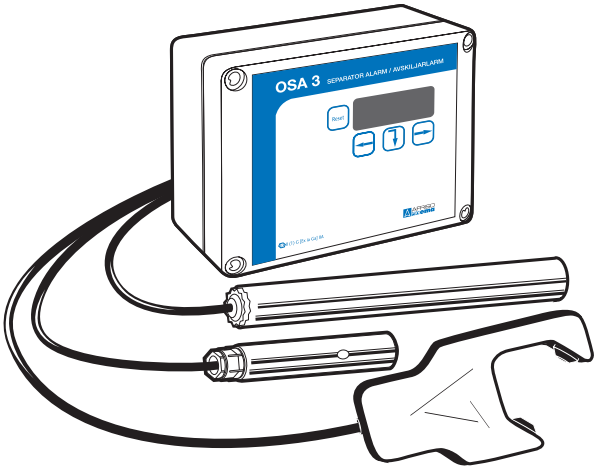
OSA 3

Level alarm for oil separator



CONTENTS:

Retain these instructions for future use.

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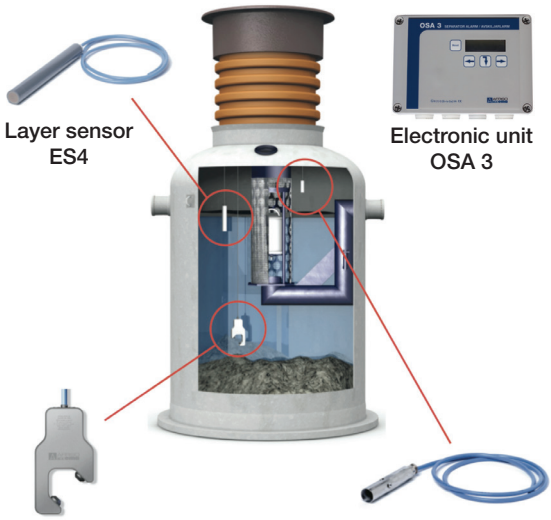
Functional description



OSA 3 is an Intrinsically Safe (Ex) grease and oil separator alarm comprising of a central alarm control unit that can accept up to three independent alarm sensors from three separate alarm points.

The IP65 enclosure housing the alarm control is designed to be mounted onto a wall or a suitably flat surface.

Note: This central alarm unit must only be mounted in a “safe-area” and never installed in an area where there a risk of an explosion.

- **ES4** Capacitance type layer (Ex) sensor for raising the alarm when the layer of oil or grease exceeds the alarm value.
- **ES8** Ultrasonic type sludge (Ex) sensor for raising the alarm when sand or particles in the separator exceed a predefined level.
- **R6-S** Thermistor type (Ex) damming sensor for indication of a high level.

OSA 3 is an Intrinsically Safe (Ex) central alarm control unit approved for use with the listed Ex sensors. The central alarm control unit has two individually programmable voltage free relay outputs (R1 and R2) that can be used to provide remote alarm monitoring or activation of secondary external alarms.

The central alarm control unit is programmable by navigation of the membrane keypad and displays the settings and alarms in a text format.

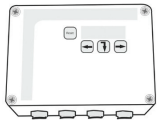
OSA 3 is supplied boxed and in the following variants:

1316	OSA 3 Level sensor
1318	OSA 3 Level and damming sensor
1319	OSA 3 Level, damming and sludge sensor
13347	OSA 3 Level and sludge sensor
13345	OSA 3 Sludge sensor

Subject to design modifications.

COMPONENT PARTS

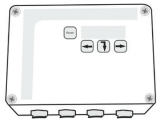
OSA 3 level sensor
Art nr: 1316



Central unit
OSA 3, 1 x

Level sensor ES4, 1 x

OSA 3 Level and damming alarm
Art no: 1318

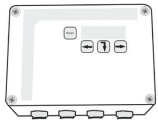


Central unit
OSA 3, 1 x

Level unit ES4, 1 x

Damming sensor R6-S, 1 x

OSA 3
Level, damming and sludge alarm
Art no: 1319



Central unit
OSA 3, 1 x

Level sensor ES4, 1 x

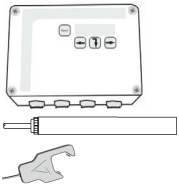
Damming sensor R6-S, 1 x

Sludge sensor ES8, 1 x

Subject to design modifications.

