

# Oil treatment system VacuClean

## Type VacuClean

**RE 51435**

Issue: 07.14



- ▶ Sizes 0050
- ▶ Device series 2X



### Features

The oil treatment system VacuClean removes dirt, oil aging products and gases as well as free and dissolved water from hydraulic and lubricating oils in the bypass.

The effectiveness of the system is guaranteed by multi-stage filtration and the very low pressure inside the vacuum chamber which is evacuated through the water ring vacuum pump.

During the process the water evaporates from the oil even at low temperatures. The separated water is used to lubricate the vacuum unit.

- ▶ PLC controlled operation with self monitoring and automatic shutdown in the event of a fault.
- ▶ Oil flow can be adjusted 10 l/min up to the nominal value 50 l/min
- ▶ Adjustable to a wide variety of application scenarios
- ▶ Can treat a wide viscosity range
- ▶ Fast cleaning and very low residual moisture through high-performance vacuum pump
- ▶ Low-maintenance, easy to operate
- ▶ No need for cooling water due to water-lubricated vacuum pump with capacitor as well as oil-free and dry air.

### Contents

Features	1
Ordering code oil treatment system	2
Preferred types	2
Function	3
Technical data	4
Intended purpose	5
Ordering code spare parts	6

**Ordering code****Oil treatment system**

01	02	03	04	05	06	07
<b>VCM</b>	<b>50</b>	<b>-</b>	<b>2X</b>	<b>/</b>	<b>-</b>	<b>M</b>
						<b>-</b>
						<b>S</b>

**Series**

01	VacuClean, mobile	<b>VCM</b>
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**Nominal size**

02	50 l/min	<b>50</b>
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03	<b>Device series</b>	<b>2X</b>
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**Filter rating**

