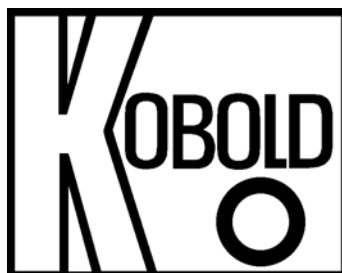


**Operating Instructions
for
Plastic Flow Meter**

Model: KSM



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2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.

The devices are only to be used, maintained and serviced by persons familiar with these operating instructions and in accordance with local regulations applying to Health & Safety and prevention of accidents.

When used in machines, the measuring unit should be used only when the machines fulfil the EWG-machine guidelines.

PED 97/23/EG

In acc. with Article 3 Paragraph (3), "Sound Engineering Practice", of the PED 97/23/EC no CE mark.

	Pipe	
	Table 8 Group 1 dangerous fluids	Table 9 Group 2 no dangerous fluids
KSM-x001 – KSM-x010	Art. 3, § 3	Art. 3, § 3
KSM-x020 – KSM-x600	Kat. I	Art. 3, § 3

3. Regulation Use

Any use of the Plastic Flow Meter, model: KSM, which exceeds the manufacturers specification may invalidate its warranty. Therefore any resulting damage is not the responsibility of the manufacturer. The user assumes all risk for such usage.

4. Operating Principle

The Plastic Flow Meter model: KSM operates according to the variable area principle, in which the float is free to move without friction inside the measuring tube. The reading edge corresponds to the larger diameter of the float. The standard flow meter is equipped with a scale for water (+20°C), a percentage scale, O-rings, 2 adjustable set-point indicators and a rail for accessories; on each end, two threaded cap-screws accommodate various connectors (see Section 9: Technical Data; Connections). For the operation with bistable reed switches the float will be supplied with internal magnets.

5. Instrument Inspection

Instruments are inspected before shipping and sent out in perfect condition. Should damage to a device be visible, we recommend a thorough inspection of the delivery packaging. In case of damage, please inform your parcel service / forwarding agent immediately, since they are responsible for damages during transit.

Scope of delivery:

The standard delivery includes:

- Plastic Flow Meter model: KSM
- Operating Instructions

6. Mechanical Connection

Before Installation:

- Remove all transportation safety locks and ensure that no packing material remains within the unit.
- Be sure that the maximum allowable operating pressure and temperature is not exceeded (see Technical Data).
- Install the flow meter in the piping system, making certain the instrument is under no mechanical stress/tension (install support bracing if necessary).

- Protect the measuring tube from external damage.
- Avoid pressure peaks in the measuring tube, e.g. from sudden surges or stoppage of flow.
- The units with bistable reed switch may not be installed within an inductive field.
- If possible, immediately after making mechanical connections, check whether the connections are properly sealed with no evidence of leakage.

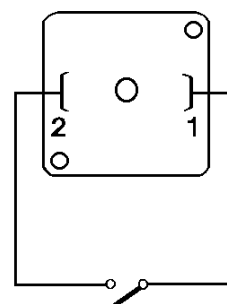
Detailed information regarding installation of float flow meters is available in VDI/VDE guidelines 3513.

7. Electrical Connection

Reed contact, bistable (option)

- Ensure that the electrical supply lines are disconnected from power.
- Loosen the plug-cap holding screw and remove the cap from the switch housing.
- Connect the supply lines inside the plug-cap in accordance with the connection diagram opposite.
- If the set point has not yet been adjusted, it may be done at this point. (see section 8, 'Operation').
- Set the plug to the socket and fix it with the safety screws.

N/O contact



Attention! The stated electrical parameters of the reed switch may not be exceeded, even for a short period of time. For switching higher power ratings, we recommend a contact protection relay (e.g. our model MSR) or any other interposing relay.

After connecting the external devices, and adjusting the switch housing to the desired switch points, all the connection work is completed. The unit is ready for operation.

8. Operation

In order to initialise the bistable switching function, it is essential that the float-travel activates the contact once in each direction.

