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**Variable-Area Flowmeter**

**K09**

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**Operating Instructions**



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## 1 Identification

### 1.1 Supplier/manufacturer

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Fax +49 (221) 49708 - 178  
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### 1.2 Product type

Miniature flow meter based on the variable area flow meter principle. Mounting length 90 mm.

### 1.3 Issue date:

19.10.2016

### 1.4 Version no.:

K09\_BA\_16.02\_EN.DOC

## 2 Applications

### 2.1 K09

The flow meter can be used for measuring the flow of liquid and gaseous products in pipes. It shows the current flow in volume or mass per unit time.

Applications:

Measuring the flow of liquid and gaseous products in pipes as well as dosing, superimposing, monitoring, regulating and controlling them.

### 2.2 K09-.V / N differential pressure regulator

The flow meter can be used for stabilizing a constant flow of liquid and gaseous products in pipes. The flow is kept constant regardless of pressure changes during product inflow for type K09-.N or of a pressure change during product outflow for type K09-.V.

Applications: Constant dosing, level measurement in open and closed vessels, N<sub>2</sub> superposition of combustible media

**Caution:** The devices should be used with the greatest possible caution to measure potentially hazardous liquids and (especially) gases. Precautionary measures must be taken to protect personnel and equipment from any potential danger or damage due to glass-tube breakage. The plant operator is fully responsible for using the devices. Where possible, we recommend the use of metal devices such as type KDS.

## 3 Operational mode and system design K09

Float principle:

The product flows through the meter vertically from the bottom to the top. The height of the float in the measuring tube is a measure of the flow quantity. The float is in equilibrium between the buoyant force of the flowing medium and the counteracting force of gravity on the float. The measured value is displayed on the measuring-tube scale with the upper edge or the indicator edge of the float (ball).

### 3.1 K09 system design

The meter consists of a conical measuring tube made of glass containing a float that can move vertically. The height of the float in the measuring tube reproduces the calibrated flow quantities on the measuring tube.

### 3.2 Measuring principle for K09-.V / N

Differential pressure regulator

The diaphragm of the controller is in a state of equilibrium when the pressure conditions are the same on both sides. The pressure on the input side is determined by the pressure of the product; the pressure on the output side is determined by the pressure drop of the setting valve of the flow meter.

If either the inlet or outlet pressure changes, the change in pressure is compensated by the built-in diaphragm valve - thus maintaining a constant set flow rate.

**Important:** The controller can only regulate inlet or outlet pressure fluctuations. Steady pressure conditions must prevail on the other side.

### 3.3 K09-..V / N system design

The unit consists of a K09 variable-area flow meter, equipped with a diaphragm differential pressure flow controller. The variable-area flow meter consists of a device fitting with an integrated measuring tube made of glass that contains a vertically movable float and the valve for setting the flow rate.

The differential pressure flow controller is made of stainless steel and consists of a diaphragm made of Viton or PTFE and a compensating valve made of stainless steel. For gaseous products, two versions are available: **K09-...V** for a constant inlet pressure and a variable outlet pressure

**K09-...N** for a constant outlet pressure and a variable inlet pressure

For liquids, both versions can be used; however, the **K09-...V** version should be preferred.

## 4 Input

### 4.1 Measured variable:

Volume flow

### 4.2 Measuring range:

(lower-range and upper-range values)

#### Measuring span water 20 °C K09:

Smallest measuring range: 0.02-0.25 l/h water      Largest measuring range: 10-100 l/h water

#### Measuring span air 20°C, 1,013 bar abs. K09

Smallest measuring range: 2-20 NI/h air      Largest measuring range: 300-3000 NI/h air

#### Measuring /controlling range for K09-..V / N

Span: 10-100%

#### Smallest measuring/controlling range

0.02-0.25 l/h water      2-20 NI/h air

#### Largest measuring/controlling range

10-100 l/h water      300-3000 NI/h air

#### Measuring range table

Measuring ranges water 20 °C					Measuring ranges air 1,013 bar abs., 20 °C				
Float st. 1.4401 (316L) / glass					Float st. 1.4401 (316L) / glass				
Range N°	Water l/h	∅ Float (mm)	∅ Valve seat (mm)	Press. loss (mbar)	Range N°	air l/h	∅ Float (mm)	∅ Valve seat (mm)	Press. loss (mbar)
91	0,02-0,25	glass	2,8	2	88	2-20	glass	2,8	1
92	0,08-0,7	glass	2,8	3	89	4-40	glass	2,8	2
79	0,1-1	1.4401	2,8	2	70	5-50	1.4401	2,8	1
80	0,25-2,5	1.4401	2,8	3	71	10-100	1.4401	2,8	2
81	1,0-10	1.4401	2,8	3	90	12-120	glass	2,8	2
82	1,5-16	1.4401	2,8	5	72	25-250	1.4401	2,8	2
83	2,5-25	1.4401	2,8	5	73	30-350	1.4401	2,8	2
84	4-40	1.4401	2,8	5	74	50-450	1.4401	2,8	3
85	5-65	1.4401	2,8	5	75	60-800	1.4401	2,8	3
86	6-63	1.4401	2,8	6	76	120-1200	1.4401	2,8	3
87	10-100	1.4401	2,8	6	77	200-2000	1.4401	2,8	3
					78	300-3000	1.4401	2,8	3

## 5 Electrical output (option)

1 inductive limit switch  
Mono- or bistable

### 5.1 Ad-on limit switches Type RC 10/15-14-XX, Manufacturer Pepperl & Fuchs

Monostable	Type	RC 10/15-14-N0
Bistable	Type	RC 10/15-14-N3

Ex-Marking PTB 99 ATEX 2128 X, II 2G Ex ia IIC T6

### 5.2 Ad-on limit switches Type N7R\*\*A, Manufacturer ifm electronic

Monostable	Typ	N7R28A (Inside diameter 10mm)
		N7R30A (Inside diameter 15mm)

