Leybold

Vacuum Pump Systems

RUTA
Forevacuum Pump Systems

SOGEVAC
Oil Sealed Vacuum Pump Systems
Central Vacuum Supply Systems

DRYVAC
Dry Compressing Vacuum Pump Systems

TURBOLAB
High Vacuum Pump Systems

UNIVEX
High Vacuum Experimentation Systems

CS Calibration Systems

250.00.02
Excerpt from the Leybold Full Line Catalog (Edition 2022)
Catalog Part Vacuum Pump Systems

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General to Vacuum Pump Systems

Overview

A continually increasing number of applications in industry and research are relying on vacuum technology. Thus widely differing requirements result regarding the vacuum generating systems.

The comprehensive range of vacuum pumps from Leybold offers, in combination with the matching accessories, all options of selecting the optimum pump system for your application in each case.

Based on the longstanding experience in the design and manufacture of vacuum pump systems, Leybold offers standardized pump systems which will match most applications – the RUTA pump systems.

RUTA pump systems excel by being compact, reliable and service-friendly.

The pump systems are equipped as standard with 400 V, 50 Hz three-phase motors.

Motors for special supply voltages, special mains frequencies or explosion protected pumps are available.

Standards

Leybold pump systems are rated according to CE, ISO, DIN and VDE regulations. Compliance with other standards is possible upon request.

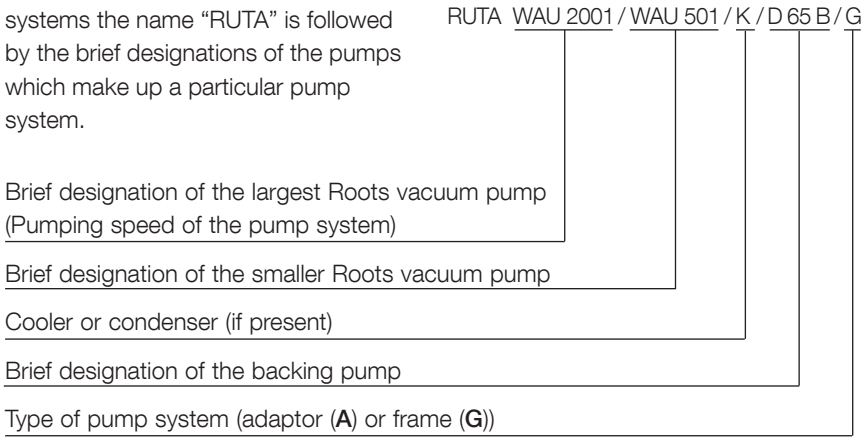
The technical data of the vacuum pump systems given in this catalog part are based on the PNEUROP Acceptance Specifications for Vacuum Pumps, Part 1, and comply with DIN 28 426. The characteristic curves in our pumping speed diagrams are plotted in accordance with DIN 28 426. The curves represent the mean of several measurements. Our warranty refers to the values indicated in the technical data table.

Designation of Roots Vacuum Pump Systems

Leybold pump combinations of Roots vacuum pumps with backing pumps are called “RUTA”.

In order to identify the standard pump systems the name “RUTA” is followed by the brief designations of the pumps which make up a particular pump system.

The pump system designation is arranged as follows:



Part Numbers

The part numbers listed refer in each case to the standard version of the respective systems. Minor deviations are indicated by way of variants. The variant V001 designates in each case the described version of the system.
The pump system RUTA WAU 2001/ SP630 F/G has Part No. 502 511 V001. When using the air-cooled screw pump SCREWLINE SP 630 then the variant will have the Part No. 502 511 V002. Minor deviations are special operating voltage, fitted accessories and custom painting for frame or pumps, for example.
The use of a different type of Roots vacuum pump, use of the WS 2001 instead of the WAU 2001, for example, is also treated as a variant. All variants with the same basic number have the same frame dimensions, the same distance between intake flange of the Roots pump and the exhaust flange of the backing pump.

Types of Pump Systems

Typical areas of application for RUTA pump systems are industry, research and chemistry. Here the focus is on processes for metal production and processing, drying and degassing, thermal treatment, coating in the area of solar components and semiconductor manufacture as well as surface refinement. RUTA pump systems are also used as backing pump sets for high vacuum systems in combination with diffusion pumps, turbomolecular pumps and cryo pumps.



RUTA WH7000/4xSV750BF/G

The RUTA pump systems described here have been designed for rough and medium vacuum operation, i.e. for the pressure range from atmospheric pressure down to 10^{-4} mbar (0.75×10^{-4} Torr). RUTA pump systems consist of a combination of individual pumps whereby Roots vacuum pumps are employed on the intake side. Further compression to atmospheric pressure may be performed either by oil sealed or dry compressing vacuum pumps, liquid ring pumps or Roots vacuum pumps with pre-inlet cooling. All combinations may be equipped at suitable places with condensers.

The selection criteria for a RUTA pump system are as follows:

- Pumping speed
- Operating pressure
- Process conditions
- Characteristics of the media
- Standards and regulations which depend on the area of application and the produced products.

Standard RUTA Pump Systems

Our Roots vacuum pumps WA, WH, WS and RA or WAU and WSU with integrated bypass line are combined with oil sealed backing pumps for conventional generation of the vacuum. Single-stage arrangements are capable of delivering pumping speeds of 250 to 16000 m^3/h (147.3 to 9424 cfm). Higher pumping speeds can be attained by paralleling several pumps. The attainable operating pressures depend on the number of pumping stages.

For higher pumping speeds or lower ultimate pressures, also three-stage or multi-stage pump systems are available.

RUTA Pump Systems with Condensers

If vacuum systems must pump larger quantities of vapor or vapor gas mixtures, it is economical to insert condensers which are cooled with water or a different coolant at a suitable place within the pump system. Cooled condensers are themselves effective partial pumps which condense most of the vapors from the pumped media. The downstream mechanical pumps will then only need to pump those gases which have not already condensed.

The quantity of vapor present in each case determines the size of the condenser and the temperature at which it is operated. The size of the downstream pump is determined by the quantity of non-condensable gases, the required pressure and the required pump-down time for the system.

All pump systems of the WA/WAU, WS/WSU, WH and RA series may be equipped with one or several condensers. These are often used in the chemical industry. Here RUTA vacuum pump systems with condensers are not only used to generate a vacuum, but they are also often employed in the recovery of solvents. When installing one or several Roots pumps upstream of a condenser, low operating pressures and high condensation pressures can be attained. Thus the condenser may in many cases be operated with cooling water instead of brine. The vapor components pumped together with inert gases may be separated once more in an emission condenser on the exhaust side so that the quality of the exhaust gas can be maintained within close tolerance regarding its cleanness.

Dry Compressing RUTA Vacuum Pump Systems

Increasing environmental awareness, pumping of condensable vapors or high requirements regarding cleanness when pumping high quality media which must not be contaminated by other media for recycling, often requires the use of universal pumps where the pump chamber is free of operating agents (dry pumps).

Here Leybold offers two solutions:
1. Pump systems with dry compressing vacuum pumps combined with one or several Roots vacuum pumps.
2. Single-stage RUTA RAV vacuum pump systems, consisting of Roots vacuum pumps with pre-admission cooling.

The operating pressure ranges of the pump systems depend on the number of Roots vacuum pumps, but will extend in any case without interruptions to atmospheric pressure.

Already in connection with one Roots pump, pump systems with a screw pump are capable of attaining base pressures of < 1 x 10^{-3} mbar (7.5 x 10^{-4} Torr).

Single-stage RAV combinations attain an ultimate pressure of 150 mbar (112.5 Torr).

Multi-stage combinations with Roots vacuum pumps of all systems are capable of attaining pressures below 10^{-4} mbar (7.5 x 10^{-5} Torr).

RUTA Custom Pump Systems

Most users will be able to select the right pump system for their application from our range of standard pump systems. In special cases a custom design may be required for special processes and high pumping speeds.

We are prepared to design and manufacture custom pump systems according to customers specifications. If required we will use – besides oil-sealed and dry compressing backing pumps – liquid ring and ejector pumps.

RUTA Pump Systems for the Metal Producing and Processing Industry

In common vacuum furnace processes such as hardening, annealing, brazing, melting and casting, preferably oil sealed or dry compressing standard vacuum pump systems are usually used.
The oil sealed systems consist of a combination of Roots vacuum pumps with a single or two-stage rotary vane or rotary piston pump.

In the dry compressing systems our screw vacuum pump SCREWLINE is used as the backing pump.

The vacuum pumps are mounted in a rugged frame. The design of the pump systems is service-friendly, modular and can be easily upgraded with additional equipment.

On smaller furnaces RUVAC WAU Roots vacuum pumps are the most suitable because these may be cut-in at a higher operating pressure, while on larger furnaces and particularly where short pump-down cycles are required, the use of RUVAC WH Roots vacuum pumps with suitably sized backing pumps is advisable. For special processes, e.g. fusion or degassing of molten masses, due to the high dust contents, the additional use of a dust separator is required as well as equipping the backing pumps with oil filtering units.
These additional units ensure utmost operational reliability of the pump systems even under the toughest operating conditions.



Pump system for the field of steel degassing

RUTA Pump Systems for the Photovoltaic and Coating Industry

In photovoltaic coating processes reactive, toxic and corrosive substances are generally used.

Frequently large quantities of dust for the pump system need to be expected. For such applications, Leybold has developed process pump combinations consisting of pumps from the DRYVAC line and Roots pumps from the RUVAC WS/WH line with optionally integrated controller.

The integrated electronics and sensor systems permit easy integration of the pump systems within the plant control system.

(For information on possible applications, see Catalog Part “Dry Compressing Screw Vacuum Pumps DRYVAC”).

RUTA Pump Systems for the Chemical Industry

In chemical processes it is often necessary to remove corrosive, condensable and reactive gases and vapors. Leybold designs and manufactures custom-built pump systems for specific process applications. Depending on the type of application, either a rotary vane pump, or a dry compressing screw vacuum pump (SCREWLINE, for example), a liquid ring pump or a combination of gas jet pump and liquid ring pump may be used as the backing pump.

To ensure dependable monitoring of the system, the following monitoring devices, among others, may be installed:

- Temperature sensors to monitor the gas temperatures between the pump stages and the pump body temperature,
- Water flow monitors for the cooling water supply to pumps and condensers,
- Differential pressure indicator with control setpoint to monitor the exhaust filters of the rotary vane vacuum pump.

Pump Systems for Drying, Evaporation and Distillation Applications (TVD)

More and more vacuum applications are finding their way into the areas of environmental protection, recycling and waste disposal. “Waste disposal of used oil and aromatic compounds” and “Cleaning processes in metal-processing factories” demonstrate that the combination of vacuum know-how, innovative engineering and applications know-how is in-dispensable for the successful application of vacuum technology in most widely differing applications.



TVD pump system, mobile with control cabinet

The product is no longer in the foreground, solutions to problems are demanded instead.

Leybold has developed some continuously operating vacuum pump systems for these applications. These systems basically
consist of a rotary vane pump with a condenser unit. Upon request the condenser arrangement may also be equipped with a cold water set. This version will then be independent of any cooling water connections and - being a mobile system - it is well-suited for operation at varying locations.

Products

Oil Sealed RUTA Pump Systems – Three-Stage, with Two-Stage TRIVAC Backing Pumps, Adaptor Version



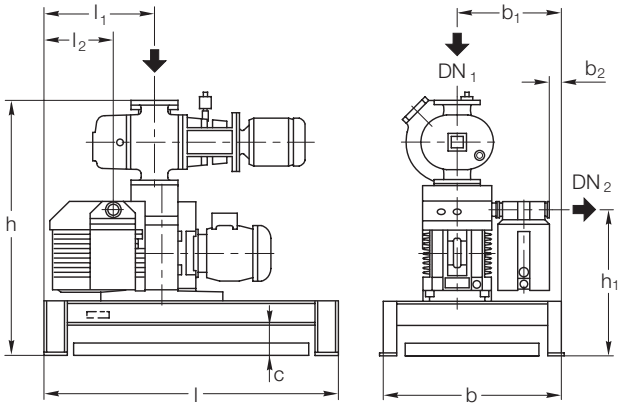
RUTA WAU501/D65B/A

Standard Equipment

- Exhaust filter
- Oil collecting pan
- Manually operated gas ballast
- Crane eyes on the frame
- Floor mounting
- The oil is supplied with the pump
- CE approval

Options

- Frequency converter RUVATRONIC RT for controlling the speed of the Roots pump
- Oil filter
- 24 V DC gas ballast valve
- Sound proofing box
- Vibration absorbers
- Castors
- Different types of floor mounts
- Oil drain valve on each pump
- Exhaust filter with oil return line
- Special motors
- Electric control systems



Type	RUTA	251/D40B/A	251/D65B/A	501/D65B/A
RUVAC WA/WAU/WS/WSU	P2	251	251	501
Backing pump TRIVAC	P1	D 40 B	D 65 B	D 65 B
	DN_1	63 ISO-K	63 ISO-K	63 ISO-K
	DN_2	40 ISO-KF	40 ISO-ISO-KF	40 ISO-KF
	l	1000 (39.37)	1000 (39.37)	1000 (39.37)
	l_1	375 (14.76)	375 (14.76)	375 (14.76)
	l_2	234 (9.21)	234 (9.21)	234 (9.21)
	b	600 (23.62)	600 (23.62)	600 (23.62)
	b_1	350 (13.78)	350 (13.78)	350 (13.78)
	b_2	40 (1.57)	40 (1.57)	40 (1.57)
	h	854 (33.62)	854 (33.62)	894 (35.20)
	h_1	488 (19.21)	488 (19.21)	488 (19.21)
	c	100 (3.94)	100 (3.94)	100 (3.94)

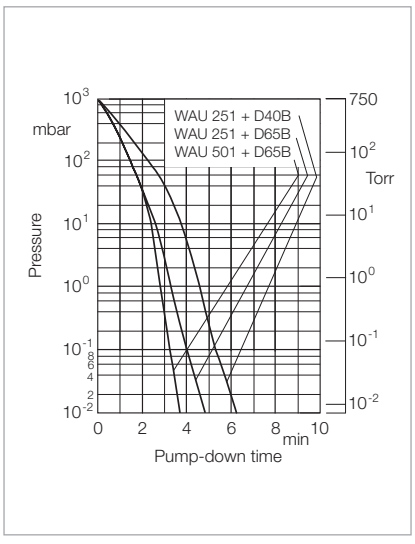
Dimensional drawing for the pump systems with TRIVAC D40/65 B backing pumps on pallet; dimensions in brackets ( ) are in inch

Technical Data, 50 Hz

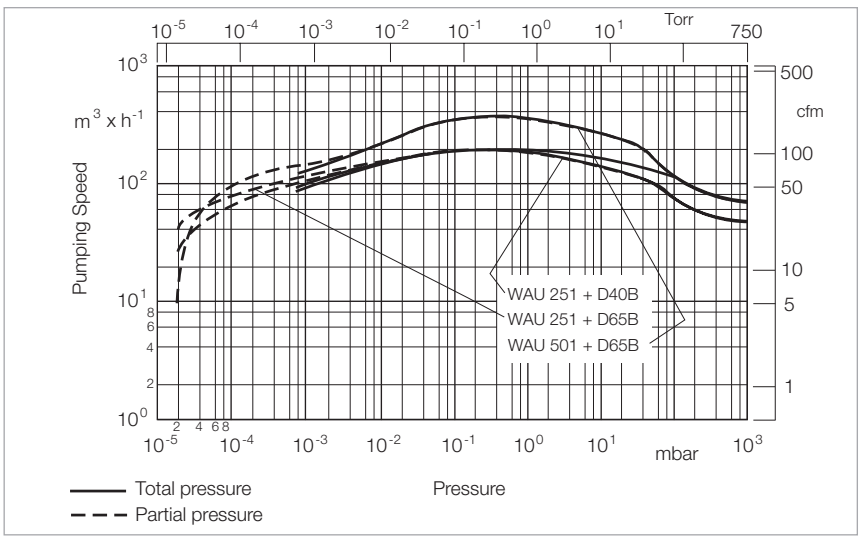
		RUTA WAU		
		251/D40B/A	**251/D65B/A**	**501/D65B/A**
RUVAC (WA/WAU/WS/WSU possible)	P2	251	251	501
Backing pump TRIVAC	P1	D 40 B	D 65 B	D 65 B
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	200.0 (117.8)	210.0 (123.7)	380.0 (223.8)
Ultimate partial pressure	mbar (Torr)	$< 2 \times 10^{-5}$ ($< 1.5 \times 10^{-5}$)		
Ultimate total pressure with gas ballast	mbar (Torr)	$< 8 \times 10^{-4}$ ($< 6 \times 10^{-4}$)		
Installed motor power 400 V, 50 Hz	kW (hp)	2.6 (3.5)	3.3 (4.5)	4.4 (6.0)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	2.0 (2.7)	2.5 (3.4)	2.7 (3.7)
Noise level				
max.	dB(A)	64	65	67
without gas ballast at 1 mbar (0.75 Torr)	dB(A)	62	63	63
Oil filling, total, approx.	l (qt)	3.3 (3.49)	4.0 (4.23)	4.3 (4.55)
Weight, total, approx.	kg (lbs)	245.0 (540.2)	260.0 (573.3)	305.0 (627.5)
Connecting flange				
Inlet port	DN_1	63 ISO-K		
Outlet port	DN_2	40 ISO-KF		

Ordering Information

		RUTA WAU		
		251/D40B/A	**251/D65B/A**	**501/D65B/A**
		Part No.	**Part No.**	**Part No.**
RUVAC (WA/WAU/WS/WSU possible)	P2	WAU 251	WAU 251	WAU 501
Backing pump TRIVAC	P1	D 40 B	D 65 B	D 65 B
Pump system, complete (adaptor version), pallet mounted, with Roots vacuum pump RUVAC WAU		**023 06**	**023 07**	**023 08**
Frequency converter RUVATRONIC (see description in Chapter “Accessories”)		RT 5/251 **500 001 381**	RT 5/251 **500 001 381**	RT 5/501 **500 001 382**

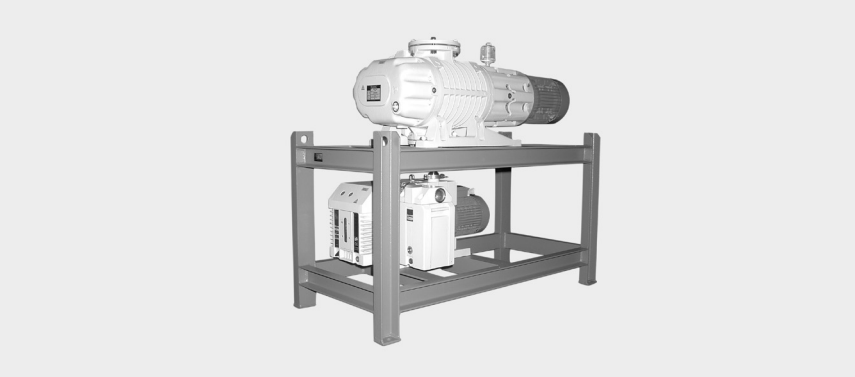


Pump-down time diagram for a 1000 l tank at 50 Hz



Pumping speed diagram at 50 Hz

Oil Sealed RUTA Pump Systems – Three-Stage, with Two-Stage TRIVAC Backing Pumps, Frame Version



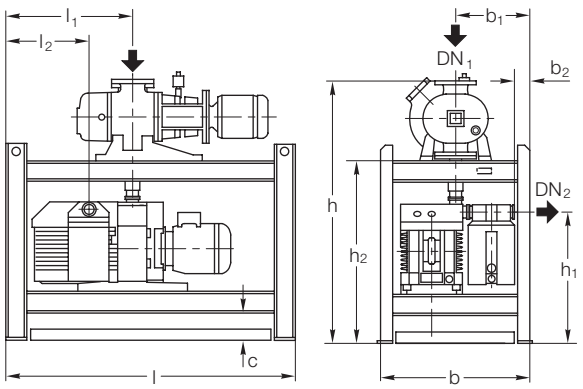
RUTA WAU501/D65B/G

Standard Equipment

- Exhaust filter
- Oil collecting pan
- Manually operated gas ballast
- Crane eyes on the frame
- Floor mounting
- The oil is supplied with the pump
- CE approval

Options

- Frequency converter RUVATRONIC RT for controlling the speed of the Roots pump
- Oil filter
- 24 V DC gas ballast valve
- Sound proofing box
- Vibration absorbers
- Castors
- Different types of floor mounts
- Oil drain valve on each pump
- Exhaust filter with oil return line
- Special motors
- Electric control systems



Type	RUTA	251/D40B/G	251/D65B/G	501/D65B/G	1001/D65B/G
RUVAC WA/WAU/WS/WSU	P2	251	251	501	1001
Backing pump TRIVAC	P1	D 40 B	D 65 B	D 65 B	D 65 B
	DN_1	63 ISO-K	63 ISO-K	63 ISO-K	100 ISO-K
	DN_2	40 ISO-KF	40 ISO-KF	40 ISO-KF	40 ISO-KF
	l	1000 (39.37)	1100 (43.31)	1150 (45.28)	1300 (51.18)
	l_1	400 (15.75)	480 (18.90)	480 (18.90)	480 (18.90)
	l_2	234 (9.21)	314 (12.36)	314 (12.36)	314 (12.36)
	b	560 (22.05)	560 (22.05)	560 (22.05)	600 (23.62)
	b_1	280 (11.02)	280 (11.02)	280 (11.02)	280 (11.02)
	b_2	59 (2.32)	59 (2.32)	59 (2.32)	59 (2.32)
	h	977 (38.46)	977 (38.46)	1017 (40.04)	1067 (42.01)
	h_1	488 (19.21)	488 (19.21)	488 (19.21)	488 (19.21)
	h_2	677 (26.65)	677 (26.65)	677 (26.65)	671 (26.42)
	c	100 (3.94)	100 (3.94)	100 (3.94)	100 (3.94)

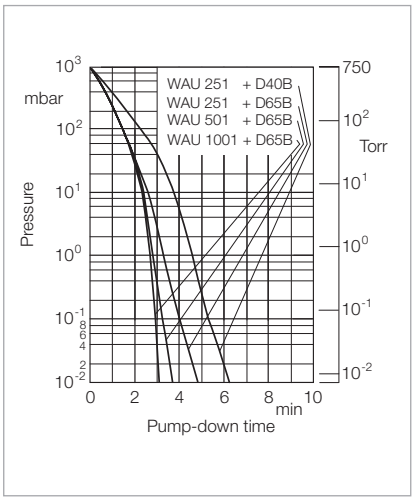
Dimensional drawing for the pump systems with TRIVAC D40/65 B backing pumps in a frame; dimensions in brackets ( ) are in inch

Technical Data, 50 Hz

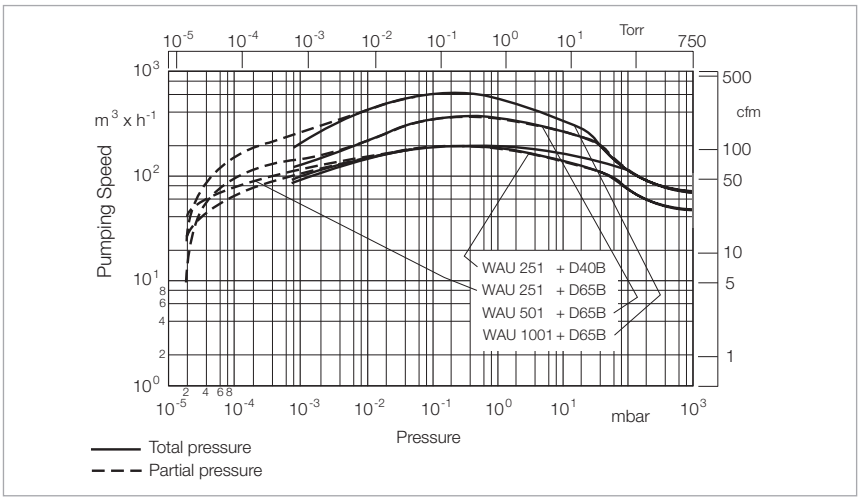
		RUTA WAU			
		251/D40B/G	251/D65B/G	501/D65B/G	1001/D65B/G
RUVAC (WA/WAU/WS/WSU possible)	P2	251	251	501	1001
Backing pump TRIVAC	P1	D 40 B	D 65 B	D 65 B	D 65 B
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	185.0 (109.0)	205.0 (120.7)	340.0 (200.3)	620.0 (365.2)
Ultimate partial pressure	mbar (Torr)	$< 2 \times 10^{-5}$ ($< 1.5 \times 10^{-5}$)			
Ultimate total pressure with gas ballast	mbar (Torr)	$< 8 \times 10^{-4}$ ($< 6 \times 10^{-4}$)			
Installed motor power 400 V, 50 Hz	kW (hp)	2.6 (3.5)	3.3 (4.5)	4.4 (6.0)	6.2 (8.4)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	2.0 (2.7)	2.5 (3.4)	2.7 (3.7)	3.0 (4.1)
Noise level					
max.	dB(A)	64	65	67	77
without gas ballast at 1 mbar (0.75 Torr)	dB(A)	62	63	63	70
Oil filling, total, approx.	l (qt)	3.3 (4.5)	4.0 (4.23)	4.3 (4.55)	5.3 (5.60)
Weight, total, approx.	kg (lbs)	280.0 (617.4)	310.0 (683.6)	350.0 (771.8)	460.0 (1014.3)
Connecting flange					
Inlet port	DN_1	63 ISO-K	63 ISO-K	63 ISO-K	100 ISO-K
Outlet port	DN_2	40 ISO-KF	40 ISO-KF	40 ISO-KF	40 ISO-KF

Ordering Information

		RUTA WAU			
		251/D40B/G	251/D65B/G	501/D65B/G	1001/D65B/G
		Part No.	Part No.	Part No.	Part No.
RUVAC (WA/WAU/WS/WSU possible)	P2	WAU 251	WAU 251	WAU 501	WAU 1001
Backing pump TRIVAC	P1	D 40 B	D 65 B	D 65 B	D 65 B
Pump system, complete (frame version), frame mounted, with Roots vacuum pump RUVAC WAU		**023 16**	**023 17**	**023 18**	**023 19**
Frequency converter RUVATRONIC (see description in Chapter “Accessories”)		RT 5/251 **500 001 381**	RT 5/251 **500 001 381**	RT 5/501 **500 001 382**	RT 5/1001 **500 001 383**



Pump-down time diagram for a 1000 l tank at 50 Hz



Pumping speed diagram at 50 Hz

Oil Sealed RUTA Pump Systems – Three-Stage, with Two-Stage SOGEVAC NEO Backing Pumps, Adaptor Version

Standard Equipment

- RUVAC WAU with air cooling
- SOGEVAC SOGEVAC NEO 40 / 65 D with air cooling
- Exhaust filter with oil return
- Oil filter
- Oil collecting pan
- With manual gas ballast with three positions: closed, low flow and standard flow
- Crane eyes on the frame
- Floor mounting
- The oil is supplied with the pump

Options

- Frequency converter RUVATRONIC RT for controlling the speed of the Roots pump
- 24 V DC gas ballast valve
- Sound proofing box
- Vibration absorbers
- Castors
- Different floor mountings
- Oil drain tap on each pump
- Special motors
- Electric controls
- The SOGEVAC NEO pump can be equipped with a thermal oil level or exhaust filter overpressure switch

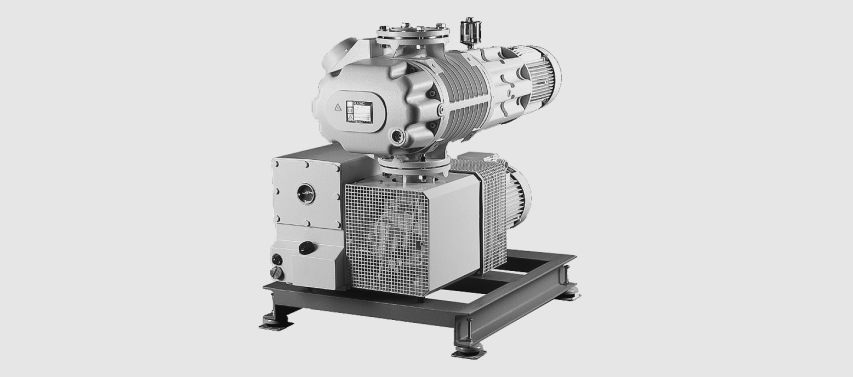
Technical Data, 50 Hz

		RUTA WAU		
		251/NEO D40/A	251/NEO D65/A	501/NEO D65/A
Ordering Information *	**Part No.**	**505048V001**	**505049V001**	**505050V001**
RUVAC (WA/WAU/WS/WSU possible)	P2	251	251	501
Backing pump SOGEVAC NEO	P1	D 40	D 65	D 65
Pumping speed, 50 Hz at 10^{-1} mbar	m^3/h	200	210	380
Ultimate total pressure	mbar	$< 8 \cdot 10^{-4}$		
Ultimate total pressure with gas ballast	mbar	$< 1 \cdot 10^{-2}$		
Installed motor power 400 V, 50 Hz	kW	2.6	3.3	4.4
Electrical power consumption at 10^{-1} mbar	kW	2.0	2.5	2.7
Noise level without gas ballast 1 mbar	dB(A)	63	63	66
Oil filling, total, approx.	l	4.2	4.6	4.8
Weight, total, approx.	kg	260	265	310
Connecting flange				
Inlet port	DN_1	63 ISO-K		
Outlet port	DN_2	40 ISO-KF		

* For suitable RUVATRONIC frequency inverters, see section "Accessories"

Notes

Oil Sealed RUTA Pump Systems – Two-Stage, with Single-Stage SOGEVAC Backing Pumps, Adaptor Version



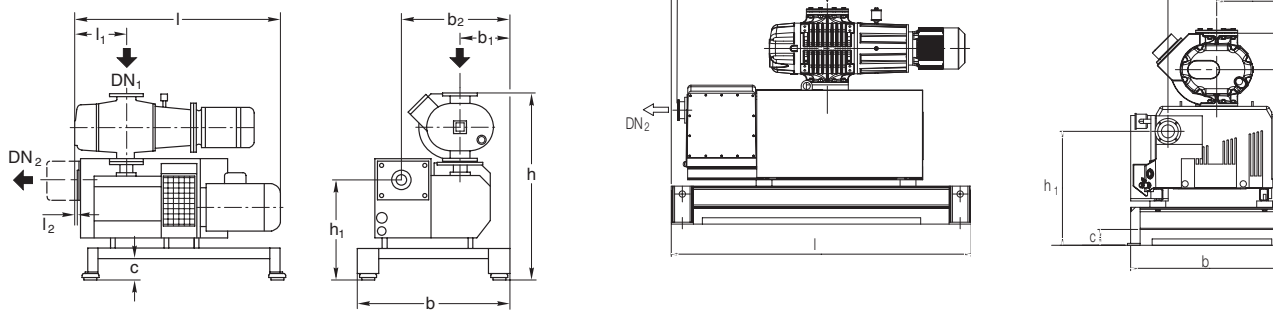
RUTA WAU1001/SV200/A

Standard Equipment

- Exhaust filter with oil return line
- Oil filter
- Oil collecting pan
- Gas ballast valve:
  SV 200/300 B manually operated
  SV 630 BF 24 V DC
- SV 200/300 B with air cooling
- SV 630 BF with water cooling
- Floor mounting
- The oil is supplied with the pump
- CE approval

Options

- Frequency converter RUVATRONIC RT for controlling the speed of the Roots pump
- 24 V DC gas ballast valve or manually operated
- Sound proofing box
- Vibration absorbers
- Castors
- Different types of floor mounts
- Oil drain valve on each pump
- Special motors
- Electric control systems



Type	RUTA	501/SV200/A	1001/SV200/A	1001/SV300B/A	2001/SV630BF/A
RUVAC WA/WAU/WS/WSU	P2	501	1001	1001	2001
Backing pump SOGEVAC	P1	SV 200	SV 200	SV 300 B	SV 630 BF
	DN_1	63 ISO-K	100 ISO-K	100 ISO-K	160 ISO-K
	DN_2	2"	2"	2"	100 ISO-K
	l	962 (37.87)	1050 (41.34)	1030 (40.55)	1896 (74.65)
	l_1	242 (9.53)	303 (11.93)	298 (11.73)	987 (38.86)
	l_2	70 (2.76)	77 (3.03)	88 (3.47)	40 (1.56)
	b	700 (27.56)	700 (27.56)	700 (27.56)	1000 (39.37)
	b_1	230 (9.06)	230 (9.06)	230 (9.06)	456 (17.95)
	b_2	499 (19.65)	499 (19.65)	520 (20.47)	764 (30.08)
	h	873 (34.37)	923 (36.34)	929 (36.58)	1340 (52.76)
	h_1	468 (18.43)	468 (18.43)	480 (18.90)	720 (28.35)
	c	100 (3.94)	100 (3.94)	100 (3.94)	100 (3.94)

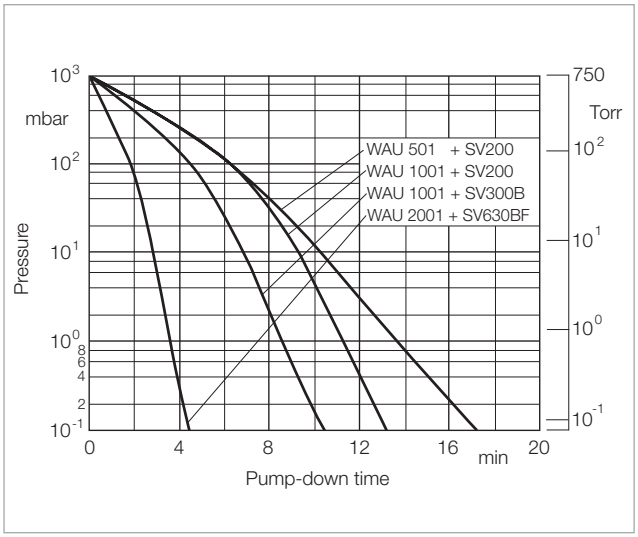
Dimensional drawing for the pump systems with SOGEVAC SV 200 and 300 B backing pumps [left], SOGEVAC SV 630 BF [right]; dimensions in brackets ( ) are in inch

Technical Data, 50 Hz

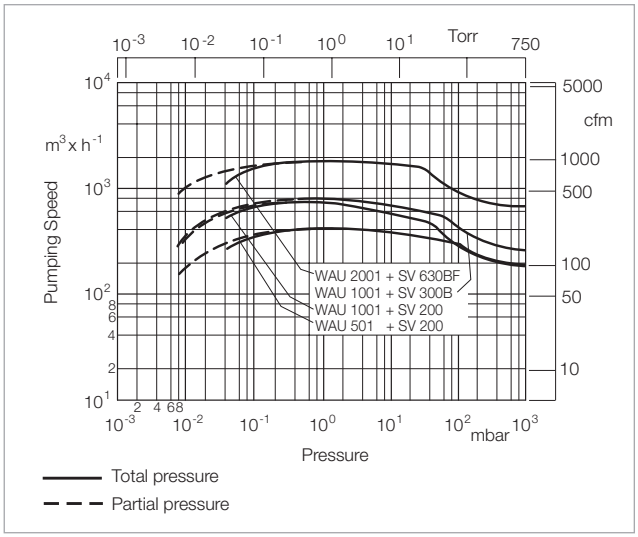
		RUTA WAU			
		501/SV200/A	1001/SV200/A	1001/SV300B/A	2001/SV630BF/A
RUVAC (WA/WAU/WS/WSU possible)	P2	501	1001	1001	2001
Backing pump TRIVAC	P1	SV 200	SV 200	SV 300 B	SV 630 BF
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	365.0 (215.0)	715.0 (421.0)	730.0 (430.0)	1690.0 (995.4)
Ultimate partial pressure	mbar (Torr)	$< 8 \times 10^{-3}$ ($< 6 \times 10^{-3}$)			
Ultimate total pressure with gas ballast	mbar (Torr)	$< 4 \times 10^{-2}$ ($< 3 \times 10^{-2}$)			
Installed motor power 400 V, 50 Hz	kW (hp)	6.2 (8.4)	8.0 (10.9)	9.5 (12.9)	22.5 (30.6)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	3.0 (4.1)	3.5 (4.8)	4.0 (5.4)	16.5 (22.4)
Noise level without gas ballast at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	70	75	76	80
Oil filling, total, approx.	l (qt)	6.0 (6.34)	7.0 (7.4)	11.0 (11.63)	26.0 (27.47)
Weight, total, approx.	kg (lbs)	335.0 (738.7)	430.0 (948.2)	480.0 (1058.4)	1140.0 (2513.7)
Connecting flange					
Inlet port	DN_1	63 ISO-K	100 ISO-K	100 ISO-K	160 ISO-K
Outlet port	DN_2	2"	2"	2"	100 ISO-K

Ordering Information

		RUTA WAU			
		501/SV200/A	1001/SV200/A	1001/SV300B/A	2001/SV630BF/A
		Part No.	Part No.	Part No.	Part No.
RUVAC (WA/WAU/WS/WSU possible)	P2	WAU 501	WAU 1001	WAU 1001	WAU 2001
Backing pump SOGEVAC	P1	SV 200	SV 200	SV 300 B	SV 630 BF
Pump system, complete (adaptor version), pallet mounted, with Roots vacuum pump RUVAC WAU		**022 06**	**022 08**	**502 462 V001**	**502 463 V001**
Frequency converter RUVATRONIC (see description in Chapter “Accessories”)		RT 5/501 **500 001 382**	RT 5/1001 **500 001 383**	RT 5/1001 **500 001 383**	RT 5/2001 **500 001 384**

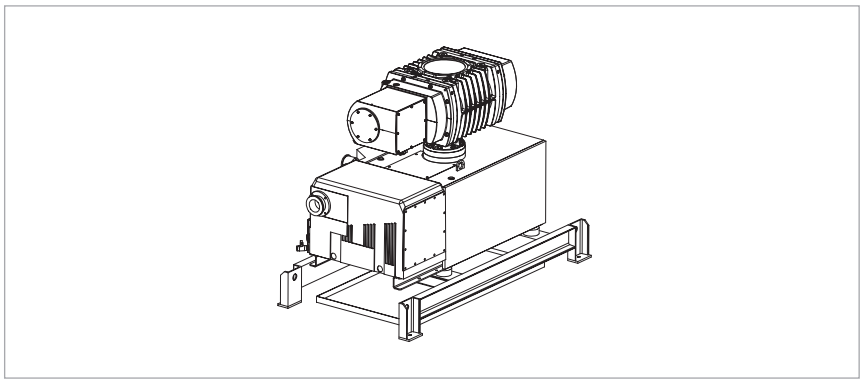


Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Oil Sealed RUTA Pump Systems – Two-Stage, with Single-Stage SOGEVAC Backing Pumps, Adaptor Version



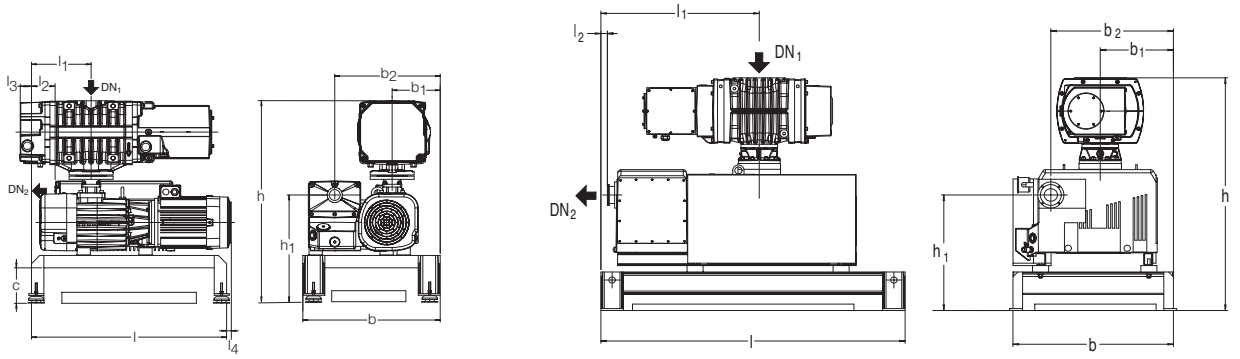
RUTA WH4400/SV630BF/A

Standard Equipment

- RUVAC WH with water cooling
- Exhaust filter with oil return line
- Oil filter
- Oil collecting pan
- Gas ballast valve:
  SV 100 to 300 manually operated
  SV 630 BF 24 V DC
- SV 100 to 300 with air cooling
- SV 630 BF with water cooling
- Floor mounting
- The oil is supplied with the pump
- RUVAC WH including external frequency converter (frequency converter permits pumping speed control)
- CE approval

Options

- 24 V DC gas ballast valve or manually operated
- Sound proofing box
- Vibration absorbers
- Castors
- Different types of floor mounts
- Oil drain valve on each pump
- Special motors
- Electric control systems



Type	RUTA	700/SV100B/A	700/SV200/A	700/SV300B/A	4400/SV630BF/A
RUVAC WH	P2	700	700	700	4400
Backing pump SOGEVAC	P1	SV 100 B	SV 200	SV 300 B	SV 630 BF
	DN_1	100 ISO-K	100 ISO-K	100 ISO-K	250 ISO-K
	DN_2	G 1 1/4"	G 2"	G 2"	100 ISO-K
	l	710 (27.95)	950 (37.40)	950 (37.40)	1896 (74.65)
	l_1	217 (8.54)	262 (10.32)	335 (13.19)	947 (37.28)
	l_2	85 (3.35)	84 (3.31)	125 (4.92)	40.5 (1.59)
	l_3	41 (1.61)	–	45 (1.77)	–
	l_4	17 (0.67)	–	95 (3.74)	–
	b	500 (19.69)	700 (27.56)	700 (27.56)	1000 (39.37)
	b_1	175 (6.89)	230 (9.06)	230 (9.06)	456 (17.95)
	b_2	384 (15.12)	499 (19.65)	520 (20.47)	764 (30.08)
	c	100 (3.94)	100 (3.94)	100 (3.94)	100 (3.94)
	h	708 (27.87)	829 (32.64)	827 (32.56)	1450 (57.09)
	h_1	365 (14.37)	468 (18.43)	480 (18.90)	720 (28.35)

Dimensional drawing for the pump systems with SOGEVAC SV 100 B, 200 and 300 B backing pumps [left], SOGEVAC SV 630 BF [right]; dimensions in brackets ( ) are in inch

Technical Data, 50 Hz

RUTA WH

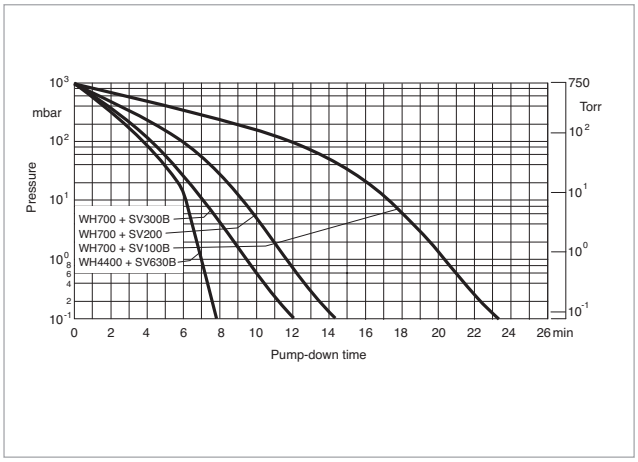
		700/SV100B/A	700/SV200/A	700/SV300B/A	4400/SV630BF/A
RUVAC WH	P2	700	700	700	4400
Backing pump SOGEVAC	P1	SV 100 B	SV 200	SV 300 B	SV 630 BF
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	520 (306)	570 (335)	600 (353)	3332 (1961)
Ultimate pressure without gas ballast	mbar (Torr)	$< 5 \times 10^{-3}$ ($< 3.75 \times 10^{-3}$)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)	$< 3 \times 10^{-3}$ ($< 2.25 \times 10^{-3}$)	$< 3 \times 10^{-3}$ ($< 2.25 \times 10^{-3}$)
Installed motor power 400 V, 50 Hz	kW (hp)	4.4 (5.9)	6.2 (8.3)	7.7 (10.3)	26.0 (34.9)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	1.6 (2.2)	2.9 (3.9)	6.0 (8.0)	9,68 (12.98)
Noise level at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	62	69	70	73
Oil filling, total, approx.	l (qt)	2.9 (2.6.)	9.9 (8.7)	12.4 (10.9)	27.0 (23.8)
Weight, total, approx.	kg (lbs)	350 (722)	415 (915)	465 (1025)	1 330 (2932)
Connecting flange					
Inlet port	DN_1	100 ISO-K	100 ISO-K	100 ISO-K	250 ISO-K
Outlet port	DN_2	G 1 1/4"	G 2"	G 2"	100 ISO-K