Adjustment of limit-values

The switch-point can be adjusted to the desired levels by using both red sliders as reference points.

Reference edge for falling flow: bottom-edge, switch housing

Reference edge for rising flow: approx. 5 mm above the bottom-edge of switch housing.

Slide the switch housing up or down until the reference edge coincides with the desired switch-point scale reading.

Hysteresis

Hysteresis is the difference between the level at which “switch-on” occurs during rising flow and the level at which “switch-off” occurs during decreasing flow. The hysteresis is approximately 5 mm on the float scale.

Overranging

With non-pulsating flow, the maximum flow rate can be exceeded. Only an increase in pressure loss will result (max. permissible operating pressure must not be exceeded!)

9. Technical Data

Housing:	KSM-1...: Trogamide-T (PA) KSM-2...: Polysulfone KSM-3...: PVDF (transparent)
Connections:	G 1 1/2...G 3 1/2 acc. to size
Float:	PVDF PVC (KSM-x600...)
Seals:	EPDM (KSM-1.../KSM-2...) Viton (KSM-3...)
Max. temperature:	KSM-1...: 0-60 °C KSM-2...: 0-100 °C KSM-3...: 0-140 °C
Max. pressure:	15 bar (KSM-..200, KSM-..300, KSM-..600) 10 bar (KSM-3...) 16 bar (all other models except KSM-3)
Accuracy:	±4% F.S.
Repeatability:	≤1%

Reed contact (optional):

Bistable Reed contact (N/O) on rising flow

Max. ambient temperature: 0...55°C

Max. power: 230 V_{AC}; 10 W / 12 VA; 0.5 A

Hysteresis: approx. 3 ...12 mm span

Protection: IP 65

(While upgrading a unit with contact, the float must be replaced by a float with integrated magnet.)

Connections (optional):

(only KSM-1... and KSM-2...)

Following connections are available with cap-screws:

- Glue-in connection made of PVC (max. 60°C; PN 10)
- Female thread made of PVC (max. 60°C; PN 10)
- Female thread made of cast iron

Respective connection sizes are listed in the tables in Section 10 "Ordering Information"

10. Ordering Codes

Medium liquids

Measuring range water L/h	Order no. Trogamide	Order no. Polysulfone	Order no. PVDF	Scale	Option screwed fitting (for KSM-1..., KSM-2... only)	Option contact
15-150	KSM-1001...	KSM-2001...	KSM-3001...	H= L/h water Q= m³/h water M= L/min water	000=without auxiliary screwed fitting K32=glue-in connection Da32 (PVC) P15=PVC G 1/2 IG P20=PVC G 3/4 IG P25=PVC G 1 IG T25=malleable cast iron G 1 IG V32=PVDF (Welding sleeve) Da32**	R0=without contact R1=1 contact R2=2 contacts
50-500	KSM-1005...	KSM-2005...	KSM-3005...	S= L/s water N= L/h NaOH 30 % A= L/h NaOH 50 % C= L/h HCl 30 %		
100-1000	KSM-1010...	KSM-2010...	KSM-3010...	H= L/h water Q= m³/h water M= L/min water	000=without auxiliary screwed fitting K50=glue-in connection Da50 (PVC) P25=PVC G 1 IG P32=PVC G 1 1/4 IG P40=PVC G 1 1/2 IG T40=malleable cast iron G 1 1/2 IG V50=PVDF (Welding sleeve) Da50**	R0=without contact R1=1 contact R2=2 contacts
200-2000	KSM-1020...	KSM-2020...	KSM-3020...	S= L/s water N= L/h NaOH 30 % A= L/h NaOH 50 % C= L/h HCl 30 %		
300-3000	KSM-1030...	KSM-2030...	KSM-3030...	H= L/h water Q= m³/h water M= L/min water	000=without auxiliary screwed fitting K63=glue-in connection Da63 (PVC) P25=PVC G 1 IG P40=PVC G 1 1/2 IG P50=PVC G 2 IG T50=malleable cast iron G 2 IG V63=PVDF (Welding sleeve) Da63**	R0=without contact R1=1 contact R2=2 contacts
600-6000	KSM-1060...	KSM-2060...	KSM-3060...	S= L/s water N= L/h NaOH 30 % A= L/h NaOH 50 % C= L/h HCl 30 %		
1200-12000	KSM-1120...	KSM-2120...	KSM-3120...	H= L/h water Q= m³/h water M= L/min water	000=without auxiliary screwed fitting K75=glue-in connection Da75 (PVC) P40=PVC G 1 1/2 IG P50=PVC G 2 IG T65=malleable cast iron G 2 1/2 IG V75=PVDF (Welding sleeve) Da75**	R0=without contact Contact not for KSM-16.. and KSM-26.. R1=1 contact R2=2 contacts
2000-20000	KSM-1200...	KSM-2200...	KSM-3200...	S= L/s water N= L/h NaOH 30 % A= L/h NaOH 50 % C= L/h HCl 30 %		
3000-30000	KSM-1300...	KSM-2300...	KSM-3300...			
8000-60000	KSM-1600...	KSM-2600...	-			

