

OMS-1

Oil Separator Alarm Device



Installation and Operating Instructions



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SYMBOLS



Warning / Attention



Pay special attention to installations at explosive atmospheres



Device is protected by double or reinforced insulation

1 GENERAL

OMS-1 is an alarm device for monitoring the thickness of the oil layer accumulating in an oil separator. The system consists of OMS-1 control unit, OMS sensor and a cable joint.

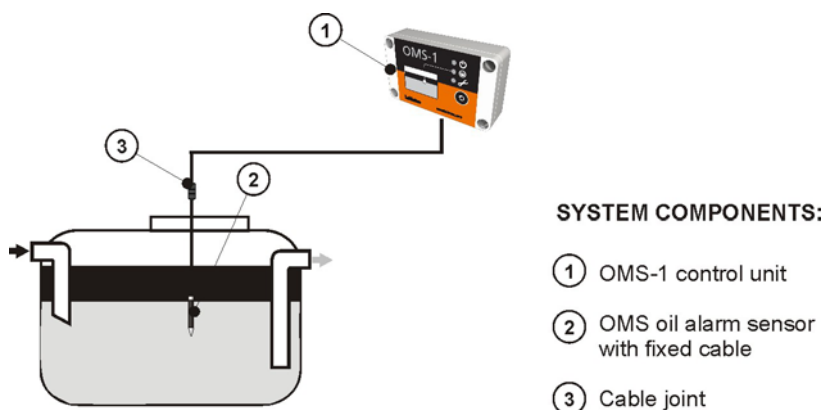


Figure 1. Oil separator supervision with OMS-1 alarm device

OMS sensor is installed into the light liquid storage chamber and gives an alarm when the chamber oil layer reaches a pre-determined level. The sensor is normally immersed in water.

The function is based on the measurement of the electrical conductivity of the surrounding liquid – water conducts electricity much better than oil.

Oil separator is regarded as potentially explosive (Ex) area. OMS-1 sensor can be installed in a zone 0, 1 or 2 potentially explosive area but the control unit must be mounted in a safe area.

The LED indicators, push button and interfaces of the OMS-1 control unit are described in figure 2.

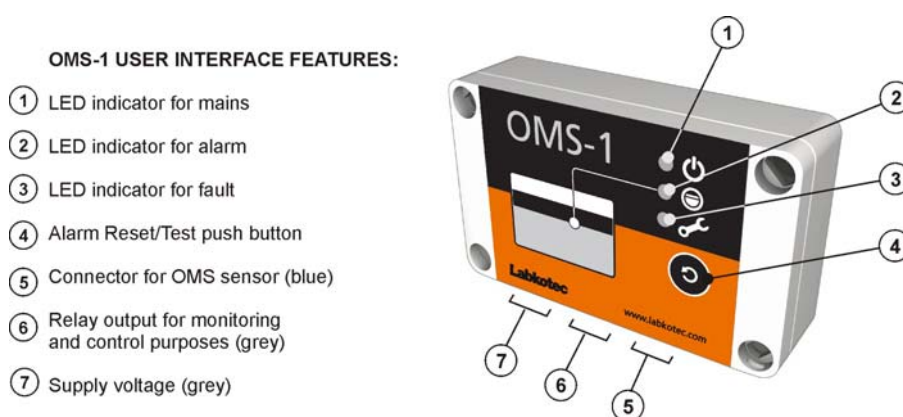


Figure 2. OMS-1 control unit - features

2 INSTALLATION

2.1 OMS-1 control unit

OMS-1 control unit can be wall-mounted. The mounting holes are located in the base plate of the enclosure, beneath the mounting holes of the front cover.

The connectors of the external conductors are isolated by separating plate. The plate must not be removed.

The cover of the enclosure must be tightened so, that the edges touch the base frame. Only then does the push button function properly and the enclosure is tight.

Before installation, please read the safety instructions in chapter 6!

