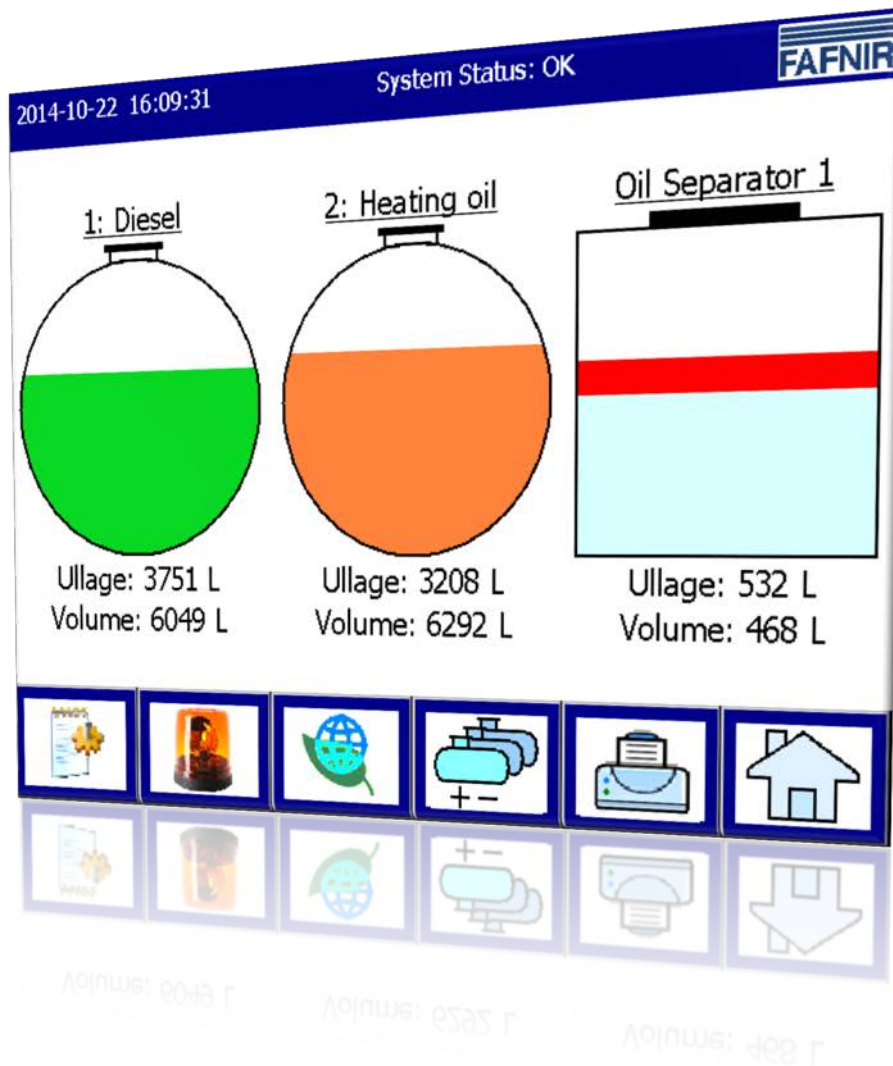


# VISY-X

VISY-SoftView from V1.7

Oil separator on the basis of VISY-Stick



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## 1 Overview

This documentation, "VISY-SoftView from Version 1.7", describes the configuration and use of oil separators ("OS") on the basis of VISY-Stick.



*During the recording of measuring data via VISY-Stick probe, the procedure with "reversed" tank table is used.*

## 2 Installation VISY-Stick oil separator

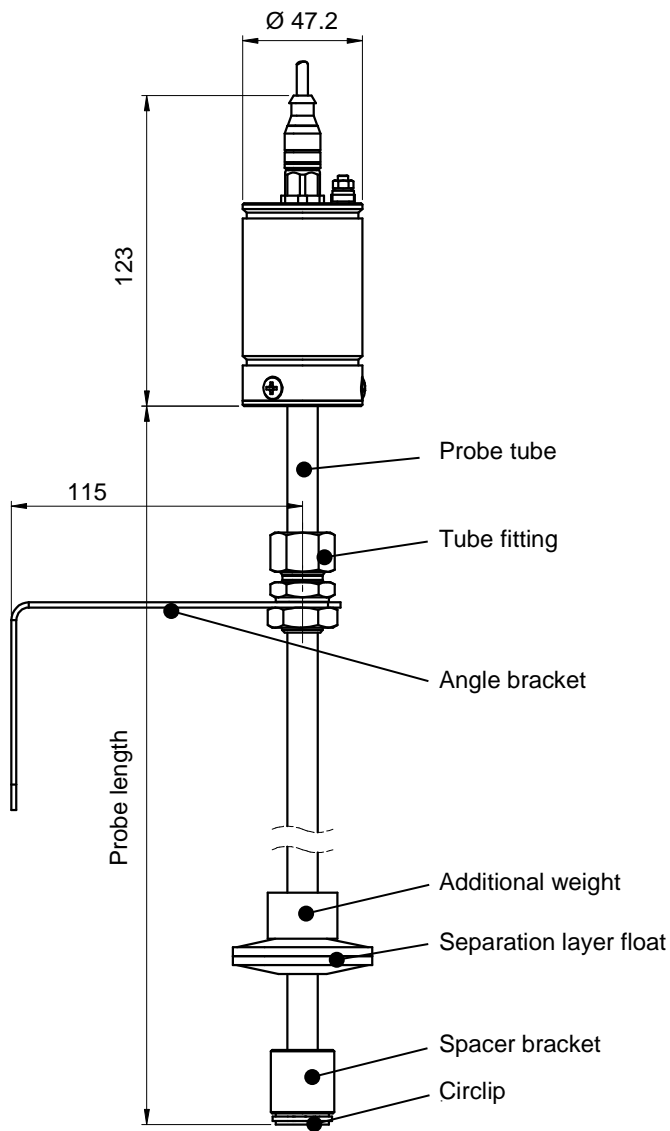
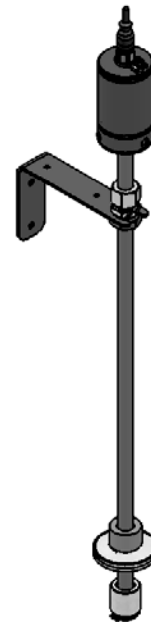


Figure 1: VISY-Stick oil separator

The VISY-Stick oil separator probe is supplied with an angle bracket (supplied separately) for installation in the oil separator, as shown below.



