



Oilcon Ballast Monitor

International Marine Radio Company

A British Company of **ITT**



Features

The *Oilcon* has DOT and USCG approval based on the IMCO Resolution A393(X)

Utilising laser and fibre optic technology significantly contributes towards safe operation in hazardous areas. DOT fire test approval granted for type AO, A15, A30, A60 fibre optic bulkhead penetrations

Automatic backward and forward flushing of sampling lines minimises clogging

Responds to both black and white oils as specified by IMCO with one calibration

Instantaneous response at the cell

Designed to high reliability standards using advanced solid state technology

Capable of operating at elevated water temperatures

Selection of up to five sample points

Comprehensive alarms and controls

Built-in test equipment allows rapid check out of system status

Automatic window flush keeps measurement cell windows clean over long period

Principle of operation

The measurement technique used in the *Oilcon* Ballast Monitor is based on scattered light. The sample of ballast water is passed through a measurement cell and, at the same time, light enters and leaves the cell. The sample flow being at right angles to the optical path.

Near infra-red monochromatic light is generated by a Gallium Aluminium Arsenide laser and transmitted along a fibre optic linkage to the measurement cell and leaves the cell via two windows and along fibre optic linkages to two silicon detectors. One detector receives the direct (or straight through) light beam and is used for automatic zero setting, and compensation for any deposits on the optical windows. The other detector receives the light which has been scattered by the small oil droplets present in the water. Both of the received light signals are used to compute an electrical output signal which is proportional to the oil concentration present in the sample passing through the cell.

The electrical signal is passed both to the read out box giving a continuous digital display of the oil content in ppm., and to a chart recorder providing a permanent record of the amount of oil in ppm which has been discharged into the sea.

Automatic sequential control of forward and backward flushing at start up and shut down of the Monitor keeps sampling lines clean. This minimises system deterioration when not in use and ensures reliable start up.

System arrangement

The *Oilcon* Ballast Monitor has the following main units:—

Sampling assembly unit (Skid) mounted in the pump room as close as possible to the ballast discharge lines; this unit contains the measurement cell, the various changeover valves and window wash pump

The sample pump and its drive motor

The opto-pneumatic cabinet, mounted on the engine room side of the bulkhead, which generates pneumatic signals for valve operation and for the window wash pump. It also contains the logic circuits

The interface cabinet which transforms the ship's power supply into supplies required by the monitor

The control box which provides control for the complete system and also provides digital readout of oil in water level

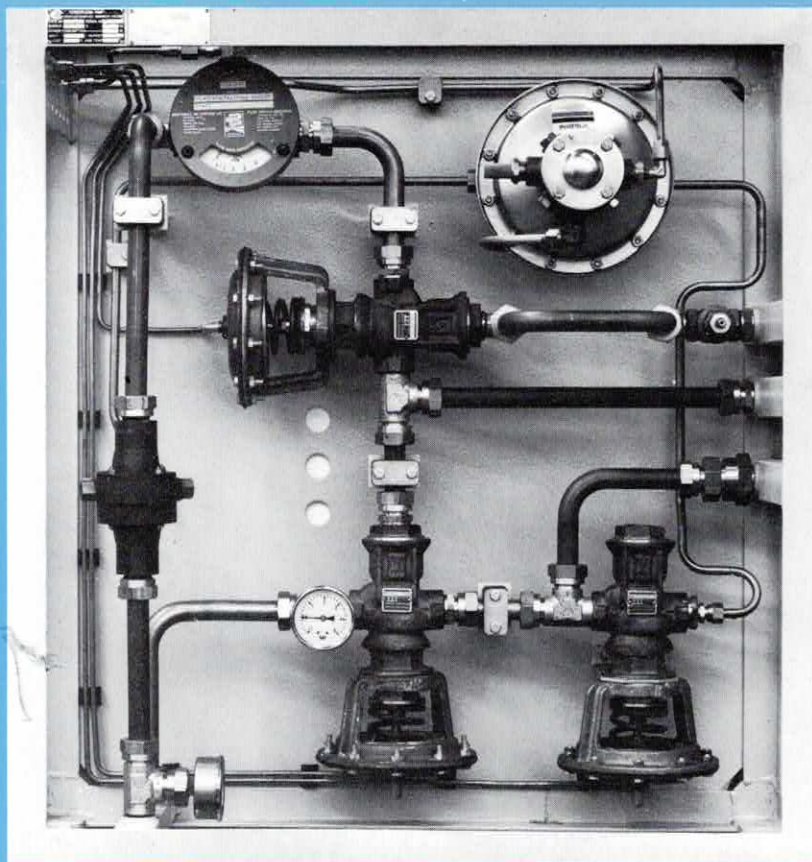
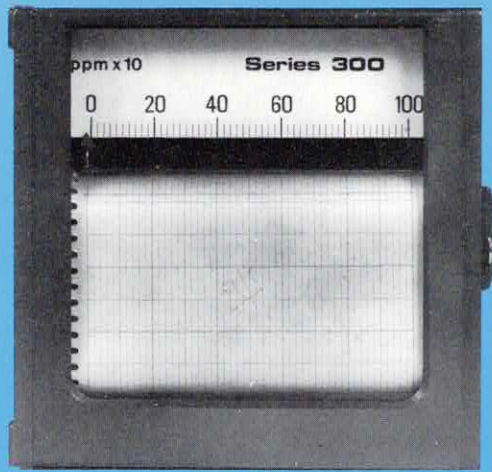
The chart recorder which provides an analogue readout and permanent record of oil in water measurements