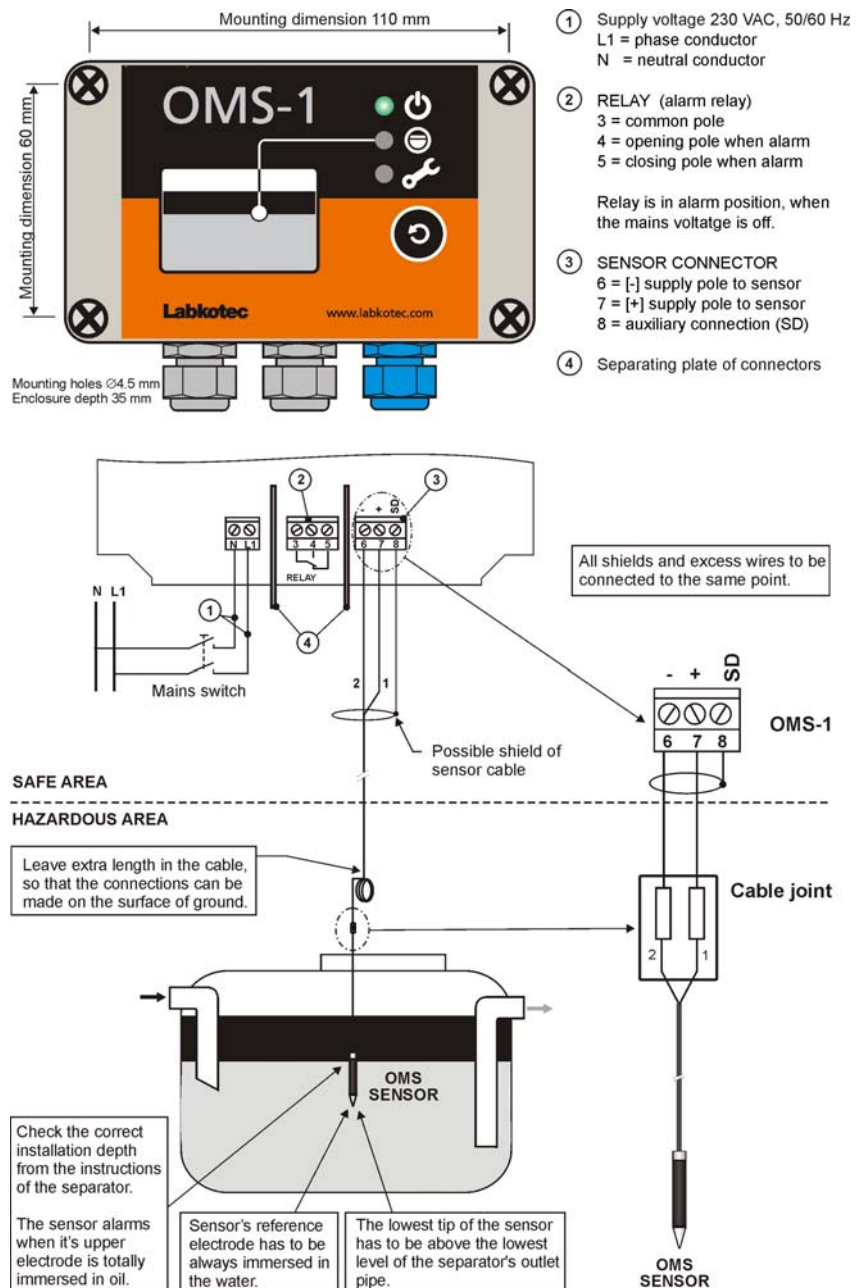


Figure 3. OMS-1 alarm device installation.

2.2 OMS sensor

OMS sensor should be installed as described in figure 3.

The sensor gives an alarm when the upper electrode is in oil.

Please check the correct installation depth also from the instructions of the oil separator.

2.3 Cable joint



Fig. 4 Cable joint

Connections of the sensor cable inside the cable joint are explained in figure 3. If shielded cable is used cable shields and possible excess wires need to be connected to the same point in galvanic contact.

Please make sure, that the sensor and cable between OMS-1 control unit and the sensor do not exceed the maximum allowed electrical parameters – see chapter 7 Technical data.

IP rating of the cable joint is IP68. Make sure, that the cable joint is closed properly.



Notice in cabling: Risk of electrostatic charging!

If the sensor cable must be extended and there is a need for equipotential grounding, it should be done with the junction box LJB2. The cabling between the OMS-1 control unit and the junction box should be done with a shielded twisted pair instrument cable. Maximum cable length is 100 m.

3 OPERATION

The operation of the alarm device should be checked always after the installation. Also check the operation always when emptying the separator or at least once every six months.

