# USER MANUAL

for

# GDMS-OMD14®

## Gear and Diesel engine Monitoring System
## Oil Mist online Detection System

Part No.: 2 914 00 0000
Release: 160623
(revision 160704)

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# *Declaration of Conformity*

**EMC-Directives:**
**2004 / 108 / EC**
**2014 / 34 / EU**

We

## MSS AG

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declare on our own responsibility, that the products

Kind of equipment:

**Gear and Diesel Monitoing System**
**Oil Mist online Detection System**

Type - designations:

**GDMS-OMD14**

are in compliance with following norms:

**EN 55011, EN 55022,**
**EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6,**
**IEC 60068-2-1: 2007-03, IEC 60068-2-2: 2007-07,**
**IEC 60068-2-30: 2005-08, IEC 60068-2-6: 2007-12**

**EN 60079-0:2012 (General requirements),**
**EN 60079-11:2012 (Intrinsic safety),**
**IEC 60079-28:2015 (optical radiation)**

66606 St. Wendel, Germany, 2016 June 23

It is recommended to read this manual before commencing the repair, assembly or commissioning of the oil mist detector system!

**Caution:** The manufacturer's warranty will become void if these instructions are not followed!

Unless notified, these operation instructions are applicable for:

GDMS-OMD14

**In case of a GDMS-OMD14 alarm, the operator should take appropriate actions to prevent an explosion or damages from the engine.**

**The recommended measures of the engine manufacturer are to be followed.**

**If the system is installed on a ship, special cases while maneuvering may occur (like docking maneuver) which may override the local safety system! So, the engine might not be stopped if an alarm has been triggered.**

**The explosion protection (Ex) design is always provided by the GDMS-OMD14. The use of GDMS-OMD14 with gas engines requires special safety measures!**

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## Contents

# 1. System Description

## 1.1. Components

### 1.1.1. GDMS-OMD14 Principle

The **GDMS-OMD14** is an advanced oil mist detection system especially constructed to meet the requirements of large diesel and gas engines, like ship engines or power plant engines. While developing GDMS-OMD14 MSS AG has used the latest technical knowledge and practical experience.

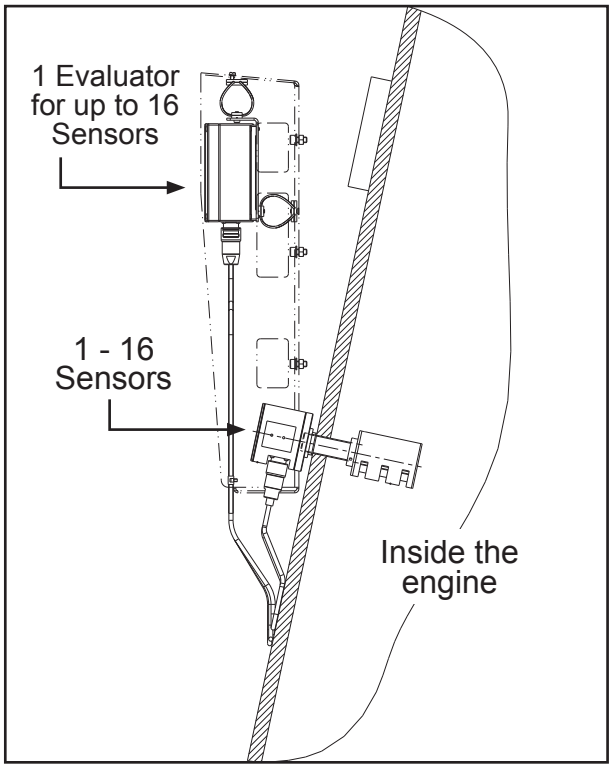



**Fig. 1.1. Exemplary assembly of the GDMS-OMD14 System**

The issue of highly ignitable oil mist produced when lubricants or fuel come in contact with hot surfaces within the engine has become one of the most significant risks for engine builders and operators. Mist concentration of 50 mg/l and higher is sufficient for an explosion to occur, resulting in large-scaled engine damages and in severe cases in the loss of lives. The presence of oil mist inside the engine can also indicate a damage of sliding surfaces, because the lubricant film can vapour in areas where moving parts begin to rub against each other.

The main topics of oil mist detection are:

1. Prevention of larger damages in engines. If the oil mist is detected early, minimal maintenance and repair works are often sufficient to solve the problem, allowing to avoid high repair- and breakdown costs for the engine.

2. Protection of the engine against explosion. Before the concentration of oil mist reaches the LEL, Lower Explosion Level (50 mg/l), the oil mist detector will trigger an alarm.

GDMS-OMD14 is also capable of detecting water vapour. Due to water vapour, corrosion on major parts inside the engine may occur which will damage the engine.

Oil mist detection systems are also part of rules applied world-wide which are administered by the IACS, the International Association of Classification Society. These rules are called UR, Unified Requirements, and oil mist detection systems are part of UR M10 and UR M67. These Unified Requirements are realized and used in the national rules of the Classification Societies, like the German Lloyd.

Based on a widely-used principle of light measurement, GDMS-OMD14 does not have the disadvantages of some older OMD systems. The GDMS-OMD14 is a pipe-free system, with sensors mounted directly at the engine wall, it allows quick and exact measurement of oil mist concentration in each engine compartment. A local control device, the GDMS-OMD14 Evaluator, processes and displays measurement data received from the sensors. The data can also be monitored on a computer using the interfaces of the Evaluator.

The light measurement can be performed in two different ways:

1. **Transmission**: Light emitted by a light source (LED) passes through the measuring section and is measured by a semi-conductor receiver diode. The wave length of the light can be between 600nm and 960nm. Oil mist reflects and refracts light, therefore lowering the intensity that can be detected by the receiver. The concentration of oil mist in the measuring section correlates to the intensity of light detected by the receiver. This measuring principle is employed by GDMS-OMD14.

2. **Remission**: Light of a LED is emitted into a measuring section and the light reflecting on the mist is measured via an optical semi-conductor. The extent of the oil mist concentration in the measuring section correlates to the reflection on the mist.

The GDMS-OMD14 Evaluator as well as the optional PC monitoring software have a warning system which allows to raise an alarm when the measured data indicates high oil mist concentration in the engine.

## Key benefits of the GDMS-OMD14 System

1. The oil mist is measured inside the engine where it develops. Therefore, the response time from the development of oil mist until the system raises an alarm is very short.
2. The measured data is displayed on the Evaluator which can be mounted near the engine or at any other place. The measured data can also be shown on a Remote Monitoring Unit and/or a PC. This eliminates the risk of being near the faulty engine.
3. If one of the sensors gets dirty, the operator will be alerted immediately. The sensor can be cleaned easily without stopping the engine.
4. Easy handling.
5. Immediate localization and indication of the compartment where the oil mist developed.

### 1.1.2. GDMS-OMD14 - Delivered Items

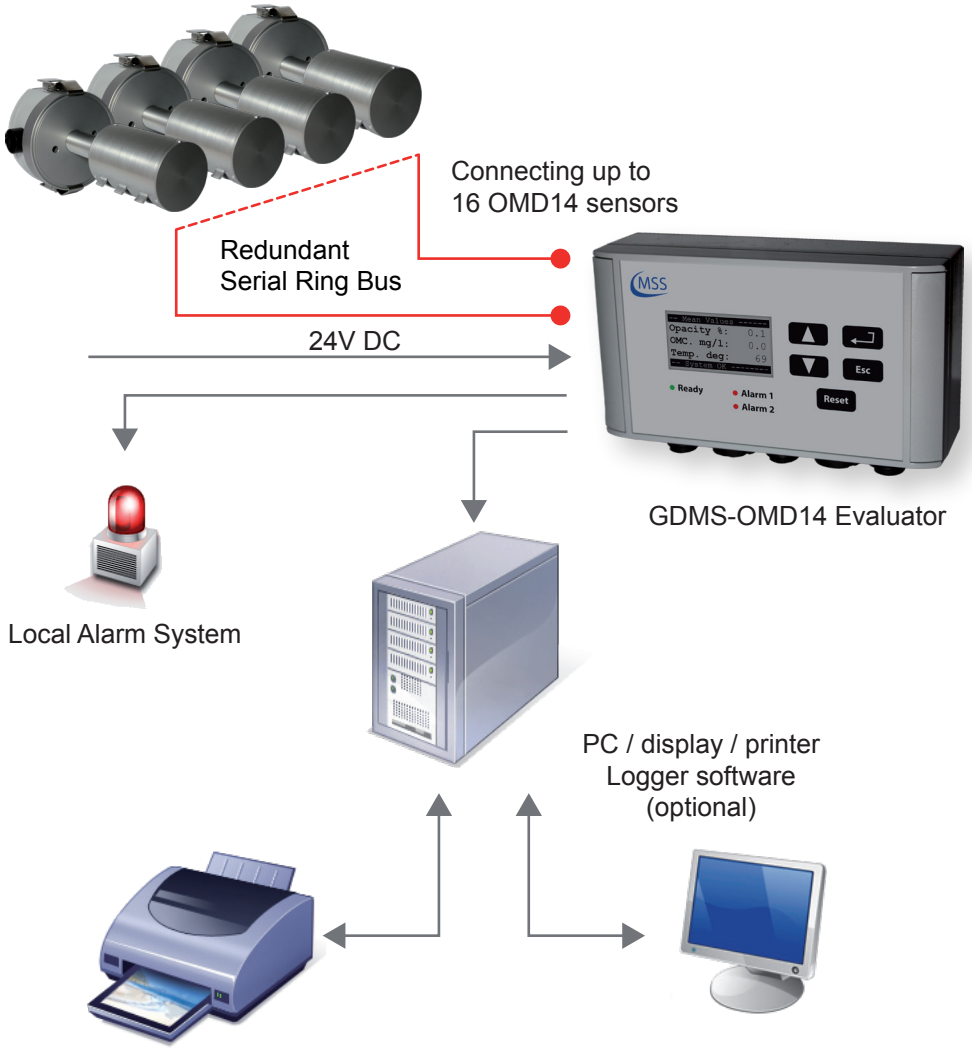



**Fig. 1.2. GDMS-OMD14 System**

Main components of GDMS-OMD14 system:
1. Evaluator
2. 1....16 sensors
3. 1....16 SOPS
4. Cables sensor - sensor
5. Cables sensor - Evaluator
6. Cables for power supply

### 1.1.3. GDMS-OMD14 - System Components

#### 1.1.3.1. GDMS-OMD14 Evaluator


**Fig. 1.3. GDMS-OMD14 Evaluator**

The Evaluator consists of a metallic case, a liquid crystal display (LCD), three LEDs (Alarm 1, Alarm 2 and Ready), four control keys (Esc, ↵, ▲, ▼) and one reset button Reset.