Utilising a laser and fibre optic linkages eliminates the necessity to pass electrical circuits into the cargo pump room, since this is a hazardous area. All electrical circuits in the system are contained in a non-hazardous space. Penetrations of the engine room/pump room bulkhead are required for:

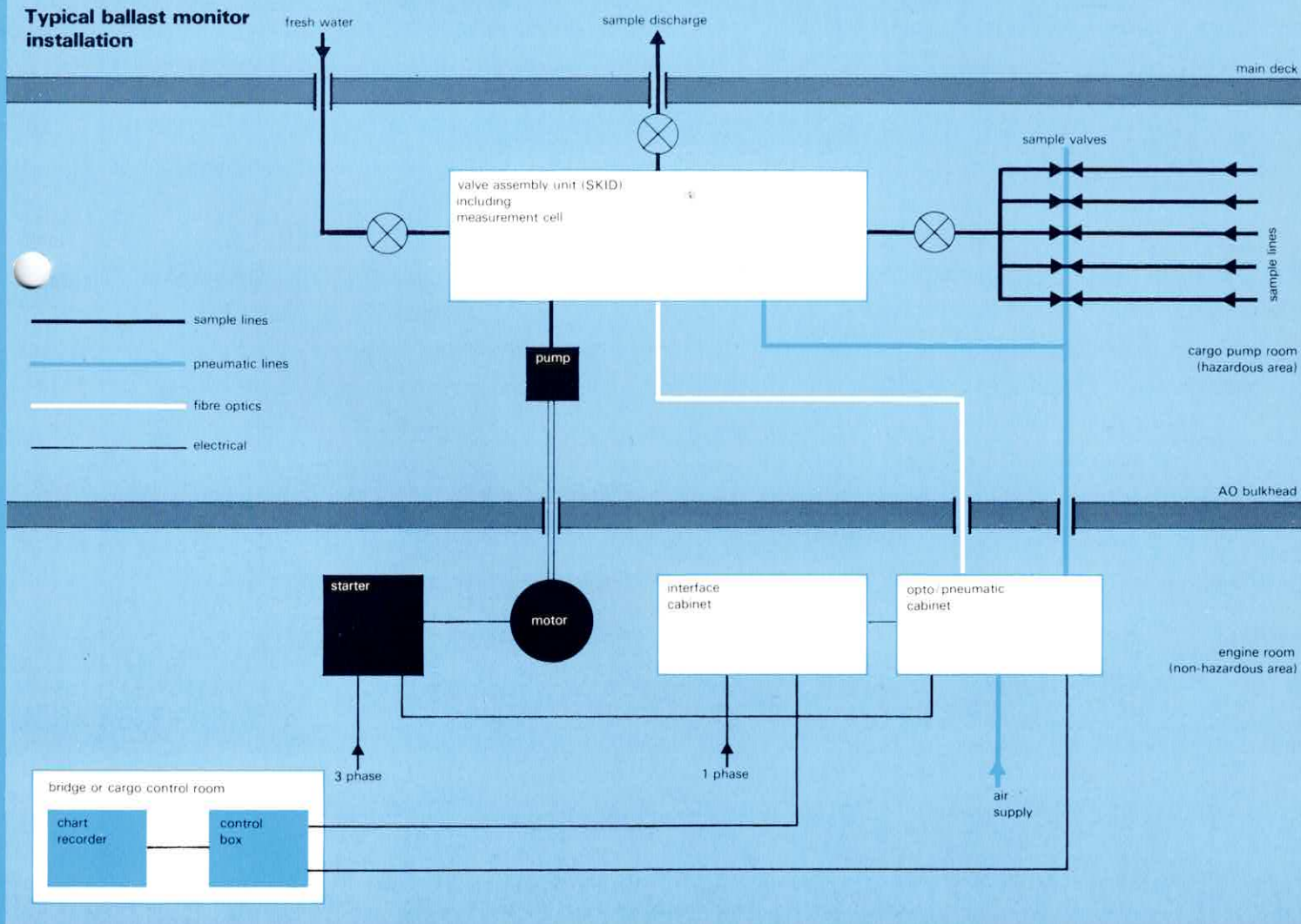
Pneumatic signals for valve operation

Fibre optic linkages passing light signals to and from the measurement cell

Mechanical drive between sample pump and sample pump drive motor



Typical ballast monitor installation



Specification

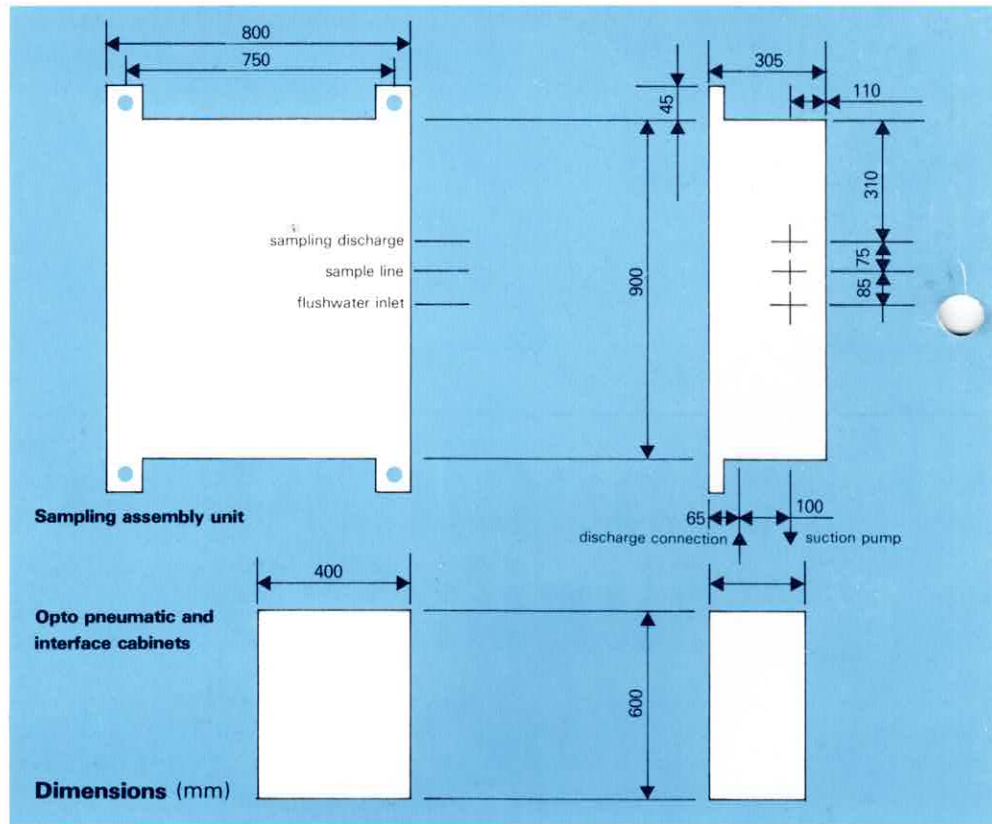
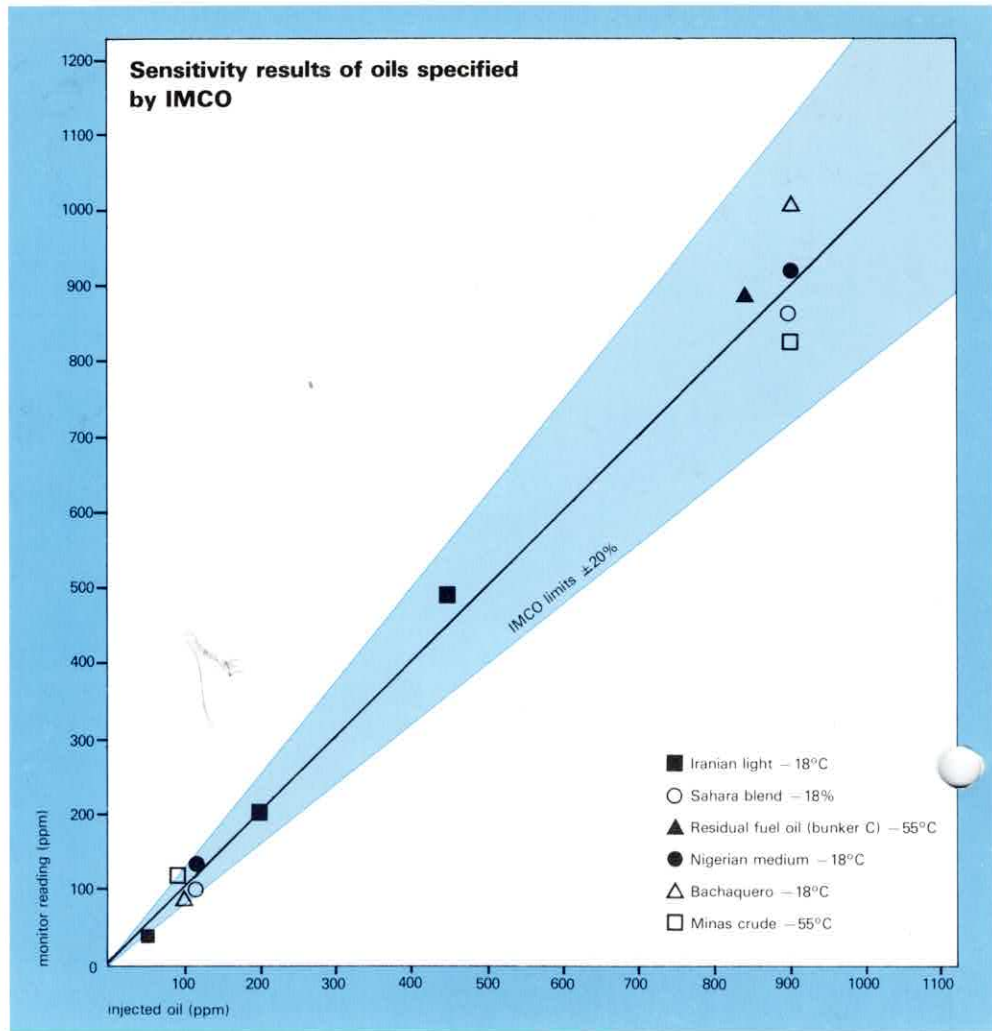
Range	0-1000 ppm
