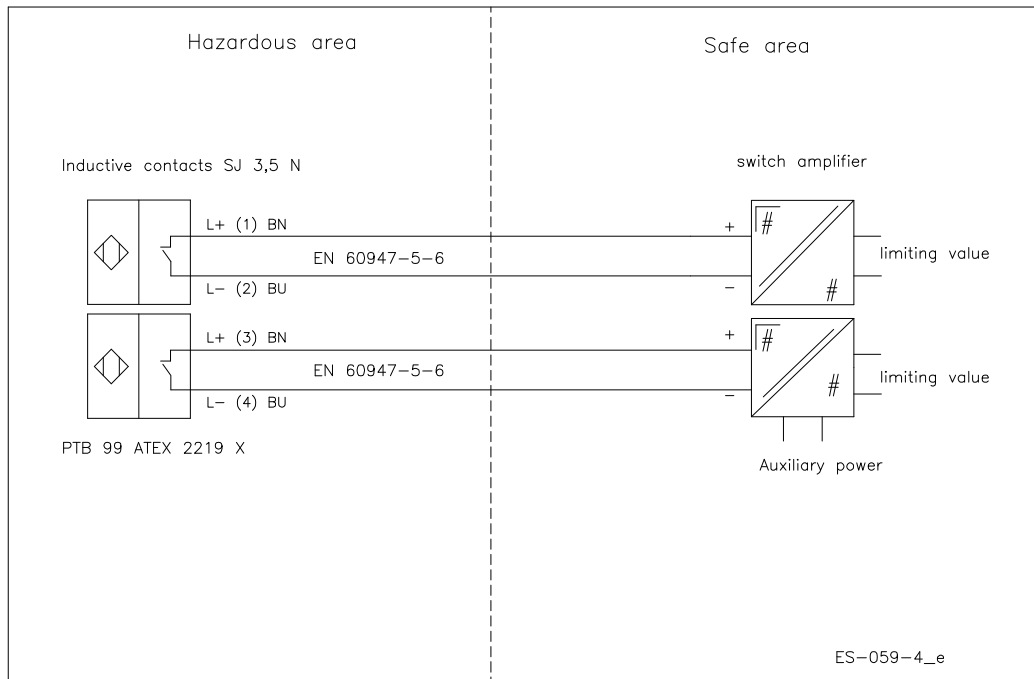
11.6.2 Wiring diagram for ES transmitter with 4-20 mA output and 2 limit switches



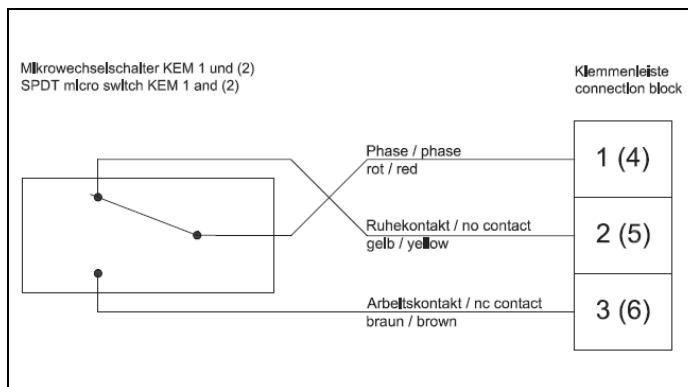
11.6.3 Wiring diagram for ES transmitter with 4- 20 mA output, pulse output and limit switches



11.6.4 Wiring diagram for inductive limit switches KEI



11.6.5 Wiring diagram for KEM 1 and KEM 2 micros witches



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 indicate 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 statutory requirements of the following EU directives: Directive 94/9/EC (Equipment and Protective Systems for Use in Potentially Explosive Atmospheres), the Electromagnetic Compatibility (EMC) Directive 89/336/EEC and the Pressure Equipment Directive 97/23/EC.

Heinrichs Messtechnik confirms compliance with the directives by attaching the CE mark.

15 Order information

Please include the following information in your order: Product data, density, 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 note that with devices with built-in electrical equipment, removing the indicator cover restricts the EMC protection.
- Before removing device, make sure that the pipeline is free of product, is depressurized, 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 due to 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 and 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.
Note: On threaded process connection versions removal of the float is not possible!

