



# Vacuum Pump Systems

Central Vacuum Supply Systems  
with SOGEVAC Pumps



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# Central Vacuum Supply Systems with SOGEVAC Pumps



Central vacuum supply systems: CVS500 with 3 SOGEVAC SV 100 B, CVS 160 with 2 SOGEVAC SV 100 B, CVS 60 with 1 SOGEVAC SV 40 B

Central vacuum supply systems are frequently used in those cases where a large number of minor requirements for vacuum need to be economically covered. Moreover, the systems serve the purpose of compensating for large variations in the number of vacuum consumers and increase the availability of the vacuum service.

A typical central vacuum supply system from Leybold consists chiefly of one or more SOGEVAC rotary vane vacuum pumps, a buffer vessel, an electrical cabinet with controller as well as the corresponding connection components. The systems are supplied by us fully assembled, tested as plug and play units.

## Standard Equipment

### Typically consisting of

- up to 3 SOGEVAC pumps
- buffer vessel
- manual valve (basic control) or electropneumatic valve (PLC control)
- dust filter at the pump inlet
- pressure sensor
- two-stage pressure controller
- electrical cabinet with controller
- all connecting components

## Advantages to the User

- Industrial grade vacuum generator consisting of proven SOGEVAC single-stage rotary vane vacuum pumps
- Covers the demands of numerous small vacuum consumers
- Modular design, customized to customer specific processes
- Simple to operate
- Space-saving system solution
- High return on investment, excellent price-to-performance ratio
- Energy saving capabilities
- Low cost of ownership
- Cycle time reduction due to the buffer volume
- Complete turn-key systems, ready for operation

## Typical Applications

### General applications demanding vacuum:

- Transportation
- Handling / lifting
- Degassing
- Automation (pick and place)

### Automotive industry

- Thermoforming
- Break filling, degassing

### Composites manufacturing

- Resin Transfer Moulding (RTM)

### Vacuum pressing, like rubber, plastics, gaskets

### Food packaging/food processing

- Vacuum filling
- Thermoforming
- Vacuum transportation, handling, lifting
- Tray sealing / MAP packaging
- Degassing

### Hospitals/Medical engineering

- Bacteriological filters

# Controller Types for the Central Vacuum Supply Systems from Leybold

Generally a difference is made between the controller types **BASIC** and **FF** (Full Featured).

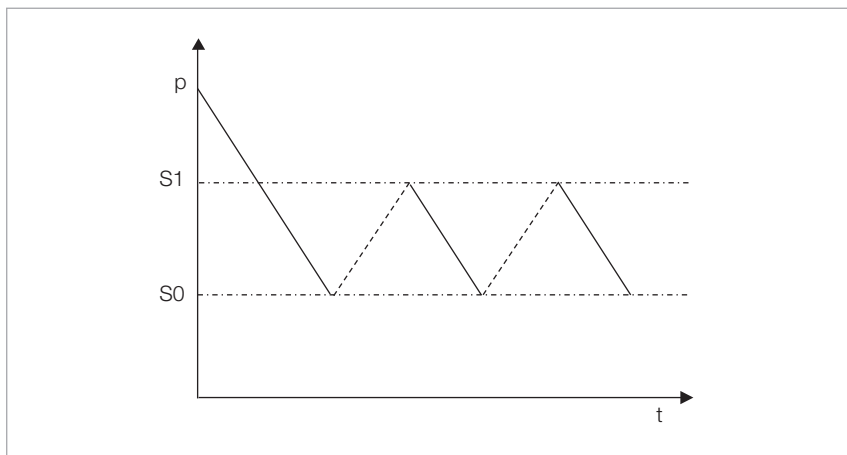
Differing custom solutions are available upon request.

## **BASIC Controller**

The Basic controller provides for two freely selectable switching thresholds, through which an individual vacuum pump or alternatively a blocking valve (optional) can be driven.

Moreover, the controller includes an electronic pressure display and an operating hours counter.

This type of controller is suited for systems equipped with a single pump up to a nominal pumping speed of 100 m<sup>3</sup>/h (58.9 cfm).



Basic control with one pump

## **Operating Principle of the BASIC Controller**

Starting at atmospheric pressure, the central vacuum supply system is evacuated down to the intended "lower operating pressure"  $S_0$ . As soon as the pressure has attained the level of  $S_0$ , the vacuum pump is switched off automatically, respectively the optional blocking valve is closed.

When switching on the consumers, the pressure in the system rises again until the "upper operating pressure" is reached thereby tripping the switch-on threshold  $S_1$  of the pump, respectively attaining the opening pressure of the valve.

Provided pumping speed of the pump and vacuum consumption are balanced, the operating pressure will change between  $S_0$  and  $S_1$ . At reduced consumption, the system pressure will reduce until the switching threshold  $S_0$  is reached again causing the pump to switch off, respectively the valve to close etc.

