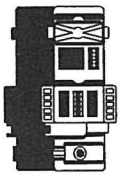
VISATRON

Operating
Instructions
Article No.: 10980

VN 115 / 93

VN 116 / 93

VN 215 / 93



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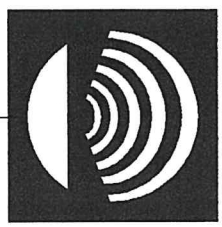

It is recommended to read this instruction manual before commencing the repair, assembly or commissioning of the oil mist detector system!

CAUTION: The manufacturer's warranty will become void if these instructions are not followed!

Unless notified to the contrary, these operating instructions are applicable for:

VN 115 / 93
VN 116 / 93
VN 215 / 93

In case of an oil mist alarm, the oil mist detector (OMD) must be in condition to react within the next few seconds and shut down the engine, in order to minimise immediate or consequential damages!

More Information can be found in the SAB Oil Mist Vademecum which SAB provides free of charge.


Safety Signs in general


Safety Signs electrical


Safety Signs parts are sensitive to electrostatic

SCHALLER AUTOMATION

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Product Description

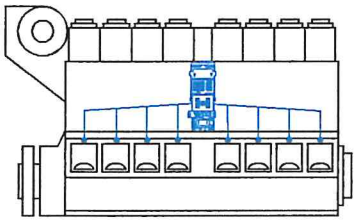
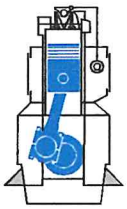
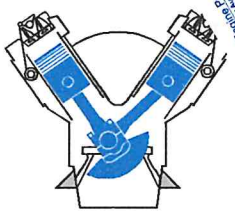
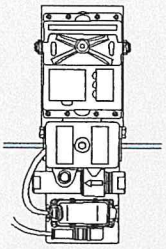
Oil mist detectors protect large diesel engines of all applications from heavy consequential damage as a result of overheating.

Application

With the VISATRON oil mist detectors of the type VN 115 / 93 and 116 / 93, 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 required for the type VN 215 / 93.
Application of the different VISATRON® devices and suction systems:

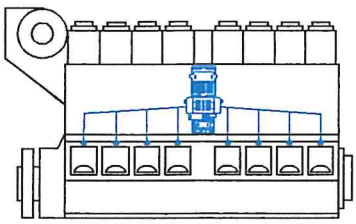
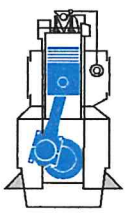
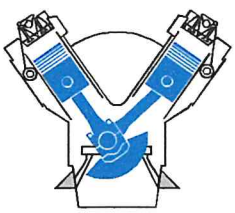
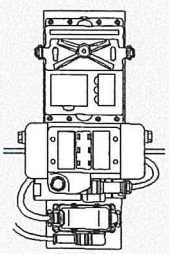
VN 115 / 93

- Basic 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 without localisation of the point of damage.

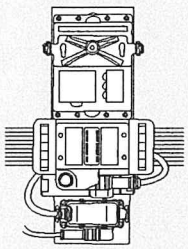
VN 116 / 93

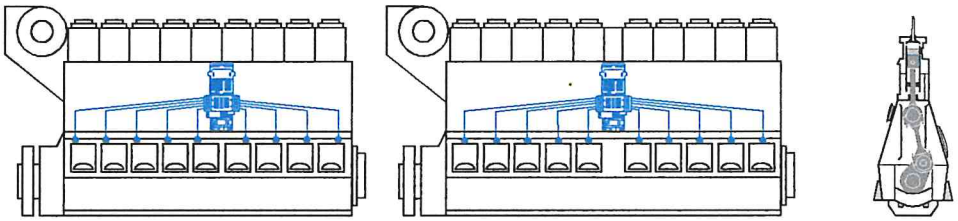
- Design with a higher sensitivity, suitable for the monitoring of trunk piston diesel engines with in-line and V cylinder arrangements, running at medium and high speed.
- Damage detection through a header pipe sampling system with a display of the crankcase compartment half (left or right side of the position of the detector) in which overheating damage has arisen.
- The header pipe sampling system is the same as in the VN 115 / 93, so the VN 116 / 93 can replace the VN 115 / 93 without modification of the suction system if localisation of damage is called for.

VN 215 / 93

- Device with the highest sensitivity, suitable for the monitoring of large four stroke and crosshead engines running at medium and slow speed.
- Damage selection through the individual compartment suction pipe system, with display of the compartment with the overheating damage.





Options

Available for all devices as an option in the package (option must be ordered with the particular OMD, not separately)

- Serial RS 485 interface
- Built-in history storage device for storing events with the data and time

Connection to a PC is possible with this option. The trend of the opacity (oil mist concentration) can be graphically displayed through this PC with the DIEMOS software that can also be provided as an option.
Furthermore, the interface makes it possible to drive the remote display. The history storage device is for storing events in the detector, such as the appearance of an alarm with the date and time. These data can subsequently be read out through the serial interface.

Function description

All VISATRON® devices continuously draw the atmosphere from every compartment in the crankcase area 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 the 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. 50 mg of atomised oil in 1 litre of air and up, which corresponds to an opacity of approx. 40%.

The sensitivity, i.e. the opacity that is required to trigger an alarm, can be set at 10 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 VN 93 series is distinguished from the VN 87 series through the following features:

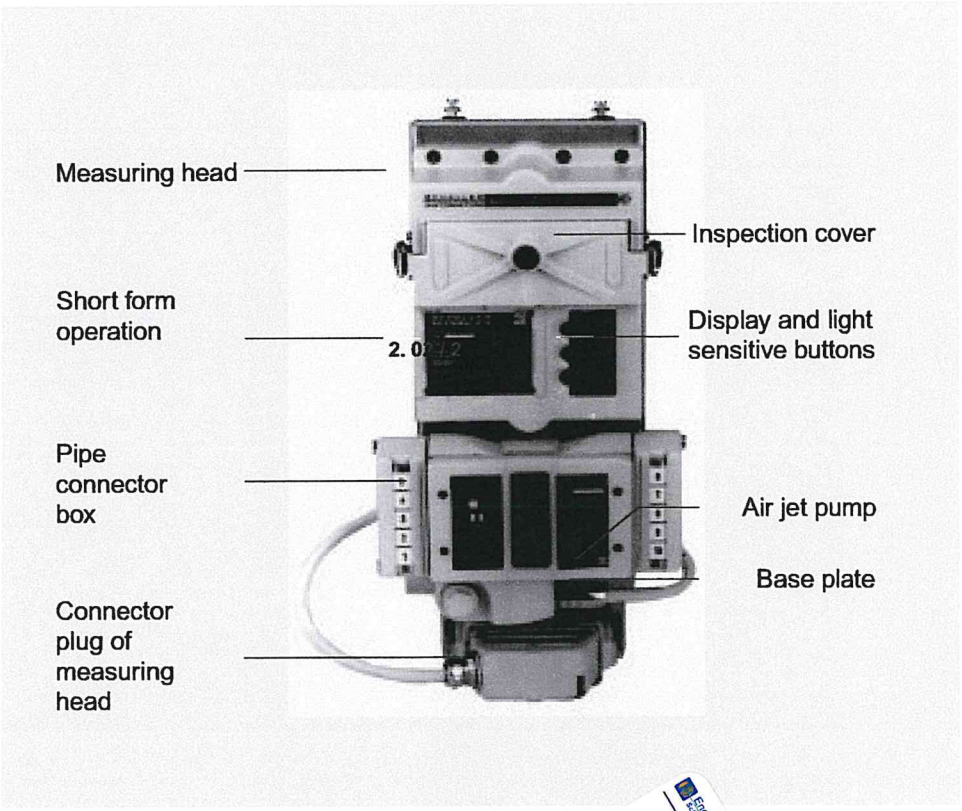
- Scavenging air chambers are not supplied with fresh air from the engine room, but instead with forced air, so fumes from a fire in the machine room cannot lead to an alarm.
- The measuring head heating unit for the avoidance of precipitating condensation water in the device, which can be delivered as an option to the VN 87, is integrated in the measuring head of the VN 93.
- An optional RS 485 interface with a history storage device permits the connection of the VN 93 to the ship's computer or PC.
- A pre-alarm relay, programmable in the sensitivity, is activated before an engine stop will be triggered by a high concentration of oil mist.
- The possibility of a calibration with fresh air exists for the types VN 116 / 93 and VN 215 / 93. It permits the measurement of the absolute opacity.

Design

The air jet pump, the connector plug, the pipe connector box (VN 115 / 93) or the valve box (VN 116 / 93 and VN 215 / 93) and the shock-absorbing mounting plate for the actual measuring head are supported on a sturdy base plate.

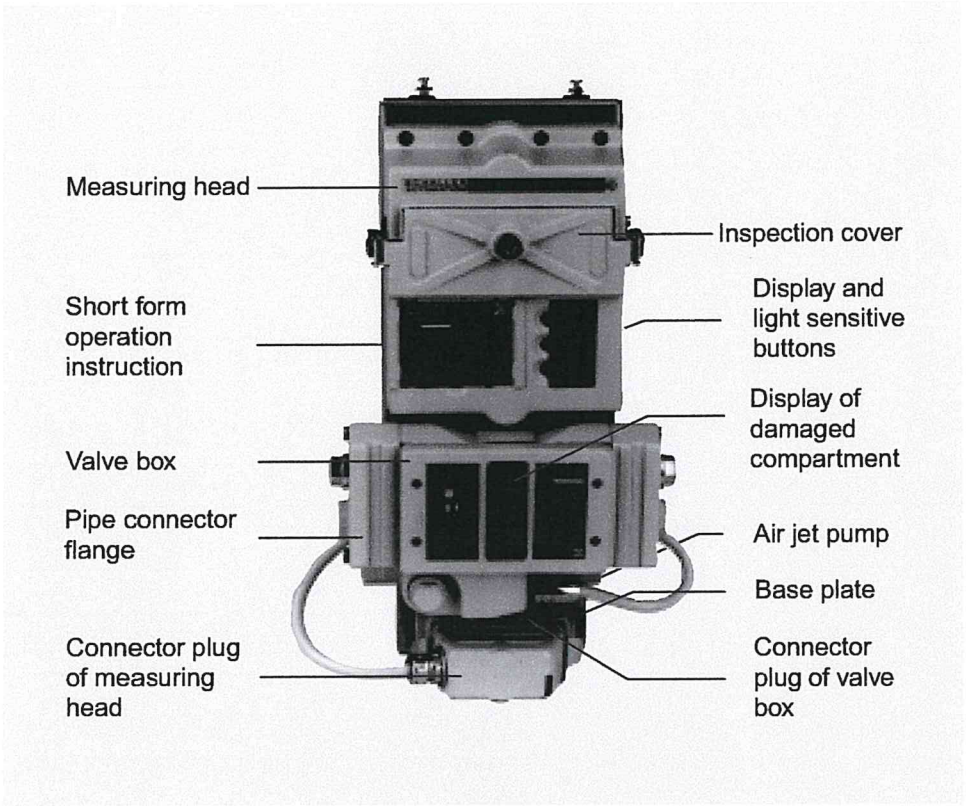
The opacity measurement path and the electronics with microprocessor control are located in the measuring head.

Three wear-free light sensitive buttons are provided for the operation and display: 2 pieces of 7-segment displays, each with 4 digits, 1 LED chain and 3 further LEDs to display the operating state.



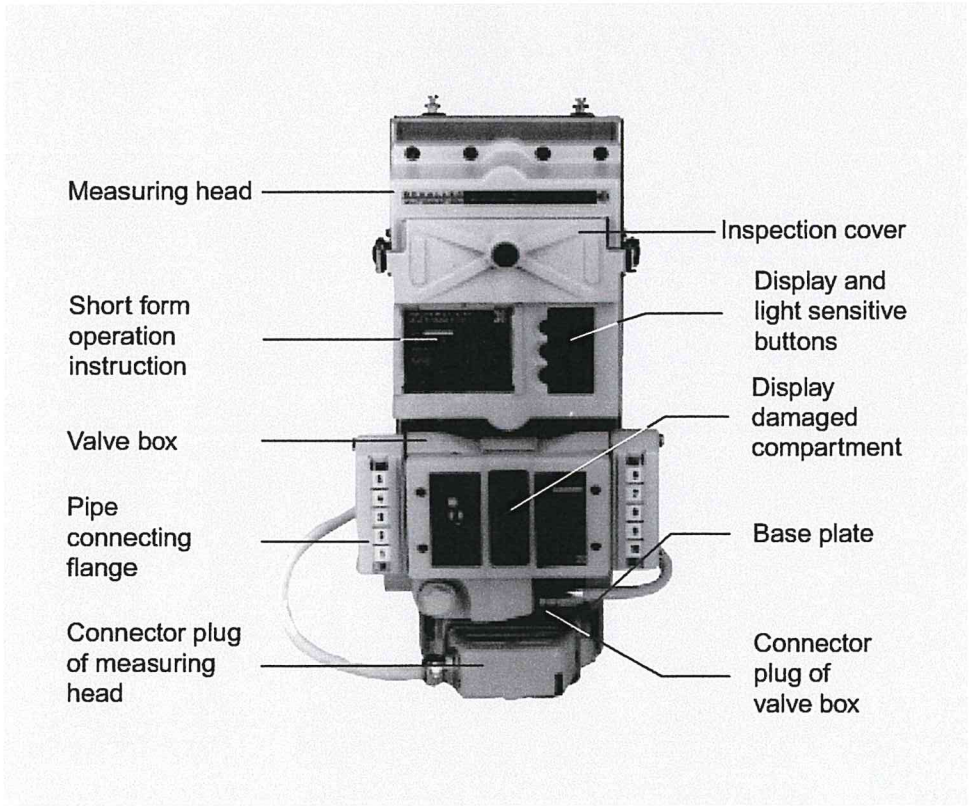
VN 115 / 93

1. 04 / 1



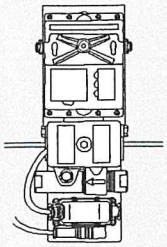
VN 116 / 93

1. 05 / 1



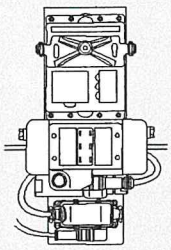
VN 215 / 93

1. 05 / 2



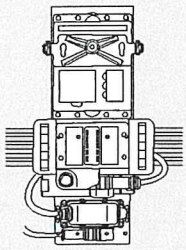
VISATRON® VN 115 / 93

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 at 10 levels, in a range from 0.5% to 25% Opacity.



VISATRON® VN 116 / 93

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 at 10 levels, in a range from 0.7% to 28% Opacity.
The increased sensitivity, in comparison with the VN 115 / 93, 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.



VISATRON® VN 215 / 93

Damage selection takes place through an individual compartment suction pipe system (the OMD is directly connected to each compartment) with a display of the compartment in which the overheating damage has arisen.
Damage selection takes place as in the VN 116 / 93. The wear and tear free reed valves are switched over according to a certain algorithm during the damage check, until the compartment with the damaged location has been found.

Suction System

The maximum number of sampling points for both systems (header pipe and individual) =10. Suction pressure measured against atmospheric pressure is 60 - 80 mm. 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).

VN 115 / 93
VN 116 / 93
VN 215 / 93

VN 115 / 93, VN 116 / 93

2 header pipes (22 x 2 mm) with branch pipes (10 x 2 mm) to the crankcase compartments are to be installed for VN 115 / 93 and VN 116 / 93

VN 115 / 93
VN 116 / 93

VN 215 / 93

Individual pipes (14 x 2 mm) from each compartment to the OMD for VN 215 / 93

VN 215 / 93

Sensitivity

VN 115 / 93

Alarm threshold 2% Opacity* (see brief description of the VN 115 / 93), adjustable in 10 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 50 mg/l at ignition temperature of approx. 500° C)
*Factory setting

VN 115 / 93

VN 116 / 93, VN 215 / 93

Damage Check-start threshold 0.24% Opacity* (see brief description of the VN 116 / 93), adjustable in 10 levels from 0.07% to 2.8% Opacity. Differential alarm threshold 0.49% Opacity* (see brief description of the VN 116 / 93), adjustable in 10 levels from 0.14% to 5.6% Opacity. Safety alarm threshold 2.44% Opacity* (see column 5, brief description of the VN 115 / 93), adjustable in 10 levels from 0.7% to 28% Opacity.
*Factory setting

VN 116 / 93
VN 215 / 93

Power Supply

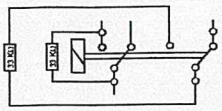
Electric Power Supply

Voltage: 24 V DC +/- 25%, 24 V battery or power supply unit
Note: In case of battery operation, provide a direct power supply from the battery terminals to the VISATRON®- device!
Current consumption: max. 3 A, starting current 4 A, fuse 4 A semi time lag.
Electromagnetic compatibility: interference radiation EN 55011, resistance to interference EN 50082/2 (interference immunity industry).

