

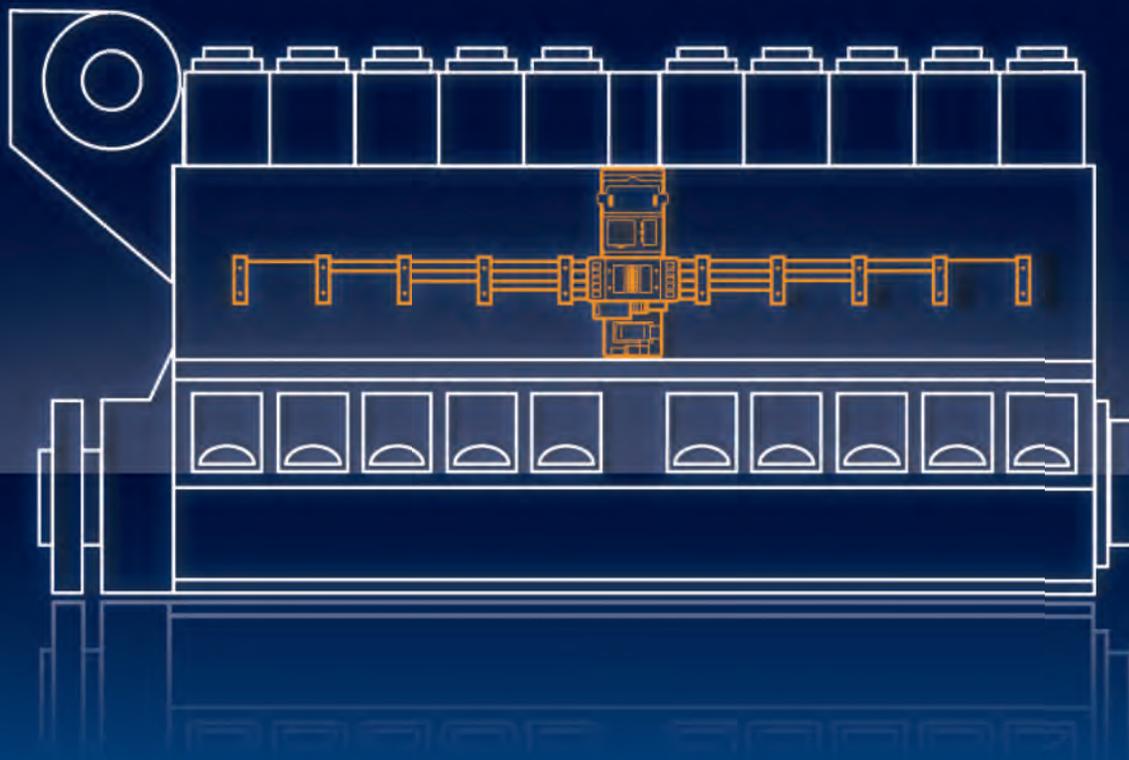
OIL MIST DETECTION SYSTEMS VISATRON®

VN115/87^{plus}

VN115/87^{plus} EX 

VN116/87^{plus}

VN215/87^{plus}



Technical Information



SYSTEM FEATURES:

- Over 53.000 engines well protected by VISATRON®
- Automatic opacity adaptation to engine in normal operation - False Alarm Free System even under frequent changes in engine load and rpm
- Extremely low maintenance cost - designed for engine lifetime
- Active Dirt protection of optics by clean air - only available from SCHALLER AUTOMATION
- Designed for vibrations beyond classification rules
- class approval of 11 classification societies

... a member of DIEMOS® family

SCHALLER 
AUTOMATION

VISATRON® TECHNICAL DATA

A COMPONENT OF THE DIEMOS-SYSTEM

FUNCTION DESCRIPTION

All VISATRON® - devices continuously draw the atmosphere from every compartment of the crankcase by means of the suction system. The suction vacuum required is generated by a wear-free air jet pump in the device, fed with compressed air (drive air).

The sample flow, consisting of the sucked-in atmosphere from the crankcase compartments, is guided through an optical channel for measuring turbidity. The sample flow turbidity is measured by the absorption of infrared light.

% Opacity is used as the dimensional unit of the turbidity; 100% Opacity means total light absorption, and 0% Opacity no absorption.

The VN87^{plus} series offers the following standard features:

- Scavenging air chambers are not supplied with air from the Engine atmosphere, but with fresh pressurized air, so the optical system is maximally protected against dirt contamination and stays clean. Also the filters stay clean for a longer period.
- A measuring head heating unit avoids a possible condensation, the danger of false Alarm due to humidity around the optical system is banned.
- An RS 485 interface permits the connection of the VN87plus series to a remote monitoring unit, alternatively via 4-20 mA connection (jumper).
- A separate pre-alarm relay, activated at 70% opacity of main alarm level, will be activated before an engine stop will be triggered based on a high concentration of oil mist (endangering the engine).

DESIGN

All Oil Mist Detectors of the VISATRON® family are not supposed to be disposable parts but designed to last for the entire engine lifetime.

The measuring heads containing the optical system for opacity measurement as well as the electronics are designed to be interchangeable with the ones of the former VN/87 series, produced for almost 25 years.

The air jet pump, the connector plug, the pipe connector box (VN115/87plus) resp. the valve box (VN116/87plus and VN 215/87plus) and the shock-absorbing mounting plate for the actual measuring head are supported on a sturdy base plate.

