

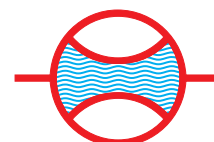
KM-335, KM-350



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Operating instructions flowmeter / flowmonitor KM-335, KM-350

1 Introduction

The flowmeters / flowmonitors of the KM series are characterized by reliable performance and easy operation. To use the advantages of the instrument in its entirety, please note the following:

Any person who is in charge of commissioning or operation of this equipment must read and have fully understood the operating instructions and the safety instructions!

2 Safety information

2.1 General information

To ensure safe operation, the device may only be operated in accordance with the specifications in the operating instructions. In use, the regulations for the respective application, as well as the legal and safety regulations must be observed. The same applies to the use of accessories.

2.2 Correct use in accordance with these instructions

The devices are used to measure continuous flow of fluids. Any other use is considered improper. Applications where intermittent loads occur, (e.g. cyclic operation) must previously have been discussed with, and operation under such conditions, must be authorized by our technical staff!

Do not subject the flow meter / flow monitor to pressure surges!

The devices must not be used as the sole means to avoid dangerous situations on systems and machinery. Machines and systems must be designed so that faulty conditions cannot lead to a hazardous situation for the operator.

2.3 Qualified personnel

The devices may only be installed by qualified personnel who are able to use the equipment properly. Qualified personnel are persons who are familiar with the installation, assembly, commissioning and operation of this equipment and possess the appropriate qualifications to perform the assigned task.

3 Design and function

The flowmeter / flow monitor operates on the float measuring principle and is used to measure flow in closed pipework. The medium flows through the vertically integrated flowmeter from bottom to top. The float is thereby raised and shows the current flow on the scale affixed to the device. The reading edge corresponds to the largest diameter of the float. In the standard version, flowmeters of the KM- series are equipped with a scale calibrated for the density of water and 2 setpoint indicators.

When applying special scales, make sure that the ► mark on the scale is in alignment with the appropriate mark on the measuring tube.

4 Installation

4.1 Preparatory work

- **Versions with the guide rod:** For versions with the guide rod, remove the bent rod which fixes the float. For this purpose, only the top union nut and the process connector must be removed. The top insert or the guide rod may not be disassembled..
- **Versions without the guide rod:** For versions without the guide rod, remove the webbing, which surrounds the float. For this purpose, unscrew the top union nut and remove the upper process connector, the upper insert and O-ring.
- After removing the transport safety lock of the flowmeter / flow monitor, the device must be re-assembled.

4.2 Process connection

Attention! The following requirements must be strictly adhered to; otherwise the flow meter / flow monitor or the plant may be damaged:

- The on-site connection must be suitable to the process connection of the flow meter / flow monitor
- Check if connections are proper size and mechanically secured
- Check screw depth (threaded connection)
- Use suitable sealing agent (liquid sealant will damage the flow meter /flow monitor if it gets inside the device)
- Ensure a proper seal



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4.3 Requirements at the place of installation

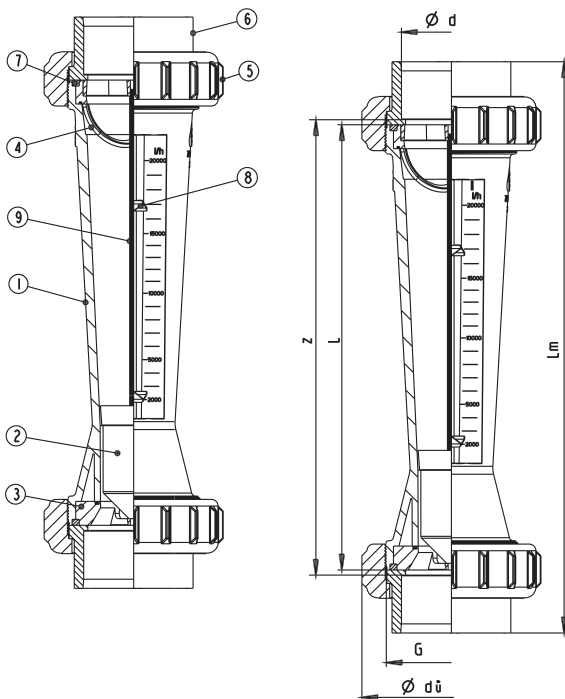
- Do not install the flow meter / flow monitor as a supporting part in a pipe construction.
- The flow meter / flow monitor must be installed free of stress.
- Do not use the flow meter / flow monitor with media containing solids or abrasives.
- Changes in cross section, branch-offs or elbows in the piping affect the measurement accuracy. There must be an unimpeded flow section of 10 x DN (rated width) upstream of the device and 5 x DN (rated width) downstream of the device. Never reduce the pipe diameter immediately before the device!
- For liquid media take appropriate measures to ensure proper venting of the device.
- Check water additives for compatibility before use.

