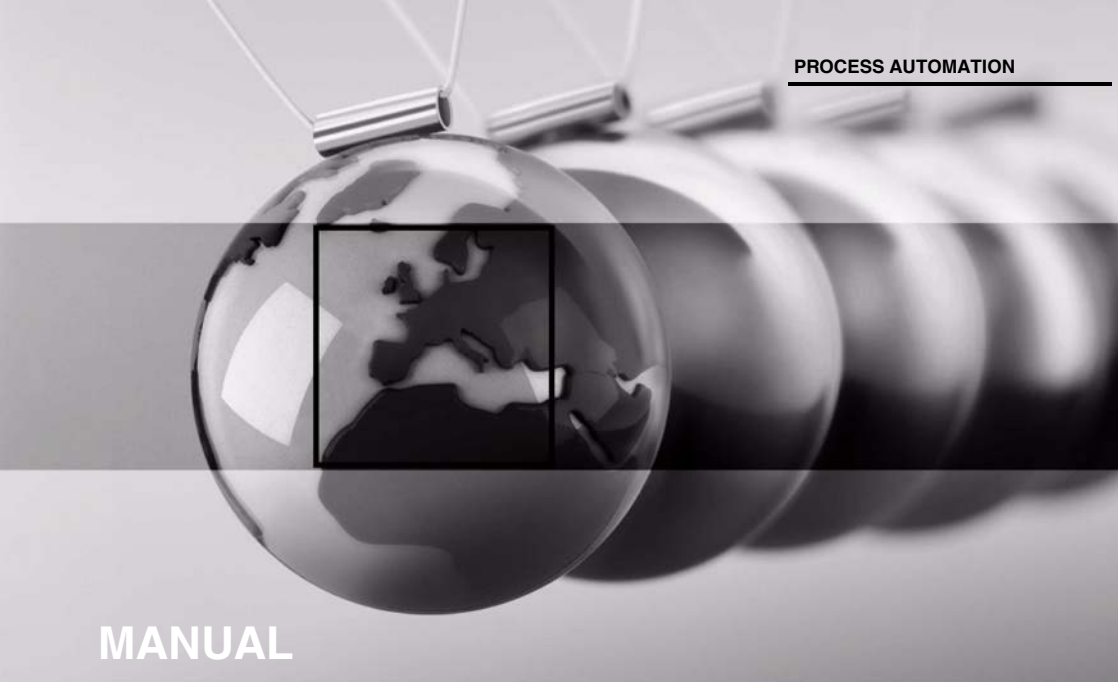

MANUAL

Oil Level Sensor
KVF-104-PF

ISO9001

CE
0102

PEPPERL+FUCHS
PROTECTING YOUR PROCESS

With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

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1 Safety

1.1 General safety instructions

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

Installation and commissioning of all devices must be performed by a trained professional only.

Protection of operating personnel and the system is not ensured if the product is not used in accordance with its intended purpose.

Laws and regulations applicable to the usage or the intended purpose must be observed. The devices are only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

The Declaration of Conformity, Certificate of Compliance, Statement of Conformity, EC-type-examination certificate and data sheets are an integral part of this document.

The data sheet contains the electrical data of the Declaration of Conformity, the Certificate of Compliance and the EC-type-examination certificate.

The documents mentioned are available from http://www.pepperl-fuchs.com or contact your local Pepperl+Fuchs representative.

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1.2 Used Symbols

Safety-relevant Symbols

Danger!
This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.

Warning!
This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.

Caution!
This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

Informative Symbols

Note!
This symbol brings important information to your attention.

Action

This symbol indicates a paragraph with instructions.

1.3 Declaration of Conformity

All products were developed and manufactured under observance of the applicable European standards and guidelines.

Note!
A Declaration of Conformity can be requested from the manufacturer.

The product manufacturer, Pepperl+Fuchs GmbH, 68307 Mannheim, has a certified quality assurance system that conforms to ISO 9001.

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1.4 Intended use

The oil level sensor KVF-104-PF (referred to as "sensor" in the following section) is a suspended sensor for monitoring oil layer thickness in oil/petrol separators.

The KVF-104-PF must always be connected to an ATEX-approved, intrinsically safe warning device of type LAL-SRW (see product program).

The device is only approved for appropriate and intended use. Ignoring these instructions will void any warranty and absolve the manufacturer from any liability.

Use the device only within the specified ambient temperature range.