Accuracy	± 10 ppm or ± 20% of reading whichever is greater
Response time	Less than 10 seconds
Sample flow rate	Between 800 and 1100 litres per hour
Zero noise and Drift	Less than 2 ppm and nil when changing from sea water to fresh water
Response to oils	In accordance with IMCO specification
Sensitivity to solids	Change is less than 10% for IMCO specified mixture
Fouling	Clears in less than one minute after the IMCO fouling test
Water temperature range	5°C-65°C
Alarm adjustment	0-1000 ppm
Alarm outputs	Normally open or normally closed contacts (2A at 220V max)

Supplies

Electronic controls	110/220V, 240/250V, 50 or 60 Hz, single phase
Sample Pump	380V, 415V ± 10%, 50 Hz ± 5% 440V ± 10%, 60 Hz ± 5% 3 phase
Air Supply	2.5 – 7 bars

Controls and readout

ppm meter	Digital Display
Recorder	Linear
Sample selection	Up to 5 sample points
Alarm signals	Manually adjustable setting; audible warning signal
High alarm set	Set at maximum pollution level permitted
Low alarm set	Two thirds of setting for high alarm
Sample switch	Automatic sensing of sample pump operation and line filling. Initiates system flushing, automatic calibration of the measuring circuits and the sampling pump
Window wash	Automatic during sampling approximately every three minutes, with manual override
System Flush	Manual override of automatic system
BITE	Built-in test equipment – may be used during sampling



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