## FF Controller

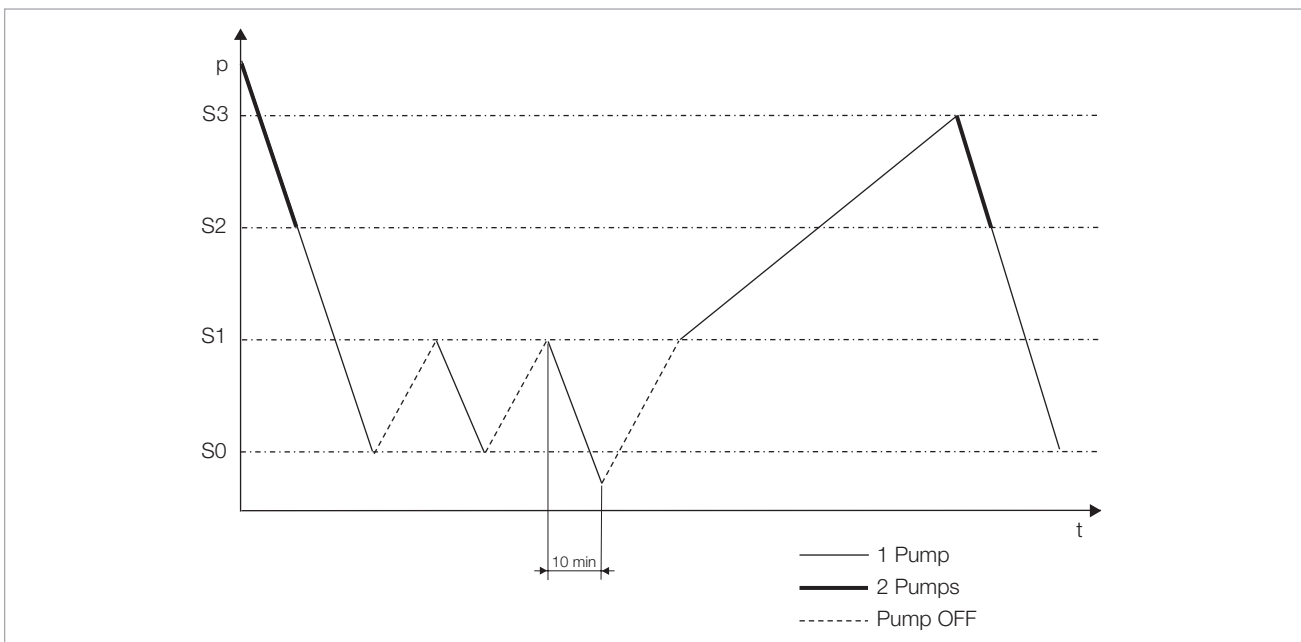
Basically the FF controller provides for four freely selectable switching thresholds and has thus been designed to operate two pumps running in parallel. Depending on the design rating and current demand, the base load or master pump will operate alone or jointly together with the spare pump.

In order to spread the number of operating hours equally between the pumps, master pump and spare pump are interchanged in regular intervals. In case a pump fails, the controller effects an automatic change to the spare pump.

For operating vacuum pumps having a nominal pumping speed of over

100 m<sup>3</sup>/h (58.9 cfm), a delayed shutdown facility has been integrated which will restrict the number of switching cycles to 6 per hour.

Through the use of a Programmable Logic Controller (PLC), the FF controller permits flexible coverage of quite differing requirements.



FF controller with two pumps and an example for delayed shutdown (pumps over 100 m<sup>3</sup>/h (58.9 cfm))

## Operating Principle of the FF Controller

Just as for the Basic controller, the system is, upon switching on, evacuated down to the lower operating pressure S<sub>0</sub>. This is effected with both pumps running in parallel (master pump and spare pump) until the shutdown threshold for the spare pump S<sub>2</sub> is reached. Thereafter, the master pump alone will ensure that the lower operating pressure is reached and is then also switched off. When the system pressure increases due to the number of consumers or leaks to the level of S<sub>1</sub>, then the master pump will be switched on automatically etc.

In the case of vacuum pumps having a pumping speed of over 100 m<sup>3</sup>/h (58.9 cfm) and a running time of the pump of less than 10 minutes, then the standard switch off delay can be responsible for the pressure to drop below S<sub>0</sub>. This will prevent too frequent switching on and off of the pumps.