Drive Air for the Suction System

Suction vacuum measured against the atmosphere of 60 - 80 mm is required. The measurement is performed with a U- tube manometer on the measuring head. The U- tube 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 Nm^3 / h (m^3 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. primary air pressure 12 bar (additional 30 bar pressure regulator is also available).

Signal Outputs and Displays



MAIN ALARM

ADJUSTMENT RANGE FOR THE SENSITIVITY: can be set at 10 levels.
REMOTE SIGNALLING: relay with 2 potential-free switch-over contacts, excitation with a main alarm. Contact load max. 60V AC, 2 A, 120 VA / max. 60V DC, 2 A, 60 W.
WIRE- BREAK PROTECTION: bridging the contacts with 33 K ohm resistance. On request, resistance with other value is available. 1 contact as n.o., the other as n.c.
DISPLAY ON THE DEVICE: permanently- illuminated red ALARM LED.

PRE-ALARM

ADJUSTMENT RANGE FOR THE SENSITIVITY: 20% to 100% of the main alarm threshold.
REMOTE SIGNALLING: relay with potential- free switch contact, opens for a pre-alarm. Contact load max. 60V AC, 2 A, 120 VA / max. 60 V DC, 2 A, 60 W.
DISPLAY ON THE DEVICE: flashing red alarm LED. The relay and LED switch off again when the opacity has gone below the pre- alarm threshold.

FAIL - SAFE ALARM

REMOTE SIGNALLING: relay with potential-free switch-over contact, excitation when the device is functioning trouble free. Contact load max. 60V AC, 2 A, 120 VA / max. 60 V DC, 2 A, 60 W.
DISPLAY ON THE DEVICE: illuminated green READY - LED when the device is functioning trouble free.

DISPLAYS

2 x 4 digit, 7 segment display for presentation of internal device measurement values.

OPACITY DISPLAY

REMOTE SIGNALLING: By the remote indicator, driven through the optional RS 485 interface.
DISPLAY ON THE DEVICE: By LED chain with 12 LEDs, display of the opacity relative to the alarm threshold in 12 steps, i.e. the main alarm is triggered when the upper LED illuminates.

OPERATING CONTROLS

3 wear-free reflection light buttons for operation of the device.

SERIAL INTERFACE

Optional serial RS 485 interface for the output of operating data.

CABLE CONNECTIONS

1 PG screwed connection for the cable connection of the relay contacts
1 PG screwed connection for the cable connection of the power supply
1 plug connector for connection of a serial interface.

MECHANICAL DATA

HOUSING AND BASE PLATE: cast aluminium.
MEASURING HEAD: stainless steel plate with anti vibration suspension
ALL SURFACES: lacquered, RAL 7035.
RUBBER PARTS FOR VIBRATION REDUCTION AND SEALS: oil resistant. Built- in vibration reduction for protection of the electronics.

WEIGHT

VN 115 / 93 Net: 9,0 kg, Gross with special packing: 12,5 kg

VN 116 / 93 Net: 11 kg, Gross with special packing: 14,5 kg

VN 215 / 93 Net: 11 kg, Gross with special packing: 14,5 kg

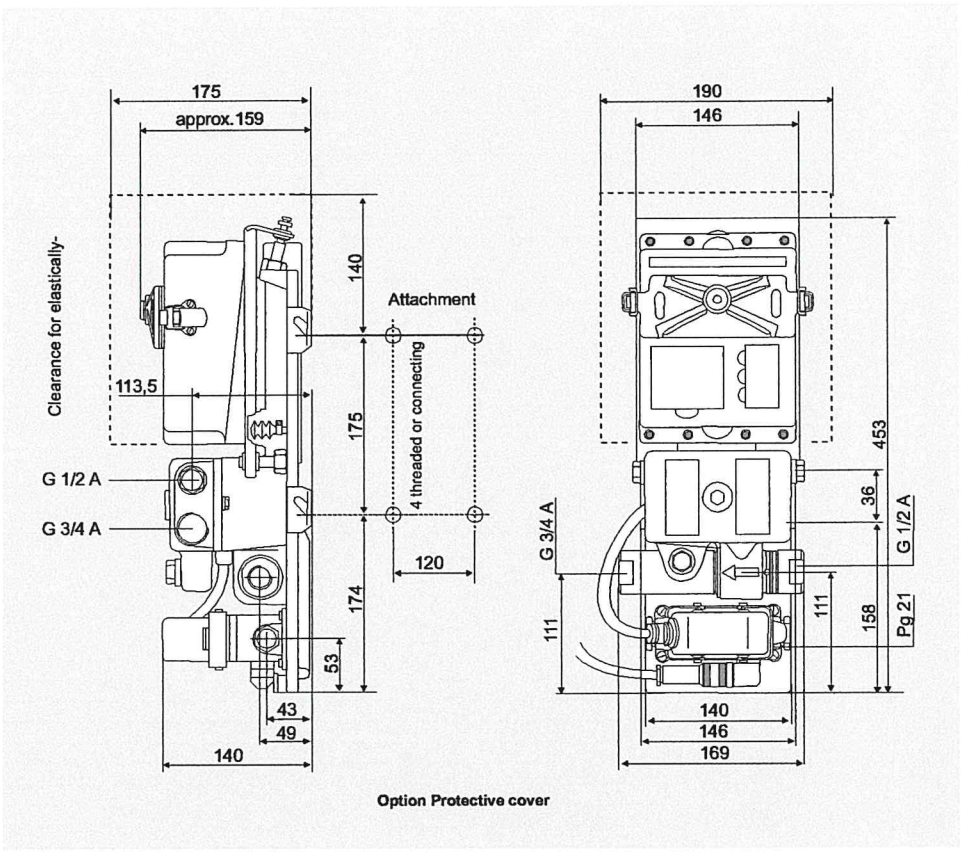
Enviromental Conditions

SYSTEM OF PROTECTION IP 44.
OPERATING RANGE: 0°C to 70°C with the highest humidity.
-25°C to +85°C

Vibration: 4 G at fastening points

Dimensional diagrams

VN 115 / 93



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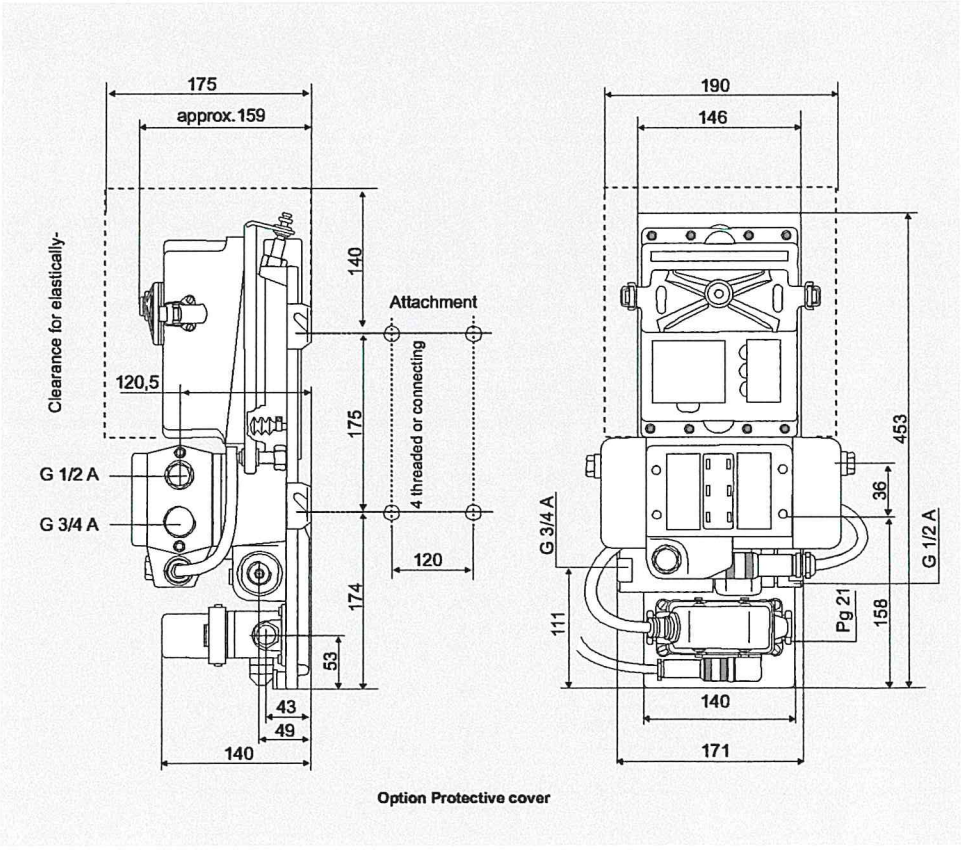
VN 116 / 93



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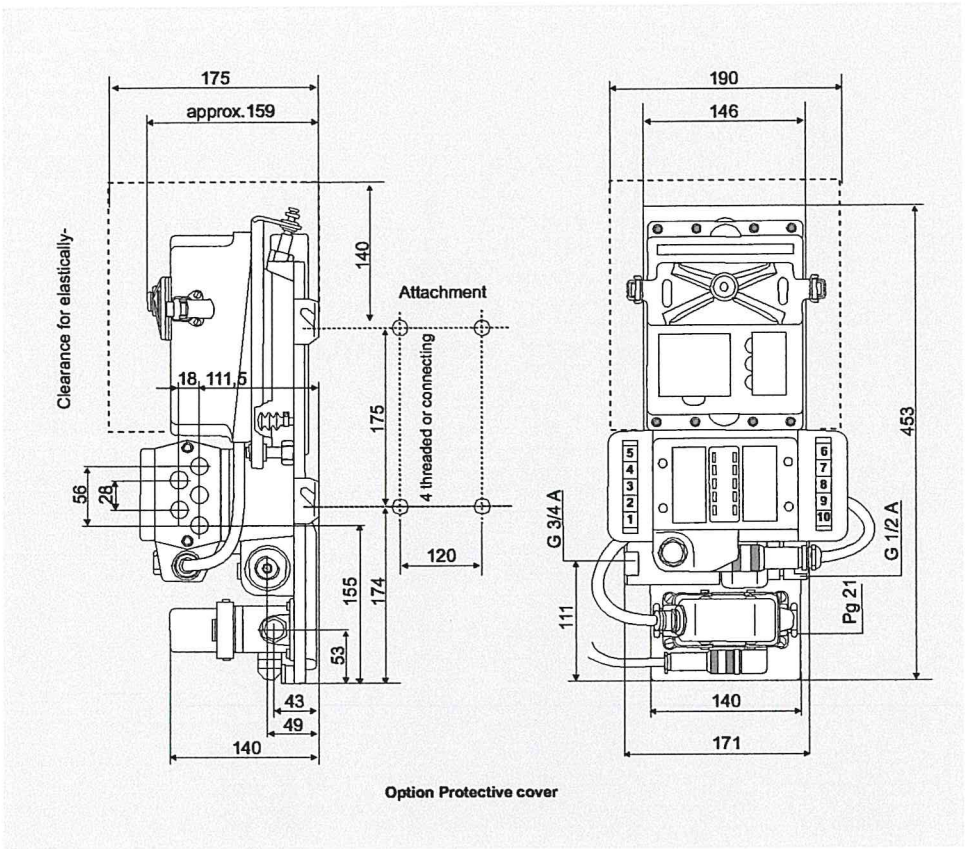
Dimensional diagrams



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VN 215 / 93

Installation

General

It is important to emphasize cleanliness during the assembly work!

Clean pipelines and fastening parts before assembly.

Lay pipes in a stress- free manner!

Installation position of the device:

Locate the oil mist detector in a vertical position!

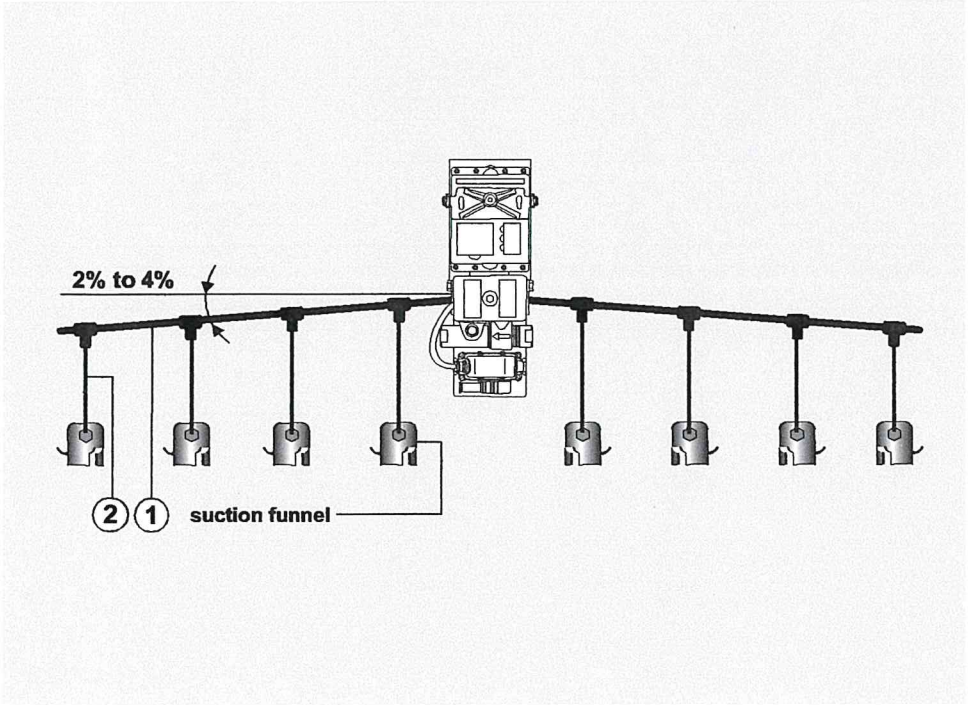
Make sure not to install the device within the airflow of blowers or air deflectors.

Suction pipes VN 115 / 93 and VN 116 / 93 (see Fig. 2.01 / 1)

Material: Seamless steel pipes,
header (1) 22 x 2 mm (i.d. 18mm), max. length: 9 m
suction pipes (2) 10 x 2 mm (i.d. not less than 6mm)

Pipe Laying: Ascending to the device,
4%, without sagging, avoid oil collection
(see Fig. 2.01 / 1)

Ascending
Gradient 2% to 4%!



Consider to avoid oil collection when laying the headers! Oil must always drain back to engine

VN 115 / 93
VN 116 / 93

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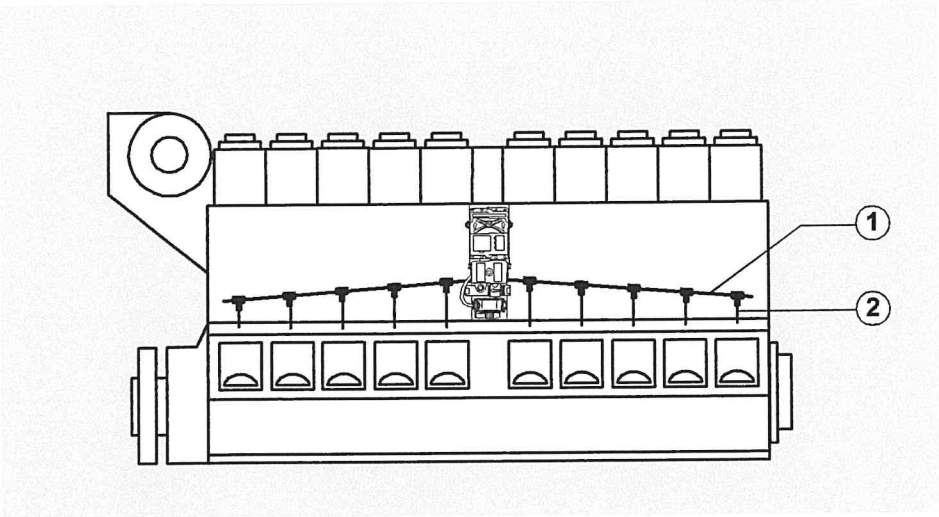
Headers above suction points for:

VN 115 / 93

VN 116 / 93

without pipe end- siphon

Lay headers in ascending direction to the detector!

