



Variable-Area Flowmeter

K12

Operating Instructions



Betriebsanleitung bitte durchlesen und an einem sicheren Ort aufbewahren!

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1 Identification

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Product type: Miniature flow meter based on the variable area flow meter principle.

Product designation: K12
Mounting length 125 mm

File name: K12_BA_21.01_EN.DOC

Version No. / 21.01

Issue date: 18. Januar 2021

2 Applications

2.1 K12

The flow meter is suitable for the measurement of the flow of liquid and gaseous products in pipes. It displays 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 the controlling of them.

2.2 K12-..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 K12-.N or of a pressure change during product outflow for type K12-.V.

Applications: Constant dosing, level measurement in open and closed vessels, N₂ superposition of combustible media

Caution: The devices should be used with the greatest possible caution when measuring potentially hazardous liquids and (especially) gases. Precautionary measures must be taken to protect personnel and equipment from any potential danger or damage resulting from glass-tube breakage. The plant operator carries full responsibility for the use of the devices.

Where possible, we recommend the use of metal devices such as type KDS.

3 Operational mode and system design K12

Float principle:

The product flows vertically through the meter 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 indicated on the measuring-tube scale with the upper edge or the indicator edge of the float (ball).

3.1 K12 system design

The meter consists of a conical measuring tube made of glass containing a vertically free-moving float. The height of the float in the measuring tube reproduces the calibrated flow quantities on the measuring tube.

3.2 Measuring principle for K12-...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 flowmeter.

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 regulator can only regulate inlet or outlet pressure fluctuations. Steady pressure conditions must prevail on each side of the regulator.

3.3 K12-..V / N system design

The unit consists of a K12 variable-area flow meter, equipped with a diaphragm differential pressure flow regulator. 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:

- **K12-...V** for a constant inlet pressure and a variable outlet pressure
- **K12-...N** for a constant outlet pressure and a variable inlet pressure

For liquids, both versions can be used; however, the **K12-...V** version should be favoured.

4 Input

4.1 Measured variable

Volume flow

4.2 Measuring ranges

(lower-range and upper-range values)

Measuring span water 20 °:

Smallest measuring range: 0.02-0.25 l/h water

Largest measuring range: 16-160 l/h water

Measuring span air 20 °C, 1.013 bar abs.

Smallest measuring range: 0.5-5.0 NI/h air

Largest measuring range: 500-5000 NI/h air

Measuring /regulating range for K12-..V / N

Span: 10-100 %

Smallest measuring/regulating range

16-160 l/h water

0.5-5 NI/h air

Largest measuring/ regulating range

16-160 l/h water

500-5000 NI/h air

Measuring range table

All measurement range values with fully open valve

Measuring ranges water 20 °C					Measuring ranges air 1.013 bar abs. 20 °C				
Float st.st. 1.4401 (SS316)					Float st.st. 1.4401 (SS316)				
Range N°	Water l/h	Float ø (mm)	Valve seat ø (mm)	Press. loss (mbar)	Range N°	air l/h	Float ø (mm)	Valve seat ø (mm)	Press. loss (mbar)
17	0.25-2.5	4	1.2	10	07	0.5-5	4	1.2	15
20	0.5-5	4	1.2	20	09	0.8-8	4	1.2	15
25	1.2-12	6	2.8	10	13	1.6-16	4	1.2	15
28	2.5-25	6	2.8	20	21	4-40	4	1.2	20
30	4-40	6	2.8	30	24	6-60	4	1.2	25
35	6-60	6	2.8	80	29	10-100	6	2.8	15
39*	10-100	6	2.8	125	32	25-250	6	2.8	15
40*	12-120	6	3.4	200	37	50-500	6	2.8	15
41*	16-160	6	3.4	200	42	80-800	6	2.8	20
					46	100-1000	6	2.8	25
					51	180-1800	6	2.8	80
					57*	240-2400	6	2.8	125
					61*	300-3000	6	2.8	150
					64*	400-4000	6	3.4	200
					68*	500-5000	6	3.4	200

* Limited adjustment range of the contact / contact can only be adjusted as min. contact

5 Electrical output (option)

1 or 2 inductive limit switches,
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 Gb

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

Monostable Type N7R28A (I7R2010-N - Inside diameter 10mm)

 Type N7R30A (I7R2015-N - Inside diameter 15mm)

Bistable Type N7R29A (I7R2010-NL - Inside diameter 10mm)

 Type N7R31A (I7R2015-NL - Inside diameter 15mm)

Ex-Marking BVS 08 ATEX E026 / IECEx BVS 09.0016
II 1G Ex ia IIC T6 Ga
II 1D Ex ia IIIC T85°C Da

