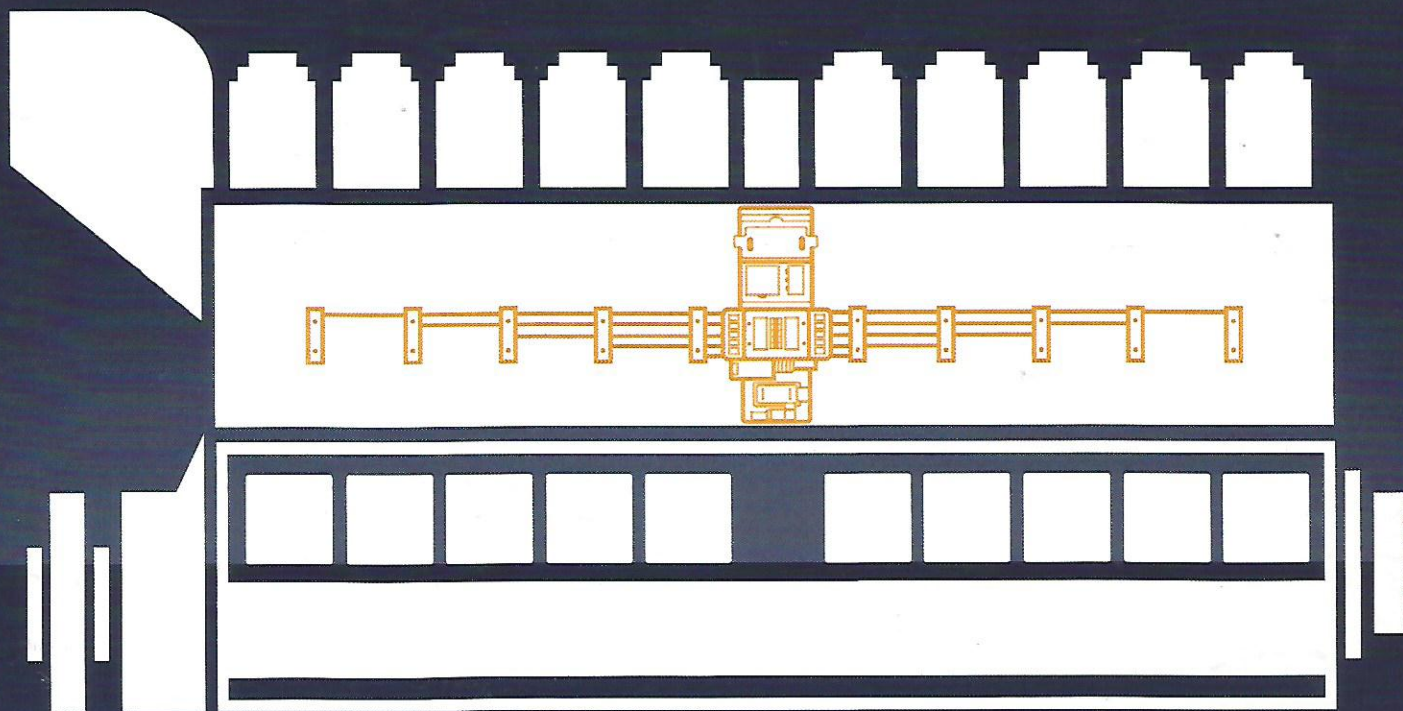


MAXIMUM ENGINE PROTECTION WITH MINIMUM MAINTENANCE

> 54.000 Engines well protected by
VISATRON® Oil Mist Detection Systems



WORLD MARKET LEADER IN OIL MIST DETECTION

EXPERIENCE

The experience Schaller Automation has gained in automation technology and in particular, during the development of the Oil Mist Detection systems, goes into modern innovative products and up-to-date technology.

Activities are concentrated in the development of safety and monitoring systems for large Diesel, Gas and Dual Fuel engines, as well as their corresponding components.

One further supplementary engine protection system is the Oil Mist Detector. The trusted VISATRON® Oil Mist Detection system, with its quick assembly, represents a reliable, cost-effective and space saving Oil Mist Detection system, proven in thousands of installations.

The products of the VISATRON® family meet the highest demands in functionality and operational lifetime. They permit specific engine-adapted installations and offer superior replacement services worldwide.

For more than 60 years, Schaller Automation has been a pioneer in the field of oil mist detection, applied to piston engines and gear transmissions.