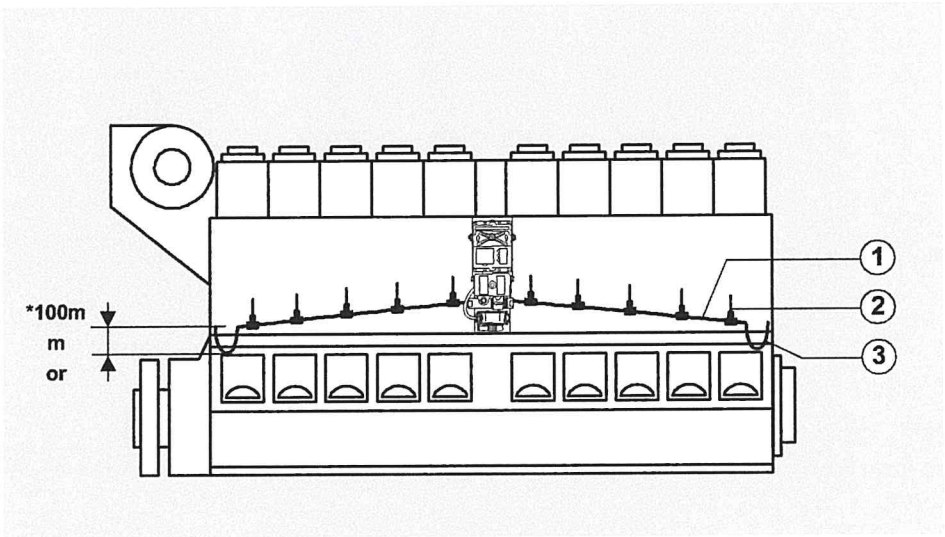


2. 02 / 1

Headers below suction points:

with pipe end- siphon

Lay headers in asccending direction to the detector!

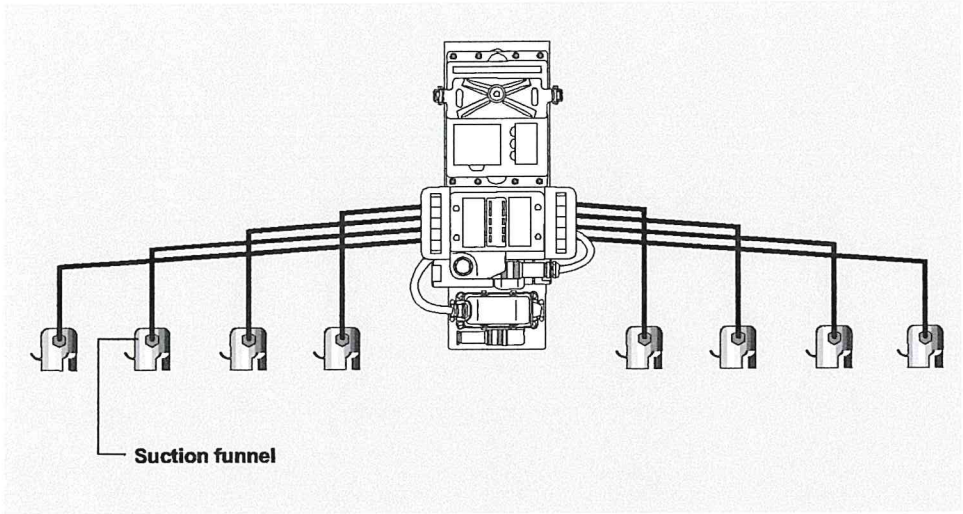


2. 02 / 2

(1) Header pipe ø22 mm x 2 mm (i.d. 18mm)

(2) Compartment suction pipes to header ø10 mm x 2 mm (i.d. not less than 6mm)

(3) *Pipe end-siphon 100 mm with oil return back to the engine, or 200 mm with oil discharge outside the engine



2. 03 / 1

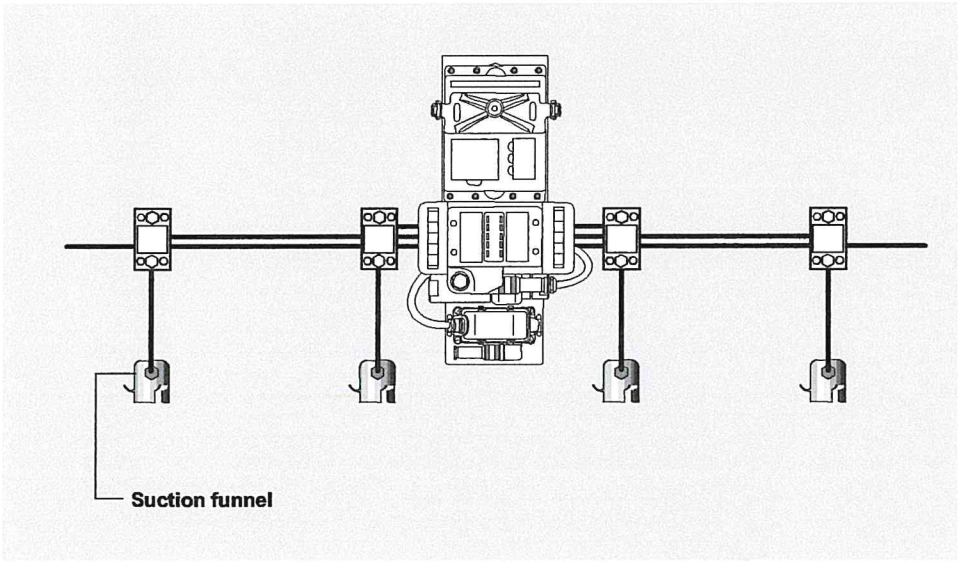
VN 215 / 93

Lay suction pipes in ascending direction to the detector

Suction pipes VN 215 / 93

Material: Seamless steel pipes, 14 mm x 2 mm (i.d. 10mm)

Pipe Laying: Ascending to the device, ascending gradient 2 - 4% (see Fig. 2. 03 / 1)



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Siphon blocks

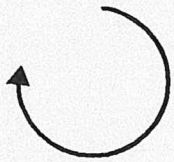
Pipes can be mounted horizontally

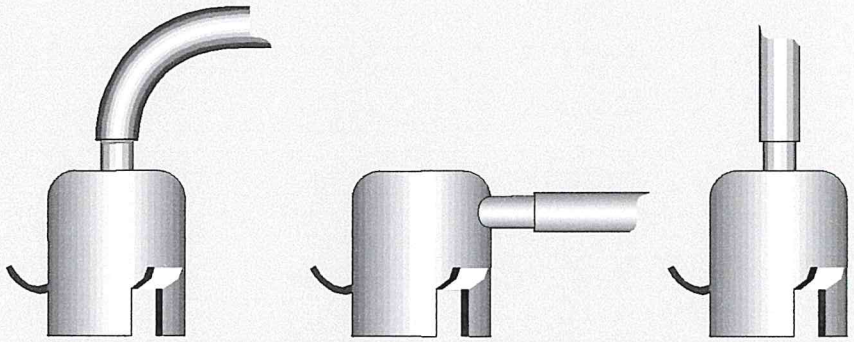
Avoid sagging or oil collection

Suction funnel in the crankcase compartment

Suction funnels have the function to avoid the blockage of suction pipes by splashing oil. 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 Fig. 2. 04 / 1). Caution: Make sure funnels are not interfering with rotating or moving parts of the engine.

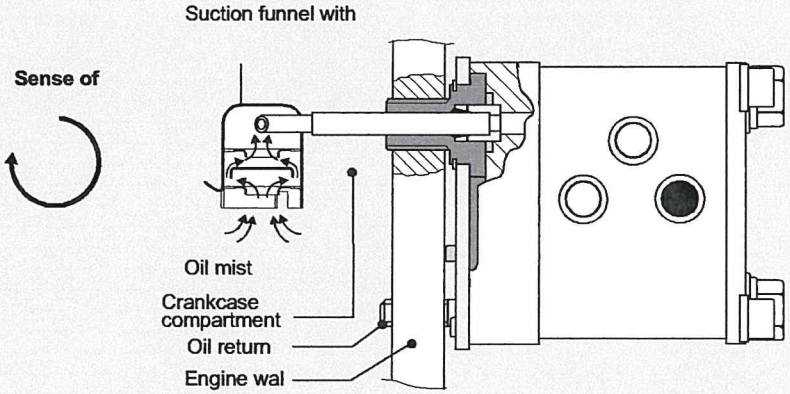
Sense of rotation





2. 04 / 1

Push in suction funnel pipe firmly to the stop during assembly!



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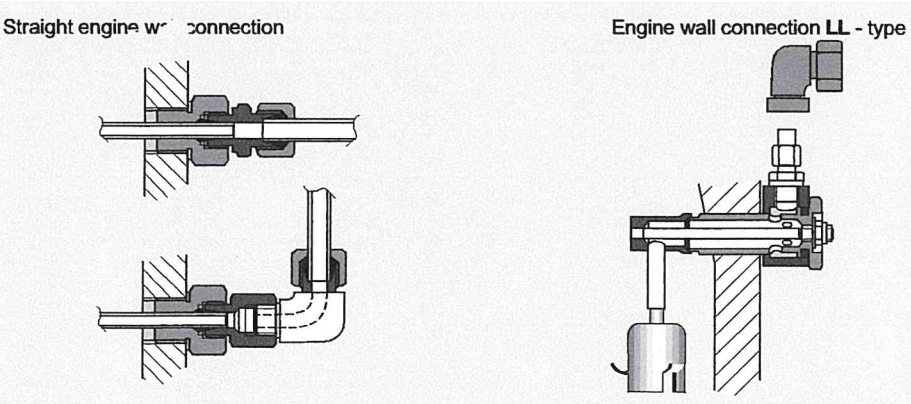
Observe mounting position!



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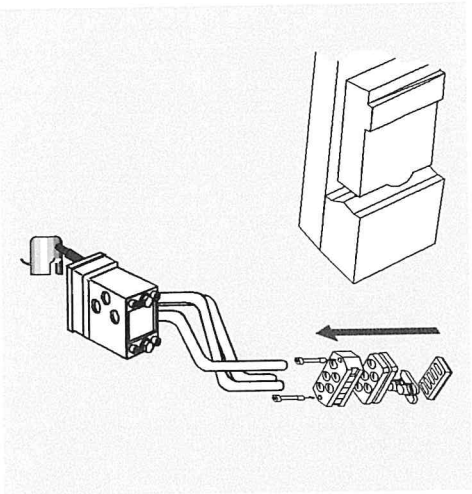
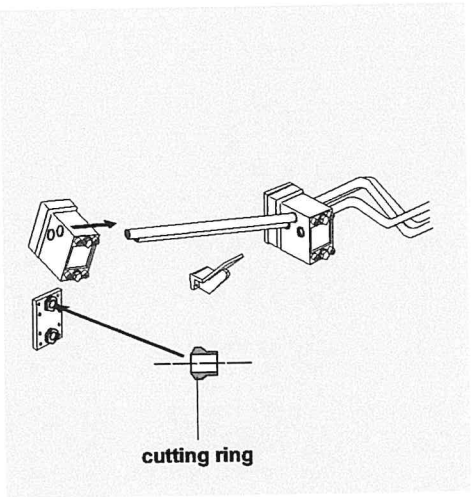
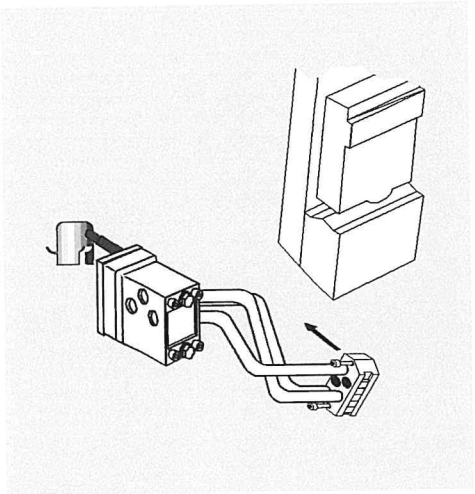
Installation of siphon blocks