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): K12 $\pm 2.5\%$ qG=50 % acc. VDE/VDI 3513 page 2

V / N (option diff.pressure regulator):

Measurement error / regulator deviation $\pm 3\%$ / $\pm 5\%$ of full-scale within 10-100 % of range

6.3 Repeatability

(Liquid/Gas) $\pm 1.0\%$ full-scale,

V / N (optional differential pressure regulator):

Measurement error / regulator deviation: $\pm 1.5\%$ / $\pm 2.5\%$ of full-scale within 10-100 % of range

6.4 Influence of ambient temperature

none

6.5 Influence of fluid temperature

Deviations in fluid temperature from that of the observed temperature during calibration can result in a proportional display fault because of the corresponding change in density.

Temperature-related changes in viscosity will cause a non-linear display fault.

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 behaviour and an adequate inlet pressure.

V/N (optional differential pressure regulator)

The minimum differential inlet and outlet pressures must amount to 350 mbar.

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

7.1 Safe operation

7.1.1 General conditions for safe operation

- a) If the conditions described in this document are not adhered to, or if there is any inappropriate interference with the equipment, all the manufactures warranties shall be considered void.
- b) Conditions described in this manual, as well as the permitted operating conditions which have been defined for the sensor and which are stated on the rating plates must be adhered to.
- c) Appropriate measures shall be met to prevent any unintentional or inadmissible damage to the device.
- d) The operator shall ensure that the equipment is only installed in areas which comply with the approved types of protection and environments.
- e) All connected electrical equipment must be suitable for its intended use.
- f) The operator shall ensure protection against lightning according to local regulations.
- g) The flowmeter is maintenance-free.

7.1.2 Requirements for installation in all environments

- a) The installation of the intrinsically safe circuits requires a control drawing (system description), to be issued by the operator/erector.
- b) The equipment is only to be installed and connected in a de-energized state.
- c) It is to be insured that intrinsically safe circuits are not laid together with non-intrinsically safe circuits.
- d) Seized screws or adhering joints (e.g. by frost or corrosion) are not to be opened with force in the presence of a potentially explosive atmosphere.
- e) Where substances of explosion group "IIC" or "A" are present and the presence of an Ex-atmosphere is considered possible, only non-sparking tools shall be used.

7.1.3 Requirements for installation dust environments

- a) In certain circumstances, the non-metallic parts of the sensor may generate an ignition-capable level of electrostatic charge. Therefore, the user/installer shall implement precautions to prevent the build-up of electrostatic charge, e.g. locate the equipment where a charge-generating mechanism (such as wind-blown dust) is unlikely to be present.
- b) Clean the flowmeter regularly with a damp cloth,
- c) Dust deposits with a thickness of more than **5 mm** are to be avoided.
- d) The flowmeter is to be electrostatically earthed. Electrostatic charging must be avoided.

7.1.4 Mounting and commissioning

When installing and commissioning the flowmeter, the following points must be observed:

- a) The variable-area flow meter must be installed perpendicularly (bottom-up direction of flow).
- b) Take special care to install glass-tube devices free from strain.
- c) The size of the product line to be connected must be identical to the size of the device connection.
- d) All instruments are shipped with the valve installed at the inlet. By flipping the glass tube in its fitting and then the instrument, the valve also can be positioned at the outlet.
- e) V / N: for the measurement of gas, the "valve at the top" version for a constant inlet pressure should be used and the "valve at the bottom" version for a constant counter pressure. For liquids, the position of the valve has no impact on the function of the meter.
- f) Open the upstream and downstream shut-off valves of the flowmeter slowly.
- g) When measuring liquids, vent the pipes carefully.
- h) When measuring gases, increase pressure slowly.
- i) Avoid float impact (e.g. caused by solenoid valves), impacts may damage the measuring section or/and float.

7.2 Ambient conditions

7.2.1 Ambient temperature ranges

without limit switch	-20 °C to +100 °C
with limit switch	-20 °C to +70 °C

Risk of breakage due to frost

7.2.2 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 (DIN EN 60529)

7.2.5 Shock resistance/vibration resistance

The meter should be protected against shocks and vibrations, which could cause damage to the glass tube.

