Labkotec Oy
Myllyhaantie 6
FI-33960 PIRKKALA
Tel. +358 029 006 260
Fax +358 029 006 1260
Internet: www.labkotec.fi

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SET/V

High level sensor

OPERATION AND INSTALLATION MANUAL

SYMBOLS

To be considered in installations in potentially explosive atmospheres.

Warning/Attention

1. GENERAL

SET/V is a level switch sensor that is to be connected to analogical and digital SET control units of Labkotec. Operating principle of the sensor is based on the measurement of the vibration of the sensor.

Sensor is suitable to be used as a high level alarm for liquid tanks, for example. Typical applications of SET/V sensor include oil and grease separators.

The SET/V has been certified according to the ATEX Directive (94/9/EC) in equipment category 1 and it can be installed in potentially explosive atmospheres in zoned areas 0, 1, and 2.

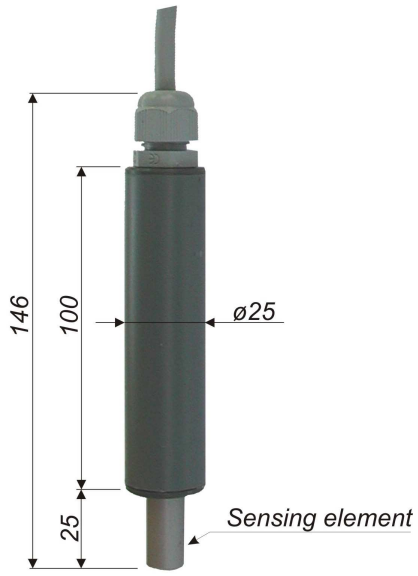

Figure 1. *Dimensional drawing of the SET/V sensor*

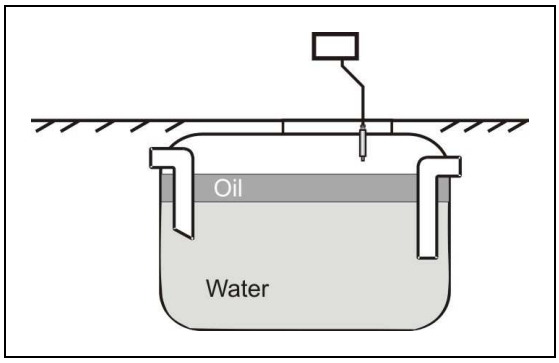

Figure 2*. Application: high level alarm for an oil separator*

2. TECHNICAL DATA

Control unit	LevelSET S and SET control units by Labkotec Oy
Signal **Operating voltage**	Digital and analogical 7mA/13mA 8V…16V (DC)
Cable	Shielded 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 with a shielded cable. The recommended maximum cable loop resistance is 75 Ω.
Materials	PA, PVC, aluminum, NBR
Temperature range	Operation: 0…+60℃ Safety: -30…+60℃
EMC Emissions Immunity	 IEC/EN 61000-6-3 IEC/EN 61000-6-2
IP-classification	IP68
Ex-classification	II 1 G Ex ia IIB T5 Ga VTT 09 ATEX 025X IECEx VTT 10.0006X Ui = 16 V Ii = 80 mA Pi = 400 mW Ci = 3500 pF Li = 85 µH
Operating principle	Vibration
Manufacturing year: Please see the serial number on the type plate.	xxx x xxxxx xx YY x where YY = manufacturing year (e.g. 10 = 2010)

The sensor may be installed in potentially explosive atmospheres of zones 0, 1, and 2 with the following special conditions (X):

– The ambient temperature is –30…+60℃.

– The risk of electrostatic charge must be observed!

Standards to be considered in the installation:

IEC/EN 60079-25 Intrinsically-safe electrical systems "i", and/or IEC/EN 60079-14 Electrical installations in hazardous areas. If the cabling is voltage-tested, the sensor must be detached from the system.

3. CONNECTIONS AND INSTALLATION

The SET/V sensor is equipped with a shielded 2-wire cable. The numbered wires 1 and 2 of the cable are connected to the corresponding connectors (1 = +, 2 = –) in the control unit. Always check the connections from the installation and operation manual of the control unit as well.

In the example shown in figure 4A, an LJB2-78-83 junction box has been used to connect the cabling to the equipotential bonding.

In figures 4B and 4C, equipotential bonding is not available. The shield is connected to the appropriate connector in the supply device.

In these kinds of arrangements, it must be ensured that the electrostatic charges do not cause a hazard. Make sure in the installation that the device and cabling are not close to a strong current or other installations and that they are not exposed to strong stream flows, mechanical abrasions, or impacts.

