



SOGEVAC DI & BI

The preferred roughing pump
for Analytical Applications



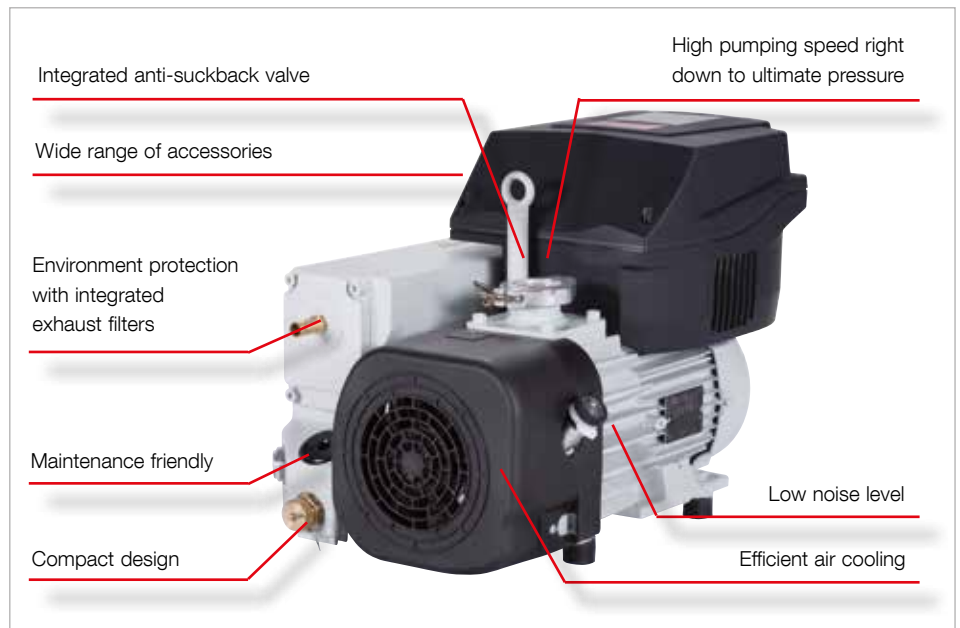
Features and Design

Oil sealed rotary vane vacuum pumps are being used in all areas of vacuum engineering.

The SOGEVAC BI and DI pump models are the preferred rotary vane vacuum pumps to generate medium vacuum for analytical applications and offer better ultimate pressure, higher pumping speeds and single phase drives.

Their excellent reliability is a fact and unmatched maintenance free operation durations are granted. Pumping speeds range between 16 and 147 m³/h.

Top notch engineering and unique oils allow a maintenance free operation for three years on Liquid Chromatography and Gas Chromatography Mass Spectrometers.



Outstanding features of the SOGEVAC BI and DI pumps

Typical Applications

- Liquid Chromatography and Gas Chromatography Mass Spectrometers
- Inductively Coupled Plasma Mass Spectrometers
- Electron microscopes
- Turbomolecular pump backing in other research and development applications
- Leak testing
- Refrigerating and air conditioning
- Metallurgy
- Freeze drying

Our Solution

- Up to 24'000 hours maintenance free operation on Liquid Chromatography and Gas Chromatography Mass Spectrometers
- High pumping speed at low pressures
- Very low noise levels below 61 dB(A) and low vibrations
- Exhaust gas free of oil mist thanks to integrated efficient exhaust filters (oil loss below 1 ppm)
- Single phase wide range drives from 200 to 240 V, $\pm 10\%$, 50/60 Hz
- F/C drives with RS 485 interface for preventive maintenance and pump control
- Preventive maintenance possible by reading out pump operating hours or trends
- Pump speed control through RS485 interface
- Pumps are EN/UL 61010-1 certified
- Pumps reach EMC Class B levels
- Smart packaging and handling device for safe set-up at site
- Best reliability on the market

Design Principle

SOGEVAC pumps are oil sealed rotary vane pumps.

The oil carried with the process gas is roughly separated in the oil box before the discharged gas enters the integrated exhaust filters where the fine oil mist is trapped. The thus filtered oil is collected in the oil box and then supplied back to the pump.