Ordering Information

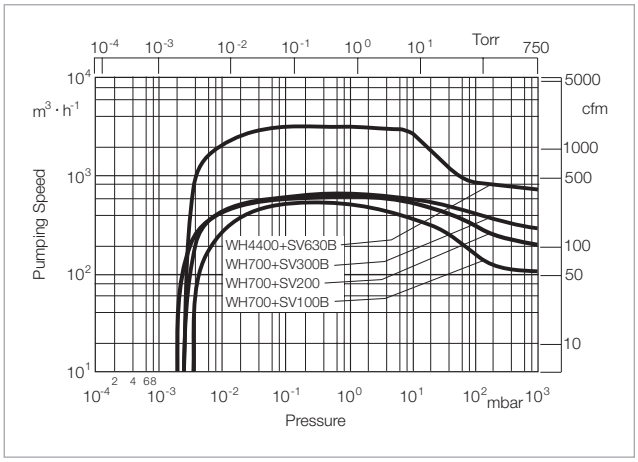
RUTA WH

		700/SV100B/A	700/SV200/A	700/SV300B/A	4400/SV630BF/A
		Part No.	Part No.	Part No.	Part No.
RUVAC WH	P2	700	700	700	4400
Backing pump SOGEVAC					
air-cooled	P1	SV 100 B	SV 200	SV 300 B	–
water-cooled	P1	–	–	–	SV 630 BF
Pump system, complete (adaptor version), pallet mounted, with Roots vacuum pump RUVAC WH		**503155V001** [1]	**503156V001** [1]	**503157V001** [1]	**503164V001** [1]

[1] Including external frequency converter

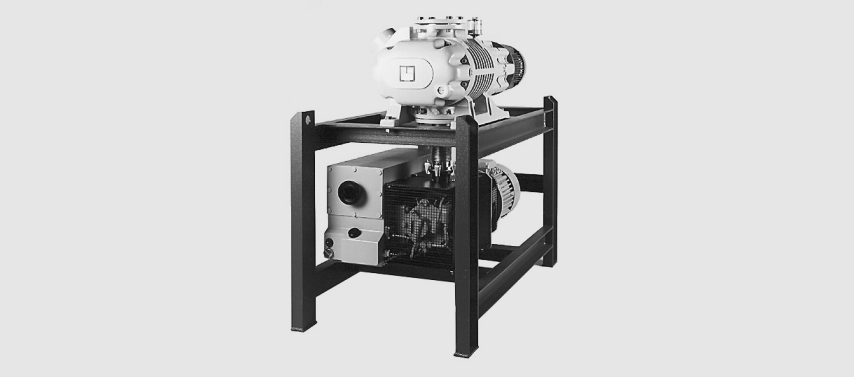


Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Oil Sealed RUTA Pump Systems – Two-Stage, with Single-Stage SOGEVAC Backing Pumps, Frame Version



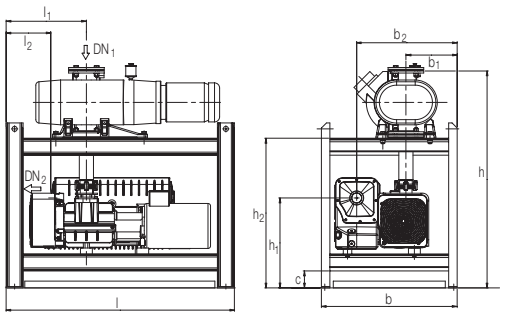
RUTA WAU2001/SV300B/G

Standard Equipment

- RUVAC WAU with air cooling
- SOGEVAC SV 300 B with air cooling
- Exhaust filter with oil return line
- Oil filter
- Oil collecting pan
- Gas ballast valve: SV 300 B manually operated
- Crane eyes on the frame
- Floor mounting
- The oil is supplied with the pump
- CE approval

Options

- Frequency converter RUVATRONIC RT for controlling the speed of the Roots pump
- 24 V DC gas ballast valve or manually operated
- Sound proofing box
- Vibration absorbers
- Castors
- Different types of floor mounts
- Oil drain valve on each pump
- Special motors
- Electric control systems



Type	RUTA	1001/SV300B/G	2001/SV300B/G
RUVAC WA/WAU/WS/WSU	P2	1001	2001
Backing pump SOGEVAC	P1	SV 300 B	SV 300 B
	DN_1	100 ISO-K	160 ISO-K
	DN_2	2"	2"
	l	1340 (52.76)	1340 (52.76)
	l_1	470 (18.50)	470 (18.50)
	l_2	260 (10.24)	260 (10.24)
	b	750 (29.53)	800 (31.50)
	b_1	252 (9.92)	302 (11.89)
	b_2	208 (8.19)	208 (8.19)
	h	1278 (50.32)	1338 (52.68)
	h_1	530 (20.87)	530 (20.87)
	h_2	882 (34.72)	808 (31.81)
	c	100 (3.94)	100 (3.94)

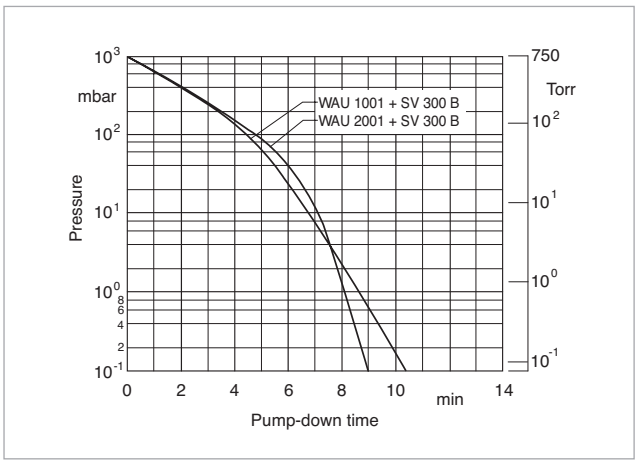
Dimensional drawing for the pump systems with SOGEVAC SV 300 B backing pumps; dimensions in brackets ( ) are in inch

Technical Data, 50 Hz

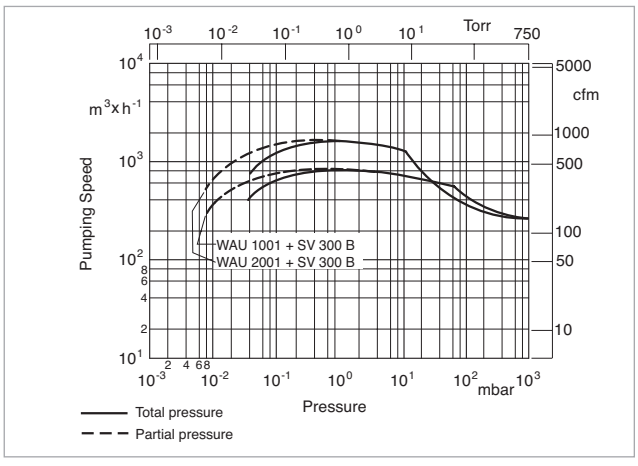
		RUTA WAU 1001/SV300B/G	RUTA WAU 2001/SV300B/G
RUVAC (WA/WAU/WS/WSU possible)	P2	1001	2001
Backing pump SOGEVAC	P1	SV 300 B	
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	730 (430)	1445 (850)
Ultimate partial pressure	mbar (Torr)	$< 8 \times 10^{-3}$ ($< 6 \times 10^{-3}$)	
Ultimate total pressure with gas ballast	mbar (Torr)	$< 4 \times 10^{-2}$ ($< 3 \times 10^{-2}$)	
Installed motor power 400 V, 50 Hz	kW (hp)	9.5 (12.9)	13.0 (17.7)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	4.0 (5.4)	4.5 (6.1)
Noise level without gas ballast at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	75	79
Oil filling, total, approx.	l (qt)	11 (11.63)	13 (13.74)
Weight, total, approx.	kg (lbs)	560.0 (1234.8)	740.0 (1631.7)
Connecting flange			
Inlet port	DN_1	100 ISO-K	160 ISO-K
Outlet port	DN_2	2"	2"

Ordering Information

		RUTA WAU 1001/SV300B/G	RUTA WAU 2001/SV300B/G
		Part No.	**Part No.**
RUVAC (WA/WAU/WS/WSU possible)	P2	WAU 1001	WAU 2001
Backing pump SOGEVAC	P1	SV 300 B	
Pump system, complete (frame version), frame mounted, with Roots vacuum pump RUVAC WAU		**502 452 V001**	**502 453 V001**
Frequency converter RUVATRONIC (see description in Chapter“Accessories”)		RT 5/1001 **500 001 383**	RT 5/2001 **500 001 384**

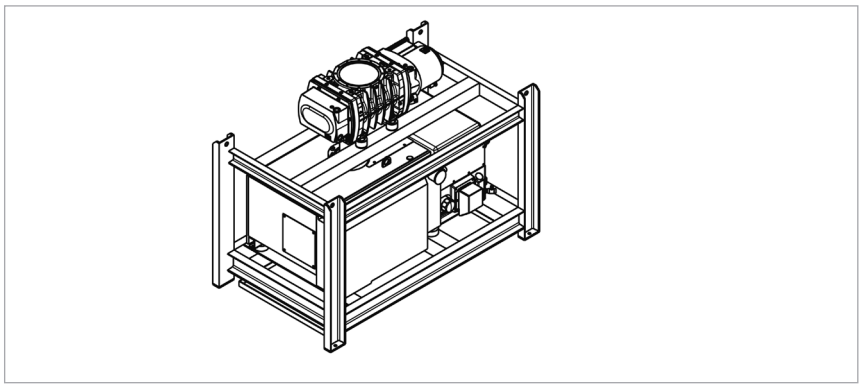


Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Oil Sealed RUTA Pump Systems – Two-Stage, with Single-Stage SOGEVAC Backing Pumps, Frame Version



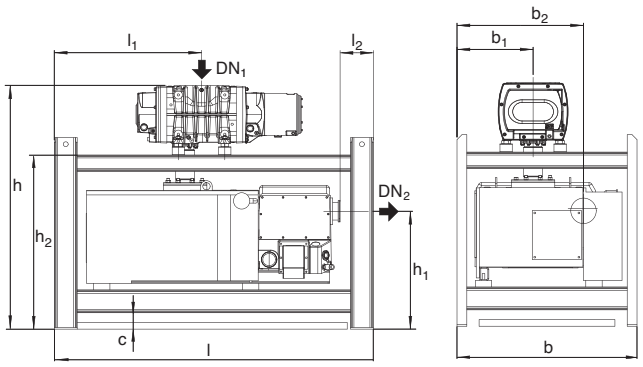
RUTA WH2500/SV630BF/G

Standard Equipment

- RUVAC WH with water cooling
- Exhaust filter with oil return line
- Oil filter
- Oil collecting pan
- Gas ballast valve: SOGEVAC SV 630 BF 24 V DC
- SOGEVAC SV 630 BF with water cooling
- SOGEVAC SV 1200 with air cooling
- Crane eyes on the frame
- Floor mounting
- The oil is supplied with the pump
- RUVAC WH including external frequency converter (frequency converter permits pumping speed control)
- CE approval

Options

- Frequency converter for controlling the speed of the Roots pump (only RUVAC WA/WS)
- 24 V DC gas ballast valve or manually operated
- Sound proofing box
- Vibration absorbers
- Castors
- Different types of floor mounts
- Oil drain valve on each pump
- Special motors
- Electric control systems



Type	RUTA	2500/SV630BF/G	4400/SV630BF/G	7000/SV630BF/G
RUVAC WH	P2	2500	4400	7000
Backing pump SOGEVAC	P1	SV 630 BF	SV 630 BF	SV 630 BF
	DN_1	250 ISO-K	250 ISO-K	320 ISO-K
	DN_2	100 ISO-K	100 ISO-K	100 ISO-K
	l	1950 (76.77)	1950 (76.77)	1950 (76.77)
	l_1	900 (35.43)	800 (31.50)	800 (31.50)
	l_2	204 (8.03)	204 (8.03)	204 (8.03)
	b	1100 (43.31)	1100 (43.31)	1100 (43.31)
	b_1	465 (18.31)	465 (18.31)	465 (18.31)
	b_2	773 (30.43)	773 (30.43)	773 (30.43)
	h	1064 (41.89)	1518 (59.76)	1518 (59.76)
	h_1	720 (28.35)	720 (28.35)	720 (28.35)
	h_2	1064 (41.89)	1081 (42.56)	1093 (43.03)
	c	100 (3.94)	100 (3.94)	100 (3.94)

Dimensional drawing for the pump systems with SOGEVAC SV backing pumps

Technical Data, 50 Hz

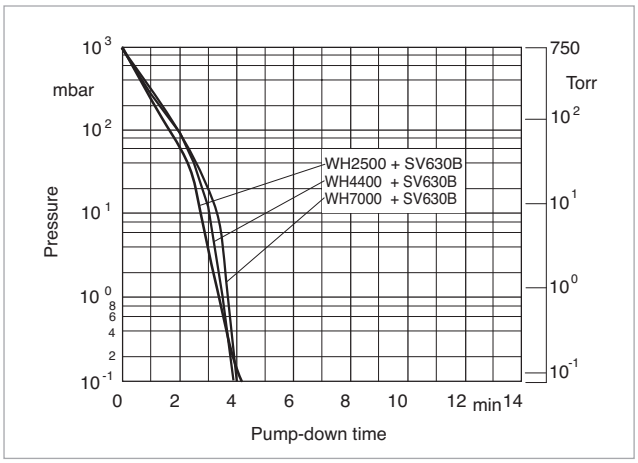
		RUTA WH		
		2500/ SV630BF/G	4400/ SV630BF/G	7000/ SV630BF/G
RUVAC WH [1]	P2	2500	4400	7000
Backing pump SOGEVAC	P1	SV 630 BF		
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	1902 (1119)	3332 (1961)	4990 (2937)
Ultimate total pressure				
with gas ballast	mbar	$< 5 \cdot 10^{-3}$	–	–
	(Torr)	($< 3.7 \times 10^{-3}$)	–	–
without gas ballast	mbar	–	$< 5 \cdot 10^{-3}$	$< 5 \cdot 10^{-3}$
	(Torr)	–	($< 3.7 \times 10^{-3}$)	($< 3.7 \times 10^{-3}$)
Installed motor power 400 V, 50 Hz	kW (hp)	21.5 (28.8)	26.0 (34.9)	26.0 (34.9)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	8.5 (11.4)	9.68 (12.98)	9.84 (13.20)
Noise level without gas ballast at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	73		
Oil filling, total, approx.	l (qt)	16.2 (17.1)	27.0 (4.6)	27.0 (4.6)
Weight, total, approx.	kg	1360 (2998)	1530 (3373)	1590 (3505)
Connecting flange				
Inlet port	DN_1	250 ISO-K	250 ISO-K	320 ISO-K
Outlet port	DN_2	100 ISO-K	100 ISO-K	100 ISO-K

Ordering Information

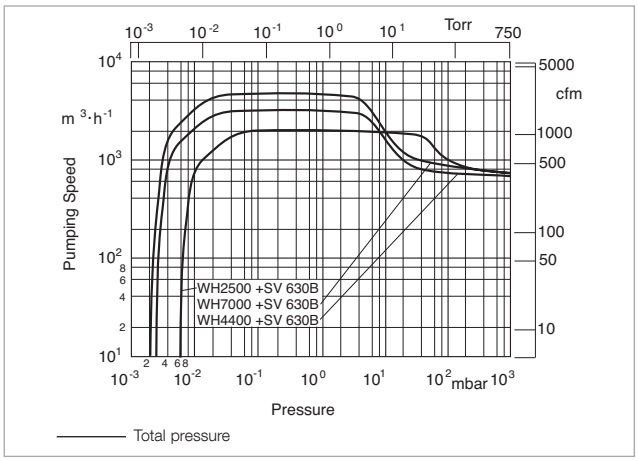
		RUTA WH		
		2500/ SV630BF/G	4400/ SV630BF/G	7000/ SV630BF/G
		Part No.	Part No.	Part No.
RUVAC WH [1]	P2	2500	4400	7000
Backing pump SOGEVAC	P1	SV 630 BF		
Pump system, complete (frame version), frame mounted, with Roots vacuum pump RUVAC WH		**503161V001** [1), 2)]	**503165V001** [1), 2)]	**503169V001** [1), 2)]

[1] Including external frequency converter

[2] With this combination, continuous operation of the Roots pump is not possible at atmospheric pressure



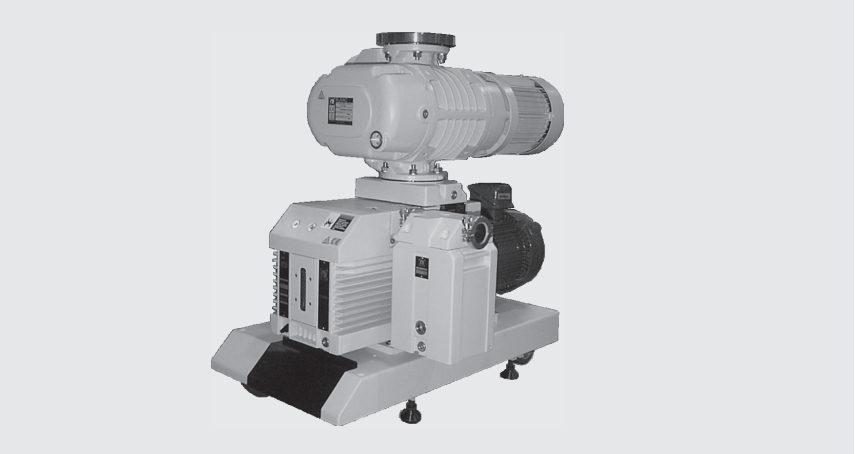
Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Pump Systems (Only available for purchase in North and South America)

RBS – B/BCS Roots Pump Systems with Two-Stage TRIVAC Backing Pumps



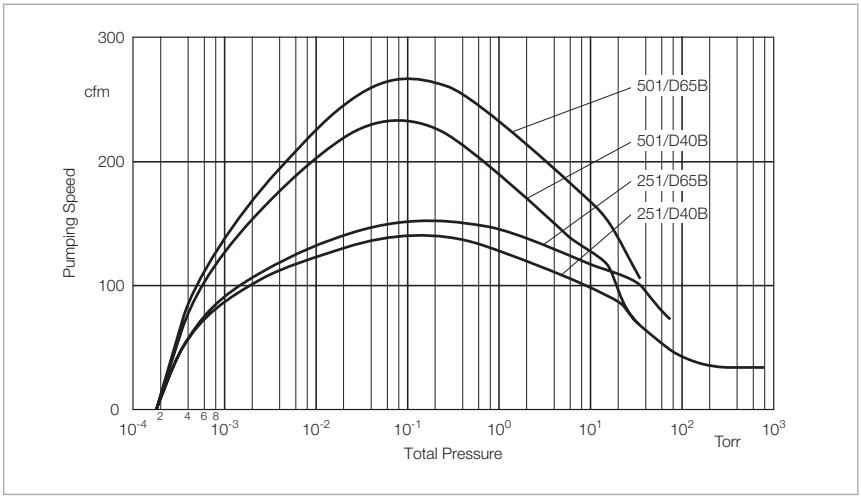
RBS - B/BCS Roots pumping system, shown with optional AF exhaust filter

Standard Equipment

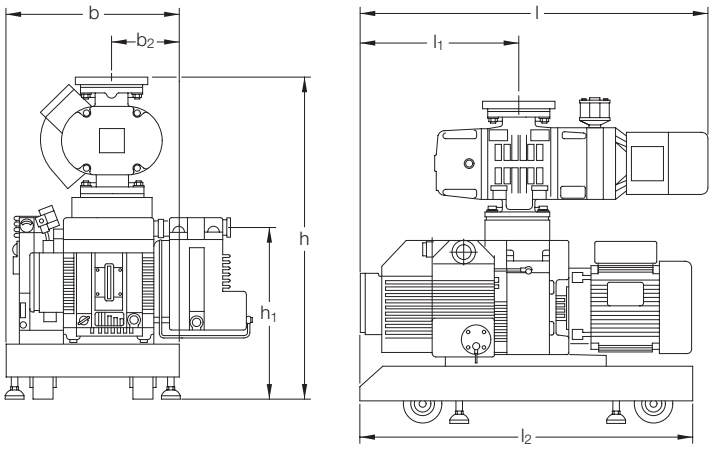
- System consists of TRIVAC dual-stage B or BCS direct drive vane pump and RUVAC blower
- Complete air-cooled system
- 18" wide frame base equipped with caster wheels and leveling pads
- Compact construction with quiet operation
- Manual operation of gas ballast
- Close-coupled RUVAC blower with ANSI inlet flange

Options

- All TRIVAC accessories, Exhaust filter, 24 V DC gas ballast valve, chemical oil filter, and electrical limit switch system
- Full frame drip pan
- Oil drain valves
- Special motor voltages and frequencies
- Special oil for unique applications
- Full electrical controls for control start/stop and monitoring of system



Pumping speed diagram for the RBS systems with WSU series Roots blowers at 60 Hz



System Close-coupled	b	b_1	b_2	h	h_1	l	l_1	l_2
D 40 B/BCS								
WSU 251	18 (457)	8 (203)	7 (178)	33 3/16 (853)	17 15/16 (456)	32 3/4 (832)	14 (356)	34 (864)
WSU 501	18 (457)	8 (203)	7 (178)	34 3/4 (883)	17 15/16 (456)	33 13/16 (859)	14 (356)	34 (864)
D 65 B/BCS								
WS/WSU 251	18 (457)	8 (203)	7 (178)	33 3/16 (853)	17 15/16 (456)	34 3/4 (883)	16 (406)	34 (864)
WS/WSU 501	18 (457)	8 (203)	7 (178)	34 3/4 (883)	17 15/16 (456)	35 13/16 (910)	16 (406)	34 (864)

Dimensional drawing for the RBS – B/BCS Roots pumping systems 18" with TRIVAC D 40/65 B backing pumps, close-coupled package; dimensions in brackets ( ) are in mm

Technical Data

RBS – B/BCS Roots Pump Systems

		251/D40B	251/D65B	501/D40B	501/D65B
RUVAC (WA/WAU/WS/WSU possible)		251	251	501	501
TRIVAC backing pump		D 40 B/BCS	D 65 B/BCS	D 40 B/BCS	D 65 B/BCS
Pumping speed at 0.1 Torr	cfm (m^3/h)	140 (237)	150 (254)	232 (394)	267 (453)
Ultimate total pressure	Torr (mbar)	< 2 x 10^{-4} (< 4 x 10^{-4})			
Connecting flanges					
Inlet port					
WSU	DN	3" ANSI			
Outlet port	DN	40 ISO-KF			
Operating voltage	V	208/230/460			
Phase / Frequency [1]	– / Hz	3 / 60			
Full load amps [2]					
RUVAC WSU		5.5/5.5/3.2	5.5/5.5/3.2	9.0/9.0/5.2	9.0/9.0/5.2
TRIVAC		9.0/8.8/4.5	9.0/8.8/4.5	9.0/8.8/4.5	9.0/8.8/4.5
Displacement					
RUVAC	cfm (m^3/h)	179 (304)	179 (304)	357 (606)	357 (606)
TRIVAC	cfm (m^3/h)	32 (54)	53 (90)	32 (54)	53 (90)
Maximum differential pressure	Torr (mbar)	60 (80)			
Normal starting pressure [3]	Torr (mbar)	20 (27)	30 (40)	12 (16)	16 (21)
Oil capacity					
RUVAC WSU	qt (l)	0.75 (0.7)	0.75 (0.7)	1.1 (1.0)	1.1 (1.0)
TRIVAC	qt (l)	2.7 (2.6)	3.4 (3.2)	2.7 (2.6)	3.4 (3.2)
Nominal rotation speed					
RUVAC WSU	rpm (min^{-1})	3600 (3600)			
TRIVAC	rpm (min^{-1})	1800 (1800)			
Motor power					
RUVAC WSU	hp (kW)	1.9 (1.4)	1.9 (1.4)	3.3 (2.4)	3.3 (2.4)
TRIVAC	hp (kW)	3.0 (2.2)	3.0 (2.2)	3.0 (2.2)	3.0 (2.2)

Ordering Information

RBS – B/BCS Roots Pump Systems

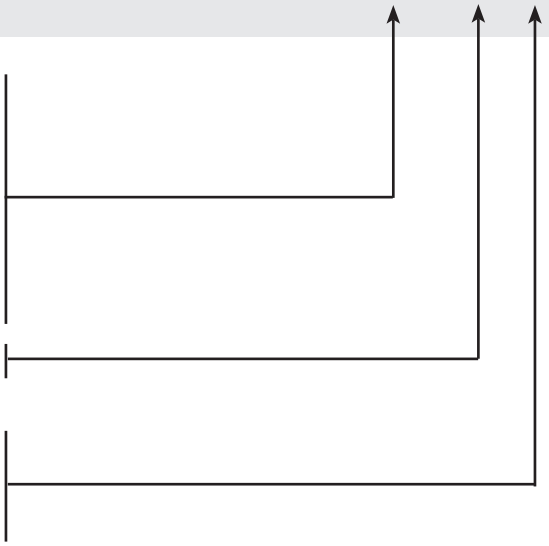
	251/D40B	251/D65B	501/D40B	501/D65B
	Part No.			
RUVAC WH RBS – B/BCS Roots pump system (supplied with hydrocarbon oil)	Ordering Information see right page			

[1] For 50 Hz systems, consult the factory
[2] Determined by operating voltage
[3] WSU pumps permit start-up at atmospheric pressure (760 Torr)

Ordering Information

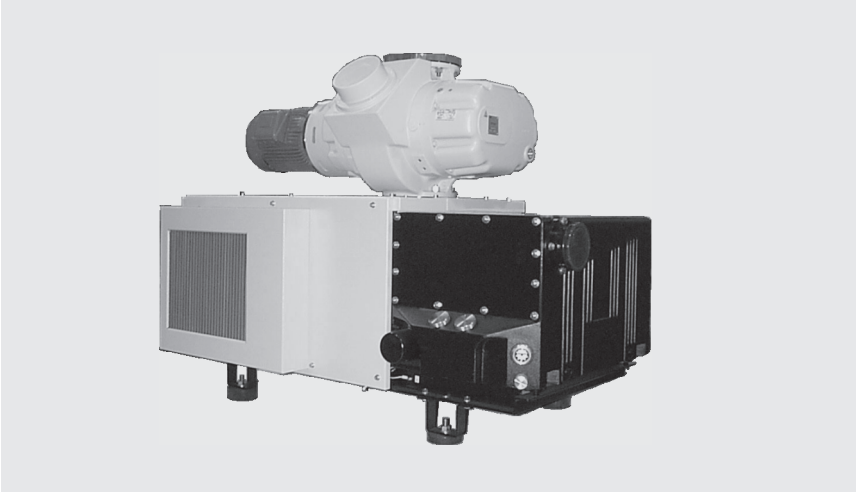
Part No. 180037V- _ _ 0 _

Blower / TRIVAC pump	
WSU 251 / D 40 B	**24**
WSU 251 / D 40 BCS-LVO 400	**35**
WSU 251 / D 65 B	**26**
WSU 251 / D 65 B-LVO 400	**37**
WSU 501 / D 40 B	**54**
WSU 501 / D 40 BCS-LVO 400	**65**
WSU 501 / D 65 B	**56**
WSU 501 / D 65 BCS-LVO 400	**67**
Reserved	**0**
Electrical Control Panel	
None	**0**
208 V	**1**
230 V	**2**
460 V	**3**



Pump Systems (Only available for purchase in North and South America)

HTS Close-Coupled Systems with Single-Stage SOGEVAC Backing Pumps



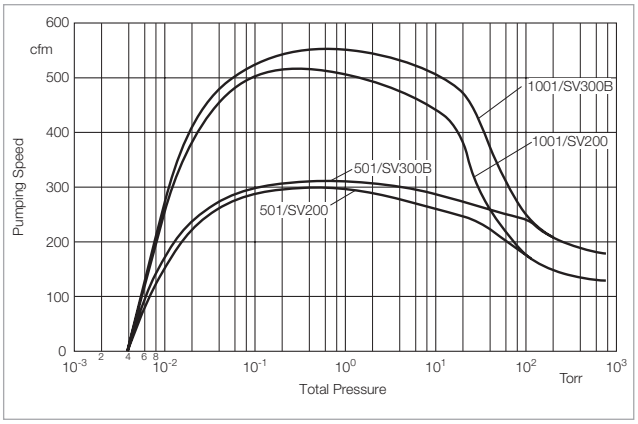
HTS close-coupled system

Standard Equipment

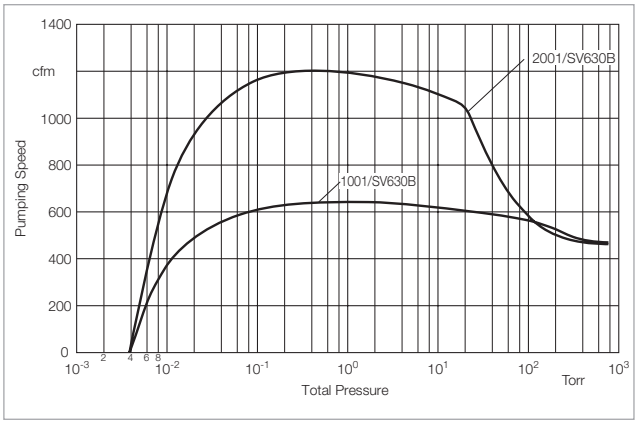
- System consists of single-stage SOGEVAC vane pump
- Complete air-cooled system
- Close-coupled RUVAC blower
- Compact construction with quiet operation
- Manual operation of gas ballast
- Spin-on type oil filter

Options

- SOGEVAC accessories: oil level monitoring, exhaust case gauge, 24 V DC gas ballast purge, water cooling
- Frame base mounted caster wheels
- Frame base mounted leveling pads
- Oil drain valves
- Inlet dust filter
- Special motor voltages and frequencies
- Special oil for unique applications
- Full NEMA12 electrical controls for stand/stop operation and monitoring of system from remote and local locations
- 24 V DC gas ballast valve

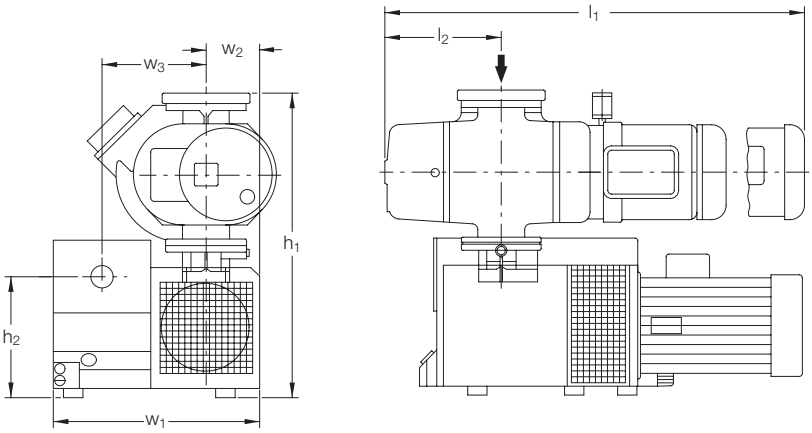


Pumping speed diagram for the HTS close-coupled systems with WSU series Roots blowers and SOGEVAC SV 200/300B at 60 Hz

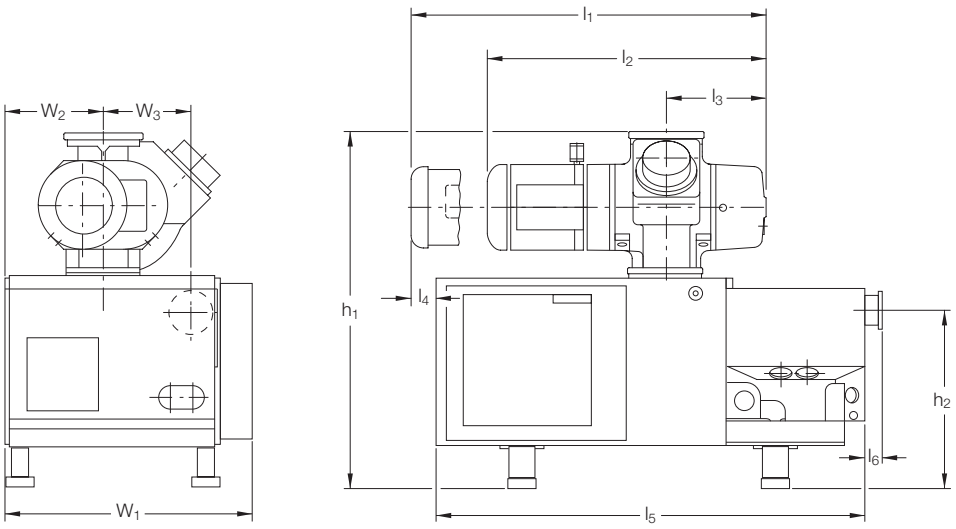


Pumping speed diagram for the HTS close-coupled systems with WSU series Roots blowers and SOGEVAC SV 630B at 60 Hz

Dimensions for SV 200 and SV 300 B only



Dimensions for SV 630 B only



Roots Pump	Vane Pump	h_1	h_2	l_1	l_2	l_3	l_5	l_6	w_1	w_2	w_3
WSU 501	SV 200	29 7/16 (748)	12 17/32 (318)	–	9 17/32 (242)	–	–	–	21 11/16 (551)	6 1/8 (156)	10 19/32 (269)
WSU 501	SV 300 B	29 7/16 (748)	12 17/32 (318)	–	9 17/32 (242)	–	–	–	21 11/16 (551)	6 1/8 (156)	10 19/32 (269)
WSU 1001	SV 200	31 7/16 (799)	12 17/32 (318)	–	11 15/16 (303)	–	–	–	21 1/16 (535)	5 1/2 (140)	10 19/32 (269)
WSU 1001	SV 300 B	31 7/16 (799)	12 17/32 (318)	–	11 15/16 (303)	–	–	–	22 13/16 (579)	7 1/4 (184)	10 19/32 (269)
WSU 2001	SV 630 B	48 5/16 (1227)	23 13/16 (605)	50 3/16 (1275)	–	14 9/16 (370)	60 3/4 (1543)	2 1/2 (64)	34 15/16 (887)	13 7/8 (352)	12 13/32 (315)

Dimensional drawing for the HTS close-coupled system with single-stage SOGEVAC backing pumps; dimensions in brackets ( ) are in mm

Technical Data

HTS Close-Coupled Systems

		501/SV200	501/SV300B	1001/SV200	1001/SV300B
RUVAC		WSU 501	WSU 501	WSU 1001	WSU 1001
SOGEVAC		SV 200	SV 300 B	SV 200	SV 300 B
Pumping speed at 0.1 Torr	cfm (m^3/h)	277 (470)	285 (483)	504 (855)	545 (925)
Ultimate total pressure	Torr (mbar)	< 8 x 10^{-3} (< 1 x 10^{-2})			
Connecting flanges					
Inlet port WSU	DN	3" ANSI			
Exhaust port SOGEVAC	DN	2" NPT			
Operating voltage	V	208/230/460			
Phase / Frequency [1]	– / Hz	3 / 60			
Full load amps [2]					
RUVAC WSU		7.8/10.0/5.8	7.8/10.0/5.8	13.0/14.7/8.5	13.0/14.7/8.5
SOGEVAC		21.0/18.0/9.0	29.0/25.0/12.5	21.0/18.0/9.0	29.0/25.0/12.5
Displacement					
RUVAC	cfm (m^3/h)	357 (606)	357 (606)	707 (1200)	707 (1200)
SOGEVAC	cfm (m^3/h)	130 (606)	200 (340)	130 (606)	200 (340)
Oil capacity					
RUVAC WSU	qt (l)	1.1 (1.0)	1.1 (1.0)	2.1 (2.0)	2.1 (2.0)
SOGEVAC	qt (l)	5.3 (5.0)	9.0 (8.5)	5.3 (5.0)	9.0 (8.5)
Nominal rotation speed					
RUVAC WSU	rpm (min^{-1})	3600 (3600)			
SOGEVAC	rpm (min^{-1})	1800 (1800)			
Motor power					
RUVAC WSU	hp (kW)	3.3 (2.4)	3.3 (2.4)	6.0 (4.4)	6.0 (4.4)
SOGEVAC	hp (kW)	7.5 (5.5)	10.0 (7.4)	7.5 (5.5)	10.0 (7.4)

Ordering Information

HTS Close-Coupled Systems

	501/SV200	501/SV300B	1001/SV200	1001/SV300B
	Part No.			
HTS - close-coupled systems	**Ordering Information see right page**			

[1] For 50 Hz systems, consult the factory

[2] Determined by operating voltage

Technical Data

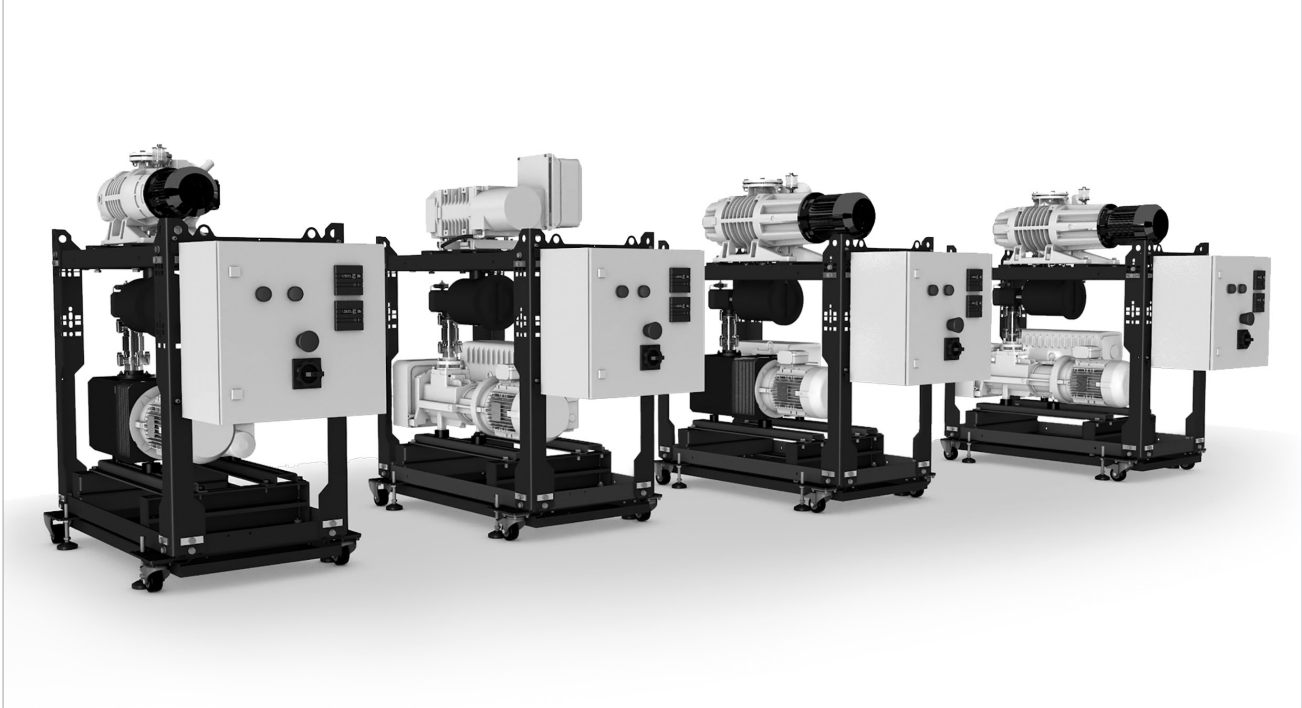
		HTS Close-Coupled Systems	
		1001/SV630B	2001/SV630B
RUVAC		WSU 1001	WSU 2001
SOGEVAC		SV 630 B	
Pumping speed at 0.1 Torr	cfm (m^3/h)	610 (1035)	1186 (2031)
Ultimate total pressure	Torr (mbar)	< 8 x 10^{-3} (< 1 x 10^{-2})	
Connecting flanges			
Inlet port WSU	DN	4" ANSI	6" ANSI
Exhaust port SOGEVAC	DN	4" ANSI	4" ANSI
Operating voltage	V	460	
Phase / Frequency [1]	– / Hz	3 / 60	
Full load amps [2]			
RUVAC WSU		8.5	5.0
SOGEVAC		29.5	29.5
Displacement			
RUVAC WSU	cfm (m^3/h)	707 (1200)	1449 (2460)
SOGEVAC	cfm (m^3/h)	495 (840)	495 (840)
Oil capacity			
RUVAC WSU	qt (l)	2.1 (12.0)	4.2 (4.0)
SOGEVAC	qt (l)	37.0 (35.0)	37.0 (35.0)
Nominal rotation speed			
RUVAC WSU	rpm (min^{-1})	3600 (3600)	
SOGEVAC	rpm (min^{-1})	1170 (1170)	
Motor power			
RUVAC WSU	hp (kW)	6.1 (4.5)	11.4 (8.4)
SOGEVAC	hp (kW)	25.0 (13.4)	25.0 (13.4)

Ordering Information

Part No. 180036V- _ _ _ _

Blower / TRIVAC pump	
WSU 501 / SV 200	**52**
WSU 501 / SV 300 B	**53**
WSU 1001 / SV 200	**12**
WSU 1001 / SV 300 B	**13**
WSU 1001 / SV 630 B	**16**
WSU 2001 / SV 630 B	**26**
Casters & Levelers (SV 200 & SV 300 only)	
None	**0**
Casters & Levelers	**1**
Casters only	**2**
Levelers only	**3**
Electrical Control Panel	
None	**0**
208 V (SV 200 & SV 300 only)	**1**
230 V (SV 200 & SV 300 only)	**2**
460 V	**3**

Oil Sealed Standard Vacuum Systems SOGEVAC



SOGEVAC Standard Vacuum Systems (SVS), configuration examples

Systems based on SOGEVAC rotary vane pumps in combination with Roots blowers from the RUVAC WA, WS or WH families are the industrial standard for all moderately demanding processes.
Vacuum systems based on oil-sealed SOGEVAC pumps deliver the best cost vs. performance ratio for a broad base of industrial applications.

Advantages to the User

- Fully modular system design with standard component combinations
- Smart combinations of SOGEVAC rotary vane pumps and RUVAC roots blowers
- Fast response times for quotations
- Shorter lead times compared to customized pump systems
- Well thought-out service concept
- Standard electrical cabinet with an identical operating concept
- Standard I/O interface
- Additional features like emergency stop switch “EMS”

Design

The two-stage SOGEVAC SYSTEMS consist of a combination of dry compressing Roots pumps and oil-sealed rotary vane pumps. The Roots pump installed on top of the backing pump serves as a booster for increasing the pumping speed in lower pressure ranges.

