

OMS-1

Oil Separator Alarm Device



Installation and Operating Instructions



TABLE OF CONTENTS

1	GENERAL.....	3
2	INSTALLATION	4
2.1	OMS-1 control unit	4
2.2	OMS sensor	5
2.3	Cable joint	5
3	OPERATION.....	6
3.1	Modes of operation	6
4	TROUBLE-SHOOTING	8
5	REPAIR AND SERVICE	9
6	SAFETY INSTRUCTIONS.....	9
7	TECHNICAL DATA.....	10
	APPENDIX 1. OMS SYSTEM DRAWING	11
	APPENDIX 2. EU DECLARATION OF CONFORMITY.....	12
	APPENDIX 3. EU DECLARATION OF CONFORMITY.....	13
	APPENDIX 4. UK DECLARATION OF CONFORMITY.....	14
	APPENDIX 5. UK DECLARATION OF CONFORMITY.....	15

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.

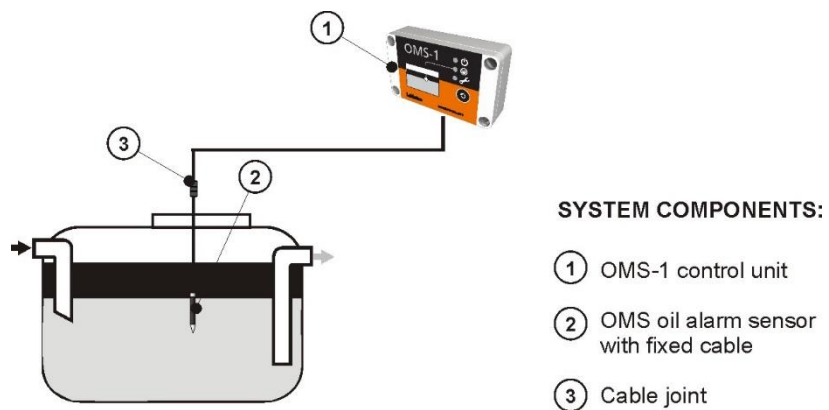


Figure 1. Oil separator supervision with OMS-1 alarm device

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.

