

**Operating Instructions
for
Flowmeter and Monitor
Model: SMV-...**



1. Note

Please read and take note of these Operating Instructions before unpacking and putting into operation.

The instruments may only be used, maintained and installed by personnel familiar with the Operating Instructions and the applicable Health and Safety Requirements.

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3. Declaration of Conformance

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

Flowmeter and switch Model SMV

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

DIN EN 61 010-1

Safety requirements for electr. equipment for measuring control and laboratory use.

EN 60529, DIN VDE 0470-1

Degrees of protection provided by enclosures (IP-code)

following the provision of European Directives:

73/23 EWG

Signed *H.-D. Nemyczuk*
H.D. Nemyczuk

Date: 25.11.1996

Manufactured and sold by:

Kobold Messring GmbH Tel.: 06192-2990
Nordring 22-24 Fax: 06192-23398
D-65719 Hofheim

4. Regulation Usage

Model SMV instruments are used for monitoring of liquid and gas flows. Only clean, low viscosity and homogeneous media may be measured, which do not affect the materials used in the instrument casing. Large measuring errors will occur when using high viscosity media. Large dirt particles may lead to blocking of the float and therefore large measurement and signal errors. Ferritic particles that deposit on the float body (with internal magnet) may also lead to a similar effect. Therefore we recommend a magnet filter.

The instruments are provided as follows:

Flow measurement

The actual flow may be read locally off the instrument indication, which is mounted at the side of the housing. The scale shows the flow rate directly in litres per minute of water.

Limit Value Contacts (only model SMV-2.. and SMV-3..)

For the monitoring of the flow rate, the instruments may be fitted with one or two adjustable limit value contacts (reed contacts).

Standard Design: Normally open (with rising flow)
 Special Design: Changeover switch (SPDT)
 Special Design: Ex-contact N/O, Ex-contact SPDT

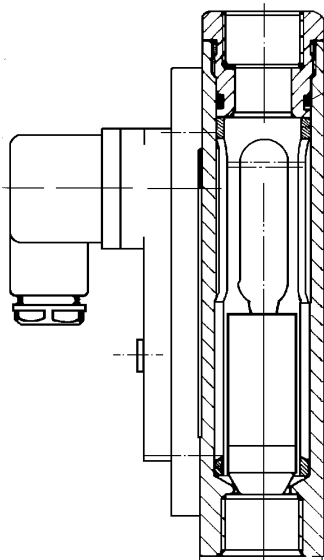
The contact is adjustable over the full measuring range.

Standard Material Combinations

(The material combination applicable to the delivered instruments is marked as follows)

	Material brass				Material St. steel	
Slotted nozzle	brass, nickel pl.	brass, nickel pl.	brass, nickel pl.	brass, nickel pl.	1.3955	1.3955
Connection	brass, nickel pl.	brass, nickel pl.	brass, nickel pl.	brass, nickel pl.	1.4301	1.4301
Float	Polypropylen	brass, nickel pl.	Aluminium	1.4301	Polyprop.	1.4301
Housing	brass, nickel pl.	brass, nickel pl.	brass, nickel pl.	brass, nickel pl.	1.4301	1.4301
O-Rings	Perbunan	Perbunan	Perbunan	Perbunan	Viton	Viton
T _{max}	70° C	100° C	100° C	100° C	70° C	100° C
P _{max}	30 bar	250 bar	250 bar	250 bar	30 bar	350 bar

5. Operating Principles



The model SMV flowmeters and monitors are based on the principle of the well-known float type flowmeters except for the conventional upward tapering measuring tube. These patented instruments are provided instead with a cylindrical guidetube with conical slots along the periphery. A float is found in this tube which, by means of the flow of the medium, is raised in the tube. Each float position corresponds to a certain flow which can be read off by means of an indicator, external to the medium.

Permanent magnets are inserted in the float which activate reed switches mounted outside of the flow throughput. The activation of the contact is carried out by means of magnetic field, ie: the contact is hermetically separated from the flowing medium.

6. Instrument Inspection

The instruments are inspected before dispatch and sent out in perfect condition. Should damage to the instrument be visible, we recommend close inspection of the delivery package. In cases of damage, please immediately inform the shippers as they are liable for any damage in transit.

Scope of Supply

All parts belonging to the standard scope of supply are attached to the instrument.

