

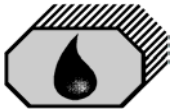
INSTRUCTION MANUAL

15ppm Bilge Alarm

Type OMD-21

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IMPORTANT NOTICE

Replacement components for 15ppm Bilge Alarms.

General

All monitors in our range are inspected and tested to I.M.O. 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 manuals.

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.

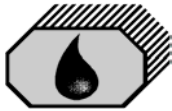
This procedure is by far the easiest and most cost effective way of ensuring the monitor on board conforms to I.M.O. resolution MEPC.60 (33).

Component Replacement/Repair

When replacing or repairing electronic components (except fuses) please note that due to varying component performance characteristics it may be necessary to re-adjust or calibrate the monitor.

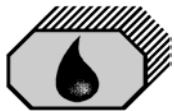
Failure to carry out the correct procedure could result in the monitor over or under reading which in turn could lead to oil pollution and the consequences that follow.

In order to avoid this potential problem we can only advise that a service exchange unit be supplied.



CONTENTS

SECTION	TITLE	PAGE
1.0	Introduction	4
2.0	Important Notes	4
3.0	Principle of Operation	4
3.1	Measuring Principle	4
3.2	Features	5
3.3	Adjustment	5
3.4	Displays and Alarms	5
4.0	Specification	6
5.0	Construction	7
6.0	Installation	8
7.0	Piping	9
8.0	Wiring	10
8.1	Typical Control System	10
9.0	Power Supply	11
10.0	Commissioning	12
10.1	Electrical	12
10.2	Piping	12
10.3	Functional Tests	12
10.4	Programming Mode	13
11.0	Operating Instructions	15
11.1	Operator Notes	15
12.0	Operator Maintenance	16
12.1	Manual Cell Clean Unit	16
13.0	Fault Finding	17
13.1	Sample Tube Replacement	18
13.2	Power Supply PCB Replacement	19
13.3	Optic Block PCB Replacement	19
13.4	Display PCB Replacement	20
14.0	Calibration	21
14.1	Calibration Check	21
14.2	Calibration	21
15.0	Spare Parts	22
15.1	Recommended On Board Spares	22
16.0	Remarks	23



1.0 INTRODUCTION

The OMD-21 Bilge Alarm Unit has been designed specifically for use in conjunction with 15 ppm oil-water separator units and has a specification and performance which exceeds the requirements of the International Maritime Organization specifications for 15ppm Bilge Alarms contained in Resolution MEPC. 60 (33).

The unit is supplied with 2 works-adjusted alarms at 15 ppm. Other set points (10 ppm or 5 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.

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

2.0 IMPORTANT NOTES

- a) This equipment must be installed and operated in strict accordance with the instructions contained in this manual. Failure to do so will impair the protection provided.
- b) Installation and servicing must be undertaken by a competent and suitable 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 manual.
- f) To avoid wrong measurements, only quick separating detergents / cleaner should be used.
- g) In case of freezing conditions the measuring cell should be emptied complete.

3.0 PRINCIPLE OF OPERATION

3.1 Measuring Principle

Several optical sensors measure a combination of light scattered and absorbed by oil droplets in the sample stream. The sensor signals are then processed by a microprocessor to produce linearised output.

If an alarm (works set point 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.

3.2 Features

- Compact and robust construction
- Automatic voltage selection
- Solid suppression capability
- Low maintenance
- Small dimensions
- Low weight
- Easy installation
- Constant readiness
- Low spare part stock holding
- Watertight Housing
- Works adjustment
- Easy zero adjustment via push buttons

3.3 Adjustment

The unit is delivered with a works calibration according the IMO-requirements. The alarm points are set to 15 ppm.

The "Zero" point is also works calibrated and can be re-adjusted on site by using the programming mode and clean water. See Section 10.4 "Zero Setting".

3.4 Displays and Alarms

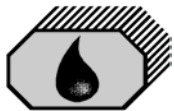
In the unit are two independent alarm circuits available. Both can be set separately from 1 to 15 ppm. From the manufacturing both alarms are set to 15 ppm (according IMO). The set points can be changed according to the requirements on site, for example to 10 ppm or 5 ppm. An alarm point setting above 15 ppm is not possible. The adjustment can be done in the programming mode as described in Section 10.4.

In this mode also the individual adjustment of the time delays for the alarms and the possible changing between 0 - 20 mA or 4 - 20 mA output can be done.

Both alarm circuits are also connected with an alarm LED on the front panel.

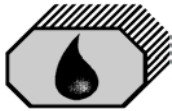
Additional to the alarm LED's each alarm circuit is equipped with a relay with potential free alarm contacts. These contacts can be used for external processing of the signal or for control of further functions.

If a malfunction or failure of the power supply occurs, both relays will switch to alarm condition.



