

INSTALLATION MANUAL

for

GDMS-OMDN09[®]

**Gear and Diesel engine Monitoring System
Oil Mist online Detection Navy**

Diesel- and -Version

Part No.: 2 900 01 0000

Release: 100614
(revision 110901)



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1. Safety instructions

This installation manual has to be read before assembling, commissioning or maintenance by the assigned personal. The GDMS-OMDN09 User Manual is part of the installation instructions. References have to be followed in any case! The specific instructions given in this manual have to be carried out. Non-observance of this installation manual will be followed by losing any warranty claim against MSS AG.

1.1. Safety instructions

- 1.1.1 Only qualified and accordingly instructed personal may assemble commission or maintain a GDMS-OMDN09.
- 1.1.2 Work at electronic parts may only be done by certified electricians according to DIN EN 50110/1.
- 1.1.3 GDMS-OMDN09 may only be used within the specifications given in technical documents of MSS AG:
 - GDMS-OMDN09 = for HFO- or diesel operation
 - GDMS-OMDN09-Ex = for Dual-Fuel and Gas operating engines
(and diesel engines)
- 1.1.4 Safety and Monitoring devices may not be removed, bypassed or disabled in any way.
- 1.1.5 GDMS-OMDN09 may be operated only if in faultless condition. Malfunctions and damages which affect or could affect the safety, have to be repaired immediately by qualified personnel.
- 1.1.6 Damaged components in modules have to be replaced by original MSS AG spare parts.



2. Standards and Specifications

GDMS-OMDN09 complies to the following standards:

Diesel and Ex-Version:

EN 50141, ENV 50204, EN 55011,
EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-8

Additional for Ex -Version:

EN 60079-0:2006 (General requirements)
EN 60079-11:2007 (Intrinsic safety)
IEC 60079-28:2006 (Optical radiation)

IACS Type Approval by Germanischer Lloyd AG Hamburg according to D; EMC 2

ATEX Approval by DEKRA EXAM GmbH, Bochum

This installation manual has to be kept in safe custody and has to be read before installing the device.

3. System Description

3.1. SOPS (Splash Oil Protection System)

The SOPS will be installed inside of the engine and protects the sensor against splash oil.