7. Mechanical Connection

Before installation:



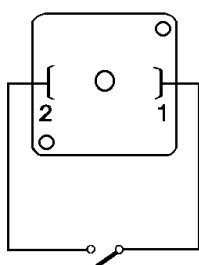
- Please ascertain whether the allowable maximum operating pressure and operating temperature of the instruments will not be exceeded (See Standard Material Combinations).
- The instrument should be installed in a vertical position in the pipework. The flow direction is from bottom to top.
- Remove all transport packing and ascertain that no packing material is left in the instrument.

- Sealing of the connection threads should be carried out with Teflon tape or similar.
- Do not install the instrument within an induction field.
- Check that the connection thread to pipe is fully sealed immediately after mechanical installation (See Commissioning of the Instruments).

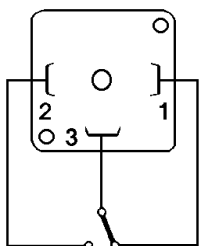
8. Electrical Connection

Only for model SMV-1.. and SMV-3...

N/O contact



Changeover contact



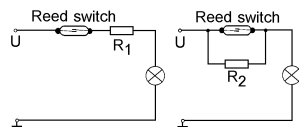
- Ensure that the power is disconnected during connection of the cable.
- Loosen the holding screw on the plug cap and remove the cap from the plug.
- Connect the power cable to the plug cap in accordance with the connection diagram below.
- If the contact has as yet not been adjusted, this should be carried out at this stage.
- Connect the plug to the contact connections and secure it with the holding screw.

Warning: The given electrical values of the reed contacts may not be exceeded even for short periods. For higher switching values we recommend contact protection relays or other contact protection measures.

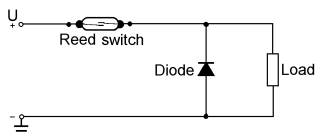
Following connection of the external equipment to the output and adjustment of the required switch points, the external power supply to the equipment may be switched on.

Examples for Contact Protection Measures

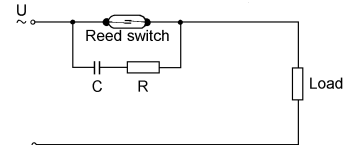
For capacitive and inductive loads (long cables and replays) we recommend protective switching.



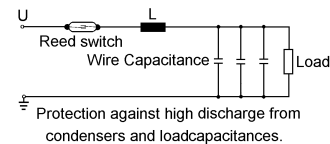
Lamp load with parallel or series resistance to the switch.



Protection with an idle diode for d.c. current and inductive load.



Protection with an RC circuit for a.c. current and inductive load.

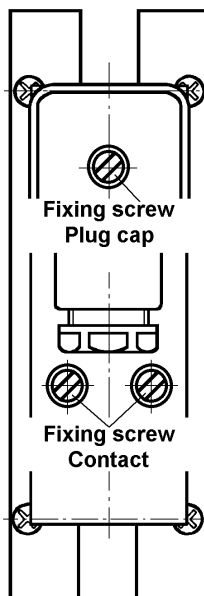


Protection against high discharge from condensers and loadcapacitances.

9. Commissioning of the Instruments

The use of this meter in machines acc. to directive 89/392/EWG is prohibited until the complete machine complies to this directive.

Adjustment of the limit values (Type SMV-3... indication / contact)



- Loosen the two fixing screws on the contact base.
- Slide the switch housing to the bottom stop.
- After loosening the holding screw, remove the plug cap from the contact base.
- Connect a suitable continuity meter to PIN 1+2 (changeover switch PIN 2+3).
- In case the **instrument is installed**, open the inlet line and introduce the medium slowly until the instrument indicates the required minimum flow volume.
The reed contact is now closed (electrical continuity).
- In case the instrument is not yet installed, the float may be lifted with a suitable tool.
- Push the switch housing to the top until the reed contact opens (no electrical continuity).
- Fix the switch in this position by tightening the fixing screws.

- Replace the plug cap and the instrument is now ready for operation.
- If the limit switch is adjusted correctly, a bi-stable switch characteristic is achieved, i.e.: the contact remains closed when the float rises above the set limit value (PIN 1+2, or alternatively PIN 2+3).

Adjustment of the limit values (Type SMV-1... only contact)

- Loosen the two fixing screws on the contact base.
- Fix the adjustable notch on the contact base, to rate of the housing scale to which you prefer.
- Fix the switch in this position by tightening the fixing screws.
- Replace the plug cap and the instrument is now ready for operation.
- If the limit switch is adjusted correctly, a bi-stable switch characteristic is achieved, i.e.: the contact remains closed when the float rises above the set limit value (PIN 1+2, or alternatively PIN 2+3).

