

Oilcon[®] Mark 6



P R O D U C T B U L L E T I N

639



First class service and installation

We provide not only the hardware, but also engineering assistance, installation and tuning on board or on site. VAF instruments has experience with hundreds of installations, in all kinds of environments and with all types of applications.

Oilcon[®] Mark 6 is a registered trade mark of VAF Instruments B.V.

Introduction

For the continuous on-line monitoring of discharge water during de-ballasting operations, VAF Instruments is one of world's main suppliers. The Oilcon[®] Mark 6 Oil Discharge Monitoring & Control Systems are more reliable and more accurate than any other monitoring & control system. It is suitable for all ballast and slop water discharges.

Unprecedented accuracy, reliability and cost efficiency

Undesirable as it is that a ship has to stay in port because of problems reliability is our highest priority. The system is based on the unique multiple scattering principle for which VAF Instruments has obtained world-wide patents. This technique resulted in unprecedented levels of accuracy, reliability and cost efficiency of installation and ownership.

Meeting every quality standard

The Oilcon[®] Mark 6 Oil Discharge Monitoring & Control Systems apply to the highest quality standards. The system fully complies with MARPOL requirements and is standard equipped with a 19" rack mounting Main Control Unit. The system is equipped with a comprehensive range of alarms and controls. All this and more from a fully ISO 9001:2000 credited company.

Contributing to a cleaner environment

VAF Instruments makes every effort to prevent marine pollution. Because no additional chemicals or solvents are needed for operation no environmental pollution takes place. No hot water flushing is required, which means minimal fresh water consumption.

VAF VAF INSTRUMENTS
for quality and innovation

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Demonstration unit

Your advantage

Easy and automatic operation

Because of the easy operation of Oilcon® Mark 6, no special operator attention or operator training is required. The monitoring of clean, segregated and dirty ballast happens from a single unit and authoritative information is instantly available. The system is featured with some very practical automated functions, like automatic self cleansing, zeroing and calibration. It is also equipped with fully automatic flushing, which eliminates clogging on shutdown. Automatic cell window washing prevents fouling of the optical path.

- No additional chemicals/solvents needed for operation: meaning no environmental pollution and low operating costs.
- No hot water flushing required.

Designed to perform in tough environments

To suit a marine environment, the system has a rugged, compact design with many 'built in' features. The robust measurement unit is capable to perform optimally in a tough pump room environment.

Minimal installation costs

The installation of the ODME Oilcon® is easy: only two bulkhead penetrations are needed. Therefore, costs of installation will be minimal.


Extremely flexible to suit your preferences

The system is extremely flexible. For example, the distance between engine room and pump room located units may be up to 30 meters.

- Annex I and Annex II capabilities in one version.
- Adjustable alarm relay contact for ppm level.
- Single data link engine room/control room.
- Light weight.

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Why VAF Instruments?



Manufacturing sample pump

Guaranteed reliability

You expect a company to demonstrate its trust and its commitments to its clients by guaranteeing the quality of its products. You can expect more from VAF Instruments products. We give a standard two year guarantee on all our products, the longest and most comprehensive guarantee in the maritime industry.