COMPONENT PARTS

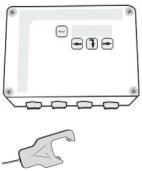
OSA 3 Level and damming alarm
Art no: 13347



Central unit
OSA 3, 1 x

Level sensor ES4, 1 x
Sludge sensor ES8, 1 x

OSA 3 Slamgivare
Art nr: 13345

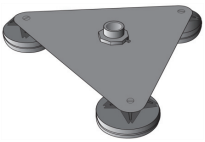


Central unit
OSA 3, 1 x

Sludge sensor ES8, 1 x

OPTIONS

Float
Float for level sensor ES4 where the surface is not constant
Art no: 1236

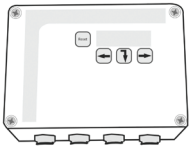


Subject to design modifications.

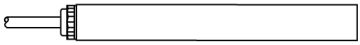
SPARE PARTS

INSTALLATION PARTS, SENSOR
Hook, grommet, cable tie, coupling sleeve
Art no: 1053

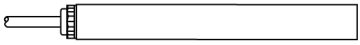
CENTRAL UNIT OSA 3
Electronic unit
Art nr: 1310



LEVEL SENSOR ES4, 5 meters
Capacitive sensor ES4. Emits alarm if thick layer of oil/grease in separator
Art nr: 1147



LEVEL SENSOR ES4, 20 meters
Capacitive sensor ES4. Emits alarm if thick layer of oil/grease in separator
Art nr: 1147



DAMMING SENSOR R6-S, 5 meters
Thermistor sensor. Emits alarm if high level in separator.
Art nr: 990143

DAMMING SENSOR R6-S, 20 meters
Thermistor sensor. Emits alarm if high level in separator.
Art nr: 990144

SLUDGE SENSOR ES8
Ultrasound sensor. Emits alarm if high sludge level in separator.
Art nr: 990143

SMS-ALARM
GSM dialler for alarm transmission.
Art nr: 1324

Subject to design modifications.

Safety regulations:

Safety symbols

SYMBOL	DESCRIPTION
	**Critical warning, risk of injury**
	**Warning: risk of injury or damage to equipment**
Note:	**Attention required**
	**To note when there is a risk of explosion.**

Regulations applicable to OSA 3

SYMBOL	DESCRIPTION
Note:	**Read instructions before installation**
	**Installation may only be carried out by a qualified installation engineer**
	**The intrinsically safe circuit must not be earthed**
	**Observe regulatory requirements when connected in an EX-classified area**

Subject to design modifications.

Checklist:

Before installation

- Do you have the knowledge necessary to carry out electrical installation? Note relevant EX regulations and regulatory requirements: EN60079-14 and EN60079-17 are particularly important.
- All pole switches should never be installed so as to prevent the disconnection of the alarm function.
- Extension cables to sensor, 2 x 1.5 mm² or 6 x 1.0 mm², max. 200 metres
- Remember to check regulations and installation instructions for your specific system

After installation

- Check the connection of the electronic unit, cable area and use of poles
- Flat strip for cover fitted on electronic unit, and cover closed
- Check installation position of sensor as per the separator manufacturer's recommendations
- Make sure the separator is filled with water as per the manufacturer's recommendation before carrying out a sensor function control
- Switch on the power and check sensor signals
- Carry out a function control as shown in the commissioning instructions

Subject to design modifications.

Installation

Wiring the system using multi-core cables

Note: Read the installation instructions

Installation should only be carried out by a suitably qualified Installation Engineer.