The electronics and the display of the GDMS-OMD14 Evaluator are installed in a closed, shock-proofed, water, dust and EMC resistant aluminium case, protection class IP 67.

The Evaluator can be mounted close to the engine or in the engine control room. The Evaluator operates reliably at temperatures between 0°C to 70°C and at relative humidity up to 80%.

The installation of the Evaluator is performed via 2 assembly rigs. If required, the Evaluator can be mounted vibration-free. In either case the connecting cable must be relaxed (e.g. using a loop) without putting any strain on the connectors / plugs.

The Evaluator displays the measurement values and OMD14 parameter values on its LCD display. It also provides test procedures that can be executed for GDMS-OMD14 diagnostics.

The control keys of the Evaluator are implemented as membrane buttons. This type of buttons must not be operated using sharp items, including knifes, screw-drivers or ball-pens.

If necessary, the keypad can be wiped with a mild cleaning agent. Never use solvents!

After successful installation and testing by service technicians approved by MSS AG, the settings of the Evaluator should not be changed. The Evaluator does not require regular maintenance.

Note: Firmware updates for the Evaluator will be available and may be applied to your system only by service technicians approved by MSS AG. Firmware updates are generally not free of charge. Please contact MSS AG or an authorized representative for pricing and further information.

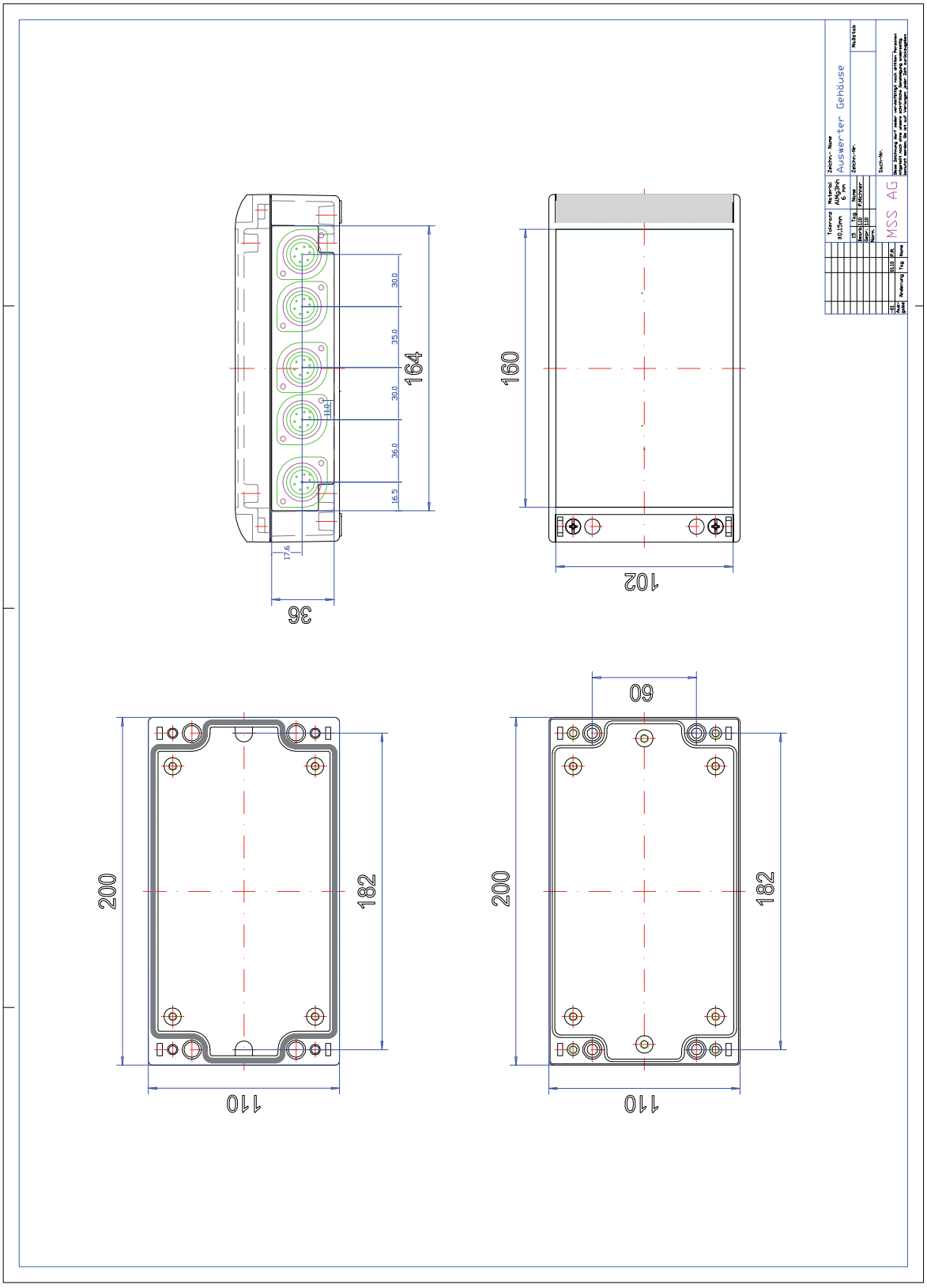



**Fig. 1.4. Evaluator Dimensions**

### 1.1.3.2. Connectors and pin-out of the GDMS-OMD14 Evaluator

| | Connectors of the Evaluator | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| Pin | Power Supply | Relays | Serial Data Link | OMD14 OUT | OMD14 IN |
| 1 | +24V | REL1-A Alarm 1 Relay NC | RS232 OUT | +24V | +24V |
| 2 | 0V | REL1-B Alarm 1 Relay NO | RS232 IN | 0V | 0V |
| 3 | | REL1-C Alarm 1 Relay COM | RS485 OUT- | OMG14 IN - 3 | OMD14 OUT - 3 |
| 4 | | REL2-A Ready Relay NO | RS485 OUT+ | OMD14 IN - 4 | OMD14 OUT - 4 |
| 5 | | REL2-B Ready Relay COM | RS485 IN- | OMD14 IN - 5 | OMD14 OUT - 5 |
| 6 | | REL3-A Alarm 2 Relay NO | RS485 OUT- | OMD14 IN - 6 | OMD14 OUT - 6 |
| 7 | | REL3-B Alarm 2 Relay COM | GND | GND | GND |
| Cable Part No. | | | | | |
| Connec-tor Part No. | | | | | |

**Table 1.1. Connections of Evaluator**

### 1.1.3.3. GDMS-OMD14 Sensor and SOPS

GDMS-OMD14 performs compartment specific oil mist monitoring and lubrication oil temperature measurements.

The measuring unit of GDMS-OMD14 for a compartment consists of a finger-shaped optical sensor with system redundancy, and a multiple chamber Splash Oil Protection System (SOPS) which prevents the sensor from being soiled with splash oil, but allows the oil mist and water vapour to enter the sensor light beam within milliseconds. So, the reaction time of each sensor and the whole system is less than one second.

The SOPS is mounted from the inner side of the engine wall into already existing drilling of the crankcase. The sensor is pushed into the installed SOPS from the outside of the engine. So, the OMD14 sensor installation is very simple. This also means that **the optical measuring section is positioned inside the crankcase area where oil mist could occur. No piping is needed!**

The GDMS-OMD14 sensors are interconnected via two redundant serial bus interfaces. If necessary, a sensor can be easily dismounted, for example for cleaning, while the engine is running without affecting the system's functionality.

**Fig. 1.5. GDMS-OMD14 sensor with SOPS**

GDMS-OMD14 does not have any movable mechanical parts and hence does not undergo any wear and tear.

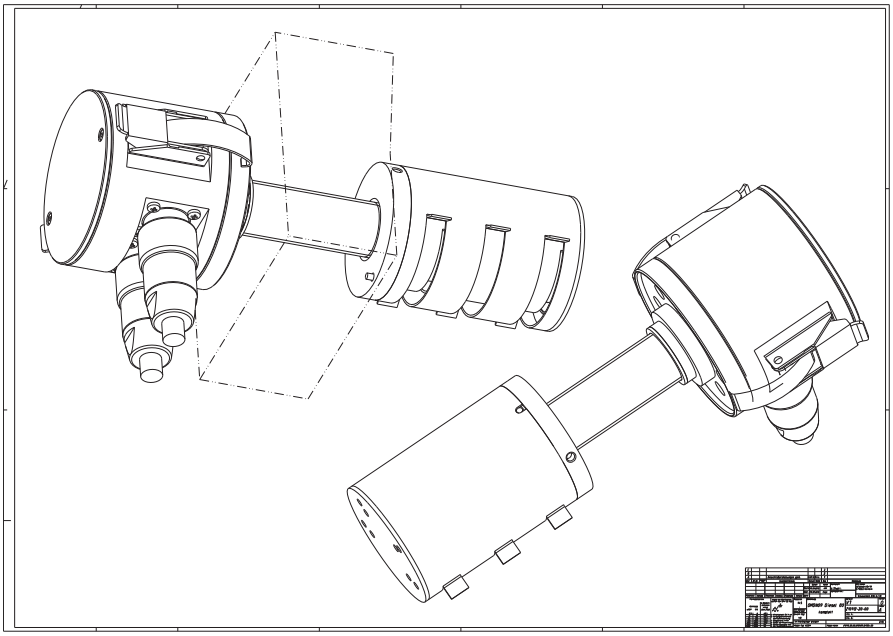


**Fig. 1.6. Installation of SOPS and sensor**

The sensor and alarm system's reaction time is in the range of less than one second.

The SOPS and the sensors are identically for each engine. Due to differences in each engine design which result in different wall thicknesses different SOPS and sensor lengths are required. The needed length will be determined by personell of MSS AG or an authorized partner.

If the SOPS and the sensor are installed near or in a section with a high splash oil concentration the usage of the Diffusor add-on is required (also refer to "2.2. Installation Position" on page 2.2).

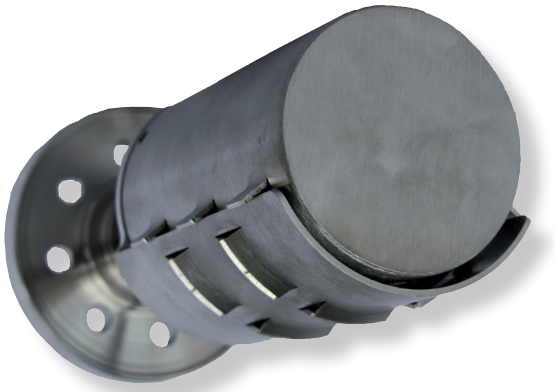


**Fig. 1.7. SOPS with Diffusor**

### Important for users of Gas Engines

The GDMS-OMD14 consists of an appropriate component (electronic system) and an intrinsically safe component (Sensor). These components build a mechanical unit.

The GDMS-OMD14 is mounted to the engine wall, separating the crank case with its Ex-category 2G requirements, from the non explosive engine room.