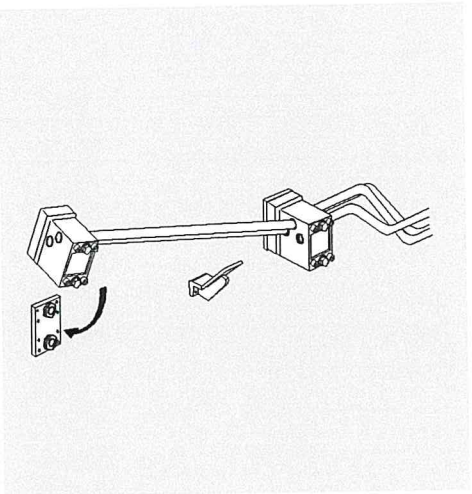
2. 05 / 1



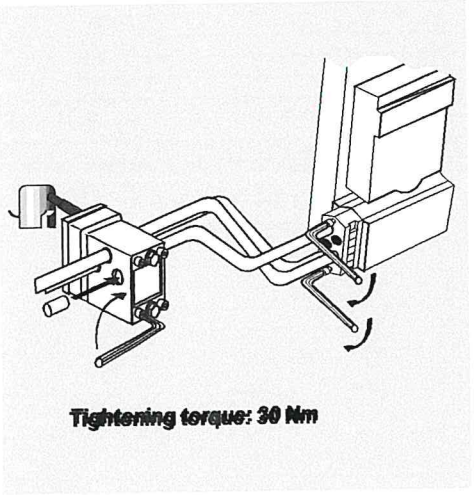
2. 05 / 4



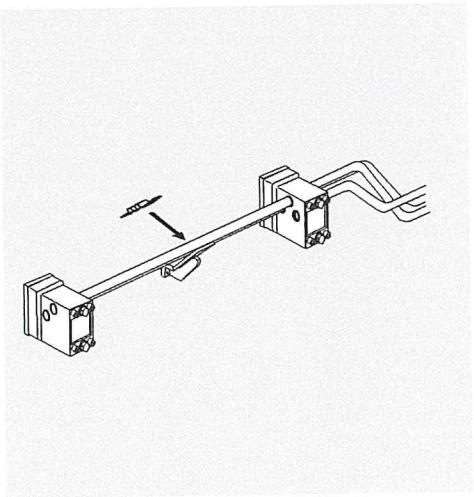
2. 05 / 2



2. 05 / 5

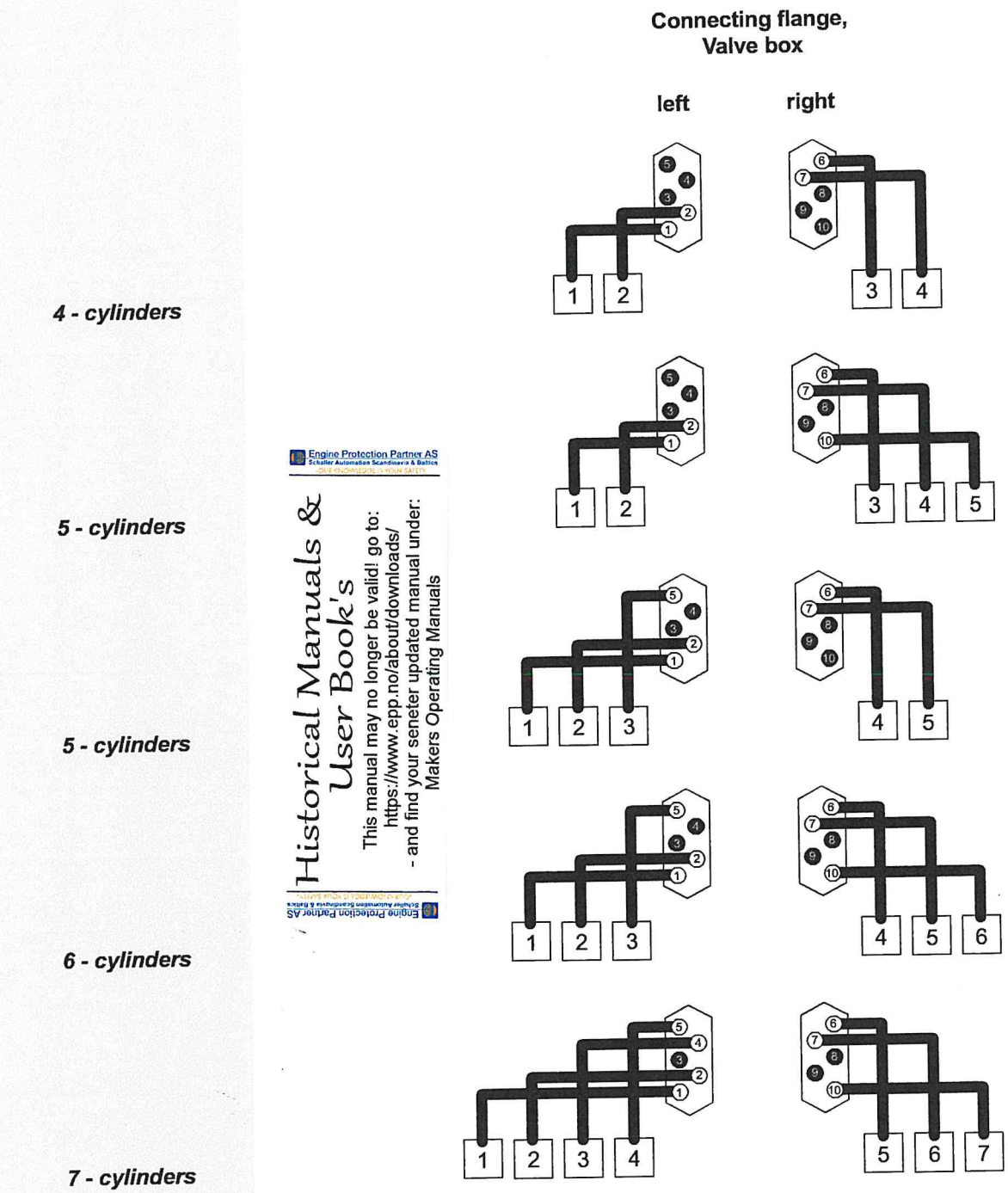


2. 05 / 3



2. 05 / 6

Suction piping of VN 215 / 93



⑤ *Connection numbers to valve box*

● *Closed by viton plug*

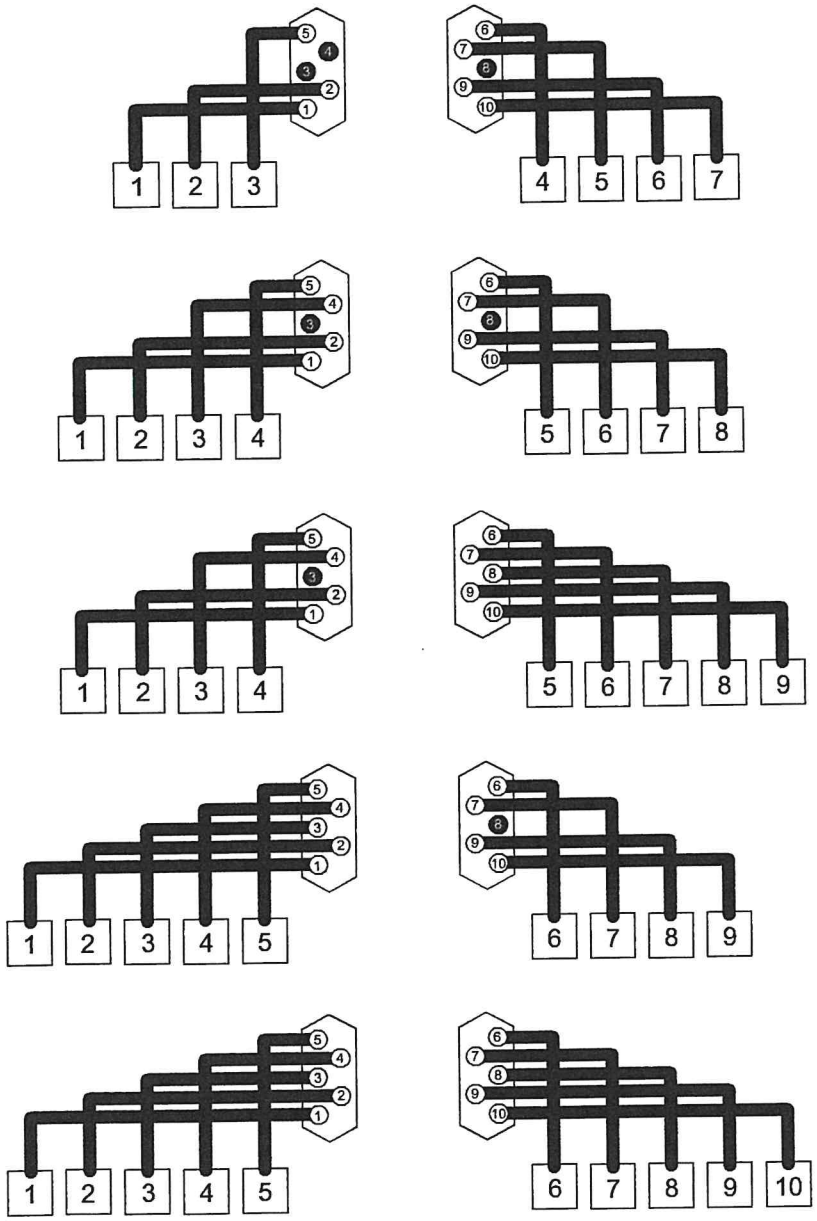
○ *Connection for suction pipe*

Unused pipe connection bores in flange are to be plugged with the supplied viton plugs.

Suction piping of VN 215 / 93

Connecting flange,
Valve box

left right



7 - cylinders

8 - cylinders

9 - cylinders

9 - cylinders

10 - cylinders

⑤ *Connection numbers to valve box*

● *Closed by viton plug*

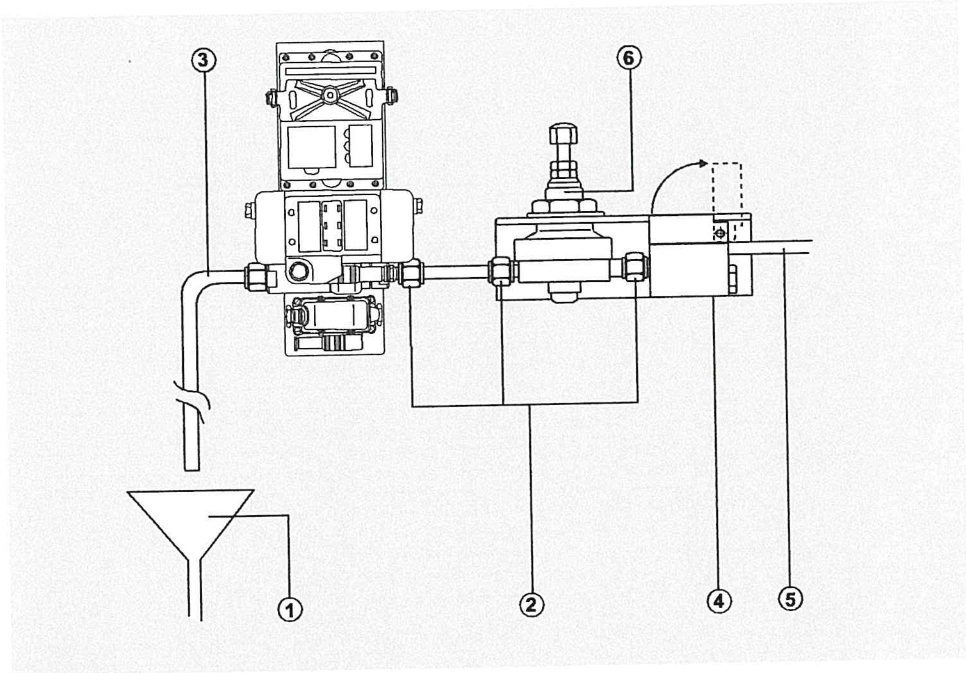
○ *Connection for suction pipe*

Unused pipe connection bores in flange are to be plugged with the supplied viton plugs.

SCHALLER AUTOMATION

Air supply

No back pressure and no oil collection is allowed in exhaust air pipe!



2. 08 / 1

Parts are not included in the scope of supply, but they can be purchased as an option!

① Discharge funnel (used by some engine makers)

② Draft air connection set

③ Exhaust air connection (design to be consulted with Schaller Automation)

Pressure regulator unit consisting of:

④ Throttle block

⑤ Pressure connection 2 - 12 bar

⑥ Pressure regulator

If parts are not included in the scope of supply they can be purchased as an option!

To avoid backpressure, lay exhaust pipes without any reducers (DN 22).

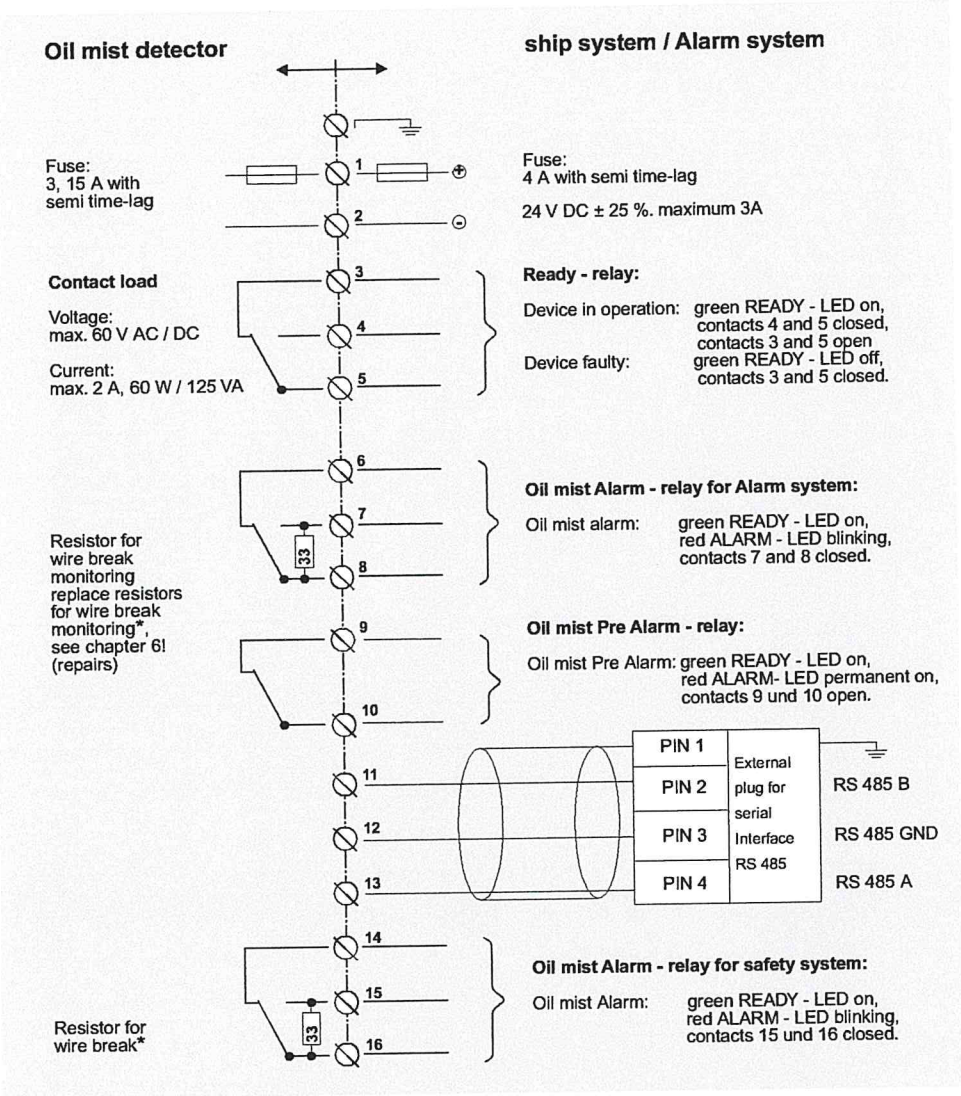
Avoid sagging and oil collection in pipes (See drawing 2. 08 / 1)

Electrical connection (see Fig. 2. 09 / 1)

Connection:	24 V DC
	min. 18 V
	max. 30 V
Power consumption:	3 A
Protection:	4 A with semi time-lag

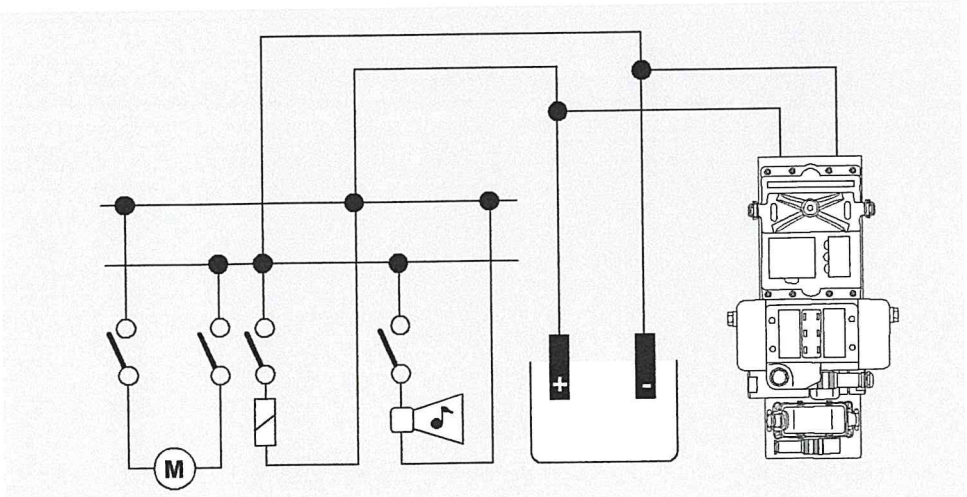
When power is supplied by batteries, charging voltages of more than 30 V might occur. These voltages are not permitted. Device will go into failure mode. Voltage limiters must be installed!

Terminal Plan VN 93



2. 09 / 1

Power supply connection for battery supply



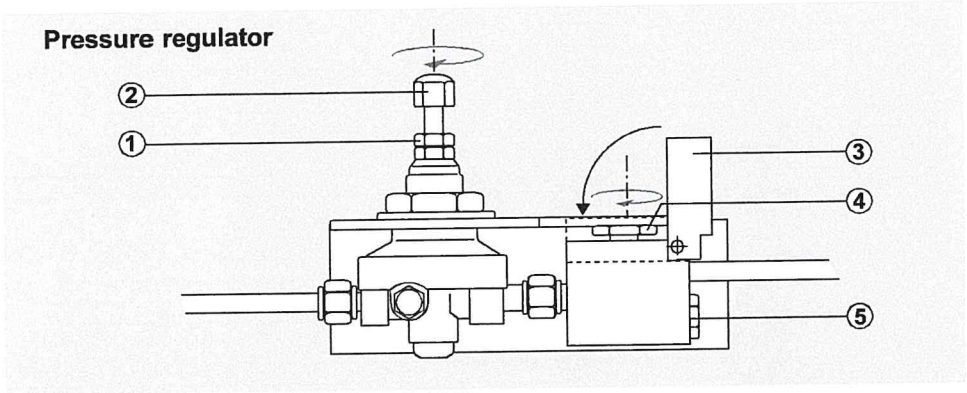
2. 09 / 2

*other values available

Commissioning

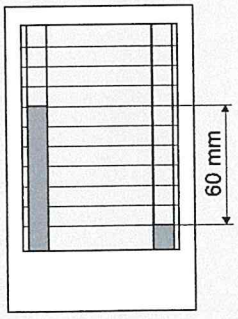
Adjust suction pressure

The suction pressure must be calibrated by adjusting the pressure regulator when the engine is at a standstill. Make sure ventilation of the engine room is in operation (pressure difference in room). An increase or decrease of the pressure in the crankcase compartment during operation and its effect on the flow velocity of the oil mist in the suction pipes, is largely compensated by the internal restriction integrated in the device. (e.g., +25 mm W. G. in the crankcase compartment against the atmosphere account for an increase of the oil mist flow velocity in the suction pipes of approx. 8%; +50 mm W. G. of approx. 14%, a negligible figure).
This is important because precipitation of minute oil droplets of the oil mist increases with a too high flow rate, thus reducing the sensitivity of the device.



