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INSTRUCTION MANUAL

OMD-2008 Series

15ppm Bilge Alarm



OMD-2008 Series

- OMD-2008
- Electric Valve – OMD-2008 EV
- Electric Valve Auto Clean – OMD-2008 EVA
- Electric Valve Flow Control – OMD-2008 EVFC
- (Optional: Manual Cleaning Unit MCU)

We help to protect the Environment





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Usage of this instruction manual

This instruction manual will guide you how to use the OMD-2008 Series. The instruction manual is split into sections. Every section handles a specific part of the OMD-2008 Series. The first section gives you general information about safety before using and servicing the OMD-2008 Series. Please take notice on this section.

You will also find information about the construction and the installation of OMD-2008 Series. The programming mode is explained in detail at the end of the instruction manual.

This instruction manual also contains information about the service support and our contact details. The symbols below will accompany for a better understanding.






Disposal



The crossed-out waste container icon on waste electrical or electronic device indicates that this device must not be disposed of with household waste at the end of its life. There are collection points available in your area for free. The addresses can be obtained from your municipality or local administration. You can also email us at post@deckma.com to find out further return options provided by our company.

Separate collection of waste electrical and electronic equipment (WEEE) is intended to prevent the re-use, recycling other forms of use of WEEE as well as to avoid adverse effects on the environment and human health from the disposal of potentially hazardous substances contained in devices.


Symbols

- This symbol is used for giving general advices.
- i This symbol is used to clarify a recommendation.
- ⚡ This symbol is used for giving advice about servicing.
-  This symbol is used to draw warning against hand injuries.
-  This symbol is used to show electrical voltage warnings.
-  This symbol is used to draw attention to hot surfaces.
-  This symbol is used for giving general warnings.
-  This symbol is used to draw attention to hazardous substances.




Safety hazard


Mechanical Risks

 Risk of hand injuries	While closing the front cover hand injuries could be possible.
--	--


Electrical Risks

 Electrical voltage warnings	Incorrect commissioning and wiring, touching live parts, and cable breakage or faulty components can lead to electrical hazards.
--	--

Thermal Risk

 Risk of scalding	High temperatures can occur on the surface of the measuring cell. Hot water may spill and cause scalding.
---	---

Chemical Risk

 Risk of chemicals	Material used during cleaning and maintenance can cause eye and skin irritation.
---	--

Risk reduction

Risks	Recommended reduction	Risk level (1)Low – (3)High
Risk of hand injuries.	While opening and closing the front cover care must be taken.	1
Electrical risks.	Works on the units should be only be done by a qualified person. Keep Terminal Cover closed at all times.	3
Risks of scalding.	It is recommended to wear protective clothing in the form of heat-resistant gloves and protective goggles, if high temperature sample is present.	1
High temperature risks.	Do not open the cell cap until the sample water has cooled down sufficiently. Stop any sample water flow prior to opening the head screw.	2
Unexpected movement of the wiper piston.	Close pressurized air supply before working on the Autoclean System or dismantling the Autoclean System.	2
Chemical Risk.	Material used for Cleaning and Maintenance may cause eye and skin irritation. Cleaning solution may cause health problems if ingested.	1
Risk of environmental damage.	Use instrument strictly within its specification. Keep instrument properly maintained.	1
Risk of health damage.	Do not touch or ingest any residue from sample stream.	2



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IMPORTANT NOTICE

Replacement components for 15 ppm Bilge Alarms

General

All monitors in our range are inspected and tested to the related International Maritime Organization IMO requirements at our factories prior to delivery.

In normal use the units should operate correctly and without fault over a long period of time requiring only small amounts of maintenance to be carried out as outlined in the instruction manual.

Service Exchange Units

In the event of a monitor malfunction due to electrical or electronic component failure it is our recommendation that a service exchange unit be ordered.

The defective instrument should be returned to our works within 30 days of supplying the service exchange unit, then only the repair charge is payable. Otherwise the whole cost of a service exchange unit becomes payable.

This procedure is by far the easiest and most cost-effective way of ensuring the monitor on board conforms to IMO resolution MEPC.107(49).

Remark

According to the MEPC.107(49) § 4.2.11 the units have to be checked at IOPP Certificate renewal survey by the manufacturer or persons authorized by the manufacturer. Alternatively, the unit may be replaced by a calibrated 15 ppm Bilge Alarm.

The OMD-2008 Series are designed in that way, that only the Measuring Cell needs to be changed, as these units carry the Calibration Certificate. The Calibration Certificate with the date of the last calibration check should be retained onboard for inspection purposes.

If for some reasons the Computer Unit needs to be changed, it has to make sure, that the memory card will remain on board for at least 18 months. The new Computer Unit will carry its own memory card. The old card can be inserted into the new unit only for reading. Writing is only possible with the card delivered with the new Computer Unit. For details see section

15. *Memory Card.*

Warranty

Our warranty terms are 12 months after installation but maximum 18 months after delivery ex works. The maker undertakes to remedy any defect resulting from faulty materials of workmanship except wearing parts.

The maker's obligation is limited to the repairs or replacement of such defective parts by his own plant or one of his authorized service stations.

The purchaser shall bear the cost and risk of transport of defective parts and repaired parts supplied in replacement of such defective parts.

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ANY DISMANTLING OR BREAKING OF A SEAL WILL VOID THE WARRANTY.



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Revision

Document-Name	Revision No.	Notation	Date
OMD-2008 Series	R04_20220318		21.03.2022



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1. Introduction

The OMD-2008 Series Bilge Alarm Units have been designed specifically for use in conjunction with 15 ppm oil-water separator units and have a specification and performance which exceeds the requirements of the International Maritime Organization IMO specifications for 15 ppm Bilge Alarms contained in Resolution MEPC.107 (49).

The units are supplied with 2 works-adjusted alarms at 15 ppm. Set points from 1 ppm to 15 ppm are possible and can be adjusted on site at any time by using the buttons at the front panel.

If an alarm set point is exceeded, the alarms are visible at the front panel and the appropriate relays are switched. In case of malfunction the “**SYS LED**” at the front panel will change from blinking green to permanent red.

For the data logging function, the unit requires a status input from the separator.

A 0(4) - 20 mA signal output (equal to 0 - 30 ppm) is available for driving a recorder or external meter.

By request the OMD-2008 Series are also available with 5 ppm alarm set point. Additionally, instrument versions equipped with a Measuring Cell Cleaning Unit or an Automatic Cell Cleaning Device are available.

OMD-2008 Series generally consist of a Computer Unit, a Measuring Cell, and further equipment (e.g. Valve Assembly, EV Valve, Automatic Cell Cleaning Device, and EV Flow Control).

The Computer Units contain the display PCB with the data logger and the terminals for external connections.

The Measuring Cell is built out of an anodized all-aluminium body with inlet and outlet block made from stainless steel. This rugged cell contains optics and electronics and is connected with the Computer Unit via a plugged data cable.

The Measuring Cell should be positioned vertical.

All OMD-2008 units are mounted onto stainless supports and can be mounted on wall or as bulkhead installation.

The OMD-2008 Series should be located as close as possible to the oily water separator to minimize response delays. According MEPC.107(49) the layout of the installation should be arranged so that the overall response time (including the response time of the 15 ppm Bilge Alarm, which is less than 5 sec.) between an effluent discharge from the 15 ppm Bilge Separator exceeding 15 ppm, and the operation of the Automatic Stopping Device preventing overboard discharge, should be as short as possible and in any case not more than 20 s.

Mount the OMD-2008 Series instrument by means of M6 or M8 screws on to a rigid vertical surface or frame and preferably with the display panel of the monitor at user convenience. For service and maintenance sufficient space to all sides should be available.



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Care must be taken at mounting of the pipes connections to avoid any torsion of the housing and damage of the instrument.

For separator discharge pipes, up to 75 mm OD a standard "T"-type junction of the welded or screwed type is satisfactory for the tapping point. For the separator discharge pipes of 80 mm OD and above a sample probe should be employed which protrudes into the discharge piping by approx. 25 % of the ID of the pipe.

If connection to a vertical section of the separator outlet piping is impractical, the tapping may be made into the side of the horizontal pipe. Avoid top or bottom entry.

Electrical connections are made through the metric cable gland openings prepared underneath the instrument. Not all openings may be free. The electrical connections are located inside the computer housing.

The Units must be connected to the mains supply via a suitable rated and approved fused isolator unless such fusing/ isolation is provided by associated equipment. When fitted, the isolator should be close, readily accessible and marked as to function.

Close front cover completely after electrical installation. Water and humidity inside the instrument may result in corrosion and malfunction.



If the instrument is operated at high voltages, additional care has to be taken to provide reliable ground connections. Ground (PE) must be connected direct to the PE terminal or, if this is not sufficient according local rules, to the computer housing (PE bolt inside, right side).



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2. Important Notes

- a) This equipment must be installed and operated in strict accordance with the instructions contained in this instruction manual. Failure to do so will impair the protection provided.
- b) Installation and servicing must be undertaken by a competent and suitably skilled person.
- c) The equipment must be connected to the ground according relevant requirements.
- d) The unit must be isolated from the electrical supply before any maintenance of the equipment is attempted.
- e) All national or local codes of practice or regulations must be observed and, where applicable, are deemed to take precedence over any directive or information contained in this instruction manual.
- f) In case of freezing conditions, the Measuring Cell should be emptied completely. Some components mentioned in this instruction manual may not be present on the instrument on site, and/or the instrument may have additional components.
- g) Technical specifications are subject to change without notification.
- h) If uncertain how to proceed, contact the maker.



3. Principle of operation

3.1 Touch Panel

The OMD-2008 Series Touch Display consists of several buttons and LEDs. Each button/LED has its own specific function.

A.	+ button
B.	OK button
C.	AL1/2 button/ LED
D.	SYS button/ LED
E.	SET button
F.	Arrow Slider
G.	LOG button
H.	TEST button
I.	ON button/ LED
J.	- button
K.	ESC button
L.	Display

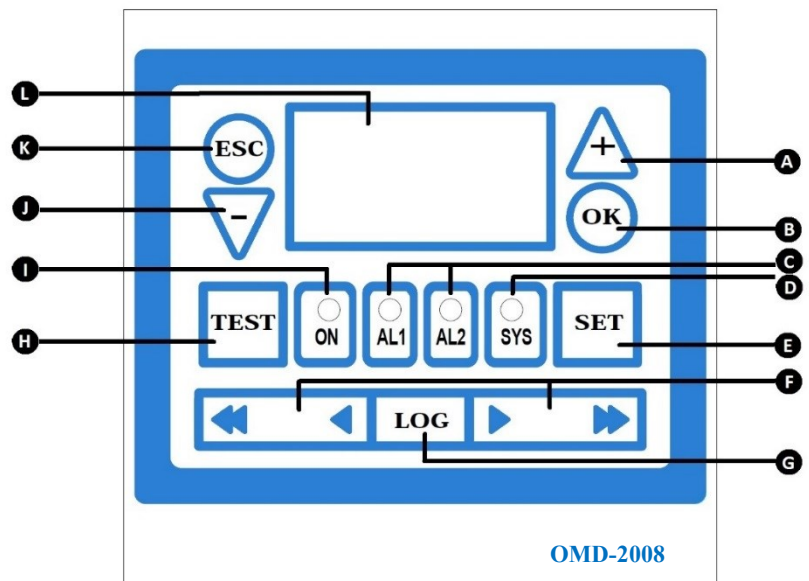


Figure 1 Touch Panel

3.2 Measuring Principle

An optical sensor array measures a combination of light scattered and absorbed by oil droplets in the sample stream. The sensor signals are processed by a microprocessor to produce linearized output.

If an alarm (set point from 1 ppm to 15 ppm) occurs, the two oil alarm relays are activated after the adjusted time delay.

The microprocessor continuously monitors the condition of the sensor components and associated electronics to ensure that calibration accuracy is maintained over time and extremes of environmental conditions.

3.3 Display Visualization

The display visualizes the oil content status of the units. Using the buttons, it is also possible to see information about the settings.



3.4 Alarms

The units contain two independent oil alarm circuits. From the manufacturing both alarms are set to 15 ppm (according IMO). The set points can be changed according to the requirements on site, to any point between 1 ppm and 15 ppm. An alarm point setting above 15 ppm is not possible. The adjustment can be done in the programming mode as described in the appendix (See section 22.2.3 Functional Buttons AL1/ AL2/ SET).

Both alarm circuits are also related to an alarm LED on the front panel.

In case of malfunction the “**SYS LED**” will indicate some type of internal fault of the unit. This LED is flashing green in normal conditions and is red in alarm conditions.

Additional to the alarm LEDs each alarm circuit is equipped with a relay with potential free alarm contacts. These contacts can be used for external processing of the signal or for control of further functions. The alarm circuits contain two independent alarm delays, which can be set separately. In this mode, also the individual adjustment of the time delays for the alarms can be done. An alarm delay is set to 4 sec. The flow sensor is downstream of the Measuring Cell.

If a malfunction or failure of the power supply occurs, all three relays (both alarm relays and the SYSTEMFAULT relay) will switch to alarm condition. (See Section 23.

Appendix III. for an easily understandable example). If the unit is off, all three relays will be in alarm condition.

3.5 Adjustment

The unit is delivered with a works calibration according the IMO requirements. A customer calibration on board is not permitted. This has to be done according IMO Regulations by the manufacturer or persons authorized by the manufacturer.

The units contain two alarm delays. Alarm 1 is to be used for signing purposes and the delay can be set from 1 sec. to 9 min. Alarm 2 is limited to control overboard discharge. The Alarm 2 delay can be set from 1 sec. to 10 sec. max.

The "Zero" point is also works calibrated and is adjustable to ± 5 ppm.

On site by using the programming mode (See Section 22.2.3 Functional Buttons AL1/ AL2/ SET) and clean water you can adjust following settings:

Settings	Min.	Max.	Default.
Alarm 1/ Alarm 2	1 ppm	15 ppm	15 ppm
Delay 1	1 sec.	9 min.	2 sec.
Delay 2	1 sec.	10 sec.	10 sec.
Offset	-5 ppm	5 ppm	0 ppm

Table 1



3.5.1 Limited Adjustment Alarm Set Point

By request units with alarm set point of 5 ppm max. are available. (For more information, read section 18. OMD-2008 Series with 5 ppm Alarm Set Point).

3.6 Active Current Interface

The active current interface represents a combination of measurements and interpretations. The active current interface is adjustable to 0 to 20 mA or to 4 to 20 mA. This complies the oil content from 0 to 30 ppm. In case of malfunction e.g. “EE” means 20 mA.

The output voltage is about 5 V and it is strongly recommended not to burden 150 Ω external load.

3.7 Inputs

The unit also has four active inputs, which can be used separately as well.

- a) Separator Input is dedicated to be used according the MEPC.107 (49).
- b) Reserve Input reserved for future use.
- c) Optionally there is an active input for external flow switch (FLOW). The Unit will be in alarm condition, whenever Terminals are open/ disconnected. Normally this input is delivered with a link.
- d) An Input for fresh water switchover for units with an Electric Valve is available.

3.8 EV (Electric clean water Valve)

The OMD-2008 EV is designed with an Electric Switchover Valve to switch the instrument from the sample stream to supply of clean, oil free water. Whenever fresh water is allowed to flow to the Measuring Cell, the OMD-2008 EV will switch over to alarm condition as required by MEPC.107(49), and it will also continue to display the measurement result. The OMD-2008 EV setup replaces the manual valve setup for the standard OMD-2008, and also allows remote flushing. After two minutes the fresh water flush will switch back to sample stream.

3.9 FC (Flow Control)

OMD-2008 EVFC instruments are equipped with a Vortex Flow Sensor (For technical information see Section **Fehler! Verweisquelle konnte nicht gefunden werden.**). The Unit displays the flow rate. A flow rate between 0.7 l/min to 4.5 l/min can be measured. If the flow rate through the Measuring Cell is below 0.7 l/min for more than 4 seconds, or if the sample is not flowing at all, the Instrument will go to Alarm condition and issue a “**Status: Flow!**” message. If a flow rate more than 0.7 l/min is achieved, the unit will be out of alarm.



3.10 Automatic Cell Cleaning Device

The Automatic Cell Cleaning Device is a useful addition to the OMD range of monitoring equipment. It was developed in order to facilitate the task of routine cleaning as described in the manuals and to ensure that the measuring system of the monitoring equipment is kept in good working order. Auto Clean System provides a truly Automatic Cell Cleaning Device which is designed to run only when the system is on. The Auto Clean System consists of:

- a) Cylinder/ wiper piston assembly for physical cleaning of the sample cell.
- b) Air Regulation Filter Unit (different makes and types may be used).
- c) Auto Clean logic control with valve. It determines the frequency of the cleaning cycles.

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The Automatic Cell Cleaning Device does not replace the operator maintenance schedule but can reduce the maintenance workload.

3.11 MCU (Manual Cleaning Unit)

Optionally the instruments can be fitted with a Manual Cleaning Unit. The Manual Cleaning Unit allows to clean the Sample Glass Tube without opening the Cell Cap, and without interrupting the normal sample flow. Maintenance is made easier with the MCU. Please note that operating the MCU may set the instrument to alarm condition for a few seconds.

3.12 Features

OMD-2008 Series Features	OMD-2008	OMD-2008 EV	OMD-2008 EVA	OMD-2008 EVFC
MEPC.107(49).	✓	✓	✓	✓
Solid suppression capability	✓	✓	✓	✓
Low maintenance	✓	✓	✓	✓
Easy installation	✓	✓	✓	✓
Constant readiness	✓	✓	✓	✓
Low spare part stock holding	✓	✓	✓	✓
Easy settings via menu	✓	✓	✓	✓
Works adjustment	✓	✓	✓	✓
Electric Valve		✓	✓	✓
FW Remote Control		✓	✓	✓
Auto Clean System			✓	
MCU (<i>optional</i>)	✓	✓		✓
Robust Construction	✓	✓	✓	✓
Electrical Monitoring of Desiccator	✓	✓	✓	✓
Automatic Voltage Selection	✓	✓	✓	✓

Table 2



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3.13 Specification Internal Clock

The IMO resolution MEPC.107(49) requires the 15 ppm Bilge Alarm to record Date, Time, Alarm Status, and “Separator Status”. To do so, the instrument has an internal clock. The internal clock circuitry is “state of the art”, with only a few ppm derivations over the entire range of operational conditions. The instruments are adjusted within ± 2 minutes of GMT (Greenwich Mean Time) in production.

In many cases derivations of the internal clock tend to cancel out each other, but in some cases the instrument accumulates more derivation. If the difference vs. GMT is small (minutes), it should be of no further concern. There are no requirements for clock accuracy in MEPC.107(49). If the derivation is many minutes, it is recommended to eventually (e.g. annually) document the derivation, so that it is always possible to relate recorded events to real time. If the derivation is huge (hours or more), or if it occurs suddenly or erratically, or if a completely useless time information is displayed, some defect or damage of the internal clock has to be assumed and it would be necessary to exchange the Computer Unit and send it for diagnosis and repair. There is no way of adjusting the internal clock on site.

3.13.1 Internal Back-Up Lithium Thionyl Chloride Battery

Further the PCB of the computer unit is equipped with an internal back-up lithium thionyl chloride battery, for the internal clock, if the computer unit is out of power.

The internal lithium battery of the OMD-2008 Computer Unit has a low self-discharge (<1% per year) and should have a calculated lifetime over 20 years, if handled properly.



In case the lithium thionyl chloride battery fails, it must be replaced by a qualified technician in our factory. Please do **not** exchange the lithium battery by yourself. The battery cannot be replaced with a standard battery.

See Section Disposal for more information.



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4. OMD-2008

The OMD-2008 is the basic version of the OMD-2008 Series. It is equipped with a manual Valve Handle to switch from sample stream to clean water.



4.1 Specification OMD-2008

Range:	0 – 30 ppm, Trend indication 50 ppm
Accuracy:	According IMO MEPC. 107(49)
Linearity:	0 – 30 ppm better than $\pm 2\%$
Display:	Yellow Graphic Display
Power Supply:	24 V – 240 V AC or DC Automatic Voltage selection
Consumption:	< 10 VA
Alarm Points 1, 2:	Adjustable between 1 – 15 ppm* (Works adjustment 15 ppm)
Alarm 1 Operating Delay: (for annunciation purpose)	Adjustable between 1 – 540 sec. (Works adjustment 2 sec.)
Alarm 2 Operating Delay: (for control purposes)	Adjustable between 1 – 10 sec. (Works adjustment 10 sec.)
Alarm Indication: (Alarm 1, 2, System Fault)	Red LEDs
Alarm Contact Rating: (Alarm 1, 2, System Fault)	Potential free 1 pole change over contacts, 3A / 240 V
Output Signal:	0 – 20 mA or 4 – 20 mA selectable, active, ext. Load < 150 Ω
Sample/ Fresh Water Pressure:	0 – 10 bar recommended range of installation
Sample Flow:	Approx. 2 l/min
Sample Water Temperature:	+ 1 to + 65° C
Ambient Temperature:	+ 1 to + 55° C
Roll:	Up to 45°
Size: (Computer Unit / Measuring Cell)	360 mm W x 240 mm H x 100 mm D
Weight:	5,4 kg
Degree of Protection:	IP 65
Pipe Connections:	R ¼" Female
→ Technical specifications are subject to change without notification.	

* By request the alarm set point can be set to 5 ppm max.



4.2 OMD-2008 Construction

The OMD-2008 consists of a Computer Unit and a Measuring Cell, which is equipped with a Valve Assembly. All components are mounted on one support. The valve handle controls sample water flow and clean water usage.

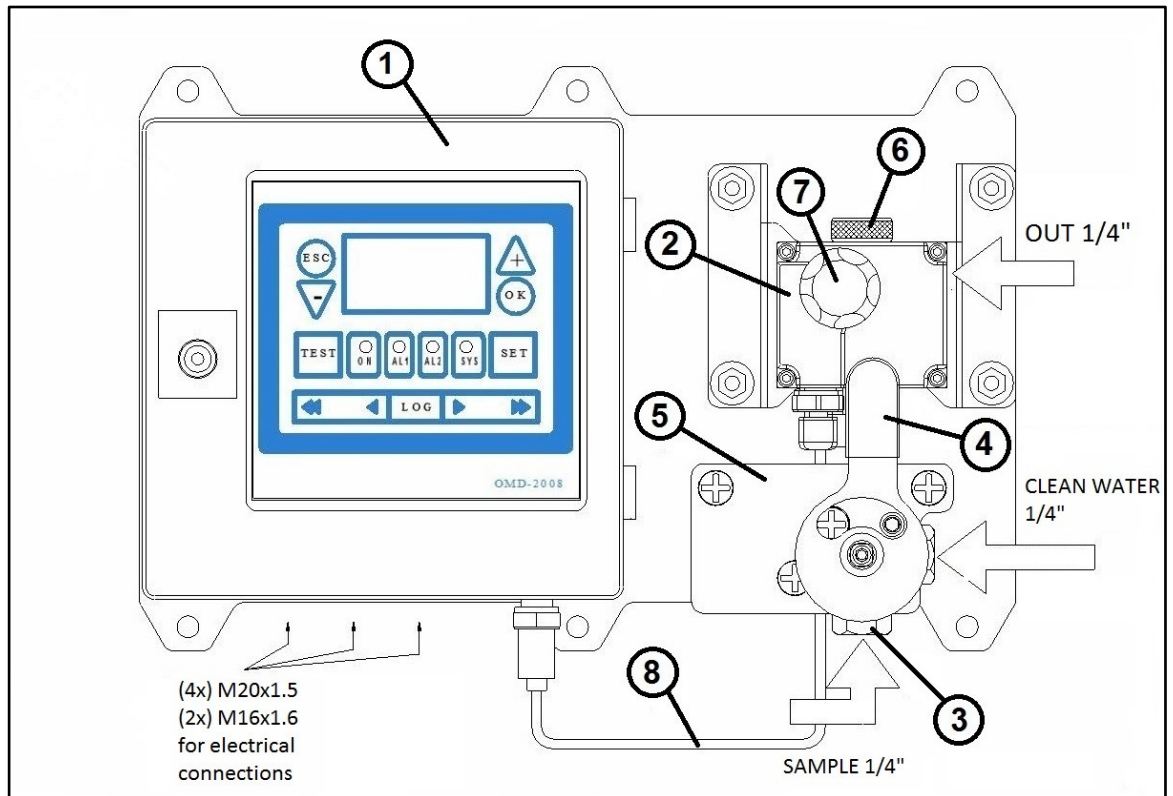


Figure 2. Construction OMD-2008

- | | | |
|---|------------------|--|
| 1. Computer Unit | 4. Valve Handle | 7. Desiccator Cap |
| 2. Measuring Cell | 5. Valve Support | 8. Communication Cable
(Measuring Cell) |
| 3. Sample & Clean Water
Switchover Valve | 6. Cell Cap | |



4.3 OMD-2008 Installation

Please refer to the following drawing for mounting dimensions.

