Operating Instructions

for

Viscosity Compensated

Flowmeter / Monitor

Model: VKA

1. Contents

Manufactured and sold by:

KOBOLD Instruments Inc.
1801 Parkway View Drive
Pittsburgh PA 15205-1422
Tel.: 412-788-2830
Fax: 412-788-4890
E-Mail: info.@koboldusa.com
Internet: http://koboldusa.com

2. Note

Please read these operating instructions before unpacking and putting the unit into operation. Follow the instructions precisely as described herein.
The instruction manuals on our website www.koboldusa.com are always for currently manufactured version of our products. Due to technical changes, the instruction manuals available online may not always correspond to the product version you have purchased. If you need an instruction manual that corresponds to the purchased product version, you can request it from us free of charge by email (info.@koboldusa.com) in PDF format, specifying the relevant invoice number and serial number. If you wish, the operating instructions can also be sent to you by post in paper form against an applicable postage fee.

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

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

as per PED 2014/68/EU

In acc. with Article 4 Paragraph (3), "Sound Engineering Practice", of the PED 2014/68/EU no CE mark.
Diagram 8, Pipe, Group 1 dangerous fluids

3. Regulation Use

The models VKA-... are used for measuring and monitoring of viscous liquid flows (30- 540 mm^2/s). They are suitable for measuring clean and homogeneous fluids which have no effects on the instrument materials used.
If using higher viscosity media, large deviations will occur to the measured values.
Large dirt particles may lead to blocking of the float and cause false alarm conditions.
Ferritic particles deposited on the float (with magnet) may lead to the same effects.

The instruments are provided as follows:

Flow measurement (only for Model VKA-2.. and VKA-3..)

The actual flow rate may be read off the magnetically operated pointer indicator mounted on the instrument. The scale indicates the flow rate directly in litres per minute.

Limit Value Switches (only for Model VKA-1.. and VKA-3..)

The instrument is fitted with one or two adjustable limit value switches for the monitoring of flow throughput values.

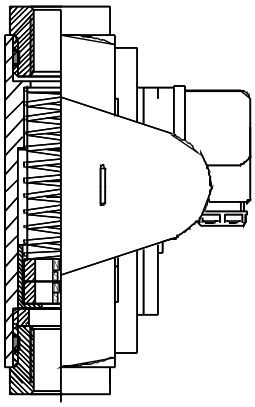
Standard design: Normally open reed contact (for increasing flow)
Special design: Changeover reed contact

The contact is adjustable over the full measuring range.

Standard Material Combinations

Housing	Nickel plated brass
Float	Brass
Spring	Stainless steel 301
Orifice	stainless steel 301
Magnets	Ceramic oxide
Fixing ring	Brass
Reduction (Option)	Nickel plated brass
O-Rings	PTFE (only for opion reduction)
Pointer indication	Plastic
Switch housing	Plastic

4. Operating Principle



KOBOVAR flow meters /monitors of model VKA have been developed for measuring and monitoring of viscous flow. They employ a special float principle, with cylindrical measurement pipe, orifice and spring-loaded suspended float. This ensures an on-going viscous compensation within 30 to 540 cSt. All of these units work independent of position. The recommended position, however, is vertical, with flowdirection from below to upwards.

T**hese units are supplied in following versions:**

VKA-1… Flow monitor with 1 contact
VKA-2… Flow meter with Side-display; without contact
VKA-3… Flow meter/ monitor with side-display, and contact

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.