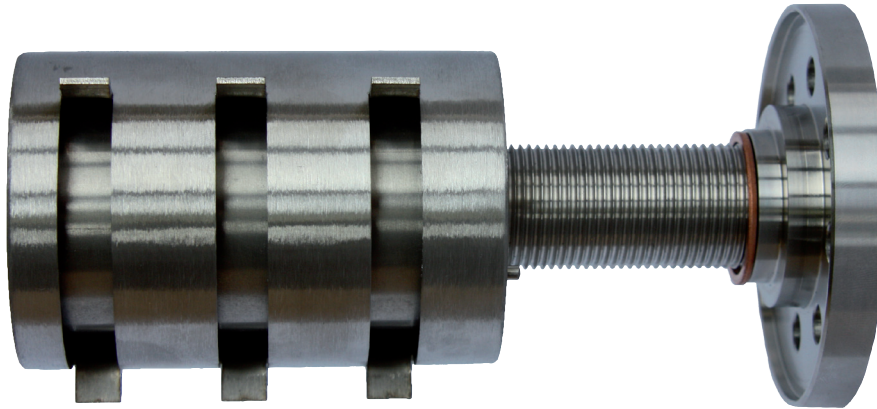


Fig. 1: SOPS for diesel engines with counter nut and seal ring

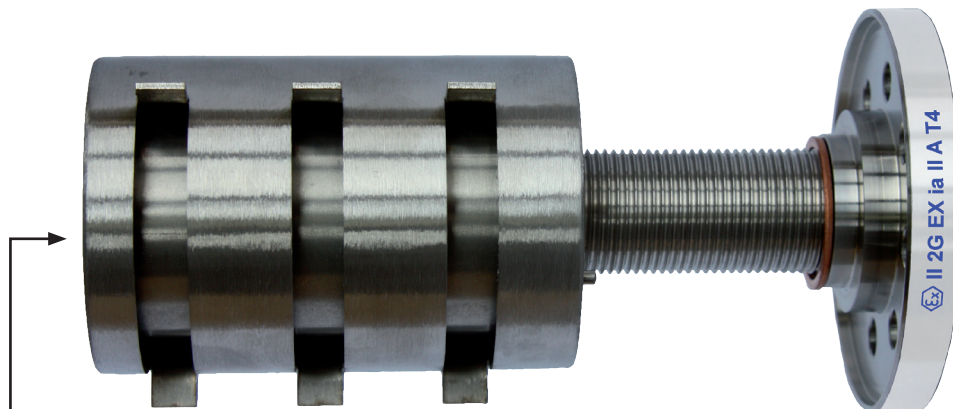


Fig. 2: SOPS for Ex-Installation with counter nut and seal ring

Front end of GDMS-OMDN09  oil protection System (SOPS) contains an engraved mark

Attention: Pay attention to the different marking, since **different** SOPS are used for diesel- and Ex-version.



3.2. GDMS-OMDN09 Sensor



Fig. 4: GDMS-OMDN09 sensor for diesel engines

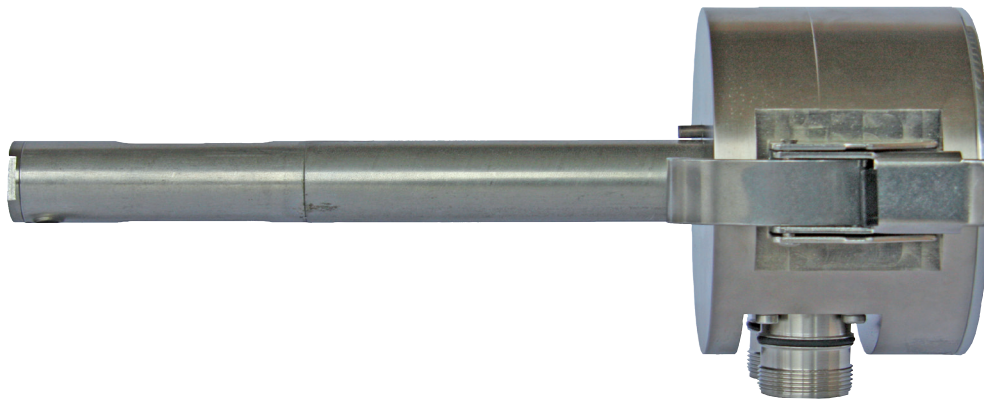


Fig. 5: GDMS-OMDN09 sensor for Ex-Installations

Attention: Pay attention to the different marking, since **different** sensors are used for diesel- and Ex-version.

3.3. GDMS-OMDN09 Evaluator

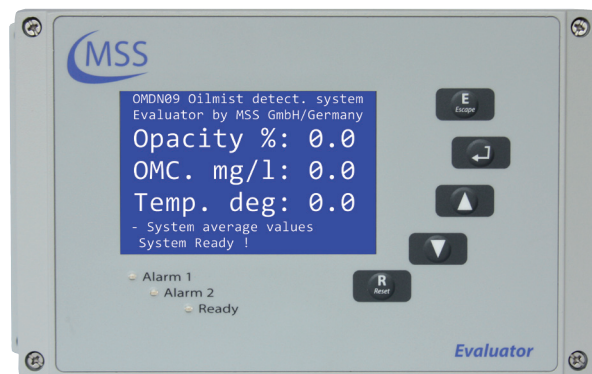


Fig. 6: GDMS-OMDN09 Evaluator

Note: GDMS-OMDN09 Evaluator for both versions (Diesel and Ex)

4. Installation

The position for the installation of sensors and of the SOPS in the engine wall must be selected accurate.

The splash oil inside the engine follows the rotation of the crank shaft. Due to this rotation discoidal zones with very high splash oil concentrations (also called “splash discs”) appear.