Bistable	Typ	N7R29A (Inside diameter 10mm)
		N7R31A (Inside diameter 15mm)

Ex-Marking BVS 08 ATEX E026, IECEx BVS 09.0016  
II 1G Ga Ex ia IIC T4/T5/T6, II 1D Ex iaD 20 T125°C

**When installing electrical equipment in hazardous areas please pay attention to the conditions specified in the approval certificate.**

## 6 Measuring accuracy

### 6.1 Reference conditions:

Water 20°C (air 20°C; 1, 013 bar abs)

### 6.2 Measured error

(Liquid/Gas):  $\pm 3\%$   $q_G=50\%$  acc.. VDE/VDI 3513 page 2

V / N (option diff.pressure regulator):  $\pm 3, 5\%$  /  $\pm 5\%$  FS within 10-100% of the range

### 6.3 Repeatability

(Liquid/Gas)  $\pm 1.0\%$  FS,

V / N (option differential pressure regulator):  $\pm 1, 5\%$  /  $\pm 2, 5\%$  FS within 10-100% of the range

### 6.4 Influence of ambient temperature

none

### 6.5 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 and viscosity.

## 7 Conditions of use

The VDI/VDE guidelines must be observed.

The devices can be used for:

- liquid products that are sufficiently free-flowing, are free of solids, do not bond or do not tend to settle.
- gases with linear flow behavior and an adequate inlet pressure.

V/N(option differential pressure regulator)

The minimum differential inlet and outlet pressures must be 350 mbar.

Please refer to the instructions for potentially hazardous products in Section 2.2.

### 7.1 Mounting / start-up

When starting up the flowmeter, the following points must be observed:

- The variable-area flow meter must be installed perpendicularly (direction of flow from the bottom to the top).
- Take special care to install glass-tube devices free from strain.
- The size of the product line to be connected must be identical to the size of the device connection.
- All instruments are shipped with the valve installed at the inlet. By turning the glass tube resp. the fitting, the valve also can be installed at the outlet.

- **V/N** (option diff.pressure regulator): When using gases, the version for a constant inlet pressure with "valve at the top" and for a constant counter pressure with "valve at the bottom" should be used. If liquids are involved, the position of the valve does not have any impact on the function of the meter.
- Slowly open the shut-off valve upstream and downstream of the flowmeter.
- When measuring liquids, vent the pipes carefully.
- When measuring gases, increase pressure slowly.
- Void float impact (e.g. caused by solenoid valves), as this is likely to damage the measuring section or float.

## 7.2 Ambient conditions

### 7.2.1 Ambient temperature ranges

-20°C to +100°C (with limit switch -20° +70°C) (**risk of breakage due to frost**)

### 7.2.2 Storage temperature

-20°C to +100°C

### 7.2.3 Climatic category

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

### 7.2.4 Degree of protection

IP65 (EN60529)

### 7.2.5 Shock resistance/vibration resistance

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

### 7.2.6 Electromagnetic compatibility

Built in limit switch:

acc. NAMUR recommendation NE 21

Product standard: EN 60947-5-2: 2004

## 7.3 Fluid conditions

### 7.3.1 Fluid temperature ranges

without limit switch -20°C to + 100°C

with limit switch -20°C to + 70°C (**risk of breakage due to frost**)

### 7.3.2 Fluid pressure limit

16bar (at 20 degrees Celsius)

Important:

All pressure values are for non-hazardous liquids and for devices installed free from strain.

For **V/N**, (option differential pressure regulator) the maximum unilateral pressure resistance of the diaphragm is **7 bar**.

### 7.3.3 Inlet and outlet sections

Inlet and outlet sections are not required for a linear flow profile of the fluid.

### 7.3.4 Physical state:

Liquid or gaseous

### 7.3.5 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.

### 7.3.6 Pressure loss

Depends on the measuring range. (see measuring range tables in Section 4.2)

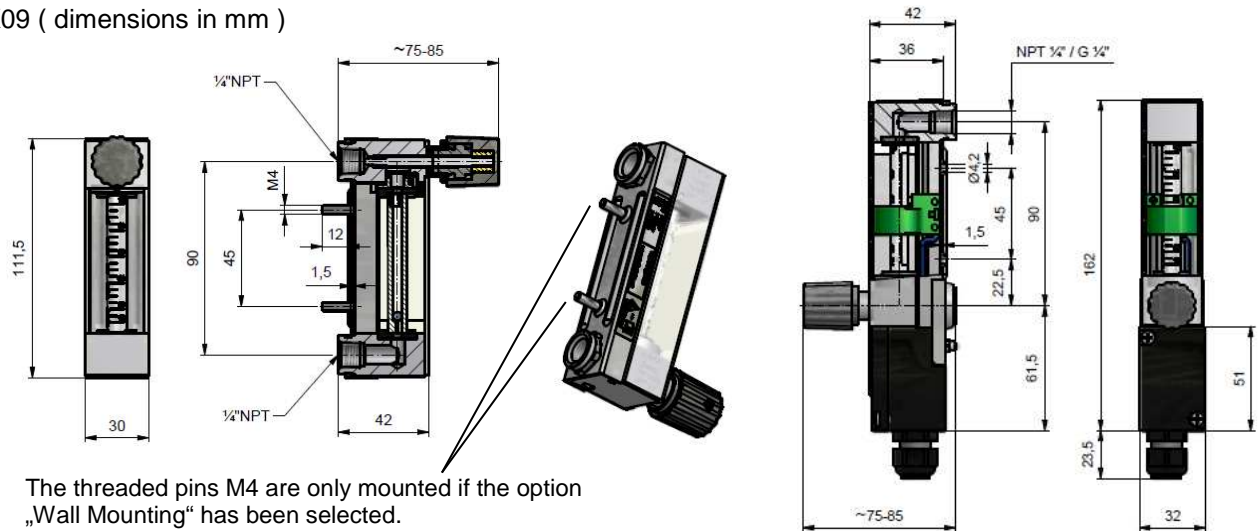
## 8 Design details

### 8.1 Design/dimensions K09

The meter consists of a conical measuring tube made of borosilicate glass with a vertically movable float made of stainless steel or glass. The measuring tube is installed in the device fitting and does have a horizontal connections on the rear.

