

# **SOGEVAC®**

## **SV470 B (F) - SV570 B (F)**

Single-stage, oil-sealed rotary vane pump

**Original Operating instructions 300358964\_002\_C0**

Part Numbers :  
960752 V to 960768 V  
and their variants



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# Safety Information

## Important Safety Information

Indicates procedures that must be strictly observed to prevent hazards to persons.

Indicates procedures that must be strictly observed to prevent damage to, or destruction of the product.

Emphasises additional application information and other useful information provided within these Operating Instructions.

The Leybold Sogevac® has been designed for safe and efficient operation when used properly and in accordance with these Operating Instructions. It is the responsibility of the user to carefully read and strictly observe all safety precautions described in this section and throughout the Operating Instructions. The Sogevac® **must only be operated in the proper condition and under the conditions described in the Operating Instructions.** It must be operated and maintained by trained personnel only. Consult local, state, and national agencies regarding specific requirements and regulations. Address any further safety, operation and/or maintenance questions to our nearest office.

### Failure to observe the following precautions could result in serious personal injury!

SOGEVAC® pumps are not designed:

- for pumping of aggressive, corrosive, flammable or explosive gases or gases mixtures ;
- for pumping of oxygen or other highly reactive gases with a greater concentration than atmospheric concentration (>20%) ;
- for working in flammable or explosive environment.

For all these cases, special materials must be used. In case of doubt, please contact Leybold.

See also the limits of use indicated in the CE declaration of conformity.

Never expose part of the body to the vacuum. There is a danger of injury. Never operate the pump with an open and thus accessible inlet. Vacuum connections as well as oil filling and oil draining openings must not be opened during operation of the pump.

When operating, pump is hot and some surfaces could reach a temperature higher than 80°C (176°F). There is a risk of burn by touching.

Depending on the process involved, dangerous substances and oil may escape from the pump. Take the necessary safety precautions !

When working on the pump system, always observe the Operating Instructions.

**Disconnect the unit from the power supply before starting any work.**

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### Warning

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### Caution

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### Note

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### Warning



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### Avertissement



# Safety Information

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## Warning



Take appropriate precautions to insure that the pump cannot start.

If the pump has pumped hazardous gases it will be absolutely necessary to determine the nature of the hazard involved and take the appropriate safety precautions.

Observe all safety regulations !

Take adequate safety precautions prior to opening the intake or exhaust port.

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## Caution

**Failure to observe the following precautions could result in damage to the equipment !**

Liquid and solid particles must not enter the pump. Install the adequate filters, separators and/or condensers. In case of doubt consult Leybold.

The intake line of the pump must never be connected to a device with over atmospheric pressure. Design the exhaust line so that no pressure higher than 1,15 bar abs. (0,15 bar rel.) can occur.

Operating of the pump without oil or operating with incorrect direction of rotation can destroy the pump.

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## Note

Never use discarded seals. Always assemble using new seals.

Respect the instructions concerning environment protection when discarding used oil or exhaust filters !

The pump must be packaged in such a way that it will not be damaged during shipping, and so that no harmful substances can escape from the package.

We reserve the right to alter the design or any data given in these Operating Instructions. The illustrations are not binding.

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## 1 Description

SOGEVAC® pumps are designed for pumping of inert gases in the range of rough vacuum, between atmospheric pressure and end pressure of the pump.

When removing condensable vapours, a gas ballast valve (or 2) must be installed.

### 1.1 Principle of operation

The SOGEVAC® is a single-stage, oil-sealed rotary vane pump.

The anti-suckback valve, gas ballast valve, exhaust filters, oil feedback circuit, oil cooler and thermal switch are integrated functional elements. The pump is driven by a foot-mounted motor via belts.

The rotor mounted eccentrically in the pump cylinder has three vanes which divide the pump chamber into several compartments. The volume of each changes periodically with the rotation of the rotor.

As a result of enlargement of the pump chamber that is open in the direction of the intake port, gas is sucked in. The gas passes through the dirt trap and the open antisuckback valve and enters the pump chamber. As the rotor rotates further, the vane separates part of the pump chamber from the intake port. This part of the pump chamber is reduced, and the gas is compressed. At slightly above atmospheric pressure the gas is expelled from the chamber via the exhaust valves.

Oil injected into the pump chamber serves to seal, lubricate and cool the pump.

The oil entrained with the compressed gas is coarsely trapped in the bottom part of the oil casing. Then fine filtering occurs in the integrated exhaust filter. The proportion of oil in the exhaust gas is thus reduced below the visibility threshold (over 99 % entrapment rate).

The oil trapped in the exhaust filters is returned to the stator via an oil return line. To prevent gas flowing at atmospheric pressure from the oil reservoir into the intake port, the oil return line is controlled by a float valve.

The oil cycle of the SOGEVAC® is maintained by the pressure difference existing between the oil casing (pressure above atmospheric pressure) and the intake port (pressure below atmospheric pressure).

Unintentional venting of the vacuum chamber as well as oil suckback when switching off the pump are prevented by the built-in anti-suckback valve. Nevertheless, the anti-suckback valve does not guarantee the same safety as a valve.

As an additional failsafe device a thermal switch is incorporated ; it measures the temperature of the vacuum generator exhaust.

All pumps are equipped with an oil drain valve.

All motors are equipped with PTC sensors.

# Description

## 1.2 Technical characteristics

### SV470 B AIR

Technical data		50 Hz	60 Hz
Pumping speed <sup>1)</sup>	m <sup>3</sup> . h <sup>-1</sup>	400	470
Ultimate partial pressure without gas ballast <sup>1)</sup>	mbar	≤ 8.10 <sup>-2</sup>	≤ 8.10 <sup>-2</sup>
Ultimate total pressure with 1 gas ballast <sup>1)</sup>	mbar	≤ 0,7	≤ 0,7
Ultimate total pressure with 2 gas ballasts <sup>1)</sup>	mbar	≤ 2	≤ 2
Water vapour tolerance:	mbar		
■ with 1 gas ballast <sup>1) 3)</sup>		15	20
■ with 2 gas ballasts <sup>1) 3)</sup>		40	50
Water vapour capacity:	kg.h <sup>-1</sup>		
■ with 1 gas ballast <sup>1) 3)</sup>		5	7,5
■ with 2 gas ballasts <sup>1) 3)</sup>		13	17
Noise level <sup>2)</sup>	dB (A)	72	75
Type of protection/Isolation		IP 54/F	IP 54/F
Rated rotational speed pump	min <sup>-1</sup>	820	1000
Weight (with oil filling)	kg	480	480
Oil capacity min./max.	l	20	20
Intake connection <sup>4)</sup>		G3" + WA(U)1001 + WH(U)2500	
Exhaust connection <sup>4)</sup>		G3"	

1) to DIN 28400 and following numbers, with standard gas-ballast

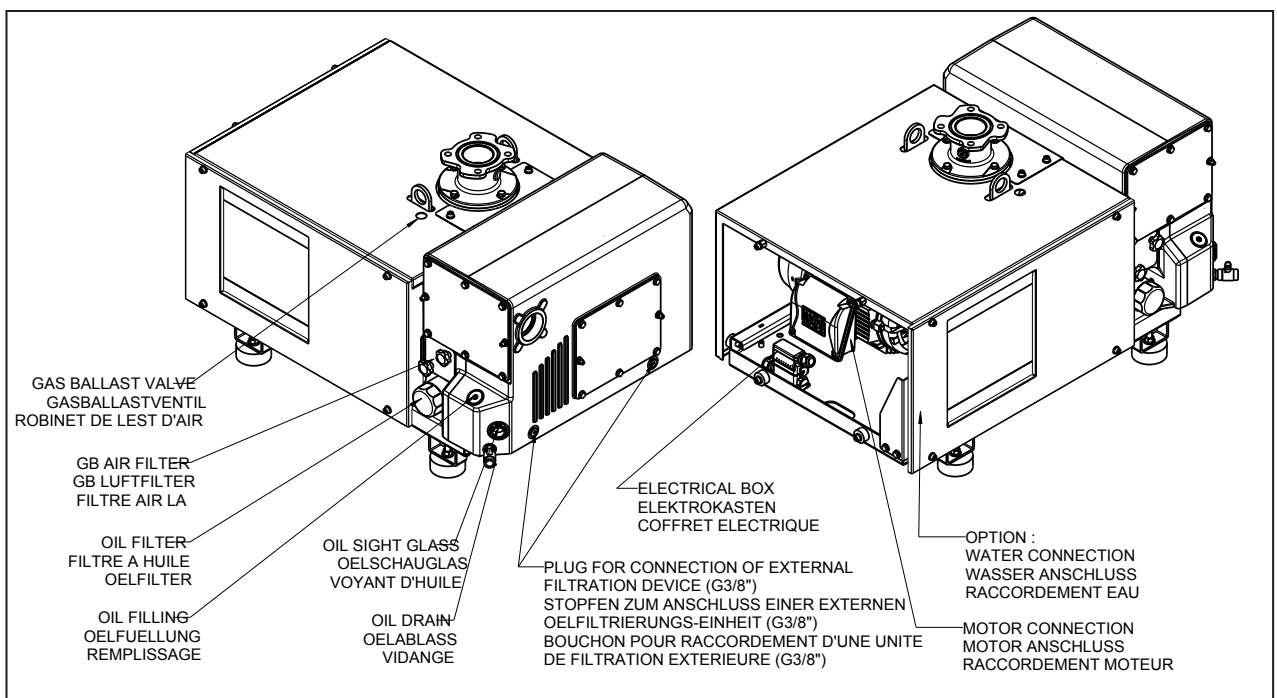
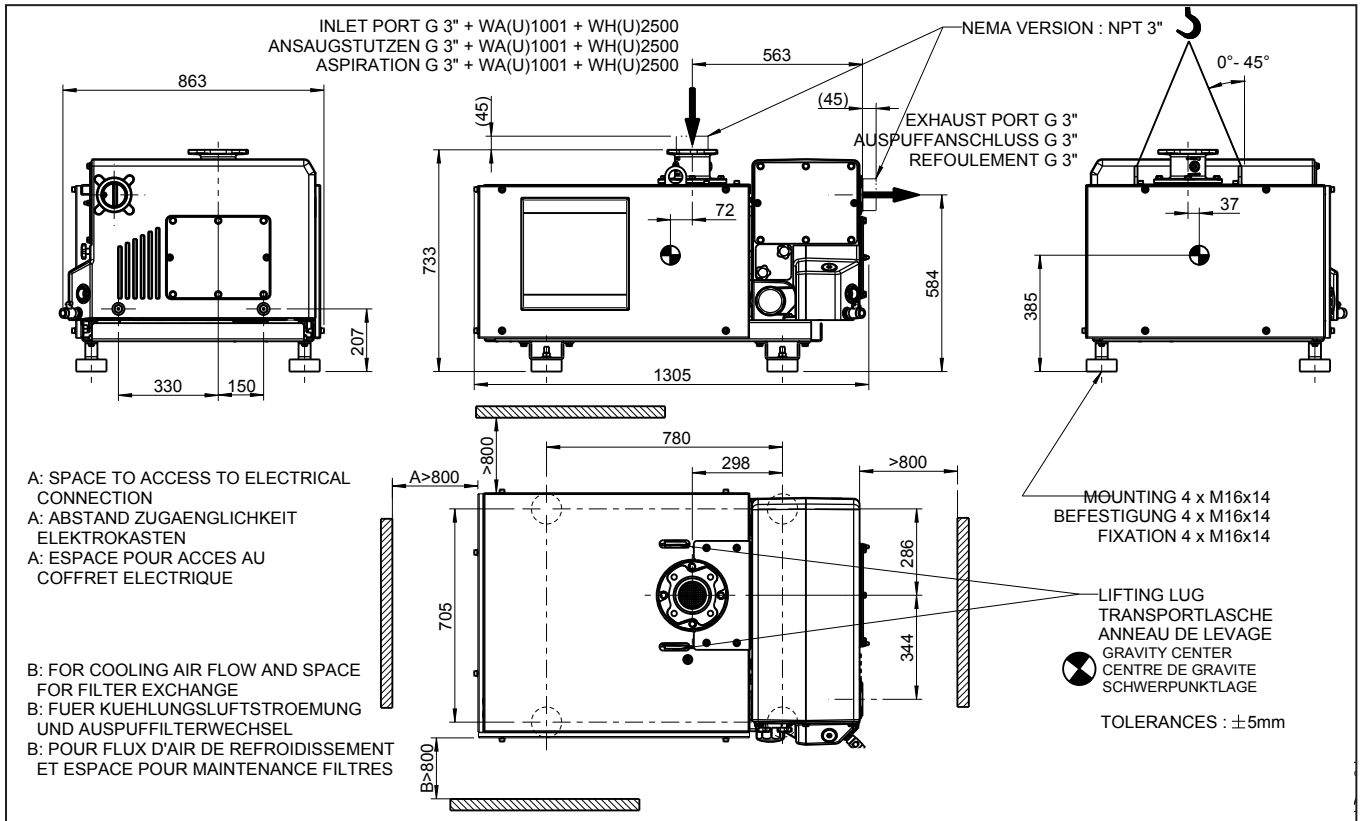
2) operated at the ultimate pressure without gas-ballast, free-field measurement at a distance of 1 m