The intrinsically safe circuit must not be earthed

When connecting more than 1 sensor it is recommended that a junction box is used. If a junction box is not used all cable joints should be sealed using heat shrink tubing. When connecting an ES8 sludge sensor an external junction box should be used that allows the shielded cable to be grounded to earth.

When making connections between the central control unit and a junction box this should be interconnected using a multi-core cable (6-core 1.0mm²) with connections made as shown in the following diagram.

Terminals

K1: 230 VAC, 4 VA

K2: R1 Voltage free relay output (Symbols on the circuit board are indicated in the alarm condition)

K2: R2 Voltage free relay output (Symbols on the circuit board are indicated in the alarm condition)

K4: Terminal contact for membrane keypad ribbon cable (not shown)

K3: 1-G Capacitive sensor ES4

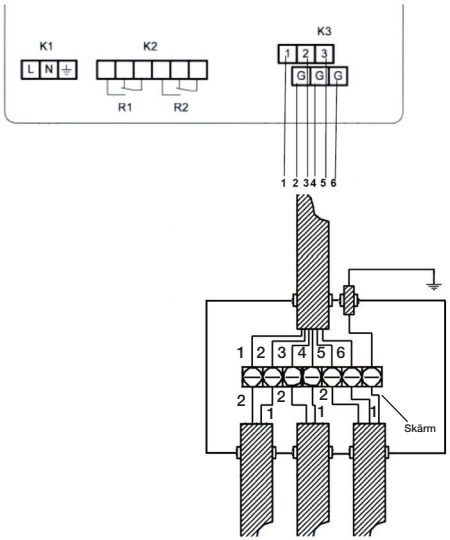
K3: 2-G Thermal sensor R6-S

K3: 3-G Sludge sensor ES8

Recommended cable

Power supply: 3 x 1.5 mm²

Multi-core cable to junction box: 6 x 1 mm²



Subject to design modifications.

Wiring the system using individual cables

When fitting an ultrasonic sludge sensor a junction box should always be used that allows the equalisation of the earth potential outside of the alarm control unit.

When connecting more than 1 sensor it is recommended that a junction box is used. If a junction box is not used all cable joints should be sealed using heat shrink tubing. When connecting an ES8 sludge sensor an external junction box should be used that allows the shielded cable to be grounded to earth.

Terminals

K1: 230 VAC, 4 VA

K2: R1 Voltage free relay output (Symbols on the circuit board are indicated in the alarm condition)

K2: R2 Voltage free relay output (Symbols on the circuit board are indicated in the alarm condition)

K4: Terminal contact for membrane keypad ribbon cable (not shown)

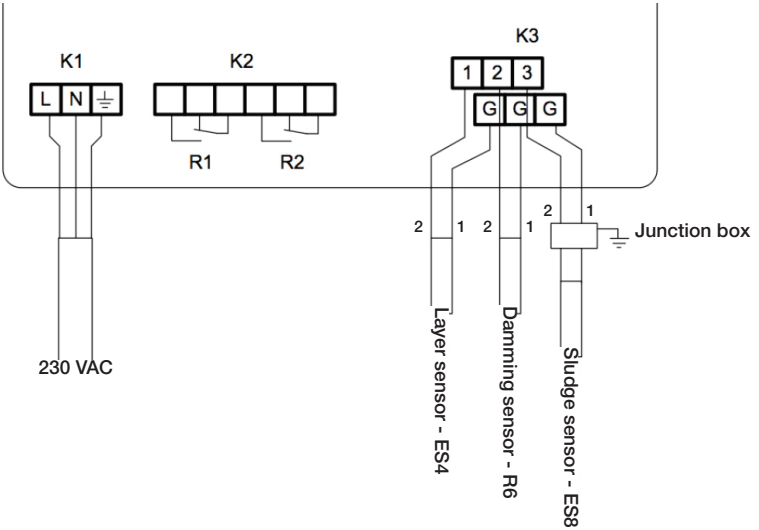
K3: 1-G Capacitive sensor ES4

K3: 2-G Thermal sensor R6-S

K3: 3-G Sludge sensor ES8

Recommended cable

Power supply: 3 x 1.5 mm²
Separate cable for sensor ES4 and R6-S: 2 x 1 mm²
Separate cable for sensor ES8: 3 x 1 mm² or 2 x 1 mm² with shielding