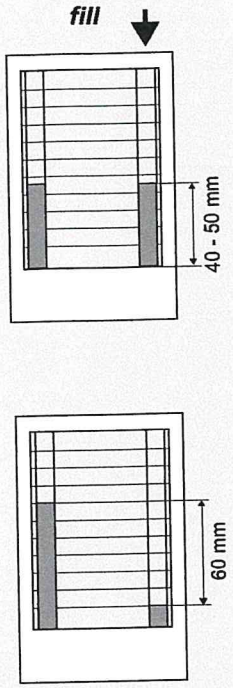
3. 01 / 1

1. Connect U-tube manometer with quick connection (Pos. 31 from Servicebox) at inspection cover (see Fig. 3. 02 / 1).
2. Pour water inside the U- tube manometer utilizing bottle (Pos. 13 from Servicebox). Both tubes shall be filled to the half of the scale of the manometer. Both columns should be on the same level when U-tube manometer is not connected to Oil Mist Detector and in vertical position.
3. Loosen nut (1) and turn setscrew (2) in clockwise direction gently up to the stop.
4. Open safety cover (3) at the throttle (5) and manually turn setscrew (4) in clockwise direction gently up to the stop.
5. Switch on compressed air supply with inlet pressure (range 2 to 12 bar). The U-tube manometer should now read zero pressure.
6. Turn setscrew (4) in counterclockwise direction until the U-tube manometer indicates a negative pressure of 80 mm W. G
7. Close safety cover.
8. Turn setscrew (2) in counterclockwise direction until the negative pressure is only 60 mm W. G.
9. Tighten counternut (1).
10. Disconnect U-tube manometer, insert and tighten plug screw again.

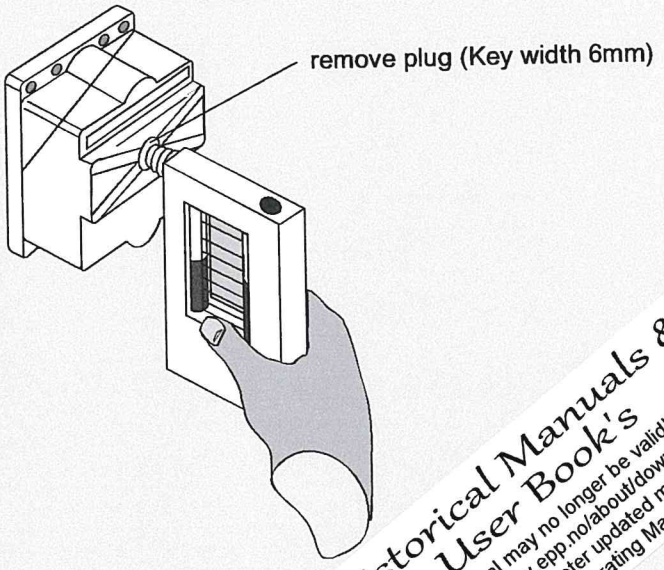


Adjust 60 mm W. G.!

After adjustment, remove U-tube manometer and screw in the previously removed plug



Exhaust air connection

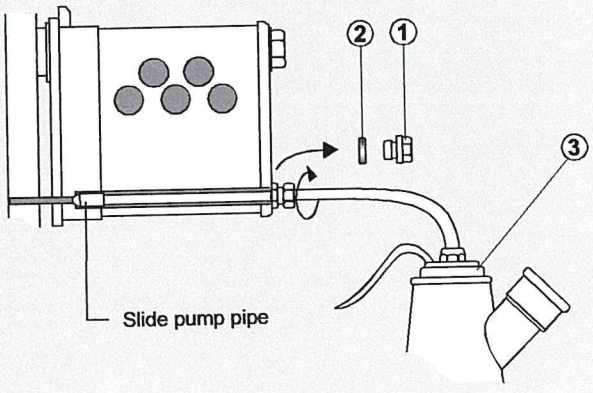


3. 02 / 1

Filling of siphons (Fig. 3. 02 / 2)

1. Remove plug (1) and seal ring (2).
2. Introduce filling pump (3) against the stop.
3. Secure filling pump with fitting and slightly tighten union nut.
4. Pump 10 to 12 times with fast strokes.
5. After the filling process has been completed, remove pump and tighten plug (1) and seal ring (2).
6. Measure negative pressure in the last siphon with U-tube manometer, minimum 3 mm WG (Water Gauge).

Filling of siphons



3. 02 / 2

Apply power supply

Switch on power supply after checking the wiring.

Operating

Operating and Display Elements

The VISATRON Display window consists of the following display elements:

Display (4 digits)	"CODE"
Display (4 digits)	"VALUE"
LED- Chain (12 LED's)	"OPACITY".
LED at the bottom =	%, LED on top = Alarm level
LED green	"READY"
LED red	"TEST"
LED red	" ALARM"

The Display window also contains the following operating elements:

Light sensitive button	"UP"
Light sensitive button	"DOWN"
Light sensitive button	"RESET / ENTER"

When commissioning is completed and the electrical power supply is switched on the device is passing through the following set-up phases :

Test of the display
For the duration of 5 seconds the following display appears:

Display "CODE" :	8888
Display "VALUE" :	8888
LED - Chain	all 12 LED's on
LED "READY":	on
LED "TEST":	on
LED "ALARM":	on

Afterwards the version number of the software is displayed.

Display "CODE" :	xxx (xxx = software version number of the device)
Display "VALUE" :	0000
LED - Chain	all 12 LED's on
LED "READY":	off
LED "TEST":	off
LED "ALARM":	off

Self calibration of the electronic module during set-up period

When the power supply is switched on the following display appears during the first 30 seconds:

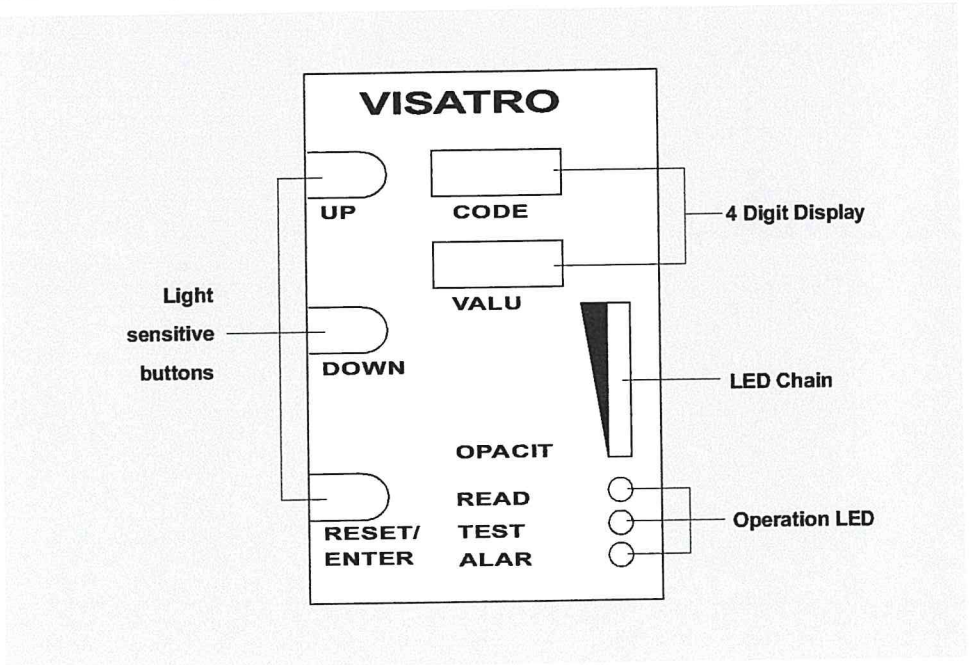
Display "CODE" :	-215 (-116) (-115) representing the type of device VN 215, VN 116 or VN 115
Display "VALUE" :	starting with 29 counting down to 0 in 1 second steps
LED - Chain	bottom LED on, all others off
LED "READY":	off
LED "TEST":	off
LED "ALARM":	off

When the self calibrating procedure is completed the device is in normal operation mode

A manipulation or operation becomes necessary only if:

- an oil mist alarm occurs
- a device failure is being recognised
- maintenance of the oil mist detector has to be performed
- the factory default settings of the parameters must be changed.

VISATRON display window



Display and function during normal operation of the engine

Display "CODE" :	-215 (-116) (-115) representing the type of device VN 215, VN 116 or VN 115
Display "VALUE" :	0
LED - Chain	bottom LED on, all others off
LED "READY":	on
LED "TEST":	off
LED "ALARM":	off

All valves of the valve box are open, when the red symbols at the display window of the valve box can be seen (VN 116 / 93 , VN 215 / 93).

VN 116 / 93
VN 215 / 93

Display of operating and parameter values

In normal operation mode of the device the following values are displayed:

"CODE" indicates:	-215 (-116) (-115)
"VALUE" indicates:	The measured value of %Opacity

To display the operating and parameter values proceed as follows:

Touch the button "UP" or the button "DOWN" for more than 3 seconds. IN "CODE" the number "-001" or "-026" is indicated and in "VALUE" the corresponding value will be indicated. By short touches on the buttons "UP" or "DOWN" the following code will be displayed with its corresponding value in "VALUE" (see Table 1).
To leave the parameter value mode choose the code number of the VISATRON device -215 (-116) (-115).Alternatively, if no button is touched for 1 minute it will return by itself to normal operation mode.

see Table 1

Table "code of the operating and parameter values:" **TABLE 1**

CODE	Designation	VALUE	Unit, hint
-215 (-116) (-115)	VISATRON device type 215 116 or 115 (normal operation mode)	0 to 100	% Opacity
-001	Oil mist main Alarm level	0,5 to 25	% Opacity
-002	Measured opacity relative to alarm level	0 to 100	%
-003	Measured opacity compared to fresh air (only when fresh air calibration is activated)	0 to 100	%
-004	pollution of light measuring track	0 to 100	%
-005	Negative pressure inside measuring head	0 to 100	mm WG
-006	Temperature of ambient air	0 to 70 °	° C
-007	Temperature inside measuring head	0 to 75 °	° C
-008	Date		dd . mm
-009	Time		hh . mm
-010	Adjusted alarm level (Factory setting: 4) see also table 4!	1 to 10	--
-011	Pre-alarm level relative to main alarm level (Factory setting: 100¨%)	40 to 100	% of main alarm level
-012	Time interval of fresh air calibration (0 = no fresh air calibration) optional available on device VN 116/93 and VN 215/93 only	1 to 24	hour
-020	Digital value of opacity	0 to 4095	for service personal only
-021	Digital value of air flow sensor	0 to 4095	
-022	Digital value of ambient air temperature sensor	0 to 4095	
-023	Digital value of measuring head temperature sensor	0 to 4095	
-024	Digital value of internal power supply	0 to 4095	
-025	Digital value of light measuring track against fresh air	0 to 4095	
-026	Digital value of relative opacity	0 to 4095	

Rise of opacity higher than damage check level

- Display "CODE" :	-215 (-116) (-115) representing the type of device VN 215, VN 116 or VN 115
- Display "VALUE" :	Value is higher than zero and represents the opacity
- LED - Chain	with increasing opacity the illuminated LED is moving upwards
- LED "READY":	on
- LED "TEST":	off
- LED "ALARM":	off

- Devices VN 215 / 93 and VN 116 / 93 only : The valves in the valve box will be activated according to a special algorithm to identify the side of the engine with the highest opacity (on VN 116 / 93) or the compartment with the highest opacity on devices VN 215 / 93

VN 116 / 93 and VN 215 / 93 only

Rise of opacity higher than main alarm level

- Display "CODE" :	-215 (-116) (-115) representing the type of device VN 215, VN 116 or VN 115
- Display "VALUE" :	On devices VN 116 / 93 and VN 215 / 93 : represents the opacity in the compartment which is indicated by the red symbol of the valve box On devices VN 115 / 93 : Average value of the opacity of all compartments.
- LED - Chain	with increasing opacity the illuminated LED is moving upwards
- LED "READY":	on
- LED "TEST":	off
- LED "ALARM":	on
- ALARM - Relay	will be activated

- VN 116 / 93 :
The side of the engine (left or right) where the highest opacity occurred will be indicated by 3 red symbols shown above each other on the valve box.
It can be assumed that the engine damage is located on that side.

VN 116 / 93

- VN 215 / 93 :
The compartment where the highest opacity occurred will be indicated by one red symbol. It can be assumed that the engine damage is located in that compartment!

VN 215 / 93

To perform a reset after an alarm during normal operation mode:

- By touching the light-sensitive button "RESET / ENTER " for longer than 1 second
- At occurrence of device failure

Subsequently, the following is displayed at the display window:

- Display "CODE" :	-215 (-116) (-115) representing the type of device VN215, VN116 or VN115
- Display "VALUE" :	0
- LED - Chain	bottom LED on, all others off
- LED "READY":	on
- LED "TEST":	off
- LED "ALARM":	off

VN 116 / 93 and VN 215 / 93 only

- On devices VN 215 / 93 and VN 116 / 93 only:
All valves in the valve box will be opened, all 10 red symbols are visible.

In case that the opacity is still higher than the damage check level (after resetting the device) the damage check will start again.

Display and function in case of malfunction

In case of a malfunction the following is displayed at the display window:

Display "CODE" :	Exxx	(xxx = error code e.g. E 014)
Display "VALUE" :	yyyy	(yyy = value giving detailed information to the error code)
LED - Chain	bottom LED on, all others off	
LED "READY":	off	
LED "TEST":	off	
LED "ALARM":	off	

see Table 2

For more information please refer to chapter 5 "Malfunction" !

Table for Error Codes:

TABLE 2

CODE	Designation Description	VALUE	READY LED	READY Relay	Device monitors the engine	Trouble shooting
E001	Not used	-----	-----	-----	-----	Change measuring head
E002	Digital value for negative pressure sensor too high	0 to 4095	off	n.e.	no	Change measuring head
E003	Digital value for negative pressure too low	0 to 4095	off	n.e.	no	Change measuring head
E004	Failure digital value-light measuring track	0 to 4095	off	n.e.	no	Change measuring head
E005	Not used	-----	-----	-----	-----	Change measuring head
E006	Voltage too high (> 32V)	18 to 40 (Volt)	blinking	n.e.	yes	Check voltage
E007	Light sensitive button(s) defect	blank	blinking	n.e.	yes	Clean display window or change measuring head
E008	Temperature inside the device too high >75 °C	-25 to 100 (°C)	off	n.e.	no	If ambient temperature around the device is below 70°C, change measuring head
E009	Temperature inside the device below 0 °C	-25 to 100 (°C)	off	n.e.	no	Avoid direct cold air flow from blowers and fans to the device
E010	Ambient temperature too high	-25 to 100 (°C)	off	n.e.	no	Protect the device against heat sources. Ensure supply of cooling air (fan,blower)
E011	Ambient air temperature too low	-25 to 100 (°C)	off	n.e.	no	Avoid direct cold air flow from blowers and fans to the device
E012	Checksum error	blank	off	n.e.	no	Repeat parameter adjustment
E013	Light measuring track polluted, transmitting factor < 40%	0 to 100 (%)	blinking	n.e.	no	Clean infrared lenses of the light measuring track **)
E014	Negative pressure/air flow too low	0 to 100 mm WG	off	n.e.	no	Check negative pressure (-60 to -80 mm WG) check air supply. Change fresh air filters
E015	Light measuring track heavily polluted, transmitting factor < 30%	0 to 100 (%)	off	n.e.	no	Clean infrared lenses of the light measuring track **)
E016	Checksum error at history memory in the E^2PROM *)	0 to 100 (%)	blinking	n.e.	yes	Change measuring head
E017	Failure of electronic module	blank	off	n.e.	no	Change measuring head
E018	Voltage of battery too low *)	blank	blinking	n.e.	no	Change measuring head
blank	Supply voltage too low	LP	blank	n.e.	no	Check electrical power supply

n.e.= Relay not energised. That means Relay in position "Device failure"

****) = available on devices with the option history memory, clock and serial interface only***

*****) = Caution: use only soft, non scratching material of Servicebox***

Function of the Relay outputs

Function of the READY - Relay

(Corresponds to condition indicated by the READY - LED)
The Relay will be activated, when the oil mist detector is in normal operation state and functioning trouble free.

Function of the Alarm Relay

- The relay will be activated when the measured opacity has exceeded the adjusted alarm level. The relay will be deenergized by resetting the device as described in 3.08.

- Wire break monitoring by the alarm system is made possible by wire break resistors installed between contacts 7 and 8 as well as between contacts 15 and 16 of the pre-alarm relay. Factory standard supply is with resistors 33 kOhm.

- For changing the wire break resistors to other required values refer to chapter 6.

Function of the Pre-Alarm Relay

The pre-alarm relay has the same function as the alarm relay for an earlier warning before main alarm. The difference is that a lower alarm level can be adjusted by the parameter adjustment. The pre-alarm level can be adjusted from 40% to 100% of the main alarm level by authorised personnel only.
The pre-alarm relay will be deenergized when the measured opacity is below the pre-alarm level.

