

# **SOGEVAC<sup>®</sup> SV16 D(I) - SV25 D(I)**

Single-stage, oil-sealed rotary vane pump

**Original Operating Instructions 300359027\_002\_C2  
and spare parts list**

Part No.

960180V...  
960215V...

960191V  
960194V  
960195V  
960196V

and their variants



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## Obligation to Provide Information

Before installing and commissioning the pumps, carefully read these Operating Instructions and follow the information so as to ensure optimum and safe working right from the start.

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.

“Trained personnel” for the operation of this pump are

- skilled workers with knowledge in the fields of mechanics, electrical engineering and vacuum technology and
- personnel specially trained for the operation of vacuum pumps.

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE is used to notify users of installation, operation, programming or maintenance information that is important, but not hazard related.

We reserve the right to modify the design and the specified data. The illustrations are not binding.

Retain the Operating Instructions for further use.

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## NOTICE



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## DANGER



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## WARNING



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## CAUTION



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## NOTICE



# Safety Information

## WARNING



## DANGER



## CAUTION



## DANGER



## 0 Important Safety Information

### 0.1 Mechanical Hazards

- 1 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.

### 0.2 Electrical Hazards

- 1 The electrical connection must only be provided by a trained person. Please observe the national regulations in the country of use like EN 50110-1 for Europe, for example.
- 2 Disconnect the unit from the power supply before starting any work.
- 3 Always operate the pump with a properly connected protective earth conductor and make sure that the pump connection box are closed.
- 4 Lay the connecting lines so that these cannot be damaged. Protect the lines against humidity and contact with fluids.
- 5 Avoid thermally stressing the lines by unfavourable laying. Provide strain relief for the connecting lines so that the plugs and the line connectors are not subjected to excessively high mechanical stresses.
- 6 Lay electric feed lines so that there is no risk of tripping over these.

### 0.3 Thermal Hazards

- 1 When operating pump is hot and some surfaces could reach a temperature higher than 120 °C (248 °F). There is a risk of burn by touching.
- 2 As a touching protection, you can use the “Noise enclosure for SV40 BI + 65 BI FC” P/N 960331NENC. The noise enclosure is an accessory not included in the pump delivery.
- 3 All work on a pump which is “still warm from operation” should be done only whilst wearing protective gloves.
- 4 Handle the pump only while vented and after having let it cool down.
- 5 Never remove the oil-fill or oil-drain plugs while the pump is running. There exists the risk of suffering burns. Always wear protective gloves and protective goggles also for protection against the oil.

### 0.4 Hazards Caused by Materials and Substances

- 1 SOGEVAC® pumps are **not** designed:
  - for pumping of dusty, 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, explosive or dusty 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.

- 2 Depending on the process involved, dangerous substances and oil may escape from the pump. Take the necessary safety precautions!
- 3 Take appropriate precautions to insure that the pump cannot start.
- 4 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.
- 5 Observe all safety regulations!
- 6 Take adequate safety precautions prior to opening the intake or exhaust port.
- 7 Respect the instructions concerning environment protection when discarding used oil or exhaust filters!
- 8 Some pumps use perfluoropolyether (PFPE) as lubricant. When handling PFPE you should observe the following:  
During thermal decomposition at temperatures over 290 °C toxic and corrosive gases are released. This is not likely to happen in a SOGEVAC pump. When handling PFPE keep it away from open fires. Do not smoke with PFPE on your fingers.  
Touch the inner sections of the pumps only while wearing clean gloves, and use clean tools; do the necessary work in clean and dry rooms.

## 0.5 Danger of Pump Damage

- 1 Liquid and solid particles must not enter the pump. Install the adequate filters, separators and/or condensers. In case of doubt consult Leybold.
- 2 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. Never work with closed or restricted pump exhaust.
- 3 Operating of the pump without oil or operating with incorrect direction of rotation can destroy the pump or lead to oil backstreaming. After having made changes to the wiring, check the motor's direction of rotation.
- 4 Never use discarded seals. Always assemble using new seals.
- 5 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.

This Manual is valid for standard products. If the delivered pump is a special version, then the pump will be delivered with an additive document which is to be understood as a part of the Instruction Manual.

Upon request, we can deliver translations of this manual in other languages.

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### NOTICE



# Description

## 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, also in continuous duty.

### 1.1 Principle of operation

The SOGEVAC SV 16 D (I) and SV 25 D (I) are single stage, oil-sealed rotary vane pumps.

The anti-suckback valve, gas ballast valve and an exhaust filter, oil return circuit are integrated functional elements of the SOGEVAC. The pump is driven by a motor directly integrated into the housing.

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 the rotor rotates, the intake portion of the pumping chamber expands and sucks in gas through the intake port. 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, then the gas is expelled from the chamber via the exhaust valve.

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 case. Then fine filtering occurs in the integrated exhaust filter elements. 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 oil cycle at the anti-suckback valve. The oil return is controlled by a float valve.

Oil from the oil reservoir is injected directly, so as over the end flange bearings via bores in these end flanges in the pump. The oil flow is ensured by the difference of pressures within the pump.

By opening the gas ballast valve, a dosed quantity of air - so-called "gas ballast" - is admitted into the pump chamber. This gas ballast prevents condensation (up to the vapor tolerance specified in the Technical Data) when pumping condensable gases or vapors.

Unintentional venting of the vacuum chamber as well as oil suckback when switching the pump off are prevented by the built-in antisuckback valve.

When the pump is switched off, the pump chamber is vented with gas from the oil pump via a bore in the exhaust valve. Since a pressure in the inner pump section is then higher than in the intake line, the anti-suckback valve closes. The anti-suckback must be clean and in good condition for a tight closing. The gas flowing into the pump chamber also prevents oil from entering the chamber when the pump is idle.

The anti suck-back valve is not a safety valve. If oil back flowing is to be avoided by all means, it is necessary to mount a separate safety valve on the pump inlet.

A fan attached to motor generates the air flow needed to cool the pump.

The pumps with some single phase motors have been tested to the requirements of CAN/CSA-C22.2 No. 61010-1, third edition, including Amendment 1, or a later version of the same standard incorporating the same level of testing requirements up to 400 mbar abs in continuous duty.



## 1.2 Standard Specification

The pumps with three-phase motors are supplied with a three phase socket and plug to be wired by the end-user. A suitable C13 plug is provided for pumps with single-phase AC motor.

Single phase pumps include a C14 power socket and an ON-OFF switch with overload protection.

The amount of oil needed for the first filling is supplied in oil cans.

The intake port is blanked off by a protective sticker. After having ripped off the protective sticker, the exhaust plug is to be screwed into the exhaust port. That plug is supplied loose with the pump.

Stability of pump is insured with accessories of Leybold.

Mounting of any other accessory will engage the responsibility of user concerning stability of the pump.

When ordering spare parts, please always state the serial and catalog numbers of the pump.

# Description

## 1.3 Technical Data

at 50 Hz

		SV16 D	SV25 D	SV16 DI	SV25 DI
Nominal speed <sup>1)</sup>	m <sup>3</sup> ·h <sup>-1</sup>	16	25	16	25
Pumping speed <sup>1)</sup>	m <sup>3</sup> ·h <sup>-1</sup>	14.5	22.5	14.5	22.5
Ultimate pressure without gas ballast <sup>1)</sup>	mbar	< 0.5	< 0.5	≤ 0.1	≤ 0.1
Ultimate pressure with gas ballast <sup>1)</sup>	mbar	< 1.5	< 1.5	< 1.0	< 1.0
Water vapor tolerance <sup>4)</sup>	mbar	15	15	15	15
Max. water vapor throughput with gas ballast <sup>4)</sup>	kg·h <sup>-1</sup>	0.05	0.15	0.05	0.15
Connections		G1/2	G1/2	DN 25 ISO-KF	
Weight	kg			25	
Oil capacity	l			2	
Motor power	kW	0.75	0.90	0.75	0.90
Rated speed	min <sup>-1</sup>			1500	
Noise level <sup>2)</sup>	dB (A)			≤ 59	
Leak rate	mbar l·s <sup>-1</sup>			1·10 <sup>-5</sup>	
Type of protection				IP20	
Ambient temperature T	3 φ			12 ... 40°C 54 ... 104°F	
Ambient temperature T	1 φ			18 ... 40°C 64 ... 104°F	
Humidity rel.				≤ 80 % T ≤ 31°C ≤ 50 % 31°C < T ≤ 40°C	
Supply voltage fluctuation				± 10 % UN	
Normal presence of transient over-voltages on the mains supply					