The angle bracket is mounted to the inner side wall of the oil separator that the separation layer float is located in the height of the oil reservoir (see Figure 2).

### 3 Oil separator - via VISY-Stick probe

#### 3.1 Overview

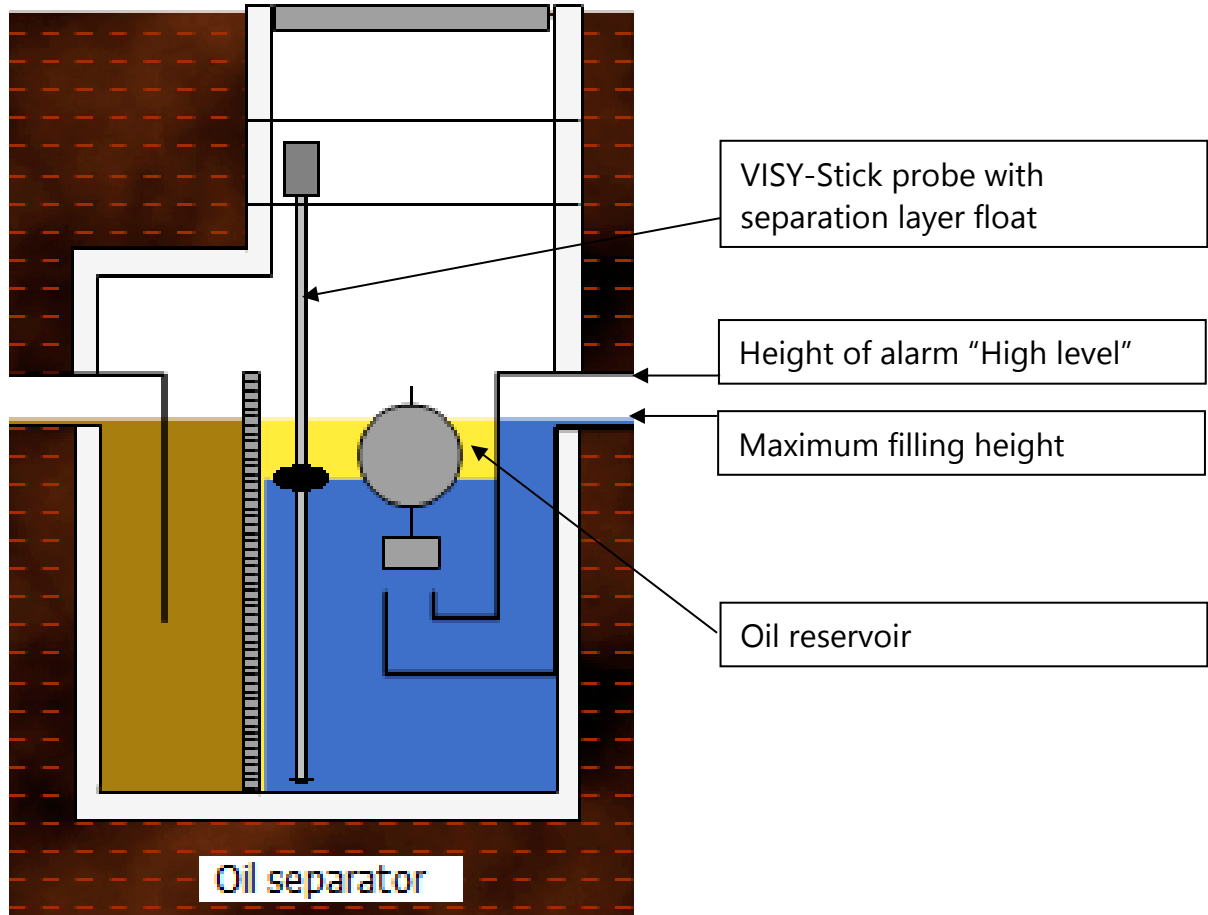


Figure 2: Oil separator with VISY-Stick probe

#### 3.2 Requirements

For configuration of the oil separator, VISY-Command GUI or VISY-View Touch and the VISY-Stick oil separator probe must be installed. In addition, the oil separator must be filled with water up to the maximum filling height.

### 3.3 Oil separator, table for oil reservoir

#### Oil reservoir

Due to the construction and design the oil separator comes with an area for storing the oil, or the "Light liquid" (= "LL"). This storage area is called "Oil reservoir" in the following (see Figure 2).

#### Oil reservoir table

To calculate the LL volume on the basis of the height ("thickness") of the oil layer, the manufacturer of the OS will generally make available a corresponding oil reservoir table.

Cons. No.	Thickness of layer / mm	Volume of oil reservoir / litres
1	0	0
2	30	100
3	60	200
4	90	300
5	120	400
6	150	500
7	180	600
8	210	700
9	240	825
10	270	920
11	300	1000

Here the thickness of the layer is indicated from the surface in the direction of the tank bottom, in a **downward** direction.