This technology has since been developed to a high level of perfection.

The result of this is that more than 54.000 OMD installations have been done, making SCHALLER AUTOMATION the market leader in this specialized field.

The main manufacturers of large Diesel, Gas and Dual Fuel engines all over the world, 2-and 4-stroke such as MAN, Wärtsilä, Rolls Royce, Caterpillar and others, together with most of their licensees trust in crankcase protection of their engines by SCHALLER AUTOMATION'S VISATRON® Oil Mist Detectors.

OIL MIST DETECTION SYSTEMS

Oil Mist Detectors protect large Diesel, Gas and Dual Fuel engines of all applications from heavy consequential damage due to oil mist explosions as a result of overheating of bearings or other moving parts.

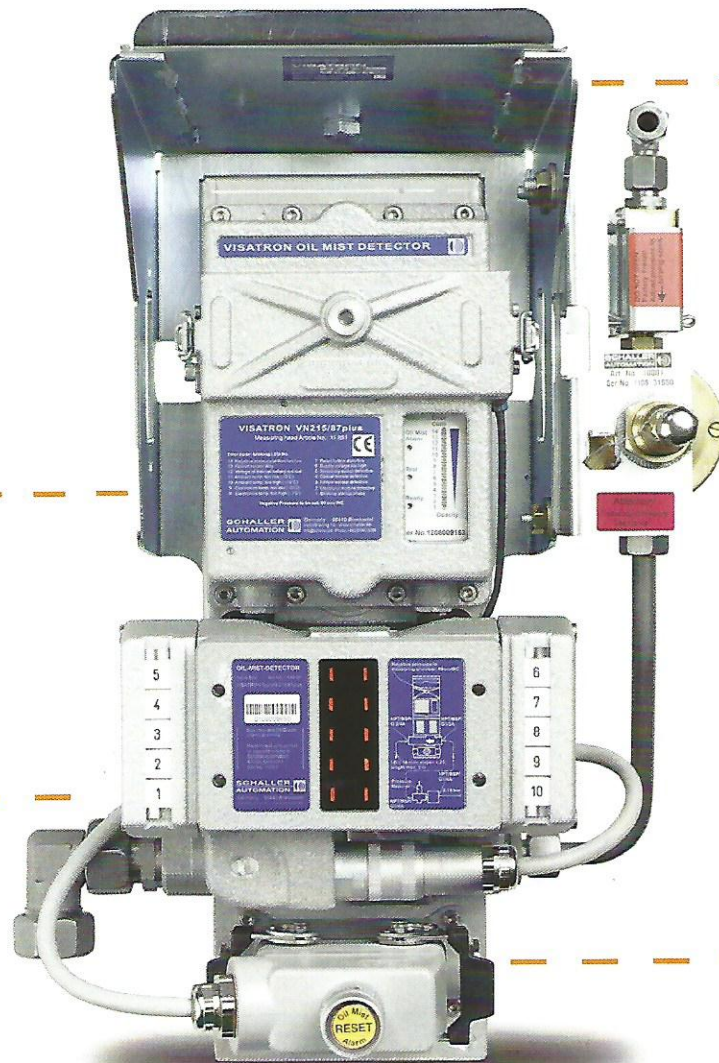
All Schaller VISATRON® Oil Mist Detection systems continuously extract the atmosphere from every compartment of the engine's crankcase by way of a suction system. The suction vacuum required is generated by a wear-free air jet pump within the device, fed by compressed air.

This technology is well proven and accepted by both engine makers and ship owners, bringing advantages such as high operational reliability and low maintenance costs.

The VISATRON® Oil Mist Detection system is designed to last the entire lifetime of the engine.

OIL MIST DETECTION SYSTEM VISATRON® FEATURES

OVER 54.000 ENGINES
WELL PROTECTED
BY VISATRON®



EXTREMELY LOW
MAINTENANCE
COST – DESIGNED
FOR ENGINE LIFETIME

DESIGNED FOR
VIBRATIONS BEYOND
CLASSIFICATION RULES

ACTIVE DIRT PROTECTION OF OPTICS
USING CLEAN AIR - A SYSTEM ONLY
AVAILABLE FROM SCHALLER AUTOMATION

AUTOMATIC OPACITY ADAPTATION
TO ENGINE OIL MIST LEVELS IN
NORMAL OPERATION - FALSE
ALARM-FREE SYSTEM EVEN UNDER
FREQUENT CHANGES IN ENGINE
LOAD AND RPM

