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Oil-in-Water Monitoring

for

Marine and Industrial

Applications

DECKMA HAMBURG GmbH
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15ppm Bilge Alarm

OMD-21

Compact 15ppm Bilge Alarm, with superior solids suppression capabilities

According to the regulations of IMO Resolution MEPC.60(33), U.S. Coast Guard CFR 162.050-35 and Canadian Standard for 5ppm Bilge Alarm

We help to protect the Environment

Specification

Range (measurement & indication)	0 to 50 ppm
Range (IMO specification)	0 to 15 ppm (according IMO regulations)
Accuracy	better than IMO MEPC.60(33)
Electrical power supply	24V to 240V, AC or DC, automatic voltage adjustment
Electrical power consumption	less than 6W / 6VA
Sample	Oily water from separator outlet, 0,1 - 4 l/min.
Sample pressure	0 to 10 bar
Sample temperature range	+1°C to +65°C
Sample connections	R 1/4“ ISO female
Alarm 1 & 2 Set Point	1 to 15 ppm (independently adjustable)
Alarm 1 operating delay for annunciation purposes	1 to 540 sec.
Alarm 2 operating delay for control purposes	1 to 20 sec.
Alarm contacts	2 independently adjustable switchover contacts
Alarm contact operation mode	De-energized in Alarm State
Alarm contact ratings	3A, 240V each
Alarm output	0..20 mA or 4..20 mA Current Loop, selectable
Display	Numeric 2-Digit LED Display
Ambient temperature	+1°C to +55°C
Class of protection	IP 65
Dimensions	152 mm x 155 mm x 91 mm (width x height x depth)
Weight	2,55 kgs

(Note: The manufacturer reserves the right to change or amend specifications without notice.)

General information

The OMD-21, 15ppm Bilge Alarm exceeds the requirements of IMO Resolution MEPC. 60 (33). With the OMD-21 DECKMA Hamburg offer the most advanced oil content measuring device, to prevent reliably pollution from oil.
The OMD-21 measures the oil content in the sample through our advanced light scattering principle. Infrared light is passed through the sample and captured by an array of solid state sensors. The signals are then processed and through the application of advanced algorithms the displayed oil content disregards virtually all influence of solids present in the sample. Thus oil content is displayed and turbidity from other sources is disregarded.
The OMD-21 provides two independent alarm contacts, for the operation of an audible alarm and/or operation of an automatic overboard discharge shutdown device.

Special versions such as shock-proof, antimagnetic for Navy application or options like auto-clean system, higher sample throughputs are available on request.

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DECKMA HAMBURG GmbH
15ppm Bilge Alarm
OMD-2005
Tested to Regulations of IMO Resolution MEPC. 107 (49)
OMD-2005
OIL CONTENT
15 PPM
Status OK
ON
ALARM1
ALARM2
SYSTEM
OK
DECKMA HAMBURG
We help to protect the Environment

Specification OMD-2005

Range:	0 – 30 ppm, Trend up to 50 ppm
Accuracy	According IMO MEPC. 107(49)
Linearity	Up to 30 ppm better than ± 2 %
Display	Green Graphic Display
Power Supply:	24 V – 240 V AC or DC Automatic Voltage Selection
Consumption:	< 15 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.)
System Fault Alarm:	Red 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 45°
Size (over all):	360 mm W x 240 mm H x 100 mm D
Degree of Protection:	IP 65
Weight:	7,3 kgs
Pipe Connections:	R ¼" Female

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OIL-IN-WATER MONITORS

OMD-12 Series

for continuous measurement of Oil-in-Water

Model OMD-12 A

Oil-in-Water Monitors and Systems
for Industrial Applications

Besides our Oil/Solids/Turbidity Monitor, Type: OMD-7, DECKMA HAMBURG GmbH has expanded the scope of supply with the OMD-12 Series, especially developed for applications in clean water or with a low content of solids in the water. This Series is especially for the quick, continuous control of Oil-in-Water in many different applications. Utilizing the latest "state of the art" in micro-processor design and measuring technique, the benefits of the OMD-12 are:

OMD-12 with ManualClean Unit

- Easy to operate
- Improvement on Solids suppression
- Variable Parameters
- Compact Model
- 14 Segment LED's
- Reliable
- Light Weight (3,5 kgs)

SPECIFICATION OMD-12 SERIES

Range:	0 - 30 ppm (trend indication to 50ppm)
Accuracy:	Better than +/- 2 ppm insoluble Oil (with special calibration)
Degree of Protection:	IP 65
Size OMD-12:	175 x 190 x 220 mm (W x H x D)
Size OMD-12 A:	210 x 330 x 220 mm (W x H x D)
Sample Temperature:	+1° to +70° C
Alarm Contact Rating:	Potential-free 1 pole change-over contacts, 3 A / 24 V
Alarm Operating Points:	15 ppm (Factory Set) adjustable from 1 - 30 ppm
Alarm 1 & 2 Operating Delay:	2 - 30 sec. adjustable
Power supply:	24 Volt AC/DC, other voltages on request
Output Signal:	0 - 20 mA or 4 - 20 mA, reversible Ri < 500 Ω

(Change or amendment of specifications without notice.)