7.2.6 Electromagnetic compatibility

Built in limit switch:

- acc. NAMUR recommendation NE 21
- Product standard: EN 60947-5-2

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

Max. 16 bar (20 °C)

Important:

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

For **K12-...V/N**, 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)

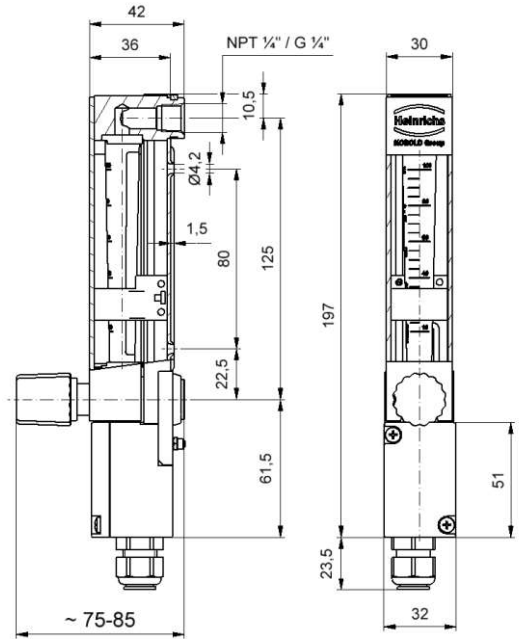
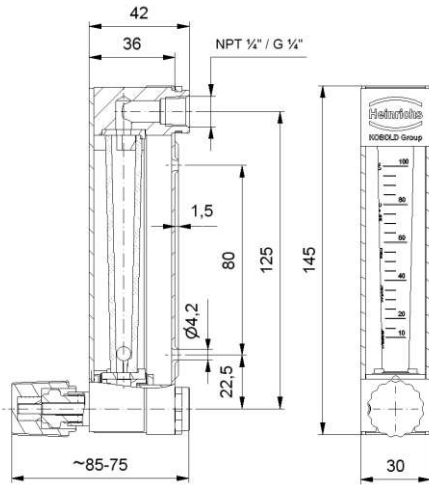
8 Construction details

8.1 Construction/dimensions K12

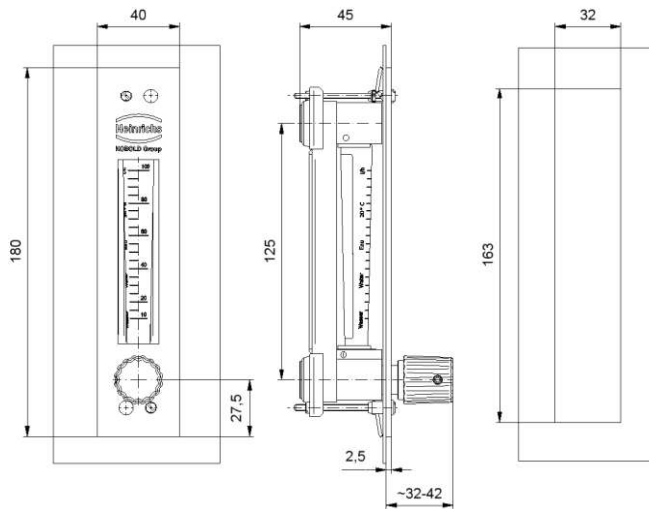
The meter consists of a conical measuring tube made of borosilicate glass, with a vertical movable float made of stainless steel or glass glass (optionally, for types K12-L/E, the float may be made of aluminium). The measuring tube is mounted vertically in the device fitting, which possesses two process connections, arranged perpendicularly to the measuring tube, on its rear.

The standard version of the device is equipped with a setting valve.

K12 (dimensions in mm)



K12 with contact terminal box



K12 c/w panel mounting set

8.2 Design / Dimensions / Commissioning V / N (option diff. pressure regulator)

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

Caution! Differential pressure regulators are not pressure reduction valves

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

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

The max.one sided 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.