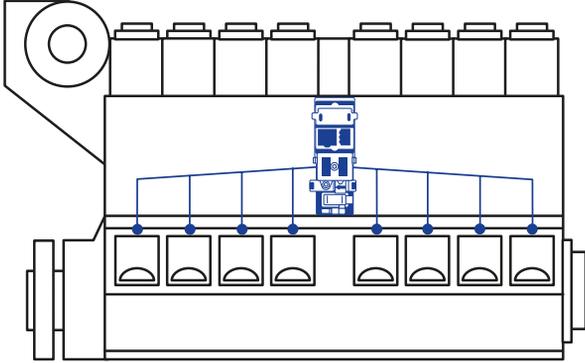
All VISATRON® Oil Mist Detectors are equipped with 3 Relay outputs:

- System ready
- Pre-Alarm
- High Oil Mist Alarm (also called Main Alarm)

APPLICATION OF THE DIFFERENT VISATRON® DEVICES AND SUCTION SYSTEMS

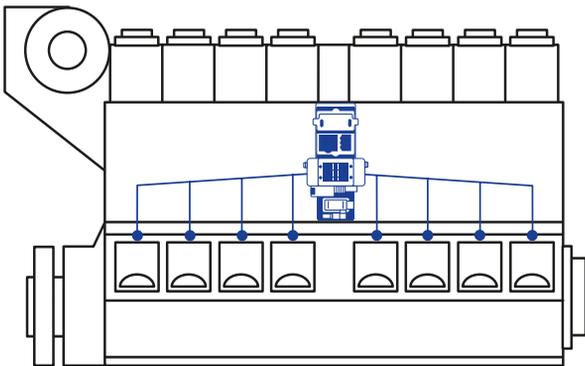
VISATRON® VN115/87^{plus} and VN115/87^{plus} EX

- Basic design, suitable for the monitoring of trunk piston diesel engines with in-line and V cylinder arrangements, running at medium and high speed.
- In the case of dangerous oil mist generation, Alarm signal via Alarm relay for High Oil Mist. No indication of Oil Mist source location.



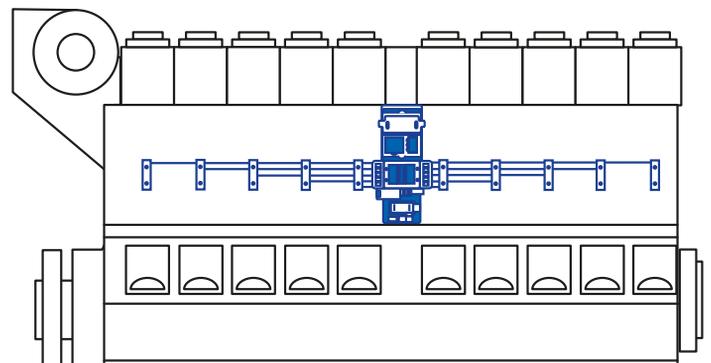
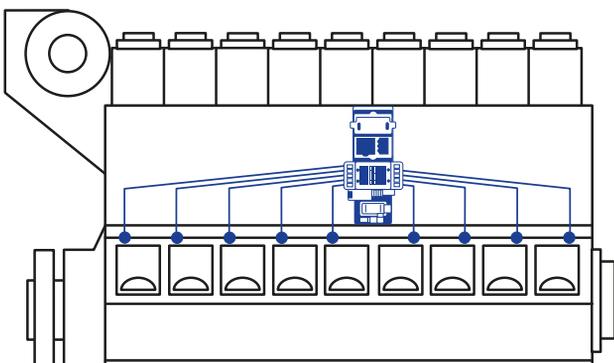
VISATRON® VN116/87^{plus}

- Design suitable for the monitoring of trunk piston diesel engines with in-line and V cylinder arrangements, running at medium and high speed.
- Damage detection via a header pipe sampling system with a display of the crankcase compartment half (left or right side of the position of the detector) in which overheating damage has arisen.
- The header pipe sampling system is the same as in the VN115, so the VN116 can replace the VN115 without modification of the suction system if localisation of damage is called for.



VISATRON® VN215/87^{plus}

- Device suitable for the monitoring of crosshead engines running at medium and slow speed, because the oil mist spreads out from the damaged compartment more slowly than in the case of trunk piston engines.
- Damage detection through the individual compartment suction pipe system, with display of the compartment with the overheating damage.