Additional Equipment like Sample Lift Pumps and Sample Conditioning Units available on request.

Models: OMD-12 - without Autoclean-System
OMD-12A - with Autoclean-System

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OIL-IN-WATER MONITORS

OMD-15 Series

for Boiler Feedwater and Condensate

Model OMD-15A with Autoclean System

Continuous Monitoring of Oil-in-Condensate

or Oil-in-Boiler Feedwater

The OMD-Series includes a Monitor, the OMD-15, for the control of Oil-in-Boiler Feedwater or Boiler Condensate. This Monitor is type approved by Germanischer Lloyd in accordance with the IMO-Resolution MEPC.60 (33) and with the "Technische Regeln für Dampfkessel TRD 604", sheet 1. Utilizing the latest "state of the art" in micro-processor design and measuring technique, the benefits of the OMD-15 are:

OMD-15

- Easy to operate
- Improvement on Solids suppression
- Variable Parameters
- Compact Model
- 14 Segment LED's
- Reliable
- Light Weight (3,5 kgs)

SPECIFICATION OMD-15 SERIES

Range:	0 - 9,9 ppm
Accuracy:	Better than +/- 1 ppm insoluble Oil (with special calibration)
Degree of Protection:	IP 65
Size OMD-15:	175 x 190 x 220 mm (W x H x D)
Size OMD-15A:	210 x 330 x 220 mm (W x H x D)
Sample Temperature:	+1°C to +90°C
Alarm Contact Rating:	Potential-free 1 pole change-over contacts, 3 A / 24 V
Alarm Operating Points:	2 ppm (Factory Set) adjustable from 0,2 - 9,9 ppm
Alarm 1 & 2 Operating Delay:	2 - 20 sec. adjustable
Power supply:	24 Volt AC/DC, other voltages on request
Output Signal:	0 - 20 mA or 4 - 20 mA, reversible Ri < 500 Ω

(Change or amendment of specifications without notice.)

Additional Equipment like Sample Lift Pumps and special Coolers available on request.

Models: OMD-15 - without Autoclean-System
OMD-15A - with Autoclean-System

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OIL-IN-WATER MONITORS

OMD-17 Series

for continuous measurement of Oil-in-Water

Model OMD-17 with Auto Clean Unit

Oil-in-Water Monitors and Systems
for Industrial Applications

The OMD-17 Series is designed for higher oil concentrations up to 100 ppm oil-in-water. It is suited especially well for various cooling water applications. This Monitor is type approved by Germanischer Lloyd in accordance to the IMO-Resolution MEPC.60 (33) and with increased oil concentrations. Utilizing the latest "state of the art" in micro-processor design and measuring technique, the benefits of the OMD-17 are:

OMD-17

- Easy to operate
- Improvement on Solids suppression
- Variable Parameters
- Compact Model
- 14 Segment LED's
- Reliable
- Light Weight (3,5 kgs)

SPECIFICATION OMD-17 SERIES

Range:	0 - 99 ppm
Accuracy:	Better than +/- 5 ppm insoluble Oil (with special calibration)
Degree of Protection:	IP 65
Size OMD-17:	175 x 190 x 220 mm (W x H x D)
Size OMD-17 A:	210 x 330 x 220 mm (W x H x D)
Sample Temperature:	+1° to 90° C
Alarm Contact Rating:	Potential-free 1 pole change-over contacts, 3 A / 24 V
Alarm Operating Points:	15 ppm (Factory Set) adjustable from 1 - 99 ppm
Alarm 1 & 2 Operating Delay:	2 - 30 sec. adjustable
Power Supply:	24 Volt AC/DC, other voltages on request
Output Signal:	0 - 20 mA or 4 - 20 mA, reversible Ri < 500 Ω

(Change or amendment of specifications without notice.)

Additional Equipment like Sample Lift Pumps and Sample Conditioning Units available on request.

Models: OMD-17 - without Autoclean-System
OMD-17A - with Autoclean-System

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Examples for OMD-12, OMD-15 and OMD-17 applications.