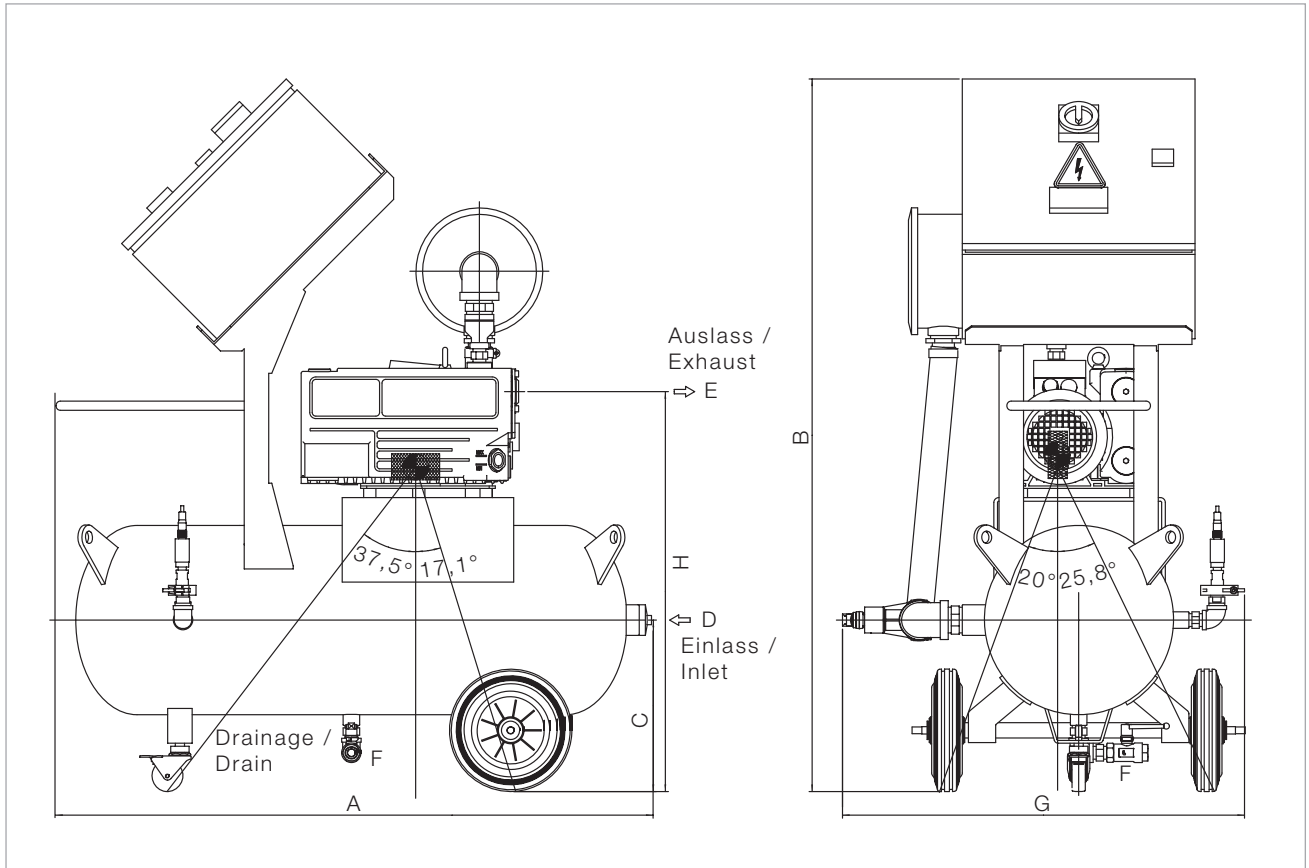
If for process reasons the pressure is not allowed to drop below the lower operating pressure, we recommend

the use of electropneumatic or solenoid blocking valves.

If the current vacuum demand cannot be met by the master pump alone, the system pressure will increase to the upper switching pressure S<sub>3</sub> upon which the spare pump is automatically started.

With both pumps running in parallel, the system is then again evacuated until the switch off threshold S<sub>2</sub> for the spare pump is reached again etc.

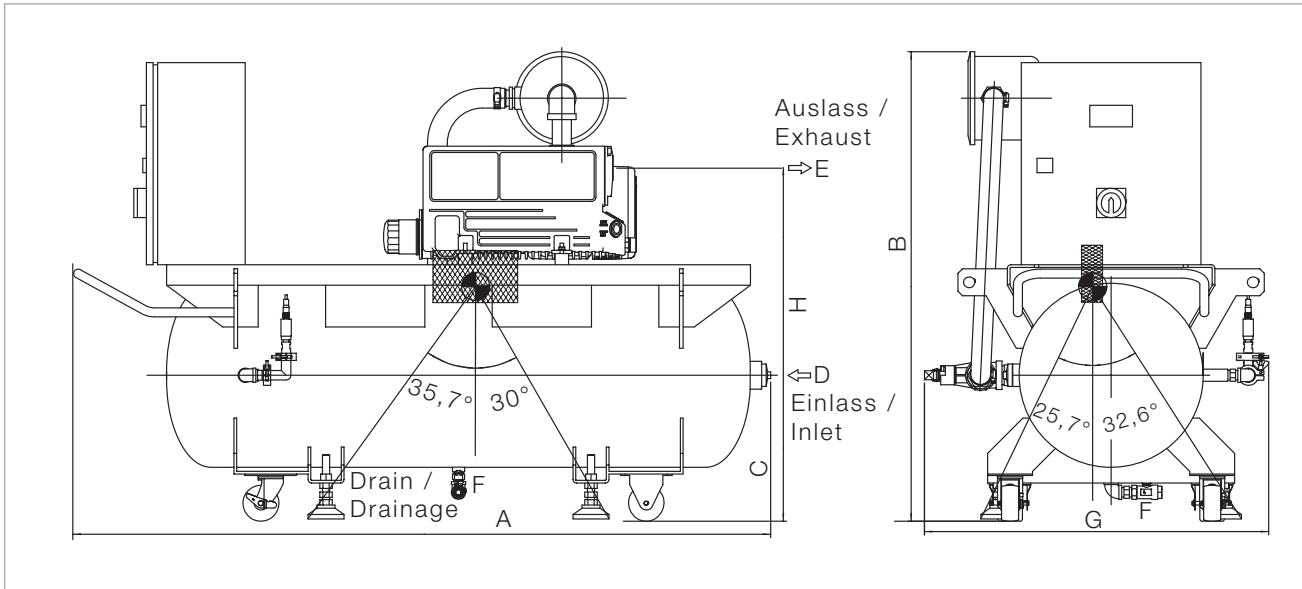




Dimensional drawing CVS60 with SV25B

CVS-System *	A	B	C	D	E	F	G	H
CVS60 1xSV25B	973	1163	280	G 1¼"	G ¾"	G ½"	656	653
CVS60 1xSV40B	973	1163	280	G 1¼"	G 1¼"	G ½"	656	697