Table 1: Example of an oil reservoir table from the manufacturer of the OS

### 3.4 Adaptation to measuring methods of the VISY-Stick probes / VI-4 card

To ensure that the VI-4 card of the VISY-Command can make the volume of oil available via the corresponding interfaces, the above-mentioned table must be converted. VISY-Stick probes measure the filling levels starting from the probe base in an **ascending** direction.



*The precise recording of the "Maximum filling height" parameter is important for the conversion of the table.*

In cleaned new state the OS is generally filled with water up to the bottom edge of the outlet. If the float of the VISY-Stick probe is located at this height, this results in the "**Maximum filling height**" of the filling level measurement value of the probe. In this example, the maximum fill level is assumed to be 800 mm.

The application contains a function for saving this configuration parameter. (See chapter 3.9.4 Button: Maximum filling level for normal operation).

The filling levels [mm] of the individual parameter pairings of the VI-4 tank table now result from the subtraction of the "Layer thickness" from the "Maximum filling height". An example of this is shown in following table by means of the above-listed oil reservoir table. The following tank table for the VI-4 results from the above tank table of the OS manufacturer. "Maximum filling height" → max\_Fh

Cons. No.	Filling level / mm	Filling level / mm at max_Fh = 800 mm	Volume / litres	Comments
1	0	0	0	Necessary for VI-4 / VISY-Setup
2	max_Fh - 0	800	0	"Maximum filling height" thickness of oil layer = 0
3	max_Fh - 30	770	100	
4	max_Fh - 60	740	200	
5	max_Fh - 90	710	300	
6	max_Fh - 120	680	400	
7	max_Fh - 150	650	500	
8	max_Fh - 180	620	600	
9	max_Fh - 210	590	700	
10	max_Fh - 240	560	825	
11	max_Fh - 270	530	920	
12	max_Fh - 300	500	1000	Maximum light liquid (oil) volume

Table 2: VI-4 tank table, reversed tank table

In its result the above tank table shows several specific features:

#### Undefined areas / no parameter pairings available:

There are no parameter pairings for filling levels above the maximum filling height. In this example, 800 mm.

There are no parameter pairings for filling levels below the oil reservoir. In this example, 500 mm.

#### There are no additional parameter pairings (0 mm / 0 litres, cons. no. 1).

This parameter pairing is required for technical reasons, to be able to import the "reversed" tank table into the VI-4 via VISY-Setup.

#### Reversed characteristic curve

In the area from 500 mm to 800 mm a smaller volume results at a rising filling level; hence the designation "reversed tank table".

#### Defined area for volume display

The defined area in the tank table lies between the limits "Maximum filling height" (oil layer thickness = 0) and "Maximum oil volume".

### 3.5 Calculation of measured values

#### 3.5.1 Thickness of oil layer (= thickness of light liquid layer)

The OS probe has a special float which reproduces the height position of the water surface ("**Separation layer float**"). The oil layer is located on the water due to its lower density.

The height of the oil layer, i.e. the "**Oil layer thickness**", results as difference from the "Maximum filling height" minus the "Height position of the float".

#### Normal operation

During normal operation the float is located precisely on the position of the "Maximum filling height" or below. The above-mentioned difference, i.e. the "**Oil level thickness**", is therefore always positive during normal operation.

#### Special case of high level

When the "Height position" of the float is above the "Maximum filling height", the thickness of the oil layer can no longer be determined (it can not become negative). In this case the thickness of the oil layer is specified with "-" (i.e. "unknown").

A "High level" alarm is registered when the float position has reached the corresponding alarm threshold, or has exceeded it (see also further below). The application contains a function for configuring the high level alarm threshold.

#### 3.5.2 Oil volume (light liquid volume)

The VI-4 supplies a product volume for the assigned tank on the basis of the above-mentioned tank table. If the measured float position is within the **defined area** (see above), the volume is displayed as "Volume", or "light liquid volume".

#### 3.5.3 Oil ullage (light liquid ullage)

The oil ullage, or light liquid ullage, describes the free volume in the oil reservoir (see above). It results as a difference during the subtraction of "Maximum oil volume" minus "Oil volume".

If the measured float position is within the **defined area** (see above), the light liquid ullage is displayed as "Ullage", or "light liquid ullage".



## 3.6 Alarms

The following alarms are currently available for the OS:

- System error
- High level
- Light liquid layer too thick

### 3.6.1 System error

Failure of the sensor probe, here: when the VISY sensor status is not OK. This event can (as before) be triggered via a OS connected to a VISY-Input.

### 3.6.2 High level

The separation layer float is located above the "Maximum filling height" and the alarm threshold for the high level alarm has been exceeded.

After exceeding the high level alarm threshold, a "High level alarm" is registered.

The high level alarm threshold can be configured.



*The SEPARIX FAFNIR sensor can additionally be used for the alarm of a high level (see Technical Documentation SEPARIX, art. no. 207105).*

### 3.6.3 Light liquid layer too thick

The alarm threshold of the "Light liquid layer too thick" alarm is set with **VISY-Setup** as **Product alarm "Low"** in the unit "**mm**". For the above tank table this could be the value 560 mm (cons. no. 10, see Table 2), for example. This signals the alarm before the absorption capacity of the oil reservoir is exhausted.



*Use **VISY-Setup** to set the threshold value for the **Water alarms** to a value larger than 0, e.g. **10 mm**. This prevents an otherwise possible alarm message of "Water alarms not configured".*

### 3.7 OS maintenance function

During cleaning the OS may be completely emptied for a brief period, which means that the float would follow the sinking water level and the application would calculate an increasing oil layer (up to the maximum height) and would then trigger a corresponding alarm threshold alarm. The generation of this false alarm can be prevented with the "Oil separator maintenance function".

The maintenance state is to be activated manually before cleaning the OS - and is deactivated again manually after work has been completed.