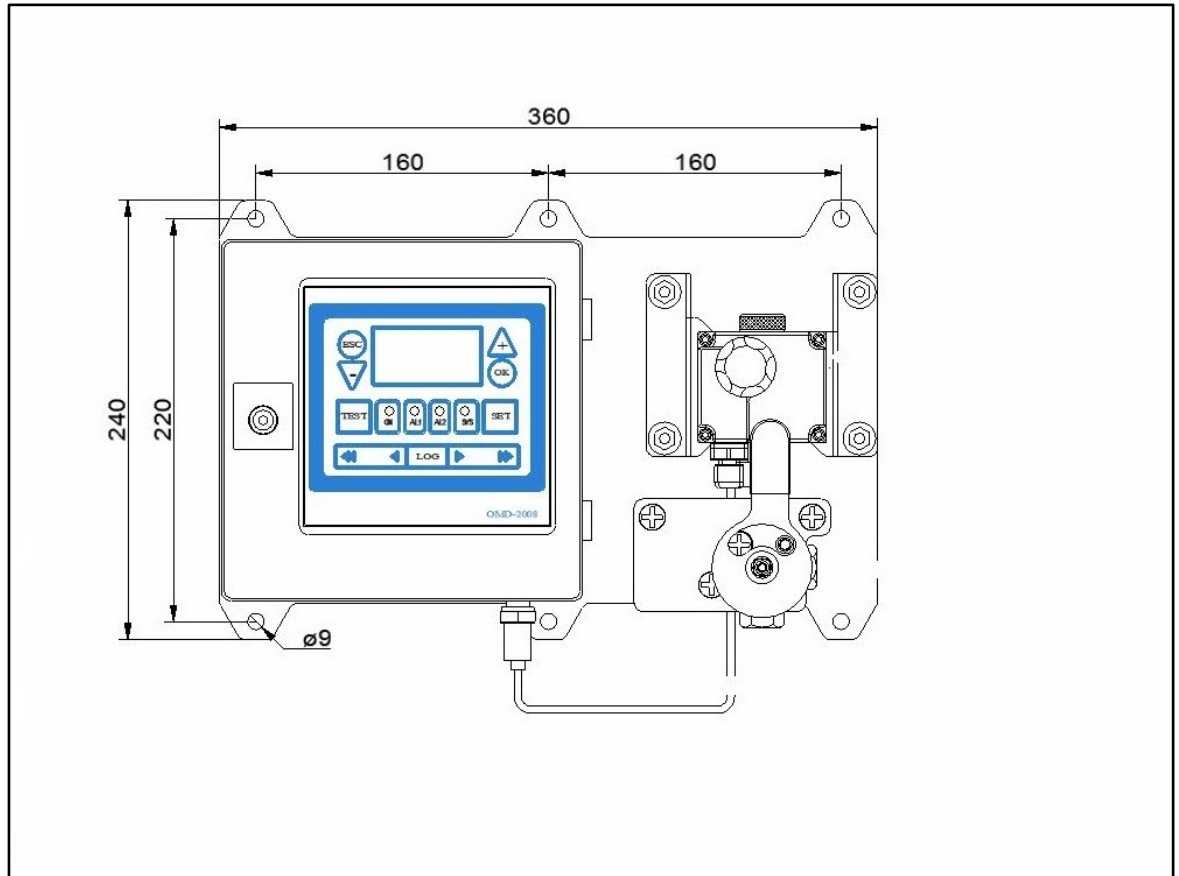


Figure 3. Installation OMD-2008



4.4 OMD-2008 Piping

Connect the OMD-2008 Monitor to the sample point of the oily-water separator outlet and to a source of oil free water employing 6 mm OD copper or stainless-steel pipe. The sampling point should be located on a vertical section of the separator outflow piping to minimize the effects of any entrained air. The sampling point should be at a level above the outlet of the monitor to ensure a proper sample flow rate.

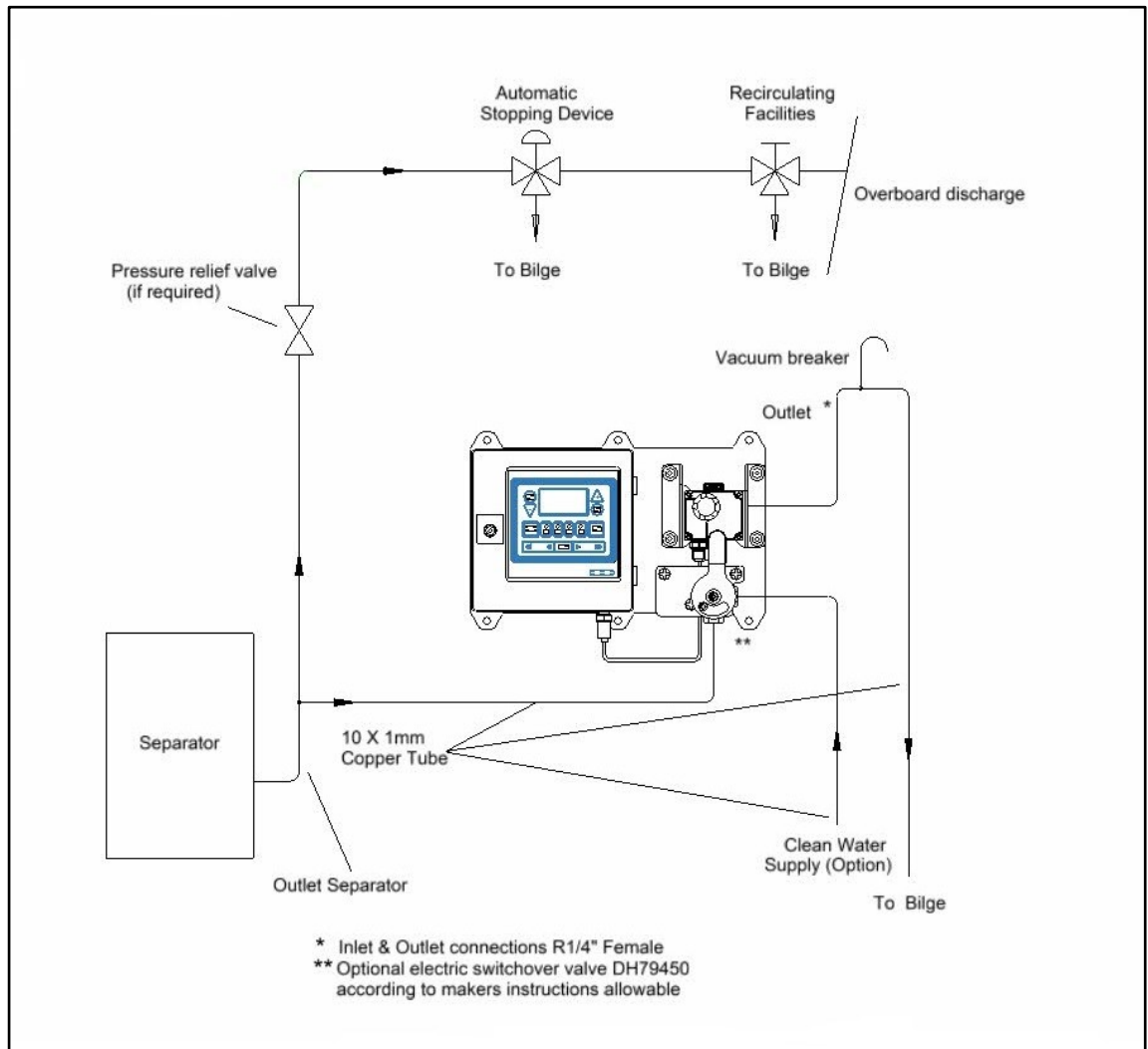


Figure 4. Piping OMD-2008



4.5 OMD-2008 Cabling



The following figures illustrate a bottom view of the OMD-2008 Computer Units as delivered.

Use one of the M20 opening for the power supply voltage. Remove the plastic screw to attach the cable gland. Further openings can also be used with a cable gland.

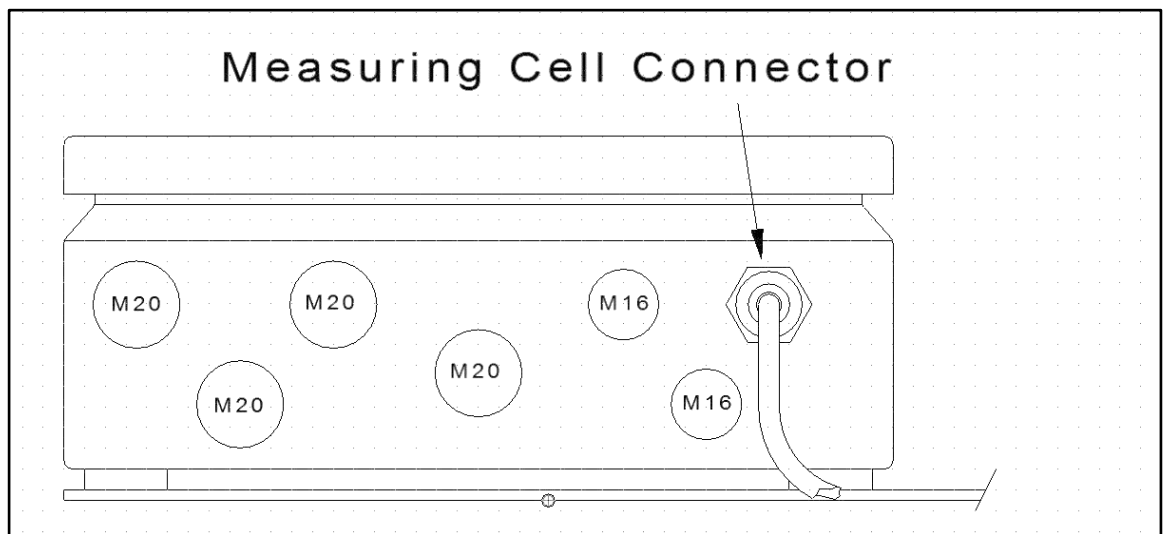


Figure 5. Bottom View: OMD-2008



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5. OMD-2008 EV

The OMD-2008 EV is designed with an Electric Switchover Valve to switch the instrument from sample stream to supply of clean, oil free water. The instrument will switch over to alarm condition but will also continue to display the measurement result. The Electric Switchover Valve also allows remote flushing.



5.1 Specification OMD-2008 EV

Range:	0 – 30 ppm, Trend indication 50 ppm
Accuracy:	According IMO MEPC. 107(49)
Linearity:	0 – 30 ppm better than $\pm 2\%$
Display:	Yellow Graphic Display
Power Supply:	24 V – 240 V AC or DC Automatic Voltage selection
Consumption:	< 10 VA
Alarm Points 1 + 2:	Adjustable between 1 – 15 ppm* (Works adjustment 15 ppm)
Alarm 1 Operating Delay: (for annunciation purpose)	Adjustable between 1 – 540 sec. (Works adjustment 2 sec.)
Alarm 2 Operating Delay: (for control purposes)	Adjustable between 1 – 10 sec. (Works adjustment 10 sec.)
Alarm Indication: (Alarm 1, 2, System Fault)	Red LEDs
Alarm Contact Rating: (Alarm 1, 2, System Fault)	Potential free 1 pole change over contacts, 3 A / 240 V
Output Signal:	0 – 20 mA or 4 – 20 mA selectable, active, ext. Load < 150 Ω
Sample/ Fresh Water pressure:	0 – 6 bar recommended range of installation
Sample Flow:	Approx. 2 l/min
Sample Water Temperature:	+1 to +65 °C
Ambient Temperature:	+1 to +55 °C
Roll:	Up to 45°
Size: (Computer Unit / Measuring Cell)	360 mm W x 240 mm H x 120 mm D
Weight: (with Measuring Cell)	6 kg
Degree of Protection:	IP 65
Pipe connections:	R ¼" Female
→ Technical specifications are subject to change without notification.	

*By request the alarm set point can be set to 5 ppm max.



5.2 Construction OMD-2008 EV

The OMD-2008 EV consists of a Computer Unit, and a Measuring Cell, which is equipped with an Electric Valve Assembly. All components are mounted on one baseplate.

The Electric Valve controls sample water flow and clean water usage. The EV Valve is controlled from the Computer Unit.

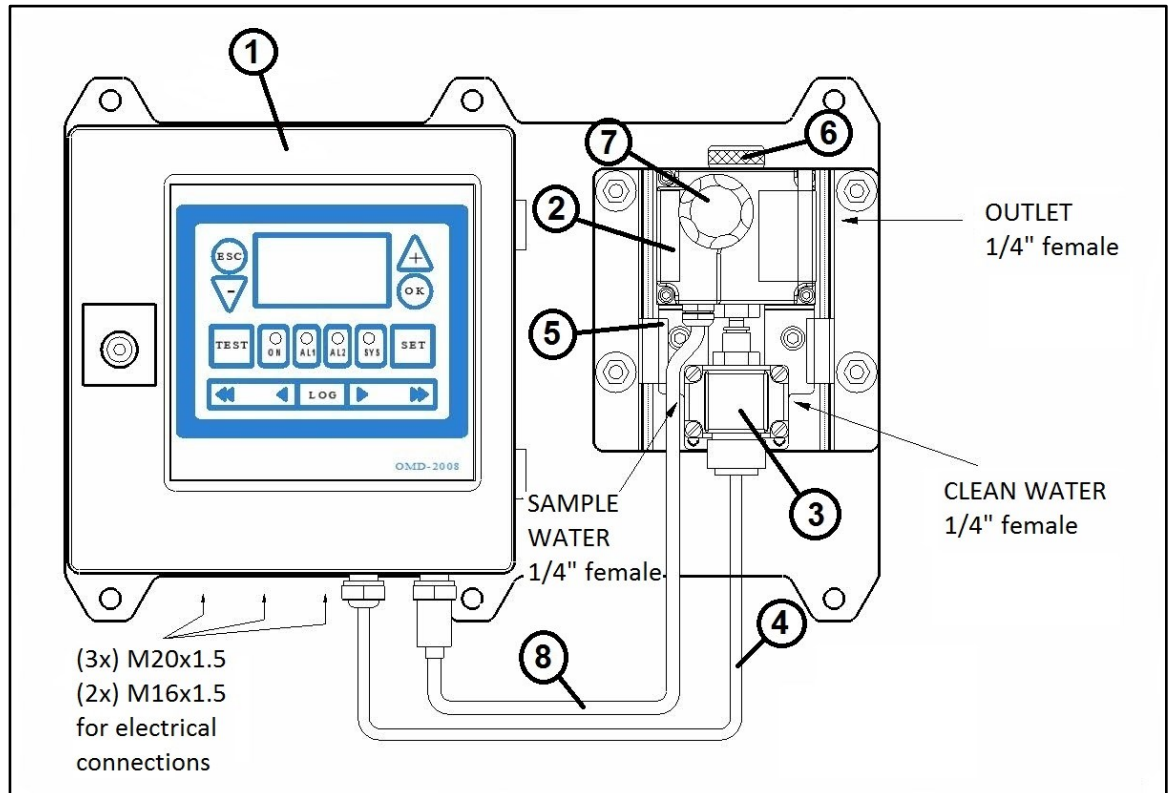


Figure 6. Construction OMD-2008 EV

- | | | |
|-------------------|-----------------------|---|
| 1. Computer Unit | 4. EV Valve Connector | 7. Desiccator Cap |
| 2. Measuring Cell | 5. EV Support | 8. Communication Cable (Measuring Cell) |
| 3. Electric Valve | 6. Cell Cap | |



5.3 Installation OMD-2008 EV

Please refer to the following drawing for mounting dimensions.

The Connector on top of the valve must not be removed under any circumstances, as that requires the breaking of the seal.

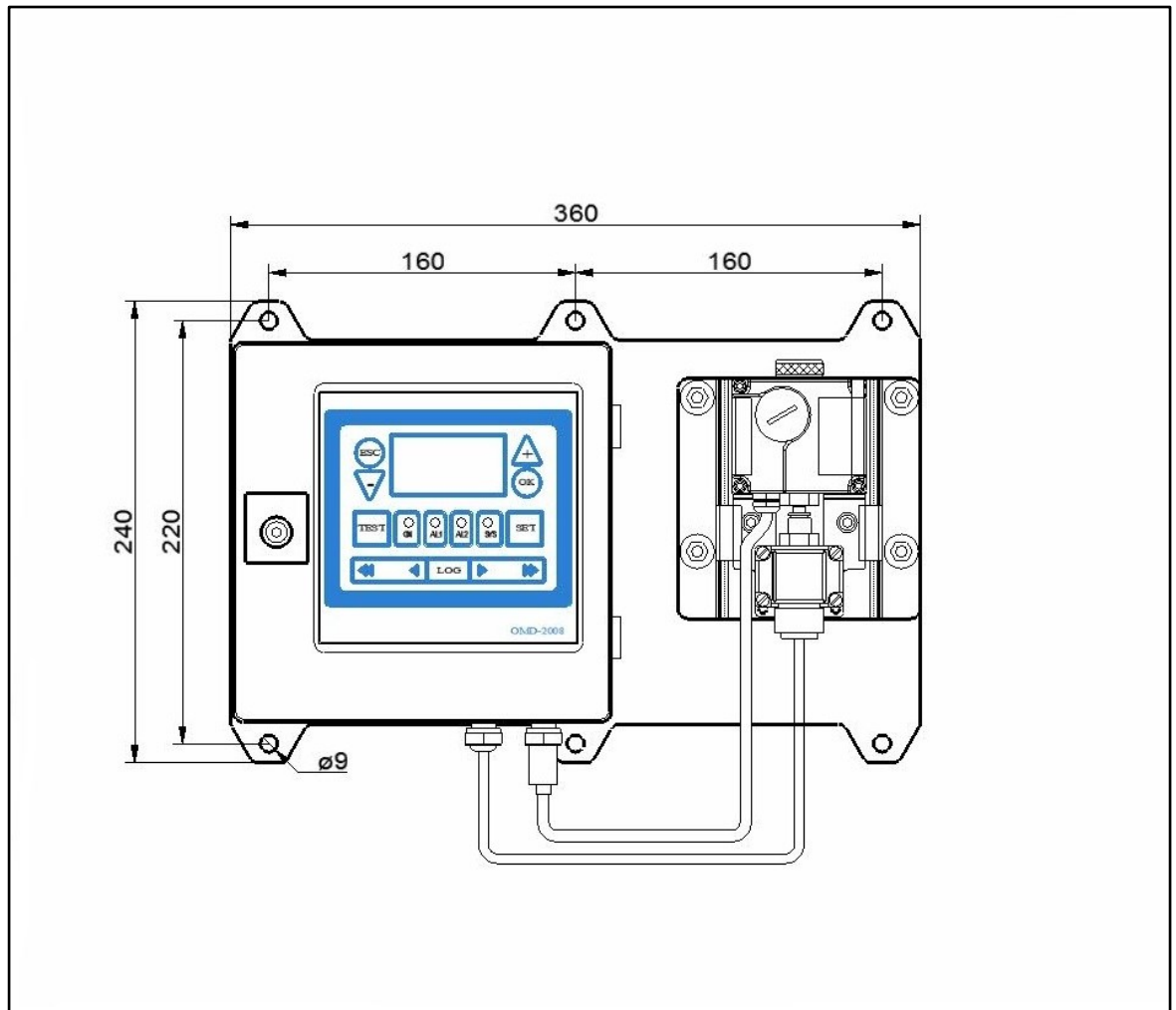


Figure 7. Installation OMD-2008 EV



5.4 Piping OMD-2008 EV

Connect the Sample line to the left side input of the OMD-2008 EV. Connect the clean water line to the right-hand side input of the valve. Both inputs have 1/4" female threads. It is recommended to employ 6 mm OD copper or stainless-steel pipe. If possible, it is recommended to install a manual valve into the clean water line next to the OMD-2008 EV. This allows to stop any water flow through the instrument for easy manual cleaning. No additional valve in the sample line can be allowed.