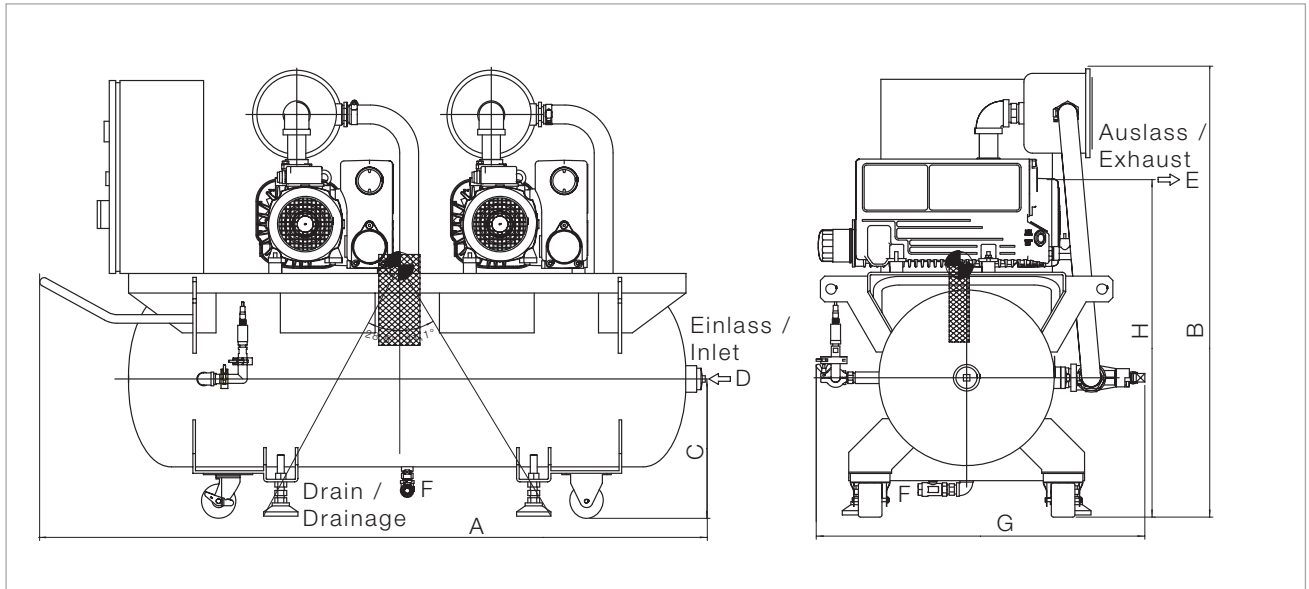
\* Dimensions in mm



Dimensional drawing CVS160 with SV65B

CVS-System *	A	B	C	D	E	F	G	H
CVS160 1xSV65B	1542	1045	325	G 1¼"	G 1¼"	G ½"	766	787
CVS300 1XSV65B	1819	1155	385	G2"	G 1¼"	G ½"	826	897
CVS160 1XSV100B	1542	1050	325	G 1¼"	G 1¼"	G ½"	766	791
CVS300 1XSV100B	1819	1160	385	G2"	G 1¼"	G ½"	826	901
CVS500 1XSV100B	1976	1310	485	G2"	G 1¼"	G 1¼"	927	1051
CVS500 1XSV200	1976	1509	485	G2"	G2"	G 1¼"	927	1149
CVS1000 1XSV200	2395	1719	585	G2"	G2"	G 1¼"	1136	1359
CVS500 1XSV300B	1976	1514	485	G2"	G2"	G 1¼"	927	1161
CVS1000 1XSV300B	2395	1724	585	G2"	G2"	G 1¼"	1136	1371

\* Dimensions in mm



Dimensional drawing CVS160 with 2x SV65B

<b>CVS-System *</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>
CVS500 2xSV100B	1976	1310	485	G 2"	G 1¼"	G 1¼"	940	1051
CVS500 2xSV200	1976	1509	485	G 2"	G2"	G 1¼"	1107	1149
CVS1000 2xSV200	2395	1719	585	G 2"	G2"	G 1¼"	1223	1359
CVS500 2xSV300B	1976	1514	485	G 2"	G2"	G 1¼"	1107	1161
CVS1000 2xSV300B	2395	1724	585	G 2"	G2"	G 1¼"	1189	1371