FOR 4-STROKE ENGINES DIESEL, GAS AND DUAL FUEL

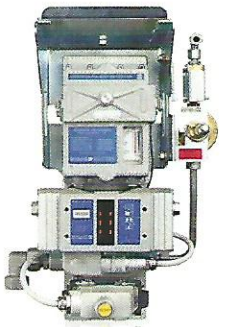
VISATRON®
VN115/87plus



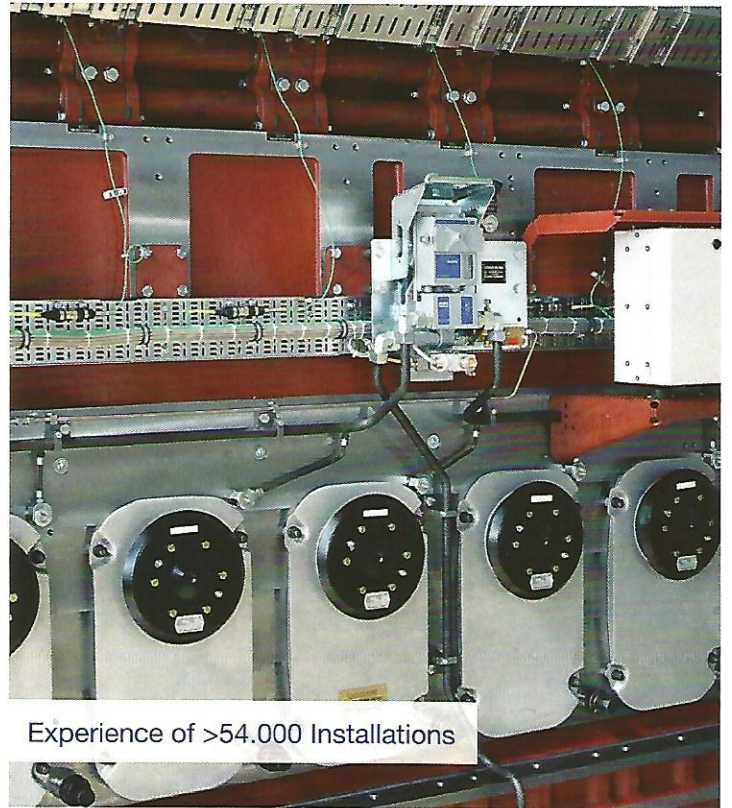
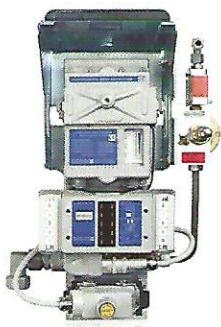
VISATRON®
VN115/87plusEX



VISATRON®
VN116/87plus



VISATRON®
VN215/87plus



FOR 2-STROKE ENGINES DIESEL, GAS AND DUAL FUEL

VISATRON® VN301plus

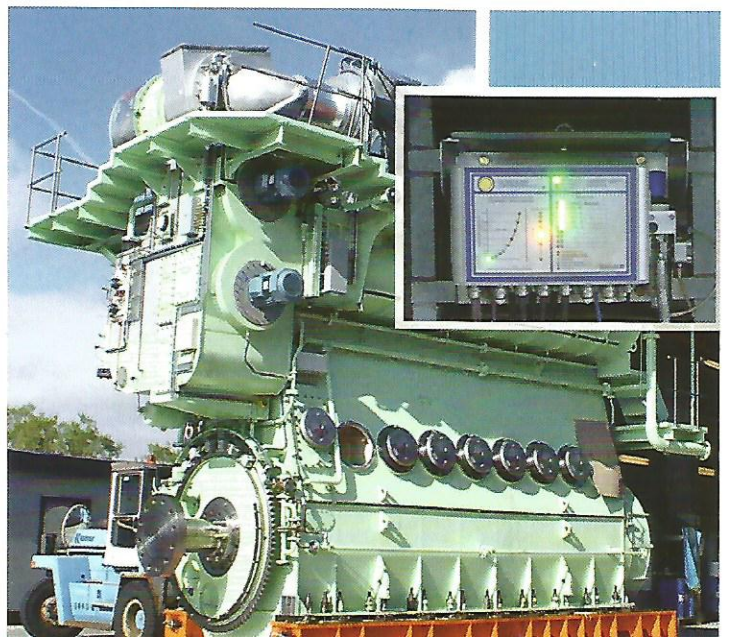
VISATRON® VN301plusEX



Tubeless OMD-System with Hybrid Cables.