From measuring ranges 5-50 l/h water and higher the float 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 N2 rinsing connection - change to high temp 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 stuck (contamination)	- 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 stuck	- Contamination / residues in the process - Measuring pipe damaged - gas or liquid damping system damaged by the process	- remove instrument from the process and clean carefully - return 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 switches without function	wrong wiring defective el. parts	- check wiring diagram in the instruction manual - change elec. parts (e.g. limit switches) or send 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 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
Display	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 KE1 (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 for 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 KEI1 (SJ3,5-N)	
	Retrofit set for KEI2 (SJ3,5-N)	

NOTE:

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

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

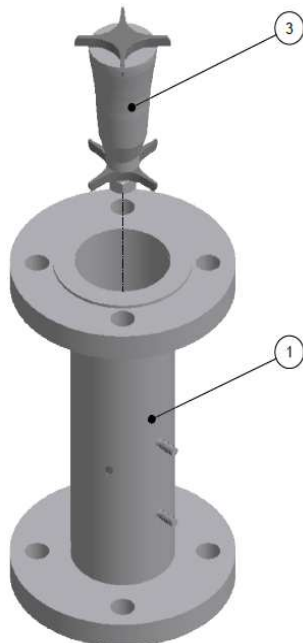
For further instruction on spare parts please contact the Heinrichs Messtechnik GmbH service department

22 Exploded views

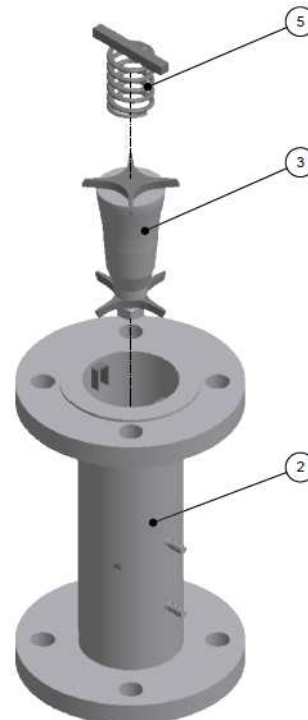
22.1 Fitting with measuring element

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

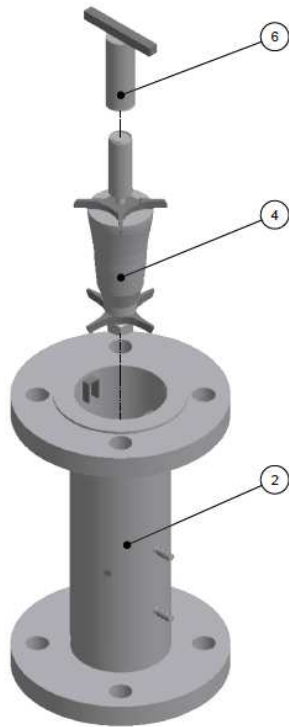
22.1.1 BGN-.... Standard version



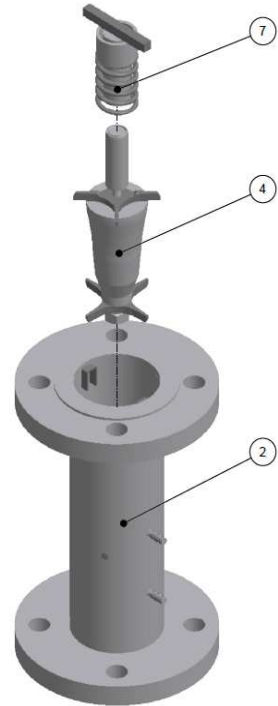
22.1.2 BGN-.... with spring stop



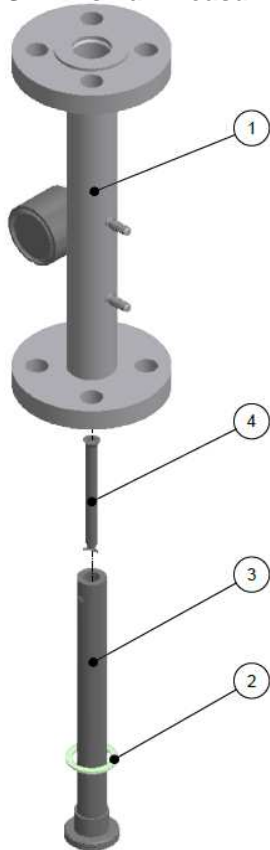
22.1.3 BGN-.... with damping piston



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

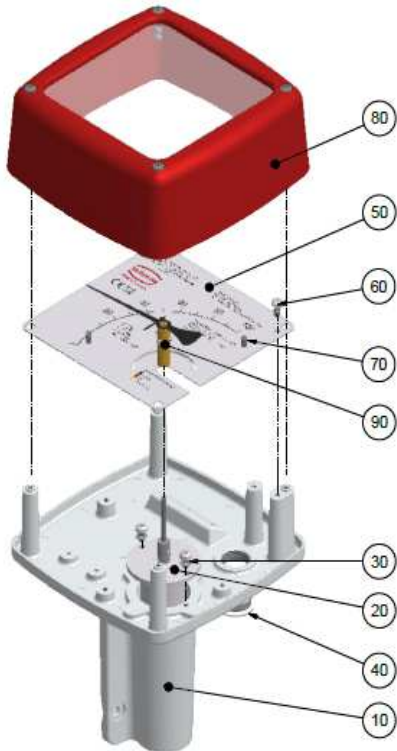
Information about replacing of measuring cones on low volume meters

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.