Tailored solutions for your specific needs

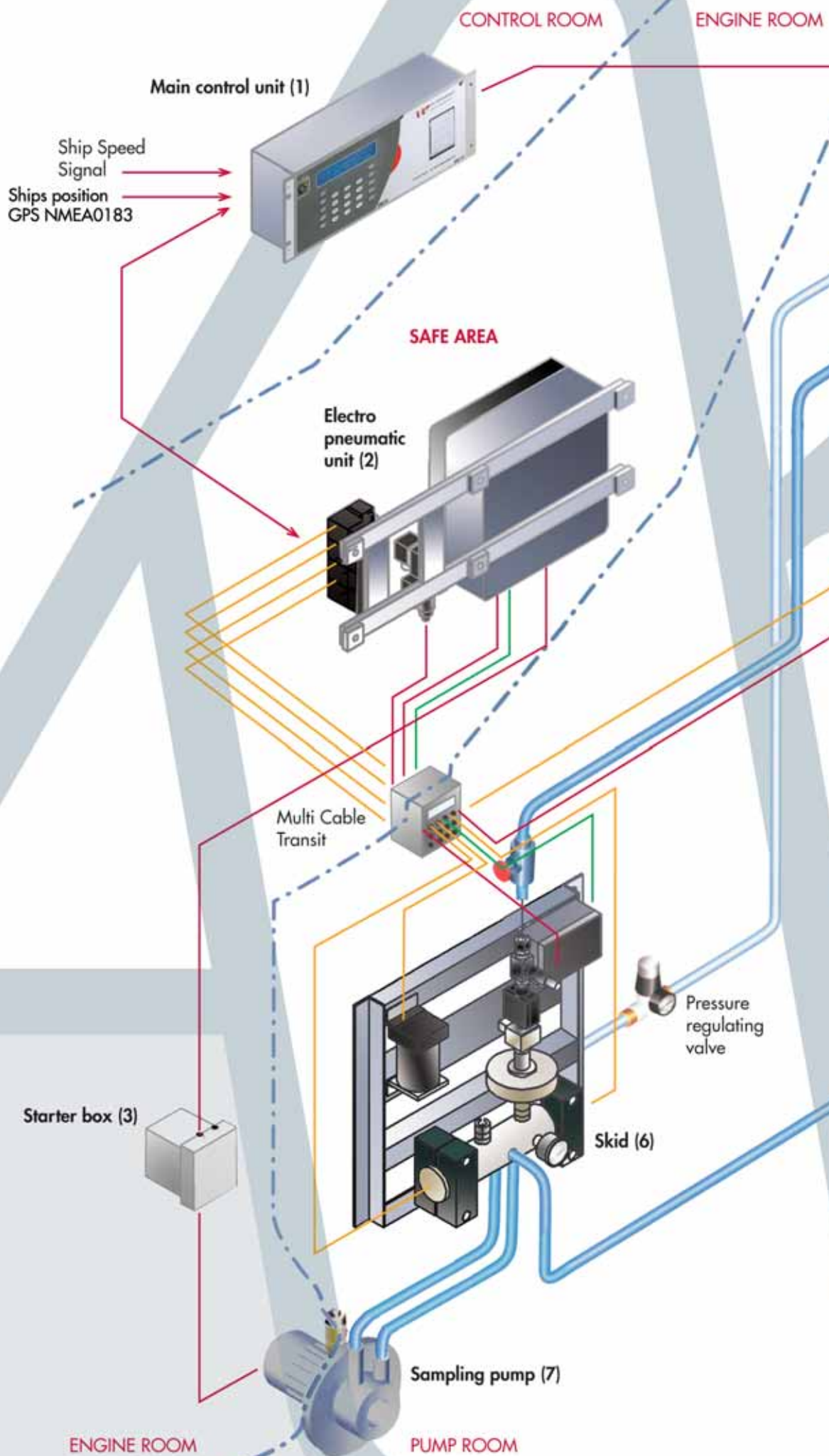
This product bulletin comprises mostly information about VAF instruments' Oilcon® Mark 6 Oil Discharge Monitoring & Control Systems. Please consult our company for further information about the tailor-made solution we can offer for you. They will support you in helping you find the right solution.