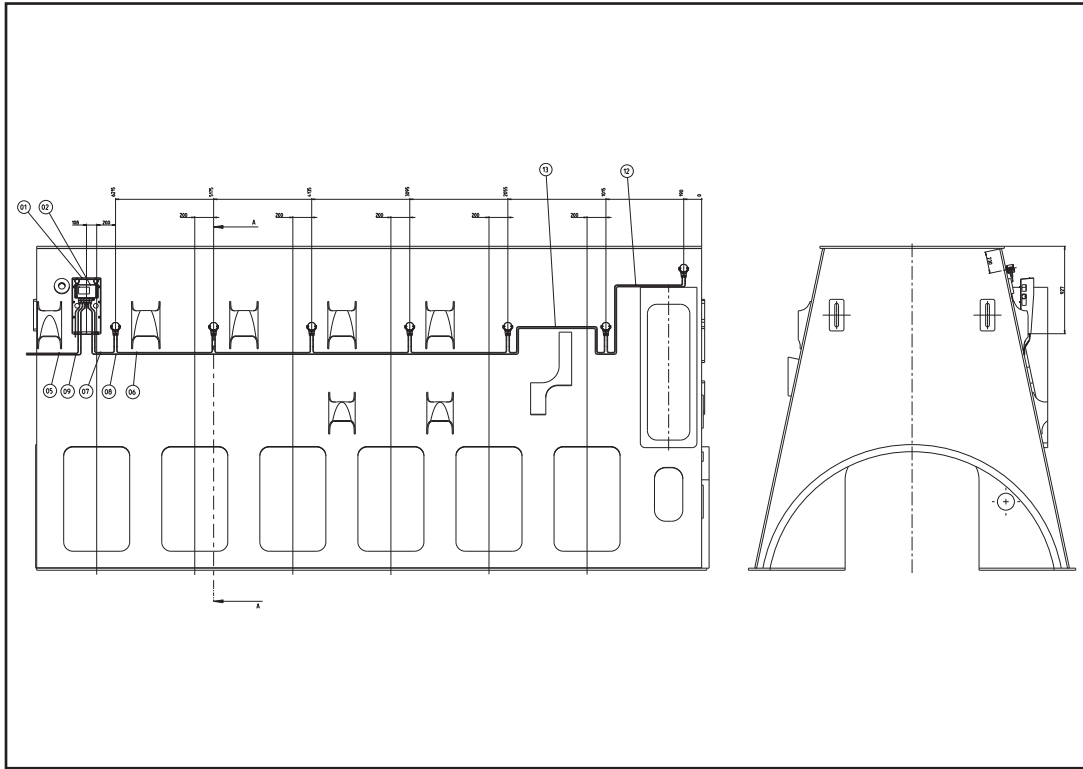
In an in-line engine two “splash discs” appear between the con-rod and the crankweb. In a V engine a third “splash disc” appears between two con-rods.