3) please contact Leybold

4) The US versions have NPT3" flanges

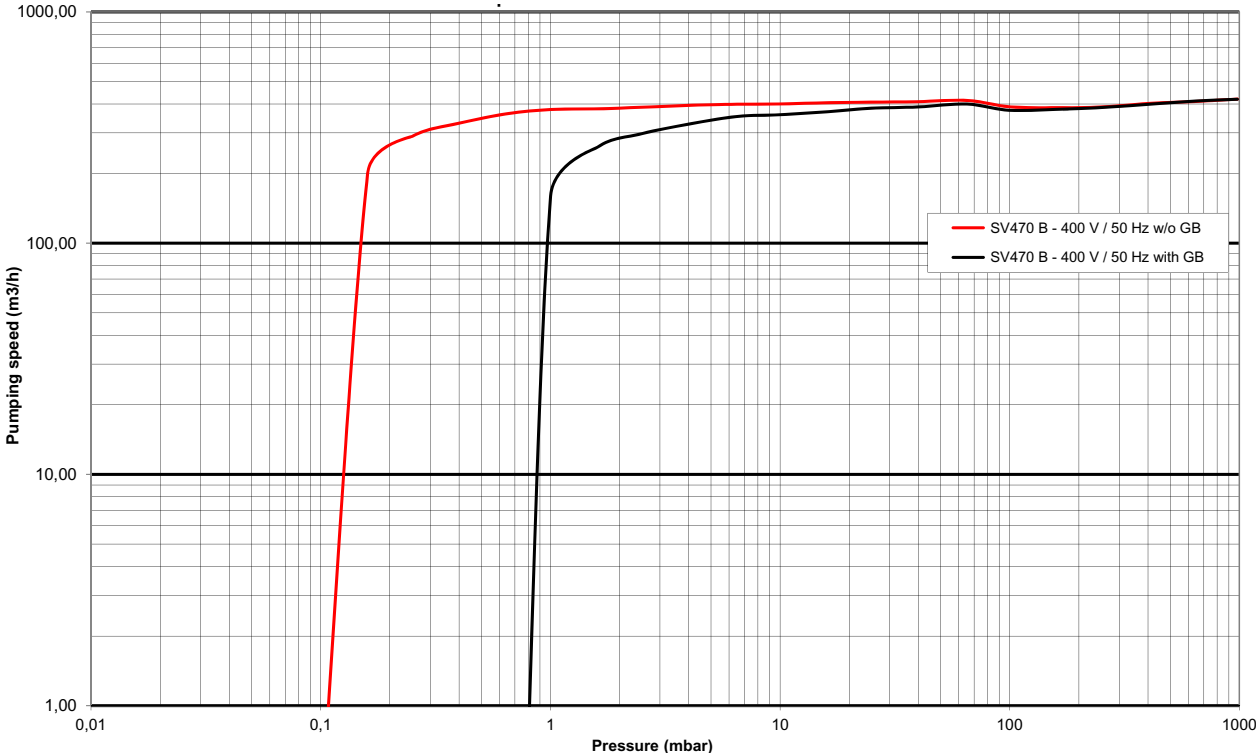
# Description

## SV 470 B / 570 B AIR



# Description

Pumping speeds SV470 B at 50 Hz





## SV470 BF WATER

Technical data		50 Hz	60 Hz <sup>5)</sup>
Pumping speed <sup>1)</sup>	m <sup>3</sup> . h <sup>-1</sup>	400	470
Ultimate partial pressure without gas ballast <sup>1)</sup>	mbar	≤ 8.10 <sup>-2</sup>	≤ 8.10 <sup>-2</sup>
Ultimate total pressure with 1 gas ballast EM <sup>1)</sup> 24 VDC	mbar	≤ 0,7	≤ 0,7
Ultimate total pressure with 2 gas ballasts EM <sup>1)</sup> 24 VDC	mbar	≤ 2	≤ 2
Water vapour tolerance:	mbar		
■ with 1 gas ballast <sup>3)</sup>		15	20
■ with 2 gas ballasts <sup>3)</sup>		35	40
Water vapour capacity:	kg.h <sup>-1</sup>		
■ with 1 gas ballast <sup>1) 3)</sup>		5	7,5
■ with 2 gas ballasts <sup>1) 3)</sup>		11	13
Cooling		H <sub>2</sub> O	H <sub>2</sub> O
Thermostatic valve		Pos 3	Pos 3
Water quality	TH (°F)	4 - 8	4 - 8
Water pressure min./max. see § 3.2 for water consumption	bar	2/8	2/8
Min water flow for 10°C water warming	l/h	700	800
Noise level <sup>2)</sup>	dB (A)	72	72
Type of protection/Isolation		IP 54/F	IP 54/F
Rated rotational speed pump	min <sup>-1</sup>	820	1000
Weight (with oil filling)	kg	480	480
Oil capacity min./max.	l	20	20
Intake connection <sup>4)</sup>		G3'' + WA(U)1001 + WH(U)2500	
Exhaust connection <sup>4)</sup>		G3''	

1) to DIN 28400 and following numbers, with standard gas-ballast

2) operated at the ultimate pressure without gas-ballast, free-field measurement at a distance of 1 m

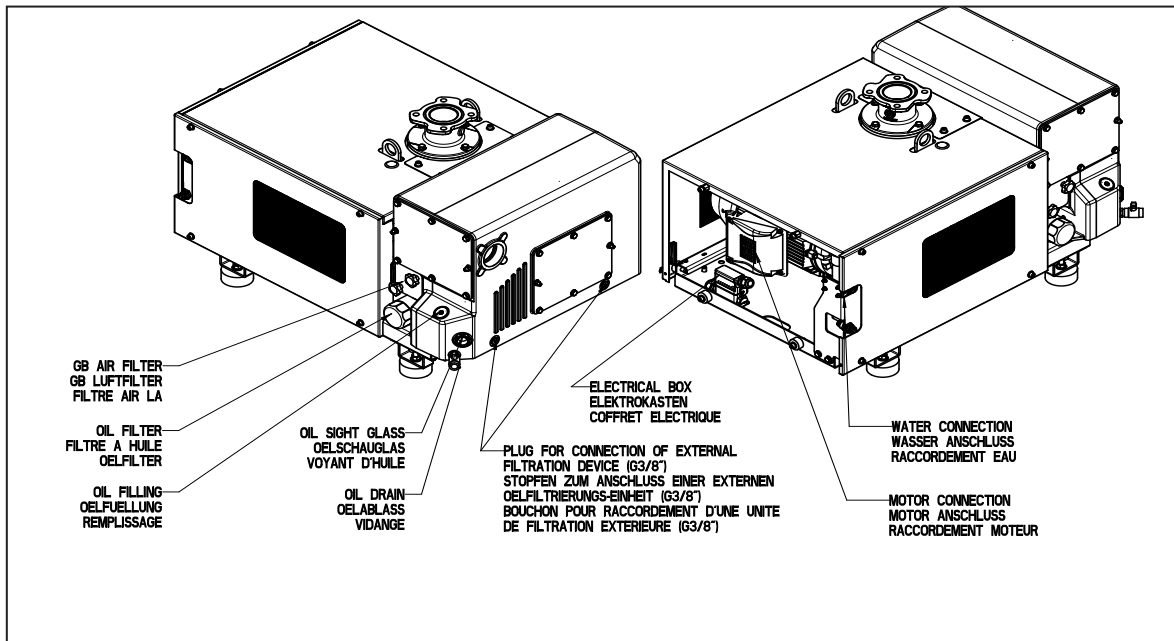
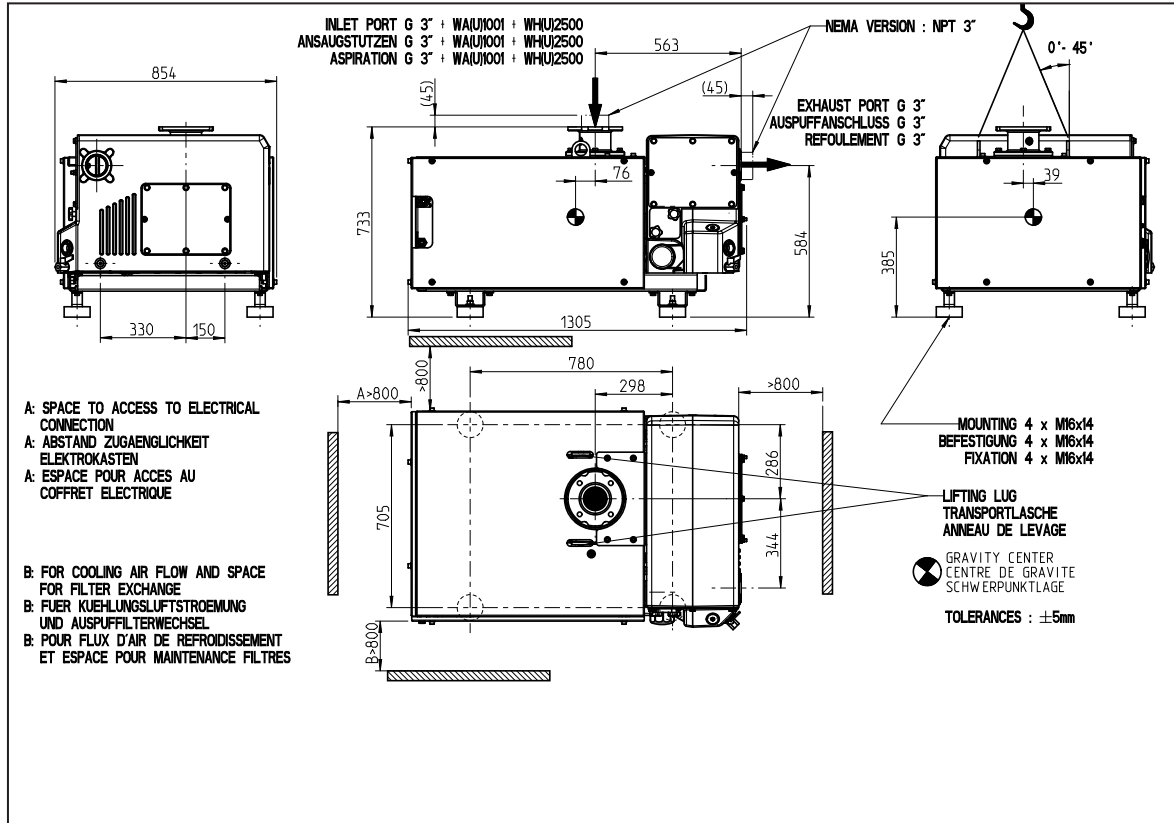
3) please contact Leybold

4) The US versions have NPT3'' flanges

5) Only US versions

# Description

SV 470 BF / SV 570 BF WATER



## SV570 B AIR

Technical data		50 Hz	60 Hz
Pumping speed <sup>1)</sup>	m <sup>3</sup> . h <sup>-1</sup>	470	470
Ultimate partial pressure without gas ballast <sup>1)</sup>	mbar	≤ 8.10 <sup>-2</sup>	≤ 8.10 <sup>-2</sup>
Ultimate total pressure with 1 gas ballast standard <sup>1)</sup>	mbar	≤ 0,7	≤ 0,7
Ultimate total pressure with 2 gas ballasts standard <sup>1)</sup>	mbar	≤ 2	≤ 2
Water vapour tolerance:	mbar		
■ with 1 gas ballast <sup>1) 3)</sup>		20	20
■ with 2 gas ballasts <sup>1) 3)</sup>		70	50
Water vapour capacity:	kg.h <sup>-1</sup>		
■ with 1 gas ballast <sup>1) 3)</sup>		7,5	7,5
■ with 2 gas ballasts <sup>1) 3)</sup>		20	17
Noise level <sup>2)</sup>	dB (A)	75	75
Type of protection/Isolation		IP 54/F	IP 54/F
Rated rotational speed pump	min <sup>-1</sup>	1000	1000
Weight (with oil filling)	kg	550	550
Oil capacity min./max.	l	20	20
Intake connection <sup>4)</sup> WA(U)1001+WH(U)2500		G3" +	
Exhaust connection <sup>4)</sup>		G3"	

1) to DIN 28400 and following numbers, with standard gas-ballast

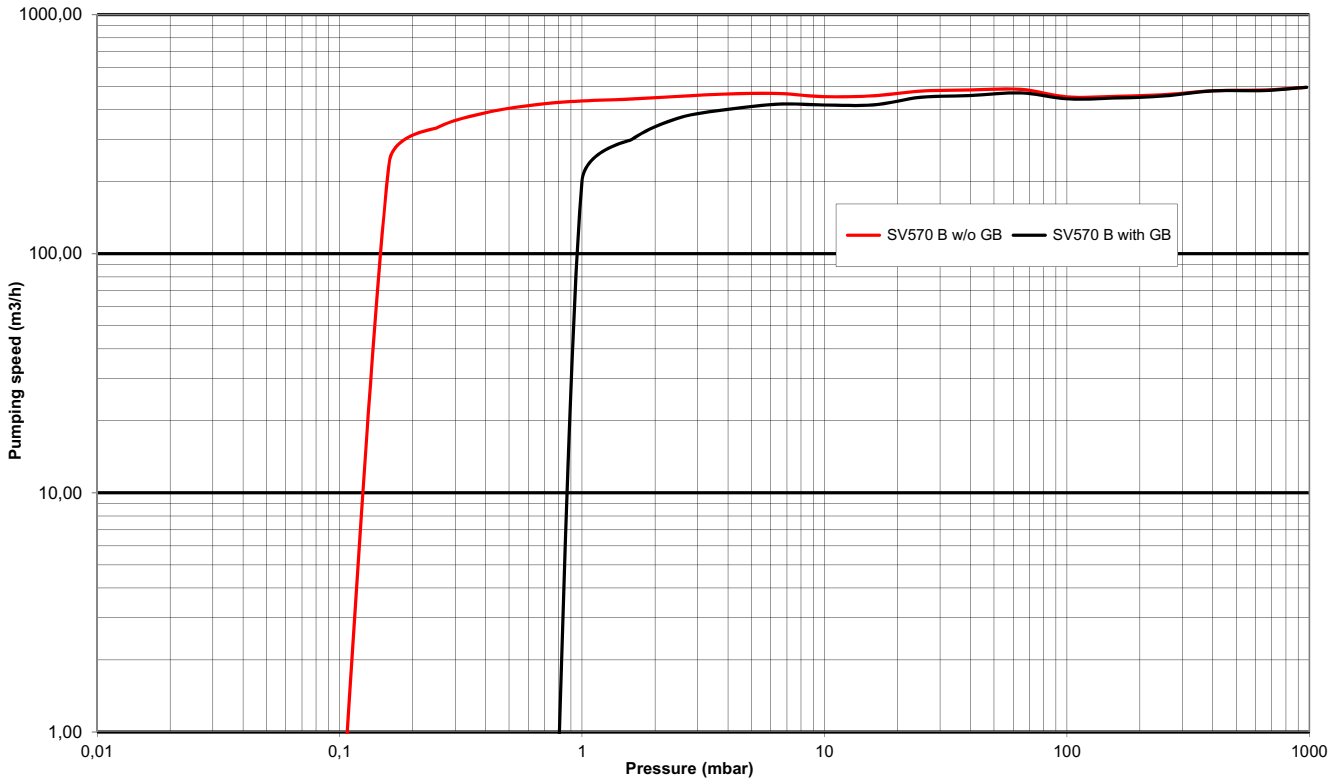
2) operated at the ultimate pressure without gas-ballast, free-field measurement at a distance of 1 m