The SOGEVAC vacuum pumps distinguish themselves by their very low power consumption, low noise levels and excellent reliability

Materials used:

Steel, cast iron, aluminium, bronze, FPM (FKM), glass, polyamid 6.6, filter material (polymers, paper), epoxy resin and glass fibre.

Customer Benefits

Leybold rotary vane vacuum pumps from the SOGEVAC BI and DI series excel through numerous special features:

Compact Design

The pumps have been designed for high efficiency, especially at low pressures.

For the SV 16 DI through SV 65 BI FC, the pump and motor use the same shaft.

For the SV 120 BI FC the motor is mounted using a coupling housing.

Quiet Operation

SOGEVAC pumps are designed throughout to keep the noise level as low as possible, below 61 dB(A) and provide constant, pleasant and low pitched noise levels.

This typically allows a pump operation without expensive noise enclosures.

Universal Use

All pumps can be operated on single phase mains 200 to 240 V, $\pm 10\%$ @ 50/60 Hz.

Anti-Suckback Valve

A valve is built into the intake of the SOGEVAC pumps. During standstill of the pump (for example due to shutting down or a power failure) the valve closes the intake.

This prevents the pressure from rising in the connected chamber while the pump is vented at the same time. Any suckback of pump oil into the vacuum system is thus also effectively prevented. This blocking process operates under all operating conditions (below 800 mbar (600 Torr)) and even when the gas ballast valve is open.

Interface Capabilities

- I/O and RS 485 interface.
- Adjustable speed 50 to 100 %
- Predictive maintenance

Environment Protection

The built-in exhaust filter ensures an oil-mist free exhaust gases over the entire range of operating pressures – from atmospheric pressure to ultimate pressure. The oil loss level at pump exhaust is below 1 ppm.

Supplied Equipment

All pumps are delivered with the required quantity of oil, already filled into the pump. Pumps are ready for operation, and in a package making life easy for the field service engineer. Smart unpacking without HSE risks.

Each pump is delivered with convenient tools for easy maintenance:

- Hex key for the oil filling plug
- Oil drain hose

SOGEVAC models												
Brief technical data		Unit		SV16 DI		SV28 BI		SV40 BI		SV40 BI FC	SV65 BI FC	SV120 BI FC
Frequency	Hz	50	60	50	60	50	60	50 / 60	50 / 60	50 / 60		
Nominal pumping speed (DIN 28 400 ff)	m³/h	≥ 16.0	≥ 18.7	≥ 25	≥ 30	≥ 42	≥ 50	50	71	≥ 147		
Pumping speed, according to DIN 28 400 ff	m³/h	≥ 14.5	≥17.0	≥ 23	≥ 27	≥ 40	≥ 48	≥ 48	≥ 64	≥ 122		
Pumping speed at 2 mbar	m³/h	≥ 12	≥ 13	≥ 19	≥ 23	≥ 36	≥ 43	43	50	≥ 100		
Ultimate total pressure without gas ballast	mbar	≤ 0.1	≤ 0.1	≤ 0.05	≤ 0.05	≤ 0.20	≤ 0.20	≤ 0.20	≤ 0.20	≤ 0.20		
Ultimate total pressure with standard gas ballast	mbar	≤ 1.0	≤ 1.0	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5	≤ 0.5	≤ 1.0	≤ 1.0		
Noise level	dB(A)	≤ 59	≤ 59	≤ 57	≤ 60	≤ 60	≤ 63	≤ 59	≤ 60	≤ 61		
Oil filling capacity (min.)	l	2.0	2.0	1.5	1.5	1.0	1.0	1.0	2.0	2.0		
Mains plug	IP	C14	C14	C14	C14	*	*	*	*	C20		
Mains switch		Yes	Yes	Yes	Yes	Possible	Possible	Possible	Possible	Possible		
Interface		N/A	N/A	N/A	N/A	RS 485	RS 485	RS 485	RS 485	RS 485		
See page		4	4	5	5	6	6	7	7	8		

* please refer to the ordering information on the product page

SOGEVAC SV 16 DI

Our Solution

- Compact and rugged design
- Optimized pump temperature owing to a new air cooling concept
- Longest oil service life due to an increased oil volume within the pump (up to 4 times increased oil capacity compared to equivalent pumps)
- High reliability
- Integrated lubrication with oil recovery system without any external oil lines
- Low noise level across the entire operating pressure range due to low generator speeds
- Integrated anti-suckback valve
- Customer-oriented variants concept
- Different single phase motors with overload protection in accordance to EN 61010-1