Individually accessible non-grounded metal parts can become electrostatically charged. The determined capacitance exceeds the required value according to IEC/EN 60079-0. The determined capacitance is specified in the technical data.

Information on electrostatic hazards can be found in the technical specification IEC/TS 60079-32-1.

1.4.1 Marking

Pepperl+Fuchs GmbH
Lilienthalstrasse 200, 68307 Mannheim, Germany
Oil level sensor KVF-104-PF
DEMKO 07 ATEX 142586X
Ex II 1G Ex ia IIB T3

1.5 Delivery, Transport and Storage

Check the packaging and contents for damage.

Check if you have received every item and if the items received are the ones you ordered.

Keep the original packaging. Always store and transport the device in the original packaging.

Always store the device in a clean and dry environment. The permitted storage temperature (see data sheet) must be considered.

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1.6 Installation and Commissioning

1.6.1 Installation des Sensors

The sensor may be installed in **potentially explosive zone 0** in accordance with Directive 94/9/EC (ATEX). The sensor must not be installed in places with potentially aggressive vapors.

The sensor and warning device must be free of voltage during installation and maintenance. The warning device must only be connected to the supply voltage after complete mounting and connection of the sensors.

The sensor has IP68 protection and is weather- and oil-resistant. It can therefore be installed in oil/petrol separators.

When installing the device in oil/petrol separators, observe the permissible ambient temperature in the range from -20 °C ... 60 °C (253 K ... 333 K).

1.6.2 Installation in connection with intrinsically safe circuits

Installation of the intrinsically safe power circuits of the devices is permitted in potentially explosive zones, whereby, in particular, safe separation from all non-intrinsically safe power circuits must be guaranteed.

The intrinsically safe current circuits must be installed according to valid setup regulations.

For the interconnection of the intrinsically safe field devices and the intrinsically safe power circuits of the associated devices, the respective maximum values of the field device and the associated device with regard to explosion protection must be observed (proof of intrinsic safety). EN 60079-14/IEC 60079-14 must be observed.

If the used sensors have not a tested dielectric strength (500 V according to IEC/EN 60079-11) between the external conductive parts and the intrinsically safe circuits, it must be assumed that the sensors and the corresponding intrinsically safe circuits have electrical contact with each other. In this case verification of intrinsic safety must include the possibility of the interconnection of all intrinsically safe circuits.

1.6.3 Sensor Cables

Sensor cables must not be installed in cable or conductor bundles together with other current circuits. Avoid installing sensor cables parallel to other cables that may transmit interfering signals, which impair the sensor signal and thus the alarm function. The sensor itself must not be grounded.

If you extend the sensor cable, observe the applicable ATEX specifications with regard to color, quality and durability. Use unshielded cables.

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1.7 Operation

1.7.1 Caution - emulsions

An oil/petrol separator is a device for separating oil from water. Situations may arise in which the oil can not be separated because an emulsion has formed. An emulsion is a relatively stable mixture of oil and water. Sensors can not detect oil if emulsions with a high water content have formed. Always contact the oil/petrol separator manufacturer if there is any doubt as to whether the oil has been separated from the water before the liquid is drained to the sewage system.

1.8 Maintenance

For operation of oil/petrol separators, there may be standards, directives or laws that define regular system or sensor tests. Check the operation of the sensor at least twice a year and more frequently in the event of unfavorable environmental conditions.

When the oil/petrol separator is being emptied (disposal), the sensor must always be washed and dried. The sensor must not be cleaned with caustic fluids. A badly contaminated sensor can trip a wrong alarm or, in certain circumstances, fail to trip an alarm.

1.9 Repair

The devices must not be repaired, changed or manipulated. If there is a defect, the product must always be replaced with an original device.

1.10 Disposal

Disposal of devices and their packaging material must be performed in compliance with the applicable laws and guidelines of the corresponding country.

The devices do not contain batteries which need to be disposed of separately from the products.

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2 Product Specifications

2.1 Function

The sensor has an integrated electronic circuit which, via an oscillator circuit, emits a weak HF signal that changes depending on whether the sensor element is surrounded by water or by oil/air. The sensor is capable of distinguishing between air and water, and between water and oil, but not between air and oil.

2.2 Layout and dimensions

The sensor consists of three sections (see illustration):

- The lower stainless steel section (1) provides electrical connection to the liquid.
- The middle section (2) is electrically isolated.
- The upper section made of stainless steel forms the switch contact (3).