<i>Functionality test</i>	<ol style="list-style-type: none">1. Immerse the sensor into water. The device should be in normal mode.2. Lift the sensor up in air or oil. An Oil alarm should be generated (see chapter 3.1 for more detailed description).3. Clean up the sensor.4. Immerse the sensor back into water. The alarm should go off after a delay of 10 sec.
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A more detailed description of the operation is provided in chapter 3.1. If the operation is not as described here, check connections and cabling. If necessary contact a representative of the manufacturer.

3.1 Modes of operation

<i>Normal mode – no alarms</i>	<p>Sensor is totally immersed in water. Mains LED indicator is on. Other LED indicators are off. Relay is energized.</p>
<i>Oil alarm</i>	<p>Sensor is immersed in oil. (the sensor gives an alarm when the upper electrode is in oil). Mains LED indicator is on. Oil Alarm LED indicator is on. Buzzer on after 10 sec delay. Relay de-energize after 10 sec delay. (Note. The same alarm takes place when OMS sensor is in the air.)</p> <p>After removal of an alarm, the Oil Alarm LED indicator and buzzer will be off, and relay will be energized after 10 sec delay.</p>
<i>Fault alarm</i>	<p>Sensor cable break, short circuit or a broken sensor. Mains LED indicator is on. Sensor circuit Fault LED indicator is on after 10 sec delay. Buzzer is on after 10 sec delay. The relay de-energize after 10 sec delay.</p>
<i>Reset of an alarm</i>	<p>When pressing the Reset/Test push button. Buzzer will go off. If the buzzer is not reset, it goes off automatically after three days.</p>

TEST FUNCTION

Test function provides an artificial alarm, which can be used to test the function of the OMS-1 alarm device and the function of other equipment, which are connected to OMS-1 via its relay.



Attention! Before pressing the Reset/Test button, make sure that the change of relay status does not cause hazards elsewhere!

<i>Normal situation</i>	<p><i>When pressing the Reset/Test push button:</i> <i>Oil Alarm and Fault LED indicators are immediately on.</i> <i>Buzzer is immediately on.</i> <i>Relay de-energize after 2 sec of continuous pressing.</i></p> <p><i>When the Reset/Test push button is released:</i> <i>LED indicators and buzzer go immediately off.</i> <i>Relay energize immediately.</i></p>
<i>Alarm on</i>	<p><i>When pressing the Reset/Test push button for the first time:</i> <i>Buzzer will go off.</i></p> <p><i>When pressing the Reset/Test push button after that:</i> <i>Fault LED indicator is immediately on.</i> <i>Oil Alarm LED indicator remains on.</i> <i>Buzzer remains on. If it has been reset earlier, it will return to be on.</i></p> <p><i>When the Reset/Test push button is released:</i> <i>The device returns right away to the preceding status.</i></p>
<i>Fault alarm on</i>	<p><i>When pressing the Reset/Test push button:</i> <i>The device does not react to the test at all.</i></p>

4 TROUBLE-SHOOTING

Problem: **MAINS LED indicator is off**

Possible reason: Device doesn't get supply voltage.

- To do:**
1. Check that power separation switch is not switched off.
 2. Measure the voltage between poles N and L1. It should be 230 VAC + 10 %.

Problem: **No alarm when sensor in oil or air, or the alarm will not go off**

Possible reason: Sensor is dirty.

- To do:**
1. Clean-up the sensor and check the operation again.

Problem: **FAULT LED indicator is on**

Possible reason: Resistance in sensor circuit too high (cable break or out of connector) or too low (cable in short circuit). The sensor might also be broken.

- To do:**
1. Make sure, that the sensor cable has been connected correctly to the OMS-1 control unit.
 2. Disconnect sensor's [+] wire and measure resistance between [+] and [-] wires. The measured resistance should be 46-48 k Ω .
 3. If it is possible measure also resistance between [+] wire and sensor's upper electrode. The measured resistance should be 1,1 – 1,3 k Ω .
 4. If the resistance values in items 2 and 3 are correct, then OMS-1 control unit is defective, otherwise problem is in cabling or in sensor.

If the problem can not be solved with the above instructions, please contact Labkotec Oy's service.



Attention! If the sensor is located in an explosive atmosphere, the multimeter must be Exi-approved!

5 REPAIR AND SERVICE

The sensor should be cleaned and the operation should also be tested when emptying the oil storage chamber or at least once every six months. The easiest way to check the operation is to lift the sensor up in the air and to put it back to the separator. The operation is described in chapter 3.