Technical Data			
SOGEVAC Rotary vane pump		SV 16 DI	
		50 Hz	60 Hz
Nominal pumping speed ¹⁾	m ³ /h (cfm)	16.0 (9.4)	18.7 (11.0)
Pumping speed ¹⁾	m ³ /h (cfm)	14.5 (8.5)	17.0 (10.0)
Ultimate total pressure			
without gas ballast ¹⁾	mbar (Torr)	≤ 0.1 (≤ 0.08)	
with gas ballast ¹⁾	mbar (Torr)	≤ 1.0 (≤ 0.8)	
Water vapor tolerance ¹⁾	mbar (Torr)	15 (11.3)	
Oil filling	l (qt)	2 (2.1)	
Noise level	dB (A)	59	
Motor power (1~ + 3~), max.	kW (hp)	0.75 (1.01)	0.90 (1.21)
Nominal speed	min ⁻¹ / rpm	1440	1750
Weight (with oil filling)	kg (lbs)	25 (55.1)	
Connections, intake and exhaust side ²⁾		DN 25 ISO-KF	
Dimensions (L x W x H)	mm	440 x 268 x 259	

Ordering Information *	SV 16 DI
SOGEVAC rotary vane pump with UL/CSA three-phase world motor and integrated gas ballast valve	
200 - 240 V ±10% and 380 - 415 V ±10%, 50 Hz/ 200 - 240 V ±10% and 380 - 460 V ±10%, 60 Hz	960 191V3001
SOGEVAC rotary vane pump with single phase AC motor and integrated gas ballast valve	
200 - 240 V / ±10%, 50/60 Hz	960 195V3001
110 V -15% and 100 V +10%, 50/60 Hz	960 194V3001
110 - 115 V ±10% and 220 - 230 V ±10%, 50/60 Hz, manually switchable	960 196V3001

¹⁾ in acc. with DIN 28 400 et. seq.

²⁾ Please indicate when ordering

* Excerpt from our line of products. Details on other motor voltages/frequencies as well as accessories and maintenance materials are available upon request.

SOGEVAC SV 28 BI

Our Solution

- Compact design thanks to integrated motor
- Longest oil service life due to an increased oil volume within the pump (up to 4 times increased oil capacity compared to equivalent pumps)
- High reliability thanks to dynamic shaft seals
- Integrated lubrication with oil recovery system without any external oil lines
- Low noise level across the entire operating pressure range due to low generator speeds
- Integrated anti-suckback valve
- Customer-oriented variants concept
- Different single phase motors with overload protection in accordance to EN 61010-1



Technical Data			
SOGEVAC Rotary vane pump		SV 28 BI	
		50 Hz	60 Hz
Nominal pumping speed ¹⁾	m³/h (cfm)	25 (14.8)	30 (17.8)
Pumping speed ¹⁾	m³/h (cfm)	23 (13.6)	27 (15.9)
Ultimate total pressure without gas ballast ¹⁾	mbar (Torr)	≤ 0.05 (≤ 0.04)	
with gas ballast ¹⁾	mbar (Torr)	≤ 0.5 (≤ 0.4)	
Water vapor tolerance ¹⁾	mbar (Torr)	10.0 (7.5)	10.0 (7.5)
Oil filling	l (qt)	1.5 (1.59)	
Noise level (1~ / 3~)	dB (A)	57 / 54	60 / 57
Motor power (1~ / 3~), max.	kW (hp)	0.55 / 0.75 (1.0 / 1.2)	0.66 / 1.1 (0.9 / 1.5)
Nominal speed	min⁻¹ / rpm	1500	1800
Weight with oil filling (min./max.)	kg (lbs)	34 to 37 (75 to 82)	
Connections, intake and exhaust side		DN 25 ISO-KF	
Dimensions (L x W x H)	mm	423 x 258 x 301	

Ordering Information *	SV 28 BI
SOGEVAC rotary vane pump with wide range three-phase motor, gas ballast and 1.5 l oil casing	
170–253 / 294–440 V, 50 Hz and 170–292 / 294–506 V, 60 Hz	960 273
SOGEVAC rotary vane pump with wide range single-phase motor, gas ballast and 1.5 l oil casing	
180–264 V, 50/60 Hz	970 277

¹⁾ in acc. with DIN 28 400 et. seq.