4.0 SPECIFICATION

Range:	0 – 50 ppm
Accuracy	Better than IMO requirements
Linearity	Up to 30 ppm better than $\pm 2 \%$
Display	2 digit 7 segment LED's
Power Supply:	24 V – 240 V AC or DC Automatic Voltage Selection
Consumption:	< 6 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 – 20 sec. (Works adjustment 10 sec)
System Fault Alarm:	LED
Alarm Contact Rating:	Potential free 1 pole change over contacts, 3 A / 240 V
Alarm Indication:	Red LED's
Output Signal:	0 – 20 mA or 4 – 20 mA, reversible ext. Load < 150 Ω
Sample Water Pressure:	0,1 – 10 bar
Sample Flow:	Approx. 0,1 - 4 l/min depend. to pressure
Ambient Temperature:	+ 1 to + 55° C
Sample Water Temperature:	+ 1 to + 65° C
Roll:	Up to 22,5°
Size (over all):	152 mm W x 155 mm H x 91 mm D
Degree of Protection:	IP 65
Weight:	2,6 kg
Pipe Connections:	R 1/4" Female

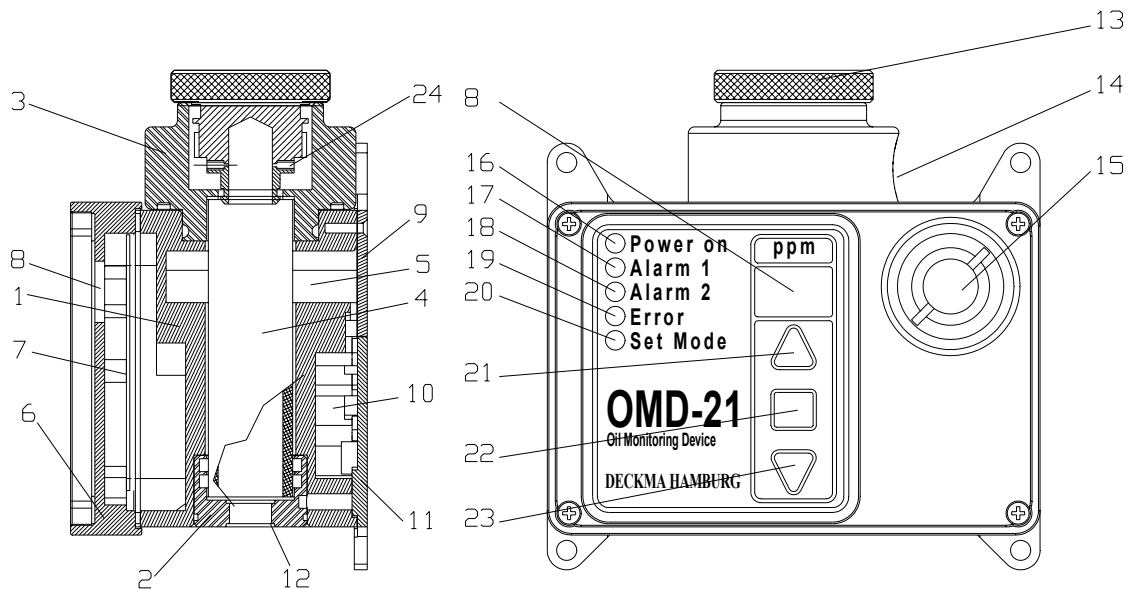


5.0 CONSTRUCTION

All components are assembled in an alloy enclosure with the protection class IP 65. The optical components are mounted directly on the printed circuit board. The plug in technology assures an easy changing of the components together with an compact and robust construction. The electronic is designed to the latest state of art.

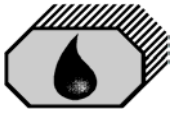
The wetted parts are produced out of Stainless Steel to assure a reliable corrosion protection for a long time. The sample water is fed to the unit from underneath and is discharged above to the side.

The mounting brackets of the unit are prepared at the rear of the unit either for wall or bulkhead mounting.



1	Housing	9	Measuring Cell Cover	17	LED "Alarm 1"
2	Inlet Block	10	Power Supply Unit	18	LED "Alarm 2"
3	Outlet Block	11	PSU Cover	19	LED "Error"
4	Sample Glass Tube	12	Inlet Connection 1/4"	20	LED "Set Mode"
5	Optik Block PCB	13	Head Screw	21	Upper Button
6	Front Cover	14	Outlet Connection 1/4"	22	Centre Button
7	Display PCB	15	Desiccator	23	Lower Button
8	Display	16	LED "Power On"	24	Flow adjust screws

Fig. 1



6.0 INSTALLATION (Refer to Fig. 2 and Fig. 3)

See Section 2 for important notes concerning installation.

The OMD-21 Monitor should be located as close as possible to the oily water separator to minimise response delays. Under no circumstances should the distance between the monitor and the separator exceed 8 meters since this would result in a response time of more than 20 seconds and breach IMO regulations.

Mount the OMD-21 Monitor by means of 4 x M5 screws on to a rigid vertical surface and preferably with the display panel of the monitor at eye level. For service and maintenance sufficient space to all sides should be available.