04	Pre-filter 20 µm / Main filter 6 µm	<b>A</b>
	Pre-filter 10 µm / Main filter 3 µm	<b>B</b>

**Seals**

05	Mineral oil resistant	<b>M</b>
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**Monitoring**

06	Water content measurement	<b>W</b>
	Water content and particle measurement	<b>P</b>

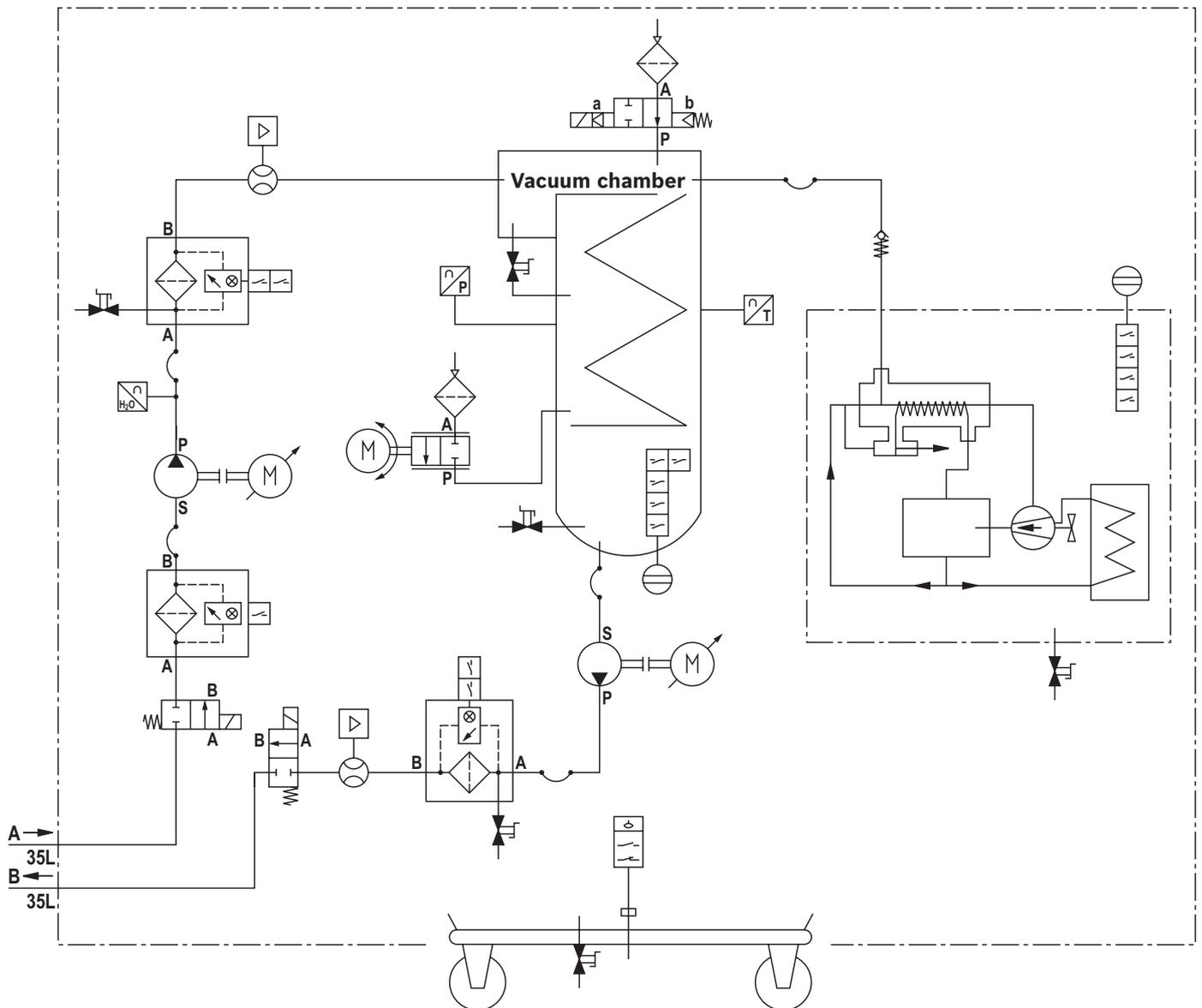
**Electrical connection**

07	380 V / 50 Hz	<b>S</b>
	Other variants upon request	

**Preferred types**

Type	Material no.
VCM50-2X/A-M-W-S	R928053122
VCM50-2X/B-M-W-S	R928052869

## Function



In a multi-stage process the VacuClean system removes dirt, oil aging products and gases as well as free and dissolved water from hydraulic and lubricating oils.

A gear pump delivers the media into the system. After the pre-filter, the oil in the antechamber is degassed and calmed. The medium is then transferred to the evacuation process chamber via the spiral in a laminar flow. The escaping water vapor is transported through the fresh air targeted for extraction. The water is separated in the capacitor and used to lubricate the oil-free water ring vacuum pump. Excess water is discharged through a line. The exhausted air is then released oil and vapor-free. After the process has run through the drained oil is carried by a low pressure-resistant gear pump to the main filter

and pumped back into the tank. In the event of a fault solenoid valves in the inlet and outlet shut the system down immediately in order to prevent leaks.

Two-stage filtration, consisting of a coarse pre-filtration and the secondary fine filter, allow for excellent cleaning results and long service life of the filter elements even with high viscosities and volume flow. The pressure is reduced in the evacuation vacuum chamber through the high-performance vacuum pump in so far that free water and water in the oil evaporates even at low temperatures. At the same time, gasses dissolved in oil and other liquid impurities such as oil acid are removed.

**Technical data** (For applications outside these parameters, please consult us!)

Dimensions (width x height x depth)		1,100 x 1,700 x 1,770 mm
Product weight		710 kg
Temperature range	- Medium (operation)	+20 ... +70 °C
	- Environment (operation)	0 ... +35 °C
	- Storage	-20 ... +60 °C (Antifreeze required for water ring vacuum pump)
Relative humidity environment		max 90 % no condensation
Type of protection EN 60529/IEC529		IP 54
Type	- Vacuum pump	Water ring vacuum pump
	- Hydraulic pumps	Gear
Seal material		FKM
Admissible medium		Hydraulic and lubricating oil
Minimum oil quantity necessary for operating		100 l
Viscosity range		15 ... 1000 mm <sup>2</sup> /s
Operating pressure process chamber		0.05 ... 1 bar abs.
Permitted pressure at suction port		0.4 ... 1.5 bar abs.
Flow rate (adjustable)		10 ... 50 l/min
Electrical connection		50Hz: 3~ 360-415V 60Hz: 3~ 360-480V (Rated voltage according to DIN EN 60 034 / DIN IEC 34-1 + 10 %)
Power consumption		max. 8 kW
Length electric cable		10 m
Connection inlet/outlet		1 1/4" L35 Fitting
Length hose		5 m
Achievable residual moisture / residual water content		< 10 % (corresponds to approximately 50 PPM at ISO VG32)

## Intended purpose

In practice, more than 3/4 of all problems in fluid systems can be attributed to pollution. Taking into account economic considerations the use of VacuClean allows the reduction of operating and downtime costs. With the help of the mobile oil treatment device, a multiplication of the hydraulic oil service life and, by improvement of the oil, a significantly reduced wear of system components and thus lower operating costs can be achieved with very little effort.