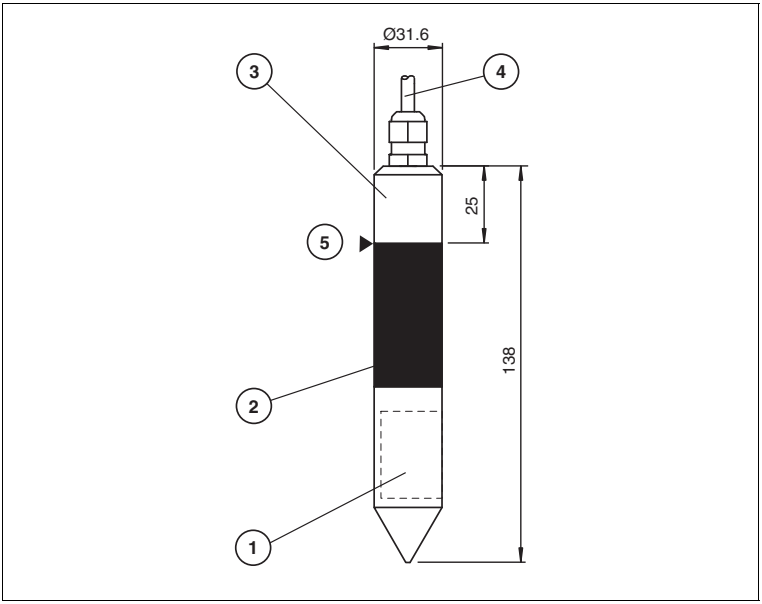

Figure 2.1

1 Lower section with laser marking
2 Middle section
3 Upper section
4 Cable
5 Switching point

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2.3 Product programm

Warning device

Description	Type code
Intrinsically safe warning device, 230 V AC	LAL-SRW

Sensors

Description	Type code
Overflow sensor for detecting excessively high fluid level	NVF-104/34-PF
Oil level sensor for detecting thickness of oil level	KVF-104-PF

Accessories

Description	Type code
Cable connector IP68 for one sensor	LAL-SK2
Mounting set for one sensor	NVO5-B

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3 Installation

3.1 Mounting in oil/petrol separators

Read the chapter on Safety and, in particular, the section on Installation and Commissioning (see chapter 1.6.1) before installing the sensor.

Warning!
Risk of short circuit

Injuries and damage to the device are possible when working with live parts.

- Before working on the device, always disconnect the supply voltage.
- Connect the device to the supply voltage only after completion of the work.

During installation, observe the instructions of the oil/petrol separator manufacturer. Always ensure that the sensor suspension device remains constantly at the correct height. If possible, ensure that the suspension device is mounted in a location that can be reached from the separator access shaft so that it is possible to raise the sensor during separator emptying (disposal) or maintenance of the oil/petrol separator.

The oil/petrol separator can be made of various materials. We therefore recommend using the following methods to secure the device in a suspended position:

- If mounting the device in concrete containers, use the NVO5-B mounting set. See the figure below.
- If mounting the device in containers made from other materials, such as plastic or metal, use other suspension devices as appropriate, for example, screws and screw anchors.

With a correct fluid level, the sensor must be immersed a few centimeters in the fluid. How far it is immersed depends on the type of oil/petrol separator, the design and the capacity. The lower section made of stainless steel must always be immersed in the fluid. The switch point (see chapter 2.2, dimension drawing, position 5) of the sensor is located between the isolated middle section and the upper metal section.

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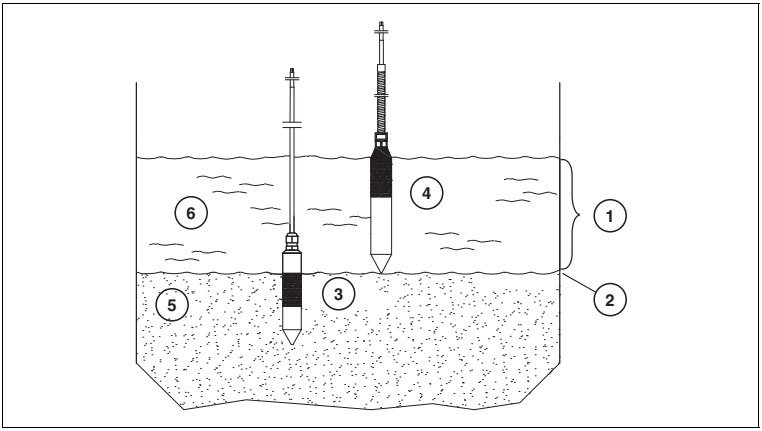

1 Layer thickness
2 Alarm level
3 Sensor KVF-104-PF (new model)
4 Sensor KVF-103-PF (old model)
5 Water
6 Oil

3.2 Connection

Read the chapter on Safety and, in particular, the section on Installation and Commissioning (see chapter 1.6.1) before connecting the sensor.