Attention :
In case of an oil mist alarm, the oil mist detector (OMD) must be in condition to react within the next few seconds and shut down the engine, in order to minimise immediate or consequential damages. The corresponding relay contacts are instantly connected to trigger the alarm safety system (no time delay).

Parameter adjustment

By the parameter adjustment function the factory pre-settings of the parameters can be displayed and changed, by authorised personnel only. Permission by the operator´s management is required.

In case that the factory pre-set parameters are changed by the operator, he takes over the responsibility for the correct monitoring of the engine what the oil mist detector concerns.

Procedure for parameter adjustment

- The "UP" and "DOWN" light sensitive buttons have to be touched simultaneously for more than 3 seconds. The following display appears:

- Display "CODE" :	P000 (=parameter code)
- Display "VALUE" :	blank
- LED - Chain	bottom LED on, all others off
- LED "READY":	no change
- LED "TEST":	no change
- LED "ALARM":	no change

The following choice can be made now:
The parameters can be displayed or the parameters can be displayed and changed.

The display will set itself back into its basic state if no input is made for more than 60 seconds.

Display of parameters only

By touching the light sensitive button "UP" the parameter code will be increased.
By touching the light sensitive button "DOWN" the parameter code will be decreased.

Meaning of parameter codes, refer to table 3.

see Table 3

In the display "VALUE" appears the value of ther corresponding parameter.

Leaving the parameter adjustment function, is achieved:

- By touching the "UP" and "DOWN" light sensitive buttons simultaneously for more than 3 seconds,
- Or automatically if no inputs are made with the light sensitive buttons for more than 60 seconds.

Display during change of parameters:

Attention. While performing parameter adjustment the engine is not monitored by the oil mist detector. This will be indicated by the READY-LED being off and the not energised READY-Relay!

- Display "CODE" : P000 (=parameter code)
- Display "VALUE" : blank
- LED - Chain bottom LED on, all others off
- LED "READY": no change
- LED "TEST": no change
- LED "ALARM": no change

By touching the light sensitive button "RESET/ENTER" the READY-LED goes off. The READY-Relay changes to position "Device failure" and the following display appears:

- Display "CODE" : P000 (=parameter code)
- Display "VALUE" : 0000 (the digit of the right side is blinking)
- LED - Chain bottom LED on, all others off
- LED "READY": off
- LED "TEST": off
- LED "ALARM": off

passcode 4711

At "VALUE" a passcode now has to be entered. If the passcode is e.g. **4711** :

- Touch the light sensitive button "UP" or "DOWN" to increase or decrease the number of the blinking digit at "VALUE".
- Touch the buttons until the required value is set at the blinking digit.
- Touch the button "RESET/ENTER" once.
- Now the next digit on left side is blinking. The digit which was blinking before is now illuminated constantly.
- Continue with this procedure until the number 4711 is entered.
- When the last number (4) is entered, touch "RESET/ENTER" and the following display appears:

see Table 3

- Display "CODE" : P000 (=parameter code)
- Display "VALUE" : 4711
- LED - Chain bottom LED on, all others off
- LED "READY": off
- LED "TEST": off
- LED "ALARM": off

By touching the light sensitive button "UP" the parameter code will be increased.
By touching the light sensitive button "DOWN" the parameter code will be decreased.
Meaning of parameter codes refer to table 3.

- When the required parameter code has been selected touch the button "RESET/ENTER" to change parameter.
- The corresponding value is blinking and can be changed with the buttons "UP" and "DOWN"
- To confirm the modification touch the button "RESET/ENTER".

Leaving of the parameter adjustment function

- By touching the "UP" and "DOWN" light sensitive buttons simultaneously for more than 3 seconds.
- Automatically if no inputs are made by the light sensitive buttons for more than 60 seconds.

Table with parameter codes

TABLE 3

CODE	designation	range of possible values	factory presettings	unit
P001	Main Alarm level in steps 1 to 10 (see Table 4) 1=most sensitive level 10= least sensitive level	1 to10	4	----------
P002	Time delay for fresh air calibration (0 = no fresh air calibration)	0 to 24	0	hour
P003	Minimum value of allowed negative pressure	25 to 60	40	mm WG
P004	Pre- Alarm level as percentage of the main alarm level. At 100% pre- alarm level= main alarm level	40 to 100	100	% of main alarm level
P005	Adress of RS 485-interface*)	1 to 99	1	----------
P006	Adjust the factory pre- settings 0=values can be adjusted individually; 1=all parameters will be set to "default" values	0 or 1	0	----------
P050	Date *)	01.01 to 31.12"		dd . mm
P051	Date *)	1990 to 2010"		JJJJ
P052	Time *)	00.00 to 23.99"		hh . mm""

) = with the option history memory, clock, serial interface only

TABLE 4

Level of sensitivity	Alarm level (% Opacity) VN 115 / 93	Alarm level (% Opacity) VN 116 / 93 and VN 215 / 93
1	0,5	0,7
2	1,0	1,1
3	1,5	1,6
4	2,0	2,4
5	3,0	3,7
6	5,0	5,5
7	7,0	8,2
8	10,0	12,4
9	15,0	18,5
10	25,0	27,8

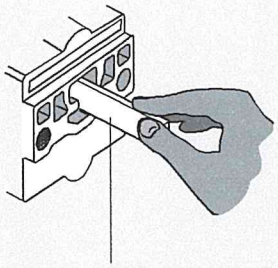
Performance test

Attention !
During this test the engine is not monitored by the oil mist detector !

- Open the control cover of the measuring head
- Wait until the READY-LED is switched off (approx. after 10 seconds)
- The following display appears:

- Display "CODE" :	E 014
- Display "VALUE" :	decreasing to values below the adjusted "minimum value for negative pressure" (P003)
- LED - Chain	bottom LED on, all others off
- LED "READY":	off
- LED "TEST":	off
- LED "ALARM":	off

- Blind the light beam of the measuring track with a woodden vane or similar object.
- At devices VN 116 / 93 and VN 215 / 93 the damage check starts, as described in chapter 3.04.
- When the alarm level is reached the TEST-LED lights up (TEST-Alarm). To set back the TEST-Alarm touch the "ENTER/RESET" button for more than 1 second. TEST-LED goes off.
- Close the control cover of the measuring head. At "VALUE" the increasing value of the negative pressure is displayed. When the minimum negative pressure is exceeded the device set-up will be started.
- After approx. 15 seconds the device is in basic operation mode again. The following display appears:



vane
(wood, steel, etc.)

- Display "CODE" :	-215 (-116) (-115)
- Display "VALUE" :	0
- LED - Chain	bottom LED on, all others off
- LED "READY":	on
- LED "TEST":	off
- LED "ALARM":	off

Attention !
After the test is completed successfully it is imperative to close the control cover of the measuring head again to ensure that the engine will be monitored by the oil mist detector!

Additional functions in connection with the History memory

The following package is available as an option:

- clock, powered by battery
- History memory, for collection of events being recognised by the VISATRON oil mist detector also during power supply failure (see below table 5).
- serial data interface for data link of the VISATRON to a personal computer, connecting cable with interface adapter RS 485 / RS 232
- PC- Software for readout of the history memory.

An operating instruction explaining the connection of the VISATRON to the PC and the data readout of the history memory is supplied with the software-diskette.

The following events are stored by the history memory with indication of date and time:

TABLE 5

designation	value
electrical power supply switched on	date, time
electrical power supply switched off	date, time
Alarm level has been changed	date, time, new alarm level
Pre-alarm level has been changed	date, time, new pre-alarm level
READY switched on	date, time
READY switched off	date, time, Error code
Main alarm released	date, time
Main alarm off	date, time
Pre-alarm released	date, time
Pre-alarm switched off	date, time

Shut Down

- **Stop drive air supply**
- **Do not switch off the power supply**

Storage

In closed rooms

T min	-25°C
T max	+80°C
Maximum air humidity	85%

Avoid humidity condensation!

Performance Test / Maintenance

Performance test
(To be preformed before the engine is started):

- Pull out the main connector plug,
  green READY LED will go off
- Re- install main connector plug,
  LED No. 1 is blinking for about 30 seconds, then:
  the green READY LED and chain LED No. 1 light up.
  Device is ready for operation.
- Open inspection cover at the measuring head.
  After about 15 seconds the green READY LED and
  Display "CODE" E 014 is on.
  Display "VALUE": negative pressure in the measuring head is showing a low value.
- Close inspection cover at the measuring head again.
  Negative pressure at measuring head is increasing (displayed at "VALUE").
  The green READY LED subsequently switches on.
  Device is ready for operation.

Performance test with test vapour, e. g. vapour distillate from the service box
(to be performed only when engine is not running)

- Open crankcase-cover of a compartment in order to access
  a suction pipe or sampling funnel.
- Fill the plastic bag (found in the service box) with vapour
- Affix the plastic bag to suction pipe or sampling funnel.
- Allow the oil mist detector to draw in the distillate vapour for
  a minimum of 20 seconds.

It depends on the vapour density and suction time (at least 20 seconds):

1 - whether an oil mist alarm is triggered, or

2 - oil mist alarm is triggered, and a search run is started, or during
the search run only one half or the engine is indicated, or the
affected compartment is indicated.
(If the amount of vapour is insufficient or the suction time is too short, a wrong compartment may be indicated in the display window of the valve box.)

Damage- Check:

VN 116 / 93
and
VN 215 / 93

Maintenance work to be carried out regularly. In case of non-compliance, the manufacturer's liability expires. Maintenance work has to be documented.

Monthly: Check the negative pressure in the measuring head (range 60 - 80 mm H_2O, see 3. 01)

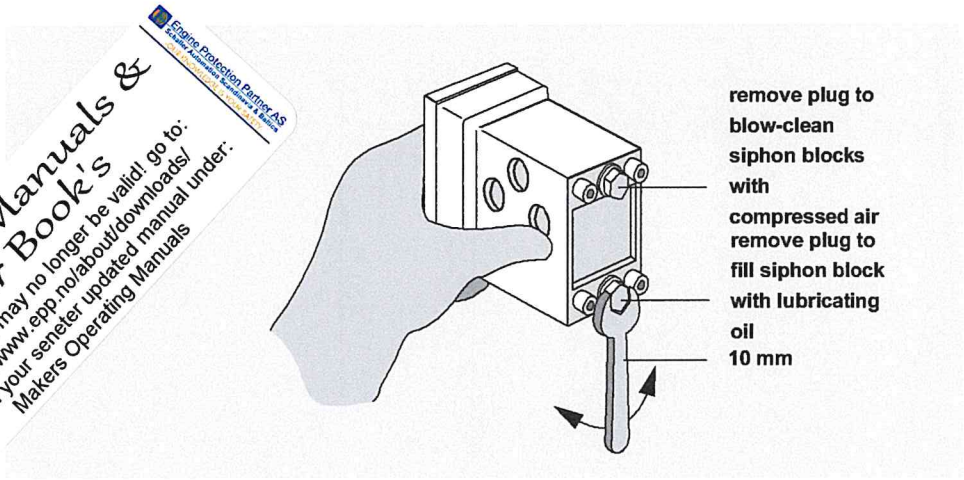
Rough filter side outwards!

Quarterly: Replace the sintered bronze filter in the measuring head. **Attention: Filters cannot be cleaned.** (see 5. 02)

Use cotton sticks only, otherwise the glasses may be damaged!

Clean the infrared filter glasses in the measuring head (see Fig. 5. 05 / 1)

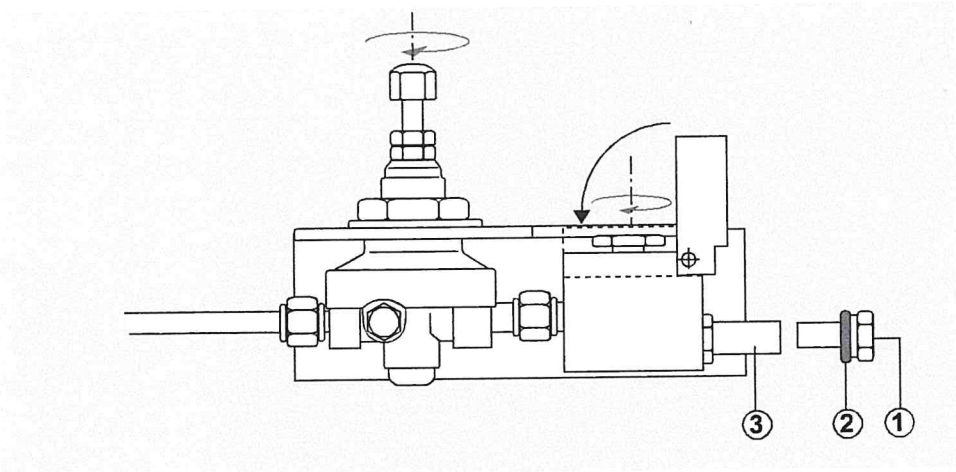
Every 6 months: Only with siphon block assembly system, optional for all OMD device types.



4. 02 / 1

In order to do so:
Remove header pipes from the connecting box, (VN 115 / 93) or from the valve box of VN 116 / 93, or individual pipes from valve box of VN 215 / 93 (to ensure that the device is not contaminated during the cleaning operation).
Remove siphon block plug, blow-clean the siphons with compressed air (max. 7 bar), mount the header or the individual suction pipes and siphon block plug, tighten accordingly.
Subsequently fill the siphon blocks with lubricating oil (see Fig. 4. 02 / 1)

Annually: Replace the sintered bronze filter in the pressure reducer (see Fig. 4. 03 / 1)



4. 03 / 1

Turn off drive air supply (control air)

In order to do so:
Turn off drive air supply, remove plug (1) with O- ring (2), detach sintered bronze filter (3), insert new filter, install and tighten plug (1) with O-ring (2) and turn on the drive air supply.

Malfunctions

Failures and corrective action

A malfunction of the oil mist detector has occurred if:

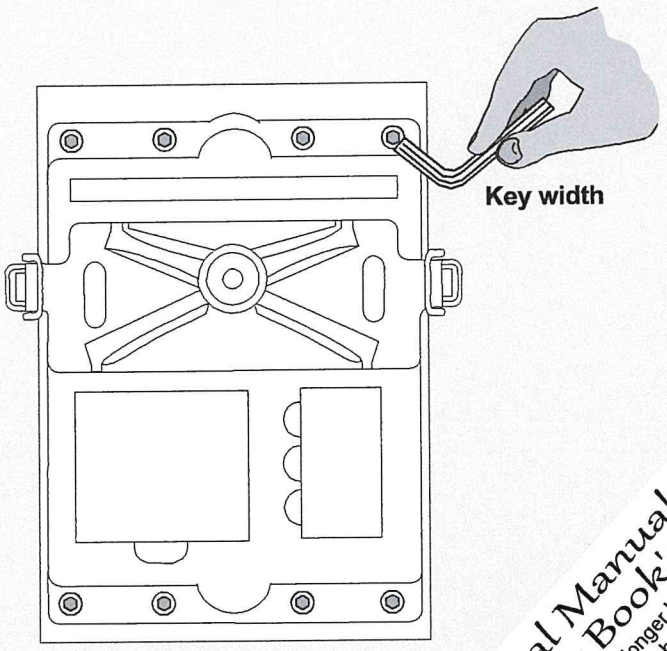
- the green READY LED is blinking or off
- all displays are blank, all LED´s are off

A pending oil mist alarm will be reset when malfunction occurs.

Failure:
No display in the inspection window, all LEDs off.