Solids (particles), foreign liquids and air are typical types of pollution in hydraulic and lubricating oil. Solids and particles can be carried into the system from the outside (fresh oil; system breathing) or by abrasion and wear of components. Even just the hard particles can lead in turn to an acceleration of component wear and ultimately failure.

Liquid contamination, usually water in free or dissolved form, can result in serious consequences and cannot be removed through the normal filtration of the medium.

Water dissolved in oil or even free leads to corrosion, degradation of viscosity, reduction of lubricating properties and consequently to increased wear. Other problems occur through the chemical reactions of the fluid in the presence of water, air and metal particles which result in oil ageing and oil oxidation.

Gaseous contaminants, typically air, which dissolve in the oil in the tank, affect the response of valves, lead to foaming, loss of energy and pump damage.

- ▶ Water accumulates in the small cracks of balls and running surfaces and causes corrosion there.
- ▶ Reaction with catalytic acting metal particles greatly accelerates oxidation (fluid aging)
- ▶ Water increases the acid value (TAN) by four to ten times and thus accelerates the fluid decomposition
- ▶ The viscosity and lubrication properties of the fluid is changed in the dissolved and emulsified form. This leads to increased friction, heat development and wear.
- ▶ Dissolved water attracts dust, due to its high dielectric constant, which leads to the contamination of the fluid and the formation of dust clumps, which for example can clog servo valves. This can be difficult to remove by filtration however, due to the small particle size of the individual dust grains.
- ▶ Polarised additives are removed from the fluid causing further deterioration in its properties
- ▶ Water promotes the formation of slurry
- ▶ Water deteriorates the filtration properties of the fluid

The mobile and easy-to-use oil treatment system allows the cyclic or permanent cleaning of a complete hydraulic circuit in the bypass. The large surface filter with high contamination retention capacity can be operated cost-effectively even at very high filter grades with low differential pressures.

Due to the negative pressure in the evacuation vacuum chamber, even at low oil temperatures, effectively dissolved water and also free water is removed and dried during the entire hydraulic system process.

## Ordering code spare parts

### Filter elements

Designation	Description	Material no.
7.004 G25-S00-0-V	Filter element cloth 25 µm (Ventilation filter tank)	R928051646
7 004 H10XL-S00-0-M	Filter element glass fiber 10 µm (Ventilation filter tank)	R928035939
2.0160 G300-A00-0-V	Filter element cloth 300 µm (Pump protection filters)	R928048771
1.1000 H3XL-A00-0-V	Filter element glass fiber 3 µm (Pre-filter/Main filter)	R928006042
1.1000 H6XL-A00-0-V	Filter element glass fiber 6 µm (Pre-filter/Main filter)	R928006043
1.1000 H10XL-A00-0-V	Filter element glass fiber 10 µm (Pre-filter/Main filter)	R928006044
1.1000 H20XL-A00-0-V	Filter element glass fiber 20 µm (Pre-filter/Main filter)	R928006045

Filter element			
Non woven glass fiber H...XL		Single-use element on the basis of inorganic fiber	
		Filtration ratio according to ISO 16889 up to $\Delta p = 5 \text{ bar}$ [72.5 psi]	Achievable oil cleanliness according to ISO 4406 [SAE-AS 4059]
Particle separation	H20XL	$\beta_{20(c)} \geq 200$	19/16/12 ... 22/17/14
	H10XL	$\beta_{10(c)} \geq 200$	17/14/10 ... 21/16/13
	H6XL	$\beta_{6(c)} \geq 200$	15/12/10 ... 19/14/11
	H3XL	$\beta_{3(c)} \geq 200$	13/10/8 ... 17/13/10

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## Notes

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