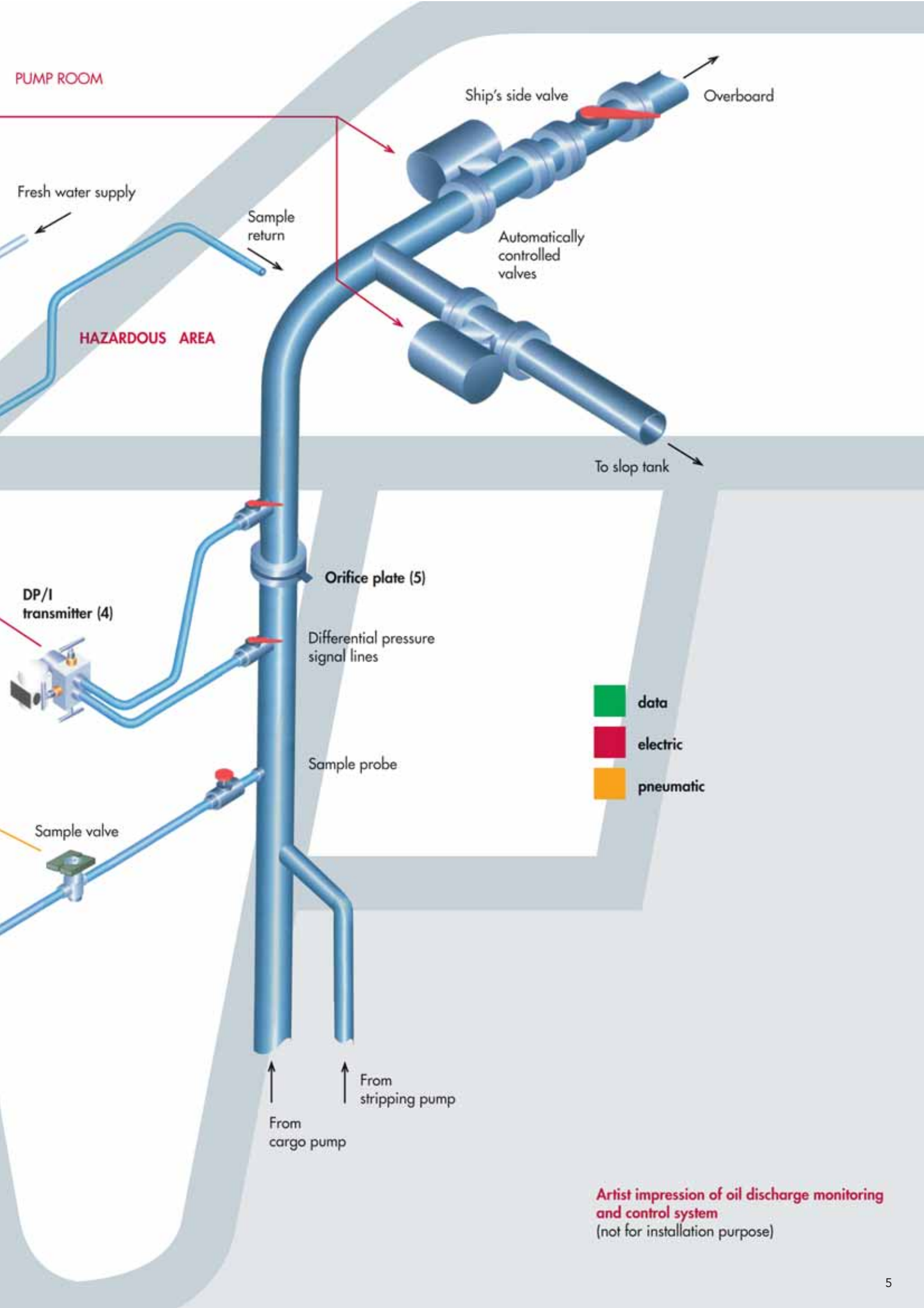
Service 24/7 and around the globe

At VAF Instruments we understand that our instruments are critical to your performance. Therefore we will do anything to prevent any down time related to our instruments. But it also means we will respond quickly in case something goes wrong, 24/7, around the clock and around the globe. For minimum response times we have 55 service and sales points in all major ports around the globe, more than any of our competitors.

Proven expertise

VAF Instruments' expertise in pollution monitoring systems dates back to the early nineteen seventies. During this time, international legislation concerning marine pollution from ships first resulted in the development of a series of VAF Instruments Oilcon® Ballast- and Bilge Water Discharge Monitors. Based on nearly 30 years of successful experience in the marine industry world-wide, the range of Oilcon® monitors has been expanding and improving to cope with ever increasing demands from the IMO (International Maritime Organization) , Installers and Operators.





PUMP ROOM

Fresh water supply

HAZARDOUS AREA

Sample return

Ship's side valve

Overboard

Automatically controlled valves

To slop tank

DP/I transmitter (4)

Orifice plate (5)

Differential pressure signal lines

Sample probe

Sample valve

- data
- electric
- pneumatic

From cargo pump

From stripping pump

Artist impression of oil discharge monitoring and control system
(not for installation purpose)



Main control unit (1)

The Main Control Unit (MCU) is the central part of the ODME system and is designed for mounting in the cargo control console (19" rack).

signals:

- ships speed in knots, ships GPS NMEA0183, overboard valve position,
- oil content of ballast water in ppm
- rate of discharge of ballast water in tonnes per hour.