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

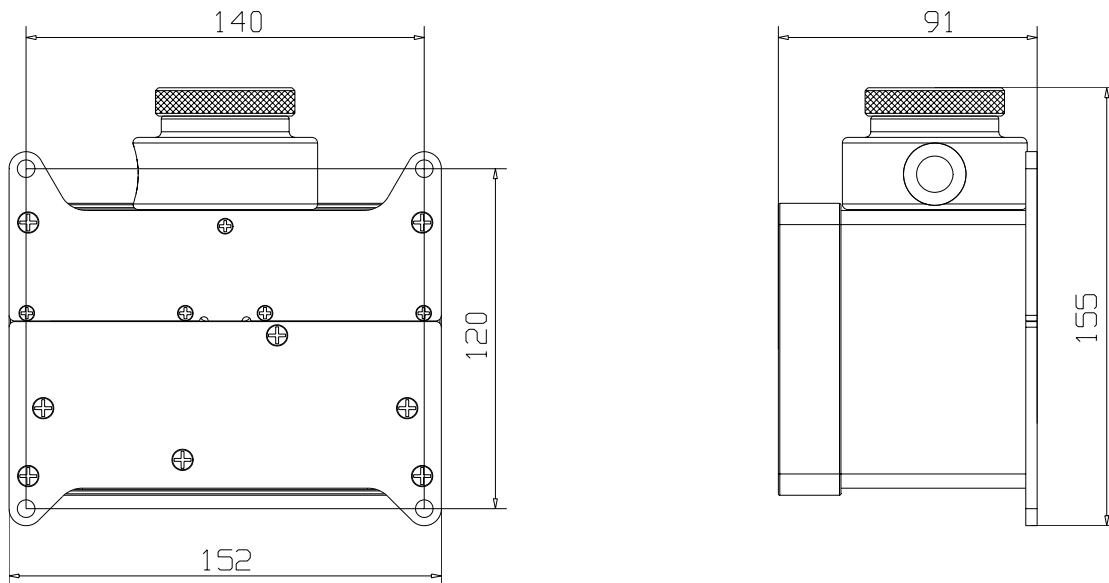
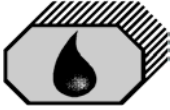


Fig. 2



7.0 PIPING (Refer to Fig. 3)

Connect the OMD-21 Monitor to the sample point of the oily-water separator outlet and to a source of oil free water employing 10 mm OD copper or stainless steel pipe. The sample point should be located on a vertical section of the separator outflow piping to minimise the effects of any entrained air. The tapping point should be at a level above the outlet of the monitor to ensure the sample cell is flooded at all times.

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.

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.

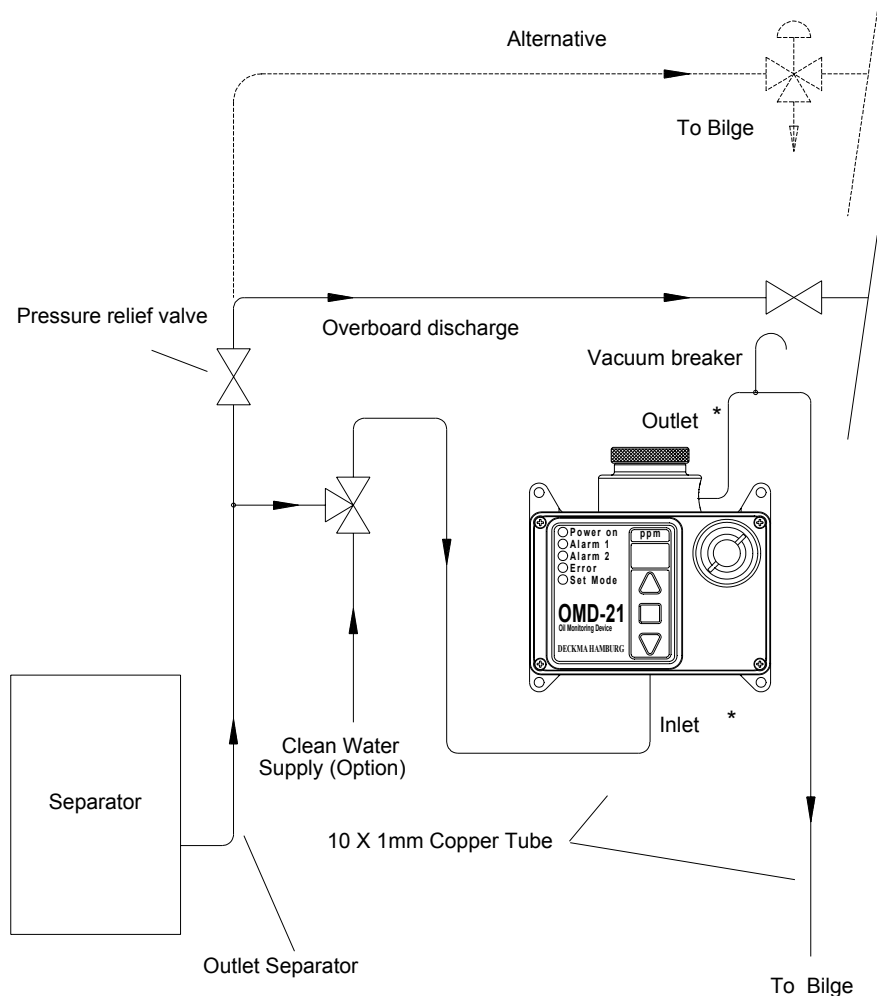
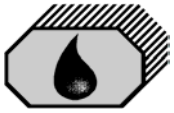


Fig. 3

* Inlet & Outlet connections R1/4" Female

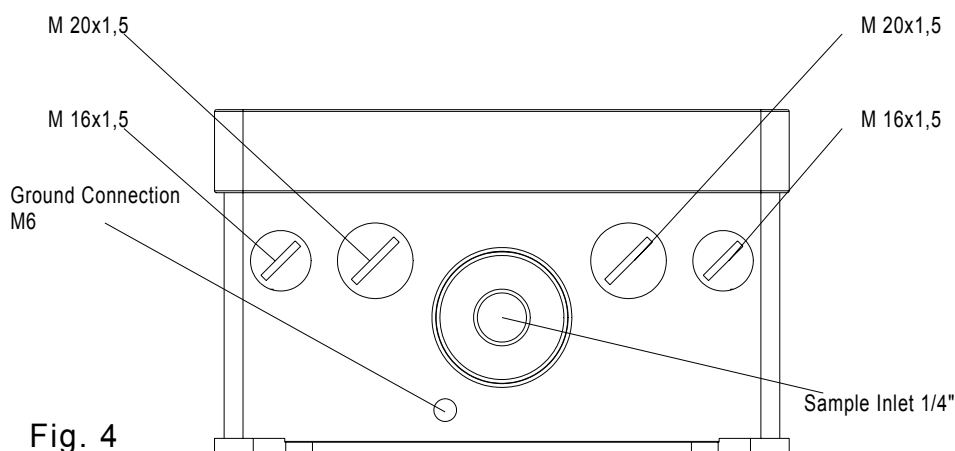


8.0 WIRING (Refer to Fig. 4 + 5)

See Section 2 for important notes concerning wiring.