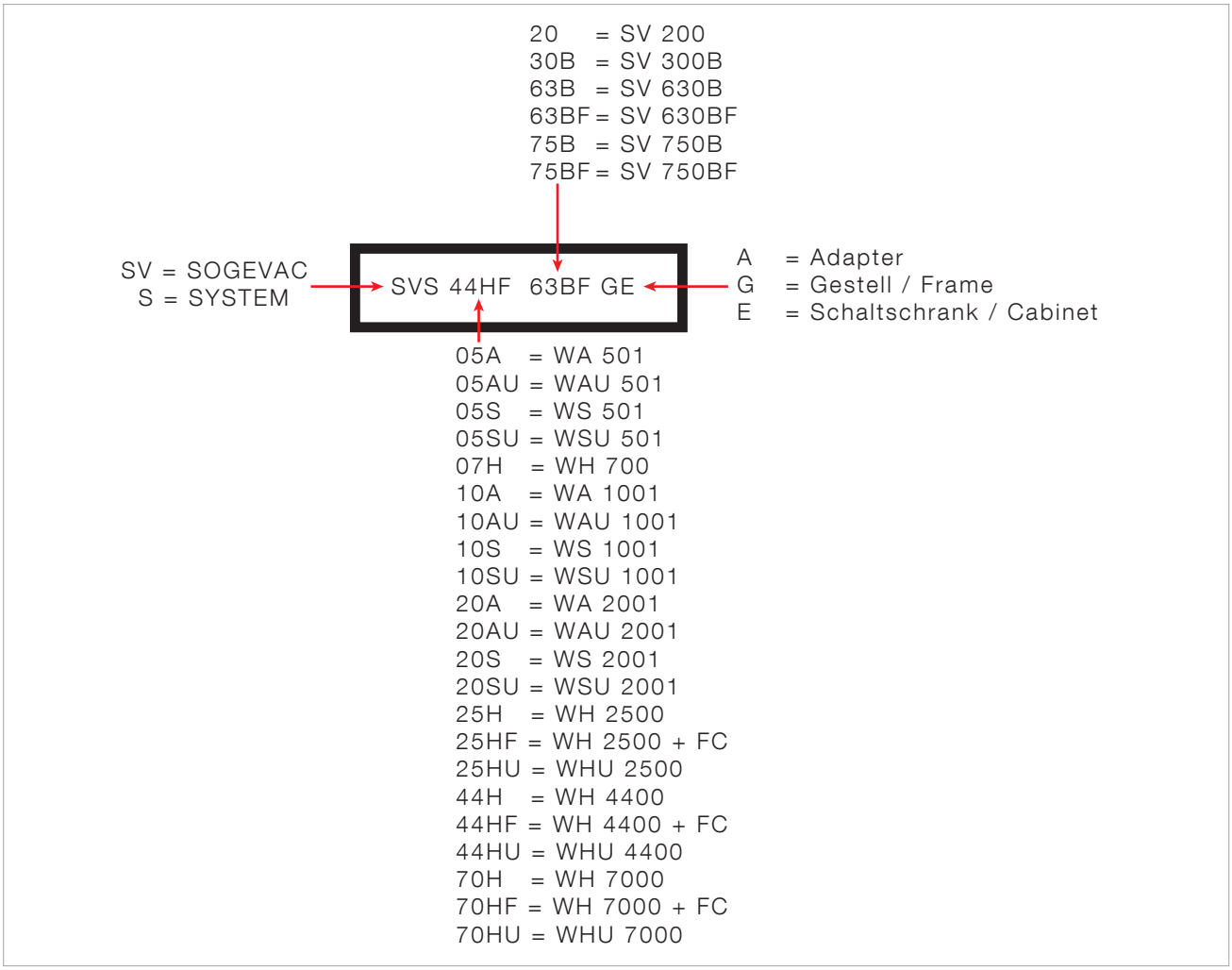
Various types of pumps may be used with SOGEVAC SYSTEMS:

Roots pumps
RUVAC WA / WAU
RUVAC WS / WSU
RUVAC WH / WHU

Backing pumps
SOGEVAC SV

All SOGEVAC SYSTEMS described hereinafter are delivered as basic versions. The basic version can be customized according to individual requrirements with an electrical system control, gas ballast system, a shut-off valve, and / or an inlet filter.

The pumps are air- and/or water-cooled and will be delivered either with mineral (LVO 1x0) or synthetic oil (LVO 210).

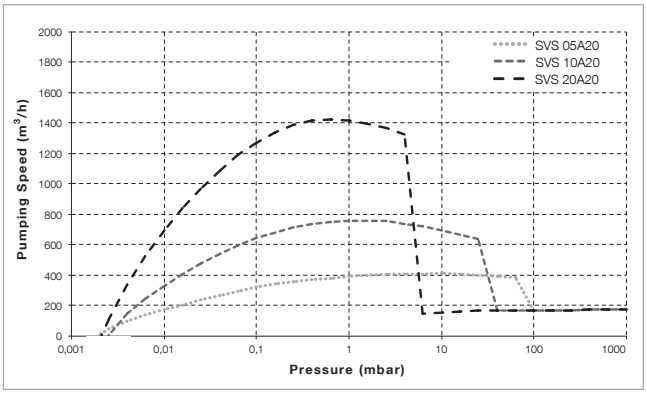


Naming conventions for SOGEVAC SYSTEMS

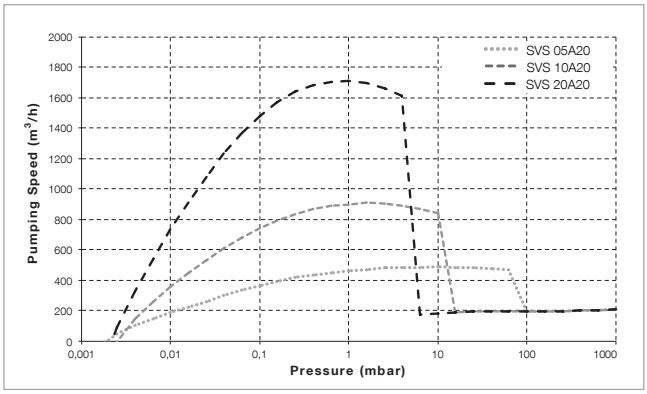
Naming conventions

The product designations of SOGEVAC SYSTEMS are rather obvious and indicate directly which pumps were combined for a specific system:

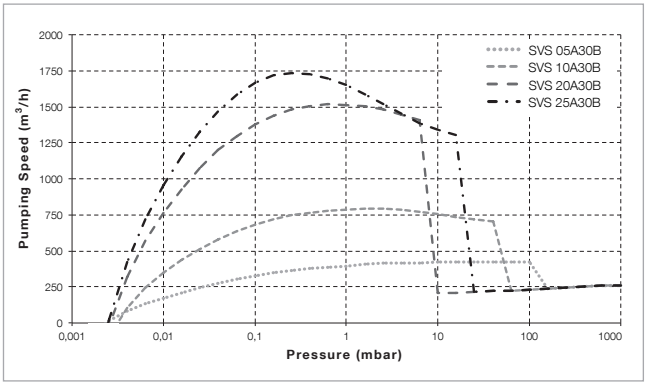
- The first three letters „SVS“ stand for „SOGEVAC SYSTEM“
- The next (up to 4 alphanumeric) characters stand for the RUVAC version
- The following 4 characters stand for the SOGEVAC’s pumping speed and version
- The last two characters give hints on the features of the pump system



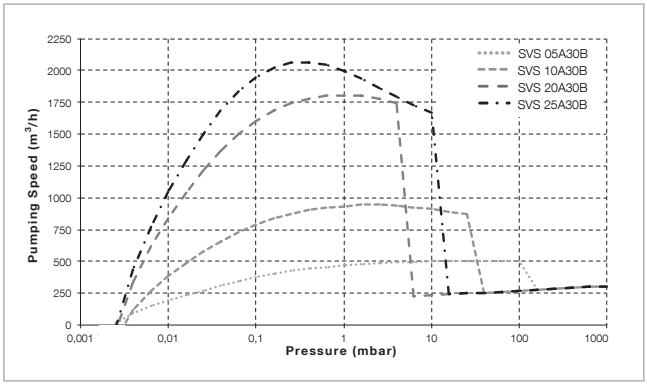
Pumping speed characteristics SVS xxxA20 50Hz, without gas ballast



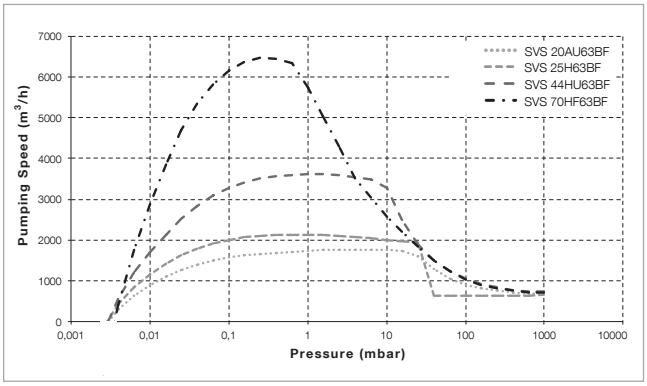
Pumping speed characteristics SVS xxxA20 60Hz, without gas ballast



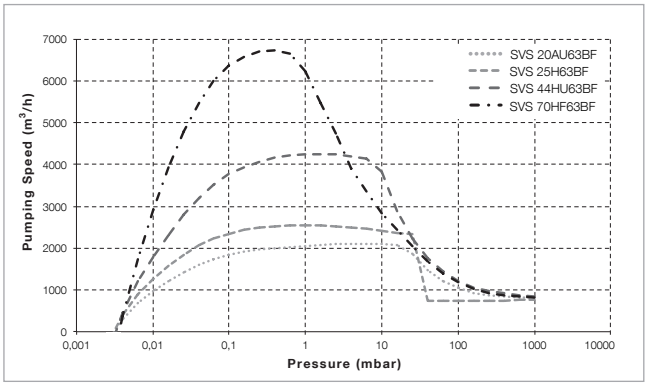
Pumping speed characteristics SVS xxxA30 50Hz, without gas ballast



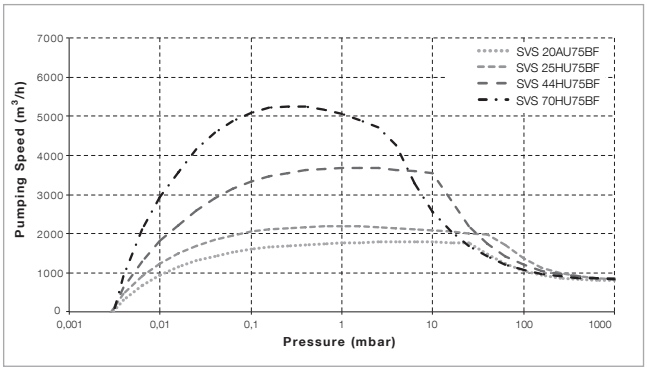
Pumping speed characteristics SVS xxxA30 60Hz, without gas ballast



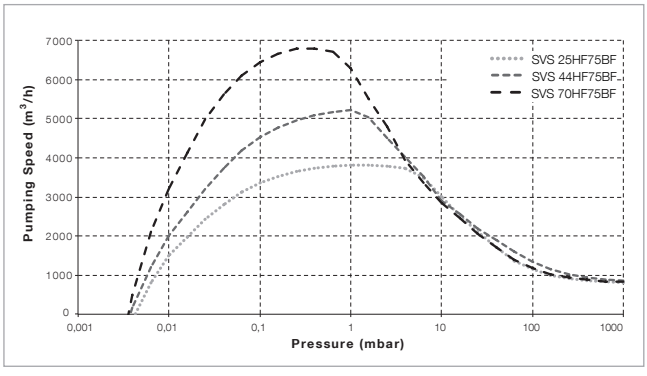
Pumping speed characteristics SVS xxxA63 50Hz, without gas ballast



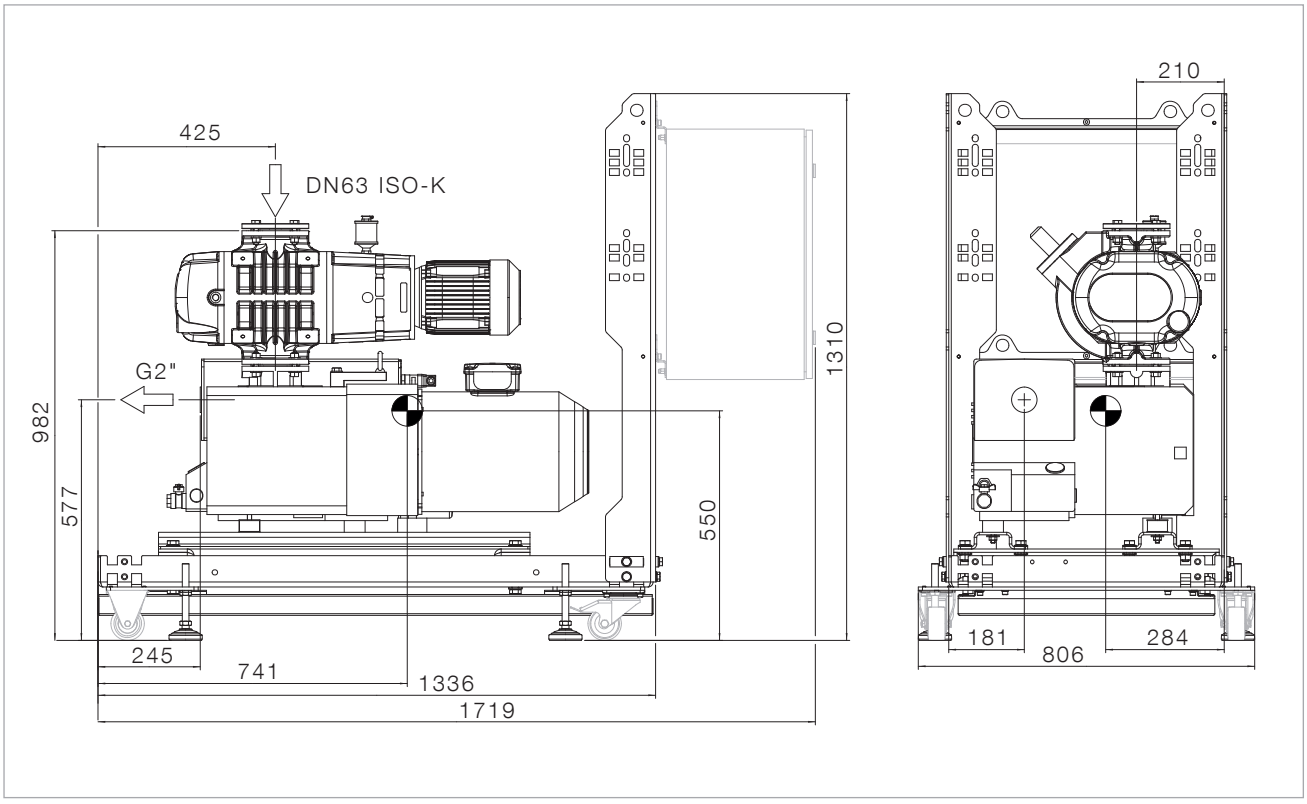
Pumping speed characteristics SVS xxxA63 60Hz, without gas ballast



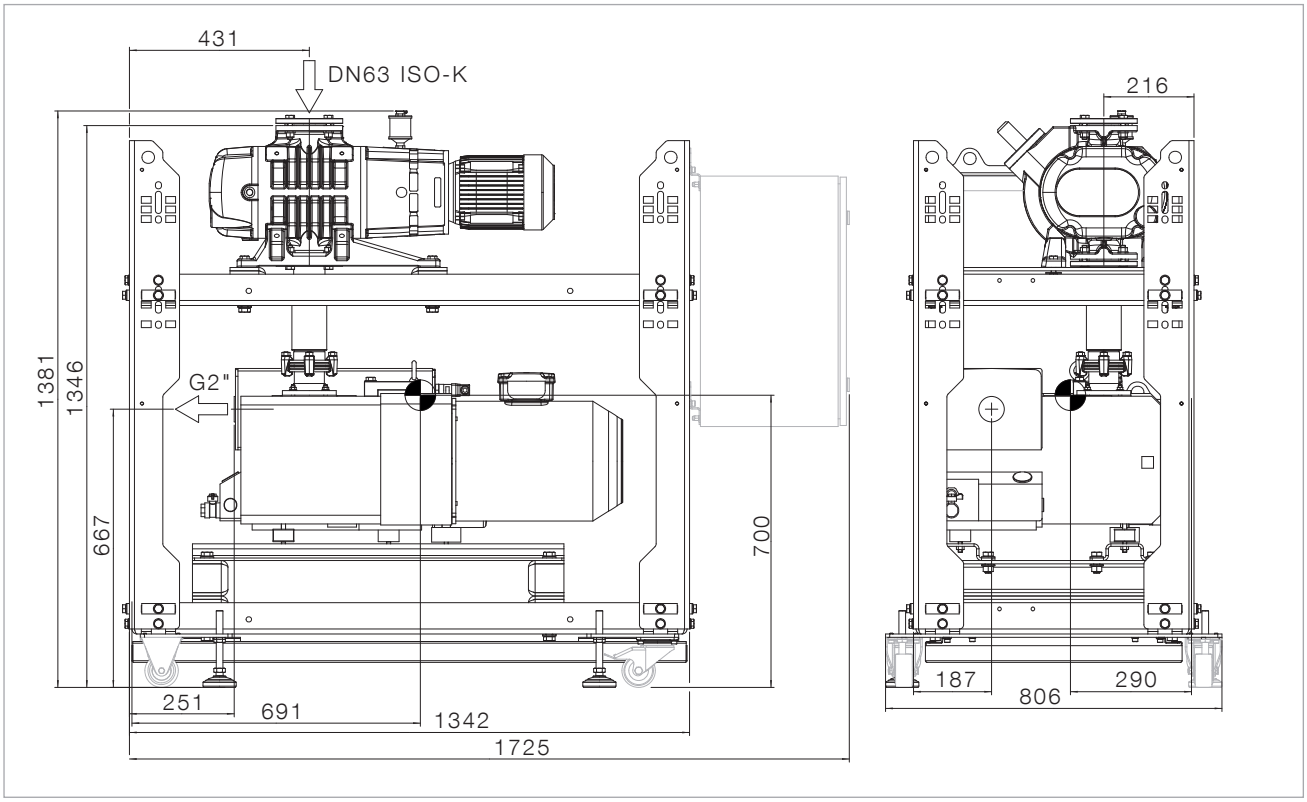
Pumping speed characteristics SVS xxxU75 50Hz, without gas ballast



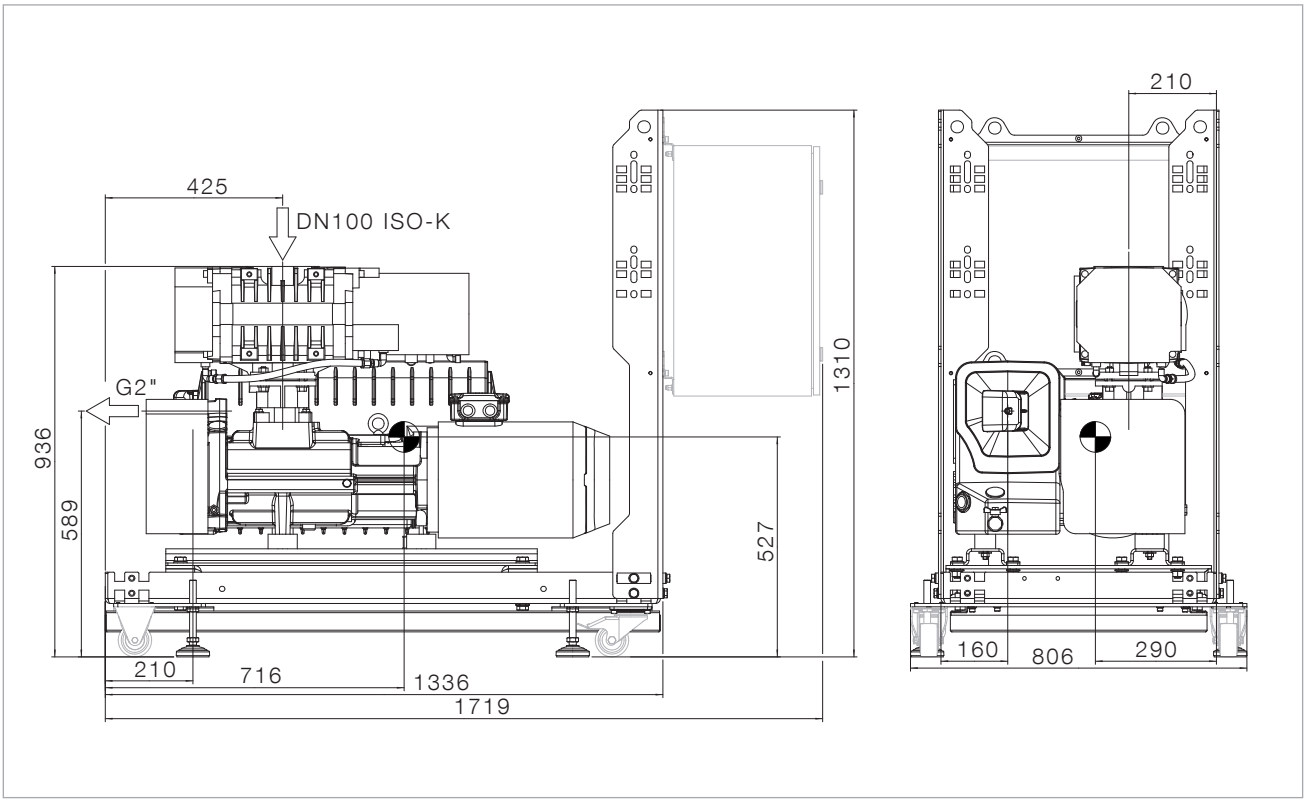
Pumping speed characteristics SVS xxxF75 50Hz, without gas ballast



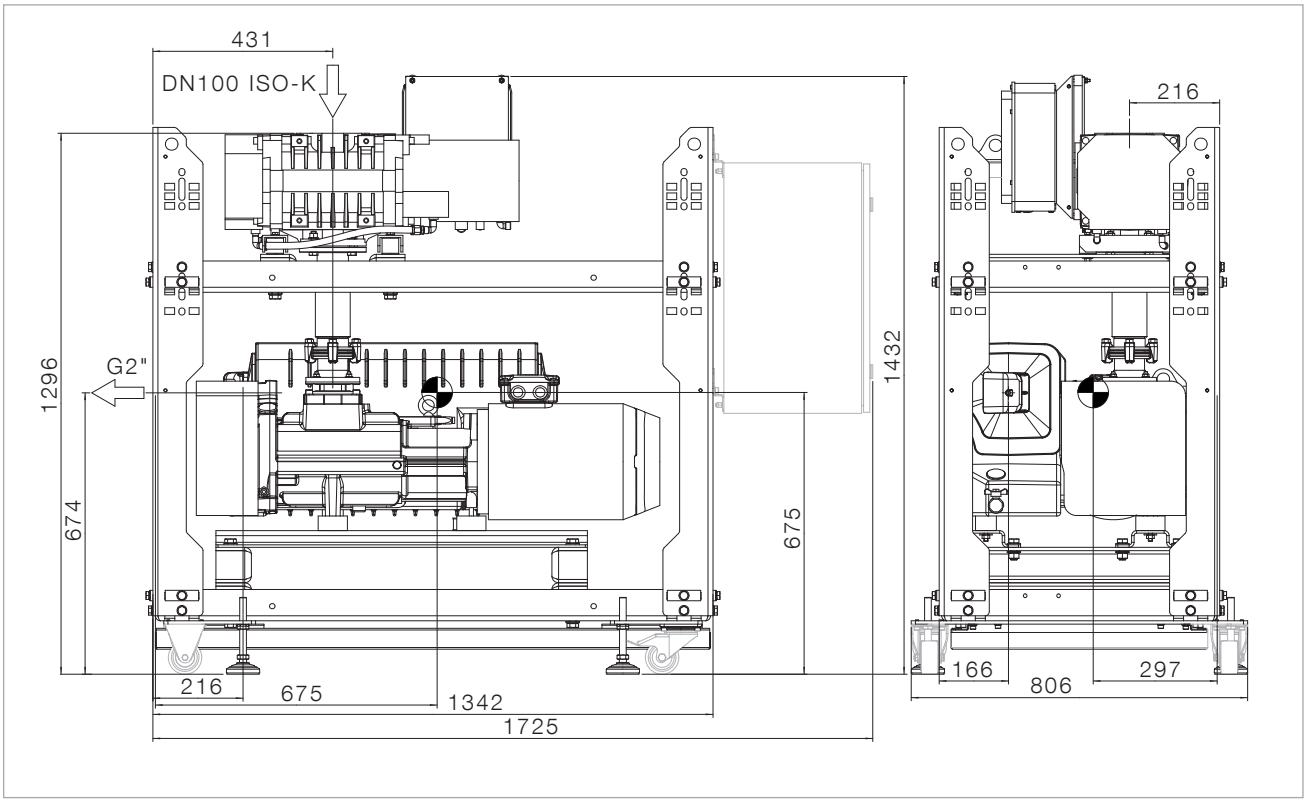
Dimensional drawing for SVS 07H 30B A / SVS 07H 30B AE with all configuration options (dimensions in mm)



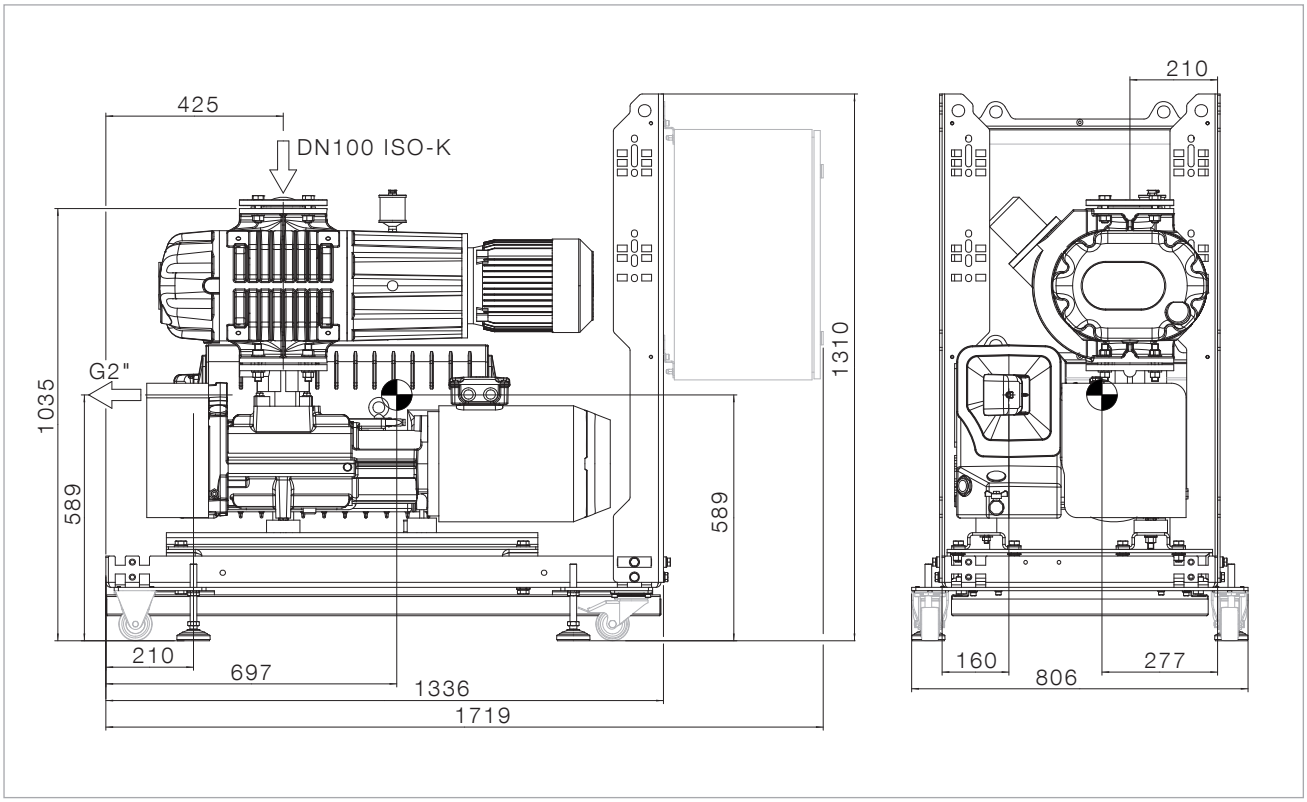
Dimensional drawing for SVS 05AU 20 G / SVS 05AU 20 GE with all configuration options (dimensions in mm)



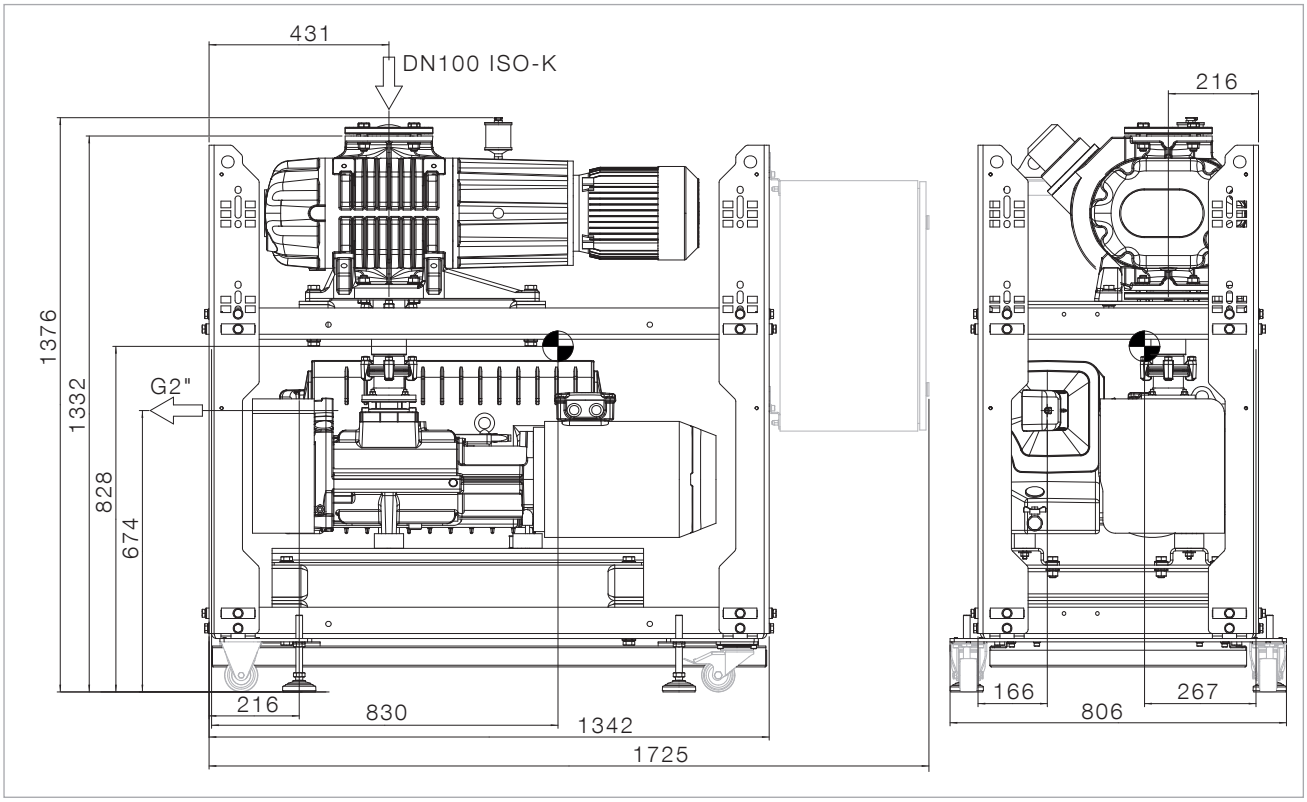
Dimensional drawing for SVS 07H 30B A / SVS 07H 30B AE with all configuration options (dimensions in mm)



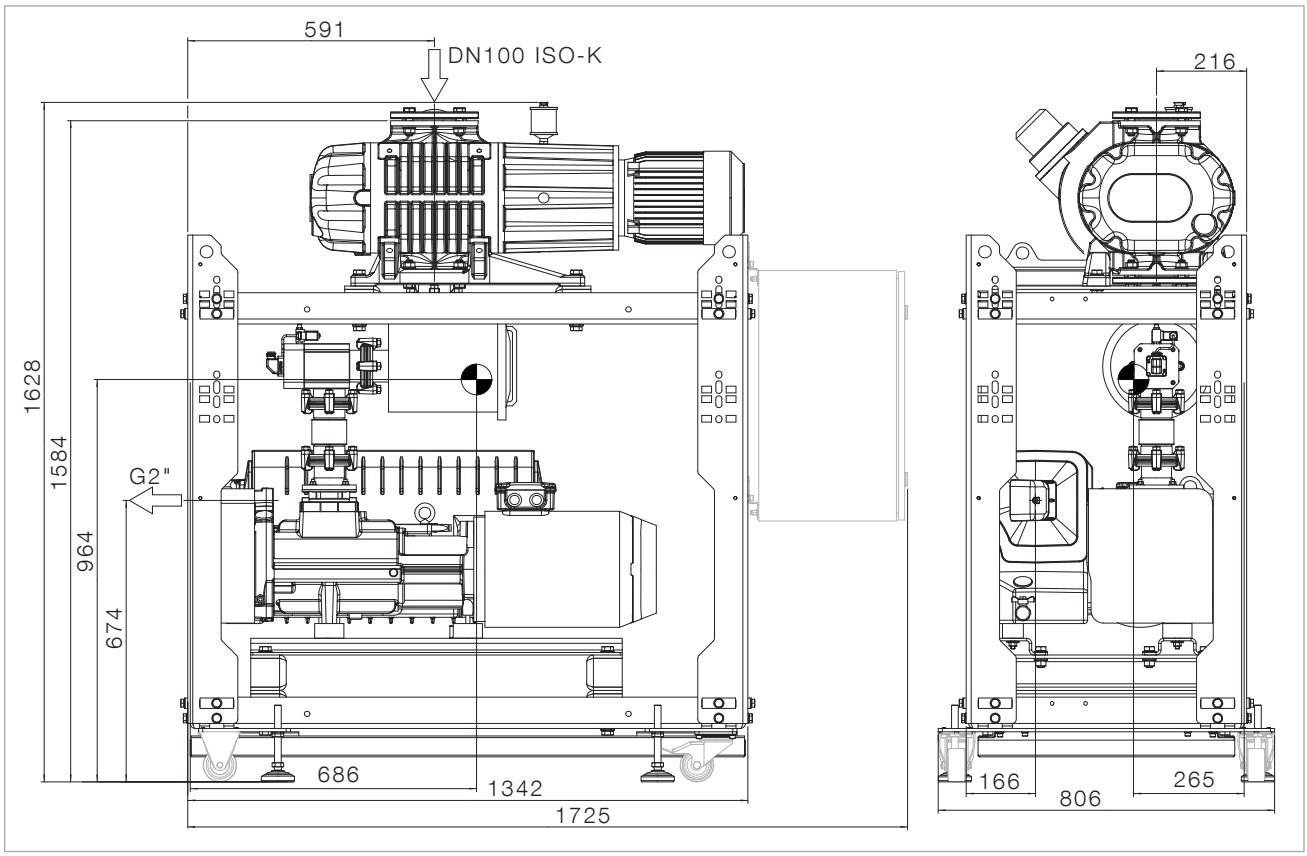
Dimensional drawing for SVS 07HF 30B G / SVS 07HF 30B GE with all configuration options (dimensions in mm)



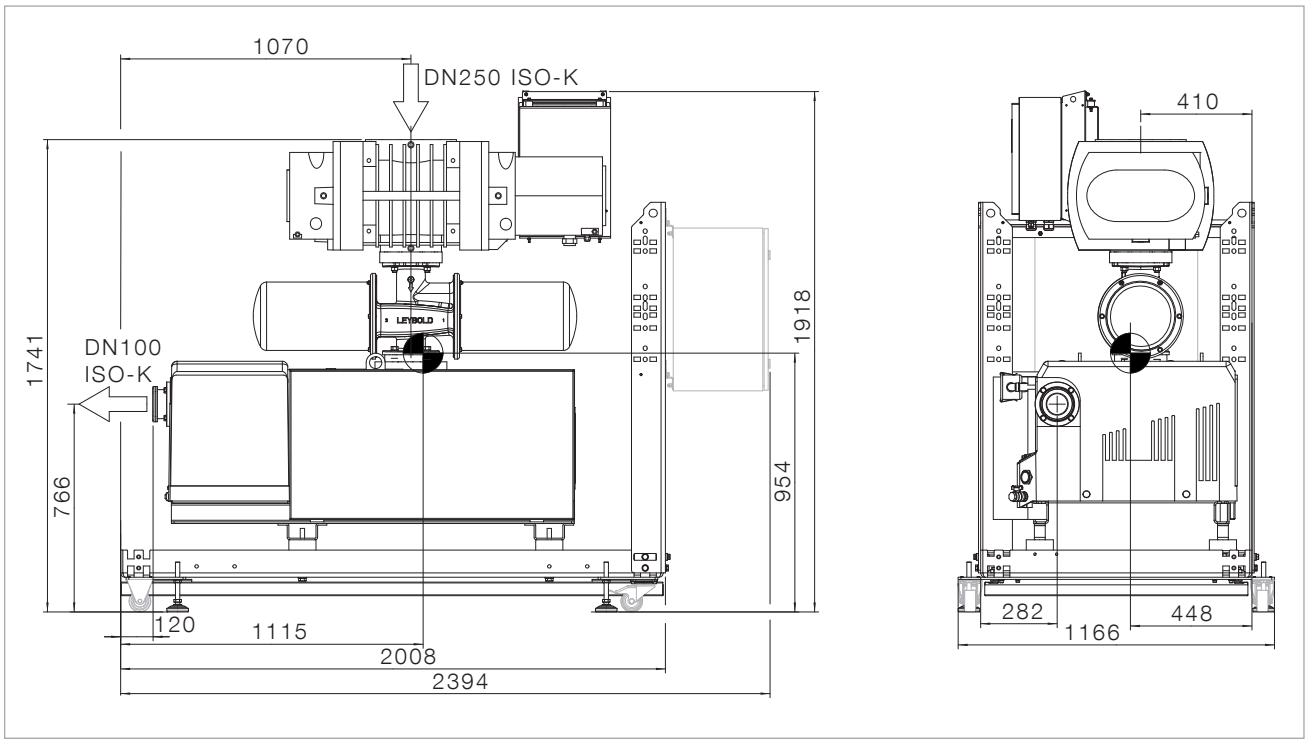
Dimensional drawing for SVS 10AU 30B A / SVS 10AU 30B AE with all configuration options (dimensions in mm)



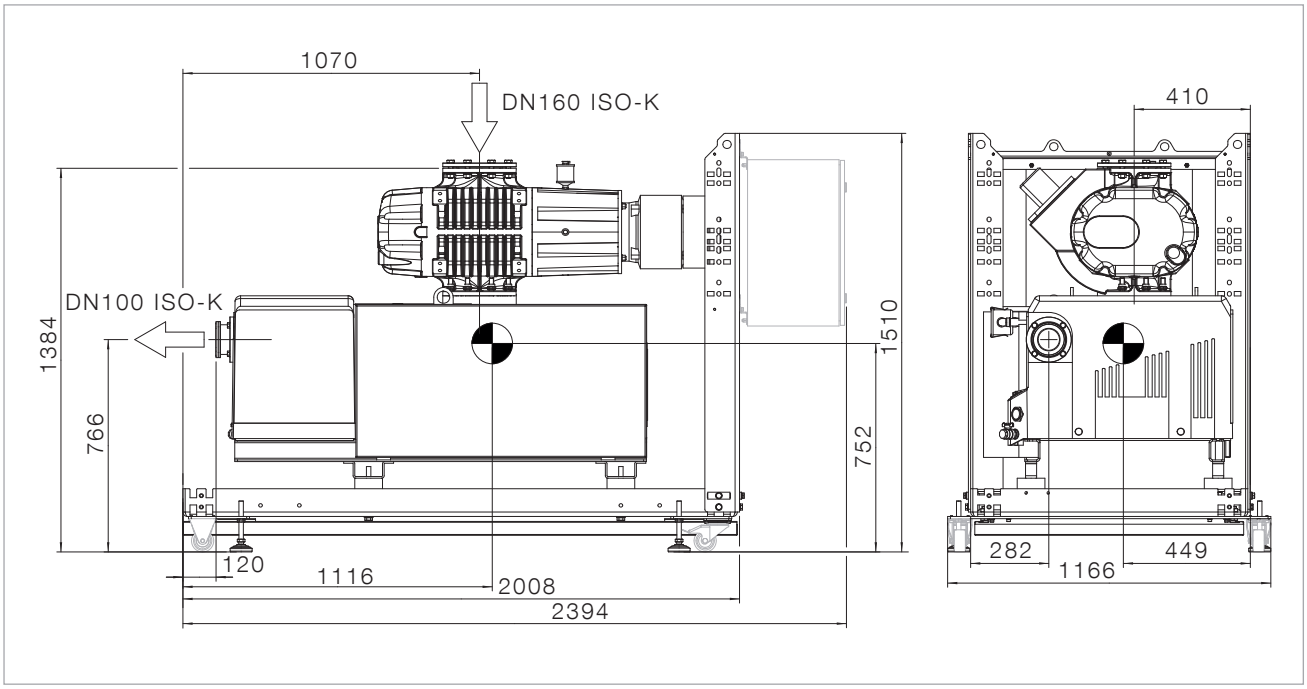
Dimensional drawing for SVS 10AU 30B G / SVS 10AU 30B GE with all configuration options (dimensions in mm)



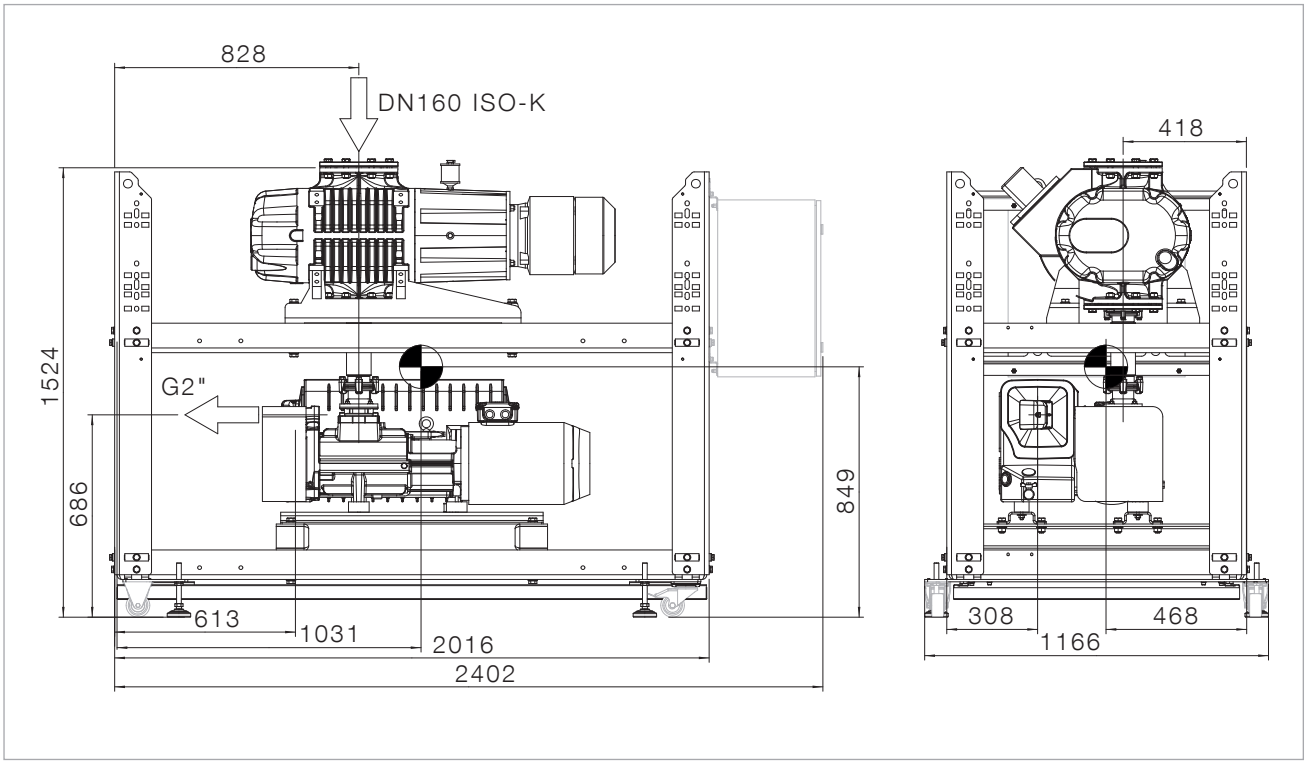
Dimensional drawing for SVS 10AU 30B G / SVS 10AU 30B GE with filter valve combination with all configuration options (dimensions in mm)