1) to DIN 28400 and following numbers

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

4) with room temperature 20°C to 25 °C

1) Valid only with LVO120 mineral oil



# Description

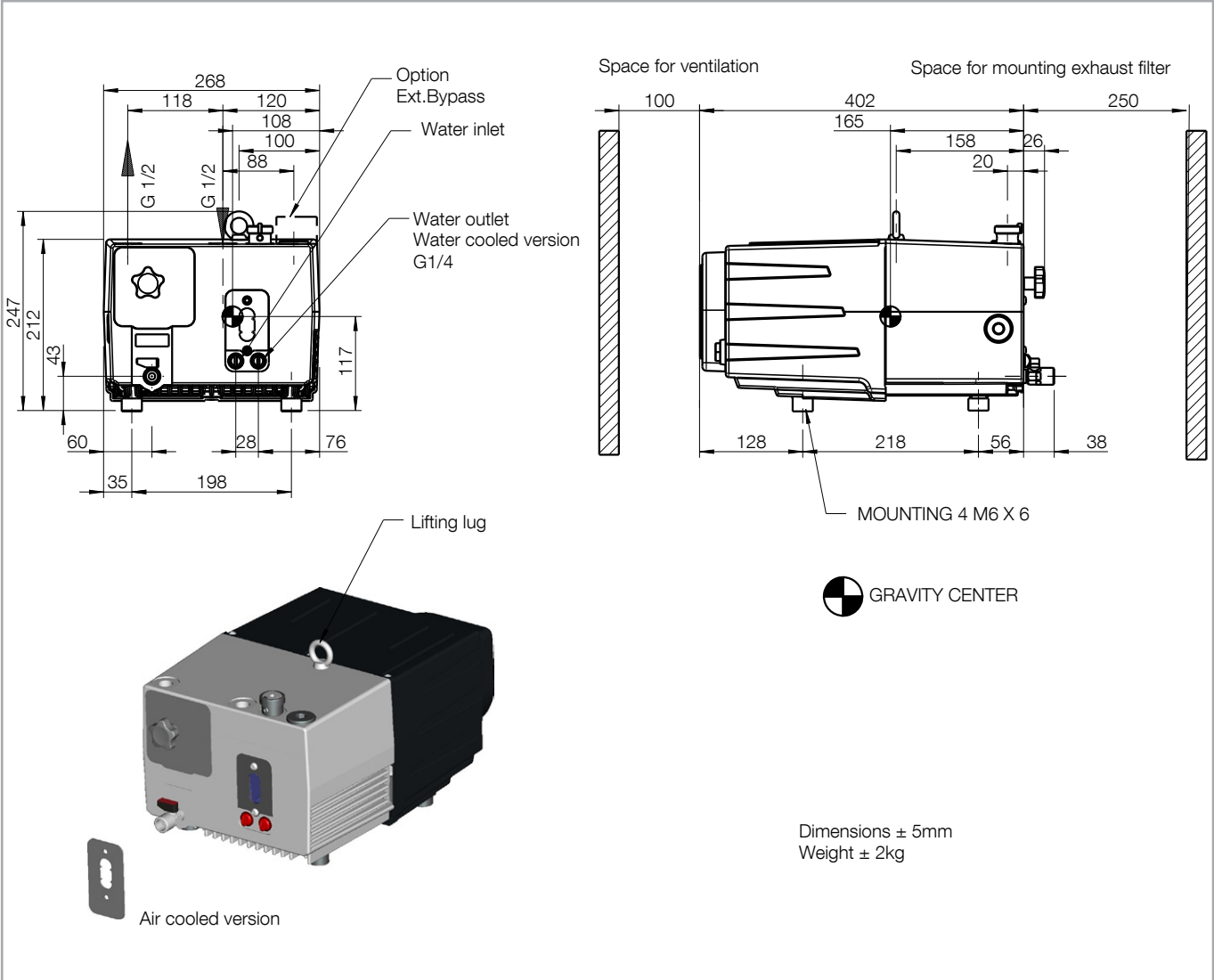


Fig. 1 Dimensional drawing of SV16 D and SV25 D

# Description

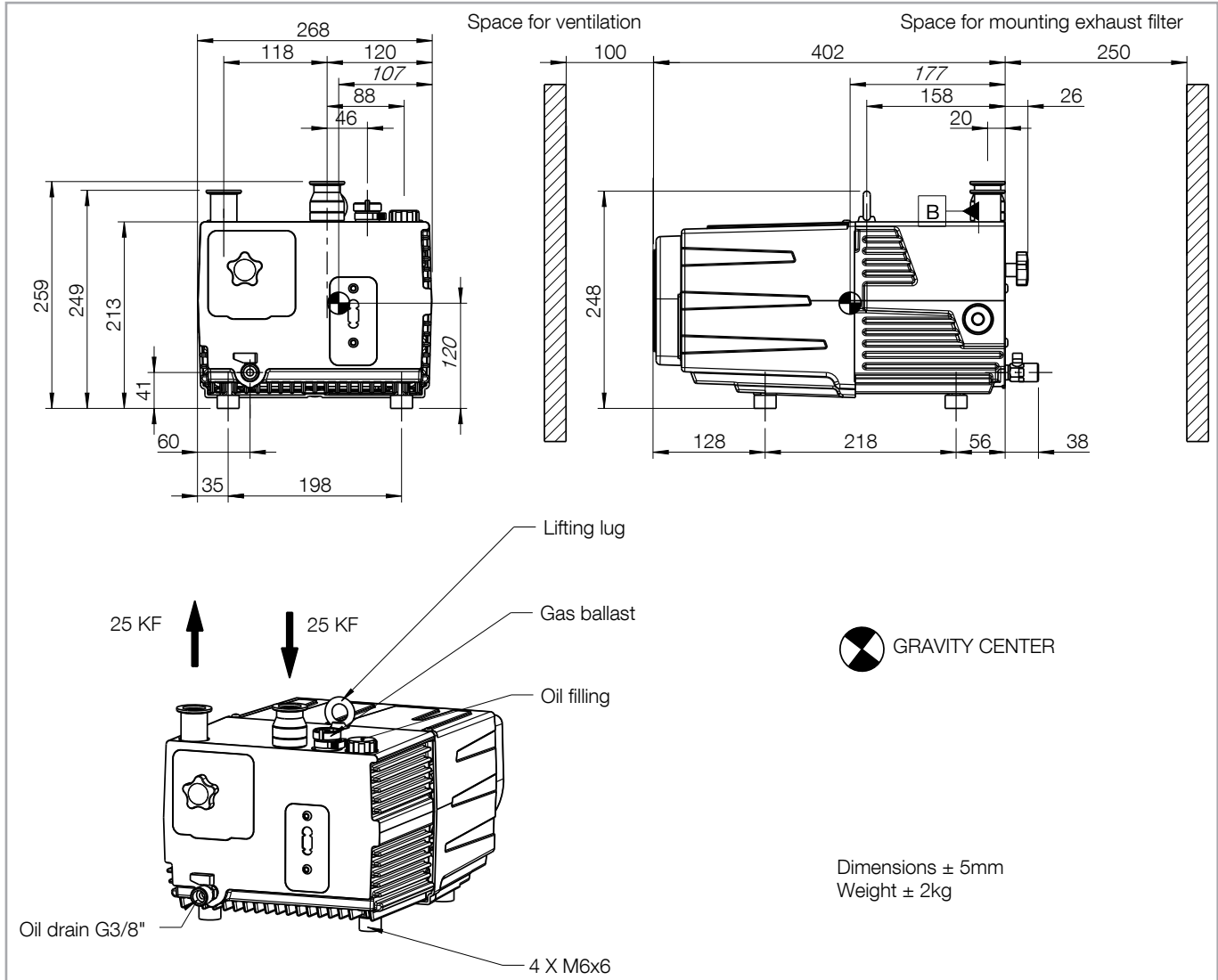


Fig. 2 Dimensional drawing of SV16 DI and SV25 DI

# Description

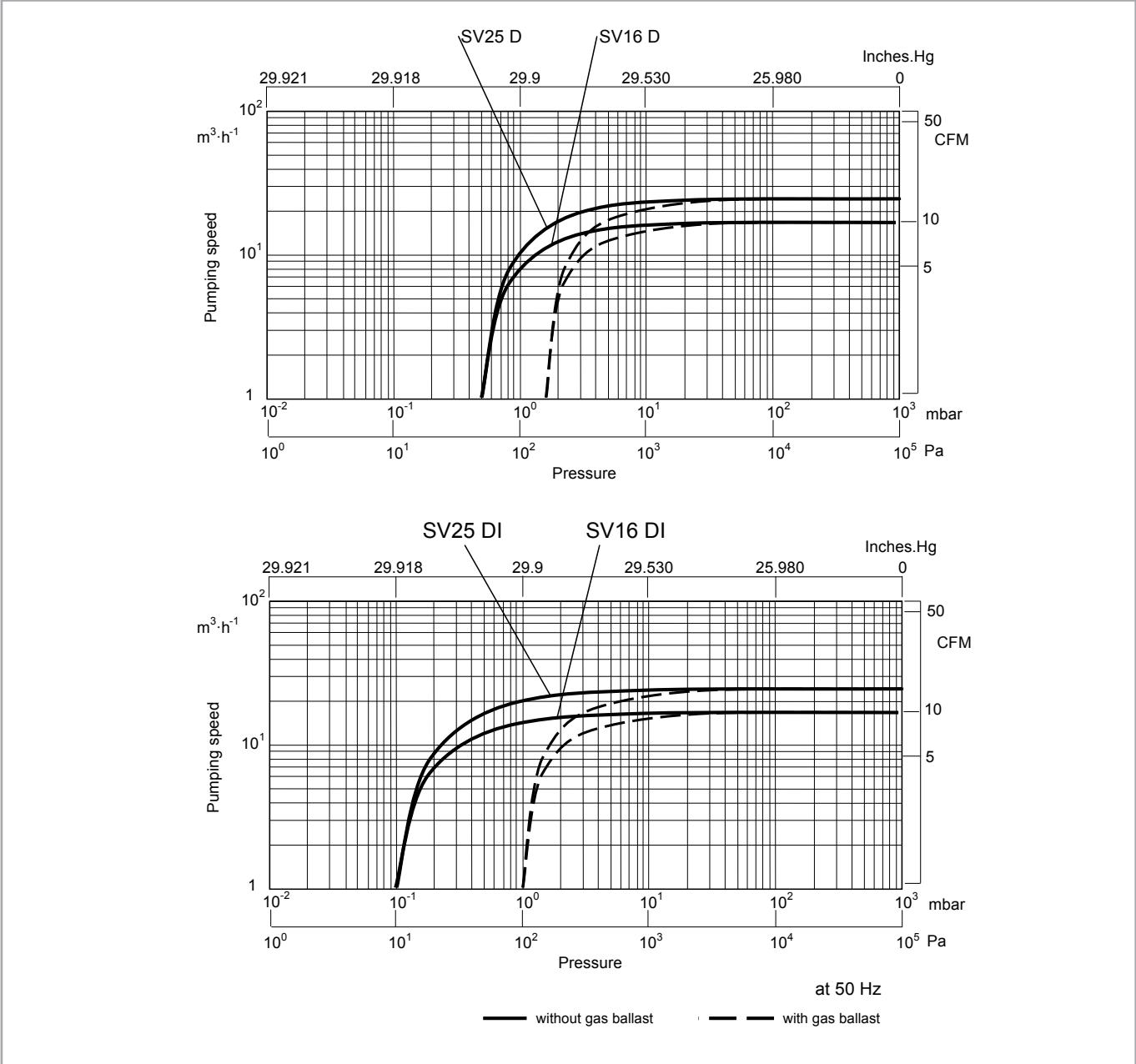


Fig. 3 Pumping speed curves of SV16 D(l) and SV25 D(l), 50 Hz

# Description

## 1.3.1 Technical Data at 60 Hz<sup>1)</sup>

		SV16 D	SV25 D	SV16 DI	SV25 DI
Nominal pumping speed	cfm	11	17	11	17
Pumping speed	cfm	10	15	10	15
Ultimate pressure without gas ballast	Torr	≤ 0.4	≤ 0.4	≤ 0.08	≤ 0.08
Ultimate pressure with gas ballast	Torr	≤ 1.15	≤ 1.15	≤ 0.8	≤ 0.8
Water vapor tolerance	Torr	11	11	11	11
Water vapor pumping with gas ballast	lbs/hr	0.05	0.2	0.05	0.2
Connections ports		NPT 1/2	NPT 1/2	DN 25 ISO-KF	
Weight	lbs	55			
Oil filling	qt	2.1			
Motor power	hp	1.0	1.2	1.0	1.2
Rated speed	r.p.m.	1800			
Noise level to DIN 45 635	dB (A)	≤ 59			
Leak rate	mbar l·s <sup>-1</sup>	1·10 <sup>-5</sup>			
Type of protection		IP20			
Ambient temperature T	3 φ	12 ... 40°C 54 ... 104°F			
Ambient temperature T	1 φ	18 ... 40°C 64 ... 104°F			
Humidity rel.		≤ 80 % T ≤ 31°C ≤ 50 % 31°C < T ≤ 40°C			
Supply voltage fluctuation		± 10 % UN			
Normal presence of transient over-voltages on the mains supply					
1) Valid only with LVO120 mineral oil					

## Conversion of Units

### Conversion mm - inch, see Fig. 1 & 2

mm	20	32	36	115	190	196	198	216	218	250	263	415
inch	25/32	1 1/4	1 7/16	4 17/32	7 1/2	7 23/32	7 13/16	8 1/2	8 19/32	9 27/32	10 3/8	16 11/32

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	0.589
1 qt = 0.946 l	400	300	18.12		0.278	0.589
1 hp = 0.735 kW	133	100	25.98	l·s <sup>-1</sup> = l/s	3.60	2.12
1 r.p.m. = 1 min <sup>-1</sup>	4	3	29.80		1	2.12
1 inch = 25.4 mm	1	0.75	29.89	cfm (cubic feet per minute)	1.699	1
	0	0	29.92		0.472	1

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  
Note: the nominal pumping speed of a pump at 60 Hz is 20% higher than at 50 Hz