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

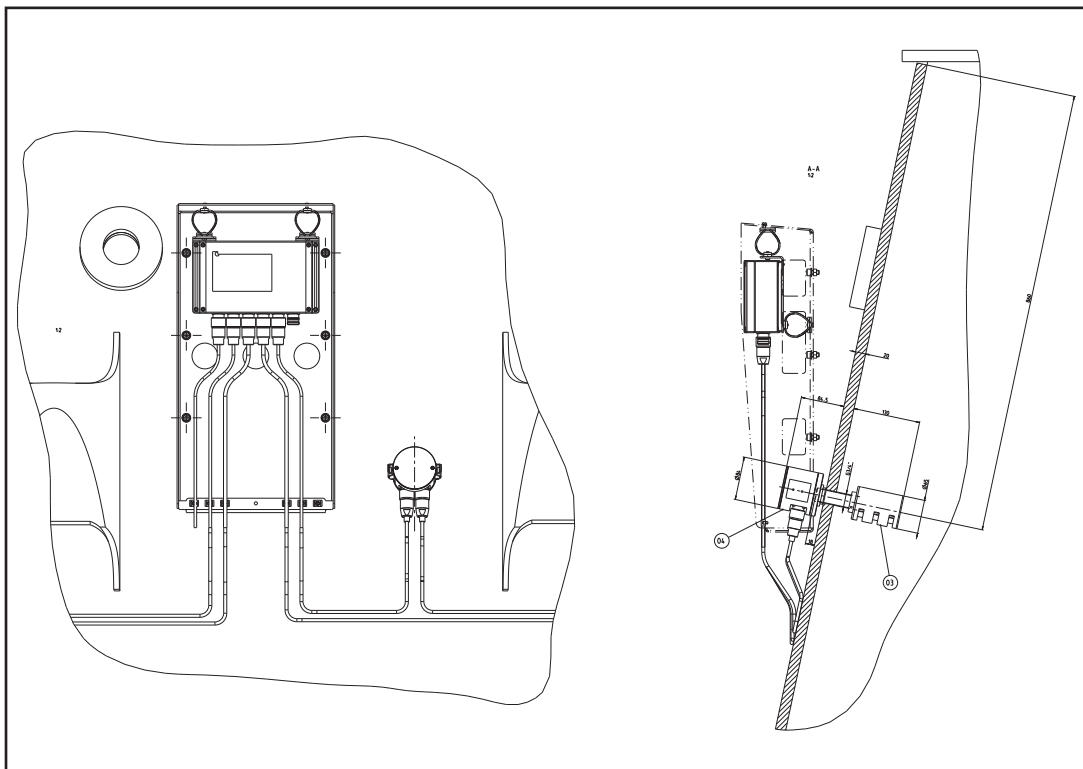
In a four stroke engine, you have to pay attention to install the sensors on the side with the splash oil hitting the sensors on the top.

This does not apply to two stroke engines since the nominal speed as well as the splash oil creation is much lower.

A mounting diagram, which will be developed by MSS AG and the engine manufacturer, is needed prior the installation to determine the best installation position of the GDMS-OMDN09 sensors.



Example 1: Sensor installation positions on a 2 stroke engine



Example 2: Sensor installation position at the engine wall of a 2 stroke engine

On the basis of these drawing, authorized and qualified personnel have to drill tap holes (G3/4" DIN ISO 228-1) on site for mounting the sensors.

When reconditioning, refer to:

GDMS-OMDN09 User Manual, chapter 8.2: Installation Procedure of Mechanical Components

4.1. Mounting the components

(Refer to GDMS-OMDN09 User Manual, chapter 8)

- Take the SOPS and screw it from the inner side of the crankcase into the hole until 16mm of the thread overlap the outer surface

Attention: The inlet faces down, the TOP mark (a notch) faces up (Fig. 7)