\* Dimensions in mm

## Technical Data and Ordering Information

### CVS BASIC Systems

Part No.	Designation	Nominal pumping speed* m <sup>3</sup> /h	Weight, approx. kg	Connection	Noise level** dB(A)	Motor power	Nominal current max. A	Power connection
				Inlet / Exhaust G or NPT		kW		
<b>504309V001</b>	CVS60 – 1 x SV25B	26	145	1¼" / ¾"	64	0,9 1,1	2,3 2,6	400 V / 50 Hz 460 V / 60 Hz
<b>504309V002</b>	CVS60 – 1 x SV40B	44	165	1¼" / 1¼"	58	1,1 1,5	2,8 2,7	400 V / 50 Hz 460 V / 60 Hz
<b>504310V001</b>	CVS160 – 1 x SV65B	59	255	1¼" / 1¼"	60	1,5 1,8	3,8 3,7	400 V / 50 Hz 460 V / 60 Hz
<b>504310V004</b>	CVS160 – 1 x SV100B	97,5	295	1¼" / 1¼"	61	2,2 3,5	4,5 5,3	400 V / 50 Hz 460 V / 60 Hz
<b>504311V001</b>	CVS300 – 1 x SV65B	59	340	2" / 1¼"	60	1,5 1,8	3,8 3,7	400 V / 50 Hz 460 V / 60 Hz
<b>504311V004</b>	CVS300 – 1 x SV100B	97,5	335	2" / 1¼"	61	2,2 3,5	4,5 5,3	400 V / 50 Hz 460 V / 60 Hz
<b>504312V006</b>	CVS500 – 1 x SV100B	97,5	415	2" / 1¼"	61	2,2 3,5	4,5 5,3	400 V / 50 Hz 460 V / 60 Hz
<b>504312V007</b>	CVS500 – 2 x SV100B	195	550	2" / 1¼"	64	4,4 7,0	9,0 10,6	400 V / 50 Hz 460 V / 60 Hz
<b>504312V011</b>	CVS500 – 1 x SV200	180	460	2" / 2"	69	4,0 4,6	8,9 10,0	400 V / 50 Hz 460 V / 60 Hz
<b>504312V012</b>	CVS500 – 2 x SV200	360	630	2" / 2"	72	8,0 9,2	17,8 20,0	400 V / 50 Hz 460 V / 60 Hz
<b>504312V014</b>	CVS500 – 1 x SV300B	280	500	2" / 2"	72	5,5 6,3	10,5 9,3	400 V / 50 Hz 460 V / 60 Hz
<b>504312V015</b>	CVS500 – 2 x SV300B	560	725	2" / 2"	75	11,0 12,6	21,0 18,6	400 V / 50 Hz 460 V / 60 Hz
<b>504313V011</b>	CVS1000 – 1 x SV200	180	600	2" / 2"	69	4,0 4,6	8,9 10,0	400 V / 50 Hz 460 V / 60 Hz
<b>504313V012</b>	CVS1000 – 2 x SV200	360	775	2" / 2"	72	8,0 9,2	17,8 20,0	400 V / 50 Hz 460 V / 60 Hz
<b>504313V016</b>	CVS1000 – 1 x SV300B	280	640	2" / 2"	72	5,5 6,3	10,5 9,3	400 V / 50 Hz 460 V / 60 Hz
<b>504313V017</b>	CVS1000 – 2 x SV300B	560	860	2" / 2"	75	11,0 12,6	21,0 18,6	400 V / 50 Hz 460 V / 60 Hz

\* 50 Hz

\*\* At ultimate pressure without gas ballast, free-field measurement, distance 1 m

Beyond the equipment which is supplied as standard, the modular design of the central vacuum supply systems from Leybold allows for customization according to your specific requirements.

Optionally available are, for example:

- Higher pumping speeds and larger buffer volumes
- Electropneumatic or solenoid blocking valves
- Mobile construction on castors
- Other mains voltages
- Additional pumps, filters, fittings etc.

## Technical Data and Ordering Information

### CVS FF Systems

Part No.	Designation	Nominal pumping speed* m <sup>3</sup> /h	Weight, approx. kg	Connection	Noise level** dB(A)	Motor power	Nominal current max. A	Power connection
				Inlet / Exhaust G or NPT		kW		
<b>504310V050</b>	CVS160 – 2 x SV65B	118	350	1¼" / 1¼"	63	3,0 3,6	7,6 7,4	400 V / 50 Hz 460 V / 60 Hz
<b>504310V051</b>	CVS160 – 2 x SV100B	195	430	1¼" / 1¼"	64	4,4 7,0	9,0 10,6	400 V / 50 Hz 460 V / 60 Hz
<b>504311V050</b>	CVS300 – 2 x SV65B	118	410	2" / 1¼"	63	3,0 3,6	7,6 7,4	400 V / 50 Hz 460 V / 60 Hz
<b>504311V051</b>	CVS300 – 2 x SV100B	195	470	2" / 1¼"	64	4,4 7,0	9,0 10,6	400 V / 50 Hz 460 V / 60 Hz
<b>504312V050</b>	CVS500 – 3 x SV65B	177	560	2" / 1¼"	65	4,5 5,4	11,4 11,1	400 V / 50 Hz 460 V / 60 Hz
<b>504312V051</b>	CVS500 – 2 x SV100B	195	550	2" / 1¼"	64	4,4 7,0	9,0 10,6	400 V / 50 Hz 460 V / 60 Hz
<b>504312V052</b>	CVS500 – 3 x SV100B	292,5	680	2" / 1¼"	66	6,6 10,5	13,5 15,9	400 V / 50 Hz 460 V / 60 Hz
<b>504312V053</b>	CVS500 – 2 x SV200	360	630	2" / 2"	72	8,0 9,2	17,8 20,0	400 V / 50 Hz 460 V / 60 Hz
<b>504312V054</b>	CVS500 – 2 x SV300B	560	725	2" / 2"	75	11,0 12,6	21,0 18,6	400 V / 50 Hz 460 V / 60 Hz
<b>504313V050</b>	CVS1000 – 3 x SV65B	177	700	2" / 1¼"	65	4,5 5,4	11,4 11,1	400 V / 50 Hz 460 V / 60 Hz
<b>504313V051</b>	CVS1000 – 2 x SV300B	195	690	2" / 1¼"	64	4,4 7,0	9,0 10,6	400 V / 50 Hz 460 V / 60 Hz
<b>504313V052</b>	CVS1000 – 3 x SV100B	292,5	820	2" / 1¼"	66	6,6 10,5	13,5 15,9	400 V / 50 Hz 460 V / 60 Hz
<b>504313V053</b>	CVS1000 – 2 x SV200	360	775	2" / 2"	72	8,0 9,2	17,8 120,0	400 V / 50 Hz 460 V / 60 Hz
<b>504313V054</b>	CVS1000 – 3 x SV200	540	950	2" / 2"	74	12,0 13,8	26,7 230,0	400 V / 50 Hz 460 V / 60 Hz
<b>504313V055</b>	CVS1000 – 2 x SV300B	560	860	2" / 2"	75	11,0 12,6	21,0 18,6	400 V / 50 Hz 460 V / 60 Hz
<b>504313V056</b>	CVS1000 – 3 x SV300B	840	1080	2" / 2"	77	16,5 18,9	31,5 27,9	400 V / 50 Hz 460 V / 60 Hz