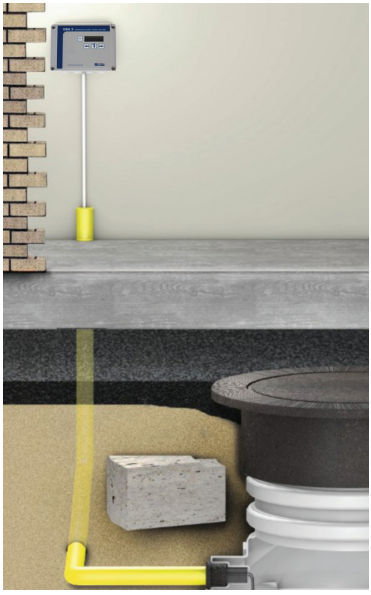
Subject to design modifications.

Assembly

The electronic must not be positioned in any area where there is a risk of explosion

All cables laid within the hazardous area zones should be mechanically protected.

OSA 3 should be wall mounted in an appropriate safe-area. It is always recommended that the power supply should be connected so as to prevent accidental isolation of the system that may result in separator alarm conditions being inactive and missed. of fitting. The exact appearance of separator types will vary from manufacturer to manufacturer.
Check with your separator manufacturer for more details.

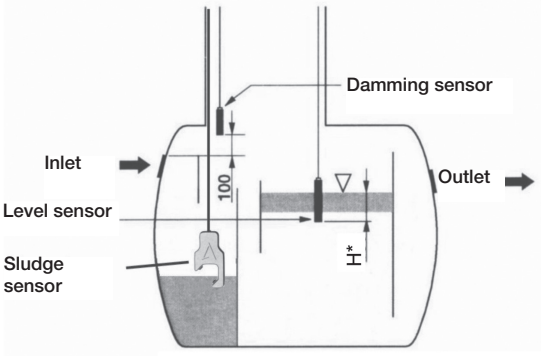


The following recommendations apply:

Level sensor ES4 is fitted so that its underside H* is fixed approx. 100-500 mm below the static water level. The precise installation depth H* below the static water level is specified in the separator manual. The underside of the level sensor must be in water so as NOT to trigger an alarm, see the illustration below.

Damming sensor R6-S is fitted approx. 100 mm above the top of the separator's intake pipe. The damming sensor must be in air so as NOT to trigger an alarm, see the illustration below.

Sludge sensor ES8 is fitted so that its underside is located at the recommended emptying height for sludge, specified in the separator manual.



H: the precise installation depth is specified in the separator manual.*

Subject to design modifications.

Commissioning

Note: For the oil/petrol/grease warning device to trigger an alarm, a marked layer must form between the water and the oil/grease/petrol. The equipment will not work in an emulsion or where grease or oil has been dissolved by chemicals

Operation on startup
The following buttons can be found on the unit: < = arrow left, > = arrow right, v = arrow down and reset to reset.

- The **"<"** and **">"** buttons are used to increase and decrease input values in the display
- "v" down is used to acknowledge the input values and to move forwards through input menus

Backlight in display:
Flashes when an alarm or an error message has been triggered. Use the reset button to acknowledge alarms.

Buzzer:
A built-in buzzer makes a noise when an alarm or an error message has been triggered. The buzzer sound is repeated automatically after 20 hours if R1 is not set for an acknowledgeable function.

Checks when starting the electronic unit
Check that all connections and installation are completed correctly before connecting to a power supply.