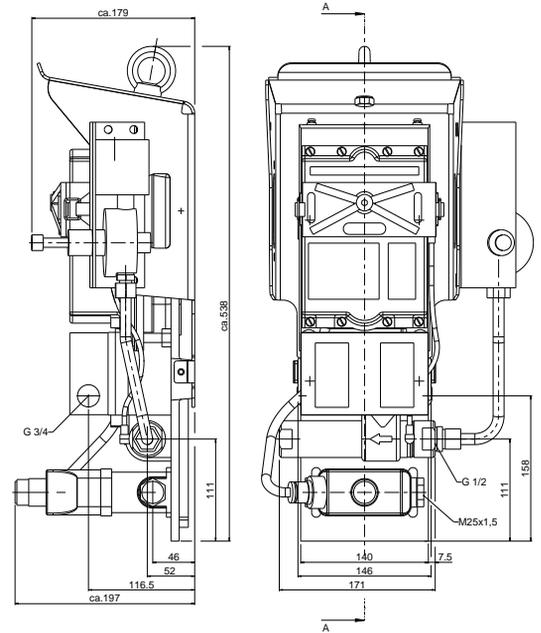
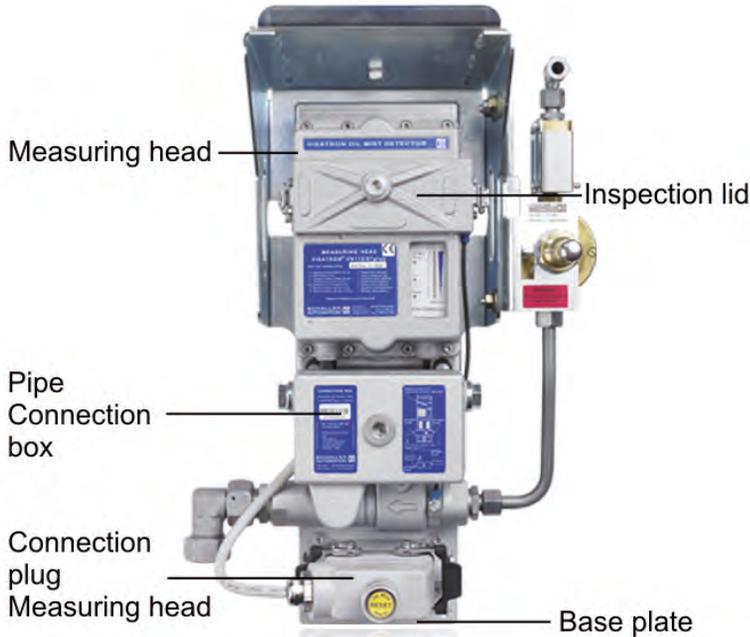


THE DIFFERENT VISATRONS®

VISATRON® VN115/87plus

The detection of damage takes place through a header pipe sampling system without localisation of the point of damage. The mixture of atmosphere from the crankcase passes from all individual compartments via the header

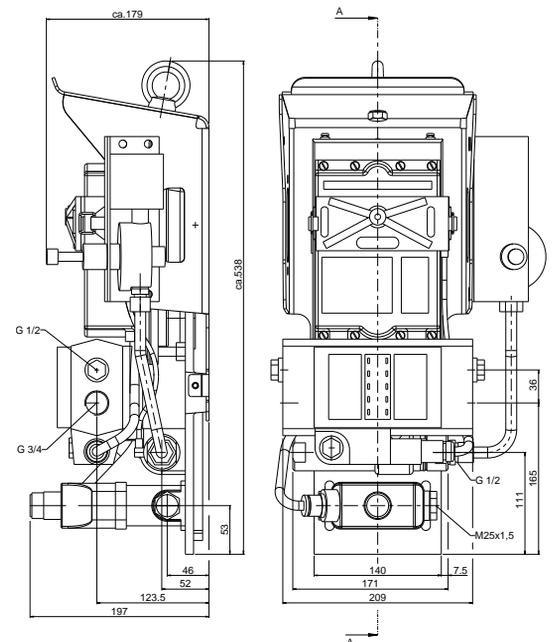
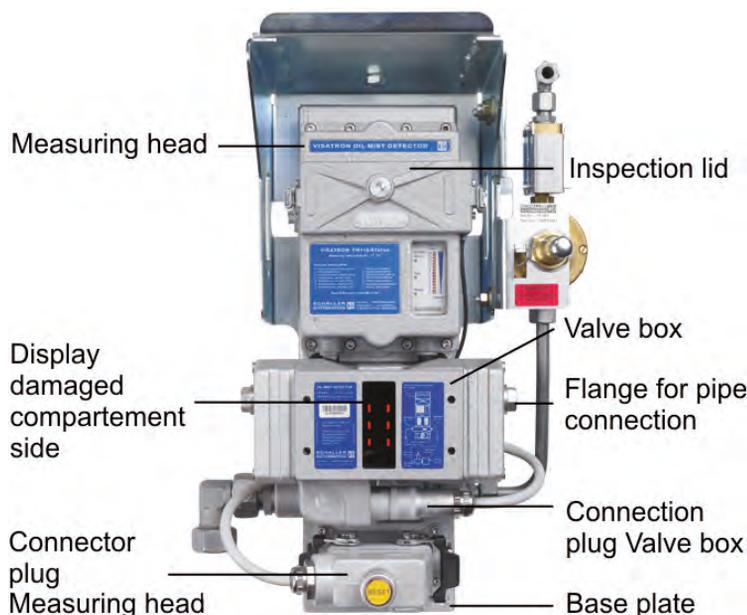
pipe through the detector's pipe connector box into the opacity measurement path in the housing of the measuring head. The alarm threshold can be set to 4 levels.



VISATRON® VN116/87plus

The detection of damage takes place through a header pipe sampling system with a display of the crankcase compartment half in which the overheating damage has arisen. The mixture of atmosphere from the crankcase passes from all individual compartments via the header pipe through the valve box into the opacity measurement path in the housing of the measuring head. If the opacity of the mixture of atmosphere from the crankcase exceeds 10% of the alarm threshold that has been set, a so-called damage check starts.

The valves in the valve box are switched over according to a certain algorithm during the damage check, until the half of the crankcase compartments with the overheating damage has been found. The alarm threshold can be set to 4 levels. The increased sensitivity, in comparison with the VN115/87plus, results from the fact that an alarm is triggered if the difference in opacity between the two halves of the crankcase compartment exceeds 20% of the alarm threshold that has been set.