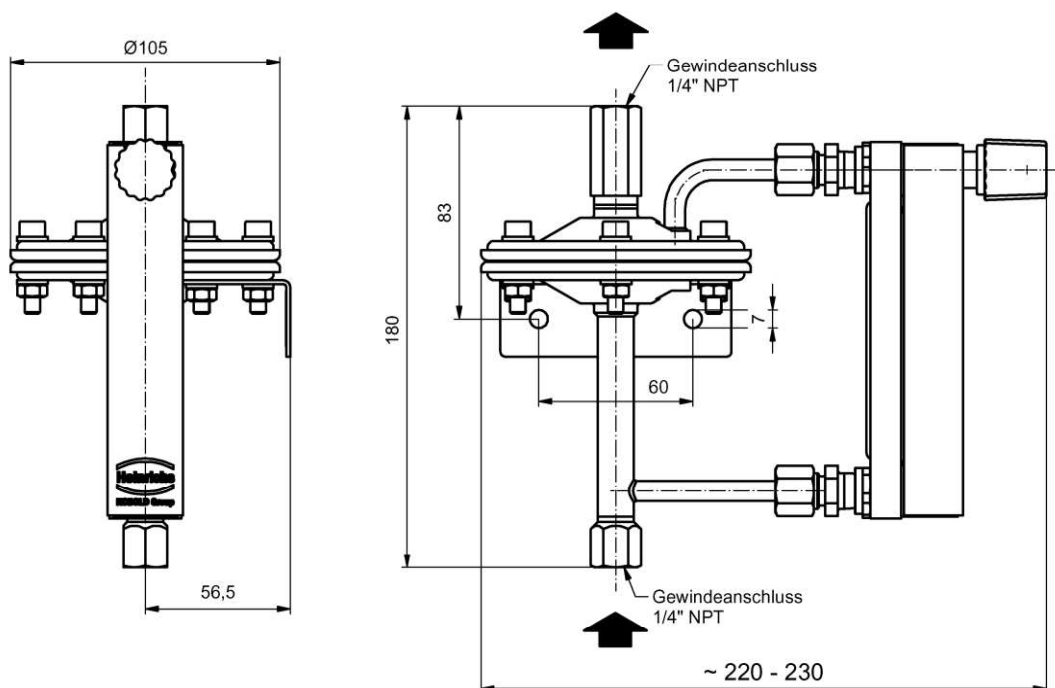
IMPORTANT OPERATION DETAILS

- The installation of a 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 with gas the inlet pressure shall be increased slowly to avoid strong pressure peaks.
- To prevent excessive acceleration of the float, operation of the instrument by means of solenoid valves should be avoided.
- For the operation of the regulator minimum inlet pressures are required.

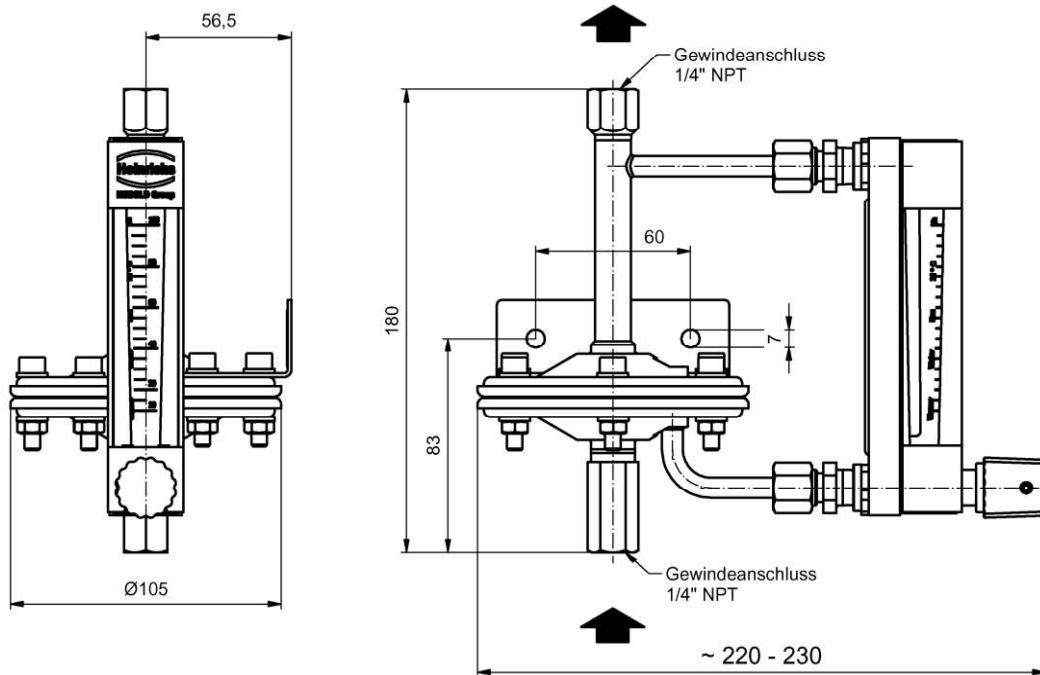
Regulator with constant outlet pressure: 350 mbar

Regulator with constant inlet pressure: 350 mbar

8.2.1 Dimension K12-...V as regulator c/w constant inlet pressure



8.2.2 Dimension K12-...N as regulator c/w constant outlet pressure



8.3 Weights

K12	0.46 kg
K12-...V/N	0.80 kg

8.4 Materials

Fitting, connections, setting valve:	1.4404 (SS316L) / 1.4571 (SS316 TI),
Float:	1.4401 (SS304)
Seals	
measuring tube:	viton, FFKM (option)
Valve:	PTFE,
Hose-fittings:	PA
V/N (option differential pressure regulator)	
Regulator/control pipes:	1.4301(SS304)
Membrane:	Viton or PTFE