Control of cooling water for transformers in a transformer station. Each transformer is connected to a separate cooling-stream. The cooling water is controlled by an OMD-15 A Monitor with a sample lift pump.


Pumpe E3
Pumpe E2
Pumpe E1

OMD-12A with sample lift pump for the control of cooling water. The flow of the sample water is approx. 2-4 l/min. Sample is taken in bypass condition from the main pipe. (DN 65)

SETTING NEW STANDARDS FOR CONTINUOUS MONITORING OF:

Oil-in-Water

Multi-Functional-Monitor

Type: **OMD-7 MK II**

Accurate monitoring of:

Oil-in-Water **Solids-in-Water** **Turbidity**

We help to protect the Environment.

DECKMA HAMBURG GmbH are proud to announce the launch of an all new Oil-in-Water Monitor, the "OMD-7 MK II Industrial Monitor", designed to measure the content of Free Oils, Suspended Solids and Turbidity in Water continuously and independently.

This design represents the first all new Industrial Monitor capable of distinguishing between the different characteristics of Oil particles, Solid particles and Water Turbidity on a continuous basis. The OMD-7 MK II comprises a compact Measuring Cell, Monitor with integral Computer Unit and Monochrome Alphanumeric Display and our proven Sample Conditioning Unit (SCU) for sample processing.

The measurement method employs light scattering as the base technique but uses a novel concept whereby multiple wavelength lightsources combined with multiple detector angles are used to differentiate between the various contaminants within the water phase.

Great attention has been given to ensure the instrument construction is rugged whilst remaining easy to use. The proven Automatic cell cleaning device, as used on our OCD range of products, has been incorporated to ensure the measuring cell remains in 100% optimum condition throughout even the most demanding of applications.

All variable operational parameters can be adjusted on site by key inputs at the Monitor Key Pad. These include Oil, Solids and Turbidity range and Alarm Set Points, Alarm Time Delays and Frequency of Cleaning Cycle.

By use of this novel Light Scattering technique the OMD-7MK II is capable of measuring Free Oil, Solids and Turbidity in the following applications:

Surface Water Run-Off from Power Stations, Chemical Plants, Refineries and Petroleum Tank Farms. Boiler Condensate returns, Produced Water Discharge from Production Platforms and FPSO's, Cooling Water in a variety of Industrial environments.

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Jan. 2000

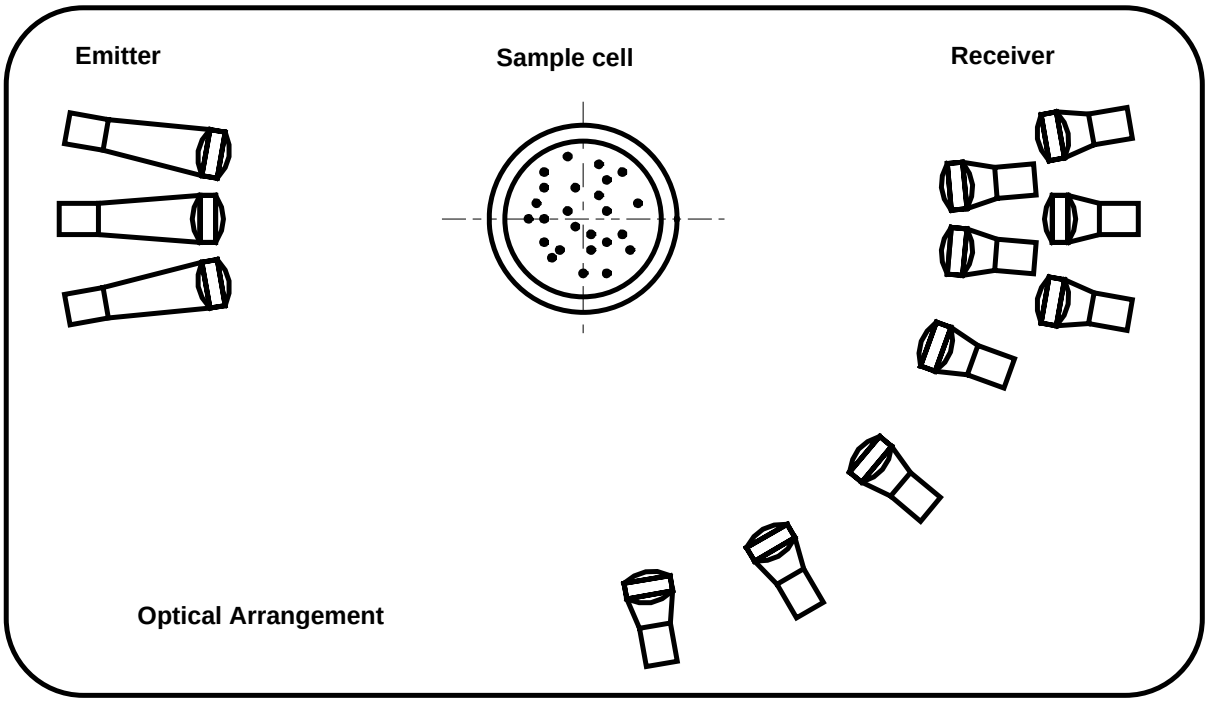
Measuring Principle of the OMD-7 MK II

The principle of measurement is based on the scattering of light, internationally known as "Scattered Light Principle".