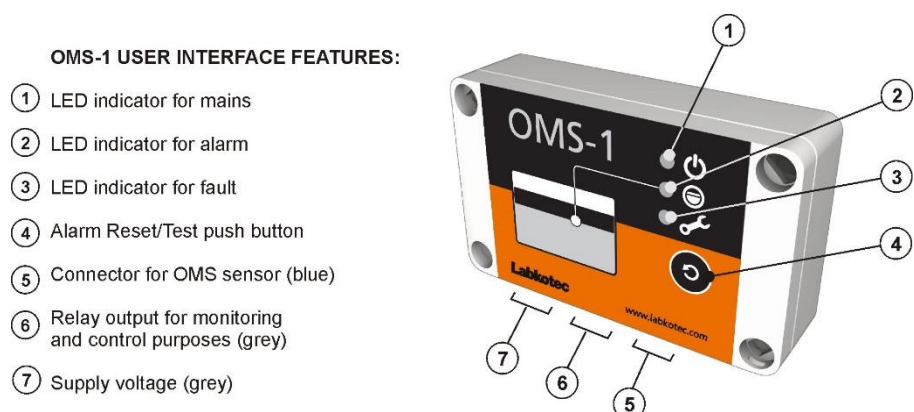


Figure 2. OMS-1 control unit - features

2 INSTALLATION

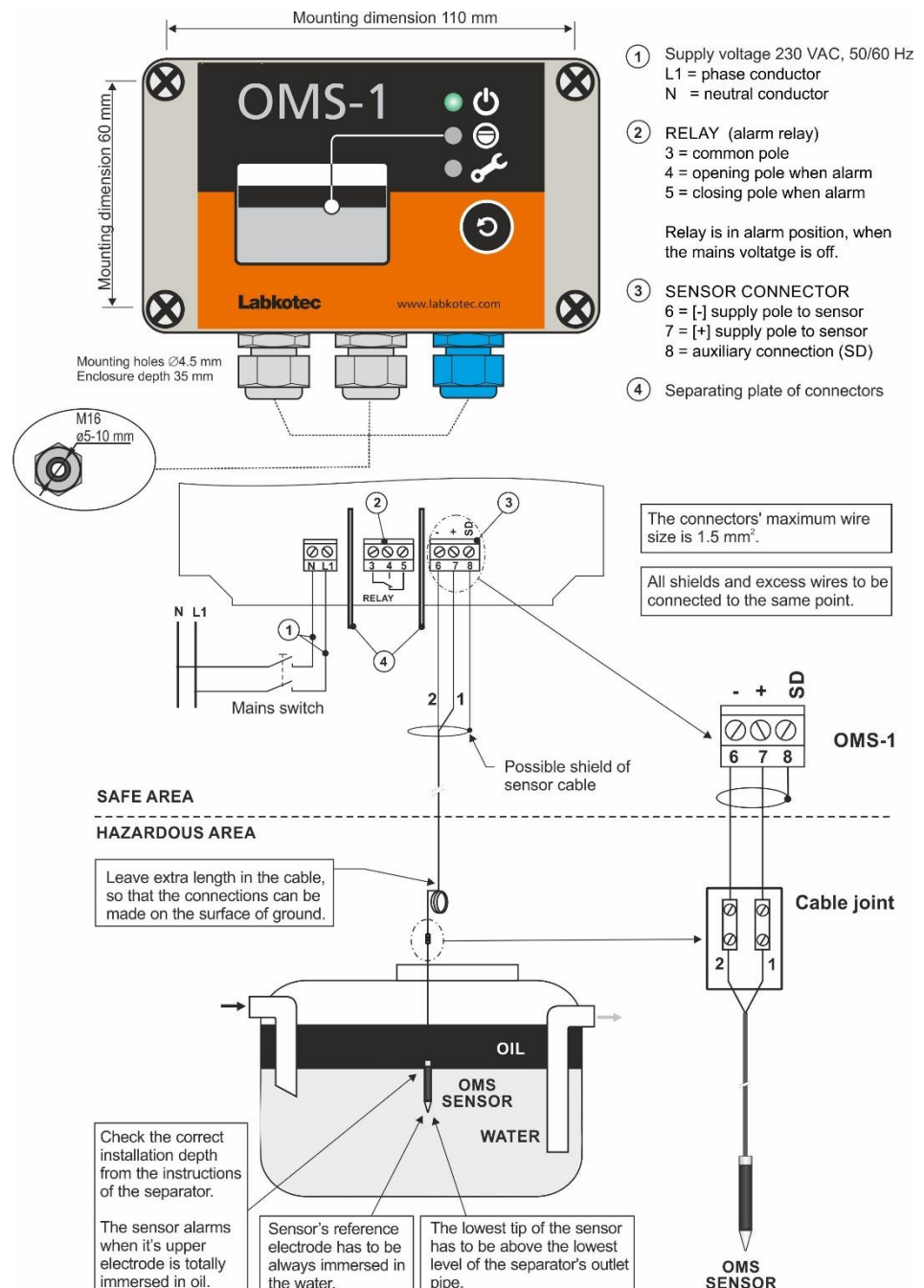
2.1 OMS-1 control unit

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!



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!

Normal situation

When pressing the Reset/Test push button:

Oil Alarm and Fault LED indicators are immediately on.

Buzzer is immediately on.

Relay de-energize after 2 sec of continuous pressing.

When the Reset/Test push button is released:

LED indicators and buzzer go immediately off.

Relay energize immediately.

Alarm on

When pressing the Reset/Test push button for the first time:

Buzzer will go off.

When pressing the Reset/Test push button after that:

Fault LED indicator is immediately on.

Oil Alarm LED indicator remains on.

Buzzer remains on. If it has been reset earlier, it will return to be on.

When the Reset/Test push button is released:

The device returns right away to the preceding status.

Fault alarm on

When pressing the Reset/Test push button:

The device does not react to the test at all.

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 \pm 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 45-51 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.

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 *EN IEC 60079-25 and/or EN IEC 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. Fuse maximum 10 A.