This unit 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.

Electrical connections are made through the metric cable gland openings underneath the instrument. There are two M16 and two M20 threads (metric) for cable glands.



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 control purposes.

Electrical connections are made to the three terminal blocks inside the instrument. 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.

Ground (PE) can be connected to the instrument body left or right side. Do not disconnect other ground connections. If the instrument is operated at high voltages, additional care has to be taken to provide reliable ground connections.

The instrument provides a pilot voltage output at terminals 4&5 (Power Supply Terminal X5). This is internally connected to the power supply input (Terminals 1&2), but is fused by Fuse F2 (2 A). The pilot voltage can be used to supply additional external circuitry, e.g. alarm lamps or electrical valves.

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.

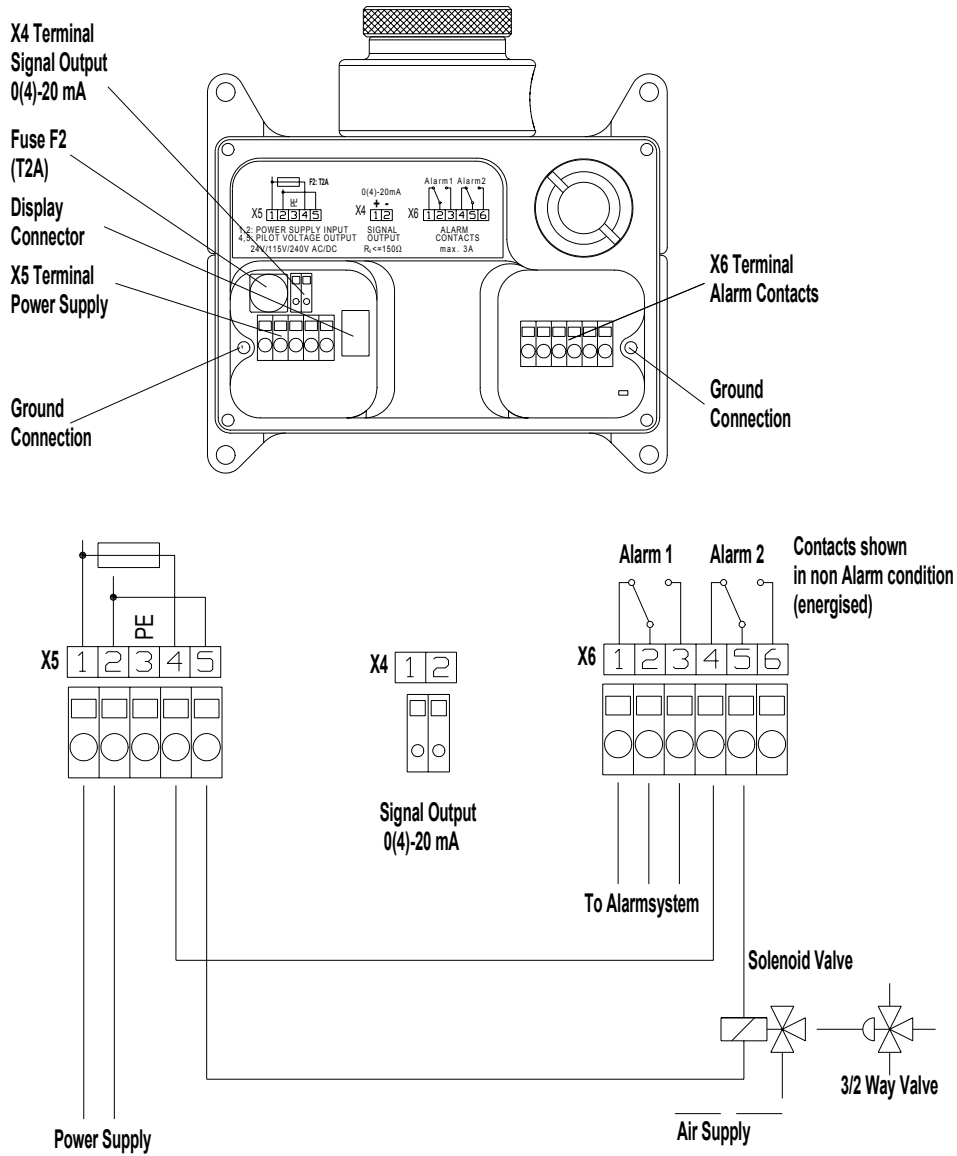
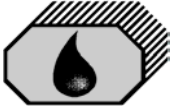
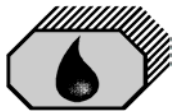


Fig. 5

Close front cover complete after electrical installation. Water inside the instrument may result in corrosion.



8.1 Typical Control System

The two most frequently employed systems are:

- a) Pump Stop on alarm
- b) Recirculation on alarm

with a pump stop system (a) alarm relay 2 controls the energisation of the bilge pump direct on line starter coil.