For this the VISY-SoftView makes available an additional "Oil separator (cleaning)" function key in the area of the "System functions". The function key is visible only if at least one (1) tank probe has been configured as data source for an OS.

As long as the "OS maintenance state" exists the measured values continue to be recorded and displayed; however, **no** OS alarms are calculated and triggered, neither fill level nor other probe alarms. The OS probe can also be removed during maintenance work without an alarm ("No response") being triggered. When activating the maintenance function, the user is reminded about the automatic expiry in x hours, if an expiry time larger than zero has been entered. The expiry time can be configured (whole hours). The OS maintenance state is also displayed in the system status line by VISY-SoftView, e.g.: "System status: OK – Oil separator maintenance".

The cleaning of the oil separator takes on the average between 6 to 8 hours.

#### 3.7.1 Automatic termination of the "OS Maintenance State"

The above-mentioned state is to be exited again automatically after a given time to reactivate the monitoring system of the OS.

This is signalled to the user approximately 30 minutes before expiry; the message is to be acknowledged.

The maintenance interval is made available again by pressing the acknowledgement key.

After expiry (or manual termination of the maintenance state) the monitoring system of the OS is reactivated and the alarms are calculated and will continue to be processed on the basis of the available measured values.



*The OS maintenance state will only be monitored time-based if a time of more than zero (0) hours have been entered for the automatic end of the maintenance state.*

### 3.8 Representation

An OS according to the above measuring principle is (as before) displayed as part of the environmental sensor system and treated further.

Additionally:

- There is the option of additionally displaying the OS in the main window (at the tanks).
- Display of measured values:
  - Height of the light liquid layer (mm)
  - Volume of the light liquid layer (litres)
  - Light liquid ullage (litres)

#### 3.8.1 Display in the main window (at the tanks)

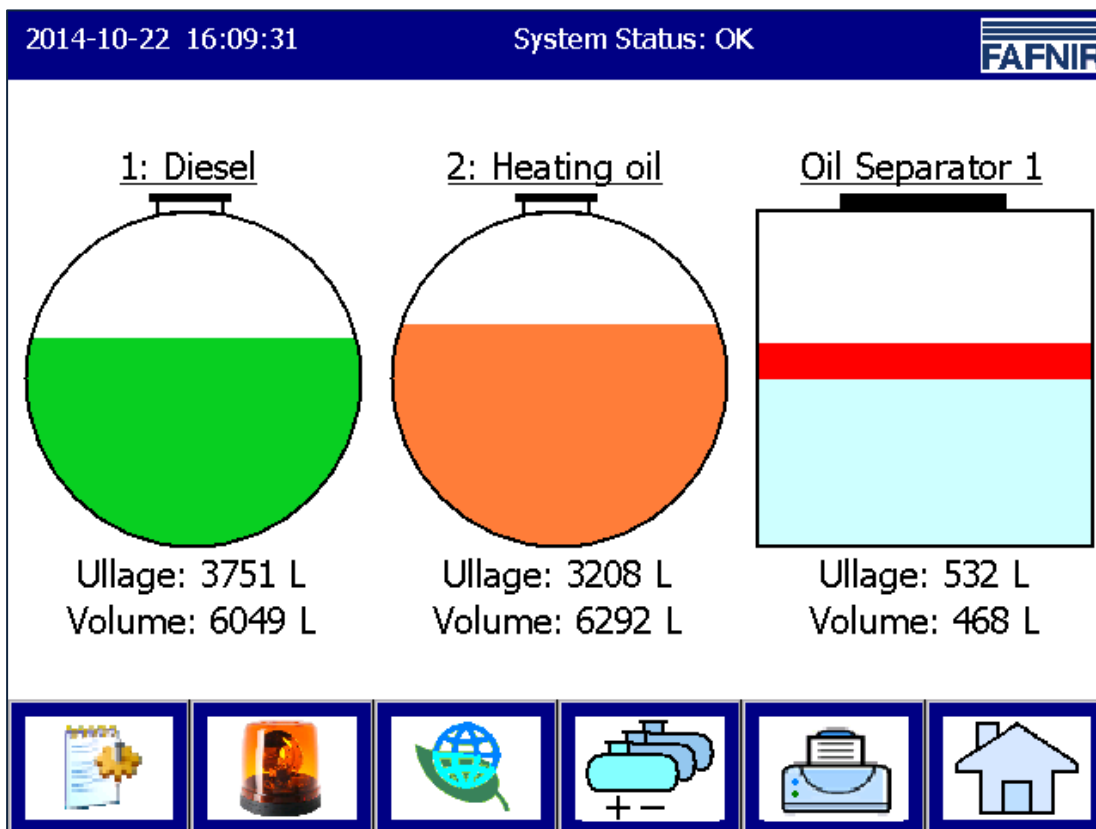



Figure 3: Main window



*The display of the OS in the main window (at the tanks) can be configured.*

### 3.8.2 Detail view

Main window / Oil separator 1 or Environmental sensor system / Oil separator / Oil separator 1

 The OS graphic and the measured values are only displayed if the data are recorded according to the above-mentioned measuring principle.