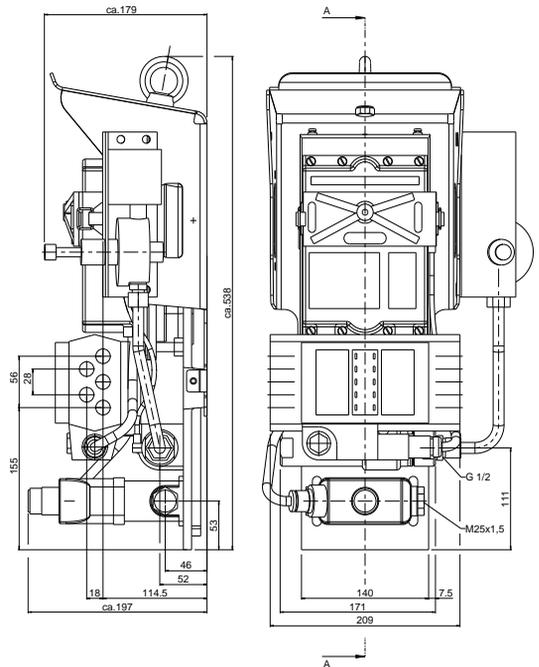
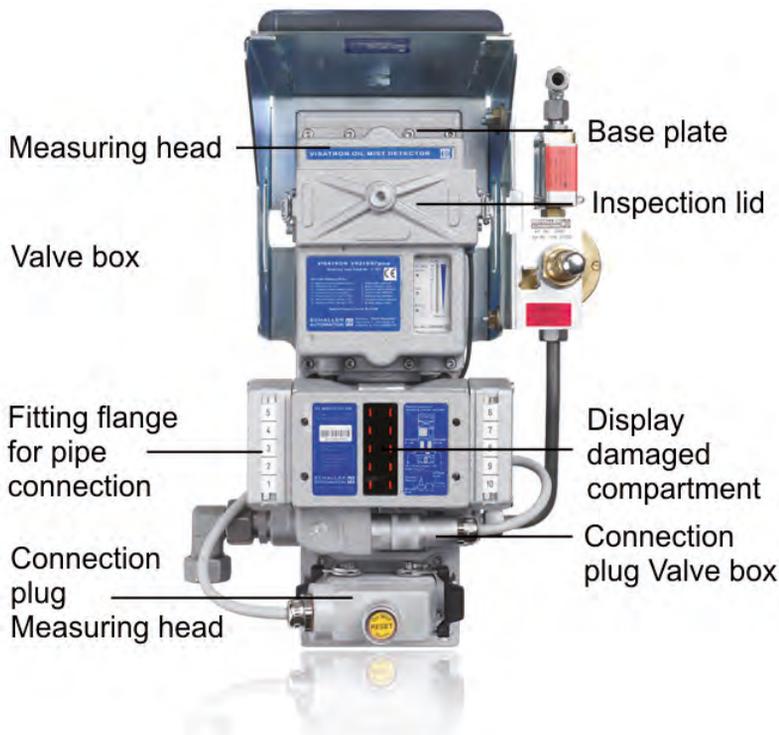
THE DIFFERENT VISATRONS®

VISATRON® VN215/87^{plus}

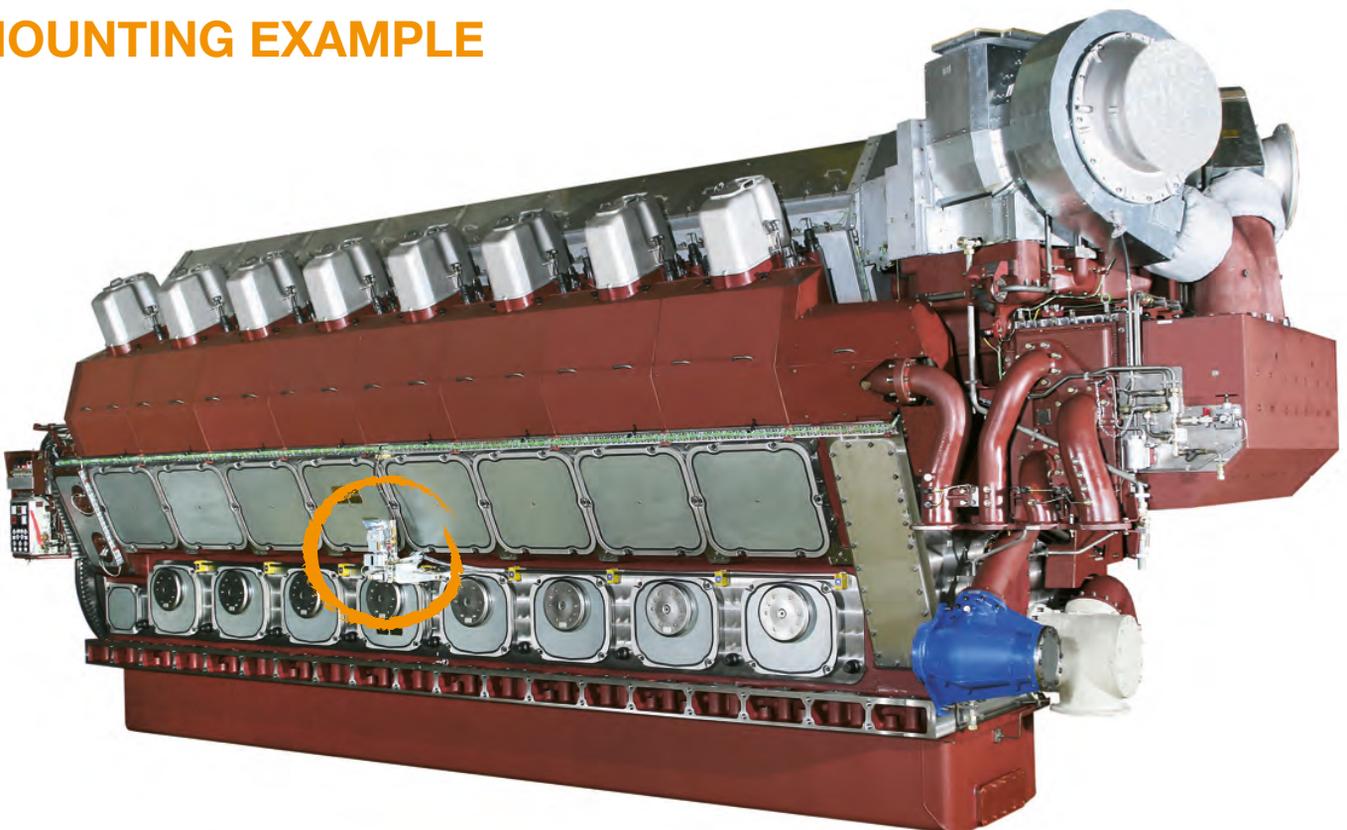
The detection of damage takes place via a single pipe sampling system with a display of the crankcase compartment in which the overheating damage has arisen. The mixture of atmosphere from the crankcase passes from all individual compartments of the measuring head's housing. If the opacity of the mixture of atmosphere from the crankcase exceeds 10% of the alarm threshold that has been

