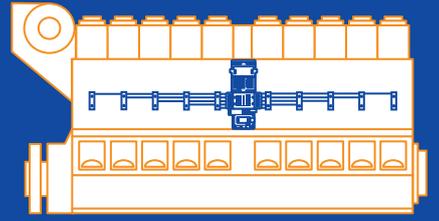


VISATRON

VISATRON[®] OIL MIST DETECTORS

A component of the DIEMOS-System



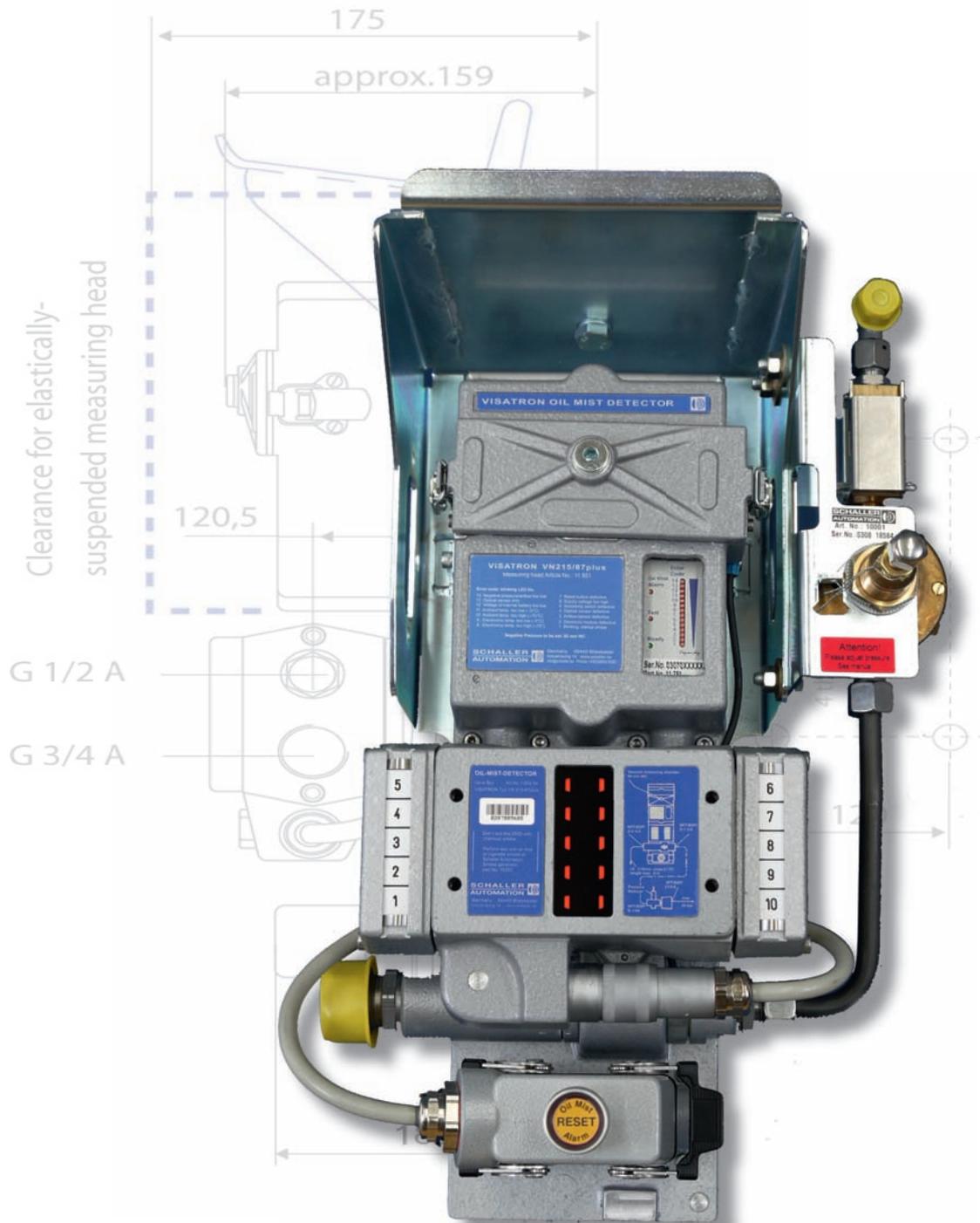
Type

VN115/87plus

VN116/87plus

VN215/87plus

87plus



Brief description

Oil mist detectors protect large diesel, gas and dual fuel engines of all applications from heavy consequential damage as a result of overheating of bearings or other moving parts.