* Excerpt from our line of products. Details on other motor voltages/frequencies as well as accessories and maintenance materials are available upon request.

SOGEVAC SV 40 BI and SV 40 BI FC

Our Solution

- Compact design thanks to integrated motor
- Longest oil service life. PFPE variants available for ICPMS (Inductively Coupled Plasma Mass Spectrometers) instruments
- High reliability
- Integrated lubrication with oil recovery system without any external oil lines
- Low noise level across the entire operating pressure range due to low generator speeds
- Integrated anti-suckback valve
- Customer-oriented variants concept
- Different single phase motors or drives with overload protection in accordance to EN 61010-1



Technical Data				
SOGEVAC Rotary vane pump		SV 40 BI		SV 40 BI FC
		50 Hz	60 Hz	50/60 Hz
Nominal pumping speed ¹⁾	m ³ /h	42.0	50.0	53.0
Pumping speed ¹⁾	m ³ /h	40.0	48.0	36.0
Ultimate total pressure				
without gas ballast ¹⁾	mbar	≤ 5 x 10 ⁻² to ≤ 0.20		≤ 0.20
with gas ballast ¹⁾	mbar	≤ 0.5		≤ 1.0
Water vapor tolerance ¹⁾	mbar	10		10
Oil filling	l	1.0		1.0
Noise level	dB (A)	60	63	≤ 59
Motor power	kW	1.3	1.6	1.5
Nominal speed	rpm	1500	1800	1800
Weight (with oil filling)	kg	43	43	45
Connections, intake and exhaust side		DN 40 ISO-KF		DN 40 or DN 25 ISO-KF
Dimensions (L x W x H)	mm	497 x 296 x 340		506 x 306 x 386

Ordering Information *		SV 40 BI	SV 40 BI FC
SOGEVAC rotary vane pump with single phase motor and gas ballast			
230 V, ± 10%, 50/60 Hz		960331V3001	–
180-264 V, ± 10%, 50/60 Hz		960331V3012	–
SOGEVAC rotary vane pump with single phase motor, frequency drive, RS 485 interface and gas ballast			
180 - 264 V, 50/60 Hz			
with LVO 700, inlet DN 40/outlet DN 25 ISO-KF		–	960359V01
with LVO 200, inlet DN 25/outlet DN 25 ISO-KF		–	960361V01
with LVO 420 PFPE, inlet DN 25/outlet DN 25 ISO-KF		–	960362V01

¹⁾ in acc. with DIN 28 400 et. seq.

* Excerpt from our line of products. Details on other motor voltages/frequencies as well as accessories and maintenance materials are available upon request.

SOGEVAC SV 65 BI FC

Our Solution

- Compact design thanks to integrated motor
- Longest oil service life. PFPE variants available for ICPMS (Inductively Coupled Plasma Mass Spectrometers) instruments
- High reliability
- Integrated lubrication with oil recovery system without any external oil lines
- Low noise level across the entire operating pressure range due to low generator speeds
- Integrated anti-suckback valve
- Customer-oriented variants concept
- Different single phase drives with overload protection in accordance to EN 61010-1



Technical Data		
SOGEVAC Rotary vane pump		SV 65 BI FC 50/60 Hz
Nominal pumping speed ¹⁾	m ³ /h	71.0
Pumping speed at 2 mbar ¹⁾	m ³ /h	≥ 50.0
Ultimate total pressure		
without gas ballast ¹⁾	mbar	≤ 0.20
with gas ballast ¹⁾	mbar	≤ 1.0
Water vapor tolerance ¹⁾	mbar	10
Oil filling	l	2.0
Noise level	dB (A)	≤ 60
Motor power	kW	1.5
Nominal speed	rpm	1800
Weight (with oil filling)	kg	58
Connections, intake side exhaust side		DN 40 ISO-KF DN 40 ISO-KF or 1/2" barbed hose fitting
Dimensions (L x W x H)	mm	521 x 351 x 386

Ordering Information *		SV 65 BI FC
SOGEVAC rotary vane pump with single phase motor, frequency drive, RS 485 interface and gas ballast		
180 - 264 V, 50/60 Hz with LVO 420 PFPE, inlet/outlet DN 40 ISO-KF		960462V01
with LVO 200, inlet DN 25 ISO-KF outlet 1/2" barbed hose fitting		960463V01

¹⁾ in acc. with DIN 28 400 et. seq.