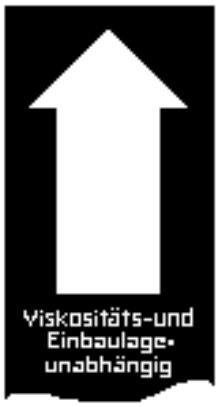
Scope of delivery:
The standard delivery includes:

- Viscosity Compensated Flowmeter / Monitor model: VKA

6. Mechanical Connection

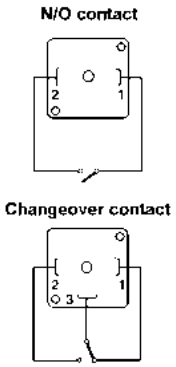
Before installation:

- It should be confirmed that the maximum allowed operating pressures and operating temperatures of the equipment are not exceeded (see technical specifications).
- The instruments may be mounted in every flow direction. No recalibration is required when changing position. The flow must always take place in the direction of the arrow (see label).
- 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.
- The instruments must not be installed within an induction field.
- Where possible after the mechanical installation it should be checked that the connection thread to pipe is fully sealed (see also Commissioning).



7. Electrical Connection

(Only for Model VKA-1.. and VKA-3..)



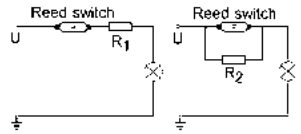
- Check that electrical supply voltage is switched off.
- Loosen the mounting screw from the plug cap and remove the cap from the plug.
- Connect the power supply cable to the plug as shown in the connection diagram.
- If the contact has not yet been adjusted, it should be done so at this stage (see Commissioning of the Instruments).
- Place the plug on the contact and fasten it with the mounting screw.

Warning! The given electrical values of the reed contacts must not be exceeded, not even singly or for short durations. For increased switch values we recommend a contact protection relay or other contact protection measures.

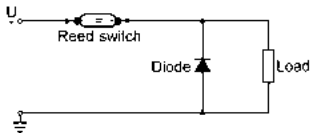
After connection of your external equipment at the connection points, and after adjustment of the chosen switch points, the external power supply to the instrument may be switched on.

Examples for contact protection measures

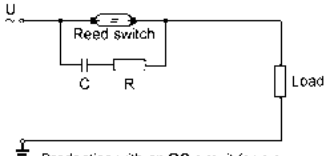
For capacitive and inductive loads (long cables and relay/protection) we recommend relay switching.



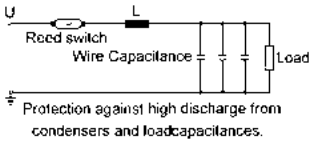
Lamp load with parallel or series resistance to the switch.



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



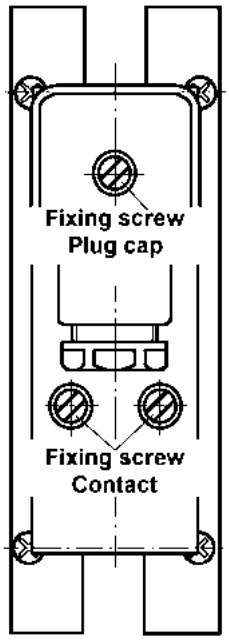
Protection with an RC circuit for a.c. current and inductive load.



Protection against high discharge from condensers and loadcapacitances.

8. Commissioning

Adjustment of the Limit Values (for instruments with indicator)



- With a screwdriver, loosen both mounting screws at the contact.
- Move the switch housing to the lowest position.
- After loosening the screws, remove the plug cap from the contact.
- Connect a suitable multimeter to PIN 1 & 2 (changeover contact PIN 2 & 3).
- When the instrument is already installed, open the inlet pipe and slowly allow the medium to flow until the pointer indicator shows the required minimum flow throughput. The Reed switch is then closed (electrical continuity).
- Move the switch housing upwards until the Reed switch just opens (no electrical continuity).
- At this position tighten the mounting screws. Replace the plug cap. The instrument is now ready for operation.
- By correct adjustment of the limit switch, a bi-stable switch condition is achieved, i.e.: even when exceeding the adjusted limit value, the contact remains closed
  (PIN 1 + 2 or PIN 2 + 3 for changeover contact option).

Adjustment of the Limit Value (for Instruments without Indicator)

- Loosen the mounting screws on the contact.
- Position the marking on the contact in line with the required value on the housing scale.
- Tighten the mounting screws at this position.