3) please contact Leybold

4) The US versions have NPT3" flanges

# Description

Pumping speed curve (also for SV470 B at 60 Hz)



EM GB flow Nm<sup>3</sup>/h  
EM GB Durchfluss Nm<sup>3</sup>/h  
Débit LA EM Nm<sup>3</sup>/h

	50 Hz	60 Hz
1 x EM GB	15	15
2 x EM GB	28	28

Manual GB flow Nm<sup>3</sup>/h  
Manueller GB Durchfluss Nm<sup>3</sup>/h  
Débit LA manuel Nm<sup>3</sup>/h

	50Hz	60Hz
1 x manual	20	20
1 x permanent	20	20
2 x GB	38	38

## SV570 BF WATER

Technical data		50 Hz	60 Hz <sup>5)</sup>
Pumping speed <sup>1)</sup>	m <sup>3</sup> . h <sup>-1</sup>	470	470
Ultimate partial pressure without gas ballast <sup>1)</sup>	mbar	≤ 8.10 <sup>-2</sup>	≤ 8.10 <sup>-2</sup>
Ultimate total pressure with 1 gas ballast EM <sup>1)</sup> 24 VDC	mbar	≤ 0,7	≤ 0,7
Ultimate total pressure with 2 gas ballasts EM <sup>1)</sup> 24 VDC	mbar	≤ 2	≤ 2
Water vapour tolerance:	mbar		
■ with 1 gas ballast <sup>3)</sup>		20	20
■ with 2 gas ballasts <sup>3)</sup>		40	40
Water vapour capacity:	kg.h <sup>-1</sup>		
■ with 1 gas ballast <sup>1) 3)</sup>		7,5	7,5
■ with 2 gas ballasts <sup>1) 3)</sup>		13	13
Cooling		H <sub>2</sub> O	H <sub>2</sub> O
Thermostatic valve		Pos 3	Pos 3
Water quality	TH (°F)	4 - 8	4 - 8
Water pressure min./max. see § 3.2 for water consumption	bar	2/8	2/8
Min water flow for 10°C water warming	l/h	800	800
Noise level <sup>2)</sup>	dB (A)	72	72
Type of protection/Isolation		IP 54/F	IP 54/F
Rated rotational speed pump	min <sup>-1</sup>	1000	1000
Weight (with oil filling)	kg	550	550
Oil capacity min./max.	l	20	20
Intake connection <sup>4)</sup>	G3" + WA(U)1001 +WH(U)2500		
Exhaust connection <sup>4)</sup>	G3"		

1) to DIN 28400 and following numbers, with standard gas-ballast

2) operated at the ultimate pressure without gas-ballast, free-field measurement at a distance of 1 m

3) please contact Leybold

4) The US versions have NPT3" flanges

5) Only US versions

# Description

## SV570 B US/AIR (60 Hz) - US version

Technical data		60 Hz
Pumping speed <sup>1)</sup>	cfm	277
Ultimate partial pressure without gas ballast <sup>1)</sup>	Torr	≤ 0.06
Ultimate total pressure with 1 gas ballast standard <sup>1)</sup>	Torr	≤ 0.5
Ultimate total pressure with 2 gas ballasts standard <sup>1)</sup>	Torr	≤ 1.5
Water vapour tolerance:	Torr	
■ with 1 gas ballast <sup>1)</sup>		15
■ with 2 gas ballasts <sup>1)</sup>		30
Water vapour capacity:	qt/hr	
■ with 1 gas ballast <sup>1) 3)</sup>		8
■ with 2 gas ballasts <sup>1) 3)</sup>		14
Noise level <sup>2)</sup>	dB (A)	75
Motor power	hp	15
Type of protection/Isolation		TEFC / F
Rated rotational speed pump	rpm	1000
Weight (with oil filling)	lb	1214
Oil capacity min./max.	qt	21
Intake connection WA(U)1001+WH(U)2500		NPT 3" +
Exhaust connection		NPT 3"

1) to DIN 28400 and following numbers, with standard gas-ballast

2) operated at the ultimate pressure without gas-ballast, free-field measurement at a distance of 1 m

3) please contact Leybold

### Conversion factors

#### Different pressure units

#### Different pumping speed units

	Mbar (millibar)	torr	inches Hg vacuum		m <sup>3</sup> .h <sup>-1</sup>	l.s <sup>-1</sup>	cfm
1 lb = 0.453 kg	1013	760	0	m <sup>3</sup> . h <sup>-1</sup> = m <sup>3</sup> /h	1	0.278	0.589
1 qt = 0.946 l	400	300	18.12				
1 hp = 0.735 kW	133	100	25.98	l.s <sup>-1</sup> = l/s	3.60	1	2.12 l r.p.m.
= 1 min <sup>-1</sup>	4	3	29.80				
1 pouce = 25.4 mm	1	0.75	29.89	cfm (cubic feet per minute)	1.699	0.472	1
	0	0	29.92				

1 atm (atmosphere) = 1013 mbar

1 Pa (pascal) = 0.01 mbar = 10<sup>-2</sup> mbar

1 bar = 1000 mbar

1 torr = 1.33 mbar

Example : 1 m<sup>3</sup>.H<sup>-1</sup> = 0.589 cfm

## SV570 BF US WATER (60 Hz) - US version

Technical data		60 Hz
Pumping speed <sup>1)</sup>	cfm	277
Ultimate partial pressure without gas ballast <sup>1)</sup>	Torr	0.06
Ultimate total pressure with 1 gas ballast EM <sup>1)</sup> 24 VDC	Torr	≤ 0.5
Ultimate total pressure with 2 gas ballasts EM <sup>1)</sup> 24 VDC	Torr	≤ 1.5
Antisuckback valve 24 VDC		OUI
Water vapour tolerance:	Torr	
■ with 1 gas ballast <sup>3)</sup>		15
■ with 2 gas ballasts <sup>3)</sup>		30
Water vapour capacity:	qt/hr	
■ with 1 gas ballast <sup>1) 3)</sup>		8
■ with 2 gas ballasts <sup>1) 3)</sup>		13
Cooling		H2O
Thermostatic valve		Pos 3
Water quality	TH (°F)	4 - 8
Water pressure min./max.	PSI	29/114
Min water flow for 10°C water warming	qt/h	850
Noise level <sup>2)</sup>	dB (A)	72
Motor power	HP	15
Type of protection/Isolation		TEFC / F
Rated rotational speed pump	rpm	1000
Weight (with oil filling)	lb	1440
Oil capacity min./max.	qt	21/24
Intake connection + WH(U)2500		NPT3" + WA(U)1001
Exhaust connection		NPT3"

1) to DIN 28400 and following numbers, with standard gas-ballast

2) operated at the ultimate pressure without gas-ballast, free-field measurement at a distance of 1 m

3) please contact Leybold

# Description

## 1.3 Ordering Information

### SV470 B AIR

Options	960 754 V	960 753 V
Intake connection	G3" + WA(U)1001+WH(U)2500 WA(U)1001+WH(U)2500	G3"+
Exhaust connection	G3"	G3"
Gas ballast	Manual	Manual
Mains voltage	Wide 11/13,2 kW	Europe 9,2/10,5 kW

### SV470 BF WATER

Options	960 758 V	960 757 V
Intake connection	G3" + WA(U)1001+WH(U)2500 WA(U)1001+WH(U)2500	G3" +
Exhaust connection	G3"	G3"
Gas ballast	24 VDC	24 VDC
Mains voltage	Wide 11/13,2 kW	Europe 9,2/10,5 kW



# Description

## SV570 B AIR

Options	960 766 V	960 765 V	960 755 V
Intake connection	G3" +WA(U)1001+WH(U)2500	G3" +WA(U)1001+WH(U)2500	NPT3" +WA(U)1001+WH(U)2500
Exhaust connection	G3"	G3"	NPT3"
Gas ballast	Manual	Manual	Manual
Mains voltage	Wide 11/13,2 kW	Europe 11 kW	USA NEMA 15 hp

## SV570 BF WATER

Options	960 768 V	960 767 V	960 759 V
Intake connection	G3" +WA(U)1001+WH(U)2500	G3" +WA(U)1001+WH(U)2500	NPT3" +WA(U)1001+WH(U)2500
Exhaust connection	G3"	G3"	NPT3"
Gas ballast	24 VDC	24 VDC	24 VDC
Mains voltage	Wide 11/13,2 kW	Europe 11 kW	USA NEMA 15 hp

# Description

<b>Europe</b>	<b>SV470 B(F)</b>		<b>SV570 B(F)</b>	
220 V ±10%, 50 Hz	9,2 kW	34.8 A	11 kW	----
230 V ±10%, 50 Hz	9,2 kW	33.8 A	11 kW	----
240 V ±10%, 50 Hz	9,2 kW	35.9 A	11 kW	----
380 V ±10%, 50 Hz	9,2 kW	20.1 A	11 kW	25.6 A
400 V ±10%, 50 Hz	9,2 kW	19.5 A	11 kW	24.4 A
415 V±10%, 50 Hz	9,2 kW	18.7 A	11 kW	23.7 A
440 V ±10%, 60 Hz	10,5 kW	21.5 A	----	----
460 V ±10%, 60 Hz	10,5 kW	20.7 A	----	----
<b>Wide / Monde / Welt</b>				
200 V +10 % - 15 % , 50 Hz	11 kW	41.6 A	11 kW	52.6 A
220 V ±10%, 50 Hz	11 kW	37.8 A	11 kW	45.6 A
230 V ±10%, 50 Hz	11 kW	36.4 A	11 kW	43.6 A
240 V ±10%, 50 Hz	11 kW	37.6 A	11 kW	42.6 A
380 V ±10%, 50 Hz	11 kW	21.8 A	11 kW	26.3 A
400 V ±10%, 50 Hz	11 kW	21.0 A	11 kW	25.2 A
415 V±10%, 50 Hz	11 kW	21.7 A	11 kW	24.6 A
200 V +10 % - 15 % , 60 Hz	13,2 kW	52.8 A	----	----
220 V ±10%, 60 Hz	13,2 kW	44.7 A	----	----
230 V ±10%, 60 Hz	13,2 kW	42.6 A	----	----
380 V ±10%, 60 Hz	13,2 kW	25.8 A	----	----
400 V ±10%, 60 Hz	13,2 kW	24.6 A	----	----
460 V ±10%, 60 Hz	13,2 kW	22.2 A	----	----
<b>USA NEMA with terminal board avec bornier mit Klemmbrett</b>				
400 V ±10%, 50 Hz	----	----	11 kW	19.0 A
230 V ±10%, 60 Hz	----	----	15 hp	41.2 A
460 V ±10%, 60 Hz	----	----	15 hp	20.6 A

## 1.4 Connection fittings

Item	Description	Dim	Ref.
1	Filter (Paper)		951 70
	Filter (Metal)		711 27 133
	Filter (Active charcoal)		711 27 132
2	Elbow 90°	G3'' M/F	951 62 23V
3	Adaptater	G3'' M - DN90	951 62 21V
4	PVC hose	DN 90	711 18 329
5	Manual valve	G3'' M/F	951 62 25V
6	Flange	G3'' M - 100 ISO K	711 18 127
7	Filter (Paper)	100 ISO K	951 72
	Filter (Metal)	100 ISO K	711 27 167
	Filter (Active charcoal)	100 ISO K	711 27 166
	Filter (Polyester)	100 ISO K	711 27 168
8	Centering ring	100 ISO K	268 06
9	Set of 4 clamps	M10 x 24	267 01
10	Elbow 90°	100 ISO K	887 26
11	Adapter flange	DN 100, DIN 2501	267 50
12	Collar flange	DN 100 - PN 10 - G3''' M	951 62 26V
13	Compensator	DN 100 - PN 10	711 18 342
14	Flange	DN 100 - PN 10 - G3'' F	711 18 370
15	Double nipple	DN 100 - PN 10 - G3'' M	951 62 22V
16	Filter manometer	G 1/2'' M	951 92
17	Venting valve	G 1/2'' M/F	711 30 113
18	O-ring FKM		712 42 892
19	Set of bolts	M 16	714 12 440