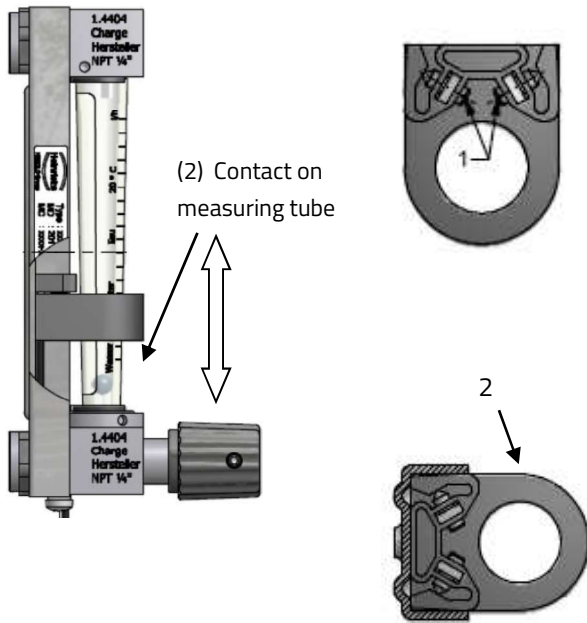
8.5 Process connection

Standard:	NPT $\frac{1}{4}$ " (F)
Special connections:	Ermeto, Swagelok, G $\frac{1}{2}$ ", Hose connector 8 mm

Note: Other connections are available as special versions

9 Electrical connection for limit transducer 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 unit.

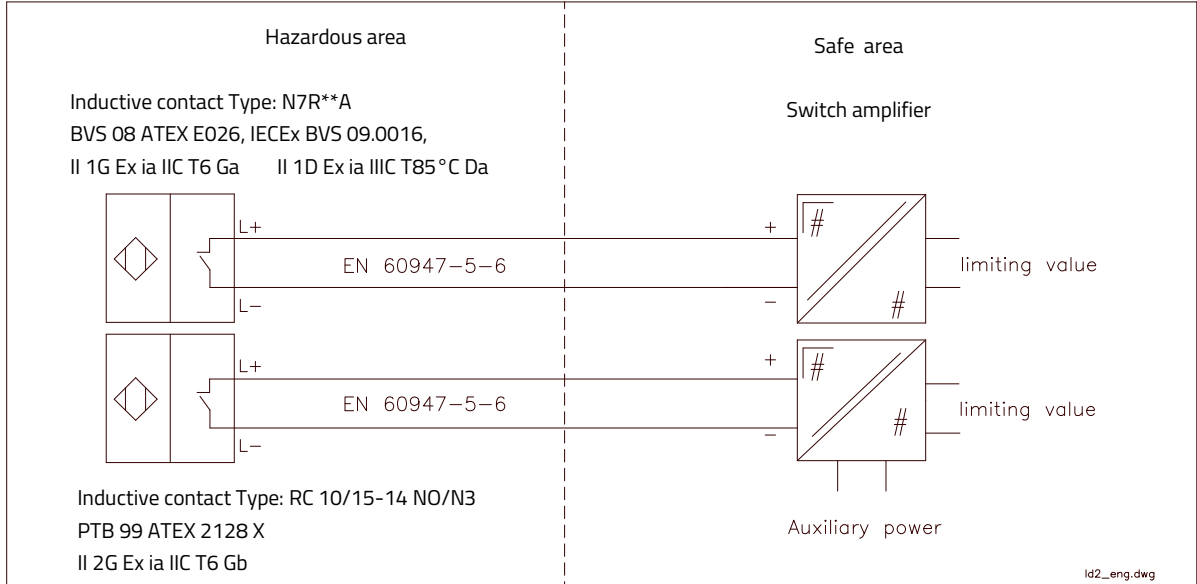
Adjusting of the contact:

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

ATTENTION: (limited switching range)

For the measuring tubes / glasses N° 40, 41, 61, 64 and 68 the contact cannot be moved to the max. flow range.

Wiring diagram for 2 limit transducers



When using two switch contacts the distance between both contacts must be minimum 16 mm.

10 Indicator unit

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

11 Use in hazardous areas

Only devices with Ex-markings may be operated within areas with potentially explosive atmospheres.



Ambient temp.	Process-Temp.	Marking	Zone	Description
-20 °C ...+70 °C	-25 °C ...+70 °C	II 2G Ex h IIC T6 Gb II 2D Ex h IIIC T85 °C Db	1	With built-in switch, observe the type certificate of the contact manufacturer!
-20 °C ...+100 °C	-40 °C ...+100 °C	II 2G Ex h IIC T6...T5 Gb II 2D Ex h IIIC T85 °C...T100 °C Db	1	As a pure mechanical device

11.1 Atmospheric Conditions

According to EN 1127-1, a “potentially explosive atmosphere” is defined as a mixture of air and combustible gases, vapour, mist or dust under atmospheric conditions. These conditions are defined in DIN EN ISO 80079-36, para. 1, with values $T_{atm} = -20\text{ °C}$ to $+60\text{ °C}$ and $P_{atm} = 0.8$ to 1.1 bar . Outside of this range, safety parameters for most ignition sources are not available.