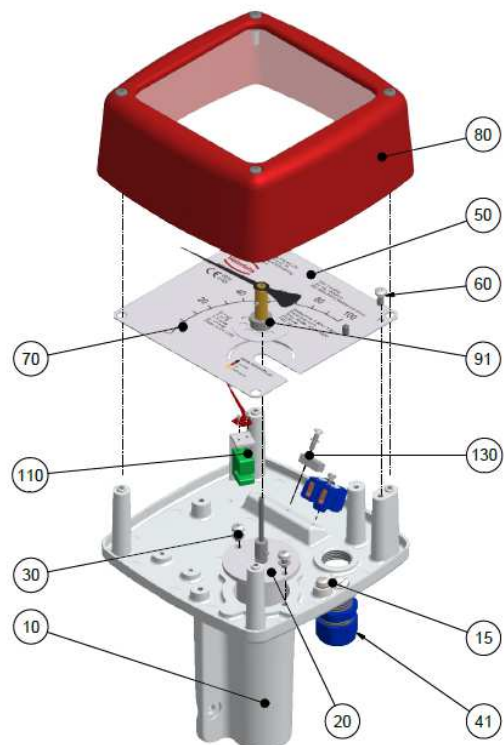
22.2 Indicator unit

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

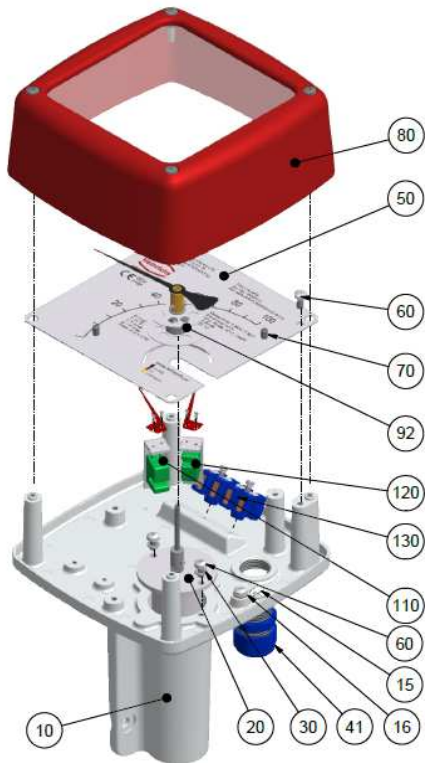
22.2.1 Complete indicator unit, with local scale



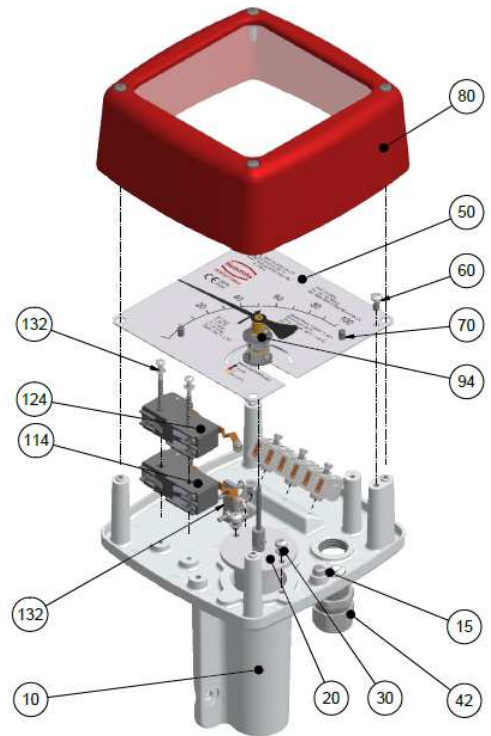
22.2.2 Complete indicator unit, c/w 1 pc limit switch SJ 3,5-N