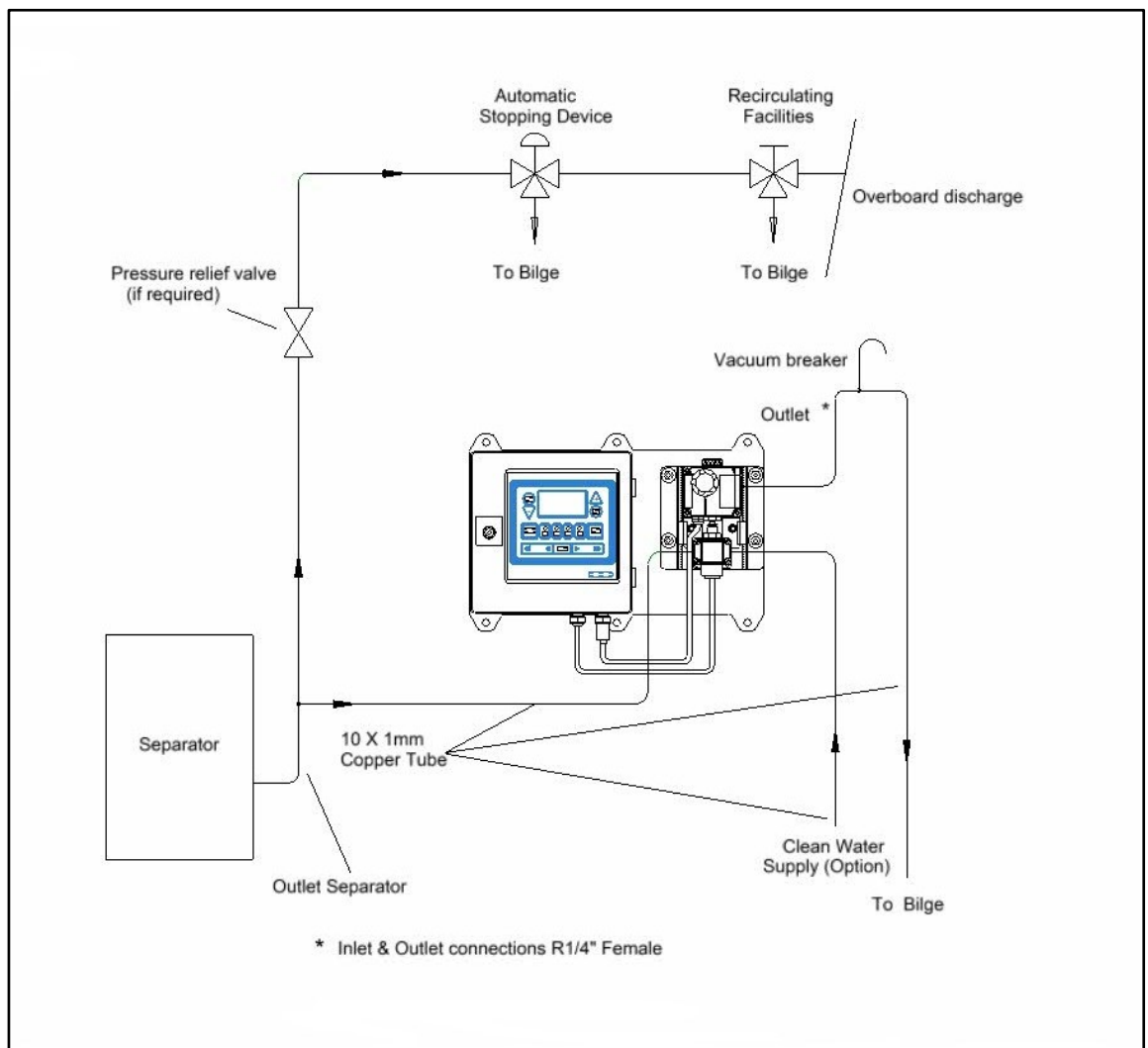


Figure 8. Piping OMD-2008 EV



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5.5 Cabling OMD-2008 EV

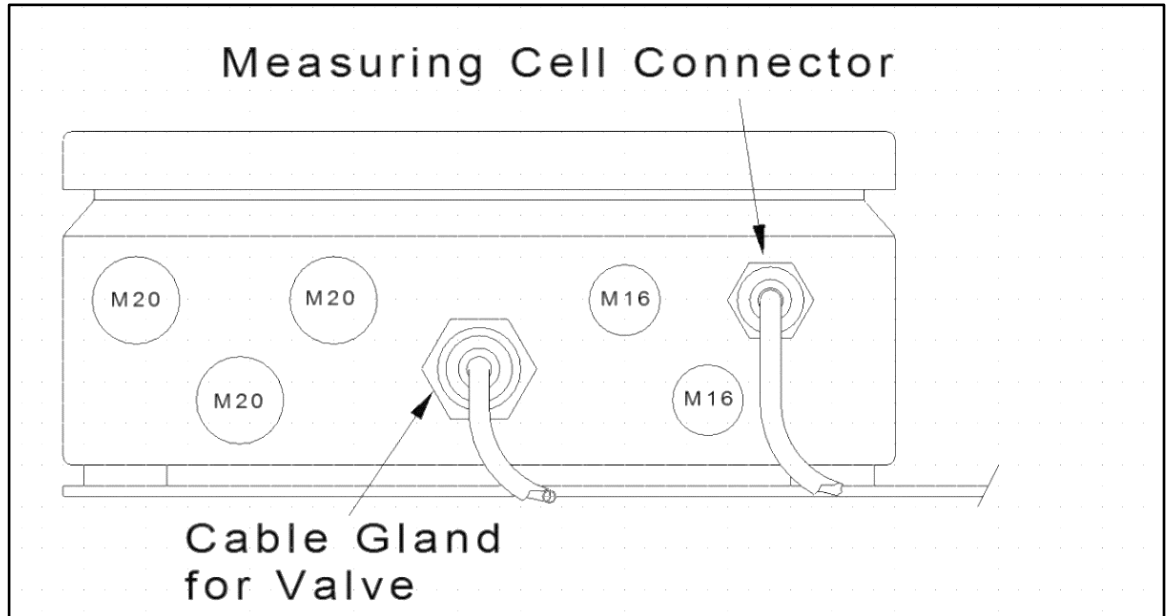


Figure 9. Bottom View: OMD-2008 EV



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6. OMD-2008 EVA

The OMD-2008 EVA is fitted with an Electric Switchover Valve and an Automatic Cell Cleaning Device.



6.1 Specification OMD-2008 EVA

Range:	0 – 30 ppm, Trend indication 50 ppm
Accuracy:	According IMO MEPC. 107(49)
Linearity:	0 – 30 ppm better than $\pm 2\%$
Display:	Yellow Graphic Display
Power Supply:	24 V – 240 V AC or DC Automatic Voltage selection
Consumption:	< 10 VA
Alarm Points 1 + 2:	Adjustable between 1 – 15 ppm* (Works adjustment 15 ppm)
Alarm 1 Operating Delay: (for annunciation purpose)	Adjustable between 1 – 540 sec. (Works adjustment 2 sec.)
Alarm 2 Operating Delay: (for control purposes)	Adjustable between 1 – 10 sec. (Works adjustment 10 sec.)
Alarm Indication: (Alarm 1, 2 System Fault)	Red LEDs
Alarm Contact Rating: (Alarm 1, 2, System Fault)	Potential free 1 pole change over contacts, 3 A / 240 V
Output Signal:	0 – 20 mA or 4 – 20 mA selectable, active, ext. Load < 150 Ω
Sample/ Fresh Water Pressure:	0 – 6 bar recommended range of installation
Sample Flow:	Approx. 2 l/min
Sample Water Temperature:	+ 1 to + 65° C
Ambient Temperature:	+ 1 to + 55° C
Roll:	Up to 45°
Size: (Computer Unit) (Automatic Cell Cleaning Device) (Measuring Cell)	200 mm W x 240 mm H x 100 mm D 140 mm W x 240 mm H x 120 mm D 140 mm W x 280 mm H x 120 mm D
Weight:	7 kg
Degree of Protection:	IP 65
Air Supply	4 – 6 bar
Air Pressure Regulator	Typical 4 bar
Pipe Connections: Air, Water	R ¼" Female
→ Technical specifications are subject to change without notification.	

*By request the alarm set point can be set to 5 ppm max.



6.2 Construction OMD-2008 EVA

The OMD-2008 EVA consists of a Computer Unit, and a Measuring Cell, which is equipped with an EV-Valve and Automatic Cell Cleaning Device. Additionally, the components of the OMD-2008 EVA are mounted onto three separate supports.

The Automatic Cell Cleaning Device is electrically inserted between the Computer Unit and the Measuring Cell. The cable length is limited to typical about 1 m. The cable is connected with the Measuring Cell as well as with the Automatic Cell Cleaning Device consecutively.

The Automatic Cell Cleaning Device additionally needs a sufficient supply of dry, clean instrumentation air.

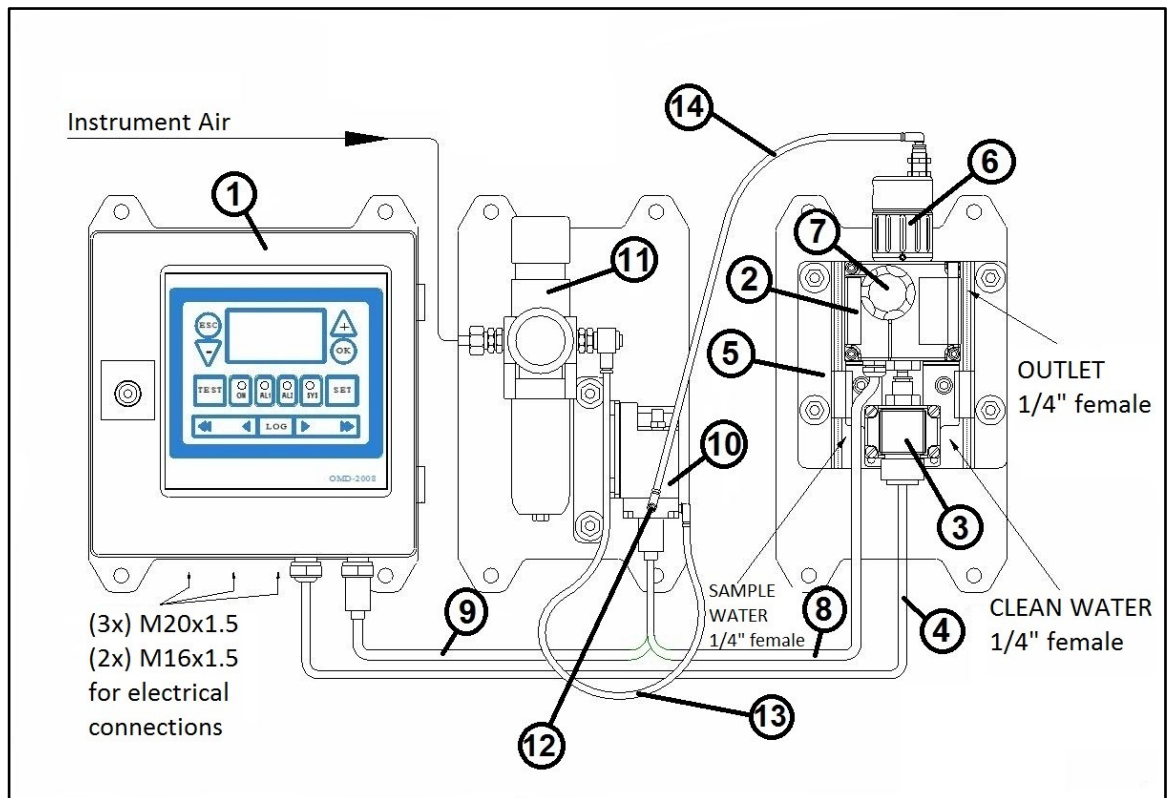


Figure 10. Construction OMD-2008 EVA

- | | | |
|------------------------------|---|------------------------------|
| 1. Computer Unit | 6. Automatic Cell Cleaning Device | 10. Autoclean Controller |
| 2. Measuring Cell | 7. Desiccator Cap | 11. Air Regulator |
| 3. Electric Valve | 8. Communication Cable (Measuring Cell) | 12. Air Flow Adjuster |
| 4. EV Valve Connection Cable | 9. Communication Cable (Automatic Cell Cleaning Device) | 13. Air Supply for Regulator |
| 5. EV Support | | 14. Air Supply for Cylinder |



6.3 Installation OMD-2008 EVA

The OMD-2008 EVA is fitted with the Auto Clean System. Installation of the OMD-2008 EVA can be carried out in a few steps. Please refer to the following drawing for mounting dimensions.

Install the Air Regulation Filter Unit close enough to the OMD-2008 EVA for connection of the air pipe.

- a) Connect an air supply of 4 to 6 bar to Air Regulation Filter Unit.
- b) Set the Air Regulation Unit output to a pressure of approximately 4 bar typical. Too high-pressure settings can cause unnecessary wear. Low pressure may make operation unreliable.
- c) Insert the wiper into the cleaner. Check the Wiper Seal for damage.
- d) Put Automatic Cell Cleaning Device onto Measuring Cell. Make sure it is completely screwed in. If it is only partially screwed in, flow rate regulation will not work and may cause unstable operating conditions for the instrument.
- e) Connect air hose to Automatic Cell Cleaning Device.

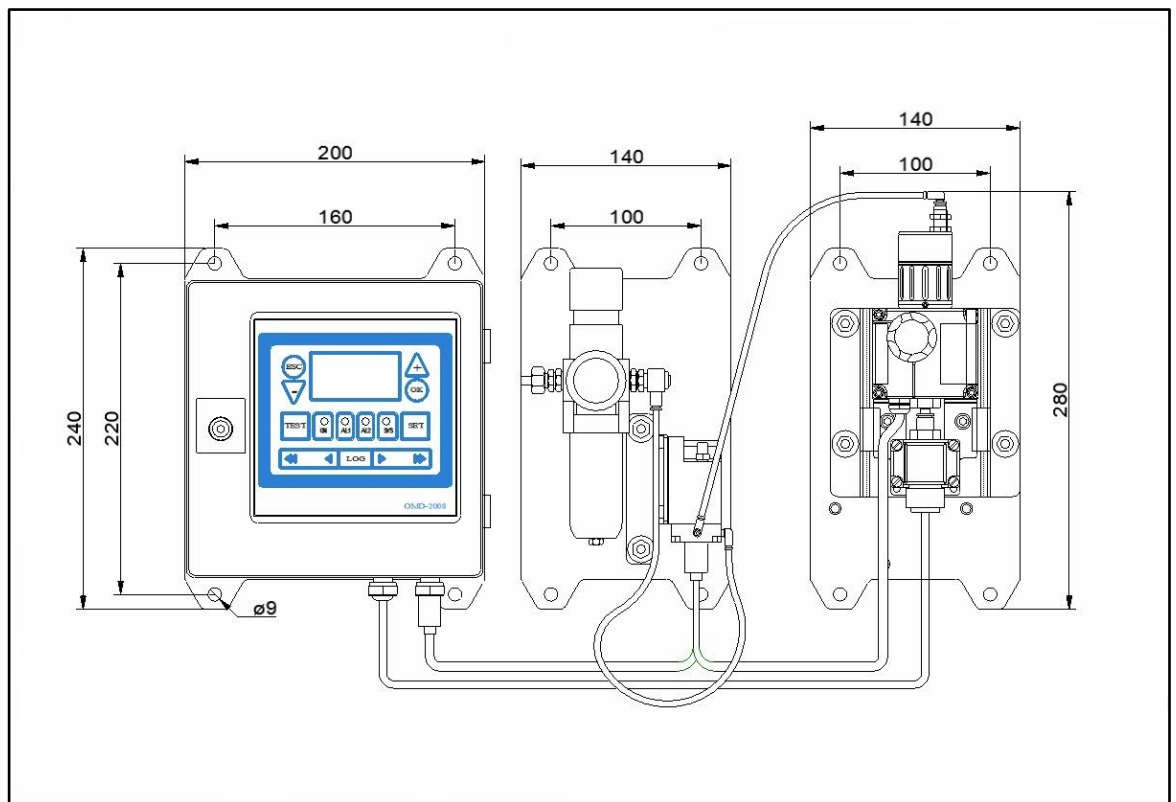


Figure 11. Installation OMD-2008 EVA



6.4 Piping OMD-2008 EVA

Connect the Sample line to the left side input of the OMD-2008 EVA. Connect the clean water line to the right-hand side input of the valve. Both inputs have 1/4" female threads. It is recommended to employ 6 mm OD copper or stainless-steel pipe. If it is possible, install a manual valve into the clean water line next to the OMD-2008 EVA. For Air Regulation connect the air pipe to the Unit and the Measuring Cell. The air supply should be of 4 to 6 bar.

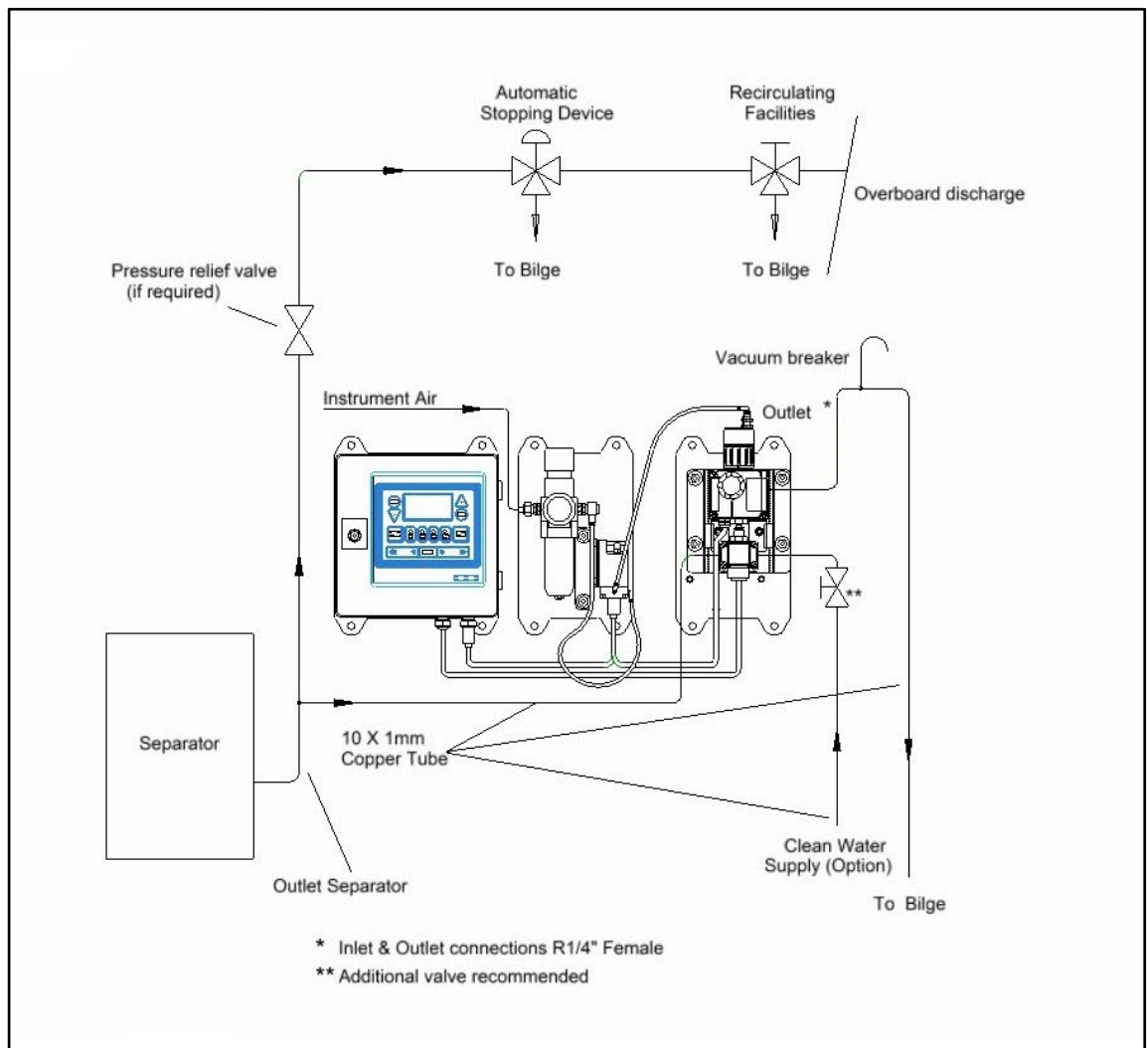


Figure 12. Piping OMD-2008 EVA



6.5 Cabling OMD-24 EVA

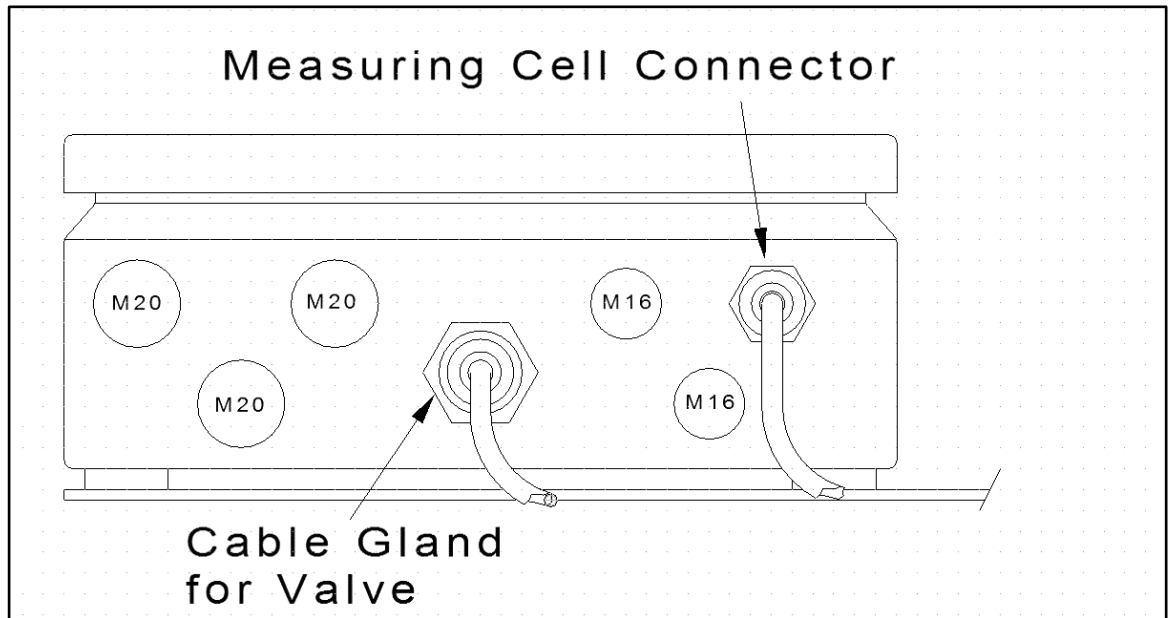


Figure 13. Bottom View: OMD-2008 EVA

The OMD-2008 EVA is in tandem with the Automatic Cell Cleaning Device. The Automatic Cell Cleaning Device is connected with the Measuring Cell with another cable.



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7. OMD-2008 EVFC

The OMD-2008 EVFC is equipped with an Electric Switchover Valve for clean water usage and a Flow Sensor, to monitor the sample flow rate through the Measuring Cell.



7.1 Specification OMD-2008 EVFC

Range:	0 – 30 ppm, Trend indication 50 ppm
Accuracy:	According IMO MEPC. 107(49)
Linearity:	0 – 30 ppm better than $\pm 2 \%$
Display:	Yellow Graphic Display
Power Supply:	24 V – 240 V AC or DC Automatic Voltage selection
Consumption:	< 10 VA
Alarm Points 1 + 2:	Adjustable between 1 – 15 ppm* (Works adjustment 15 ppm)
Alarm 1 Operating Delay: (for annunciation purpose)	Adjustable between 1 – 540 sec. (Works adjustment 2 sec.)
Alarm 2 Operating Delay: (for control purposes)	Adjustable between 1 – 10 sec. (Works adjustment 10 sec.)
Alarm Indication: (Alarm 1, 2 System Fault)	Red LEDs
Alarm Contact Rating: (Alarm 1, 2, System Fault)	Potential free 1 pole change over contacts, 3 A / 240 V
Output Signal:	0 – 20 mA or 4 – 20 mA selectable, active, ext. Load < 150 Ω
Sample/ Fresh Water Pressure:	0 – 6 bar recommended range of installation
Sample Flow:	Approx. 2 l/min
Flow Meter: Measuring Range:	Vortex Type: 0.7 – 4.5 l/min
Sample Water Temperature:	+ 1 to + 65° C
Ambient Temperature:	+ 1 to + 55° C
Roll:	Up to 45°
Size: (Computer Unit) (EV-FC-Arrangement)	200 mm W x 240 mm H x 100 mm D 150 mm W x 290 mm H X 140 mm D
Weight:	5,9 kg
Degree of Protection:	IP 65
Pipe Connections:	For 6 mm OD Cu or SS Pipe
→ Technical specifications are subject to change without notification.	

*By request the alarm set point can be set to 5 ppm max.