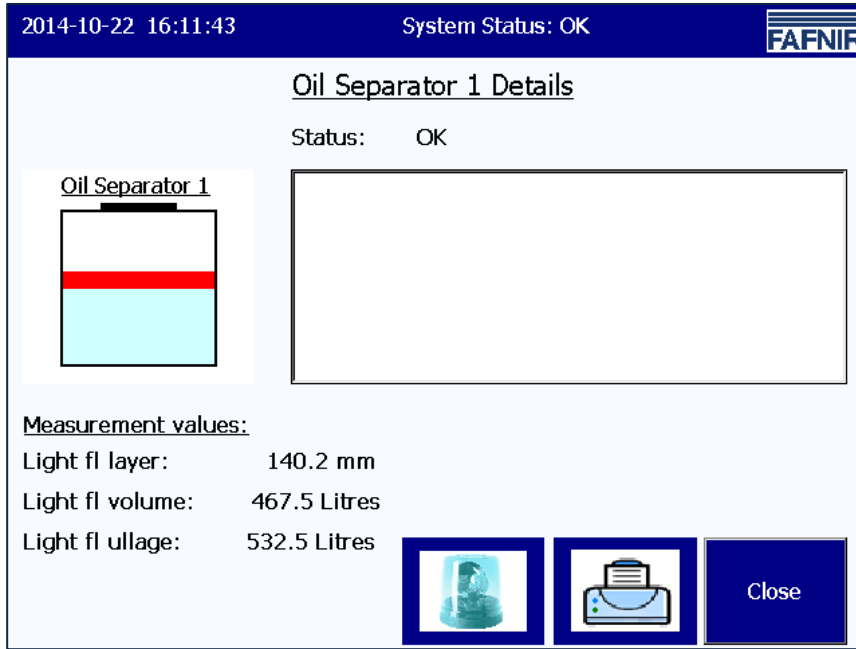


Figure 4: Details of the oil separator based on VISY-Stick

### 3.8.3 Oil separator graphics

**Normal state, with oil layer, no alarm**

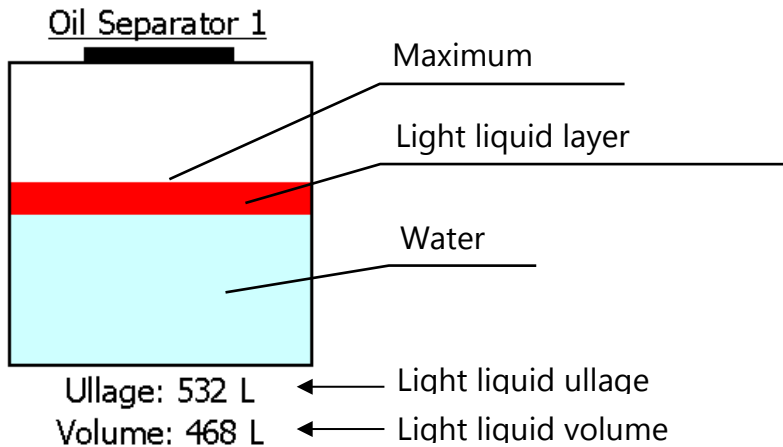


Figure 5: OS in main window, no alarm

### OS with alarm "Light liquid layer too thick"

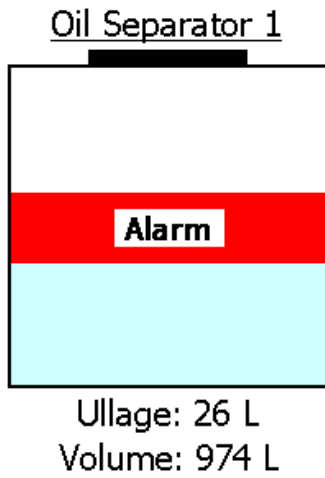
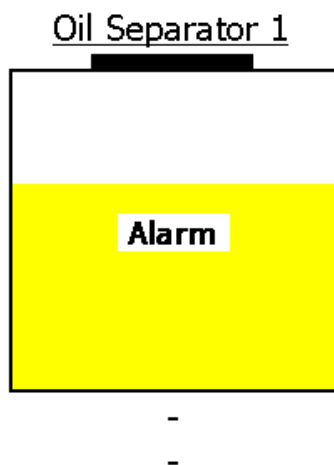


Figure 6: OS with alarm "Light liquid layer too thick"

### OS with alarm "High level"



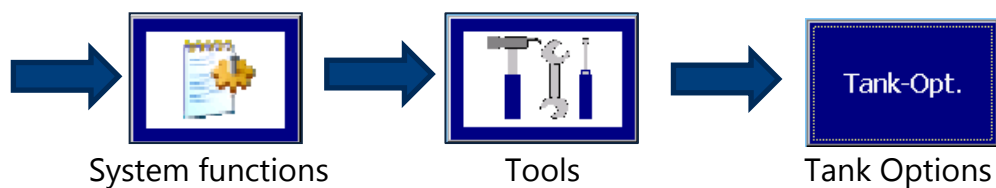
*During "high level" the float of the probe is above the "Maximum filling height" and outside the defined area of the tank table.*

*That is why no measured values can be displayed.*

Figure 7: OS with high level alarm

## 3.9 Configuration

A VISY-Stick based oil separator is configured in the "Tank option" functions:



### 3.9.1 Configuration user interface

In the "tank-options" menu the needed parameter buttons are displayed. The basic setting is the use/display as "Tank".

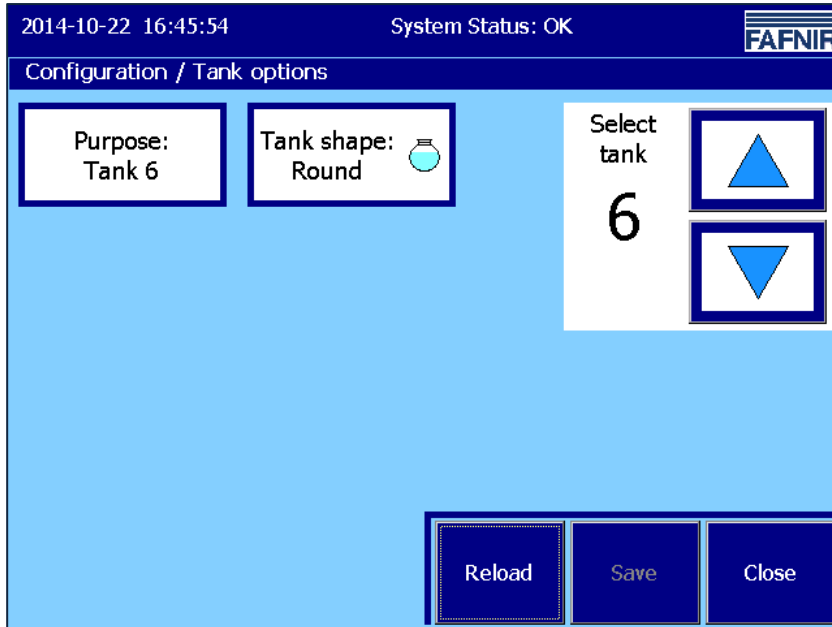


Figure 8: Tank options - Basic setting display of tank

With the "Use" button a different use can be assigned to the selected tank (right), "Tank 6" in this example.