- Switch on the power supply to the electronic unit

This screen is displayed for approx. 15 seconds, after which the current program version can be viewed on screen.

```
SEPARATOR ALARM
STATUS OK
ver 0.07
```

The automatic setup function then commences. The first step involves setting the date and time, then the unit carries out a check of sensor inputs on startup and registers automatically connected sensors

```
Automatic Setup
```

•Set date/time

Use the arrow keys on the electronic unit to move the cursor and set the date and time. The **V** key moves from the first digit in the date and forwards every time it is pressed. To reduce a value, press **<**, and to increase a value, press **>**. When you have finished, hold down **V** for 3 sec and the unit will switch to scanning sensors.

```
<,> = INCREASE/DECREASE
v = NEXT
v (3 sec) = DONE
2012.01.01  00:00
```

Subject to design modifications.

• Scanning of sensors

The unit now starts automatically scanning the sensor inputs, after which the following screens are shown. If the unit finds a correctly connected sensor, it automatically continues searching on the next channel, i.e. 1, 2 and 3.

```
searching for sensor
          1
```

• Sensor not detected

If an input does not have a connected sensor, this can be confirmed in this routine. The **V** key is used to approve the response marked **-YES-.**

```
searching for sensor
          1
 Not connected. OK ?
-YES-            No
```

If a sensor is not detected at an input despite the sensor being connected, the same message as the one shown above will appear on screen, and in this instance it is necessary to correct any incorrect connection (see Troubleshooting).

```
SEPARATOR ALARM
STATUS OK
2012.01.01   16:00
```

When automatic startup is complete and all sensors have been detected, the unit is ready to use and the following appears in the display.

Sensor function control

All connected sensors should be tested after installation. The following must be done in order to test the various sensors:

- Capacitive layer sensor type ES4 is lifted up out of the water in order to trigger an alarm.
- Damming sensor type R6-S is dipped in water in order to trigger an alarm.
- Sludge sensor type ES8 is lifted up into air or pushed into sand/sludge in order to trigger an alarm.

Note that it may take up to approx. 60 seconds to trigger an alarm. This is because the unit requires a number of scans in line with the alarm status of the sensors in order to trigger an alarm. This is done to minimise the risk of false alarms when the alarm level is close to the sensor.

• Testing of layer sensor ES4

Lift the layer sensor up into the air and wait.
The following screen should be displayed within approx. 60 sec.

```
Layer alarm triggered
Press [Reset] to
acknowledge sound
```

Subject to design modifications.

Press the reset button, the following should then be displayed.

```
Layer alarm triggered
```

When this has been displayed, lower the sensor into the separator again. The sensor should then return to “Normal operation screen” after up to 60 seconds.

- **Testing of damming sensor R6-S**

Lower the damming sensor into water, e.g. water, and wait. The following screen should be displayed within approx. 60 sec.

Press the reset button, the following should then be displayed.

```
High level alarm triggered
press [Reset] to
acknowledge sound
```

```
High level alarm triggered
```

When this has been displayed, remove the sensor from the water and wait for up to 2 minutes. The unit should then return to “Normal operation screen”.

- **Testing of sludge sensor ES8**

Lift the sludge sensor up into the air and wait.
The following screen should be displayed within approx. 60 sec.

```
Sludge alarm triggered
press [Reset] to
acknowledge sound
```

Press the reset button, the following should then be displayed.

```
Sludge alarm triggered
```

When this has been displayed, suspend the sensor in the water again and wait for up to 2 minutes. The unit should then return to “Normal operation screen”.

Once all tests have been carried out, the unit is ready to use.

Subject to design modifications.

Operation

Normal operation
If after commissioning the functional controls no alarms appear on the display the level alarm is now ready to use. No special operation is required other than to ensure the power supply to the alarm is continually maintained in order for the sensors to detect an alarm condition.Under normal operation, the text **STATUS OK** appears in the display.

```
SEPARATOR ALARM
STATUS OK
2012.01.01   16:00
```

In the event of an alarm
In the event of an alarm, text appears in the display indicating which sensor has been actuated

Layer alarm: LAYER ALARM appears in the display and the buzzer sounds.

```
Layer alarm triggered
press [Reset] to
acknowledge sound
```

Action: This normally means it is time to order emptying of the separator.