When executing service, inspection and repair in explosive atmosphere, the rules in standards *EN IEC 60079-17 and EN IEC 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
Cable bushings	3 pcs M16 for cable diameter 5-10 mm
Operating environment	Temperature: -30 °C...+50 °C Max. elevation above sea level 2,000 m Relative humidity RH 100% Suitable for indoor and outdoor use (protected from direct rain)
Supply voltage	230 VAC ± 10 %, 50/60 Hz The device is not equipped with a mains switch. Fuse maximum 10 A.
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	EN IEC 61010-1, Class II  , CAT II, POLLUTION DEGREE 2
Insulation level Sensor / Mains supply voltage	375V (EN IEC 60079-11)
EMC Emission Immunity	EN IEC 61000-6-3 EN IEC 61000-6-1
Ex-classification	 II (1) G [Ex ia Ga] IIB
Special conditions (X) ATEX IECEX UKEX	(Ta = -30 °C...+50 °C) EESF 21 ATEX 023X IECEX EESF 21.0016X CML 21UKEX21350X
Electrical parameters	Uo = 6,6 V Io = 20,2 mA Po = 33,3 mW
Characteristic curve of the output voltage is linear.	
See table 1.	
Manufacturing year: Please see the serial number on the type plate	xxx x xxxxx xx YY x where YY = manufacturing year (e.g. 22 = 2022)

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 µF	0,15 mH
			20 µF	0,5 mH
			12 µF	1,0 mH
			10 µF	2,0 mH
			8,5 µF	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 , Ø5,3 mm. 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	EN IEC 61000-6-3 EN IEC 61000-6-1
Ex-classification	 II 1 G Ex ia IIA T6 Ga According to EN IEC 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. 22 = 2022)

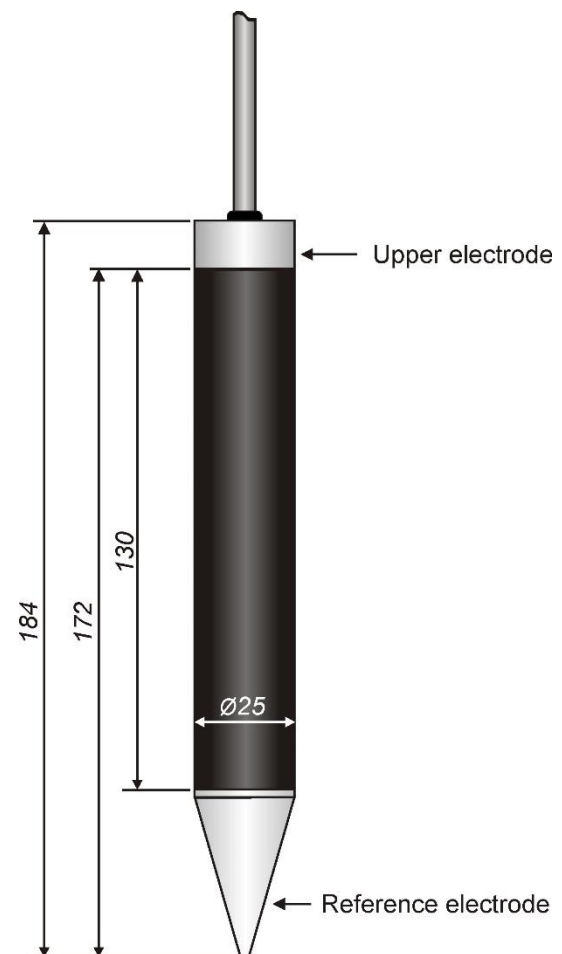
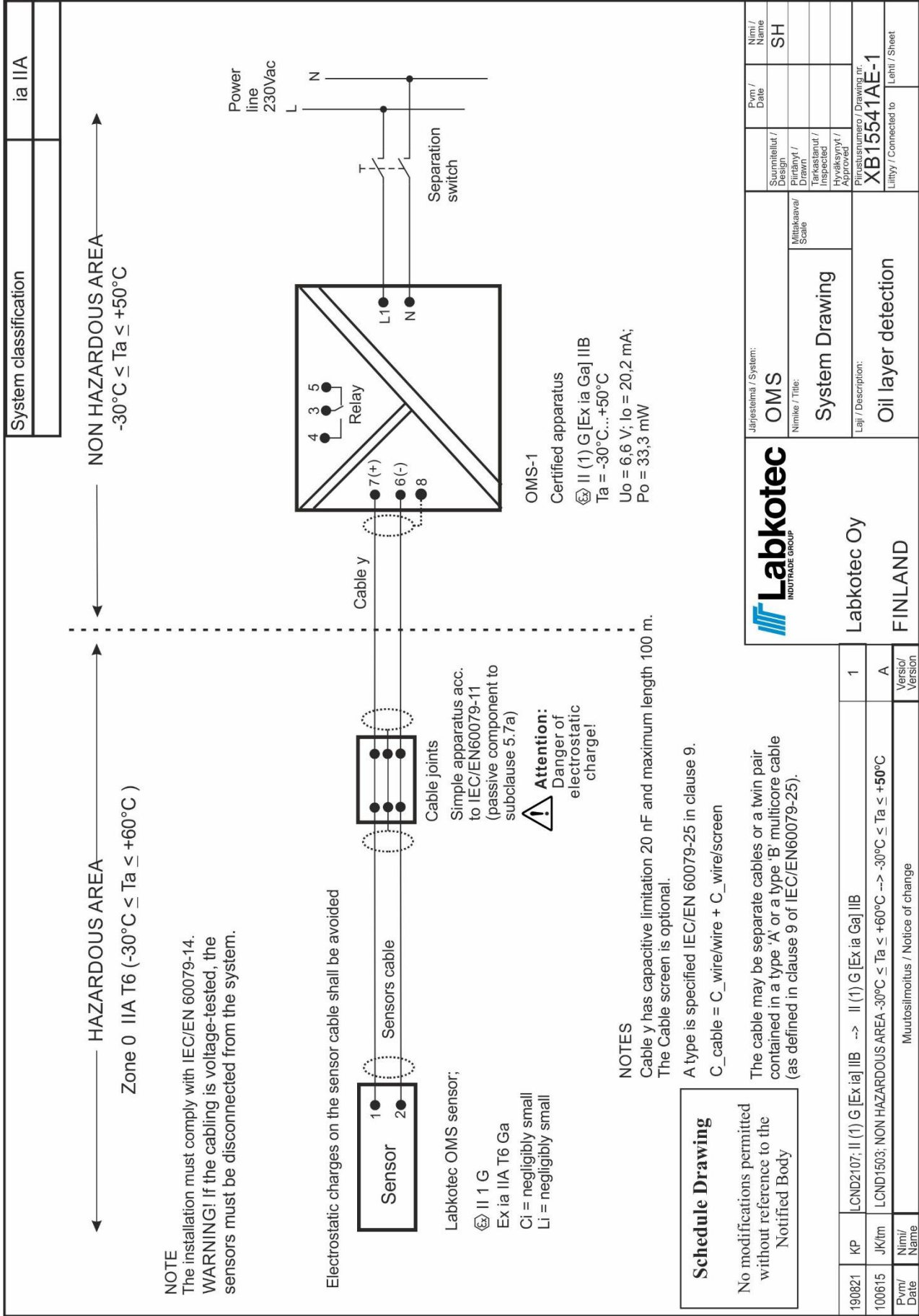