The cylindrical Aluminium housing containing the electronic system is an assembly of circuit boards and electronic components.

Two plug connectors for connection of the non intrinsically safe electric circuits (current supply and RS 485 interface) and the electronic system of a further Sensor are mounted to the cylinder barrel of the cylindrical housing.

The cylindrically shaped high-grade steel housing of the sensor consists of an optical system and a temperature sensor. The electronic components, except the optical measuring section, are embedded in explosion proof pottant.

The housing of the sensor and the electronic system are connected to each other by a threaded pipe. The multi-core connecting cable of the intrinsically safe electric circuits of the sensor is led through the threaded pipe and connected to the circuit board of the electronic system.

### 1.1.3.4. Technical Data of GDMS-OMD14 Sensor and Evaluator

Power Supply: 24V DC +30/-25% (18 - 31V DC)
Operating Current:
max. 1.5 A
Up to 16 (sixteen) GDMS-OMD14 Sensors can be connected.

If the supply voltage is below 18V DC or higher than 31V DC no guarantee can be given that the system is working properly.
A stable and constant power supply in the range of 18-31V DC must be ensured by the end user.

Sensitivity: Adjustable in 10 steps from 0,2mg/dm³ to 10 mg/dm³ (LEL 50 mg/dm³ refer Chapter 1.)

| Sensitivity Level | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sensitivity mg/l | 0.2 | 0.3 | 0.5 | 0.7 | 1.0 | 1.5 | 2.5 | 4.0 | 7.0 | 10.0 |

Relay-Outputs: Contact load for all relays:
max. 60V AC, 1A, 60VA / max. 60V DC, 1A, 60W
Alarm 1:
1 relay with 2 ground-free switch-over contacts, usually configured as main alarm
Alarm 2:
1 relay normally closed, usually configured to open if prealarm condition arises
Ready:
1 relay, closes if system is fault-free, opens otherwise
Wire break protection with 33 kOhm resistors (standard)

Interface: Serial Interface:
- RS485 for standardized industrial, bidirectional communication
- RS232 for setup and configuration

Communication Protocol:
- Modbus (optional)
- Canbus (optional)

User interface: LCD Display 128x64 dots
1 LED green “Ready”
1 LED red “Alarm 1” (usually set up as main alarm)
1 LED orange “Alarm 2” (usually set up as pre-alarm)

Environment Conditions: Ambient temperature in service:
0°C - 70°C for GDMS-OMD14 Evaluator
0°C - 85°C for GDMS-OMD14 Sensor Electronics
-10°C - 120°C for GDMS-OMD14 Sensor Measuring Section
Ambient temperature for storage:
-25°C - 85°C
Protection:
IP65

### 1.1.3.5. Important for users of Gas Engines

for non intrinsically safe electric circuits

| | | | |
|---|---|---|---|
| rated voltage for power supply | DC 24V, $U_m$ = DC 30V | | |
| rated voltage for RS 485 interface | DC 24V, $U_m$ = DC 30V | | |
| | | | |
| optical radiation | | | |
| wavelength | | | 880 nm |
| optical power of LED | $P_0$ | ≤ | 12 mW |
| radiant intensity of LED | | ≤ | 0,6 mW/mm² |
| | | | |
| Environment Conditions | 0°C | ≤ $T_a$ ≤ | +85°C |

### 1.1.4. Intended Purpose

The use of a PC with the GDMS-OMD14 is only permitted by using equipment approved by MSS AG, i.e. interface converter, plugs, etc.

MSS AG can only provide technical support if MSS AG approved equipment is used.

The purpose of this manual is to instruct the operator how to make the best use of the GDMS-OMD14 System and also to alert them of safety issues that may arise.

All products mentioned in this manual are to be handled only by personnel with appropriate electrical and PC knowledge, such as international ISO standards.

Any damages, either human or material, caused by the use of the products depicted in this manual for any purpose other than that intended, is solely the responsibility of the user and not of the manufacturer.

### 1.1.5. Materials Included

To the scope of supply of a GDMS-OMD14 System belongs one Evaluator for each engine, one sensor for each compartment with the appropriate SOPS (splash oil protection system), cables in the correct length, provided with the necessary plug-in connections as well as all seals, O-rings and small articles for the assembly.


**Fig. 1.8. Scope of Delivery for GDMS-OMD14 System**

# 2. Installation

## 2.1. General

Installation and commissioning of GDMS-OMD14 is conducted or supervised by personnel from MSS AG or its authorized representatives.

A training for the on-site operation personnel and/or the commissioning data on a CD are available on request.

The wiring diagram and schematic given here are guidelines only. The actual wiring will be adapted to the existing alarm and monitoring system on-site.

**Important for users of Gas Engines**

The GDMS-OMD14 has to be installed to the engine wall in the manner specified, that the appropriate component (electronic system) sits in the non explosive engine room outside the crank case and the intrinsically safe component (Sensor) sits inside the crank case with its Ex-category 2G requirements.


For non intrinsically safe electric circuits (current supply and RS 485 interface) Um of DC 30 V is compulsory.

For the connection to the 230V power supply the current supply of the GDMS-OMD14, inclusive the devices, connected to the RS485 interface have to:

- either be supplied by an electric power supply unit with safe galvanic isolation
- or the supply current circuit and the current circuits of the RS 485 interfaces have to be carried by an engineered safety barrier. Special instructions/requirements, constituted in the certificates of these engineered safety barriers, have to be necessarily carried out.

For further installations instructions refer to the Installation Manual.

## 2.2. Installation Position

The position for the GDMS-OMD14 sensors and SOPS in the engine wall must be chosen carefully. Using existing drilled holes, for example used by an old oil mist detection system, the installation is easy.

Anyway, the splash oil concentration inside the engine is a very important factor and must be taken into consideration:
Each engine type has got its own characteristics which influence the splash oil concentrations inside the engine. The areas of high splash oil concentration “follow” the rotation of the crankshaft. During engine work splash oil forms discoidal zones with very high splash oil concentration (also called “splash discs”).
In an in-line engine two “splash discs” appear between the conrod and the crankweb.
In a V-engine a third “splash disc” appears between two conrods.

It is important to choose the installation position **outside** the “splash discs”!

In a four-stroke engine the sensors must be installed on the side where splash oil hits the sensors on the top. Otherwise, the GDMS-OMD14 Diffusor has to be installed to the SOPS.

Two-stroke engines have no definite rotational direction, so the splash oil is not always hitting the top of the SOPS! Also the other different characteristics of an two-stroke engine compared to a four-stroke engine require the usage of the Diffusor on two-stroke engines!

In Fig. 2.1. you can see an example for installation for a four-stroke diesel generator set. The left top position of the crankcase was found here the best for oil mist monitoring.

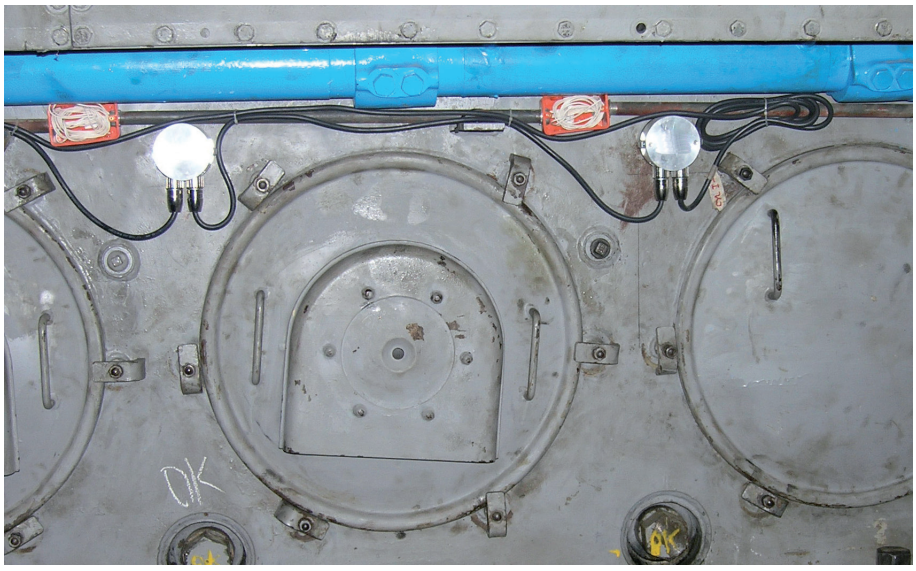



**Fig 2.1. Example of Installation for Sensors and SOPS**

## 2.3. Wiring Diagram

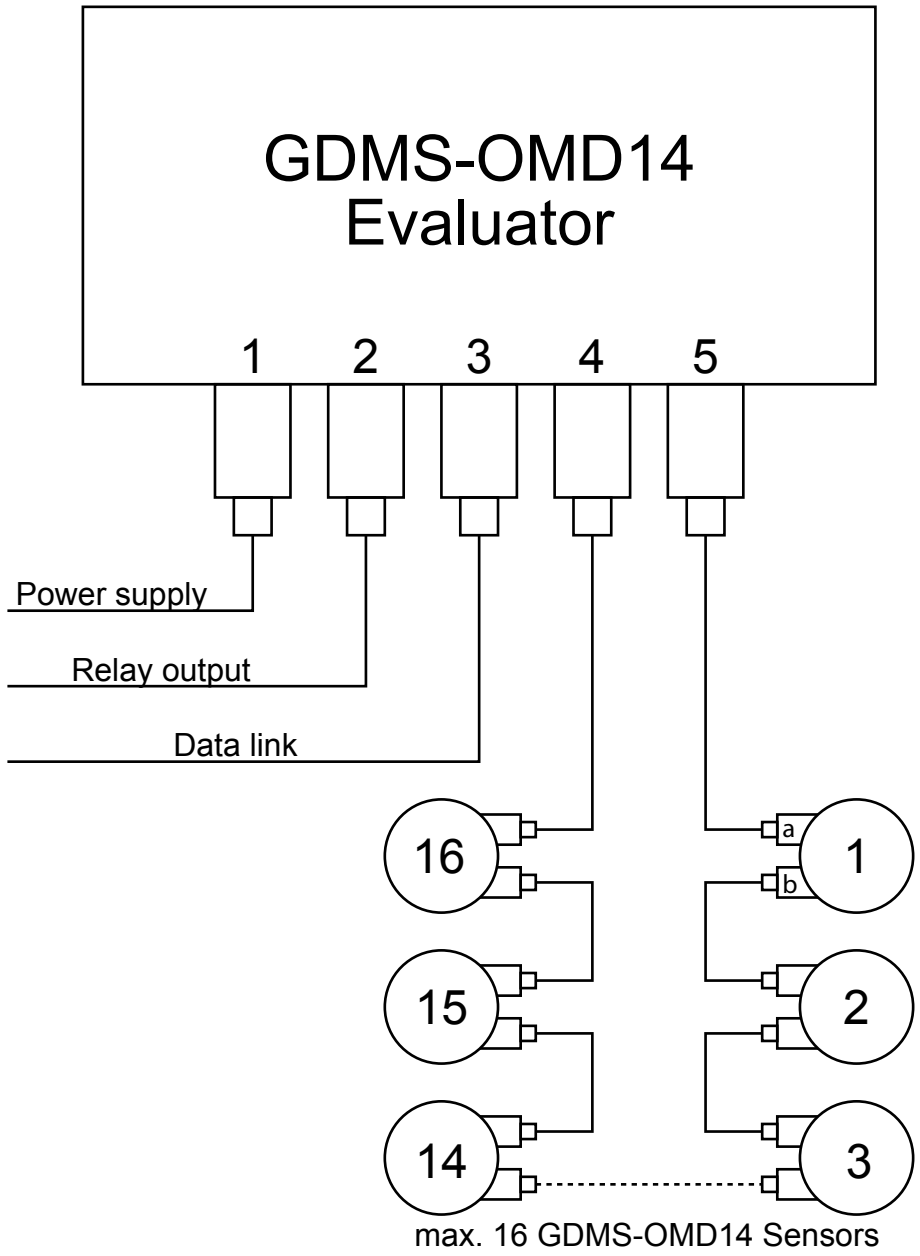



**Fig. 2.2 Principle Connection**

The connection for power supply, relay output, data link and connection of GDMS-OMD14 sensors is shown in this figure. It is possible to connect up to 16 sensors to one evaluator. For more information please refer Chapter 1.1.3.2.