Warning!
Risk of short circuit

Injuries and damage to the device are possible when working with live parts.

- Before working on the device, always disconnect the supply voltage.
- Connect the device to the supply voltage only after completion of the work.

When making the connection, ensure the polarity of the sensor cables is correct. The loop resistance of the extension cable should not exceed 20 Ω for the sensor.

Note!

Further information on connection of the sensors to the warning device is available in the manual of the warning device LAL-SRW.

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4 Operation

4.1 Emptying/Disposing of the Container

The sensor is a sensitive component. Please note the following information when disposing of/emptying the container:

Caution!

Malfunction or damage through mechanical stress of the sensor.

In case of nonobservance, the safety and operation of the sensor or the entire alarm system is not guaranteed.

- Before emptying/disposal the oil/petrol separator, remove the sensor from the container.
- Protect the sensor against impacts, knocks and unnecessary tensile forces in the cable.
- Insert the sensor in the oil/petrol separator only after it has been filled.

Caution!

Malfunction or false alarm caused by a contaminated sensor

If the sensor is very dirty, this may trigger a false alarm or mean that no alarm is triggered under certain circumstances.

- Clean and dry the sensor when emptying/disposing of the oil/petrol separator or container.
- Do not clean the sensor with corrosive liquids.

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5 Maintenance and Repair

5.1 Sensor test

Test frequency

The sensor is maintenance-free. However, to guarantee perfect operation of the complete alarm system check the operation of the sensor at least once a year, or more frequently in the event of unfavorable environmental conditions.

Check of normal situation

1. Remove the sensor from the oil/petrol separator.
2. Wash and dry the sensor.
3. Take the sensor in your hand (without gloves).
4. Only touch the upper and lower metal section (see chapter 2.2, dimension drawing, position 1 and 3)

   ↳ The green "SYSTEM OK" LED lights up or flashes at the warning device.

Check of alarm situation

1. Remove the sensor from the oil/petrol separator.
2. Wash and dry the sensor.
3. Suspend the sensor freely in midair.

   ↳ The "HIGH OIL LEVEL" LED lights up and, if applicable, an acoustic signal sounds.

Note!

Further information on the LED alarm messages is available in the manual of the warning device LAL-SRW.

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6 Troubleshooting

6.1 Sensor Maintenance

Caution!

Malfunction or false alarm caused by a contaminated sensor

If the sensor is very dirty, this may trigger a false alarm or mean that no alarm is triggered under certain circumstances.

- Clean and dry the sensor when emptying/disposing of the oil/petrol separator or container.
- Do not clean the sensor with corrosive liquids.

Cleaning the Sensor

The sensor is maintenance free. To ensure the entire alarm system functions correctly, clean the sensor at the following intervals:

1. Clean the sensor at least once a year.
2. Pay particular attention to cleaning the sensor tips of all oil, grease, and other dirt residues using a grease-dissolving cleaning agent.
3. If the sensor is used in difficult conditions, clean the sensor more often.

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7 Technical specifications

Power supply	
Rated voltage	13 V DC
Directive conformity	
Electromagnetic compatibility	
Directive 2004/108/EC	EN 61326-1:2013 (industrial locations), EN 55011:2009+A1:2010
Conformity	
Degree of protection	IEC 60529:2001
Ambient conditions	
Ambient temperature	-20 ... 60 °C (-4 ... 140 °F)
Mechanical specifications	
Degree of protection	IP68
Connection	cable, length 5 m (15 ft), 2 x 0.75 mm^2 cross section
Material	stainless steel
Mass	approx. 580 g
Dimensions	∅31.6 x 138 mm
Data for application in connection with Ex-areas	
EC-Type Examination Certificate	DEMKO 07 ATEX 142586X
Group, category, type of protection, temperature class	II 1G Ex ia IIB T3
Voltage U_i	13 V
Current I_i	140 mA
Power P_i	1.05 W
Internal capacitance C_i	200 nF
Internal inductance L_i	0.2 mH
Capacitance	50 pF for accessible non-grounded metal parts
Directive conformity	
Directive 94/9/EC	EN 60079-0:2012+A11:2013, EN 60079-11:2012

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