The measurement is based on the fact that oil droplets and solids particles present in the sample water scatter light (due to the system arrangement in the measuring cell). The use of three different wave length for the incident light and the angular arrangement of the receivers allow the monitoring of typical scattered light distribution patterns of oil droplets and solids.

The intensity of scattered light from the sample glass tube is received by the solid state detectors. After amplification the signals converted into digital data. A microprocessor controls data acquisition, data integrity and light source intensities. The data is sent to the electronic unit for further processing. The oil content can now be calculated independently from the solids content as well as the sample turbidity. All calculated values are displayed on a LCD display.

Parallel to the above measurements, the projected light signals are monitored and in the absence of the light-beams, the alarm circuits are activated ("Monitor Fault Alarm").



Novel Concept of Oil-in-Water Monitoring

Introduction

Environmental awareness has forced the introduction of stricter discharge limits for oil emission/pollution. Therefore the accuracy requirements for measuring equipment are increasing. Natural turbidity of water, caused by solids or biological growth has always had an adverse effect on oil content measuring equipment. Continuous monitoring of the free oil content, even in waste water, now becomes possible with the new OMD-7 oil monitoring device from DECKMA HAMBURG GmbH (Germany).

Measuring Principle

After intensive research a novel concept for oil-in-water monitoring was developed. It features a multi-angle multi-wavelength optical measurement system. The water sample is treated by a sample conditioning unit to ensure full homogenisation. The data acquired by the optical system yields different scatter patterns that allows discrimination of solids particles from oil particles in the sample stream. Natural sources of turbidity such as mud or algae does not influence the oil content measurement up to a high level of solids contamination. The turbidity of the sample is also displayed.
The sensitivity of the new measuring concept is well suited for oil separator monitoring and coolant control. Scattered light measurements could not replace laboratory analysis in all cases, but can now offer a much more accurate reaction to potential pollution risks. More important, the OMD-7 requires no hazardous chemicals, solvents or consumables so no toxic waste is produced.
A typical application for the OMD-7 is the monitoring of cooling water from a coastal power station (see fig.).

Due to tidal variations the intake water had differing levels of turbidity, but this solids content can now be discriminated from the oil content.

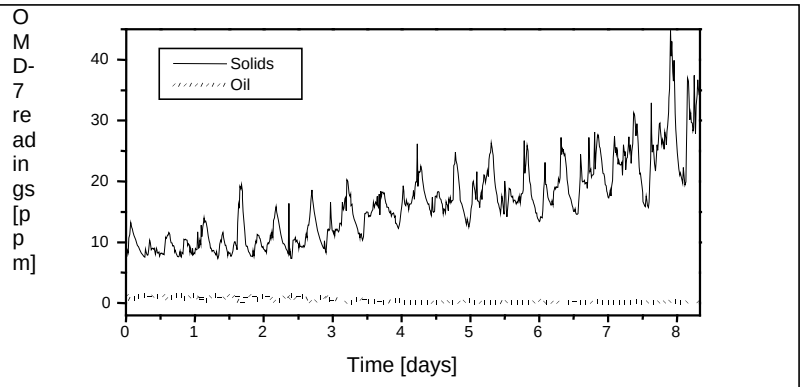


Figure: **DECKMA HAMBURG GmbH OMD-7 Test Results**
Open coolant system of a coastal power station with periodical tidal influence on the solids content. The general increase in the solids reading is due to seasonal changes.

Summary

Continuous oil monitoring in waste water and many other industrial applications without using chemicals and consumables is now possible with the new OMD-7 Monitor from DECKMA HAMBURG GmbH. A high background level of solids contamination is no longer a problem with this novel measuring technique.
Due to the novel light scattering technique the OMD-7 is capable of measuring free oil, solids and turbidity in the following applications:
Surface Water Run-Off from Power Stations, Chemical Plants, Refineries and Petroleum Tank Farms, Boiler Condensate returns, Produced Water Discharge from Production Platforms and FPSO's, as well as Cooling Water in a variety of Industrial environments.