Hysteresis

Hysteresis is characterised by the difference between the switching on and switching off points of the contact. By matching the magnet and reed contact sensitivity (AW Number) a hysteresis of approx. 3.5-7 mm of float movement is achieved (dependent of type). At the same time it may be assured that the contacts have a bi-stable switching characteristic.

Exceeding the Measuring Range:

Warning: Continuously exceeding the measuring range together with pulsating flow results in the float hitting the upper stop continuously which can lead to increased wear in the instrument. When such cases occur, please contact the supplier.

The flow range may be exceeded by a large margin with a non-pulsating flow. Only a certain increase in pressure loss is experienced (The permissible maximum operating pressure must not be exceeded).

10. Maintenance

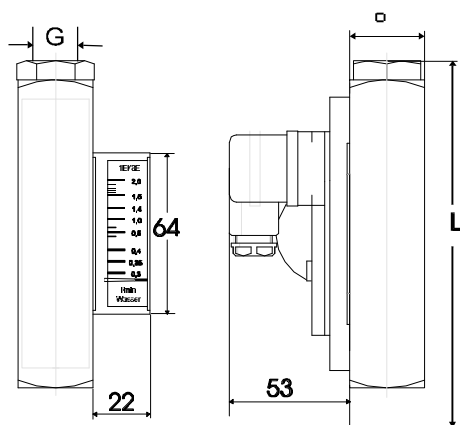
For measured media without contamination, the SMV instrument is almost maintenance-free. Where contamination or calcium or other deposits are found on the internal parts, the instrument should be regularly cleaned.

The instrument may be removed from the pipe with a suitable open ended spanner. The internal parts are accessible for cleaning after removing the top connection. The internal parts may be cleaned with a suitable brush. After cleaning, the instrument should be reassembled in the correct manner. We recommend that the O - rings of the screwed connections are changed.

11. Technical Specifications

Measurement and switch accuracy: $\pm 4\%$ of full scale value
 Max. Operating Pressure: see standard material comb. (chap. 4)
 Max. Medium Temperature: see standard material comb.(chap.4)
 Protection Type (EN 60529): IP 65
 Approvals: SEV, UL, CSA
 Elektrical Switch Values
 N/O: 240 VAC, 100 VA, 1.5 A (SEV, CSA)
 SPDT: 240 VAC, 60 VA, 1 A (SEV, CSA)
 N/O, EEx d IIC T6: 250 VAC, 2 A, 80 VA
 SPDT EEx d IIC T6: 250 VAC, 1 A, 60 VA
 N/O EEx ia I BVS: 250 VAC, 1.5 A, 100 VA (underground mining appl.)
 SPDT EEx ia I BVS: 220 VAC, 1 A, 60 VA (underground mining appl.)
 For instruments with UL-approval, see switch values on contact housing.

12. Dimensions and Pressure Losses



Instrument size	Thread G	L (mm)	4-side (mm)	weight (kg)*
SMV-..01 to SMV-..18 SMV-..21 & SMV-..22	1/4 (1/2)	132 (136)	30x30	0,78
SMV-19, SMV-..20, SMV-.. 23 & SMV-..24	1/4 (1/2)	150 (150)	30x30	0,88
SMV-..25 to SMV-..31 & SMV-..33	3/4 (1)	156 (150)	40x40	1,58
SMV-32, SMV-..34, SMV-..37 & SMV-..39	1 1/4	165	50x50	2,78
SMV-..35, SMV-..36, SMV-..38 & SMV-..40	1 1/4	180	50x50	2,88

*only for SMV-2..., for SMV-1... +0,12 kg,
 for SMV-3... +0,5 kg

13. Recommended Spare Parts

Only the parts of the instruments and the materials are listed.
 Depending on the instrument model, the parts are available in different sizes
 (When ordering please give the instrument type).

- | | |
|------------------------------------|--------------------------------|
| 1.1 Float Brass | 4.1 Contact (Normally open) |
| 1.2 Float Stainless Steel | 4.2 Contact (SPDT) |
| 2.1 Slotted nozzle Brass | 4.3 Ex-contact (Normally open) |
| 2.2 Slotted nozzle Stainless Steel | 4.4 Ex-contact (SPDT) |
| 3.1 O-Ring set Perbunan | |
| 3.2 O-Ring set Viton | |