# 3. Commissioning

## 3.1. Pre-Commissioning Checks

Check for the following:

- correct wiring as given in Chapter 2.3.
- correct power supply on GDMS-OMD14 Evaluator
- GDMS-OMD14 Evaluator display is on

- For more detailed information, please have a look at the Installation Manual!

## 3.2. Data Sampling

As soon as a GDMS-OMD14 Evaluator is powered up, it starts the initial self check procedure and shows the READY Status if all pre-set conditions are fulfilled. This self check procedure is carried out in a certain cycle.

Regardless of the green ready LED status of the GDMS-OMD14 Evaluator, if working GDMS-OMD14 sensors are connected, the GDMS-OMD14 Evaluator samples the signals from the GDMS-OMD14 sensors with a certain sampling rate, converts them into digital signals, analyzes, evaluates and displays them on its LCD display.

These data including the detected events are continuously made available through the RS485 interface. A connected Remote Monitoring Unit and/or PC can use the output for remote monitoring and further processing.

It is also possible to set up some OMD14 Evaluator parameters from the PC using standard serial terminal application (for example “Hyper Terminal”).

## 3.3. Alarm Setting and Triggering

There are 3 alarm relays integrated in the GDMS-OMD14 Evaluator:

- Ready relay: indicates the system status
- 1st Alarm relay: always assigned to main alarm, aditionally programmable as pre-alarm or over speed alarm
- 2nd Alarm relay: programmable as main alarm or pre-alarm or both and/or over-speed alarm

The GDMS-OMD14 has a self check procedure which is carried out in a certain cycle. If any one of the conditions for the System Ready status is not detected the GDMS-OMD14 Evaluator switches off the green READY LED and the ready relay opens. An error code and a text error message are shown on the LCD display of the Evaluator and also in the event window of OMD Logger on the optional monitoring PC.

GDMS-OMD14 enables to set different alarm sensitivity levels by defining different oil mist concentration thresholds as alarm condition. Oil mist concentration alarm levels are encoded as numbers from 1 to 10 (the higher the number is the less

sensitive is the system). Please also refer to the table below.
The temperature alarm level is given in degree Celsius.

| Sensitivity Level | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Sensitivity mg/l | 0.2 | 0.3 | 0.5 | 0.7 | 1.0 | 1.5 | 2.5 | 4.0 | 7.0 | 10.0 |

Alarm sensitivity levels must be set at the GDMS-OMD14 Evaluator. If alarm conditions are fulfilled, the firmware of the GDMS-OMD14 Evaluator triggers the corresponding alarm.

In case of an alarm triggering, it is shown:
- by the LED indicators on the GDMS-OMD14 Evaluator
- by the optional OMD14 Logger software on the monitoring PC
- by alarm indicators of the engine alarm devices, depending on wiring

### 3.3.1. Alarm Resetting

- In case of a System Not Ready status:

  Only if all conditions for System Ready status are re-established (e.g. the problem indicated on the display of the GDMS-OMD14 Evaluator is fixed by the operator), the System Ready status will be reactivated automatically by the system.
  Exception: In case of a communication error, the Evaluator has to be restarted to reactivate the System Ready status!

- In case of a Pre-Alarm triggered:

  If the conditions for a Pre-alarm are not confirmed after pre-set time period, the Pre-Alarm will be reset automatically by the system.

- In case of a Main-Alarm triggered:

  The Main Alarm will not be reset automatically by the system even after the conditions that led to it are not met any more. Main Alarm can only be reset manually at the GDMS-OMD14 Evaluator by pressing the RESET button for 3 seconds.

- In case of a Temperature Alarm triggered:

  Temperature Alarm is not being reset automatically by the system either! It must be reset by pressing the RESET button at the Evaluator for 3 seconds

Attention: Main-Alarm **cannot** be reset through the OMD14 Logger software, but only at the GDMS-OMD14 Evaluator by pressing the RESET-Button for 3 seconds.

## 3.4. Settings & Parameters / Using the Evaluator

### 3.4.1. Basic Usage of the Evaluator

Using the Evaluator is very simple. It has got one 128x64 pixels LCD, four navigation buttons (Esc, ↵, ▲, ▼), one reset button Reset and three LEDs indicating the system status.

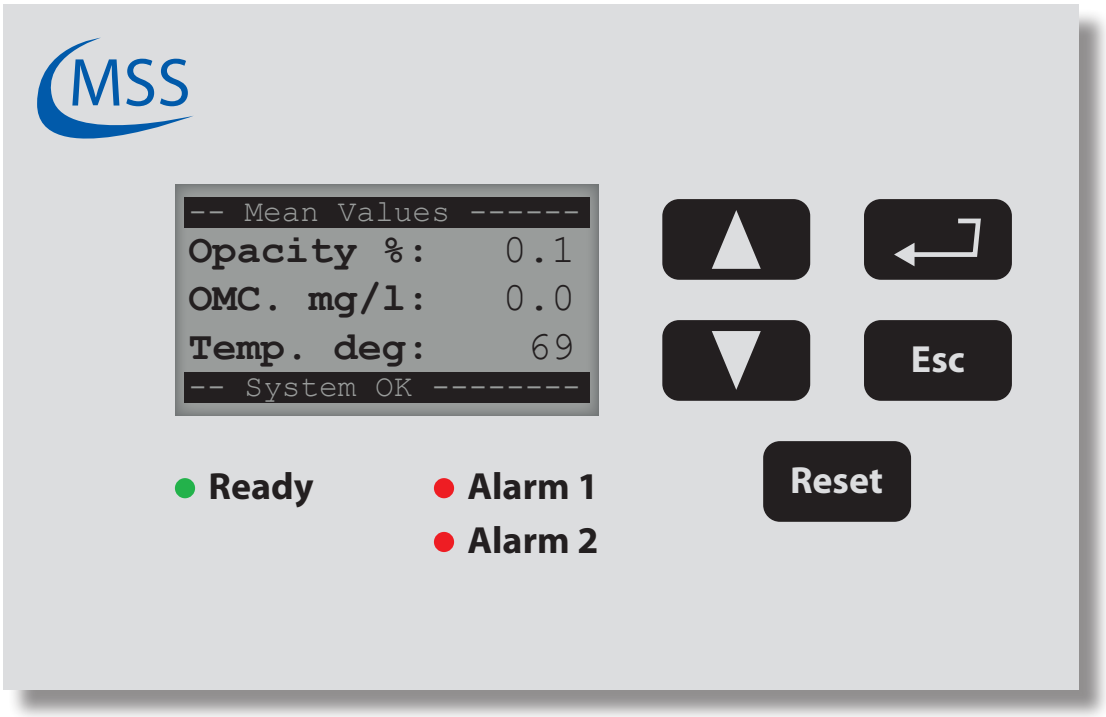



**Fig. 3.1. View of the Evaluator with the default screen**

On this sample picture you see the Evaluator displaying Screen 1.1 (page 3.9) which is the default screen while the system is running. On the following pages, each screen is described and the possible actions are given.

Please have a short look at the description of Screen 1.1 (page 3.9).
On the given table, you can see that

- pushing the button ▲ will display Screen 1.2
- pushing the button ▼ will display Screen 1.4
- pushing the button ↵ will not do anything
- pushing the button Esc will display Screen 1.5

Note: The button Reset is only needed to reset an alarm!

On the next page, an example for changing a value is given.

### 3.4.2. How to change a value

In this example the change of the value “Display Brightness” is described.

The screen we need to get to is Screen 1.3.3.1 - CPU Settings - Display Brightness.

1. Beginning with the default screen Screen 1.1 - Opacity % / OMC. mg/l / Temp. deg you have to go to Screen 1.4 - System Version by pushing ▼ once **or** by pushing ▲ three times.
2. Then, you have to push ↵ to get to the next menu level.
3. Screen 1.3.1 - System Settings will be displayed.
4. Since the target screen is at level Screen 1.3.3 - CPU Settings you need to push ▲ twice and after that ↵.

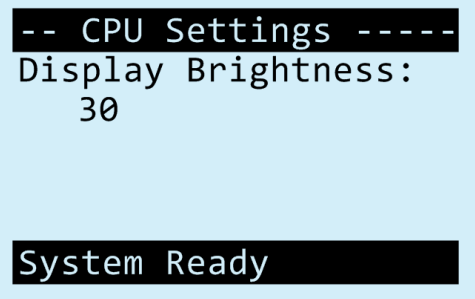



**Fig. 3.2. Screen 1.3.3.1 as of step 5**

5. Screen 1.3.3.1 - CPU Settings - Display Brightness will be displayed:
6. Now, we can change the value by pressing the ↵ button first.