# Description

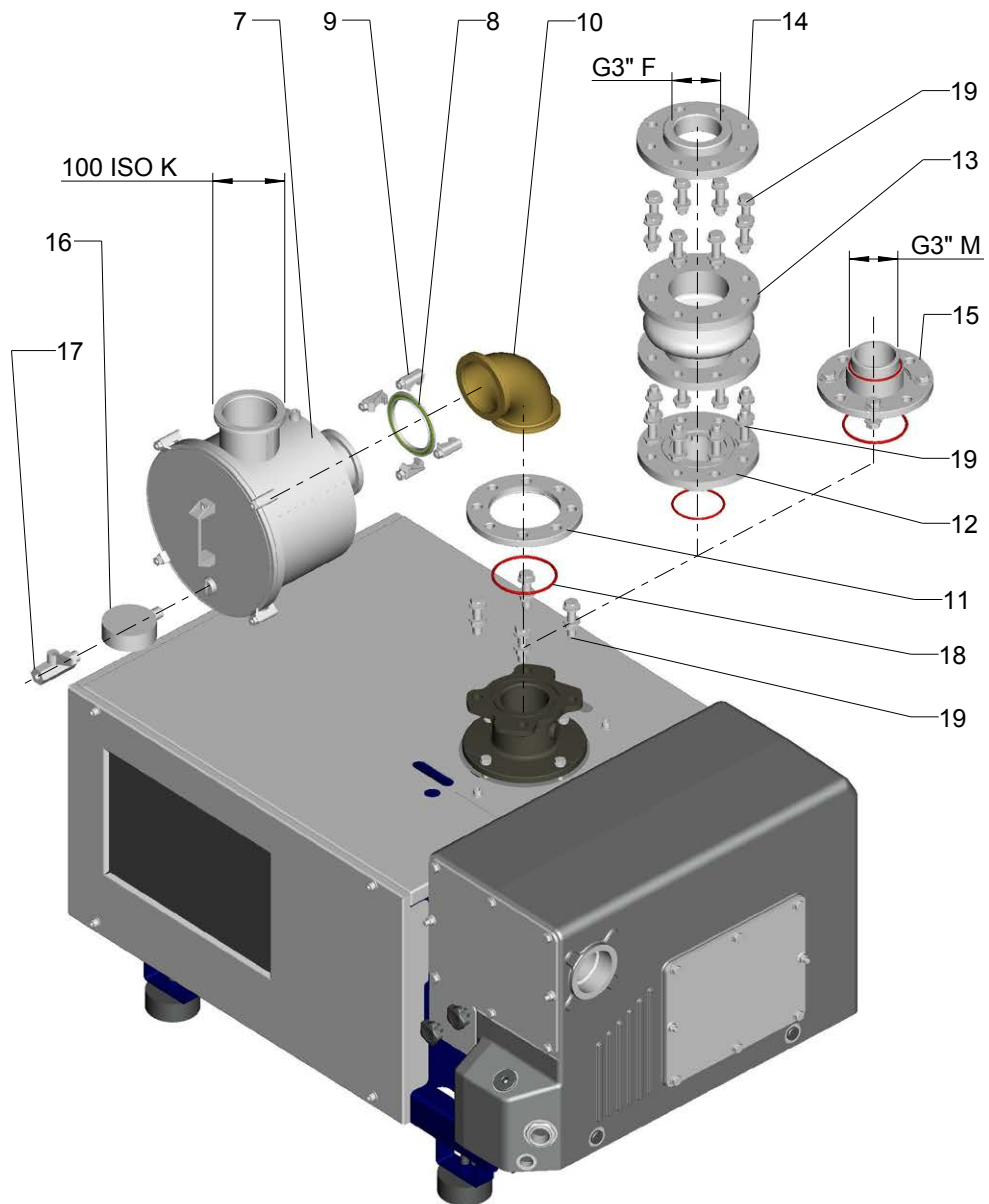


Fig 2

# Description

## 1.5 Accessories

		SV470 B SV570 B	SV 470 BF SV570 BF
		AIR	WATER
Specification		Cat. Nr.	Cat. Nr.
Oil drain tap		Standard	Standard
EM gas ballast kit 971438170	24 V DC	9 714 38 170	
Gas ballast standard	Manuel	9516232 V	9516232 V
Gas ballast	Permanent	9516233 V	9516233 V
Second EM gas ballast	24 V DC	9516234 V	9516234 V
Second gas ballast (manual )		9516235 V	9516235 V
Second permanent gas ballast		9516236 V	9516236 V
Exhaust filter gauge (manometer)		951 94	951 94
Oil level monitor		9516252 V	9516252 V
Oil level monitor type Schlemmer		9516253 V + 9516257 V	
Thermal switch 115° C	Standard	9516251 V	9516251 V
PT100		9516255 V	9516255 V
Oil filter by-pass		712 36 390	712 36 390
Exhaust filter over pressure switch		712 22 360	712 22 360

Operation of pump is insured with accessories of Leybold: mounting any other accessory will engage the responsibility of user concerning operation of pump.

Item Position	Description Beschreibung	Fixation Befestigung	Change possible by Montage durch / par
1	Electrical accessory connector Elektrisches Zubehör Stecker Connecteur accessoires électriques	By hand Bei Hand manuelle	Customer Kunde Client
2	Thermal switch Thermoschalter Sécurité thermique	Heat-conducting paste Wärmepaste Pâte conductrice	Customer Kunde Client
3	PT100	Heat-conducting paste Wärmepaste Pâte conductrice	Customer Kunde Client
4	Exhaust filter overpressure switch AFE Überdruckschalter Pressostat cartouches anti aérosols	Loctite® 572	Customer Kunde Client
5	Rear EM GB 24 V DC Hinterer EM GB 24 V DC Lest d'air arrière EM 24 V DC	Loctite® 577	<b>Leybold Service</b>
6	Front EM GB 24 V DC Vorderer EM GB 24 V DC Lest d'air avant EM 24 V DC	Loctite® 577	<b>Leybold Service</b>
7	Oil level switch Ölpegelschalter Détecteur de niveau d'huile	Loctite® 572	Customer Kunde Client
8	Hydraulic anti suck back valve Hydraulisches Saugstutzenventil Clapet anti-retour hydraulique	Loctite® 577	<b>Leybold Service</b>
9	EM 24 V DC anti suck back valve EM 24 V DC Saugstutzenventil Clapet anti-retour EM 24 V DC	Loctite® 577	<b>Leybold Service</b>

see Fig 3.

# Description

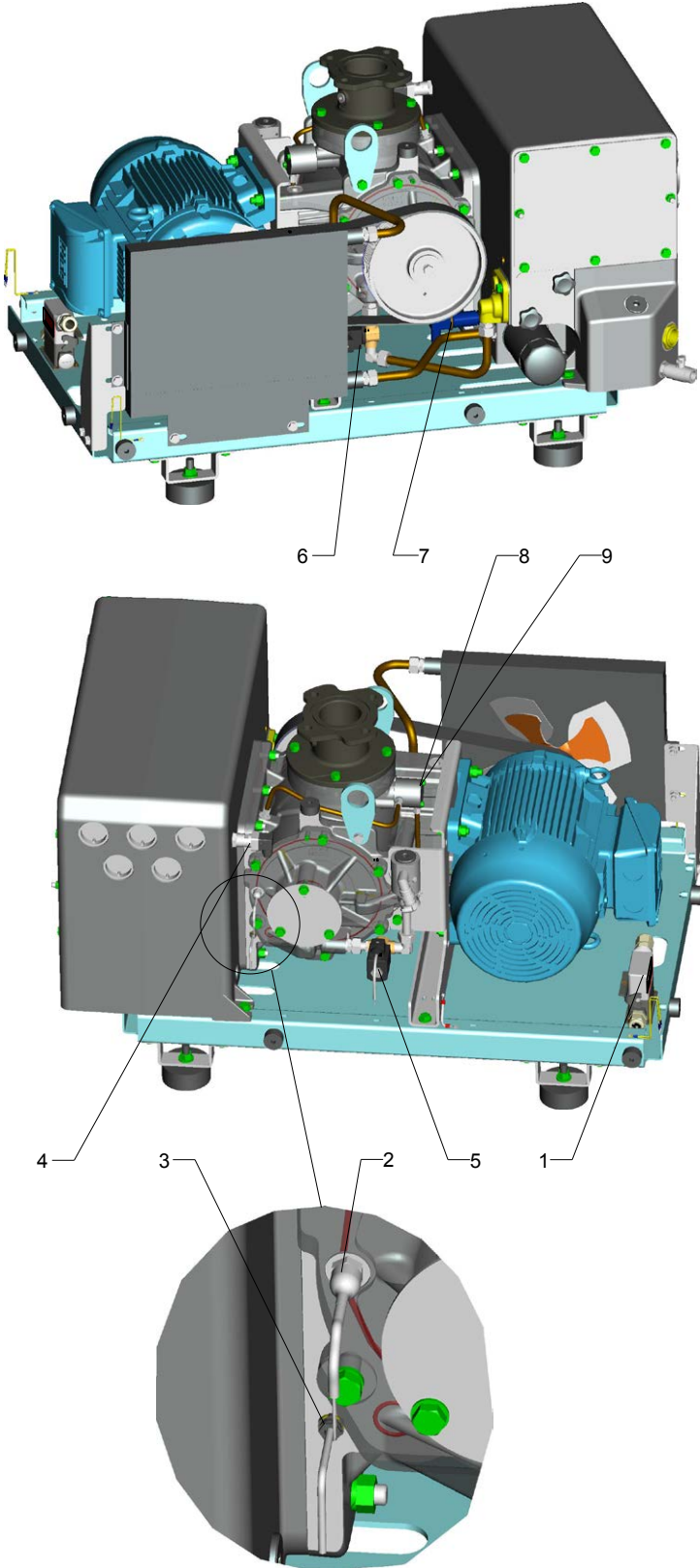


Fig 3

# Description

## 1.7 Spare parts

<b>470 B / 570 B</b>		
<b>Specification</b>		<b>P/N</b>
Oil filter standard		714 05 310
Exhaust filter (Quantity per pump)		9 714 31 120 5
Set of seals	FPM	EK 971474010
Repair set		EK 971474020
Module kit		EK 6700666
Service kit Maintenance		EK 971474000

## 1.8 Lubricants

The SOGEVAC® pumps should be run with mineral oils for vacuum pumps with low viscosity according to ISO category VG77. The Leybold oil fulfills these specifications.

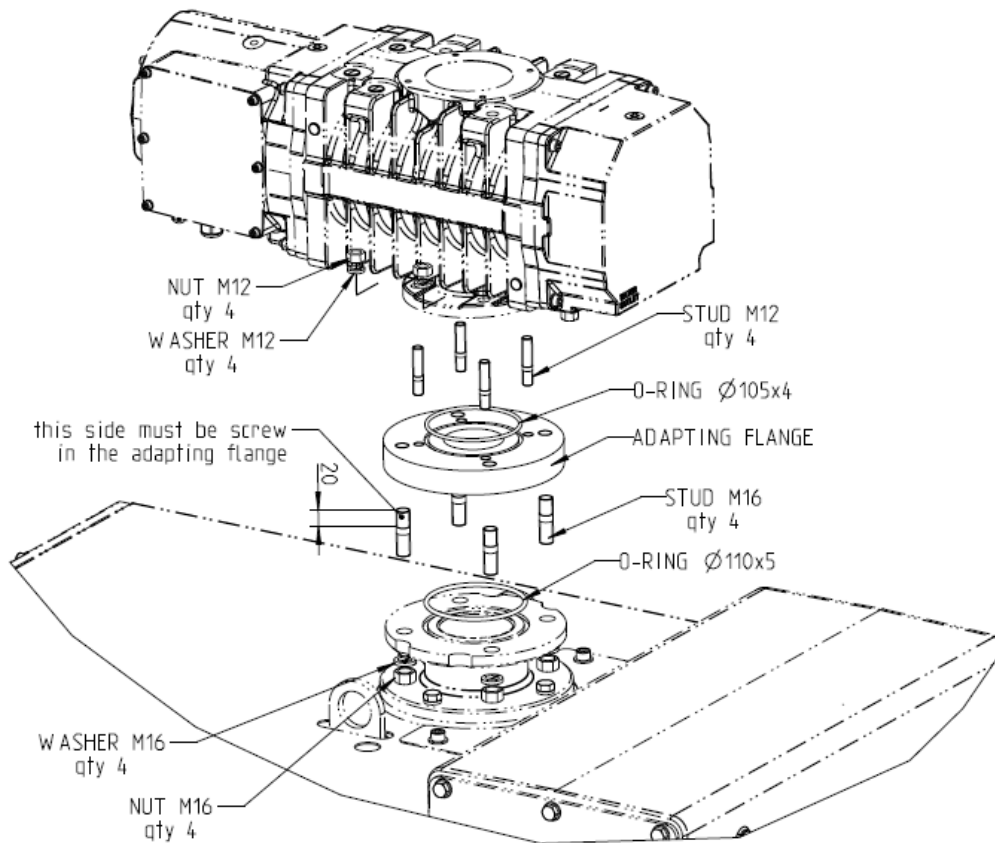
<b>LV0130 Oil :</b>	<b>Conditioning</b>	<b>Reference</b>
	20 l	711 17 775 / L13020
	200 l	711 17 779 / L13099

You may use other special lubricants adapted to the applications. Please consult us.

The indicated technical data is valid with the above oil type. Other oils may be used, but can change the ultimate pressure or pump noise level.



## 1.9 Roots adapter



During all disassembly/ assembly work ensure that the mains supply has been reliably disconnected & secured.

All electrical work must only be carried out by trained electricians in accordance with IEC60204-1 guidelines.

Transportation: the lifting lugs at the roots must not be used for lifting the pump combination. There is a risk of severe injury !

For transportation, the Sogevac SV470-570 B(F) and the Roots pump must, for safety reasons, be separated from each other and reassembled at the new site of operation.

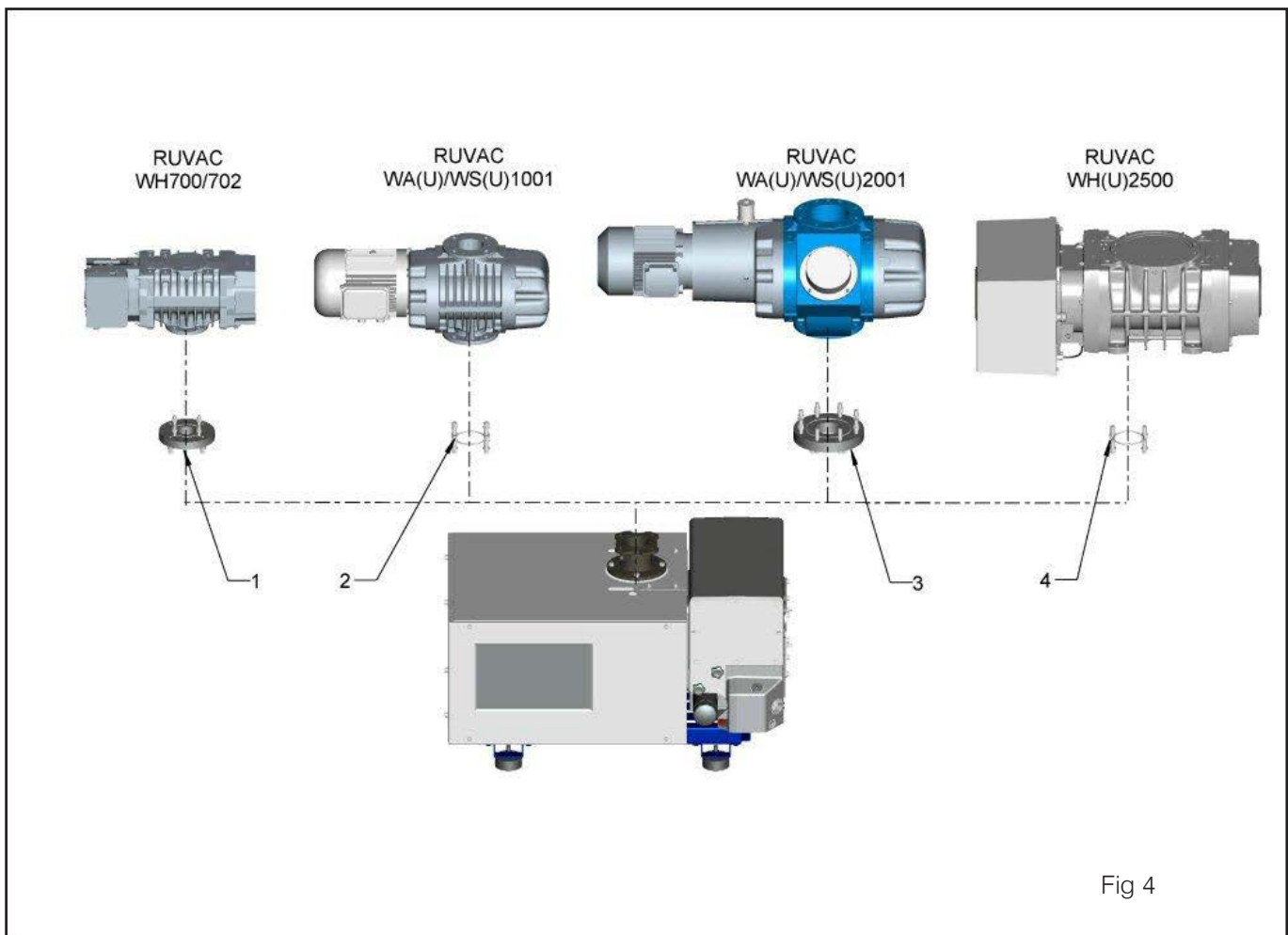
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### Warning



# Description

Item	Description	Ref.
1	Kit mounting Roots Ruvac 700	951 62 41V
2	Kit mounting Roots Ruvac 1001	951 62 42V
3	Kit mounting Roots Ruvac 2001	951 62 43V
4	Kit mounting Roots Ruvac 2500	951 62 44V



# Transport and Storing

## 2 Transport and Storing

### 2.1 Transport and packaging

SOGEVAC® vacuum pumps pass a rigorous operating test in our factory and are packaged to avoid transport damages.