High level alarm: HIGH LEVEL ALARM appears in the display and the buzzer sounds.

Action: This is a **critical alarm** and means that the shut-off valve in the separator has been closed or there is a blockage in the outlet to the tank. Check the instructions from the separator manufacturer to find out what action is recommended.

```
High level alarm triggered
press [Reset] to
acknowledge sound
```

Sludge alarm: SLUDGE ALARM appears in the display and the buzzer sounds.
Action: This normally means that the sludge layer in the tank is too thick, this normally results in impairment of the efficiency of the separator. Separator emptying should be ordered.

```
Sludge alarm triggered
press [Reset] to
acknowledge sound
```

Sensor error: In the event of a problem with a sensor connection, SENSOR ERROR appears in the display along with an indication of which sensor has triggered the alarm, and the buzzer sounds.
Check the sensor and its connection (see the Troubleshooting section).

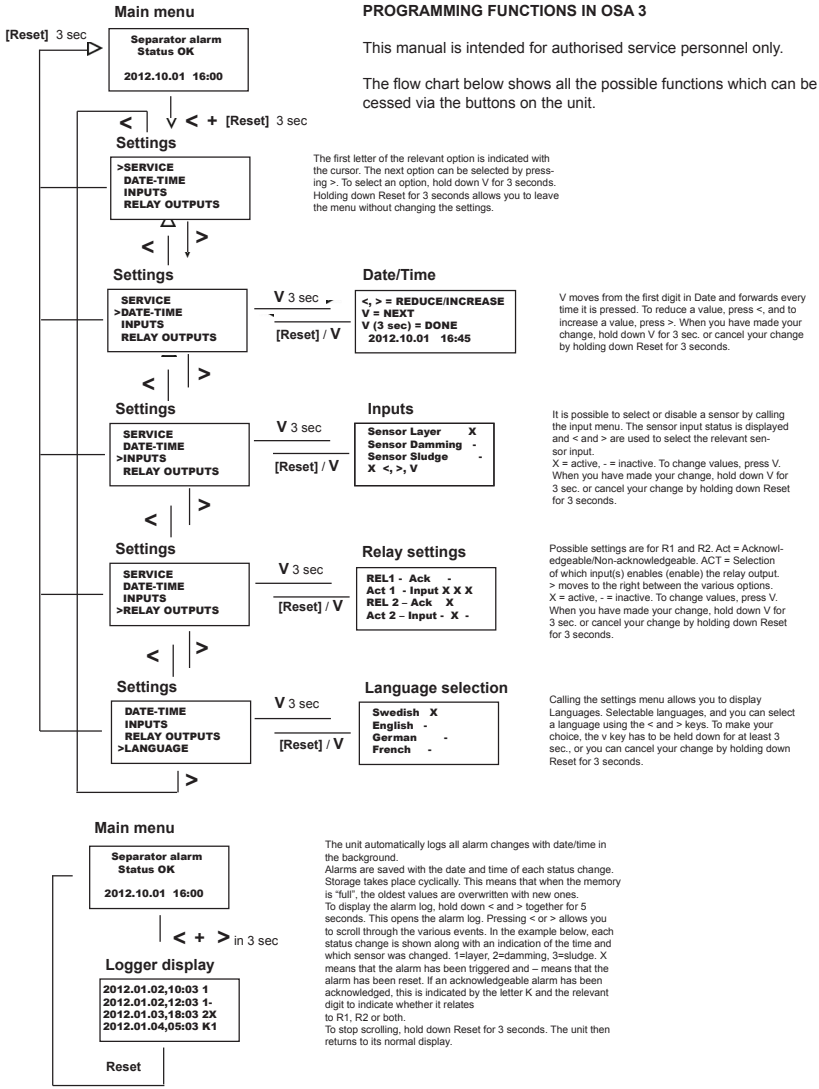
```
Sensor error at
input 3 (sludge)
see manual for
rectification [Reset]=Silent
```

Subject to design modifications.