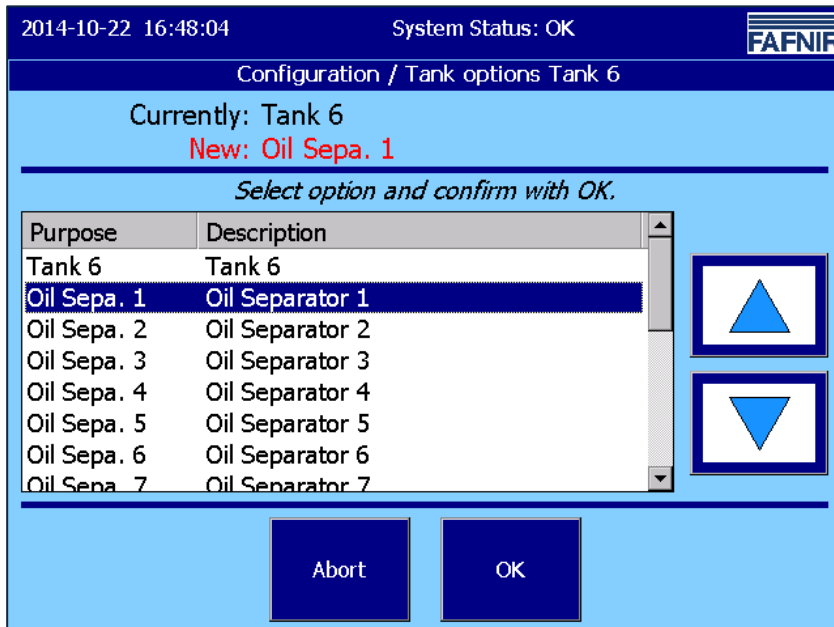


Figure 9: Tank options - Use as oil separator

The appropriate use can be selected with the "Arrow keys".

The selected use is taken over or discarded in the configuration interface with "OK" or "Cancel".

In the following example the option "Oil separator 1" was selected as use.

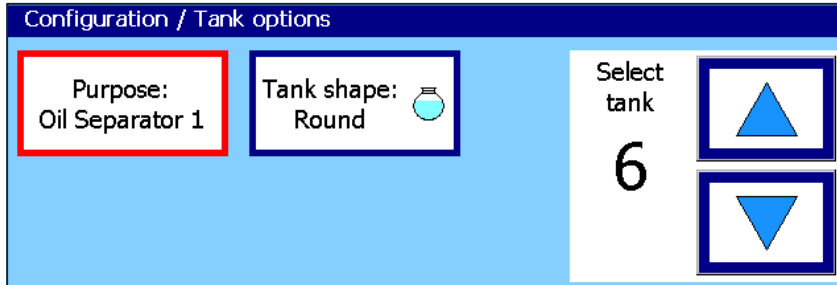



Figure 10: Tank options - Use as oil separator

To be able to enter additional parameters for "Oil separator 1", the selection must first be **saved**.

 *Red framed cells need to be confirmed with the "Save" button to take over the changed values. Without confirming the changed values are not applied.*

After saving the use as "Oil separator x", further input fields are displayed.

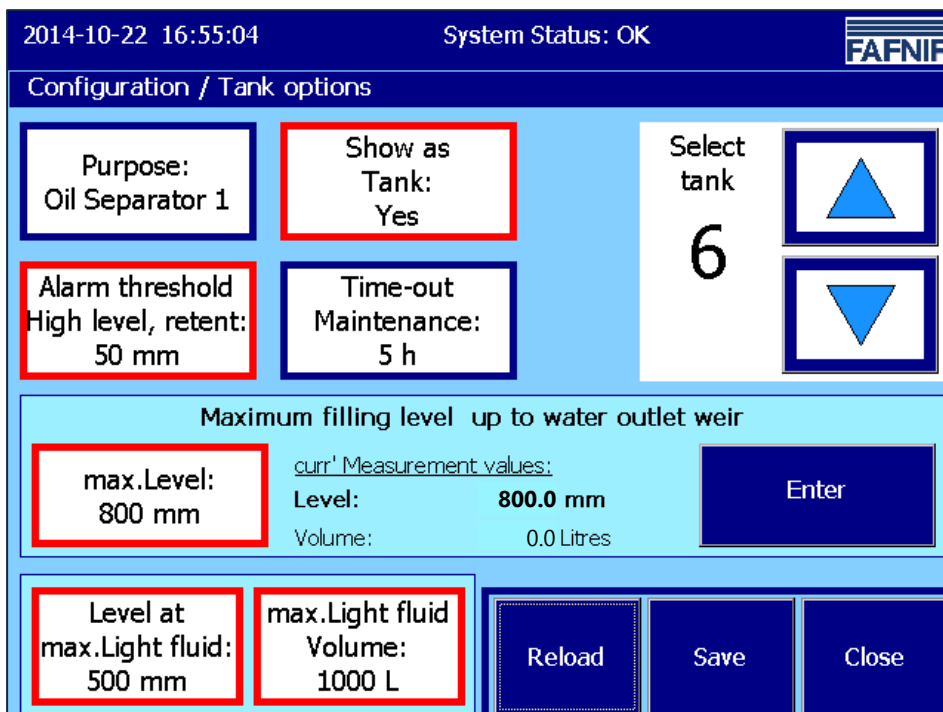


Figure 11: Tank options - Parameters for oil separator

For the configuration of an oil separator according to the above-stated measuring principle the following parameters are to be specified:

- Use as oil separator
- Display as tank
- Alarm threshold high level
- Automatic termination of the maintenance state
- Maximum filling level
- Filling level at maximum light liquid volume
- Maximum light liquid volume

### **3.9.2 Use: Allocation of tank probe / oil separator**

The VI-4 supplies data for up to 16 tank probes. For the allocation of "Tank TT" the probe (as before) is used as data source for the display of tank "TT".

This then also becomes the default setting.

For the OS data recording according to the above-stated principle the tank probe is here assigned to an OS as "Data source". The assigned (environmental) OS then obtains its data (additionally) from the information of the assigned tank probe.

In the example (Figure 11) the oil separator 1 receives its data from the probe terminal 6 of the VP board.

### **3.9.3 Button: Display as a tank (Yes/No)**

**No:** An OS with data recording according to the above-stated principle is displayed in the default setting only as part of the environmental sensor system.

**Yes:** With parameter "Display as tank: Yes", the OS is also displayed at the tanks in the main window.



### 3.9.4 Button: Maximum filling level for normal operation

(See chapter 3.4 Adaptation to measuring methods of the VISY-Stick probes / VI-4 card)

Maximum filling level up to water outlet weir	
<b>max.Level:</b> <b>800 mm</b>	<u>curr' Measurement values:</u> <b>Level: 800.0 mm</b> <b>Volume: 0.0 Litres</b>
	<div style="background-color: #000080; color: white; padding: 10px; display: inline-block; border: 1px solid black;">Enter</div>

Figure 12: Input of the maximum filling level

Here enter the filling level signalled by the probe, which becomes available when the OS in its cleaned new state is filled with water up to the bottom edge of the outlet. This value is the **essential** prerequisite for calculating the "reversed" tank table and specifies the filling level at a "Maximum filling height" (oil layer thickness = 0). The current measured values of the VISY-Stick probe are displayed on the right side of the "Maximum filling level" button. When the water has been completely filled, the values for the maximum "Filling level" can be taken over by pressing the "Accept" button.

### 3.9.5 Button: Alarm threshold "High level"

(See chapter 3.6.2, page 6)

This parameter describes the path from "Maximum filling level" up to the "High level" alarm threshold (in this example 50 mm).

### 3.9.6 Button: Automatic termination of the OS maintenance state

(See chapter 3.7.1, page 7)

This parameter is specified in full hours and **generally** applies to the time monitoring of the OS maintenance state.



*Usually maintenance services take between 5 to 8 hours.*

### 3.9.7 Button: Filling level at maximum light liquid volume

This parameter refers to the parameter pairing "Maximum oil volume" in Table 2: VI-4 tank table, reversed tank table.

Here enter the filling level [mm] at a maximum light liquid volume according to the above-listed table. In this example, 500 mm.

### **3.9.8 Button: Maximum light liquid volume**

This parameter refers to the parameter pairing "Maximum oil volume" in Table 2: VI-4 tank table, reversed tank table.

Here enter the maximum light liquid volume [litres] according to the above-listed table. In this example, 1000 litres.

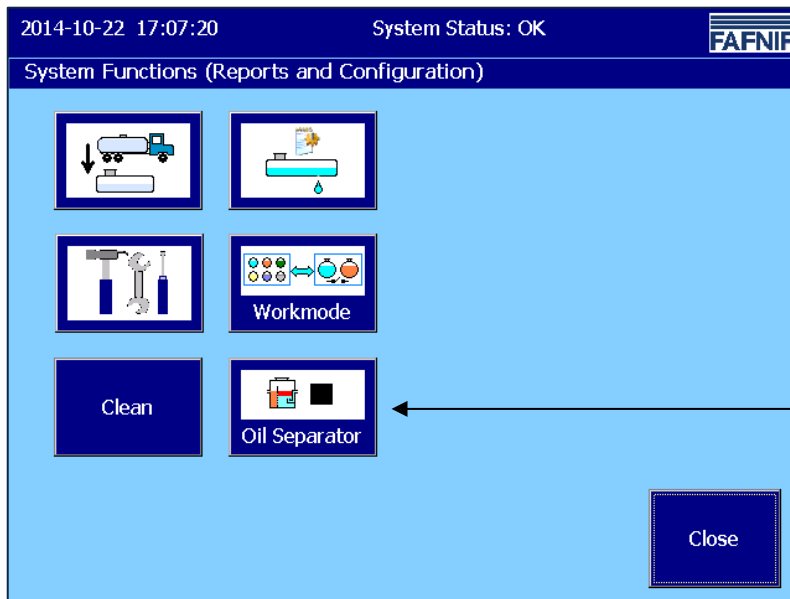
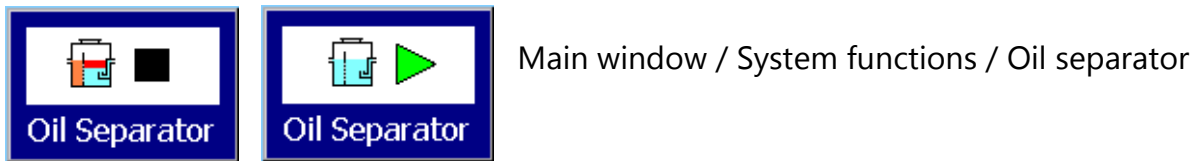
### **3.9.9 Save**

The configuration values entered are permanently saved with button "Save".