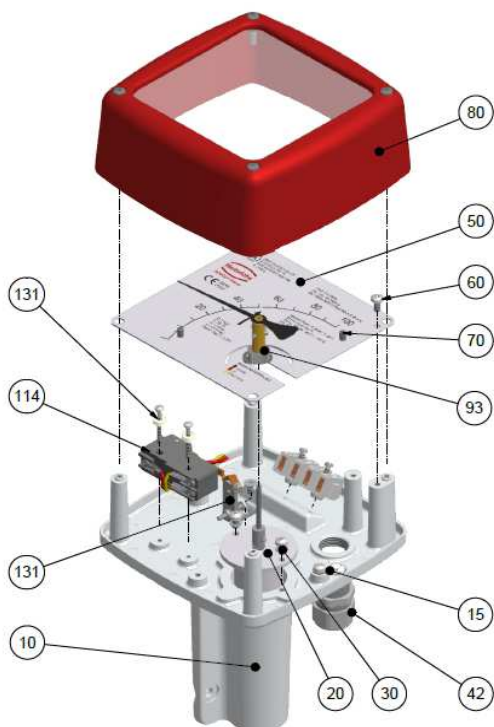
22.2.3 Complete Indicator unit with 2 pcs limit switches SJ 3,5-N



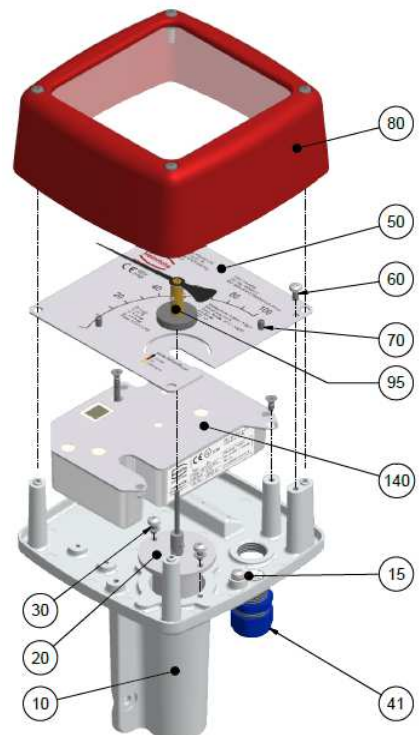
22.2.5 Complete indicator unit with 2 pcs SPDT micro switches KEM



22.2.4 Complete indicator unit with 1 pc SPDT micro switch KEM



22.2.6 Complete Indicator unit with transmitter ES Ex HART®



22.3. Model Code

Note: See KOBOLD USA Datasheet for USA Order Codes

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			
Z	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:



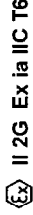

Stamp

24 EC Type Examination Certificate

<div style="display: flex; justify-content: space-between; align-items: center;">   </div> <p style="text-align: center;">Translation</p> <p style="text-align: center;">EC-Type Examination Certificate</p> <p style="text-align: center;">- Directive 94/9/EC - Equipment and protective systems intended for use in potentially explosive atmospheres</p> <p style="text-align: center;">DMT 00 ATEX E 075</p> <p>(3) Equipment: Electronic transmitter type ES or ES-PPA</p> <p>(4) Manufacturer: Bopp & Reuther Heinrichs Messtechnik Josef Heinrichs GmbH & Co. Messtechnik KG</p> <p>(5) Address: D 50933 Köln</p> <p>(6) The design and construction of this equipment and any acceptable variation thereto are specified in the schedule to this type examination certificate.</p> <p>(7) The certification body of Deutsche Montan Technologie GmbH, notified body no. 0158 in accordance with Article 9 of the Directive 94/9/EC of the European Parliament and the Council of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.</p> <p>(8) The examination and test results are recorded in the test and assessment report BVS PP 00.2071 EG.</p> <p>(9) The Essential Health and Safety Requirements are assured by compliance with: EN 50014:1997+A1 - A2 General requirements EN 50020:1994 Intrinsic safety 'i'</p> <p>(10) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.</p> <p>(11) This EC-Type Examination Certificate relates only to the design and construction of the specified equipment. Further requirements of Directive 94/9/EC apply to the manufacture and placing on the market of this equipment.</p> <p>(12) The marking of the equipment shall include the following: II 2G EEx ia IIC T6</p> <div style="text-align: right; margin-top: 20px;"> <p>Deutsche Montan Technologie GmbH Essen, dated 31. Oktober 2000</p> <p>Signed: lockers _____ DMT-Certification body _____</p> <p>Signed: Dill _____ Head of special services unit _____</p> </div>	<div style="display: flex; justify-content: space-between; align-items: center;">  </div> <p style="text-align: center;">Appendix to</p> <p style="text-align: center;">EC-Type Examination Certificate</p> <p style="text-align: center;">DMT 00 ATEX E 075</p> <p>(13) 15.1. Subject and type Electronic transmitter type ES or ES-PPA</p> <p>(14) 15.2. Description The electronic transmitter serves for the recording of the position or angular position of a magnet at rotameters. The completely encapsulated electronic device of the transmitter is mounted in a light alloy housing together with corresponding terminals for the connection of the intrinsically safe circuits. The transmitter is provided to be installed in a housing with a min. degree of protection IP 20.</p> <p>(15) 15.3. Parameters</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">15.3.1.1 Input circuit (terminals 1 and 2)</td> <td style="width: 50%;"></td> </tr> <tr> <td>voltage</td> <td>U_i DC 30 V</td> </tr> <tr> <td>current</td> <td>I_i 150 mA</td> </tr> <tr> <td>power</td> <td>P_i 1 W</td> </tr> <tr> <td>effective internal inductance</td> <td>L_i 0,24 mH</td> </tr> <tr> <td>effective internal capacitance</td> <td>C_i 16 nF</td> </tr> </table> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;">15.3.1.2 Binary outputs 1 and 2; potentially free optocoupler circuits (terminals 3 - 4 and 5 - 6), each</td> <td style="width: 50%;"></td> </tr> <tr> <td>voltage</td> <td>U_i DC 30 V</td> </tr> <tr> <td>current</td> <td>I_i 20 mA</td> </tr> <tr> <td>power</td> <td>P_i 100 mW</td> </tr> <tr> <td>effective internal inductance</td> <td>L_i 4 µH</td> </tr> <tr> <td>effective internal capacitance</td> <td>C_i 16 nF</td> </tr> </table> <p>15.3.2 type ES-PPA Input circuit (terminals 7 and 8) for connection with a circuit in accordance with FISCO model (PTB report no. PTBW-53)</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%;"></td> <td style="width: 50%;"></td> </tr> <tr> <td>voltage</td> <td>U_i DC 25 V</td> </tr> <tr> <td>current</td> <td>I_i 280 mA</td> </tr> <tr> <td>power</td> <td>P_i 2 W</td> </tr> <tr> <td>effective internal inductance</td> <td>L_i negligible</td> </tr> <tr> <td>effective internal capacitance</td> <td>C_i negligible</td> </tr> </table> <p>15.3.3 ambient temperature range</p> <p style="text-align: right;">T_a - 40 °C up to + 70 °C</p>	15.3.1.1 Input circuit (terminals 1 and 2)		voltage	U _i DC 30 V	current	I _i 150 mA	power	P _i 1 W	effective internal inductance	L _i 0,24 mH	effective internal capacitance	C _i 16 nF	15.3.1.2 Binary outputs 1 and 2; potentially free optocoupler circuits (terminals 3 - 4 and 5 - 6), each		voltage	U _i DC 30 V	current	I _i 20 mA	power	P _i 100 mW	effective internal inductance	L _i 4 µH	effective internal capacitance	C _i 16 nF			voltage	U _i DC 25 V	current	I _i 280 mA	power	P _i 2 W	effective internal inductance	L _i negligible	effective internal capacitance	C _i negligible
15.3.1.1 Input circuit (terminals 1 and 2)																																					
voltage	U _i DC 30 V																																				
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effective internal capacitance	C _i 16 nF																																				
voltage	U _i DC 25 V																																				
current	I _i 280 mA																																				
power	P _i 2 W																																				
effective internal inductance	L _i negligible																																				
effective internal capacitance	C _i negligible																																				

Page 2 of 2, No. DMT 00 ATEX E 075
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Am Technologiepark 1, 45307 Essen, Telefon (0201)72-1416, Telefax (0201)72-1716

<div style="display: flex; justify-content: space-between; align-items: center;">   </div> <h2 style="text-align: center;">1st Supplement</h2> <p style="text-align: center;">(Supplement in accordance with Directive 94/9/EC Annex III number 6)</p> <h3 style="text-align: center;">to the EC-Type Examination Certificate DMT 00 ATEX E 075</h3> <p>Equipment: Electronic transmitter type ES, ES-PPA or ES-FF</p> <p>Manufacturer: Heinrichs Messtechnik GmbH</p> <p>Address: 50739 Cologne, Germany</p> <p>Description</p> <p>The electronic transmitters type ES and ES-PPA have been assessed in acc. with the standards EN 60079-0** and a new version is available, type ES-FF.</p> <p>The Essential Health and Safety Requirements of the modified equipment are assured by compliance with:</p> <p>EN 60079-0:2006 General requirements EN 60079-11:2007 Intrinsic safety 'i' EN 60079-27:2006 Fieldbus systems FISCO</p> <p>The marking of the equipment shall include the following:</p> <div style="text-align: center;">  </div> <p>Parameters</p> <table border="0"> <tr> <td>1</td> <td>Type ES</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>1.1</td> <td>Input circuit (terminals 1 and 2)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Voltage</td> <td>Ui</td> <td>DC</td> <td>30</td> <td>V</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Current</td> <td>Ii</td> <td></td> <td>150</td> <td>mA</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Power</td> <td>Pi</td> <td></td> <td>1</td> <td>W</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Effective internal inductance</td> <td>Li</td> <td></td> <td>0.24</td> <td>mH</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td>Effective internal capacitance</td> <td>Ci</td> <td></td> <td>16</td> <td>nF</td> <td></td> <td></td> <td></td> </tr> <tr> <td>1.2</td> <td>Binary outputs 1 and 2; 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January 2010</p> </div> <p>Signed: Dr. Franz Eickhoff</p> <p>Signed: Dr. Michael Wittler</p> <p>Certification body</p> <p>Special services unit</p>	Voltage	Ui	DC	17,5	V	Voltage	Ui	DC	32	V	Current	Ii		280	mA	Power	Pi		2	W	Effective internal inductance	Li	< 10	µH	Effective internal capacitance	Ci	< 5	nF	Voltage	Ui	DC	17,5	V	Voltage	Ui	DC	32	V	Current	Ii		280	mA	Power	Pi		2	W	Effective internal inductance	Li	< 10	µH	Effective internal capacitance	Ci	< 5	nF	Ta	-40 °C up to +70 °C
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Page 2 of 3 to DMT 00 ATEX E 075 / NI
 This certificate may only be reproduced in its entirety and without charge.
 DEKRA EXAM GmbH Dimmendahlstrasse 9 44899 Bochum Germany Phone +49 234 9396-105 Fax +49 234 9396-110 E-mail ze-wan@dekra.com
 (until 31.05.2003 Deutsche Botanik Technologie GmbH Am Technologiepark 1 43897 Essen Germany)