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 strength (AW Number) a hysteresis of approx. 3.5 mm of float movement is achieved. At the same time, it may be assured that the contacts have a bi-stable switching characteristic.

Exceeding measuring range

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).

Viscosity range

The instrument scale is suitable for a viscosity range of 30 - 540 mm^2/s. Within this range there is no need for recalibration.

9. Technical Information

Housing:	Brass, Ms 58, (nickel-plated)
Connections:	Brass, Ms 58, (nickel-plated)
Float:	Brass, Ms 58
Orifice:	St. Steel 1.4310
Spring:	St. Steel 1.4310
Magnet:	Ceramic-oxide
Sealing:	PTFE (only by optional reduction)
Max. temperature:	Ambient -25…+75°C Medium -25…+100°C
Max. pressure:	PN 250
Mounting position:	vertical, inflow from below (recommended)
Contact type:	1 N / O contact, Adjustable from 10 – 90% of F.S.
Elect. Connection:	Plug DIN 43 650 Contact: 2-pole
Switching Power:	max. 250 V_{AC} / max. 100 VA / max. 1.5 A
Accuracy:	± 4 % of F.S. (at a viscosity of 105 cSt)
Measurement error w.r.t. variation in viscosity:	changes in viscosity within 30…540 cSt cause additional deviation. Maximum ± 4% of F.S.
Repeatability:	≤ 1%
Viscosity Range:	30…540 cSt

10. Order Codes

Order Details (Example: **VKA-5102 U**)

Range		Model Number		
GPH Oil	GPM Oil	Switch Only	Meter Only	Meter & Switch
2...6.3	-	VKA-5102	VKA-6102	VKA-7102
6...20	-	VKA-5104	VKA-6104	VKA-7104
-	0.3...0.9	VKA-5106	VKA-6106	VKA-7106
-	0.6...1.6	VKA-5108	VKA-6108	VKA-7108
-	1.5...4.2	VKA-5110	VKA-6110	VKA-7110
-	3.0...8.5	VKA-5112	VKA-6112	VKA-7112
-	6...15	VKA-5114	VKA-6114	VKA-7114
-	8...26	VKA-5116	VKA-6116	VKA-7116
Options (Add Suffix to Order Number)				
Suffix ..B = ¾" NPT Connection Fittings **Suffix ..C** = ½" NPT Conduit Fitting for Electrical Connector **Suffix ..U** = SPDT Switch in Place of N/O Switch				