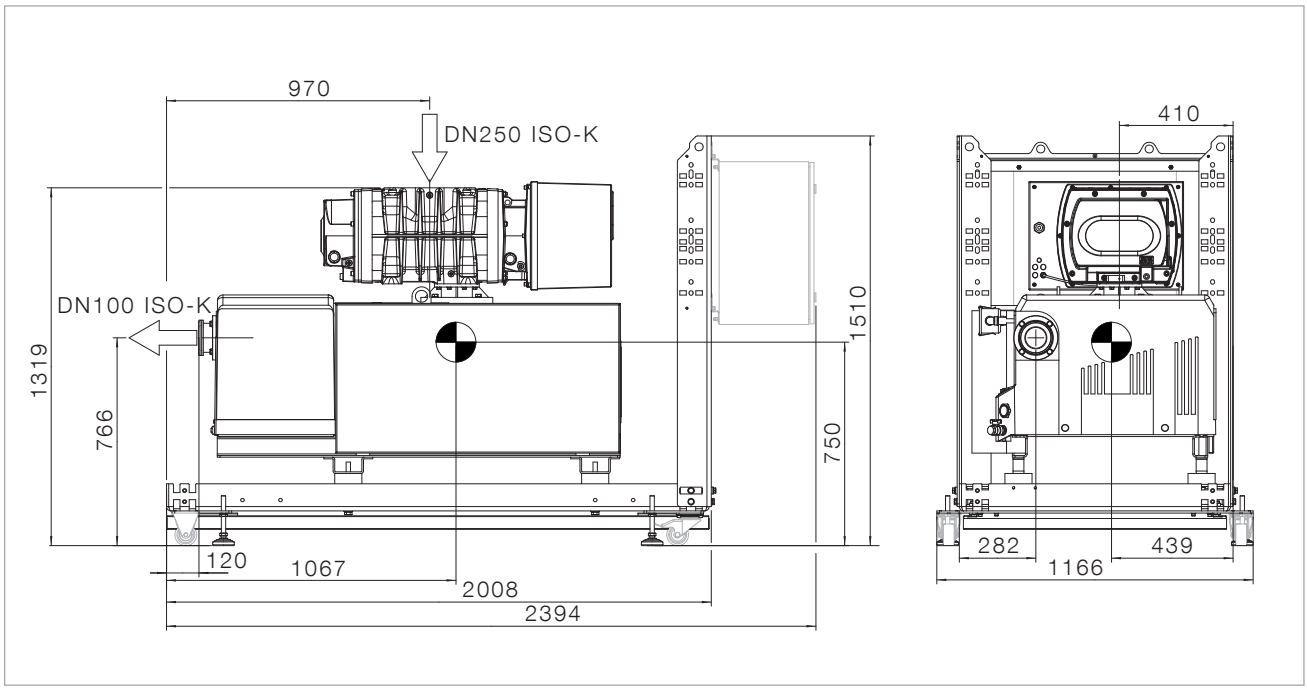
Dimensional drawing for SVS 44HF 63BF A ~ / SVS 44HF 75BF A and SVS 44HF 63BF AE ~ / SVS 44HF 75BF AE with filter combination with all configuration options (dimensions in mm)



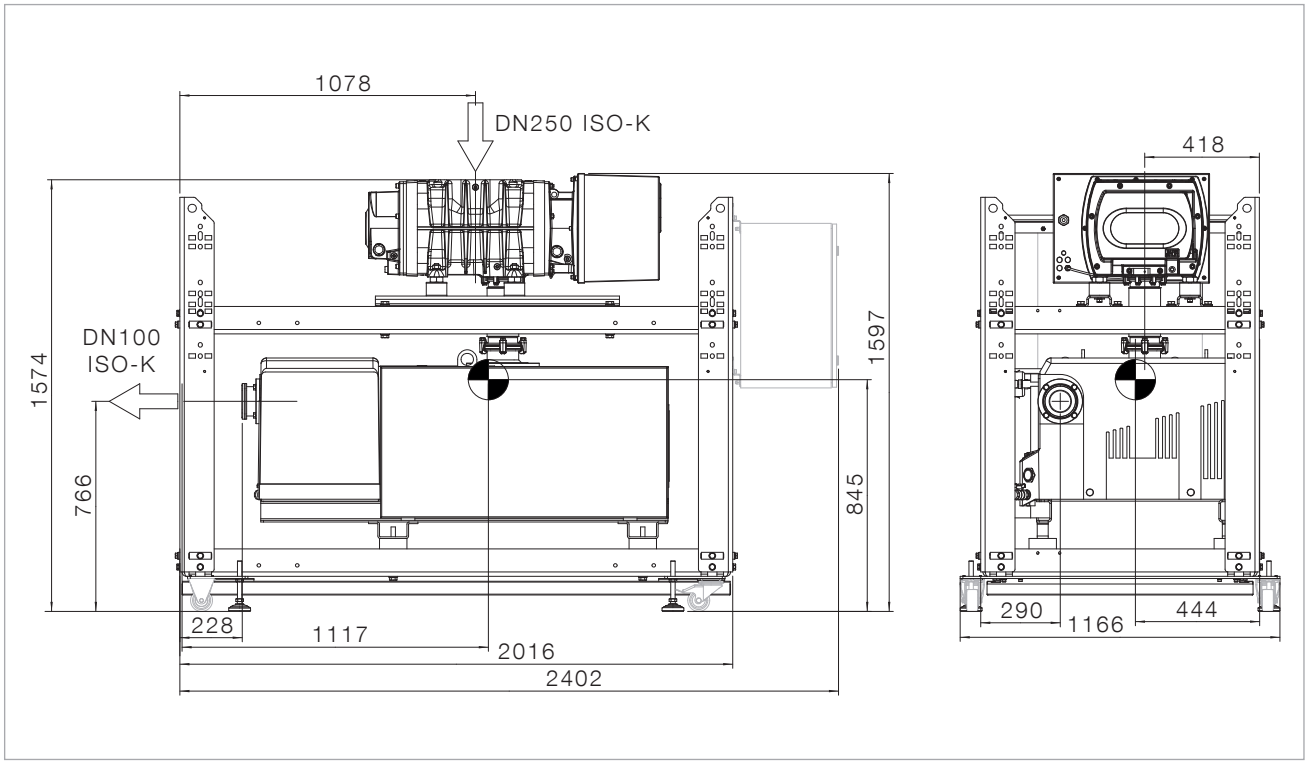
Dimensional drawing for SVS 20AU 63BF A / SVS 20AU 75BF A / SVS 20AU 63BF AE / SVS 20AU 75BF AE with all configuration options (dimensions in mm)



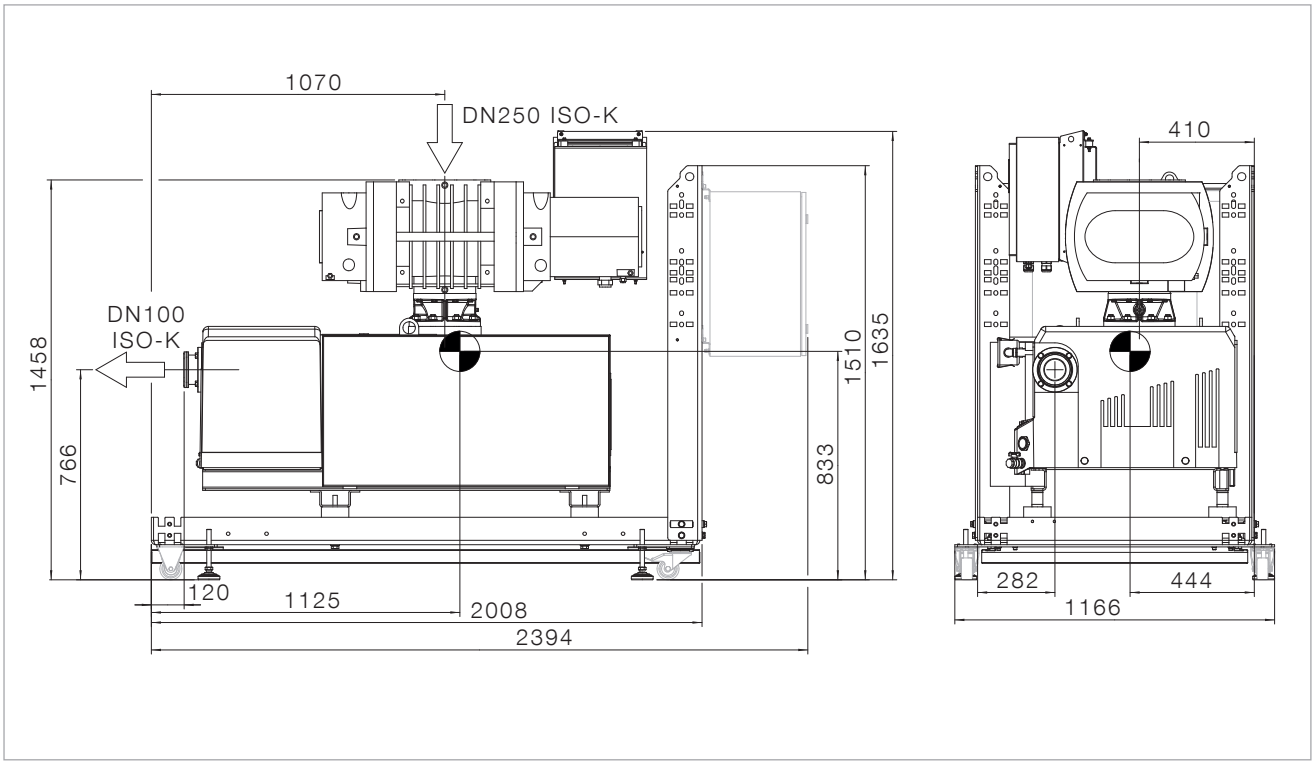
Dimensional drawing for SVS 20AU 30B G /SVS 20AU 30B GE with all configuration options (dimensions in mm)



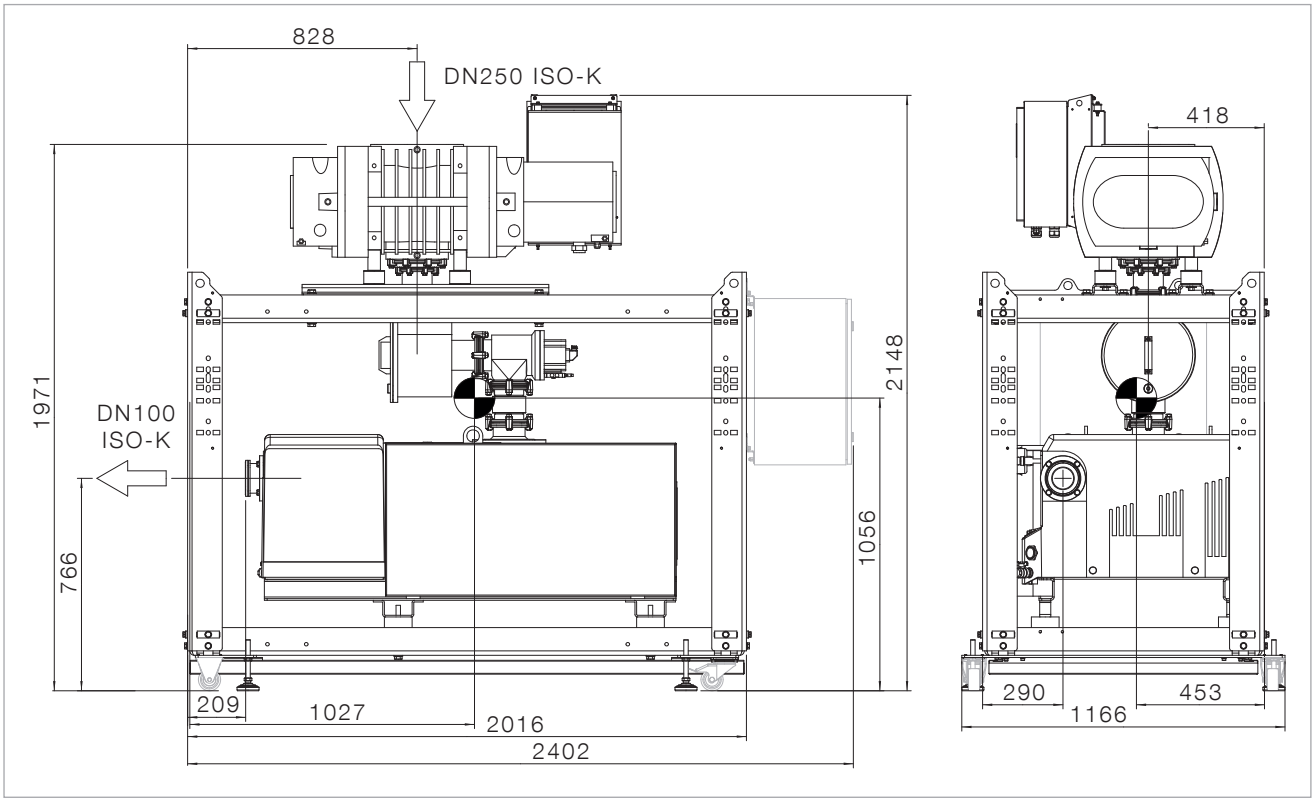
Dimensional drawing for SVS 25H 63BF A / SVS 25H 75BF A / SVS 25H 63BF AE / SVS 25H 75BF AE with all configuration options (dimensions in mm)



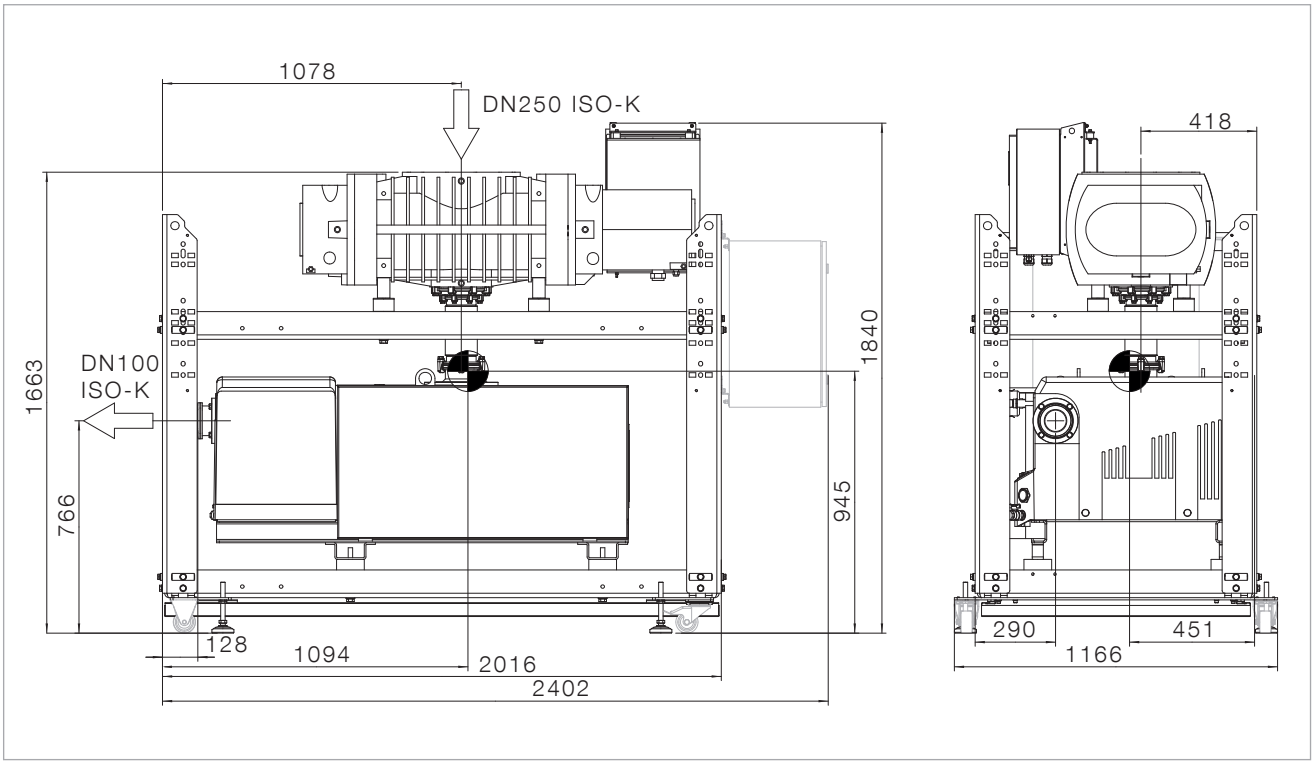
Dimensional drawing for SVS 25H 63BF G / SVS 25H 75BF G / SVS 25H 63BF GE / SVS 25H 75BF GE with all configuration options (dimensions in mm)



Dimensional drawing for SVS 44HF 63BF A / SVS 44HF 75BF A / SVS 44HF 63BF AE / SVS 44HF 75BF AE with all configuration options (dimensions in mm)



Dimensional drawing for SVS 44H 63BF G ~ / SVS 44H 75BF G / SVS 44H 63BF GE ~/ SVS 44H 75BF GE with filter valve combination with all configuration options (dimensions in mm)



Dimensional drawing for SVS 70H 63BF G GE / SVS 70H 75BF G/GE / SVS 70HU 63BF G/GE / SVS 70HU 75BF G/GE
SVS 70HF 63BF G/GE / SVS 70HF 75BF G/GE with all configuration options (dimensions in mm)

Technical Data

SOGEVAC SYSTEM SVS

	05A(U) 20	05S(U) 20	05A(U) 30B	05S(U) 30B
Nom. pump speed (50/60Hz)	505 / 606 m^3/h			
Max. effective pumping speed (50/60Hz)	410 / 490 m^3/h		424 / 505 m^3/h	
Ult. total pressure w/o gas ballast	≤ 8.0 x 10^{-3} mbar			
Ult. total pressure w/ gas ballast default (7 – 7.5 Nm^3/h) electromagnetic (7 – 10 Nm^3/h) large (15 – 18 Nm^3/h)	≤ 4.0 x 10^{-2} mbar ≤ 4.0 x 10^{-2} mbar		≤ 4.0 x 10^{-2} mbar ≤ 4.0 x 10^{-2} mbar	
Maximum permissible inlet pressure	1 013 mbar			
Maximum permissible discharge pressure (relative to ambient)	+150 mbar			
Water vapor capacity w/ gas ballast default (50/60 Hz) electromagnetic (50/60 Hz) large (50/60 Hz)	3.4 / 5.4 kg * h^{-1} 3.4 / 5.4 kg * h^{-1}		1.3 / 1.8 kg * h^{-1} 1.3 / 1.8 kg * h^{-1}	
Permissible ambient temperature	+12 ... + 40 °C			
Storage temperature	-10 ... + 60 °C			
Noise level (rigid exhaust pipe) [6] SOGEVAC (50/60Hz)	≤ 69 / ≤ 73 dB(A)		≤ 72 / ≤ 76 dB(A)	
Roots (50/60Hz)	≤ 67 dB(A)	≤ 63 dB(A)	≤ 67 dB(A)	≤ 63 dB(A)
Relative atmospheric humidity	95 %, non-condensing			
Installation location	up to 2 000 m (NHN) [2]			
Mains voltages and frequencies	400V 50Hz / 460V 60Hz			
Phases	3-ph			
Rated power (400V 50Hz / 460V 60Hz) SOGEVAC Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	4 kW 2.2 kW 6.2 kW	4 kW 2.2 / 2.4 kW 6.2 / 6.4 kW	6 / 7.2 KW 2.2 KW 8.2 / 9.4 kW	6 / 7.2 KW 2.2 / 2.4 KW 8.2 / 9.6 kW
Max. speed Roots	3 600 rpm			
Min. permissible speed Roots (off) [4]	off			
Protection class	IP54	IP20	IP54	IP20
Lubricant filling SOGEVAC Roots	LVO 130 / 210 LVO 100	LVO 130 / 210 LVO 100 / 210	LVO 130 / 210 LVO 100	LVO 130 / 210 LVO 100 / 210
Intake flange	DN 63 ISO-K			
Discharge flange	G2			

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U"-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1,000 m. If the altitude exceeds 1,000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling, and permanent operation at nominal power, the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

4) The minimum permissible frequency for the RUVAC is 20 Hz.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

7) In the EU, the drive's energy efficiency is equal to IE3 during RUVAC operations with a frequency converter. During RUVAC WH operations w/o frequency converter the energy efficiency is equal to IE2.

Technical Data

SOGEVAC SYSTEM SVS

	07H 20	07HF 20	07H 30B	07HF 30B
Nom. pump speed (50/60Hz)	700 / 840 m^3/h	1 680 m^3/h	700 / 840 m^3/h	1 680 m^3/h
Max. effective pumping speed (50/60Hz)	601 / 715 m^3/h	1164 / 1192 m^3/h	621 / 735 m^3/h	1209 / 1228 m^3/h
Ult. total pressure w/o gas ballast	≤ 8.0 x 10^{-3} mbar			
Ult. total pressure w/ gas ballast default (7 – 7.5 Nm^3/h) electromagnetic (7 – 10 Nm^3/h) large (15 – 18 Nm^3/h)	≤ 4.0 x 10^{-2} mbar ≤ 4.0 x 10^{-2} mbar		≤ 4.0 x 10^{-2} mbar ≤ 4.0 x 10^{-2} mbar	
Maximum permissible inlet pressure	1013 mbar			
Maximum permissible discharge pressure (relative to ambient)	+150 mbar			
Water vapor capacity w/ gas ballast default (50/60 Hz) electromagnetic (50/60 Hz) large (50/60 Hz)	3.4 / 5.4 kg * h^{-1} 3.4 / 5.4 kg * h^{-1}		1.3 / 1.8 kg * h^{-1} 1.3 / 1.8 kg * h^{-1}	
Permissible ambient temperature	+12 ... + 40 °C			
Storage temperature	-10 ... + 60 °C			
Noise level (rigid exhaust pipe) [6] SOGEVAC (50/60Hz)	≤ 69 / ≤ 73 dB(A)		≤ 72 / ≤ 76 dB(A)	
Roots (50/60Hz)	≤ 56 dB(A)	≤ 60 dB(A)	≤ 56 dB(A)	≤ 60 dB(A)
Relative atmospheric humidity	95 %, non-condensing			
Installation location	up to 2 000 m	up to 1 000 m	up to 2 000 m	up to 1 000 m
Mains voltages and frequencies (tolerances included w/ given values)	400V 50Hz / 460V 60Hz			
Phases	3-ph			
Rated power (400V 50Hz / 460V 60Hz) SOGEVAC Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	4 kW 2.2 / 2.6 kW 6.2 / 6.6 kW	4 kW 3.5 kW 7.5 kW	6 / 7.2 KW 2.2 / 2.6 KW 8.2 / 9.8 kW	6 / 7.2 KW 3.5 KW 9.5 / 10.7 kW
Max. speed Roots	3 600 rpm	7 200 rpm	3 600 rpm	7 200 rpm
Min. permissible speed Roots (off) [4]	off	1 200 rpm	off	1 200 rpm
Protection class	IP54			
Lubricant filling SOGEVAC Roots	LVO 130 / 210 LVO 210			
Intake flange	DN 100 ISO-K			
Discharge flange	G2			

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U"-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1,000 m. If the altitude exceeds 1,000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling, and permanent operation at nominal power, the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

4) The minimum permissible frequency for the RUVAC is 20 Hz.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

7) In the EU, the drive's energy efficiency is equal to IE3 during RUVAC operations with a frequency converter. During RUVAC WH operations w/o frequency converter the energy efficiency is equal to IE2.

Technical Data

	SOGEVAC SYSTEM SVS			
	10A(U) 20	**10S(U) 20**	**10A(U) 30B**	**10S(U) 30B**
Nom. pump speed (50/60Hz)	1 000 / 1 200 m^3/h			
Max. effective pumping speed (50/60Hz)	760 / 909 m^3/h		796 / 948 m^3/h	
Ult. total pressure w/o gas ballast	≤ 8.0 x 10^{-3} mbar			
Ult. total pressure w/ gas ballast **default (7 – 7.5 Nm^3/h)** **electromagnetic (7 – 10 Nm^3/h)** **large (15 – 18 Nm^3/h)**	≤ 4.0 x 10^{-2} mbar ≤ 4.0 x 10^{-2} mbar		≤ 4.0 x 10^{-2} mbar ≤ 4.0 x 10^{-2} mbar	
Maximum permissible inlet pressure	1 013 mbar			
Maximum permissible discharge pressure (relative to ambient)	+150 mbar			
Water vapor capacity w/ gas ballast **default (50/60 Hz)** **electromagnetic (50/60 Hz)** **large (50/60 Hz)**	3.4 / 5.4 kg * h^{-1} 3.4 / 5.4 kg * h^{-1}		1.3 / 1.8 kg * h^{-1} 1.3 / 1.8 kg * h^{-1}	
Permissible ambient temperature	+12 ... + 40 °C			
Storage temperature	-10 ... + 60 °C			
Noise level (rigid exhaust pipe) [6] **SOGEVAC (50/60Hz)**	≤ 69 / ≤ 73 dB(A)		≤ 72 / ≤ 76 dB(A)	
Roots (50/60Hz)	≤ 75 dB(A)	≤ 68 dB(A)	≤ 75 dB(A)	≤ 68 dB(A)
Relative atmospheric humidity	95 %, non-condensing			
Installation location	up to 2 000 m (NHN) [2]			
Mains voltages and frequencies	400V 50Hz / 460V 60Hz			
Phases	3-ph			
Rated power (400V 50Hz / 460V 60Hz) **SOGEVAC** **Roots** **Roots with 18.5 kW (U)** **totalling** **totalling with 18.5 kW (U)**	 4 kW 4 kW 8 kW	 4 kW 4 / 4.4 KW 8 / 8.4 kW	 6 / 7.2 KW 4 KW 10 / 11.2 kW	 6 / 7.2 KW 4 / 4.4 KW 10 / 11.6 kW
Max. speed Roots	3 600 rpm			
Min. permissible speed Roots (off) [4]	off			
Protection class	IP54	IP20	IP54	IP20
Lubricant filling **SOGEVAC** **Roots**	 LVO 130 LVO 100	 LVO 130 / 210 LVO 100 / 210	 LVO 130 LVO 100	 LVO 130 / 210 LVO 100 / 210
Intake flange	DN 100 ISO-K			
Discharge flange	G2			

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U"-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1,000 m. If the altitude exceeds 1,000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling, and permanent operation at nominal power, the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

4) The minimum permissible frequency for the RUVAC is 20 Hz.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

7) In the EU, the drive's energy efficiency is equal to IE3 during RUVAC operations with a frequency converter. During RUVAC WH operations w/o frequency converter the energy efficiency is equal to IE2.

Technical Data

	SOGEVAC SYSTEM SVS			
	20A(U) 63B	20S(U) 63B	20A(U) 63BF	20S(U) 63BF
Nom. pump speed (50/60Hz)	2 000 / 2 400 m^3/h			
Max. effective pumping speed (50/60Hz)	1 750 / 2 080 m^3/h		1 760 / 2 090 m^3/h	
Ult. total pressure w/o gas ballast	≤ 5.0 x 10^{-3} mbar			
Ult. total pressure w/ gas ballast manual (22.5 – 27.5 Nm^3/h) electromagnetic (17.55 – 21.45 Nm^3/h) large	≤ 5.0 x 10^{-1} mbar ≤ 5.0 x 10^{-1} mbar			
Maximum permissible inlet pressure	1 013 mbar			
Maximum permissible discharge pressure (relative to ambient)	+150 mbar			
Water vapor capacity w/ gas ballast default (50/60 Hz) electromagnetic (50/60 Hz) large (50/60 Hz)	17 / 24 kg * h^{-1} 17 / 24 kg * h^{-1}		11 / 14 kg * h^{-1} 11 / 14 kg * h^{-1}	
Permissible ambient temperature	+12 ... + 40 °C			
Storage temperature	-10 ... + 60 °C			
Noise level (rigid exhaust pipe) [6] SOGEVAC (50/60Hz)	≤ 72 / ≤ 75 dB(A)		≤ 72 dB(A)	
Roots (50/60Hz)	≤ 80 dB(A)	≤ 72 dB(A)	≤ 80 dB(A)	≤ 72 dB(A)
Relative atmospheric humidity	95 %, non-condensing			
Installation location	up to 2 000 m (NHN) [2]			
Mains voltages and frequencies	400V 50Hz / 460V 60Hz			
Phases	3-ph			
Rated power (400V 50Hz / 460V 60Hz) SOGEVAC Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	15 / 17 kW 7.5 kW 22.5 / 24.5 kW	15 / 17 kW 7.5 / 8.5 KW 22.5 / 25.5 kW	15 / 17 KW 7.5 / 7.5 KW 22.5 / 24.5 kW	15 / 17 KW 7.5 / 8.5 KW 22.5 / 25.5 kW
Max. speed Roots	3 000 / 3 600 rpm			
Min. permissible speed Roots (off) [4]	off			
Protection class	IP54	IP20	IP54	IP20
Lubricant filling SOGEVAC Roots	 LVO 130 LVO 100	 LVO 130 / 210 LVO 100 / 210	 LVO 130 LVO 100	 LVO 130 / 210 LVO 100 / 210
Intake flange	DN 160 ISO-K			
Discharge flange	DN 100 ISO-K			

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U"-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1,000 m. If the altitude exceeds 1,000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling, and permanent operation at nominal power, the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

4) The minimum permissible frequency for the RUVAC is 20 Hz.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

7) In the EU, the drive's energy efficiency is equal to IE3 during RUVAC operations with a frequency converter. During RUVAC WH operations w/o frequency converter the energy efficiency is equal to IE2.

Technical Data

	SOGEVAC SYSTEM SVS			
	20A(U) 75B	20S(U) 75B	20A(U) 75BF	20S(U) 75BF
Nom. pump speed (50Hz)	2 000 m^3/h			
Max. effective pumping speed (50Hz)	1 780 m^3/h			
Ult. total pressure w/o gas ballast	≤ 5.0 x 10^{-3} mbar			
Ult. total pressure w/ gas ballast manual (22.5 – 27.5 Nm^3/h) electromagnetic (17.55 – 21.45 Nm^3/h) large	≤ 5.0 x 10^{-1} mbar ≤ 5.0 x 10^{-1} mbar			
Maximum permissible inlet pressure	1 013 mbar			
Maximum permissible discharge pressure (relative to ambient)	+150 mbar			
Water vapor capacity w/ gas ballast default (50 Hz) electromagnetic (50 Hz) large (50 Hz)	24 kg * h^{-1} 24 kg * h^{-1}		14 kg * h^{-1} 14 kg * h^{-1}	
Permissible ambient temperature	+12 ... + 40 °C			
Storage temperature	-10 ... + 60 °C			
Noise level (rigid exhaust pipe) [6] SOGEVAC (50 Hz)	≤ 72 dB(A)			
Roots (50 Hz)	≤ 80 dB(A)	≤ 72 dB(A)	≤ 80 dB(A)	≤ 72 dB(A)
Relative atmospheric humidity	95 %, non-condensing			
Installation location	up to 2 000 m (NHN) [2]			
Mains voltages and frequencies	400V 50Hz			
Phases	3-ph			
Rated power (400V 50Hz) SOGEVAC Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	18.5 kW 7.5 kW 26 kW			
Max. speed Roots	3 000 / 3 600 rpm			
Min. permissible speed Roots (off) [4]	off			
Protection class	IP54	IP20	IP54	IP20
Lubricant filling SOGEVAC Roots	LVO 130 LVO 100	LVO 130 / 210 LVO 100 / 210	LVO 130 LVO 100	LVO 130 / 210 LVO 100 / 210
Intake flange	DN 160 ISO-K			
Discharge flange	DN 100 ISO-K			

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U"-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1,000 m. If the altitude exceeds 1,000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling, and permanent operation at nominal power, the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

4) The minimum permissible frequency for the RUVAC is 20 Hz.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

7) In the EU, the drive's energy efficiency is equal to IE3 during RUVAC operations with a frequency converter. During RUVAC WH operations w/o frequency converter the energy efficiency is equal to IE2.

Technical Data

	SOGEVAC SYSTEM SVS			
	25H(U) 63BF	**25HF 63BF**	**25H(U) 75BF**	**25HF 75BF**
Nom. pump speed (50/60Hz)	2500/3000 m^3/h	5000/5000 m^3/h	2 500 m^3/h / –	5 000 m^3/h / –
Max. effective pumping speed (50/60Hz)	2100/2540 m^3/h	3700/3790 m^3/h	2 180 m^3/h / –	3 800 m^3/h / –
Ult. total pressure w/o gas ballast	≤ 5.0 x 10^{-3} mbar			
Ult. total pressure w/ gas ballast **manual (22.5 – 27.5 Nm^3/h)** **electromagnetic (17.55 – 21.45 Nm^3/h)** **large**	≤ 5.0 x 10^{-1} mbar ≤ 5.0 x 10^{-1} mbar			
Maximum permissible inlet pressure	1 013 mbar			
Maximum permissible discharge pressure (relative to ambient)	+150 mbar			
Water vapor capacity w/ gas ballast **default (50/60 Hz)** **electromagnetic (50/60 Hz)** **large (50/60 Hz)**	11 / 14 kg * h^{-1} 11 / 14 kg * h^{-1}		14 kg * h^{-1} / – 14 kg * h^{-1} / –	
Permissible ambient temperature	+12 ... + 40 °C			
Storage temperature	-10 ... + 60 °C			
Noise level (rigid exhaust pipe) [6] **SOGEVAC (50/60Hz)**	≤ 72 dB(A)			
Roots (50/60Hz)	≤ 63 dB(A)			
Relative atmospheric humidity	95 %, non-condensing			
Installation location	up to 2 000 m	up to 1 000 m	up to 2 000 m	up to 1 000 m
Mains voltages and frequencies	400V 50Hz / 460V 60Hz		400V 50Hz	
Phases	3-ph			
Rated power (400V 50Hz / 460V 60Hz) **SOGEVAC** **Roots** **Roots with 18.5 kW (U)** **totalling** **totalling with 18.5 kW (U)**	 15 / 17 kW 6.2 / 7.4 kW 21.2 / 24.4 kW	 15 / 17 kW 11 KW 26 / 38 kW	 18.5 KW / – 6.2 KW / – 24.7 kW / –	 18.5 KW / – 11 KW / – 29.5 kW / –
Max. speed Roots	3 000 / 3 600 rpm	6 000 / 6 000 rpm	3 000 / 3 600 rpm	6 000 / 6 000 rpm
Min. permissible speed Roots (off) [4]	off	1 200 / 1 200 rpm	off	1 200 / 1 200 rpm
Protection class	IP54			
Lubricant filling **SOGEVAC** **Roots**	LVO 130 / 210 LVO 210			
Intake flange	DN 250 ISO-K			
Discharge flange	DN 100 ISO-K			

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U“-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1,000 m. If the altitude exceeds 1,000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling, and permanent operation at nominal power, the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

4) The minimum permissible frequency for the RUVAC is 20 Hz.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

7) In the EU, the drive‘s energy efficiency is equal to IE3 during RUVAC operations with a frequency converter. During RUVAC WH operations w/o frequency converter the energy efficiency is equal to IE2.

Technical Data

	SOGEVAC SYSTEM SVS			
	44H(U) 63BF	**44HF 63BF**	**44H(U) 75BF**	**44HF 75BF**
Nom. pump speed (50/60Hz)	4400/5280 m^3/h	7040/7040 m^3/h	4 400 m^3/h	7 040 m^3/h
Max. effective pumping speed (50/60Hz)	3610/4250 m^3/h	5120/5220 m^3/h	3 680 m^3/h	5 230 m^3/h
Ult. total pressure w/o gas ballast	≤ 5.0 x 10^{-3} mbar			
Ult. total pressure w/ gas ballast **manual (22.5 – 27.5 Nm^3/h)** **electromagnetic (17.55 – 21.45 Nm^3/h)** **large**	≤ 5.0 x 10^{-1} mbar ≤ 5.0 x 10^{-1} mbar			
Maximum permissible inlet pressure	1 013 mbar			
Maximum permissible discharge pressure (relative to ambient)	+150 mbar			
Water vapor capacity w/ gas ballast **default (50/60 Hz)** **electromagnetic (50/60 Hz)** **large (50/60 Hz)**	11 / 14 kg * h^{-1} 11 / 14 kg * h^{-1}		14 kg * h^{-1} / – 14 kg * h^{-1} / –	
Permissible ambient temperature	+12 ... + 40 °C			
Storage temperature	-10 ... + 60 °C			
Noise level (rigid exhaust pipe) [6]				
SOGEVAC (50/60Hz)	≤ 72 dB(A)			
Roots (50/60Hz)	≤ 63 dB(A)			
Relative atmospheric humidity	95 %, non-condensing			
Installation location	up to 2 000 m	up to 1 000 m	up to 2 000 m	up to 1 000 m
Mains voltages and frequencies	400V 50Hz / 460V 60Hz		400V 50Hz	
Phases	3-ph			
Rated power (400V 50Hz / 460V 60Hz) **SOGEVAC** **Roots** **Roots with 18.5 kW (U)** **totalling** **totalling with 18.5 kW (U)**	 15 / 17 kW 11 kW 18.5 / 18.5 kW 26 / 28 kW 33.5 / 35.5 kW	 15 / 17 kW 11 kW 26 / 28 kW 	 18.5 KW / – 11 KW / – 18.5 KW / – 29.5 kW / – 37 kW / –	 18.5 KW / – 11 KW / – 29.5 kW / –
Max. speed Roots	3 000 / 3 600 rpm	4 800 / 4 800 rpm	3 000 / 3 600 rpm	4 800 / 4 800 rpm
Min. permissible speed Roots (off) [4]	off	1 200 / 1 200 rpm	off	1 200 / 1 200 rpm
Protection class	IP54			
Lubricant filling **SOGEVAC** **Roots**	 LVO 130 / 210 LVO 210			
Intake flange	DN 250 ISO-K			
Discharge flange	DN 100 ISO-K			

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U"-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1,000 m. If the altitude exceeds 1,000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling, and permanent operation at nominal power, the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

4) The minimum permissible frequency for the RUVAC is 20 Hz.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

7) In the EU, the drive's energy efficiency is equal to IE3 during RUVAC operations with a frequency converter. During RUVAC WH operations w/o frequency converter the energy efficiency is equal to IE2.

Technical Data

	SOGEVAC SYSTEM SVS			
	70H(U) 63BF	**70HF 63BF**	**70H(U) 75BF**	**70HF 75BF**
Nom. pump speed (50/60Hz)	7000/8400 m^3/h	9800/9800 m^3/h	7 000 m^3/h	9 800 m^3/h
Max. effective pumping speed (50/60Hz)	5030/6000 m^3/h	6460/6720 m^3/h	5 260 m^3/h	6 800 m^3/h
Ult. total pressure w/o gas ballast	≤ 5.0 x 10^{-3} mbar			
Ult. total pressure w/ gas ballast **manual (22.5 – 27.5 Nm^3/h)** **electromagnetic (17.55 – 21.45 Nm^3/h)** **large**	≤ 5.0 x 10^{-1} mbar ≤ 5.0 x 10^{-1} mbar			
Maximum permissible inlet pressure	1 013 mbar			
Maximum permissible discharge pressure (relative to ambient)	+150 mbar			
Water vapor capacity w/ gas ballast **default (50/60 Hz)** **electromagnetic (50/60 Hz)** **large (50/60 Hz)**	11 / 14 kg * h^{-1} 11 / 14 kg * h^{-1}		14 kg * h^{-1} / – 14 kg * h^{-1} / –	
Permissible ambient temperature	+12 ... + 40 °C			
Storage temperature	-10 ... + 60 °C			
Noise level (rigid exhaust pipe) [6] **SOGEVAC (50/60Hz)**	≤ 72 dB(A)			
Roots (50/60Hz)	≤ 63 dB(A)			
Relative atmospheric humidity	95 %, non-condensing			
Installation location	up to 2 000 m	up to 1 000 m	up to 2 000 m	up to 1 000 m
Mains voltages and frequencies	400V 50Hz / 460V 60Hz		400V 50Hz	
Phases	3-ph			
Rated power (400V 50Hz / 460V 60Hz) **SOGEVAC** **Roots** **Roots with 18.5 kW (U)** **totalling** **totalling with 18.5 kW (U)**	 15 / 17 kW 11 kW 18.5 / 18.5 kW 26 / 28 kW 33.5 / 35.5 kW	 15 / 17 kW 11 kW 26 / 28 kW 	 18.5 KW / – 11 KW / – 29.5 kW / – 	 18.5 KW / – 11 KW / – 29.5 kW / –
Max. speed Roots	3 000 / 3 600 rpm	4 200 / 4 200 rpm	3 000 / 3 600 rpm	4 200 / 4 200 rpm
Min. permissible speed Roots (off) [4]	off	1 200 / 1 200 rpm	off	1 200 / 1 200 rpm
Protection class	IP54			
Lubricant filling **SOGEVAC** **Roots**	LVO 130 / 210 LVO 210			
Intake flange	DN 320 ISO-K			
Discharge flange	DN 100 ISO-K			

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U"-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1,000 m. If the altitude exceeds 1,000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

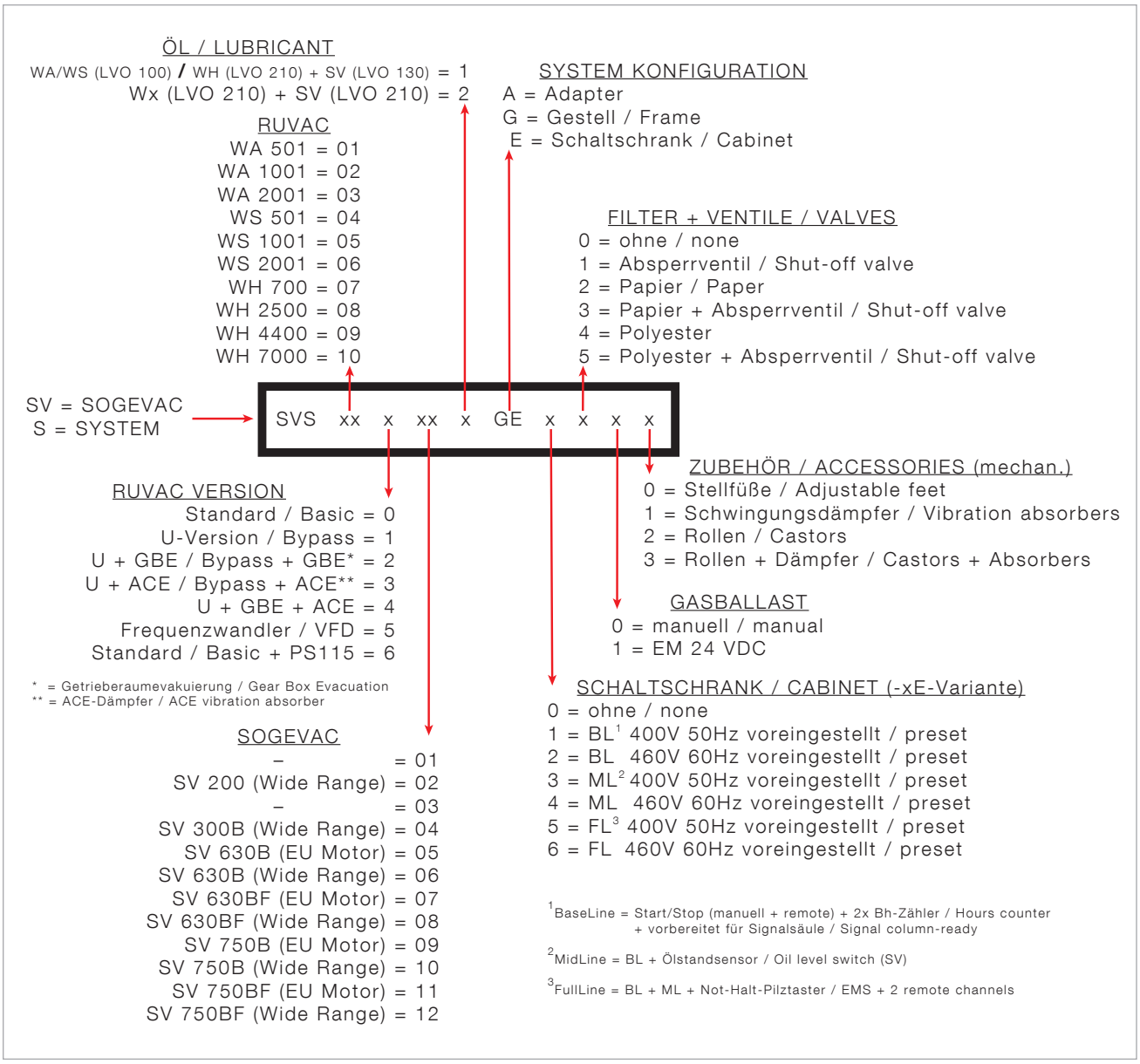
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4) The minimum permissible frequency for the RUVAC is 20 Hz.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

7) In the EU, the drive's energy efficiency is equal to IE3 during RUVAC operations with a frequency converter. During RUVAC WH operations w/o frequency converter the energy efficiency is equal to IE2.