The MCU processes these inputs and records and displays all the necessary information:

- time and date (UTC/GMT),
- Position (GPS), longitude and latitude
- auto/manual mode,
- status of operational mode,
- instantaneous rate of discharge of oil,
- rate of discharge,
- ships speed,
- total quantity of oil discharged,
- status of discharge,
- sampling point selected,
- type of oil

The data is displayed on a LCD display and is also printed on paper at maximum 10 min. intervals (selectable). Control of the MCU is through a keyboard. The MCU also displays a number of pages with information according to the operator's instructions. The various pages are designed to help the operator to control the ODME system and to give a wide range of information.



Electro pneumatic unit (2)

The Electro Pneumatic Unit (EPU) contains the control electronics and the solenoid valves to switch the pneumatic signals. It also contains the zener barriers for the input signals from the flowmeter(s) and flowswitch and measurement cell.

The EPU is designed for mounting in the engine room opposite the Skid on the engine room/pump room bulkhead, or in another suitable location.

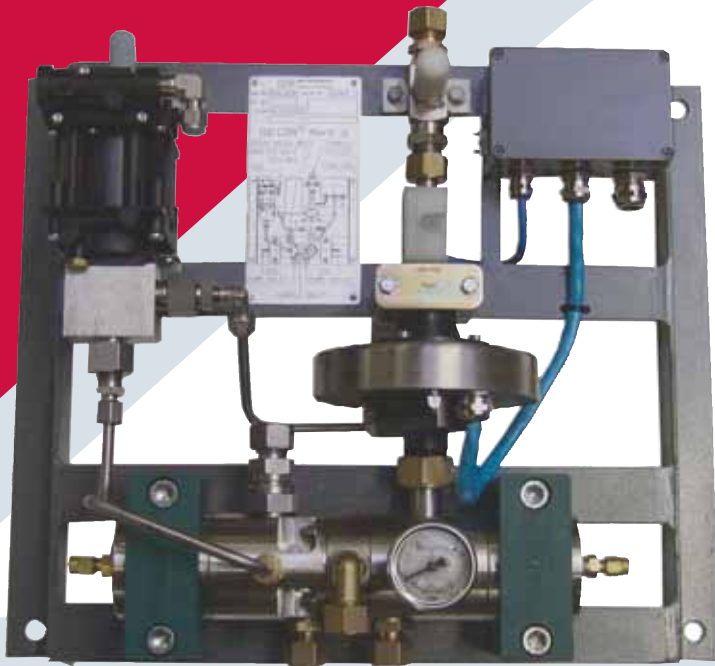


Flow meter System (4&5)

The flow metering system comprises of an Orifice Plate Flow Meter and an intrinsically safe dP/I transmitter. The flow of water passing through the orifice causes a pressure difference across the plate. This differential pressure is converted into a mA signal and transmitted to the EPU by the dP/I transmitter. Combined flowmeter function in case of two orifices available.

The manifold valve block fitted to the differential pressure transmitter, has three shut-off valves. The two outer valves are for blocking off the pressure sensing lines from the sensor. The center valve serves as equalizing valve to balance the pressure at both sides of the transmitter.

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Skid Assembly (6)

The Skid Assembly contains the necessary items to handle the sampled ballast water to measure the oil content. In the Skid Assembly is a pneumatically operated shuttle valve and window wash pump.

The shuttle valve selects between fresh water forward or backward flush and sample. The window wash pump provides a pressure boost to the window flushing water.

Also contained in the Skid Assembly is the intrinsically safe detector cell which contains the revolutionary electronic sensing system used to determine oil content.

The Skid Assembly is normally mounted in the pumproom opposite the EPU on the engine room side of the bulkhead.