Your Advantage:

- False Alarm-free
- Minimum Maintenance



HIGH MAINTENANCE COST? SAVE YOUR MONEY!

DESCRIPTION

The increasing cost of ship operations requires a focus on maintenance optimization on the main and auxiliary engines. Small items like Oil Mist Detectors incorporated in the engine safety system can contribute to significant cost savings. SCHALLER AUTOMATION's business model –unlike all

other competing OMD makers - is based on a slightly higher initial capital outlay, which is offset by the minimal spares requirements (advantage to the vessel operator) and low maintenance costs for a system that is meant to last the lifetime of the engine.

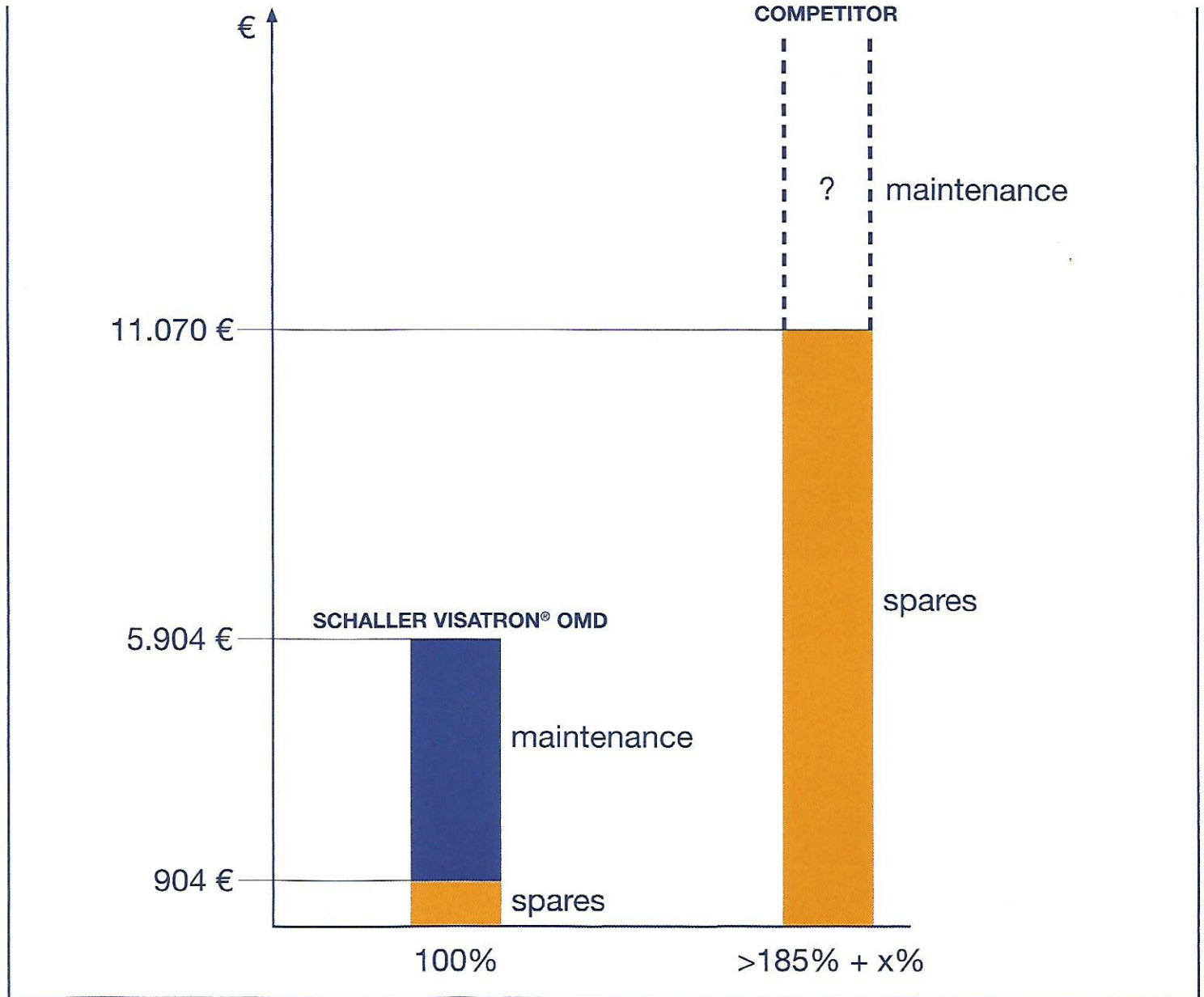
COMPARISON OF SPARE PART /MAINTENANCE COST