**for KSM-3... only

Medium air

Meas. range air m ³ /h (0 bar rel.)	Order no. Trogamide	Order no. Polysulfone	Order no. PVDF	Scale Range see Table	Option screwed fitting	Option contact
0.8-5	KSM-1001...	KSM-2001...	KSM-3001...	0 = 0 bar rel.	000 = without auxiliary screwed fitting*	R0 = without contact
2-18	KSM-1005...	KSM-2005...	KSM-3005...	1 = 1 bar rel.	K32 = glue-in connection Da32 (PVC)*	R1 = 1 contact
4-34	KSM-1010...	KSM-2010...	KSM-3010...	2 = 2 bar rel.	P15 = PVC G 1/2 IG*	R2 = 2 contacts
				3 = 3 bar rel.	P20 = PVC G 3/4 IG*	
				4 = 4 bar rel.	P25 = PVC G 1 IG*	
				5 = 5 bar rel.	T25 = malleable cast iron G 1 IG*	
				6 = 6 bar rel.	V32 = PVDF (Welding sleeve) Da32**	
10-70	KSM-1020...	KSM-2020...	KSM-3020...	7 = 7 bar rel.	000 = without auxiliary screwed fitting*	R0 = without contact
10-90	KSM-1030...	KSM-2030...	KSM-3030...	8 = 8 bar rel.	K50 = glue-in connection Da50 (PVC)*	R1 = 1 contact
					P25 = PVC G 1 IG*	R1 = 1 contact
					P32 = PVC G 1 1/4 IG*	
					P40 = PVC G 1 1/2 IG*	
					T40 = malleable cast iron G 1 1/2 IG*	
					V50 = PVDF (Welding sleeve) Da50**	
22-190	KSM-1060...	KSM-2060...	KSM-3060...		000 = without auxiliary screwed fitting*	R0 = without contact
45-370	KSM-1120...	KSM-2120...	KSM-3120...		K63 = glue-in connection Da63 (PVC)*	R1 = 1 contact
					P25 = PVC G 1 IG*	R2 = 2 contacts
					P40 = PVC G 1 1/2 IG*	
					P50 = PVC G 2 IG*	
					T50 = malleable cast iron G 2 IG*	
					V63 = PVDF (Welding sleeve) Da63**	
60-580	KSM-1200...	KSM-2200...	KSM-3200...		000 = without auxiliary screwed fitting*	R0 = without contact
100-860	KSM-1300...	KSM-2300...	KSM-3300...		K75 = glue-in connection Da75 (PVC)*	R1 = 1 contact
					P40 = PVC G 1 1/2 IG*	R2 = 2 contacts
					P50 = PVC G 2 IG*	
					T65 = malleable cast iron G 2 1/2 IG*	
					V75 = PVDF (Welding sleeve) Da75**	

