

Application

The layer thickness sensor LAL1-D-Ex is a suspended sensor for detecting oil layer thickness in oil/petrol separators. The LAL1-D-Ex can distinguish between air and water, and between water and oil, but not between air and oil. LAL1-D-Ex must always be connected to an ATEX-approved intrinsically safe alarm system of type LAL-**-GSM-Ex3.

Product programm

- | | |
|--|----------------|
| • Alarm system for oil/petrol separator,
230 V AC | LAL-A6-GSM-Ex3 |
| • Alarm system for oil/petrol separator,
battery powered | LAL-A8-GSM-Ex3 |
| • Alarm system for oil/petrol separator
12 V DC ... 30 V DC | LAL-D2-GSM-Ex3 |

Accessories

- | | |
|----------------------------------|----------|
| • Junction box IP67 for 1 sensor | NVO5-SK3 |
| • Mounting set for 1 sensor | NVO5-B |

Sensor function

The sensor has an integrated electronic circuit which, via an oscillator circuit, emits a weak HF signal that depends on whether the sensor element is surrounded by water or by oil/air.

Measuring point

At the correct liquid level, the sensor should be located a number of centimetres beneath the liquid surface. The depth at which the sensor should be located depends on the type, design and capacity of the oil/petrol separator concerned. The measuring point is located in the upper metal section of the sensor - more precisely, at the point of connection between the insulating section and the metal section (see Figure 1). The lower, stainless section must always be submerged in liquid. Always follow the instructions provided by the manufacturer of the oil/petrol separator and/or current regulations concerning oil/petrol separators.

Sensor design

The LAL1-D-Ex has a 5 m oil-resistant cable. The sensor itself consists of three sections. The upper stainless section is the measuring point. The middle section is electrically insulating. The lower stainless section provides electrical connection to the liquid.

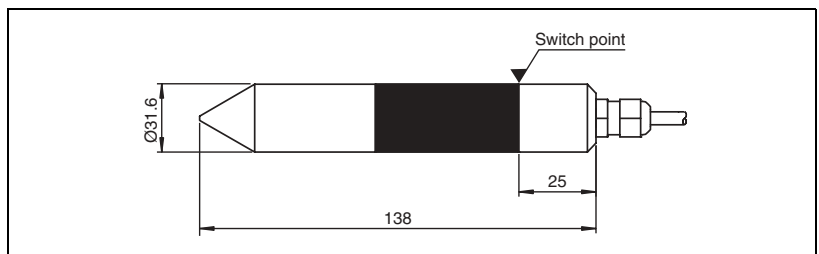


Figure 1

Maintenance

The layer thickness sensor LAL1-D-Ex is often installed in very dirty surroundings. Sensors should therefore be checked at regular intervals and should always be cleaned and dried when oil/petrol separators are emptied. If LAL1-D-Ex sensors are allowed to become very dirty, they may cause false alarms or fail to activate an alarm when necessary.

Caution - emulsions

An oil separator is a unit for separating oil from water. Situations may arise in which the oil cannot be separated because an emulsion has formed. An emulsion is a relatively stable mixture of oil and water. LAL1-D-Ex sensors cannot detect oil if emulsions with a high water content have formed. Always contact the oil 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.

Caution - emptying

When emptying oil/petrol separators, always ensure that LAL1-D-Ex is removed first. LAL1-D-Ex is a sensitive instrument. The cable must therefore be protected against unnecessary pulling and the sensor itself must be protected against bumps and knocks. After the separator has been emptied and refilled with water, the sensor can be carefully lowered into position again.

Warning

The product must only be installed by an authorised electrician. In potentially explosive atmospheres, only material that is approved for the purpose may be used. Such material must be incapable of damaging the surroundings. The product may only be used if the complete installation complies with applicable directives.

Sensor cable

The cable and rating plate are part of the product. The cable must not be shortened to such an extent that the rating plate is removed. The sensor cable may be extended if necessary. For further details, please refer to the alarm system instructions. Special regulations regarding marking and installation in potentially explosive environments must be complied with at all times. Sensor cables must not be run in cable or wire bundles for other circuits. Avoid running the sensor cable parallel to cables that could cause electrical signals/noise capable of interfering with the proper functioning of the level control system.

Use blue cables with lead cross section of 2 x 0.75 mm².

Sensor test

Test frequency:

When using oil/petrol separators, there may be standards, requirements or regulations stipulating that the system or sensors be tested at specified intervals. It is, however, recommended that the system and sensors be tested at least every six months.