The operating conditions inside the measuring tubes of variable-area flow meters generally lie outside the atmospheric conditions of 0.8 to 1.1 bar. Therefore, due to the lack of safety parameters, the explosion protection does not apply to the process conditions inside of the measuring tube, irrespective of the zone classification.

Operation with combustible products is therefore only permissible if a potentially explosive air mixture is not formed inside the flow meter. Where this condition is not met, the operator is required to assess the ignition hazard in each individual case giving due consideration to existing parameters (e.g. pressure, temperature, process product, materials)

11.2 Electrostatic charge of non-conductive parts



In hazardous areas the risk of electrostatic charge in dangerous quantities must be considered during cleaning of the measuring tubes synthetic cover.

Devices where explosive electrostatic charges are to be expected are marked with an adhesive label.

Use a damp cloth for cleaning of the synthetic materials.

Caution! Danger of electrostatic charge! Do not rub!

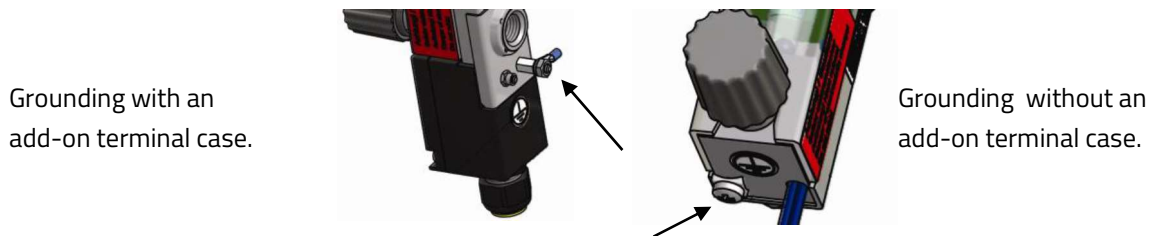
11.2.1 Grounding



In variable-area flow meters, under operating conditions it is possible for charge separation to occur in the measuring tube due to the transport of non-conductive fluids.

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

If grounding cannot be guaranteed via the process connections (e.g. plastic process 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.




11.3 Mechanical strength



The device with its glass measuring tube is to be mounted in such a way that it is protected from 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 ISO 80079-36 requirements. It can be used in hazardous areas that require Category 2 equipment.

Markings  II 2G Ex h IIC TX Gb
II 2D Ex h IIIC TX °C Db
Reg. No.: BVS 10 ATEX H-B 034
Tech. File Reg. No. HM-K09-32-ATEX-10-02-X



Since the device does not possess its own power sources that could lead to a temperature increase, the fluid temperature is decisive for the maximum surface temperature.

11.5 With limit switch

With the installation of a limit switch, the device becomes an electrical assembly and receives an additional marking in accordance with DIN EN 60079-0.

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

Marking of the limit transducer:

Manufacturer Pepperl & Fuchs Type: RC 10/15-14 NO/N3		PTB 99 ATEX 2128 X II 2G Ex ia IIC T6 Gb
Manufacturer ifm electronic Type: N7R**A		BVS 08 ATEX E026 / IECEx BVS 09.0016, II 1G Ex ia IIC T6 Ga II 1D Ex ia IIIC T85 °C Da

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

12 CE mark

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

- 2014/34/EU (ATEX) Equipment for Use in Potentially Explosive Atmospheres
- 2014/30/EU (EMC) Electromagnetic Compatibility.

With respect to the Pressure Equipment Directive 2014/68/EU, the devices fall within the scope of application of Article 4, Paragraph 3, and therefore requires no CE marking in accordance with this directive.

By attaching the CE logo, Heinrichs Messtechnik confirms compliance with these directives.

13 Available accessories

- 1 or 2 1 inductive limit switches ; mono-stable or bi-stable Special connections
- 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

VDE/VDI 3513	Measuring range rated and converted to other products
Directive 2014/34/EU	ATEX: Equipment for Use in Potentially Explosive Atmospheres
DIN EN ISO 80079-36	Non-electrical equipment for use in potentially Explosive Atmospheres

For the electrical sensor:

EN 60079-0	Explosion protection; General regulations
EN 60079-11	Explosion protection; intrinsic safety
Directive 2014/30/EU	EMC directive
NAMUR NE 21	recommendation: EMC for industrial processes and laboratory
EN 60529	Degrees of protection through housing (IP code)
EN 61010-1	Safety requirements for electrical measure, control & laboratory devices
EN 60947-5-6:2000	Low voltage switchgear and controlgear (NAMUR)

16 Safety instructions

16.1 Intended use

The K12 variable-area flowmeter 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, the material durability of all wetted parts is to be clarified.