Configuration matrix for ordering SOGEVAC SYSTEMS

Configuration matrix

Part numbers for SOGEVAC SYSTEMS are based on the matrix shown in the figure above and give hints on the individual configuration and features of the pump combination in question.

Ordering Information

SOGEVAC SYSTEMS

Part No.	Description	Short name	SOGEVAC	SV 400 V Motor Type	RUVAC 400 V	Lubricant
SVS013021A0000	SVS 05AU20-A	SVS 0520	SV200	Wide Range	WAU501H	1x0
SVS011021A0000	SVS 05AU20-A	SVS 0520	SV200	Wide Range	WAU501	1x0
SVS023041A0000	SVS 10AU30B-A	SVS 1030	SV300B	Wide Range	WAU1001H	1x0
SVS021041A0000	SVS 10AU30B-A	SVS 1030	SV300B	Wide Range	WAU1001	1x0
SVS050041A0000	SVS 10S30B-A	SVS 1030	SV300B	Wide Range	WS1001	1x0
SVS033041G0000	SVS 20AU30B-G	SVS 2030	SV300B	Wide Range	WAU2001H	1x0
SVS031031G0000	SVS 20AU30B-G	SVS 2030	SV300B	Wide Range	WAU2001	1x0
SVS033071A0000	SVS 20AU63BF-A	SVS 2063	SV630BF	EU	WAU2001H	1x0
SVS033081A0000	SVS 20AU63BF-A	SVS 2063	SV630BF	Wide Range	WAU2001H	1x0
SVS031071A0010	SVS 20AU63BF-A	SVS 2063	SV630BF	EU	WAU2001	1x0
SVS031081A0010	SVS 20AU63BF-A	SVS 2063	SV630BF	Wide Range	WAU2001	1x0
SVS033071G0000	SVS 20AU63BF-G	SVS 2063	SV630BF	EU	WAU2001H	1x0
SVS033081G0000	SVS 20AU63BF-G	SVS 2063	SV630BF	Wide Range	WAU2001H	1x0
SVS080072A0010	SVS 25H63BF-A	SVS 2563	SV630BF	EU	WH2500	210
SVS090072A0010	SVS 44H63BF-A	SVS 4463	SV630BF	EU	WH4400	210
SVS100072G0010	SVS 70H63BF-G	SVS 7063	SV630BF	EU	WH7000	210

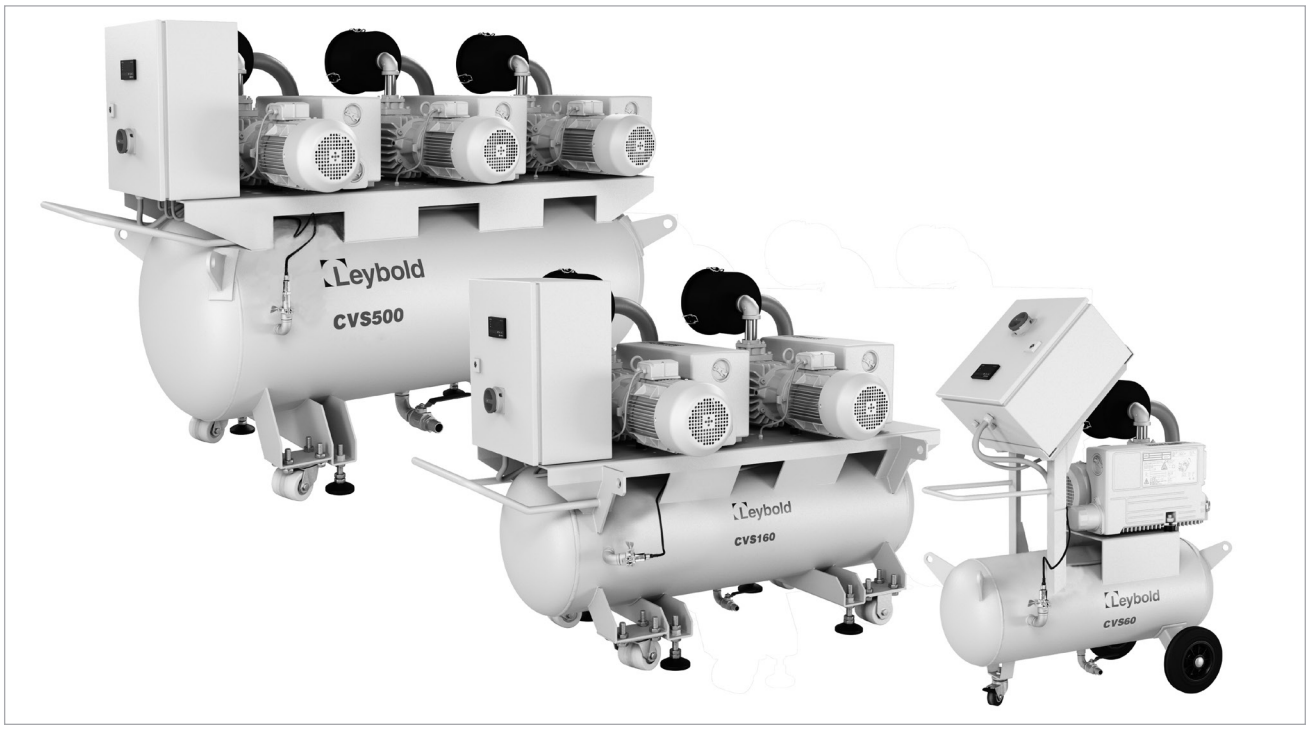
Additional systems in preparation. All SOGEVAC-SYSTEMS described here are delivered as basic models.
Basic versions can be extended with an electric control unit, gas ballast, a shut-off valve and/or inlet filter if required.

Accessories

	Part No.
Mineral oil	
LEYBONOL LVO 100, 1 litre	**L10001**
LEYBONOL LVO 100, 5 litres	**L10005**
LEYBONOL LVO 130, 1 litre	**L13001**
LEYBONOL LVO 130, 5 litres	**L13005**
LEYBONOL LVO 130, 20 litres	**L13020**
Synthetic oil	
LEYBONOL LVO 210, 1 litre	**L21001**
LEYBONOL LVO 210, 5 litres	**L21005**
LEYBONOL LVO 210, 20 litres	**L21020**
Gearbox evacuation kit (GBE) WSU / WAU	**155184V**
Gearbox evacuation kit (GBE) WH4400/7000	**155183V**
Ground fixation	**503637V001**

Notes

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).

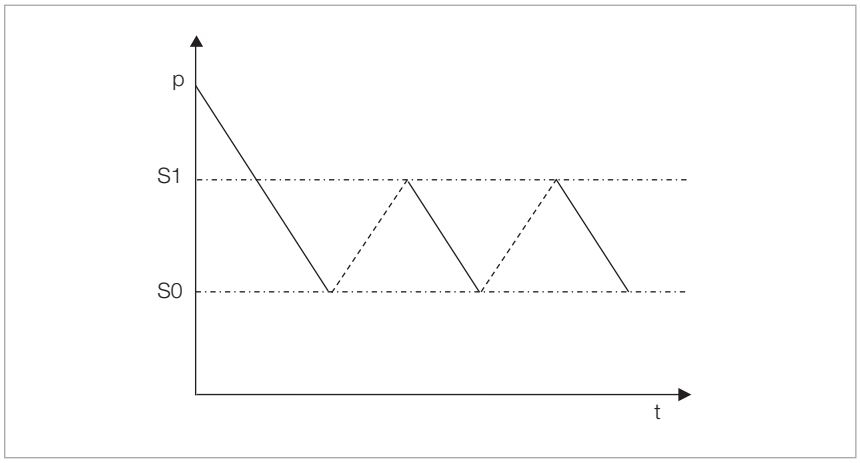
Differing custom solutions are available upon request.

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^3/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” S0. As soon as the pressure has attained the level of S0, 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 S1 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 S0 and S1. At reduced consumption, the system pressure will reduce until the switching threshold S0 is reached again causing the pump to switch off, respectively the valve to close etc.

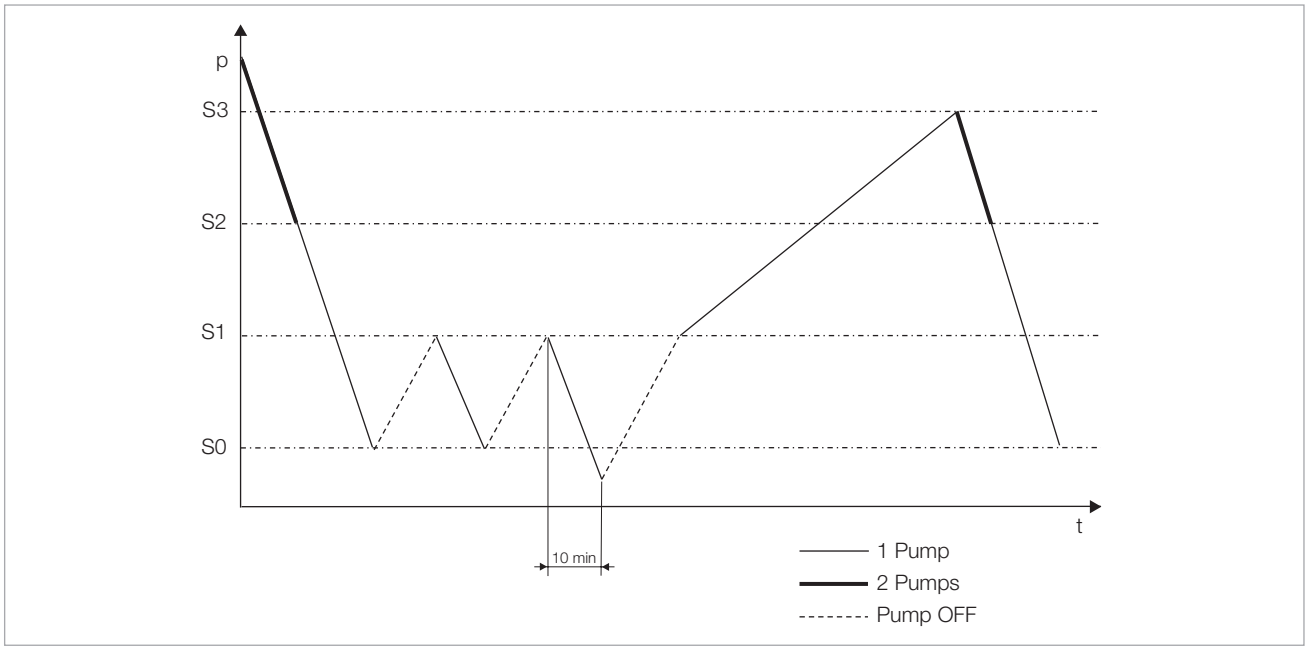
FF Controller

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^3/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^3/h (58.9 cfm))

Operating Principle of the FF Controller

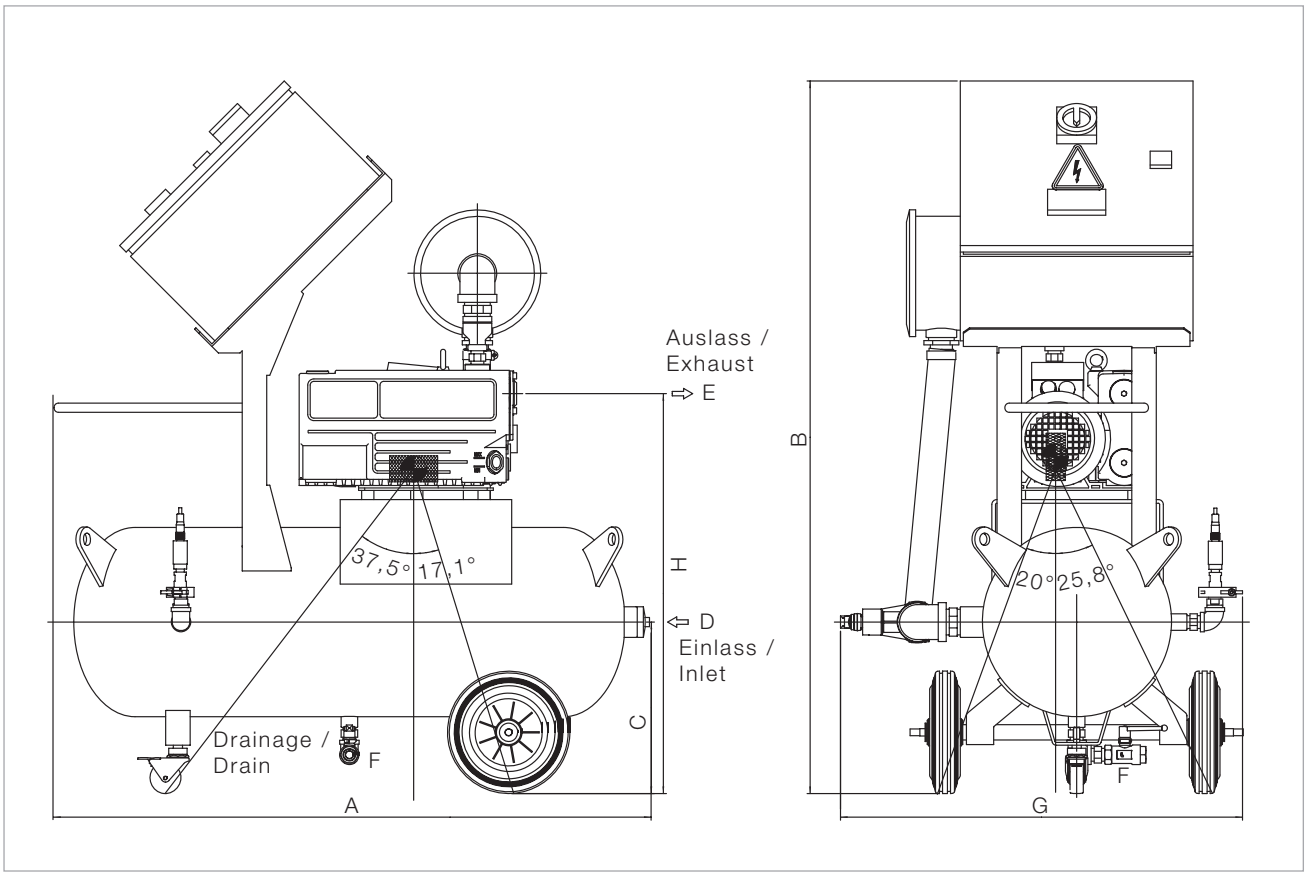
Just as for the Basic controller, the system is, upon switching on, evacuated down to the lower operating pressure S0. This is effected with both pumps running in parallel (master pump and spare pump) until the shutdown threshold for the spare pump S2 is reached. Thereafter, the master pump alone will 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 S1, then the master pump will be switched on automatically etc.

In the case of vacuum pumps having a pumping speed of over 100 m^3/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 S0. 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 S3 upon which the spare pump is automatically started.

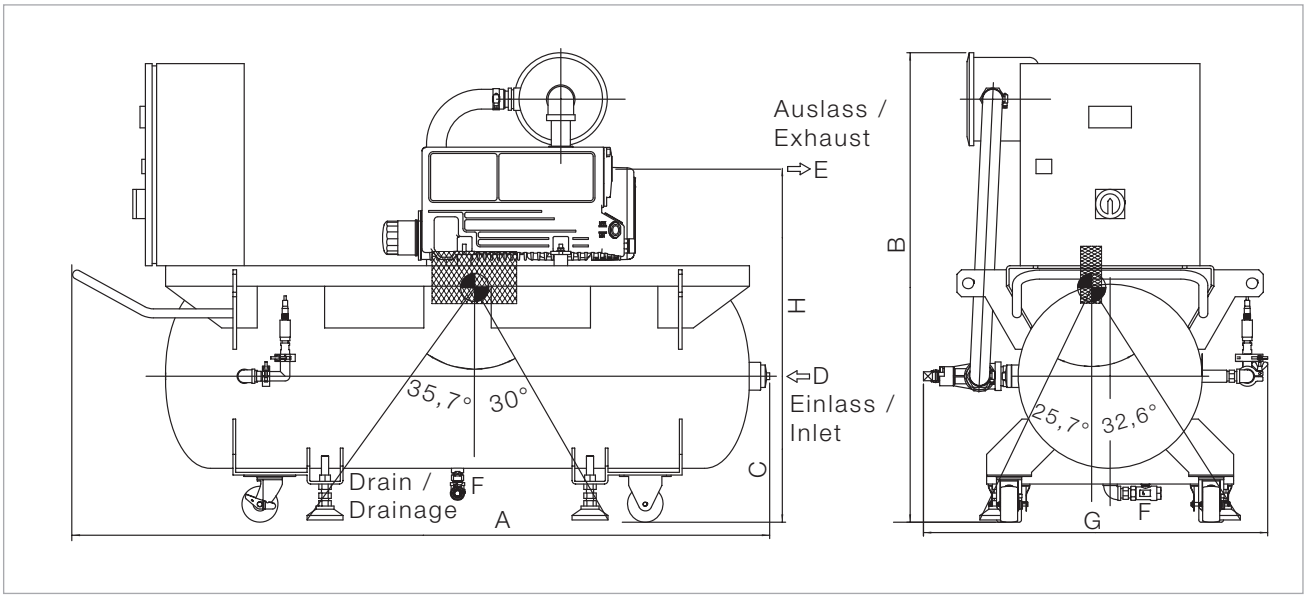
With both pumps running in parallel, the system is then again evacuated until the switch off threshold S2 for the spare pump is reached again etc.



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

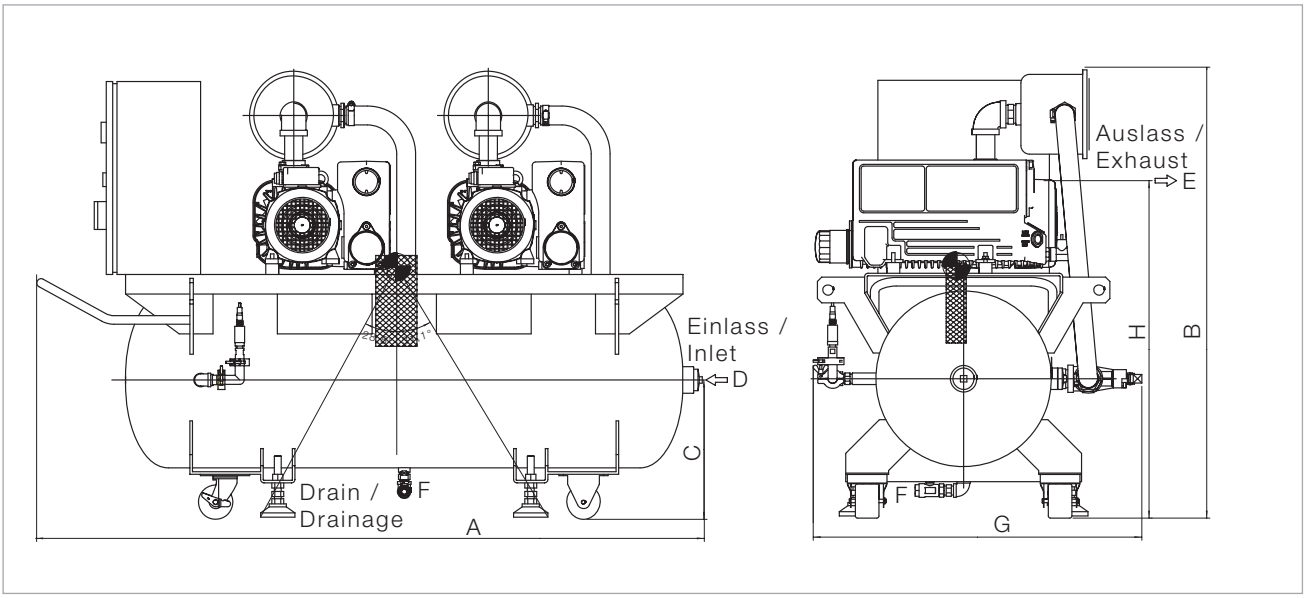
* Dimensions in mm



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

CVS-System *	A	B	C	D	E	F	G	H
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^3/h	Weight, approx. kg	Connection Inlet / Exhaust G or NPT	Noise level** dB(A)	Motor power kW	Nominal current max. A	Power connection
504309V001	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
504309V002	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
504310V001	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
504310V004	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
504311V001	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
504311V004	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
504312V006	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
504312V007	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
504312V011	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
504312V012	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
504312V014	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
504312V015	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
504313V011	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
504313V012	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
504313V016	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
504313V017	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* m³/h	Weight, approx. kg	Connection Inlet / Exhaust G or NPT	Noise level** dB(A)	Motor power kW	Nominal current max. A	Power connection
504310V050	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
504310V051	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
504311V050	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
504311V051	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
504312V050	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
504312V051	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
504312V052	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
504312V053	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
504312V054	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
504313V050	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
504313V051	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
504313V052	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
504313V053	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
504313V054	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
504313V055	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
504313V056	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 witout gas ballast, free–field measurement, distance 1 m

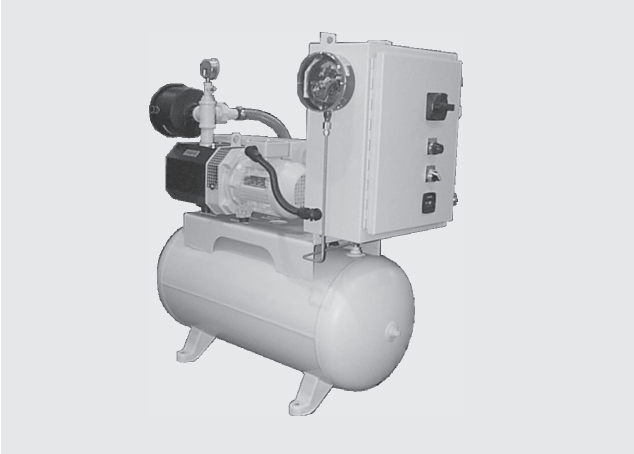
Beyond the equipment which is supplied as standard, the modular design of the central vacuum supply systems from Leybold allows for customization according to your specific requirements.

Optionally available are, for example:

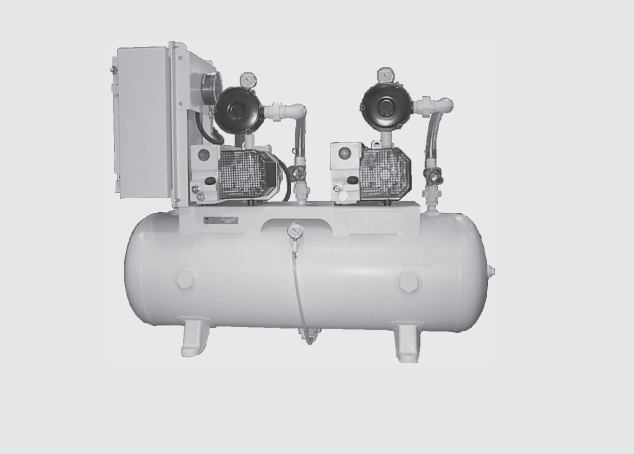
- Higher pumping speeds and larger buffer volumes
- Electropneumatic or solenoid blocking valves
- Mobile construction on castors
- Other mains voltages
- Additional pumps, filters, fittings etc.

Only available for purchase in North and South America

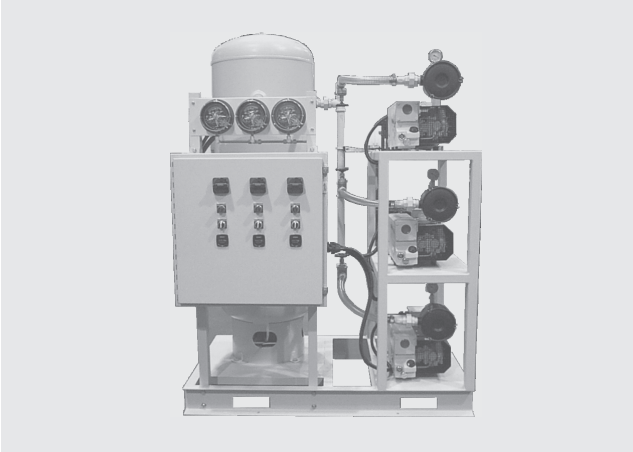
Central Vacuum Supply Systems



Central vacuum supply system, simplex



Central vacuum supply system, duplex



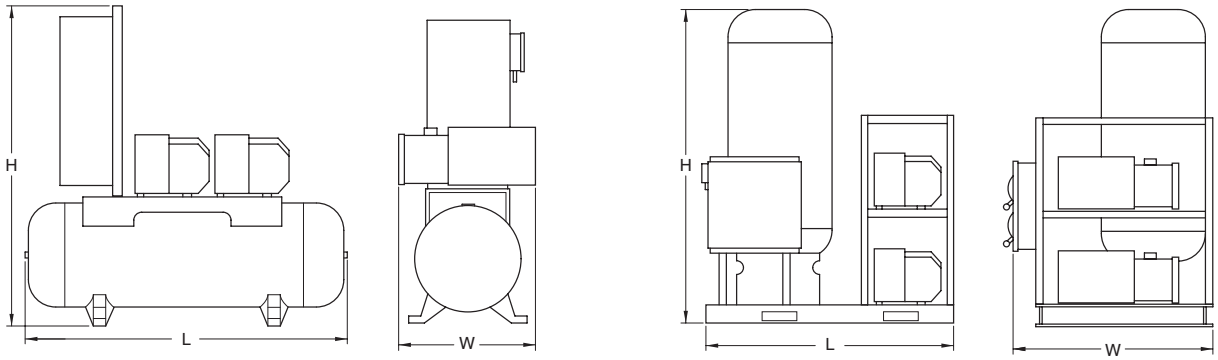
Central vacuum system, triplex

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



Pump model	Tank size (gal)	L	W	H
Tank mount - simplex				
SV 16, SV 25	30	42 (1067)	20 (508)	51 (1295)
SV 40 B, SV 65 B	60	50 (1270)	25 (635)	48 (1219)
SV 100 B	80	65 (1651)	25 (635)	56 (1422)
SV 200, SV 300	120	70 (1778)	28 (711)	58 (1473)
Tank mount - duplex				
SV 16, SV 25	60	50 (1270)	27 (686)	53 (1346)
SV 40 B, SV 65 B	80	65 (1651)	30 (762)	53 (1346)
SV 100 B	120	71 (1803)	32 (813)	53 (1346)
SV 200	240	84 (2134)	38 (965)	64 (1626)
SV 300	240	84 (2134)	43 (1092)	64 (1626)
Stack mount - duplex and triplex				
SV 16, SV 25	60	45 (1143)	38 (965)	56 (1422)
SV 40 B	80	49 (1245)	42 (1067)	56 (1422)
SV 65 B	120	62 (1575)	45 (1143)	88 (2235)
SV 100 B	120	68 (1727)	42 (1067)	88 (2235)
SV 200	200	68 (1727)	50 (1270)	91 (1626)
SV 300	200	68 (1727)	58 (1473)	91 (1626)

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^3/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^3/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

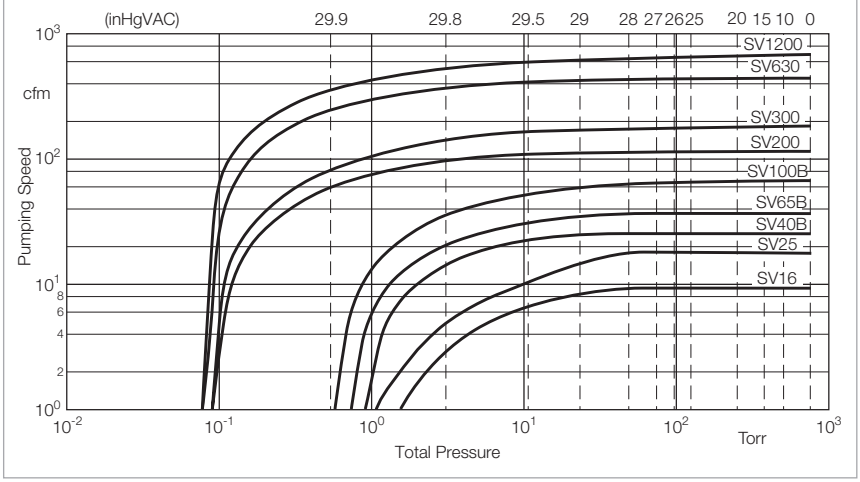
Technical Data

		Tank Mount Simplex	Tank Mount Duplex	Stack Mount 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

System	
Simplex	S
Duplex	D
Triplex	T
Pumps	
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
Mounting	
Tank mount	T
Stack mount	S
Voltage	
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
Duty	
Continuous	C
Demand Start/Stop	D



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

Notes

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.

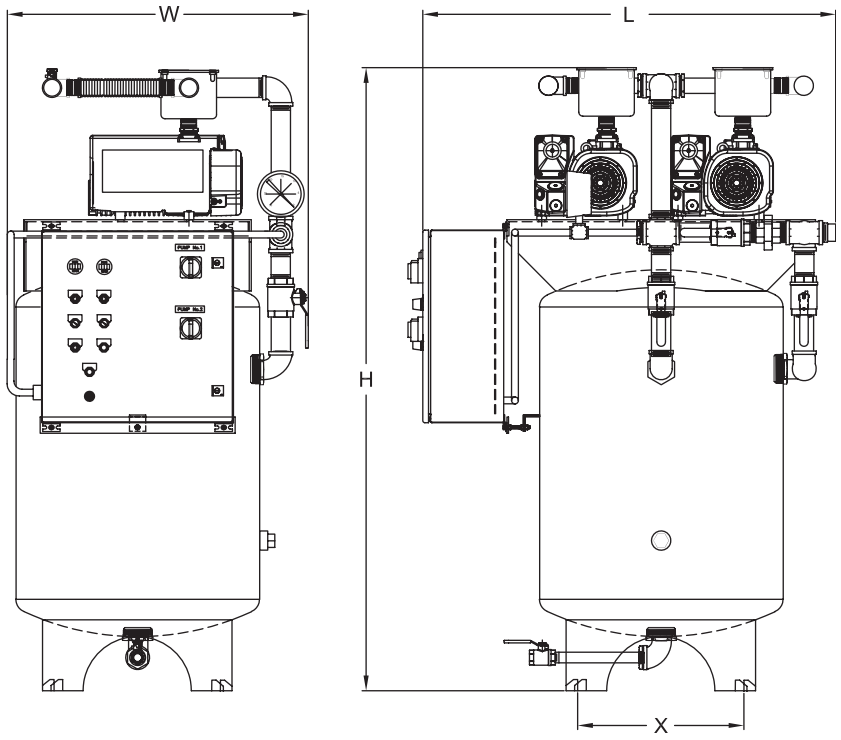
Other System Features

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



Model	Vacuum tank (gal)	Length (L)	Height (H)	Width (W)	Base (X)
VTMD-25-M	80	42 (1067)	72 (1829)	32 (813)	14.8 (376)
VTMD-40-M	80	42 (1067)	72 (1829)	32 (813)	14.8 (376)(
VTMD-65-M	120	52 (1321)	76 (1930)	34 (864)	19.0 (483)
VTMD-100-M	120	52 (1321)	76 (1930)	35 (889)	19.0 (483)

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"			
Vacuum outlet [1]	NPT	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

[1] System consists of two outlet flanges

Dry Compressing Vacuum Pump System RUTA with SCREWLINE Backing Pump, Adaptor Version, without palette



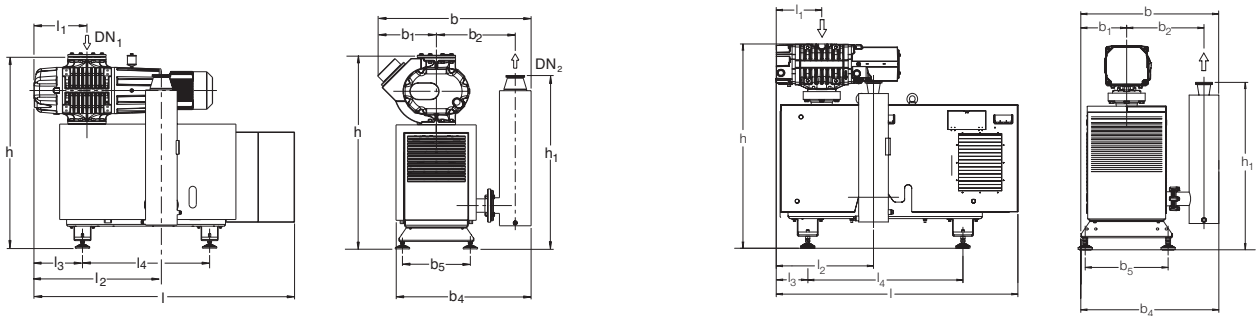
RUTA WAU2001/SP630/A

Standard Equipment

- RUVAC WAU with air cooling
- RUVAC WH with water cooling
- Silencer
- SP-GUARD
- Manually operated gas ballast
- Gear oil collecting pan integrated within the screw pump
- Gear oil supplied with the pump
- Screw pump SCREWLINE SP 630 F with water cooling
- Screw pump SCREWLINE SP 250 with air cooling
- RUVAC WH including external frequency converter (frequency converter permits pumping speed control)
- CE approval

Options

- Frequency converter for controlling the speed of the Roots pump (only RUVAC WA/WS)
- Condensate drain valve at the silencer
- Sound proofing box
- Vibration absorbers
- Castors
- Different types of floor mounts
- Oil drain valve on each pump
- Electric control systems
- Non-return valve
- Screw pump SCREWLINE SP 630 with air cooling



Type	RUTA	501/SP250/A	1001/SP250/A	2001/SP630F/A	700/SP250/A
RUVAC WA/WAU/WS/WSU	P2	501	1001	2001	–
RUVAC WH	P2	–	–	–	700
Backing pump SCREWLINE	P1	SP 250	SP 250	SP 630 F	SP 250
	DN_1	63 ISO-K	100 ISO-K	160 ISO-K	100 ISO-K
	DN_2	63 ISO-K	63 ISO-K	100 ISO-K	63 ISO-K
	l	1350 (53.15)	1409 (55.47)	1804 (71.02)	1350 (53.15)
	l_1	239 (9.41)	298 (11.73)	367 (14.45)	258 (10.16)
	l_2	533 (20.98)	592 (23.31)	882 (34.72)	552 (21.73)
	l_3	160 (6.30)	219 (8.62)	336 (13.23)	179 (7.05)
	l_4	880 (34.65)	880 (34.65)	880 (34.65)	880 (34.65)
	b	761 (29.96)	828 (32.60)	1059 (41.69)	648 (25.51)
	b_1	260 (10.24)	306 (12.05)	403 (15.87)	260 (10.24)
	b_2	438 (17.24)	438 (17.24)	546 (21.50)	438 (17.24)
	b_4	783 (30.83)	783 (30.83)	783 (30.83)	783 (30.83)
	b_5	470 (18.50)	470 (18.50)	470 (18.50)	470 (18.50)
	h	1213 (47.76)	1239 (48.78)	1342 (52.84)	1158 (45.59)
	h_1	954 (37.56)	954 (37.56)	1221 (48.07)	949 (37.36)

Dimensional drawing of the pump systems with dry compressing SCREWLINE SP backing pump, adaptor version, without palette.
Left with WAU pumps, right with WH pump. Dimensions in brackets ( ) are in inch

Technical Data, 50 Hz

RUTA

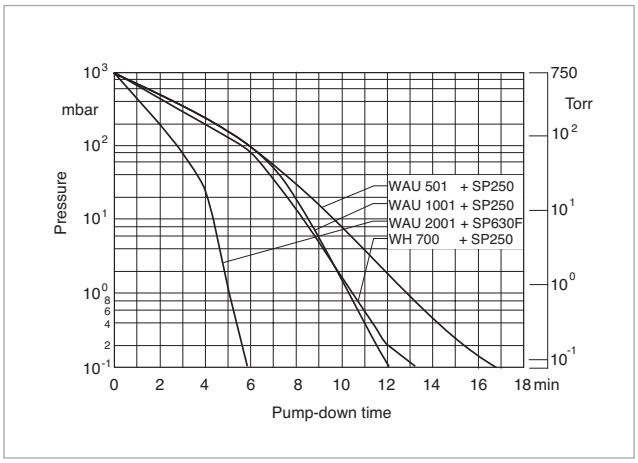
		WAU 501/SP250/A	WAU 1001/SP250/A	WAU 2001/SP630(F)/A	WH 700/SP250/A
RUVAC (WA/WAU/WS/WSU possible)	P2	501	1001	2001	–
RUVAC WH	P2	–	–	–	700
Backing pump SCREWLINE	P1	SP 250	SP 250	SP 630 (F)	SP 250
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	445.0 (262.1)	830.0 (488.9)	1745.0 (1027.8)	635 (374)
Ultimate total pressure without gas ballast	mbar (Torr)	< 1×10^{-3} (< 7.5×10^{-4})			
Installed motor power 400 V, 50 Hz	kW (hp)	9.7 (13.0)	11.5 (15.6)	22.5 (30.6)	9.7 (13.0)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	6.3 (8.6)	6.7 (9.1)	12.0 (16.3)	6.6 (8.9)
Noise level with silencer at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	75	77	79	75
Total weight with palette, approx.	kg (lbs)	720 (1187)	850 (1876)	1100 (2428)	720 (1587)
Connecting flange					
Inlet port	DN_1	63 ISO-K	100 ISO-K	160 ISO-K	100 ISO-K
Outlet port	DN_2	63 ISO-K	63 ISO-K	100 ISO-K	63 ISO-K

Ordering Information

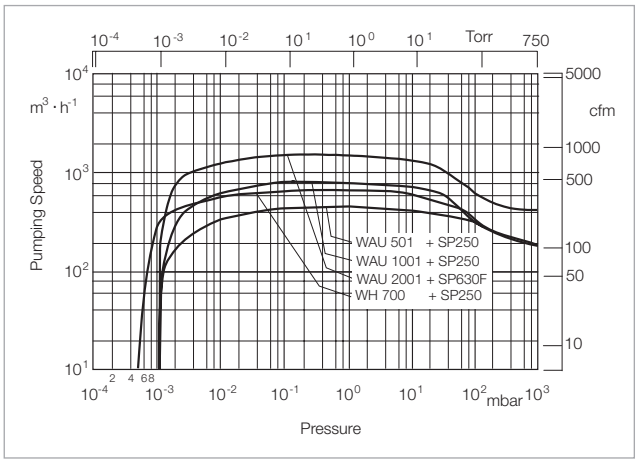
RUTA

		WAU 501/SP250/A	WAU 1001/SP250/A	WAU 2001/SP630(F)/A	WH 700/SP250/A
		Part No.	**Part No.**	**Part No.**	**Part No.**
RUVAC (WA/WAU/WS/WSU possible)	P2	WAU 501	WAU 1001	WAU 2001	–
RUVAC WH	P2	–	–	–	WH 700
Backing pump	P1	SP 250	SP 250	SP 630 (F)	SP 250
Pump system, complete (adaptor version), without pallet with water-cooled SCREWLINE		**502 465 V001**	**502 467 V001**	**502 471 V001**	**503153V001** [1]
Frequency converter RUVATRONIC (see description in Chapter “Accessories”)		RT 5/501 **500 001 382**	RT 5/1001 **500 001 383**	RT 5/2001 **500 001 384**	– **–**

[1] Including external frequency converter



Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Dry Compressing Vacuum Pump System RUTA with SCREWLINE Backing Pump, Adaptor Version, with palette



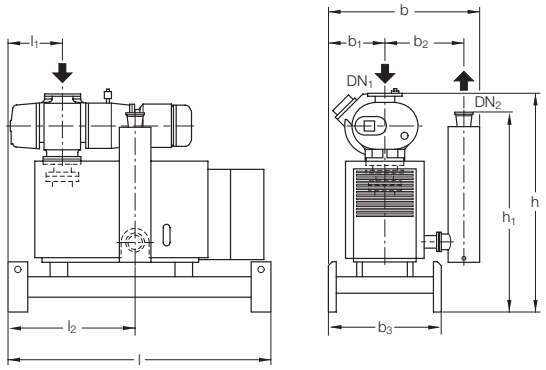
RUTA WAU2001/SP630/A

Standard Equipment

- RUVAC WAU with air cooling
- Silencer
- SP-GUARD
- Manually operated gas ballast
- Gear oil collecting pan integrated within the screw pump
- Gear oil supplied with the pump
- Screw pump SCREWLINE SP 630 F with water cooling
- Screw pump SCREWLINE SP 250 with air cooling
- CE approval

Options

- Condensate drain valve at the silencer
- Sound proofing box
- Vibration absorbers
- Castors
- Different types of floor mounts
- Oil drain valve on each pump
- Electric control systems
- Non-return valve
- Screw pump SCREWLINE SP 630 with air cooling



Type		with palette		
	RUTA	501/SP250/A	1001/SP250/A	2001/SP630F/A
RUVAC WA/WAU/WS/WSU	P2	501	1001	2001
Backing pump SCREWLINE	P1	SP 250	SP 250	SP 630 F
	DN_1	63 ISO-K	100 ISO-K	160 ISO-K
	DN_2	63 ISO-K	63 ISO-K	100 ISO-K
	l	1448 (57.01)	1488 (58.58)	1850 (72.84)
	l_1	287 (11.30)	327 (12.87)	379 (14.92)
	l_2	581 (22.87)	621 (24.45)	894 (35.20)
	b	923 (36.34)	923 (36.34)	1056 (41.58)
	b_1	400 (15.75)	400 (15.75)	400 (15.75)
	b_2	438 (17.24)	438 (17.24)	546 (21.50)
	b_3	800 (31.50)	800 (31.50)	800 (31.50)
	h	1377 (54.21)	1403 (55.24)	1509 (59.41)
	h^1	1121 (44.13)	1121 (44.13)	1388 (54.65)

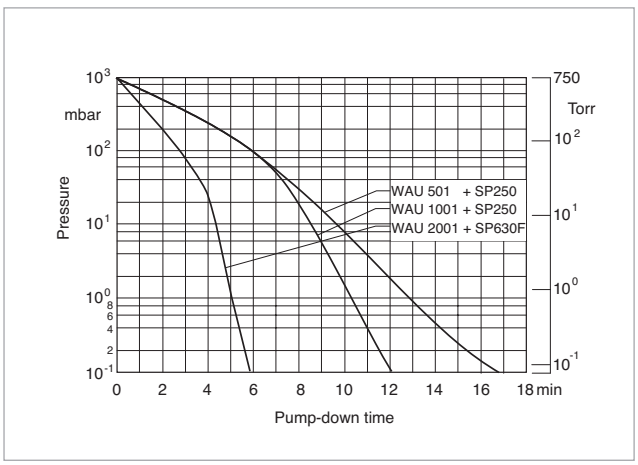
Dimensional drawing of the pump systems with dry compressing SCREWLINE SP backing pump, adaptor version; left and middle with palette, right on castors
Dimensions in brackets ( ) are in inch