Please check packaging on delivery for transport damages.

Packing materials should be disposed off according to environmental laws or re-cycled. These operating instructions are part of the consignment.

The connection ports are blanked off by plastic protective caps or self-adhesives. Take these caps or self-adhesives away before turning on the pump.

The pumps have the oil filled in.

### 2.2 Mounting orientation

See required space on drawings in paragraph 1.2.

Pumps which have been filled with oil must only be moved in the upright position (horizontally). Otherwise oil may escape. The angle of slope may not be over 10° max. Avoid any other orientations while moving the pump.

Only use the lifting lugs which are provided on the pump to lift the pump with the specified lifting devices.

Make sure that these have been installed safety. Use suitable lifting equipment. Make sure that all safety regulations are observed.

Use only lifting devices appropriated to the pump weight. Check name plate. Do not use other pump elements than the lifting lugs as handles.

### 2.3 Storage

Before stocking the pump for a long time put it back in its original condition (blank off inlet and exhaust ports with the shipping seals, drain the oil) and store the pump in a dry place at room temperature.

Until the pump is put back in to service again, the pump should be stored in a dry place, preferably at room temperature (20 °C - 168 °F). Before taking the pump out of service, it should be properly disconnected from the vacuum system, purged with dry nitrogen and the oil should be exchange too. Drain the water from the cooling circuit (See § 3.2). The gas ballast must be closed and if the pump is to be shelved for a longer period of time is should be sealed in a plastic bag together with a desiccant (Silicagel).

If the pump has been shelved for over one year, standard maintenance must be done and the oil must be exchanged too before the pump is put in to service once more.

We recommend that you contact the service from Leybold.

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### Caution

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# Installation

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## Warning



## 3 Installation

It is essential to observe the following instructions step by step to ensure safe start-up. Start-up may only be conducted by trained specialists.

The standard pump is not suitable for installation in explosion hazard areas ATEX. Please contact us, if you are planning such an application. Before installing the pump you must reliably disconnect it from the electrical power supply and prevent the pump from running up inadvertently.

Observe all safety regulations.

### 3.1 Installation

The SOGEVAC®s can be set up on any flat, horizontal surface. Under the four feet, there are metric threaded holes M16x14 (prof.) for securing the pump.

The oil level cannot be read properly if the pump is tilted and lubrication may be affected.

The pump's ambient temperature should be between 12°C (55°F) and 40°C (104°F). By modifying the pump or changing the oil type, the pump can be run at a other ambient temperature. Please consult us.

To ensure adequate cooling of the pump, leave enough space at the air intake and exhaust points, and for access and maintenance (see Fig. 1-2-3).

Make sure to keep the pump and air intake of the motor clean.

### 3.2 Connection to system

The standard pump is not suitable for installation in explosion hazard areas ATEX. Please contact us, when you are planning such an application.

#### Intake Side

- Pump should be connected to inlet line without any tension. Use flex lines or pipe unions in your inlet and exhaust lines so that they can be easily removed for pump maintenance.
- The maximum pressure at the inlet may not exceed atmospheric pressure (about 1013 mbar). Never operate the pump in the presence of over pressures at its intake.
- Type of materials used for mounting of pipings should take care of pumped gases. It is the same for its tightness.

Using suitable connecting elements (see § 1.4) the pump can be connected to the vacuum system / Roots blowers.

The cross-section of the intake line should be at least the same as the one for the intake port. If the intake line is too narrow, it reduces the pumping speed.

If the process gas contains dust, it is absolutely essential to install a dust filter in addition to the dirt trap supplied (see §1.4).

We recommend to install the dust filter horizontally. This ensures that when removing the filter no particles fall into the intake port.

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## Caution

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## Caution

When pumping vapors, we recommend installing condensate traps on the intake and exhaust sides

The intake must be installed in such a way to avoid condensates flowing into the pump.

## **Exhaust Side**

The SOGEVAC® pumps have integrated exhaust filters which, even at a high gas throughput, trap the oil mist and guarantee exhaust gas free of oil mist. If the exhaust filters are clogged, the by pass opens at 1.5 bar, (absolute pressure), and the filters are bypassed. As a result, the proportion of oil in the exhaust gas as well as the pump's oil consumption will rise. Installing new exhaust filters will correct this problem. (See § 5.4).

Check in the individual case whether an line is necessary and/or prescribed. Volatile substances will pass through the filter. Depending on the process gas, we recommend connecting an exhaust line ; this is always necessary when the exhaust gases are dangerous.

The maximum exhaust pressure must neither exceed 1.15 bar absolute (0.15 bar relative), nor fall under atmosphere pressure minus 15 mbar.

## **Corresponding pressure regulating devices to be installed by the user.**

### **Exhaust flanges**

The diameter of the exhaust line should be at least Ø 90 mm. If the exhaust line is too narrow, overpressure or overheating may occur in the pump.

Before installing the exhaust line, remove the exhaust-flange plate and ensure that the exhaust demister(s) are secured tightly in place. They sometimes loosen during shipping and installation. A loose demister results in exhaust smoke during start-up and operation. Install the exhaust line with a downward slope to prevent condensate from flowing back into the pump. If this is not possible, we strongly recommend installing a condensate trap.

Never operate the pump with a blocked or restricted exhaust line. Before start-up, ensure that any blinds or similar shut-off devices in the exhaust line on the pressure side are opened and that the exhaust line is not obstructed.

Exhaust pipe material must be resistant to pumped gases.

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### **Note**

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# Installation

## Caution

### Water cooling

The SOGEVAC® pumps are equipped in standard for the SV470 BF & SV570 BF with a water cooling system and a thermostatic valve. Depending on the local regulations, the cooling water needed may not be taken from the drinking water mains and max. water temperatures must be observed. The water cooling connection is made by a connection.

The thermostatic valve regulates the cooling water throughput, and so the pump temperature. The valve is set in standard on position 3.

Normally, the thermostatic valve should be set somewhere in the range from 3 to 5. Thermostat setting 3 (valve fully open) produces a low operating temperature of the pump, and setting 5 a high one. Pumping on vapors requires setting on position 4 or 5.

This setting increases the pump temperature and can degrade the ultimate pressure.

## Water cooling

Max. cooling water temperature : 30°C (86°F)

Min Water flow : 800 l/h

Pressure : 2 to 8 bar

	TH (°f)	0°	4°	8°	12°	20°
Water quality		Corrosion (water too soft)		Service area		Incrusting water (deposit of scale)
Carbonat content	PPm	0	30	90	160	300
		Corrosion (water too soft)		Service area	Incrusting water	Very incrusting water
	PH	0	5	7,5		
		Corrosion (water too soft)		Service area	Incrusting water	

Do not use deionised cooling water.

To clean the heat exchanger : it is recommended to clean at least twice a year the water circuit.

For that, dismantle the exchanger from the pump. Chemical cleaning is the most efficient, with dilute hydrochloric acid solution (5 to 10%) then neutralize with hexamethylethyrene tetramine at 0.2 %. For a 1 mm coat of scale, leave acting the acid during about 30 min.

The system must be open during the operations, so the product gases can escape. Rinse copiously with water after neutralization.

Proceed in an open and well ventilated place.

Observe the safety regulations given by the manufacturer of the product you are using.

Observe the regulations for the treatment and the disposal of chemical products.

Observe the relevant environmental regulations.

Drain the water-cooling circuit (before transport, long time storage, winter time).

## Warning



Remove the cover Item ET2 / 32 and place a water recovery pan under the heat exchanger and unscrew the plug.

The heat exchanger water will drain.

To drain completely the heat exchanger:

- Remove the water outlet hose and close the water outlet with a plug.
- Remove the water inlet hose
- Connect a compressed air supply in place of plug and blow.

Attention, water will be evacuated through the water inlet connection.

Reassemble in the reverse sequence.

### 3.3 Electrical connections

Ensure that incoming power to the pump is off before wiring the motor or altering the wiring.

See motor nameplate and pump nameplate.

Electrical connection work must only be carried out by a qualified electrician in accordance with the applicable safety rules, see IEC 60204-1 & 61010-1.

Connect the pump's motor to the right supply voltage via the connections in the junction box (see § 1.3). The relevant safety rules require the use of a suitable motor protection switch. Set the switch in accordance with the rating on the motor nameplate.

If any security switch or electrical defect cuts out the pump, re-start-up of the pump has to be possible only manually.

#### Motor protection device

To protect the motor windings against a variety of operational malfunctions, the motors of pumps are fitted with protection devices.

PTC thermistors to IEC 60034-1 and DIN 44081/440823 are temperature - dependent, semi-conductor devices embedded in the motor windings.

#### Working principle

Non-linear variable resistors. It is recommended to connect them to the control circuit. PTC thermistors ensure a good protection against the overheating of the motor.

The pump is designed for direct starting even under load conditions, i.e. the pump can be switched on against vacuum in the intake port.

After connecting the motor and after every time you alter the wiring, check the direction of rotation. Refer to the marking on the motor. During the check, the intake port should be open. If the direction of rotation is wrong, oil may be ejected out the intake port. (The vacuum system may be pressurised).

For the check, switch on the motor briefly. If it starts up with the wrong direction of rotation, switch it off immediately and interchange two phases of the connection. It is recommendable to check the direction of rotation with a phase sequence indicator.

**Prolonged running of the motor in the wrong direction of rotation will damage the pump !**

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#### Warning



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#### Warning



# Installation

## Note

### Oil thermal Switch

Connection has to be made in the junction box (see Fig 5).

Breaking power on resistive circuit 25 VAC or 60 V DC max.

To be serial wired with the coil of motor's contactor. Use an auxiliary relay. The pump is switched off once a certain oil temperature (115 °C/239 °F) is exceeded. It is also possible to connect an alarm system. (see Fig 5).

We draw your attention on the fact that a prolonged use in the wrong rotation direction provokes damages in the pump.

### Particularities SV470 BF / SV570 BF

The pump is in standard equipped with options which have to be connected before starting up the pump.

### Gas Ballast (EM Valve)

Normally closed (Power supply 24 V DC  $\pm$ 10%), 16 W

To be wired in connection box (see fig. 5).

### Electromagnetic valve (antisuck-back valve) - option

Normally open.

To be supplied in 24 V DC 8 W as soon as the pump starts. Shut down power supply as the pump stops.

If several pumps with EM antisuck-back valves are operated in parallel, there is a risk in case of V belt failure that the pump oil is sucked out. This can be prevented by using a valve on the intake port controlled by a motor cos phi controlling device.

## ACCESSORIES CONNECTION

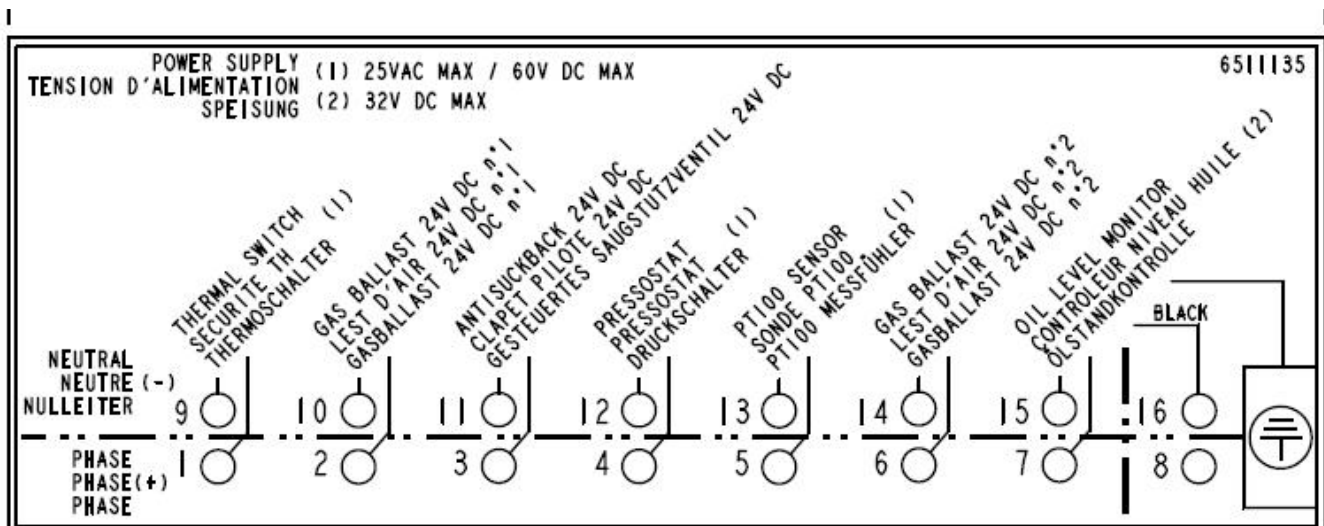


Fig 5



Accessory	Pin	Switching capacity	Power supply	Remark
Thermal switch	9&1	10 A ; 250 V AC		
EM Gas ballast 1	10&2	---	24 V DC +/- 10% ; 16 W	
EM Anti suckback valve	11&3	---	24 V DC +/- 10% ; 8 W	
Exhaust filter switch	12&4	5 A ; 60 V DC	---	
PT100	13&5	---	PT100 module	
EM Gas ballast 2	14&6	---	24 V DC +/- 10% ; 16W	
Oil level switch	15&7	2 W	18 - 32 V DC ; 10 mA	P/N 9516253V
Oil level switch	15&7	0.25 A	10 - 35 V DC	P/N 9516252V

### Option : Oil level monitor

To be serial wired with the coil of motor's contactor (the pump stops in case of missing oil). See Fig 5.

