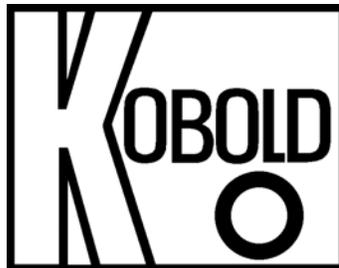


**Operating Instructions
for
Low Volume
Flow Meters / Monitors**

Models: KDF/KDG



1. Note

Read these operating instructions before unpacking and operating. The devices should only be used, serviced and repaired by qualified personnel.

2. Contents

1. Note	2
2. Contents	2
3. Specific Application.....	3
4. Method of Operation	3
5. Instrument Inspection	4
6. Installation	4
7. Initial Operation	4
8. Limit switches	5
9. Electrical Connection	6
10. Maintenance	7
11. Technical Specifications	7
12. Recommended spare parts	8
13. Dimensions	8

Manufactured and sold by:

Kobold Instruments Inc.
1801 Parkway View Drive
Pittsburgh, PA 15205
Tel.: 412-788-2830
Fax: 412-788-4890
E-mail: info@koboldusa.com
Internet: www.koboldusa.com

3. Specific Application

The model KDF devices serve to measure and monitor liquid flow, models KDG serve to measure and monitor gas flow.

Only clean, water-like (low viscosity), and homogeneous liquids, compatible with the materials of construction, should be measured. Dirt particles may block the float and thus cause erroneous signals and measurements.

Standard Material Combinations

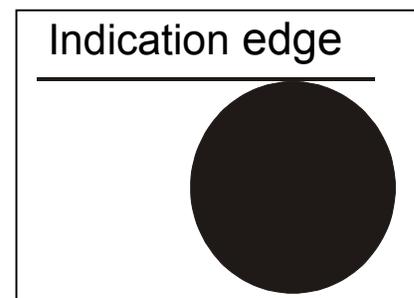
	Material combination brass	Material combination stainless steel
Measuring cone	Borosilicate glass	Borosilicate glass
Rotameter	POM, glass, titanium, stainless steel 1.4401 (depending on instrument size)	POM, glass, titanium, stainless steel 1.4401 (depending on instrument size)
Float stop	PTFE	PTFE
Valve stem	CrNi steel 1.4571	CrNi steel 1.4571
Gaskets	Viton (standard) PTFE, FFKM (option).	Viton (standard) PTFE, FFKM (option).
Fitting (head and base part)	Brass	Precision casting, 1.4581
Fitting (track)	CrNi steel 1.4571	CrNi steel 1.4571

4. Method of Operation

The low volume flow meters and monitors, models KDF / KDG, work on the known principle of the rotameter flow meter. A float is situated in a cone-shaped measuring glass, which is elevated by the inflowing medium. Every float level corresponds to a particular flow rate that can be read on the dial of the measuring glass. The flow rate is read off at the upper edge of the float.

Devices with a metallic float can be fitted with a limit switch to monitor flow rates. The limit switches are annular initiators mounted on the measuring glass that are switched inductively by the metallic float.

To maintain a constant flow rate at varying inlet or outlet pressure the devices can be delivered with optional differential pressure controllers.



5. Instrument Inspection

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

Scope of delivery:

All parts in the delivery scope are mounted firmly on the device.

6. Installation

Installation in the Pipeline

- The rotameter flow meter **must be mounted vertically** (typical of any float measuring system). Direction of flow is from bottom to top.
- Clean the pipeline to the device before connecting by blowing out or rinsing.
- The connection is made with unions suited for the model. The pipes should be connected to the ports of the measuring instrument, square and as free of stress as possible. The piping should be supported as necessary, to prevent the transmission of vibrations to the measuring instrument.

Panel Mounting

- For panel mounting, the ideal cutout dimension is 163mm x 32mm.
- Installation in the control panel: Both screws on the front panel of the measuring instrument are loosened slightly, the device is inserted in the panel cut-out from the front, then aligned and secured with both screws.

7. Initial Operation

- The actual operating pressure and measuring temperature of the plant should not exceed the specified maximum values.
- Ensure material compatibility.
- Close needle valve on flow meter.
- Open shutoff valve upstream and downstream of measuring instrument.
- The pipeline should be carefully vented **for liquids**.

- Allow the operating pressure to increase slowly **for gases**. Avoid bouncing (danger of glass breaking).
- Open needle valve and set the desired flow rate.
- Should the operating parameters deviate from the calibration data (turn down ratio, measured medium, pressure, density and temperature), the measuring instrument can be adapted to the actual conditions. Use the conversion of the flow rate according to VDI/VDE guideline 3513.

8. Limit switches

To signal particular flow rates the low volume flow meters can be fitted with limit switches that initiate an electrical signal when the set value is reached. The float in the flow meter must be made of stainless steel. One signal transmitter is required for each limit value.

The following limit switch models are available:

- Bistable annular initiators RC 10-14-N3 (TG-10-1 bi) and RC 15-14-N3 (TG-15-1 bi).

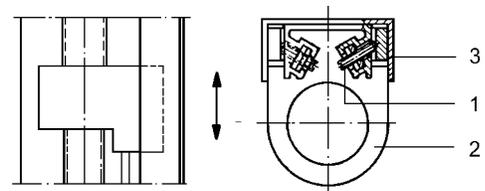
Bistable limit switches detect the direction of movement of the float when it passes by. The device can thus determine whether the float is above or below the annular initiator block. Bistable limit switches are delivered with connection box and built-in filter EMC-Y 38132 or EMC-Y38133.