### **3.9.10 Configuration completed**


After these steps, the configuration has been completed.

### 3.10 Oil separator maintenance state



The "Oil separator" button is displayed with two different graphics; each of the symbols points to the action carried out when the button is pressed.

Figure 13: System functions - Oil separator

 *The "Oil separator" button is only displayed when at least one OS has been configured according to the above-stated measuring principle.*

The function applies in general to all OSs according to the above-state measuring principle.

### 3.10.1 Oil separator in operation



The graphic shows an OS in use; the black square points symbolically to the "STOP" function that is carried out when the button is pressed: the OS maintenance state is being activated.



The change from the operating to the maintenance state is reported to the user; the impact with respect to the OS alarms is pointed out.

If the time monitoring of maintenance state is enabled, it is pointed to the automatic termination (here: time out in 8 hours)

Figure 14: Message when activating the maintenance state

### 3.10.2 Oil separator in maintenance state



The graphic shows a cleaned OS; the green triangle points symbolically to the "START" function that is carried out when the button is pressed: the OS maintenance state is being terminated and the OS is in operation again.



The change from the maintenance to the operating state is reported to the user.

Figure 15: Message when finishing the maintenance state

The existing maintenance state is, among others, also pointed out in the system status line, as well as in the status line of the individual display of the oil separator.

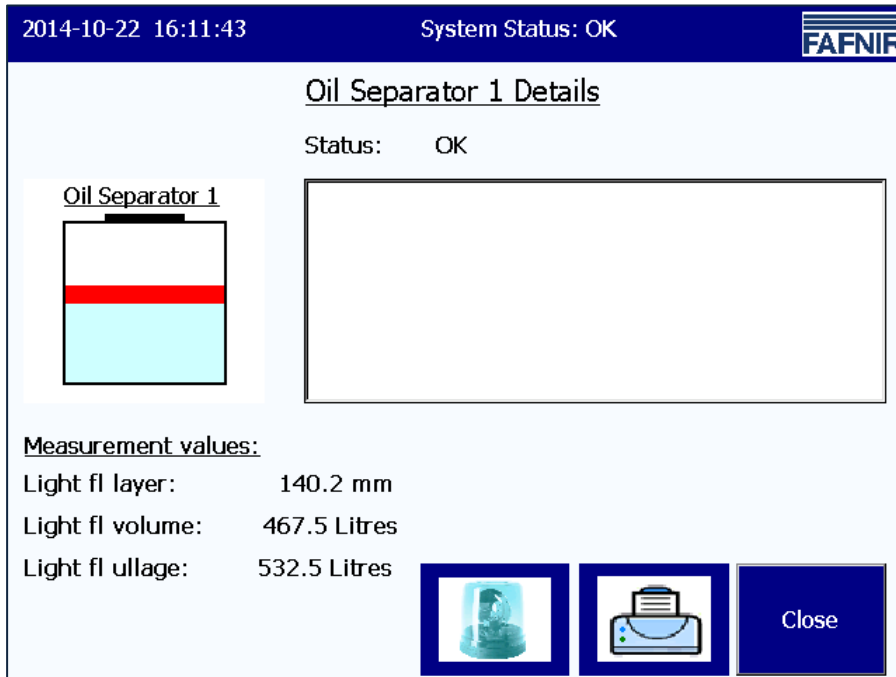
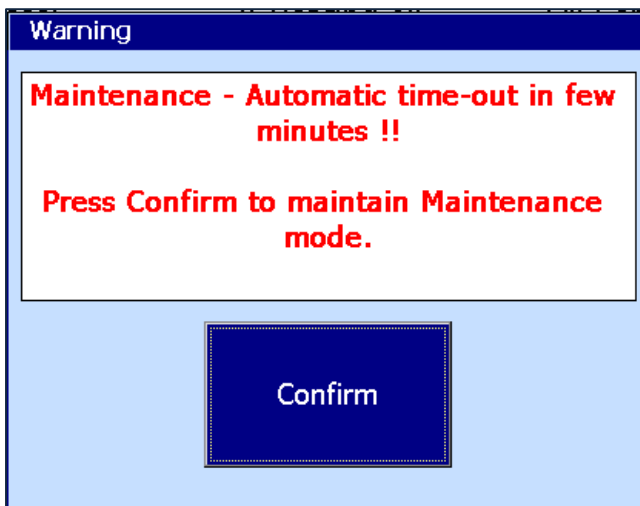


Figure 16: References to maintenance state

### 3.10.3 Warning about automatic termination of the maintenance state



Half an hour before the automatic termination of the maintenance state a warning message is displayed. The monitoring period is made available again by confirming the message.

Figure 17: Warning about automatic termination of the maintenance state

### 3.11 Special features

#### Delivery data for the oil separator "Tank"

During filling of the OS with water (after cleaning is completed) the measuring probe detects a rising filling level. When specific criteria have been met, the system registers a delivery.



*During the configuration of the VI-4 card with VISY-Setup, product quality "Freely configured" should be selected in menu item "Measuring sensor / Product quality".*

*The following data are then to be entered:*

- For product density at 15 °C: 1000.0 g/l
- For temperature coefficient: 0.2 per thousand/ °C



*In menu item "Measuring sensor / Product name", "Water" is to be entered for the product name.*

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FAFNIR GmbH  
Bahrenfelder Str. 19  
22765 Hamburg, Germany  
Tel.: +49 / 40 / 39 82 07-0  
Fax: +49 / 40 / 390 63 39  
E-mail: [info@fafnir.com](mailto:info@fafnir.com)  
Web: [www.fafnir.com](http://www.fafnir.com)

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