You must use imperatively an auxiliary relay.

### 3.4 Start-up

The pumps are supplied with the necessary oil filling in ready-to-use condition. Always verify proper oil level before operating the pump.

The pump is designed for fail-safe start-up at temperatures over 12°C (55°F) (as per PNEUROP).

If local regulations provide a WYE-DELTA starting connect the pump to the system so that it can start loadfree, i.e. at atmospheric pressure in the intake port. If the vacuum system is not to be vented further measures will be necessary, e.g. a starting valve can be mounted. Please contact us in this case.

The signals of the oil level switch and exhaust filter over pressure switch must be delayed (timer) on the pump switch-on for approx. 1 minute.

The pump SV470 BF / SV570 BF is equipped with :

- Electromagnetic gas ballast valve 24 V DC. Connection has to be made on junction box (see Fig 5).

# Operation

## 4 Operation

### 4.1 Operation

To avoid overloading the motor, do not start the pump more than 6 times within one hour.

If more than 6 starts per hour are necessary keep the pump running and mount a valve which opens and closes into the intake line.

Take note of warning labels on the pump.

Use ear protection in case of operation at high inlet pressures.

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#### Warning



#### Pumping of non-condensable gases

If the pump system contains mainly non condensable gases, the pump should be operated without gas ballast.

If the composition of the gases to be pumped is not known and if condensation in the pump cannot be ruled out, run the pump with gas ballast

valve open in accordance with section below.

#### Pumping of condensable gases and vapors

With the gas ballast valve open and at operating temperature, the SOGEVAC® can pump pure water vapor up to the values indicated in the Technical Data.

The gas ballast valve is opened by a screwdriver. The running noise of the pump is slightly louder if the gas ballast valve is open. Before pumping vapors, ensure that the pump has warmed up for approx. 30 min. with closed intake line and with open gas ballast valve.

Don't open the pump to condensable vapors until it has warmed to operating temperature ; pumping process gas with a cold pump results in vapors condensing in the oil.

For processes with a high proportion of condensable vapors, the intake line should be opened only slowly after reaching the operating temperature.

One sign of condensation of vapors in the pump is a rise of the oil level during operation of the pump.

When vapors are pumped, the pump must not be switched off immediately after completion of the process because the condensate dissolved in the pump oil may cause changes or corrosion. To prevent this, the pump must continue to operate with open gas ballast valve and closed intake port until the oil is free of condensate. We recommend operating the pump in this mode for at least 30 min. after completion of the process.

In cycle operation, the pump should not be switched off between the cycles but should continue to run with gas ballast valve open and intake port closed (if possible via a valve). Power consumption is minimal when the pump is operating at ultimate pressure.

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#### Caution

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#### Note

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Once all vapors have been pumped off from a process (e. g. during drying), the gas ballast valve can be closed in order to improve the ultimate pressure.

## 4.2 Switching off / Shutdown

The intake port of the SOGEVAC® contains an anti-suckback valve which closes the intake port when the pump is switched off, thus maintaining the vacuum in the connected apparatus and preventing oil from being sucked back into the apparatus. The valve's functioning is not impaired by gas ballast operation.

If the pump has to be shutdown, drain the oil flush out the pump with fresh oil and fill in the required amount of clean oil (see § 5.4). Close the connection ports. Special preservation or flushing oils do not need to be used.

When the pump has been switched off due to over heating, initiated by the motor or its temperature detector, the pump must be cooled down to the ambient temperature, and must only be switched on again manually after having eliminated the cause.

In order to prevent the pump from running up unexpectedly after a mains power failure, the pump must be integrated in to the control system in such a way that the pump can only be started by a manually operated switch. This applies equally to emergency cut-off switches.

In case of switching processes in connection with a pump which has warmed up under operation conditions, the pump must then not be directly switched on again.

## 4.3 Ultimate pump pressure

If the values specified in the Technical Data are not reached in the apparatus, measure the ultimate pressure directly at the pump's intake port after disconnecting the pump from the apparatus.

The ultimate pressure of non-condensable gases (partial pressure of air) can only be measured with a compression vacuum gauge or a partial pressure gauge. Precise measurements can only be obtained with calibrated instruments.

Upon initial start-up, after prolonged idle periods or after an oil change, it takes a while until the pump reaches the specified ultimate pressure. The pump has to attain its operating temperature, and the pump oil has to be degassed. We recommend operating the pump initially with the gas ballast valve open.

# Maintenance

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**Warning**

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**Caution**

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The ultimate pressure depends on the pump temperature and the pump oil used. The best ultimate pressures can be obtained at a low pump temperature and by using the recommended oil types.

## 5 Maintenance

### 5.1 Safety Information

Observe all safety regulations.

All work must be done by suitably trained personnel. Maintenance or repairs carried out incorrectly will affect the life and performance of the pump and may cause problems when filling warranty claims.

Never mount used seals ; always mount new seals.

Check after every intervention that the pump is in good condition and that all covers are mounted correctly.

### 5.2 Maintenance Intervals

The intervals stated in the maintenance schedule are approximate values for normal pump operation. Unfavourable ambient conditions and/or aggressive media may significantly reduce the maintenance intervals.

Maintenance job	Frequency	Section
Check the oil level	Daily	<b>A</b>
Check the oil condition	Depends on process	<b>B</b>
1st oil change	After 150 h of operation	<b>C</b>
Subsequent oil changes	Every 2000 h or 6 months (depending on application)	<b>C</b>
Replace the oil filter	At each oil change	<b>C</b>
Replace the exhaust filter d'échappement	If oil mist at exhaust or annually	<b>D</b>
Clean the dirt trap	Monthly	<b>E</b>
Check the anti-suckback valve	Annually	<b>F</b>
Clean oil cooler	Annually	
Clean filter of gasballast	Monthly	<b>G</b>
Checking the float valve	When changing the exhaust filters	<b>H</b>
Replacing the exhaust valves	*	<b>I</b>
Replacing the pump module	*	<b>J</b>
Disassembling and reassembling the pump module	*	<b>K</b>
Control belt	Annually	<b>L</b>

\* in case of specific pump servicing

To simplify the maintenance work we recommend combining several jobs.

## 5.3 Leybold Service

Whenever you send us in equipment, indicate whether the equipment is contaminated or is free of substances which could pose a health hazard. If it is contaminated, specify exactly which substances are involved. You must use the form we have prepared for this purpose.

A copy of the form has been reproduced at the end of these Operating Instructions: "Declaration of Contamination for Compressors, Vacuum Pumps and Components". Another suitable form is available from [www.leybold.com](http://www.leybold.com) → Documentation → Download Documents.

Attach the form to the equipment or enclose it with the equipment.

This statement detailing the type of contamination is required to satisfy legal requirements and for the protection of our employees.

We must return to the sender any equipment which is not accompanied by a contamination statement.

The pump must be packaged in such a way that it will not be damaged during shipping, and so that no harmful substances can escape from the package.

When disposing of used oil, please observe the relevant environmental regulations.

## 5.4 Maintenance Work

### Checking the oil

#### A. Oil level

The pump's oil level during operation must always be between the middle and top edge of the oil-level glass. When necessary, switch off the pump and add the correct quantity of oil.

High oil consumption often indicates that exhaust filters are clogged (See 5.4 - D).

The oil level should be checked at least once a day.

#### B. Oil Condition

Normally the oil is clear and transparent. If the oil darkens, it should be changed.

If gases or liquids are dissolved in the oil, the result is a deterioration of the ultimate pressure, the oil can be degassed by allowing the pump to run for about 30 min. with the intake port closed and the gas ballast valve open.

To check if oil should be changed, drain some oil via the oil-drain plug (ET 3/37) into a beaker or similar container with the pump switched off but still at operating temperature.

Depending on the process involved, dangerous substances may escape from the pump and oil. Take the appropriate precautions.

**Observe the safety regulations.**

## Contamination

## Form

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## Caution

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# Maintenance

## C. Oil Change, Replacing the Oil Filter (if installed)

Tool required :

- oil filter key (Ref. No. 710 73 532)

Always change the oil when the pump is switched off but still at working temperature.

If there is a risk of the oil being polymerized by the connected process, change the oil immediately after operation of the pump.

Pump when operating is hot and some surfaces could reach a temperature higher than 80° C (176 °F).

There is a risk of burn by touching. Take note of the warning labels on the pump.

Open the oil-drain valve (ET 3/37) and let the used oil drain into a suitable container.

### Observe the safety regulations.

When the flow of oil slows down, close the oil drain valve, briefly switch on the pump (max. 10s) and switch if off. Remove the oil drain plug again and drain the remaining oil.

Unscrew the oil filter. Take a new oil filter, moisten its gasket with oil and screw it in manually.

Unscrew the oil-fill plug (ET 3/34) and fill the pump with fresh oil up to the bottom edge of the oil level glass, run the pump for a short time and then change the oil again.

In case of heavy pollution, remove the lateral oil casing access panel to clean the oil sump. Wear protective gear.

Use suitable oil only (see Section 1.8).

Depending on the process involved dangerous substances may escape from the pump and oil. Take the appropriate precautions.

### Observe the safety regulations.

Never mount used seals. Always mount new seals.

When disposing of used oil please observe the relevant environmental regulations !

Clean any oil which is on the floor !  
Check regularly that no oil is on the floor !

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### Warning



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### Caution

### Warning



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### Note

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### Caution

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## D. Replacing the exhaust filters and checking the by-pass

Tools required :

- tubular box wrench 16 mm.

When the exhaust filter elements are clogged, the integrated by-pass opens and the filters are bypassed. Oil mist at the exhaust, and/or high oil consumption are signs that the exhaust filters are clogged.

The exhaust filters must be replaced more often if subjected to increased oil cracking products at high operating temperatures and/or aggressive media.

Remove the cover with gasket. Remove the exhaust deflector by unscrewing the bolt.

Remove both demister support units by unscrewing the nuts.

The exhaust filters can be removed individually.

Check also the float valve. See § 5.4 - H.

Plug new exhaust filters into the oil casing.

Insert carefully the demister support units over the new exhaust filters threaded bars (M6) and compress slightly the demister springs.

Tighten the demister support units with the 4 nuts and the exhaust deflector. If necessary mount a new seal and mount the exhaust plate.

When disposing of used oil please observe the relevant environmental regulations !

## E. Cleaning the dirt trap

Tools required :

- Open-jaw or box wrenches 18 mm or 17 mm.

A wire-mesh filter is located in the pump's intake port to act as a dirt trap for impurities. It should be kept clean at all times in order to avoid reduction of the pumping capacity.

For this purpose, disconnect the intake line and remove the flange by the 4 screws, remove the dirt trap from the intake port and rinse it in a suitable vessel using a solvent. Then dry it with compressed air. If the dirt trap is defective, replace it.

The cleaning intervals depend on requirements. If large amounts of abrasive materials occur, a dust filter should be fitted into the intake line (see § 1.4).

Never mount used seals ; always mount new seals.

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### Note

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### Caution

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## F. Checking the anti suckback valve

### SV470 B Standard version - SV570 B

Tools required :

- Tubular box wrench 18 or 19 mm.

First remove the intake line and the intake flange.

Remove the 4 screws and take off the intake port.

Remove the anti-suckback valve (ET 4/40) and the spring. Clean all parts and check that they are in perfect condition ; if not, replace them.

The top edge of the valve should be about 7 mm away from the top side of the intake port.

Reassemble in the reverse order.

Never mount used seals ; always mount new seals.

## G. Cleaning the gas ballast intake filter

When the pump operates with open gas ballast valve, clean the filter once a month.

Release the clips on the gas ballast filter. Clean the filter (ET 1/45) using a suitable solvent. Then dry it. Reassemble in the reverse sequence.

## H. Checking the float Valve

Tools required :

- Tubular box wrench SW16.

If the pressure does not fall below approx. 5 mbar (4 Torr) during pump operation, check the tightness of the float valve (ET 3/33).

Remove the exhaust filter cover by unscrewing the nuts and remove the seal.

Remove the exhaust deflector by unscrewing the bolt and remove the exhaust filters - see § D.

Remove the screw and washer and pull out the float valve.

Take off the gasket, clean the nozzle, check the tightness of the float valve and the good state of the O-ring and valve body.

Reassemble the float-valve in reverse sequence. The float valve must move upwards freely.

Tighten the demister support units and the exhaust deflector. If necessary mount a new seal and mount the cover.

Depending on the process involved, dangerous substances may escape from the pump and oil. Take the appropriate precautions.

Wear adequate protection gear.



## I. Replacing the exhaust valves

Required tools:

- Tubular box wrench SW16, 17, 18, 19 mm and allen key 8 mm

Remove the lateral oil casing cover and the gasket.

By removing the nuts, it is possible to dismount the valve stop and valve plates (ET 4/3).

Replace these elements and clean them if required.

Check the right contact of the exhaust valves on the generator with a lamp and screwdriver.

Reassemble the valve stop and valve plates in reverse sequence.

The 2 valves with large fingers are mounted on the bottom, the 2 ones with the narrow fingers on top.

Depending on the process involved, dangerous substances may escape from the pump and oil. Take the appropriate precautions.

### Observe the safety regulations.

Never mount used seals ; always mount new seals.

When disposing of used oil please observe the relevant environmental regulations !

## J. Replacing the pump module

**Disconnect & secure the electrical power supply.**

**Remove the hoods, untighten the vacuum generator – oil casing liaison, drain the oil (see § C) and remove the belt, motor, oil pipes and motor & generator support frame.**

**Replace the generator and reassemble in reverse order. Refill with oil (see § A).**

Depending on the process involved, dangerous substances may escape from the pump and oil. Take the appropriate precautions.

### Observe the safety regulations.

Never mount used seals ; always mount new seals.

When disposing of used oil please observe the relevant environmental regulations !