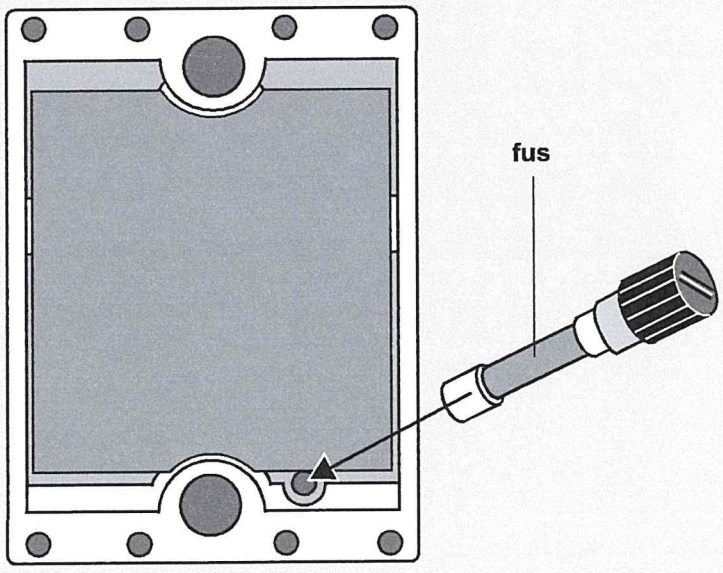
Possible cause:	**Remedy:**	
Breakdown of power supply or voltage too low	Check power supply by: pulling off the main connector plug. Between terminals 1 and 2 in the socket on the base plate, check if min.18V to max. 30V is available. Push on main connector plug and lock into place. Make sure that the power supply does not break down under the load of the oil mist detector. (voltage not to be below 18V)	***min. 18V*** ***max. 30V***
Fuse in the measuring head defective (see Fig.5. 06 / 1)	Replace fuse in the measuring head (3,15 A, semi time lag) by: pulling off the main connector plug. Detach measuring head (8 screws) Replace fuse by a new one. Mount measuring head into position. Push on main connector plug and lock into place.	
Should there still be no READY LED indication	Replace the measuring head (see Fig. 6. 02 / 1)	

Remove measuring head



5. 02 / 1

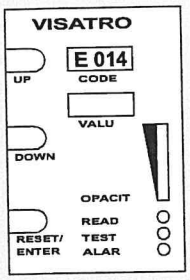
Replace fuse in the measuring head



5. 02 / 2

Failure

Display " CODE": E 014, **-Negative pressure in the measuring head too low.**

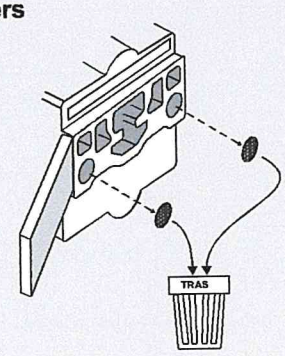


Possible causes:	**Remedy:**
Open inspection cover	Close inspection cover
Filter or water separator in the air supply system clogged or filled	Clean accordingly, empty if necessary
Pressure reducer misadjusted by vibration	Readjust (see chapter 3. 01)
Pressure throttle misadjusted by vibration	Readjust (see chapter 3. 01)
Sintered bronze filter in the pressure reducer clogged	Replace bronze filter (see Fig. 4. 03 / 1)
Sintered bronze filters in the measuring head clogged	Replace sintered bronze filters (see Fig. 5. 03 / 1) by: opening the inspection cover. Remove circlips. Insert new filters (always on both sides, rough side outwards), insert circlips, close cover.

Do not clean filters, but always replace by new ones!

Close inspection cover after replacement!

Replace sintered bronze filters in the measuring head



5. 03 / 1

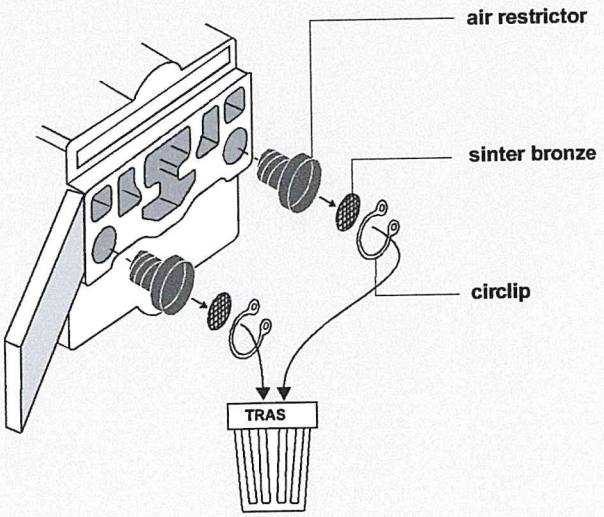
Possible cause:	Remedy:
Leakage at the device	Check all pipes and seals by: checking flexible expansion bellows (accessible after the measuring head has been detached) Replace damaged seals or expansion bellows
Exhaust air pipe malfunction	Eliminate blockage of the exhaust air pipe, the air must flow without restriction!
Fresh air restrictors in the measuring head are clogged	replace fresh air restrictors by: opening the inspection cover remove circlips and fresh air filter pull out fresh air restrictors and replace by new ones. Insert new fresh air filters insert circlips close cover

always replace both fresh air restrictors!

when replacing fresh air restrictors change fresh air filters too!

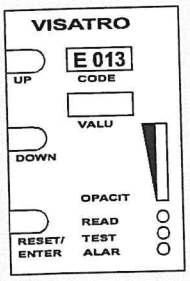
After replacement close the inspection cover!

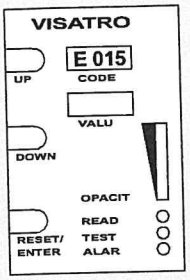
Replacing fresh air restrictors



Failure

Display "CODE": E 013 or E 015, **- Infrared filter clogged**





Possible causes:

Infrared filter lenses clogged

Remedy: (see Fig. 5. 05 / 1)

Clean infrared filter lenses

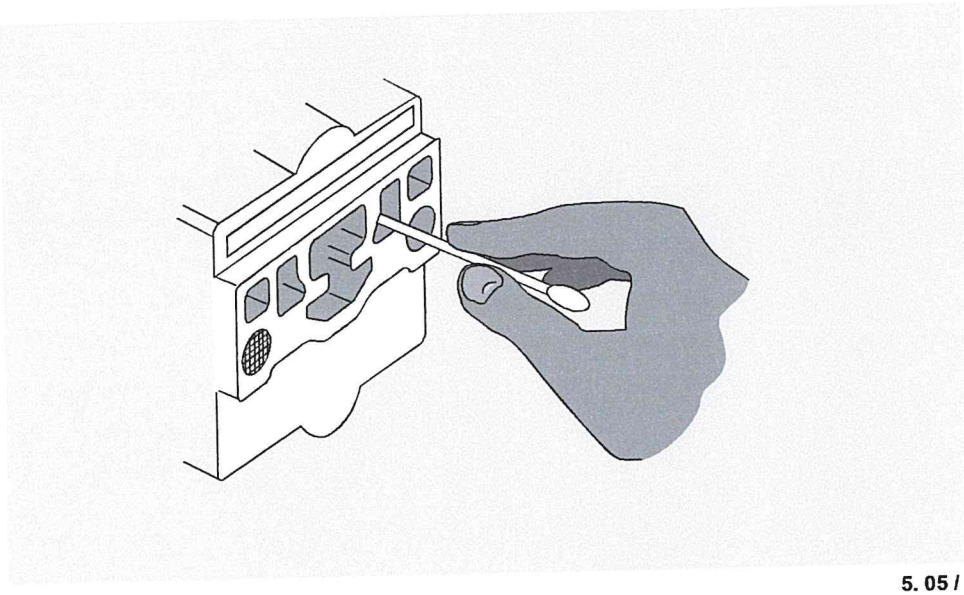
by: opening the inspection cover.

Use item 7 and 8 in service box.

Soak cotton stick (8) (plastic only!) with alcohol (7). Clean infrared filter with cotton stick several times.

Rub infrared filter dry by means of cotton stick. Make sure no fluff remains on the infrared filter lenses

Close inspection cover again.



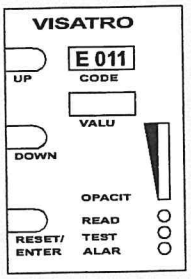
5. 05 / 1

Do not use hard objects like screw-drivers for cleaning. The infrared filter lenses can be scratched and will be damaged!

If failure continues:

Replace measuring head

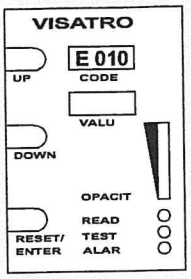
(see chapter 6 "Repair")



Failure:

Display "CODE": E 011, **-Ambient temperature below 0° C**

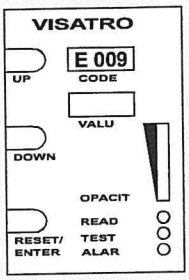
Possible causes:	**Remedy:**
Engine room ventilator blows cold air onto the device.	Change blowing direction of ventilator, away from oil mist detector.



Failure:

Display "CODE": E 010, **-Ambient temperature above 70° C**

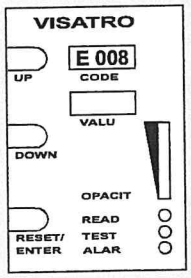
Possible causes:	**Remedy:**
Source of heat radiates on the device.	Protect device against sources of heat, ensure an improved fresh air circulation.



Failure:

Display "CODE": E 009, **- Electronics temperature below 0° C**

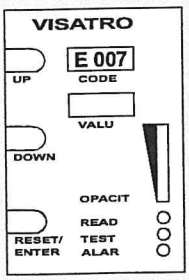
Possible causes:	**Remedy:**
Engine room ventilator blows cold air onto the device.	Change blowing direction of the ventilator to ensure that cold air it is not directed to the oil mist detector.



Failure:

Display "CODE": E 008, **- Electronics temperature above 70° C**

Possible causes:	**Remedy:**
Source of heat radiates on the device	Protect device against sources of heat, improve fresh air circulation.



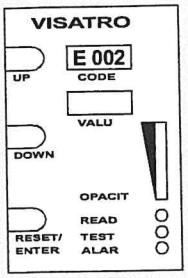
Failure:

Display "CODE": E 007, **- Light sensitive button defect**

Possible causes:	**Remedy:**
Display window dirty	Clean display window, if failure continues: change measuring head.

Failure

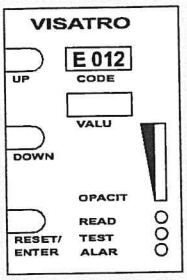
Display "CODE": E 002, E 003, E 004, E 017,



Possible causes:	**Remedy:**
Electronics defect	Rplace measuring head (see fig. 6. 02 / 1).

Failure

Display "CODE": E 012, **-Checksum error**



Possible causes:	**Remedy:**
Heavy interferences on electrical power supply	Repeat parameter adjustment, if it occurs frequently, check power supply for interferences.

Further possible failures

Sudden false alarms in very warm or cold climatic areas can be triggered by humidity (in the crankcase) falling below the dew point:
Water droplets passing the measuring track or dew on the filter glasses may trigger a false alarm.

Remedy: Check negative pressure and calibrate to 60 mm W. G., if required.
Ventilation air fans, if any, blowing towards the device and its suction pipes.
Change blowing direction (install deflectors) of the ventilator to ensure that cold air it is not directed to the oil mist detector or suction pipes.
Check VISATRON heating system (the heating element is located inside the top of the measuring head), the surface should be fairly warm.

Repairing

Replace measuring head

Procedure

- Loosen clamps on the main connector plug
- Pull off the main connector plug
- Dismantle the measuring head (8 screws, see fig. 6. 01 / 1)

- Examine if the measuring head is equipped with the correct factory supplied (or the one required for the system) wire break resistor values.

To change the wire break resistors, see instructions on the protecting cover on the back side of the measuring head. (see fig. 6. 02 / 1)

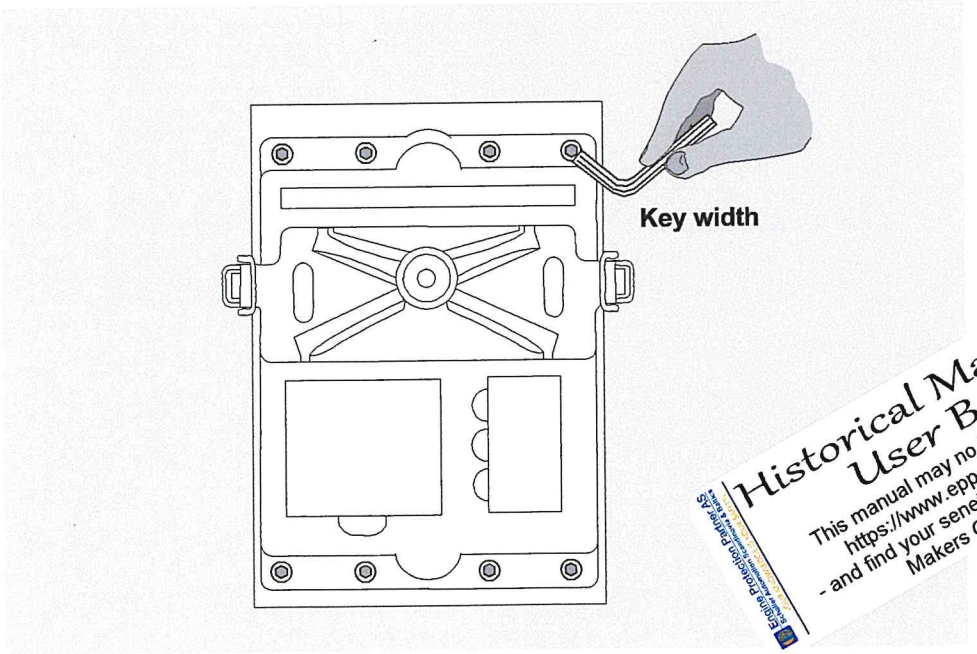
More information can be found in chapter 2, commissioning, under "electrical connection".

In case that the value of the wire break resistors do not match your installation :

- Change the wire break resistors of the new measuring head. The resistors are designed as plug-in resistors and can be replaced without soldering !

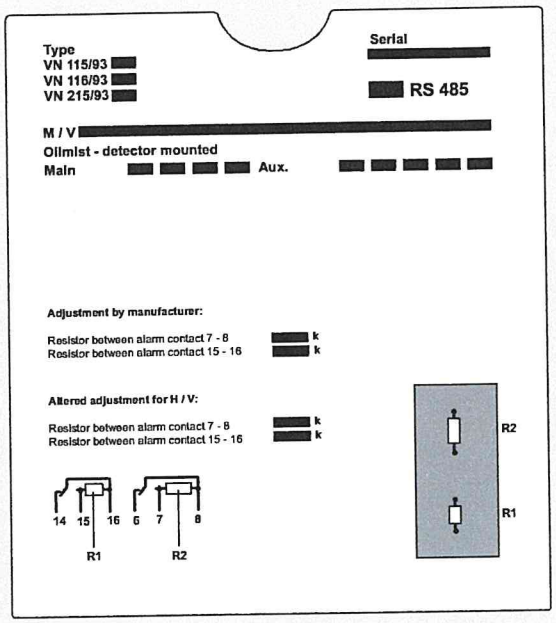
- Fasten measuring head, tighten 8 screws moderately
- Push on main connector plug
- Lock into place
- Carry out performance test according chapter 3

Attention!
replacement of wire break resistors must only be done by skilled and trained personnel!



6. 01 / 1

Examine module or spare when received from shipment. If you return the electronic module, ensure that the completed form „Why do you declare this unit faulty?“ from chapter 10 is included



6. 02 / 1

Leaks or failure of the connecting box of VN 115 / 93

Remedy: (see Fig. 6. 02 / 2)

Disconnect header pipes on the left and right side of connecting box (1), push pipes aside to get free access.

Loosen the two screws (2) and (3) of the connecting box.

Detach the connecting box and remove the gasket.

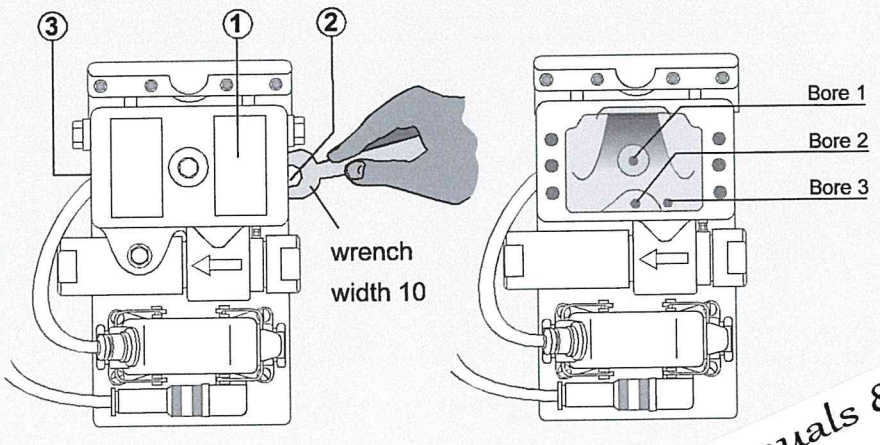
Check if bores 1, 2 and 3 are free from dirt, clean if necessary.

Clean the base plate cavity from oil.

On principle, use new connecting box gasket!

Assembly in reverse order, utilising new gasket.