A recirculation system (b) employs alarm relay 2 to control a pneumatic solenoid valve which energises or de-energises a pneumatically operated 3 - way valve as depicted in Fig. 5.

The disadvantage of a pump stop system is that, in the event of an alarm condition, the process of discharging bilge water is halted and it may be impossible to restart the process without first flushing with clean water.

This problem is avoided when a 3-way diversion valve is provided since on alarm the contaminated bilge water will be switched from the overboard discharge back to the bilge pump suction or bilge space. 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.

9.0 POWER SUPPLY

See Section 2 for important notes.

The unit is designed for a power supply of 24 V to 240 V AC or DC. It has an automatic power selection.

10.0 COMMISSIONING

See Section 2 for important notes.

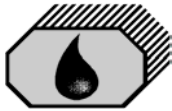
On completion of the installation, wiring and piping carry out the following checks:

10.1 Electrical

- a) Check that the power supply is connected to the terminals 1 + 2 of the terminal block X5.
- b) Check that the earthing has been made according to the relevant regulations.

10.2 Piping

- a) Check all piping connections for leaks and rectify as appropriate.



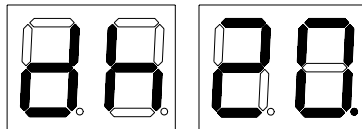
10.3 Functional Tests

- a) Run oil free water through the instrument to purge the system.
- b) Adjust the flow rate through the unit by using the small screws in the cell cap (Fig. 1, Pos. 24). Taking out a screw will increase the flow rate.

NB: The flow rate should be checked on both, the clean water supply and the separator sample supply. If the clean water supply is obtained from a high pressure source, the flow rate will be higher than from the sample point.

The flow rate is not influencing the accuracy of the instrument. The adjustment is only important for the time delay between the sample point and the monitor.

- c) Switch on the instrument and make sure, that the Power LED is illuminated and the display is changing between "dh" or "- -" and numbers, decreasing from "20". During the start also the "Set Mode" LED is flashing to indicate the initiation. The monitor will display "0" with clean water, otherwise the monitor will be in working conditions when it reached the measured value. The "Set Mode" LED is off. Allow a period of time for sample water entering the unit.

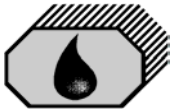


- d) The start up sequence can also be released by pressing the "□" button for at least 3 sec. This can be used for testing of the external alarm and control connections.
- e) During oil free water is running through the monitor check the Zero adjustment according Section 11. The display should be "0". If the display varies by greater amounts, it may be that air entrainment is present. If this is the case, the cause must be located and rectified.
- f) If the Zero need to be adjusted, this can be done in the programming mode as described in section 10.4.

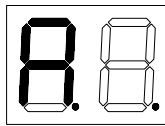
10.4 Programming Mode

In the programming mode the alarm set points, the time delays, the signal output and the zero can be modified. It is also possible to recall the factory default values at any time.

The 2 alarm relays can be set to an individual threshold between 1 to 15 ppm. Alarm circuit 1 can be set between 1 sec up to 9 min and alarm circuit 2 between 1 to 20 sec time delay. The works adjustment for both thresholds is 15 ppm according IMO. The time delay for alarm relay 1 is works adjusted to 2 sec. and for alarm relay 2 to 10 sec. All adjustments can be changed on site by using the buttons at the front panel. The adjustment can only be done in the programming mode. To enter this mode, all 3 buttons "↑ □ ↓" have to be pressed simultaneously when the monitor is powered on. During the programming mode the unit continues in measurement and the yellow "Set Mode" LED is on.

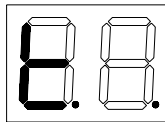


Alarm set points and delay



After starting the programming mode the display will show an "A" changing with the actual alarm set point. At the same time the alarm LED for alarm circuit 1 is flashing. Pressing the "↓" button will decrease the set point, pressing the "↑" button will increase the threshold. An alarm set point above 15 ppm is not possible.

When the set point is confirmed by pressing the "□" button, the display will

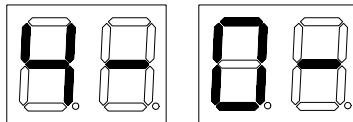


show a "t" changing with the actual time delay for alarm circuit 1. At the same time the alarm LED for alarm circuit 1 is flashing. Pressing the "↓" button will decrease the time delay pressing the "↑" button will increase the time delay. Up to 30 sec this can be done in steps of 1 sec, after 30 sec the steps are 1 min up to 9 min. A time delay above 9 min is not possible.

After confirming the selected value by pressing the "□" button, the sequence is repeated for alarm circuit 2. In this case the alarm LED for alarm circuit 2 is flashing. The time delay for alarm circuit 2 is limited to 20 sec. to avoid too long alarm suppression for the discharging overboard.

Signal output

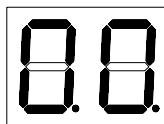
The next point of the programming mode is done by the choice for the signal output. It can be changed between 0 - 20 mA and 4 - 20 mA for 0 to 30 ppm content.



The changing is done similar to the a.m. settings by using the "↑" or the "↓" button. The display will show the actual value of "0-" or "4-" changing with "20".