Pump/Motor Assembly (7)

The Pump/Motor Assembly comprises a high-shear vortex pump, a certified gas tight bulkhead seal and a motor. The pump provides a degree of sample water conditioning as the shearing effect tends to produce droplets of oil of roughly similar size. The motor is suitable for 380 V or 440 V at 50 Hz or 60 Hz, runs at 2850 rpm or 3460 rpm respectively and is constructed to IP55 and isolation Class F, IEC 34-1.



Details of principal components of Mark 6 Oilcon[®] oil discharge monitoring & control system

1 Main Control Unit

Weight: 4,5 kg
Dimensions: 483W x 174H x 111D

2 Electro Pneumatic Unit

Weight: 9,5 kg
Dimensions: 500W x 263H x 114D

3 Motor Starter box

Weight: 1,0 kg
Dimensions: 126W x 176H x 100D

4 Electronic Differential Pressure

Transmitter
Weight: 8,0 kg
Dimensions: 225W x 195H x 194D

5 Orifice Plate

Thickness: 6 mm
Material: Stainless Steel
Diameter and bore: Specific to each installation

6 Skid

Weight: 20 kg
Dimensions: 500W x 420H x 177D
Air Connections: 6 mm & 10 mm tube
Water connections: 15 mm OD Tube

7 Sampling pump

Weight: 30 kg
Length overall: 348
Cut out diameter: 290
Connections: 15mm OD tube

Total weight complete system 87 kg



Principle of operation

The measurement technique used in the Oilcon[®] Oil Discharge Monitor is based on scattered light. In accordance with IMO Resolution MEPC.108(49), the Mark 6 Oilcon[®] is able to discriminate between oil and other contaminants such as mud, rust or entrained air.