set, a so-called damage check starts.

The valves in the valve box are switched over according to a certain algorithm during the damage check, until the crankcase compartment with the overheating damage has been found. The alarm threshold can be set to 4 levels.



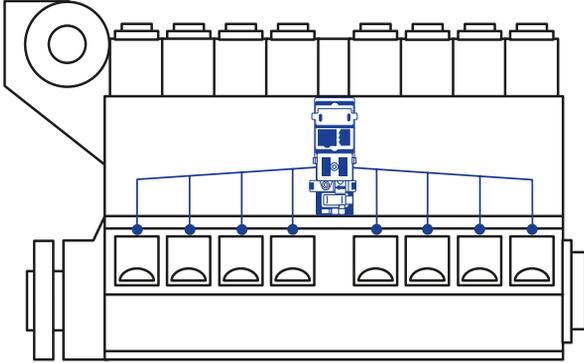
MOUNTING EXAMPLE



THE DIFFERENT VISATRONS®

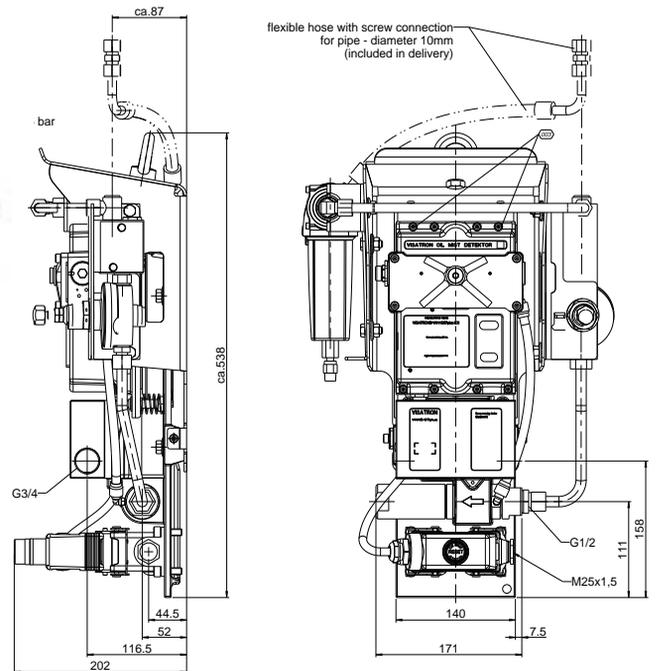
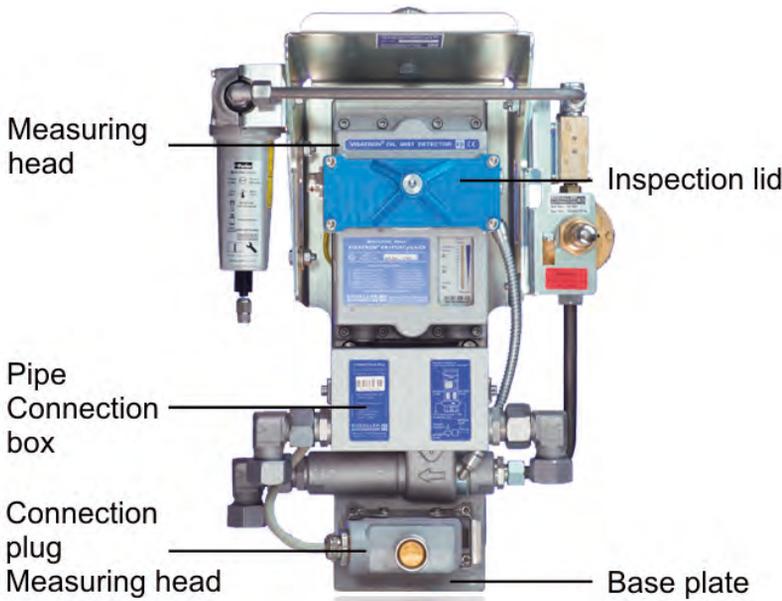
VISATRON® VN115/87^{plus} EX

- Suitable for the monitoring of 4-stroke Diesel, Gas- and Dual Fuel engines in-line or V-cylinder arrangements
- ATEX-certified for crankcase environment according to II (2G) [Ex op is IIB T4 Gb]
- In the case of dangerous oil mist generation, Alarm signal via Alarm relay for High Oil Mist. No indication of Oil Mist source location.