Page 1 of 3 to DMT 00 ATEX E 075 / NI
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Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin



(1) **EC-TYPE-EXAMINATION CERTIFICATE**
(Translation)



(2) Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres - Directive 94/9/EC
(3) EC-type-examination Certificate Number:

PTB 99 ATEX 2219 X
(4) Equipment: Slot-type initiators types SJ... and SC...
(5) Manufacturer: Pepperl + Fuchs GmbH
(6) Address: D-68307 Mannheim

(7) This equipment and any acceptable variation thereto are specified in the schedule to this certificate and the documents therein referred to.

(8) The Physikalisch-Technische Bundesanstalt, notified body No. 0102 in accordance with Article 9 of the Council Directive 94/9/EC of 23 March 1994, certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres, given in Annex II to the Directive.

(9) The examination and test results are recorded in the confidential report: PTB Ex 99-29/175.

(10) Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 50014:1997
EN 50020:1994

(11) If the sign "X" is placed after the certificate number, it indicates that the equipment is subject to special conditions for safe use specified in the schedule to this certificate.

(12) This EC-type-examination Certificate relates only to the design and construction of the specified equipment in accordance with Directive 94/9/EC. Further requirements of this Directive apply to the manufacture and supply of this equipment.

(13) The marking of the equipment shall include the following:



Braunschweig, December 22, 1999

Zertifizierungsstelle Explosionschutz

By order:



Dr.-Ing. U. Johannsmeyer
Regierungsdirektor

sheet 1/3

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt • Bundesallee 100 • D-38116 Braunschweig



Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

SCHEDULE

(14) **EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X**

(15) Description of equipment

The slot-type initiators of types SJ... and SC... are used to convert displacements into electrical signals.

The slot-type initiators may be operated with intrinsically safe circuits certified for categories and explosion groups [EEx ia] IIC or IIB resp. [EEx ib] IIC or IIB. The category as well as the intrinsic group of the intrinsically safe slot-type initiators depends on the connected supplying intrinsically safe circuit.

Electrical data

Evaluation and

supply circuit..... type of protection Intrinsic Safety EEx ia IIC/IIB

resp. EEx ib IIC/IIB

only for connection to certified intrinsically safe circuits

Maximum values:

type 1	type 2	type 3	type 4
$U_i = 16 V$	$U_i = 16 V$	$U_i = 16 V$	$U_i = 16 V$
$I_i = 25 mA$	$I_i = 25 mA$	$I_i = 52 mA$	$I_i = 76 mA$
$P_i = 34 mW$	$P_i = 64 mW$	$P_i = 169 mW$	$P_i = 242 mW$

The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of slot-type initiators are shown in the table.

sheet 2/3

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of dispute, the German text shall prevail.