Maintenance

The function of the separator alarm must be tested as described in SS-EN 1825 and SS-EN 858.

For more details, see the operation and maintenance instructions for the separator. The sensors may need to be periodically cleaned or wiped so as to prevent excessive deposits building up that may cause the triggering of false alarms.



PROGRAMMING FUNCTIONS IN OSA 3

This manual is intended for authorised service personnel only.

The flow chart below shows all the possible functions which can be accessed via the buttons on the unit.

Subject to design modifications.

Troubleshooting

Note: If an input did not have a sensor installed when the system was installed, this will not be scanned. To activate an inactive output, see the Maintenance section.

Note: Sensors are activated in a sequence: Sensor 1 (layer sensor ES4) active in 4 sec -> sensor 2 (thermistor sensor R6-S) active in 45 sec -> sensor 3 (sludge sensor ES8) active in 4 sec.This sequence is repeated continuously.

Checks when alarms appear in the display

Problem	Check	Cause/action
Layer alarm		
"Layer alarm triggered" alarm appears in the display	Check the thickness of the oil/grease layer	Order emptying
"Sensor error at input 1 (layer)" alarm appears in the display	Measure voltage at sensor	Error in sensor circuit to sensor (e.g. cable failure/short-circuit) / Replace faulty component
Damming alarm		
"High level alarm triggered" alarm	Blockage at outlet to separator (critical alarm)	Clear blockage or find out cause
"Sensor error at input 2 (high level)" alarm appears in the display	Measure voltage at sensor	Error in sensor circuit to sensor (e.g. cable failure/short-circuit) / Replace faulty component
Sludge alarm		
"Sludge alarm triggered" alarm	The sludge level has reached a set alarm level (normal alarm)	This normally means that the sludge layer in the tank is too great, this normally results in impairment of the efficiency of the separator. Separator emptying should be ordered.
"Sensor error at input 3 (sludge)" alarm appears in the display	Measure voltage at sensor	Error in sensor circuit to sensor (e.g. cable failure/short-circuit) / Replace faulty component

Subject to design modifications.

Voltage measurements of the sensors
In the event of a fault occurring in any of the sensor circuits an error message will be displayed on OSA 3 indicating which sensor output is detecting an error. The output voltage to the sensor in question can be measured in order to check what is wrong.

Sensors are scanned in the following sequence, and sensors can only be checked when the are active: Sensor 1 (layer sensor ES4) active in 4 sec -> sensor 2 (thermistor sensor R6-S) active in 45 sec -> sensor 3 (sludge sensor ES8) active in 4 sec. This sequence is repeated continuously.

Note: Measure the voltage and use a multimeter showing decimals in order to measure the difference in voltage.

The illustration below shows an example for connection for troubleshooting of sensor 1

Terminals 1, 2 and 3 and + feed to sensor and Terminal G is the relevant output feed.

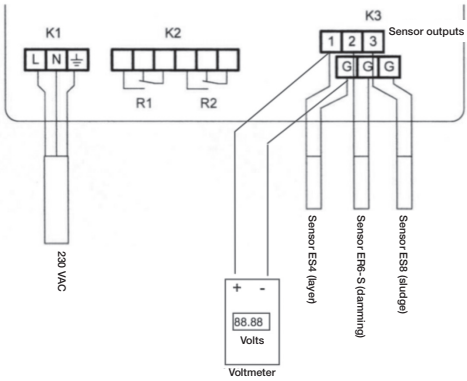


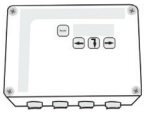
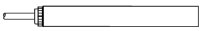
Table for check measurement of sensors