Based on Example of engine arrangement on board a container vessel :

1 main engine , 8 cylinder
4 Aux. Engines with total 33 cylinders
8 + 33 cylinders = 41 cylinders

	SCHALLER VISATRON® 1x VN 215/87 ^{plus} 4x VN 115/87 ^{plus}	COMPETITOR
	installation of 1 OMD + tubing system on each engine, total 5 OMD's	installation of 41 sensor heads on every engine's suction point + junction box + evaluation unit
PURCHASE COST (ENGINE MANUFACTURER)	100%	approx. 50%
SPARE PARTS NECESSARY (FOR 2 YEARS OPERATION) (SHIPOWNER)	suction from crankcase via 5 air jet pumps, no wear and tear approx. cost: 80 scavenging air filter: 504 € 20 Filter pressure reducer: 400 € subtotal 904 € only material (Filter change can be done within 2 Min.) Maintenance cost after 2 years 5x EUR 1000. per OMD total 5.904 €	suction from crankcase via 41 electrically driven fans on every suction point cost: Fans in sensor head limited to 1.5 years life span, before there is a need for a change (according to maintenance manual) 41 heads x ca. 270 € each subtotal 11.070 € only material fan exchange approx ½h each total 11.070 € + (maintenance)

MAINTENANCE COST AFTER 2 YEARS OPERATION



UNIQUE PRODUCT FEATURES, ONLY SCHALLER VISATRON® OIL MIST DETECTORS OFFER:

- active crankcase atmosphere extraction by means of pressurized air

YOUR ADVANTAGE:

- secure separation of oil splash in engines crankcase from oil mist enables maximum false alarm avoidance.
- active dirt protection of optical system by use of a fresh air curtain. Maximum false alarm avoidance.
- no electrical micro-fans exposed to dirt and vibrations. The air pump is a lifetime product. Reduction in spare parts requirements and optimal operational reliability.
- faster reaction times compared to other OMD systems

FURTHER ADVANTAGES AROUND SCHALLER VISATRON® OMD'S:

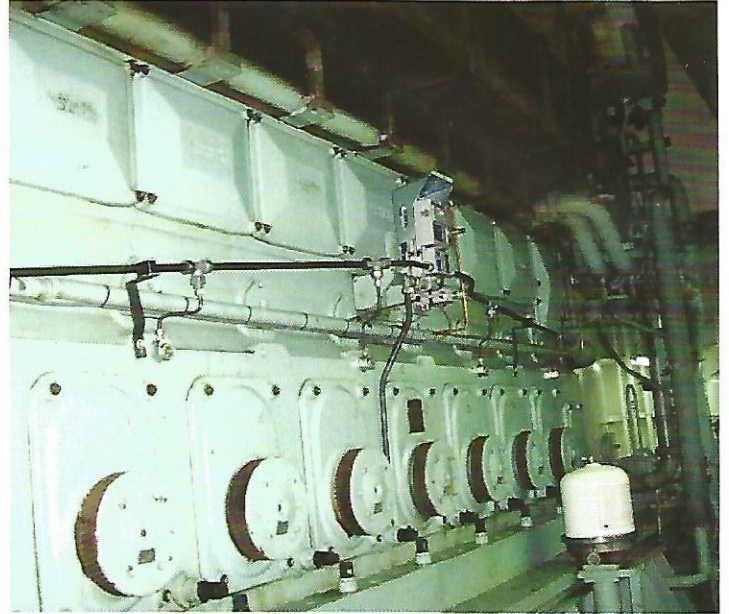
- 54.000 engines well protected with VISATRON® OMD systems.
- technical support with 4 Schaller Key Account Management centers and 42 service partners covering >50 countries worldwide
- high number of engine retrofits with Schaller OMDs.