With the VISATRON® oil mist detectors of the type VN 115/87plus and 116/87plus, a header pipe sampling system is used for suction extraction of the crankcase atmosphere from each crankcase compartment; whereas an individual compartment suction pipe system is engaged for the type VN215/87plus.

Function description

All VISATRON®- devices continuously draw the atmosphere from every compartment of the crankcase through the suction system. The suction vacuum required is generated through a wear-free air jet pump in the device, fed with compressed air (drive air), and is consequently independent of e.g. an alternating power supply.

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

% Opacity is used as the dimensional unit of the turbidity; 100% Opacity means total absorption, and 0% Opacity

means no absorption. Oil mist becomes explosive from a concentration of approx. 47 mg of atomised oil in 1 litre of air and up, which corresponds to an absolute opacity of approx. 40%.

The sensitivity, i.e. the opacity that is required to trigger an alarm, can be set at 4 different levels in all devices.

A slow increase in the operating opacity or the contamination of the optics is compensated in the microprocessor system up to a maximum safety alarm threshold. The contamination is strongly limited through scavenging air chambers that are supplied with fresh air and are located in front of the optics.

The VN87plus series is distinguished from the VN87 series through the following features:

- Scavenging air chambers are not supplied with air from the engine room, but instead with fresh pressurized air, so fumes from a fire in the machine room cannot lead to an alarm and filters stay clean for a longer period.
- The measuring head heating unit for the avoidance of precipitating condensation water in the device, which can be delivered as an option to the VN87, is integrated in the measuring head of the VN87plus.
- An optional RS 485 interface permits the connection of the VN87plus series to a remote monitoring unit.
- A pre-alarm relay, activated at 70% opacity of main alarm level, can be activated before an engine stop will be triggered based on a high concentration of oil mist (endangering the engine).

Design

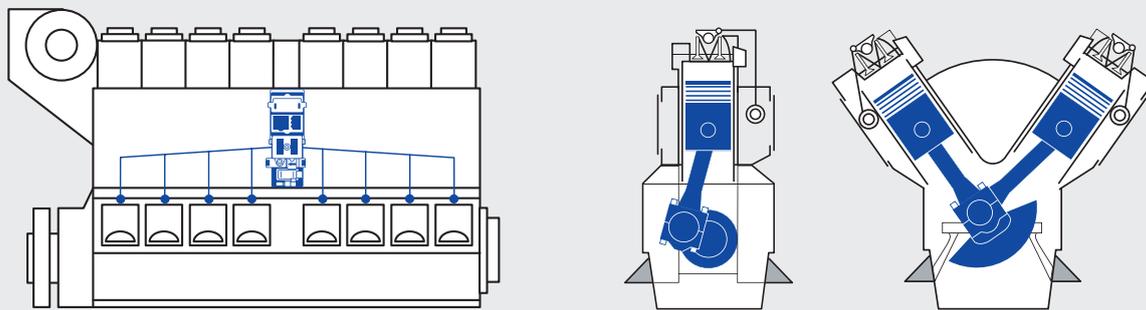
The air jet pump, the connector plug, the pipe connector box (VN115/87plus) or the valve box (VN116/87plus and VN 215/87plus) and the shock-absorbing mounting plate for the actual measuring head are supported on a sturdy base plate. The opacity measurement path and the electronics with microprocessor control are located in the measuring head.

1 LED chain and 3 further LEDs to display the operating state. The measuring heads are designed to be interchangeable with the ones of VN/87 series.

Application of the different VISATRON[®] devices and suction systems

VN115/87plus

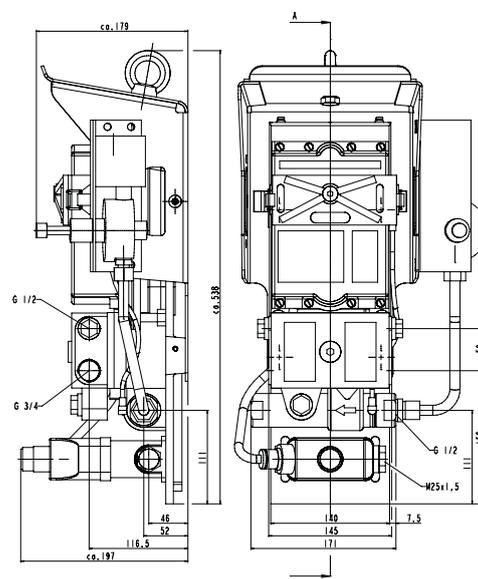
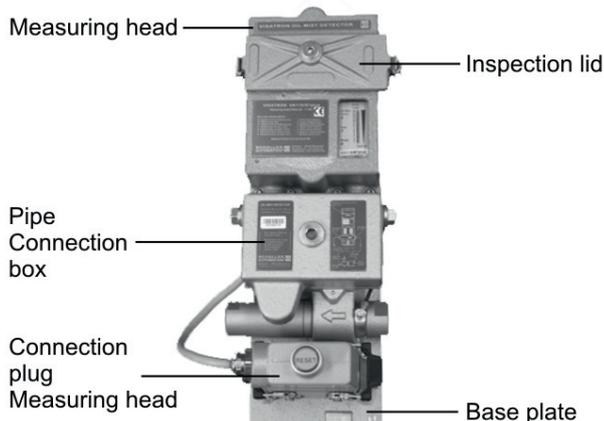
- Basic design, suitable for the monitoring of trunk piston diesel engines with in-line and V cylinder arrangements, running at medium and high speed.
- In the case of oil mist generation, damage detection through a header pipe sampling system without localisation of the point of damage.