*for KSM-1... and KSM-2... only

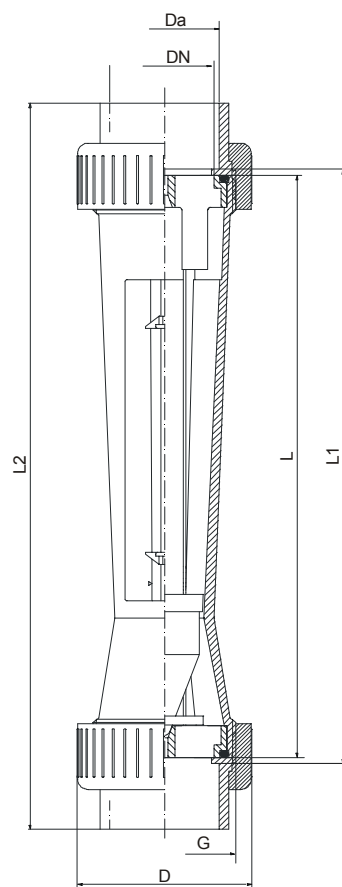
**for KSM-3... only

11. Maintenance

If the medium to be measured is clean, the series KSM is virtually maintenance-free. If deposits form on the inner housing or parts, periodic cleaning of the unit is recommended. Remove the units from the piping with a suitable tool; clean the flow meter with a suitable cleaning agent or make use of an ultrasonic bath.

If using the setpoint switch, it is particularly important to guard against contamination by ferritic (metal) contaminants. These can be eliminated by using the KOBOLD model MF magnetic filter (or equivalent).

12. Dimensions



Model	DN	G	Da [mm]	L [mm]	L1 [mm] approx.	L2 (mm) approx.									D [mm] approx.
						Annealed- cast-iron	Glue conn.	PVC G 1/2	PVC G 3/4	PVC G 1	PVC G 1 1/4	PVC G 1 1/2	PVC G 2	PVDF welded	
KSM-...001	25	R 1 1/2	32	335	341	390	385	432	441	480	--	--	--	385	60
KSM-...005	25	R 1 1/2	32	335	341	390	385	432	441	480	--	--	--	385	60
KSM-...010	25	R 1 1/2	32	335	341	390	385	432	441	480	--	--	--	385	60
KSM-...020	40	R 2 1/4	50	335	341	401	403	--	--	467	477	525	--	403	83
KSM-...030	40	R 2 1/4	50	335	341	401	403	--	--	467	477	525	--	403	83
KSM-...060	50	R 2 1/4	63	335	341	411	417	--	--	482	--	498	558	417	103
KSM-...120	50	R 2 3/4	63	335	341	411	417	--	--	482	--	498	558	417	103
KSM-...200	65	R 2 3/4	75	335	342	412	457	--	--	--	--	510	570	429	122
KSM-...300	65	R 3 1/2	75	335	342	412	457	--	--	--	--	510	570	429	122
KSM-...600	65	R 3 1/2	75	335	342	412	457	--	--	--	--	510	570	--	122

13. Declaration of Conformance

We, KOBOLD-Messring GmbH, Hofheim-Ts, Germany, declare under our sole responsibility that the product:

Plastic Flow Meter with Contact Model: KSM -...R1/R2

to which this declaration relates is in conformity with the standards noted below:

DIN EN 61010-1 1994-03

Safety regulations for electrical measurement, control, regulation and Laboratory equipment

DIN EN 60529 2000-09

Protection through housing (IP-Code)

Also the following EWG guidelines are fulfilled:

73/23 EWG Low voltage guidelines

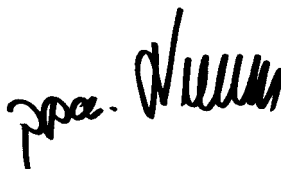
97/23/EG Pressure devices guidelines

Category I, Diagram 6, Piping, Group 1 dangerous fluids

Signature:



H. Peters



M. Wenzel

Date: 30.09.02