16.2 Installation, commissioning and operating personnel

Only trained specialists authorized by the system operator may carry out the montage, electrical installations, commissioning, maintenance and operation. They must have read and understood the operating manual and follow its instructions.

Always adhere to the conditions and provisions applicable in the country of installation.

17 Packaging, mounting and shipment

Take care whilst unpacking 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 performed in a clean and dry room to avoid – especially of the interior of the fitting – contamination.

The boundary values for the ambient temperature are to be adhered to.

When transporting the device to a remote mounting location, we recommend to reuse the factory-issued packaging and the transport protection.

18 Maintenance

If you use the meter in the intended manner no special maintenance is required. However, the variable area flow meter should be checked in the context of the routine maintenance of the facility and the pipelines. Special attention should be paid to dirt, corrosion denudation, mechanical wear as well damage to 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 rating plate) must not be exceeded.

Attention!

Should it become necessary due to contamination to clean the float or the measuring cone, please observe the following precautions:

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

18.1 Replacing the measuring cone

Images depicting the disassembly and assembly of the device can be found on page 22 in section 18.1.3

18.1.1 Removal:

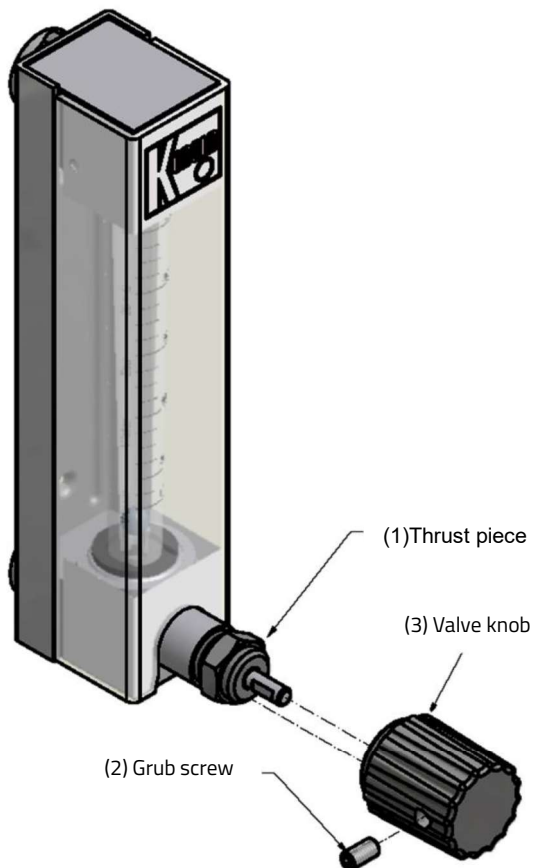
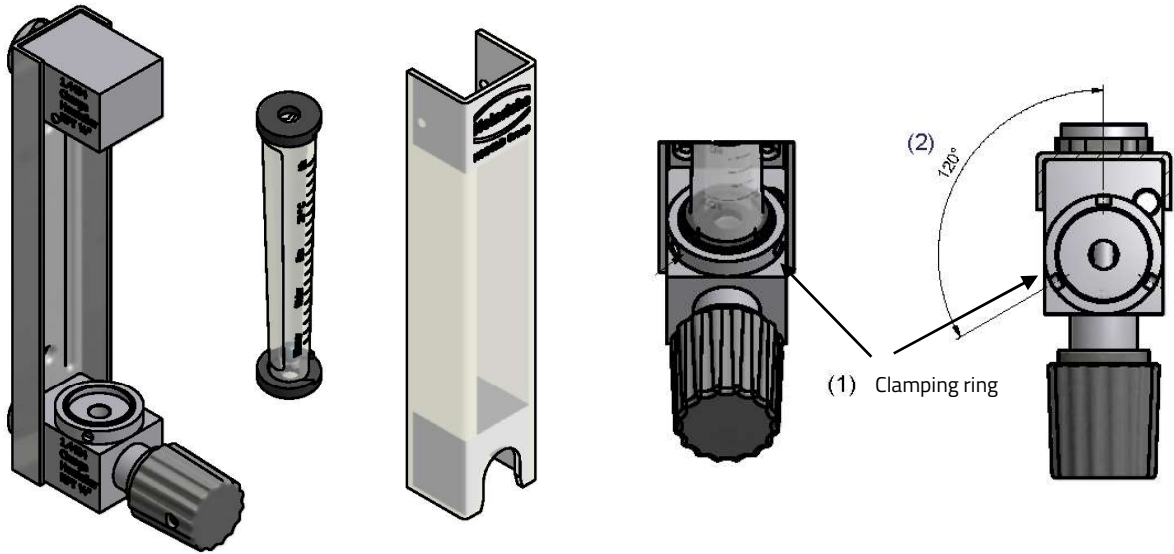
- Close valve in front and behind the unit
- Close needle valve of the device
- Shift protective cover upwards and remove to the front.
- By turning the adjusting ring at the unit base counterclockwise the measuring glass can be loosened and removed.