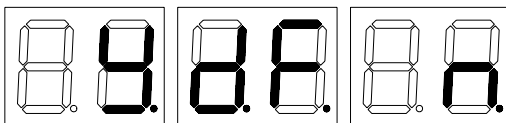
Zero adjustment

This setting allows to adjust the instrument reading for oil free water. The instrument has to be properly cleaned and filled with oil free water for adjustment. It will display the actual measured reading changing with "0.0.". With the "↑" and the "↓" button adjust reading to zero. The adjustment range is limited to +/- 5 ppm. Note, that zero adjustment must not be used to compensate for insufficient glass tube cleaning.

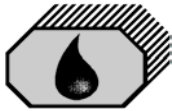


Default values

If settings or manufacturers calibration have been altered, it is always possible to



recall the initial factory settings. Attention! All individual settings will get lost if the default values are activated. To recall the default values including the original calibration set the display to "y" instead of "n" by using the "↑" or the "↓" button and confirm with the "□" button.



Listing:

No.	Setting Code	Setting	Default Value	Range	Unit
1.	A. . +LED „Alarm 1“	Alarm Circuit 1 set point	15	1..15	[ppm]
2.	t. . +LED „Alarm 1“	Alarm Circuit 1 delay time	2	1" ..9'	[s], [min]
3.	A. . +LED „Alarm 2“	Alarm Circuit 2 set point	15	1..15	[ppm]
4.	t. . +LED „Alarm 2“	Alarm Circuit 2 delay time	10	1" ..20"	[s]
5.	20.	Output 0-20mA / 4-20mA	0	0- / 4-	[mA]
6.	0.0.	Zero adjustment	0	-5..0..5	[ppm]
7.	d.F.	Default setting	N	n/y	

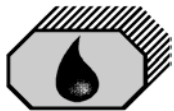
NB: All changed values have to be confirmed by pressing the " □ " button. Otherwise the existing values are valid.

11.0 OPERATING INSTRUCTIONS

- a) Switch on the power supply.
- b) Allow a period of time for water entering the sample tube.
- c) Flow oil free water through the system for a few minutes and check that the display show 0 to 2 ppm. If not, adjust the unit according section 10.4 "Zero adjustment".
- d) Switch the instrument sample supply from the clean water supply to the separator sampling point connection.
- e) The instrument is now ready for use.

11.1 Operator Notes

- a) When oily water flows through the instrument the display will show the actual value of oil content.
- b) If the oil concentration exceeds the adjusted threshold (works adjustment 15 ppm), the alarm indicator 1 will be illuminated and the associated alarm relay will operate within the adjusted time delay. Accordingly also the alarm indicator 2 will be illuminated and its associated alarm relay will take the appropriate shut down action.
- c) The function of the system can be checked also with clean water. Press the "□" button for more than approx. 5 Seconds. Yellow "Set Mode" LED will start to flash. Electronic sensors are checked for sensitivity. Instrument will display error code if any internal error was detected. Alarm contacts will switch over to alarm state . Upon pushbutton release the instrument performs the same start-up procedure as on power up. It will resume to normal operation automatically.



12.0 OPERATOR MAINTENANCE

See Section 2 for important notes.

AT WEEKLY INTERVALS:

- a) Flush the cell with oil free water.
- b) Isolate the instrument from both, sample and oil free water supply.
- c) Unscrew and remove the cell cap.
- d) Insert a suitable Cell Cleaning brush (Art. No. 30102) into the cell and clean it with upwards and downwards motion through the entire length of the cell several times.
- e) Remove the Cell Cleaning brush and replace the cell cap.
- f) Reconnect the oil free water supply and allow this to flow through the instrument for a few minutes.
- g) Observe that the display is showing "0" to "2". If not, clean again.
- h) Examine the colour of the desiccator (Fig. 1, Pos. 15). Blue colour is indicating an active moisture absorber. If the colour is light blue or white, the desiccator should be replaced.

The desiccator assures a humidity below 40% inside the measuring cell to avoid wrong measurement resulting due to condensation at the cell glass tube. The replacement is easy done without opening the instrument. Just unscrew the old desiccator out of the front panel and replace it by a new one. The protection cap of the spare unit can be also used as a tool.

- j) Reconnect the instrument to the separator sampling point.

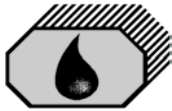
12.1 Manual Cell Clean Unit

Optional item if fitted

This unit facilitates cleaning of the cell without the need of removing the cell cap. Regular use of this device should prevent malfunction of the monitor due simply to fouling of the sample tube and all the inconvenience which this can cause.

Operating Instructions

- a) Ensure that the monitor is switched off and that there is a clean water supply through the cell.
- b) Activate the manual cell clean unit by pressing the handle several times.
- c) Switch the monitor back on and check the reading is between 0 to 2 ppm.
- d) Repeat a) to c) at least once a week or as necessary.







NB: The Manual Cell Clean Unit may also be used during normal operation with sample water, but in this case an alarm occurs because the wiper is passing the light source.

Spares: Wiper Seal, Part. No. 30605

13.0 FAULT FINDING

See Section 2 for important notes.