- Monostable annular initiators RC 10-14-NO (TG-10-1) and RC 15-14-NO (TG-15-1).

The annular initiator is actuated when the metal float passes the annular initiator (wiper effect). No EMC filter is required for monostable limit monitors. A transistor relay should be connected on the load side for each switching circuit for operation. (For example: model EX-3001, EX-3002)

Adjusting the Limit switch

The limit switch is adjusted for the desired flow rate by moving it. The limit switch (2) is fixed to the back track (3) of the measuring instrument with the two retaining screws (1).



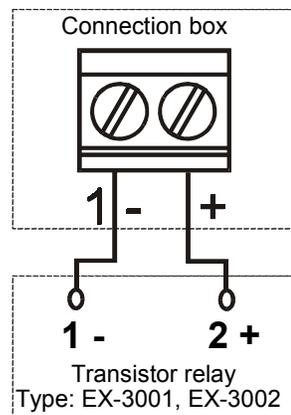
Please note that limit switches TG-15-1 or TG-15-1 bi as from the measuring range 100-l/h water and 3500-l/h air can only be used to approximately 50% of the max. measuring range because of the cone-shaped measuring glasses. Replace plexiglass protective cover after adjustment.

9. Electrical Connection

- Make sure that the electrical supply lines are not active.
- Install the supply line to the transistor relay according to the wiring diagram. The wiring diagram shown here is only valid for the transistor relay recommended by us. We cannot provide any details here for connecting the limit switch to a transistor relay from a different manufacturer.
- If the contact has not been adjusted yet, do so at this time.

Monostable / Bi-Stable

1 Limit switch



Connect contact (+ = brown wire, - = blue wire) to transistor relay for devices without terminal box.

10. Maintenance

Replacing the Measuring Cone

- Close valve upstream and downstream of device.
- Devices, fitted in a control panel, must be removed. Close device valve.
- An anti-drainback valve is fitted in the device head in low volume flowmeters to prevent liquids returning from the pipeline.

Important! The measuring instrument must not be under pressure and must be free of aggressive and caustic media!

If necessary, rinse device **thoroughly** and neutrally before **removal**.

- Push plexiglass protective cover upward and remove to the front.
- Rotate spanner in base of device counter-clockwise to loosen the measuring glass; then remove the glass.
- Install in reverse order. To avoid breaking the glass in the measuring cone when clamping, the measuring glass must be installed squarely between the gaskets.

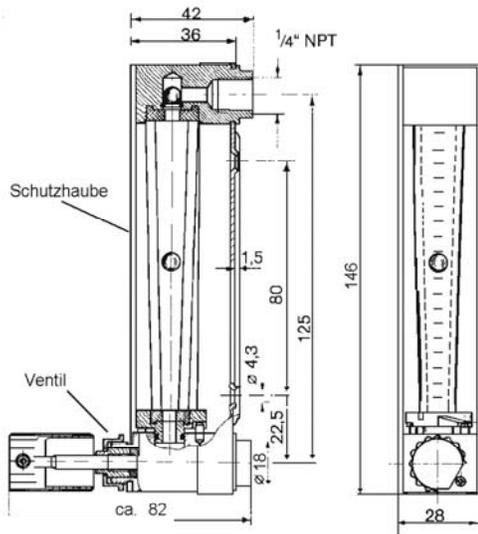
11. Technical Specifications

Span:	10:1
Accuracy:	2.5 according to VDI/VDE-conformance 3513, page 2
Max. Operating Pressure:	145 PSIG, 85 PSIG for PVDF versions
Max. Temperature:	210°F, (176°F with limit switch)
Connection:	2x 1/4" NPT (at the back)
Data for contact device:	Nominal voltage: 8 VDC Current consumption: active surface bare: 3 mA Active surface covered: 1 mA Protection: IP 67 Connection: 0.5 m PVC stranded cable (0.14 mm ²)

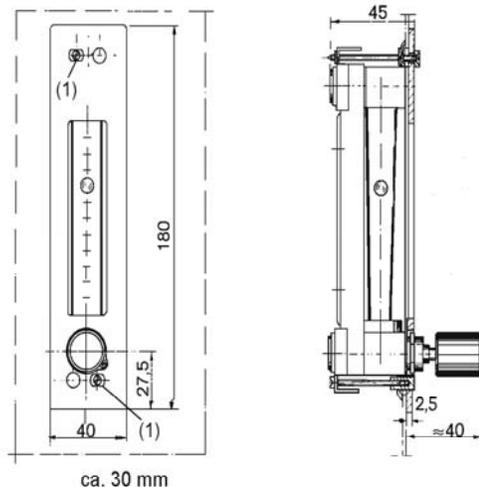
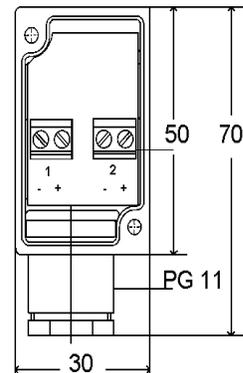
12. Recommended spare parts

- 1) Measuring glass (specify measuring range, medium, service conditions)
- 2.1) Viton set of gaskets for measuring glass
- 2.2) PTFE set of gaskets for measuring glass
- 3) Protective cover
- 4.1) Limit switch TG 10-1
- 4.2) Limit switch TG 10-1 bi
- 4.3) Limit switch TG 15-1
- 4.4) Limit switch TG 15-1 bi

13. Dimensions



PG-connection
box
with EMV-Filter



Schalttafelanschnitt: 163 x 32 mm

- Installation of connection box
- a) devices without switch panel
building block: below
 - b) devices with switch panel
building block: back