The detection of damage takes place through a header pipe sampling system without localisation of the point of damage. The mixture of atmosphere from the crankcase passes from all individual compartments via the header

pipe through the detector's pipe connector box into the opacity measurement path in the housing of the measuring head. The alarm threshold can be set to 4 levels.



VISATRON® VN115/87^{plus}, VISATRON® VN115/87^{plus} EX and VISATRON® VN116/87^{plus}

2 header pipes (22 x 2 mm) with thinner branch pipes (10 x 2 mm) to the crankcase compartments, max. length 9m.

VISATRON® VN215/87^{plus}

Individual pipes (14 x 2 mm) from each compartment to the OMD, max. length 9m.

The maximum number of sampling points for both systems (header pipe and individual) =10
Suction pressure measured against atmospheric pressure 60 mmWC.

SENSITIVITY

VISATRON® VN115/87^{plus}

Alarm threshold 2% *Opacity (see Brief Description of the VN 115/87plus), adjustable in 4 levels from 0,5% to 25% Opacity.

VISATRON® VN116/87^{plus} and VISATRON® VN215/87^{plus}

Damage Check - start threshold 0,24% *Opacity (see Brief Description of the VN 116/87plus), adjustable in 4 levels from 0,16% to 0,55% Opacity.
Differential alarm threshold 0,49% *Opacity (see Brief Description of the VN 116/87plus), adjustable in 4 levels from 0,33% to 1,1% Opacity. Safety alarm threshold 2,44% *Opacity, adjustable in 4 levels from 1,6% to 5,5% Opacity.
*Factory setting

POWER SUPPLY ALL VISATRONS

ELECTRIC POWER SUPPLY

Voltage	24 V DC - 25/+ 30%, 24 V battery or power supply unit
Note	In case of battery operation, provide a direct power supply from the battery terminals directly to the VISATRON-device!
Current consumption	max. 2A

DRIVE AIR FOR THE SUCTION SYSTEM ALL VISATRONS

Suction vacuum measured against the atmosphere 60 mmWC. The measurement is performed with a U- pipe manometer on the measuring head. The U- pipe manometer is a component of the service box (see accessories). Air consumption max. 2,5 Nm³/h (m³ at atmospheric pressure).

re). The drive air can be taken from the pneumatic engine control system or from the starting air system. A pressure regulation unit (see device list) can be delivered as an option for pressure reduction; max. inlet air pressure 15 bar (additional 30 bar pressure regulator is also available).

SIGNAL OUTPUTS AND DISPLAYS

MAIN ALARM

Adjustment range for the sensitivity	can be set to 4 levels
Remote Signalling	relay with 2 potential-free switch-over contacts, excitation with a main alarm.
Contact load	max. 60V DC, 1 A, 60 W
Wire-Break Protection	bridging the n.o. contacts with 33 K ohm resistor. On request, resistor with other value is available.
Display on the device	permanently red Alarm LED

VISATRON® TECHNICAL DATA

PRE-ALARM

Factory Pre-Set	to 70% of the main alarm threshold, not changeable
Remote Signalling	relay with potential- free contact, opens for a pre-alarm
Contact load	max. 60V AC, 2 A , 120 VA / max. 60 V DC, 2A, 60W
Display on device	blinking Red Alarm Relay

READY, INDICATION OF DEVICE IN OPERATION

Remote Signalling	Relay with potential-free switch-over contact, excitation when the device is functioning troublefree
Contact load	max. 60V AC, 2 A, 120 VA/max. 60V DC, 2 A, 60W
Display on the device	green Ready-LED on when the device is functioning troublefree

OPACITY DISPLAY

Remote Signalling	By a remote indicator, driven through the RS 485 interface or 4-20 mA
Display on the device	By LED chain with 14 LED's display of the opacity relative to the alarm threshold in 14 steps, i.e. the main alarm is triggered when the upper LED is reached.

CABLE CONNECTIONS

M25 x 1,5 screwed connections for the cable connection of the relay contacts and power supply

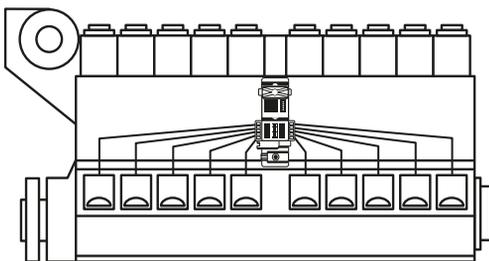
MECHANICAL DATA / TEMPERATURE

Housing and base plate	cast aluminium. Support plate for the measuring head: stainless steel plate with anti vibration suspension
All surfaces	lacquered, RAL 7035
Springs, bolts etc.	stainless steel
Rubber parts for vibration reduction and seals	oil resistant. Built-in vibration reduction for the electronic part
System of Protection	IP 54
Operating range	0°C to 70°C
Storage temperature	-25°C to +80°C
VN 115/87plus net weight	7,5 kg
Gross with special packing	12,5 kg
VN 116/87plus and VN 215/87plus net weight	9,4 kg
Gross with special packing	13,5 kg
VN115/87 ^{plus} EX net weight	11,0 kg
Gross with special packing	15,0 kg

Comprehensive investigations on different types of engines have made clear that the sampling points for the oil mist have to be placed in the interior of the crankcase at points where the highest possible concentration of oil mist can be extracted, in case of damage, without a loss of time. The concentration of the drawn oil mist is the message as to the condition of the crankdrive for the oil mist detector. It becomes imperative that a genuine information is transmitted as