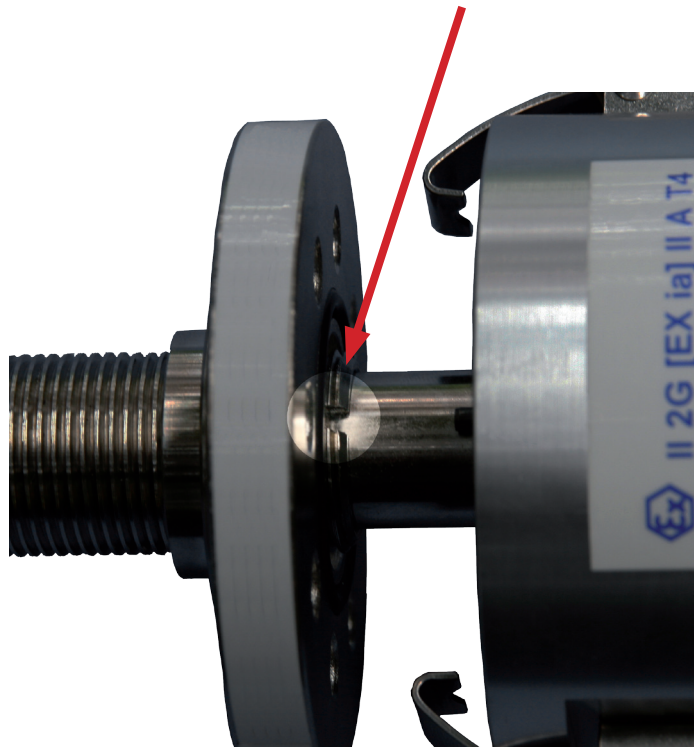


Fig. 7: Top mark

- Use Loctite 2701 on four turns of the counter nut and screw the nut and the copper seal ring 27x32x1,5 DIN 7603A onto the outstanding 16mm (refer to Fig. 2, page 3)

- Use the counter support (hook wrench) on the inside and the V-wrench on the outside to tighten the installation (Fig. 8 and 9)



Fig. 8: Installation kit, Part. Nr. 2 600 20 4000



Fig. 9: Use of the installation kit

- Insert the GDMS-OMDN09 sensor by using the O-ring 36x2mm into the SOPS and lock it with the retaining clips (refer to example 2, page 6), also refer to GDMS-OMDN09 User Manual, chapter 8.2, Fig. 8.12 to Fig. 8.19

- Mount GDMS-OMDN09 Evaluator according to the customer's preference; An optional (and recommended) vibration damping feature is available when mounting onto the engine, Part. Nr. 2 020 20 0000

The mounting of the GDMS-OMDN09 Evaluator has to be done in a way, that the displayed values are readable and the use of the Evaluator is safe and without any risk of an injury in any operating condition of the engine.



Pay special attention to the following cabling information:

- Only cable which meet the certification requirements may be used (i.e. Metrofunk 12 AWG 20UC-L), please also refer to the User Manual, chapter 1.1.3.4. on page 9.
- The length of the connection cable between the sensor-chain and the Evaluator may not exceed 500 meters! The same applies to the connection cable between the Evaluator and the Remote Monitoring Unit.
- The connection cable may not contact any hot parts!
- The connection cable has to be layed in a vibration-free cable duct.
- The connection cable may not be layed parallel to a high voltage current power line to prevent inductive influences!
- To avoid any intrusion of dirt and dust, the coupling nut has to be tightened after plugging the connector!