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### Warning



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### Note

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### Warning



# Maintenance

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## Warning



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## Note

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### K. Disassembling and reassembling the pump module

Consult Leybold.

Depending on the process involved, dangerous substances may escape from the pump and oil. Take the appropriate precautions.

#### Observe the safety regulations.

Never mount used seals ; always mount new seals.

When disposing of used oil please observe the relevant environmental regulations !

### L. Checking and tightening the belt

Tools required :

- Key 19 and 24.

In normal operating conditions, the belt has a lifetime of 30'000 hours. Wear characterizes by slip, abnormal wear or cracks.

In case of wear, the correct alignment of the pulleys has to be checked. Tolerance  $\pm 1,3$  mm.

A dismantled belt has to be replaced with a new one.

Take off the hood (ET 1/31 or 32).

Loosen the nuts (66) and (23) x 2.

Remove the V belt.

Reassemble in reverse sequence.

### M. Lubricating the bearings

The SOGEVAC® are equipped with separate grease-lubricated bearings. In normal operation the permanent-lubricated bearings are provided for 30 000 hours of maintenance-free operation.

With increased thermal load, i. e. continuous operation at high intake pressures, gas ballast operation, it is advisable to check the bearings at shorter intervals. To do so, remove the rear and front covers (97 and 136).

Test the bearing grease. If the grease is resinified, clean the bearings and change the grease.

Use high-temperature grease LVO 820 (P/N EK81140).

#### Grease quantity per bearing (quantity : 2/pump) :

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Bearing	14 cm <sup>3</sup> or 12 g
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Motor :

In normal operating conditions, the motor bearings have a lifetime of 30'000 hours.

# Troubleshooting

## 6 Troubleshooting

Fault	Possible cause	Remedy	Reference section *
Pump does not start.	Pump is connected incorrectly.	Connect the pump correctly.	3.3
	Motor protection switch incorrectly set.	Set motor protection switch properly.	3.3
	Operating voltage does not match motor.	Replace the motor.	
	Motor is malfunctioning.	Replace the motor.	
	Oil temperature is below 12°C (54°F).	Heat the pump and pump oil or use different oil.	1.8
	Oil is too viscous.	Use appropriate oil grade.	5.4-C
	Exhaust filter / exhaust line is clogged.	Replace the filter or clean the exhaust line.	3.4-D
Pump does not reach ultimate pressure.	Power transmission by V-belt is impaired.	Tighten or replace the V-belt.	5.4-L
	Pump is seized up	Repair the pump.	5.4-M
Pump does not reach ultimate pressure.	Measuring technique or gauge is unsuitable.	Use correct measuring technique and gauge.	4.3
	External leak	Repair the pump.	
	Float valve does not close.	Repair the valve.	5.4-I
	Anti-suckback valve is malfunctioning.	Repair the valve.	5.4-F
	Inadequate lubrication due to:		
	■ unsuitable or contaminated oil,	Change the oil (degas it, if necessary).	5.4-C
	■ Oil level too low	Add oil	5.4-C
	■ clogged oil filter,	Replace the oil filter.	5.4-C
	■ clogged oil lines.	Clean the oil casing.	
	Vacuum lines are dirty.	Clean vacuum lines.	
Pump is too small.	Check the process date; replace the pump, if necessary.		
Anti suck back valve control not operating	Check / clean	5.4-F	
Pumping speed is too low.	Dirt trap in the intake port is clogged.	Clean the dirt trap ; Precaution : install a dust filter in intake line.	5.4-E/1.2/3.2
	Exhaust filter is clogged.	Install new filter elements.	5.4-D
	Connecting lines are too narrow or too long.	Use adequately wide and short connecting lines.	3.2
	Anti-suckback valve is hard to open.	Check spring free length.	
After switching off pump under vacuum, pressure in system rises too fast.	System has a leak.	Check the system.	
	Anti-suckback is malfunctioning.	Repair the valve.	5.4-F
Pump gets too hot	Cooling air/watter supply is obstructed.	Set pump up correctly.	3.1
	Cooler is dirty.	Clean the cooler.	
	Ambient temperature / water is too high.	Set pump up correctly.	3.1
	Process gas is too hot.	Change the process.	
	Oil level is too low.	Add oil to reach the correct oil level.	5.4-C
	Oil is unsuitable.	Change the oil.	5.4-C
	Oil cycle is obstructed.	Clean or repair the oil lines.	
	Exhaust valve finger damaged or polluted	Change exhaust valve / clean	5.4-I
	Exhaust filter / exhaust line is obstructed.	Replace the exhaust filter, clean the exhaust line.	5.4-D
Pump module is no longer usable.	Replace the pump module.	5.4-K	

# Troubleshooting

<b>Fault</b>	<b>Possible cause</b>	<b>Remedy</b>	<b>Reference section *</b>
Oil in intake line or in vacuum vessel.	Oil comes from the vacuum system.	Check the vacuum system.	
	Anti-suckback valve is obstructed open	Clean or repair the valve.	5.4-F
	Sealing surfaces of anti-suckback valve are damaged or dirty.	Clean or repair the intake port and valve.	5.4-F
	Oil level is too high.	Drain the excess oil.	5.4-C
	Anti suck back valve control not operating	Check / clean	5.4-F
Pump's oil consumption too high, oil mist at exhaust.	Exhaust filters are clogged or damaged.	Replace the filters.	5.4-D
	Nozzle of float valve is clogged.	Check the valve, clean the nozzle.	5.4-H
	Oil level is too high.	Drain the excess oil.	5.4-C
Oil is turbid.	Condensation.	Degas the oil or change the oil and clean the pump.	4.1/5.4-B
		Precaution : open the gas ballast valve or insert a condensate trap.	
		Clean the gas ballast intake filter.	
Pump is excessively noisy.	Oil level is very low (oil is no longer visible).	Add oil.	5.4-C
	Too much oil / condensation	Oil change	5.4-C
	Oil filter is clogged.	Change the oil and filter.	5.4-C
	Vanes or bearings damaged	Repair pump	5.4-J
	Large vacuum leak in system.	Repair vacuum leak.	5.4-K
	Power transmission by belt is impaired.	Tighten or replace the belt.	5.4-L

\* Reference section : This column refers to the section in the Operating Instructions that contains the applicable repair information.

Never mount used seals. Always mount new seals.

## 7 Spare parts

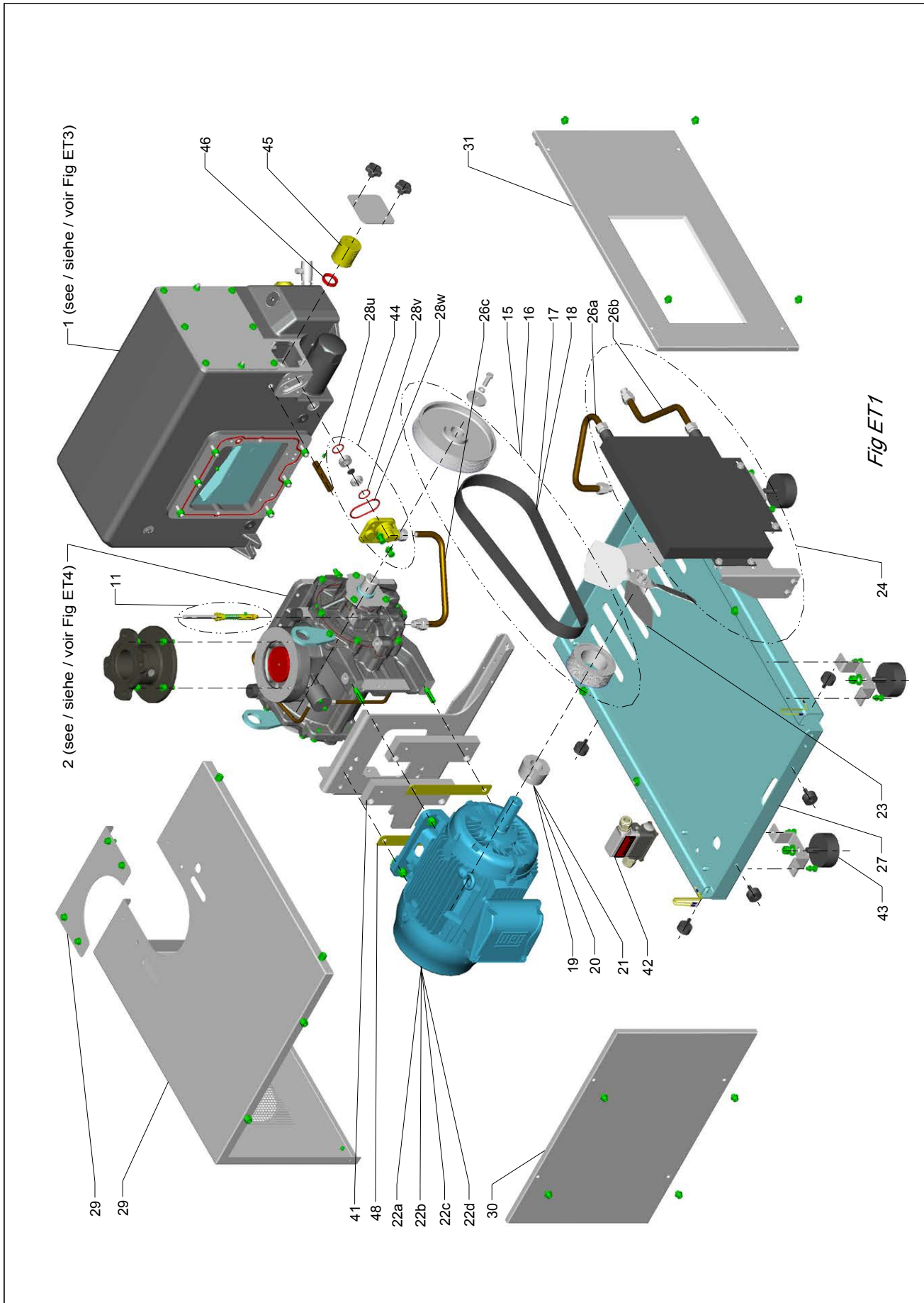
To guarantee safe operation of the Leybold vacuum pump, only original spare parts and accessories should be used. When ordering spare parts and accessories, always state pump type and serial number. You can find part numbers in the spare parts list.

Consummables and main spare parts kits for SOGEVAC® pumps are usually available on stock at Leybold's service centers. The list of these parts is given here after and in the spare parts table where the contents of each kits is detailed.

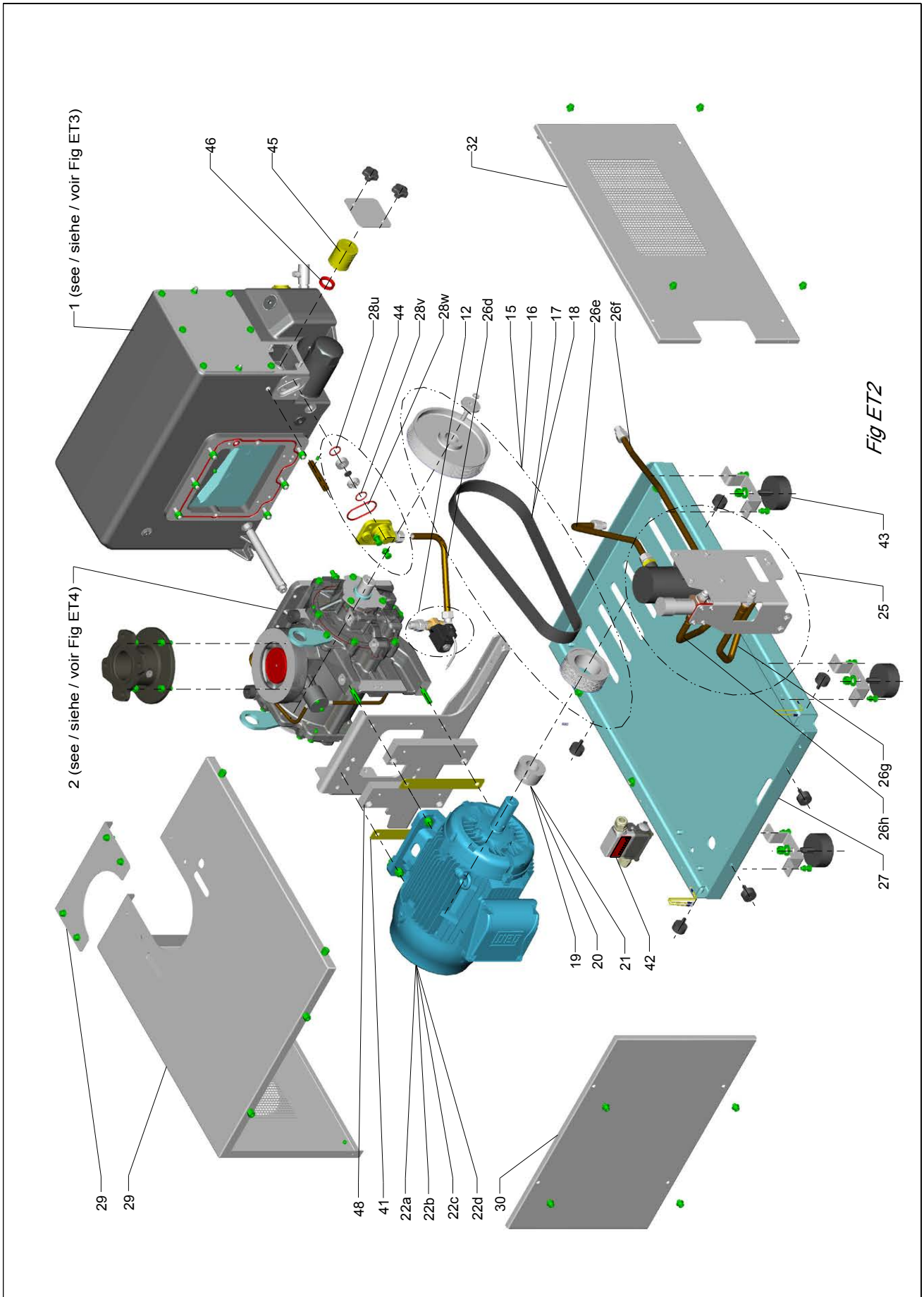
- Oil filter (on some models)
- Exhaust demisters
- Oil (Special oils please refer to the specific notice of the pump or contact Leybold).
- Service kit
- Set of seals
- Repair kit

We recommend to use these kits which have been defined to allow an optimal maintenance or repair. individual spare parts may need longer delivery time.