A fault is indicated, when the red "Error"-LED is illuminated. Additional following messages maybe shown for at least 15 sec at the display for some special functions of the unit:

Display/Fault	Reason	Servicing
	Meter out of range, oil content too high, dirty sample tube	Clean sample tube, wait until oil content is within the range
	Calibration request after changing the position of Jumper X5 inside the instrument	Calibration according Section 14.2
	Internal Communication Initiation	N/A
	Communication Fault	Check Main PCB Power LED and wiring Repair of the complete system at the manufacturer
Different LED's on the PCB's indicate also the status of the unit if it is powered on. They are visible as shown in Fig. 6 after removing the front cover and the desiccator.		
Power Supply LED not on	No power supply,	Check power supply (24 to 240 V AC/DC)
	Power Supply PCB defective	Replace Power Supply PCB
Power Supply LED on:		
Optic Block PCB LED's not on	Optic Block PCB defective	Replace Optic Block PCB
	Connection interrupted	Check Wiring
No Display	Display PCB defective	Replace Display PCB
	Connection interrupted	Check Wiring

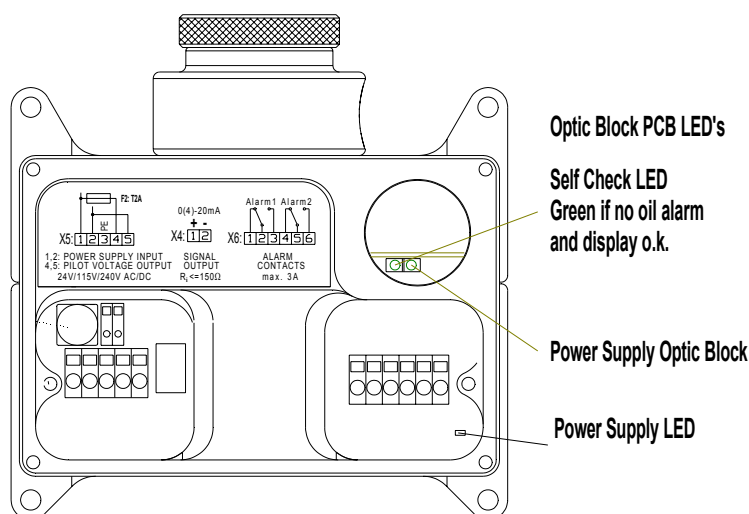
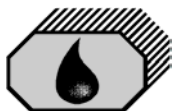


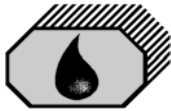
Fig. 6

13.1 Sample Cell Tube Replacement (refer to Fig. 7)

It is strongly recommended to send the unit for repair to the manufacturer.

Changing of the sample cell tube may influence the accuracy of the instrument!

- (a) Switch off the Power supply and disconnect all wiring from the terminals.
- (b) Remove all piping from the instrument.
- (c) Dismount the unit and take it to a clean working place.
- (d) Open the instrument from the back and remove the upper cover. Remove carefully also the lower cover with the power supply PCB and disconnect the plug connection from the optic block PCB.
- (e) Loose the 2 screws (5) from the outlet block (2) and remove this carefully. Loose the 1 (6) screw from the inlet block and remove this together with the sample tube (4).
- (f) Clean the inner part of the instrument and make sure, that everything is dry. Check also the optic block PCB visual
- (g) Replace the O-Rings, the PTFE washer and the sample tube in the inlet block (3). Replace the O-Rings and the PTFE washer in the outlet block (2). Check and replace the seals of the housing as necessary.
- (h) Mount the outlet block (2) and secure it with the 2 screws (5) when it is in the correct position. Make sure, that the optic block PCB is in the correct position and mount the inlet block (3) with the sample cell tube (4). Make sure, that the sample tube is absolutely clean from outside. Secure it with the screw (6) when it is in the correct position.
- (i) Connect the plug connection from the optic block PCB to the power supply PCB and make sure that the cable is sealed. Mount the lower cover with the power supply PCB.



- (j) Close the upper cover.
- (k) Do a pressure test of appr. 8 bar with oil free water.
- (l) Examine the colour of the desiccator (Fig. 1, Pos. 15). If the colour is light blue or white, the desiccator need to be replaced.
- (m) Mount the unit at its place and connect the piping and wiring.
- (n) Follow Section 11.0 and carry out a calibration check according Section 14.1.

13.2 Power Supply PCB Replacement

- a) Switch off the Power supply and disconnect all wiring from the terminals.
- b) Remove all piping from the instrument.
- c) Dismount the unit and take it to a clean working place.
- d) Open the instrument from the back and remove carefully the lower cover with the power supply PCB. Disconnect the plug connection from the optic block PCB.
- e) Check the seals and mount the new lower cover with the replacement power supply PCB.
- f) Examine the colour of the desiccator (Fig. 1, Pos. 15). If the colour is light blue or white, the desiccator need to be replaced.
- g) Mount the unit at its place and connect the piping and wiring.
- h) Follow Section 11.0 and carry out a calibration check according Section 14.1.

13.3 Optic Block PCB Replacement

*It is strongly recommended to send the unit for repair to the manufacturer.
Changing of the Optic Block PCB may influence the accuracy of the instrument!*

- (a) Switch off the Power supply and disconnect all wiring from the terminals.
- (b) Remove all piping from the instrument.
- (c) Dismount the unit and take it to a clean working place.