Warning! The following requirements must be met, otherwise the flow monitoring function is impaired or measurement results are falsified:

- External magnetic fields affect the switching contact. Keep sufficient distance to magnetic fields (e.g. electric motors).
- Piping, process connections or supports made of ferromagnetic material influence the magnetic field of the flow switch. Maintain a distance of 100 mm to such materials (e.g. steel).

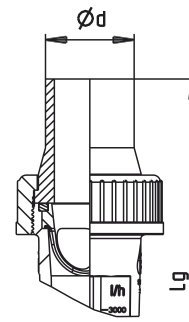
5 Technical data

5.1 Technical drawing

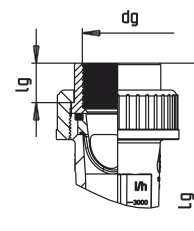


Union (process connection) with glue socket PVC or welding sleeve PP

5.2 Screw connections



Union (process connection) with butt end welding sleeve PP



Union (process connection) with threaded sleeve PVC, PP, cast iron or stainless steel

5.3 Materials used

No.	Description	Qty.	Material
1	Measuring tube	1	PVC, PA, PSU
2	Float	1	PVDF
3	Insert, lower	1	PVDF
4	Insert, upper	1	PVDF
5	Union nut	2	PVC (Standard), PP

No.	Description	Qty.	Material
6	Insert (process connection)	2	PVC (Standard), PP
7	O-Ring	2	EPDM (Standard), FPM
8	Limit indicator	2	PS
9	Guide rod ⁽¹⁾	1	PVDF / stainless steel

⁽¹⁾ DN 50 and higher (1500 - 15000 l/h)



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5.4 Combinations of materials used

Measuring tube	Float	Insert, upper and lower	O-Ring
PVC	PVDF	PVDF	EPDM (optional FPM)
PA	PVDF	PVDF	EPDM (optional FPM)
PSU	PVDF	PVDF	EPDM (optional FPM)

5.5 Connection options

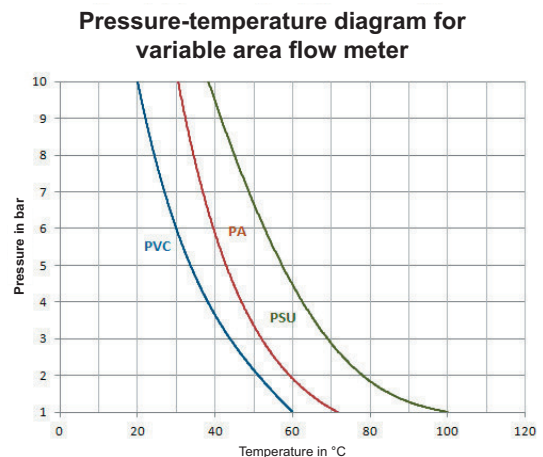
Sleeve	Connecting piece	Inner thread plastic	Inner thread metal
PVC solvent cement socket (standard)	PP welding socket	PVC	stainless steel V4A
PP welding socket		PP	malleable cast iron

5.6 Pressure loss

Measuring range [l/h]	50 - 500	100 - 1000	150 - 1500	250 - 2500
Pressure loss [mbar]	22,84	22,84	22,84	22,84
Measuring range [l/h]	200 - 2000	300 - 3000	600 - 6000	
Pressure loss [mbar]	24,99	24,99	24,99	
Measuring range [l/h]	1000 - 10000	1500 - 15000		
Pressure loss [mbar]	24,99	28,23		
Measuring range [l/h]	2000 - 20000	3000 - 30000	6000 - 60000	
Pressure loss [mbar]	45,67	45,67	47,24	

5.7 Pressure – Temperature diagram

The diagram shows the allowable pressure as a function of temperature for each measuring tube material. These values may not be exceeded at any time.



5.8 Measuring accuracy

Accuracy class 4 according to VDE / VDI 3513 sheet 2

Flow rate in %	10	20	30	40	50	60	70	80	90	100
Total error of measurement in %	13,00	8,00	6,33	5,50	5,00	4,67	4,43	4,25	4,11	4,00
Total error of final value in %	1,3	1,6	1,9	2,2	2,5	2,9	3,1	3,4	3,7	4,0



6 Limit contacts ZNC and ZNO

6.1 Application

The limit contacts ZNC and ZNO are used to monitor flow limits. They are slipped onto the guide on the flow meter and can be set to any value on the scale.

6.2 Function

A built-in magnet in the float closes or opens a firmly encapsulated reed contact in the limit switch. The switching function is bistable. That is, the switch state is maintained even when the magnetic float is away from the contact.

6.3 Information

For later installation of a limit contact, make sure that the standard float is replaced by a magnetic float.