Figure 5. Dimensional drawing of OMS sensor

APPENDIX 1. OMS System drawing



APPENDIX 2. EU DECLARATION OF CONFORMITY




EU DECLARATION OF CONFORMITY

We hereby declare that the product named below has been designed to comply with the relevant requirements of the referenced directives and standards.

Product	Measuring and control unit and sensor OMS-1 Control Unit OMS Sensor
Manufacturer	Labkotec Oy Myllyhaantie 6 FI-33960 Pirkkala Finland
Directives	The product is in accordance with the following EU Directives: 2014/30/EU Electromagnetic Compatibility Directive (EMC) 2014/35/EU Low Voltage Directive (LVD) 2014/34/EU Equipment for Potentially Explosive Atmospheres Directive (ATEX) 2011/65/EU Restriction of Hazardous Substances Directive (RoHS)
Standards	The following standards were applied: EMC: EN IEC 61000-6-1:2019 EN IEC 61000-6-3:2021 EN IEC 61000-3-2:2019 EN 61000-3-3:2013/A1:2019 LVD: EN 61010-1:2010/A1:2019/AC:2019-04 ATEX: EN IEC 60079-0:2018 EN 60079-11:2012 EN 60079-25:2010/AC:2013 EC-type examination certificate: EESF 21 ATEX 023X. Notified Body: Eurofins Expert Services Ltd, Notified Body number 0537. The revised harmonised standards have been compared to the previous standard versions used in the original type certification and no changes in the "state of the art" apply to the equipment. RoHS: EN IEC 63000:2018 The product is CE-marked since 2012.
Signature	This declaration of conformity is issued under the sole responsibility of the manufacturer. Signed for and on behalf of Labkotec Oy.