The standard version of the device is equipped with an adjusting valve at the outlet

K09 ( dimensions in mm )



The threaded pins M4 are only mounted if the option „Wall Mounting“ has been selected.

### 8.2 Design / dimensions / operating details V / N (option differential pressure regulator)

Differential pressure regulators are used to achieve constant flow values at variable inlet and outlet pressures.

- ➔ Differential pressure regulators are not pressure reduction valves

The measuring device consists of variable area flowmeter with control valve and mounted differential pressure regulator.

The flow amount will be adjusted via the integrated adjusting valve.

The max.one side pressure resistance of the regulator membrane is 7 bar. If the operating pressure exceeds 7 bar, the control valve must not be fully closed as this leads into overstressing the membrane.

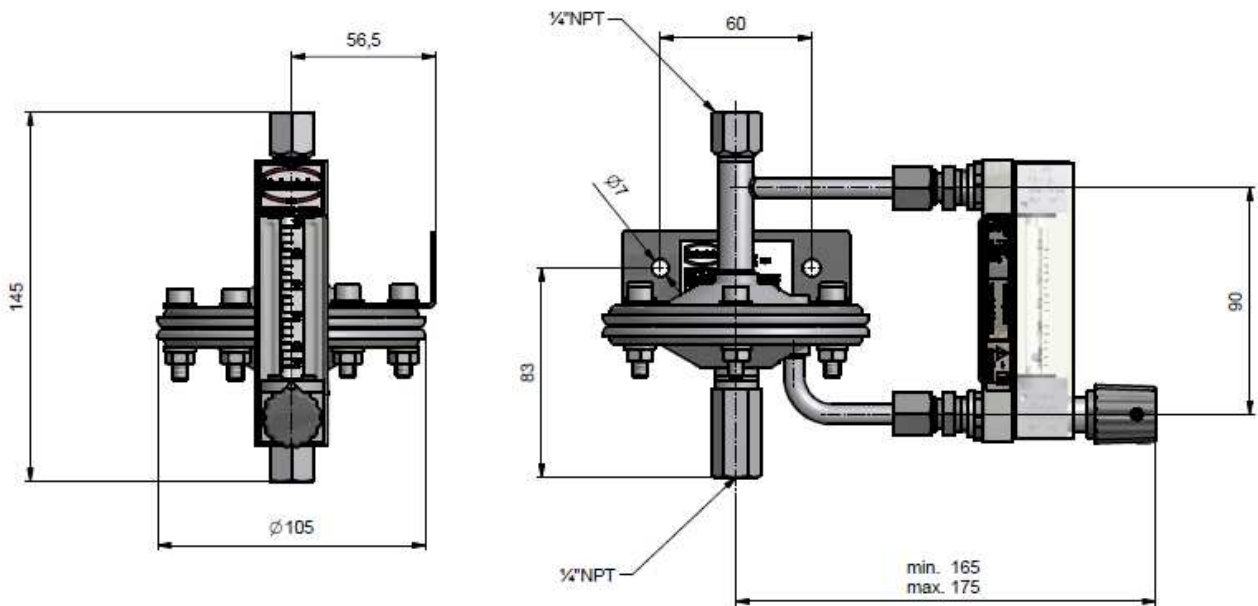
#### IMPORTANT OPERATION DETAILS

- ➔ The installation of any valve before the inlet and outlet of the instrument shall be avoided
- ➔ Initial operation / start up of the process only with opened control valve
- ➔ When operating any gas the inlet pressure shall be increased slowly to avoid strong pressure peaks
- ➔ Any operation of the instrument trough any solenoid valve shall be avoided, this will prevent the float will be thrown upwards heavily.
- ➔ For the operation of the regulator minimum inlet pressure are required.
 

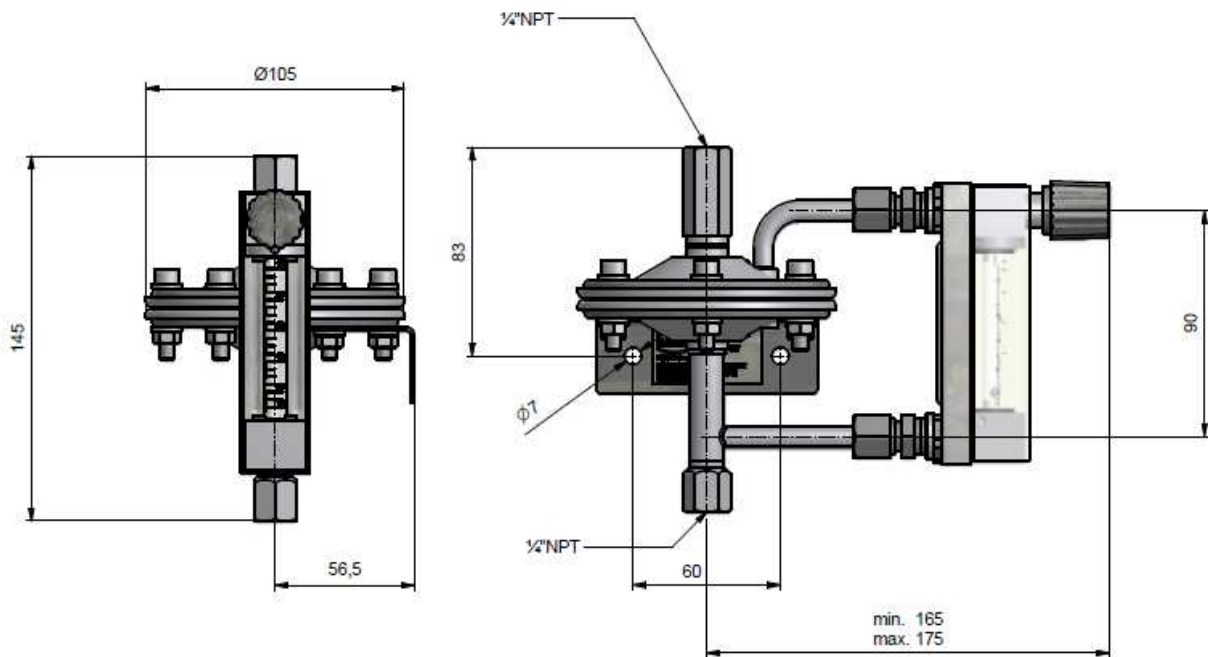
Regulator with constant outlet pressure:	350 mbar
Regulator with constant inlet pressure:	350 mbar