7.2 Construction OMD-2008 EVFC

OMD-2008 EVFC consists of a Computer Unit, and a Measuring Cell, which is equipped with the EV Flow Control assembly. The components are mounted onto two separate supports.

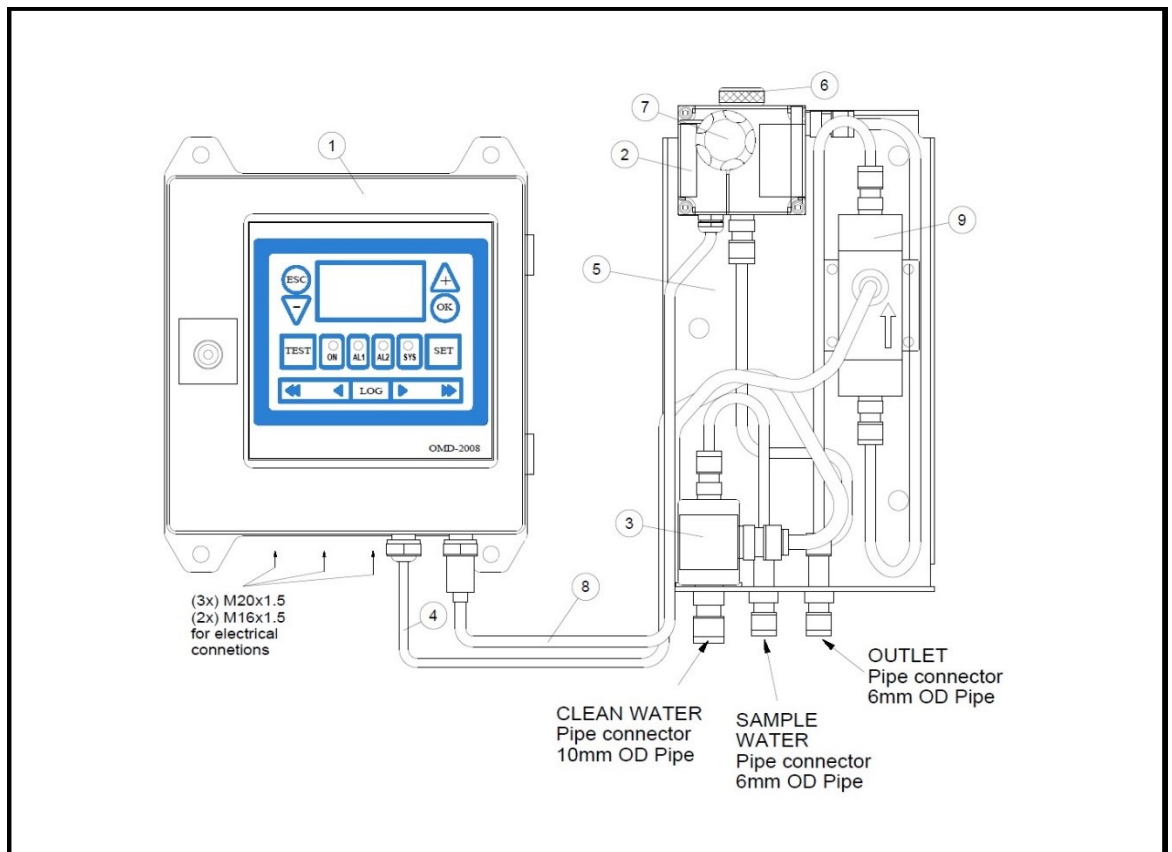


Figure 14. Construction OMD-2008 EVFC

- | | | |
|-------------------------------|-----------------------|-----------------------|
| 1. Computer Unit | 4. EV Valve Connector | 7. Desiccator Cap |
| 2. Measuring Cell | 5. Holding Support | 8. Y-Wire |
| 3. Clean Water Electric Valve | 6. Cell Cap | 9. Vortex Flow Sensor |



7.3 Installation OMD-2008 EVFC

Computer Unit and Measuring Cell assembly should be mounted close to each other. Please refer to the following drawing for mounting dimensions.

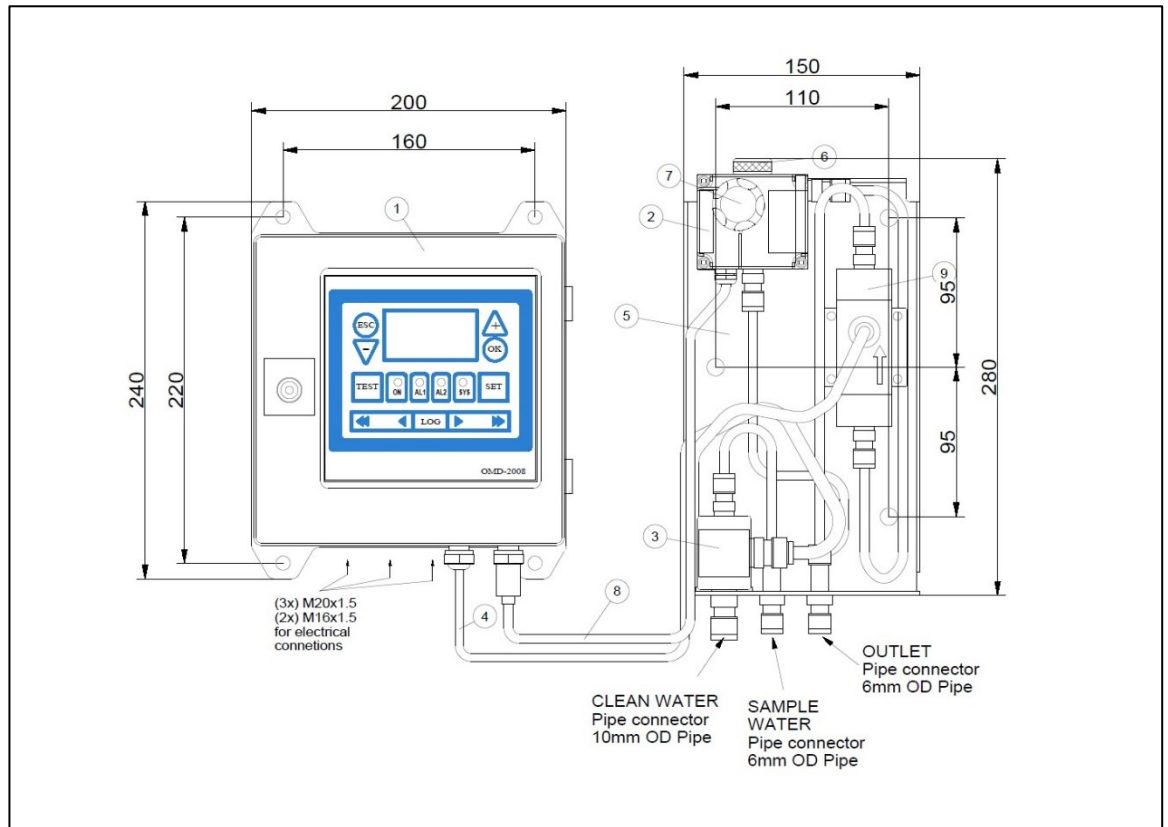


Figure 15. Installation OMD-2008 EVFC

Pipe connections are prepared for 10mm OD stainless steel (clean water) and 6 mm OD stainless steel or copper pipes (sample water/ outlet). Adapter fittings for other pipe diameters are available upon request. Working space for maintenance and operation is recommended in front of and above the instrument.



7.4 Piping OMD-2008 EVFC

Connect the OMD-2008 EVFC Monitor to the sample point of the oily-water separator outlet and to a source of oil free water. Fittings on the instrument are for 10mm OD stainless steel (clean water) and 6 mm OD stainless steel or copper pipes (sample water/outlet). Adapter fittings for other pipe diameters are available upon request.

The sampling point should be located on a vertical section of the separator outflow piping to minimize the effects of any entrained air. The sampling point should be at a level above the outlet of the monitor to ensure the sample cell is flooded at all times.

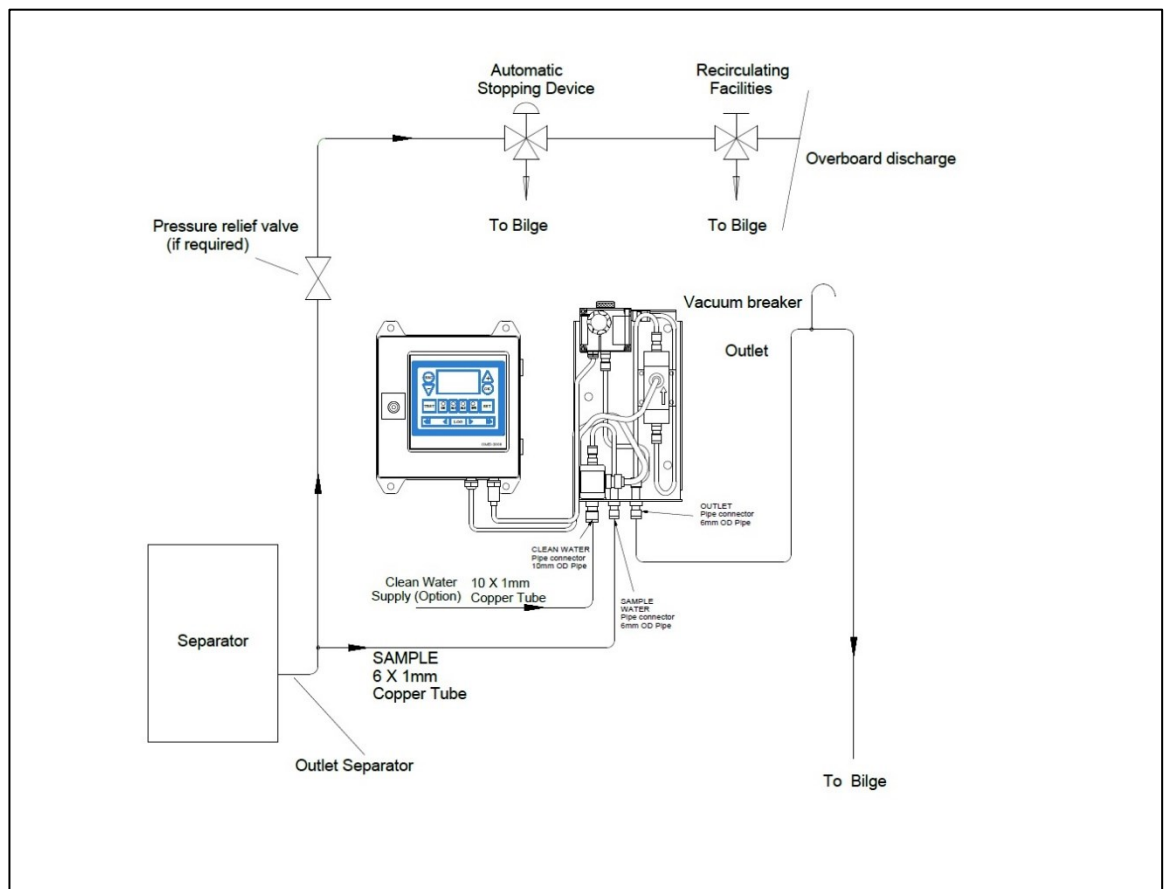


Figure 16. Piping OMD-2008 EVFC



7.5 Cabling OMD-2008 EVFC

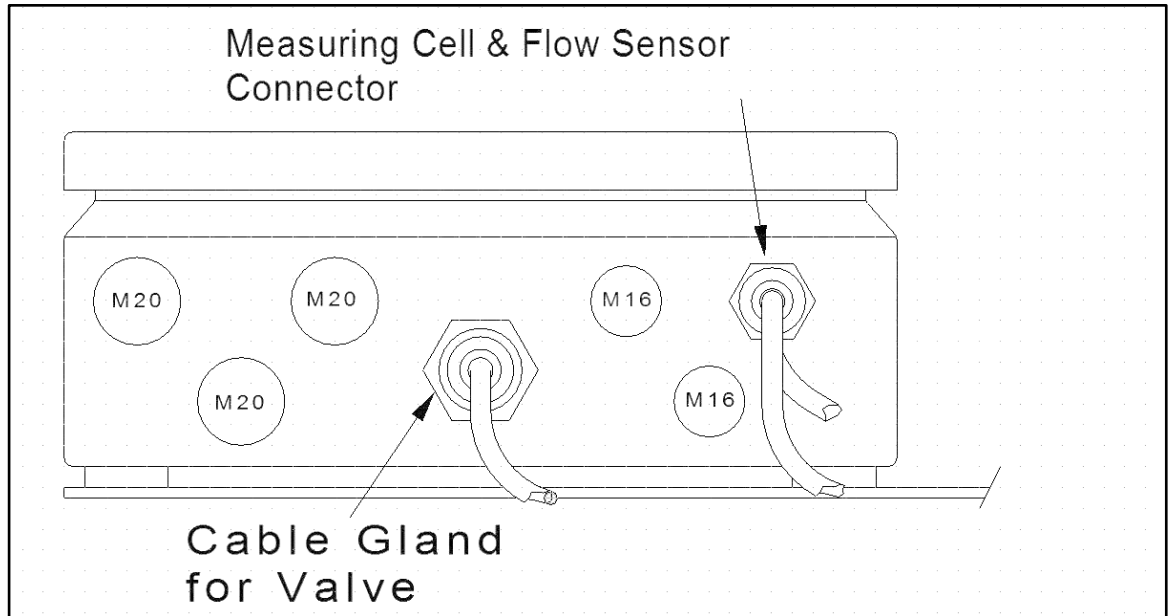


Figure 17. Bottom View: OMD-2008 EVFC

The OMD-2008 EVFC is connected with a y-cable to the Measuring Cell and the Flow Sensor.



8. Cleaning Devices

Optional item if fitted.

There are two optional Cleaning Units available. Both allow routine cleaning of the Sample Glass Tube. They are different in the way they are operated.

8.1 Manual Cleaning Unit (MCU)/ Automatic Cell Cleaning Device

The Automatic Cell Cleaning Device is driven pneumatically, while the Manual Cell Cleaning Unit has to be operated by hand. The cleaning mechanism is identical: a wiper moves through the Sample Glass Tube and removes deposits from the Sample Glass Tube surface. This unit facilitates cleaning of the cell without the need of removing the Cell Cap. Regular use of this device can reduce difficulties in operation of the monitor due simply avoiding of the Sample Glass Tube and all the inconvenience this can cause.

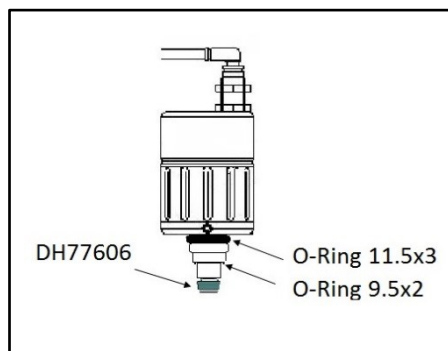


Figure 18. Automatic Cell Cleaning Device, pneumatically operated

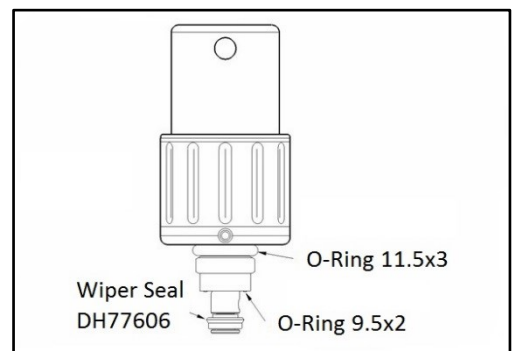


Figure 19. MCU DH77780 Manual Cell Cleaning Unit, manually operated

9.1.1 Flow rate regulation on MCU, Auto Clean System

Flow rate is regulated by using a small O-Ring inside the cleaning device. There is a groove for an O-Ring.

(For more information, see section 11.3).



9. Terminal description

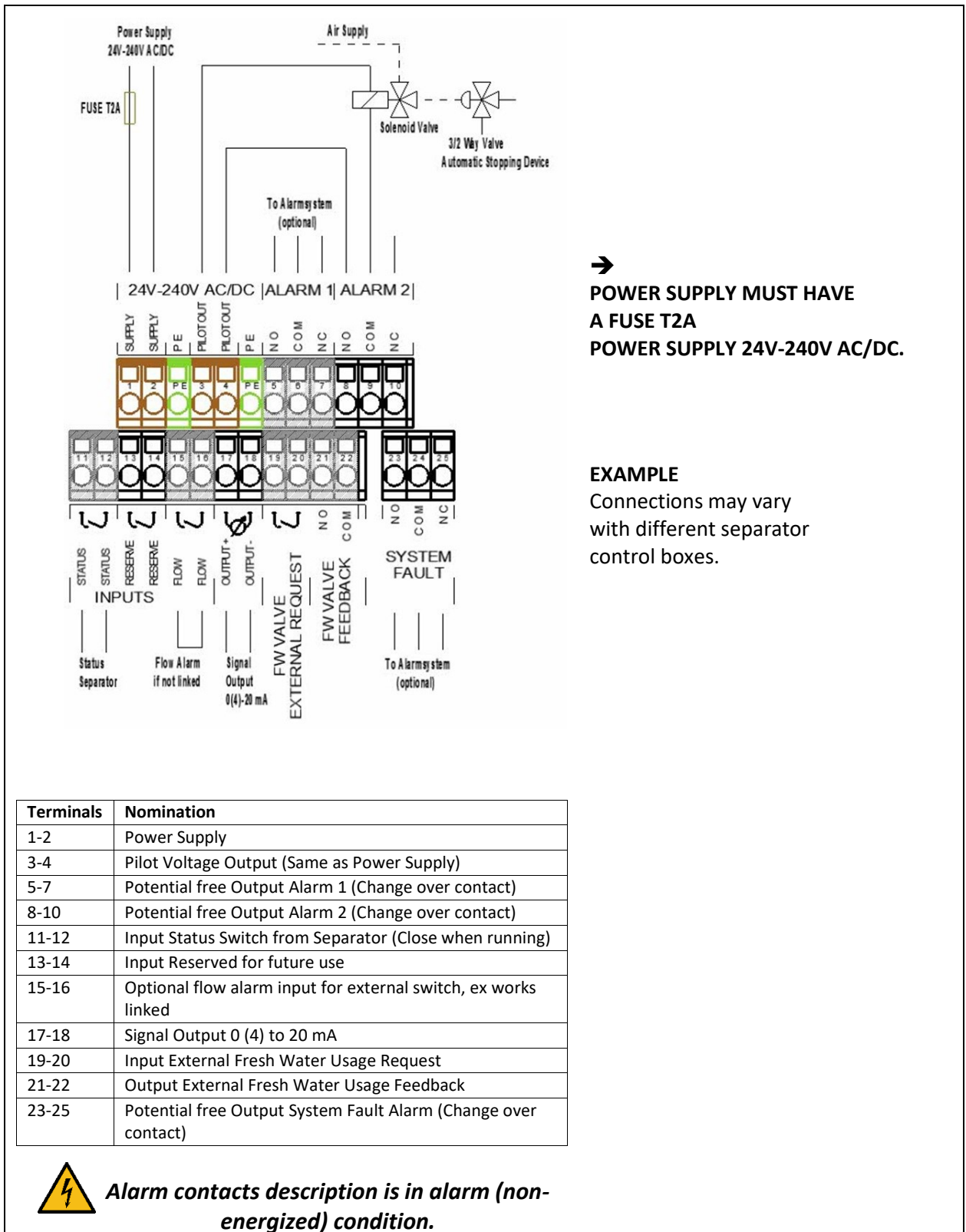


Figure 20. Connection Example



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Precise wiring details will vary dependent upon the control system to be employed but the most frequently used systems employ alarm relay 1 for alarm only and alarm relay 2 for overboard valve purposes.

Electrical connections are made to the terminal blocks inside the computer housing. Wires are connected to the terminals by pushing a suitable screwdriver into the clamp holes to release the internal spring-loaded clamps. After the wire is inserted to the terminal and the screwdriver is removed, the wire is fixed.

Terminals 1&2 are reserved for power supply input. Up next is the first ground connection PE.

The instrument provides a pilot voltage output at Terminals 3&4. This is internally connected to the power supply input (Terminals 1&2 via Fuse T2A). The pilot voltage can be used to supply additional external circuitry, e.g. alarm lamps or electrical valves. Up next is the second Ground (PE), which is connected to the Ground (PE).

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Please note: any device connected to the pilot voltage output must be rated for the voltage the instrument is supplied with. Do not use the pilot voltage for driving motors, heaters or other high load devices. The pilot voltage is intended for alarm purposes only.

The Terminals 5 – 10 are for alarm 1&2. The switch over contact relays are reserved for alarm 1 and alarm 2, respectively. These are free switch over contacts. **NO** means “Normally Open”, **COM** means “Common”, and **NC** is “Normally Close”. The Terminals 5 – 7 are changeover contacts for the potential free output alarm 1. Terminal 5 is NO, Terminal 6 is COM, and Terminal 7 is NC. The Terminals 8 – 10 are also changeover contacts for the potential free output alarm 2. Terminal 8 is NO, Terminal 9 is COM, and Terminal 10 is NC (see Figure 20. Connection Example).

The Terminals 11&12 are dedicated “STATUS” inputs for the STATUS SEPERATOR signal provided by the separator.

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Note: Alternatively, a “Status Separator” signal can be generated from the Separator control, and an auxiliary relay be operated with this signal. The Contacts of this relay then can operate the “STATUS” input. Please refer to the Separator manual or contact the separator maker for information regarding the separator. Additionally, the separator status will be recorded into the data logger*.

Input “RES” is reserved for future use. The state of the “RES” input is recorded in the electronic record.

Terminals 15&16 are input for an optional external flow switch. Use a dry contact. The Unit is delivered with a link as standard. If the Terminals are open, the Unit will be in alarm condition.



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*As replacement to a MEPC.60(33) approved separator and no “Status Separator” signal is available.

Terminals 17&18 are for signal output of 0(4) to 20 mA. These are active outputs with an open-load voltage about 5 V. And it is recommended not to exceed the 150 Ω external load. The signal output complies the oil content from 0 to 30 ppm. In case of malfunction e.g. EE means 20 mA.

The Terminals 19&20 could be linked to switch the EV-Valve to clean water. The EV-Valve allows to remotely control the valve operation. The OMD-2008 will switch as requested within 20 seconds. The EV-Valve will stay in clean water condition, and the OMD-2008 will remain in alarm condition, as long as the link (Terminals 19&20) is present. These are dry contacts as well.

The Terminals 21&22 are outputs for external fresh water usage feedback. The OMD-2008 EV, EVA , EVFC will close the FW Valve Feedback contact whenever the FW Valve is set to clean water usage.

Note: The Feedback contact is not influenced from the system fault conditions.

The Terminals 23 - 25 are changeover contacts for the potential free system fault alarm. Terminal 23 is NO, Terminal 24 is COM, and Terminal 25 is NC.

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Note: For any input, it has to be used a potential free relay switch for the link to electrically insulate the OMD-2008 from any external voltages.

Generally, the inputs and the output share a common potential (Terminals: 12, 14, 16, 18, 20, 22).

9.1 External Control System

The installation on site has to make sure that in case of any loss of power supply and/or loss of air supply for the automatic stopping device the overboard discharge valve closes the overboard line and open the re-circulating line.