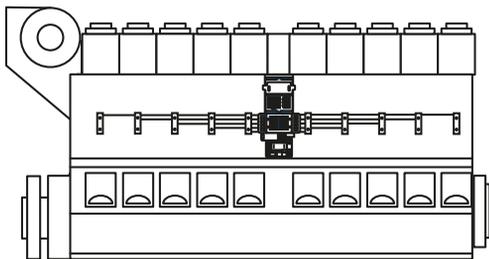
a signal with the greatest possible intensity from the point of oil mist generation, so that the sensitivity of the oil mist detector doesn't have to be set unnecessarily high. Otherwise, interfering influences are also received and evaluated. One of the most important requirements for a well-functioning oil mist monitoring system is the absolute necessity of avoiding false alarms. In addition, the way the suction system is installed on the engine is of great importance.

ILLUSTRATION 1



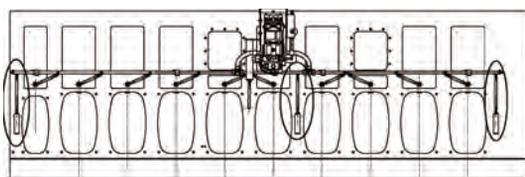
shows the conventional installation of a VISATRON® oil mist detector VN215. The pipes have the necessary slope for the return of the oil that has precipitated from the oil mist. Due to this slope, the pipes require a notable area of free space, extending over the entire length of the engine and part of its height, avoiding this way that the pipes obstruct the required space for accessing the crankcase doors and compartments, during maintenance work.

ILLUSTRATION 2



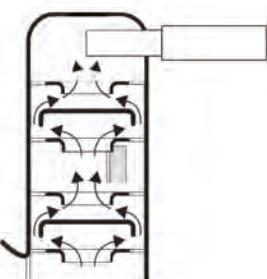
shows, the installation of a VISATRON® oil mist detector, type VN215, with individual compartment suction pipe system consisting of a space-saving siphon block assembly set. The advantage of horizontal pipe installation can be clearly recognised. Oil that precipitates in the suction pipes is led back into the crankcase through the siphon blocks.

ILLUSTRATION 3



shows a further alternative in tubing arrangement for VN115/87plus and VN116/87plus. To avoid collection of excessive oil in the horizontal tubing system, oil separation units are installed (see marking).

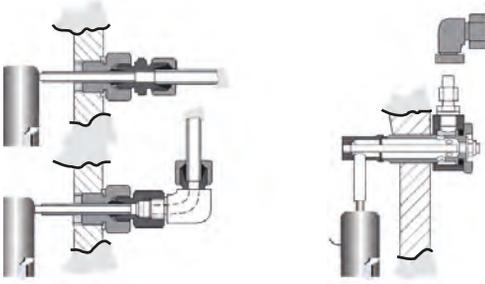
ILLUSTRATION 4



shows the sectional view through a suction head with its labyrinth, which effectively prevents spray oil from getting into the suction pipe system.

VISATRON® ASSEMBLY SYSTEM

ILLUSTRATION 5



The engine wall connections join the labyrinth suction heads located inside the crankcase compartment and the suction pipes on the outside, and are available in various designs with different metric or pipe thread sizes. Labyrinth suction heads with different pipe lengths can be installed (see Illustration 4). The engine wall connections can be used for conventional suction pipe systems or also in connection with VISATRON® siphon blocks.

ILLUSTRATION 6



SCHALLER AUTOMATION has developed various types of VISATRON® assembly units, in order to adapt to the installation conditions on almost every engine design. The assembly units consist of a VISATRON® OMD, a specific engine adapted bracket, available for crosshead and trunk piston engines, an integrated protective cover, an air pressure regulation unit, fixtures and fittings for the compressed air supply. The assembly unit is a component of the VISATRON® assembly set. SCHALLER AUTOMATION supplies special, ready-made modular assembly sets for VISATRON® oil mist detectors, for a variety of engine types from worldwide manufacturers. An oil mist detection system for a specific engine, (Illustration 6) consists of:

- The assembly unit with oil mist detector
- The pipe connections, either with engine wall connections or siphon blocks
- The ready-made pipes
- All necessary fitting material, such as pipe supports and fastening elements

ILLUSTRATION 7



SCHALLER AUTOMATION offers a special design service, set up for the VISATRON® adaptation to the engine for quick assembly, that is available to all our clients. Service Box (Illus. 7) on request. The service box contains all replacement parts, tools and devices necessary for the initial operation, the repair and the fixing of malfunctions. The amount of replacement parts in the service box is designed in such a way that a stock of replacement parts is available for an operating period of one year.

ILLUSTRATION 8



Pressure regulation unit (Illus. 8) The pressure regulation unit consists of a pressure regulator and a throttle block with an integrated air filter. The throttle block ensures that the drive air pressure in the VISATRON® oil mist detector does not increase to an excessively high level if the pressure regulator fails, (e.g. failure of diaphragm). The pressure regulation unit is delivered, pre-assembled and ready to operate, with its bracket.

OIL MIST DETECTION EFFICIENCY APPROVAL**SYSTEM FEATURES**

The idea of OMDEA is to find out the highest possible OMD sensitivity and so the shortest response time at maximum false Alarm immunity, adapted to a specific engine type.