* Excerpt from our line of products. Details on other motor voltages/frequencies as well as accessories and maintenance materials are available upon request.

SOGEVAC SV 120 BI FC

Our Solution

- Easy to handle thanks to integrated cart and “foldable” handles:
The pump is placed on castors and provided with two foldable handles to allow an easy single person unpackaging and pump moving without any lifting devices
- Longest oil service life
- High reliability
- Integrated lubrication with oil recovery system without any external oil lines
- Low noise level across the entire operating pressure range due to low generator speeds
- Integrated anti-suckback valve
- Customer-oriented variants concept
- Different single phase drives with overload protection in accordance to EN 61010-1



Technical Data		
SOGEVAC Rotary vane pump		SV 120 BI FC 50/60 Hz
Nominal pumping speed ¹⁾	m³/h	≥ 147
Pumping speed at 2 mbar ¹⁾		
with DN 50 ISO-KF inlet	m³/h	≥ 100.0
with DN 40 ISO-KF inlet	m³/h	≥ 90.0
Ultimate total pressure		
without gas ballast ¹⁾	mbar	≤ 0,2
with gas ballast ¹⁾	mbar	≤ 1.0
Water vapor tolerance ¹⁾	mbar	10
Oil filling	l	2.0
Noise level	dB (A)	≤ 61
Motor power	kW	2.2
Nominal speed	rpm	1800
Weight (with oil filling)	kg	98
Connections, intake side exhaust side		DN 40 ISO-KF or DN 50 ISO-KF 1/2" barbed hose fitting
Dimensions (L x W x H)	mm	733 x 470 x 483

Ordering Information *		SV 120 BI FC
SOGEVAC rotary vane pump with single phase motor, frequency drive, RS 485 interface and gas ballast		
180 - 264 V, 50/60 Hz with LVO 700, inlet DN 40 ISO-KF, outlet 1/2" barbed hose fitting		960563V3001
with LVO 700, inlet DN 50 ISO-KF, outlet 1/2" barbed hose fitting		960565V

¹⁾ in acc. with DIN 28 400 et. seq.

* Excerpt from our line of products. Details on other motor voltages/frequencies as well as accessories and maintenance materials are available upon request.

Smart pumping with SOGEVAC BI FC models

Our Solution

The SOGEVAC SV 40 BI FC, SV 65 BI FC and SV 120 BI FC are equipped with a frequency converter.

At high inlet pressures, the frequency converter automatically reduces the pump rotational speed not to exceed 13 A mains current.

These pumps are using single phase power supplies, protected by normal building breakers. This current regulation avoids overloading the mains.