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.

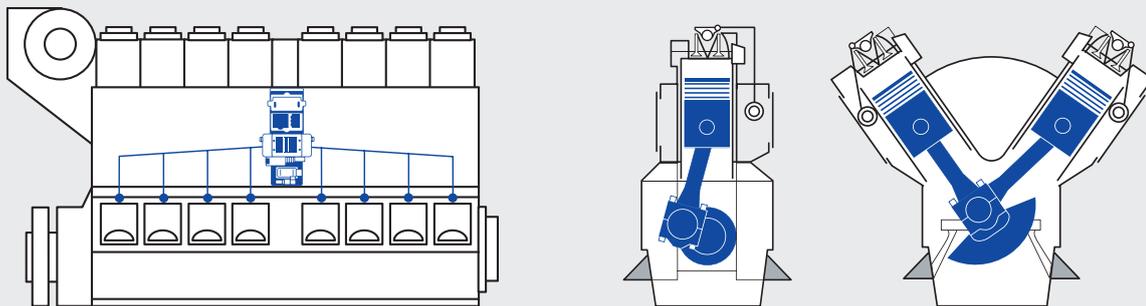
Dimensional diagram



Application of the different VISATRON® devices and suction systems

VN116/87plus

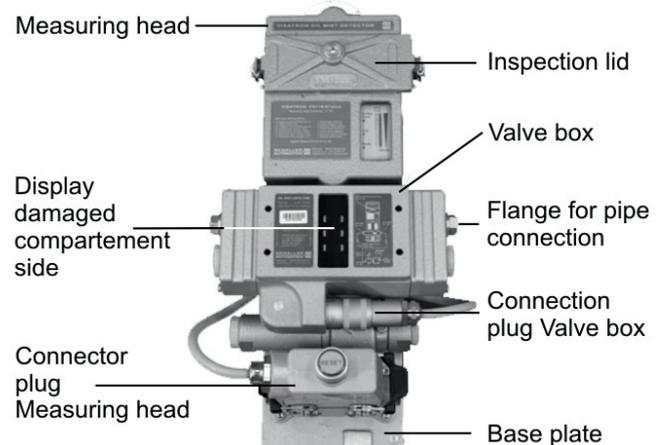
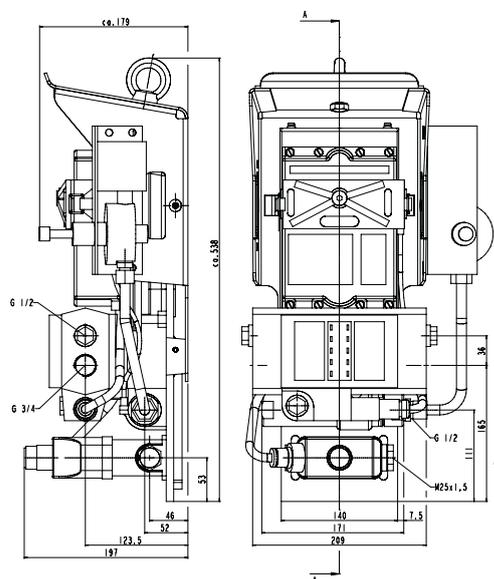
- Design suitable for the monitoring of trunk piston diesel engines with in-line and V cylinder arrangements, running at medium and high speed.
- Damage detection through a header pipe sampling system with a display of the crankcase compartment half (left or right side of the position of the detector) 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.



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.

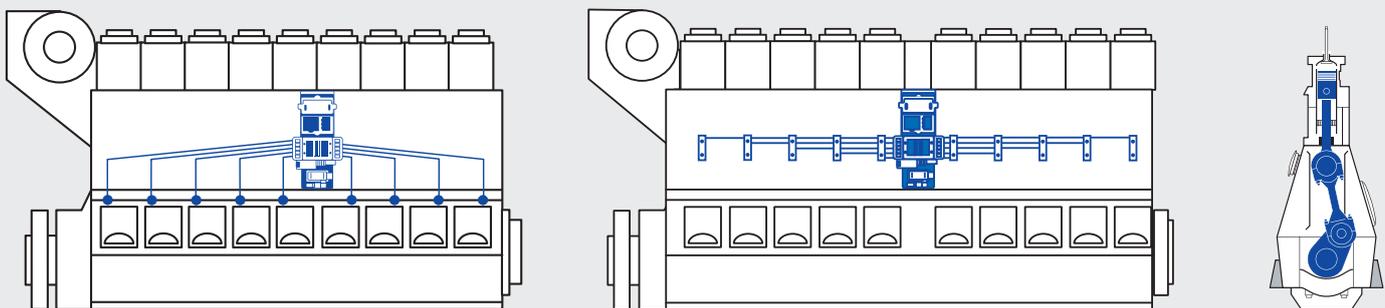
Dimensional diagram



Application of the different VISATRON[®] devices and suction systems

VN215/87plus

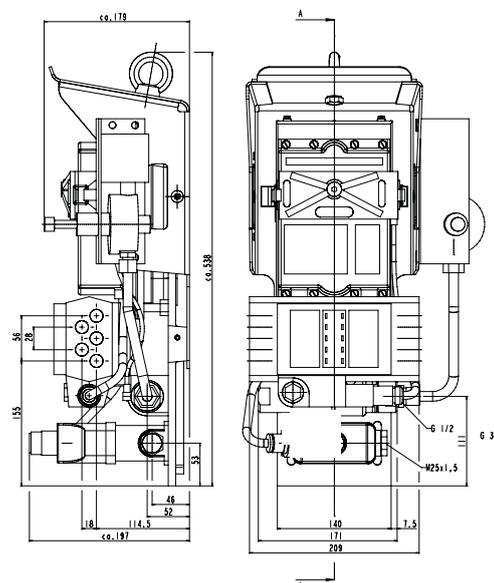
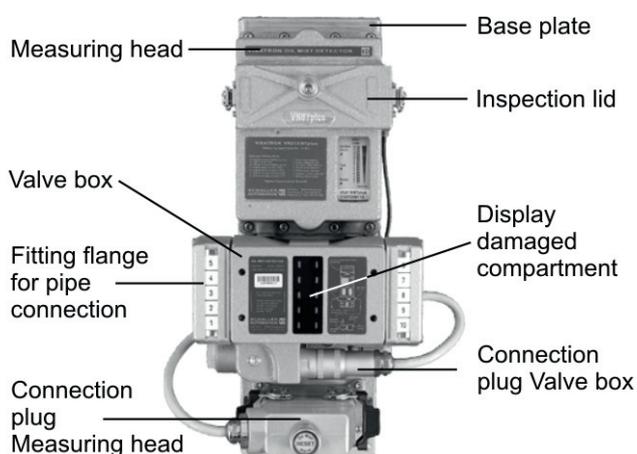
- Device suitable for the monitoring of crosshead engines running at medium and slow speed, because the oil mist spreads out from the damaged compartment more slowly than in the case of trunk piston engines.
- Damage detection through the individual compartment suction pipe system, with display of the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



The 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.

Dimensional diagram



Technical Data

Suction System

VN115/87plus and VN116/87plus:

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

VN215/87plus:

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. The measurement is performed with a U-pipe manometer on the measuring head. The U-pipe manometer is a component available in the service box (see accessories).

Sensitivity

VN115/87plus:

Alarm threshold 2% Opacity* (see Brief Description of the VN 115/87plus), adjustable in 4 levels from 0,5% to 25% Opacity. (1% Opacity corresponds to approx. 0,2 mg of oil mist per litre of crankcase atmosphere; explosion limit 47 mg/l at ignition temperature of 270°C).

VN116/87plus und VN215/87plus:

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* (see Column 5, Brief Description of the VN 115/87plus), adjustable in 4 levels from 1,6% to 5,5% Opacity.

*Factory setting

Power Supply

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. 2 A.

Drive Air for the suction system

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 pressure required at the inlet of the jet pump approx. 0,6 bar. Air consumption max. 1,0 Nm³/h (m³ at atmospheric pressure). 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 on red Alarm Led

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

Fail-Safe Alarm, 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 optional RS 485 interface

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

M25 x 1,5 screwed connections for the cable connection of the 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

VISATRON[®] assembly system

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. Precipitated oil can accumulate in the piping system, therefore provisions have to be made to drain it back into the crankcase, to avoid that the suction pipes become clogged. If the pipes are fitted conventionally, they must be installed with a slope ensuring the drainage of oil at all times.

Illustration 1 shows the conventional installation of a VISATRON[®] oil mist detector. The pipes have the necessary slope for the return of the oil that

VISATRON[®] assembly system

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 crank- case doors and compartments, during maintenance work.

Illustration 2 shows, on the right side, 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. On the left side, in the conventional layout, the unfavourable displacement of the suction points downwards can be recognised.

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.

Illustration 1

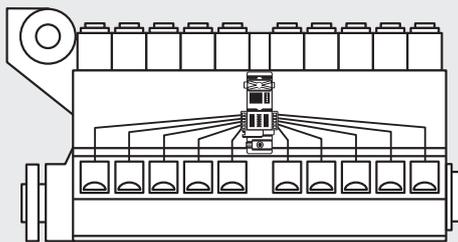


Illustration 2

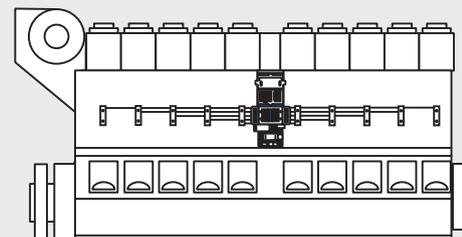


Illustration 3

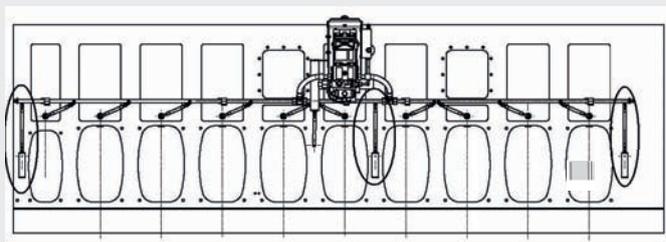
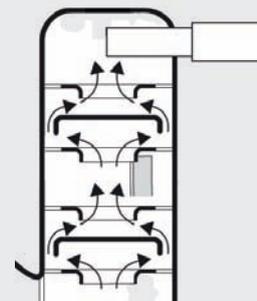


Illustration 4



VISATRON® assembly system

Illustration 5

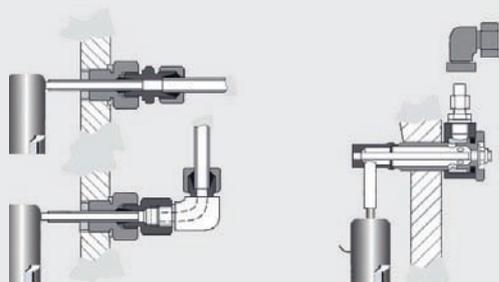


Illustration 6

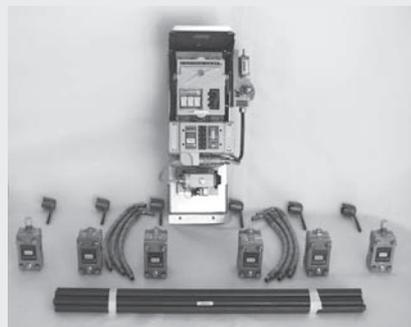


Illustration 7

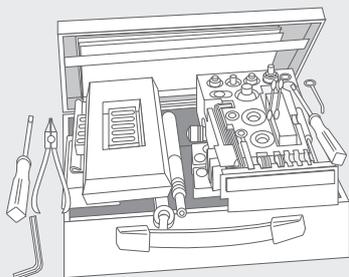
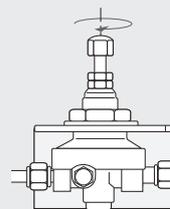


Illustration 8



Fitting components for conventional suction pipe systems.

(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. **Engine adapted installation** SAB 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. SAB 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

SAB 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. **Pressure regulation unit (Illus. 8)** The pressure regulation unit consists of a precision 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.

SCHALLER AUTOMATION
INDUSTRIELLE AUTOMATIONSTECHNIK GMBH & CO. KG

D-66440 Blieskastel / Saarland / Germany - Industriering 14 / P.O. Box 1280
Tel. +49 (0) 68 42 / 5 08 / Fax +49 (0) 68 42 / 5 08-2 60 / eMail: info@schaller.de
Certified according to DIN EN ISO 9001. GLC-Cert.Nr.QS -760HH www.schaller.de