RETROFIT SUCCESS STORIES

SUCCESS STORY 1

CONVERSION FROM COMPETITOR'S MULTI-SENSOR OMD SYSTEM TO SCHALLER AUTOMATION VISATRON® OMD FOR ALL ENGINES ON BOARD.

- Container vessel 8400 TEU
- 4x Auxiliary engines Hyundai MAN B&W 7L32/40
- 1x Main Engine MAN B&W 12K98

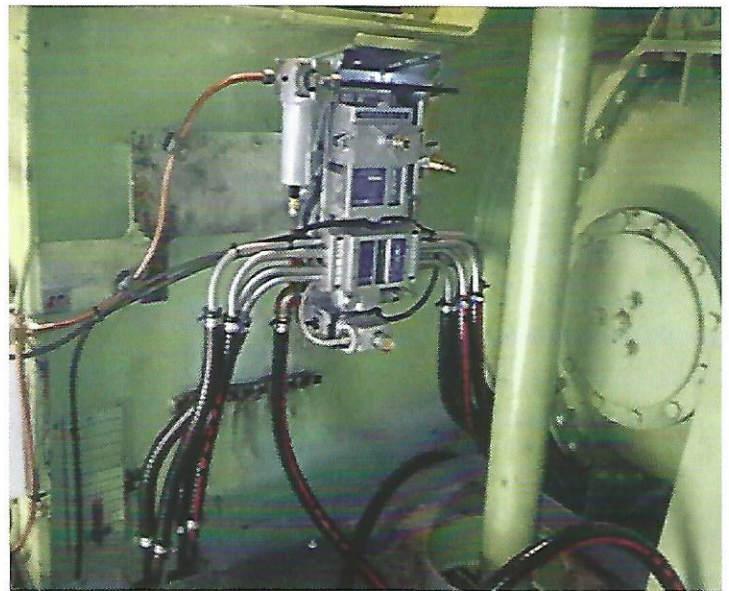


Auxiliary engine after retrofit to
SCHALLER AUTOMATION OMD VN115/87^{plus}

SUCCESS STORY 2

CONVERSION FROM COMPETITOR'S MULTI-SENSOR OMD SYSTEM TO SCHALLER AUTOMATION VISATRON® OMD.

- Car/Passenger Ferry 134m long
- Main engines MAN B&W 8L45GB



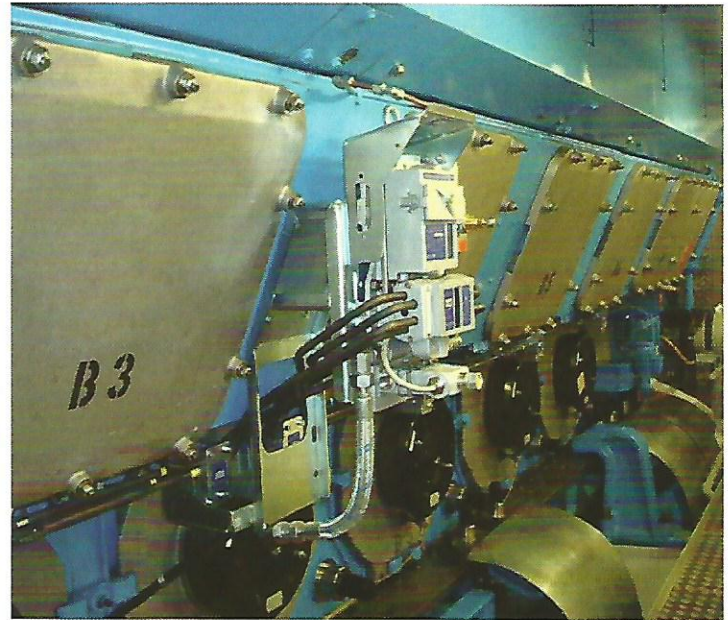
Main engines after conversion to
SCHALLER AUTOMATION OMD VN215/87^{plus}

RETROFIT SUCCESS STORIES

SUCCESS STORY 3

CONVERSION FROM COMPETITOR'S MULTI-SENSOR OMD SYSTEM TO SCHALLER AUTOMATION VISATRON® OMD FOR ALL ENGINES ON BOARD.

- Cruise Liner, 314m long
- 4x Main engines MAN 14V48/60



Main engines after conversion to
SCHALLER AUTOMATION OMD VN215/87^{plus}

WHAT MAKES THE SCHALLER VISATRON® OMDs UNIQUE IN THE MARKET?