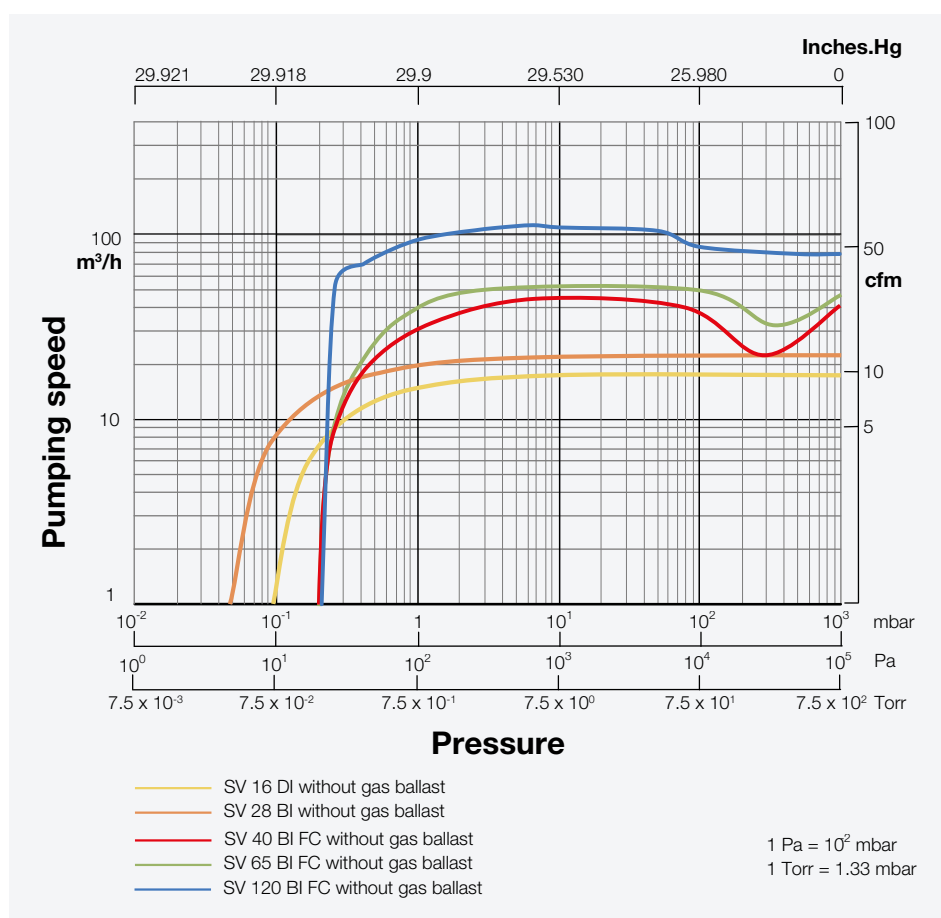
Also, the frequency converter are designed to limit the inrush current so that usual curve B breakers can be used.

The pumps equipped with a frequency converter can be controlled through an RS 485 interface, for start / stop or speed control. The interface allows also to monitor the power consumption and drive temperature for preventive maintenance.

SOGEVAC BI FC pumps include an overload protection with fuses accessible from the outside or a resettable breaker on the single phase motor.



Pumping Speed Characteristics (at 50/60 Hz)



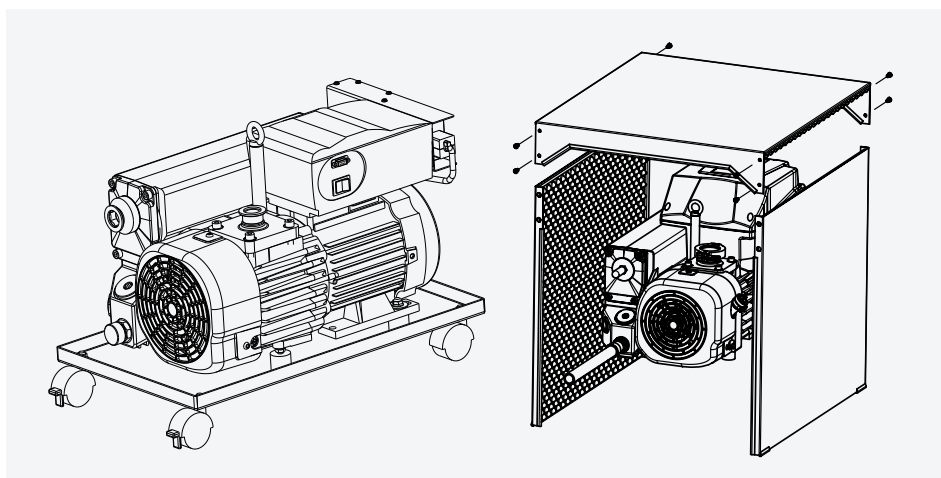
Accessories

Mobile Base Frame

The mobile base frame allows moving easily single and double stage rotary vane pumps up to 120 m³/h and facilitates therefore their maintenance.

The oil tight base frame allows to hold up to two litres oil and has swivable casters of which two have breaks.

The base frame does not alter the pump noise and facilitates oil draining and pump displacement.