8.2.1 Dimension drawing K09-N with conn. 1/4" NPT (F) as regulator c/w constant outlet pressure



8.2.2 Dimension drawing K09-...V with conn. 1/4" NPT (F) as regulator c/w constant inlet pressure



8.3 Weights:

K09: 0,4kg, K09- V/N: 0.8 kg

8.4 Materials:

Fitting, connections, setting valve: 1.4404 (316L)

Float 1.4401 / glass

Seals measuring tube: viton, FFKM (option)

Valve: PTFE, Hoses: PVC

V/N (option differential pressure regulator)

Controller/control pipes: 1.4301

**8.5 Process connection:**

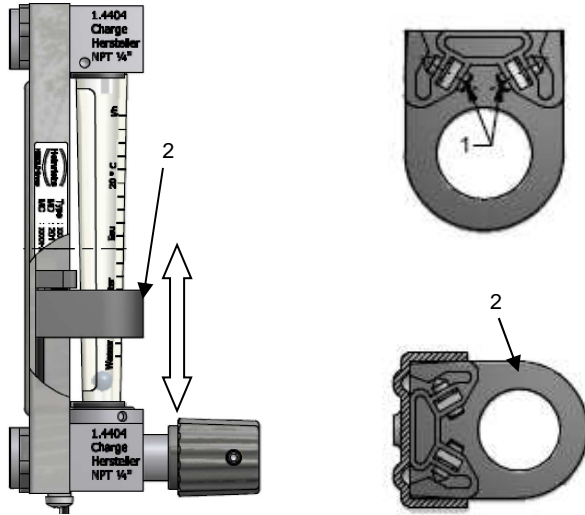
NPT 1/4" (F)

Special connections: Ermeto, Swagelok, G 1/4", Hose connector 8 mm

**Important:** Other connections are available as special versions

**9 Electrical connection for limit switch (option)**

with cable end length of 2 m



The limit switch (ring form) can be adjusted alongside of the measuring tube. It is fixed via two screws (1) at the back wall of the instrument.

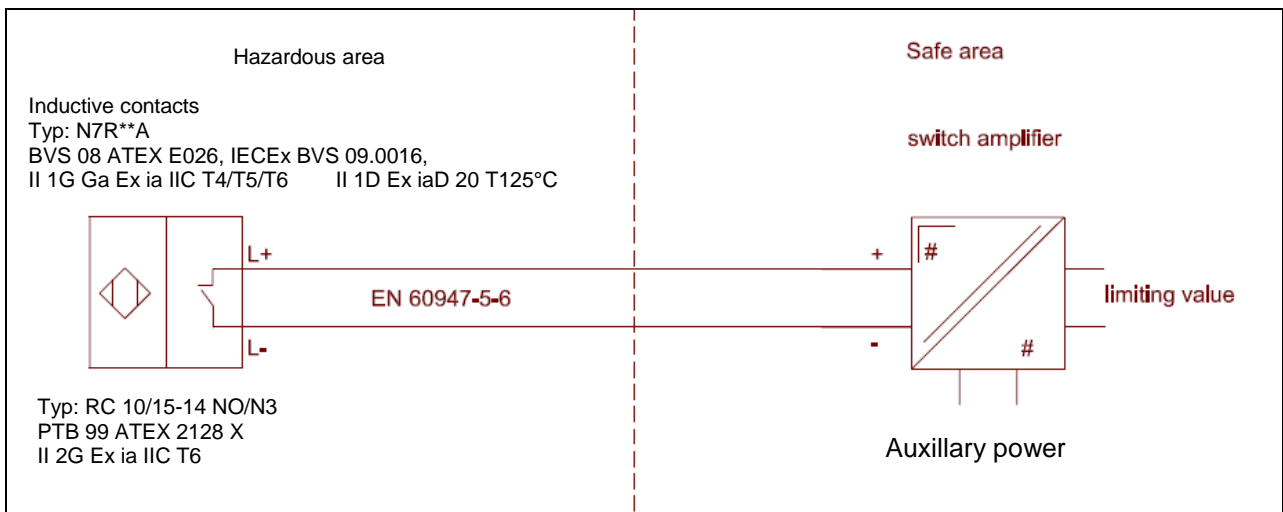
**Adjusting of the contact:**

- unlock the fixing screws (1)
- move contact (2) to bottom or top
- lock fixing screws (1)

**ATTENTION: (limited switching range)**

Measuring ranges 78, 78 and all ranges with glass float cannot be equipped with contact. For the measuring tubes N° 77 and 86 the contact cannot be moved to the max. flow range.

Wiring diagram for limit switch



**10 Indicator unit**

Direct indication via the position of the float in the measuring tube

## 11 Use in hazardous areas



Only devices with ex marking may be operated within the explosive atmospheres range.



### 11.1 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  $T_{atm} = -20^{\circ}C$  to  $+60^{\circ}C$  and  $P_{atm} = 0.8$  to  $1.1\text{bar}$ . 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 1.1bar. 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)

### 11.2 Electrostatic charge of non-conductive parts



In hazardous areas pay attention to the risk of the electrostatic charge in a danger threatening amount at cleaning works of the synthetic material housing and glasses.