4.2. Electrical wiring

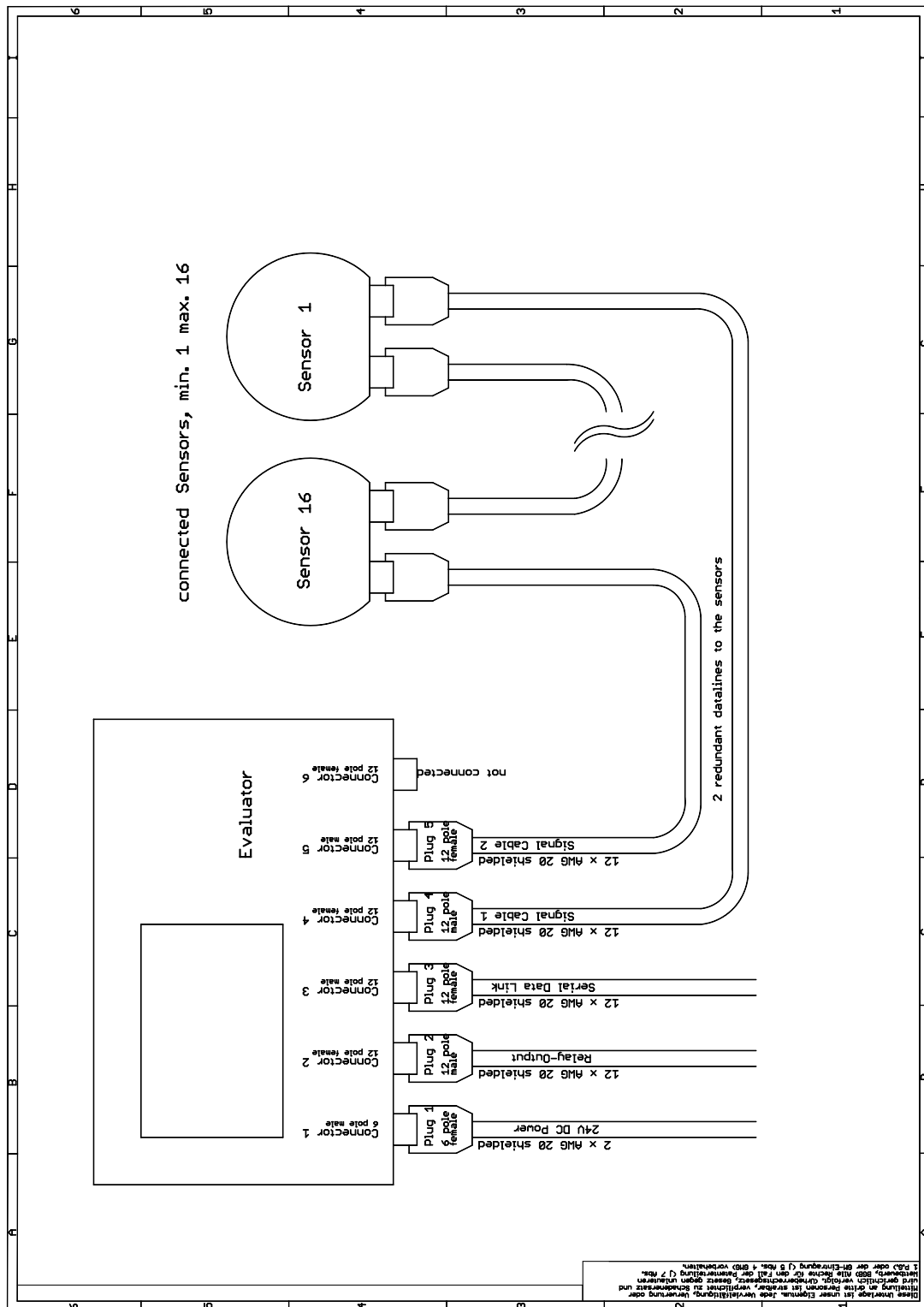


Fig. 10: Wiring diagram GDMS-OMDN09

4.3. Laying of the sensor wiring

The data cables from the Evaluator to the first sensor and from the last sensor back to the Evaluator as well as the cables between each sensor with correct lengths are typically included in the GDMS-OMDN09 mounting set.

It is possible that cables have to be assembled on site as described in the attachment “12pol connection cable male-female connector” to these instructions and as described in the GDMS-OMDN09 User Manual, chapter 8, page. 8.3.

The lengths of the cables have to be taken on site. Please keep in mind that the required cable is Kabel Metrofunk 12 x AWG 20 C UL SW.

Wiring diagram, Fig.10:

- Connect connector 4 with first sensor
- Connect each sensor to another
- Connect last sensor with connector 5
- Connect the 24V power supply of the Evaluator (refer to attachment 2)

When installing a GDMS-OMDN09-Ex system, take care, that the 24V power supply requires a U_m of 30V. If you are using a 230V to 24V power converter, make sure that it includes a galvanic isolation or that the electric and RS485-datacircuits go through barriers. These barriers require certificates. Also pay attention to the specific conditions of the barriers for safe use.



- Connect the ready- and alarm-relays from connector 3 of the Evaluator to the control- and operating system of the engine, refer to the wiring diagram, sheets 2-6

Make sure each cable is installed in a way that it does not get damaged by vibrations. Pay attention, that every connection is tightened. Securely fasten the coupling nuts!