SOGEVAC pump on a mobile base frame and in a noise enclosure (from left to right)

Noise Enclosure

Leybold has developed a specific noise enclosure for vacuum pumps, which reduce the noise level by approx. five dB(A) and which makes sure the pump does not overheat due to the open design on both sides.

A combination with the mobile base frame is possible.

Power Cords

Wide range of power cords with different plugs to cover most requirements.

Ordering Information *				P/N
Accessories				
Mobile base frame for single stage pumps up to 65 m³/h with handles and oil pan with oil pan				960560WB 960331BASE
Mobile base frame for single stage pumps up to 120 m³/h				960560WB
Noise enclosure for single stage pumps up to 65 m³/h up to 120 m³/h				960331NENC 960560NENC
Adapter for tubing				71241608
Hex key metric male 12 mm				E6507617
Power cords - plug pump side / plug supply side				
2.5 m	Hirschmann	Euro / Schuko 16 A	971457EUR	
2.5 m	Hirschmann	UK plug 13 A	971457GB	
2.5 m	Hirschmann	NEMA 6-15P 250 V	971457NEMA	
2.5 m	Hirschmann	Swiss plug 10 A	971457CH	
2.5 m	Hirschmann	w/o	971457WW	
5 m	Hirschmann	IEC 309 16 A	EK6506966	
2.5 m	Hirschmann	C20	EK6510715	
2.8 m	Hirschmann	Cable shoes 5 mm	EK6520102	
2.5 m	Hirschmann	C14	EK6510720	
1.8 m	C19	NEMA 5-15P 125 V	140304	
1.8 m	C19	NEMA 6-15P 250 V	140305	
1.8 m	C19	Euro / Schuko 16 A	140306	
1.8 m	C19	UK plug 13 A	140307	
2.5 m	C19	C20	E6500825	
5 m	C19	IEC 309 16 A	E6505883	
2.5 m	C19	C14	EK6502798	

* Excerpt from our line of products. Details on other motor voltages/frequencies as well as accessories and maintenance materials are available upon request.

Oil for SOGEVAC pumps

LEYBONOL oils and lubricants from Leybold are especially designed with regard to the high demands in vacuum technology. Their vapour pressure is low at high temperatures and the water content and water uptake is minimal. Their viscosity characteristics are flat, lubricating properties excellent, and they have high resistance against thermal decomposition and increased mechanical stress.

For Liquid Chromatography and Gas Chromatography Mass Spectrometer applications, we recommend using our synthetic oil LVO 700, while on most ICPMS (Inductively Coupled Plasma Mass Spectrometers) instruments PFPE LVO 420 is applicable.

Please note that PFPE oil can only be used on pumps specifically designed for this fluid.



SOGEVAC models

	SV 16 DI	SV 28 BI	SV 40 BI	SV 40 BI FC	SV 65 BI FC	SV 120 BI FC
LEYBONOL Oils						
LVO 420 (PFPE oil)	●	●	●	●	●	●
LVO 700 (Synthetic cyclic hydrocarbon oil)	●	●	●	●	●	●

● = Possible

For further questions, please contact our technical sales support.

For information on oil specifications please refer to our general catalogue.

Ordering Information *	
LEYBONOL LVO pump fluid, bottle with one litres.	
Synthetic oil LVO 700	L700 01
PFPE oil LVO 420	L420 01

* Excerpt from our line of products. Details on our full range of LEYBONOL pump fluids are available in our general catalogue or our webshop www.leyboldproducts.com.

Leybold Services - all from a single source
Fast, competent and reliable.

Our Global Support for You



In addition to high-quality products, Leybold offers you comprehensive services worldwide in accordance with our internationally unified quality standards.

Our fully-trained and certified engineers are experts in repairing and servicing your vacuum equipment.

Benefit from the densest service network in the entire vacuum industry!

No matter whether you use our products directly or integrate them into your plants - we are always close to you!

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Our Performance

- Global Sales and Service network
- Factory overhaul of your vacuum components in one of our local service centers
- Preventive maintenance
- On-site service by our field service
- Tailor-made service contracts
- Extended warranty programs
- Exchange and back-up pool
- Remote maintenance
- Calibration of your measuring systems
- Installation and operator trainings
- Expertise and application consulting in all matters of vacuum technology
- Multi brand repairs on request



Pioneering products. Passionately applied.