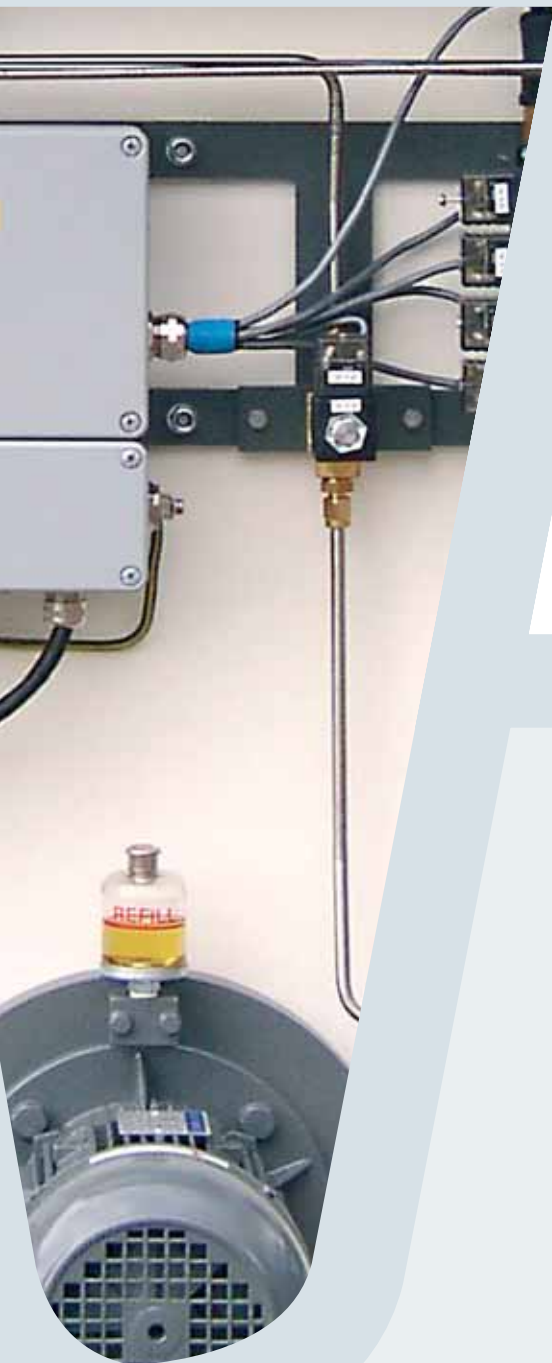
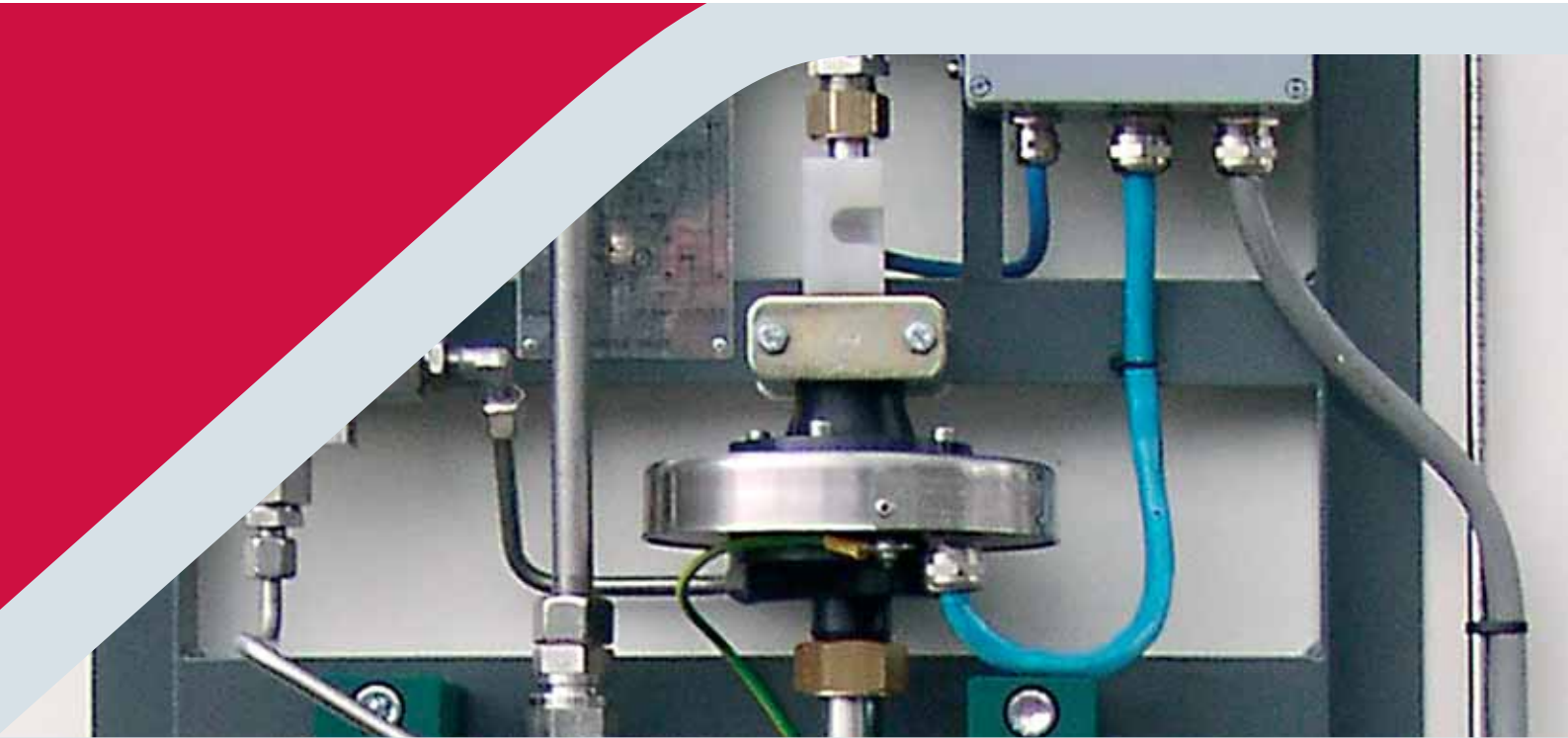
A sample of discharge water passes through a detector cell while light enters and leaves the measurement area of the cell. The sample flow is at right angles to the optical path. When no particles or oil droplets are present in the water, light can pass straight through the cell (Direct beam). When oil is present in the form of a homogeneous mixture, light is scattered at different angles (Scatter beam). The intensity of scattered light at a specific angle depends on the density of oil droplets and upon their particle size relative to the wavelength of radiation. The intensity of light of the direct beam decreases logarithmically with increasing oil concentration, while the scatter beam increases linearly but passes through a maximum before decreasing logarithmically.