Normal situation:

Grip the sensor in your hand (while not wearing gloves) so that contact is made with both the upper and lower metal sections of the sensor. "System OK" on the alarm unit should light up. If "System OK" flashes, this merely indicates that an alarm has been activated.

Alarm situation:

Suspend the sensor freely in air. The two red LEDs should flash, indicating which sensor has activated an alarm.

Installation

Always comply with the instructions provided by the manufacturer of the oil/petrol separator. Always use high-quality suspension brackets to ensure that the sensor remains at the correct height. If possible, ensure that the suspension bracket 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 and maintenance.

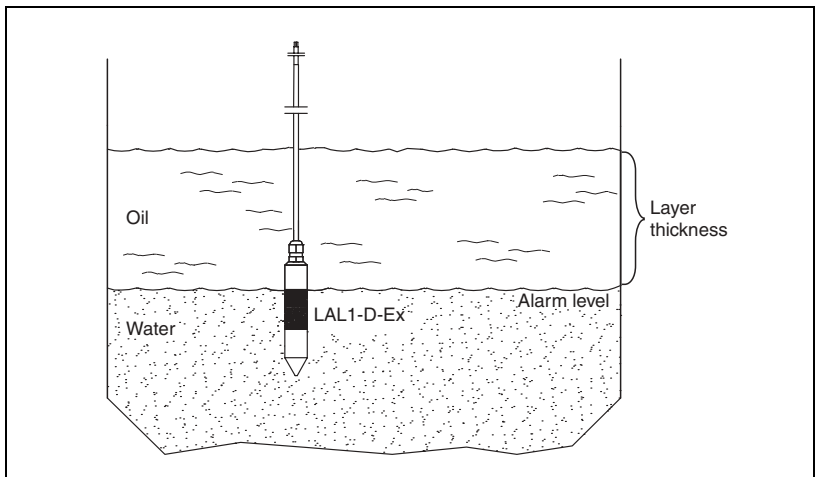


Figure 2

Technical data

The LAL1-D-Ex must only be connected to an intrinsically safe alarm system of type LAL**-GSM-Ex3.

Supply voltage

Rated voltage 11 V DC

Directive conformity

Electromagnetic compatibility

Directive 89/336/EG EN 61000-6-2, EN 61000-6-3

Conformity

Electrical isolation EN 50178

Ambient conditions

Ambient temperature -20 ... 60 °C (253 ... 333 K)

Operating instructions

Layer thickness sensor LAL1-D-Ex

Mechanical data

Protection degree	IP68
Connection	cable
Material	stainless steel
Cable	length 5 m
Weight	360 g
Dimensions	Ø31.6 mm x 138 mm

Data for application in conjunction with hazardous areas

EC-Type Examination Certificate

DEMKO 05 ATEX 138222 X, for additional certificates see www.pepperl-fuchs.com

Input	EEx ia IIB T3
Voltage U_i	11 V
Current I_i	60 mA
Power P_i	250 mW
Internal capacitance C_i	4 μ F
Internal inductance L_i	0.2 mH
max. C_i for extension cable to LAL1-D-Ex	0.1 μ F
max. L_i for extension cable to LAL1-D-Ex	0.3 mH

Directive conformity

Directive 94/9 EG	EN 50020, EN 60079-0
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Supplementary information

EC-Type Examination Certificate, Statement of Conformity, Declaration of Conformity and instructions have to be observed. For information see www.pepperl-fuchs.com.

CE Marking

Pepperl+Fuchs hereby declares that the product is manufactured in accordance with council directive 89/336/EEC (and subsequent amendments) on electromagnetic compatibility (EMC), council directive 73/23/EEC on electrical equipment designed for use within certain voltage limits (LVD), and council directive 94/9/EC on the approximation of the laws of the member states concerning equipment and protective systems intended for use in potentially explosive atmospheres (ATEX).

Applied standards

EN 60079-0, EN 50020, EN 61000-6-2, EN 61000-6-3 and EN 50178.

The product may only be used if the complete installation complies with applicable directives. The product carries a manufacturer's warranty if installed in accordance with these instructions and applicable regulations.

Intrinsically safe cables must be kept separate from non-intrinsically safe cables.

If the product has been damaged in any way, e. g. during transport, it must be inspected and checked by authorised personnel before being connected to the power supply.

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