\* 50 Hz

\*\* At ultimate pressure without gas ballast, free-field measurement, distance 1 m

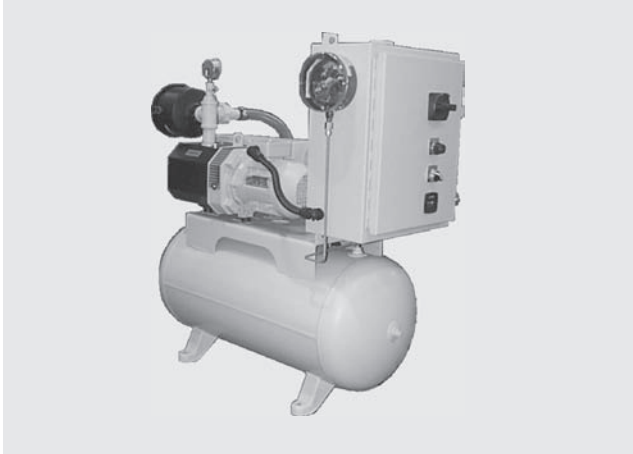
Beyond the equipment which is supplied as standard, the modular design of the central vacuum supply systems from Leybold allows for customization according to your specific requirements.

Optionally available are, for example:

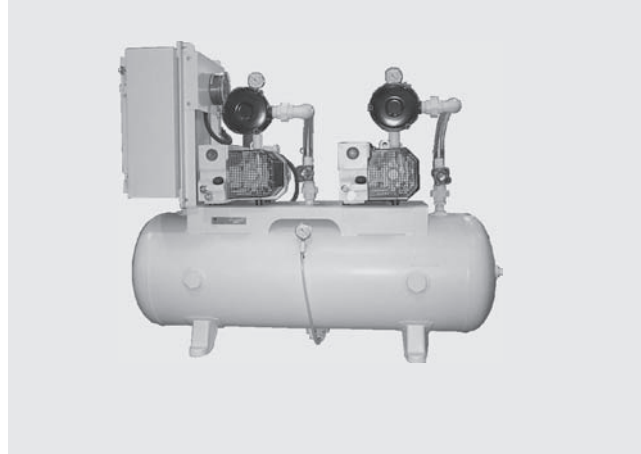
- Higher pumping speeds and larger buffer volumes
- Electropneumatic or solenoid blocking valves
- Mobile construction on castors
- Other mains voltages
- Additional pumps, filters, fittings etc.

# Only available for purchase in North and South America

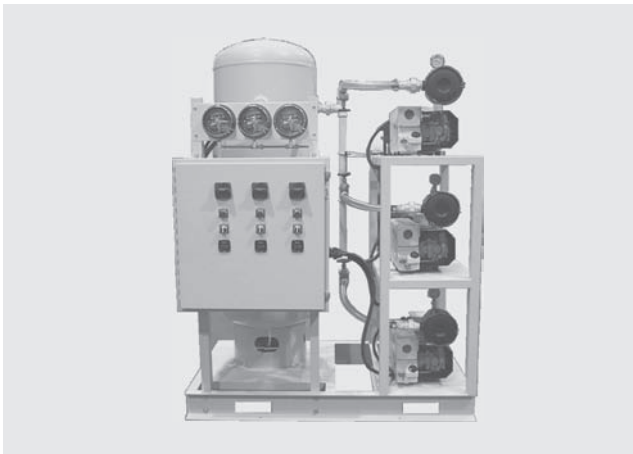
## Central Vacuum Supply Systems



Central vacuum supply system, simplex



Central vacuum supply system, duplex



Central vacuum system, triplex

### Standard Equipment

- ASME® rated receiver tank
- Flexible configurations for one, two, or three SOGEVAC pumps
- Manual isolation valves
- Simple operation, high reliability, easy maintenance
- Complete package with gauges and NEMA12 controls
- Standard “ON/OFF/AUTO” switch
- Elapsed time meters
- Inlet particulate filters
- Lead/Lag or continuous operation of pumps
- Adjustable pressure switch for control of vacuum level
- Air-cooled SOGEVAC pumps with built-in “anti-suckback” valves

### Options

- Tank or stack mounted pumps
- Larger receiver tank
- Special inlet filters
- Automatic isolation valves
- Special design controls per customer specification



Central vacuum supply systems, tank mounted [left] and stack mounted [right]; dimensions in inch, dimensions in brackets ( ) are in mm