# Description

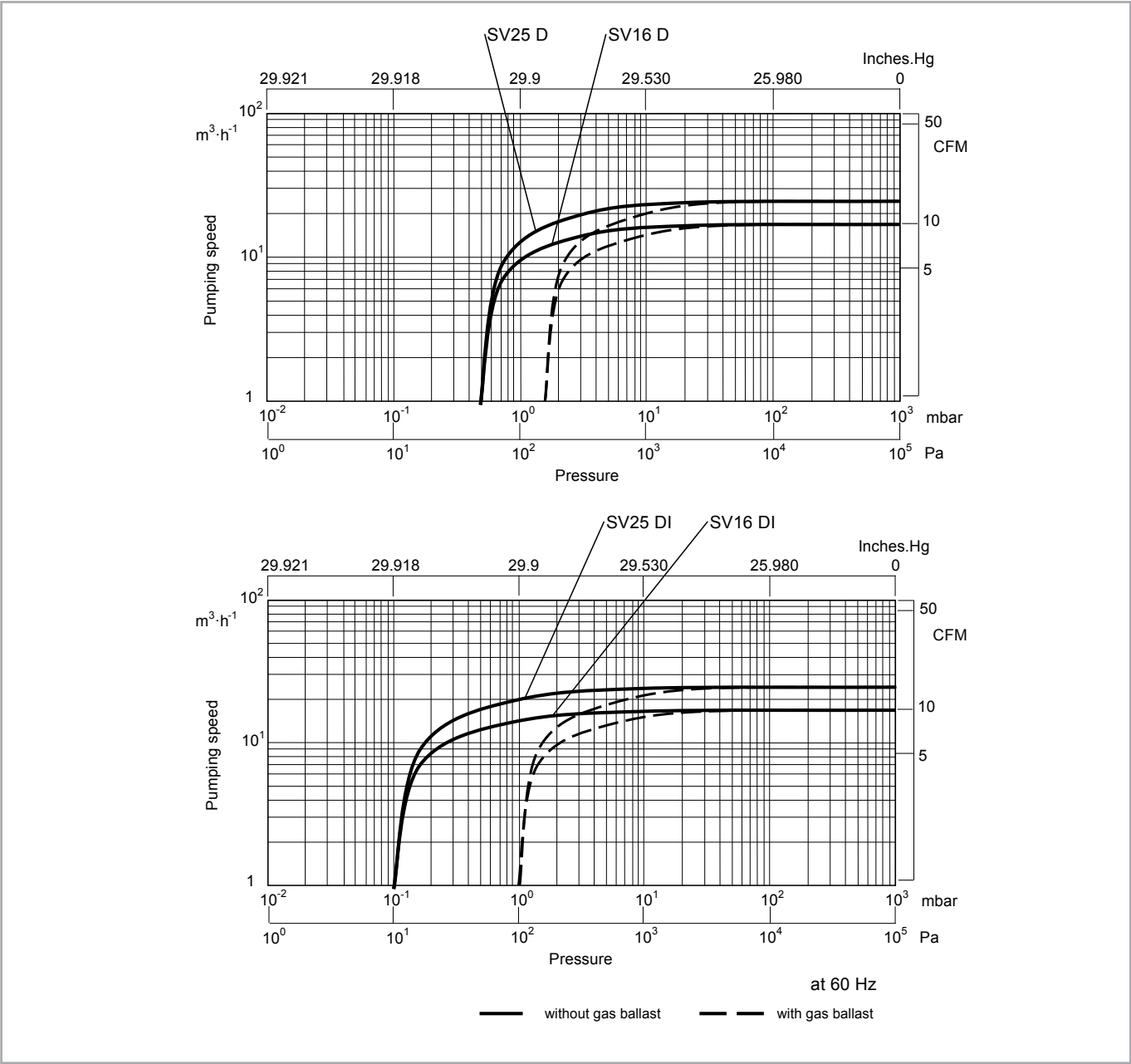


Fig. 4 Pumping speed curves of SV16 D(l) and SV25 D(l), 60 Hz

# Description

## 1.4 Ordering information

P/N	Pump	Motor	Cooling	GB	Oil	Inlet & Exhaust connections
<b>SV16 D</b>						
960180V	SV16 D	A	Air	Y1	LVO120	G1/2
960181V	SV16 D	C	Air	Y1	LVO120	G1/2
960184V	SV16 D	G	Air	Y1	LVO120	G1/2
960185V	SV16 D	D	Air	Y1	LVO120	G1/2
960186V	SV16 D	F	Air	Y1	LVO120	G1/2
<b>SV16 DI</b>						
960191V3001	SV16 DI	C	Air	Y1	LVO700	DN 25 KF
960194V3001	SV16 DI	E	Air	Y1	LVO700	DN 25 KF
960195V3001	SV16 DI	D	Air	Y1	LVO700	DN 25 KF
960196V3001	SV16 DI	F	Air	Y1	LVO700	DN 25 KF
<b>SV25 D</b>						
960210V	SV25 D	A	Air	Y	LVO120	G1/2
960211V	SV25 D	C	Air	Y	LVO120	G1/2
960215V	SV25 D	E	Air	Y	LVO120	G1/2

## Motor

A	Three phase 200 V + 10 % - 10 % ; 0.55 kW ; 4.4 A ; 50 Hz 200 V + 10 % - 10 % ; 0.75 kW ; 3.8 A ; 60 Hz
C	Three phase 200 – 240 V ±10 % ; 0.75 kW ; 5.0 A ; 50 Hz 380 – 415 V ±10 % ; 0.75 kW ; 2,2 A ; 50 Hz 200 – 240 V ±10 % ; 0.90 kW ; 4.3 A ; 60 Hz 380 – 460 V ±10 % ; 0.90 kW ; 2.2 A ; 60 Hz
D	Single phase 200 ... 240 V ±10% ; 0.75 kW ; 5.4 A ; 50 Hz 200 ... 240 V ±10% ; 0.90 kW ; 3.6 A ; 60 Hz
E	Single phase 230 V ±10% ; 0.75 kW ; 5.2 A ; 50 Hz 230 V ±10% ; 0.90 kW ; 5.3 A ; 60 Hz
F	Single phase 110 ... 115 V ±10% ; 50/60 Hz & 220 ... 230 V ±10% ; 50/60Hz ; 0.66 kW
G	Single phase 100 V - 15 % & 100 V + 10 % ; 50/60 Hz










## Cooling

H2O	Water (pump) & air (motor)
Air	Air for pump & motor

## Gas ballast

N	No
Y1	Manual 0.4 m <sup>3</sup> /h
Y2	Manual 1.0 m <sup>3</sup> /h

# Description

Motor	Pump motor plate	Motor	Pump motor plate																																																												
A	<p><b>Leybold</b> Motor 3PH</p> <p>IP20 cl.F 40°C amb S1 <math>U_N</math> <math>\pm 10\%</math></p> <table border="1"> <thead> <tr> <th>V</th> <th>Hz</th> <th>min<sup>-1</sup></th> <th>Kw</th> <th>Cos <math>\phi</math></th> <th>A</th> </tr> </thead> <tbody> <tr> <td>200</td> <td>50</td> <td>1440</td> <td>0.55</td> <td>0.61</td> <td>4.4</td> </tr> <tr> <td>200</td> <td>60</td> <td>1700</td> <td>0.75</td> <td>0.77</td> <td>3.8</td> </tr> <tr> <td>220</td> <td>60</td> <td>1726</td> <td>0.79</td> <td>0.70</td> <td>3.8</td> </tr> </tbody> </table> <p> 6510257</p>	V	Hz	min <sup>-1</sup>	Kw	Cos $\phi$	A	200	50	1440	0.55	0.61	4.4	200	60	1700	0.75	0.77	3.8	220	60	1726	0.79	0.70	3.8	E	<p><b>Leybold</b>   NRTL Listed</p> <p>Motor 1PH Cp: 20<math>\mu</math>F 425V Cd: 70<math>\mu</math>F 330V</p> <p>IP20 cl.F 40°C amb S1 <math>U_N</math> <math>\pm 10\%</math></p> <table border="1"> <thead> <tr> <th>V</th> <th>Hz</th> <th>min<sup>-1</sup></th> <th>Kw</th> <th>Cos <math>\phi</math></th> <th>A</th> </tr> </thead> <tbody> <tr> <td>220-230</td> <td>50</td> <td>1420</td> <td>0.75</td> <td>0.72</td> <td>5.2</td> </tr> <tr> <td>220-230</td> <td>60</td> <td>1720</td> <td>0.90</td> <td>0.95</td> <td>5.3</td> </tr> </tbody> </table> <p>Pression maximale abs. de fonctionnement en régime permanent. Maximum abs. operating pressure in continuous duty. Maximaler abs. Arbeitsdruck im Dauerbetrieb. <b>400 mbar</b> 6510252</p>	V	Hz	min <sup>-1</sup>	Kw	Cos $\phi$	A	220-230	50	1420	0.75	0.72	5.2	220-230	60	1720	0.90	0.95	5.3																		
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220-230	50	1420	0.66	0.85	4.8																																																										
110-115	60	1710	0.66	0.98	6.3																																																										
220-230	60	1710	0.66	0.98	3.5																																																										
D	<p><b>Leybold</b>   NRTL Listed</p> <p>Motor 1PH Cp: 20<math>\mu</math>F 425V Cd: 70<math>\mu</math>F 330V</p> <p>IP20 cl.F 40°C amb S1 <math>U_N</math> <math>\pm 10\%</math></p> <table border="1"> <thead> <tr> <th>V</th> <th>Hz</th> <th>min<sup>-1</sup></th> <th>Kw</th> <th>Cos <math>\phi</math></th> <th>A</th> </tr> </thead> <tbody> <tr> <td>200-240</td> <td>50</td> <td>1420</td> <td>0.75</td> <td>0.56</td> <td>5.4</td> </tr> <tr> <td>200-240</td> <td>60</td> <td>1720</td> <td>0.90</td> <td>0.84</td> <td>3.6</td> </tr> </tbody> </table> <p>Pression maximale abs. de fonctionnement en régime permanent. Maximum abs. operating pressure in continuous duty. Maximaler abs. Arbeitsdruck im Dauerbetrieb. <b>400 mbar</b> 6510254</p>	V	Hz	min <sup>-1</sup>	Kw	Cos $\phi$	A	200-240	50	1420	0.75	0.56	5.4	200-240	60	1720	0.90	0.84	3.6	G	<p> Motor 1 PH</p> <p>Cp: 270-324<math>\mu</math>F 125VAC Cd: 50<math>\mu</math>F 280VAC</p> <p>IP20 cl.F 40°C amb S1 <math>U_N</math> <math>\pm 10\%</math></p> <table border="1"> <thead> <tr> <th>V</th> <th>Hz</th> <th>min<sup>-1</sup></th> <th>Kw</th> <th>Cos <math>\phi</math></th> <th>A</th> </tr> </thead> <tbody> <tr> <td>100</td> <td>50</td> <td>1440</td> <td>0.66</td> <td>0.9</td> <td>10</td> </tr> <tr> <td>100-120</td> <td>60</td> <td>1730</td> <td>0.66</td> <td>0.95</td> <td>9</td> </tr> </tbody> </table> <p>6528240</p>	V	Hz	min <sup>-1</sup>	Kw	Cos $\phi$	A	100	50	1440	0.66	0.9	10	100-120	60	1730	0.66	0.95	9																								
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# Description