The system showed in the example see Figure 20. Connection Example, employs alarm relay 2 to control a pneumatic solenoid valve which energizes or de-energizes a pneumatically operated 3 - way valve.

The separation process will continue until such time as the pollution level falls below the alarm set point at which time the discharge will be directed overboard.

A pump stop system is according MEPC.107(49) not allowed.



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10. Power Supply

→ (See Section 2. Important Notes).



The unit is designed for a power supply of 24 V to 240 V AC or DC. It has an automatic voltage selection. The power supply must have a fuse rated no more than 2A.



11. Commissioning

For operating and servicing on board, please carefully read the instruction manual and ensure, that the safety recommendations are considered. Read important notice as well. Ensure that wires are correctly connected to the terminal blocks inside the computer housing and ensure that the connection to the Measuring Cell is in place (refer to Figure 2. Construction OMD-2008 to Figure 14. Construction OMD-2008 EVFC, respectively). On completion of the installation, cabling, and piping, carry out the following checks:

11.1 Electrical and Piping



- a) Check that the power supply is connected to the terminals 1&2 of the terminal block.
- b) Check that the grounding (PE) has been made according to the relevant regulations.
- c) Check that the cabling of the automatic stopping device (Back-to-bilge-valve) and to the alarm system is according the IMO Requirements.
- d) Check all piping connections and rectify as appropriate.
- e) Check the sample supply and the fresh water supply.

For instruments equipped with an Automatic or Manual Cell Cleaning Unit, check the following points:

- f) Check, that the Cell Cleaning Device is fitted correctly.
- g) Check, that the push in connectors and hoses are fitted correctly (Automatic Cleaning System only).
- h) Check that the Air Supply is between 4 – 6 bar.



During the installation of the unit it is recommended to wear safety boots, for the unit is about 6 kg and it could come to injuries.



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11.2 Instrument Start-Up Sequence

Switch on:

- a) Power Supply (24V – 240V)
- b) Sample Flow
- c) FW Flow
- d) Air Supply 4 – 6 bar (Automatic Cell Cleaning Device)

Make sure, that the Power LED is illuminated and the display is showing the initializing display for about 15 sec. After that time, it will change to the “normal operation” display, showing the actual measurement as shown below in Figure 21. Analyzing Display: DECKMA HAMBURG and Figure 22. Normal Operation Display.



*Figure 21. Analyzing Display:
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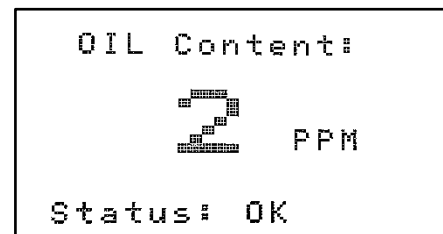


Figure 22. Normal Operation Display

Allow a period of time for water entering the Sample Glass Tube. It is recommended to let oil free water flow for about 10 minutes. Switch the EV, or the manual valve, respectively, to clean water stream. Check, that the display shows 0 to 2 ppm. If not, see 13.3 Cleaning Process. Check the relative desiccator humidity. Switch the instrument back to sample stream flow to the separator sampling point connection.

11.3 Flow rate Adjustment

The flow rate is not influencing the accuracy of the instrument as required by IMO. The adjustment is only important for the time delay between the sampling point and the monitor. The flow rate can be adjusted to compensate environmental changes and pump aging.

If the installation has a clean water feed, the flow rate should be checked on both, the clean water supply and the sample supply. If the clean water supply is obtained from a high-pressure source, the flow rate will be higher than from the sampling point.

Measure the amount of water flowing through the instrument. Flow rate should be approximately 2 liters per minute.

Instruments with an EVFC simplifies the flow measurement, for the flow rate is displayed directly. If the flow rate is below 0.7 liters per minute, EVFC instruments will display Status: “Flow”. For more information, see section 22.2.2 Functional Button “ON”.



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Flow rate adjustments can be made by Cell Cap, MCU or the Automatic Cell Cleaning Device.

Adjust the flow rate through the unit by using the O-Rings in the normal Cell Cap.

- Low Flow:** Let all three O-Rings inside the cap.
Medium Flow: Take out the inside O-Ring 4.5x2.
High Flow: Let the Main O-Ring 11.5x3 as figured below.

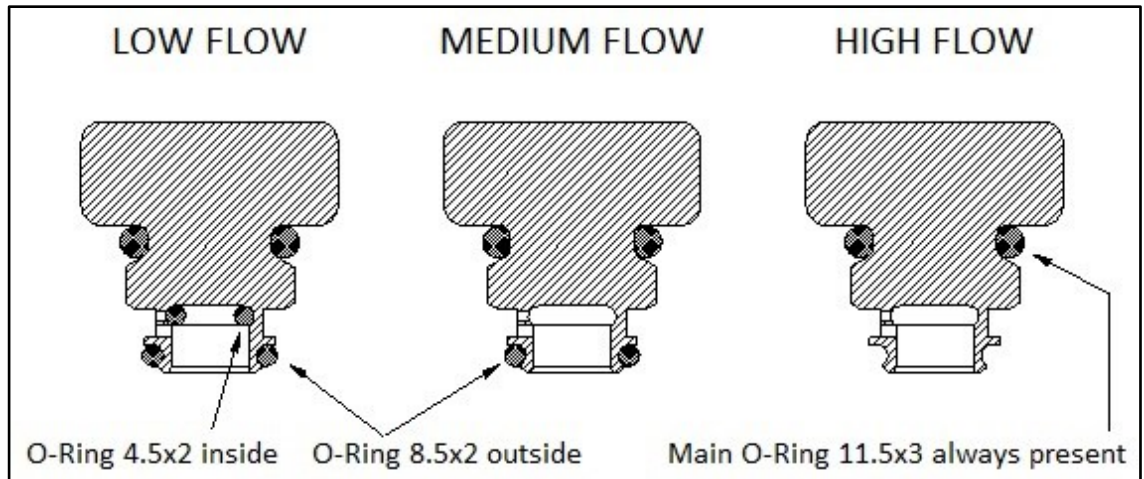


Figure 23. Flow Rate Adjustment Cell Cap

For instruments equipped with a MCU or an Automatic Cell Cleaning Device a high or a low flow rate can be adjusted.

- Low Flow:** Let the smaller O-Ring 9.5x2 inside the MCU/ Auto Clean
High Flow: Remove the smaller O-Ring 9.5x2.

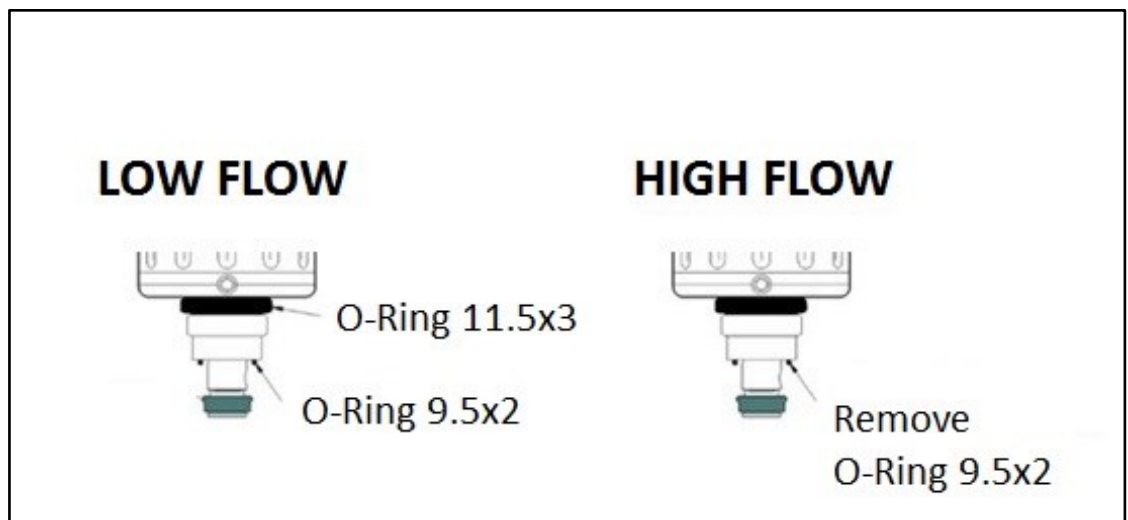


Figure 24. Flow Rate Adjustment Automatic Cell Cleaning Device/ MCU

For more information about the Flow Control and Cleaning Frequency, see 22.2.2 Functional Button "ON".



11.4 System Settings

At commissioning, alarm set points and alarm delays can be set. The signal output can be modified from 0 – 20 mA or 4 to 20 mA. According to external requirements also the offset can be set from -5 ppm to 5 ppm. Also, the settings can be reset to the factory default values, if needed.

For more information about the Settings, see 22.2.3

Functional Buttons AL1/ AL2/ SET.

11.5 Auto Clean Control Unit

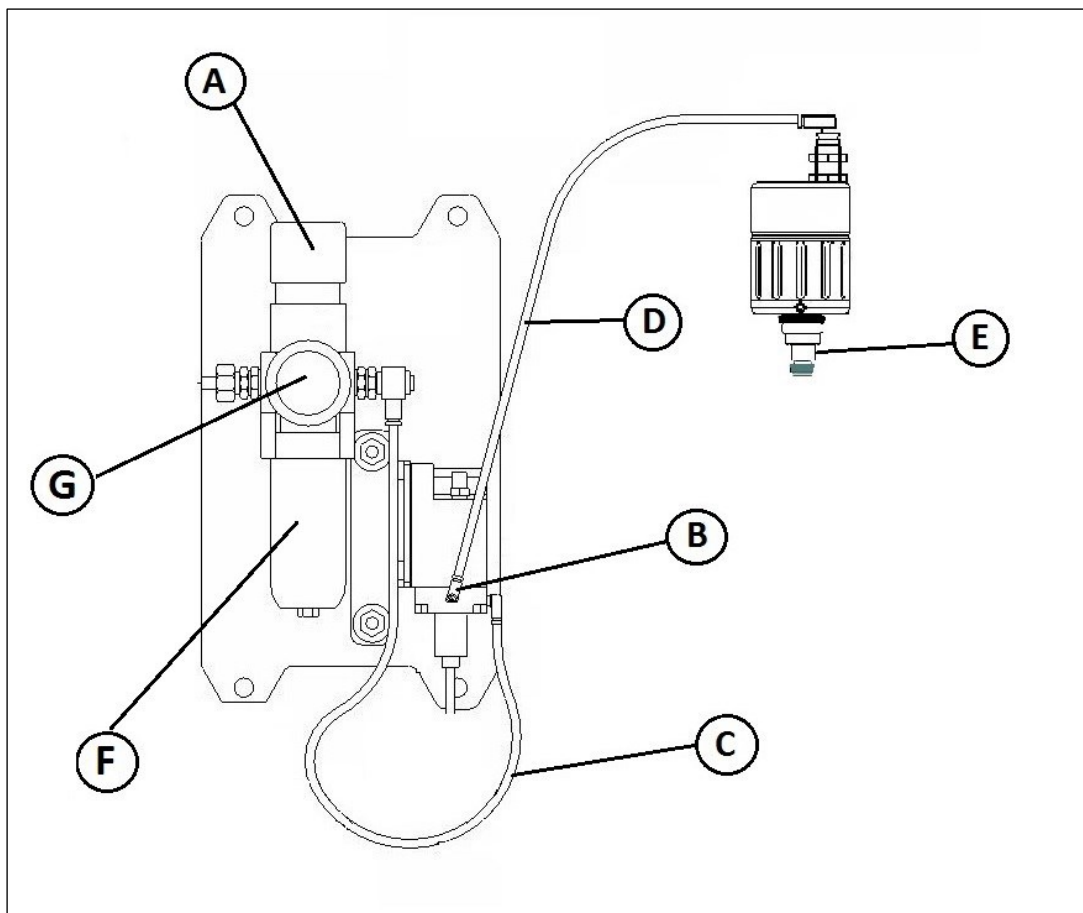


Figure 25. Auto Clean Control Unit

- | | |
|---------------------------|---|
| A. Air Regulator | E. Wiper Piston |
| B. Air Flow Adjuster | F. Transparent Bowl (Filter with water separator) |
| C. Air Regulator Hose | G. Ø 40mm Pressure Gauge |
| D. Air Flow Adjuster Hose | |



The Automatic Cell Cleaning Unit will not work without sufficient supply of pressurized instrumentation air. Make sure, that an air supply is installed. Further check, that the pipes are fixed correctly. Set the Air Regulator (A) output pressure to a pressure of approximately 4 - 6 bar. Too high-pressure settings can cause unnecessary wear. Low pressure may make operation unreliable. The Air Maintenance Unit consists of a transparent bowl (F), a pressure regulator (A) and Pressure Gauge (G).

11.5.1 Pressure Regulation

1. Pull the knob upwards.
2. Rotate the knob and set the pressure
3. Lock the set pressure by pushing the knob down.

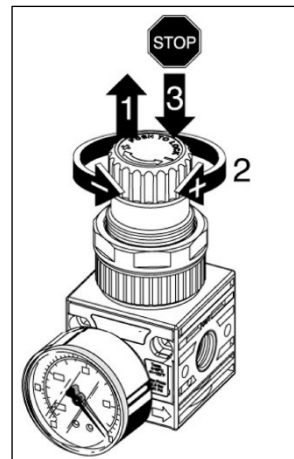


Figure 26 Pressure Regulation

11.5.2 Using standard drainage SS

- When the push button is positioned as in step **A**, drainage is semiautomatic, draining condensate when bowl is depressurized and locking up when bowl is pressurized. Push up the button to drain when bowl is pressurized.
- Then, rotating the button anticlockwise, drainage valve is manually closed, both when bowl is pressurized and depressurized, step **B**.

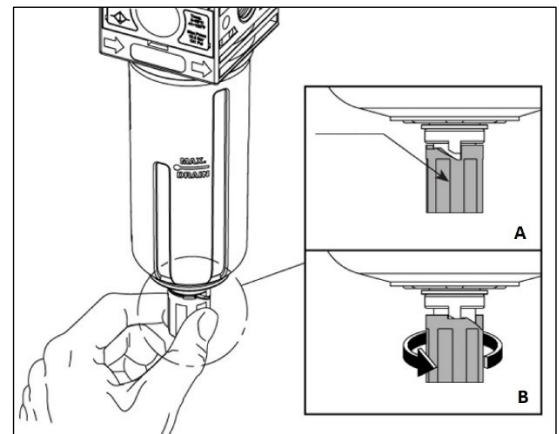


Figure 27 Using standard drainage



Please do not hesitate to contact DECKMA Hamburg GmbH for additional support.

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Output Pressure set at the Air Regulator can be only reduced, if the cleaning sequence is activated repeatedly.

Open the air flow adjuster counter-clockwise about typically two revolutions with a screwdriver. Auto Clean should be activated repeatedly, while adjusting the air flow adjuster. The wiper piston should gently run up and downwards. Be careful, if the air pressure is too high, wiper piston will dash.



12. OMD-2008 Series Operating instructions

When oily water flows through the instrument the oil content will be measured and the display will show the actual value of oil content.

If the oil concentration exceeds the adjusted threshold (works adjustment 15 ppm), the alarm indicator 1 will be illuminated in intervals during the selected time delay before it changes to steady light and the associated alarm relay will operate. Accordingly, also the alarm indicator 2 will be illuminated and its associated alarm relay will take the appropriate shut down action.

Whenever the instrument is switched over to FW, it will be in alarm condition, too, as required by IMO.

Additionally, alarms, oil content and separator status will be recorded in data logger to IMO Requirement every 15 seconds.

To switch over from sample water to clean water is depending on the instrument.

The OMD-2008 is equipped with a manual valve to switch over from sample water to fresh water (See Figure 28. Operating Instructions OMD-2008).

Do not use excessive force to operate the handle. The OMD-2008 will only allow overboard discharge in Normal Operation setting of the valve handle.

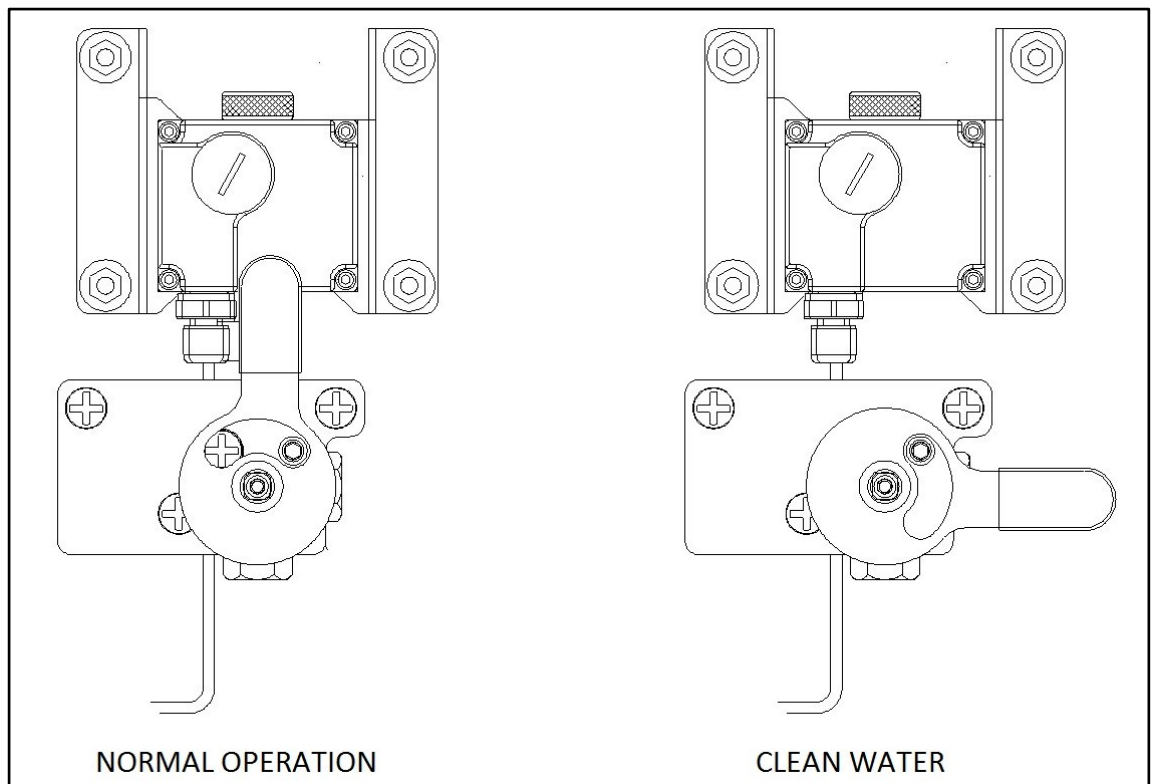


Figure 28. Operating Instructions OMD-2008



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The OMD-2008 EV units have an electric switchover valve to switch over from sample water to fresh water. Any operation is triggered via the front panel, or triggered remotely, by an external dry contact (see terminals 19&20). The units will be in alarm condition, if fresh water is opened.

12.1 Cleaning Options

It is also recommended to use MCU or the Automatic Cell Cleaning device to clean the Measuring Cell.

Cleaning of the Sample Glass Tube could be simplified with a MCU or an Automatic Cell Cleaning Device.

Using the Manual Cell Cleaning Unit MCU:

- Ensure that there is a clean water supply through the cell.
- Activate the Manual Cleaning Unit by gently pressing the handle several times. Each time the handle is pressed, the wiper goes through the Sample Glass Tube once.
- Check, that the reading is between 0 to 2 ppm.
- Additional conventional cleaning with the Cell Cleaning Brush may be necessary.
- The MCU may also be used during operation with sample water. An alarm may occur, because the wiper is passing the light source.

Using the Automatic Cell Cleaning Device:

The Automatic Cell Cleaning Device can be set to cleaning intervals from a minimum of 1 minute to maximum of 8 hours (See 22.2.2 Functional Button "ON"). This cleaning sequence can be set from the display at all time. Even if the cleaning interval has been set before and is not finished.

i

It is recommended to assist the Automatic Cell Cleaning Device by manually cleaning the Sample Glass Tube at regular maintenance schedule, or as necessary.

If the Measuring Cell is equipped with a Cell Cap, please refer to section 13. Operator Maintenance.



13. Operator Maintenance

→ (See Section 2. Important Notes).

WEEKLY INTERVALS: 13.1 to 13.6 Data Logger Checking

MONTHLY INTERVALS: 13.7 MCU and Automatic Cell Cleaning Device

The Operator Maintenance should be scheduled at least once a week. If needed, prepare the Quick Check List to keep track on maintenance. For more information, see section 24.1 Operator Maintenance Quick Checklist.

13.1 General Test

- a) Visually inspect instrument for obvious leakages or damage.
- b) Visually check condition of cables and connections.
- c) Check the desiccator:
 - Press **“SYS”** button, select Measuring Cell, confirm.
 - Internal data is displayed. Identify Dew Point Temperature [°C] and relative humidity [%rH] data.

The relative humidity [%rH] should be below 10%rH. Dew Point Temperature should be below 0°C. If not, desiccator exchange is recommended. The desiccator also has to be exchanged, if the humidity is higher 40%rH. For more information, see section 22.2.4 Functional Button **“SYS”**.

13.2 Normal Operation

- d) Switch on the EV Valve or manual valve to fresh water, so that the cell is flushed with oil free water. Check 22.2.2 Functional Button **“ON”**.
 - i) When operated via the front panel the EV-Valve will automatically switch back to normal operation (sample stream measurement) after approximately 120 seconds of clean water flushing.

For operating the Electric FW Valve press the **“ON”** button, select **“FW FLUSH”**, change the Status to **“ON”**. The EV-Valve will switch over to fresh water immediately and remain in fresh water setting for 2 minutes before switching back to normal operation. If a prolonged flushing is desired, it can be retrigged within the 2 minutes, or repeated afterwards.

Anytime the EV-Valve is switched to fresh water, the OMD-2008 will be in alarm condition, as required by IMO MEPC.107(49). If the instrument is switched to FW remotely, it will remain so until the remote signal is changing.
- e) Let the oil free water flow for few minutes.
- f) Verify that the display is showing 0 to 2 ppm. If this is the case, continue with the steps r) to t).



13.3 Cleaning Process



- g) Stop any water flow.
For instruments equipped with Automatic Cell Cleaning Device, shut off the instrument air.
- h) Unscrew and remove the Cell Cap. Visually check the wiper piston and the O - Rings for wear or damage.
- i) The wiper seal should be clean.
- j) It is recommended to clean the Measuring Cell on a regular schedule manually using the Cell Cleaning Brush with upwards and downwards motion through the entire length of the cell several times.
- k) For oily deposits use a mild detergent on the Cell Cleaning Brush.
- l) Put back the Cell Cap, and the wiper piston. Make sure that the Cell Cap is screwed in completely.
- m) Purge with oil free water for several minutes to get a clean Measuring Cell.
- n) Verify that the display is showing 0 to 2 ppm.
- o) For instruments equipped with Automatic Cell Cleaning Device, restore the air.
- p) Turn on the sample water flow.

13.4 Intensive Cleaning

- q) If there is no improvement, repeat cleaning with the Cell Cleaning Brush and use Sample Tube Cleaner and check in contemporary the display, if the "0" point is achieved. The process could take about 5 minutes. Shouldn't the result improves again, use Citric Acid and let act on over the night.
 - Cut the upper part of the Cell Cleaning Brush.
 - Insert the wire stem of the Cell Cleaning Brush into an accu driller and fix it.
 - Slowly rotate the Cell Cleaning Brush for a few minutes in the Sample Glass Tube.
 - Flush with clean water and re-test.