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Physikalisch-Technische Bundesanstalt

Braunschweig und Berlin

SCHEDULE TO EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

types	C _i [mF]	L [µH]	type 1 maximum permissible ambient temperature in °C for application in temperature class					type 2 maximum permissible ambient temperature in °C for application in temperature class					type 3 maximum permissible ambient temperature in °C for application in temperature class					type 4 maximum permissible ambient temperature in °C for application in temperature class				
			T6		T5		T4-T1	T6		T5		T4-T1	T6		T5		T4-T1	T6		T5		T4-T1
			T6	T5	T6	T5	T4-T1	T6	T5	T6	T5	T4-T1	T6	T5	T6	T5	T4-T1	T6	T5	T6	T5	T4-T1
SC2-NO...	150	150	72	87	100	65	80	100	40	55	75	23	38	54								
SC3.5-NO-Y...	150	150	72	87	100	65	80	100	40	55	75	23	38	54								
SC3.5...NO...	150	150	73	88	100	66	81	100	45	60	89	30	45	74								
SJ1.8-N-Y...	30	100	73	88	100	67	82	100	45	60	78	30	45	57								
SJ2.2-N...	30	100	73	88	100	67	82	100	45	60	78	30	45	57								
SJ2-N...	30	100	73	88	100	67	82	100	45	60	78	30	45	57								
SJ3.5...N...	50	250	73	88	100	66	81	100	45	60	89	30	45	74								
SJ3.5-H...	50	250	73	88	100	66	81	100	45	60	89	30	45	74								
SJ5...-N...	50	250	73	88	100	66	81	100	45	60	89	30	45	74								
SJ5-K...	50	550	72	87	100	66	81	100	42	57	82	26	41	63								
SJ10-N...	50	1000	72	87	100	66	81	100	42	57	82	26	41	63								
SJ15-N...	150	1200	72	87	100	66	81	100	42	57	82	26	41	63								
SJ30-N...	150	1250	72	87	100	66	81	100	42	57	82	26	41	63								

(16) Test report PTB Ex 99-29175

(17) Special conditions for safe use

- For the application within a temperature range of -60°C to -20 °C the slot-type initiators of types SJ... and SC... must be protected against damage due to impact by mounting into an additional housing.
- The connection facilities of the slot-type initiators of types SJ... and SC... shall be installed as such that at least a degree of protection of IP20 according to IEC-publication 60529:1989 is met.
- The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of slot-type initiators is shown in the table given under item (15) of this EC-type-examination certificate.
- Inadmissible electrostatic charge of the plastic housing of the slot-type initiators of type SJ30-N... has to be avoided (warning label on the device).

(18) Essential health and safety requirements

Met by the standards mentioned above

Zertifizierungsstelle Explosionsschutz

By order:

Dr.-Ing. V. Johannsmeyer
Regierungsdirektor



Braunschweig, August 10, 1999

sheet 3/3

EC-type-examination Certificates which require the presence and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt. In case of disputes, the German text shall prevail.

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Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

1. SUPPLEMENT
according to Directive 94/9/EC Annex III.6
to EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X
(Translation)

Equipment: Slot-type initiators, types SJ... and SC...

Marking: **Ex II 2 G EEx ia IIC T6**

Manufacturer: Peppert + Fuchs GmbH

Address: Königsberger Allee 87, 68307 Mannheim, Germany

Description of supplements and modifications

The slot-type initiators of type series SJ... and SC... listed below may in future also be used in hazardous areas where equipment of category-1 is required.

The modifications exclusively concern the „Electrical data“ (change of maximum permissible ambient temperatures for application as category-1 equipment, reduction of the intrinsically safe evaluation and supply circuit to category ia) as well as the marking of the slot-type initiators listed below.

SC2-N0... SJ5-...-N...
 SC3.5-N0-Y... SJ5-K...
 SJ10-N... SJ10-N...
 SJ15-N... SJ15-N...
 SJ2-N... SJ2-N...
 SJ3.5-...-N... SJ3.5-...-N...

For application as category-1 equipment the marking of the slot-type initiators listed above will be in the future.

Ex II 1 G EEx ia IIC T6

The „Special conditions“ are also valid for application as category-1 equipment without changes.

Sheet 1/2

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt in case of dispute, the German text shall prevail.

Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

PTB

1. SUPPLEMENT TO EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

Electrical data

type of protection Intrinsic Safety EEx ia IIC/IIB
only for connection to certified intrinsically safe circuits
Maximum values.


	type 1	type 2	type 3	type 4
U _i = 16 V	U _i = 16 V	U _i = 16 V	U _i = 16 V	U _i = 16 V
I _i = 25 mA	I _i = 25 mA	I _i = 52 mA	I _i = 76 mA	I _i = 76 mA
P _i = 34 mW	P _i = 64 mW	P _i = 169 mW	P _i = 242 mW	P _i = 242 mW

The assignment of the type of the connected circuit to the maximum permissible ambient temperature and the temperature class as well as the effective internal reactances for the individual types of slot-type initiators are shown in the following table.