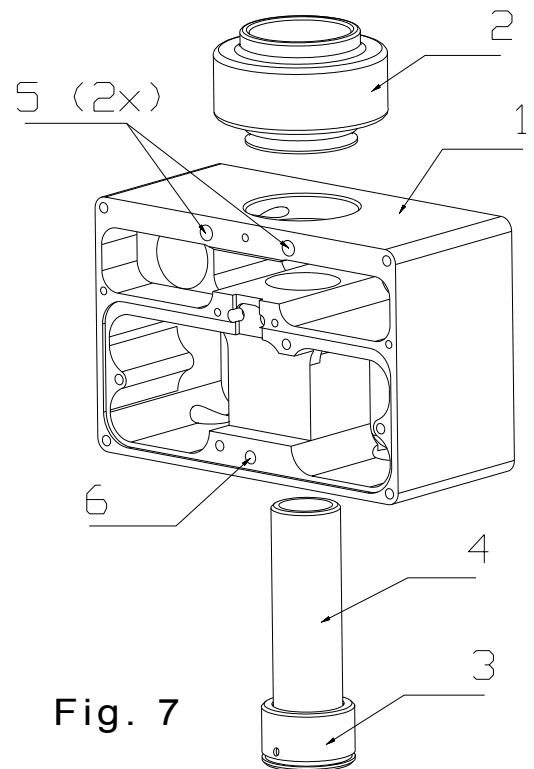
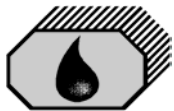


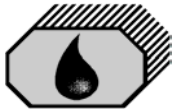
Fig. 7



- (d) Open the instrument from the back and remove the upper cover. Remove carefully also the lower cover with the power supply PCB and disconnect the plug connection from the optic block PCB.
- (e) Loose the 2 screws from the outlet block and remove this carefully. Loose the 1 screw from the inlet block and remove this together with the sample tube.
- (f) Clean the inner part of the instrument and make sure, that everything is dry. Replace the optic block PCB.
- (g) Replace the O-Rings, the PTFE washer and the sample tube in the inlet block. Replace the O-Rings and the PTFE washer in the outlet block.
- (h) Mount the outlet block and secure it with the 2 screws when it is in the correct position. Make sure, that the optic block PCB is in the correct position and mount the inlet block with the sample cell tube. Make sure, that the sample tube is absolutely clean from outside. Secure it with the screw when it is in the correct position.
- (i) Connect the plug connection from the optic block PCB to the power supply PCB and make sure that the cable is sealed. Mount the lower cover with the power supply PCB.
- (j) Close the upper cover.
- (k) Do a pressure test of app. 8 bar with oil free water.
- (l) Examine the colour of the desiccator (Fig. 1, Pos. 15). If the colour is light blue or white, the desiccator need to be replaced.
- (m) Mount the unit at its place and connect the piping and wiring.
- (n) Follow Section 11.0 and carry out a calibration check according Section 14.1.

13.4 Display PCB Replacement

- (a) Switch off the Power supply and open the front cover.
- (b) Disconnect the plug connection from the power supply PCB.
- (c) Make sure, that the jumpers of the new PCB are in the same position than at the old one and replace the display PCB.
- (d) Connect the plug connection to the power supply PCB.
- (e) Close the front cover and continue as described under Section 11.0.



14.0 CALIBRATION

The OMD-21 is works adjusted and a calibration on site is normally not necessary. Before starting the calibration procedure carry out a calibration check by following the procedure as described below.

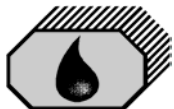
For both actions a definite fluid for comparison needs to be available. With the OMD-21 Monitor a formazin in water solution with the concentration of 100 FTU (Formazin Turbidity Units) has to be used. A suitable calibration set can be ordered separately under Part. No. 18500.

14.1 Calibration check

- a) Switch off the power supply and stop any water flow.
- e) Clean the sample tube accurate by using a suitable Cell Cleaning brush as described under Section 12.0. Make sure, that the Zero adjustment is correct.
- f) Empty the sample tube and fill it with a solution of 100 FTU as described with the calibration set. It is necessary, to fill the sample tube twice with the formazin solution to avoid any dilution with a rest of the oil free water from cleaning.
- g) If it is sure, that the correct formazin solution is in the instrument, the reading should be $12 \text{ ppm} \pm 3 \text{ ppm}$.
- i) Continue as described under Section 11.0.

14.2 Calibration *(only necessary if calibration check fails)*

- a) Switch off the power supply and stop any water flow.
- b) Open the instrument and set the jumper X5 on the backside of the display to its opposite position, so that the other 2 pins than before are linked.
- c) Mount the front panel and switch on the power supply. The display will show "CA" and the instrument is in alarm condition.
- d) Clean the sample tube accurate by using a suitable Cell Cleaning brush as described under Section 12.0. Make sure, that the Zero adjustment is correct.
- e) Empty the sample tube and fill it with a solution of 100 FTU as described with the calibration set. It is necessary, to fill the sample tube twice with the formazin solution to avoid any dilution with a rest of the oil free water from cleaning.
- f) If it is sure, that the correct formazin solution is in the instrument, press the buttons " \uparrow " and " \downarrow " simultaneously. The display will show 12 ± 1 and the instrument is calibrated.
- g) Continue as described under Section 11.0. Do not change the position of the jumper again!



h) If it is required to recall the works calibration, refer to section 10.4, "Default Values"

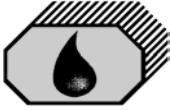
15.0 SPARE PARTS

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

DESCRIPTION	ART-NUMBER
Sample Cell Tube	50540
Fuse, T 2 A	40107
O-Ring Set	65545
Desiccator	65550
Cell Cleaning Brush	30102
Power Supply PCB	65265
Optic Block PCB	65625
Display PCB	65225

15.1 Recommended On Board Spares

2 off Desiccator	65550
1 off Sample Cell Tube	50540
2 off Fuse T 2 A	40107
1 off O-Ring Set	65545
1 off Cell Cleaning Brush	30102
Optional item	
1 off Manual Cell Clean Unit	65580



16.0 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:
