

Version 2.4, 11/2015

**VISATRON®**

**Oil Mist Detectors**

**VN115/93**

**VN116/93**

**VN215/93**

# Operation Manual

Part-No. 10980



**IACS UR M67 type approved**

**SCHALLER**  
**AUTOMATION**



## About this Manual

This manual was designed to answer your questions concerning the handling, operation and maintenance of the Oil Mist Detector (OMD) VISATRON® series VN93.

The operating instructions are applicable for:

VN115/93

VN116/93

VN215/93

Should you encounter any interruption or breakdown of your VISATRON® series OMD device during operation, please contact your local representative (refer to chapter 10 'Service Partners') or SCHALLER AUTOMATION Industrielle Automationstechnik GmbH & Co. KG directly. The repair of OMD devices may only be carried out by authorized repair centres. You can expect safe and reliable operation of your OMD only when the device is operated in accordance with this manual.

Please take note of the following:

- Please read this manual thoroughly and acquaint yourself with the correct installation, operation and maintenance of your VISATRON® series VN93 device.
- Installations of the VISATRON® series VN93 devices have to be in accordance to the IACS UR M10 if applicable.
- Use the VISATRON® series VN93 devices only for the purpose described in the operation manual.
- Incorrect maintenance and handling errors may cause possible device failure or an unsafe operating environment.
- The VISATRON® series VN93 devices may only be used by authorised staff.
- This operation manual must be available at the place of installation at all times.

## Terms and conditions of sale

The standard terms and conditions of sale of SCHALLER AUTOMATION shall apply to all VISATRON® and related products.

SCHALLER AUTOMATION Industrielle Automationstechnik GmbH & Co. KG warrants that under proper use, handling and maintenance OMD VISATRON® series VN93 is free from defects in material, design and/or workmanship. Claims of buyers/operators, in particular compensation for damage, which does not arise at OMD VISATRON® series VN93 itself or for natural wear and tear of consumable supplies, e.g. filters etc., are excluded. SCHALLER AUTOMATION Industrielle Automationstechnik GmbH & Co. KG is not responsible for defects which arise as a result of:

- a) natural wear and tear, improper commissioning, improper use/handling, use of unsuitable power supply, welding processes on the engine as well as non-observance of commissioning, installation, operating and service instructions as given in this Operation Manual







- b) components and design other than the OMD VISATRON® series VN93
- c) alterations or modifications of the OMD VISATRON® series VN93 carried out by the buyer/operator or third parties without written authorization of SCHALLER AUTOMATION Industrielle Automationstechnik GmbH & Co. KG
- d) incorrect combination of devices and/or components or operation of devices and/or components which are not certified to be compatible or not permitted by the manufacturer - SCHALLER AUTOMATION Industrielle Automationstechnik GmbH & Co. KG




**Safety instructions**

The series VN93 devices are manufactured according to the high quality standards of SCHALLER AUTOMATION and must pass stringent factory tests. In order to keep the device operating reliable and trouble free, the user has to take note of the safety hints and warnings. In the instruction manual they are marked with the following symbols.

Used symbols	
	CAUTION! Do not ignore the text in this box. Personnel safety can be endangered or the device can be damaged.
	WARNING! This text contains important information.
	The marked text contains only a hint for faster processing.

	<b>CAUTION! Unplug the OMD during welding processes on the engine.</b>
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**Reset of Oil Mist Alarms**

 **CAUTION!**  
**Ensure that the oil mist concentration inside the engine has fallen under the Lower Explosion Level (LEL) before acknowledging an oil mist alarm by pressing the Oil-Mist-Alarm button. **Otherwise you risk an oil mist explosion!****

**Follow the instructions of the engine builder, ship yard and ship owner.**

**Use a monitoring device at a safe location (e.g. ECR) to check for the actual oil mist concentration. At an Oil Mist Alarm, Schaller Automation strongly recommends to approach the engine only after indicated oil mist concentration (LED chain) has lowered to half of its bar indication (VISATRON®-device and Remote Indicator II).**



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## **EC Declaration of Conformity**

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We, the manufacturer

**SCHALLER AUTOMATION**  
**Industrielle Automationstechnik GmbH & Co. KG**  
**Industriering 14**  
**D-66440 Blieskastel**  
**Germany**  
**Tel.: 06842 / 508-0**  
**Fax: 06842 / 508-260**

declare on our own responsibility, that the product:

Kind of equipment: **Oil Mist Detector**

Type-designation: **VISATRON® VN115/93**  
**VISATRON® VN116/93**  
**VISATRON® VN215/93**

to which this declaration relates exclusively used for the detection and signaling of oil mist in diesel aggregates and complies with the following EG-directives

**Machinery directive 2006/42/EG**  
**EMC directive 2004/108/EC**

is in compliance with following standards:

**EN ISO 4414**  
**EN 60529**  
**EN 55022**  
**EN 61000-part 6-1 till 6-4**  
**EN ISO 12100**  
**CSPRI 16-1**  
**CSPRI 16-2**  
**CSPRI 16-4**  
**IACS UR M67**

**A technical documentation is completely available. The operating manual according to the oil mist detectors is available in the original version.**

D-66440 Blieskastel, 2012/08/02



Stephan Schaller  
- Managing Director -



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## 1 Introduction and functional overview

The VISATRON® series VN93 Oil Mist Detector (OMD) from SCHALLER AUTOMATION protects large diesel engines against oil mist explosion caused by spontaneously occurring oil mist. It is part of a safety system that helps protect operating personnel and prevents heavy damages to the engine.

This device conforms to the IACS UR M10 which is valid since January 2006.

It is not possible to directly monitor all potential sources of oil mist inside a large diesel engine. There are main bearings, large end bearings, pistons, liners, sliders, pumps, camshaft bearings, chains, gears or even tools left behind from installation – all of these parts could produce oil mist e.g. in case of lubrication problems. Therefore the philosophy of SCHALLER AUTOMATION is that only OMD-systems can securely prevent oil mist explosions by detecting the primary origin of danger: the oil mist itself.

The VISATRON® series VN93 OMD-System uses the approved wear-free suction system to continuously extract the atmosphere of the crankcase compartments and other engine locations. The system works actively and is not waiting for oil mist clouds. This ensures proper reaction times from the beginning of oil mist generation to an oil mist alarm.

To avoid false alarms caused by splash oil the suction system makes use of Schaller's special suction funnels working independent of the rotation sense of the engine. Additional draining components ensure correct working under all operating conditions. This includes the application in power plants as well as on vessels with their static or dynamic inclinations. False alarms initiated by condensing water vapour are prevented by an integrated heater inside the measuring head housing.

The OMD-System consists of following parts:

- VISATRON® series VN93 oil mist detector
- Protection cover
- Suction system including pressure regulator
- Monitoring device

Three different types of the VISATRON® series VN93 oil mist detectors are available (see Figure 1):

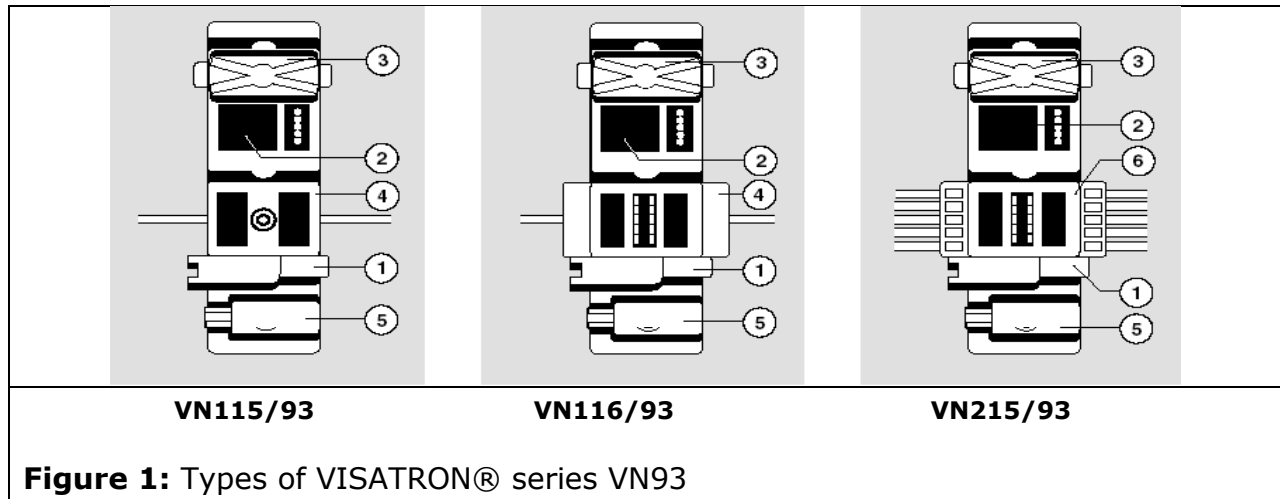
- VN115/93
- VN116/93
- VN215/93

All devices have a measuring head (2) which includes the optical measuring track under the control cover (3), a label on the front side and a display to give the user all important information for normal operations conditions. The measuring head is mounted on a vibration protected base plate.





The negative pressure for the suction system is generated by an air jet pump (1) working with the Venturi principle. The electrical interface is integrated within a socket housing (5). The device can be connected directly to the engine safety system. The interface includes two Oil-Mist-Alarm outputs, a Pre-Alarm output and a Ready signal.



VN115/93

The suction system is connected to the common "Connecting Box" (4). This type of oil mist detector is able to detect an oil mist alarm, without identifying the location of the oil mist source inside the engine.

VN116/93

The suction system is connected to the "Valve Box 116" (4). This type of oil mist detector is able to detect an oil mist alarm, indicating in the valve box window the left or right side of the detector with the highest oil mist concentration.

VN215/93

The suction system is connected to the "Valve Box 215" (6). This type of oil mist detector is able to detect an oil mist alarm, indicating in the valve box window the compartment with the highest oil mist concentration.

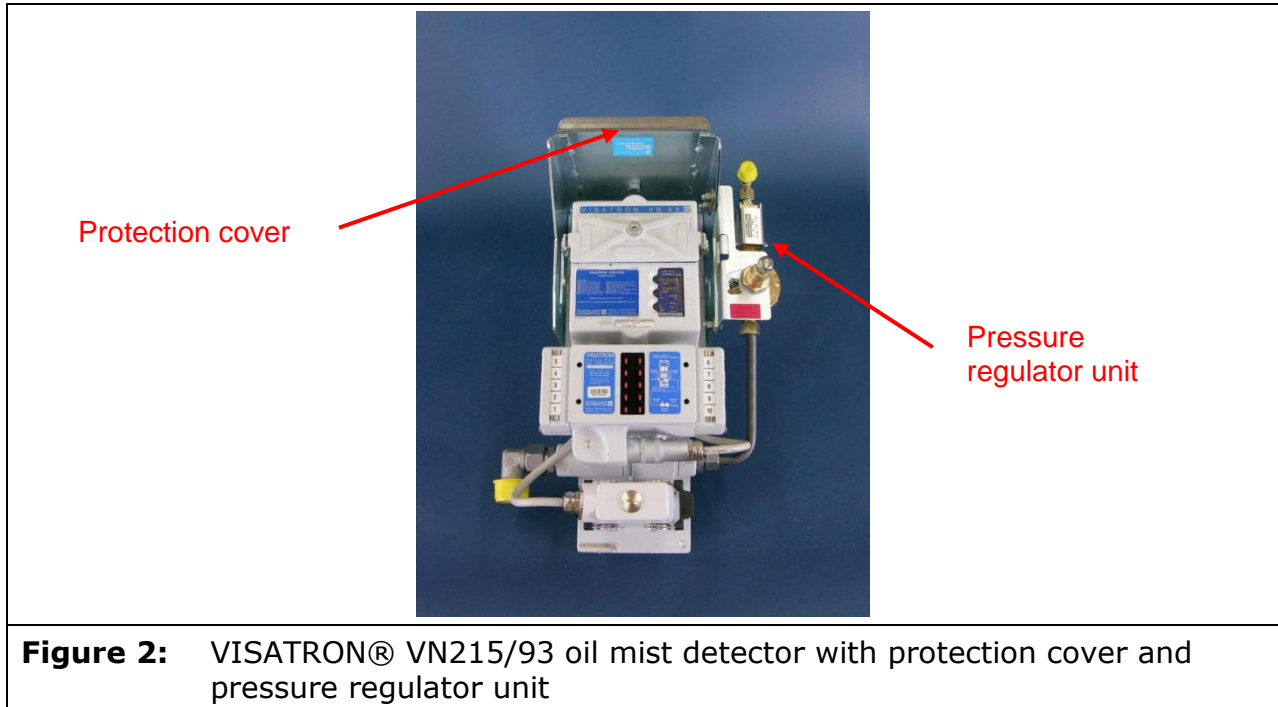
In normal operation mode all models sample the atmosphere of the engine at all suction points in parallel through the suction system to the measuring head. Upon detection of an oil mist alarm the models VN116 and VN215 start an additional search run to determine the location of the highest oil mist concentration. The reaction time to an alarm is totally independent of the search run.

The devices offer two alarm levels: Main-Alarm and Pre-Alarm. They can be adjusted by the light buttons (see chapter 4).

To keep the optical track clean all models use clean scavenging air in front of the filter glasses. This air is derived from the compressed air driving the air jet pump.



The devices can be ordered as single OMD device or integrated in a mounting unit. In this case the scope of supply includes an additional pressure reducer and a protection cover.



The suction system always requires a so called 'suction funnel' at each suction point. This prevents the system against incoming splash oil. During normal operation mode of an engine the OMD sucks out a small concentration of oil mist which was generated by blow-by or mechanical spraying. This oil mist intercepts in the suction pipes and must be drained back to the crankcase.

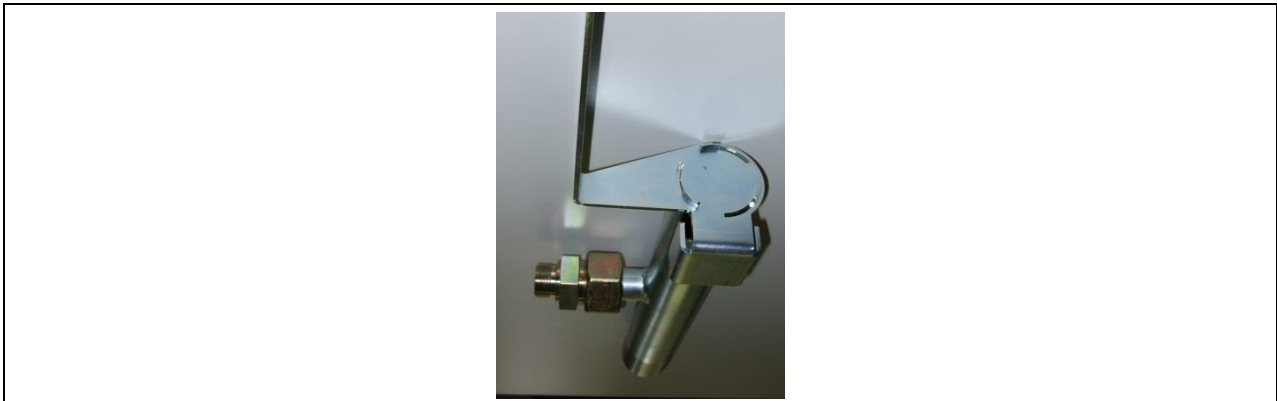


The best method on a VN115/93 and VN116/93 installation to drain the system is to use pipe siphons. Also recommended is the use of siphon blocks.

On 2-stroke engines the crankcase and the combustion chambers are separated by stuffing boxes, which let the crankcase be nearly free of blow-by. Therefore it's also possible to use the suction funnel as a draining device. In this case it is necessary to mount the suction pipes with an inclination of greater than 6°.



To become independent from fast changes of the engine room air pressure, it is recommended that the output of the air jet pump is blown back into the crankcase. If the air is blown into the engine room, SCHALLER AUTOMATION offers an optional oil separator which should be mounted directly to the output of the pump.



**Figure 4:** Oil separator for air outlet

The OMD device can be connected to Schaller's monitoring devices Remote Indicator II or ReCon DS23 to monitor the oil mist concentration and the status of the OMD device from a safe location as requested by IACS UR M10. The connection to the monitoring devices is realized by a RS485 two-wire bus. Additionally Schaller realized an integration of the VISATRON® devices into ship automation systems (e.g. Mega-Guard of Praxis).



**Figure 5:** Remote Indicator II

**Figure 6:** ReCon DS23

Thus, the series VN93 is a further contribution to safety at sea. Our goal is to avert damage to assets, personnel and the environment.



## 2 Installation instructions

### 2.1 Mechanical installation

#### 2.1.1 Basics

There are multiple potential sources of oil mist inside an engine. These are for example defective main bearings, connecting rod bearings as well as piston seizures, chains and covers of pumps. For each of these individual sources you could determine the "optimum" suction point. The result would be a vast number of holes to be distributed over the entire engine. To find out a safe and economic solution to monitor oil mist SCHALLER AUTOMATION recommends the OMDEA-test (Oil Mist Detection Efficiency Approval). In each case the following rules are recommended.



**CAUTION!** Do not ignore the guidelines. The safety of persons can be endangered

Following rules are recommended by SCHALLER AUTOMATION:

- Use at least one suction point per compartment.
- Use always the long version of the suction funnels. This makes the installation independent from the rotation sense of the engine.
- At least one suction point per chain drive or gear drive is necessary.
- Avoid the splash oil disk of the crankshaft bearings.
- Select points in the upper area of the crankcase, as oil mist tends to rise upwards!
- The detection unit has to be placed above the suction points.
- Installation Rules: in general avoid U-bends or kinks in the tubing system.
  - VN115/116 with pipe siphons: Mount one pipe siphon at each end of the horizontal header pipes, place the pipes a little bit above the suction points and connect the pipes and the engine wall connections with flexible tubes.
  - VN115/116 with siphon blocks: Use one siphon block at each compartment.
  - VN215 with siphon block: Use one siphon per compartment. If a suction point is placed above the detection unit e.g. at the camshaft use a pipe siphon at the lowest point of the pipe to avoid an oil pocket, which could clog the pipe.
  - VN215 without draining components: The pipes have to be mounted with an angle greater than 6° inclination.
- If possible mount the device on the engine side opposite to the crankcase relief valves to reduce danger to the crew during a damage situation.

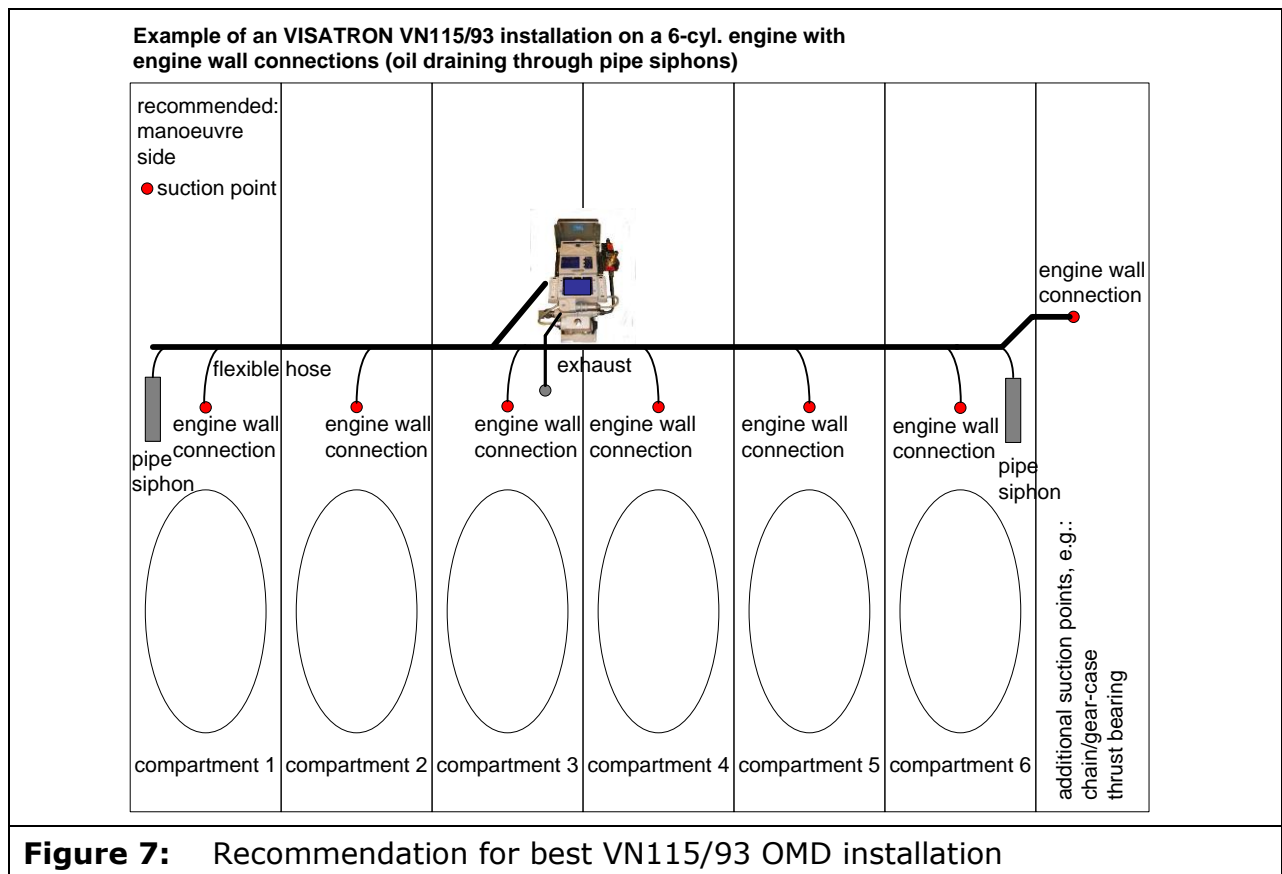


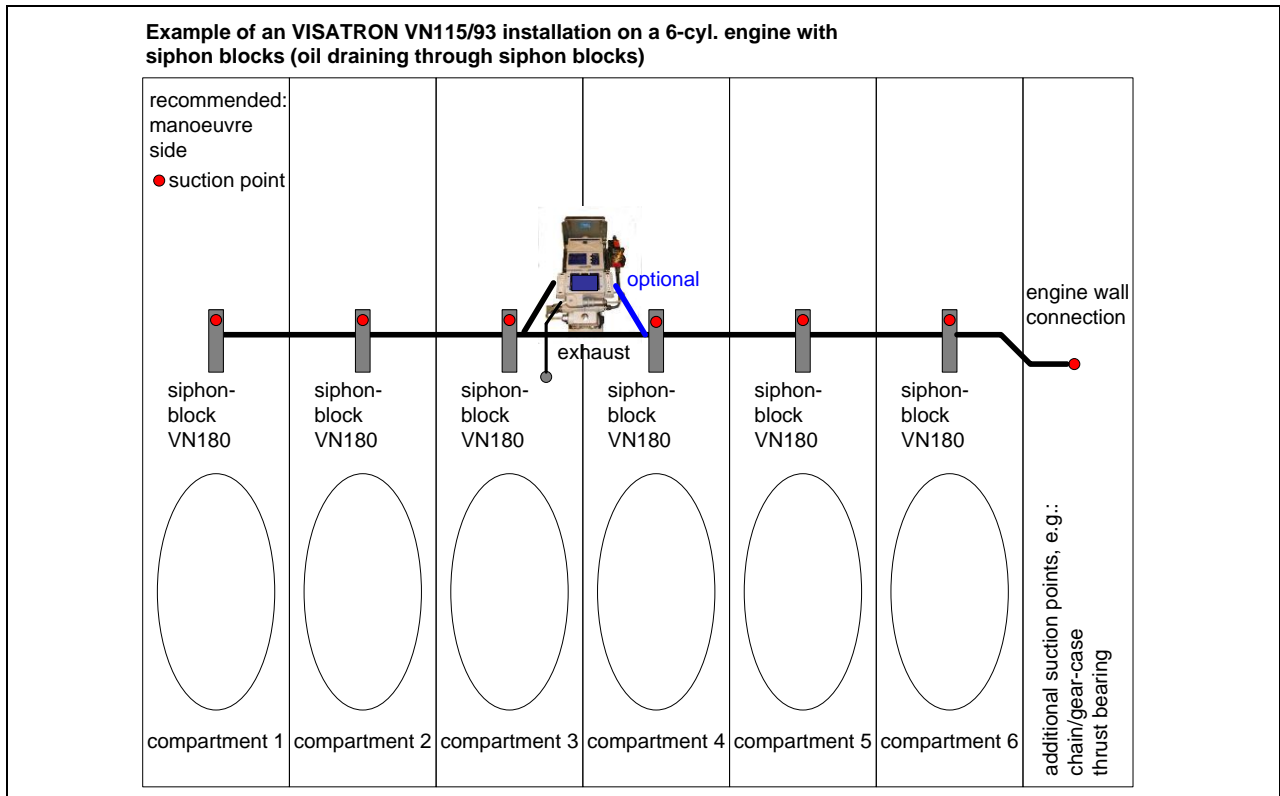
- If possible place the VISATRON® detection unit in the center of the engine to avoid long pipe runs.
- Select only suction points which allow the use of long suction funnels. In this case the installation side is independent from the rotation sense of the engine. Installations without any suction funnels are not allowed.
- If recommended by engine builder, determine an additional suction point at the camshaft bed.

**SCHALLER AUTOMATION recommends a final test procedure per engine type called OMDEA (Oil Mist Detection Efficiency Approval).**

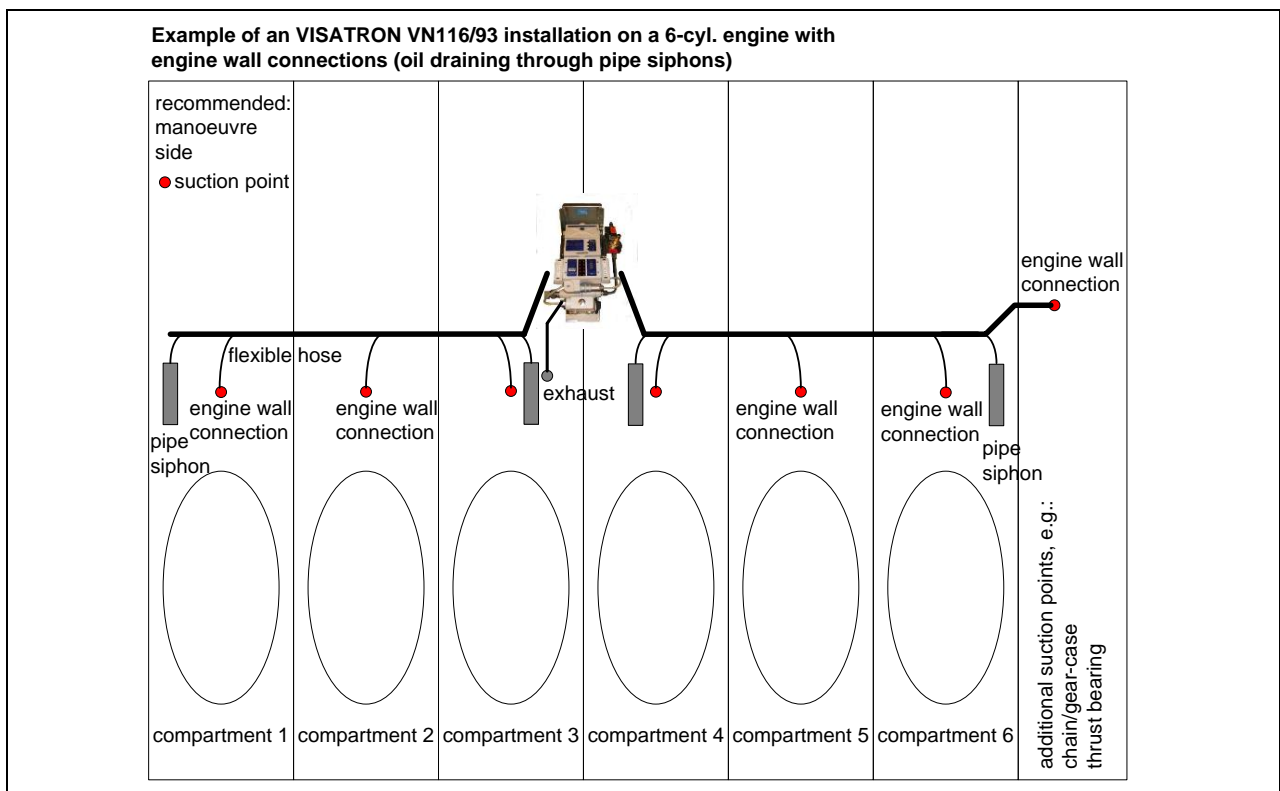
According to the IACS unified requirement M10 the installation drawings have to be approved from engine builder and SCHALLER AUTOMATION. The installations have to be executed in compliance with these drawings and the contents of this manual.

The following figures show typical installation arrangement on a 6 cylinder engine.



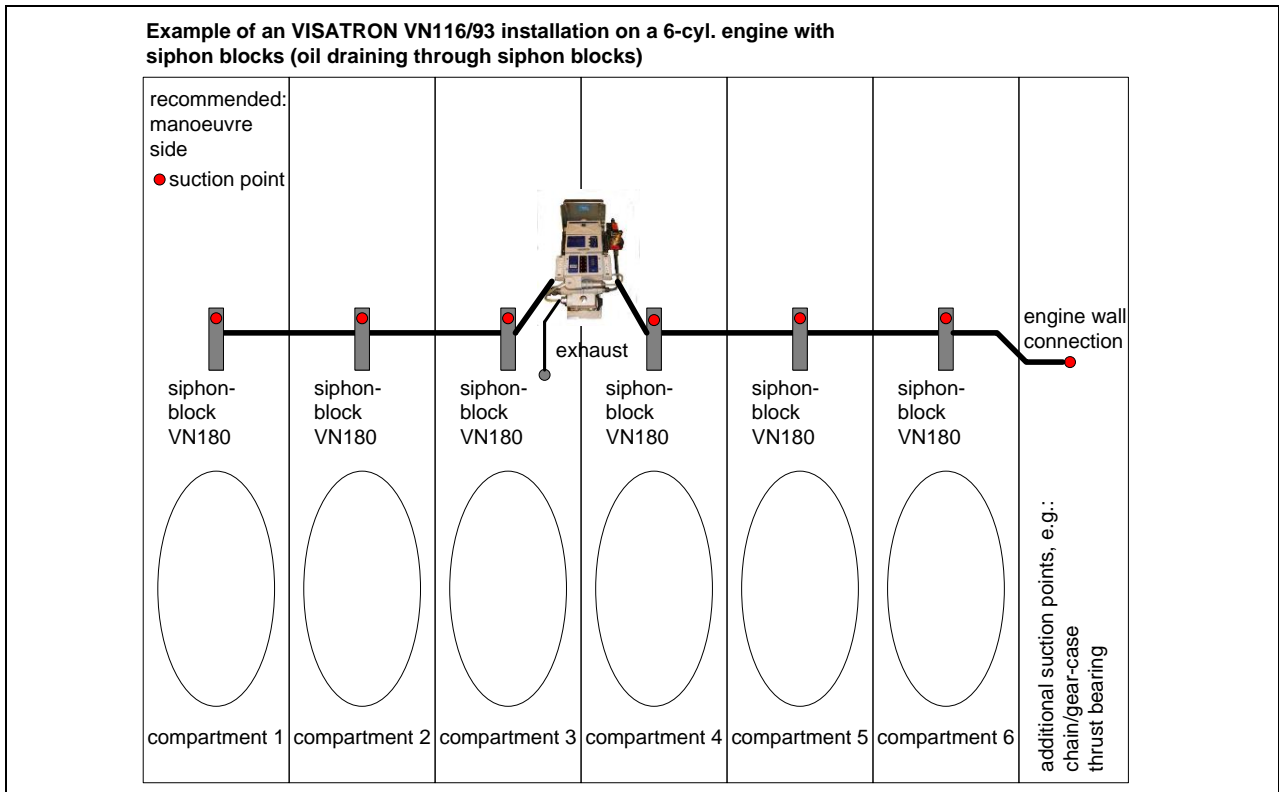


**Figure 8:** Alternative installation of VN115/93 OMD

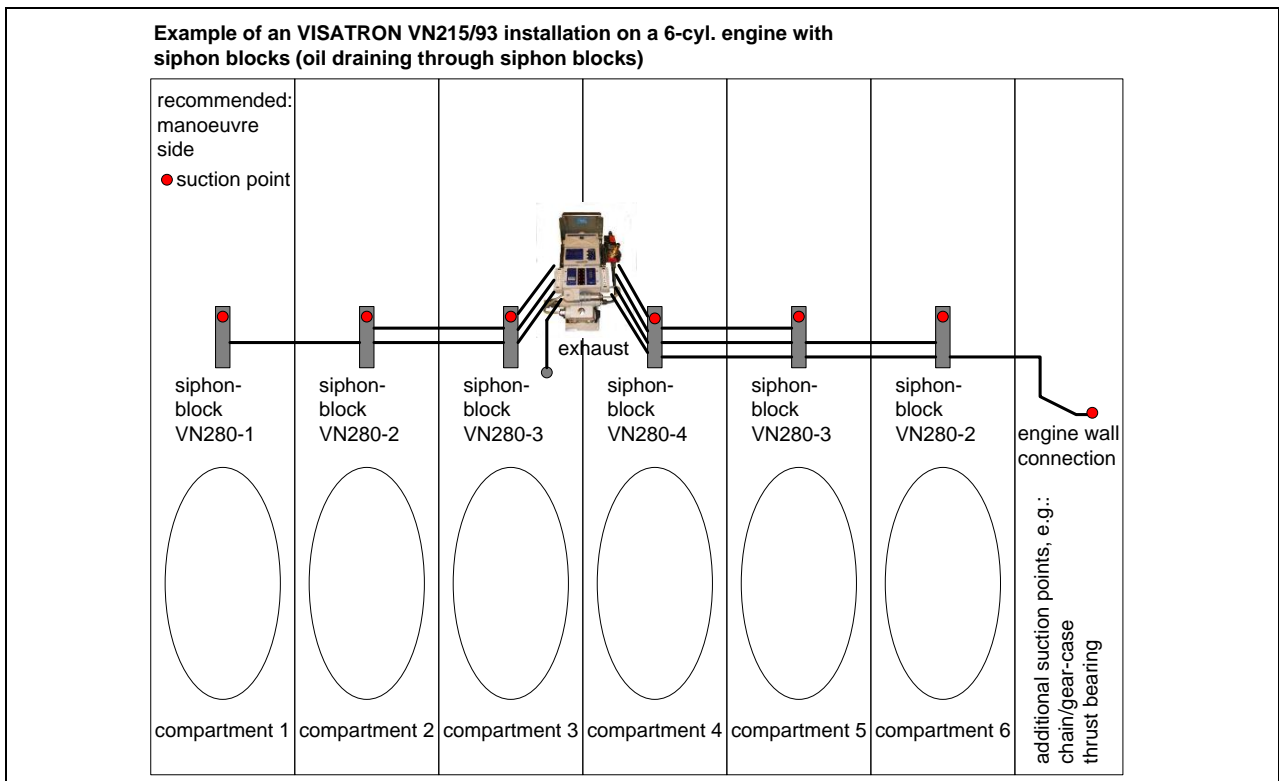


**Figure 9:** Recommendation for best VN116/93 OMD installation



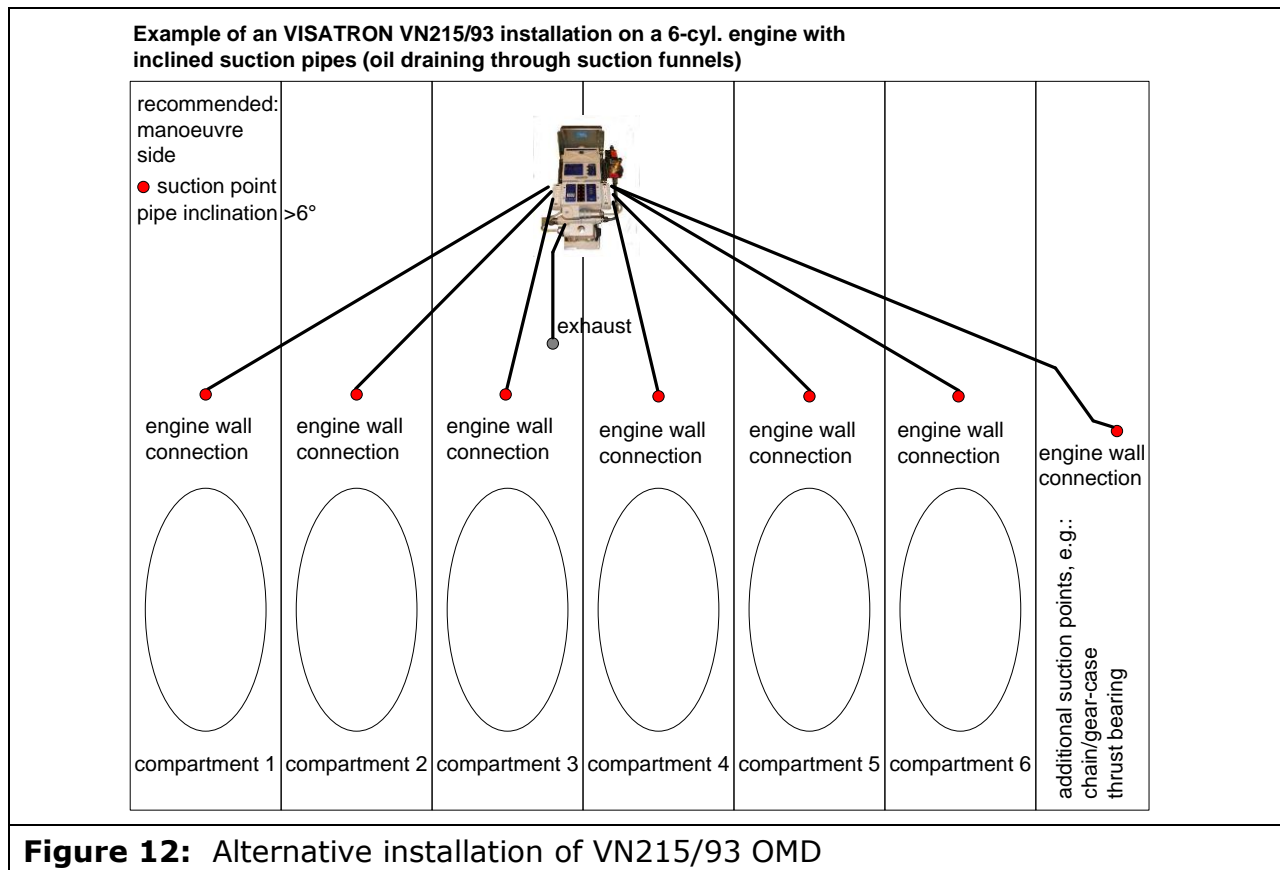


**Figure 10:** Alternative installation of VN116/93 OMD



**Figure 11:** Recommendation for best VN215/93 OMD installation





### 2.1.2 Pipe dimensions

- For VN115 and VN116 standard applications:
  - Seamless steel Pipes: 22 mm outer diameter, 2 mm wall thickness
  - Flexible hoses: inner diameter not less than 6 mm
  
- For VN215 standard applications:
  - Seamless steel pipes: 14 mm outer diameter, 2 mm wall thickness  
or, if 14 mm is not available
  - Seamless steel pipes: 13,71 mm (known as 1/4-inch pipes, schedule no. 40, 0.540 inch outer diameter, 0.088 inch wall thickness)

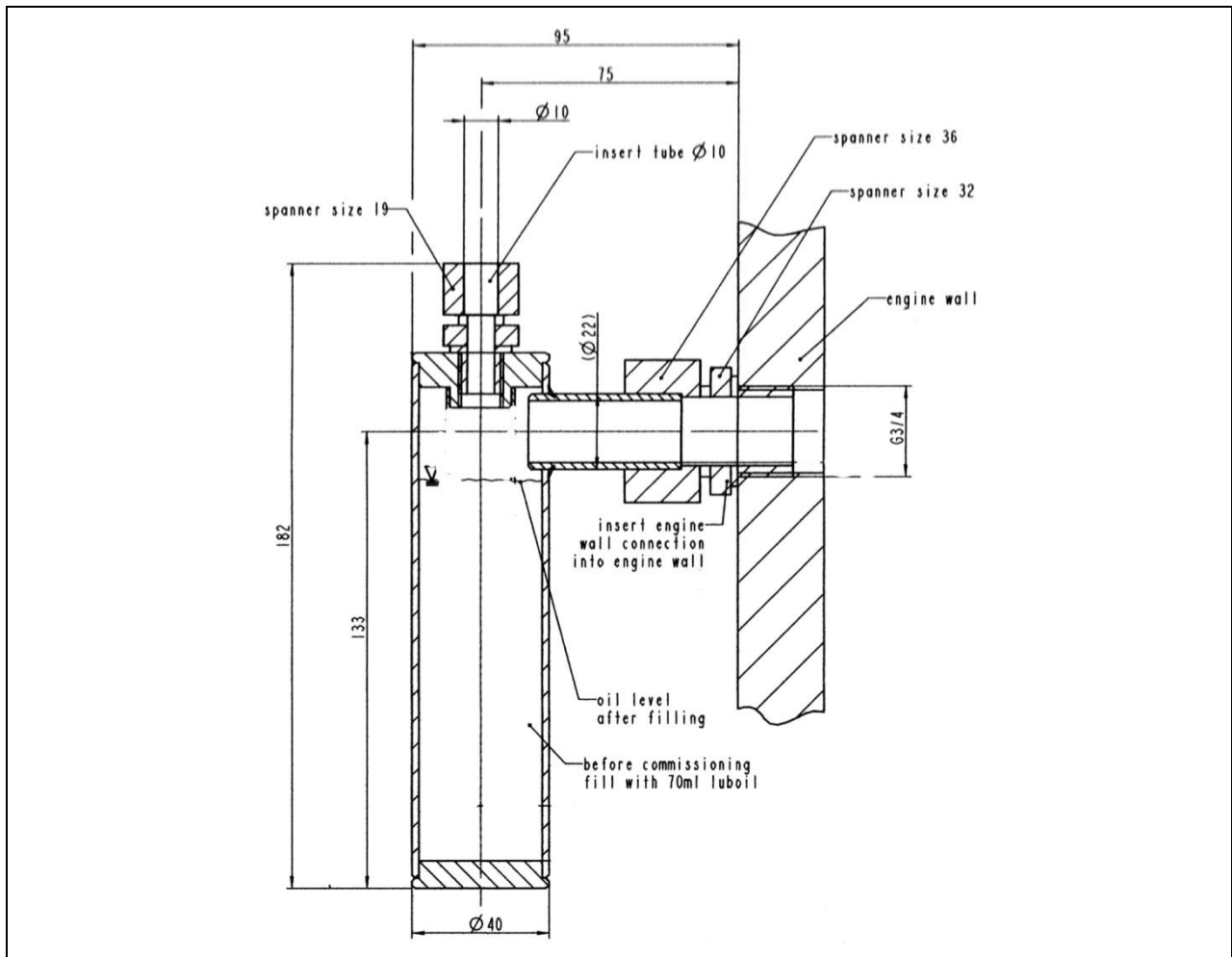
The length of the exhaust air pipe (outlet of the venturi injector) is restricted to max. 2m. The inner diameter has to be  $\geq 18$  mm. U-bends and kinks are forbidden.

Other installation solutions must have written agreements by SCHALLER AUTOMATION as required by IACS UR M10.





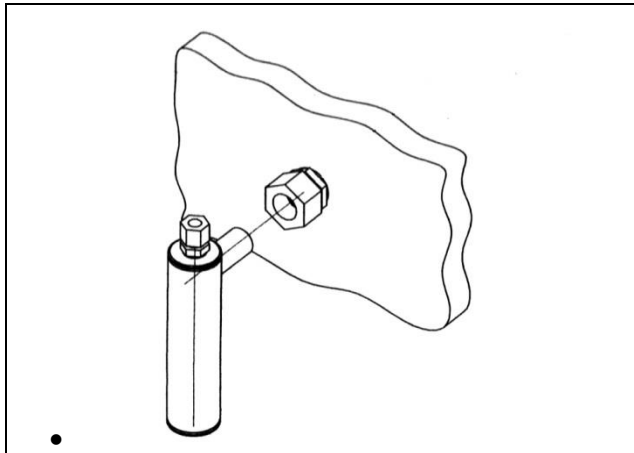
### 2.1.3 Installation of pipe siphons



**Figure 13:** Pipe siphon

- Mount the engine wall connection into the G3/4" thread with 110 Nm torque
- Put the pipe siphon in the hole
- Fix the clamping nut
- Fill the pipe siphon with oil (see chapter 'commissioning')
- Fix the flexible tube on the top fitting

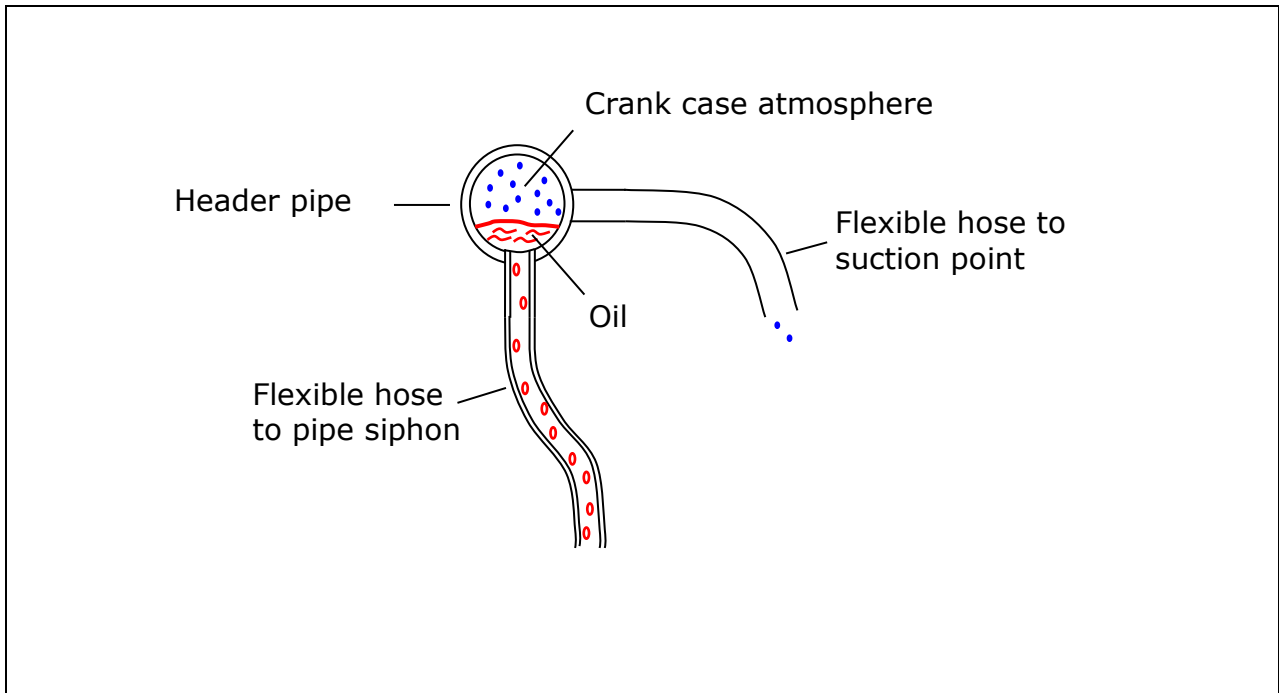




**Figure 14:** Pipe siphon at engine wall



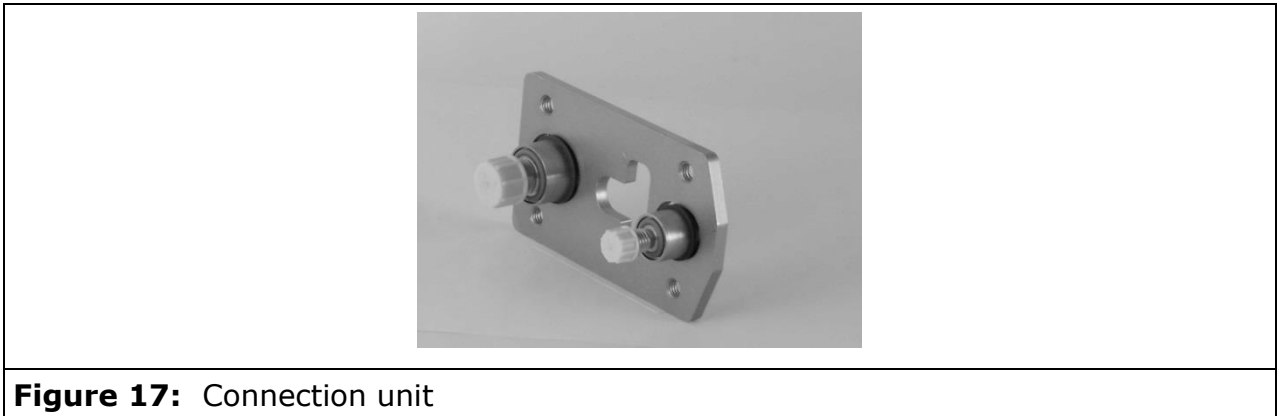
**Figure 15:** Image of pipe siphon



**Figure 16:** Oil draining principle



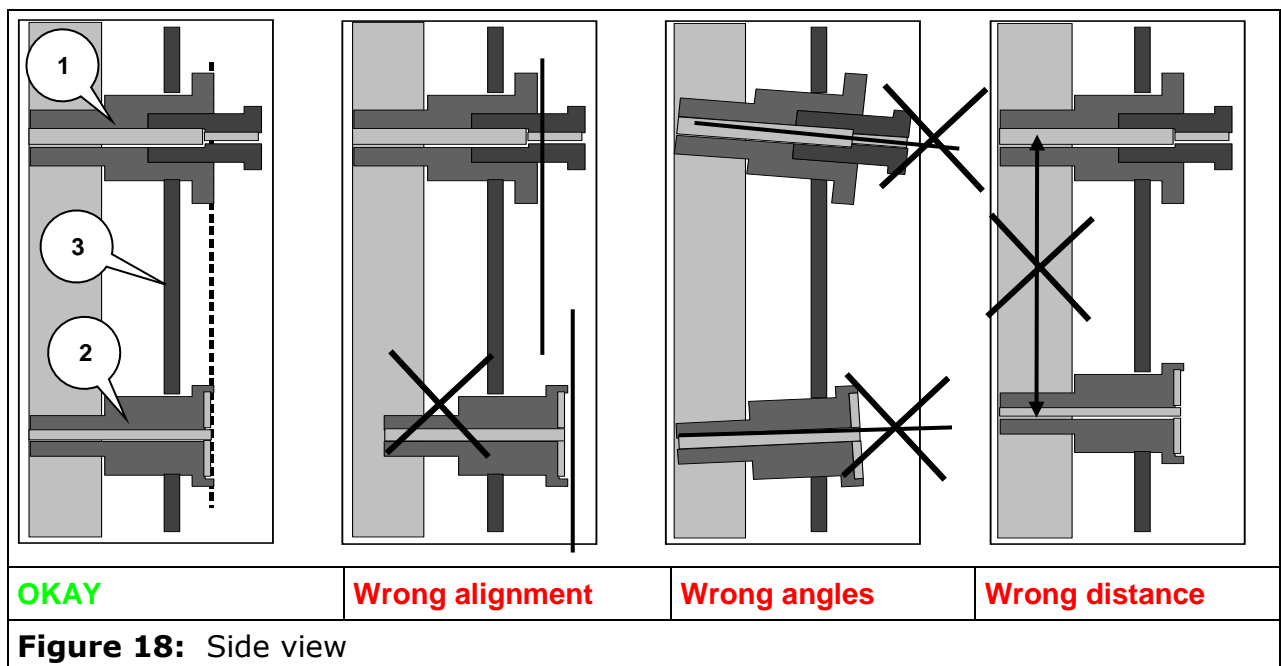
2.1.4 Installation of the siphon block connection units



**Figure 17:** Connection unit

Consider the following points:

- Take note of the drilling template (made of paper, included with the connection units)
- Drill through
- Seal all threads with 'Loctite 572'
- Max. torque = 30 Nm



**Figure 18:** Side view

- Avoid wrong alignment, wrong angles and incorrect distances (see Figure 18)
- Insert the suction funnel from the crankcase side into the siphon block, align it in a vertical position (see Figure 19) **with the opening at the bottom** and fix the small clamping nut.

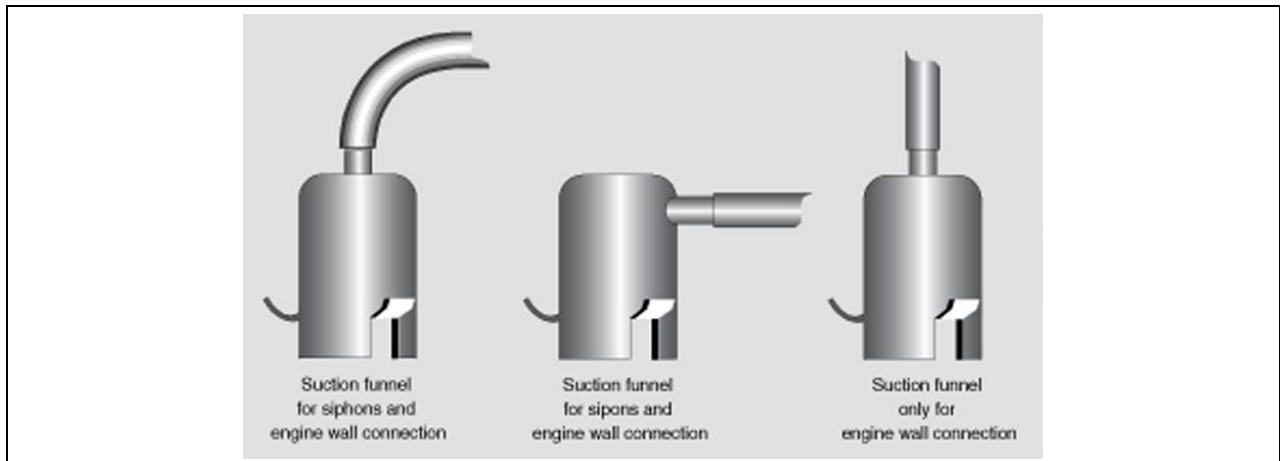


### 2.1.5 Suction funnels in the crankcase compartment

The suction funnels have to be fitted in such a way that flooding by splashing bearing oil or returning piston cooling oil is avoided (see Figure 19).



**CAUTION!** Make sure funnels do not interfere with rotating or moving parts of the engine.



**Figure 19:** Different types of suction funnels



2.1.6 Pipe arrangement at valve box (VN215/93 system only)

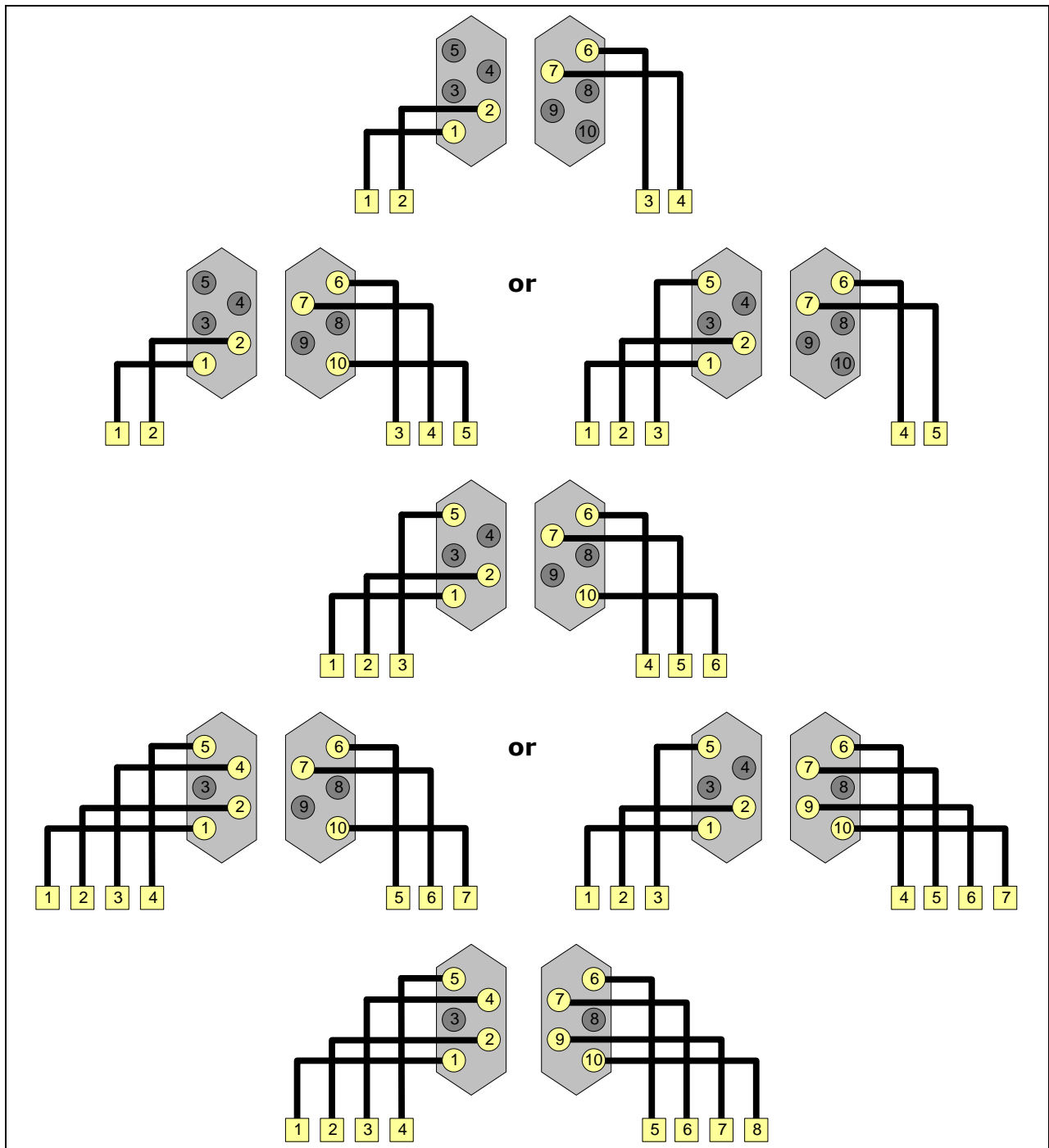
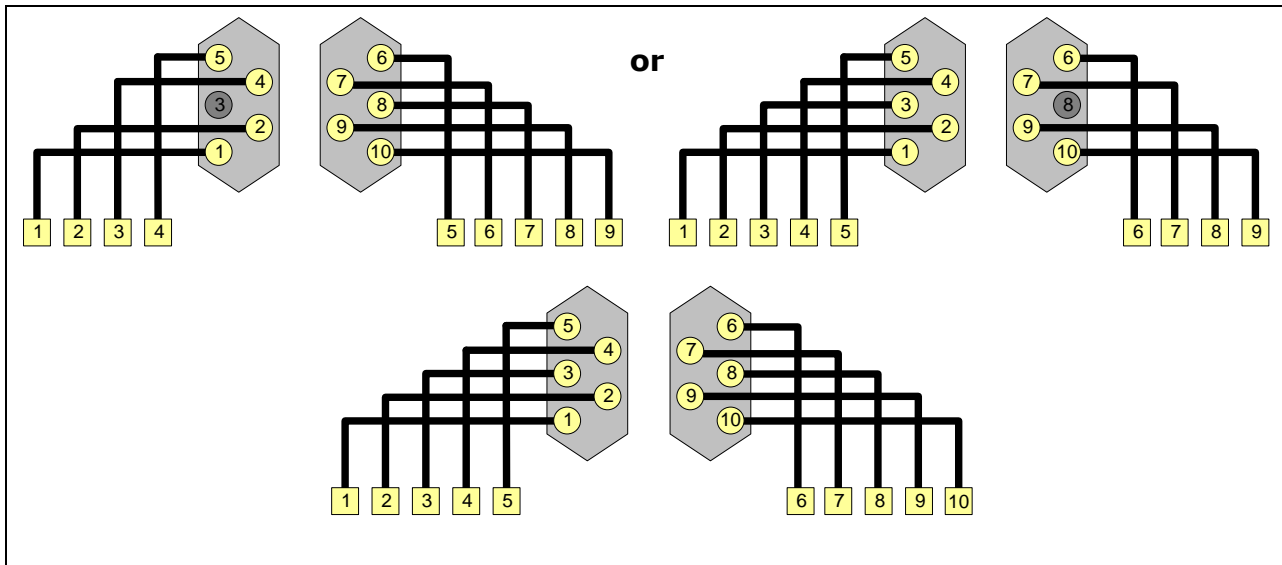


Figure 20: Pipe arrangement for 4 to 8 suction points





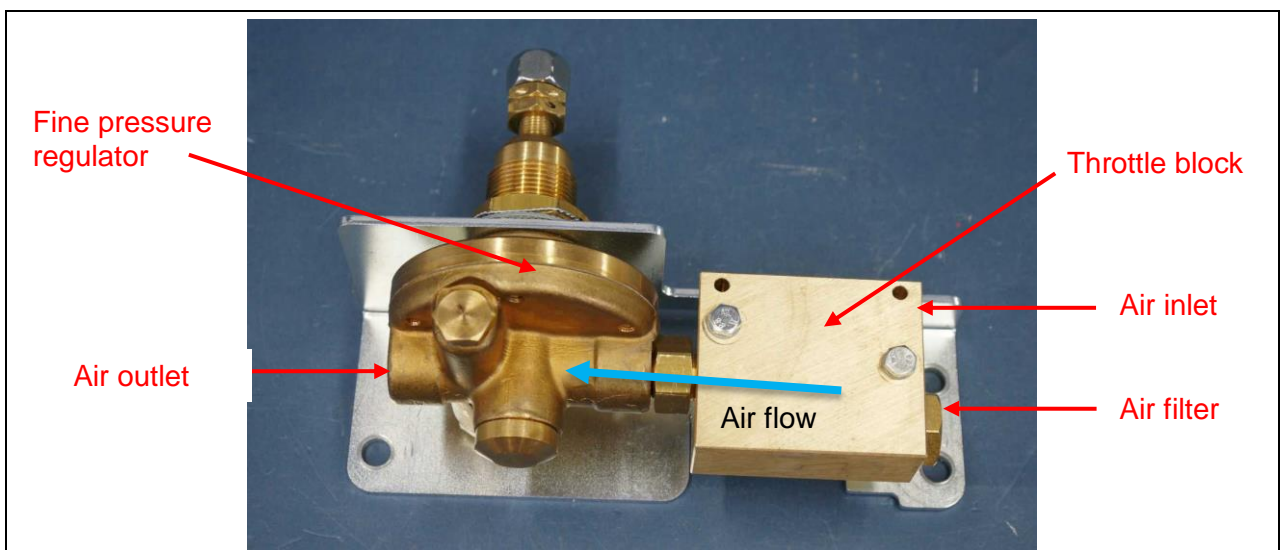
**Figure 21:** Pipe arrangement for 9 and 10 suction points



**CAUTION!** Other arrangements are not valid. Unused connection points (see Figure 20 and Figure 21, marked dark grey) must to be closed by supplied rubber plugs. If not respected, malfunction of the OMD-System may occur!

### 2.1.7 Compressed air connection

If the SAB pressure regulator (see Figure 22) is used connect the compressed air supply at the NTP/BSP/G1/4A fitting. Do always connect OMD to engine's control air system, pressure range 2 - 15bar. A **dry and clean air (ISO8473-1:2010 – 6-4-4)** with low humidity/oil contamination is of high importance.



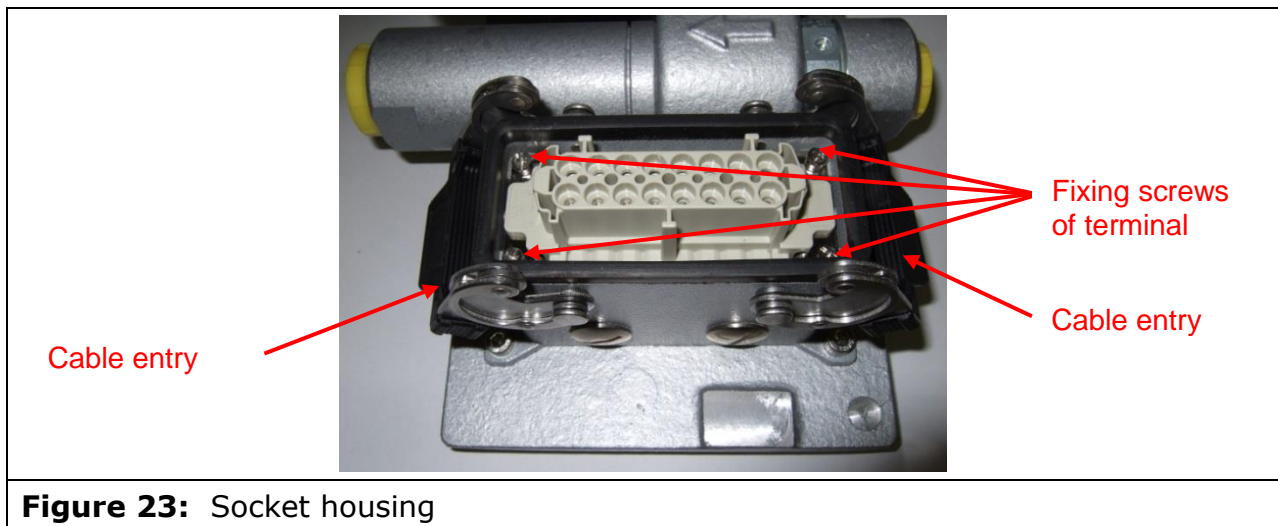
**Figure 22:** SAB pressure regulator unit



## 2.2 Electrical installation

### 2.2.1 VISATRON® series VN93 device

The electrical terminal is inside the socket housing (see Figure 23) on the base plate of the VISATRON® device. The pin assignment is specified in Figure 26. The cable entry points are located on either side.



**Figure 23:** Socket housing

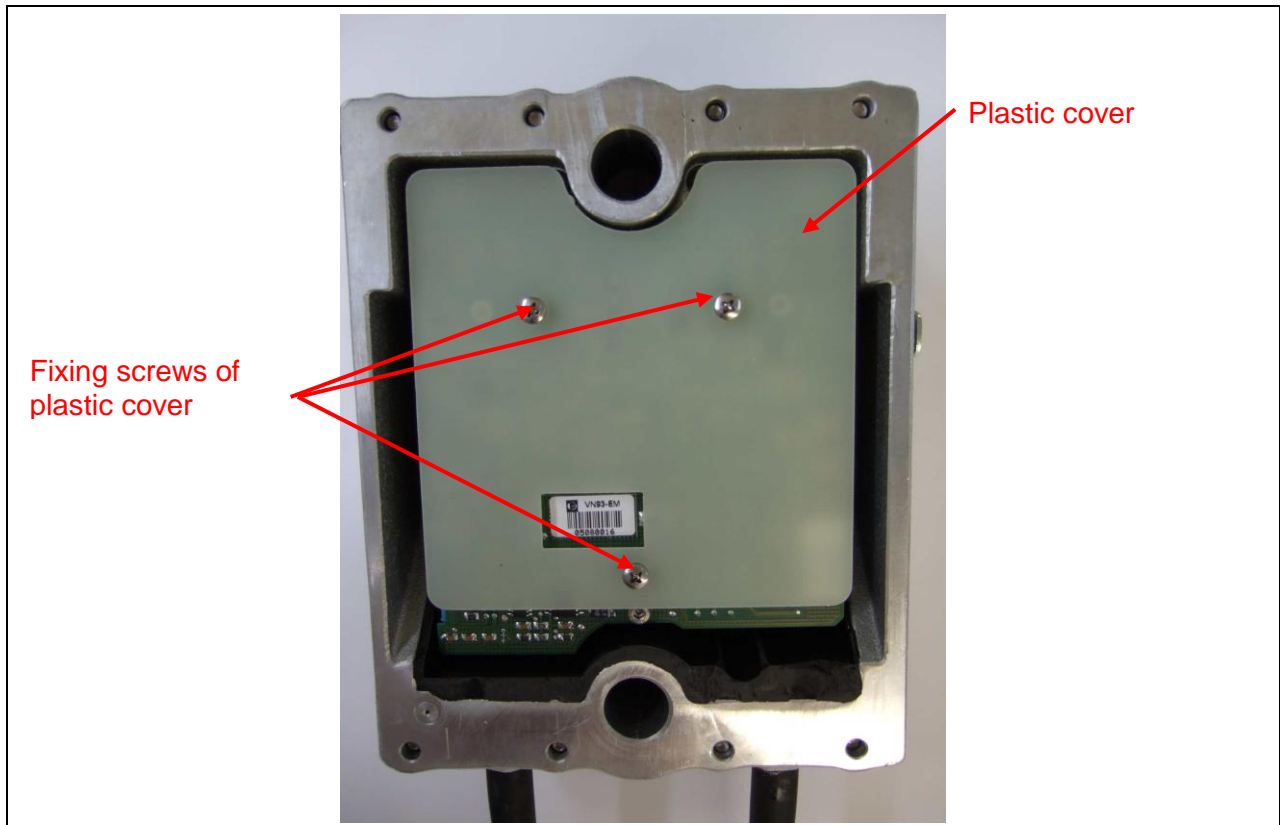
According to the pin assignment of Figure 26 connect the VISATRON® device to the 24 Volts power supply. The supply voltage can be potential free or not. The earth connection between the OMD and the engine is carried out by the fixing screws of the base plate or protection cover.

Additionally connect one alarm relay output to the safety system of the engine. As specified by the classification societies the 'Alarm' relay must be connected either to the shutdown or to the slow-down input.

During normal operation the alarm relay is switched off. In case of an oil mist alarm the relay is switched on. To monitor this output, a wire break resistor is installed (between pin 7 and 8 and between 15 and 16 as shown in Figure 26).

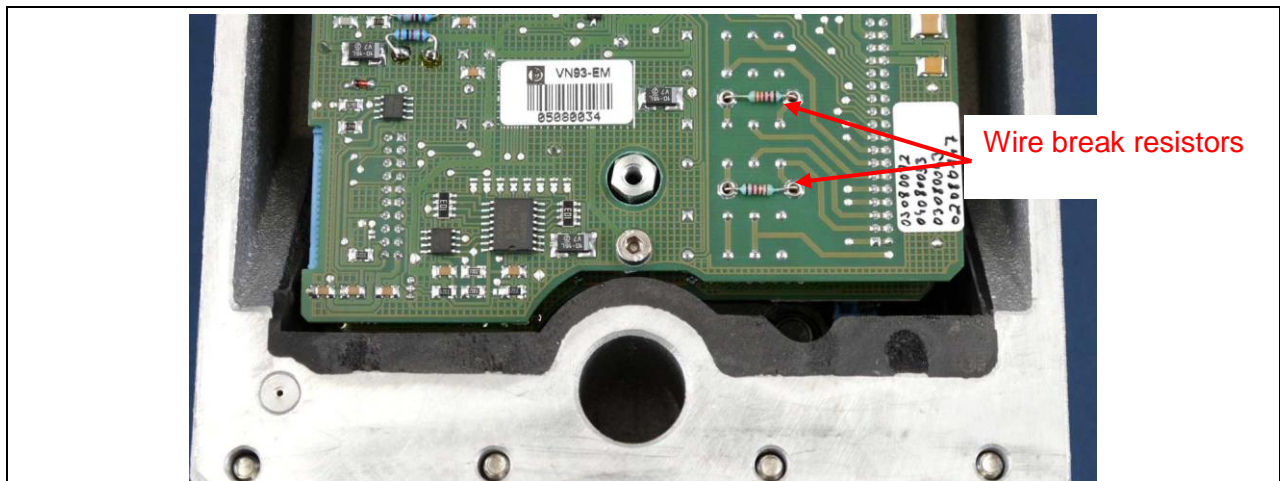
To replace the wire break resistors the measuring head has to be dismantled. The resistors (see Figure 25) are located on the rear side under the plastic cover (see Figure 24). The plastic cover can be removed via the screws. Do not forget to write the resistor value on the plastic cover with a permanent marker.





**Figure 24:** Rear side of measuring head

The second 'Alarm' output must be connected to separate channels on the alarm monitoring system of the vessel or power plant and the 'Ready' output. The 'Ready' relay is switched on when the OMD is in correct operation (see Figure 26).



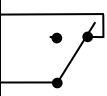
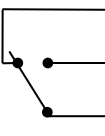
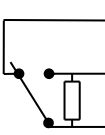
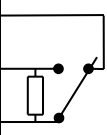
**Figure 25:** Wire break resistors

The optional pre-alarm output can be used to initiate either a pre-warning signal or slow-down signal. The pre-alarm relay is switched on when the oil mist





concentration has risen to the adjusted level. Depending on the characteristics of an oil mist occurrence the time between 'Pre-alarm' and 'Alarm' could be only a fraction of a second.

Description	Pin		Description		
24 Volts DC	1	9	 'Pre-alarm' relay		
24 Volts DC GND	2	10			
'Ready' relay closed		3	11	RS485 B	
'Ready' relay open		4	12	Reserved, do not use	
'Ready' relay common		5	13	RS485 A	
'Alarm' 1 relay closed		6	14	 'Alarm' 2 relay closed	
'Alarm' 1 relay open		7	15		'Alarm' 2 relay open
'Alarm' 1 relay common		8	16		'Alarm' 2 relay common

**Figure 26:** Pin assignment

We recommend to connect 'Alarm' 1 to the alarm system and 'Alarm' 2 to the safety system.

The relay outputs are potential-free.

Power supply	18 – 31.2 Volts DC, max. 3 A
Nominal voltage	24 Volts DC
Relay Outputs	Max. 60 Volts DC/AC, 60W, 125VA, 2A
Internal fuse	3.15 A semi time lag

**Table 1:** Electrical specification

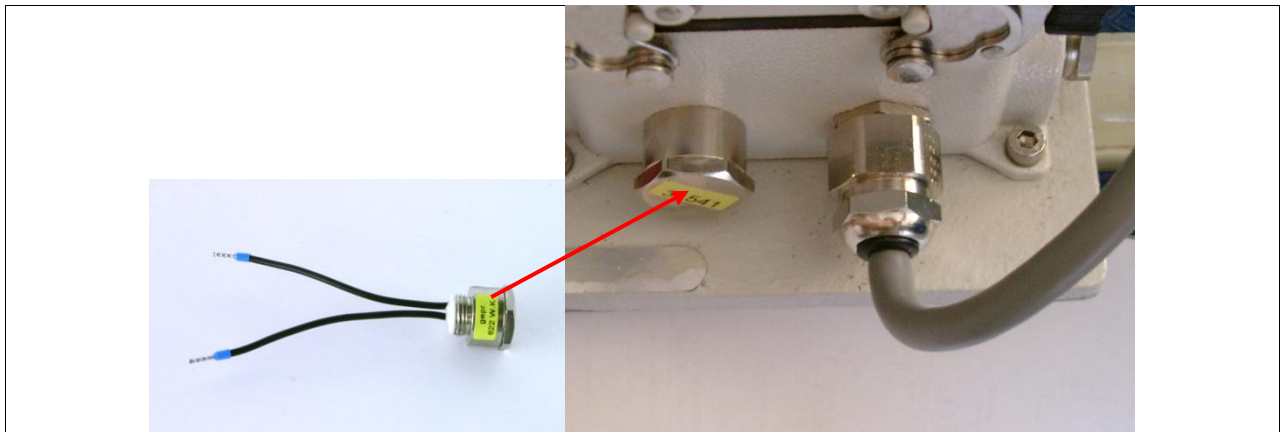


### 2.2.2 Connection of monitoring devices

As required by IACS UR M10 the OMD device can be connected to Schaller's remote monitoring devices Remote Indicator II to monitor the oil mist concentration and the OMD status from a safe location.


The connection to the monitoring devices is accomplished via a RS485 two-wire bus. In case of a Remote Indicator II installation the connection is only a two point link. The bus system at the OMD device must be terminated by the resistor. It is integrated in the terminator (see Figure 27+Figure 28), which is supplied with the monitoring device.

The used communication cable must be twisted pair and shielded. We recommend LAPPKABEL UNITRONIC-FD CP (TP) plus UL-CSA, AWG20. The total bus length is limited to 400 m. The VISATRON® device cable entry (see Figure 27) at the VISATRON device is designed for cable diameter between 7.5 and 10.0 mm.

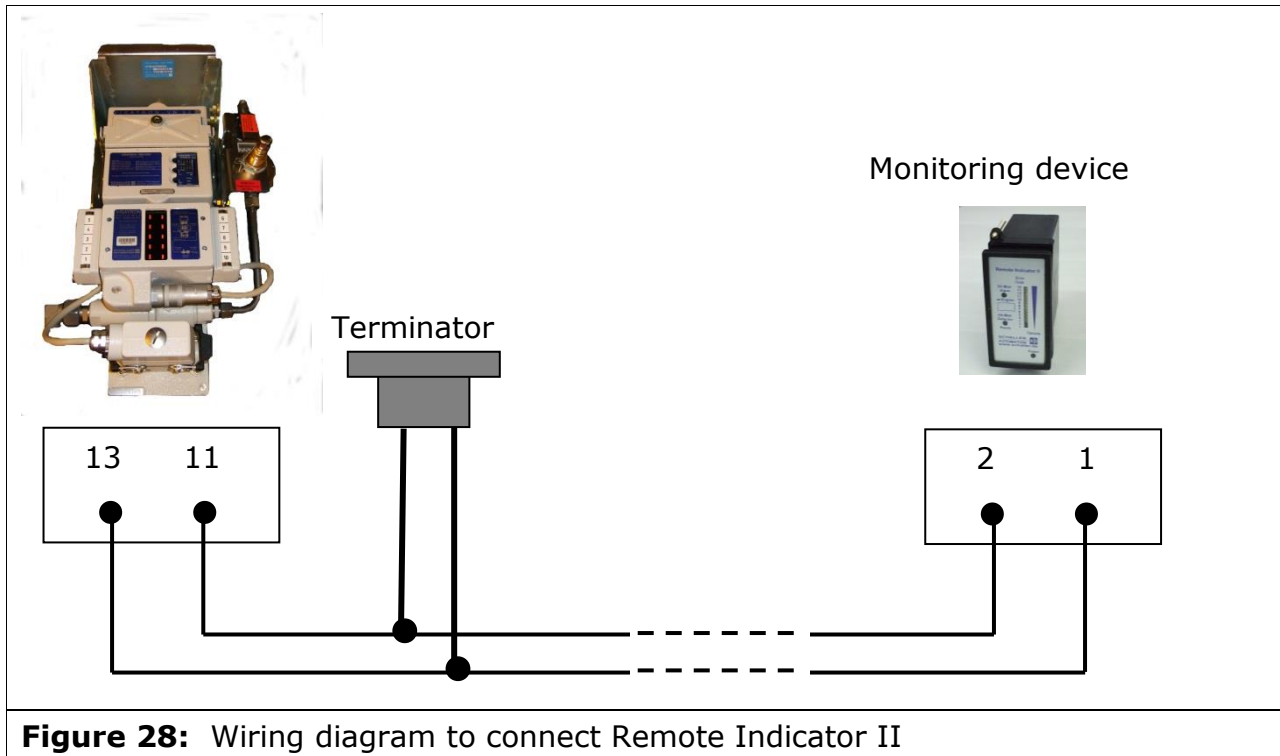


**Figure 27:** Cable entry and bus-terminator on the bottom side of the VISATRON® device

The connection between the OMD device and the monitoring device for standard applications is shown in the following wiring diagram (see Figure 28).

	<p><b>WARNING!</b> The shield must be connected directly at the cable grommet.</p>
---	--



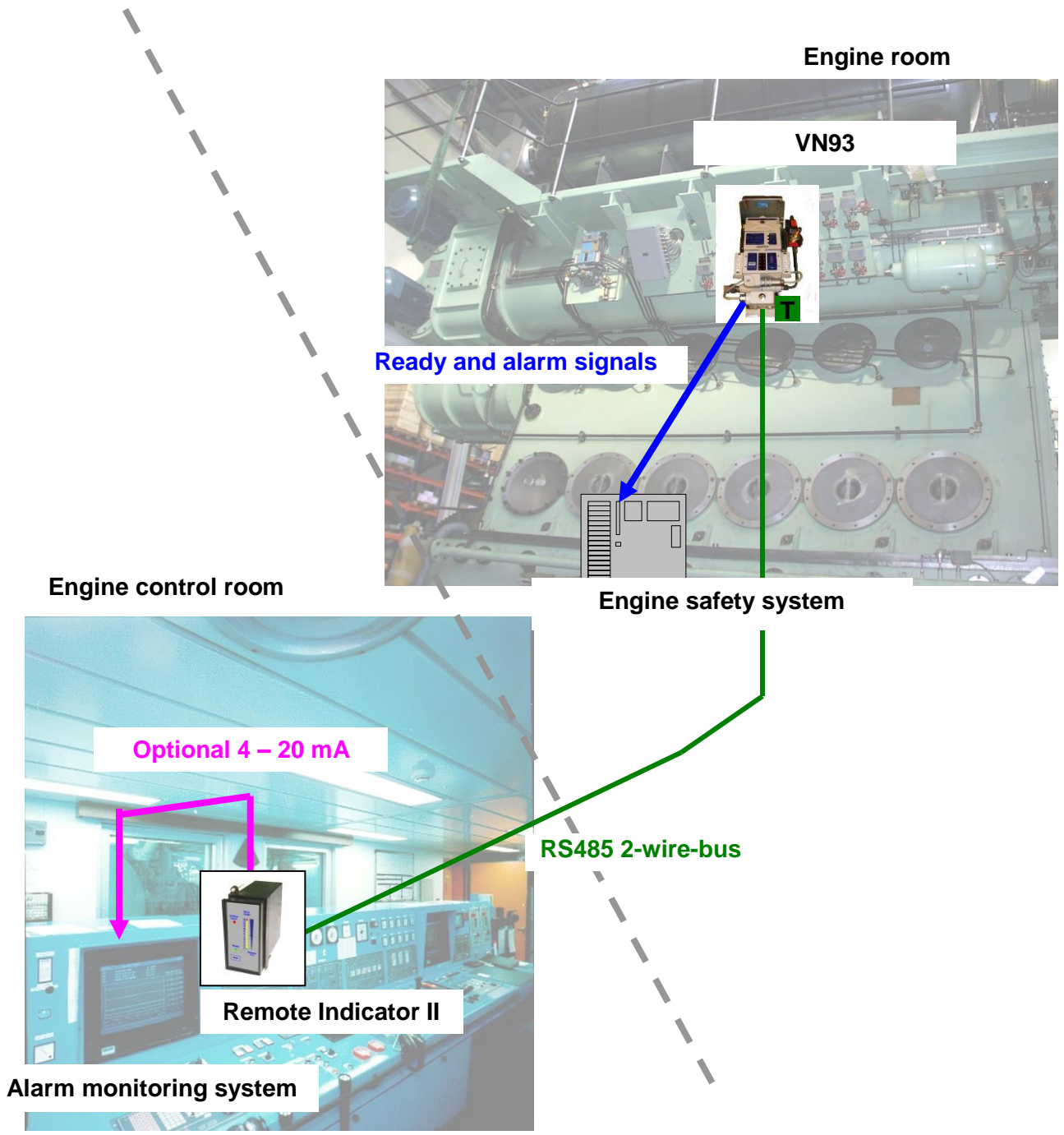


**Figure 28:** Wiring diagram to connect Remote Indicator II

The monitoring device is the bus master and the OMD devices are the slaves. It is necessary to adjust different bus addresses at each slave device. Normally the first OMD device gets the address '1' and so on. The address can be adjusted by the light buttons (see chapter 4).



2.2.3 Schematic electrical wiring diagram

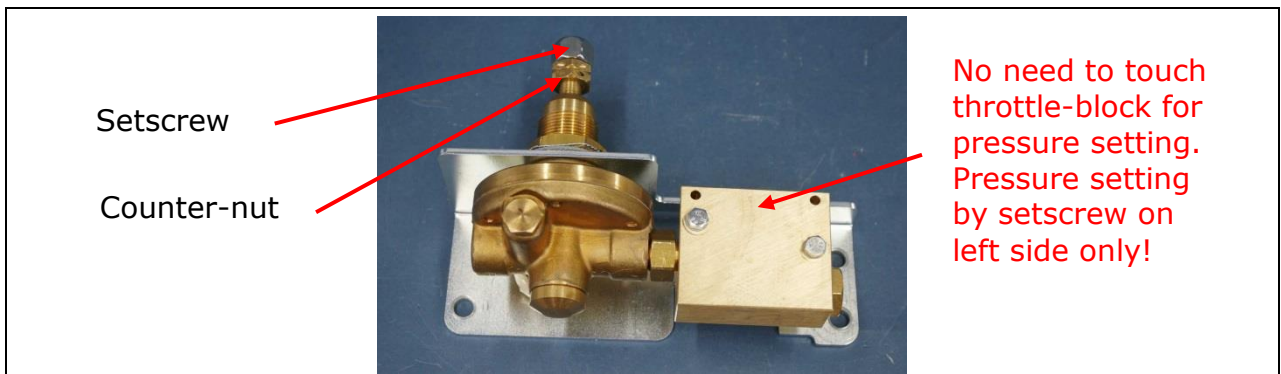


### 3 Commissioning


	<p><b>CAUTION! Unplug the OMD during welding processes on the engine.</b></p>
---	---


#### 3.1 Adjusting or checking the suction pressure

The suction pressure must be set by adjusting the pressure regulator when the engine is at standstill. Make sure ventilation of the engine room is in operation.



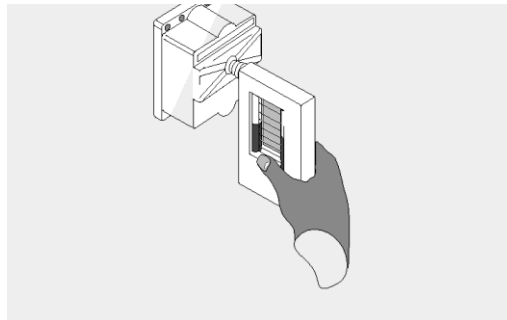
**Figure 29:** Pressure regulator unit

	<p><b>WARNING! Adjust 60 mm WC negative pressure.</b> After adjustment, remove U-tube pressure gauge and screw in the previously removed plug.</p>
---	--

	<p><b>CAUTION!</b> A pressure setting much higher than 60 mm WC negative pressure may cause a change in detecting sensitivity and can impact the functionality of the siphon blocks.</p>
---	--

- Connect a U-tube manometer at inspection cover (see Figure 30). (U-tube manometer is included in the service box, available as an option).
- Switch on compressed air supply with inlet pressure in a range from **2 to 15 bar (before connecting the OMD the first time check the pressure).**
- If the negative suction pressure is already adjusted to 60 mm WC within a tolerance of  $\pm 5$  mm remove the U-tube manometer and finish the procedure.
- Otherwise loosen counter-nut.
- Turn setscrew until the negative pressure is only 60 mm WC.
- Tighten counter-nut.





**Figure 30:** U-tube manometer connected to OMD control cover

- Remove U-tube manometer

### 3.2 Filling of siphon blocks VN280plus of VN215/93 system with oil

- Press the pump lever of the filling pump (see Figure 32) as many times until the first oil drops come out.
- Unscrew the lower siphon block plug (see Figure 31).
- Insert filling pump nozzle.



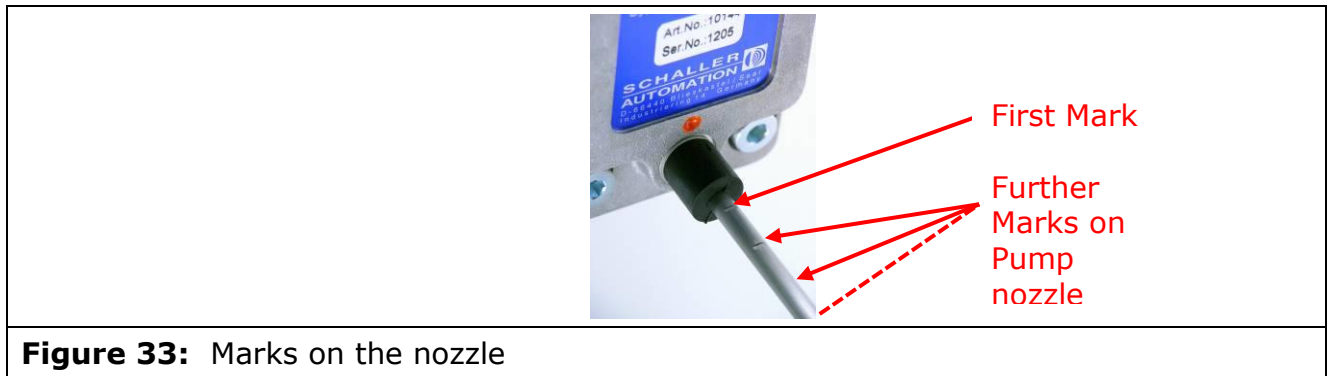
**Figure 31:** Siphon block VN280plus for 5 connecting tubes (5 holes on its side)



**Figure 32:** Filling pump


- Press the black nipple into the opening of the block.
- Push the nozzle to the first mark (see Figure 33).






**Figure 33:** Marks on the nozzle

- Fill the first siphon with 12 pump strokes, push the nozzle to the next mark and repeat the procedure until the nozzle reaches the rear plate.
  - Repeat procedure at all marks until the nozzle reaches stop at the rear plate.
- At a siphon for 5 connecting tubes you will reach stop at 5<sup>th</sup> mark, at siphons for e.g. 2 connecting tubes, stop will come after 2<sup>nd</sup> mark, etc.

	<p><b>CAUTION! Do not fill with more than 12 strokes per siphon.</b> The excess oil may flow in the suction tubes. Additionally the excess oil can remove the required oil in the siphon by a physical suction effect through the draining channel.</p>
--	---

	<p>The number n of internal siphons is equal to the number of pipe connections. This means, that the pump has to be used n times at varying positions.</p>
---	--

- Close the threaded hole with the plug (a small amount of oil coming out does not impact the functionality).
- Clean the siphon block.
- Continue with the next block.



### 3.3 Filling of siphon blocks VN180 for VN115/93 and VN116/93 system with oil

- Press the pump lever of the filling pump (see Figure 35) as many times until first oil drops are coming out.
- Unscrew the lower siphon block plug (see Figure 34).
- Insert filling pump nozzle (see Figure 36).



**Figure 34:** Siphon block VN180



**Figure 35:** Filling pump

- Screw in the fitting of the filling pump.
- Press the nozzle to stop position.
- Tighten the lock nut.
- Fill the siphon with 8 strokes.



**CAUTION!** Do not fill with more than 8 strokes. The excess oil may flow in the suction tubes. Additionally the excess oil can remove the required oil in the siphon by a physical suction effect through the draining channel.







**Figure 36:** Filling pump inserted and fixed in the siphon block

- Remove the filling pump.
- Close the threaded hole with the plug (a small amount oil coming out does not impact the functionality).
- Clean the siphon block.
- Continue with the next block.

### 3.4 Filling of pipe siphons for VN115/93 and VN116/93 system with oil



**Figure 37:** Pipe siphon

- Remove flexible hose
- Fill in 70ml lubrication oil
- Fix flexible hose again



**CAUTION!** Do not fill in more than 70ml; the excess oil can remove the required oil in the siphon by a physical suction effect through the draining channel.



### 3.5 Adjusting the sensitivity of the OMD

The detector determines the oil mist concentration by an optical measurement. The calculated values have the unit 'opacity'. 100% opacity means that no light is transmitted through the oil mist sample. This is equivalent to a complete white wall.


The IACS UR 67 requires an oil mist alarm at 5% of the Lower Explosion Level (LEL). The LEL is equal to 47mg/l oil mist concentration in air at a temperature of 25 °C, which means that the OMD is required to indicate an oil mist alarm at approx. 2.5mg/l.

Position	VN115 alarm level in opacity	VN116/VN215 alarm level in opacity
3	1.5%	1.6%
4	2.0%	2.4%
5	3.0%	3.7%
6	5.0%	5.5%

**Table 2:** Sensitivity switch position and corresponding oil mist alarm level

Inside the measuring head 2.5mg/l oil mist concentration is approx. 23% absolute opacity compared to the full measuring range.

The number of suction points, the different oil mist concentration in the compartments and the progress of oil mist occurrence can influence the amount of oil mist being sucked out of the engine to the measuring head. Therefore the amount of oil mist concentration to be detected is variable. The use of the alarm levels 3 and 4 is in accordance to the unified requirements M67.

	<p><b>CAUTION!</b> Standard switch position 3 or 4 normally is sufficient for all sorts of engines. In case, sensitivity level needs to get switched to 5 or 6 (less sensitive), it is mandatory that person changing it does inform Schaller Automation about that in writing: <a href="mailto:info@schaller.de">info@schaller.de</a>.</p>
---	---

The sensitivity of the VISATRON® oil mist detector can be adjusted by the light buttons (see chapter 4).



### 3.6 Commissioning check list

<b>Mechanical check</b>	
Are all suction pipes installed as specified in the installation drawing?	<input type="checkbox"/> yes / <input type="checkbox"/> no
Are all fittings fastened and tight?	<input type="checkbox"/> yes / <input type="checkbox"/> no
On VN215/93 installation: Is the arrangement of the pipes at the valve box correct?	<input type="checkbox"/> yes / <input type="checkbox"/> no
On VN215/93 installation: Are all un-used openings at the valve box closed?	<input type="checkbox"/> yes / <input type="checkbox"/> no
On installations with siphon blocks: Are all siphon blocks filled with oil and all un-used openings closed?	<input type="checkbox"/> yes / <input type="checkbox"/> no
On installations with pipe siphon: Are all siphons filled with oil?	<input type="checkbox"/> yes / <input type="checkbox"/> no
On installations with oil separator: Is the separator filled with oil?	<input type="checkbox"/> yes / <input type="checkbox"/> no
Is the negative pressure at the measuring head adjusted to 60 mmWC?	<input type="checkbox"/> yes / <input type="checkbox"/> no
Adjusted negative pressure	mmWC

<b>Electrical check</b>	
Is the power supply connected to the terminal and is the voltage within the specified range?	<input type="checkbox"/> yes / <input type="checkbox"/> no
Measured supply voltage	Volts
Is the monitoring device installed?	<input type="checkbox"/> yes / <input type="checkbox"/> no
Are the 'Alarm' and 'Ready' signals connected to the engine control and safety system?	<input type="checkbox"/> yes / <input type="checkbox"/> no
Are the correct wire break resistors installed	<input type="checkbox"/> yes / <input type="checkbox"/> no
Value of wire break resistor	kOhm
Is the correct interface mode at pin 11 and 13 selected?	<input type="checkbox"/> yes / <input type="checkbox"/> no

<b>Functional check</b>	
On vessels perform the on-board test with test plate. Test positive?	<input type="checkbox"/> yes / <input type="checkbox"/> no
At engine factory perform smoke test. Test positive?	<input type="checkbox"/> yes / <input type="checkbox"/> no
On VN115/93 installations, as an alternative to the smoke test, measure the negative pressure at the end of the suction pipes. Values as specified?	<input type="checkbox"/> yes / <input type="checkbox"/> no



## 4 Operating instructions

### 4.1 Display

After power-on the VISATRON® device starts a 30 seconds count down before the device enters the normal display mode. The device type appears in the upper 'Code' window and the current opacity in the 'Value' window. The 'Ready' LED indicates, that the device is running well.



**Figure 38:** Normal display mode (VN116/93 as example)

The device offers a user interface to display and to adjust some parameters. Input is performed via the three light buttons (see Figure 38). By touching the glass plate the infrared light from the transmitter is reflected to the optical receiver which generates a signal for the micro-controller.



**Figure 39:** Example of an oil mist alarm state with 20% opacity

In case of a high oil mist concentration the LED bar goes up. At 100% opacity, compared to the alarm level, the 'Oil-Mist Alarm' LED starts blinking. If the opacity later goes down, the alarm condition will be stored. The opacity is shown in the right LED bar. If the highest LED is switched on the opacity is equal or higher, compared to the alarm level.

By touching the light button 'Up' for longer than 3 seconds the 'Parameter display mode' is activated. The available parameters are listed in Table 3. The 'Up' and 'Down' buttons can be used to navigate within this list.

If no button is touched for one minute the 'Parameter display mode' will be exited.


Code	Description	Unit/Format
-215/-116/-115	Opacity	%
-001	Oil mist alarm level	%
-002	Opacity relative to alarm level	%
-003	Not used	
-004	Not used	
-005	Negative pressure inside measuring head	% relating to threshold
-006	Ambient temperature	°C
-007	Electronic temperature	°C
-008	Time	hh.mm
-009	Date	dd.mm
-010	Alarm level (see chapter 3.5)	
-011	Oil mist pre-alarm level relative to the main alarm level (40 -100)	%
-012	Not used	
-020	A/D converter: opacity	
-021	A/D converter: air flow sensor	
-022	A/D converter: ambient temperature	
-023	A/D converter: electronic temperature	
-024	For internal use	
-025	For internal use	
-026	For internal use	
-027	Up-Counter	s

**Table 3:** Parameters



## 4.2 Parameter Adjustment

By simultaneously touching the light buttons 'Up' and 'Down' for longer than 3 seconds the 'Parameter adjustment mode' is activated. The 'Up' and 'Down' buttons can be used for navigation.

	WARNING! The engine is <b>not</b> monitored In the 'Parameter adjustment mode'.
---	---

To enable the adjustment of all parameters, a password must be entered in parameter P000 first, otherwise the parameters are only readable.

The value of the password is **4711** and cannot be changed. To input the password first touch the 'Enter' button and then use the 'Up' and 'Down' buttons to scroll through the numbers. Touch 'Enter' once again to input the currently indicated number and move on to the next position.

To exit the 'Parameter adjustment mode' either simultaneously touch the light buttons 'Up' and 'Down' for longer than 3 seconds or simply don't press any button for longer than one minute.

Code	Description	Range	Factory pre-setting	Unit/Format
P001	Oil mist alarm level	3-6	4	
P002	Used for service purpose, must be always 0			
P003	Used for service purpose, must be always 0			
P004	Oil mist pre-alarm level relative to the main alarm level	40 - 100	100	%
P005	RS485 bus-address	1 - 16	1	
P006	Restore pre-setting by enter '1'	0 or 1	0	
P050	Date	01.01 - 31.12		dd.mm
P051	Date	1990 -		yyyy
P052	Time	00.00 - 23.59		hh.mm

**Table 4:** Adjustable Parameters



### 4.3 Diagnostics

If a device internal error or a system failure occurs the diagnostics system displays the failure condition in the 'Code' window and the 'Ready' LED is off. The error codes are shown in Table 5.

Error Codes	Value	Series VN93 device failures
E018		Voltage of internal battery too low
E017		Electronic module defective
E016		Electronic module defective
E015	% of max.	Optical sensor very dirty
E014	% of switch-on threshold	Negative pressure/airflow too low
E013	% of max.	Optical sensor dirty
E012		Checksum error
E011	Temperature	Ambient temperature too low (<0°C)
E010	Temperature	Ambient temperature too high (>70°C)
E009	Temperature	Electronics temperature too low (<0°C)
E008	Temperature	Electronics temperature too high (>75°C)
E007		Light button defective
E006	Voltage	Supply voltage too high
E005		Not used
E004	Digital value	Optical sensor defective
E003	Digital value	Airflow-sensor defective
E002	Digital value	Airflow-sensor defective

**Table 5:** Error codes

A detected oil mist alarm is displayed at this time with the 'Test' LED. In this case the alarm relay or shutdown relay is not switched on.





**Figure 40:** Device not ready, example of 'Negative pressure too low'

The second value shows the negative pressure in % relating to the switch-on threshold.





4.4 Reset of Oil Mist Alarms



**Caution!**

Ensure that the oil mist concentration inside the engine has fallen under the Lower Explosion Level (LEL) before acknowledging an oil mist alarm by pressing the Oil-Mist-Alarm button. **Otherwise you risk an oil mist explosion!**

Follow the instructions of the engine builder, ship yard and ship owner.

Use a monitoring device at a safe location to read off the current oil mist concentration. SAB recommends to wait until more than the half of the indication LED's are switched off (VISATRON®-device and Remote Indicator II) or the oil mist alarm level has to reduce below 50% (ReCon DS23).

The alarm condition can be reset only by pressing the Oil-Mist-Alarm reset light button.



**Figure 41:** Oil-Mist-Alarm reset light button




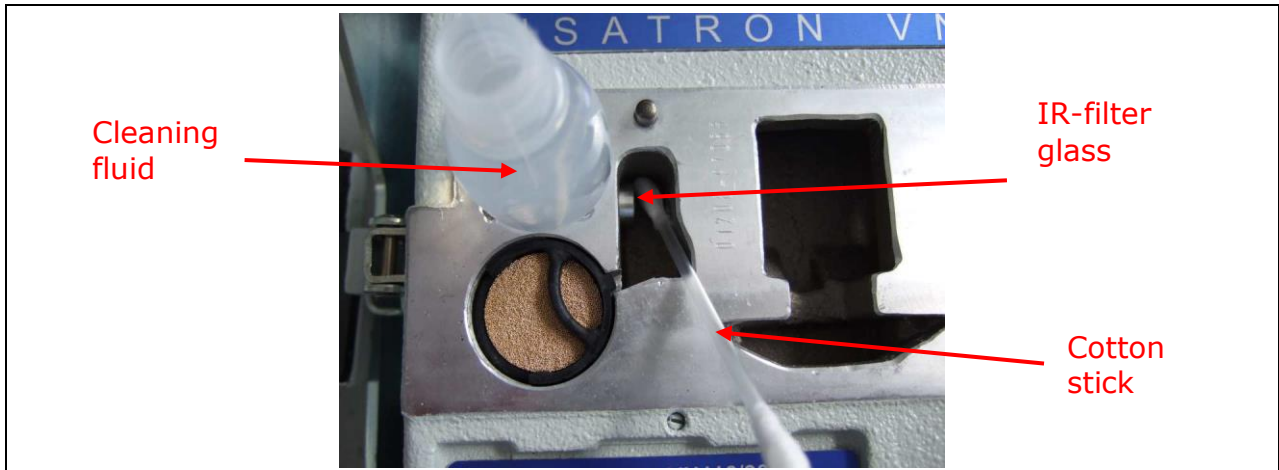
## 5 Troubleshooting

Error	Description	Measure	Chapter
18	Voltage of internal battery too low	1. Exchange measuring head	5.4 page 45
17	Electronic module defective	1. Exchange measuring head	5.4 page 45
16	Electronic module defective	1. Exchange measuring head	5.4 page 45
15	Optical sensor dirty	1. Clean infrared filter	5.1 page 43
14	Negative pressure / airflow too low	1. Exchange air filters 2. Check suction system 3. Adjust suction pressure 4. Exchange filter cartridge (optional) 5. Exchange measuring head	5.2 page 43  3.1 page 29 8.3 page 50  5.4 page 45
13	Optical sensor dirty	1. Clean infrared filter	5.1 page 43
12	Checksum Error	1. Repeat parameter setting	
11	Ambient temperature too low (<0°C)	1. Remove ambient cooling components	
10	Ambient temperature too high (>70°C)	1. Remove or turn away ambient heating components 2. Install metal heat shields against radiation 3. Install vortex coolers	
9	Electronics temperature too low (<0°C)	1. Remove ambient cooling components	
8	Electronics temperature too high (>75°C)	1. Remove or turn away ambient heating components 2. Install metal heat shields against radiation 3. Install vortex coolers	
7	Light button defective	1. Clean glass plate 2. Exchange Measuring head	5.4 page 45
6	Supply voltage too high	1. Measure supply voltage 2. Exchange measuring head	5.4 page 45
4	Optical sensor defective	1. Clean infrared filter 2. Exchange measuring head	5.1 page 43 5.4 page 45
3	Airflow-sensor defective	1. Exchange measuring head	5.4 page 45
2	Airflow-sensor defective	1. Exchange measuring head	5.4 page 45
	All LED off	1. Measure supply voltage 2. Replace measuring head fuse 3. Exchange measuring head	5.5 page 46 5.4 page 45




### 5.1 Clean infrared filter

	<p><b>CAUTION!</b> Dirty optical filter glass may cause a loss of sensitivity of the device.</p>
---	--




**Figure 42:** Cleaning of IR-Filter glass in the left and the right chamber

	<p><b>WARNING!</b> Use only cleaning fluids for optical components as delivered in the service box.</p>
---	---

### 5.2 Exchange air filters in the measuring head

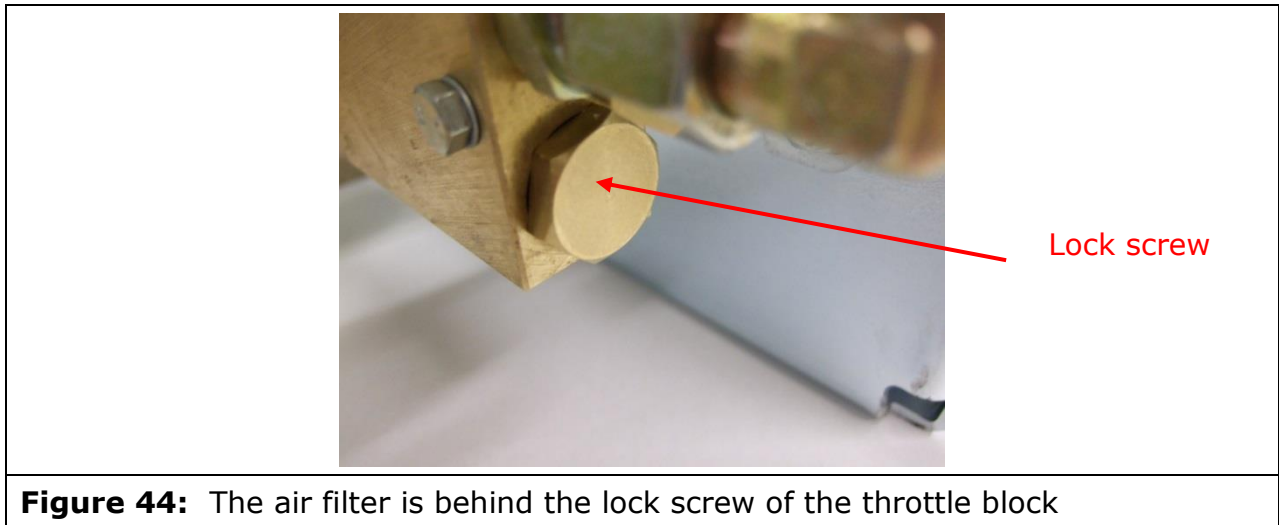


**Figure 43:** Exchange of the air filters

	<p><b>WARNING!</b> Do not try to clean the filters, use always new ones.</p>
---	--



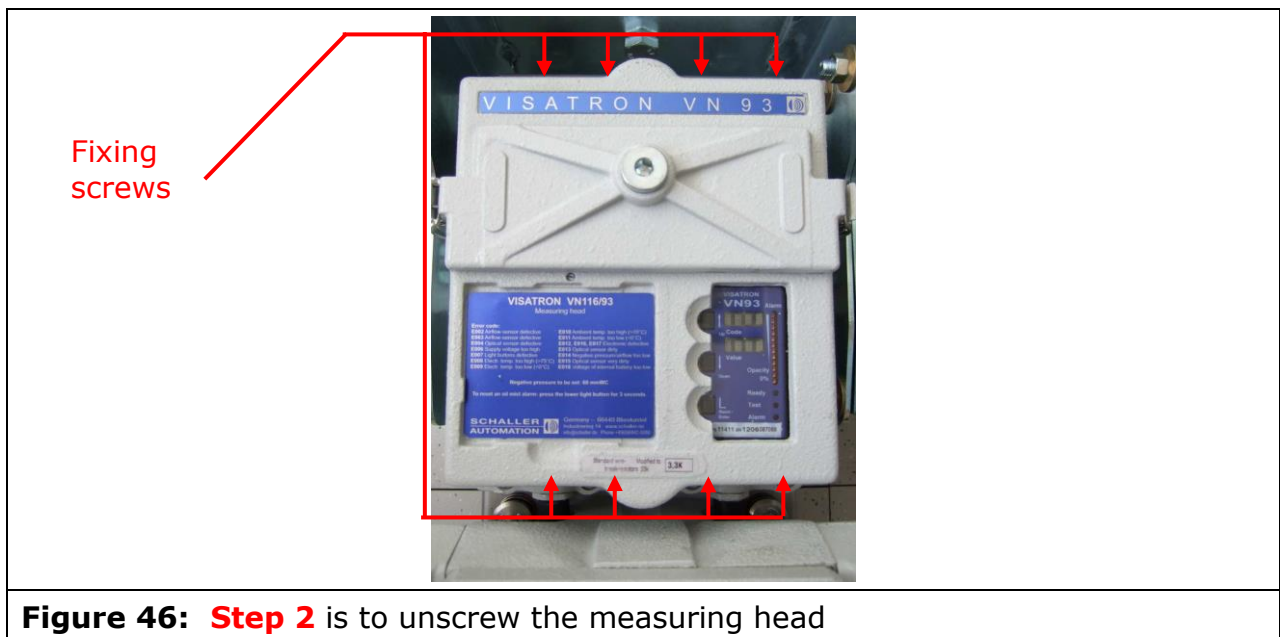
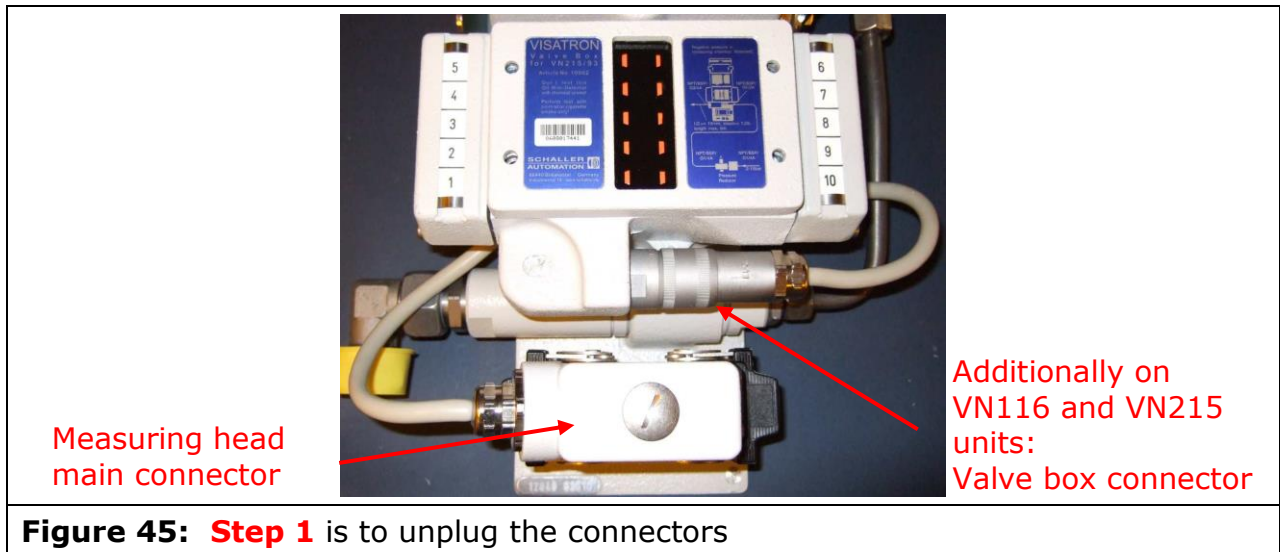
### 5.3 Exchange air filter in pressure regulator unit



**WARNING!** Switch off the compressed air supply during the maintenance work. After the exchange re-check the negative suction pressure.



5.4 Exchange measuring head

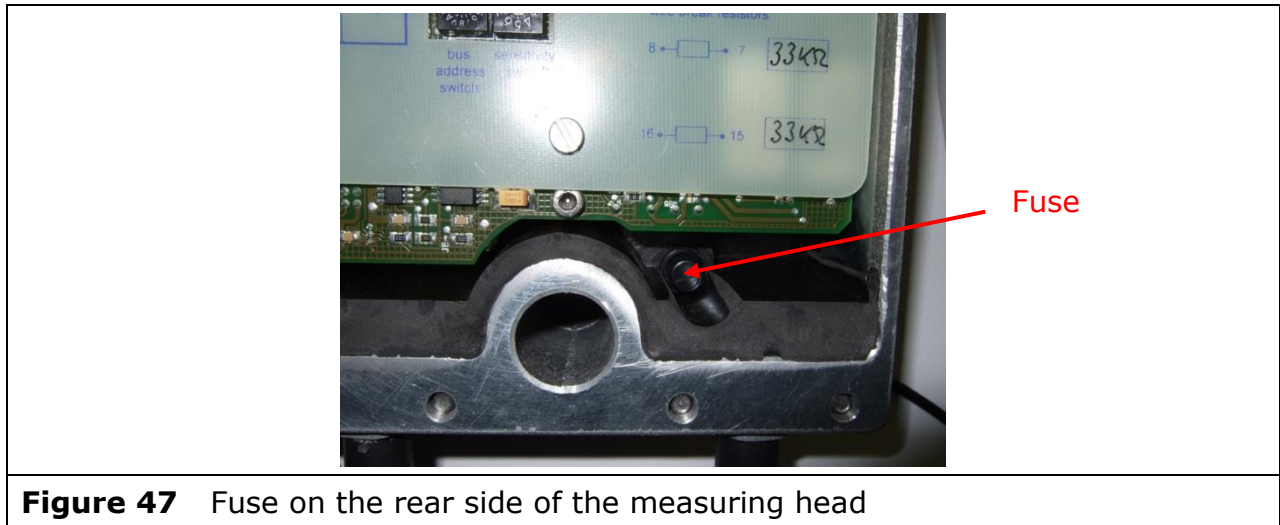


To mount the new measuring head execute the 2 steps in reverse order.

	<p><b>WARNING!</b> Check the values of the wire break resistors or in case of doubt use the old ones.</p>
--	---



### 5.5 Measuring head fuses




**WARNING!** Unplug the main connector during the exchange of the fuse.

If all LED's remain off exchange the 3.15 A semi lag fuse at the rear side of the measuring head (see Figure 47).



**6 Maintenance procedures**


	CAUTION! Maintenance work has to be done when engine is stopped.
---	--

<b>Quarterly or after 2000 operating hours</b>		
1	Check negative pressure in the measuring head: under 55 mmWC → adjust pressure between 55 mmWC and 65 mmWC → okay between 65 mmWC and 85 mmWC → adjust pressure over 85 mmWC → check pressure regulator unit	See chapter 3.1 page 29
2	Clean infrared filters in the measuring head	See chapter 5.1 page 43
3	Exchange air filters in the measuring head	See chapter 5.2 page 43
<b>Half-yearly or after 4000 operating hours</b>		
4	Perform quarterly maintenance procedure 1 - 3	
5	Exchange air filter in pressure regulator unit	See chapter 5.3 page 44
6	Exchange filter cartridge (optional)	See chapter 8.3 page 61
<b>Yearly or after 8000 operating hours</b>		
7	Perform half-yearly maintenance procedure 4 - 6	
8	Clean suction system with compressed air. <b>ATTENTION, do not forget to refill the siphons!</b>	See chapter 3 page 29
9	Check the bellows and the suspension-system between measuring head and base plate, check the scavenging air outlet behind the control cover (see Figure 42) by feeling the air stream to control scavenging air system	
10	Perform functional test	See chapter 7 page 48
<b>Additional every 5 years</b>		
11	Exchange bellows	Use services of our partners (see chapter 10)




7 Functional test

7.1 On board test

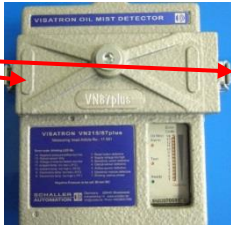

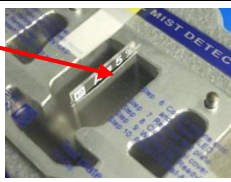
	Attention: Before starting the on board test execute the procedures as specified in the maintenance schedule. The pipe system has to be clean and if used all siphons have to be filled with oil (refer to chapter 2.1.3.)
---	--

Using the test plate set included in this manual folder, you can easily test the functionality of the VISATRON® oil mist detectors and their connection to the safety system of the engine. The set can also be ordered separately under Part.-No. 11072. It consists of the following parts:

<ul style="list-style-type: none"> <li>• Test plate (A)</li> <li>• Test glass (B)</li> <li>• Working instruction</li> </ul>	<b>A</b>		<b>B</b>	
---	----------	--	----------	---

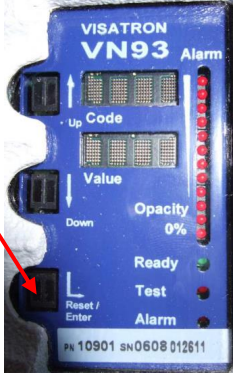
	<b>Attention: You will stop or slow down the engine.</b>
---	--

Test procedure step by step:

Step 1	Open the latches of the OMD control cover and flip the cover to the left side.	
Step 2	Press the test plate onto the <b>openings</b> . Ensure that the openings are completely covered. Now the device starts to create the negative suction pressure again.	
Step 3	Wait for the 'Ready'-LED on the display.	
Step 4	Insert the <b>test glass into the slot</b> of the test plate. The glass simulates oil mist and generates an oil mist alarm.	
Step 5	Wait for the 'Alarm'-LED. At this comes on, the engine has to stop or to enter the slow down	






	mode.	
Step 6	Remove the test plate and put it together with the test glass back into the bag.	
Step 7	Close the control cover carefully.	
Step 8	Wait for the 'Ready'-LED.	
Step 9	Press the <b>Oil-Mist-Alarm RESET button</b> to acknowledge the alarm state and enter the normal monitoring mode.	

If applicable perform an additional pressure measurement to check the tightness of the suction system as described in chapter 7.3. Instead of an electronic gauge you can use the U-pipe manometer of the service box.



**7.2 Factory test at engine builder with smoke generator on VN115/93 and VN116/93 installations**

Both installation types can be verified by a smoke test. Due to vessels not normally having the equipment SCHALLER AUTOMATION recommends this procedure only for the factory test by using the SCHALLER smoke generator (see Figure 48). If a smoke generator is available on a vessel this test can be also performed, however, in this case observe the following warning.

	<p>Attention: Before starting the on board test execute the procedures as specified in the maintenance schedule. The pipe system has to be clean and if used <b>all siphons have to be filled with oil</b> (refer to chapter 2.1.3.)</p>
---	--

A complete test including the suction funnels can be done only at standstill of the engine. The crankcase service covers must be opened first. Put a small amount of smoke fluid (see Chapter 'Accessories') into the reservoir and switch on the generator for a few seconds until the storage tank is completely filled with smoke. This is important so that the tank can provide sufficient smoke to complete the search run of a VN116/93 installation to determine the correct engine side. The last step is to hold the flexible hose directly into the suction funnels until an oil mist alarm is indicated.



**Figure 48:** SCHALLER AUTOMATION smoke generator, see 'Accessories'

If it's not possible to open the service covers a functional test can be performed without testing the suction funnels.



In this case the flexible hose has to be pressed over the opening under the lock screws of the siphon blocks as seen in Figure 49 or has to be pressed over the open header pipe end after removing the lock nut.



**Figure 49:** Test inlet on the siphon blocks VN180

	<p>Attention: In case of siphon block VN180 installation you have to test all compartments and the additional suction points at running engine.</p>
--	---


### 7.3 Additional pressure measurement on VN115/93 and VN116/93 installations

Perform the functional and smoke test as shown in the previous chapters 'On board test' and 'Factory test with smoke generator'.

<p><b>Figure 50:</b> Manometer connected to siphon block VN180</p>	<p><b>Figure 51:</b> Manometer connected to header pipe</p>

Then carry out a pressure measurement at the end of the suction system. The engine including the oil pump must be at standstill.



	Attention: You will only measure correct values at standstill of the engine and the lube oil pump.
---	--

On a VN115/93 and VN116/93 installation the tightness of the suction system can be determined by a pressure measurement at the outer siphon blocks or at the end of the header pipes.

This siphon block has an additional fitting for a manometer (see Figure 50). To remove the 17 mm lock nut you have to counter the 19 mm nut with a jaw wrench.


The pressure measurement procedure can also be performed at the end of the 22 mm diameter suction pipes which are delivered from SCHALLER AUTOMATION. These pipes have also fittings for the manometer at the pipe end (see Figure 51).

Use only a digital manometer with a differential measuring method. On completion do not forget to lock all openings.

The minimal negative pressure values are defined in Table 6. They are only valid if a negative pressure of **60 mm WC** is adjusted at the measuring head.

VN115/93	6.5 mm WC
VN116/93	1.5 mm WC

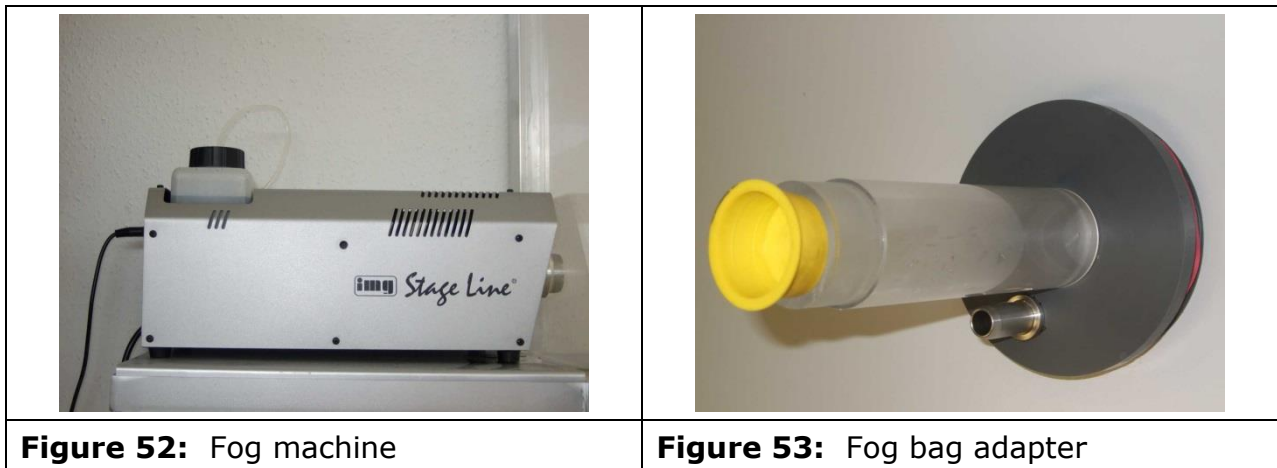
Table 6: Minimal pressure values **at the end** of the suction system

	CAUTION! Do not use chemical smoke that is not approved by Schaller Automation for testing the OMD. You risk harming the OMD's optical system!
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**7.4 Factory test at engine builder with fog machine on VN215/93 installations**

This test includes the indication of an oil mist alarm as well as the indication of the affected compartment. Instead of the above mentioned smoke generator you have to use the more powerful fog machine (see Figure 52) with a fog bag with adapter (see Figure 53).




This equipment guarantees a constant fog concentration during the test and due to high density no influence of the additionally sucked in crankcase atmosphere.

Due to the increasing request of the ship owners and classification societies to test the OMD-System at running engines SCHALLER AUTOMATION recommends now following procedure.

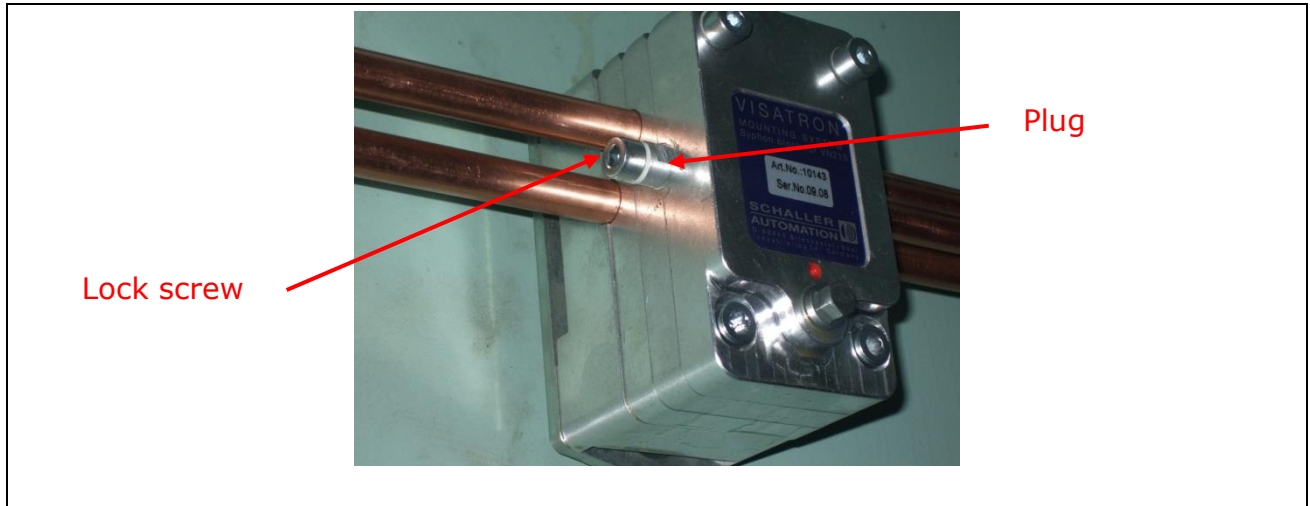
The first test must be performed at standstill to secure, that the engine is well protected by the OMD system. If it is not possible to open the service covers or if it is not possible to access the suction funnels, e.g. on large 2-stroke engines, a functional test can be performed alternatively using a special connection on the siphon block or respectively on the T-engine wall connection.

Fill the fog bag completely with fog and close the adapter with the yellow cap. The next step is to press the flexible hose of the fog bag adapter over the opened plug at the side of the siphon blocks as seen in **Figure 54** or over the open tube end at T-engine wall connections. Do not remove the hose until an oil mist alarm is indicated and the search run to indicate the affected compartment is finished. The plugs can be countered by an 11 mm jaw wrench to open or close the lock screw.

	<p>Attention: You have to test all compartments and the additional suction points.</p>
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The second test can be performed on request at running engine using the plugs of the siphon block or the T-engine-wall connection to induce the fog.



**Figure 54:** Test inlet on the siphon blocks VN280



A wrong compartment indication can be caused either by:

- Empty fog bag: → Repeat the test with a full bag
- Empty siphon block → Drain all siphon blocks of the affected side completely by opening the 4 screws on the front side and refill the siphons again.



**8 Spare Parts and Accessories**

Part-No. new	Part-No. old	Description	Min. Quantity
151075	10950	Service box	1
11201	11201	Measuring head VN115/93; 33k; sensitivity level 4 *	1
11401	11401	Measuring head VN116/93; 33k; sensitivity level 4 *	1
10901	10901	Measuring head VN215/93; 33k; sensitivity level 4 *	1
270197	10968	Control cover measuring head series VN93 devices	1
11432	11432	Valve box VN116/93	1
10902	10902	Valve box VN215/93	1
365206	10002	Air filter for pressure regulator unit	1
365197	10042	Scavenging air filter ( <b>10 pcs.</b> )	2
270090	10035	Bottle with cleaning fluid	1
190003	10135	Cleaning needle	1
452176	10036	Cotton buds to clean IR-filters ( <b>min. 10 pcs.</b> )	1
200548	10046	U-pipe manometer	1
270502		Manometer adapter for siphon block VN180	1
270089	10040	Bottle with slacked water	1
270493	10053	Manometer adapter for control cover	1
330721	10405	Gasket for valve box	1
360132	10406	Sealing for oil draining in valve box	1
360133	10407	Sealing for suction channel in valve box (2 pcs.)	
310526	10087	Fuse cap	1
436551	10973	Semi lag fuses 3.15A ( <b>10 pcs.</b> )	1
365193	10023	Flexible bellow of suction channel	2
360245	10990	Flexible bellow of scavenging air channel	1
350001	10409	Clamp plate VN215 valve box connection	2
360079	10411	Rubber insert for valve box pipe connection VN215	2
360194	10412	Rubber plugs for unused valve box connections	3
200251	10905	Main connector socket	1
271769	10975	Scavenging air inserts with metal bush (2 pcs.)	1
271899		Scavenging air inserts for measuring heads delivered as from cw27/2009 (sn 0608012611) (2 pcs.) .cw year	1

**Table 7:** Spare parts

\* Other versions are also available on enquiry.



Part-No. new	Part-No. old	Description
151075	10950	Service box series VN93
151164	11048	Commissioning box series VN93
180061	10980	Manual DVD series VN93
151072	10001	Pressure regulator unit with input throttle
270888	10753	Protection cover
150938	11163	Oil separator for air outlet
150939	11164	Pipe siphon
150929	10140	Siphon block VN280 1 connection
151931	10142	Siphon block VN280 2 connection
151932	10143	Siphon block VN280 3 connection
151933	10144	Siphon block VN280 4 connection
151934	10145	Siphon block VN280 5 connection
151930	10141	Siphon block VN280 1 connection with manometer fitting
271544	10160	Mounting plate VN280
270409	11062	Oil pump VN280
340115	10091	Blind plug VN280
150260	10013	Siphon block VN180
150166	10612	Siphon block VN180 with manometer fitting
270504	10089	Mounting plate VN180
270371	10062	Oil pump VN180
340375	10640	Blind plug VN180
150740	10353	Smoke generator 230 Volts
151067	11089	Smoke generator 110 Volts
451209	10097	Smoke fluid
151167	11049	Fog machine complete
450137	11052	Fog fluid
270453	11072	Test-plate kit
150998	11506	Monitoring device Remote Indicator II
230140	11503	Bus-cable 10m for monitoring devices
Depends on engine type		Suction funnel
Depends on engine type		Engine wall connection

**Table 8:** Accessories





8.1 Optional Service Box

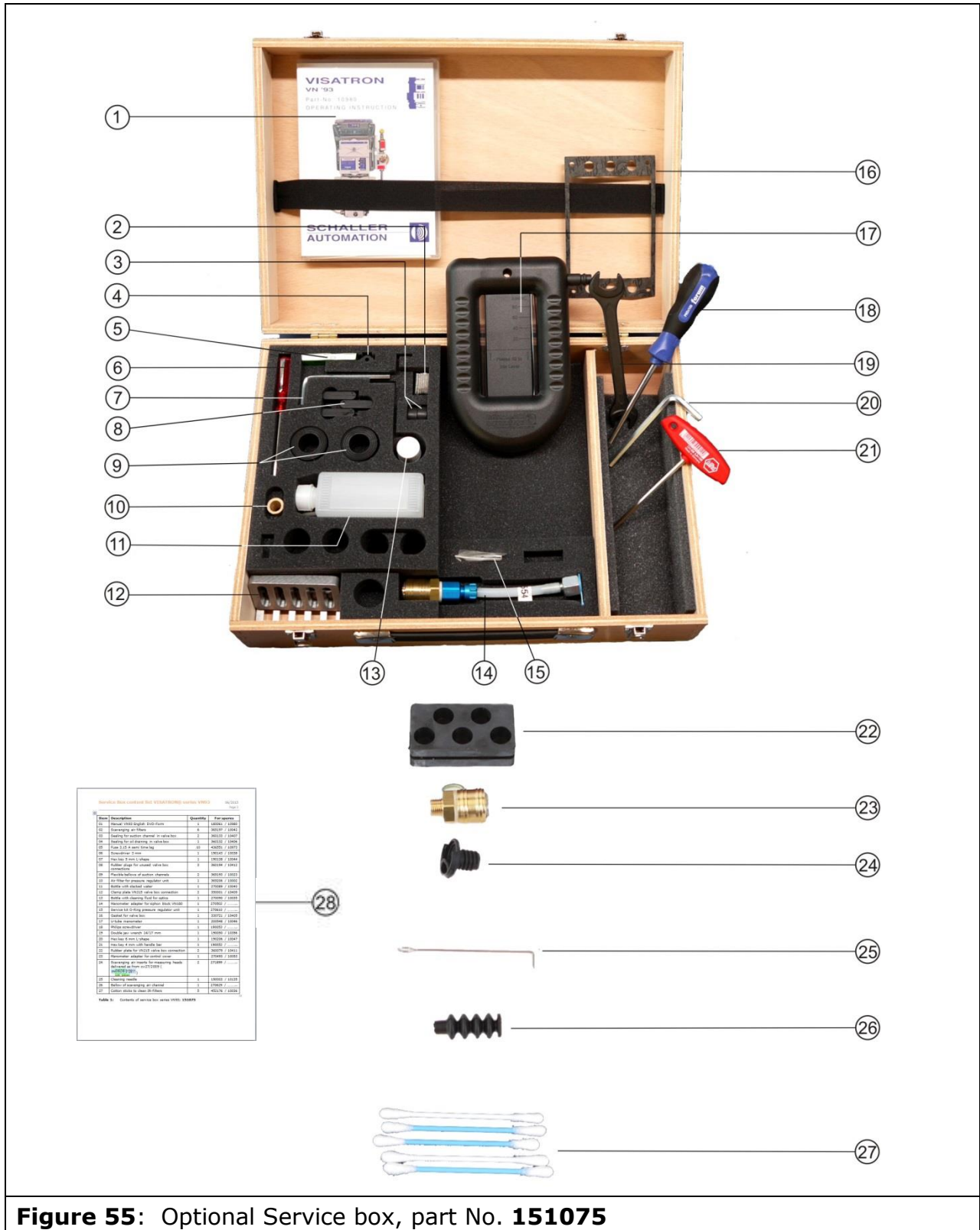


Figure 55: Optional Service box, part No. 151075



Item	Description	Quantity	Reorder No.
01	Manual VN93 English DVD-Form	1	180061 / 10980
02	Scavenging air filters	6	365197 / 10042
03	Sealing for suction channel in valve box	2	360133 / 10407
04	Sealing for oil draining in valve box	1	360132 / 10406
05	Fuse 3.15 A semi time lag	10	436551 / 10973
06	Screwdriver 3 mm	1	190143 / 10038
07	Hex key 5 mm L-shape	1	190138 / 10044
08	Rubber plugs for unused valve box connections	3	360194 / 10412
09	Flexible bellows of suction channels	2	365193 / 10023
10	Air filter for pressure regulator unit	1	365206 / 10002
11	Bottle with slacked water	1	270089 / 10040
12	Clamp plate VN215 valve box connection	2	350001 / 10409
13	Bottle with cleaning fluid for optics	1	270090 / 10035
14	Manometer adapter for siphon block VN180	1	270502
15	Service kit O-Ring pressure regulator unit	1	270610
16	Gasket for valve box	1	330721 / 10405
17	U-tube manometer	1	200548 / 10046
18	Philips screwdriver	1	190053
19	Double jaw wrench 14/17 mm	1	190050 / 10356
20	Hex key 6 mm L-shape	1	190206 / 10047
21	Hex key 4 mm with handle bar	1	190052
22	Rubber plate for VN215 valve box connection	2	360079 / 10411
23	Manometer adapter for control cover	1	270493 / 10053
24	Scavenging air inserts for measuring heads delivered as from cw27/2009 ( SN 0608 012611 ) .cw year )	2	271899
25	Cleaning needle	1	190003 / 10135
26	Bellow of scavenging air channel	1	270629
27	Cotton sticks to clean IR-filters	5	452176 / 10036
28	Service box content list VN93	1	180504

**Table 9:** Contents of service box series VN93; Part No. **151075**



8.2 Optional Commissioning Box

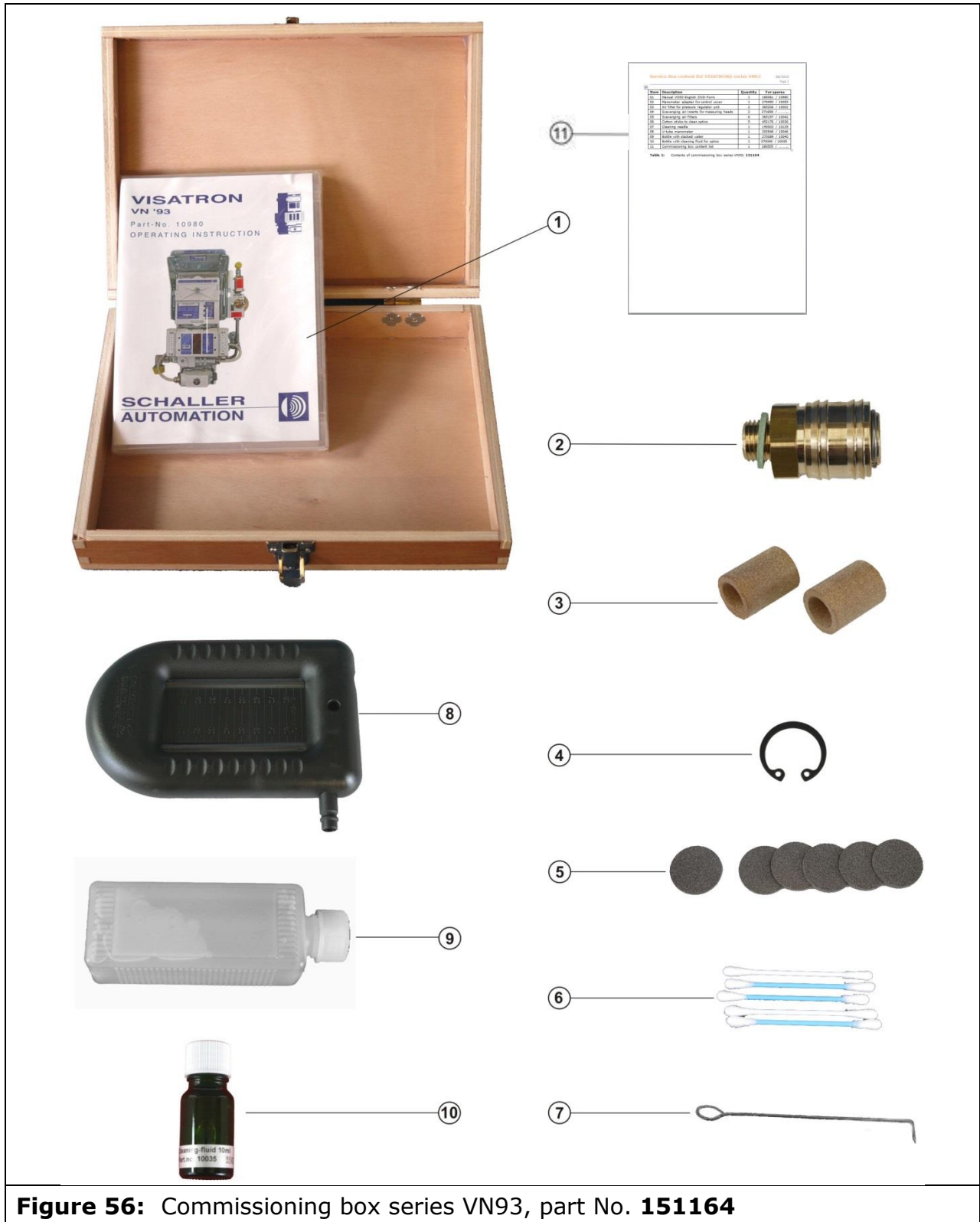


Figure 56: Commissioning box series VN93, part No. 151164



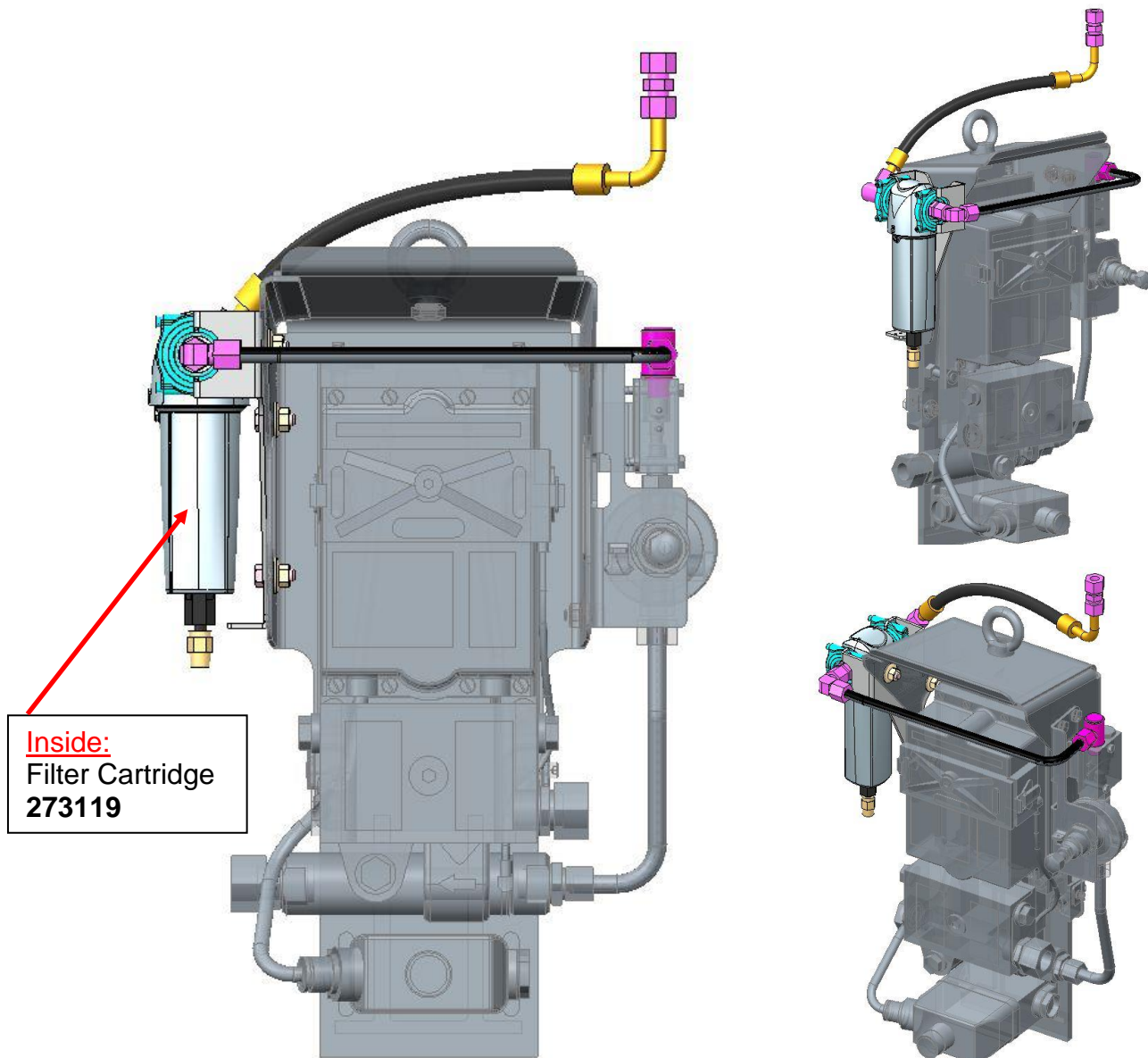
Item	Description	Quantity	Reorder No.
01	Manual VN93 English DVD-Form	1	180061 / 10980
02	Manometer adapter for control cover	1	270493 / 10053
03	Air filter for pressure regulator unit	2	365206 / 10002
04	Scavenging air inserts for measuring heads	2	271899
05	Scavenging air filters	6	365197 / 10042
06	Cotton sticks to clean optics	5	452176 / 10036
07	Cleaning needle	1	190003 / 10135
08	U-tube manometer	1	200548 / 10046
09	Bottle with slacked water	1	270089 / 10040
10	Bottle with cleaning fluid for optics	1	270090 / 10035
11	Commissioning box content list VN93	1	180505

**Table 10:** Contents of commissioning box series VN93; Part No. **151164**



8.3 Optional Driving Air Conditioning (Part No. 272213)

VISATRON VN/93



**Inside:**  
Filter Cartridge  
273119

- For longer lasting air filter lifetime
- Longer TBO
- Makes independent of onboard air quality
- Easy retrofit

As an Option:

- Automatic de-oiling/-watering

VISATRON Oil Mist Detection systems of VN/87plus series are known as being reliable and trustworthy safety systems to protect your engine from crankcase explosions.

Nevertheless, in order to reduce maintenance cost and to ensure a maximum availability time, some upgrade kits are available.

In case of a non-optimal driving air quality to the oil mist detector, this kit may help you getting rid of failing OMD measuring heads, being indicated eg. by failure LED No. 14, negative pressure/airflow to low.

It helps you also avoiding trouble with clogged air filters in measuring head and pressure reducer.



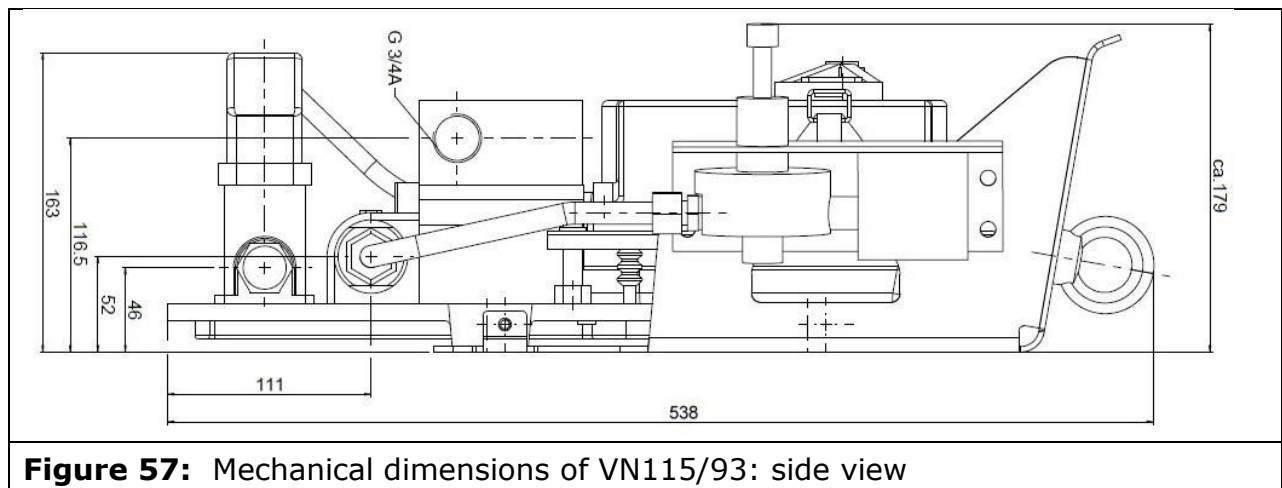
**9 Technical data**

<b>Mechanical data</b>	
Dimensions	See drawings (Figure 57 to Figure 62)
Weight	VN115/93 9 kg VN116/93 11 kg VN215/93 11 kg
Display	LED-bar with 14 LED's 1 green Ready LED 1 red Alarm LED 1 red Test LED 2 x 4 alpha-numerical displays
Suction pipes	VN115/93 ø 22 x 2 x max. 9m VN116/93 ø 22 x 2 x max. 9m VN215/93 ø 14 x 2 x max. 9m
Pipe connections	VN115/93 2 x G3/4 VN116/93 2 x G1/2 or G3/4 VN215/93 10 x ø 14
Venturi injector connections	In NTP/BSP/G1/2A Out NTP/BSP/G3/4A
Pressure reducer connections	In NTP/BSP/G1/4A Out NTP/BSP/G1/4A
<b>Electrical data</b>	
Power supply	18 Volts – 31.2 Volts DC, max. 3 A
Nominal voltage	24 Volts DC
Relay Outputs	2 x 'Alarm' 1 x 'Ready' 1 x 'Pre-Alarm' (max. 60 Volts DC/AC, 60W, 125VA, 2A)
Cable entry	2 x M25
Communication interface to monitoring device	2 wire RS485, galvanic separated
Communication cable recommendation	LAPPKABEL UNITRONIC-FD CP (TP) plus UL-CSA, 2 x 2 x AWG20, max 400 m length, 7.5-10.0mm Ø
<b>Air data</b>	
Air pressure	Before pressure reducer 2 – 15 bar Before air jet pump max. 500 mbar



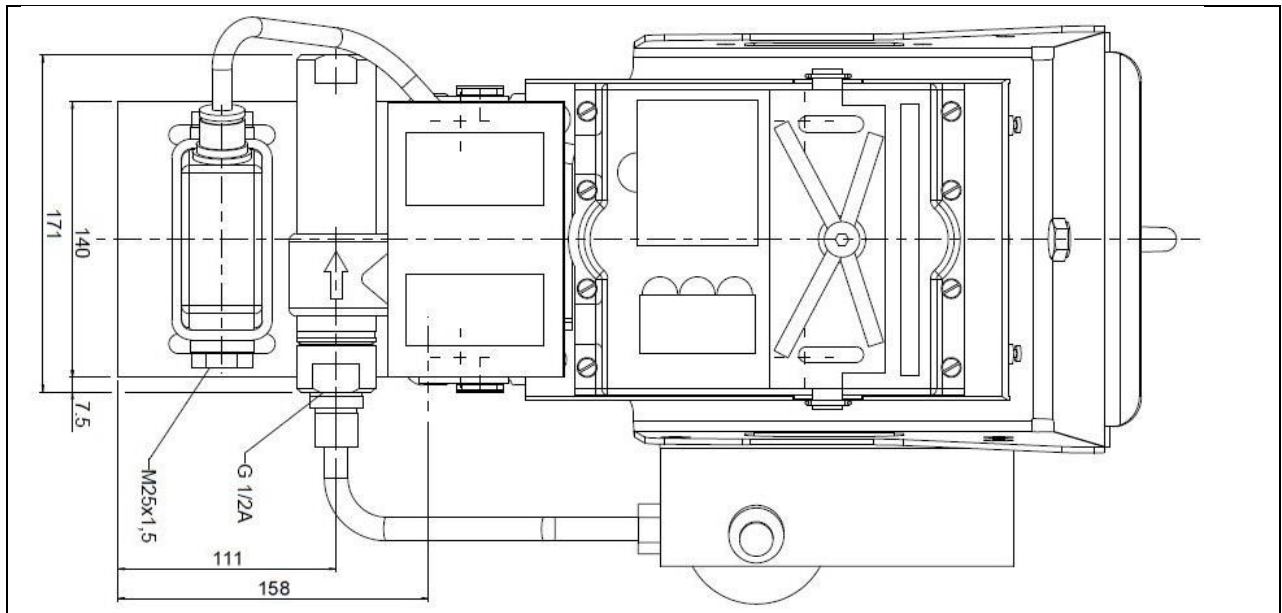
Air consumption	Depends on the suction system (about. 1 m <sup>3</sup> /h)
Negative pressure in measuring head	- 60 mm WC or - 6 mbar
Air quality	ISO8473-1:2010 - "6-4-4"
<b>Environmental conditions</b>	
Operating temperature	0 - 70 °C
Storage temperature	-25 - 80 °C
Max. vibrations	4 g (25-100Hz)
Relative humidity	up to 95%
Protection class	IP54
<b>Approval of classes</b>	
	Type approved for closed areas, designed for installation on combustion engines, environmental category D (GL), IACS UR M67 conform, list of type approvals see <a href="http://www.schaller.de">www.schaller.de</a>

**Table 11:** Technical data

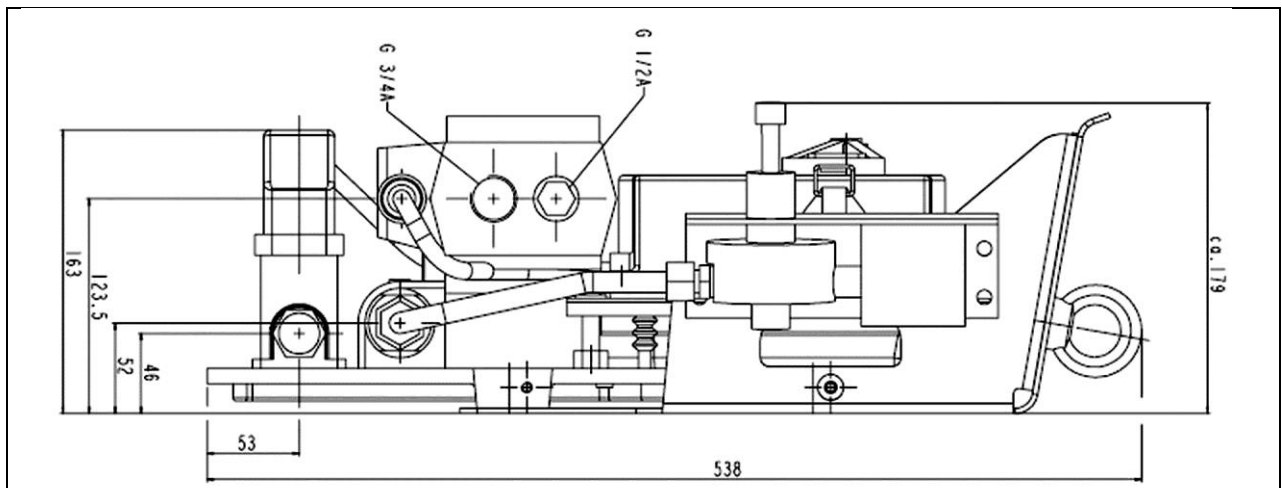


**Figure 57:** Mechanical dimensions of VN115/93: side view





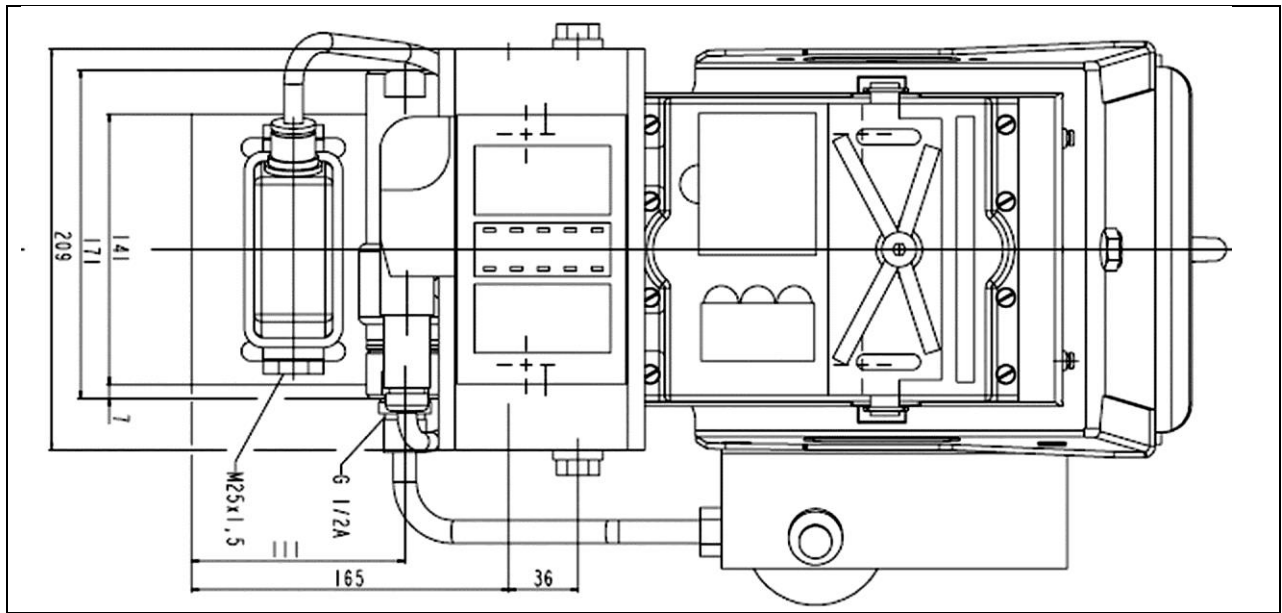
**Figure 58:** Mechanical dimensions of VN115/93: top view



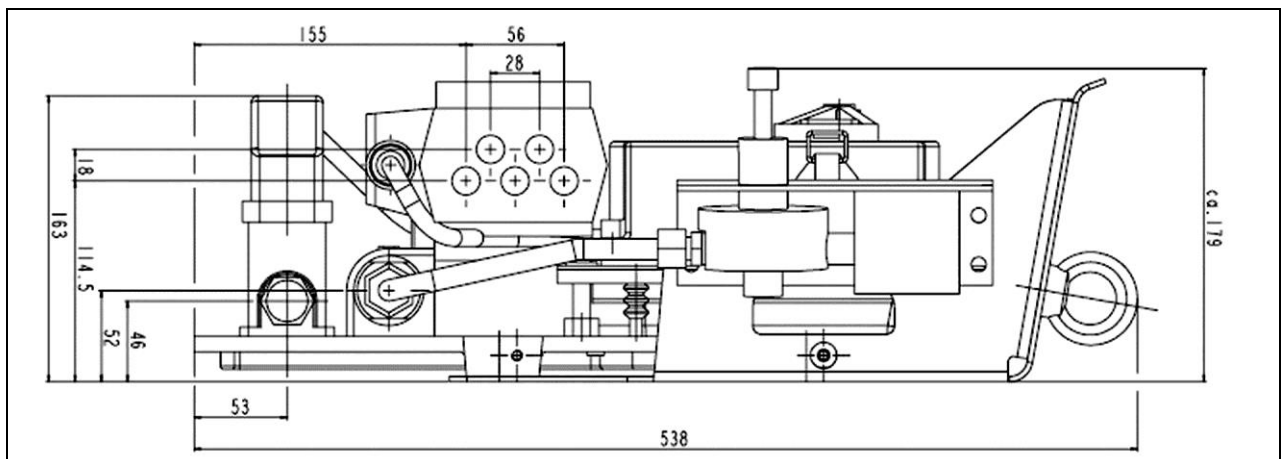
**Figure 59:** Mechanical dimensions of VN116/93: side view





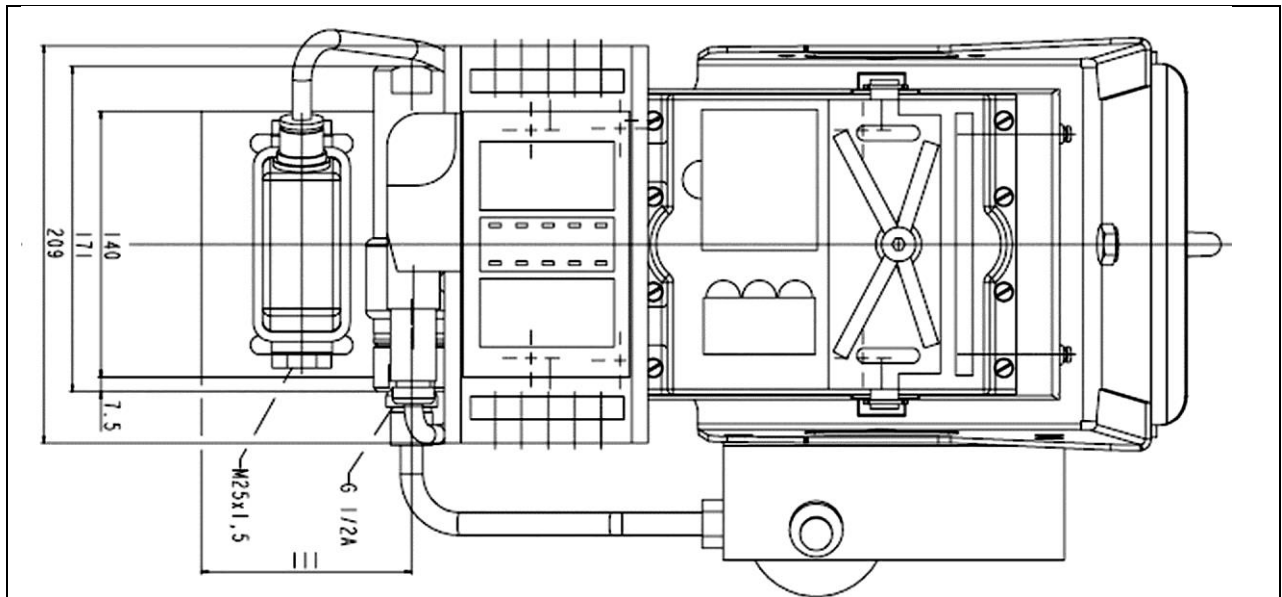


**Figure 60:** Mechanical dimensions of VN116/93: top view

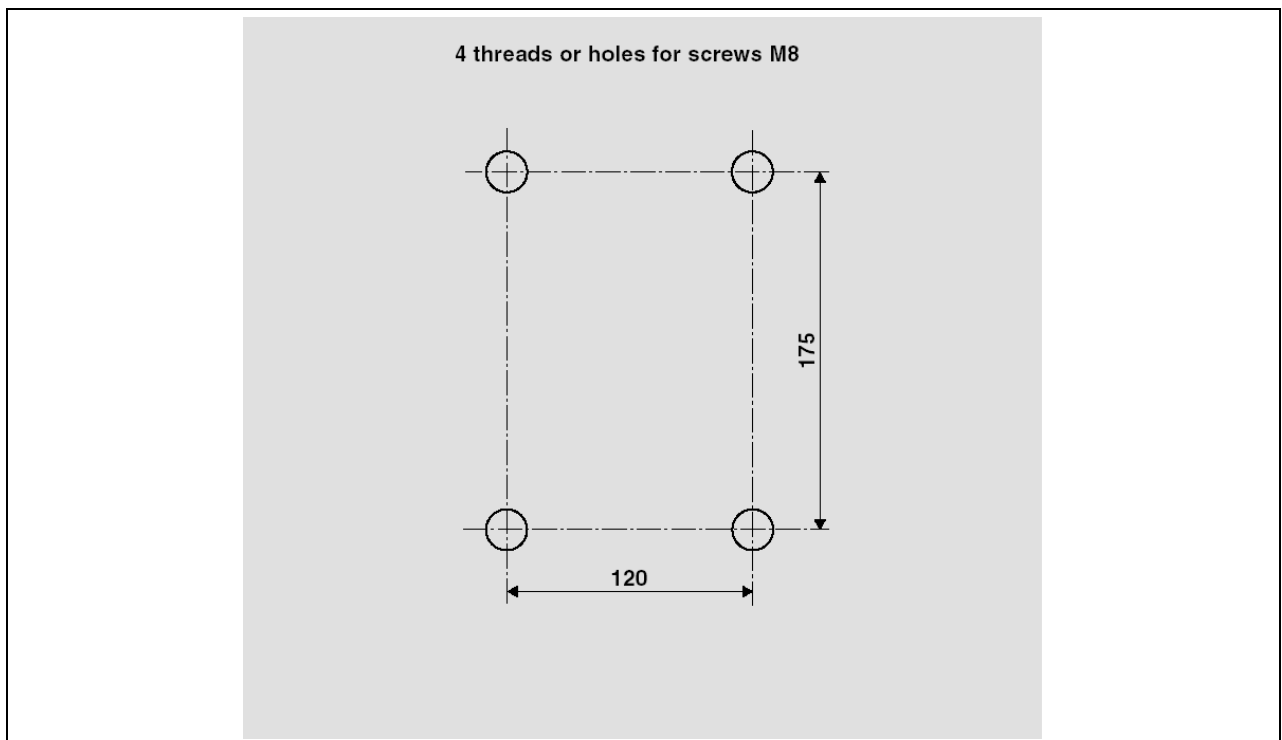


**Figure 61:** Mechanical dimensions of VN215/93: side view





**Figure 62:** Mechanical dimensions of VN215/93: top view



**Figure 63:** Drilling template of the OMD base plate



## **10 Service Partners**

Schaller Automation maintains a worldwide network of service partners currently in the following countries:

**Australia**  
**Brazil**  
**Canada**  
**Chile**  
**China**  
**Denmark**  
**Germany**  
**Greece**  
**Italy**  
**Japan**  
**Korea**  
**Netherlands**  
**Norway**  
**Poland**  
**Singapore**  
**Spain**  
**Taiwan**  
**Turkey**  
**United Arabian Emirates**  
**United Kingdom**  
**United States of America**

For an up-to-date list of our representatives including address and contact details please visit our website:

[www.schaller.de](http://www.schaller.de)

Alternatively, you may call the German headquarters for assistance in locating your nearest representative.

**Tel. +49 (0)6842 508 0**