Devices where explosive electrostatic charges can be expected to be generated due to cleaning action are marked with an adhesive label.

Caution! Static charge possible at cleaning and maintenance works.

To clean these devices use a wet wiper.

#### 11.2.1 Static Electricity



In variable-area flow meters, it is possible under operating conditions for charge separation to occur in the measuring tube due to the transport of non-conductive fluids and/or when the flow comes into contact with non-conductive internals (e.g. liners, floats).

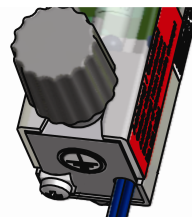
For that reason, variable-area flow meters must be permanently grounded by the operator by way of the process connections (flanges) in order to discharge electrostatic build-up.

The operator is also responsible for extending the ground continuity of the process pipe line. 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.

Grounding at variant with an add-on terminal case.



Grounding at variant without an add-on terminal case.




### 11.3 Mechanical strength



The device has to be mounted in a way that it is protected against mechanical damages.

## 11.4 Without electrical equipment

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

Marking  II 2GD IIC TX  
Reg. No.: BVS 10 ATEX H-B 034  
Tech. File Reg. No. HM-K09-32-ATEX-10-01-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.

## 11.5 With limit switch

When the limit switch is installed, the device becomes additional an electrical assembly and receives a marking in accordance with DIN EN 60079-0.

The electrical and thermal data and the special conditions of the Type Examination Certificate must be observed.

### Marking of the limit transducer:

Manufacturer Pepperl & Fuchs		PTB 99 ATEX 2128 X
Type: RC 10/15-14 NO/N3		II 2G Ex ia IIC T6
Manufacturer ifm electronic		BVS 08 ATEX E026, IECEx BVS 09.0016,
Type: N7R**A		II 1G Ga Ex ia IIC T4/T5/T6, II 1D Ex iaD 20 T125°C

**The influence of the fluid temperature on the built-in limit transducer must be observed.**

## 12 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) and Electromagnetic Compatibility (EMC) Directive 2004/108/EG.

With respect to the Pressure Equipment Directive 97/23/EG, the devices fall within the scope of application of Article 3, Section 3, and need no CE mark in accordance with this directive.

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

## 13 Available accessories

1 inductive limit switch ; mono-stable or bi-stable  
Special connections

## 14 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.

## 15 Standards and directives

Measuring range rated and converted to other products according to VDE/VDI guidelines 3513

Directive 97/23/EG (Pressure Equipment Directive)

Directive 94/9/EG (Equipment and Protective Systems for Use in Potentially Explosive Atmospheres)

For the electrical sensor

EN 60079-0 General regulations

EN 60079-11 intrinsically safeness

Guideline 2004/108/EG (EMC guideline)

NAMUR recommendation NE 21

EN 60529 – Degrees of protection through housing (IP code)

EN 61010-1 – Safety requirements for electrical measuring, control and laboratory devices

EN 60947-5-6:2000 – Switchgear and controlgear

## 16 Safety instructions

### 16.1 Intended use

The K09 variable-area flow meter may be used only for flow measurements of fluid and gaseous media. The manufacturer shall not be liable for damage that may result from improper or unintended use. When dealing with an aggressive medium, clarify the material durability of all wetted parts.

## 16.2 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.

Basically, follow the conditions and provisions applicable in your country.

## 17 Packaging, storage and shipment

Carefully unpack the device to avoid damaging it. With the help of the delivery note enclosed in the packaging, check whether all technically relevant data coincide 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.

## 18 Maintenance

If you use the meter in the intended manner special maintenance is not necessary. However, the variable area flow meter should be checked in the context of the routine maintenance of the facility and the pipelines. You have to eighth especially for dirt, corrosion denudation, mechanical wear as well damage at the glass cone. We recommend checking the meter once a year.

In the recurrent pressure test of the system, the maximum allowed pressure test PT (see name plate) must not be exceeded.

Attention

If cleaning of the float or of the measuring cone is necessary due to contamination, please note following items:

- Before removing a device, make sure that the pipe line is empty (no product residues) depressurized and cooled.
- For devices that are used to measure corrosive or hazardous media, appropriate security precautions have to be taken regarding any remaining liquid in the measuring unit
- Avoid electrostatic charging of surfaces when cleaning non-conductive surfaces (e.g. protective hood)
- Having dismantled the device, dirt on the inside of glass measuring cones can be gently cleaned with a brush and appropriate media.
- When assembling and reinstalling the system always new gaskets have to be used.

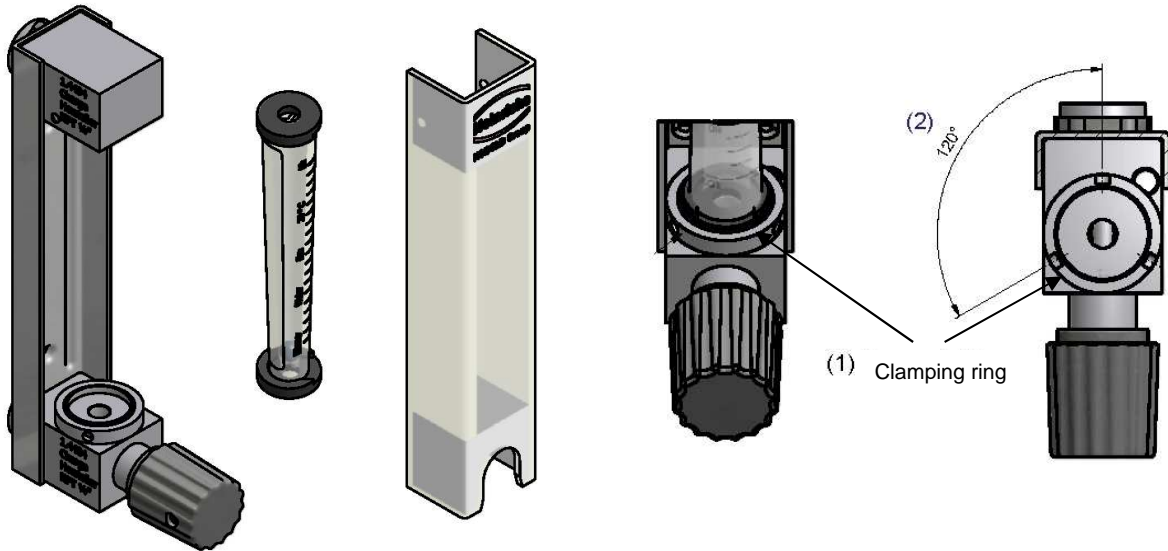
### Replacing the measuring cone

**Removal:**

- Close valve in front and behind the unit
- Close needle valve of the device
- Shift protective cover upwards and remove to the front.
- By turning the adjusting ring at the unit base counterclockwise the measuring glass can be loosened and removed.