For cleaning, a mild detergent (e.g. washing-up liquid) and a scrubbing brush can be used.

In case of queries, please contact Labkotec Oy's service:

labkotec.service@labkotec.fi.

6 SAFETY INSTRUCTIONS



OMS-1 control unit must not be installed in potentially explosive atmosphere. Sensors connected to it may be installed in zone 0, 1 or 2 potentially explosive atmospheres.

In case of installations in explosive atmospheres the national requirements and relevant standards as *IEC/EN 60079-25 and/or IEC/EN 60079-14* must be taken into account.

Warning! If the cabling is voltage-tested, the sensor must be disconnected.



If electrostatic discharges can cause hazards in the operating environment, the device must be connected into equipotential ground according to requirements with regards to explosive atmospheres. Equipotential grounding is made by connecting all conductive parts into same potential e.g. at the cable junction box. Equipotential ground must be earthed.





The device does not include a mains switch. A two pole mains switch (250 VAC 1 A), which isolates both lines (L1, N) must be installed in the main power supply lines in the vicinity of the unit. This switch facilitates maintenance and service operations and it has to be marked to identify the unit.



When executing service, inspection and repair in explosive atmosphere, the rules in standards *IEC/EN 60079-17 and IEC/EN 60079-19* about instructions of Ex-devices must be obeyed.


7 TECHNICAL DATA

OMS-1 control unit	
Dimensions	125 mm x 75 mm x 35 mm (L x H x D)
Enclosure	IP 65, material polycarbonate
Operation temperature	-30 °C...+50 °C
Supply voltage	230 VAC ± 10 %, 50/60 Hz The device is not equipped with a mains switch
Power consumption	1 VA
Sensors	OMS sensor
Relay output	Potential-free relay output 250 V, 5 A, 100 VA Operational delay 10 sec. Relay de-energize at trigger point.
Electrical safety	IEC/EN 61010-1, Class II  , CAT II
Insulation level Sensor / Mains supply voltage	375V (IEC/EN 60079-11)
EMC Emission Immunity	IEC/EN 61000-6-3 IEC/EN 61000-6-1
Ex-classification Special conditions (X) ATEX IECEX	 II (1) G [Ex ia] IIB (Ta = -30 °C...+50 °C) VTT 12 ATEX 003X IECEX VTT 12.0001X
Electrical parameters Characteristic curve of the output voltage is linear. See table 1.	U _o = 6,6 V I _o = 20,2 mA P _o = 33,3 mW
Manufacturing year: Please see the serial number on the type plate	xxx x xxxxx xx YY x where YY = manufacturing year (e.g. 12 = 2012)

In the cable parameters of OMS-1 sensor connection must be taken into account the interaction of capacitance and inductance. The table below indicates the connecting values in explosion group IIB. In explosion group IIA the values of the group IIB can be applied.

	Max. permissible value		Combined Co and Lo	
	Co	Lo	Co	Lo
II B	500 µF	300 mH	40 µH	0,15 mH
			30 µH	0,5 mH
			12 µH	1,0 mH
			10 µH	2,0 mH
			8,5 µH	5,0 mH

Table 1. OMS-1 electrical parameters

OMS sensor	
Principle of operation	Measurement of conductivity
Material	PVC, AISI 316
IP-classification	IP68
Temperature	Operation: 0 °C...+60 °C Safety: -30 °C ...+60 °C
Cable	Oil-proof cable 2 x 0.75 mm ² . Standard length 5 m, other lengths optional. The max. length of the fixed cable is 15 m. Can be extended up to 100 m..
EMC Emission Immunity	IEC/EN 61000-6-3 IEC/EN 61000-6-1
Ex-classification	 II 1 G Ex ia IIA T6 Ga According to IEC/EN 60079-11 simple apparatus.
Manufacturing year: Please see the serial number on the type plate	xxx x xxxxx xx YY x where YY = manufacturing year (e.g. 12 = 2012)