# Spare parts



# Spare parts



# Spare parts

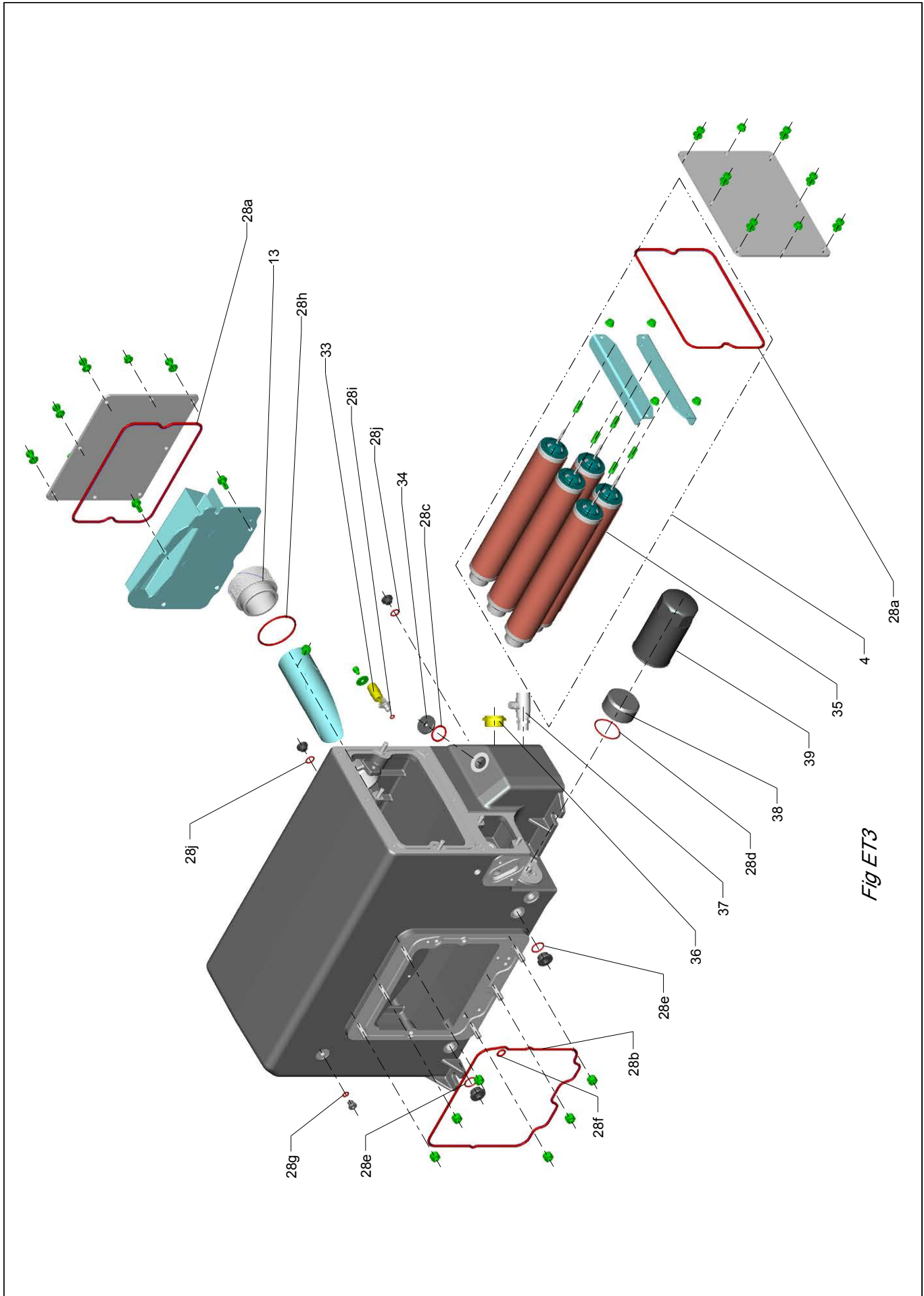


Fig ET3





# Spare parts

Item	Qty.	DESCRIPTION	Part-Nr.	Notes
1	1	OIL CASING	EK6507417	Inclu. 33, 34, 36, 37, 28a, c, e, g, i, j
2	1	VACUUM GENERATOR	EK6700666	Inclu. 5, 6, 7, 8, 9, 10, 28p, q
3	1	VALVES AND VALVES STOP KIT		Inclu. EK971474020
4	1	MAINTENANCE KIT	EK971474000	Inclu. 35, 37, 28a, c, e, g, i, j
5	1	BEARING KIT	EK6513809	Inclu. 28m, n, o, l
6	1	SET OF 3 VANNES	EK6507487	
7	1	STATOR	EK6507446	
8	1	FRONT END PLATE	EK6507476	
9	1	REAR END PLATE	EK6507477	
10	1	ROTOR	EK6507483	
11	1	KIT MANUAL AND PERM GAS BALLAST	EK6700691	
12	1	KIT REAR EM GAS BALLAST	EK6510606	
13	1	KIT G3" / NPT 3"	EK6700843	Inclu. 28h
14	1	KIT HYDR ANTI SUCK BACK VALVE	EK6701224	Inclu. 26i, j, 28k, r, s, 40
15	1	KIT BELT AND PULLEY SV470B Euro 50 Hz AND NEMA 60 Hz	EK6700709	Inclu. 17
16	1	KIT BELT AND PULLEY SV570B Euro 50 Hz	EK6700710	Inclu. 18
17	1	BELT SV470B Euro 50 Hz AND NEMA 60 Hz	EK6509656	
18	1	BELT SV570B Euro 50 Hz	EK6509657	
19	1	MOTOR HUB SV470B EURO 9,2 kW 38 mm 50 Hz	EK6507909	
20	1	MOTOR HUB SV570B EURO WIDE 11 kW 50 Hz	EK6507910	
21	1	MOTOR HUB SV570B 15hp NEMA 60 Hz	EK6507911	
22a	1	MOTOR WIDE SV470B / 570B 11KW	EK6513000	
22b	1	MOTOR EURO SV470B 9.2KW	EK6510735	
22c	1	MOTOR EURO SV570B 11KW	EK971429908	
22d	1	MOTOR NEMA SV570B 15HP	EK6514031	
23	1	FAN SV470B / 570B 350 mm	EK6700679	
24	1	OIL COOLER KIT AIR COOLED PUMPS	EK6700678	Inclu. 26a, b
25	1	HEAT EXCHANGER H2O PUMPS	EK6700882	Inclu. 26 e, f, g, h
26	1	PIPE KIT	EK6507814	All 26
27	1	BASE FRAME	EK6700667	Inclu. 43
28	1	SEAL KIT	EK971474010	All 28 + 40
29	1	UPPER COVER	EK6507790	
30	1	ACCESSORY AND MOTOR COVER	EK6507788	
31	1	REAR COVER AIR COOLED PUMPS	EK6507789	
32	1	REAR COVER H2O PUMPS	EK6507792	
33	1	FLOAT VALVE KIT	71417210	Inclu. 28i
34	1	OIL FILL PLUG G1"	71073040	Inclu. 28c
35	5	EXHAUST FILTER WITH BYPASS	971431120	
36	1	OIL LEVEL GLASS	71029600	
37	1	OIL DRAIN VALVE	71235740	
38	1	OIL FILTER BYPASS	71230570	Inclu. 28d
39	1	OIL FILTER	71405310	
40	1	ANTISUCKBACK VALVE	971437830	
41	1	WEDGES NEMA MOTOR		
42	1	EL ACCESSORY CONNECTOR	EK6700863	
43	1	SET RUBBER FEET	71403350	
44	1	GASBALLAST KIT	EK6700821	Inclu. 28u, v, w
45	1	GASBALLAST PAPER FILTER	71040760	
46	1	SEAL	71410820	
	1	REPAIR KIT	EK971474020	Inclu. 3, 5, 6, 15, 16, 35, 36, 39,
48	1	WEDGES 9 kW EURO MOTOR		
49	1	FRONT END PLATE FLANGE		
50	1	FRONT BEARING BUSHING		
51	1	REAR BEARING BUSHING		
52	1	REAR END PLATE FLANGE		



# EU Declaration of Conformity

(Translation of original Declaration of Conformity)

**The manufacturer:** Leybold GmbH  
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D-50968 Köln  
Germany

herewith declares that the products specified and listed below which we have placed on the market, comply with the applicable EU Council Directives. This declaration becomes invalid if modifications are made to the product without agreement of Leybold GmbH.

**Product designation:** SOGEVAC  
**Type designation:** SV16, SV25, SV16D, SV25D, SV200, SV1200, SV16B, SV25B, SV40B, SV65B, SV100B, SV120B (I FC), SV300B, SV470B, SV500B, SV570B, SV630B, SV750B, SV28BI (FC), SV40BI (FC), SV65BI (FC), and their variants, excepted pumps delivered without motor

**The products complies to the following European Council Directives:**

Machinery Directive (2006/42/EC)

The safety objectives of the Low Voltage Directive 2014/35/EU were complied with in accordance with Appendix 1 No. 1.5.1 of Machinery Directive 2006/42/EC.

Electromagnetic Compatibility (2014/30/EU)

RoHS Directive (2011/65/EU) & (2015/863/EU)

**The following harmonized standards have been applied:**

EN 1012-2:1996+A1:2009	Compressors and vacuum pumps — Safety requirements — Part 2: Vacuum pumps
EN 60204-1:2006/A1:2009	Safety of machinery — Electrical equipment of machines — Part 1: General requirements requirements
EN 61000-6-2:2005/AC:2005	Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
EN 61000-6-4:2007/A1:2011	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments

**Documentation officer:** Herbert Etges  
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Cologne, November 14, 2016

Cologne, November 14, 2016



ppa. Martin Tollner  
Head of Product Lines



ppa. Dr. Monika Mattern-Klosson  
Head of Quality & Business Process Management

## Declaration of Contamination of Compressors, Vacuum Pumps and Components

The repair and / or servicing of compressors, vacuum pumps and components will be carried out only if a correctly completed declaration has been submitted. Non-completion will result in delay. The manufacturer can refuse to accept any equipment without a declaration.

**A separate declaration has to be completed for each single component.**

This declaration may be completed and signed only by authorized and qualified staff.

Customer/Dep./Institute : _____ Address : _____ _____ Person to contact: _____ Phone : _____ Fax: _____ End user: _____	Reason for return: <input checked="" type="checkbox"/> applicable please mark <b>Repair:</b> <input type="checkbox"/> chargeable <input type="checkbox"/> warranty <b>Exchange:</b> <input type="checkbox"/> chargeable <input type="checkbox"/> warranty <input type="checkbox"/> Exchange already arranged / received <b>Return only:</b> <input type="checkbox"/> rent <input type="checkbox"/> loan <input type="checkbox"/> for credit <b>Calibration:</b> <input type="checkbox"/> DKD <input type="checkbox"/> Factory-calibr. <input type="checkbox"/> Quality test certificate DIN 55350-18-4.2.1
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<b>A. Description of the Leybold product:</b> Material description : _____ Catalog number: _____ Serial number: _____ Type of oil (ForeVacuum-Pumps) : _____	<b>Failure description:</b> _____ <b>Additional parts:</b> _____ <b>Application-Tool:</b> _____ <b>Application- Process:</b> _____
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<b>B. Condition of the equipment</b>	<b>No<sup>1)</sup></b>	<b>Yes</b>	<b>No</b>	<b>Contamination :</b>	<b>No<sup>1)</sup></b>	<b>Yes</b>
1. Has the equipment been used	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	toxic	<input type="checkbox"/>	<input type="checkbox"/>
2. Drained (Product/service fluid)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	corrosive	<input type="checkbox"/>	<input type="checkbox"/>
3. All openings sealed airtight	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	flammable	<input type="checkbox"/>	<input type="checkbox"/>
4. Purged	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	explosive <sup>2)</sup>	<input type="checkbox"/>	<input type="checkbox"/>
If yes, which cleaning agent _____				radioactive <sup>2)</sup>	<input type="checkbox"/>	<input type="checkbox"/>
and which method of cleaning _____				microbiological <sup>2)</sup>	<input type="checkbox"/>	<input type="checkbox"/>
<sup>1)</sup> If answered with "No", go to D. ←				other harmful substances	<input type="checkbox"/>	<input type="checkbox"/>

<b>C. Description of processed substances (Please fill in absolutely)</b>																												
1. What substances have come into contact with the equipment ? Trade name and / or chemical term of service fluids and substances processed, properties of the substances According to safety data sheet (e.g. toxic, inflammable, corrosive, radioactive)																												
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:5%;">X</th> <th style="width:40%;">Tradename:</th> <th style="width:55%;">Chemical name:</th> </tr> <tr><td>a)</td><td></td><td></td></tr> <tr><td>b)</td><td></td><td></td></tr> <tr><td>c)</td><td></td><td></td></tr> <tr><td>d)</td><td></td><td></td></tr> </table>	X	Tradename:	Chemical name:	a)			b)			c)			d)			<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th style="width:50%;"></th> <th style="width:10%;"><b>No</b></th> <th style="width:10%;"><b>Yes</b></th> </tr> <tr> <td>2. Are these substances harmful ?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td>3. Dangerous decomposition products when heated ?</td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td colspan="3">If yes, which ? _____</td> </tr> </table>		<b>No</b>	<b>Yes</b>	2. Are these substances harmful ?	<input type="checkbox"/>	<input type="checkbox"/>	3. Dangerous decomposition products when heated ?	<input type="checkbox"/>	<input type="checkbox"/>	If yes, which ? _____		
X	Tradename:	Chemical name:																										
a)																												
b)																												
c)																												
d)																												
	<b>No</b>	<b>Yes</b>																										
2. Are these substances harmful ?	<input type="checkbox"/>	<input type="checkbox"/>																										
3. Dangerous decomposition products when heated ?	<input type="checkbox"/>	<input type="checkbox"/>																										
If yes, which ? _____																												

<sup>2)</sup> Components contaminated by microbiological, explosive or radioactive products/substances will not be accepted without written evidence of decontamination.

**D. Legally binding declaration**  
 I / we hereby declare that the information supplied on this form is accurate and sufficient to judge any contamination level.

Name of authorized person (block letters) : _____		
Date _____	signature of authorized person _____	firm stamp <span style="border: 1px dashed black; display: inline-block; width: 100px; height: 50px; vertical-align: middle;"></span>

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