**Installation:**

- Installation has to be carried out in reverse order
- The measuring glass is fixed by clamping the adjusting ring on the unit base hand tightened
- With a 3 mm pin the clamping ring is fixed by **4, max. 5 120° turns** clockwise.
- The torque should be max 2, 8 to 3 Nm.
- Caution! To avoid breaking of the glass flow tube it has to be installed centrally between the seals.
- Before re-commissioning the tightness of the measuring device has to be checked by suitable means.



**Attention**

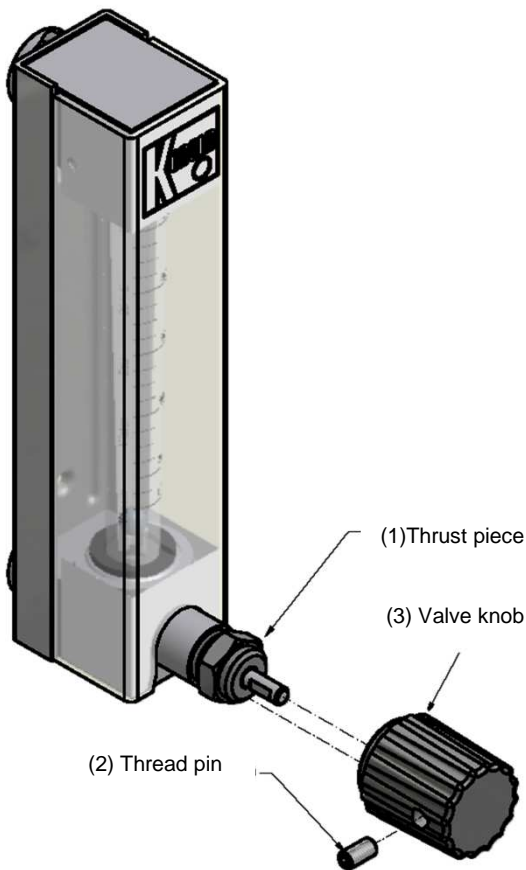
The shaft packing of the valve must be readjusted during the life cycle. This requires tightening of the thrust piece (1)

Loosen thread pin (2) M4x8 with hexagon 2mm and remove valve knob (3).

Tighten thrust piece (1) SW14 with a torque of 3, 8 Nm - 4, 0 Nm

**Caution**

Valves that have not been operated for a long time may require a higher operating torque.



## 19 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 requirement 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 is authorized to remove them at the client's expense without further inquiry.

**20 Decontamination certificate for device cleaning**

Company: .....

City: .....

Department: .....

Name: .....

Tel: .....

This variable-area flowmeter

Type K09.....

was operated using the measured medium.....

Since this measured medium is dangerous in water\*/poisonous\*/corrosive\*/flammable\*,

we have:

- checked that all hollow spaces of the device are free of these materials\*
- neutralized and flushed all hollow spaces of the device\*

\*cross out what is not applicable.

We hereby confirm that in resending the device no danger to persons or the environment is posed by the residual measured substance.

Date: .....

Name: .....

Signature: .....

Stamp



21 Model Code

MODEL			Accessories	
K09-	Mounting length	90 mm		Mounting options
			0	without
			W	Wall mounting (not with contact terminal box)
	<b>Connection</b>			<b>Contacts</b>
N	Internal thread		0	without
G	Internal thread (not with V / N regulator.)		M	Inductive contact, ring type mono -stable
X	Special connec- (on request)		B	Inductive contact, ring type bi-stable
	<b>Connection-</b>			<b>N° of contacts</b>
0	without		0	without
1	¼"-NPT Hose	for Ø8mm,angled	1	1x
2	¼"-NPT Hose	for Ø8mm,straight line		
	<b>Valve position</b>			<b>Terminal box</b>
0	without		0	without
1	outlet	Standard	A	c/w
2	inlet			<b>Flow - differential pressure regulator</b>
	<b>Ranges</b>		0	without
88	Air (NI/h)	2-20	VV	inlet pressure constant / outlet pressure variable (HV)
89	Air (NI/h)	4-40	NV	Outlet pressure constant / inlet pressure variable (HN)
70	Air (NI/h)	5-50	VP	inlet pressure constant / outlet pressure variable (HV)
71	Air (NI/h)	10-100	NP	Outlet pressure constant / inlet pressure variable (HN)
90	Air (NI/h)	12-120		<b>Approvals</b>
72	Air (NI/h)	25-250	0-	without
73	Air (NI/h)	30-350	1-	ATEX II2G (Gas,Zone 1)
74	Air (NI/h)	50-450		
75	Air (NI/h)	60-800		
76	Air (NI/h)	120-1200		
77	Air (NI/h)	200-2000		<b>Labeling</b>
78	Air (NI/h)	300-3000	H	Heinrichs
91	H <sub>2</sub> O: (l/h)	0,02-0,25	K	KOBOLD
92	H <sub>2</sub> O: (l/h)	0,08-0,7	N	neutral
79	H <sub>2</sub> O: (l/h)	0,1-1,0	X	Special
80	H <sub>2</sub> O: (l/h)	0,25-2,5		<b>Marking</b>
81	H <sub>2</sub> O: (l/h)	0,6-6,3	0	without
82	H <sub>2</sub> O: (l/h)	1,0-10	1	st.st. plate 40x20mm
83	H <sub>2</sub> O: (l/h)	1,6-16		<b>Certificates</b>
84	H <sub>2</sub> O: (l/h)	2,5-25	0	without
85	H <sub>2</sub> O: (l/h)	4-40	1	Certificate of compliance acc. EN10204 2.1
86	H <sub>2</sub> O: (l/h)	6-63	2	Certificate of compliance acc. EN10204 2.2
87	H <sub>2</sub> O: (l/h)	10-100		<b>Pressure and leak testing</b>
XX	Special range	On request	0	without
			1	Supplier test report M acc. DIN 55350 incl. Pressure test
			2	Supplier test report M acc. DIN 55350 incl. Leak test (air)
	<b>Scaling</b>			<b>Calibration report</b>
0	Standard - range			without
1	% -skale (H <sub>2</sub> O)		0	without
2	Product skale		1	Confirmation of the accuracy class
3	Product scale %		2	5 point calibration report
X	Special		4	Special acc. request
	<b>Sealing glass</b>			<b>Cleaning</b>
V-	Viton	standard	0	without
P-	FFKM-PTFE		1	Cleaning (oxygen service) "oil and grease free"
X-	Special		2	Cleaning (oxygen service) incl. Marking "oil and grease free"
	<b>Base Model</b>			<b>Panel Mount</b>