For more information, see section 25.1 Servicing and Cleaning Manual.

13.5 System Test

- r) Perform a "System Test" for checking the alarms contacts. See section 22.2.1 Functional Button "TEST".
- s) The "System Test" is only useful, if the oil content is under 15 ppm before starting the test.



13.6 Data Logger Checking

- t) Check the data logger:
 - 1. Is the data logger recording the data?
 - 2. Check the clock for time deviation.

For more information, see section: 14. Programming Mode.

13.7 MCU and Automatic Cell Cleaning Device

- a) Stop water flow and air supply, respectively.
- b) Check the wiper seal and the O-Rings. Clean if necessary. The wiper piston can be pulled out easily. It is magnetically coupled.
- c) To reinsert just put the wiper back. The magnetic coupling will arrest it.

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Both MCU and Automatic Cell Cleaning Device may require additional manual cleaning. Check the Sample Glass Tube condition and correct working of cleaning systems at regular maintenance schedule.

→ **Remarks:**

The automatic cleaner will not work without sufficient supply of pressurized instrumentation air.

If the wiper is not correctly installed, the wiper piston may proceed to its lower position, thus blocking the measurement region of the Measuring Cell Glass Tube. This can cause false alarms and error conditions.

A worn out or damaged wiper seal may fail to properly clean the Sample Glass Tube. A damaged or missing wiper seal may lead to permanent damage due to scratching the Sample Glass Tube surface.



With excessive air pressure while the automatic cell cleaning device is taken out of the Measuring Cell, if the cleaning system operates, the wiper may be thrown out. Handle with care to avoid loss of wiper and avoid risk of injury.



It is recommended to wear safety goggles and safety gloves while handling chemicals.



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13.8 Maintenance Recommendations

Maintenance recommendations for 15 ppm Bilge Alarms OMD-2008 Series

IMPORTANT

**NEVER DISASSEMBLE THE UNITS AS THIS MAY VOID
CALIBRATION AND CERTIFICATION!**

CLEANING HAS ONLY TO BE DONE THROUGH THE REMOVED CELL CAP BY USING THE CELL
CLEANING BRUSH!

In some cases of unexpected high ppm readings with clean water the Measuring Cell has a problem with internal coating of the Sample Glass Tube. Just cleaning with brush and clean water does not always help in this case. Additional cleaning is required.

Please carry out the following instructions to make sure that the Sample Glass Tube is really clean. Then the unit will show 0 to 2 ppm with clean water.

Check Measuring Cell humidity readings and desiccator status. Press **“SYS”** button, select Measuring Cell, confirm. Internal data is displayed. Dew Point Temperature [°C] should be below zero Degree Celsius, relative Humidity [%rH] should be below 10%rH. If above values are exceeded, renew desiccator and allow new desiccator to absorb the humidity inside the Measuring Cell.

Clean the Sample Glass Tube by using the Cell Cleaning Brush and a mild cleaning agent.

In certain cases, depending on environmental conditions on site, Iron Oxide may be deposited inside the Sample Glass Tube (brownish surface deposit on the Sample Glass Tube). To remove Iron Oxide, it is recommended to use Citric Acid. Drain the instrument, fill Citric Acid into the Sample Glass Tube, add water and let it soak overnight. Flush with clean water. If situation improves, repeat until success. Other deposits may be removed with a mild acidic cleaner.

Additional use of tooth paste may also assist in cleaning as a last resort. Do not use abrasive cleaners containing hard particles. Hard abrasive particles may scratch the glass surface, permanently damaging the instrument.

The Measuring Cell is expected to read 0 - 2 ppm, if successfully cleaned.



14. Programming Mode

There are 3 groups of push buttons to control the functions of the display. Navigation buttons are in group 1. Functional buttons are group 2. Group 3 is for data logger operation.

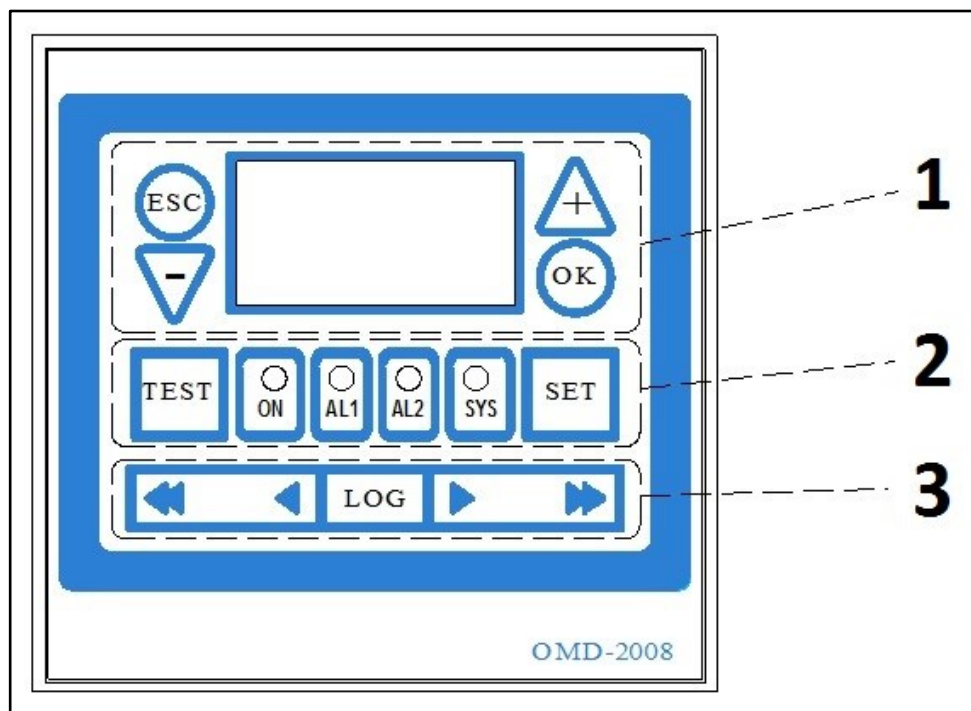


Figure 29. Display Functions

1. Navigation Buttons

With the Navigation Buttons, some setting can be adjusted, confirmed or actions can be canceled before confirmed. The display shows status information. (See section 22.1 Navigation Buttons for more details.)

2. Functional Buttons

The Functional Buttons provide a direct access to certain settings. Alarm set points 1 or 2, alarm delays 1 or 2, the Offset, and the Output can be modified. By selecting “set default” all the settings can be reset to the factory default values as well.

Also, instrument specific information like type, serial number, and certificate information can be displayed. Additionally, it is also possible to read information about the Measuring Cell, and internal data on temperature, humidity, dew point etc.

With the “**TEST**” button system test can be performed. Additionally, the Desiccator Status can be checked. (See section 22.2 Functional Buttons for more details.)



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FW Flush can be switched on or off, respectively. At OMD-2008 EVFC the Flow Measurement can be read. Also, cleaning interval at OMD-2008 EVA can be managed from minimum 1 minute and maximum 8 hours. By “0” Autoclean will be off.

3. Data Logger Operation Buttons












The “**Log**” buttons are used to operate the integrated data logger. These buttons show a live display, in which the current data from alarm status, the external separator additionally, the oil content, the device status, and a reserve is recording to IMO Requirements. That data can be shown as a graphical or a text-based recording at any particular time. All the information will be recorded every 15 seconds. All recorded data is available for more than 18 months.

With the arrow buttons the data can be navigated.

The internal clock is factory set for GMT, **Greenwich Mean Time** and cannot be changed or adjusted. The internal clock is adjusted to be within +/- 2 minutes of GMT in production. A few minutes of derivation per year of operation should be expected. (See section 22.3 Data Logger Operation Buttons for more details.)

→ See Section 22. Appendix for more details about the buttons.

14.1 Buttons

Buttons	Description
	Pressing this button once, it is possible to return to the previous menu. Pressing this button twice, it is possible to return to the “Normal Operation” display.
	Navigates to the next or previous option.
	Navigates to the next or previous option.
	By pressing this button, it is possible to select and confirm entry.
	Pressing this button, directly leads into the “SYSTEM TESTS” menu.
	Pressing this button, directly leads into the “SYSTEM-OPTIONS” menu.
	Pressing “AL1/2” buttons, leads into the “SETTING,def.” menu.
	Pressing this button, leads directly into the “SYSTEM info” menu.
	Pressing this button once, leads into the “SETTING,def.” menu. Pressing the button twice leads into “DEFAULT” menu.
	Pressing this button once, leads into the “DATA LOG live” menu, if the memory card is activated. Pressing this button twice, the recorded data display mode will be invoked and graphical recorded data appears. Pressing this button if a non-activated memory card is inserted, leads to the menu to activate the memory card.
	It is possible to press and slide the “Arrow” sliders (right/ left), to navigate to the data or time of recorded data, in the graphical recorded data menu.



15. Memory Card

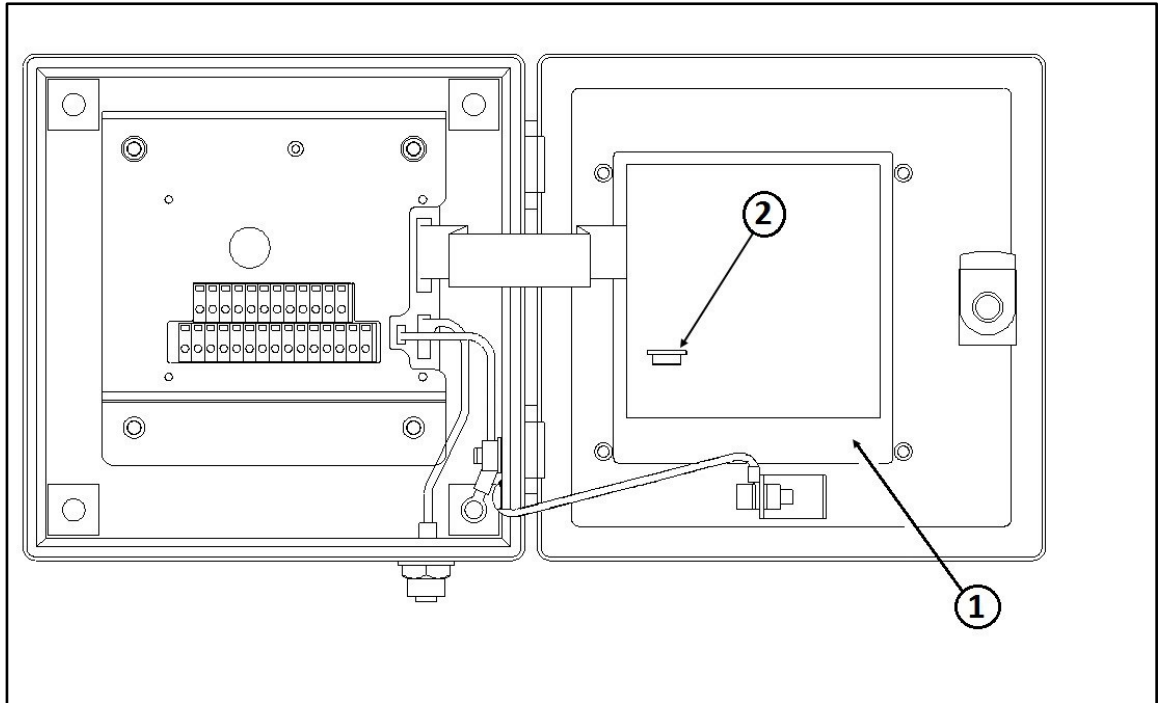


Figure 30. Memory Card Location

1. Display PCB
2. Memory Card

The Memory Card is on the backside of the Display PCB inside the computer housing. It is sufficient for the life of the instrument, and it ensures to the required storage time of at least 18 months according to MEPC.107(49). When the card is completely used, the oldest entry will be overwritten, so that a replacement is not necessary. Under normal use the card should not be taken out. The memory card is registered with the specific instrument. The card can be read in other OMD-2008 units, but writing is only possible in the related system.

If no memory card is mounted, if the memory card is defective, or a card from another system is inserted, the unit will be in alarm condition **“Status: Datalog”**.



15.1 OMD-CR Memory Card Reader

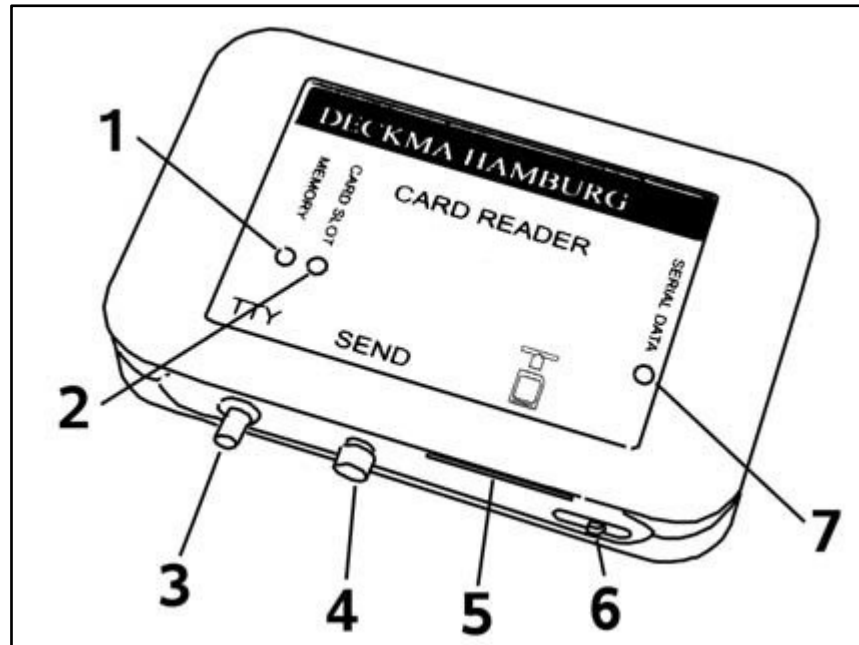


Figure 31. OMD-CR Memory Card Reader

1. Memory LED
2. Card Slot LED
3. Serial Interface Connector
4. SEND – Button
5. Card Slot
6. On-Off Switch
7. Serial Data LED

DECKMA Hamburg oil in water monitors store certain data according to IMO Requirements in a memory card. The data stored by any OMD-2008 Unit can be displayed with any other OMD-2008 Unit.

Additionally, the data can be accessed with the DECKMA HAMBURG OMD-CR card reader. The OMD-CR card reader allows to copy certain memory card data to a file on a computer, so that it can be processed, browsed, or printed, with only brief interruption of the 15 ppm Bilge Alarm Monitor operation. Please note that only the data requested by MEPC.107(49) (Date, Alarm Status, Separator Status) can be copied to the computer.



16. Fault finding

→ See Section 2. *Important Notes*

The OMD-2008 Series will indicate several malfunctions in the status line of the display. Pressing the **“OK”** button will display additional information.

Status	OK		
Reading	0..15	15..49	EE
System Alarm LED	Green/ Blinking		
Alarm Circuit 1,2	No Alarm	Alarm	
Reason	Low oil content.	Normal Operation.	Sample reading is out of range: -oil content too high. -dirty Sample Glass Tube. -Air bubbles in sample stream.
Recommendations	-Continue operation. -Apply standard maintenance schedule.	Resume normal maintenance schedule.	-Wait until oil content is within the range. -Clean Sample Glass Tube.

Status	FW!	Flow!	E-VALVE?
Reading	0..49/ EE		Any
System Alarm LED	Green/ Blinking		Red
Alarm Circuit 1,2	Alarm		
Reason	- Freshwater is enabled. - Remote fresh water input is linked 19 -> 20).	-Terminals 15&16 open. - A magnet is missing. - Flow sensor unsatisfied. - Magnet sensor defective.	EV FW Valve position not detected. (For EV Units only)
Recommendations	- Switch back to sample stream.	Check sample flow rate.	Check connectors and wiring.



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Status	Com?	Sample?	Data log?
Reading	EE		0..49/EE
System-Alarm-LED	Red/Steady		
Alarm Circuit 1,2	Alarm		
Reason	No communication between Computer Unit and Measuring Cell.	Meter is not able to measure the sample: no water in, oil content much too high no light transmission possible.	Data logging is not possible: No DECKMA memory card inserted. A read only card has been inserted. -A new DECKMA memory card has been inserted but has not been activated.
Recommendations	Check connection between Computer Unit and Measuring Cell.	-Check sample, check sample flow rate, clean Sample Glass Tube according to section 12. OMD-2008 Series Operating instructions	Insert the active memory card. New memory card. Activate the memory card.

Status	Int.Err	Desicc.	Humid
Reading	0..49/EE		
System-Alarm-LED	Red/Steady	Green/ Blinking	
Alarm Circuit 1,2	Alarm	Normal Operation	
Reason	Internal error.	Measuring Cell Humidity critically high (>40%rH)	Sample temperature below dew point. Instantaneous condensation possible.
Recommendations	Restart the system.	Check/ Replace desiccator.	Check/ Replace desiccator.



16.1 Automatic Cell Cleaning Unit Fault Finding

Fault	Explanation	Solution
Pneumatic Cleaner not operating	Air pressure low.	Restore air pressure.
	Air connections missing or wrong.	Sort out air connections. Air connections are Push-In type. Press release ring to release hose.
	Auto Clean interval set to "OFF".	Activate cleaner via menu.
	Auto Clean interval set to long interval, time not yet expired.	Wait for time to expire, or manually trigger cleaning cycle. Refer to section 22.2.2 <i>Functional Button "ON", "Change of cleaning frequency"</i> .
Wiper moving very slowly	Air flow adjuster too stringent.	Turn Adjuster on Auto Clean Control counter-clockwise or un-clockwise with a screw driver.
	Wiper or Cylinder not clean.	Clean wiper.
Wiper moving very fast	Air flow adjuster too wide.	Turn Adjuster on Auto Clean Control clockwise with a screw driver.
Cleaning insufficient	Cleaner not operating.	Check wiper and air supply.
	Debris deposits.	Try additional manual cleaning.
	Deposition of material that cannot be removed mechanically (e.g. Iron Oxide.)	Try chemical removal of deposit. Apply Cleaning Kit. Iron Oxide can be removed with Citric Acid.
	Cleaner frequency not adjusted to situation on site.	Adjust cleaner frequency.
	Wiper seal worn out or damaged.	Replace wiper seal.
	Wiper piston missing.	Re-install wiper piston.



Please do not hesitate to contact DECKMA Hamburg for additional support.



17. Calibration

17.1 OMD-2008 Series

15 ppm Bilge Alarms built according MEPC.107(49) have to be protected against access beyond the checks of instrument drift, repeatability of the instrument reading and zero adjustment. For this reason, the instrument is electronically sealed, so that only the manufacturer or his authorized persons, equipped with the related tools, are able to get access for changing the calibration.

To provide a simple procedure to check the instrument aboard ship, the OMD-2008 Series is constructed in that way, that the zero check also confirms the instrument drift within the specifications.

17.2 Calibration and Repeatability Check

- a) Switch off the power supply and stop any water flow.
- b) Clean the Sample Glass Tube accurately by using a suitable Cell Cleaning Brush as described under Section 13. *Operator Maintenance.*
- c) Run clean water through the instrument.
- d) Make sure that non-aerated, clean water is in the instrument. The reading should be $0 \text{ ppm} \pm 2 \text{ ppm}$.
- e) Continue as described under Section 12. *OMD-2008 Series Operating instructions.*

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Please note: MEPC.107(49) wording regarding instrument calibration:

MEPC.107(49) Section 4.2.11:

[Quote]

The accuracy of the 15 ppm Bilge Alarms should be checked at IOPP Certificate renewal surveys according to the manufacturer's instructions. Alternatively, the unit may be replaced by a calibrated 15 ppm Bilge Alarm. The calibration certificate for the 15 ppm Bilge Alarm, certifying date of last calibration check, should be retained on board for inspection purposes. The accuracy checks can only be done by the manufacturer or persons authorized by the manufacturer. [End Quote]



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17.3 Function Test at Classification Survey and Port State Control

All 15 ppm Bilge Alarms leaving our works are calibrated according the requirements with an accuracy of better than ± 5 ppm within the measuring range. The alarm points are preset to 15 ppm (or 5 ppm for instruments limited to 5 ppm set point, see section 18. OMD-2008 Series with 5 ppm Alarm Set Point) and can only be changed to a lower value on site. A setting to a higher value is not possible.

To provide a simple procedure for instrument check aboard ship, the OMD-2008 Series are constructed in that way, that the zero check also confirms the instrument drift within the specifications. The **“TEST”** button (see section 22.2.1 Functional Button **“TEST”**) starts a self-test routine and allows to put both alarms contacts into alarm condition. The instrument will count down from an assumed high reading (30 ppm) downwards until the assumed value is equal to the actual measured ppm value.

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Note that this test will only switch the alarm contacts to non-alarm condition, if the sample contains less than 15 ppm oil content and all other conditions for proper measurement are OK.



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18. OMD-2008 Series with 5 ppm Alarm Set Point

By request the OMD-Series instruments (OMD-2008/ OMD-2008 EV/ OMD-2008 EVA/ and OMD-2008 EVFC) are also available with alarm set points limited to 5 ppm for both alarms (alarm 1 and alarm 2).



19. Spare Parts

When ordering spares, it is important to supply details of the type of monitor, instrument serial number, instrument date of commissioning, part number of each spare required, its description, and any relevant serial number.

It is not permitted to dismantle the EV-Valve. In case of any malfunction it should be replaced.

OMD-2008 Series	OMD-2008	OMD-2008 EV	OMD-2008 EVA	OMD-2008 EVFC-MCU
Alarm Set Point Limitation	10820/15ppm 10822/ 5 ppm	10821/ 15 ppm 10823/ 5 ppm	10825/15 ppm 10827/ 5 ppm	10830/ 15 ppm 10833/ 5 ppm
DESCRIPTION	ART-NUMBER			
Desiccator	79550	79550	79550	79550
Cell Cleaning Brush	77555	77555	77555	77555
O-Ring Set	77775	77775	77773	77773
O-Ring Adapter (14x 1,5 NBR)	40134			
Adapter	77408			
Measuring Cell	77500	77500	77500	77500
Service Exchange Measuring Cell (incl. new Calibration)	2277500	2277500	2277500	2277500
T2A Fuse	40107	40107	40107	40107
Electric Valve		13218	13218	13218
Wiper Seal			77606	77606
Service Kit	18570	18570	18570	18570
Memory Card	79186	79186	79186	79186
Wiper, complete with Wiper Seal			77792	77792
Air pressure filter/ regulator unit			16270	



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Set of push in connectors and hoses			78770	
Auto Clean Controller Assembly			78790	
Auto Clean Actuator Assembly			78780	
Pneumatic Cylinder			78785	



19.1 Recommended on Board Spares

OMD-2008 Series	OMD-2008	OMD-2008 EV	OMD-2008 EVA	OMD-2008 EVFC-MCU
ART-Number/ Alarm Set Point Limitation	10820/15ppm 10822/ 5 ppm	10821/15 ppm 10823/ 5 ppm	10825/15 ppm 10827/ 5 ppm	10830/ 15 ppm 10833/ 5 ppm
DESCRIPTION	ART-NUMBER			
2 off Desiccator	79550	79550	79550	79550
1 off Cell Cleaning Brush	77555	77555	77555	77555
O-Ring Set	77775	77775	77773	77773
T2A Fuse	40107	40107	40107	40107
Electric Valve		13218	13218	13218
2 off Wiper Seal			77606	77606
1 off Service Kit	18570	18570	18570	18570
1 off Set of push in connectors and hoses			78770	
1 off Pneumatic Cylinder			78785	
Optional Item				
1 off Manual Cleaning Unit	77780	77780		



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20. Optional Equipment

Equipment	Art-Number
Manual Cleaning Unit (MCU)	77780
Wiper Seal for MCU	77606
OMD-CR Memory Card Reader	75185
Function Test Kit	18510
Flow Sensor	16700
Auto Clean Controller Assembly	78790



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21. REMARKS

All the modifications and deviations from the standard form, which have to be carried out in the supply, should be attached at this paragraph.