6.4 Assembly

Slide the limit switch onto the dovetail guide of the flow meter.
Tighten the clamping screw



6.5 Switching states

		Float [above limit switch]	Float [below limit switch]
ZNC	(Normally Closed) / Min	open	closed
ZNO	(Normally Open) / Max	closed	open

6.6 Technical data

Switching voltage ⁽¹⁾	max. 230 V~
Switching capacity ⁽¹⁾	max. 10 W / 12 VA
Switching current ⁽¹⁾	max. 0,5 A
Contact resistance	< 200 mOhm
Insulation resistance	> 10 ¹¹ Ohm
Admissible ambient temperature	0 to + 55 °C
Protection type (IP)	according to DIN 40050 - IP65
Switch on- and off-hysteresis	1 - 2 mm float travel

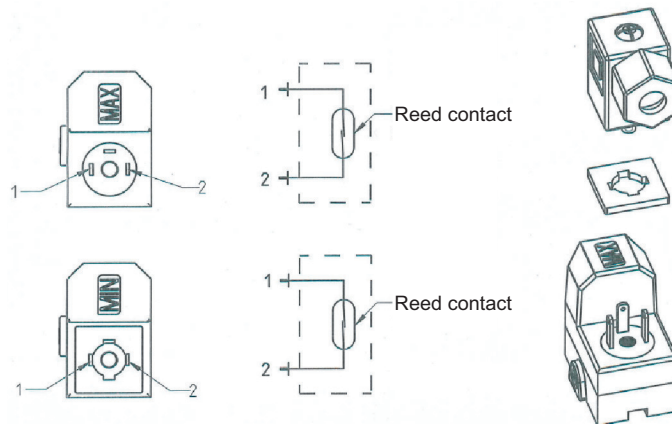
Technical changes to improve performance, reserved.

⁽¹⁾ Exceeding these limits, even momentarily, is not permissible.



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6.7 Electrical connection



7 Setting the switch point

7.1 Normally Open Contact (ZNO)

- Specify the desired flow rate. The reading edge corresponds to the largest diameter of the float.
- Loosen the lock screw of the switch contact and move the switch contact against the flow direction to the end of the guide. The switch should be closed.
- Move the switch contact in flow direction until the contact is opened.
- Tighten the lock screw of the switch contact.

Attention:

- The set switch point corresponds to the switch-off point of the switch contact by decreasing flow.
- The actual state of the switch contact can be determined using a continuity meter.

7.2 Normally Closed Contact (ZNC)

- Specify the desired flow rate. The reading edge corresponds to the largest diameter of the float.
- Loosen the lock screw of the switch contact and move the switch contact against the flow direction to the end of the guide. The switch should be open.
- Move the switch contact in flow direction until the contact is closed.
- Tighten the lock screw of the switch contact.

Attention:

- The set switch point corresponds to the switch-on point of the switch contact by decreasing flow.
- The actual state of the switch contact can be determined using a continuity meter.



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8 Measurement sensor ZAT-300

8.1 Description

The measurement sensor supplies an output signal of 4 - 20 mA corresponding to the height position of the magnetic float in the flow meter.

Please note:

Since the resolution of the different scales can vary, the sensors are factory adjusted to the respective measuring range. Therefore, when ordering always specify the desired measurement range.



8.2 Electrical connection

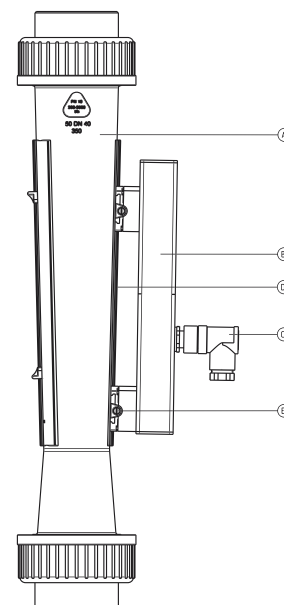
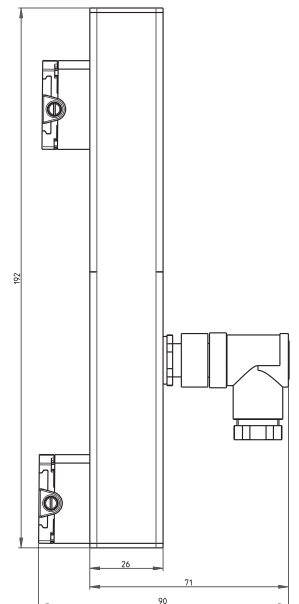
PIN 1:	Supply voltage	12 - 24 V
PIN 2:	Output signal	4 - 20 mA
PIN 3:		0 V

8.3 Technical data

Supply voltage	12 - 24 VDC (+/- 10 %)
Current consumption	< 50 mA
Load resistance	max. 500 Ohm
Current output	4 - 20 mA (3-wire)
Protection type (IP)	IP 65
Ambient temperature	0 to + 50 °C
Connection	plug to DIN 43650
Measuring accuracy	< 1 %

8.4 Function elements

- A: Flow meter / flow monitor KM-335 / 350 with magnetic float
- B: Measurement sensor ZAT-300
- C: Plug connection
- D: Guide rail
- E: Terminal screws for mounting and adjustment of the sensor



9 Operation and maintenance

Devices of the KM-series require no maintenance when properly operated.
It is sufficient to check periodically whether the device still performs its function.