- False Alarm-free operation
- Extremely low maintenance requirements
- Designed for engine lifetime

BASED ON SCHALLER AUTOMATION INNOVATIONS

- Only system on the market using pressurized air for every single sensor
- Use of Hybrid cables, leading air supply, signal and power supply via one cable,
-> can be handled like ordinary copper cables, tubeless
Pressurized air curtain to prevent contamination of optical system -> no false alarms, extremely low maintenance required
- Pressurized air for active extraction of atmosphere from engine -> fast reaction if engine needs to be stopped
- Floating opacity zero adaptation to naturally occurring opacity of a running engine, even worn out -> no false alarms and allows fast reaction if engine needs to be stopped.
- Optical systems heated -> no false alarms due to humidity
- Designed for vibrations beyond classification rules
-> maximum operational reliability

AFTER SALES SERVICE

SPARE PARTS SUPPLY

We ship all parts required for operation and maintenance on short notice to any place.

SERVICE ON BOARD

One of our service engineers is close, if your OMD requires a specialist somewhere around the world. Examination and overhaul are part of this service.

MAINTENANCE

We offer tailor-made maintenance packages reducing malfunctions to nearly zero, including evaluation and expert advice on board by factory trained specialists.

REPAIR

In our workshops systems are evaluated, repaired and tested extensively. During that period they will be upgraded, in order to provide you with a device which is "state-of-the-art".