Commissioned on: by:

Date

Firm's Name

Remarks:

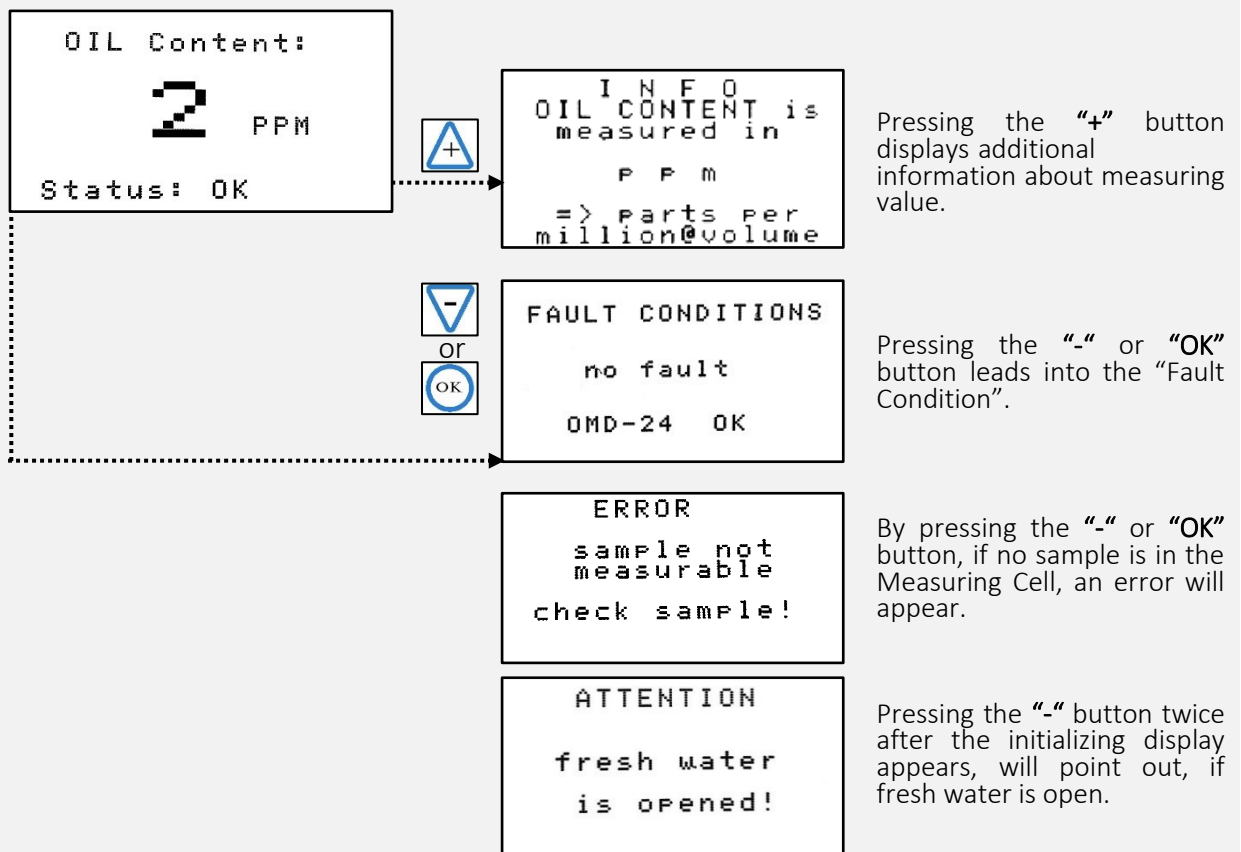


22. Appendix I.

22.1 Navigation Buttons



Pressing one of the tagged buttons, let the "Normal Operation" display appears.

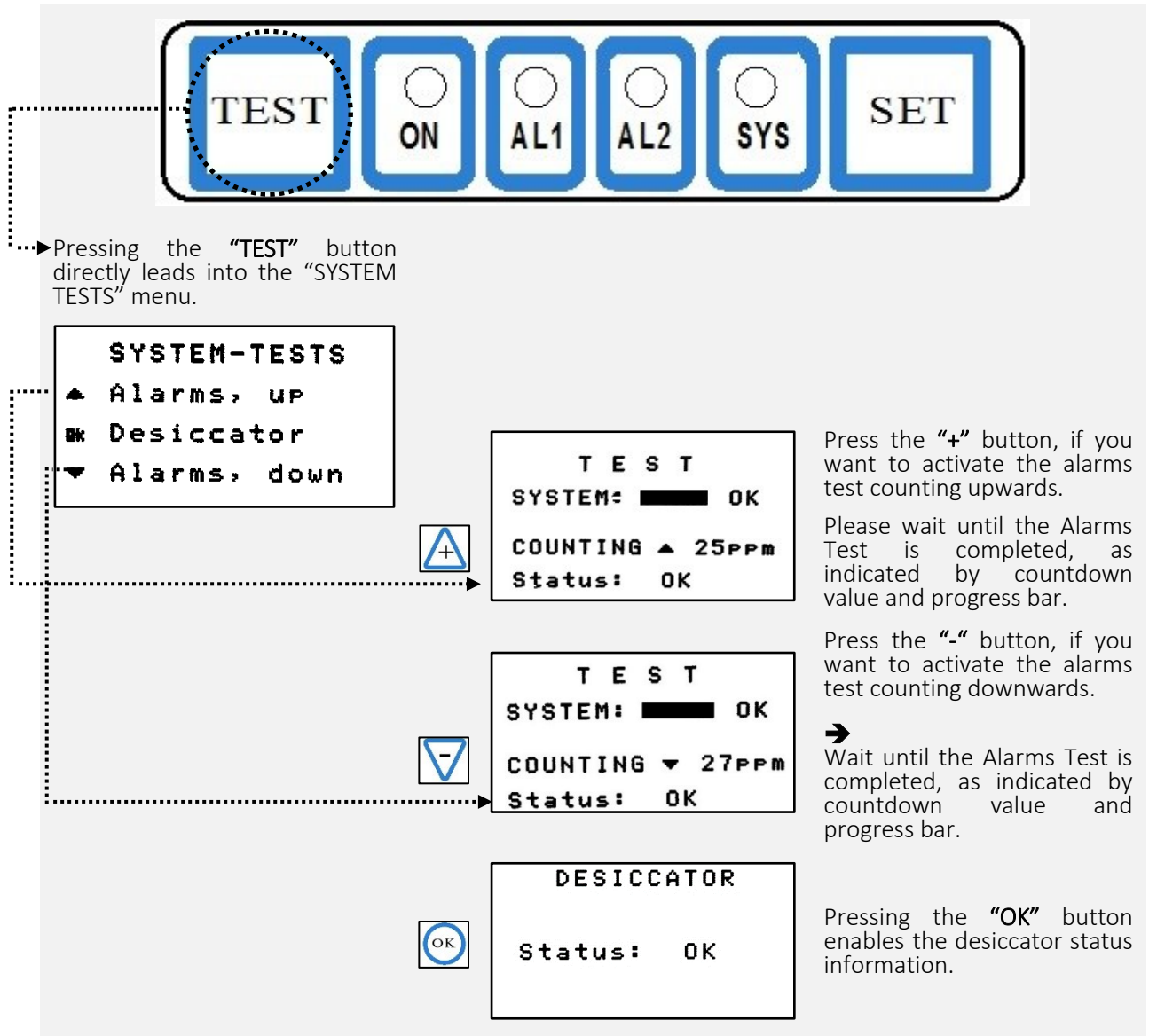


➔ Refer to Fault Finding Table in manual for explanation of status information.



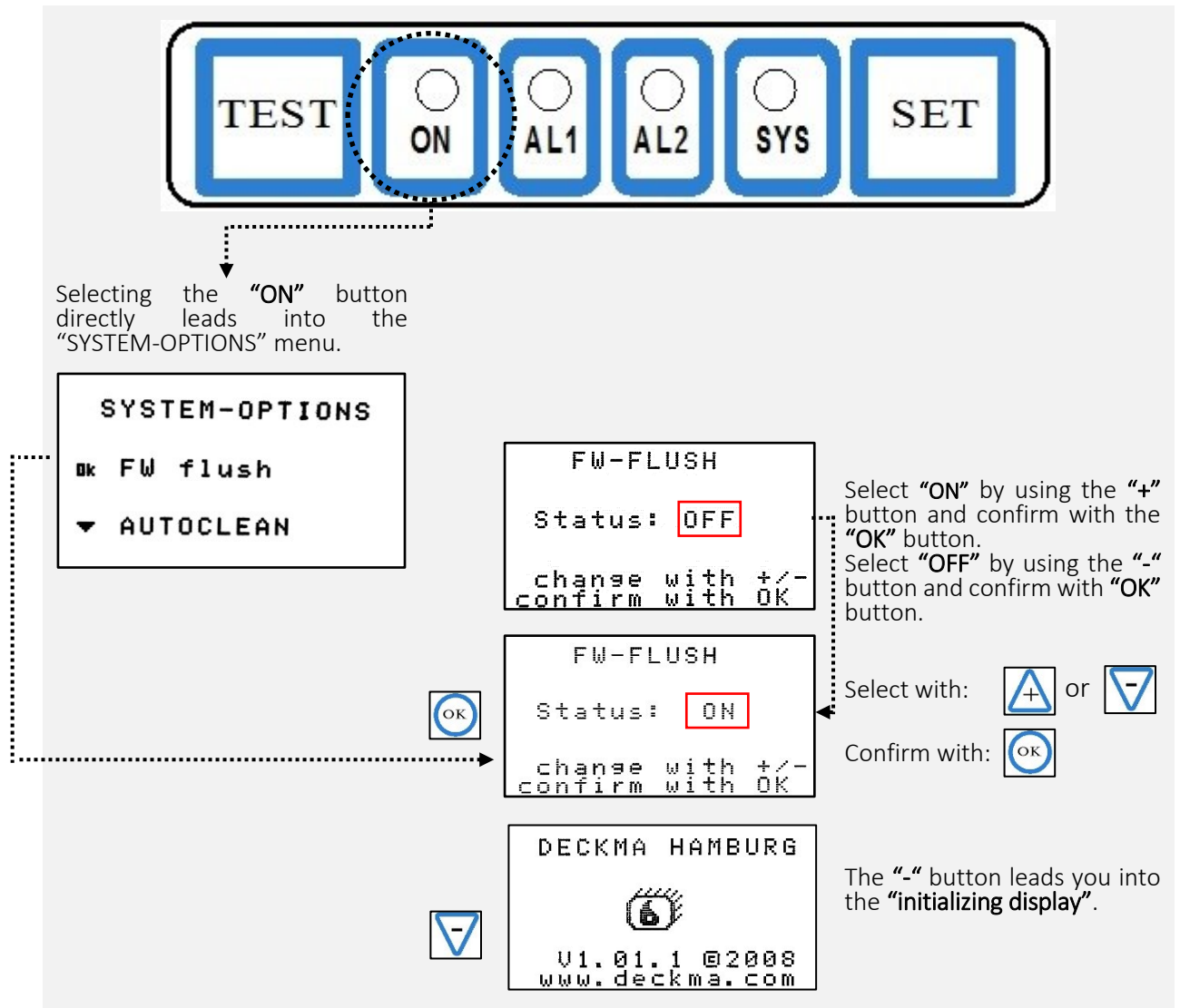
22.2 Functional Buttons

22.2.1 Functional Button "TEST"





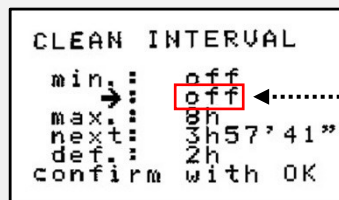
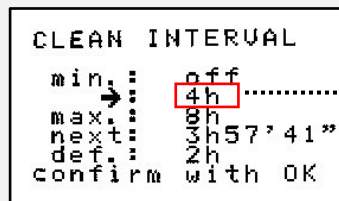
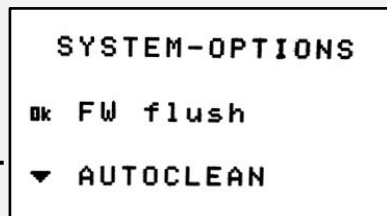
22.2.2 Functional Button "ON"





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You can adjust the cleaning frequency according to the water quality on site, by pressing the "ON" button.



Pressing the "-" button leads into the "CLEAN INTERVAL" display.

In this display status it is possible to check and set the time delay setting for Autoclean operation from minimum 1 min. to maximum 8 hours. Alternatively, it is possible to switch off the Autoclean completely.

Less than 2 hours is not recommended. It can lead to mechanical wear and decreased lifetime.

Line "next" displays the remaining time towards the net cleaning cycle. This is especially useful, if remaining very long (several hours) cleaning intervals.

By selecting "def." the cleaning interval will be set to 2 hours.

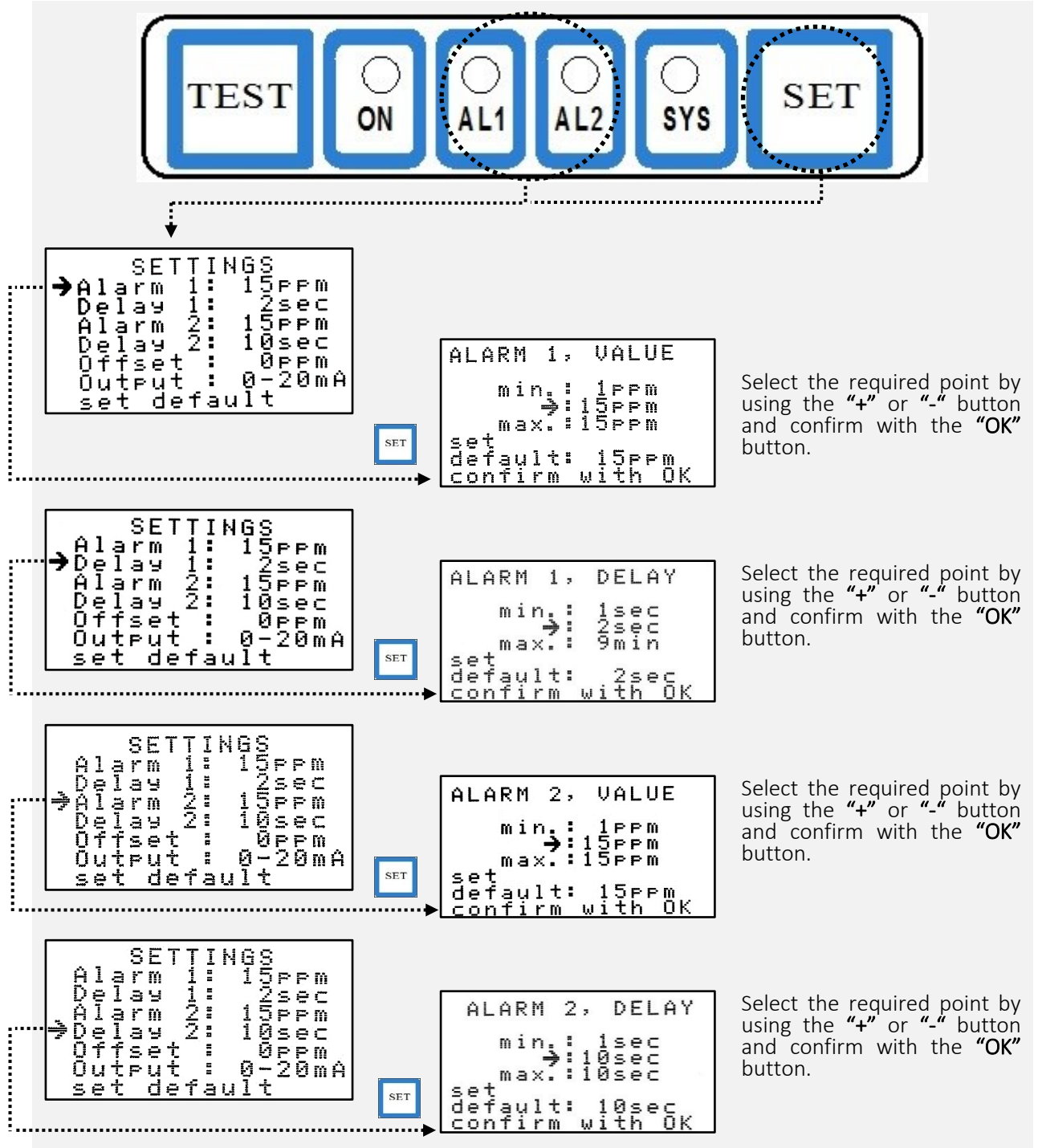
Select the required point by using the "" or "-" button and confirm with "OK" button.

The Autoclean interval should be off, if it is uncertain, that a sample stream is maintained. If the cleaner operates in a dry Sample Glass Tube, increased wear is to be expected.



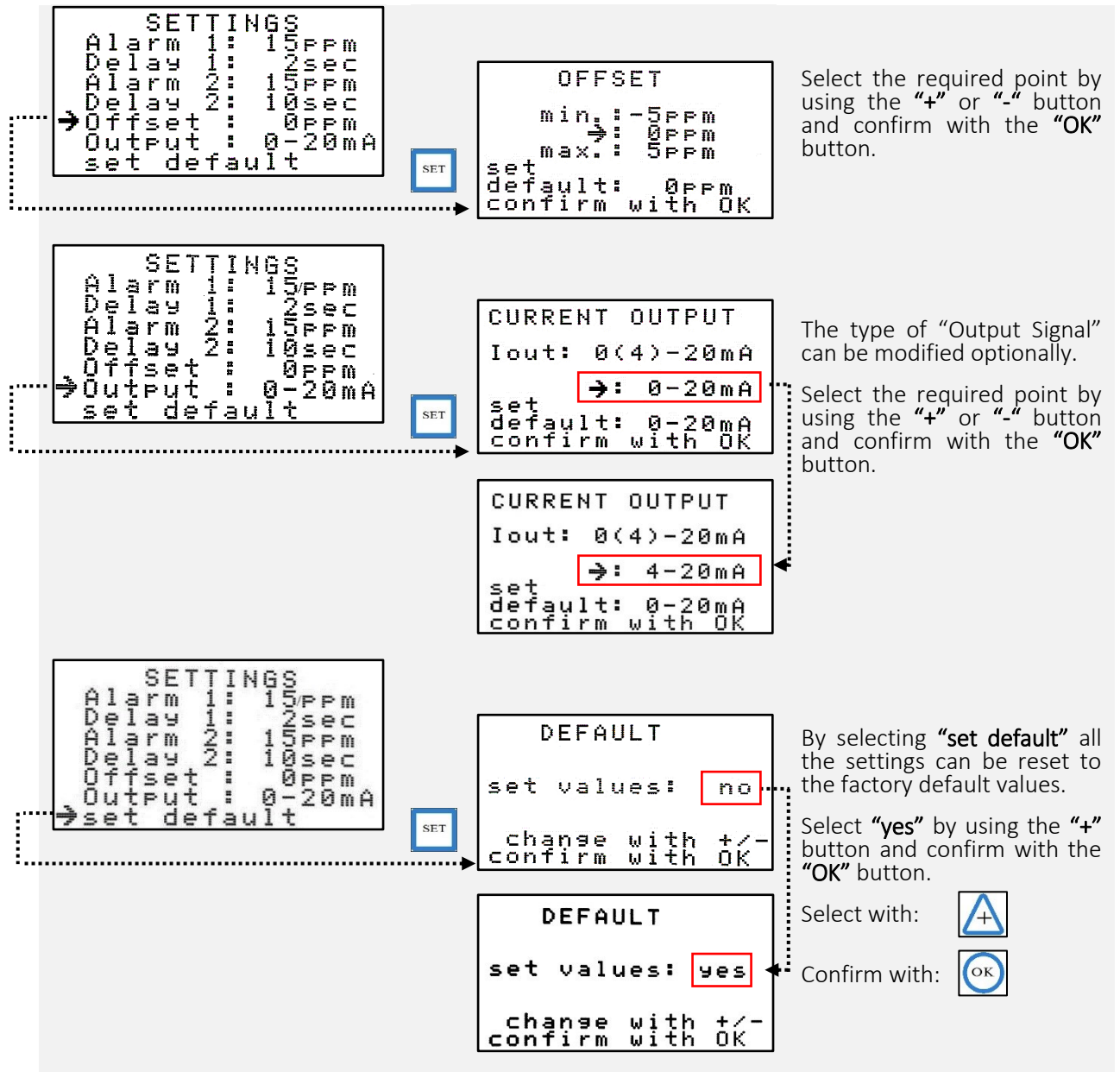
22.2.3 Functional Buttons AL1/ AL2/ SET

Pressing "AL1", "AL2", or "SET" button leads into the "SETTINGS, def." menu. At the SETTINGS, def." menu the alarms, time delays, the offset, the gain, and the output signal can be modified within the limitation. And the unit could be also reset to factory default values there. Pressing the "SET" button in the "SETTINGS, def." menu leads into the particular values, where the limitation can be adjusted.