## 1.5 Accessories

Item	Designation	Connections	Part No
1	Connecting piece (three piece)*	G1/2	711 18 020
2	Screw-in nipple*	G1/2-DN 16 KF	711 18 120
3	Centering ring	DN 16 KF	183 26
4	Clamping ring	DN 16 KF	183 41
5	Hose connection	DN 16 KF-25 mm	711 18 300
6	Hose connection*	G1/2-25 mm	711 18 011
7	PVC hose	25 mm	711 18 323
8	T-piece	G1/2	711 18 250
11	Ball valve	G1/2	711 30 113
12	Spring vacuum meter	G1/2	951 92
13	Elbow 90°	G1/2	711 18 210
14	Dust filter F 16/25 with paper cartridge	G1/2	951 50
	Spare cartridge (paper)		710 40 762
	with metal cartridge		711 27 093
	Spare cartridge (metal)		710 65 813
	with active-charcoal cartridge		711 27 092
	Spare cartridge (active-charcoal)		710 65 713

\* with NBR O-ring  
 Separator SL 2 951 38  
 Exhaust filter overpressure manometer 951 93

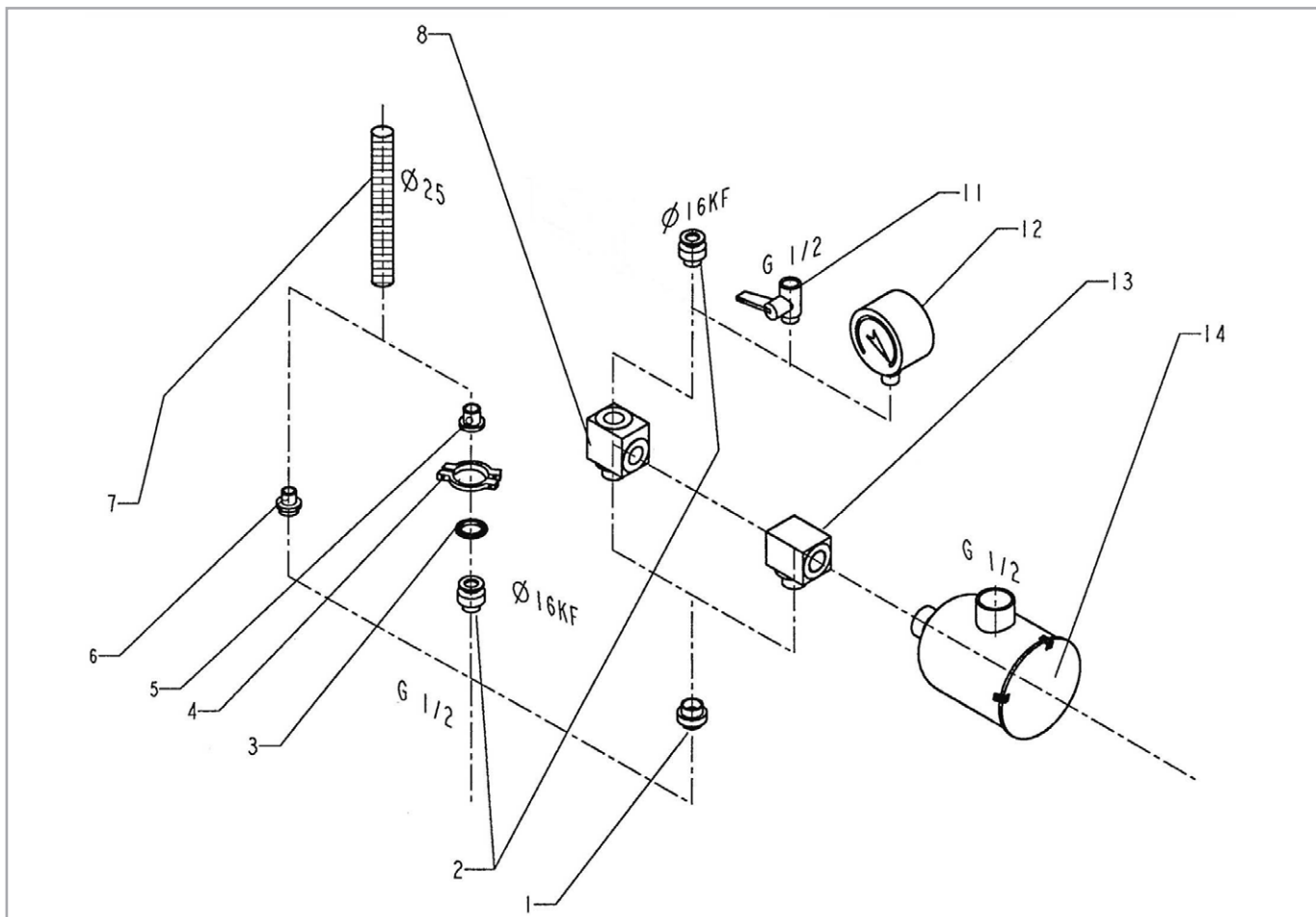


Fig. 5 Accessories



## List of single phase power cords

Part No.	Plug pump side	Plug mains side	Length
971443450	C13	Euro / Schuko 16 A	2 m
EK6508756	C13	NEMA 6-15P 250 V	2 m
9714434GB	C13	UK plug 13 A	2 m
9714434CH	C13	Swiss plug 10 A	2 m
9714434WW	C13	w/o	2 m
E6500255	C13	C14	2.5 m

## 1.6 Lubricants

The SOGEVAC SV 16 D(l) and SV 25 D(l) should be run with LVO120 or an equivalent oil approved by Leybold that meets these requirements:

- low vapor pressure, when at high temperatures;
- flat viscosity curve;
- minimum water content and absorption;
- good lubricating properties and
- resistant to aging under mechanical strain.

When using other oil brands, employ lowdoped, non detergent mineral oils of viscosity class ISO VG 32.

Using the other special-grade lubricants for specific applications is possible.

Please consult Leybold.

Only use lubricants which have been fully qualified by Leybold.

Pump oil LVO 120	Part No.
2 liters	L12002
5 liters	L12005
20 liters	L12020

Pump oil LVO 700	Part No.
1 l	L70001 (x2)

# Transport and Storing

## 2 Transport and Storing

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

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

---

### WARNING



Check the pump for the presence of any oil leaks, because there is the danger that someone may slip on the oil which has leaked from 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.

Storage temperature: - 15°C to + 50°C

Until the pump is put back into service once more, the pump should be stored in a dry place, preferably at room temperature (20 °C). 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 exchanged too. The inlet and exhaust ports of the pump must be blanked off using the shipping seals which are included upon delivery of the pump. The gas ballast must be closed and if the pump is to be shelved for a longer period of time it 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 run and the oil must be exchanged too before the pump is put into service once more. We recommend that you contact the service from Leybold.

## 3 Installation

The standard pump is not suitable for installation in explosion hazard areas. Please contact us, when 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. The pump must only be installed by suitably qualified and trained personnel. Only install the pump indoor.

Observe all safety regulations.

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.

### WARNING



### 3.1 Setting up

The pump can be set up on any flat, horizontal surface on its rubber supports.

Under the pump are threaded bores M6 for securing the pump or screwing in vibration absorbers (extras).

Install the pump horizontally for a correct oil level reading in the oil sight glass.

The pump's ambient temperature should be between 12°C (55°F) and 40°C (104°F).

To ensure adequate cooling of the pump leave space at the air intake and exhaust points at least 50 mm on both pump sides and min 100 mm above it. Also ensure that there is enough space for changing the exhaust filter.

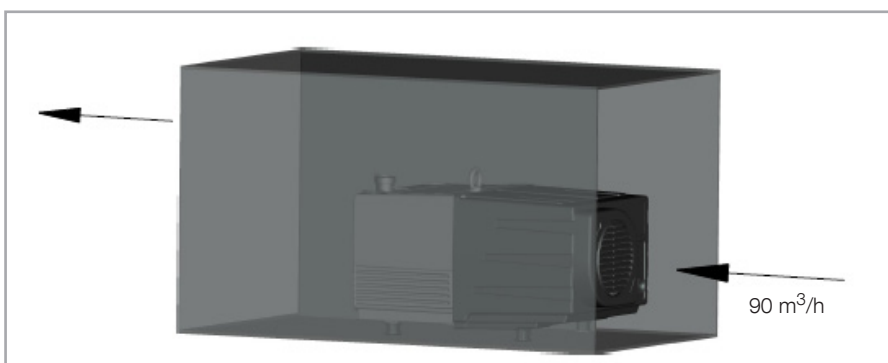
Make sure to keep the air intake of the motor clean.

The pump must be kept clean (no dust deposit).

The main air flow for cooling the pump passes between the pump and the baseplate. The air inlets and outlets must not be obstructed.

On request the SOGEVAC SV 16/25 D pumps can be supplied with an additional water cooling.

If the pump is enclosed in a machine, the below air flow is to be respected.



## 3.2 Connection to system

### 3.2.1 Intake Side

Remove the protective cap from the intake orifice.

The SV 16/25 D have a 1/2" internally-threaded connection, the SV 16/25 DI a KF flange connection. Using suitable connecting pieces (see Section 1.5), the pump can be connected to the vacuum system.

For the SV 16/25 D, adaptation to a KF flange connection is also possible. For an ISO-KF flange connection, a clamping ring and a centering ring with associated O-ring are always needed. You can connect a gauge or a venting valve to a T-piece.

The cross-section of the intake line should be at least the same as that of the intake port. If the intake line is too narrow, it reduces the pumping speed. We recommend applying LOCTITE® 567, 572 or 577 Teflon tape to the screwed unions so that they are vacuum-tight.

It is recommended to install a dust filter horizontally. This ensures that when removing the filter no particles fall into the intake port.

For pumping vapors, we recommend that condensate traps be installed on the intake and exhaust sides (see Section 1.5).

---

#### WARNING



No particles or liquids may enter in the pump.

The pump should be connected to inlet line without any tension.

Use flex lines or pipe unions in your inlet and exhaust lines so they can be easily removed for pump maintenance.

Type of materials used for mounting of canalisations should take care of pumped gases. It is the same for its tightness.

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.

---

### 3.2.2 Exhaust Side

The plug is to be screwed into the exhaust of the pump. This plug allows exhaust gases to pass through it, while preventing particles from entering the pump. The plug should be discarded only if the pump is connected to an exhaust line.

The SOGEVAC SV 16 D(I) and SV 25 D(I) have integrated exhaust filters which, even at a high gas throughput, trap over 99% of oil mist and guarantee exhaust gas free of oil. If the exhaust filters are clogged, a pressure relief valve opens at 1.5 bar, absolute (7 psid), and the filters are bypassed. As a result, the proportion of oil in the exhaust gas as well as the pump oil consumption rise. Installing new exhaust filters corrects this problem (See Section 5.5).

Check in the individual case whether an exhaust line is necessary and/or prescribed. Volatile substances can pass through the filter.

An exhaust line is always necessary if the exhaust gases are dangerous.

Depending on the type of use of the pump and the medium pumped, please observe the relevant safety rules and specifications.

The pump exhaust likewise has a 1/2" internal thread or a KF flange connection. A hose can be connected via a suitable screw-in nipple (see Section 1.5).