The cable may be shortened or extended with a junction box, if necessary.

The sensor is installed by hanging it from its cable at a suitable height so that the switch data is received as the surface level reaches the sensing element.

SET-1000 OR SET-2000 CONTROL UNIT:

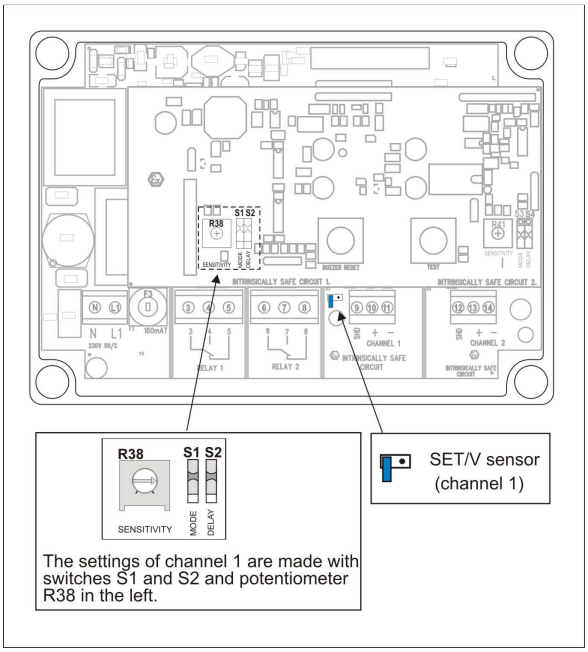

Figure 3. *Settings of SET-1000 and SET-2000 control units and selection of SET/V sensor.*

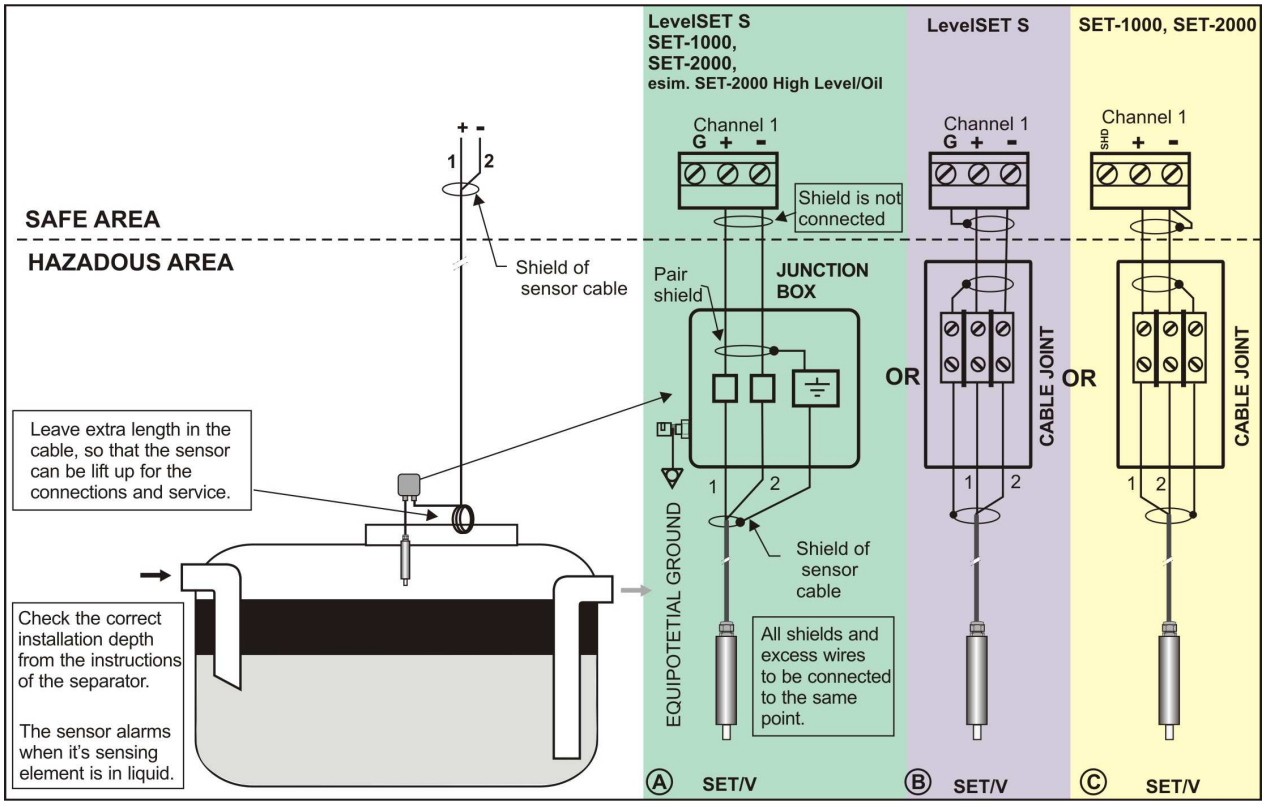

Figure 4. *Installation example in an oil separator.*

LevelSET S CONTROL UNIT:

See settings of LevelSET S control unit from its Operation and Installation Manual.

Write down the 5 digit address from the **Code field of the sensor type plate** in the installation phase for later use. This address is required if the sensor has to be re-connected to the LevelSET S system or another control unit.

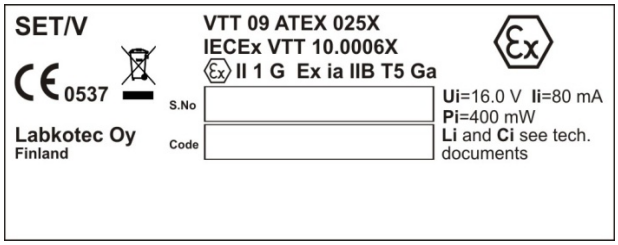

Figure 5. *Type plate of SET/V sensor*

4. OPERATION

This chapter provides a general description of the operation of the alarm in different situations. For a more detailed description, please refer to the manual of the control unit in use.

Normal mode	The SET/V high level sensor is entirely in the air. The alarm indicator lights are off. The relays are energized.
Tank full	The sensing element of the SET/V sensor is immersed in liquid. The Overfill indicator is on. The buzzer sounds The relays are de-energized. Once the alarm is off, the alarm indicator lights switch off, the buzzer stops, and the relays are energized.
Fault alarm	The sensor is broken, there is a sensor cable break or a short circuit, or the sensor signal current is not recognized (digital system). The sensor circuit Fault indicator is on. The buzzer sounds The relays are de-energized.

5. OPERATION TEST

Always check the correct operation of the alarm after the installation and after making the connections. You should also check the operation every time the separator is emptied or at least once a year.

Testing the operation

1. *The sensor is in the air. The device should be in normal mode (see chapter 4).*
2. *Lower the sensing element of the sensor into the water or oil. The "Tank full" alarm should be issued (see chapter 4).*
3. *Lift the sensor in the air. The alarm should stop after a while. Clean the sensor before installing it into the separator.*

If the sensor does not function as described, check the device settings from the control unit manual or contact the representative of the manufacturer.

6. SERVICE AND REPAIR

The sensor must be cleaned and tested when emptying the storage chamber and in connection with the annual maintenance. A mild detergent (e.g. washing-up liquid) and a scrubbing brush can be used for cleaning the sensor, if necessary.

During maintenance procedures (such as servicing the oil/fuel separator systems), the sensor should not be lifted out of the separator tank or installed back until there is water in the tank.

The instructions concerning the inspection and maintenance of Ex equipment contained in standards IEC/EN 60079-17 and IEC/EN 60079-19 should be observed when executing service, inspection, or repair procedures.

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Declaration of Conformity

This declaration certifies that the below mentioned apparatus conforms to the essential requirements of the EMC directive 2004/108/EC and ATEX directive 94/9/EC.

Description of the apparatus:	Level sensor
Type:	SET/V
Manufacturer:	Labkotec Oy Myllyhaantie 6 33960 Pirkkala FINLAND

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

EMC:

EN 61000-6-2 (2005)	Electromagnetic compatibility, Generic immunity standard, class: Industrial environment.
EN 61000-6-3 (2007)	Electromagnetic compatibility, Generic emission standard, class: Residential, commercial and light industry.

ATEX:

EN 60079-0 (2009)	Electrical apparatus for explosive gas atmospheres — Part 0: General requirements
EN 60079-11 (2007)	Explosive atmospheres — Part 11: Equipment protection by intrinsic safety 'i'
EN 60079-26 (2007)	Explosive atmospheres — Part 26: Equipment with equipment protection level (EPL) Ga
EC-type examination certificate:	VTT 09 ATEX 025X
Ex-classification :	Ex II 1 G Ex ia II B T5 Ga Ta = -30...+60°C
Production quality assessment 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

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

Pirkkala 02.11.2010

Heikki Helminen
CEO
Labkotec Oy