Pirkkala 4.8.2021


Janne Uusinoka, CEO
Labkotec Oy

APPENDIX 3. EU DECLARATION OF CONFORMITY

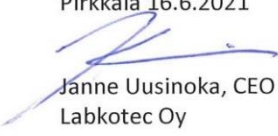


EU DECLARATION OF CONFORMITY

We hereby declare that the product named below has been designed to comply with the relevant requirements of the referenced directives and standards.

Product(s)	LCJ1-SK4 cable connector for one sensor
Manufacturer	Labkotec Oy Myllyhaantie 6 FI-33960 Pirkkala Finland
Directives	The product is in accordance with the following EU Directives: 2014/34/EU Equipment for Potentially Explosive Atmospheres Directive (ATEX) 2011/65/EU Restriction of Hazardous Substances Directive (RoHS)
Standards	The following standards were applied: ATEX: EN IEC 60079-0:2018 EN 60079-11:2012 The product is a simple apparatus according to EN 60079-11:2012 (Intrinsic Safety i). RoHS: EN IEC 63000:2018 The product is CE-marked since 2019.
Signature	This declaration of conformity is issued under the sole responsibility of the manufacturer. Signed for and on behalf of Labkotec Oy.

Pirkkala 16.6.2021


Janne Uusinoka, CEO
Labkotec Oy

APPENDIX 4. UK DECLARATION OF CONFORMITY



UK DECLARATION OF CONFORMITY

We hereby declare that the product named below has been designed to comply with the relevant requirements of the referenced regulations and standards.

Product Measuring and control unit and sensor
OMS-1 Control Unit
OMS Sensor

Manufacturer Labkotec Oy
Myllyhaantie 6
FI-33960 Pirkkala
Finland

Regulations The product is in accordance with the following UK Regulations:
S.I. 2016/1091 Electromagnetic Compatibility Regulations
S.I. 2016/1107 Potentially Explosive Atmospheres Regulations
S.I. 2016/1101 Electrical Equipment (Safety) Regulations
S.I. 2012/3032 Electrical and Electronic Equipment Regulations

Standards The following designated standards were applied:

EMC: EN IEC 61000-6-1:2019
EN IEC 61000-6-3:2021
EN IEC 61000-3-2:2019
EN 61000-3-3:2013/A1:2019

LVD: EN 61010-1:2010/A1:2019/AC:2019-04

ATEX: EN IEC 60079-0:2018
EN 60079-11:2012
EN 60079-25:2010/AC:2013

UK-type examination certificate: CML 21UKEX21350X.
Approved Body: Eurofins CML, Approved Body number 2503.

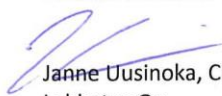
The revised harmonised standards have been compared to the previous standard versions used in the original type certification and no changes in the "state of the art" apply to the equipment.

RoHS: EN IEC 63000:2018

The product is UKCA-marked since 2022.

Signature This declaration of conformity is issued under the sole responsibility of the manufacturer. Signed for and on behalf of Labkotec Oy.

Pirkkala 10.1.2022


Janne Uusinoka, CEO
Labkotec Oy

APPENDIX 5. UK DECLARATION OF CONFORMITY

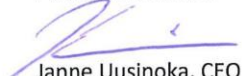


UK DECLARATION OF CONFORMITY

We hereby declare that the product named below has been designed to comply with the relevant requirements of the referenced regulations and standards.

Product(s)	LCJ1-SK4 cable connector for one sensor
Manufacturer	Labkotec Oy Myllyhaantie 6 FI-33960 Pirkkala Finland
Regulations	The product is in accordance with the following UK Regulations: S.I. 2016/1107 Potentially Explosive Atmospheres Regulations S.I. 2012/3032 Electrical and Electronic Equipment Regulations
Standards	The following standards were applied: ATEX: EN IEC 60079-0:2018 EN 60079-11:2012 The product is a simple apparatus according to EN 60079-11:2012 (Intrinsic Safety i). RoHS: EN IEC 63000:2018 The product is UKCA-marked since 2022.
Signature	This declaration of conformity is issued under the sole responsibility of the manufacturer. Signed for and on behalf of Labkotec Oy.

Pirkkala 10.1.2022


Janne Uusinoka, CEO
Labkotec Oy