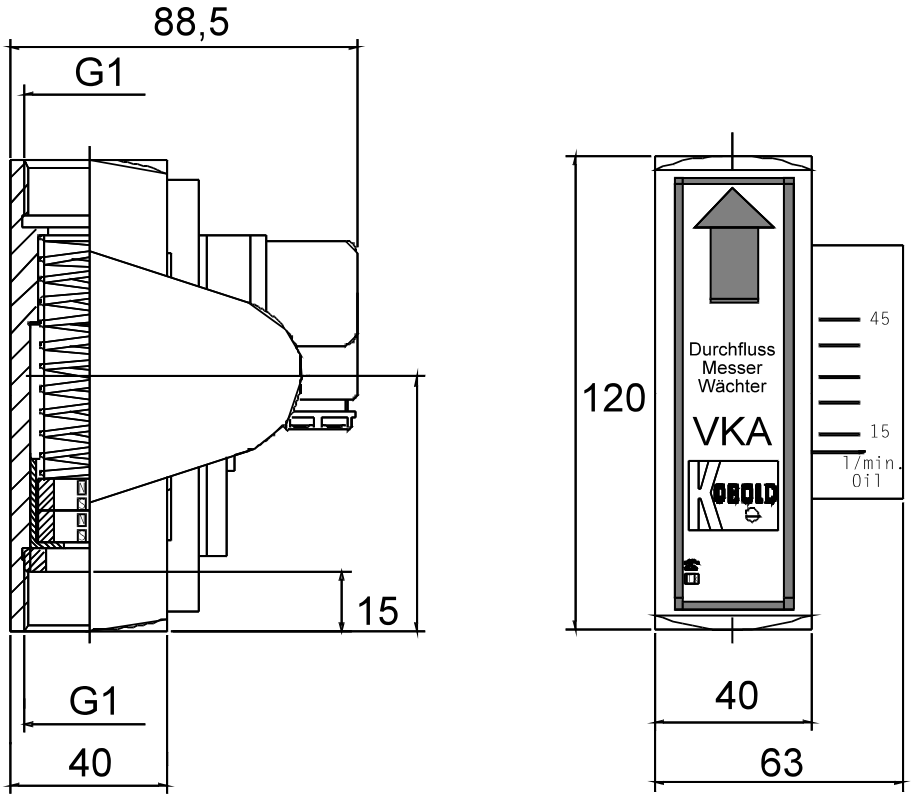
11. Maintenance

For clean medias the models VKA-... are almost maintenance-free. However, where calcium or dirt deposits form in the housing or other internal parts, the instruments should be regularly cleaned.

For disassembling the unit, please follow the steps listed below:

1. Use a spanner to dismount the unit from the pipe.
2. If the unit is assembled with a connection reduction, remove the connection reduction of the inlet side with the help of a spanner.
3. Remove the threaded ring with the help of a pointed pliers.
4. Take care that the magnets do not fall out of the float, during the sliding of the float and the spring from the housing.
5. Clean all the inner parts. Thereby take care, that the very sensitive orifice will not be damaged.
6. Reassemble the unit in the correct sequence after the cleaning. Thereby the southpoles of the magnets have to be faced upwards.

11.1. Dimensions



12. Recommended Spare Parts

Only the instrument parts and material are listed. Depending on the instrument type the parts are available in various sizes (when ordering please indicate instrument type).

1.1) Float brass with orifce without magnets
2.1) Set magnets for float
3.1) Spring
4.1) Inlet connection reduction, G 1/2 brass with PTFE O-Ring
4.2) Inlet connection reduction, G 3/4 brass with PTFE O-Ring
4.3) Inlet connection reduction, 1/2" NPT brass with PTFE O-Ring
4.4) Inlet connection reduction, 3/4" NPT brass with PTFE O-Ring
5.1) Pointer indication
6.1) Contact (Normally Open)
6.2) Contact (Changeover switch)

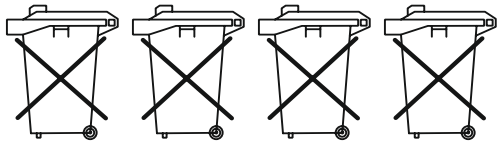
13. Disposal

Note!

- Avoid environmental damage caused by media-contaminated parts
- Dispose of the device and packaging in an environmentally friendly manner
- Comply with applicable national and international disposal regulations and environmental regulations.

Batteries

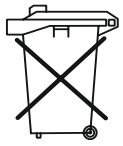
Batteries containing pollutants are marked with a sign consisting of a crossed-out garbage can and the chemical symbol (Cd, Hg, Li or Pb) of the heavy metal that is decisive for the classification as containing pollutants:



Cd[1] Hg[2] Pb[3] Li[4]

1. „Cd" stands for cadmium
2. „Hg" stands for mercury
3. „Pb" stands for lead
4. „Li" stands for lithium

Electrical and electronic equipment



14. EU Declaration of Conformance

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

Viscosity Compensated Flowmeter/Monitor model: VKA-…

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

EN 61010-1:2011
Safety requirements for electr. equipment for measuring control and laboratory use – Part 1: General requirements

EN 60529:2014
Degrees of protection provided by enclosures (IP Code)

EN IEC 63000:2018
Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

Also, the following EC guidelines are fulfilled:

2014/35/EU	**Low Voltage Directive**
2011/65/EU	**RoHS**
2015/863/EU	Delegated Directive (RoHS III)

Hofheim, 14 Jan. 2021

H. Peters
General Manager

M. Wenzel
Proxy Holder