### Technical Data

### Performance Characteristics

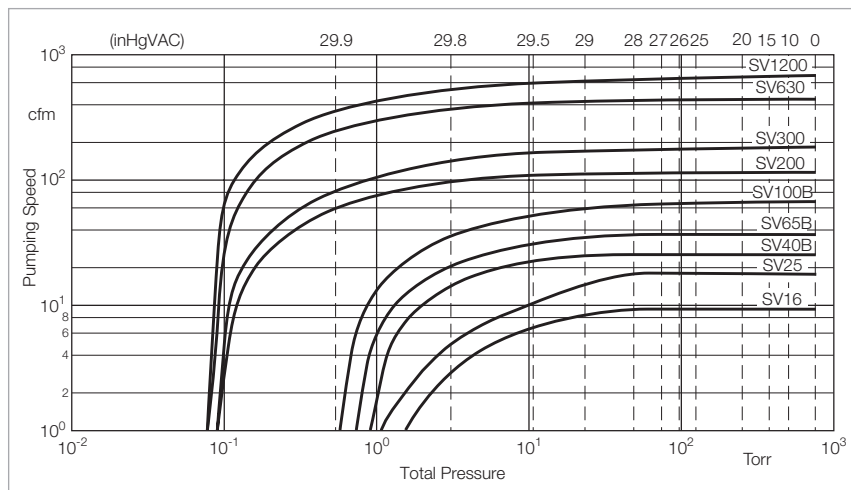
		SV 16	SV 25	SV 40 B	SV 65 B	SV 100 B	SV 200	SV 300
Free air displacement	cfm (m <sup>3</sup> /h)	11 (18.6)	17.0 (29.0)	31.2 (53.0)	41.8 (71.0)	68.9 (117.0)	129.5 (219.8)	200.3 (340.0)
Actual pumping speed	cfm (m <sup>3</sup> /h)	10 (16.9)	15 (25.5)	27.7 (47.0)	37.7 (64.0)	61.8 (105.0)	117.8 (200.0)	170.8 (289.9)
Guaranteed base pressure	Torr	0.4	0.4	0.4	0.4	0.4	0.06	0.06
Base pressure with gas ballast	Torr	1.1	1.1	1.1	1.1	1.0	0.5	0.5
Water vapor tolerance	Torr	30.0	30.0	22.5	22.5	22.5	30.0	30.0
Water vapor pumping with gas ballast	qt/hr	0.32	0.48	0.95	1.32	1.8	5.7	7.8
Noise level at 3 feet with 1 pump running without gas ballast	dB(A)	56	56	63	64	64	73	74
Motor	hp	1.0	1.5	2.0	2.5	4.0	7.5	10.0
Pump rotational speed	rpm	1750	1500	1750	1750	1750	1750	1750
Oil capacity	qt	2.0	2.0	1.05	2.1	2.1	5.5	9.0
Inlet / exhaust – NPT	in.	1/2 / 1/2	1/2 / 1/2	1-1/4 / 1-1/4	1-1/4 / 1-1/4	1-1/4 / 1-1/4	2 / 2	2 / 2
Pump weight	lbs	50.7	52.9	99.3	114.8	194.3	341.8	430.0

## Technical Data

	Tank size (gal)	Tank Mount	Tank Mount	Stack Mount
		Simplex	Duplex	Duplex and Simplex
SV 16, SV 25	Tank size (gal)	30	60	60
SV 40 B	Tank size (gal)	60	80	80
SV 65 B	Tank size (gal)	60	120	120
SV 100 B	Tank size (gal)	80	120	120
SV 200	Tank size (gal)	120	240	200
SV 300	Tank size (gal)	120	240	200

## Ordering Information

	Part No.	C	-						XX	
<b>System</b>										
Simplex	S									
Duplex	D									
Triplex	T									
<b>Pumps</b>										
SV 16 (1 hp)	016									
SV 25 (1.5 hp)	025									
SV 40 B (2.5 hp)	040									
SV 65 B (3 hp)	065									
SV 100 B (4 hp)	100									
SV 200 (7.5 hp)	200									
SV 300 (10 hp)	300									
<b>Mounting</b>										
Tank mount	T									
Stack mount	S									
<b>Voltage</b>										
460/3/60	A									
230/3/60	B									
230/1/60 (available for SV 16/SV 25 only)	C									
208/3/60 (available for SV 25 only)	D									
115/1/60 (available for SV 16 only)	E									
<b>Duty</b>										
Continuous	C									
Demand Start/Stop	D									



Pumping speed characteristics for the central vacuum supply systems at 60 Hz





# Only available for purchase in North and South America

## Tank Mounted Medical Vacuum Systems

**NFPA 99C compliant and designed for use in medical applications – hospitals, out-patient surgical and other medical facilities**



Tank mounted medical vacuum system

Leybold tank mounted systems are completely assembled with interconnecting piping, are factory tested and leak-checked prior to shipment. Some items may be disassembled for protection during shipment. Required mechanical re-assembly requirements will be clearly noted, as well as needed electrical connections, and are the responsibility of the installer.

### System Features

Key features for these duplex systems include two SOGEVAC series oil sealed rotary vane vacuum pumps with displacements up to 69 cfm each, an ultimate vacuum of better than 29.95" Hg, and automatic oil recirculation system with integral coalescing exhaust demisters as standard. ASME rated receiver tanks, NEMA12 / UL listed electrical enclosure and inter-connecting hardware. Each turn-key system is fully assembled and tested at Leybold Vacuum's factory and includes an operation manual and 12 month warranty.