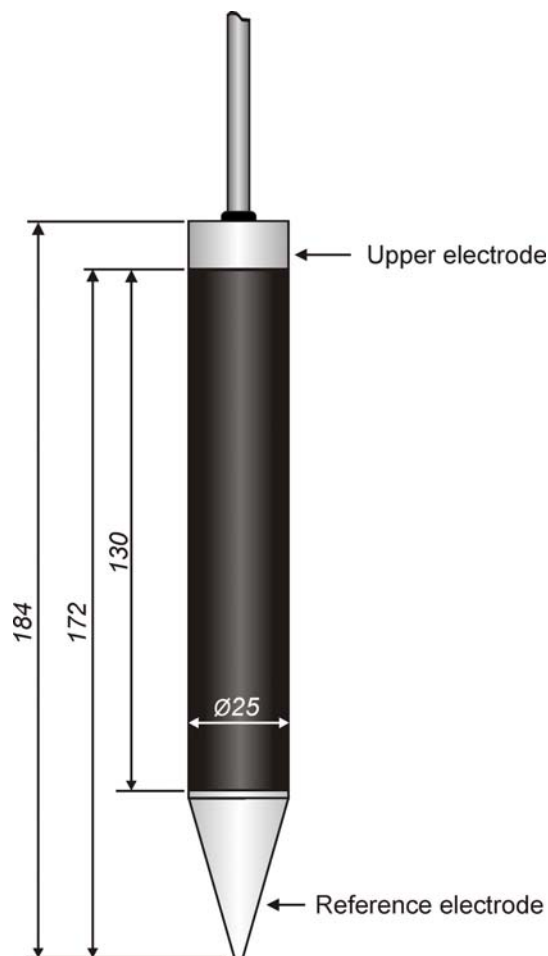
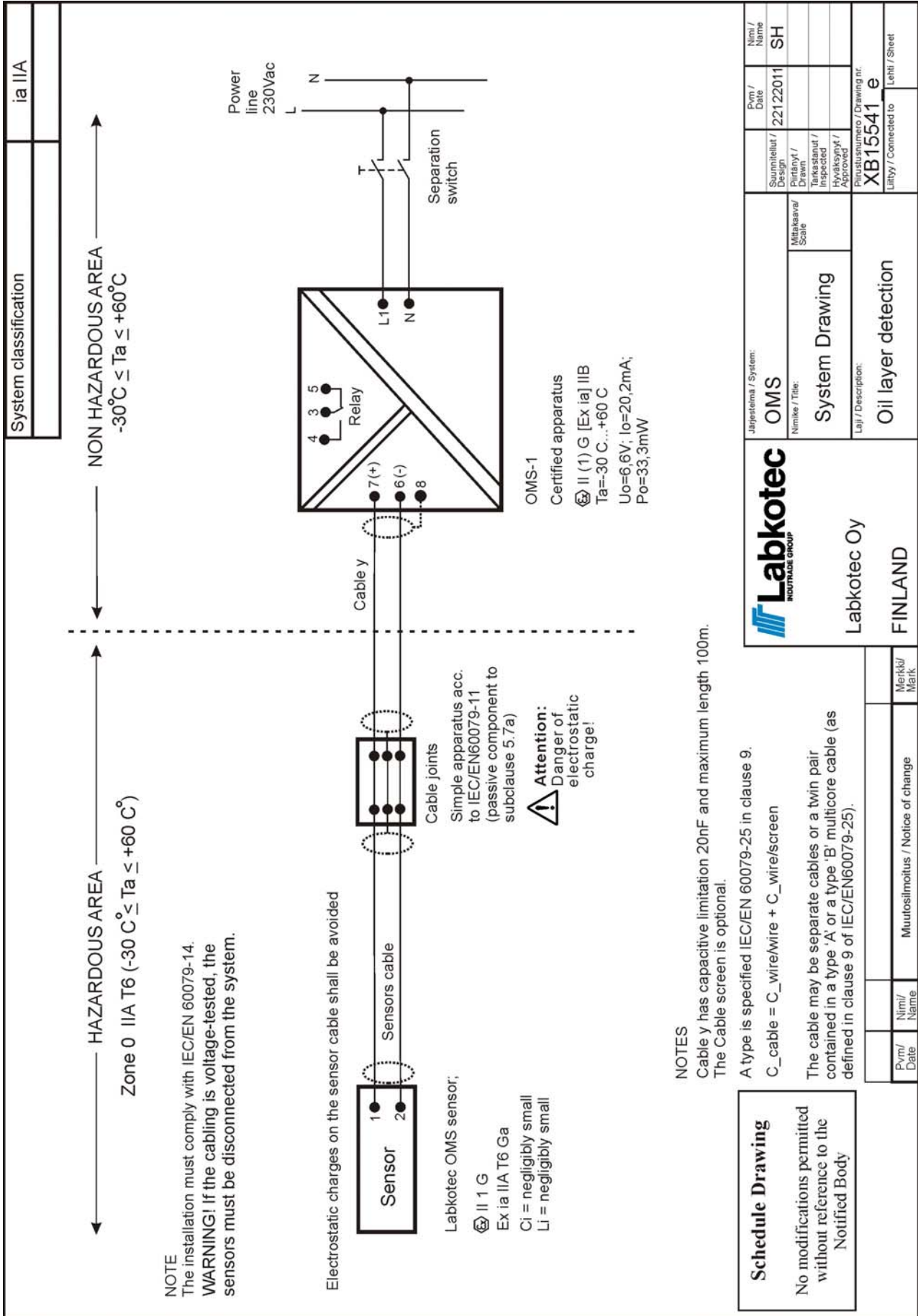