18.1.2 Installation:

The assembly is performed in the reverse order to the disassembly

- 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.

18.1.3 Abbildungen des Aus- / Einbaus



Attention!

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

Loosen grub screw (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 waste disposal legislation, the owner/client is responsible for the disposal of special waste and hazardous materials. Consequently, all devices sent to Heinrichs Messtechnik for repair must be free of any hazardous materials. This also applies to possible cavities and fissures in the devices.

If repair is necessary, the above-mentioned requirement is to be confirmed in writing. **Please use the form in section 20.**

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 name: Address:

Department: Contact person:

Phone:

The enclosed variable-area flowmeter, Model

was operated using the following fluid:

.....

In as much as this fluid is water-hazardous / toxic / corrosive / combustible / a health hazard / environmentally hazardous

we have performed the following steps:

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

*tick applicable items

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

Date: Signature:

Company Stamp

21 Model Code

MODEL	Base Model		Accessories
K12-	Mounting length 125 mm		Panel Mount
			0 w/o
			S c/w
	Connection		Contacts
N	Female thread ¼"-NPT		0 w/o
G	Female thread G¼"		M Inductive contact, ring type mono -stable
X	Special on request		B Inductive contact, ring type bi-stable
	Connection-accessories		N° of contacts
0	w/o		0 w/o
1	¼"-NPT Hose connection PVC		1 1x
2	¼"-NPT hose connection PVC		2 2x
	Valve position		Terminal box
0	w/o		0 w/o
1	outlet		A c/w
2	inlet		Flow - differential pressure regulator
	Ranges		0 w/o
07	Air (NI/h) 0,5-5		V inlet pressure constant / outlet pressure variable (HV) Viton
09	Air (NI/h) 0,8-8		N Outlet pressure constant / inlet pressure variable (HN) Viton
13	Air (NI/h) 1,6-16		inlet pressure constant / outlet pressure variable (HV) PTFE
21	Air (NI/h) 4-40		Outlet pressure constant / inlet pressure variable (HN) PTFE
24	Air (NI/h) 6-60		Approvals
29	Air (NI/h) 10-100		0- w/o
32	Air (NI/h) 25-250		1- ATEX, II 2GD IIC TX / II 2G Ex ia IIC T6
37	Air (NI/h) 50-500		
42	Air (NI/h) 80-800		
46	Air (NI/h) 100-1000		
51	Air (NI/h) 180-1800		Labeling
57	Air (NI/h) 240-2400		H Heinrichs
61	Air (NI/h) 300-3000		K Kobold
64	Air (NI/h) 400-4000		N neutral
68	Air (NI/h) 500-5000		X Special
17	H ₂ O: (l/h) 0,25-2,5		Marking
20	H ₂ O: (l/h) 0,5-5		0 w/o
25	H ₂ O: (l/h) 1,2-12		1 st.st. plate 40x20mm
28	H ₂ O: (l/h) 2,5-25		Certificates
30	H ₂ O: (l/h) 4-40		0 ohne
35	H ₂ O: (l/h) 6-60		1 Certificate of compliance acc. EN10204 2.1
39	H ₂ O: (l/h) 10-100		B Certificate of compliance acc. EN10204 2.2
40	H ₂ O: (l/h) 12-120		Pressure and leak testing
41	H ₂ O: (l/h) 16-160		0 w/o
XX	Special range On request		1 Supplier test report M acc. DIN 55350 incl. pressure test
	Skaling		2 Supplier test report M acc. DIN 55350 incl. leak test (air)
0	Standard - range		Calibration report
1	%-scale (H ₂ O)		0 w/o
2	Product scale (special range)		1 Confirmation of the accuracy class
3	Product scale %		2 5 point calibration report
X	Special		4 Special acc. request
	Sealing glass tube		Cleaning
V-	Viton standard		0 w/o
P-	FFKM		1 Cleaning (oxygen service) "oil and grease free"
M-	PTFE		2 Cleaning (oxygen service) incl. marking "oil and grease free"
X-	Special		