22 EC Type Examination Certificate of the limit switch

22.1 Manufacturer Pepperl & Fuchs

**Physikalisch-Technische Bundesanstalt**  
Braunschweig und Berlin

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

(1) **PTB 99 ATEX 2128 X**

(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 2128 X**

(4) Equipment: Ring initiator types RJ..., RC... and TG...

(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.

The examination and test results are recorded in the confidential report PTB Ex 99-29058.

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

(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 this certificate.

(11) 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.

(12) The marking of the equipment shall include the following:  
**Ex II 2 G EEx ia IIC T6**

Zertifizierungsstelle Explosionsschutz  
By order:   
In the absence of Dr.-Ing. U. Jöns  
Regierungsdirektor

Braunschweig, August 10, 1999

sheet 1/4

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**

(13) **EC-TYPE-EXAMINATION CERTIFICATE PTB 99 ATEX 2128 X**

(14) **Description of equipment**

The ring initiators of types RJ..., RC... and TG... are used to convert displacements into electrical signals.

The ring 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 explosion group of the intrinsically safe ring 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
U <sub>i</sub> = 16 V	U <sub>i</sub> = 16 V	U <sub>i</sub> = 16 V
I <sub>i</sub> = 25 mA	I <sub>i</sub> = 25 mA	I <sub>i</sub> = 52 mA
P <sub>i</sub> = 34 mW	P <sub>i</sub> = 64 mW	P <sub>i</sub> = 169 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 ring initiators are shown in the table:

sheet 2/4

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 2128 X**

types	L <sub>i</sub>	C <sub>i</sub>	type 1						type 2			type 3		
			maximum permissible ambient temperature in °C for application											
			In temperature class											
	[u]H	[n]F	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1	T6	T5	T4-T1
RJ10-N...	20	30	75	90	100	70	85	100	55	70	90			
RJ10-N...	20	30	75	90	100	70	85	100	55	70	90			
RJ10-Bi...	20	90	75	90	100	70	85	100	55	70	90			
RJ10-N...	20	90	75	90	100	70	85	100	55	70	90			
RC15-N...	100	150	75	90	100	70	85	100	55	70	90			
RC15-N...	120	90	75	90	100	70	85	100	55	70	90			
TG10	20	30	75	90	100	70	85	100	55	70	90			
TG10-1	100	150	75	90	100	70	85	100	55	70	90			
TG10-bi	20	90	75	90	100	70	85	100	55	70	90			
TG15-1bi	120	90	75	90	100	70	85	100	55	70	90			
RJ15-N...	20	130	75	90	100	70	85	100	55	70	90			
RJ15-N...	20	130	75	90	100	70	85	100	55	70	90			
RJ15-Bi...	50	90	75	90	100	70	85	100	55	70	90			
RJ15-N...	50	90	75	90	100	70	85	100	55	70	90			
RC15-N...	100	150	75	90	100	70	85	100	55	70	90			
RC15-N...	70	90	75	90	100	70	85	100	55	70	90			
TG15	20	130	75	90	100	70	85	100	55	70	90			
TG15-1	100	150	75	90	100	70	85	100	55	70	90			
TG15-bi	50	90	75	90	100	70	85	100	55	70	90			
TG15-1bi	70	90	75	90	100	70	85	100	55	70	90			
RJ21-N...	25	30	75	90	100	70	85	100	55	70	90			
RJ21-Bi...	50	70	75	90	100	70	85	100	55	70	90			
RJ43-N...	50	40	75	90	100	70	85	100	55	70	90			

(16) Test report PTB Ex 99-29058

(17) Special conditions for safe use

1. For the application within a temperature range of -60°C to -20 °C the ring initiators of types RJ..., RC... and TG... must be protected against damage due to impact by mounting into an additional housing.

2. The connection facilities of the ring initiators of types RJ..., RC... and TG... shall be installed as such that at least a degree of protection of IP20 according to IEC-publication 60529:1989 is met.

sheet 3/4

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 2128 X**

3. 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 ring initiators is shown in the table given under item (15) of this EC-type-examination certificate.

4. Inadmissible electrostatic charge of the plastic housing of the ring initiators of types RJ43-...-N..., RJ21-...-N..., and RJ21-...-Bi... has to be avoided. A warning label on the device shall point to this danger.