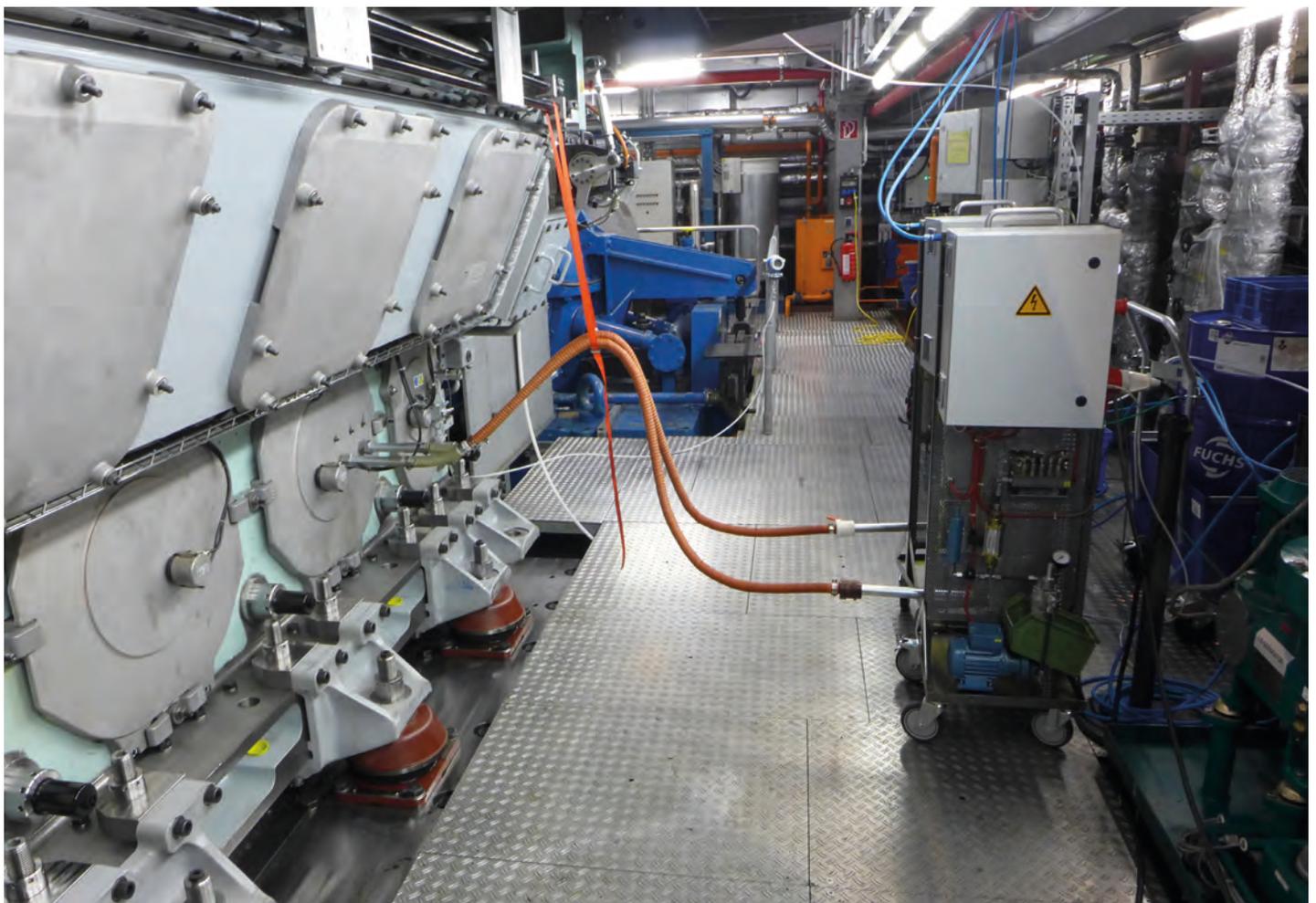
With release of The Unified Requirements (UR) M10 ('Protection of internal combustion engines against crankcase explosions') and M67 ('Type Testing Procedure for Crankcase Oil Mist Detection and Alarm Equipment') in 2006, IACS first-time requested similar tests via classification societies for new engine types resp. vessel new buildings.



SCHALLER AUTOMATION offers damage simulation to integrate the OMD System in best possible manner to a specific engine type.



Oil Mist Generators providing real Oil Mist in order to simulate e.g. an acute bearing damage at a running engine.



Safety for you and your engine: Worldwide!

Headquarters:

SCHALLER Automation

Industrielle Automationstechnik GmbH & Co. KG
 Industriering 14
 D-66440 Blieskastel
 Tel.: +49 6842 508 0
 Fax: +49 6842 508 260
 Mail: info@schaller.de
 www.schaller-automation.com

Key Account Management Center:

Singapore

Schaller Automation Pte Ltd.
 114 Lavender Street
 #09-93 CT Hub 2
 Singapore 338729
 Phone: +65 6643 5151 (24/7)
 Fax: +65 6643 5150
 Mail: info@schallersingapore.com



China

Schaller Automation - China
 Room 401, Juyang Mansion No. 1200
 Pudong Avenue,
 Shanghai 200135, P.R.China
 Phone: +86 - 21 - 5093 - 7566
 Mobile: +86 - 1390 - 1890 - 736
 Fax: +86 - 21 - 5093 - 7556
 Mail: info@schallerchina.cn

USA

Schaller Automation LP
 811 Shotgun Road
 Sunrise, FL 33326
 United States of America
 Phone: +1 954 794 1950
 Mobile: +1 561 289 1495
 Fax: +1 954 794 1951
 Mail: info@schalleramerica.com



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