5. Commissioning

- Turn on 24V power supply → Evaluator starts
- Wait until the Evaluator shows the opacity value; possible error messages can be ignored at the moment
- Go to “Screen 1.4.3 - Setup CPU” (refer to the GDMS-OMDN09 User Manual page 13)
- Go to “Screen 1.4.3.6 - PIN for Setup”
- Enter the PIN (the PIN is known by the operator)
- After entering the correct PIN, go to “Screen 1.4.1 - Parameter setup”, “Screen 1.4.1.1 - Number of sens.”
- Set up number of sensors
- Go to “Screen 1.4.1.2 - OPA Alarm-Level” and set up the required alarm level (1-10), also see GDMS-OMDN09 User Manual, “Sensitivity Table” on page 13

Attention: The IACS M67 requires, that an alarm has to be raised as soon as an oil mist concentration of 2.5 mg/l has been reached, which matches an alarm level of 7. More sensitive values are allowed. Higher alarm levels may be used at diesel or gas engines within powerplants.



- Go to “Screen 1.4.1.3 - OPA PreAlm-Level” and set up the required Prealarm-Level in % of the “OPA Alarm-Level”. (Range: 40-100%)
- optional, set up the temperature main- and pre-alarm in “Screen 1.4.1.4 - Tmp Alarm-Level” and “Screen 1.4.1.5 - Tmp PreAlm-Level”

Range of “Tmp Alarm-Level”: 0-150°C in steps of 10°C, where 0°C turns off the temperature alarm

Range of “Tmp PreAlm-Level”: 40-100%

- Press the ESC-button several times, until the Evaluator reboots
- The Evaluator initialises and addresses all connected sensors, as well as it retrieves the measured values of every connected sensor. After the successful initialisation, the Ready-LED and the Ready-Relays turn on, the system is ready. The text “System Ready!” has to be shown in the display
- The current measurements can be shown by using the buttons on the Evaluator

6. Maintenance

Since the sensor is installed inside the engine, the optical measuring section can be polluted depending on the operating condition of the engine. This pollution will be compensated automatically by an electronic circuit.

If the pollution is too high and the automatic compensation cannot adjust, a manual cleaning of the optical measuring section of the GDMS-OMDN09-Sensor is needed. An appropriate message will be shown on the display of the Evaluator.

- Go to “Screen 1.2 - Sensor values” / “Screen 1.2.1 - Measured values sensor 1” (refer to the GDMS-OMDN09 User Manual, page 14 / page 14)
- Check the values of each sensor; a dirty sensor will have a message “Dirty”
- Disconnect the sensor
- The sensor will be removed from the monitoring chain automatically by the Evaluator
- Dismount the sensor by opening the retaining clips
- Clean the optical measuring section with the Cleaning Kit, Part. Nr. 2 600 01 9000
- After cleaning, mount the sensor again and lock it with the retaining clips. Make sure, the O-ring is present and undamaged. Replace it with Gasket Set for SOPS Part. Nr.2 600 20 5000 if necessary
- Reconnect the cables
- Press the ESC-button until the Evaluator reboots
- The Evaluator initialises and addresses all connected sensors, as well as it retrieves the measured values of every connected sensor. After the successful initialisation, the Ready-LED and the Ready-Relays turn on, the system is ready. The text “System Ready!” has to be shown in the display

7. Repair and Troubleshooting

Occurring failures will be automatically detected by the Evaluator and shown, refer to GDMS-OMDN09 User Manual chapter 5 “Troubleshooting”.

Communication errors can be caused due to damaged or incorrectly fastened connectors or due to damaged communication cables.