types	C _i [nF]	L _i [µH]	type 1				type 2				type 3				type 4			
			T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	
SC2-N0...	150	150	55	67	95	48	60	88	23	35	63	6	18	46				
SC3.5-N0-Y...	150	150	55	67	95	48	60	88	23	35	63	6	18	46				
SC3.5-...-N0...	150	150	56	68	96	49	61	89	28	40	68	13	25	53				
SJ2-N...	30	100	56	68	96	49	61	89	28	40	68	13	25	53				
SJ3.5-...-N...	50	250	56	68	96	49	61	89	28	40	68	13	25	53				
SJ5-...-N...	50	250	56	68	96	49	61	89	28	40	68	13	25	53				
SJ5-K...	50	550	55	67	95	48	60	88	25	37	65	9	21	49				
SJ10-N...	50	1000	55	67	95	48	60	88	25	37	65	9	21	49				
SJ15-N...	150	1200	55	67	95	48	60	88	25	37	65	9	21	49				
SJ30-N...	150	1250	55	67	95	48	60	88	25	37	65	9	21	49				

Test report: PTB Ex 03-23133

Braunschweig, October 29, 2003


 Zertifizierungsstelle Explosionschutz
 By order:
 Dr.-Ing. U. Johannsen
 Regierungsdirektor

Sheet 2/2

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt in case of dispute, the German text shall prevail.

Sheet 2/2

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or alterations are subject to approval by the Physikalisch-Technische Bundesanstalt in case of dispute, the German text shall prevail.



Physikalisch-Technische Bundesanstalt
Braunschweig und Berlin

2. SUPPLEMENT

according to Directive 94/9/EC Annex III.6

to EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2219 X

(Translation)

Equipment: Slot-type initiators, types SJ... and SC...

Marking: II 1 G EEx ia IIC T6

Manufacturer: Pepperl + Fuchs GmbH

Address: Lilienthalstraße 200, 68307 Mannheim, Germany

Description of supplements and modifications

In the future the slot-type initiators, types SJ... and SC... may also be manufactured and operated according to the test documents listed in the assessment and test report.

The modifications concern the application of alternative casing compounds and materials for the type label as well as a different enclosure material and additional types of LEDs. The manufacturer's address changes as given above. Furthermore, the test specification is adapted to the current state of the standards which causes an alteration of the marking.

The marking will read in future:

II 1 G Ex ia IIC T6 or II 2 G Ex ia IIC T6

The "Special Conditions" and all further specifications of the EC-type examination certificate including the 1st supplement apply without changes also to this 2nd supplement.

Applied standards
EN 60079-0:2006

EN 60079-11:2007

EN 60079-26:2007

Assessment and test report:

PTB Ex 11-20276

Zertifizierungssektor, Explosionsschutz



Braunschweig, November 25, 2011

Sheet 1/1

EC-type-examination Certificates without signature and official stamp shall not be valid. The certificates may be circulated only without alteration. Extracts or photocopies are not permitted. In case of disputes, the German text shall prevail.

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ZSEK101016.dlx

25 Declaration of conformity



Konformitätserklärung Declaration of Conformity

Nº. 16.4111.02

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 alleiniger 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 02.09.2016

Frank Schramm
(Geschäftsführung / General Manager)

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Anhang N zur Konformitätserklärung Annex N of the Declaration of Conformity

Nº. 16.4111.02

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

Die Konformität mit den auf Seite 1 genannten Richtlinien diese Erklärung wird nachgewiesen durch die Einhaltung folgenden Normen (gegebenenfalls abhängig von Gerätvariante):
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 Direktive	Norm –Ref. Nr. Standard / Ref. Nº.	Ausgabe Edition	Norm Beschreibung Standard Description	ES	BGN	BGF
	DIN EN -					
2014/30/EU	61000-6-2	2011	Immunity Industrial environment	X		
	61000-6-3	2012	Emission residential environment	X		
	55011	2011	Radio frequency disturbance	X		
	61326-1	2013	EMC requirements	X		
2014/34/EU	60079-0	2012+A11	General requirements	X		
	60079-11	2012	Intrinsic Safety „i“	X		
	13463-1	2009-07	General requirements non electrical devices		X	X
	13463-5	2011	Protection by constructional safety „c“		X	X
2014/35/EU	61010	2011	Safety requirements	X		
2014/68/EU	AD 2000-Merkblätter		Module H		X	X

X: Zutreffende Norm / Applicable Standard

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

TÜV-SÜD-Industrie Service GmbH
TÜV SÜD Gruppe
Westendstraße 193
D-80686 München
ID-Nr. / ID-Nº.: RL 2014/68/EU: 0036

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





Anhang X zur Konformitätserklärung Annex X of the Declaration of Conformity

Nº. 16.4111.02

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

Gerät Zulassungen / Device certification

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

X: Zutreffende Norm / Applicable Standard

Konformitätserklärungen für die als Option verwendeten Schalter werden von der 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 EG-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 EC-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.