OMD-7 MK II

OIL / SOLID / TURBIDITY Monitor

This new microprocessor based monitor makes it possible to simultaneously determine the content of both free oils and suspended solids in water streams as well as the water turbidity.

-Specification-

APPLICATIONS	Liquids with low water solubility ie. Diesel oil, petroleum products, synthetic oils, vegetable oils, several chemicals etc. Non-oil, solids contaminations ie. dust, grinding powder, sand etc. Water turbidity measurement ie. water pollution monitoring etc.
MEASURING PRINCIPLE	Different wavelength light scattering, (polychrome) multiangle measurement
RANGE (OIL ONLY) Accuracy:	0-200 ppm, other ranges on request Better than ±5 ppm or ±10% of reading (whichever is greater). Accuracy can be increased optionally by calibration against a specific oil (e. g. up to ±2 ppm or ±5 % of reading (whichever is greater) for Diesel Oil.
RANGE (SOLIDS ONLY)	0-800 smu (Solid Measuring Unit, equals 0-800 ppm Test Air Cleaner Dust according to I.M.O), or equivalent content of other solids, depending on solid density.
Accuracy:	Calibrated against a specific solid: ±5 ppm or ±10% of reading (whichever is greater). Absolute: ~50%, based on different bulk-densities
RANGE (TURBIDITY)	0-1000 FTU (Formazin turbidity units)
Accuracy:	±5 FTU or ±10% of reading (whichever is greater)
RANGE (OIL AND SOLIDS)	0-100 ppm Oil and 0-200 ppm solids in any ratio
Accuracy:	Oil content reading: Better than ±5 ppm or ±20 % (whichever is greater) Solids content reading: Better than ±5 ppm or ±20 % (whichever is greater)

CALIBRATION	Factory set, calibration against specific oil and/or solid is possible.
ZERO SETTING	Factory adjusted zero drift: 1ppm (oil), 3ppm (solid), 5 FTU (turbiditiy) maximum (automatic cell cleaning)
CELL CLEANING	Automatic cell wiper
RESPONSE TIME	10 sec maximum (for 90% response to step)
OUTPUT	Voltage or Current Oil: Voltage: 0 to 5V DC, Current: 0(4) - 20 mA Solids: Voltage: 0 to 5V DC, Current: 0(4) - 20 mA Turbidity: Voltage: 0 to 5V DC, Current: 0(4) - 20 mA
DIGITAL INTERFACE	Optional: Serial - RS 232
DISPLAY	LCD-Display, alphanumeric Optional: Remote LED-Display
ALARM STRUCTURE	Oil: Two independent set points adjustable over the monitor range with individual delay time Solids: Two independent set points adjustable over the monitor range with individual delay time Turbidity: Two independent set points adjustable over the monitor range with individual delay time Condition-alarm Optional: Logic-combination of one alarmpoint of the oil-, solid- and turbidity-alarm each achieves High flexibility in alarm-structure to special conditions specified by the customer Fault-alarm indicates monitor fault, displayed fault-codes guarantee rapid fault-analysis
ALARM CONTACTS	Potential free single pole changeover contact for each alarmpoint, rating 5A @ 240VAC/300VDC resistive 1.5A @ 240VAC/30VDC inductive

SAMPLE CONDITIONS	Flowrate	2 l / min
	Pressure	0 to 2 bar
	Temperature	0 to 70° C
ENVIRONMENT	Temperature -20 to 70° C Humidity, rel. 5 - 95%	
ELECTRICAL SUPPLIES	Monitor: 100 W, 110/220 VAC, 50/60 Hz Sample conditioning unit: 1.1 kW, 380/440 V, 3-phase, 50/60 Hz	
AIR SUPPLY	5 to 7 bar, auto cell cleaning	
SCOPE OF SUPPLY	Compact measuring cell with microprocessor based front end electronics. All components are represent latest state of art. Computer based calculation unit with monochrome alphanumeric LCD-display. Coloured TFT-display optional available. Alarm evaluation featuring sophisticated oil to Solids discrimination algorithm. Reliable Sample Conditioning Unit, approved industrial version.	

The manufacturer reserves the right to alter the above specification without notice.

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Oil-in-Water Monitoring Systems

OMD-7 System with Air Compressor and Sample Lift Pump.

OMD-7 System for hazardous area (Air-purged system)

OMD-7 System for 2 sample points.

OMD-7 Components

Monitor

Measuring Cell

Sample Conditioning Unit

OMD-7 System (outdoor-application)

OMD-7 System (outdoor-application)

OMD-7 System "Special" for Separator control with Air Conditioning System, suitable for 4 sample points.