Technical Data, 50 Hz

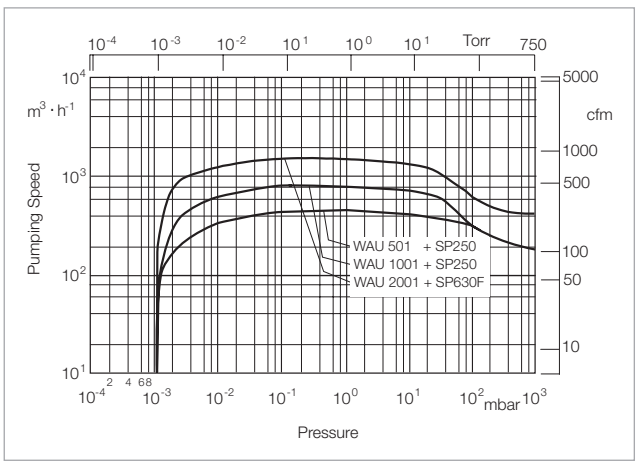
		RUTA WAU		
		501/SP250/A	1001/SP250/A	2001/SP630(F)/A
RUVAC (WA/WAU/WS/WSU possible)	P2	501	1001	2001
Backing pump SCREWLINE	P1	SP 250	SP 250	SP 630 (F)
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	445.0 (262.1)	830.0 (488.9)	1745.0 (1027.8)
Ultimate total pressure without gas ballast	mbar (Torr)	< 1×10^{-3} (< 7.5×10^{-4})		
Installed motor power 400 V, 50 Hz	kW (hp)	9.7 (13.2)	11.5 (15.6)	22.5 (30.6)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	6.3 (8.6)	6.7 (9.1)	12.0 (16.3)
Noise level with silencer at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	75	77	79
Total weight with palette, approx.	kg (lbs)	720.0 (1589.4)	850.0 (1876.4)	1100.0 (2428.3)
Connecting flange				
Inlet port	DN_1	63 ISO-K	100 ISO-K	160 ISO-K
Outlet port	DN_2	63 ISO-K	63 ISO-K	100 ISO-K

Ordering Information

		RUTA WAU		
		501/SP250/A	1001/SP250/A	2001/SP630(F)/A
		Part No.	Part No.	Part No.
RUVAC (WA/WAU/WS/WSU possible)	P2	WAU 501	WAU 1001	WAU 2001
Backing pump	P1	SP 250	SP 250	SP 630 (F)
Pump system, complete (adaptor version), pallet mounted,				
with water-cooled SCREWLINE		–	–	**502 472 V002**
with air-cooled SCREWLINE		**502 466 V001**	**502 468 V001**	**502 472 V003**
Frequency converter RUVATRONIC (see description in Chapter “Accessories”)		RT 5/501 **500 001 382**	RT 5/1001 **500 001 383**	RT 5/2001 **500 001 384**



Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Dry Compressing Vacuum Pump System RUTA with SCREWLINE Backing Pump, Adaptor Version, with palette



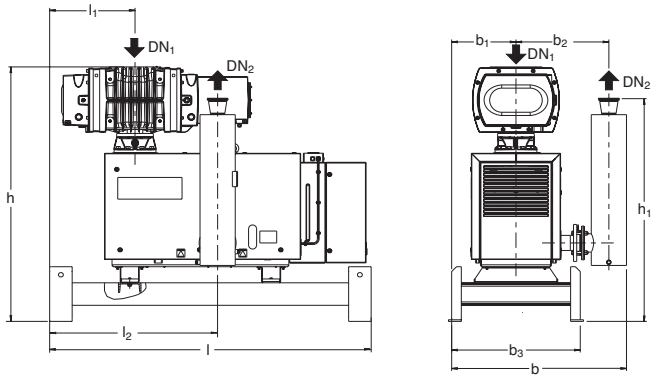
RUTA WH4400/SP630/A

Standard Equipment

- RUVAC WH with water cooling
- Silencer
- SP-GUARD
- Manually operated gas ballast
- Gear oil collecting pan integrated within the screw pump
- Gear oil supplied with the pump
- Screw pump SCREWLINE SP 630 F with water cooling
- RUVAC WH including external frequency converter (frequency converter permits pumping speed control)
- CE approval

Options

- Condensate drain valve at the silencer
- Sound proofing box
- Vibration absorbers
- Different types of floor mounts
- Oil drain valve on each pump
- Electric control systems
- Non-return valve
- Screw pump SCREWLINE SP 630 with air cooling



Type		with palette
	RUTA	4400/SP630F/A
RUVAC WH	P2	4400
Backing pump SCREWLINE	P1	SP 630 F
	DN_1	250 ISO-K
	DN_2	100 ISO-K
	l	2000 (78.74)
	l_1	531 (20.91)
	l_2	1045 (41.14)
	b	1088 (42.84)
	b_1	400 (15.75)
	b_2	578 (22.76)
	b_3	800 (31.50)
	h	1583 (62.32)
	h_1	1388 (54.65)

Dimensional drawing of the pump systems with dry compressing SCREWLINE SP backing pump, adaptor version; with palette. Dimensions in brackets ( ) are in inch

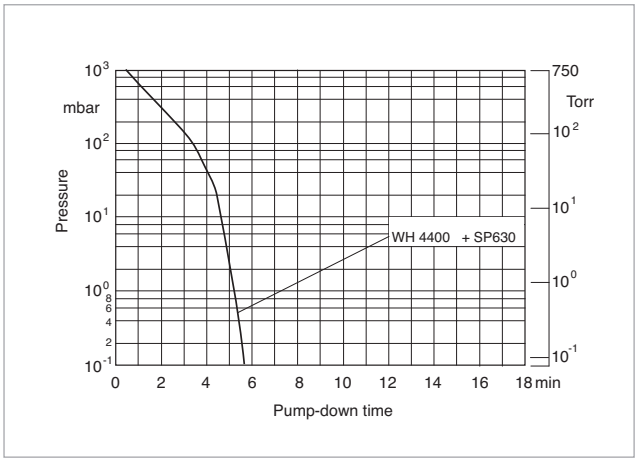
Technical Data, 50 Hz

		RUTA WH 4400/SP630F/A
RUVAC WH	P2	4400
Backing pump SCREWLINE	P1	SP 630 F
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	3380 (1990)
Ultimate total pressure without gas ballast	mbar (Torr)	$< 1 \times 10^{-3}$ ($< 7.5 \times 10^{-4}$)
Installed motor power 400 V, 50 Hz	kW (hp)	26.0 (34.9)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	12.93 (17.34)
Noise level with silencer at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	73
Total weight		
with palette, approx.	kg (lbs)	1350 (2932)
on castors, approx.	kg (lbs)	1980 (4365)
Connecting flange		
Inlet port	DN_1	250 ISO-K
Outlet port	DN_2	100 ISO-K

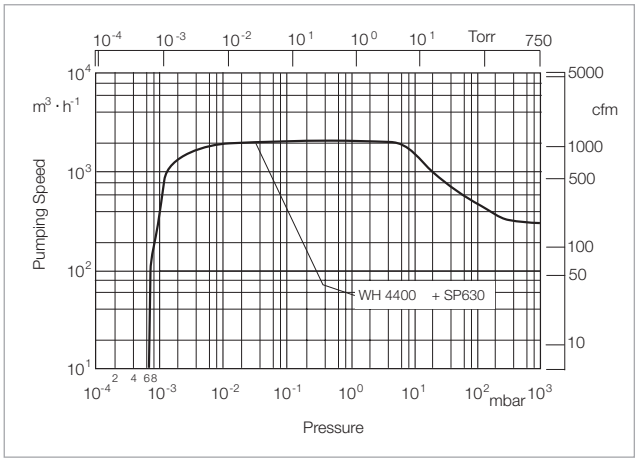
Ordering Information

		RUTA WH 4400/SP630F/A
		Part No.
RUVAC (WA/WAU/WS/WSU possible)	P2	4400
Backing pump	P1	SP 630 F
Pump system, complete (adaptor version), with water-cooled SCREWLINE pallet mounted		**503 162 V001** [1]

[1] Including external frequency converter

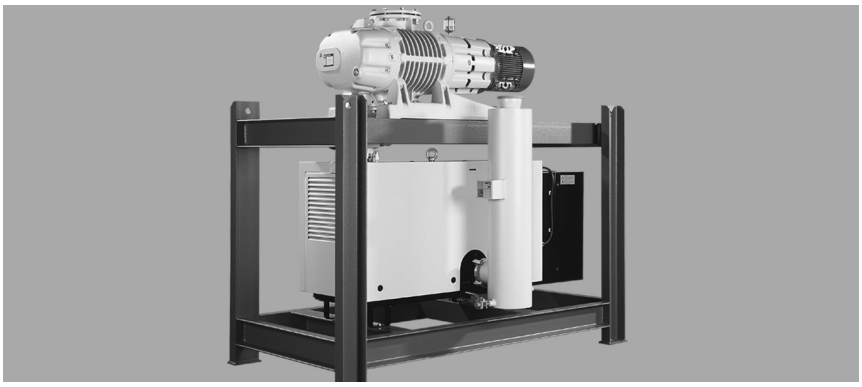


Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Dry Compressing Vacuum Pump System RUTA with SCREWLINE SP 250 Backing Pump, Frame Version



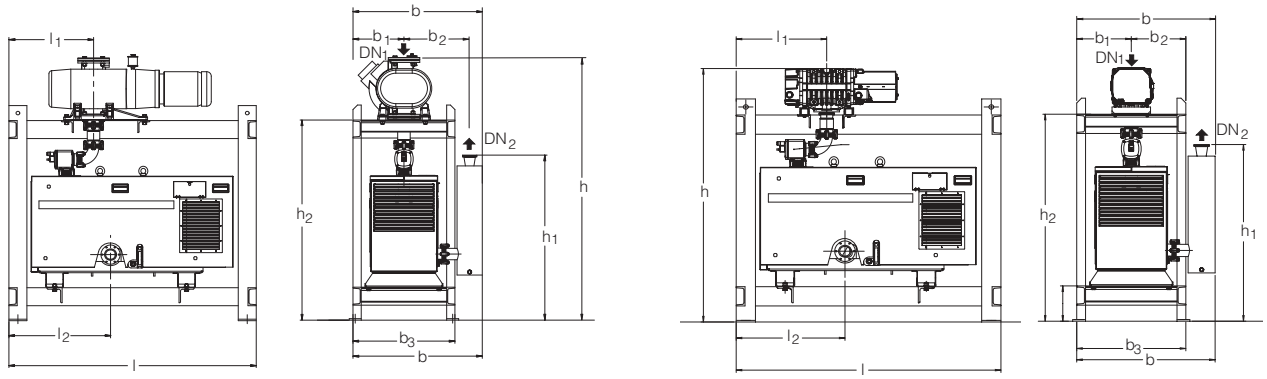
RUTA WAU2001/SP630/G

Standard Equipment

- RUVAC WH with water cooling
- RUVAC WAU with air cooling
- SCREWLINE SP 250 with air cooling
- Silencer
- SP-GUARD
- Manually operated gas ballast
- SECUVAC valve 24 V DC
- Gear oil collecting pan integrated within the screw pump
- Crane eyes on the frame
- Floor mounting
- Gear oil supplied with the pump
- Screw pump with air cooling
- RUVAC WH including external frequency converter (frequency converter permits pumping speed control)
- CE approval

Options

- Condensate drain valve at the silencer
- Sound proofing box
- Vibration absorbers
- Castors
- Different types of floor mounts
- Oil drain valve on each pump
- Electric control systems
- Non-return valve



Type	RUTA	501/SP250/G	1001/SP250/G	2001/SP250/G	700/SP250/G	2500/SP250/G
RUVAC WA/WAU/WS/WSU	P2	501	1001	2001	–	–
RUVAC WH	P2	–	–	–	700	2500
Backing pump SCREWLINE	P1	SP 250	SP 250	SP 250	SP 250	SP 250
	DN_1	63 ISO-K	100 ISO-K	160 ISO-K	100 ISO-K	250 ISO-K
	DN_2	63 ISO-K	63 ISO-K	63 ISO-K	63 ISO-K	63 ISO-K
	l	1650 (64.96)	1650 (64.96)	1650 (64.96)	1650 (64.96)	1650 (64.96)
	l_1	565 (22.24)	565 (22.24)	565 (22.24)	564 (22.21)	664 (26.14)
	l_2	678 (26.69)	678 (26.69)	678 (26.69)	678 (26.69)	678 (26.69)
	b	863 (33.98)	863 (33.98)	863 (33.98)	863 (33.98)	863 (33.98)
	b_1	340 (13.39)	340 (13.39)	340 (13.39)	340 (13.39)	340 (13.39)
	b_2	438 (17.24)	438 (17.24)	438 (17.24)	438 (17.24)	438 (17.24)
	b_3	680 (26.77)	680 (26.77)	680 (26.77)	680 (26.77)	680 (26.77)
	h	1670 (65.75)	1771 (69.72)	1947 (76.65)	1580 (62.21)	1739 (68.47)
	h_1	1101 (43.35)	1101 (43.35)	1101 (43.35)	1101 (43.35)	1081 (42.56)
	h_2	1330 (52.36)	1375 (54.13)	1417 (55.79)	1290 (5079)	1315 (51.77)

Dimensional drawing of the pump systems with dry compressing SCREWLINE SP 250 backing pump, frame version; dimensions in brackets ( ) are in inch

Technical Data, 50 Hz

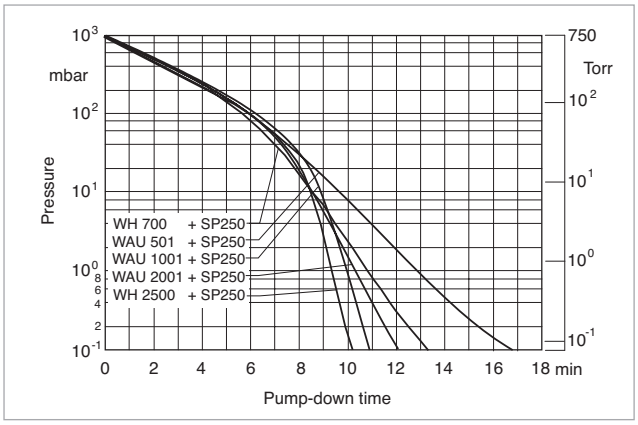
		RUTA				
		WAU 501/ SP250/G	WAU 1001/ SP250/G	WAU 2001/ SP250/G	WH 700/ SP250/G	WH 2500/ SP250/G
RUVAC (WA/WAU/WS/WSU possible)	P2	501	1001	2001	–	–
RUVAC WH	P2	–	–	–	700	2500
Backing pump SCREWLINE	P1	SP 250				
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	445 (262)	830.0 (489)	1530 (901)	635 (374)	1680 (988)
Ultimate total pressure without gas ballast	mbar (Torr)	$< 1 \times 10^{-3}$ ($< 0.75 \times 10^{-3}$)	$< 1 \times 10^{-3}$ ($< 0.75 \times 10^{-3}$)	$< 1 \times 10^{-3}$ ($< 0.75 \times 10^{-3}$)	$< 1 \times 10^{-3}$ ($< 0.75 \times 10^{-3}$)	$< 3 \times 10^{-3}$ ($< 2.2 \times 10^{-3}$)
Installed motor power 400 V, 50 Hz	kW (hp)	9.7 (13.2)	11.5 (15.6)	15.0 (20.4)	9.7 (13.2)	13.5 (18.1)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	6.3 (8.6)	6.7 (9.1)	7.6 (10.3)	6.6 (8.9)	7.3 (9.8)
Noise level with silencer at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	74	77	80	75	70
Weight, total, approx.	kg (lbs)	860 (1896)	950 (2097)	1140 (2517)	860 (1896)	1000 (2205)
Connecting flange						
Inlet port	DN_1	63 ISO-K	100 ISO-K	160 ISO-K	100 ISO-K	250 ISO-K
Outlet port	DN_2	63 ISO-K	63 ISO-K	63 ISO-K	63 ISO-K	63 ISO-K

Ordering Information

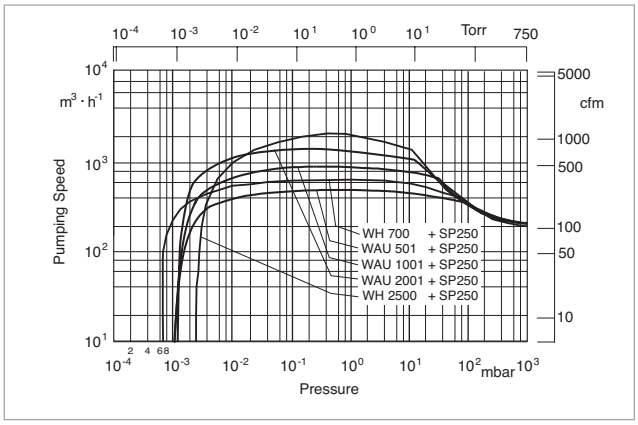
		RUTA				
		WAU 501/ SP250/G	WAU 1001/ SP250/G	WAU 2001/ SP250/G	WH 700/ SP250/G	WH 2500/ SP250/G
		Part No.	**Part No.**	**Part No.**	**Part No.**	**Part No.**
RUVAC (WA/WAU/WS/WSU possible)		WAU 501	WAU 1001	WAU 2001	–	–
RUVAC WH	P2	–	–	–	700	2500
Backing pump SCREWLINE	P1	SP 250				
Pump system, complete (adaptor version), frame mounted, with Roots vacuum pump						
RUVAC WAU		**502 531 V001**	**502 532 V001**	**502 533 V001**	–	–
RUVAC WH		–	–	–	**503 154 V001** [1]	**503 158 V001** [1] [2]
Frequency converter RUVATRONIC (see description in Chapter "Accessories")		RT 5/501 **500 001 382**	RT 5/1001 **500 001 383** [2]	RT 5/2001 **500 001 384** [2]	– –	– –

[1] Including external frequency converter

[2] With this combination, continuous operation of the Roots pump is not possible at atmospheric pressure

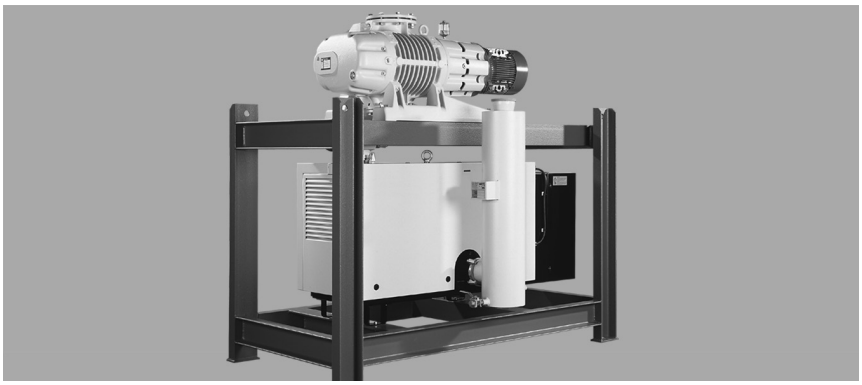


Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Dry Compressing Vacuum Pump System RUTA with SCREWLINE SP 630 F Backing Pump, Frame Version



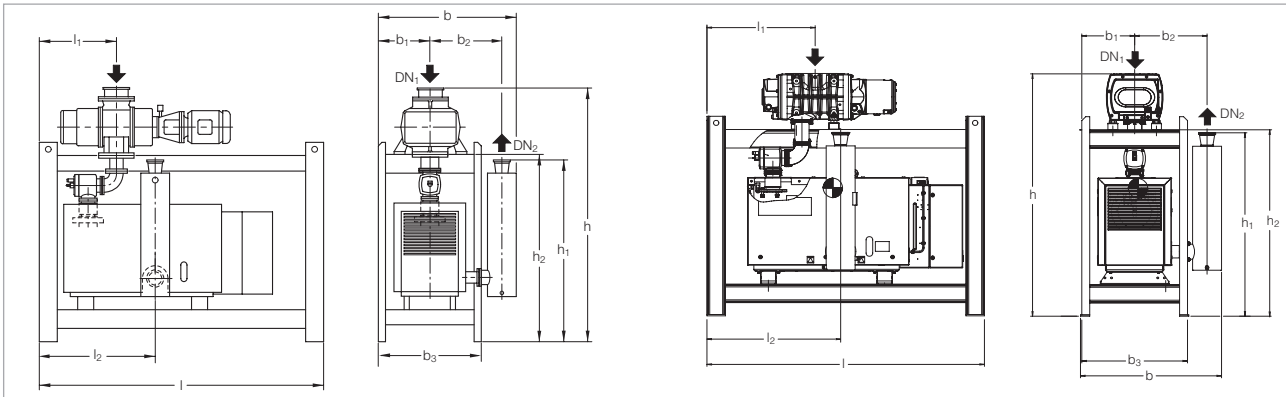
RUTA WAU2001/SP630F/G

Standard Equipment

- RUVAC WH with water cooling
- RUVAC WAU with air cooling
- SCREWLINE SP 630 F with water cooling
- Silencer
- SP-GUARD
- Manually operated gas ballast
- SECUVAC valve 24 V DC
- Gear oil collecting pan integrated within the screw pump
- Crane eyes on the frame
- Floor mounting
- Gear oil supplied with the pump
- RUVAC WH including external frequency converter (frequency converter permits pumping speed control)
- CE approval
- Condensate drain valve at the silencer
- Sound proofing box
- Vibration absorbers
- Different types of floor mounts
- Oil drain valve on each pump
- Electric control systems
- Non-return valve
- Screw pump with air cooling

Options

- Frequency converter for controlling the speed of the Roots pump (only RUVAC RA/WA/WS)



Type	RUTA	2001/SP630F/G	2500/SP630F/G	4400/SP630F/G	7000/SP630F/G
RUVAC WA/WAU/WS/WSU	P2	2001	–	–	–
RUVAC WH	P2	–	2500	4400	7000
Backing pump SCREWLINE	P1	SP 630 F	SP 630 F	SP 630 F	SP 630 F
	DN_1	160 ISO-K	250 ISO-K	250 ISO-K	320 ISO-K
	DN_2	100 ISO-K	63 ISO-K	100 ISO-K	100 ISO-K
	l	1960 (77.17)	2100 (82.68)	2100 (82.68)	2100 (82.68)
	l_1	600 (23.62)	819 (32.24)	719 (28.31)	719 (28.31)
	l_2	895 (35.24)	1012 (39.84)	1012 (39.84)	1012 (39.84)
	b	1056 (41.58)	1068 (42.05)	1068 (42.05)	1068 (42.05)
	b_1	400 (15.75)	400 (15.75)	400 (15.75)	400 (15.75)
	b_2	546 (21.50)	548 (21.58)	548 (21.58)	548 (21.58)
	b_3	800 (31.50)	800 (31.50)	800 (31.50)	800 (31.50)
	h	1784 (70.24)	1834 (72.21)	1915 (75.39)	1923 (75.71)
	h_1	1388 (54.65)	1388 (54.65)	1388 (54.65)	1388 (54.65)
	h_2	1254 (49.37)	1410 (55.51)	1410 (55.51)	1410 (55.51)

Dimensional drawing of the pump systems RUTA with dry compressing SCREWLINE SP 630 F backing pump, frame version; dimensions in brackets ( ) are in inch

Technical Data, 50 Hz

RUTA

		WAU 2001/SP630F/G	WH 2500/SP630F/G	WH 4400/SP630F/G	WH 7000/SP630F/G
RUVAC (WA/WAU/WS/WSU possible)	P2	2001	–	–	–
RUVAC WH	P2	–	2500	4400	7000
Backing pump SCREWLINE	P1	SP 630 F			
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	1745 (1028)	1956 (1151)	3380 (1990)	5093 (2998)
Ultimate total pressure without gas ballast	mbar (Torr)	$< 1 \times 10^{-3}$ ($< 0.75 \times 10^{-3}$)	$< 5 \times 10^{-3}$ ($< 3.7 \times 10^{-3}$)	$< 1 \times 10^{-3}$ ($< 0.75 \times 10^{-3}$)	$< 1 \times 10^{-3}$ ($< 0.75 \times 10^{-3}$)
Installed motor power 400 V, 50 Hz	kW (hp)	22.5 (30.0)	21.5 (28.8)	26.0 (34.9)	26.0 (34.9)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	12.0 (16.3)	11.7 (16.7)	12.93 (17.34)	13.11 (17.58)
Noise level with silencer at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	79	73	73	73
Weight, total, approx.	kg (lbs)	1300 (2866)	1300 (2866)	1550 (3417)	1600 (3527)
Connecting flange					
Inlet port	DN_1	160 ISO-K	250 ISO-K	250 ISO-K	320 ISO-K
Outlet port	DN_2	100 ISO-K	63 ISO-K	100 ISO-K	100 ISO-K

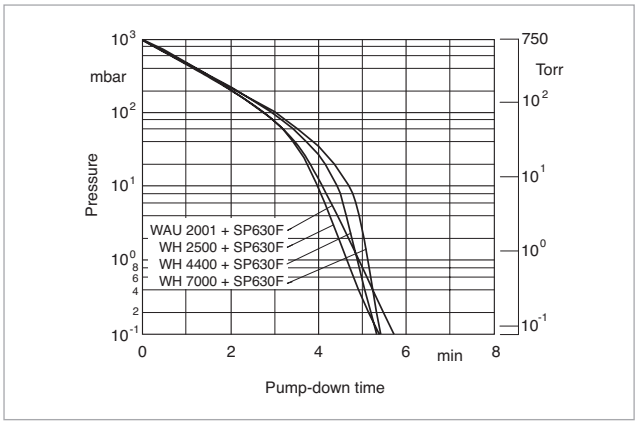
Ordering Information

RUTA

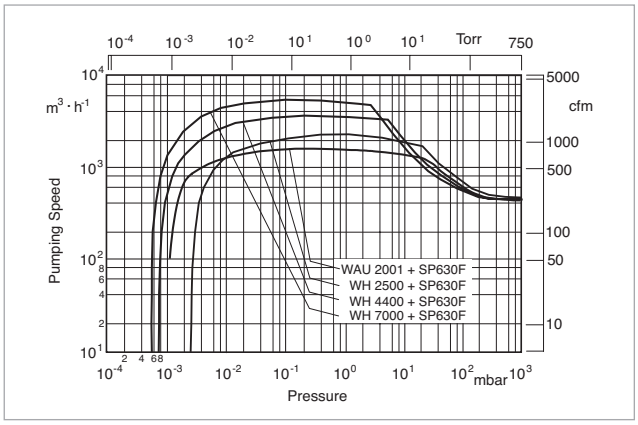
		WAU 2001/SP630F/G	WH 2500/SP630F/G	WH 4400/SP630F/G	WH 7000/SP630F/G
		Part No.	**Part No.**	**Part No.**	**Part No.**
RUVAC (WA/WAU/WS/WSU possible)		WAU 2001	–	–	–
RUVAC WH	P2	–	2500	4400	7000
Backing pump SCREWLINE	P1	SP 630 F			
Pump system, complete (adaptor version), frame mounted,					
with Roots vacuum pump RUVAC WAU		**502 511 V001**	–	–	–
with Roots vacuum pump RUVAC WH		–	**503 159 V001** [1), 2)]	**503 163 V001** [1), 2)]	**503 168 V001** [1), 2)]
Frequency converter RUVATRONIC (see description in Chapter "Accessories")		RT 5/2001 **500 001 384**	– –	– –	– –

[1)] Including external frequency converter

[2)] With this combination, continuous operation of the Roots pump is not possible at atmospheric pressure

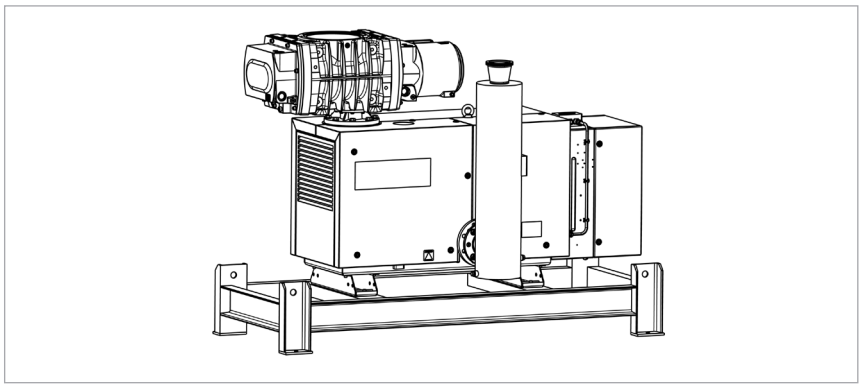


Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Dry Compressing Vacuum Pump System RUTA with SCREWLINE SP 630 F Backing Pump, Adaptor Version



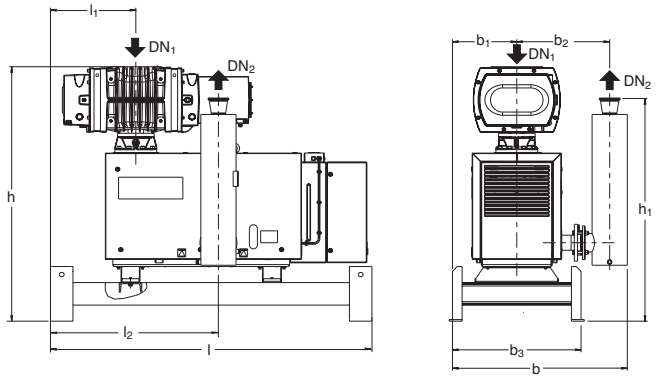
RUTA WH2500/SP630F/A

Standard Equipment

- RUVAC WH with water cooling
- SCREWLINE SP 630 F with water cooling
- Silencer
- SP-GUARD
- Manually operated gas ballast
- SECUVAC valve 24 V DC
- Gear oil collecting pan integrated within the screw pump
- Crane eyes on the frame
- Floor mounting
- Gear oil supplied with the pump
- RUVAC WH including external frequency converter (frequency converter permits pumping speed control)

Options

- Condensate drain valve at the silencer
- Sound proofing box
- Vibration absorbers
- Different types of floor mounts
- Oil drain valve on each pump
- Electric control systems
- Non-return valve
- Screw pump with air cooling



Type	RUTA	2001/SP630F/A
RUVAC WH	P2	2500
Backing pump SCREWLINE	P1	SP 630 F
	DN_1	250 ISO-K
	DN_2	100 ISO-K
	l	431 (16.97)
	l_1	1045 (41.14)
	l_2	2000 (78.74)
	b	1088 (42.84)
	b_1	400 (15.75)
	b_2	578 (22.76)
	b_3	800 (31.50)
	h	1473 (57.99)
	h_1	1388 (54.65)

Dimensional drawing of the pump system with dry compressing SCREWLINE SP 630 F backing pump, adaptor version; dimensions in brackets ( ) are in inch

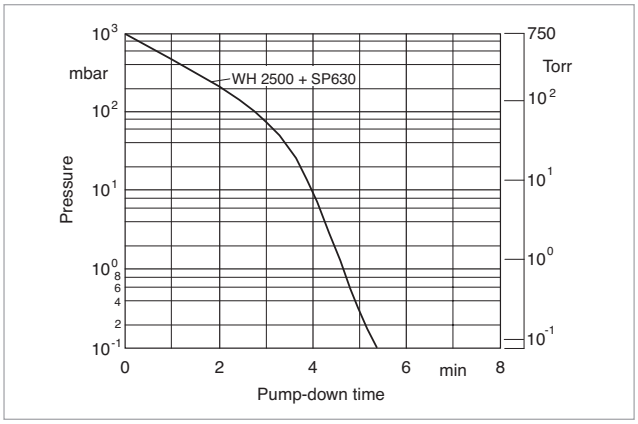
Technical Data, 50 Hz

		RUTA WH 2500/SP630F/A
RUVAC WH	P2	2500
Backing pump SCREWLINE	P1	SP 630 F
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	1956 (1151)
Ultimate total pressure without gas ballast	mbar (Torr)	$< 5 \times 10^{-3}$ ($< 3.7 \times 10^{-3}$)
Installed motor power 400 V, 50 Hz	kW (hp)	21.5 (28.8)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	11.7 (16.7)
Noise level with silencer at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	73
Weight, total, approx.	kg (lbs)	1200 (2645)
Connecting flange Inlet port Outlet port	 DN_1 DN_2	 250 ISO-K 100 ISO-K

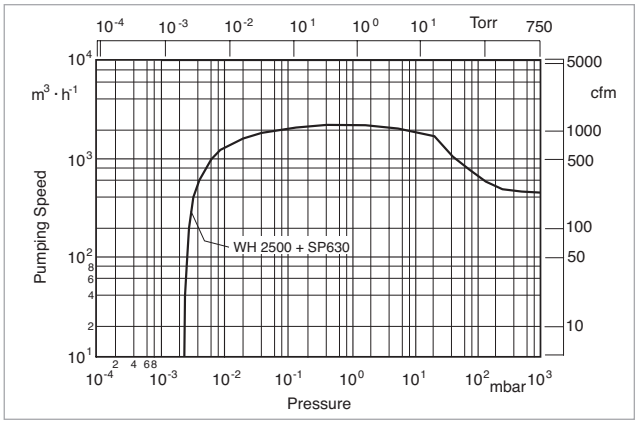
Ordering Information

		RUTA WH 2500/SP630F/A
		Part No.
RUVAC WH	P2	2500
Backing pump SCREWLINE	P1	SP 630 F
Pump system, complete (adaptor version), pallet mounted, with Roots vacuum pump RUVAC WH		**503 160 V001** [1]

[1] Including external frequency converter



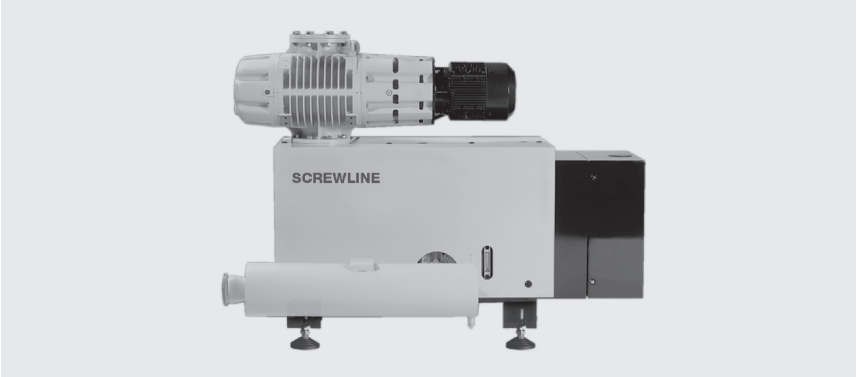
Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Pump Systems (Only available for purchase in North and South America)

SP Close-Coupled Systems with SP Dry Compressing Backing Pumps



SP close-coupled system

Advantages to the User

- Reduced maintenance and lower operating costs
- Compact close-coupled design without frame
- Oil-free compression in multiple pump stages
- Optimum leak tightness with WSU boosters
- Air-cooled
- Assembled and tested

Standard Equipment

- SCREWLINE SP 630 / WSU 1001 close-coupled pump system offering 645 ACFM at 0.3 Torr vacuum
- SCREWLINE SP 630 / WSU2001 close-coupled pump system offering 1235 ACFM at 0.3 Torr vacuum

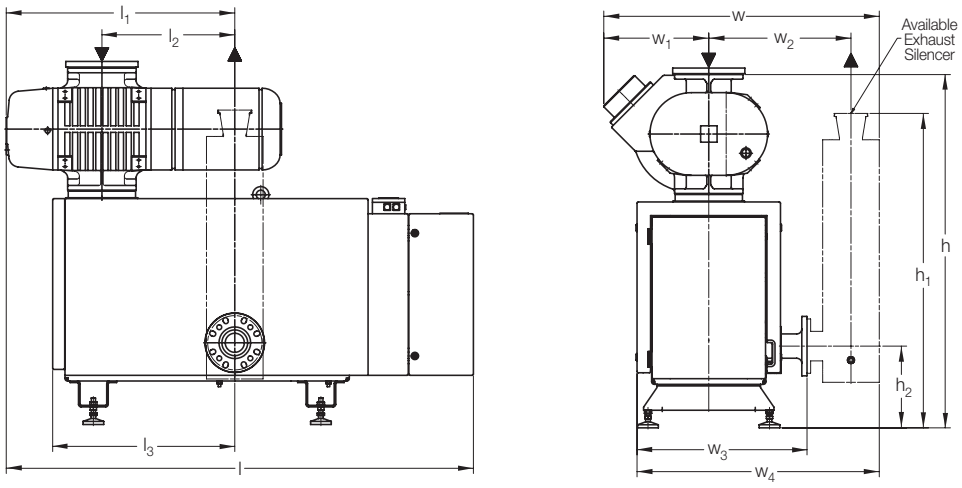
Options

- Electrical controls
- Exhaust silencer (loose)
- Inlet filter (loose)

The screw pump SCREWLINE SP 630 dry compressing screw-type vacuum pump is an environmentally friendly alternative to traditional oil sealed rotary piston and vane vacuum pumps. This innovative and robust vacuum pump produces a pumping speed of 371 cfm and better than 0.0075 Torr vacuum. SP 630 major advantages include improved environment, reduced maintenance, lower operating costs through less disposal and the elimination of expensive water cooling all with no oil contamination as the need for lubricating oil in the pumps' compression stage has been eliminated.

When used in conjunction with the Leybold WSU booster pumps, pumping speeds can be significantly increased while achieving oil-free compression in multi-ple vacuum pump stages.

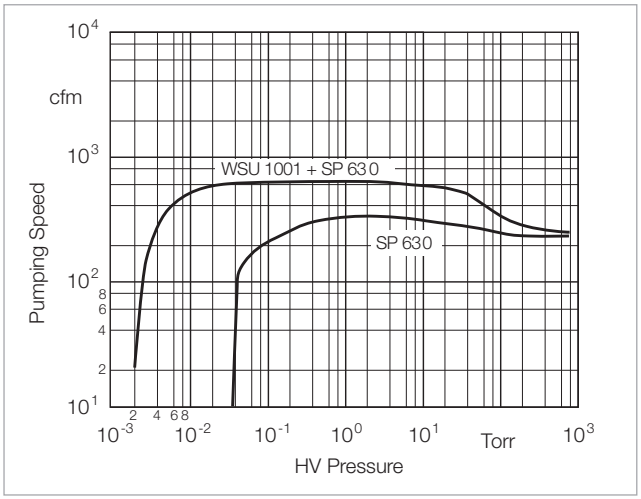
Leybold WSU boosters offer a canned motor design, which eliminates the need for shaft seals and flanged-on motors. A vacuum tight can separates the motor rotor and stator coils. This unique Leybold design provides the advantage of a more leak tight vacuum system. The WSU version booster incorporates a by-pass valve feature, which allows for automatic adjustment to varying pressure differentials between the inlet and outlet of the pump. The result is elimination of costly pressure switches/ amplifiers and faster pump down while starting at atmospheric pressure with the aforementioned SP 630 vacuum pump.