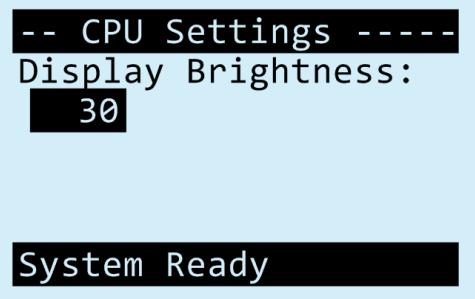



**Fig. 3.3. Screen 1.3.3.1 as of step 6**

The screen will now look like this:

7. The value is highlighted now which indicates that it may be changed.
8. To change the value use the button ▲ to increase the value and the button ▼ to decrease the value.
9. If you reached the new value, for example “50”, press ↵. The screen will look like that:

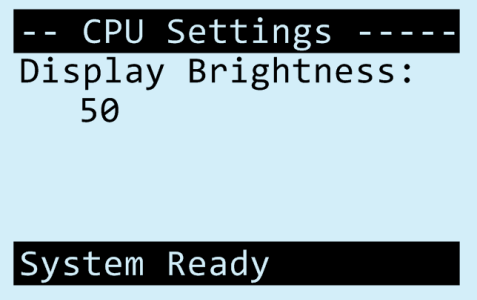



**Fig. 3.4. Screen 1.3.3.1 as of step 9**

10. By pushing Esc twice, the Evaluator will restart and the default screen Screen 1.1 - Opacity % / OMC. mg/l / Temp. deg will be shown.

Note: If you do not want to change the value while you are in step 8, press the button Esc and the old value will return.

All “System Setting” and “Alarm Inhibit” parameters and the “Test Functions” require the input of a PIN prior to change a value. You will automatically be prompted by the system if the PIN is required:

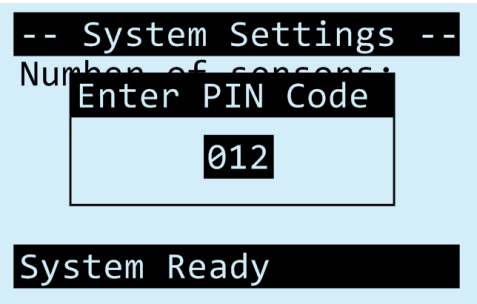
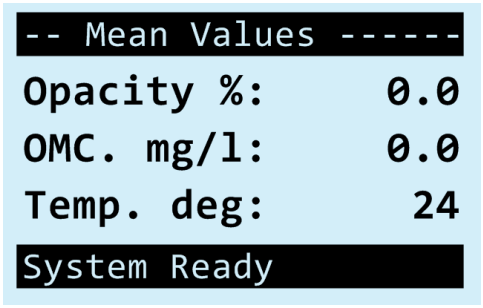



**Fig. 3.5. Automatic PIN Prompt**

### 3.4.3. Menu Screen Overview

| Screen 0.1 - Startup Screen | | |
|---|---|---|
|  | ▲ | No action |
| | ▼ | No action |
| | ↵ | No action |
| | Esc | No action |
| | Reset | No action |
| This screen is displayed right after powering up the Evaluator. It shows the product name and the firmware version.<br>This screen is shown for 5 seconds and will automatically jump to screen Screen 1.1.<br>After the intialization phase, the number of detected sensors will be shown. | | |

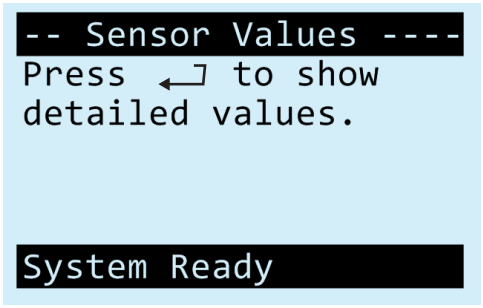
Screen 1.1 - Opacity % / OMC. mg/l / Temp. deg




| | |
|---|---|
| ▲ | Screen 1.4 will be shown |
| ▼ | Screen 1.2 will be shown |
| ↵ | No action |
| Esc | Screen 1.5 will be shown |
| Reset | No action |

This screen shows the average values of all sensors: the opacity in %, the oil mist concentraion in mg/l and the temperature in degree Celsius.

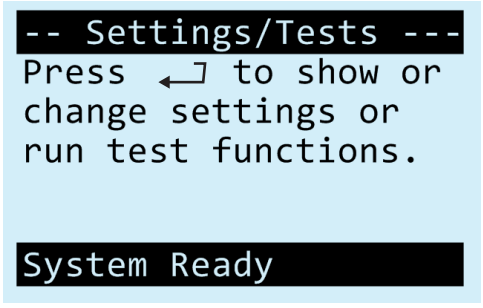
Screen 1.2 - Sensor values




| | |
|---|---|
| ▲ | Screen 1.3 will be shown |
| ▼ | Screen 1.1will be shown |
| ↵ | Screen 1.2.1 (page 3.11) will be shown |
| Esc | Screen 1.5 will be shown |
| Reset | No action |

Via this screen you can access the measured values for each sensor.

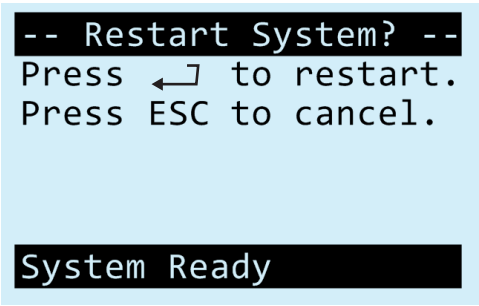
Screen 1.3 - Settings/Tests




| | |
|---|---|
| ▲ | Screen 1.4 will be shown |
| ▼ | Screen 1.2 will be shown |
| ↵ | Screen 1.3.1 (page 3.12) will be shown |
| Esc | Screen 1.5 will be shown |
| Reset | No action |

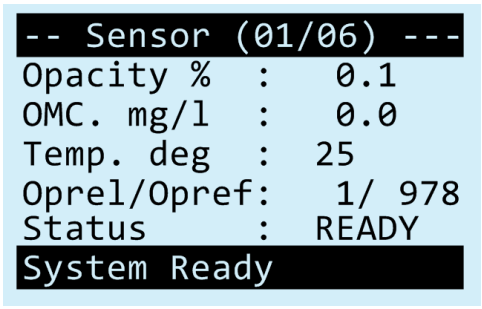
Via this screen you can access the parameter setup and test feature level.

| Screen 1.4 - System Version | | |
|---|---|---|
|  | ▲ | Screen 1.1 will be shown |
| | ▼ | Screen 1.3 will be shown |
| | ↵ | Screen 1.3.1 (page 3.13) will be shown |
| | Esc | Screen 1.5 will be shown |
| | Reset | No action |
| This screen shows the product name and the firmware version. | | |

| Screen 1.5 - Restart System? | | |
|---|---|---|
|  | ▲ | No action |
| | ▼ | No action |
| | ↵ | Evaluator will restart and will be shown |
| | Esc | Screen 1.1 will be shown |
| | Reset | No action |
| This screen is a confirmation prompt which requires you to verify if the system really should restart. | | |

The following screen is identical for each sensor and is only described once in this manual.

Screen 1.2.1 - Sensor Values - Measured values sensor 1

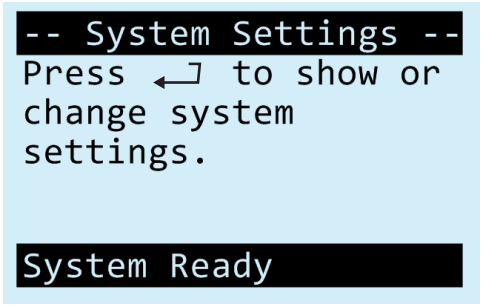


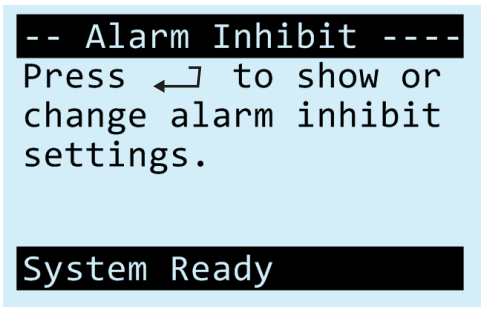

| | |
|---|---|
| ▲ | The next connected sensor will be shown, in this case sensor no. 2 |
| ▼ | The previous connected sensor will be shown |
| ↵ | No action |
| Esc | Screen 1.1 will be shown |
| Reset | No action |

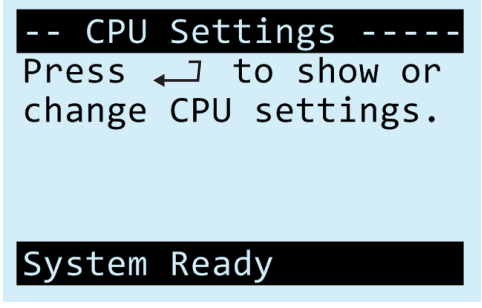
This screen shows the measured values of each sensor:

| | |
|---|---|
| “Opacity %”: | Opacity in % |
| “OMC mg/l”: | Oilmist concentration in mg/l (milligrams per litre) |
| “Temp. deg”: | Temperature in degree Celsius |
| “Oprel”: | Opacity in % relative to alarm level |
| “Opref”: | Reference value in digits to opacity calculation |
| “Status”: | Status of sensor: Ready/Dirty/Error |

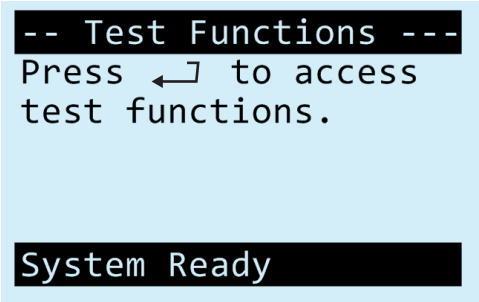
If you have entered either Screen 1.3.1, Screen 1.3.2, Screen 1.3.3 or Screen 1.3.4, pushing Esc will make the Evaluator reboot and continue with Screen 0.1!

| Screen 1.3.1 - System Settings | | |
|---|---|---|
|  | ▲ | Screen 1.3.2 will be shown |
| | ▼ | Screen 1.3.4 will be shown |
| | ↵ | Screen 1.3.1.1 (page 3.15) will be shown |
| | Esc | will be shown |
| | Reset | No action |
| Via this screen you can access the parameter setup level (for example number of sensors, alarm levels, ...). | | |

| Screen 1.3.2 - Alarm Inhibit | | |
|---|---|---|
|  | ▲ | Screen 1.3.3 will be shown |
| | ▼ | Screen 1.3.1 will be shown |
| | ↵ | Screen 1.3.2.1 (page 3.21) will be shown |
| | Esc | will be shown |
| | Reset | No action |
| Via this screen you can access the alarm inhibit setup level. | | |

| Screen 1.3.3 - CPU Settings | | |
|---|---|---|
|  | ▲ | Screen 1.3.4 will be shown |
| | ▼ | Screen 1.3.2 will be shown |
| | ↵ | Screen 1.3.3.1 (page 3.22) will be shown |
| | Esc | will be shown |
| | Reset | No action |
| Via this screen you can access the global parameters, for example the display brightness. | | |

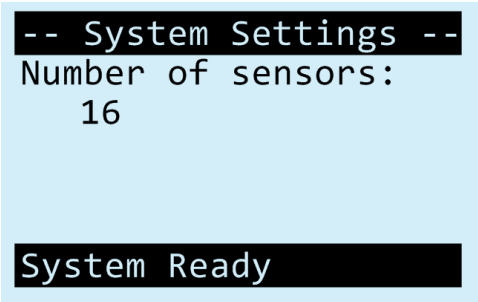
Screen 1.3.4 - Test Functions




| | |
|---|---|
| ▲ | Screen 1.3.1 will be shown |
| ▼ | Screen 1.3.3 will be shown |
| ↵ | Screen 1.3.4.1 (page 3.23) will be shown |
| Esc | will be shown |
| Reset | No action |

Via this screen you can access the testing features of the Evaluator.