The cross-section of the exhaust line should be at least the same as that of the pump exhaust port. If the exhaust line is too narrow, excessive pressure may occur in the pump.

Install the exhaust line with a downward slope or a drain leg so as to prevent condensate from flowing back into the pump. If this is not possible, we strongly recommend to install a condensate trap.

If several pumps are connected to one exhaust line, ensure that it has an adequate diameter.

Never operate the pump with a blocked or restricted exhaust line. Make sure before start-up that any blinds or similar shut-off devices in the exhaust line are opened and that the exhaust line are not obstructed by deposits.

The type of materials used for routing canalisations should be chosen in consideration of pumped gases.

When pumping dangerous gases, the exhaust line must be tight.

The maximum exhaust pressure must not exceed 1,15 bar (absolute). Also reliably prevent the occurrence of any blockage in the exhaust line. Exhaust filter, accessories and the tubing must be rated according to the maximum throughput. The maximum throughput is equivalent to the pumping speed of the pump.

The pump exhaust must be connected if oil mist or process gases are to be avoided in the pump area.

Corresponding pressure regulating devices to be installed by the user.

---

## WARNING



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## NOTICE



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## WARNING



# Installation

## 3.3 Connecting Cooling Water

(only for water cooled versions)

Some variants are equipped with a cooling coil in the oil bath. These variants are typically used on CO<sub>2</sub> Laser applications. Water flow depends of water pressure. The pump motor remains air-cooled.

Pressure of water network	2 bar min. / 5 bar max.
Max. inlet water temperature	30°C
Max water cooling fitting tightening torque	20 Nm

### 3.3.1 Water Quality

In order to ensure long trouble-free operation the cooling water must not contain any oils, greases and suspended solids. Moreover, we recommend compliance with the following limit values:

Appearance	Clear, free of oils and greases
Suspended matter	< 250 mg/l
Particle size	< 150 µm
Electrical conductivity	< 700 µS/cm
pH value	7.0 to 9.0
Total hardness (total alkaline earths)	< 8 °dH
Aggressive carbon dioxide	None, not detectable
Chloride	< 100 mg/l
Sulfate	< 150 mg/l
Nitrate	≤ 50 mg/l
Iron	< 0.2 mg/l
Manganese	< 0.1 mg/l
Ammonium	< 1.0 mg/l
Free chlorine	< 0.2 mg/l

8 °dH (degrees German hardness) = 1.4mmol/l  
= 10 °e (degrees English hardness)  
= 14 °f (degrees French hardness)

If there is the danger of frost, you may use a water glycol mixture of up to 30 %.

DS water can be used for cooling the pump, if the pH value corresponds to the range indicated above.

## 3.4 Electrical Connections

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

If any security switch or electrical defect cuts out the pump, re-start-up of the pump has only to be possible by hand-action (excepted the automatic rearming pump thermal switch on single phase versions).

---

### WARNING



### 3.4.1 Single phase AC Motor

Single-phase AC motors are fitted with an on/off switch with protection breaker and a socket C14.

The pumps are also equipped with a thermal switch (100°C/212°F for SV16 D and 120°C/248°F for SV25 D). They switch on automatically again after a few minutes when the pump has cooled down. If repeated switching off occurs, disconnect power cable and carry out the trouble shooting.

To connect the pump, wire the C13 plug supplied for the socket and link the cable to the supply voltage specified on the pump's nameplate, or plug in Leybold single phase power cord.

For single-phase AC motors it is not necessary to check the direction of rotation.

If non Leybold power cables are used, it must be controlled that they are compliant to local regulations and that they have sufficient electrical ratings.

The power supply cords used shall be in accordance to the local US and CA regulations approved and with these characteristics: SJT 3x16AWG, 10A.

Plug of power supply cable must be at least NEMA 5-15 (15 A/125 V earthed).

Unplugging the power cord serves as switching device.

The earth connection is done through the mains socket and power cable.

Pumps with dual voltage motor (Motor F) have on their rear side, on the motor plastic cover, a power block.

This power block integrates:

- Voltage selector 110 ... 115 V or 220 ... 230V
- Two fuses
- On / Off switch
- C14 power socket

The pumps are delivered set for 220 ... 230V with On / Off switch on „Off“ position.

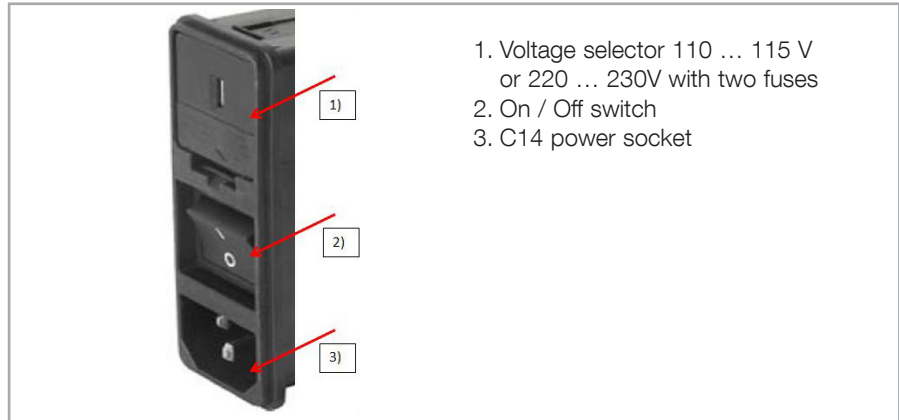
Two time lagged T fuses (5 x 20 mm) are placed in the power block for over-load protection.

For a service at 220 ... 230 V, 5 A fuses are to be used. These are delivered already mounted when the pump is delivered.

For a service at 110 ... 115 V, 10 A fuses are to be used. Those are delivered separately with the pump.



# Installation

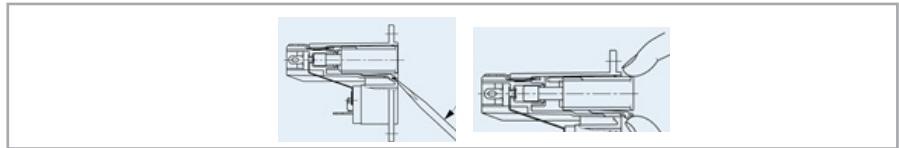


## CAUTION



### Voltage switching

Switch off the pump and unplug the power cable.



Using a tool e.g. a flat screw driver, unlock & remove the fuse & voltage selector drawer.



Remove the voltage selector drawer (light grey) und rotate it by 180 °. Put back in place until it blocks.



Check that the correct voltage indication appears in the window of the fuse & voltage selector drawer.





Insert 2 fuses in accordance with below table.

Mains voltage	Fuse rated current
220 ... 230 V	5 A T time lagged
110 ... 115 V	10 A T time lagged

Put the fuse & voltage selector drawer back into its position until it locks.

The pump can be put back into operation with the new voltage selection.

### 3.4.2 Three-Phase AC Motor

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

---

**WARNING**

Wire the motor for the correct supply voltage via connections in the junction box. See the wiring diagram on the pump motor cover.

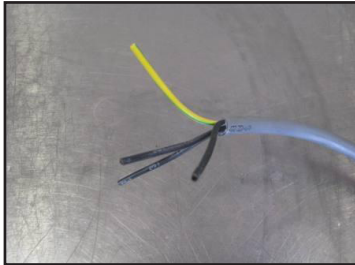
Except some OEM variants, the 3 phase pumps are delivered w/o power cable. The latter must be provided by the user and wired to the provided plug.

The power cable must comply with local regulations and have 3 phases and grounding. The works must be carried out by trained personnel according to local regulations, in voltage free condition.

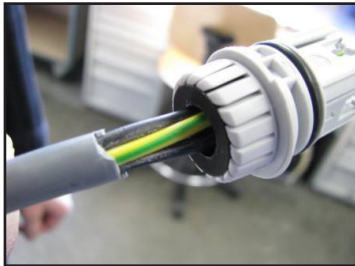
Wire section 4 x 1 mm<sup>2</sup> (AWG 17) to 2.5 mm<sup>2</sup> (AWG 14).

External cable diameter: 6 to 10 mm (1/4 to 3/8").

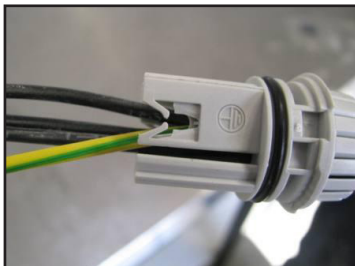
# Installation



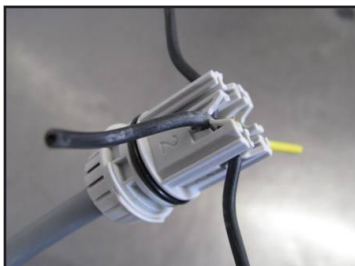
Remove the outer cable insulation over 60 mm (2 ½ inches)



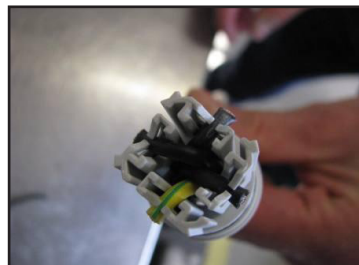
Pass the cable through the connector



Place every wire on the corresponding slot. Check the earth position.



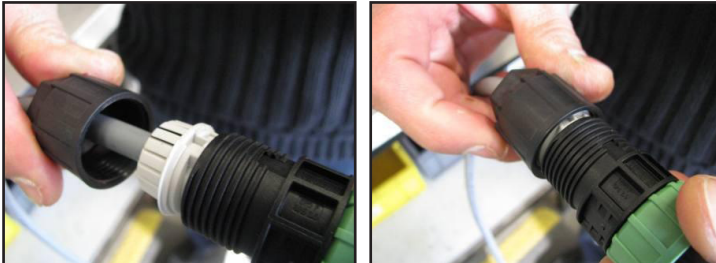
Clip every wire in place



Cut every wire close to the connector



Insert the connector into the socket



Tighten the plastic nut until mark 2



Cable can be connected on pump side

For proper connection, a suitable motor protection switch must be used in acc. with IEC 60204-1 & 61010-1.

---

## NOTICE



The setting of the motor protection switch must agree with the amprating on the nameplate.

The motor protection switch must be close to the pump, accessible and clearly identified as the pump switching device.

The three-phase AC motor must be protected by a protection breaker type GV2 ME08 from Schneider Electric (or similar) adjustable from 2,5A to 4A for a usage at low voltage and 4 to 6.5 A for a usage at high voltage.

After connecting the motor and after every change of connection, check the direction of rotation.

---

## NOTICE



To do so, switch on the pump very briefly (approx. 1 sec.) and immediately switch it off again.

Verify that the pump operates correctly by placing e.g. a rubber plug or vacuum gauge on pump inlet.

If the pump runs in the wrong direction, shut off the power and interchange 2 phases of the connection.

For the rotation check the pump should be open.

# Installation

It is advisable to check the direction of rotation with a phase-sequence indicator.

If the pump is run for too long in the wrong direction, it can be damaged.

The earth connection is done through the mains cable.

Please make sure that the power cable doesn't touch the pump oil casing.

## 3.5 Startup

The oil for the first filling is supplied with the pump in a separate can. Before the first pump start, fill in the oil in acc. with § 5.4.

---

### NOTICE



Before switching on, always make sure that the pump contains enough oil. The normal oil level is in the middle of sight glass.