Figure 5. Dimensional drawing of OMS sensor

APPENDIX 1. OMS System drawing



Schedule Drawing

No modifications permitted without reference to the Notified Body

NOTES

Cable y has capacitive limitation 20nF and maximum length 100m. The Cable screen is optional.

A type is specified IEC/EN 60079-25 in clause 9.
 C_cable = C_wire/wire + C_wire/screen

The cable may be separate cables or a twin pair contained in a type 'A' or a type 'B' multicore cable (as defined in clause 9 of IEC/EN60079-25).

Labkotec
INDUSTRIAL GROUP

Labkotec Oy
 FINLAND

Järjestelmä / System: OMS		Perm / Date: 22122011	Nimi / Name: SH
Nimike / Title: System Drawing		Suunnittelut / Design: []	
Laji / Description: Oil layer detection		Piirityy / Drawn: []	
		Tarkastanut / Inspected: []	
		Hyväksynyt / Approved: []	
		Piirustenumero / Drawing nr: XB15541	
		Liittyy / Connected to: []	Lehti / Sheet: e

Declaration of Conformity

This declaration certifies that the below mentioned apparatus conforms to the essential requirements of the EMC directive 2004/108/EY, Low-Voltage directive (LVD) 2006/95/EC and ATEX directive 94/9/EC.

Description of the apparatus: Measuring and control unit with sensor
Type: OMS-1 control unit with OMS sensor
Manufacturer: Labkotec Oy
Myllyhaantie 6
FI-33960 Pirkkala
FINLAND

The construction of the appliance is in accordance with the following standards:

EMC:

EN 61000-6-1 (2007) Electromagnetic compatibility, Generic standards – Immunity for residential, commercial and light-industrial environments.
EN 61000-6-3 (2007) Electromagnetic compatibility, Generic standards – Emission standard for residential, commercial and light-industrial environments.
EN 61000-3-2 (2006) Electromagnetic compatibility, Product family standard: Harmonic current emissions.
EN 61000-3-3 (1995) Electromagnetic compatibility, Product family standard: Voltage changes, fluctuations and flicker sensation.

LVD:

EN 61010-1 (2010) Safety requirements for electrical equipment for measurement, control and laboratory use. Part 1: General requirements.

ATEX:

EN 60079-0 (2011) Electrical apparatus for explosive gas atmospheres — Part 0: General requirements.
EN 60079-11 (2012) Explosive atmospheres — Part 11: Equipment protection by intrinsic safety 'i'.
EN 60079-25 (2010) Explosive atmospheres — Part 25: Intrinsically safe electrical systems
EN 60079-26 (2007) Explosive atmospheres — Part 26: Equipment with equipment protection level (EPL) Ga

EC-type examination certificate: VTT 12 ATEX 003X

Ex-classification: Ex ia I G [Ex ia] II B Ta = -30°...+50°C (OMS-1 control unit)
 Ex ia IIA T6 Ga Ta = -30°...+50°C (OMS sensor)

Production quality assurance notification: VTT 01 ATEX Q 001

Notified Body: VTT Expert Services Ltd; notified body number 0537.

Address of the notified body: P.O. Box 1001, FI-02044 VTT, Finland

This product is CE-marked since 2012.

Signature

The authorized signatory to this declaration, on behalf of the manufacturer, and the Responsible Person based within the EU, is identified below.

Pirkkala 27.2.2012



Heikki Helminen
CEO
Labkotec Oy