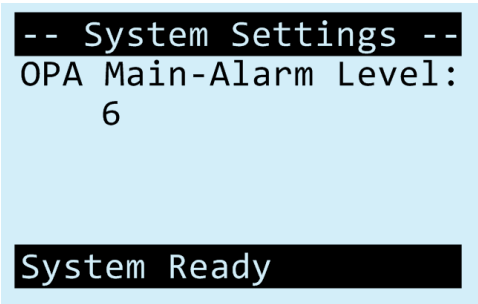
### Screen 1.3.1.1 - System Settings - Number of sensors




| | |
|---|---|
| ▲ | Screen 1.3.1.2 will be shown |
| ▼ | Screen 1.3.1.17 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.1 (page 3.13) will be shown |
| Reset | No action |

Number of connected sensors in the range from 1 to 16. (default: 16)

### Screen 1.3.1.2 - System Settings - OPA Main-Alarm Level

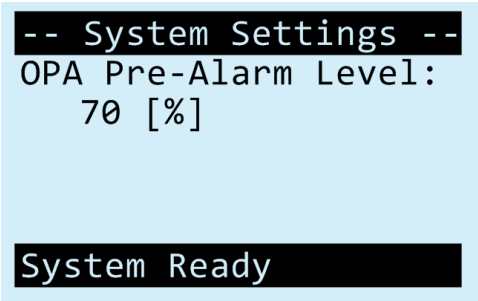



| | |
|---|---|
| ▲ | Screen 1.3.1.3 will be shown |
| ▼ | Screen 1.3.1.1 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.1 (page 3.13) will be shown |
| Reset | No action |

Setting of the opacity main alarm level in the range of 1-10.

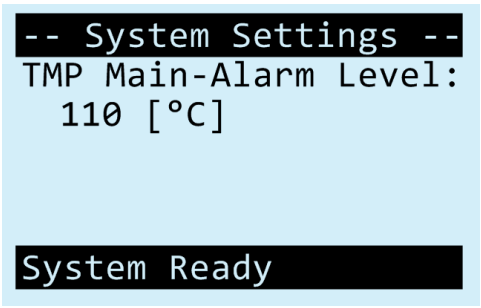
0 means alarm disabled. (default: 6 → 1.5mg/l) (refer to Sensitivity Table on page 3.2)

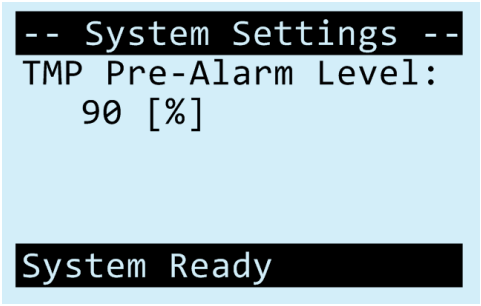
### Screen 1.3.1.3 - System Settings - OPA Pre-Alarm Level

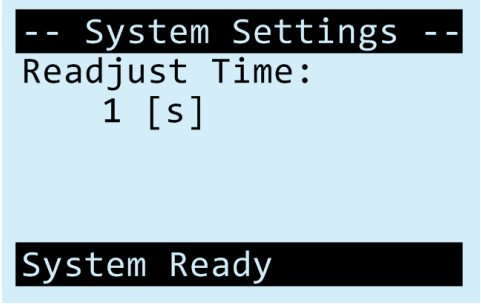



| | |
|---|---|
| ▲ | Screen 1.3.1.4 will be shown |
| ▼ | Screen 1.3.1.2 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.1 (page 3.13) will be shown |
| Reset | No action |

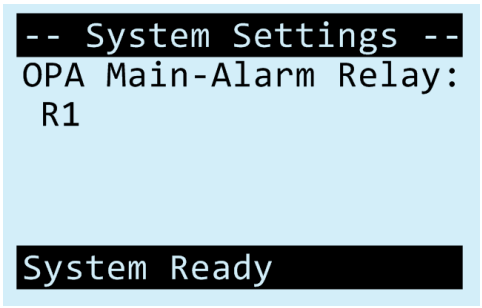
Setting of the opacity pre-alarm level (in % main alarm) in the range from 40-100%. (default: 70%)

| Screen 1.3.1.4 - System Settings - TMP Main-Alarm Level | | |
|---|---|---|
|  | ▲ | Screen 1.3.1.5 will be shown |
| | ▼ | Screen 1.3.1.3 will be shown |
| | ↵ | You may change the value if you have entered the PIN. |
| | Esc | Screen 1.3.1 (page 3.13) will be shown |
| | Reset | No action |
| Setting of the temperature alarm level in degree Celsius in the range of 0-150°C in steps of 10°C.<br>Value “0” means temperature alarm disabled. (default: 110°C) | | |

| Screen 1.3.1.5 - System Settings - TMP Pre-Alarm Level | | |
|---|---|---|
|  | ▲ | Screen 1.3.1.6 will be shown |
| | ▼ | Screen 1.3.1.4 will be shown |
| | ↵ | You may change the value if you have entered the PIN. |
| | Esc | Screen 1.3.1 (page 3.13) will be shown |
| | Reset | No action |
| Setting of the temperature pre-alarm level (in % main alarm) in the range of 40-100%. (default: 70%) | | |

| Screen 1.3.1.6 - System Settings - Readjust Time | | |
|---|---|---|
|  | ▲ | Screen 1.3.1.7 will be shown |
| | ▼ | Screen 1.3.1.5 will be shown |
| | ↵ | You may change the value if you have entered the PIN. |
| | Esc | Screen 1.3.1 (page 3.13) will be shown |
| | Reset | No action |
| Setting of readjustment time in seconds during which the measuring sections become brighter, in the range of 1-600 seconds. (default: 1) | | |

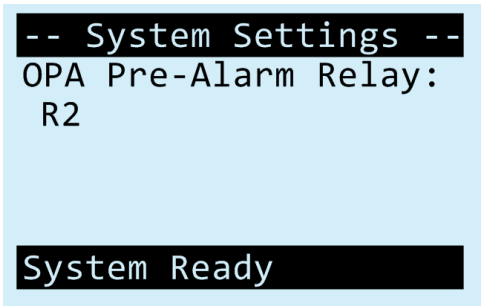
### Screen 1.3.1.7 - System Settings - OPA Main-Alarm Relay




| | |
|---|---|
| ▲ | Screen 1.3.1.8 will be shown |
| ▼ | Screen 1.3.1.6 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.1 (page 3.13) will be shown |
| Reset | No action |

Relay configuration for opacity main alarm.
Possible values: R1, R1+R2 (R1 = Relay 1 or R2 = Relay 2)

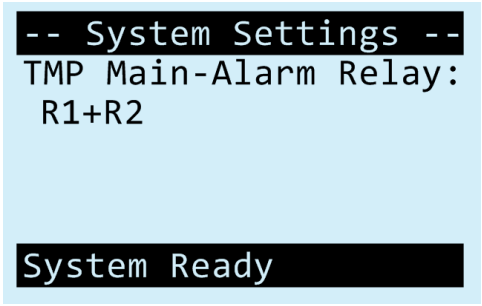
### Screen 1.3.1.8 - System Settings - OPA Pre-Alarm Relay




| | |
|---|---|
| ▲ | Screen 1.3.1.9 will be shown |
| ▼ | Screen 1.3.1.7 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.1 (page 3.13) will be shown |
| Reset | No action |

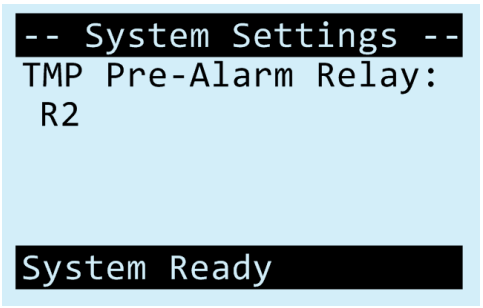
Relay configuration for opacity pre-alarm.
Possible values: OFF, R1, R2, R1+R2 (R1 = Relay 1, R2 = Relay 2)

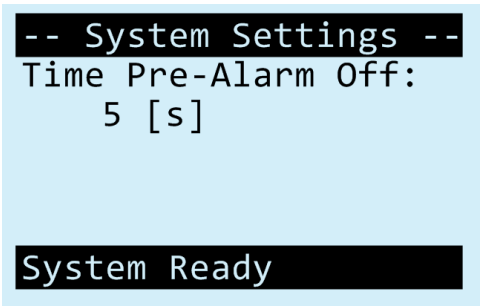
### Screen 1.3.1.9 - System Settings - TMP Main-Alarm Relay

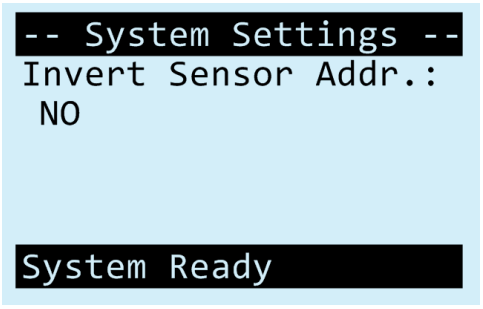



| | |
|---|---|
| ▲ | Screen 1.3.1.10 will be shown |
| ▼ | Screen 1.3.1.8 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.1 (page 3.13) will be shown |
| Reset | No action |