(18) Essential health and safety requirements

Met by the standards mentioned above

Zertifizierungsstelle Explosionsschutz  
By order:   
In the absence of Dr.-Ing. U. Jöns  
Regierungsdirektor


Braunschweig, August 10, 1999

sheet 4/4

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

22.2 Manufacturer ifm electronic



Translation

## EC-Type Examination Certificate

- Directive 94/9/EC -  
Equipment and protective systems intended for use  
in potentially explosive atmospheres

**BVS 08 ATEX E 026**

**Equipment:** Proximity sensor type I7\*2\*\*\*-N\*\*\*\*

**Manufacturer:** ifm electronic gmbh

**Address:** 45127 Essen, Germany

The design and construction of this equipment and any acceptable variation there to are specified in the appendix to this type examination certificate.

The certification body of DEKRA EXAM 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.

The examination and test results are recorded in the test and assessment report BVS PP 08.2029 EG.

The Essential Health and Safety Requirements are assured by compliance with:

EN 60079-0:2006 General requirements  
EN 60079-11:2007 Intrinsic safety 'i'  
IEC 60079-26:2006 Group II Zone 0 Apparatus  
EN 61241-0:2006 General requirements  
EN 61241-11:2004 Intrinsic safety 'ID'

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 appendix to this certificate.

This EC-Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to Directive 94/9/EC.  
Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.


The marking of the equipment shall include the following:

**Ex II 1G Ga Ex ia IIC T4 / T5 / T6  
II 1D Ex iaD 20 T125 °C / 100 °C / 85 °C**

**DEKRA EXAM GmbH**  
Bochum, dated 31. March 2008

Signed: **Dr. Jöckers**      Signed: **Dr. Eickhoff**  
Certification body      Special services unit

Page 1 of 3, BVS 08 ATEX E 026  
This certificate may only be reproduced in its entirety and without change  
DEKRA EXAM GmbH    Dimmedahlstrasse 9    44809 Bochum, Germany    Phone +49 234 6596-105    Fax +49 234 6596-110    E-mail: ze-exam@dekra.com



Appendix to

## EC-Type Examination Certificate

**BVS 08 ATEX E 026**

(15) 15.1 Subject and type:  
Proximity sensor type I7\*2\*\*\*-N\*\*\*\*  
Instead of the \*\*\* in the complete denomination letters and numerals will be inserted which characterize modifications.

(15.2) Description:  
The proximity sensor is used in explosive atmospheres for detection of metallic parts.

15.3 Parameters  
One of the following combinations with resulting temperature values:

Electrical parameters	15	16	16	16	16
Voltage U [V]	15	16	16	16	16
Current I [mA]	50	25	25	25	52
Power P [mW]	120	34	34	64	169

Temperature class    T6    T4    T5    T4    T6    T5    T4    T6    T5    T4

max. surface temperature [°C]    85    125    85    100    125    85    100    125    85    100    125

for DJUST

Type    Max. ambient temperature (-40 °C up to)

I7S2\*\*\*-N\*\*\*\*    60    100    72    87    100    70    85    100    55    70    100

I7R2\*\*\*-N\*\*\*\*    60    100    75    790    100    70    85    100    55    70    100

I7R2\*\*\*-N1\*\*\*\*    70    100    75    90    100    75    90    100    70    85    100

Maximum internal capacitance Ci and maximum internal inductance Li in accordance with the following table:

Type	Li [µH]	Ci [nF]
I7S2002-N	120	150
I7S23.5-N	150	150
I7R2010-N****	100	150
I7R2015-N****	90	90
I7R2015-N1****	65	90

Ambient temperature range    1a    -40 °C up to (see table)

(16) Test and assessment report  
BVS PP 08.2029 EG as of 31.03.2008

(17) Special conditions for safe use  
None

Page 1 of 3, BVS 08 ATEX E 026  
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## 23 Declaration of Conformity



### Konformitätserklärung Declaration of Conformity

Nº. 16.4132.01

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

---

Produktbeschreibung: **Schwebekörper-Durchflussmessgerät vom Typ K09 bis K32**  
*Product description:* **Variable Area Flowmeter Model K09 to K32**

---

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)**  
*(nur für Geräte mit Sensor)*

EU-Richtlinie über die Elektromagnetische Verträglichkeit  
*EU-Directive relating to electromagnetic compatibility*

**2014/34/EU (ATEX)**

EU-Richtlinie über Geräte zur Bestimmungsgemäße Verwendung in explosionsgefährdeten Bereichen.  
*EU-Directive relating to electrical equipment intended for use in potentially explosive atmospheres*

---

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)

**Kontakt :**  
**Contact:**

Tel: +49 (221) 49708-0  
Email: [info@heinrichs.eu](mailto:info@heinrichs.eu)  
Web: [www.heinrichs.eu](http://www.heinrichs.eu)



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

**Nº. 16.4132.01**

**Produktbeschreibung: Schwebekörper-Durchflussmessgerät vom Typ K09 bis K32**  
**Product description: Variable Area Flowmeter Model K09 to K32**

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					Anbau elektrische Sensor Add-on electrical sensors
				K09	K12	K17	K32	
	<b>DIN EN -</b>							
2014/30/EU	61000-6-2	2011-06	Immunity Industrial enviroment					X
	61000-6-3	2012-11	Emission residential enviroment					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
	1127-1	2008-2	Grundlagen und Methodik	X	X	X	X	
	13463-1	2009-07	General requirements non elec- trical devices	X	X	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

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. 16.4132.01

Produktbeschreibung: **Schwebekörper-Durchflussmessgerät vom Typ K09 bis K32**  
 Product description: **Variable Area Flowmeter Model K09 to K32**

Gerät Zulassungen / Device certification

EG-Baumusterprüfbescheinigung <i>EC-type examination certificate</i>	Nachtrag <i>Supplement</i>	Kennzeichnung <i>Marking</i>				
			K09	K12	K17	K32
BVS 10 ATEX H/B 034	-	II 2GD	X	X	X	X
<i>Tech. File Ref.</i>	-	<i>HM-K09-32-ATEX-10-01X</i>	X	X	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.*