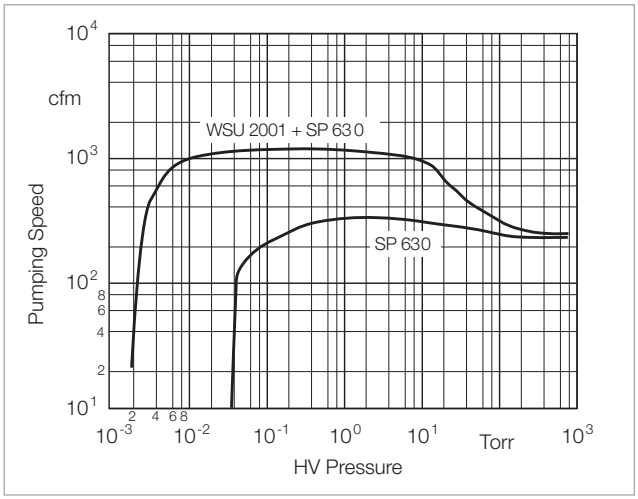
Roots Pump	Vane Pump	h	h_1	h_2	l	l_1	l_2
WSU 1001	SP 630	50 1/4 (1276)	47 7/8 (1216)	12 7/16 (316)	68 1/2 (1740)	32 3/16 (818)	20 1/4 (514)
WSU 2001	SP 630	53 25/32 (1366)	47 7/8 (1216)	12 7/16 (316)	71 5/32 (1807)	34 13/16 (884)	20 1/4 (514)

Roots Pump	Vane Pump	l_3	w	w_1	w_2	w_3	w_4
WSU 1001	SP 630	27 3/4 (705)	37 31/32 (964)	12 (305)	21 21/32 (550)	25 7/8 (657)	36 29/32 (937)
WSU 1001	SP 630	27 3/4 (705)	41 31/32 (1066)	16 (406)	21 21/32 (550	25 7/8 (657)	36 29/32 (937)

Dimensional drawing for the SP close-coupled system with SCREWLINE SP 630 dry compressing backing pumps; dimensions in brackets ( ) are in mm



Pumping speed diagram for the SP close-coupled system
with WSU 1001 Roots blower and SCREWLINE SP 630 at 60 Hz



Pumping speed diagram for the SP close-coupled system
with WSU 2001 Roots blower and SCREWLINE SP 630 at 60 Hz

Technical Data, 50 Hz

		SP Close-Coupled Systems	
		1001/SP630	2001/SP630
RUVAC (WSU possible)	P2	1001	2001
Backing pump SCREWLINE	P1	SP 630 F	
Pumping speed 60 Hz at 0.3 Torr	m^3/h (cfm)	1.092 (643)	2.085 (1,227)
Ultimate total pressure without gas ballast	mbar (Torr)	< 1 x 10^{-3} (< 7.5 x 10^{-4})	
Installed motor power	kW (hp)	16.2 (21.6)	22.5 (30.0)
Noise level with silencer at 10^{-1} mbar (7.5 x 10^{-2} Torr)	dB(A)	78	79
Weight, total, approx.	kg (lbs)	870 (1922)	1100 (2430)
Connecting flange Inlet port Outlet port	 DN_1 DN_2	 160 ISO-K 100 ISO-K	

Ordering Information

		SP Close-Coupled Systems	
		1001/SP630	2001/SP630
		Part No.	
RUVAC (WSU possible)	P2	1001	2001
Backing pump SCREWLINE	P1	SP 630 F	
Pump system, complete (adaptor version), pallet mounted, with Roots vacuum pump RUVAC WAU		**180 038 V1600**	**180 038 V2600**

Notes

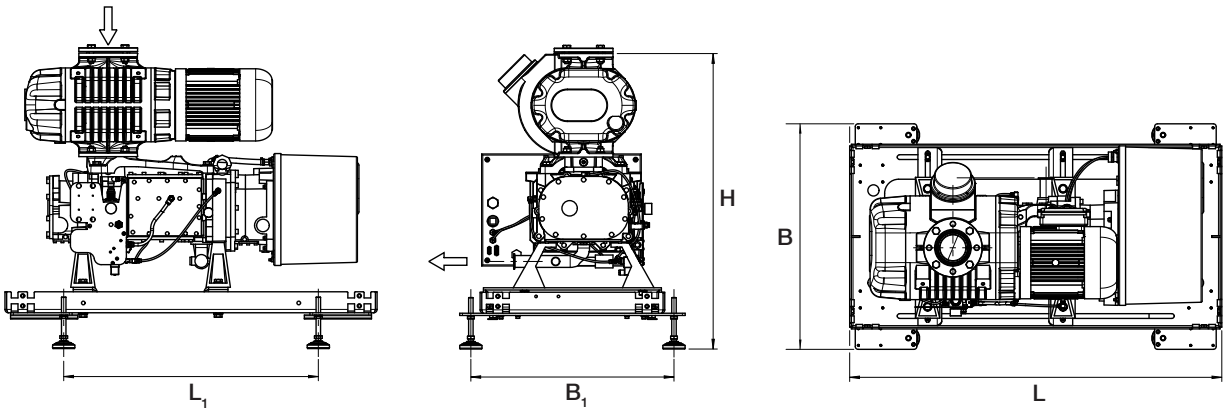
Dry Compressing Vacuum Pump System RUTA with DRYVAC DV 200/DV 300/DV 500 Backing Pump, Adaptor Version



RUTA WSU 501/DV300/A

Standard Equipment

- RUVAC WSU or RUVAC WH and DRYVAC
- DRYVAC DV 200, DV 300 or DV 500 with built-in frequency converter and indirect water cooling
- Hermetically sealed
- Integrated vacuum-side valve 24C DC for supplying purge gas to the shaft seal of the DV 200 / DV 300 / DV 500
- 24V DC controlled gas ballast
- Integrated bypass valve for fast pump down
- Integrated temperature sensors
- All DRYVAC models are compatible with numerous field bus protocols
- The integrated frequency converter together with three sensors monitors all electrical, thermal and mechanical components. The sensors determine the exhaust gas pressure, the engine temperature and the water outlet temperature and trigger an alarm if necessary
- All DRYVAC models offer serial I/O connections including an RS485 interface
- Profibus, Ethernet/IP, ProfiNet and EtherCAT are optionally available
- RUVAC with integrated bypass valve for fast pump down
- The pump system provides a very low noise level



		WSU501/ DV200/A	WH700/ DV200/A	WH700FC/ DV200/A	WSU1001/ DV200/A	WSU2001/ DV200/A	WSU501/ DV300/A	WH700/ DV300/A	WH700FC/ DV300/A	WSU1001/ DV300/A	WSU2001/ DV300/A	WH2500FC/ DV300/A
DRYVAC	P1	200	200	200	200	200	300	300	300	300	300	300
RUVAC	P2	501	700	700 FC	1001	2001	501	700	700 FC	1001	2001	2500
Inlet	DN 1	63 ISO-K	100 ISO-K	100 ISO-K	100 ISO-K	160 ISO-K	63 ISO-K	100 ISO-K	100 ISO-K	100 ISO-K	160 ISO-K	250 ISO-K
Outlet	DN 2	40 KF	40 KF	40 KF	40 KF	40 KF	40 KF	40 KF	40 KF	40 KF	40 KF	40 KF
	l	1330	1330	1330	1330	1330	1330	1330	1330	1330	1330	1330
	l_1	910	910	910	910	910	910	910	910	910	910	910
	b	806	806	806	806	806	806	806	806	806	806	806
	b_1	726	726	726	726	726	726	726	726	726	726	726
	h	1031	956	956	1056	1233	1031	956	956	1056	1233	956

Dimensional drawing of the pump system with dry compressing backing pump DRYVAC DV 200 (left) and DV 300 (right), adapter version (all dimensions in mm)

Technical Data

RUTA

Ordering Information		Part No.	WSU501/ DV200/A	WH700/ DV200/A	WH700FC/ DV200/A	WSU1001 DV200/A	WSU2001 DV200/A
			505058V001	505059V001	505059V002	505060V001	505061V001
Backing pump DRYVAC DV		P1	DV200	DV200	DV200	DV200	DV200
RUVAC		P2	WSU501	WH700	WH700FC	WSU1001	WSU2001
Pumping speed, 50 Hz		m^3/h	505	710	710	1000	2050
Ultimate total pressure w/o gas ballast		mbar	$< 5 \cdot 10^{-3}$				
Installed motor power	400 V, 50 Hz	kW	9.7	9.7	11	11.5	15
	460 V, 60 Hz	kW	9.9	9.9	11	11.9	16
Noise level with silencer at 10^{-1} mbar		dB(A)	< 66	< 66	< 66	< 66	< 69
Weight, total, approx.		kg	600	610	650	650	1000
Connecting flange	Inlet port	DN	63 ISO-K	100 ISO-K	100 ISO-K	100 ISO-K	160 ISO-K
	Outlet port	DN	40 ISO-K	40 ISO-K	40 ISO-K	40 ISO-K	40 ISO-K

Technical Data

RUTA

Ordering Information		Part No.	WSU501/ DV300/A	WH700/ DV300/A	WH700FC/ DV300/A
			505062V001	505063V001	505063V002
Backing pump DRYVAC DV		P1	DV300	DV300	DV300
RUVAC		P2	WSU501	WH700	WH700FC
Pumping speed, 50 Hz		m^3/h	505	710	710
Ultimate total pressure w/o gas ballast		mbar	$< 5 \cdot 10^{-3}$		
Installed motor power	400 V, 50 Hz	kW	9.7	9.7	11
	460 V, 60 Hz	kW	9.9	9.9	11
Noise level with silencer at 10^{-1} mbar		dB(A)	< 66	< 66	< 66
Weight, total, approx.		kg	600	610	650
Connecting flange	Inlet port	DN	63 ISO-K	100 ISO-K	100 ISO-K
	Outlet port	DN	40 ISO-K	40 ISO-K	40 ISO-K

Technical Data

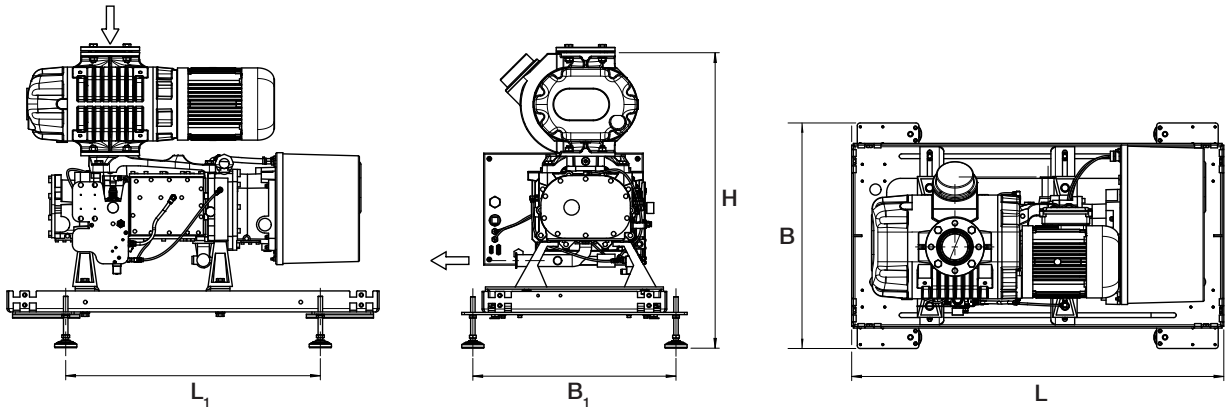
RUTA

Ordering Information		Part No.	WSU1001 DV300/A	WSU2001 DV300/A	WH2500FC DV300/A
			505064V001	505065V001	505066V001
Backing pump DRYVAC DV		P1	DV200	DV200	DV200
RUVAC		P2	WSU1001	WSU2001	WH2500FC
Pumping speed, 50 Hz		m^3/h	1000	2050	2500
Ultimate total pressure w/o gas ballast		mbar	$< 5 \cdot 10^{-3}$		
Installed motor power	400 V, 50 Hz	kW	11.5	15	18.5
	460 V, 60 Hz	kW	11.9	16	18.5
Noise level with silencer at 10^{-1} mbar		dB(A)	< 66	< 69	< 67
Weight, total, approx.		kg	650	1000	910
Connecting flange	Inlet port	DN	100 ISO-K	160 ISO-K	250 ISO-K
	Outlet port	DN	40 ISO-K	40 ISO-K	40 ISO-K

Technical Data

RUTA

			WSU1001/ DV500/A	WSU2001/ DV500/A	WH2500/ DV500/A	WH4400/ DV500/A
Ordering Information		**Part No.**	**505121V001**	**505122V001**	**505123V001**	**505124V001**
Backing pump DRYVAC DV		P1	DV500	DV500	DV500	DV500
RUVAC		P2	WSU1001	WSU2001	WH2500	WH4400
Pumping speed at 50 Hz at 60 Hz		m^3/h m^3/h	1000 1200	2050 2460	2500 3000	4000 5280
Ultimate total pressure w/o gas ballast		mbar	$< 5 \cdot 10^{-3}$			
Installed motor power	400 V, 50 Hz 460 V, 60 Hz	kW kW	5.5 5.6	6.0 6.3	5.5 5.7	5.8 6.0
Noise level with silencer at 10^{-1} mbar		dB(A)	< 66	< 69	< 67	< 67
Weight, total, approx.		kg	800	1030	955	1155
Connecting flange	Inlet port Outlet port	DN DN	100 ISO-K 63 ISO-K	160 ISO-K 63 ISO-K	250 ISO-K 63 ISO-K	250 ISO-K 63 ISO-K

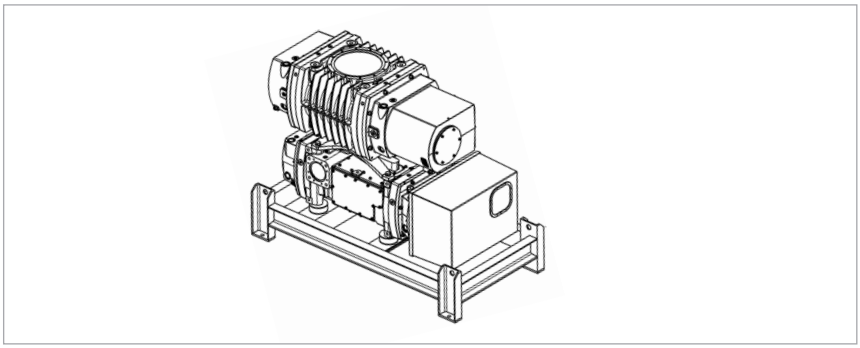


		WSU1001/ DV500/A	WSU2001/ DV500/A	WH2500/ DV500/A	WH4400/ DV500/A
DRYVAC	P1	DV500	DV500	DV500	DV500
RUVAC	P2	WSU1001	WSU2001	WH2500	WH4400
Saugseite	DN 1	100 ISO-K	160 ISO-K	250 ISO-K	250 ISO-K
Druckseite	DN 2	63 ISO-K	63 ISO-K	63 ISO-K	63 ISO-K
	l	1330	1381	1330	1471
	l_1	910	910	910	910
	b	806	806	806	806
	b_1	726	726	726	726
	h	1056	1229	1096	1183

Dimensional drawing of the pump system with dry compressing backing pump DRYVAC DV 500, adapter version (all dimensions in mm)

Notes

Dry Compressing Vacuum Pump System RUTA with DRYVAC DV 650 Backing Pump, Adaptor Version



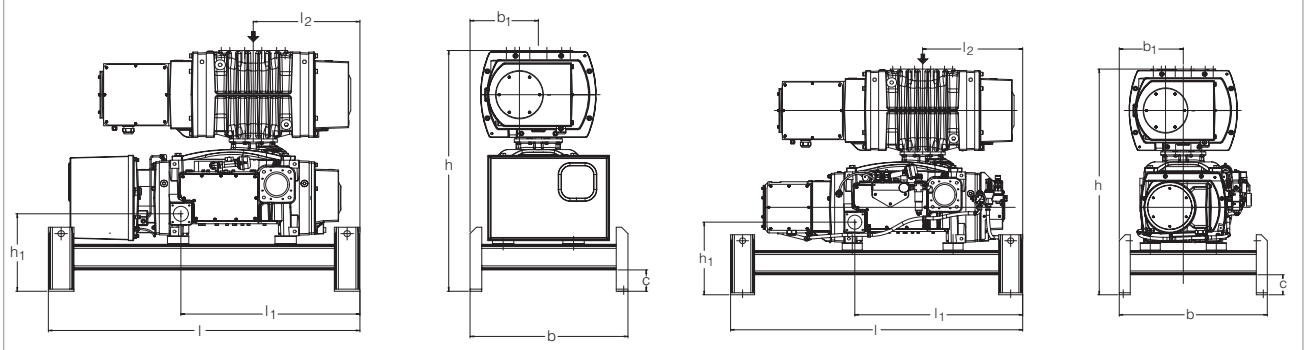
RUTA WH4400/DV650/A

Standard Equipment

- RUVAC WH and DRYVAC with water cooling
- DRYVAC DV with built-in frequency converter
- DRVAC DV-r including external frequency converter
- RUVAC WH including external frequency converter (frequency converter permits pumping speed control)
- Hermetically sealed
- Integrated protection functions (discharge pressure, temperatures and current consumption)
- Innovative motor design with efficiency class IE2
- Gas ballast with manual valve
- Leak detection port
- Lubricant: synthetic oil (LVO 210)

Options

- Exhaust silencer
- Bus interface
- Non-return valve for DRYVAC
- Seal gas connection
- Gear chamber evacuation RUVAC WH
- Frequency converter for RUVAC pump
- Electrical controller
- Oil drain tap
- Cooling water monitoring
- Quick couplings for water connections, blocking on both sides
- Frame



Type	RUTA	WH4400/DV650/A	WH4400/DV650-r/A
RUVAC WH	P2	4400	4400
Backing pump DRYVAC DV	P1	650	650-r
	DN_1	250 ISO-K	250 ISO-K
	DN_2	100 ISO-K	100 ISO-K
	l	1460 (57.48)	1460 (57.48)
	l_1	839 (33.03)	839 (33.03)
	l_2	500 (19.69)	500 (19.69)
	b	740 (29.13)	740 (29.13)
	b_1	320 (12.60)	320 (12.60)
	c	100 (3.94)	100 (3.94)
	h	1128 (44.41)	1128 (44.41)
	h_1	363 (14.29)	363 (14.29)

Dimensional drawing of the pump system with dry compressing DRYVAC DV 650 (left) and DV 650-r (right) backing pump, adaptor version; dimensions in brackets ( ) are in inch

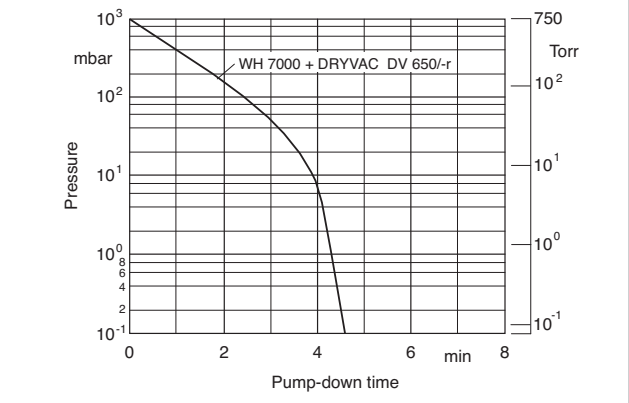
Technical Data, 50 Hz

		RUTA WH	
		4400/DV650/A	4400/DV650-r/A
RUVAC WH	P2	4400	
Backing pump DRYVAC DV	P1	650	650-r
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	3400 (2000)	
Ultimate total pressure without gas ballast	mbar (Torr)	$< 5.0 \times 10^{-4}$ (3.8×10^{-4})	
Installed motor power 400 V, 50 Hz	kW (hp)	26.0 (34.9)	
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	9.3 (12.5)	
Noise level with silencer at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	< 68	
Weight, total, approx.	kg (lbs)	1550 (3417)	
Connecting flange Inlet port Outlet port	 DN_1 DN_2	 250 ISO-K 100 ISO-K	

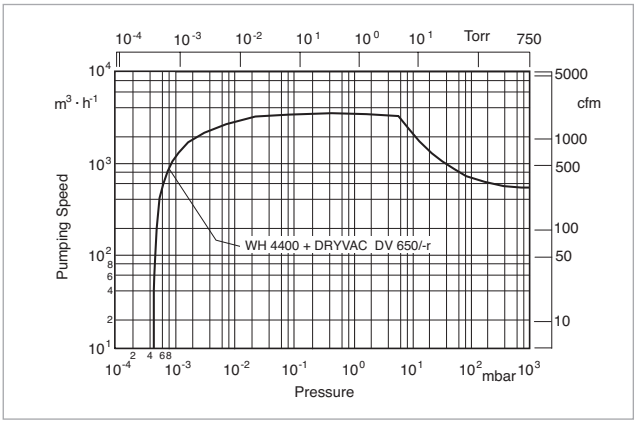
Ordering Information

		RUTA WH	
		4400/DV650/A	4400/DV650-r/A
		Part No.	Part No.
RUVAC WH	P2	4400	
Backing pump DRYVAC DV		650	650-r
Pump system, complete (adaptor version), pallet mounted, with Roots vacuum pump RUVAC WH		**503 166 V001** [1]	**503 167 V001** [1]

[1] Including external frequency converter

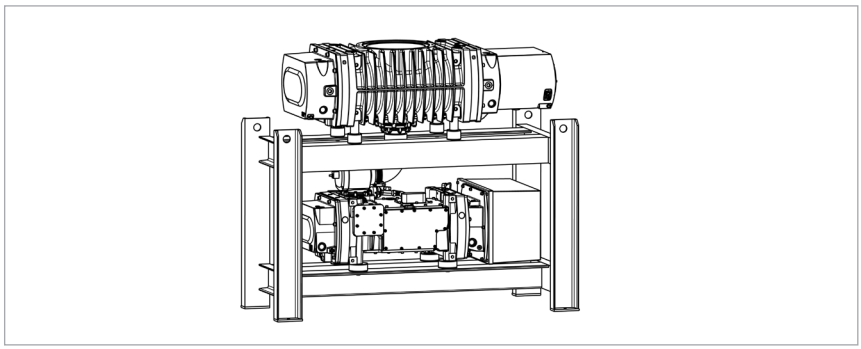


Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Dry Compressing Vacuum Pump System RUTA with DRYVAC DV 650 Backing Pump, Frame Version



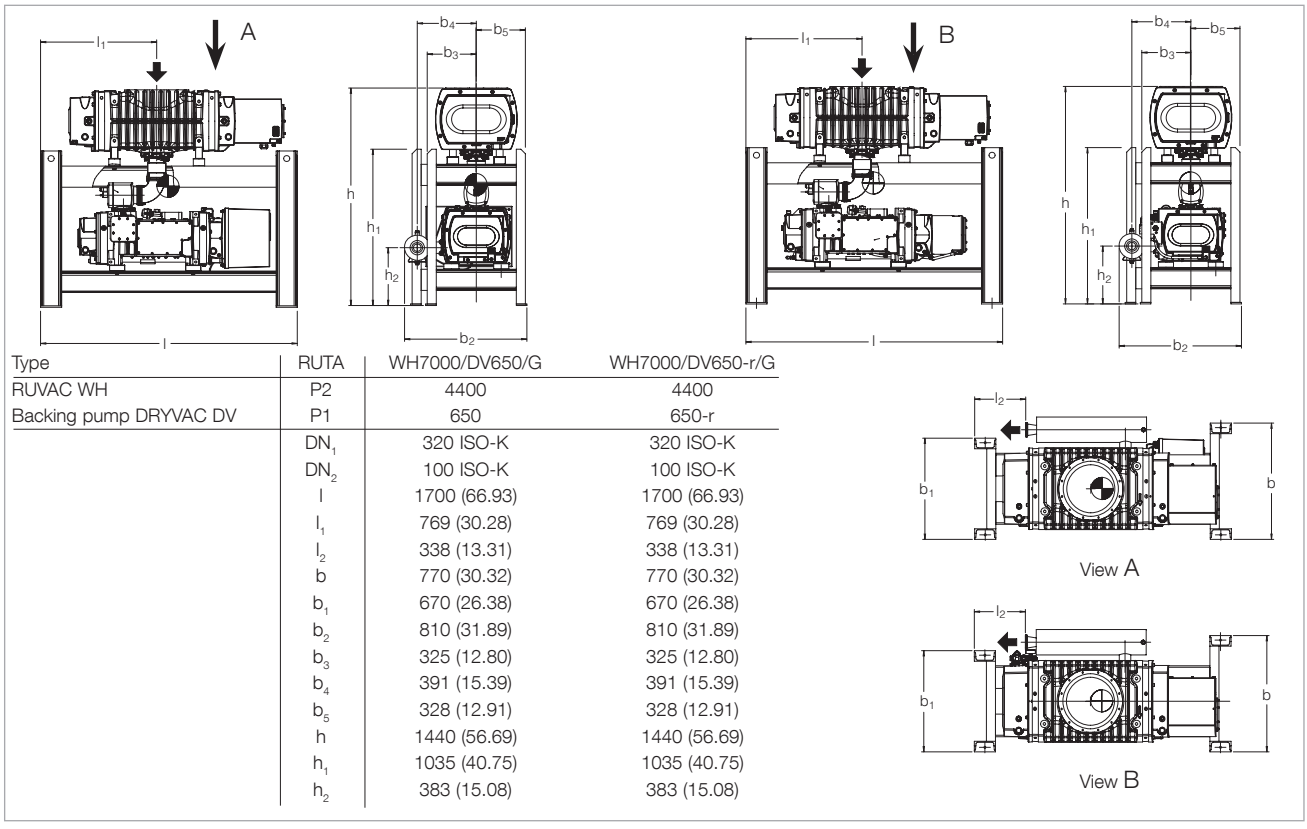
RUTA WH7000/DV650/G

Standard Equipment

- RUVAC WH and DRYVAC with water cooling
- DRYVAC DV with built-in frequency converter
- DRYVAC DV-r including external frequency converter
- RUVAC WH including external frequency converter (frequency converter permits pumping speed control)
- Hermetically sealed
- Integrated protection functions (discharge pressure, temperatures and current consumption)
- Innovative motor design with efficiency class IE2
- Gas ballast with manual valve
- Leak detection port
- Lubricant: synthetic oil (LVO 210)
- SECUVAC valve 24 V DC

Options

- Exhaust silencer
- Bus interface
- Non-return valve for DRYVAC
- Seal gas connection
- Gear chamber evacuation RUVAC WH
- Electrical controller
- Oil drain tap
- Cooling water monitoring
- Quick couplings for water connections, blocking on both sides



Type	RUTA	WH7000/DV650/G	WH7000/DV650-r/G
RUVAC WH	P2	4400	4400
Backing pump DRYVAC DV	P1	650	650-r
	DN_1	320 ISO-K	320 ISO-K
	DN_2	100 ISO-K	100 ISO-K
	l	1700 (66.93)	1700 (66.93)
	l_1	769 (30.28)	769 (30.28)
	l_2	338 (13.31)	338 (13.31)
	b	770 (30.32)	770 (30.32)
	b_1	670 (26.38)	670 (26.38)
	b_2	810 (31.89)	810 (31.89)
	b_3	325 (12.80)	325 (12.80)
	b_4	391 (15.39)	391 (15.39)
	b_5	328 (12.91)	328 (12.91)
	h	1440 (56.69)	1440 (56.69)
	h_1	1035 (40.75)	1035 (40.75)
	h_2	383 (15.08)	383 (15.08)

Dimensional drawing of the pump system with dry compressing DRYVAC DV 650 (left) and DV 650-r (right) backing pump, frame version; dimensions in brackets ( ) are in inch; (shown with optional silencer)

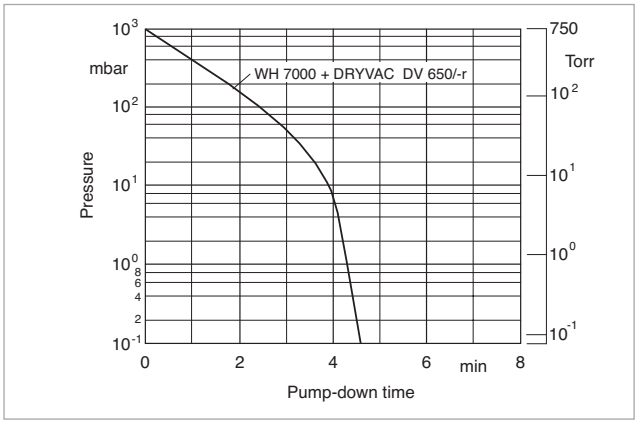
Technical Data, 50 Hz

		RUTA WH	
		7000/DV650/A	7000/DV650-r/A
RUVAC WH	P2	7000	
Backing pump DRYVAC DV	P1	650	650-r
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	5100 (3001)	
Ultimate total pressure without gas ballast	mbar (Torr)	$< 5.0 \times 10^{-4}$ (3.8×10^{-4})	
Installed motor power 400 V, 50 Hz	kW (hp)	26.0 (34.9)	
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	9.36 (12.56)	
Noise level with silencer at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	< 68	
Weight, total, approx.	kg (lbs)	1600 (3527)	
Connecting flange Inlet port Outlet port	 DN_1 DN_2	 320 ISO-K 100 ISO-K	

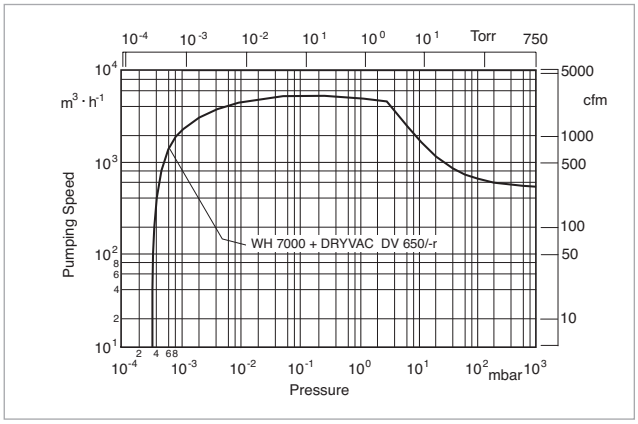
Ordering Information

		RUTA WH	
		7000/DV650/A	7000/DV650-r/A
		Part No.	**Part No.**
RUVAC WH	P2	7000	
Backing pump DRYVAC DV	P1	650	650-r
Pump system, complete (frame version), frame mounted, with Roots vacuum pump RUVAC WH		**503 170 V001** [1]	**503 171 V001** [1]

[1] Including external frequency converter

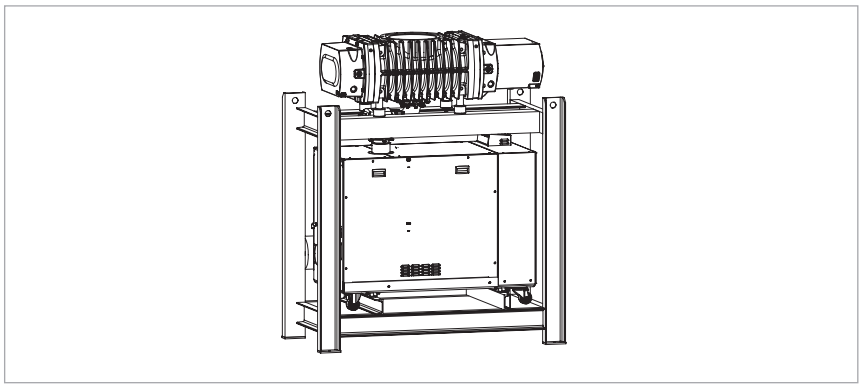


Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Dry Compressing Vacuum Pump System RUTA with DRYVAC DV 1200 Backing Pump, Frame Version



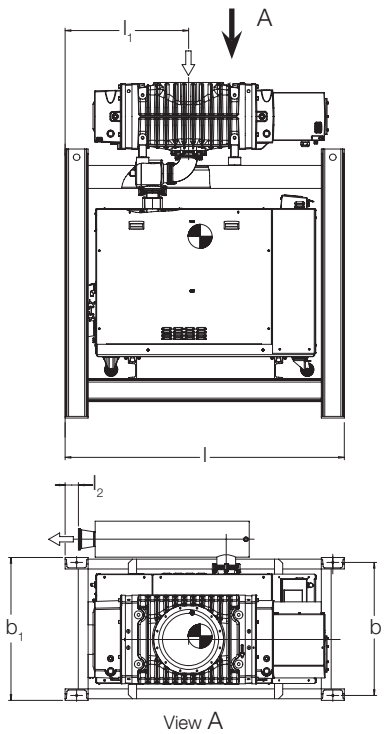
RUTA WH7000/DV1200/G

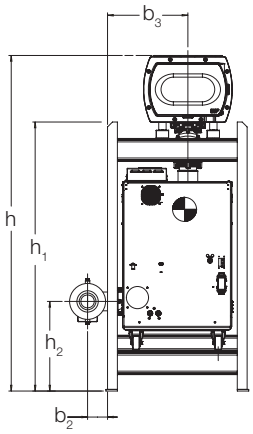
Standard Equipment

- RUVAC WH and DRYVAC with water cooling
- DRVAC DV 1200 with built-in frequency converter
- RUVAC WH with water cooling and external frequency converter
- Hermetically sealed
- Integrated protection functions (discharge pressure, temperatures and current consumption)
- Innovative motor design with efficiency class IE2
- Gas ballast with electropneumatic valve 24 V DC
- Integrated valve 24 V DC for seal gas supply
- Leak detection port
- Control via Profibus (DRYVAC)
- Lubricant: synthetic oil (LVO 210)

Options

- Exhaust silencer
- Bus interface
- Non-return valve for DRYVAC
- Seal gas connection
- Gear chamber evacuation
- Electrical controller
- Oil drain tap
- Cooling water monitoring
- Quick couplings for water connections, blocking on both sides





Type	RUTA	WH7000/DV1200/G
RUVAC WH	P2	7000
Backing pump DRYVAC DV	P1	1200
	DN_1	320 ISO-K
	DN_2	100 ISO-K
	l	1700 (66.93)
	l_1	752 (29.61)
	l_2	81 (3.19)
	b	870 (34.25)
	b_1	870 (34.25)
	b_2	122 (4.80)
	b_3	489 (19.25)
	h	2043 (80.43)
	h_1	1638 (64.49)
	h_2	546 (21.50)

Dimensional drawing of the pump system with dry compressing DRYVAC DV 1200, frame version; dimensions in brackets ( ) are in inch

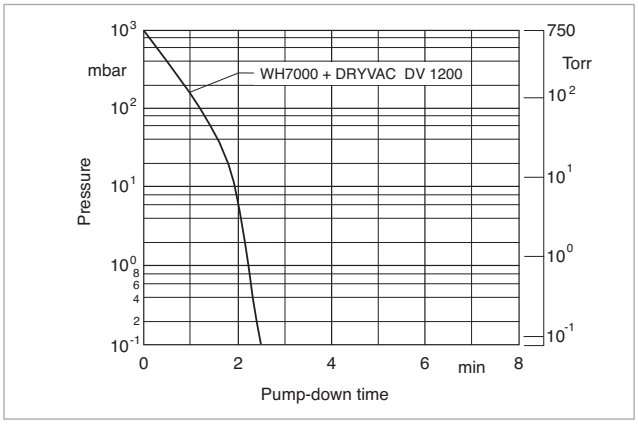
Technical Data, 50 Hz

		RUTA WH 7000/DV1200/G
RUVAC WH	P2	7000
Backing pump DRYVAC DV	P1	1200
Pumping speed, 50 Hz at 10^{-1} mbar (7.5×10^{-2} Torr)	m^3/h (cfm)	5537 (3259)
Ultimate total pressure without gas ballast	mbar (Torr)	< 6.0×10^{-4} (4.5×10^{-4})
Installed motor power 400 V, 50 Hz	kW (hp)	41.0 (55)
Electrical power consumption at 10^{-1} mbar (7.5×10^{-2} Torr)	kW (hp)	16.2 (21.7)
Noise level with silencer at 10^{-1} mbar (7.5×10^{-2} Torr)	dB(A)	< 68
Weight, total, approx.	kg (lbs)	2450 (5410)
Connecting flange Inlet port Outlet port	 DN_1 DN_2	 320 ISO-K 100 ISO-K

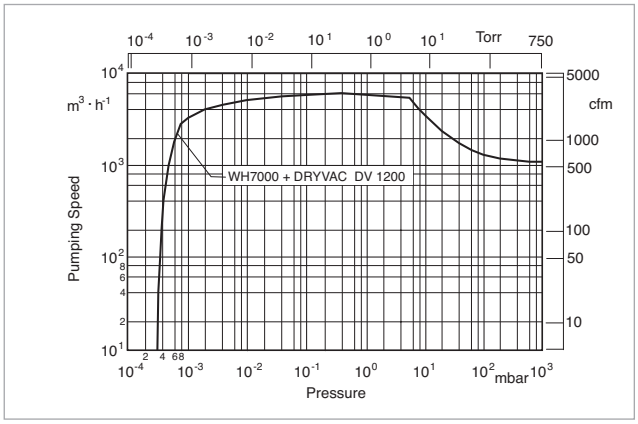
Ordering Information

		RUTA WH 7000/DV1200/G
		Part No.
RUVAC WH	P2	7000
Backing pump DRYVAC DV	P1	1200
Pump system, complete (frame version), frame mounted, with Roots vacuum pump RUVAC WH		**503 172 V001** [1]

[1] Including external frequency converter



Pump-down time diagram for a 10 m^3 tank at 50 Hz



Pumping speed diagram at 50 Hz

Dry Compressing Pump Systems DRYVAC



DRYVAC SYSTEM: Basic System Configuration (left), Smart System Configuration (middle), PowerBoost (right)

Leybold has refined its DRYVAC vacuum pump systems, making them adaptable for a variety of applications — The recipe is simple and efficient: Take a dry compressing screw vacuum pump and a roots pump, combine both of the proven technologies along with pressure measurement, shut-off devices and electrical control, creating a turn-key smart vacuum system that is cost-effective and completely ready for use by the customer.

For more than five years, the fore vacuum systems of the DRYVAC pump series by Leybold are already being used successfully in various processes, which can be simple or very challenging. The pumping systems are known for their maximum suction capacity while operating at minimum operating costs.

Now, Leybold has developed the systems further: The new two-stage DRYVAC systems distinguish themselves particularly by their modular design and the resulting improved user friendliness
and easy servicing. All equipment features are aligned to the requirements of the different markets.

Advantage to the User

- Extremely compact design provides more space in production areas
- Very low noise level improves working environment conditions
- Significant cost reduction because of high energy efficiency
- Clean technology with no oil emissions
- Optimized for fast cycle / load lock applications
- Fastest pump down times – by high throughput pump mechanisms
- Highest pumping speed for dry and booster pumps
- Pumping speed from 2,000 m^3/h up to 9,800 m^3/h
- Integrated smart monitoring of major parameters
- Standard Digital I/O interface and Profibus (optional) for the whole product family
- Platform based product design proven in a huge installed base
- Tolerance to misuse
- Optimized design and screw profile
- Lowest power consumption
- Low cost of ownership
- minimized foot print

Typical Applications

- Glas Coating
- Crystal Pulling
- Sputtering / Decorative Layers
- Furnaces
- Protective Coating
- Battery
- Solar
- Display

Basic System Configuration

Pre-assembled vacuum pump systems (basic version). Monitoring, control, programming, and power electronic components to be provided by the customer.

Standard Configuration:

- exhaust to the side
- triple purge gas module

Optional Configurations:

Double purge gas module, gas ballast system, non-return valve, quick-access couplings (water), mating connector for power & signal supply, relay board (digital I/O)

Advantages

- high performance with excellent cost-performance ratio
- worldwide service & spare parts availability
- rapid response times

Smart System Configuration

The smart pump system versions are characterized by integrated power electronics, monitoring devices for the purge gas system and key parameters, easy and user-friendly operation handling (local / remote), and additional features, e.g. connecting a gauge head.

Standard Configuration:

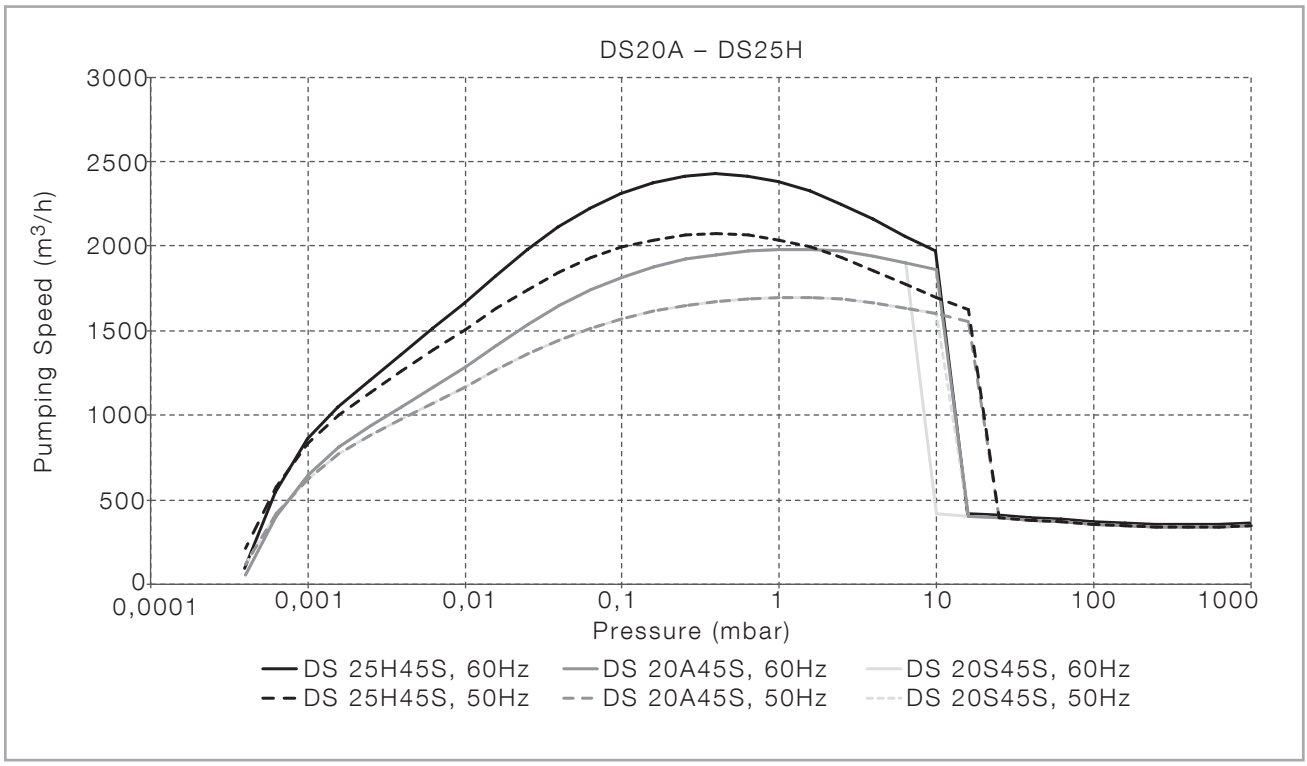
- digital I/O interface
- prepared for connecting a variety of different gauge heads (CTR, DU, TTR)
- Emergency Stop (EMS)
- compensation for voltage drops (≤ 2s)
- triple purge gas module
- exhaust to the side

Optional Configurations:

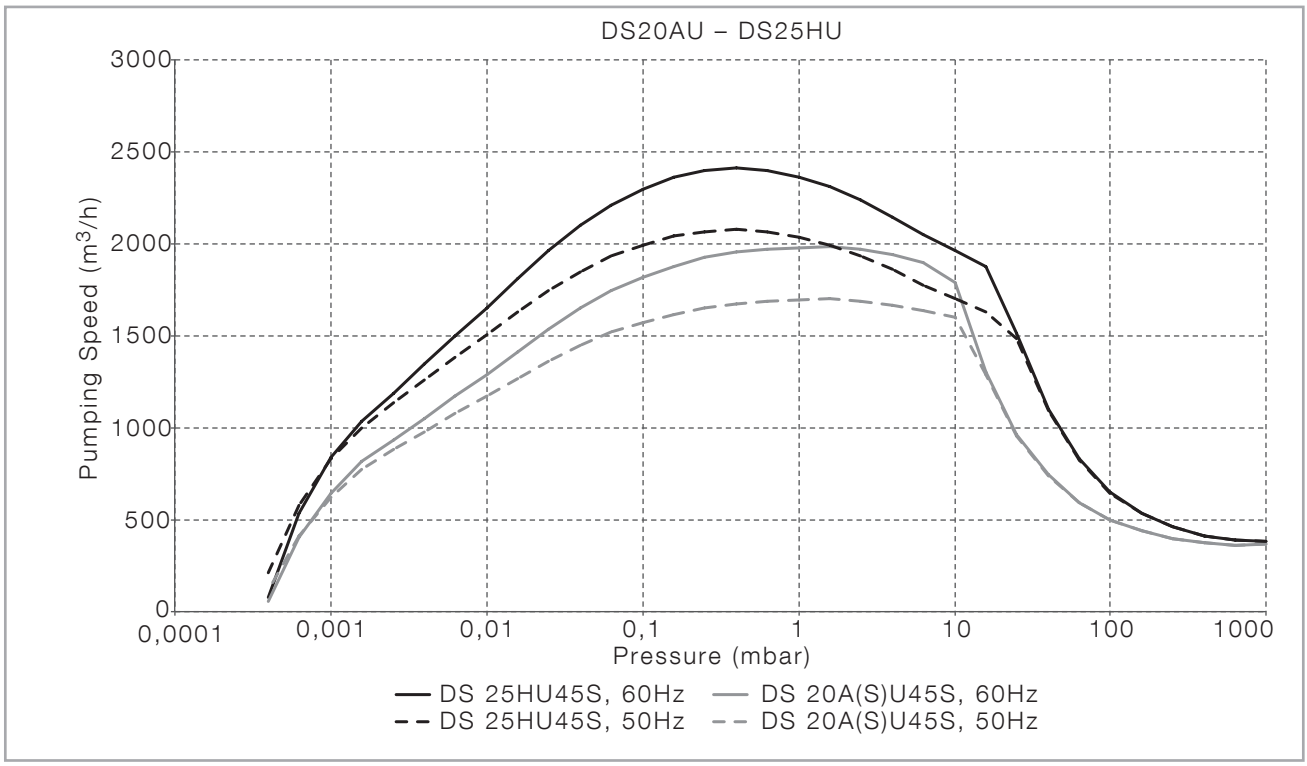
Double purge gas module, gas ballast system, non-return valve, quick-action couplings, Profibus, Ethernet or Profinet interfaces.