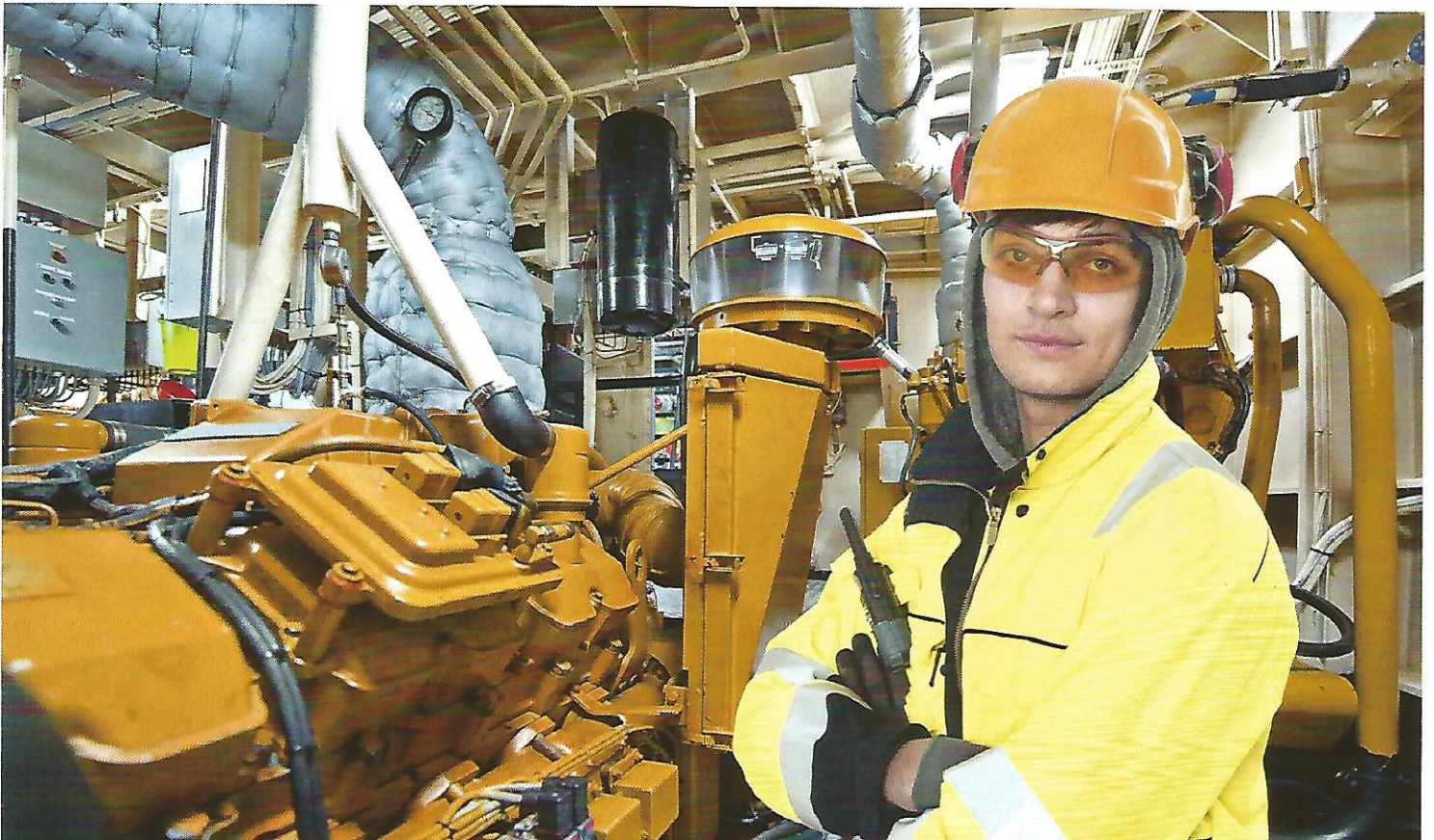
REPLACEMENT

Systems, which cannot be repaired on site, can be replaced by factory-reconditioned ones on same-day delivery service. The device returned by you will be repaired and transferred back into this closed loop.

TROUBLESHOOTING

Our specialists are at your disposal by phone or email, to rectify malfunctions in cooperation with you and your crew.

The success of **SCHALLER AUTOMATION** Oil Mist Detection Systems would not be possible without a well-organized After Sales Service. Today, 42 After Sales Service Partners, in over 50 countries throughout the world, are on stand-by to take care of any needs concerning Schaller Automation products.



UPGRADE KITS FOR MAINTENANCE MINIMIZATION

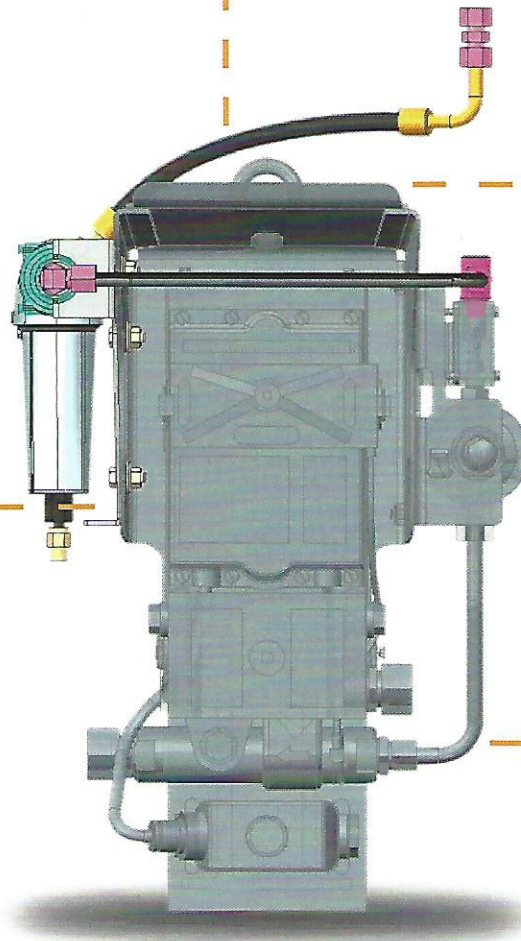
LONGER TIME
BEFORE OVERHAUL

LONGER TBO

OPTIONAL AUTOMATIC
DE-OILING/-WATERING

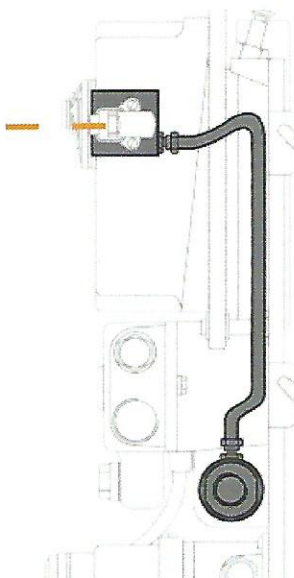
EASY RETROFIT

NOT DEPENDENT ON
ON BOARD AIR QUALITY



Scavenging Air Set for
older systems VN/87

- Independent of engine room air quality
- False Alarm avoidance



Heating Element for older
systems VN/87

- No condensation
- False Alarm avoidance