If oil has to be added, unscrew the oil-fill plug (ET1/17), add oil and screw the plug firmly back in.

The SOGEVAC is designed for normal startup at temperatures over 12°C (54 °F) (as per PNEUROP). Lower ambient temperatures are possible with use of special lubricants. Contact Leybold.

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

If more starts are needed, the pump should run continuously and be separated from or linked to the vacuum vessel by means of a valve. With the valve closed, the pump consumes little energy.

---

### WARNING



Before starting the pump ensure that the attached accessories meet the requirements of your application and that safe operation is ensured.

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.

The safety regulations which apply to the specific application in each case must be observed. This applies in particular to installation, operation and maintenance (servicing) as well as waste disposal and transportation.

Do not lay the hand on the intake to check suction. Exposure of a part of the body to the vacuum results in a rush of blood in the exposed part.

---

Single phase pumps are switched on by operating the ON/OFF switch mounted on the plastic cover on the pump rear side.

Three phase pumps are switched on by operating the non delivered breaker.

## 4 Operation

Pump in function 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 warning labels on the pump.

SOGEVAC pumps can pump gases and vapors provided that the gas ballast valve is installed and the pump has reached its operating temperature.

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

### 4.1 Pumping of Non-condensable Gases

If the pump system contains mainly permanent gases, the pump can 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, we recommend running the pump with the gas ballast valve open.

### 4.2 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 value indicated in the Technical Data. The pump's water vapor tolerance can be increased by raising the operating temperature.

Open the gas ballast valve by turning the black cap until the hole in the side of the cap is aligned with the orifice in the side of the metal ferrule. Close the valve by turning the cap until it covers the orifice in the metal ferrule. The running noise of the pump is slightly louder if the gas ballast valve is open.

When vapors are pumped, ensure that the pump has run for at least 15 min. with closed intake line and open gas ballast.

The pump cannot handle its maximum vapor throughput, until it has reached its operating temperature.

For processes with a high proportion of condensable vapors, the intake line should be opened slowly after reaching the operating temperature to prevent excessive quantities of vapors from entering the pump.

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

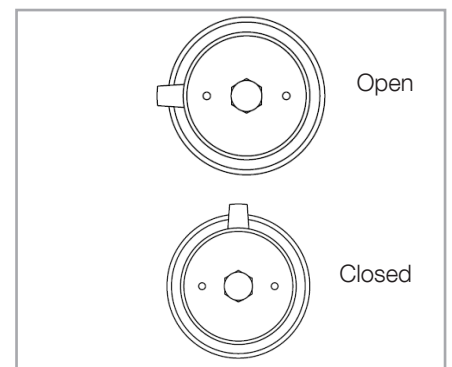
When vapors are pumped, the SOGEVAC must not be switched off immediately upon completion of the process because the condensate dissolved in the pump oil may cause changes or corrosion.

To prevent this, the pump must continue to operate with open gas ballast valve and closed intake port until the lubricant is free of condensate. We recommend operating the pump in this mode for at least 30 min. after completion of the process.

In cyclic process operation, the pump should not be switched off during the intervals between the individual working phases, but should continue to run with gas ballast valve open and intake port closed (if possible via a valve).

---

### WARNING



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### NOTICE



# Operation

Power consumption is minimal when the pump is operating at ultimate pressure.

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

### 4.3 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.

Under normal circumstances, all that you need to do is to switch off the pump.

When pumping condensable media let the pump continue to operate with the gas ballast valve open and the intake line closed before switching off (see Section 4.2).

If the SOGEVAC is to be shutdown for an extended period after pumping aggressive or corrosive media or if the pump has to be stored, proceed as follows:

Drain the oil (see Section 5.4).

Add clean oil until the oil level is at the lower mark of the oil level glass (see Section 5.3) and let the pump operate for a few minutes.

Then drain the oil and add clean oil until the oil-level is in the middle of both marks.

Seal the connection ports. Special preservation or anti-corrosion oils aren't necessary.

---

**WARNING**

When pumping harmful substances, take adequate safety precautions.

---

**WARNING**

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 into 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 operating conditions, the pump must then not be directly switched on again.

## 4.4 Ultimate Pump Pressure

If the system cannot produce the pressures specified in the Technical Data, disconnect the pump from the system and measure the ultimate pressure directly at the pump's intake port.

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

Precise measured values can only be obtained with calibrated instruments.

After 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. It is in all events advisable to operate the pump initially with the gas ballast valve open.

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 our oil types LVO 120 or LVO 700.

# Maintenance

---

## DANGER



## 5 Maintenance

Switch off the breaker or pump switch and disconnect the power before disassembling the pump. Make absolutely sure that the pump cannot be accidentally started.

If the pump has pumped harmful substances, ascertain the nature of the hazard and take adequate safety measures.

Observe all safety regulations.

---

Due to the design concept of the SOGEVAC, maintenance is normally kept to a minimum. The work required is described in the sections below.

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

Maintenance works must be carried out with proper tools in an adequate work space / bench equipped with sufficient lighting.

After a repair or maintenance job not done by Leybold, please make sure that the pump is correctly reassembled and test it to verify its performance.

Please contact Leybold should any question arise.

---

## NOTICE



Never mount used seals; always mount new seals.

### 5.1 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.

This form is available from [www.leybold.com](http://www.leybold.com) —> Downloads —> 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.

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## CAUTION



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.



## 5.2 Maintenance Schedule

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	5.3
Check the oil condition	Depends on process	5.3
1st oil change	After 150 h of operation	5.4
Subsequent oil changes	500 to 2000 h of operation or 6 months	5.4
Install new exhaust filter	If oil mist at exhaust or after 1 year	5.5
Clean the dirt trap	1 month	5.6
Check the valve	1 year	5.7

Above oil changing interval with LVO 120. Depending of the application the use of LVO 700 allows oil changing intervals every 24000 hours or 3 years.

Maintenance works must be carried out with proper tools in an adequate work space / bench equipped with sufficient lighting.

Use only Leybold spare & consumables.

An overhaul at Leybold is recommended every 3 years.

After maintenance operations, make sure the device is in a safe condition before putting back into operation.

## 5.3 Checking the Oil

(See Fig. 6)

### Oil Level

The pump's oil level must always be in the middle of the oil level glass during operation. Oil should be replenished when necessary. Over filling leads to oil losses at high intake pressures. The oil level should be checked at least once a day.

### Oil Condition

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

If gases or liquids dissolved in the oil produce a deterioration of the ultimate pressure, the pump may be degassed by allowing it to run for approx. 30 min. with closed intake port and open gas ballast valve.

When you need an oil sample to determine if the oil needs to be changed, shut down the pump and remove the oil drain plug to drain a sample while the pump is still at operating temperature.

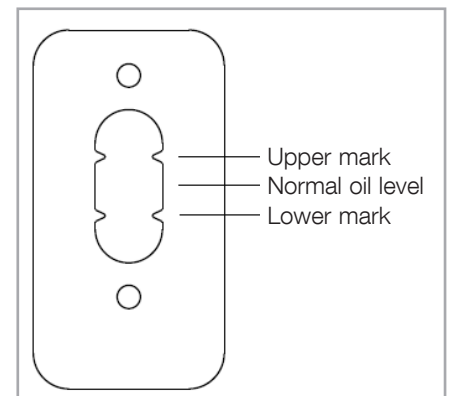


Fig. 6 Oil level glass

# Maintenance

## 5.4 Oil Change

Tool required: hex key 12 mm Leybold P/N E6507617.

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, the oil should be changed immediately after operating the pump.

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### WARNING



Pump in function is hot and some surfaces could reach a temperature higher than 80 °C (176 °F). There is a risk of burn by touching.

Open the drain valve and let the used oil drain into a suitable receptacle.

When the flow of oil slows, screw the oil-drain plug back in, briefly switch on the pump (max. 10 s) and switch it off. Remove the oil-drain plug again and drain the remaining oil.

Close the drain valve. Remove the screw from the oil-fill port and add fresh oil until it reaches the middle.

Then reinstall the plugscrew.

If the oil is badly contaminated, the pump should be flushed by filling it with fresh oil only up to the lower mark of the oil-level glass, running it for a short while and then changing the oil again.

Use suitable oil only.

The oil sight glass is made of strong glass specially used for such applications. Nevertheless, avoid shocks on it! Risks of damage. In case of oil sight glass damage, stop the pump, wear protection equipment (gloves and more depending of the process), clean the oil on the floor and change the oil sight glass. Contact our Service if required.

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### CAUTION



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

## 5.5 Replacing the Exhaust Filters

When the exhaust filter elements is clogged, a pressure relief valve opens for safety reasons and the filters is bypassed. Thus oil mist at the exhaust and high consumption are signs that the element needs to be changed.

The exhaust filter must be exchanged more frequently if subjected to increased oil cracking products at high operating temperatures and/or aggressive media.

Unscrew tightening knob (ET1/1). Remove cover (ET1/2) with its O-Ring (ET1/8) spring (ET1/3) and washer (ET1/4). Pull out used exhaust filter element (ET1/5) and replace it with new one.

Reassemble in the reverse order. Make sure that the O-ring (ET1/8) fits properly.

Never run the pump without exhaust filter. The filter is needed to produce a pressure differential within the pump to maintain the oil cycle.

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### NOTICE



Since the exhaust filter element is normally clogged by aging products from the oil, we recommend changing the oil when you change the exhaust filter.

## 5.6 Cleaning the Dirt Trap

Remove the inlet flange connection accessories.

A wire-mesh filter (ET1/13) is located in the pump's intake port to act as a dirt trap for particles. It should be kept clean at all times to avoid reducing the pumping speed.

For this purpose, disconnect the intake line, remove the dirt trap from the intake port and rinse it in a vessel using a suitable solvent. Then thoroughly dry it with compressed air. If the dirt trap is defective, install a new one.

If the process gas has large amounts of abrasives, install a dust filter into the intake line (see section 1.4).

## 5.7 Replacing Valves

### Pressure Relief Valve (ET1/11)

If you get an oil mist from the exhaust, first ensure that the exhaust filter is installed correctly, and then check if it is clogged. If it is installed correctly, and is clean, then the problem is either a clogged or damaged overpressure relief valve.

Remove the exhaust filter metal cover by loosening the hand knob and, using a 8 mm hex key, remove the plug in the upper left corner behind the exhaust filter metal cover.

Pull out the spring and valve.

Clean if necessary with a suitable solvent and control that it is in good condition. Replace the valve if necessary.

This check is to be done at every exhaust filter change.

# Maintenance

## **Anti-suckback Valve (ET1/63)**

The anti-suckback valve (ET1/63) is suspended in the ring (ET1/64) so that its sealing surface rests flat on the intake port. When the pump is in its operating position, the hanger in the ring must be at the top.

Consult the Leybold Service for the cleaning or exchange of the anti-suckback valve.

On the DI range, the anti-suckback valve is integrated in the inlet DN 25 ISO-KF port. The upper part can be unscrewed to access to the anti-suckback valve for cleaning.

## **Gas Ballast Non-Return Valve (ET1/16)**

If exhaust gas or oil appears at the gas ballast intake (ET1/14) the gas ballast non-return valve should be changed.

Using a 5 mm hex key, unscrew the GB knob.