The light source used in the Oilcon[®] Oil Discharge Monitor is a near infra red diode which is operated in the pulsed mode so that the average power dissipation is low, although the intensity is high. The light signal is processed and transmitted along a communication cable from the detector cell to the EPU, where the detection signals are used to compute the oil levels present in the sample passing through the detector cell.

Automatic sequential control of forward and backward flushing at start up and shut down of the monitor prevents erroneous readings and keeps the sampling lines clean. This also ensures reliable start up, minimises system deterioration and ensures that the pipework is left in clean condition prior to the next use of the monitor. At the end of the start up flushing cycle a system zero check is performed, this automatic zero setting compensates for any small deposits on the cell windows. The window wash pump cleans the cell windows at regular intervals during operation.



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Technical specification

Range	: 0 - 1000 ppm
Accuracy	: in accordance with IMO Resolution MEPC.108(49), the system response is within the accuracy specified.
Response time	: less than 8 seconds
Sample flow rate	: between 450 and 550 l/h
Zero noise and drift	: less than 2 ppm and nil when changing from fresh water to sea water
Response to oils	: in accordance with IMO specifications
Sensitivity to solids	: in accordance with IMO Resolution MEPC.108(49) accuracy limits.
Fouling	: clears in less than one minute after IMO fouling test.
Water temperature range	: 5°C - 65°C
Max amb temp:	: 55°C
Alarm setting	: Adjustable over full range.
Alarm outputs	: no/nc contact, (2A at 220 VAC max)
Electrical supplies	: 115/230 VAC 1 phase 50/60 Hz, 380-460 VAC, 3 phase 50/60 Hz
Air supply	: 4.. 7 bar, dry clean air
Sample points	: Optional up to 6 sample points
Valve control	: Dirty ballast relays on MCU Clean/segregated ballast relays on MCU
Ex Proof classification	: EEx ia IIB T4

Installers requirements	The Oilcon® solution	Benefits
Ease of installation	Only two bulkhead penetrations. Only one engineroom / control room data cable required	Low cost of installation
Technical assistance	Fully trained factory personnel to assist with every enquiry	Immediately available authoritative information
Localised support	Factory trained agents on a world-wide basis	Lower incurred costs
	Mounting position of components is readily adaptable	Easier lower cost installation

Users requirements	The Oilcon® solution	Benefits
Accurate in-line measurement	Continuous on-line sampling system	Direct response if pollution limits are exceeded
Reliable operation	Solids rejection algorithm	Minimises false readings due to solids in the liquid
Easy operation	Automatic system operation	No special operator attention required
	Interaction between user and system	No special operating / operator training needed. Low operating costs
No environmental pollution	No additional chemicals or solvents required for operation	Low operating costs. No environmental pollution
Minimal maintenance and operating cost	Dependable and robust instrumentation	Low maintenance costs. Comparatively minimal fresh water consumption
Dirty/Segregated/Clean ballast capability	Included as standard in software and hardware	Going the extra mile to prevent marine pollution

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Ordering information

If you need more information relevant to your particular requirements, please contact either VAF Instruments B.V. or local agent, who will be pleased to be of help. When contacting please specify type of ship:

- Newbuilding
 - Supply voltage: _____
 - Min./Max. flowrate overboard line: _____
- Retrofit
 - Supply voltage: _____
 - Min./Max. flowrate overboard line: _____

Mark 6 according resolution MEPC.108(49)

Summary of implementation requirements for oil discharge and control systems for oil tankers

Feature	Category type: ≥ 150 gross tonnage
Input information: (automatic receipt)	Ships position (GPS) Ship speed Overboard discharge valve position Oil content ppm Flowrate discharge Time and date
	Starting interlock
Output information: (printed & recorded)	Time and date (UTC) Ships position (GPS) Auto/manual mode Status of operational mode Instantaneous oil content (ppm) Flowrate of discharge (T/h) Ships speed (kts) Instantaneous rate of discharge of oil (l/Nm) Total quantity of oil discharged (l) Status of discharge Sample point selected Type of oil



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