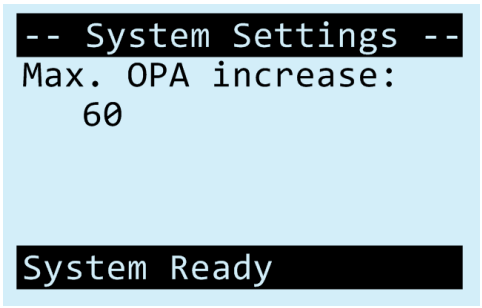
Relay configuration for temperature main alarm.
Possible values OFF, R1, R2, R1+R2 (R1 = Relay 1, R2 = Relay 2)

| Screen 1.3.1.10 - System Settings - TMP Pre-Alarm Relay | | |
|---|---|---|
|  | ▲ | Screen 1.3.1.11 will be shown |
| | ▼ | Screen 1.3.1.9 will be shown |
| | ↵ | You may change the value if you have entered the PIN. |
| | Esc | Screen 1.3.1 (page 3.13) will be shown |
| | Reset | No action |
| Relay configuration for temperature pre-alarm.<br>Possible values OFF, R1, R2, R1+R2 (R1 = Relay 1, R2 = Relay 2) | | |

| Screen 1.3.1.11 - System Settings - Time Pre-Alarm Off | | |
|---|---|---|
|  | ▲ | Screen 1.3.1.12 will be shown |
| | ▼ | Screen 1.3.1.10 will be shown |
| | ↵ | You may change the value if you have entered the PIN. |
| | Esc | Screen 1.3.1 (page 3.13) will be shown |
| | Reset | No action |
| Time for automatical reset of pre-alarm in seconds in the range of 1-60 seconds. | | |

| Screen 1.3.1.12 - System Settings - Invert Sensor Addr. | | |
|---|---|---|
|  | ▲ | Screen 1.3.1.13 will be shown |
| | ▼ | Screen 1.3.1.11 will be shown |
| | ↵ | You may change the value if you have entered the PIN. |
| | Esc | Screen 1.3.1 (page 3.13) will be shown |
| | Reset | No action |
| With this setting, you can correct the numbering of the GDMS-OMD14 sensors, so that the sensor numbering matches the compartment numbering. | | |

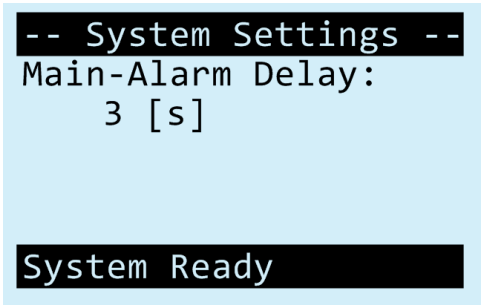
Screen 1.3.1.13 - System Settings - Max. OPA increase




| | |
|---|---|
| ▲ | Screen 1.3.1.14 will be shown |
| ▼ | Screen 1.3.1.12 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.1 (page 3.13) will be shown |
| Reset | No action |

Maximum gradient that will be accepted to trigger alarm; Unit: digits/second (default: 60)

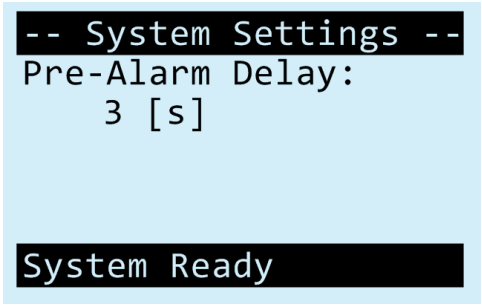
Screen 1.3.1.14 - System Settings - Main-Alarm Delay




| | |
|---|---|
| ▲ | Screen 1.3.1.15 will be shown |
| ▼ | Screen 1.3.1.13 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.1 (page 3.13) will be shown |
| Reset | No action |

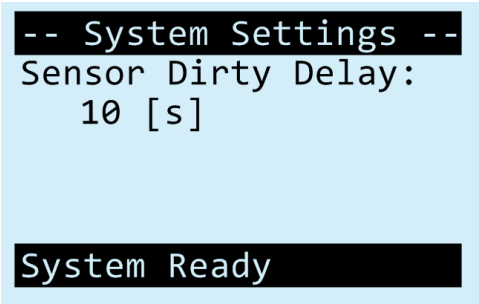
Time delay until system triggers main alarm; this setting avoids triggering alarm when the alarm-level is exceeded only for a short time. (default: 3 sec)

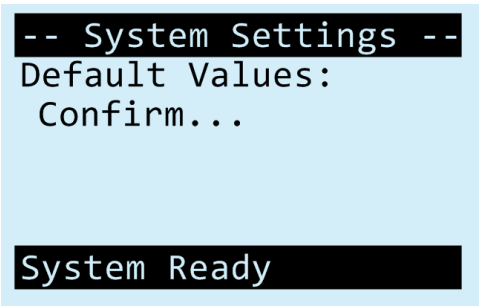
Screen 1.3.1.15 - System Settings - Pre-Alarm Delay

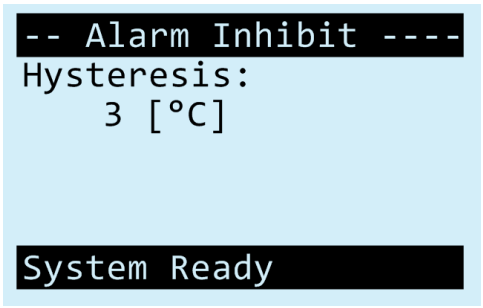



| | |
|---|---|
| ▲ | Screen 1.3.1.16 will be shown |
| ▼ | Screen 1.3.1.14 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.1 (page 3.13) will be shown |
| Reset | No action |

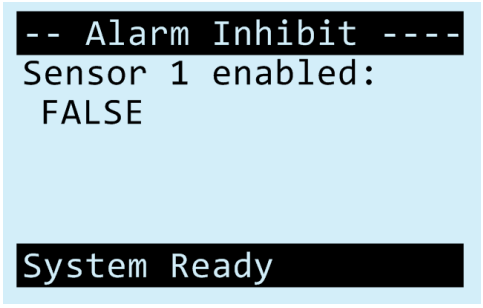
Time delay until system triggers pre-alarm; this setting avoids triggering pre-alarm when the pre-alarm-level is exceeded only for a short time. (default: 3 sec)

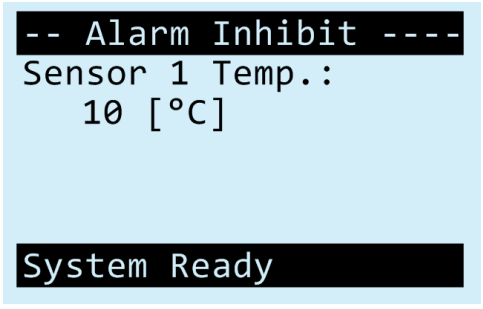
| Screen 1.3.1.16 - System Settings - Sensor Dirty Delay | | |
|---|---|---|
|  | ▲ | Screen 1.3.1.17 will be shown |
| | ▼ | Screen 1.3.1.15 will be shown |
| | ↵ | You may change the value if you have entered the PIN. |
| | Esc | Screen 1.3.1 (page 3.13) will be shown |
| | Reset | No action |
| Time delay until a sensor will be set to the “Dirty” status. | | |

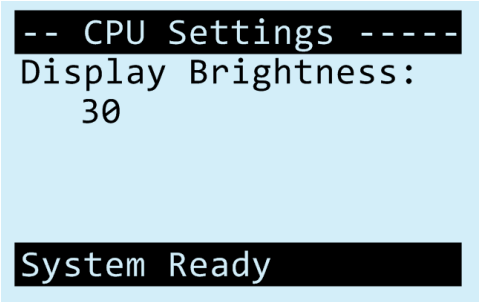
| Screen 1.3.1.17 - System Settings - Default values | | |
|---|---|---|
|  | ▲ | Screen 1.3.1.1 will be shown |
| | ▼ | Screen 1.3.1.16 will be shown |
| | ↵ | You may set the default values if you have entered the PIN. |
| | Esc | Screen 1.3.1 (page 3.13) will be shown |
| | Reset | No action |
| Reset all settings to factory defaults.<br>⚠ Attention: This will delete all personal settings and the installation will not work (correctly) anymore! At least, the number of sensors has to be corrected after a factory reset! | | |

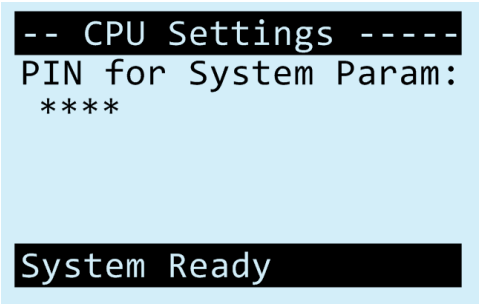
| Screen 1.3.2.1 - Alarm Inhibit - Hysteresis | | |
|---|---|---|
|  | ▲ | Screen 1.3.2.2 will be shown |
| | ▼ | Screen 1.3.2.3 will be shown |
| | ↵ | You may change the value if you have entered the PIN. |
| | Esc | Screen 1.3.2 (page 3.13) will be shown |
| | Reset | No action |
| Setting of Alarm Inhibit Hysteresis ranging from 2 to 15 °C. | | |

The following two screens are identical for each sensor and are only described once in this manual.

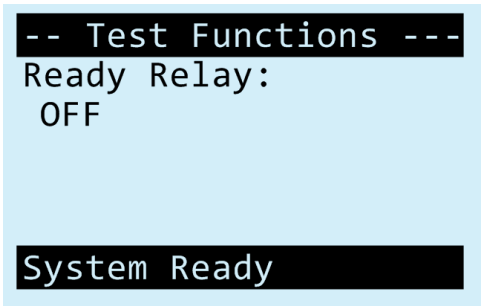
| Screen 1.3.2.2 - Alarm Inhibit - Sensor 1 enabled | | |
|---|---|---|
|  | ▲ | Screen 1.3.2.3 will be shown |
| | ▼ | Screen 1.3.2.1 will be shown |
| | ↵ | You may change the value if you have entered the PIN. |
| | Esc | Screen 1.3.2 (page 3.13) will be shown |
| | Reset | No action |
| Alarm Inhibit for sensor 1.<br><br>TRUE means enabled, FALSE disabled. (default: FALSE) | | |

| Screen 1.3.2.3 - Alarm Inhibit - Sensor 1 Temp. | | |
|---|---|---|
|  | ▲ | Screen 1.3.2.1 will be shown (for next sensor, here: sensor 2) |
| | ▼ | Screen 1.3.2.2 will be shown |
| | ↵ | You may change the value if you have entered the PIN. |
| | Esc | Screen 1.3.2 (page 3.13) will be shown |
| | Reset | No action |
| Setting of temperature threshold for alarm inhibit, ranging from 1 to 55. Below this temperature no alarm will be triggered. (default: 10) | | |

| Screen 1.3.3.1 - CPU Settings - Display Brightness | | |
|---|---|---|
|  | ▲ | Screen 1.3.3.2 will be shown |
| | ▼ | Screen 1.3.3.2 will be shown |
| | ↵ | You may change the value. |
| | Esc | Screen 1.3.3 (page 3.13) will be shown |
| | Reset | No action |
| Setting of display brightness in the range of 5 to 100. (5 = dark, 100 = bright) | | |

| Screen 1.3.3.2 - CPU Settings - PIN for System Param | | |
|---|---|---|
|  | ▲ | Screen 1.3.3.1 will be shown |
| | ▼ | Screen 1.3.3.1 will be shown |
| | ↵ | You may change the value. |
| | Esc | Screen 1.3.3 (page 3.13) will be shown |
| | Reset | No action |
| The write access to the “System Settings” and “Setup Alminhibit” parameters and all “Test Feature” operations require this PIN to be entered. It is only known by authorized personnel! | | |

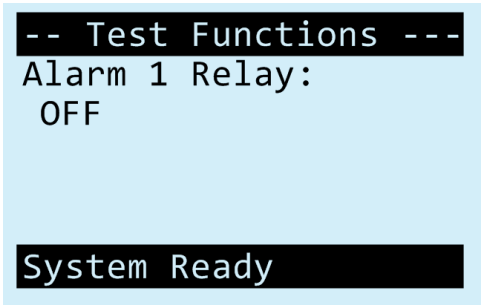
### Screen 1.3.4.1 - Test Functions - Ready Relay




| | |
|---|---|
| ▲ | Screen 1.3.4.2 will be shown |
| ▼ | Screen 1.3.4.4 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.4 (page 3.14) will be shown |
| Reset | No action |

The ready relay can be switched on and off manually for testing purposes.