Using a long 4 mm hex key, unscrew non-return valve assembly and exchange it. Use Loctite® 222 or 572 for the assembly of the GB non-return valve assembly & GB knob.

## **Float Valve (ET1/6)**

If the pressure does not drop below approx. 5 mbar during operation of the pump, check the float valve.

## **5.8 Replacing the Vanes**

Please contact the Leybold service.

## **5.9 Replacing the Electrical Devices**

Only specially trained staff or Leybold should replace the motor.

Do not remove the pump cover on an operating pump !

Switch off the voltage first and secure that no unintended switching on can occur!

# Troubleshooting

## 6 Troubleshooting

Fault	Possible cause	Remedy
Pump does not start.	Pump is connected incorrectly. Operating voltage does not match motor. Motor protection switch incorrectly set (on three-phase motors). Switch is malfunctioning (on single-phase motors). Motor is malfunctioning. Oil temperature is below 12°C (54°F). Oil is too viscous. Exhaust filter / exhaust line is clogged. Vane is broken. (Sign : pump is jammed). Pump is seized up. (Sign : pump is jammed).	Connect correctly. Replace the motor. Set motor protection switch properly. Replace the switch. Replace the motor. Heat the pump and pump oil or use different oil. Change the oil. Replace the filter or repair the pressure relief valves, clean the exhaust line. Replace the vane. Repair the pump.
Pump does not reach ultimate pressure.	Pump is too small. Measuring technique or gauge is unsuitable. Pump is too cold. Float valve does not close. Inadequate lubrication due to - missing oil, - contaminated oil, - clogged oil lines. External leak 2). Anti-suckback valve close. Exhaust valve is incorrectly mounted or malfunctioning. Vanes are stuck in their slots. Rotor clearance is too large.	Check the process date; replace the pump, if necessary. Use correct measuring technique and gauge. Disconnect the pump from the system and measure the pressure directly at the pump. Let the pump warm up for approx. 15 min. Check the float valve and repair it if necessary. Refill oil. Degas or change the oil. Clean the oil lines and oil case. Repair the pump. Repair the valve. Mount the valve properly or replace. Remove the vanes; clean the vanes and slots. Repair the pump.
Pumping speed is too low.	Dirt trap in the intake port is clogged. Exhaust filter is clogged. Connecting lines are too narrow or too long. Anti-suckback valve is hard to open. Vanes are stuck in their slots.	Clean the dirt trap; Precaution: install a dust filter in intake line Replace the filter element. Use wider or shorter connecting lines. Remove the vanes; clean the vanes and slots. Repair the pump.
Pump gets unusually hot.	Cooling faces are obstructed or dirty. Exhaust filter / exhaust line is obstructed. Inadequate lubrication due to - low oil level, - contaminated oil, - clogged oil lines. Exhaust valve is malfunctioning.	Set pump up correctly or clean the cooling faces. Replace the exhaust filter, clean the exhaust line. Refill oil. Degas or change the oil. Clean the oil lines and oil case. Replace the valve.

# Troubleshooting

<b>Fault</b>	<b>Possible cause</b>	<b>Remedy</b>
Pump is too loud	Inadequate lubrication due to - low oil level, - contaminated oil, - clogged oil lines.  Pump is too cold.  Fan is worn out.  Motor cover is not properly tightened.  Large vacuum leak in system.	Refill oil. Degas or change the oil. Clean the oil lines and oil case.  Let the pump run up for approx. 15 min.  Change the fan.  Tighten the motor cover.  Repair vacuum leak.
Oil consumption is too high, oil mist at exhaust.	Exhaust filter elements are clogged or damaged  Nozzle of the float valve is clogged.  Oil level is too high.  Exhaust filter element is incorrectly mounted.	Replace the exhaust filter.  Check the float valve, clean the nozzle.  Drain the excess oil.  Dismount the filter element and tighten the filter support.
Oil in the intake line or vacuum vessel.	Oil comes from vacuum system.  Anti-suckback valve is obstructed.  Sealing surfaces of the anti-suckback valve are dirty or damaged.  Motor turns in the wrong direction (on three-phase motors).  Oil level is too high.	Check the vacuum system.  Clean or repair the valve.  Clean or repair the intake port and anti-suckback valve.  Interchange two phases at the motor connection.  Drain the excess oil.
Oil is turbid or dark	Condensation.    Oxidation.	Degas the oil or change the oil and clean the pump. Precaution: open the gas ballast valve or insert a condensate trap.    Change the oil.
2) Bubble test: Let the pump run at operating temperature with degassed oil, without gas ballast and with closed intake port. Immerse the exhaust line in a bucket of water. If a steady stream of bubbles appears, the pump has an external leak.		
N.B.: For any other operation as described before, return the pump to a Leybold service center.		

## 7 Spare Parts

To guarantee safe operation of the Leybold 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.

Consumables 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 hereafter and in the spare parts table where the contents of each kit is detailed.

- Exhaust demisters
- Oil
- 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