Solution:

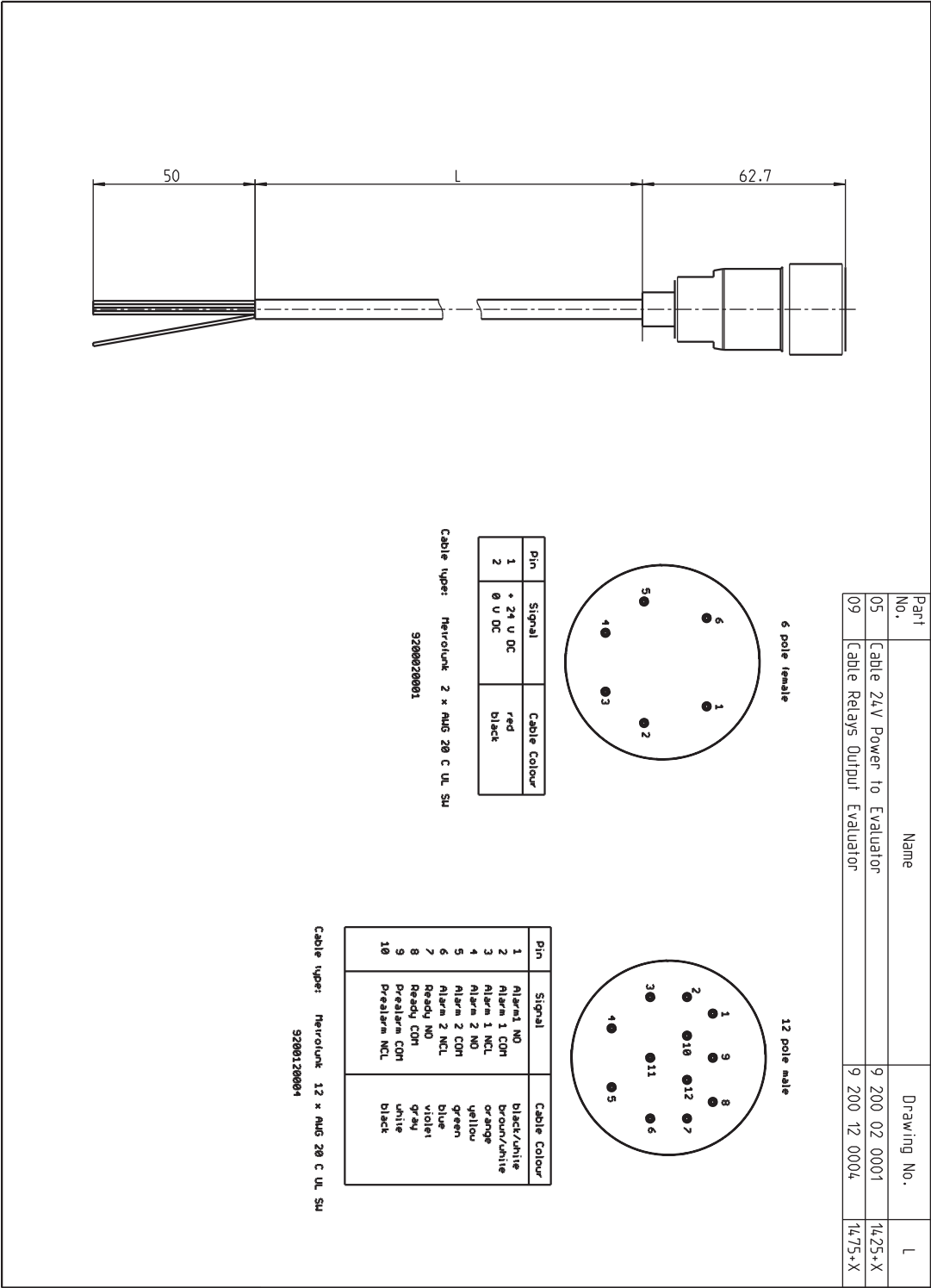
Make sure each connector is fastened correctly, check each cable for damages and replace cables if necessary.

Replacement of cables or connectors which do not apply to the given specifications is prohibited and may cause malfunctions of the system.

Damaged sensors or Evaluators have to be sent back to MSS AG including an error report. Repairs may only be done by MSS AG; also refer to GDMS-OMDN09 User Manual, chapter. 6 “Repair”.

Attachment 1

12 pol. connection cable male-female connector



Attachment 2

- 2 pol. connection cable (open end)
- 12 pol. connection cable (open end)