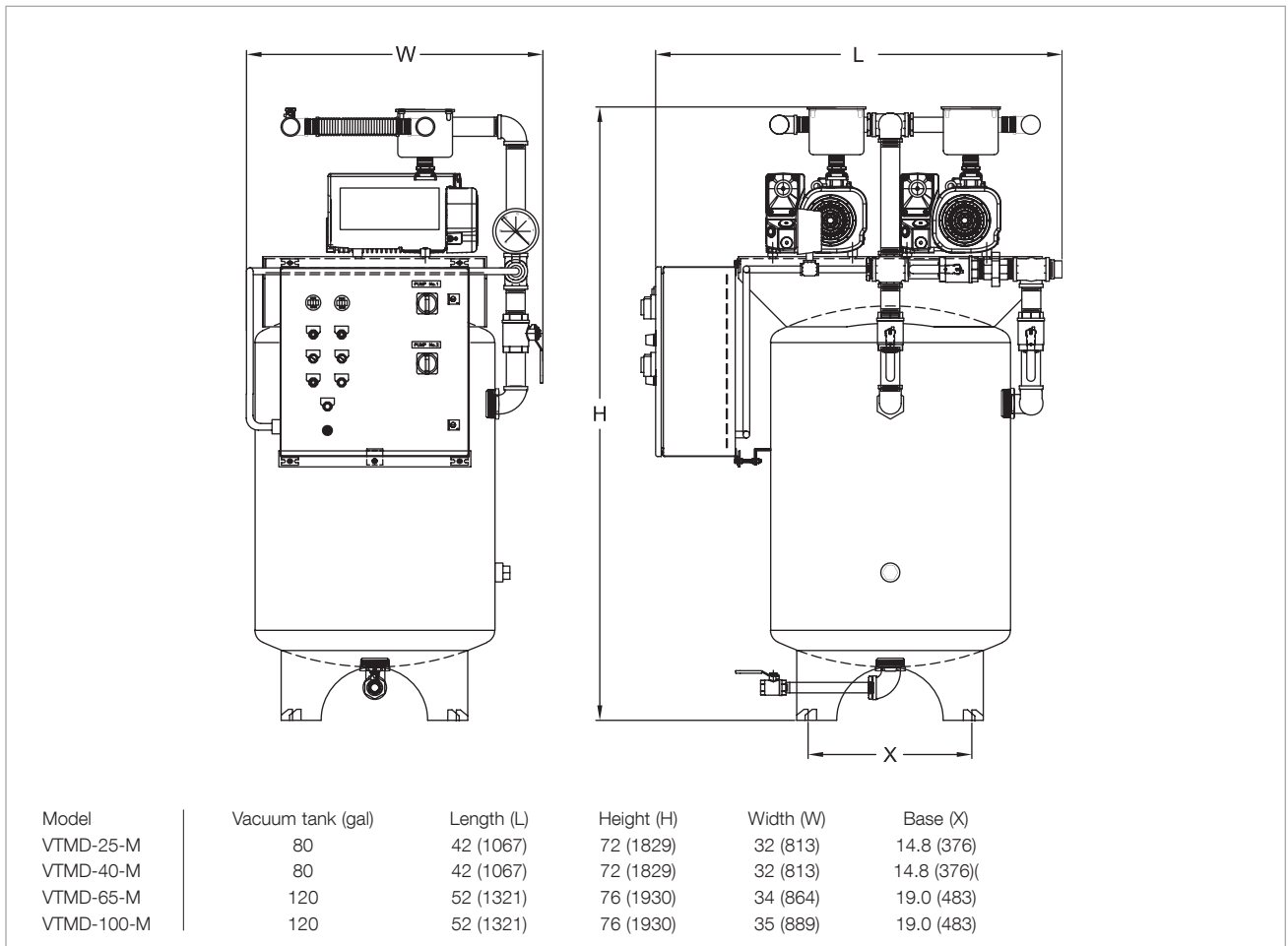
### Other System Features

#### Vacuum pumps and systems:

- Direct-coupled TEFC, IP 55 rated motors
- Integral gas ballast
- Anti suck back valve
- Air-cooled design
- NPT type inlet and exhaust connections
- Inlet protection
  - particulate filters rated for 10 micron retention
  - Isolation ball valves
  - Pump check valves
- Vacuum gauge, 0 – 30" Hg
- Vertical receiver, ASME coded, manual drain valve and tank bypass

#### Local duplex motor control center:

- 2x magnetic motor starters with overload protection
- Main fused disconnect switch
- 2x through the door disconnect switches
- 2x individual control transformers
- 2x elapsed time meters
- 2x hand-off-auto switches
- Lag pump audible alarm with indicator light
- Automatic alternation
  - Lead / Lag operation
- 2x dual set-point vacuum switches
- Emergency stop
- NEMA12, UL listed enclosure
- System wired for either 208/230/460 V, 3 phase, 60 Hz operation



Tank mounted medical vacuum systems; dimensions in inch, dimensions in brackets ( ) are in mm

### Technical Data

#### VTMD-25-M    VTMD-40-M    VTMD-65-M    VTMD-100-M

Displacement (per pump)	cfm	18.3	31.2	41.8	69.0
Capacity 19" HG (VAC) (per pump)	scfm	6.7	11.4	15.3	25.1
Motor (per pump)	hp (W)	1.5 (2.0)	2.0 (2.7)	3.0 (4.1)	5.0 (6.8)
Vacuum tank	gal	80	80	120	120
Vacuum inlet	NPT	1.5"	1.5"	1.5"	1.5"
Vacuum outlet <sup>1)</sup>	NPT	1.25"	1.25"	1.25"	1.25"
Weight	lbs (kg)	700 (305)	750 (340)	1125 (510)	1300 (589)

### Ordering Information

#### VTMD-25-M    VTMD-40-M    VTMD-65-M    VTMD-100-M

	Part. No.	Part. No.	Part. No.	Part. No.
Tank mounted medical vacuum system				
208 V, 3 phase, 60 Hz	S 170 530	S 170 533	S 170 499	S 170 490
230 V, 3 phase, 60 Hz	S 170 531	S 170 534	S 170 536	S 170 538
460 V, 3 phase, 60 Hz	S 170 532	S 170 535	S 170 537	S 170 539

<sup>1)</sup> System consists of two outlet flanges