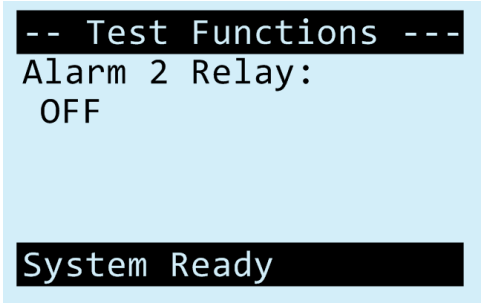
### Screen 1.3.4.2 - Test Functions - Alarm 1 Relay




| | |
|---|---|
| ▲ | Screen 1.3.4.3 will be shown |
| ▼ | Screen 1.3.4.1 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.4 (page 3.14) will be shown |
| Reset | No action |

The alarm 1 relay can be switched on and off manually for testing purposes.

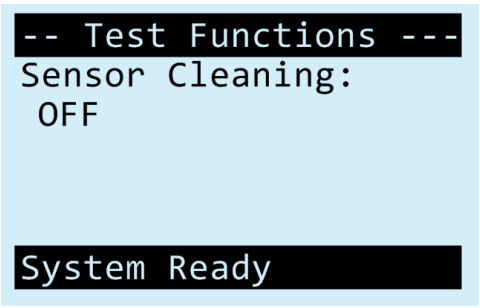
### Screen 1.3.4.3 - Test Functions - Alarm 2 Relay




| | |
|---|---|
| ▲ | Screen 1.3.4.4 will be shown |
| ▼ | Screen 1.3.4.2 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.4 (page 3.14) will be shown |
| Reset | No action |

The alarm 2 (usually pre-alarm) relay can be switched on and off manually for testing purposes.

Screen 1.3.4.4 - Sensor cleaning




| | |
|---|---|
| ▲ | Screen 1.3.4.1 will be shown |
| ▼ | Screen 1.3.4.3 will be shown |
| ↵ | You may change the value if you have entered the PIN. |
| Esc | Screen 1.3.4 (page 3.14) will be shown |
| Reset | No action |

Change the value to “ON” for cleaning sensors. You then may pull the sensors out of the engine and clean them. The alarms are disabled until you press “ESC” to restart the system after cleaning.

# 4. Performance / Maintenance Tests

## 4.1. Function Test

Following the initial installation of GDMS-OMD14 sensors, evaluator and all mounting parts, all construction units and all connections are controlled.
All parameters and data for the operation of the engine are checked for correct adjustment (please refer to the respective data sheet provided by the MSS AG).

Please note that a start of the GDMS-OMD14 system is only permitted, if the installation of the GDMS-OMD14 system has been carried out in accordance with the instructions, technical descriptions and the manuals.
After connecting the 24V DC power supply to the evaluator of the GDMS-OMD14 system the evaluator runs through a self-test.
After some time the measured values are shown on the screen of the Evaluator.
The green ready light at the Evaluator turns on as soon as the system is ready.

**The procedure after an intermediate stop is described.**
**This description assumes that the plant was already in operation once and was originally installed and put into operation by the employees of the company MSS AG.**

All cables, sensors, plotters are installed again in such a way, as they were installed before putting out of operation.
All parameters and settings are stored in a permanent memory (EEPROM), it is not necessary to restore them.
In case of using and installing new parts and units of the GDMS-OMD14 system all settings and parameter are stored during production and final inspection at MSS AG.

If there is an alarm indicated or the ready lamp is off you find references for the error correction in the manual, especially in Chapter 5.

For error diagnostics it could be helpful:

- To check all cables and connections, especially the male / female connections.
- To replace the cables systematically
- To replace sensors and to use spare sensors

To run an OMD full check of the GDMS-OMD14 system, an oil mist generator needs to be used.

Either if the engine is running or stopped, it is possible to inject oil mist into the crankcase to test the alarm device and the alarm level of the GDMS-OMD14 system. This test is carried out by MSS AG at the test bench of the engine to obtain the operation licence for this type of engines. Only in case of an older engine this test is carried out on an engine in operation.

# 5. Troubleshooting

### Error code and Error description

If a failure is detected at the GDMS-OMD14, the ready relay of the Evaluator opens. If there's at least one OMD14 sensor online and functioning at this time, the green ready LED will blink as an indicator for reduced system operation. In this case, the system is still able to raise opacity alarm. If none of the installed OMD14 sensors is online, the green ready LED switches off.

GDMS-OMD14 Evaluator error messages can be grouped in the following types:

## 5.1. Failure in GDMS-OMD14 Sensors

The display shows "Err.Sens.xx: nnnn [text error message]"

with xx: sensor number, for example 01
nnnn: error code (refer to the following table)

| Error codes | Error description | Help |
|---|---|---|
| 0001 | must value for IR transmitter LED too high (> 3000) | IR track must be cleaned and sensor must be recalibrated. If the error persists after recalibration, it means that the IR transmitter system is defect. Sensor must be exchanged and repaired by the manufacturer. |
| 0002 | must value for IR transmitter LED too low (> 1000) | |
| 0004 | calibration of IR measuring track is false | IR track must be cleaned and sensor must be recalibrated. If the error persists after recalibration, it means that the IR measuring track has not the right IR transmission and is defect. Sensor must be exchanged and repaired by the manufacturer. |
| 0008 | Transmission of IR measuring track too high (Opbzw > 1170) | |
| 0010 | ("LT dirty")<br>Transmission of IR measuring track too low (Opbzw < 400) | |
| 0020 | Transmission of IR measuring track too high. If transmitter LED is off, this means that receiver is receiving IR noise from other equipment, which can only be if the sensor is not mounted in the SOPS !! | Sensor cannot be operated in this environment (IR noise) without SOPS. Insert sensor in the SOPS and restart evaluator. |

Table continues on next page ...

| Error codes | Error description | Help |
|---|---|---|
| 0040 | Temperature of the IR track/ sensor front too low ( < -7 °C ) | Check the displayed temperature value for this sensor in the "Sensor values" menu of the evaluator. If the value is -99 or 999, the built-in temperature chip is defect, the sensor must be exchanged and repaired by the manufacturer. If the displayed value is feasible at the actual environment of sensor, the sensor is used out of specified temperature range. The error is reset automatically when the sensor temperature is back within the specification range. |
| 0080 | Temperature of the IR track/ sensor front too high ( > 117 °C) | |
| 0100 | Temperature of sensors CPU too high (> 95 degree) | The sensor CPU temperature is too high. The housing of the sensor must be cooled using airstream. |
| 0200 | Temperature of sensors CPU too low (< -5 degree) | The sensor CPU temperature is too low. The housing of the sensor must be heated up using airstream. |
| 0400 | Sensor is in power-up mode after system restart | Disappears automatically after approx. 10 seconds |

If multiple errors are detected, the error code is calculated as the hexadecimal sum of individual error codes. Text message for the first detected error code is shown after the sum error code.

## 5.2. Communication Failure

The display shows “Err.Sens.xx Stat: nn”
with xx: sensor number, for example 01
nn: error code (refer to the following table)

| Error code | Error description | Help |
|---|---|---|
| 01 | Sensor does not respond via interface “loop out” (connector 4) | Restart system by pressing the ESC button |
| 02 | Sensor does not respond via interface “loop in” (connector 5) | |
| 03 | Sensor does not respond at all | |
| 13 | Sensor will not be read any longer | |
| 20 | Sensor initialising error | |
| (connectors see paragraph 1.1.3.2) | | |

If multiple errors are detected, the error code is calculated as the hexadecimal sum of individual error codes. For example:

The message “Err.Sens.02 Stat: 33” includes the error codes 13 and 20. The meaning of the error message is: sensor 02 cannot be initialised and will not be read.

If the failure persists after restarting, the sensor causing the failure can be detected using the menu “Sensor values”:
Start menu “Sensor values”, select one sensor after another:
The circuit is broken between sensors when sensor status switches from 01 to 02:

E.g.: Sensor 01: Status 01
Sensor 02: Status 01
Sensor 03: Status 01
Sensor 04: Status 02

The circuit is broken here between sensor 03 and sensor 04. Check wiring.

### 5.3. Evaluator Failure

The display shows “OMD14 - Error nnnn!”
with nn: error code (refer to the following table)

| Error code | Error description | Help |
|---|---|---|
| 0001 | No sensor detected | • Check cables<br>• Is the number of sensors set up correctly? |
| 0002 | Date and time invalid in real-time clock | • Set date and time<br>• If the error occurs again, replace Evaluator |
| 0004 | Failure in event memory | Read out memory and reinitialise the Evaluator |

If multiple errors are detected, the error code is calculated as the hexadecimal sum of individual error codes.

### 5.4. EEprom Parameters Failure

The display shows “CPU Error nnnn!”
with nn: error code (refer to the following table)

| Error code | Error description | Help |
|---|---|---|
| 01xx | Failure within the CPU parameters | Check CPU parameters (display brightness, ...) |
| 02xx | Failure within the OMD14 parameters | Check OMD14 parameters (number of sensors, sensitivity, ...) |
| 04xx | | Check manufacturing data |

If multiple errors are detected, the error code is calculated as the hexadecimal sum of individual error codes.

# 6. Repair

Before any attempts to repair or dismount the GDMS-OMD14 devices because of an assumed defect or failure you should contact MSS AG or its authorized partners.

Based on experience, many failures can be cleared easily by fault diagnostics on-site. In most cases a repair is not necessary.

Dismounting may only be performed on demand by MSS AG or its authorized service representatives.

A repair of GDMS-OMD14 components is done exclusively by MSS AG. Defective parts should be sent to MSS AG including detailed failure description.

Please get in contact with the headquarter of MSS AG for further assistance.

# 7. Notes