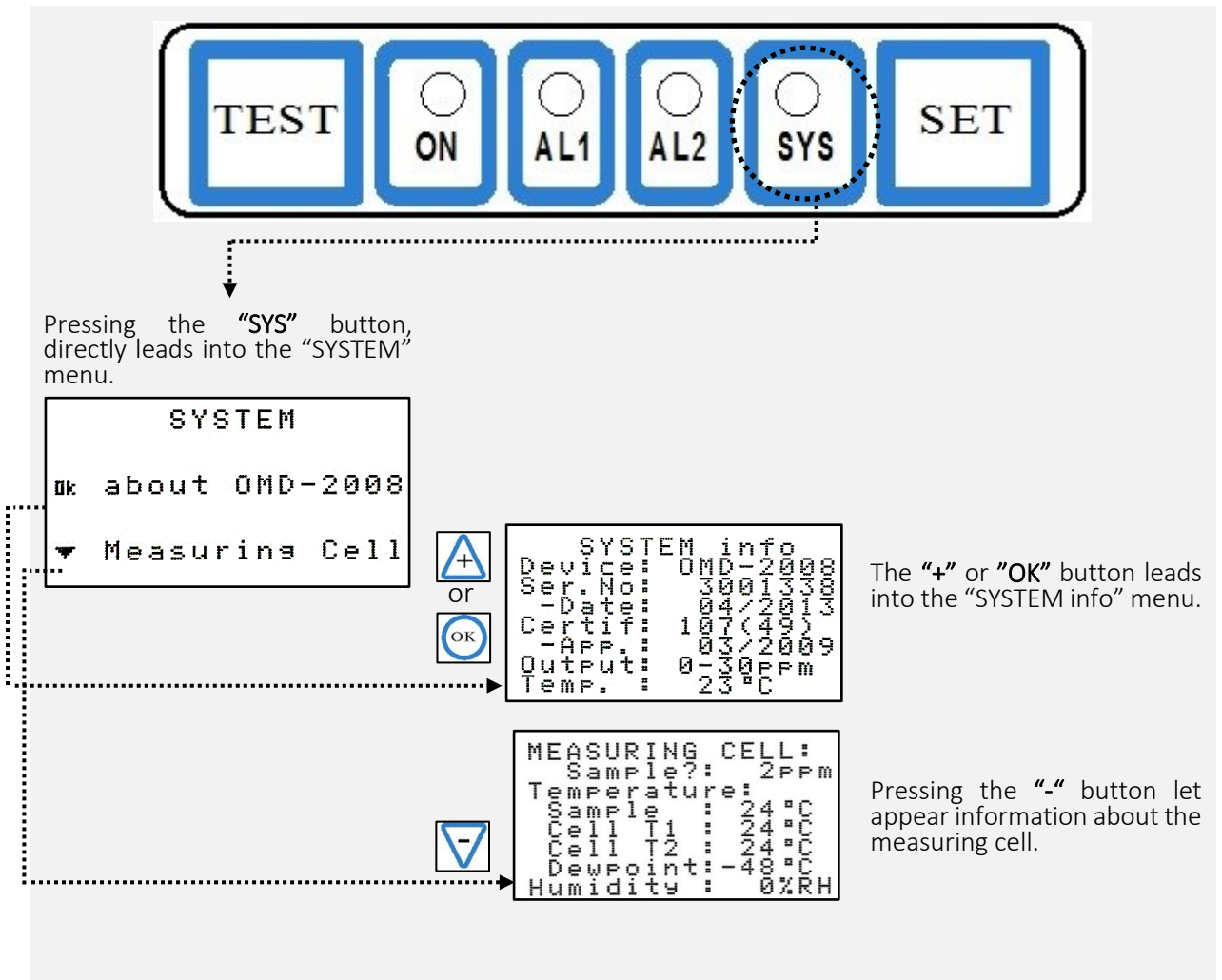


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22.2.4 Functional Button "SYS"





22.3 Data Logger Operation Buttons



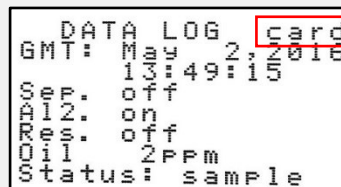
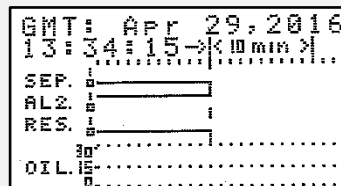
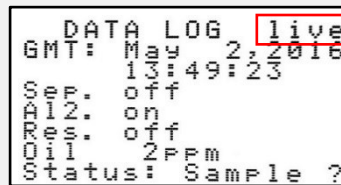
The "LOG" button leads into the data logger function.

The "LOG" button leads into the data logger function.

Initially the data logger displays the live data.



By pressing the "LOG" button again, the recorded data display mode is invoked and the graphical recorded data appears. by pressing the "LOG" button again, you will change into the non-graphical recorded data.



The "Arrow" sliders can be used to navigate to date or time recorded data.



For leaving the non-graphical recorded data, press the "ESC" button once. The live data appears.



22.4 Activating the Memory Card

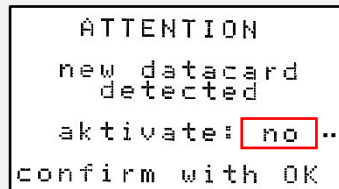



If you have inserted a new DECKMA memory card, you have to activate the memory card as follows.

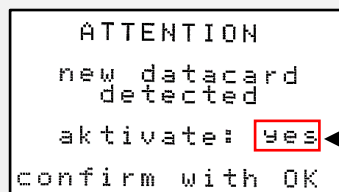
After pressing the "LOG" button twice, the display will appear with the information, if you want to activate the new DECKMA memory card.




LOG



Select with: 



Confirm with: 

Select "yes" by using the "+" button and confirm with the "OK" button. The data will be recorded now.



23. Appendix III.

23.1 ALARMS

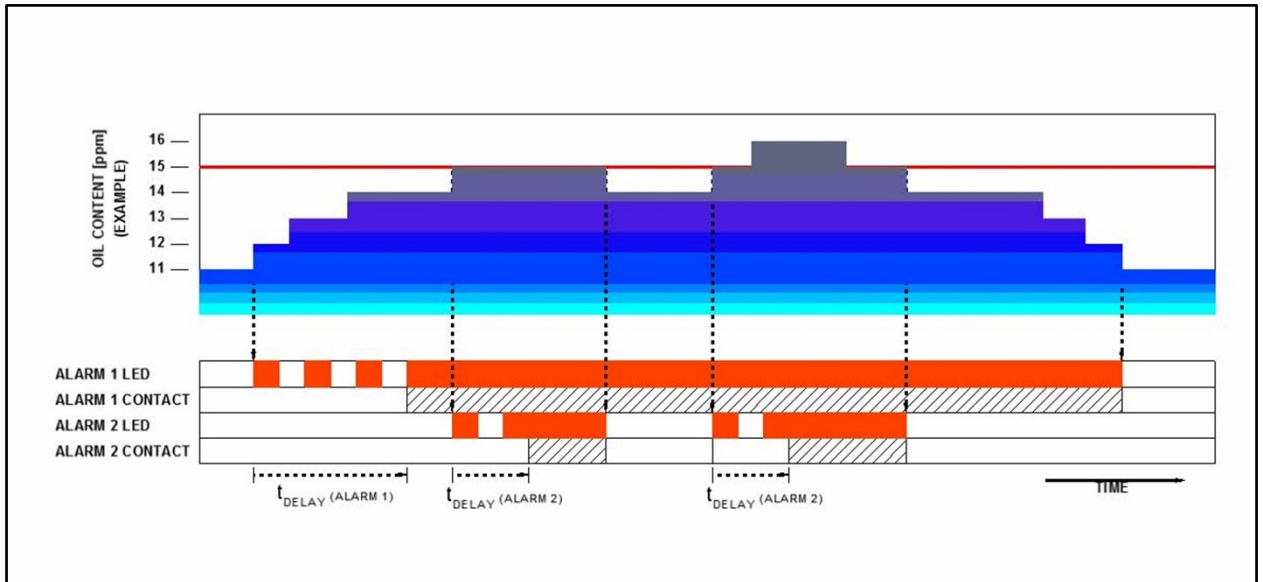


Figure 32. Alarms Example

The figure above reflects how the two independent alarms are working. In this example alarm 1 is set to 12 ppm and alarm 2 is set to 15 ppm. Each alarm is set to an individual delay setting.

Once the oil content is higher than 12 ppm, alarm 1 LED will blink red until the alarm 1 delay is exceeded. Then the alarm 1 contact will be in operation and alarm 1 LED will be continuously red as long as the measurement is higher than 12 ppm. Once the measurement is below 12 ppm, the alarm 1 contact will be out of operation and alarm 1 LED will be off.

Once the oil content is higher than 15 ppm, alarm 2 LED will blink red as long as alarm 2 delay is exceeded. Then alarm 2 contact will be in operation and alarm 2 LED will be continuously red, as long as the measurement is higher than 15 ppm. Once the measurement is below 15 ppm, alarm 2 contact will be out of operation and alarm 2 LED will be off.



24. Appendix IV.

24.1 Operator Maintenance Quick Checklist

Quick Checklist	Done	Intervention needed	Partly	Value
1. Check the outward appearance for leakages.				
2. Check out the cables for wear.				
3. The desiccator humidity [%rH]:				
4. Switch the stream.				
5. Flush the Measuring Cell with oil free water.				
6. Display shows 0 to 2 ppm. If not, follow up with the steps 8- 15.				
7. Stop any water flow. <i>(Shut off the instrument air.)</i>				
8. Check the O-Rings for wear.				
9. Check the wiper piston.				
10. Clean the Measuring Cell.				
11. Screw back Cell Cap, MCU, or Auto Clean tight in.				
12. Flush the Measuring Cell with oil free water.				
13. Display shows 0 to 2 ppm. If not, use the Servicing and Cleaning Appendix.				
14. Check air pipe connection of air supply.				
15. Turn on the sample water flow.				
16. Perform a "System Test" for checking alarms.				
17. Check data logger/ clock.				
Checked by:	Date:		Signature:	



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25. Appendix V

25.1 Servicing and Cleaning Manual

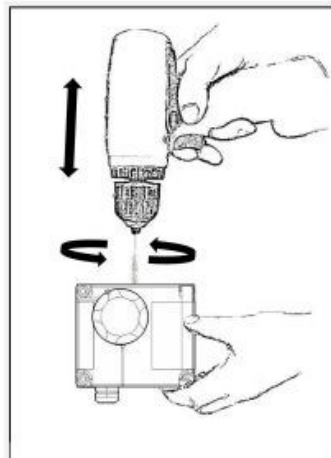
To accomplish the cleaning process, please use the Servicing and Cleaning Manual.



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SERVICING AND CLEANING MANUAL

OMD-SERIES



Cleaning Procedure of Measuring Cell MZ-09

- Cleaning Manually
- Cleaning Mechanically Assisted
- Cleaning of Iron Oxide and Calcification

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Revision

Document-Name	Revision No.	Notation	Date
Servicing and Cleaning Manual OMD-Series	R01_20170316		16.03.2017



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Appendix V.

Usage of the Service Manual

This Service Manual will guide you how to clean a Measuring Cell onboard. The instruction manual is split into sections. Every section handles a specific type of cleaning. The first part gives you general information about the outward appearance before cleaning and servicing the Measuring Cell.

The included information should be used only by a technician or a system operator for keeping the units correctly set up and cater for a clean Measuring Cell.

Following this Service Manual ensures clean maintenance and allows a right handling of the instrument

This instruction manual contains also information about the service support and our contact details. Additionally, the symbols below will support you during the cleaning process.

Symbols

- ✓ This symbol is used to show the right handling.
- X This symbol is used to show what to avoid.
- ✘ This symbol is used for giving advices about servicing.
- ➔ This symbol is used for giving general advices.



1. Measuring Cell Cleaning

1.1 Cleaning Manually

Step 1.

Stop any water flow.

Step 2.

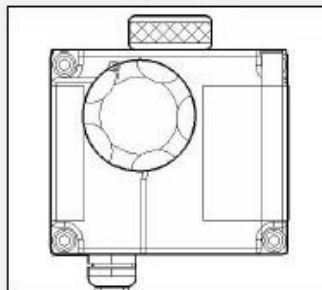


Figure 1

Unscrew Cell Cap, MCU, or Autoclean.

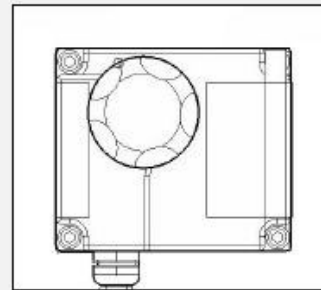


Figure 2

Remove Cell Cap, MCU, or Autoclean.

Step 3.

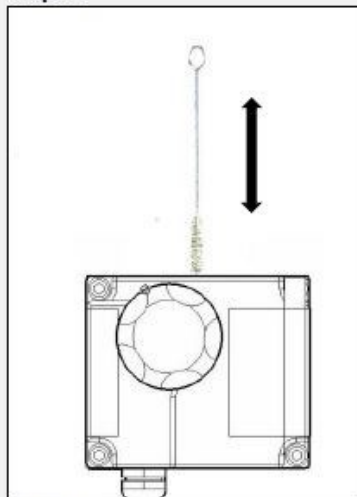


Figure 3

1. For cleaning the Sample Glass Tube, use the Cell Cleaning Brush with upwards and downwards motion through the Measuring Cell several times. Use some water to wet the Cell Cleaning Brush.
2. Remove the Cell Cleaning Brush and replace the Cell Cap.
3. Switch clean water valve to fresh water and allow oil free water to flow through the instrument for few minutes.
4. Avoid air bubbles in the stream.
5. Verify, that the display shows 0 to 2 ppm.
6. Cleaning has been sufficient if display shows 0 to 2 ppm.



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Step 4.

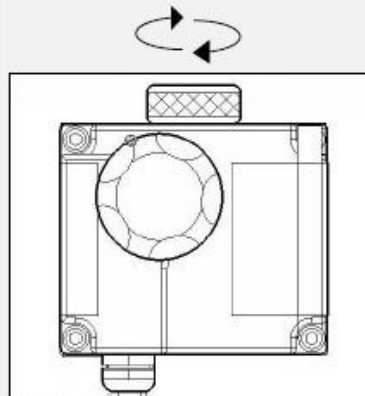


Figure 4

1. Screw in the Cell Cap.
2. Check, that the Measuring Cell Cap is screwed down completely.



1.2 Cleaning with Sample Tube Cleaner

Step 1.



Figure 5

For intensive cleaning use the Sample Tube Cleaner from the Service Kit (Order No.: 18570). Apply clean Sample Tube Cleaner to the Cell Cleaning Brush and add water.

Step 2.

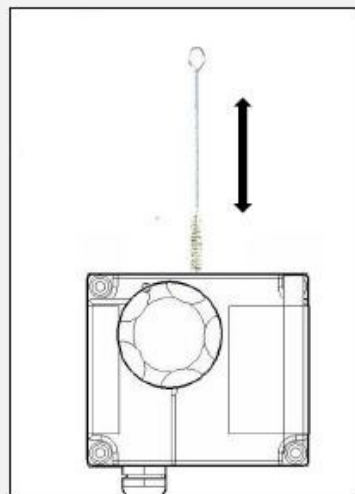


Figure 6

Clean the Sample Glass Tube with the Cell Cleaning Brush by applying the Sample Tube Cleaner.

1. For cleaning the Sample Glass Tube, use the Cell Cleaning Brush with upwards and downwards motion through the Measuring Cell several times. Wet the Cell Cleaning Brush.
2. Remove the Cell Cleaning Brush and replace the Cell Cap.
3. Switch clean water valve to fresh water and allow oil free water to flow through the instrument for few minutes.
4. Observe, that the display shows 0 to 2 ppm.

➔ Check, that the Measuring Cell Cap is screwed down completely.



1.3 Cleaning Mechanically Assisted

Step 1.

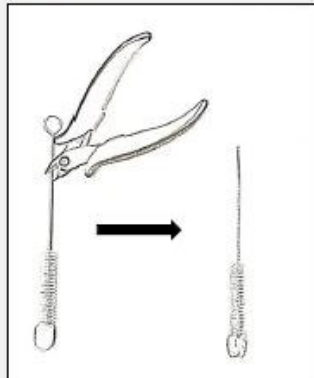


Figure 7

If the manual cleansing was not successful, an additional cleaning is recommended.

1. Cut the upper part of the Cell Cleaning Brush.
2. Insert the wire stem of the Cell Cleaning Brush into a screwdriver and fix it.
3. Slowly rotate the Cell Cleaning Brush for a few minutes in the Sample Glass Tube (See Step 3.)
4. Flush with clean water and re-test.

Step 2.

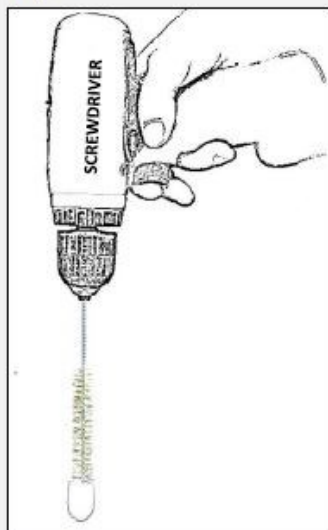


Figure 8



You can also use some Sample Tube Cleaner. It does not damage the surface of the Sample Glass Tube. Please do not use other abrasive cleaners, hard particles contained may damage the Sample Glass Tube within seconds.



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Step 3.

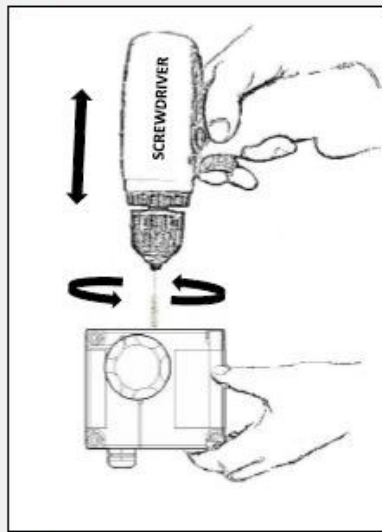


Figure 9

Use a screwdriver for an efficient cleaning. Slowly strike the Cell Cleaning Brush in the Measuring Cell for a few minutes and flush with clean water.

➔ Check, that the Measuring Cell Cap is screwed down completely!



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1.4 Cleaning of Iron Oxide and Calcification

Step 1.

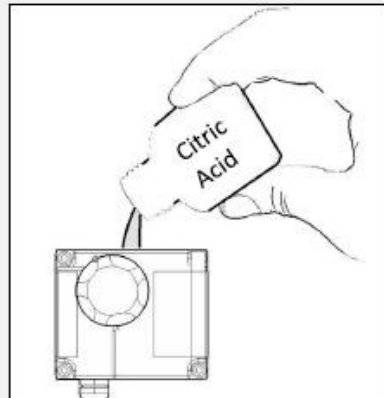


Figure 10

To clean Iron Oxide deposit, calcification, and other stubborn deposit, it is recommended to use the Citric Acid from the Service Kit (Order No.: 18570).

1. Ensure that the valves remain closed.
2. Mix some Citric Acid with 15 ml water.
3. Fill the Sample Glass Tube with the Citric Acid liquid and let it soak over night.
4. Flush with clean water without gas.





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1.5 Outward Appearance

Step 1.

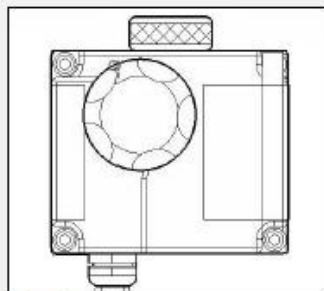


Figure 11

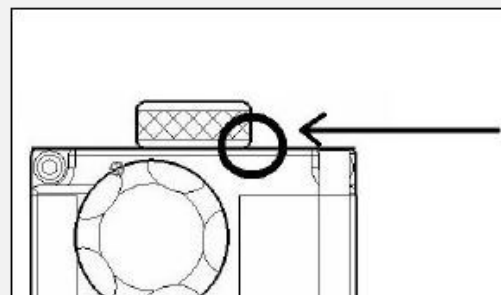


Figure 12

Check, that Cell Cap, MCU, or Autoclean is screwed down completely.

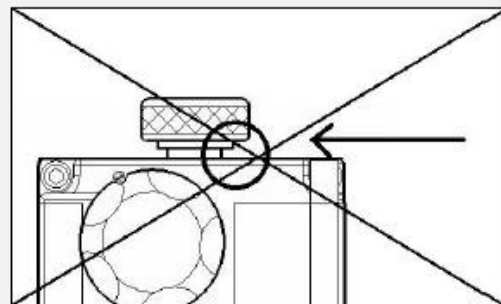


Figure 13

A not completely screwed down Cell Cap may allow formation of air bubbles and may influence with flow rate settings.

Appendix V.



1.6 Checking the O-Rings

Step 1.

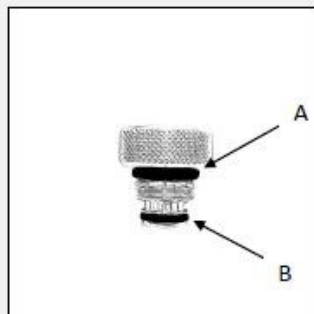


Figure 14

1. Check the condition of the three O-Rings as shown in the figures. If damaged, replace.
2. O-Rings B + C may or may not be present, depending on flow rate adjustment.
3. O-Ring A is always present.

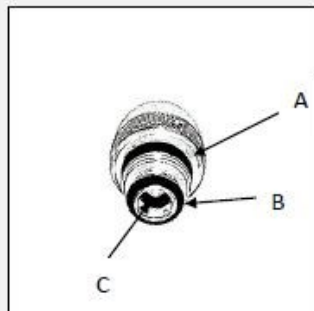


Figure 15

A=11.5X3 mm

B= 8.5X2 mm

C= 4.5X2 mm

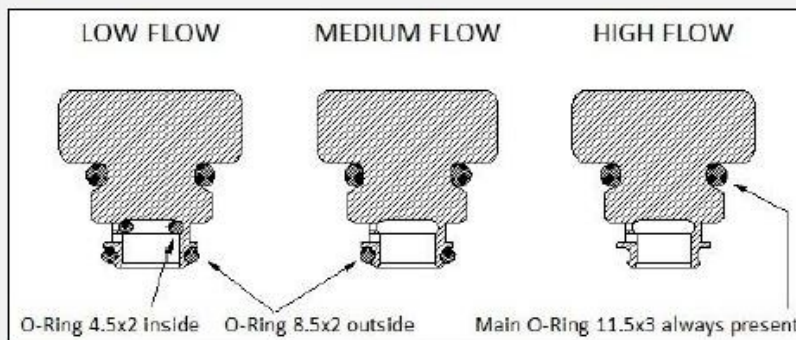


Figure 16



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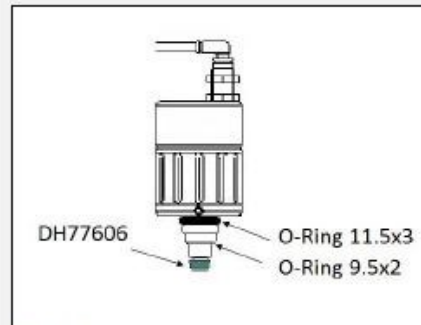


Figure 17



Figure 18



Figure 19

For Units equipped with MCU/ Automatic Cell Cleaning Device, check the two O-Rings and the piston seal.



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1.7 Desiccator Check

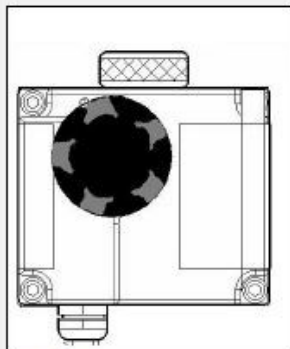


Figure 20

1. Press "SYS" Button, select Measuring Cell, confirm.
2. Internal data will be displayed.
3. The relative humidity [%rH] should be below 10%rH.
4. The dew-point Temperature should be below 0° C.
5. If not, exchange desiccator.
6. The desiccator also has to be exchanged, if humidity is higher 40%rH.

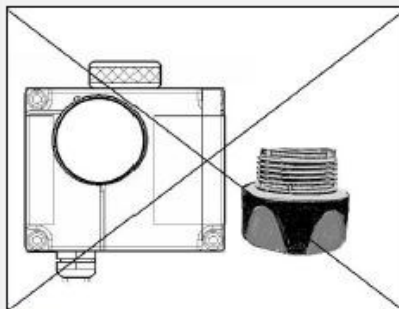


Figure 21



Do not expose the Desiccator to ambient air. Do not leave the Desiccator opening uncovered.



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