Explosion drawing SV16 D - 25 D

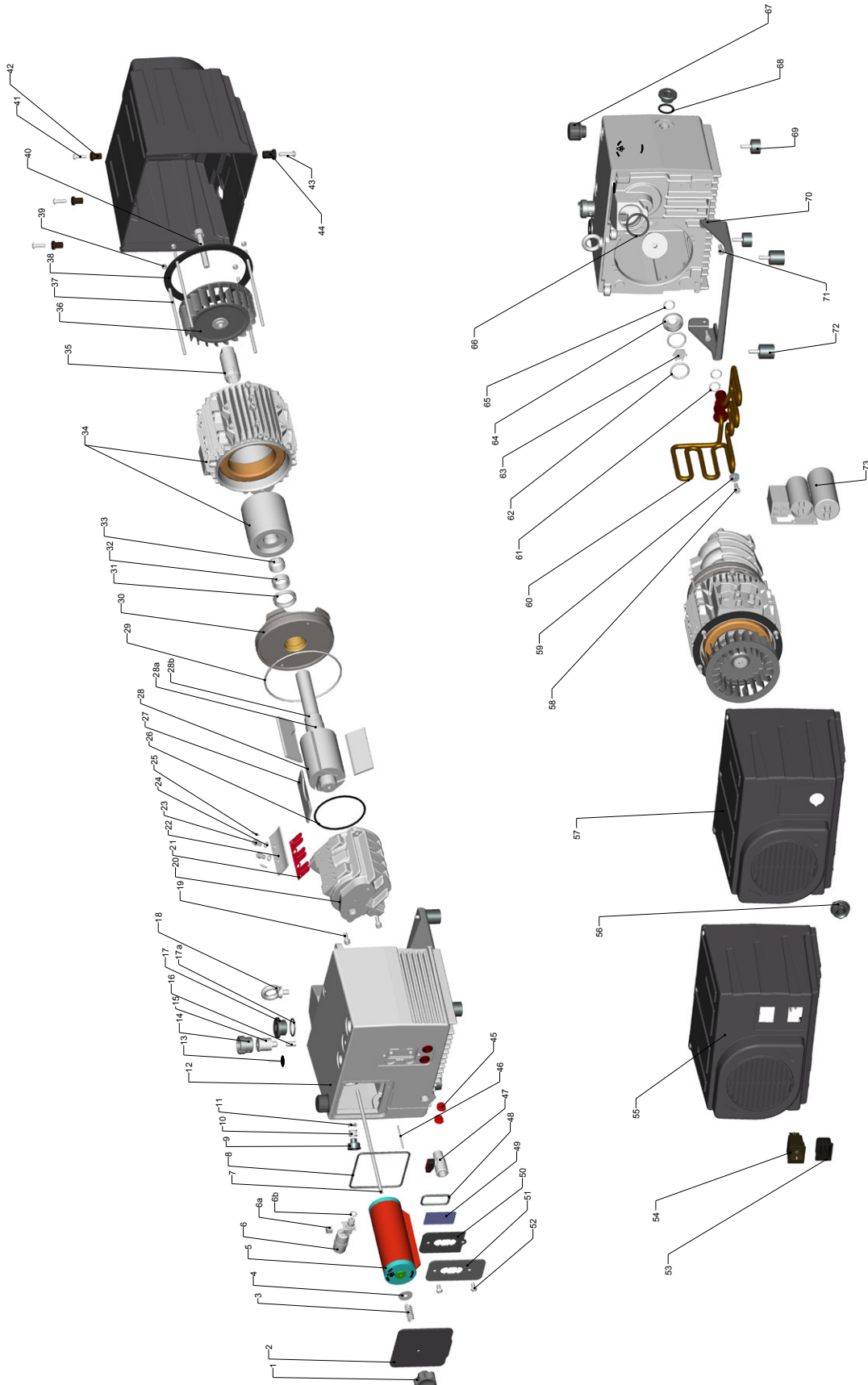


Fig. ET1



## Spare parts list SV16 D - 25 D

POS ITEM	STÜCK QTY QTE	BENENNUNG	DESCRIPTION	DESIGNATION	BESTELL-Nr. PART-Nr. N°DE REF	BEMERKUNG NOTES REMARQUES	EK971479420	EK971479430	EK971479440	EK971479450	EK971479460	EK971473510	EK971473730
1	1	KNOPFSCHRAUBE	TIGHTENING KNOB	BOUTON DE SERRAGE					•				
2	1	ABSCHLUßDECKEL	EXHAUST FILTER COVER	TAPE DE FILTRE D'ÉCHAPPEMENT									
3	1	FEDER	SPRING	RESSORT			•		•				
4	1	SCHEIBE	WASHER	RONDELLE			•		•				
5	1	AUSPUFF-FILTERELEMENT	EXHAUST FILTER	FILTRE D'ÉCHAPPEMENT	71232023		•		•				
6	1	SCHWIMMER KOMPL.	FLOAT VALVE ASSEMBLY	ENSEMBLE FLOTTEUR					•				
6a	1	ÖLRÜCKFUHRVENTIL	OIL RETURN VALVE SEAL	CLAPET DE RECUPERATION HUILE				•					
6b	1	O-RING	O-RING	JOINT TORIQUE				•					
7	1	FILTERHALTER	EXHAUST FILTER ROD	TIRANT DE FILTRE D'ÉCHAPPEMENT	71231643								•
8	1	O-RING	O-RING	JOINT TORIQUE			•	•	•				
9	1	NIPPEL G1/2	NIPPLE G1/2 D11	MAMELON G1/2									
10	1	FEDER BY-PASS	SPRING BY-PASS	RESSORT BY-PASS					•				
11	1	BY PASS VENTIL	BY PASS VALVE	CLAPET BY PASS SURMOULE				•					
12	1	ÖLKASTEN GAS BALLAST RAL 7035	OIL CASING GB RAL 7035	CARTER L-A RAL 7035	EK971473730								•
13	1	SCHMUTZFÄNGER	DIRT TRAP	TAMIS D'ASPIRATION			•		•				
14	1	GB-KAPPE	GAS BALLAST CAP	BOUCHON DE LEST D'AIR					•				
15	1	GB KOERPER	GAS BALLAST BODY	CORPS DE LEST D'AIR					•				
16	1	GB VENTIL	GAS BALLAST NON RETURN	CLAPET ANTI-RETOUR					•				
17	1	G 3/4" STOPFEN OEL EIN	G 3/4" PLUG OIL FILLING	BOUCHON HC G 3/4" REPLISSAGE			•						
17a	1	O-RING	O-RING	JOINT TORIQUE			•	•					
18	1	TRANSPORTLASCHE	LIFTING LUG	ANNEAU DE LEVAGE	714029720								
19	2	SCHRAUBE M6	SCREW M6	VIS CHC									
20	1	STATOR SV16 D	PUMP CYLINDER SV16 D	STATOR USINE SV16 D	EK971473700	Incl. 25				•			
20	1	STATOR SV25 D	PUMP CYLINDER SV25 D	STATOR USINE SV25 D	EK971473710	Incl. 25					•		
21	1	VENTILPLATTE SV16-25 D	VALVE PLATE SV16-25 D	LAME SV16-25 D					•	•	•		
22	1	VENTILANSCHLAG SV16-25	VALVE STOP SV16-25	CONTRE LAME SV16-25					•	•	•		
23	2	SCHRAUBE M6	SCREW CHC M6	VIS CHC M6					•	•	•		
24	2	SCHEIBE	WASHER WZ6	RONDELLE WZ6					•	•	•		
25	2	STIFT	PIN	GOUPILLE ELAST.					•	•			
26	1	O-RING	O-RING	JOINT TORIQUE				•		•	•		
27	1	SCHIEBER (SATZ VON 3)	VANE (SET OF 3)	PALETTE (JEU DE 3)	ES71234371				•	•	•		
28	1	ROTOR	ROTOR	ROTOR EQUIPE	EK971473560					•	•		
28a	1	ROTOR RING	ROTOR BUSHING	BAGUE ROTOR						•	•		
28b	1	ROTOR RING	ROTOR BUSHING	BAGUE ROTOR						•	•		
29	1	O-RING	O-RING	JOINT TORIQUE				•		•	•		
30	1	LAGER DECKEL	END PLATE	FLASQUE USINE	EK971473720					•	•		
31	1	WELLENDICHRING	SHAFT SEAL	JOINT A LEVRE				•		•	•		
32	1	ABSTANDSTÜCK D25	SPACER	ENTRETOISE		Nur / Only Uniquement 200V						•	
33	1	ROTOR RING	ROTOR BUSHING	BAGUE ROTOR								•	
34	1	WELT MOTOR 3PH	MOTOR WIDE RANGE 3PH	MOTEUR MONDE TRI	*	Incl. 39							
34	1	MOTOR 200V 3PH	MOTOR 200V 3PH	MOTEUR 200V TRI	*	Incl. 39							
34	1	MOTOR 1PH WELT	MOTOR 1PH WIDE RANGE	MOTEUR MONO MONDE	*	Incl. 39							
34	1	MOTOR 1PH 2 SPANNUNG	MOTOR 1PH DUAL VOLTAGE	MOTEUR MONO BI-TENSION	*	Incl. 39							
35	1	HINTERER RING	REAR BUSHING	BAGUE ARRIERE								•	
36	1	LÜFTERRAD	TURBINE	TURBINE	EK971473540								
37	4	MOTOR STAEBE	MOTOR TIE ROD M5	TIRANT MOTEUR									•
38	1	MOTOR FLANSCH	MOTOR FLANGE	BRIDE MOTEUR									
		WARTUNGS KIT SV16-25 D	MAINTENANCE KIT SV16-25 D	KIT MAINTENANCE SV16-25 D	EK971473420								
		DICHTUNGSSATZ SV16-25 D	SET OF SEALS SV16-25 D	JEU JOINTS SV16-25 D	EK971473430				•				
		REPARATURSATZ SV16-25 D	REPAIR KIT SV16-25 D	KIT REPAR SV16-25 D	EK971473440								
		PUMPENTEIL SV16 D	GENERATOR SV16 D	GENERATEUR SV16 D	EK971473450								
		PUMPENTEIL SV25 D	GENERATOR SV25 D	GENERATEUR SV25 D	EK971473460								
		MOTOR BUCHSEN + SCHRAUBEN	MOTOR BUSHINGS & SCREW	BAGUES MOTEUR & VIS	EK971473510								
		ÖLKASTEN SV16-25 D	OIL CASING SV16-25 D	CARTER SV16-25 D	EK971473730	Incl. 42							

\* For spare motors, contact Leybold

# Spare parts

## Spare parts list SV16 D - 25 D

POS ITEM	STÜCK QTY QTE	BENENNUNG	DESCRIPTION	DESIGNATION	BESTELL-Nr. PART-Nr. N° DE REF	BEMERKUNG NOTES REMARQUES	EK971473420	EK971473430	EK971473440	EK971473450	EK971473460	EK971473510	EK971473730
39	1	MUTTER M5	NUT M5	ECROU FREIN M5					•				
40	1	SCHRAUBE M10	SCREW CHC M10	VIS CHC M10								•	
41	3	SCHRAUBE M5	SCREW BHC M5	VIS BHC M5									
42	3	DAEMPFER M5	SILENT BLOCK	FIXATION REDUCTION BRUIT									
43	1	SCHRAUBE M6	SCREW BHC M6	VIS BHC M6									
44	1	DAEMPFER	SILENT BLOCK	FIXATION REDUCTION BRUIT									
45	2	STOPFEN	PLUG	BOUCHON		H2O			•				
46	1	STIFT	PIN	GOUPILLE									
47	1	OELABLASSHAHN	DRAIN VALVE	ROBINET DE VIDANGE	EK971473690								
48	1	O-RING	O-RING	JOINT TORIQUE				•					
49	1	OELSCHAUGLASS-GLASS	OIL SIGHT GLASS	VERRE VOYANT					•				
50	1	OELSCHAUGLASS H2O	SIGHT GLASS COVER WATER	VOYANT H2O					•				
51	1	OELSCHAUGLASS LUFT	SIGHT GLASS COVER AIR	VOYANT AIR					•				
52	2	SCHRAUBE M6	SCREW HC M6	VIS HC M6					•				
53	1	STECKER C14	SOCKET C14	PRISE TYPE C14									
54	1	LEISTUNGSBLOCK	POWER BLOCK	BLOC PUISSANCE									
55A	1	HAUBE 1PH	HOUSING 1PH	CAPOT MONO	EK971473520	Incl. 53;54							
55B	1	HAUBE 3PH	HOUSING 3PH	CAPOT TRI	EK971473530								
56	1	KABELKLEMME	CABLE CLAMP	SERRE CABLE DN7									
57	1	HAUBE 3PH	HOUSING 3PH	CAPOT TRI	EK971473530	Incl.56							
58	1	SCHRAUB M6	SCREW CHC M6	VIS CHC M6									
59	1	SCHLEIBE KUEHLSCHLANGE	WASHER MAINTAINING COOLING COIL	RONDELLE MAINTIEN SERPENTIN									
60	1	KUEHLSCHLANGE	COOLING COIL	SERPENTIN	EK971473550	Incl.58;59							
61	2	O-RING	O-RING	JOINT TOR				•					
62	2	O-RING	O-RING	JOINT TOR				•					
63	1	ANSAUGVENTIL	INTAKE VALVE	CLAPET SURMOULE ASPIRATION				•					
64	1	ANSAUGVENTIL HALTERUNG	INTAKE VALVE RING	SUPPORT CLAPET GOUPILLES					•				
65	1	O-RING	O-RING	JOINT TORIQUE				•					
66	1	O-RING	O-RING	JOINT TORIQUE				•					
67	1	AUSPUFFKAPPE	EXHAUST PLUG	BOUCHON D'ECHAPPEMENT					•				
68	1	O-RING	O-RING	JOINT TORIQUE				•					
69	2	DN25 FUSS	RUBBER FEET 15	AMORTISSEUR DN25 H15	EK971473580	Incl.72							
70	1	STAENDER	SUPPORT	SUPPORT PIEDS	EK971473740	Incl.44 ;69 ;72							•
71	2	SCHRAUBE M6	SCREW CHC M6	VIS CHC M6	EK971473500								
72	2	FUSS	RUBBER FEET 25	AMORTISSEUR DN25 H25	EK971473580	Incl.69							
73	1	ZUBEHÖR WS MOTOREN	ACC SINGLE PHASE MOTOR	ACC MOTEUR MONO		Relay and capacitors							
74	1	THERMOSCHALTER	THERMAL SWITCH	SECURITE THERMIQUE	1PH only/seulement								
		WARTUNGS KIT SV16-25 D	MAINTENANCE KIT SV16-25 D	KIT MAINTENANCE SV16-25 D	EK971473420								
		DICHTUNGSSATZ SV16-25 D	SET OF SEALS SV16-25 D	JEU JOINTS SV16-25 D	EK971473430			•					
		REPARATURSATZ SV16-25 D	REPAIR KIT SV16-25 D	KIT REPAR SV16-25 D	EK971473440								
		PUMPENTEIL SV16 D	GENERATOR SV16 D	GENERATEUR SV16 D	EK971473450								
		PUMPENTEIL SV25 D	GENERATOR SV25 D	GENERATEUR SV25 D	EK971473460								
		MOTOR BUCHSEN + SCHRAUBEN	MOTOR BUSHINGS & SCREW	BAGUES MOTEUR & VIS	EK971473510								
		ÖLKASTEN SV16-25 D	OIL CASING SV16-25 D	CARTER SAV SV16-25 D	EK971473730								

Spare parts list SV16 DI - 25 DI upon request. Please contact Leybold.

## 8 Waste Disposal

The equipment may have been contaminated by the process or by environmental influences. In this case the equipment must be decontaminated in accordance with the relevant regulations. We offer this service at fixed prices. Further details are available on request.

Contaminated parts can be detrimental to health and environment. Before beginning with any work, first find out whether any parts are contaminated. Adhere to the relevant regulations and take the necessary precautions when handling contaminated parts.

Separate clean components according to their materials, and dispose of these accordingly. We offer this service. Further details are available on request.

When sending us any equipment, observe the regulations given in Section "Leybold service".

### Disposal of Waste Oil

Owners of waste oil are entirely self-responsible for proper disposal of this waste.

Waste oil from vacuum pumps must not be mixed with other substances or materials.

Waste oil from vacuum pumps (Leybold oils which are based on mineral oils) which are subject to normal wear and which are contaminated due to the influence of oxygen in the air, high temperatures or mechanical wear must be disposed of through the locally available waste oil disposal system.

Waste oil from vacuum pumps which is contaminated with other substances must be marked and stored in such a way that the type of contamination is apparent. This waste must be disposed of as special waste.

European, national and regional regulations concerning waste disposal need to be observed. Waste must only be transported and disposed of by an approved waste disposal vendor.

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**WARNING**



# EU Declaration of Conformity

(Translation of original Declaration of Conformity)

**The manufacturer:** Leybold France SAS  
640 rue Aristide Bergès  
26500 Bourg-Lès-Valence  
France

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:** SV16D(I), SV25D(I), SV200, SV1200, 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

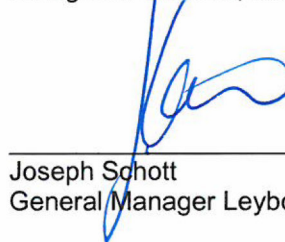
**Documentation officer:** Leybold France SAS  
640 rue Aristide Bergès  
26500 Bourg-Lès-Valence, France

Cologne, October 1<sup>st</sup> 2018



Andries Desiron  
VP Engineering  
Industrial Vacuum Division

Bourg-Lès-Valence, October 1<sup>st</sup> 2018



Joseph Schott  
General Manager Leybold Valence

# Notes

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