VN 115 / 93



6. 02 / 2

Leaks or failure of the valve box of VN 116 / 93

Remedy: (see Fig. 6. 03 / 1)

Dismantle the pipe connector flange (1) and (2) with the headers on the right and left side.

Push away the header pipes for free access to the valve box.

Unscrew the connector plug of valve box and loosen the four screws (3), (4), (5) and (6) of the valve box.

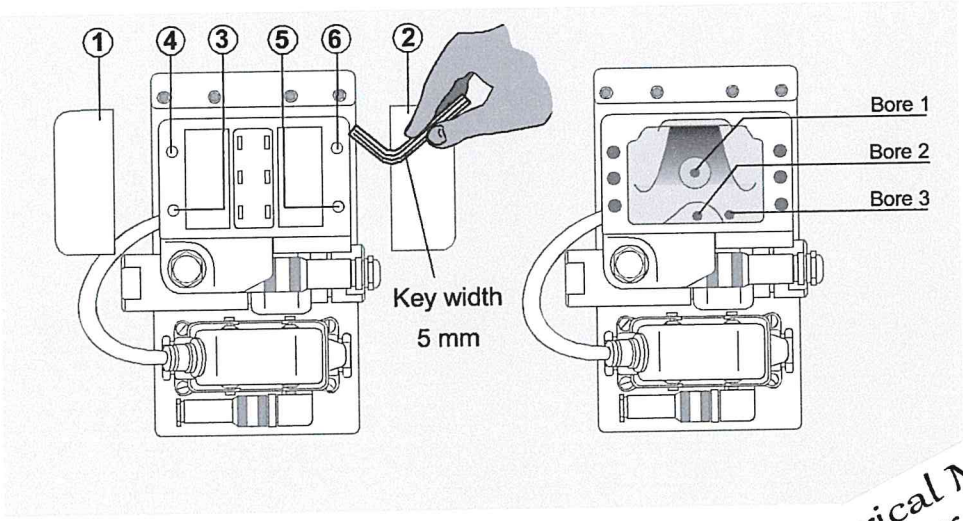
Detach valve box and remove seal.

Check if bores 1, 2 and 3 are free from dirt, clean if necessary

Clean the base plate cavity from oil.

On principle, use new valve box seals!

Assembly in reverse order, utilising new seals and gasket.



VN 116 / 93

6. 03 / 1

Leak or failure of the valve box of VN 215 / 93

Remedy: (see Fig.. 6. 04 / 1)

Release the pipe connector flange (1) and (2) on the right and on the left side.

Push away both connector flanges with individual suction pipes for free access to the valve box.

Unscrew connector plug of valve box and loosen screws (3), (4), (5) and (6) of the valve box.

Detach valve box and remove seal.

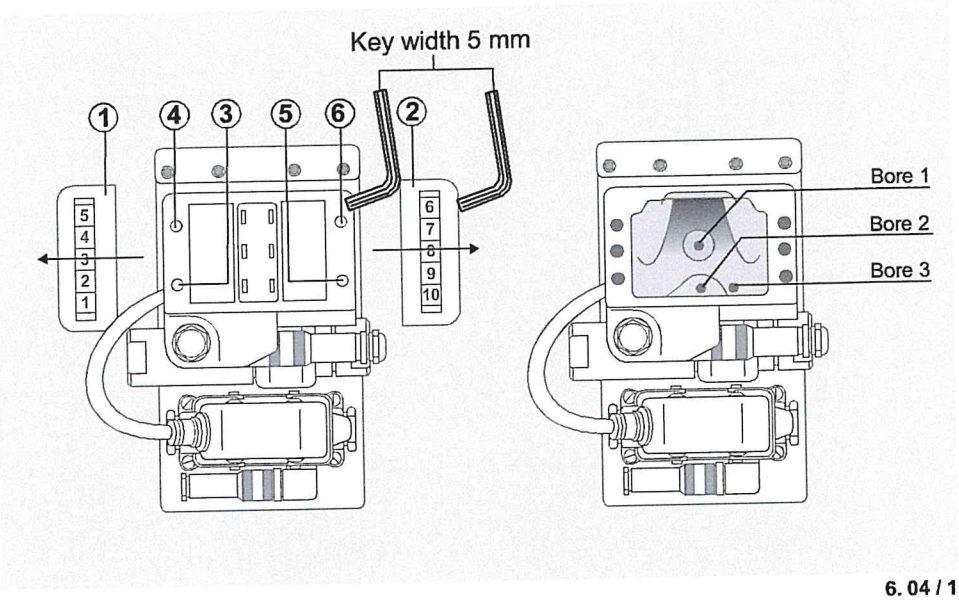
Check if bores 1, 2 and 3 are free from dirt, clean if necessary.

Clean the base plate cavity from oil.

On principle, use new valve box seals and gasket!

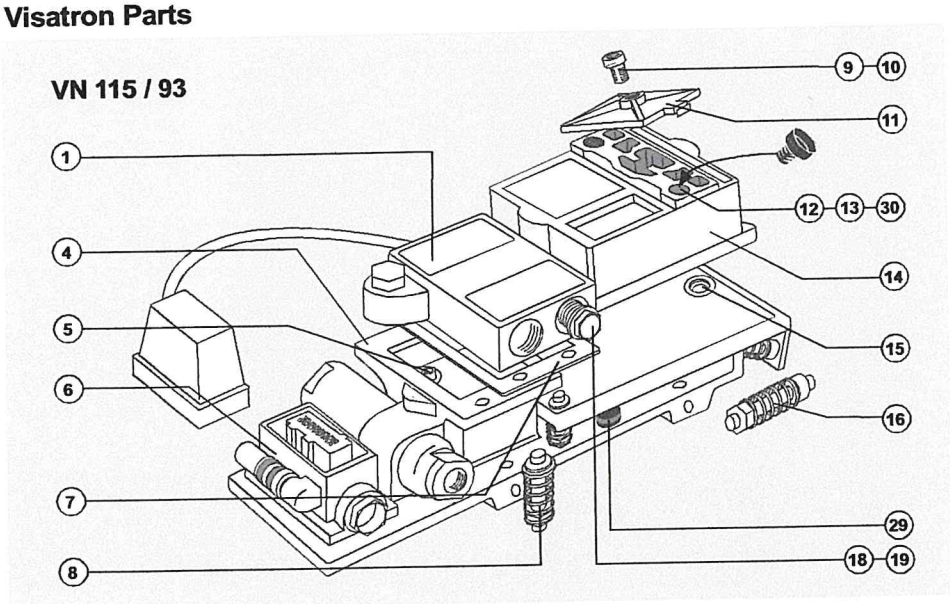
Assembly in reverse order, on principle, use new valve box seals and gasket.

VN 215 / 93

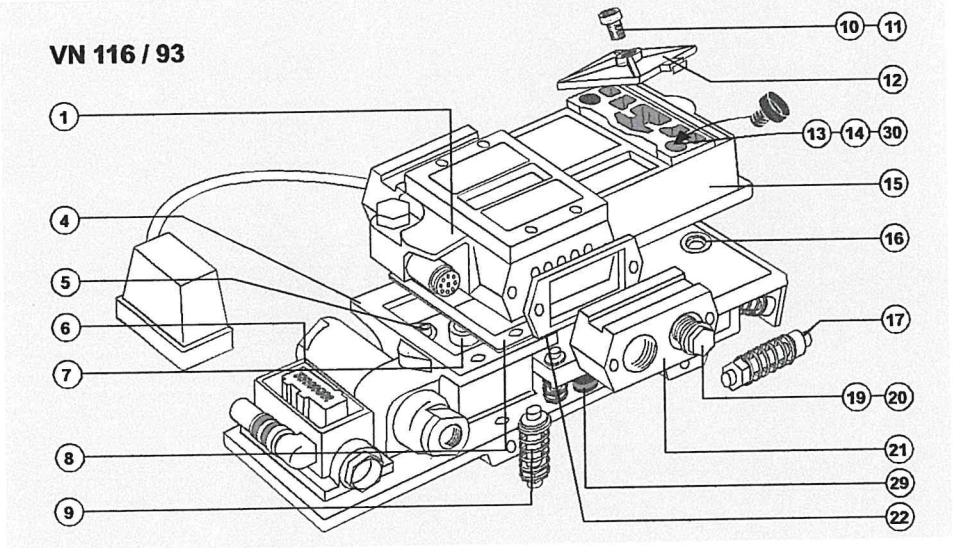


6. 04 / 1

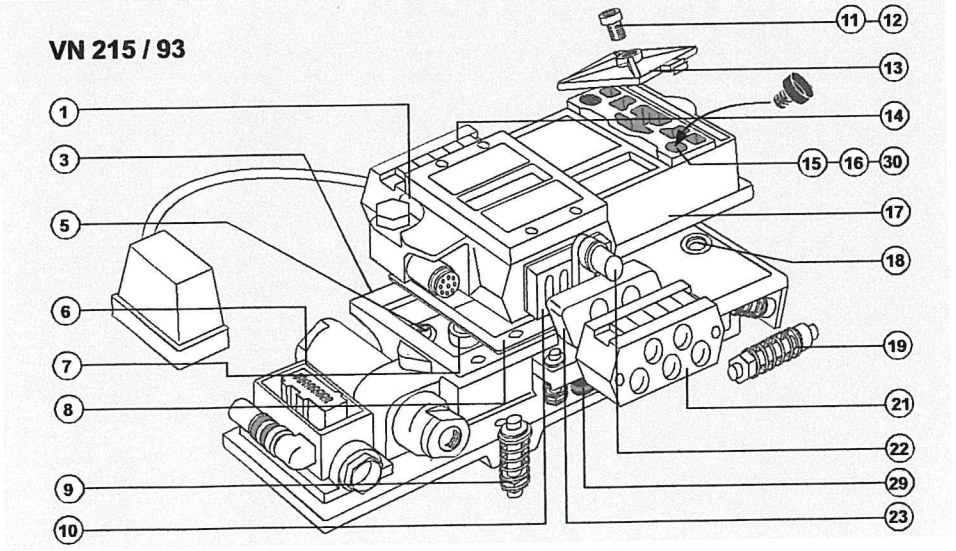
Visatron Parts



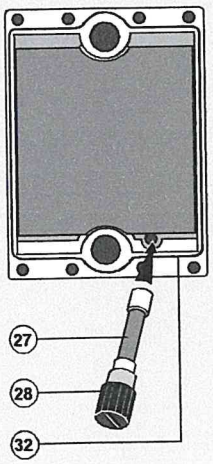
7. 01 / 1



7. 01 / 2



7. 01 / 3



Item	Description	Article No.	No. of pieces
VN 115 / 93			
1.	Pipe connector box	10202	1
4.	Base plate	10032	1
5.	Seal	10206	1
6.	Connector socket	10033	1
7.	Gasket	10049	1
8.	Measuring head suspension, bottom	10971	2
9.	Plug seal	10054	2
10.	Screw plug R 1/4"	10083	1
11.	Inspection cover	10088	1
12.	Scavenging air filter (sinter bronze)	10042	2
13.	Circlip for scavenging air filter	10041	2
14.	Measuring head for VN 115/93	10201	1
15.	Expansion bellows	10023	2
16.	Measuring head suspension, top	10970	2
18.	Srew plug R 1/2"	10208	3
19.	Screw plug seal	10209	3
27.	Fuse 3,15 A	10043	1
28.	Fuse cap	10087	1
29.	Flexible bellow for drive air scavenging	10990	1
30.	Fresh air restrictor	10975	2
32.	Gasket for measuring head	10976	1

Item	Description	Article No.	No. of pieces
VN 116 / 93			
1.	Valve box VN 116 / 93	10302	1
4.	Base plate	10032	1
5.	Oil drain seal	10306	1
6.	Connector socket	10033	1
7.	Oil mist seal	10307	1
8.	Valve box gasket	10305	1
9.	Measuring head suspension, bottom	10971	2
10.	Screw plug R 1/4"	10083	1
11.	Plug seal	10082	2
12.	Inspection cover	10088	1
13.	Scavenging air filter (sinter bronze)	10042	2
14.	Circlip for scavenging air filter	10041	2
15.	Measuring head VN 116 / 93	10301	1
16.	Expansion bellows	10023	2
17.	Measuring head suspension, top	10970	2
19.	Screw plug R 1/2"	10208	2
20.	Screw plug seal	10209	2
21.	Pipe connecting flange	10312	2
22.	Seal for connecting flange	10313	2
27.	Fuse 3,15 A	10043	1
28.	Fuse cap	10087	1
29.	Flexible bellow for drive air scavenging	10990	1
30.	Fresh air restrictor	10975	2
32.	Gasket for measuring head	10976	1

Item	Description	Article No.	No. of pieces
VN 215 / 93			
1.	Valve box VN 215 / 93	10402	1
3.	Base plate	10032	1
5.	Oil drain seal	10406	1
6.	Connector socket	10033	1
7.	Oil mist seal	10407	1
8.	Valve box gasket	10405	1
9.	Measuring head suspension, bottom	10971	2
10.	Clamping plate for pipe connection	10409	2
11.	Screw plug R 1/4"	10083	1
12.	Plug seal	10082	2
13.	Inspection cover	10088	1
14.	Pipe connecting flange, left	10408	1
15.	Scavenging air filter (sinter bronze)	10042	2
16.	Circlip for scavenging air filter	10041	2
17.	Measuring head for VN 215 / 93	10401	1
18.	Expansion bellows	10023	2
19.	Measuring head suspension, top	10970	2
21.	Pipe connecting flange, right	10430	1
22.		10412	6
23.	Rubber sleeve	10411	2
27.	Fuse 3,15 A	10043	1
28.	Fuse cap	10087	1
29.	Flexible bellow for drive air scavenging	10990	1
30.	Fresh air restrictor	10975	2
32.	Gasket for measuring head	10976	1

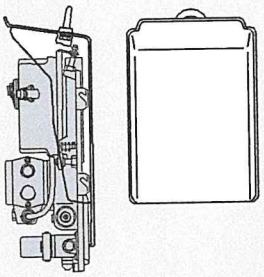
Options

List of Options for VN 93

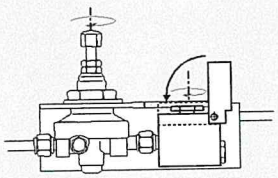
As an option, the following accessories can be supplied for the oil mist detectors of series 93:

Item	Description
1	Protecting cover
2	Pressure regulator unit with throttle block
3	Siphon block assembly system
4	History memory, clock, serial Interface RS 485 Hint: can not be installed retrospectively

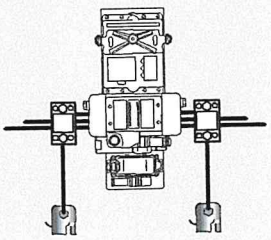
Description of the Individual Items



Item 1, Protecting cover (Art. No. 10015)
The protecting cover can easily be mounted on the four provided threads on the base plate of the VN device. It serves to protect the device against mechanical damage and contamination.



Item. 2. Pressure regulator unit (Art. No. 10001)
The pressure reducer unit consists of a pressure reducer and a throttle block. Both parts are mounted together on a frame which is fastened by 3 screws, M8. The pressure reducer device is especially designed to supply the draft air to the VISATRON (VN) device. The throttle block ensures that the negative pressure in the VN is limited and does not surpass 25% above of the calibrated negative pressure, should a failure occur in the pressure reducer (e. g. rupture of the diaphragm, etc.).
In addition, the throttle block is equipped with a filter to retain impurities from the plant air supply.



Item 3, Siphon block assembly systems (Art. No. depends on the type of engine)
Siphon blocks are devices which enable to drain the accumulated oil, from the oil mist suction pipes, directly back to the engine crankcase. The siphon blocks allow a horizontal suction pipe installation, from compartment to compartment. For consultation, please contact our service department.

Conventional suction pipe systems, without siphon blocks, require to be installed with a gradient of 2% to 4% ascending to the VN device, in order to drain the precipitated oil back to the engine.
It is imperative to drain the oil to the crankcase and avoid potential clogging.

Special engine-oriented assembly systems in modular design are available for VISATRON Oil Mist Detectors for a large number of two- and four- stroke engine types, of various manufacturers.

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Item 4, History memory

With the option "History Memory" the VISATRON devices are able to store, with date and time, the following events:

- Device switched on / off
- Occurrence of an alarm
- Occurrence of malfunctions
  see also table 5 in 3. 16

The serial data interface RS 485 enables to read out the stored infomation by the means of PC-Software.
Furthermore the RS 485 interface enables to transmit the measured values to a PC or a remote display.
The option cannot be installed retrospectively but has to be stipulated in the order of the new device!