Sensor	Measurement	Error/status	Action
1 Layer sensor	19 V	Sensor not connected or cable failure	Connect sensor/troubleshoot cable
	19 V	Sensor is connected incorrectly	Check polarisation
	0.2 V	Sensor circuit short-circuited	Check sensor circuit
	13.2 V	Sensor in air or oil/grease (alarm status)	Empty separator, or if sensor
	15.3 V	Sensor in water (normal operation)	
2 Damming sensor	19 V	Sensor not connected or cable failure	Connect sensor/troubleshoot cable
	0.2 V	Sensor circuit short-circuited	Check sensor circuit
	7.5 - 12.3 V	Sensor in fluid (alarm status)	Empty/check separator
	14.2 - 16.5 V	Sensor in air (normal operation)	
3 Sludge sensor	19 V	Sensor not connected or cable failure	Connect sensor/troubleshoot cable
	19 V	Sensor connected incorrectly	Check polarisation
	0.2 V	Sensor circuit short-circuited	Check sensor circuit
	13.1 V	Sensor in air or sludge (alarm status)	Empty/check separator
	15.3 V	Sensor in water (normal operation)	

When the sensor output is inactive, the voltage at the output is 0 volts.

Subject to design modifications.

TECHNICAL DATA

Central element OSA 3	Intrinsically safe design	II (1) G [EEx ia] II B
	Intrinsically safe circuit is galvanically isolated from earth.	
	Intrinsically safe circuit sensor	C_0: 0.60 µF, L_0: 2.0 Mh I_0: 170 mA U_0: 24.9 V P0: 1.1 W
	Operating voltage	230 V, 50 Hz
	Relay outputs, contact data	Um 250 V, Im 5A, max 100 VA (AC)
	Ambient temperature, electronics	±0 - +40°C
	Enclosure class	IP 65
Level sensor ES4	Intrinsically safe design	II 1 G EEx ia II A T4
	Sensor type	Capacitive type ES4
	Must be connected to a barrier which is galvanically isolated from earth.	
	Electrical parameters	Ci: 500 nF, Li: 10 µH, Ii: 170 mA Ui: 25.0V; Pi: 1.1 W
Damming sensor R6-S	Intrinsically safe design	II 1 G EEx ia II A T3
	Sensor type	Thermistor sensor type R6-S
	Must be connected to a barrier which is galvanically isolated from earth	
	Electrical parameters	Ci: 1 nF, Li: 10 µH, Ii: 200 mA Ui: 30.0 V, Pi: 1.0 W
	Ambient temperature sensor	-25 - +50°C
Sludge sensor ES8	Intrinsically safe design	II (1) G [EEx ia] II B
	Sensor type	Ultrasound type ES8
	Must be connected to a barrier which is galvanically isolated from earth.	
	Electrical parameters	Ci: 750 nF, Li: 10 µH, Ii: 170 mA Ui: 25.0V; Pi: 1.1 W
	Ambient temperature sensor	0 - +50°C

DEFINITIONS

Level sensor Capacitive sensor ES4. Emits an alarm if there is a thick layer of oil/grease in the separator.

Damming sensor Thermistor sensor R6-S. Emits an alarm if there is a high fluid level in the separator.

Sludge sensor Ultrasound sensor ES8. Emits an alarm if there is a high sludge level in the separator.

Static level Fluid level when the separator is full so that water runs out through the outlet pipe.

Subject to design modifications.

Manufacturer declaration

Manufacturer: Afriso Ema AB,
Kilvägen 2, SE-232 37 Arlöv

Product: Separator alarm

Technical details: AC 230V, 4VA, IP65
The above-mentioned product is compliant with the following European directives and standards.

Electromagnetic Compatibility Directive:
- EN 61000-6-4 (2001), EN 61000-6-3 (2007)
- EN 61000-6-2 (2005), EN 61000-3-3 + A1:2001 + A2:2005

Low Voltage Directive:
- EN 61010-1 (2001)

ATEX Directive:

- EN 60079-0 (2006), IEC 60079-0 (2007)
- EN 60079-11 (2007) Intrinsic safety in - EN 60079-26 (2007)
- EC Type approval: SP 11ATEX3620X - Labelling: Ex II (1) G [EEx ia Ga] IIA, Ta 0..+40°C

Sign.

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Technical Manager
Date: 2012-11-28

Subject to design modifications.

Notes

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