Advantages

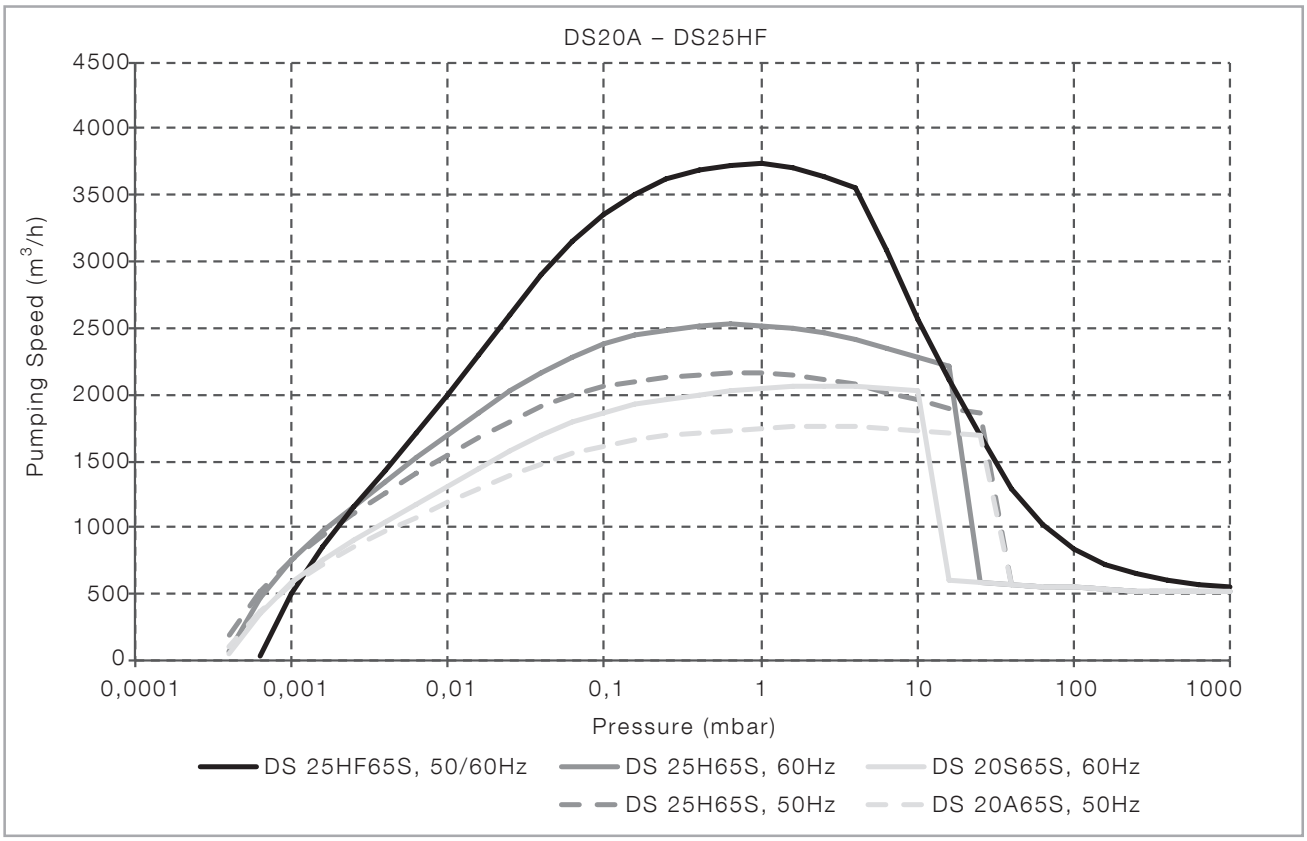
- high performance at attractive prices
- autonomous vacuum pump system
- worldwide service & spare parts availability
- rapid response times



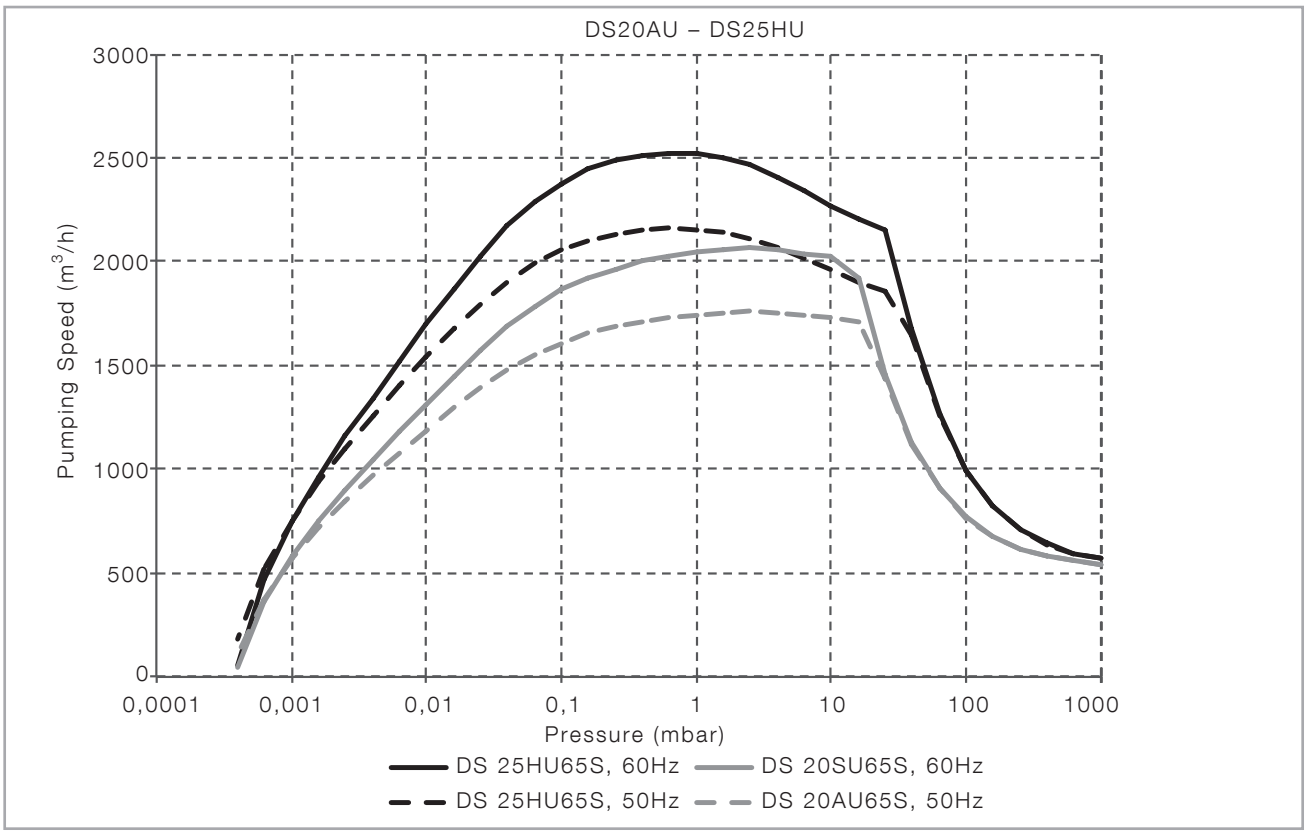
Pumping speed characteristics DV 450 (without bypass line)



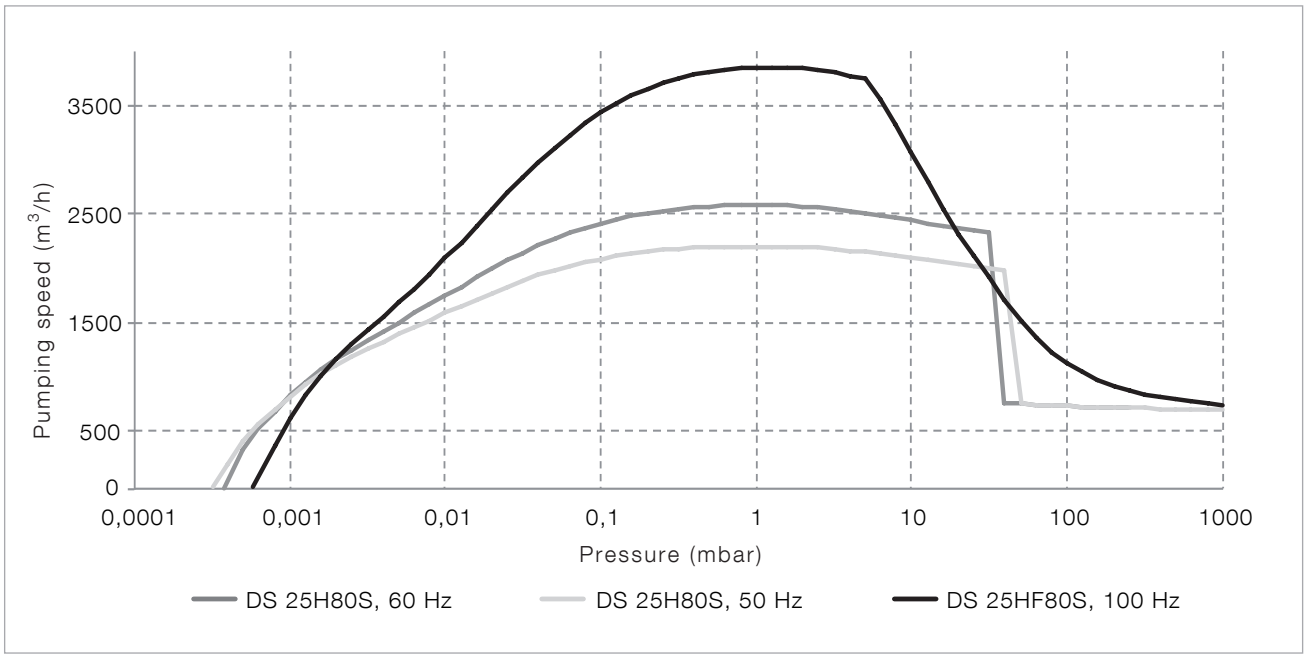
Pumping speed characteristics DV 450 (with bypass line)



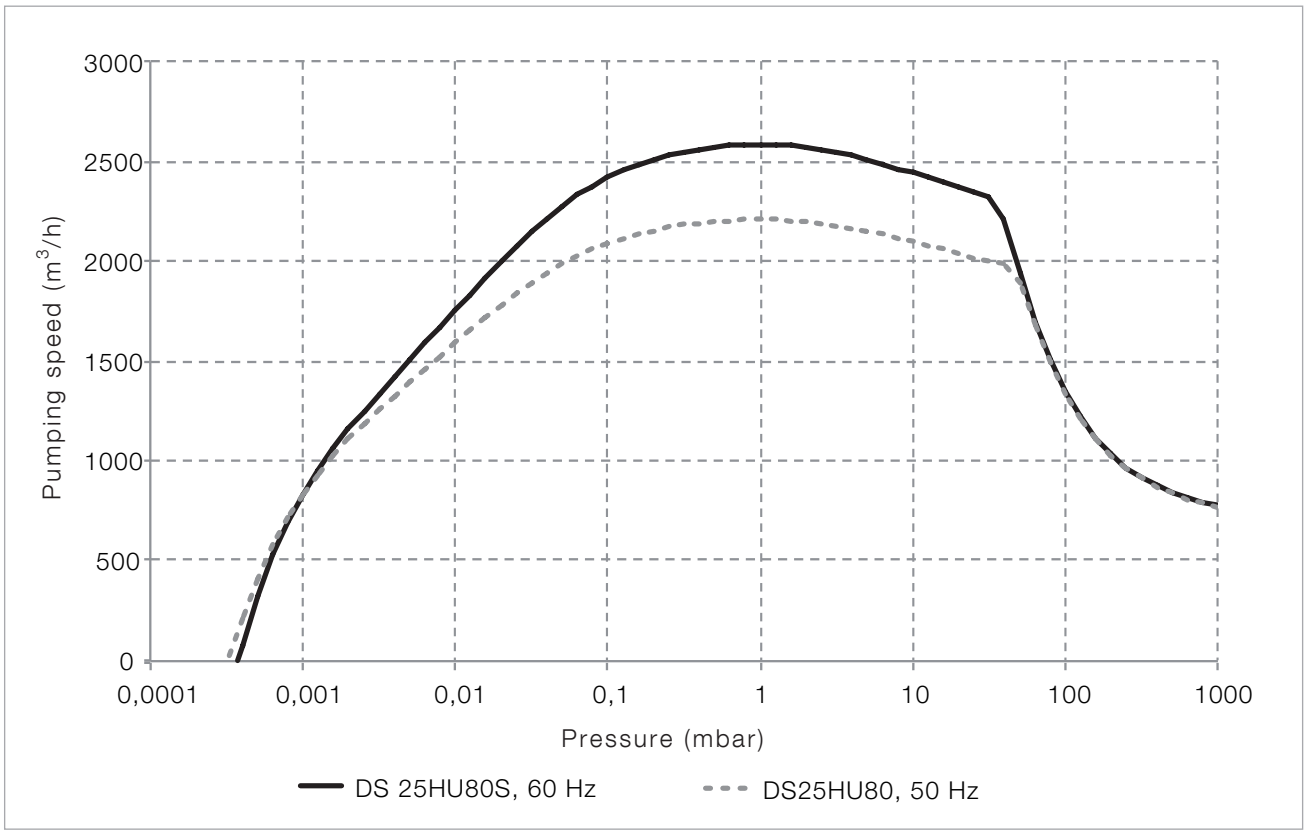
Pumping speed characteristics DV 650 (without bypass line)



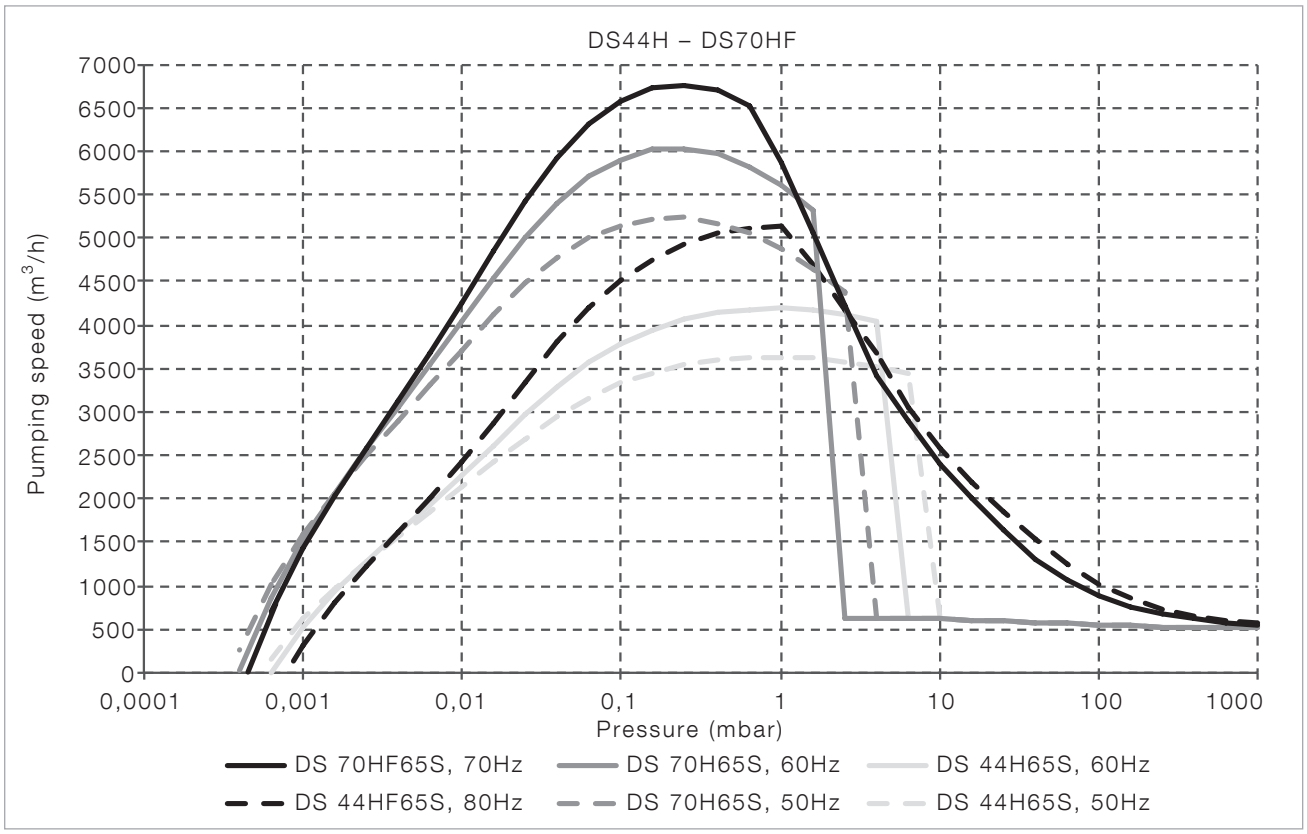
Pumping speed characteristics DV 650 (with bypass line)



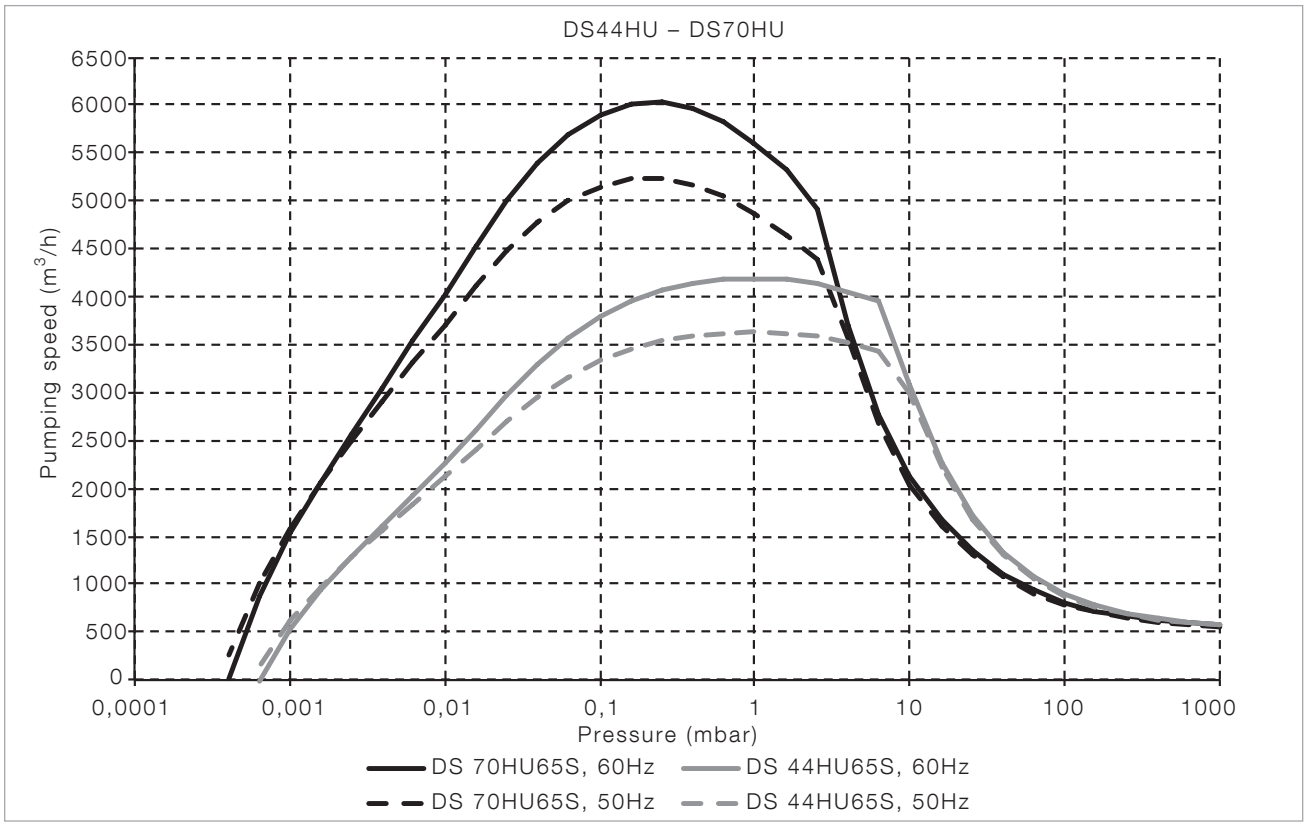
Pumping speed characteristics DV 800 (without bypass line)



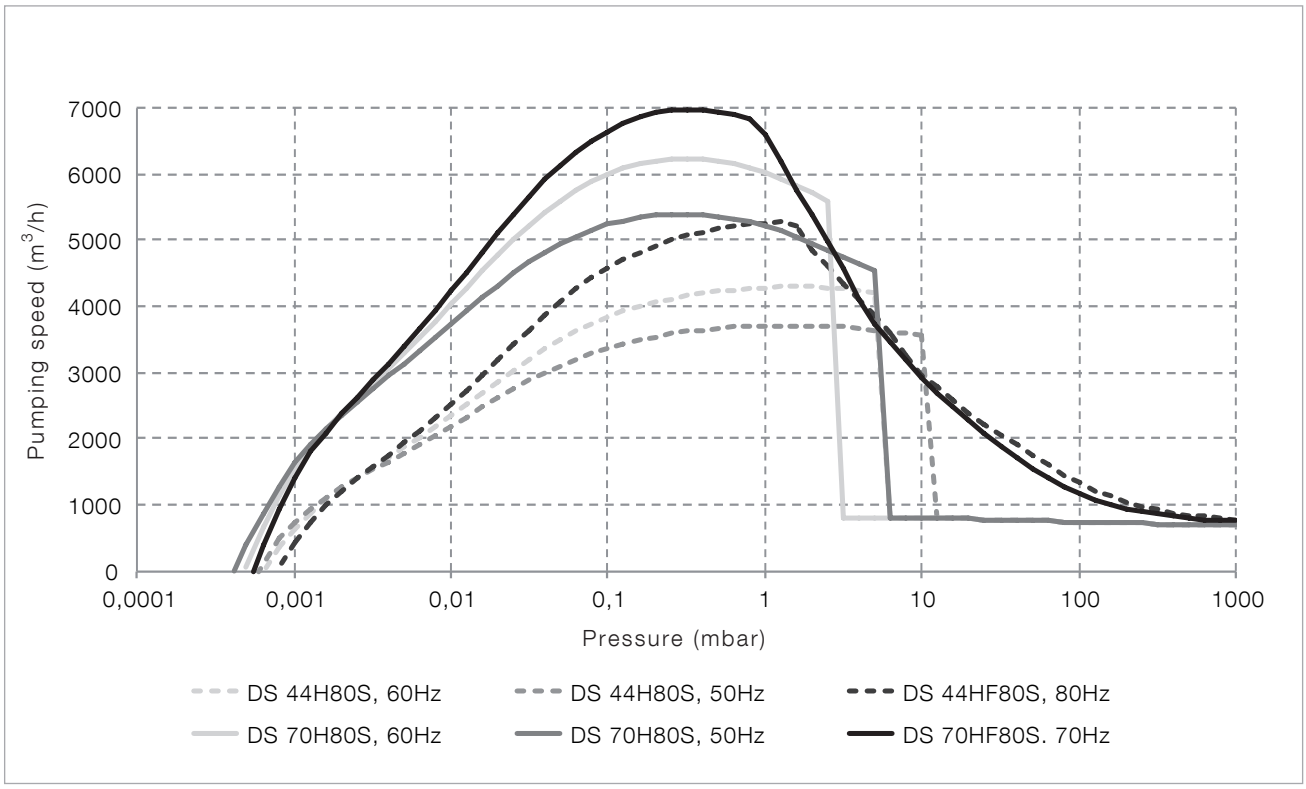
Pumping speed characteristics DV 800 (with bypass line)



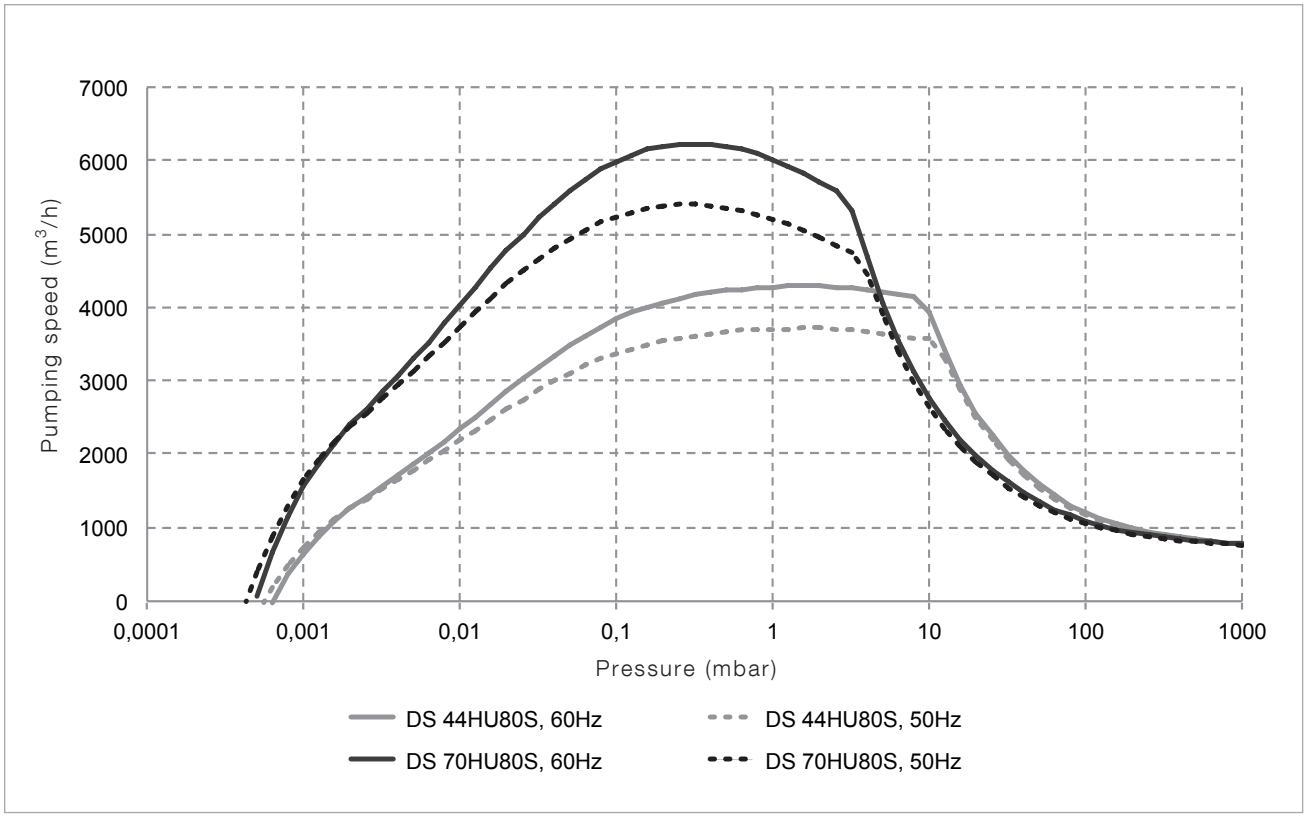
Pumping speed characteristics DV 650 (without bypass line)



Pumping speed characteristics DV 650 (with bypass line)



Pumping speed characteristics DV 800 (without bypass line)



Pumping speed characteristics DV 800 (with bypass line)

Dry Compressing Pump Systems DRYVAC Basic System Configuration



The two-stage DRYVAC SYSTEMS consist of a combination of dry compressing Roots pumps and screw pumps. The Roots pump installed on top of the backing pump serves as a booster for increasing the pumping speed.

Various types of pumps may be used with DRYVAC SYSTEMS:

Roots Pumps

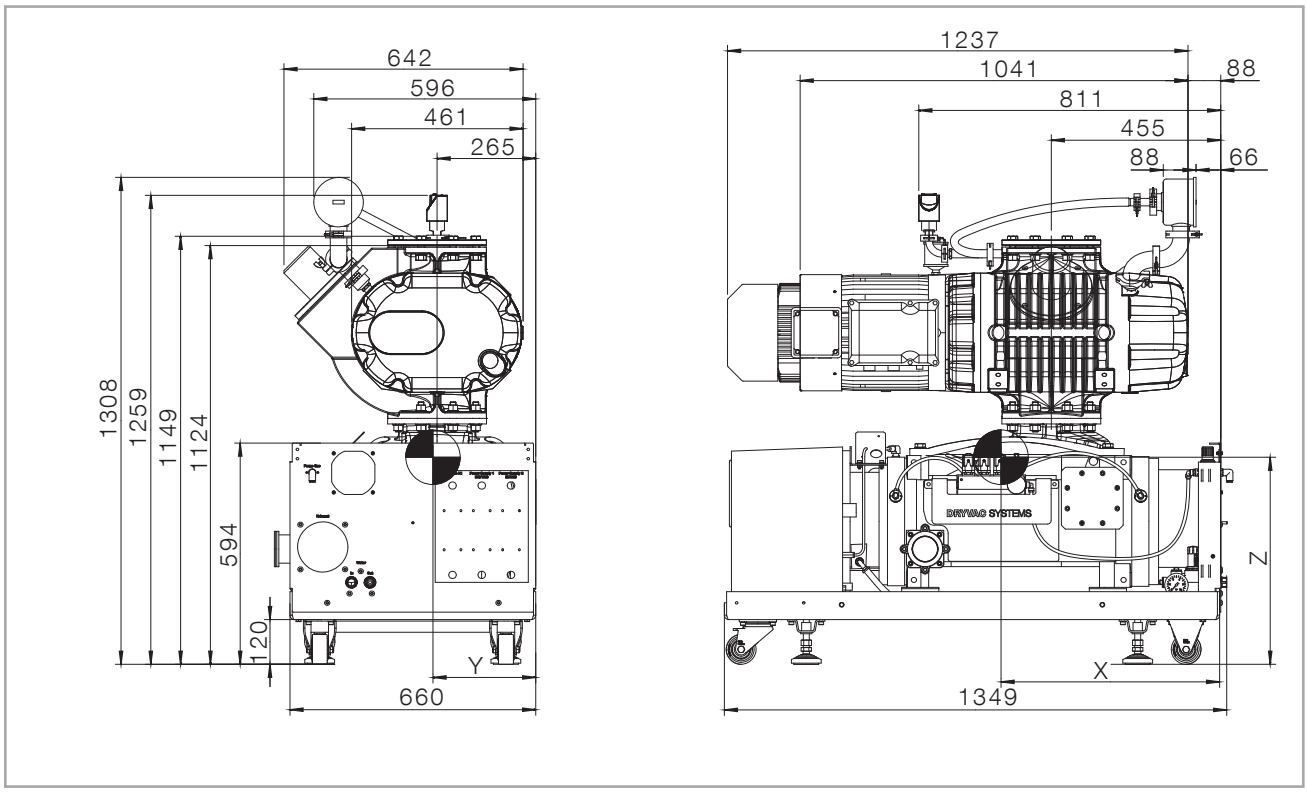
RUVAC WA
RUVAC WAU
RUVAC WH
RUVAC WHU
RUVAC WS
RUVAC WSU

Backing Pumps

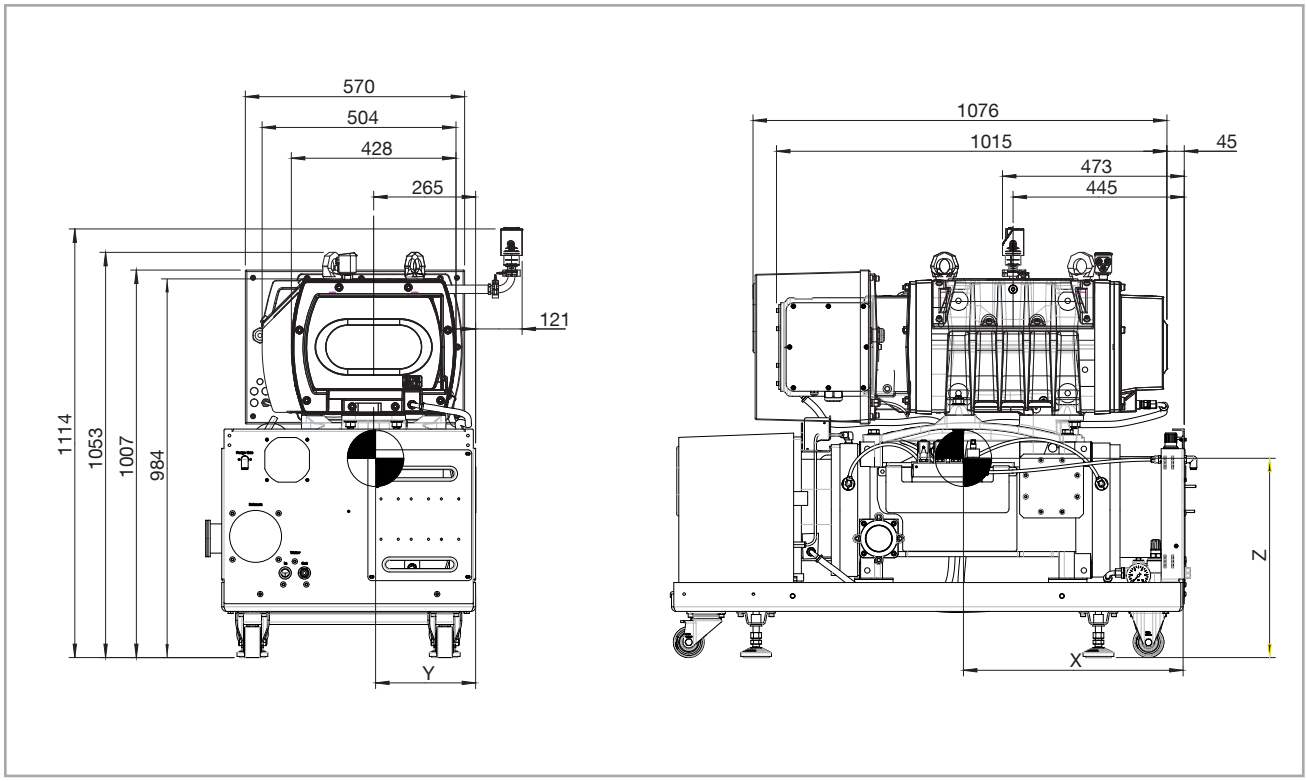
DRYVAC DV S
DRYVAC DV C

All DRYVAC SYSTEMS (b versions) described hereinafter are delivered as basic versions. The basic version can be customized according to individual requrirements with accessories (e.g. Harting plug or gas ballast system).

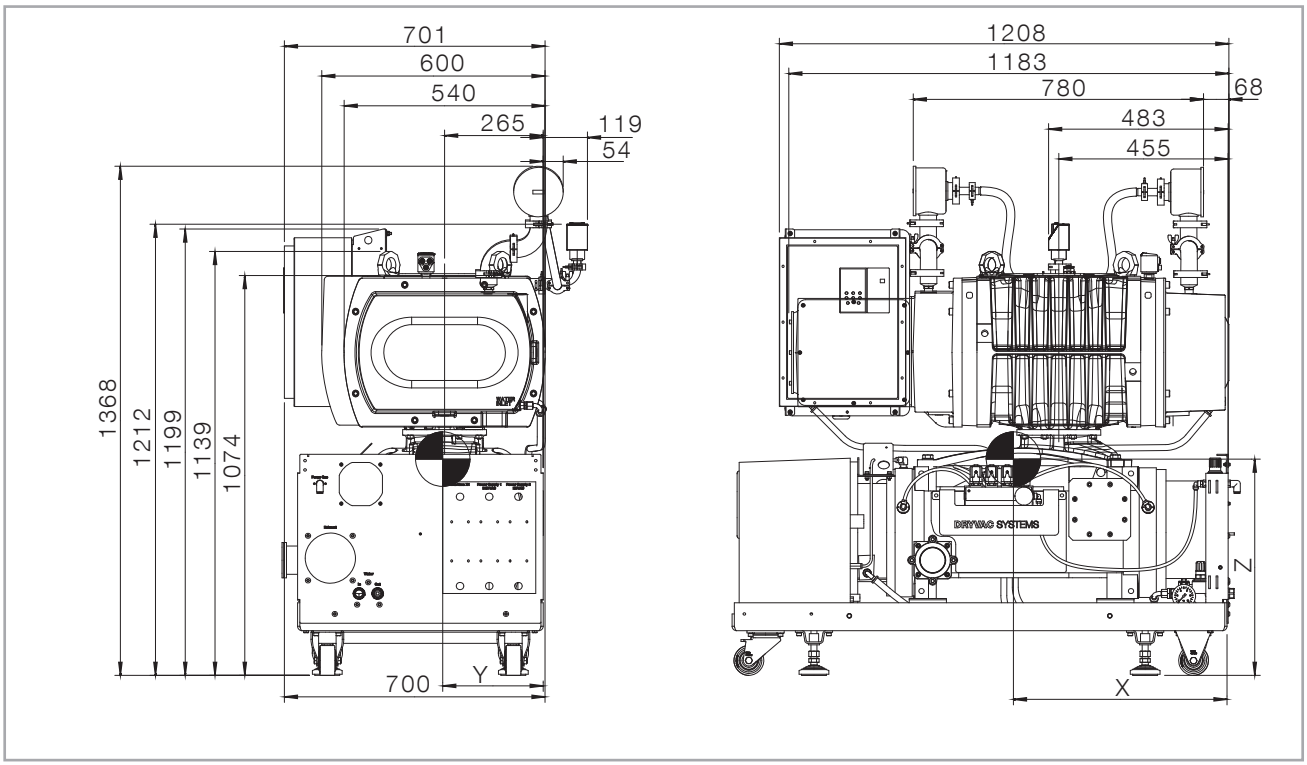
The pumps are water-cooled and lubricated either with synthetic oil or PFPE.



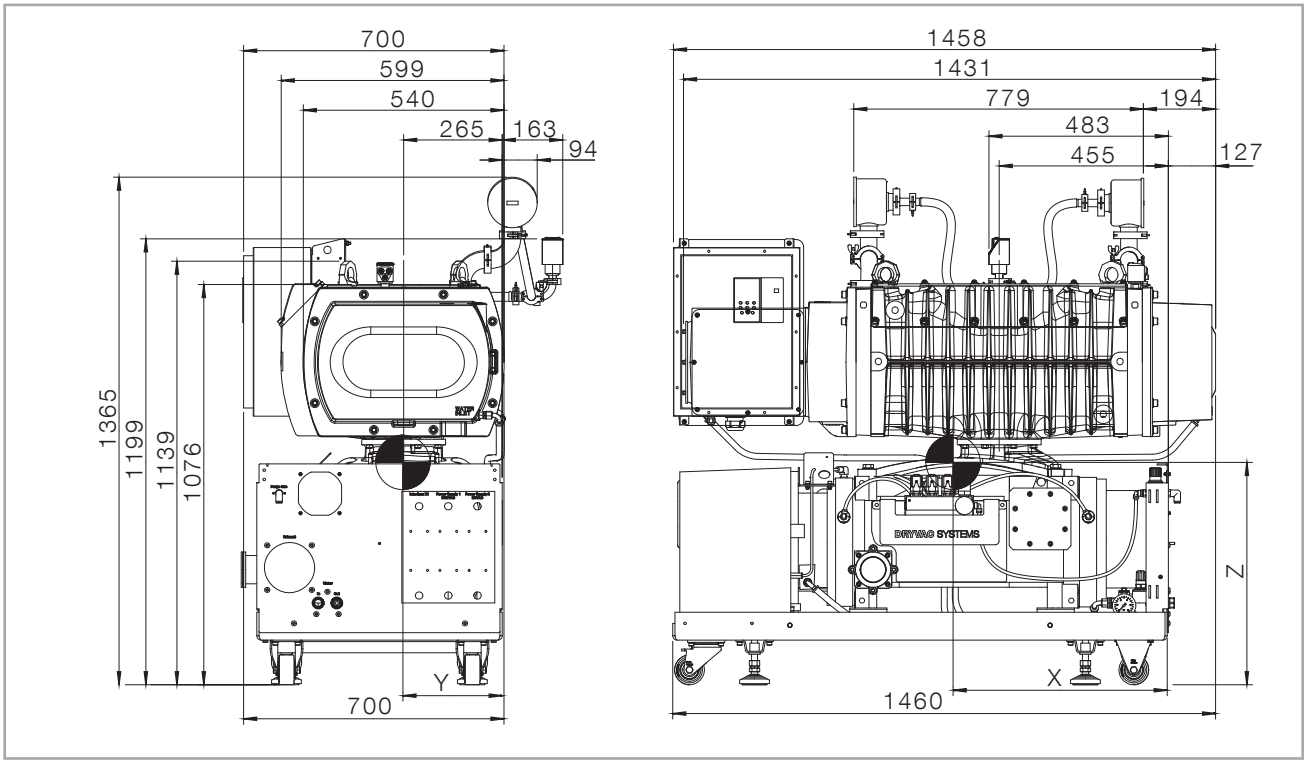
Dimensional drawing for DS 20A(U) 45(S/C) b, DS 20A(U) 65(S/C) b, DS 20S(U) 45(S/C) b, DS 20S(U) 65(S/C) b (Dimensions in mm)



Dimensional drawing for DS 25H(U) 45(S/C) b, DS25H(U) 65(S/C) b, DS 25HF 45(S/C) b, DS 25HF 65(S/C) b, DS 25H(U)80Sb, DS25HF80Sb (Dimensions in mm)



Dimensional drawing for DS 44H(U) 45(S/C) b, DS 44H(U) 65(S/C) b, DS 44HF 65(S/C) b, DS 44H(U)80Sb, DS44HF80Sb (without gearbox evacuation).
(Dimensions in mm)



Dimensional drawing for DS 70H(U) 65(S/C) b, DS 70HF 65(S/C) b, DS 70H(U)80Sb, DS70HF80Sb (without gearbox evacuation).
(Dimensions in mm)

Technical Data

		DRYVAC-SYSTEM DS			
		20A(U) 45(S/C) b(T)	20S(U) 45(S/C) b(T)	20A(U) 65(S/C) b(T)	20S(U) 65(S/C) b(T)
Max. pump speed w/o gas ballast 50/60 Hz (± 5 %)	m^3/h	2000 / 2400			
Max. effective pumping speed 50/60 Hz (± 5 %)	m^3/h	1600 / 1850		1750 /2 050	
Ult. total pressure w/o rotor and inlet purge (± 10 %)	mbar	$\leq 5 \cdot 10^{-3}$			
Max. permissible inlet pressure	mbar	1013			
Maximum permissible discharge pressure (relative to ambient)	mbar	+200			
Integral leak rate	mbar · l/s	$<5 \cdot 10^{-4}$	$<1 \cdot 10^{-4}$	$<5 \cdot 10^{-4}$	$<1 \cdot 10^{-4}$
Water vapor tolerance with purge gas (SV40)	mbar Nl/min	60 ≥ 20			
Water vapor capacity	kg/h	15		25	
Permissible ambient temperature	°C	+5 ... +35			
Storage temperature	°C	-10 ... +60			
Noise level (rigid exhaust pipe) [6]					
Screw	dB(A)	65 (K_{pA} = 3)			
Roots	dB(A)	< 80	< 72	< 80	< 72
Relative atmospheric humidity		95 %, non-condensing			
Installation location		up to 2000 m (NHN) [2]			
Cooling		Water / air			
Mains voltages and frequencies		380 – 440 V 50 Hz / 420 – 480 V 60 Hz			
Frequency (± 5%)	Hz	50 / 60 Hz			
Phases		3-ph			
Rated power 400 V 50 Hz / 460 V 60 Hz (± 0.8)					
Screw	kW	11	11	15	15
Roots	kW	7.5	7.5 / 8.5	7.5	7.5 / 8.5
Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	kW	18.5	18.5 / 19.5	22.5	22.5 / 23.5
Rated current (400 V 50 Hz / 460 V 60 Hz)					
Screw	A	24 / 21	24 / 21	31 / 27	31 / 27
Roots	A	13.6 / 12	15	13.6 / 12	15
Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	A	37.6 / 33	39 / 36	44.6 / 39	46 / 42
Power consumption at ultimate pressure (50/60 Hz)					
Motor efficiency class, calculated and configured acc. to EN 60034-30		IE2			
Electrical power rating (400 V 50 Hz / 460 V 60 Hz)					
Screw	kVA	17 / 14.9	17 / 14.9	21.8 / 19.1	21.8 / 19.1
Roots	kVA	9.8 / 8.7	10.7	9.8 / 8.7	10.7
Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	kVA	26.8 / 23.6	27.7 / 25.6	31.6 / 27.8	32.5 / 29.8
Speed Screw / Roots (50 Hz) Screw / Roots (60 Hz)		7200 / 3000/min 7200 / 3600/min			
Min. permissible speed Screw [3] Min. permissible speed Roots (off) [4]		1200/min off			
Protection class	IP	IP54	IP20	IP54	IP20

Technical Data

		DRYVAC-SYSTEM DS			
		20A(U) 45(S/C) b(T)	20S(U) 45(S/C) b(T)	20A(U) 65(S/C) b(T)	20S(U) 65(S/C) b(T)
Lubricant filling					
Screw		LVO 210 / 410	LVO 210 / 410	LVO 210 / 410	LVO 210 / 410
Roots		LVO 210	LVO 210 / 400	LVO 210	LVO 210 / 400
Total lubricant quantity (± 5 %)					
Screw LVO 210	l	1.2	1.2	1.2	1.2
Screw LVO 410	l	1.2	1.2	1.2	1.2
Roots LVO 210	l	3.6	3.6	3.6	3.6
Roots LVO 400	l		2.7		2.7
Roots LVO 410	l				
Intake flange	DN	160 ISO-K			
Discharge flange	DN	63 ISO-K			
Materials (gas contacting components)		Grey cast iron /graphite cast iron / steel/stainless steel /epoxy paint / FKM			
Materials sealing the pump in the chamber to the outside		FKM, grey cast iron			
Weight, approx. (± 40 kg)	kg	1156	1215	1156	1215
Dimensions (L x W x H) (±10 mm)					
Conn. flange, w/o acc., side exhaust		1349 x 700 x 1124 mm			
Conn. flange, w/o acc., rear exhaust		1355 x 660 x 1124 mm			
Water					
Water connection		G1/2" (female)			
Water temperature					
pumps with LVO 210		5 – 35 °C			
pumps with LVO 400 / 410		5 – 25 °C			
Minimum supply pressure (free outflow, no counterpressure)	bar(g)	2 [5]			
Minimum supply pressure	bar(g)	6 [5]			
Nominal flow					
Screw		6 l/min	6 l/min	7.5 l/min	7.5 l/min
Roots					
total		6 l/min	6 l/min	7.5 l/min	7.5 l/min
Purge gas					
Connection		plug-in connection D10			
Nom.setting pressure “Purge gas” (at nominal flow, valves open)	bar(g)	2.8 [5] (±5%)			
Permissible setting pressure “Purge gas” (at purge gas flow)	bar(g)	2.8 to 4.5 [5] (±5%)			
Permissible supply pressure “Purge gas”	bar(g)	4.0 to 10.0 bar [5] (±5%)			
Purge gas flow shaft seal 2.8 bar(g) nozzle out- / inlet (d = 0.9 / 2.0 mm)	slm	22 / 92 (±10%)			
Rotor purge gas flow 2.8 bar(g) nozzle inlet (d = 1.0 mm)	slm	28 (± 10 %)			

Additional information regarding the technical data

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U“-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1000 m. If the altitude exceeds 1000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling and permanent operation at nominal power the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

4) The minimum permissible frequency is 20 Hz for both the DRYVAC and the RUVAC.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for 50Hz operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

Technical Data

		DRYVAC-SYSTEM DS					
		25H(U) 45(S/C) b(T)	25H(U) 65(S/C) b(T)	25HF 45(S/C) b(T)	25HF 65(S/C) b(T)	25H(U) 80Sb	25HF 80Sb
Max. pump speed w/o gas ballast 50/60 Hz (± 5 %)	m^3/h	2500 / 3000					
Max. effective pumping speed 50/60 Hz (± 5 %)	m^3/h	2100 / 2400		2150 / 2500		2200 / 2600	3850
Ult. total pressure w/o rotor and inlet purge (± 10 %)	mbar	$< 5 \cdot 10^{-3}$					
Max. permissible inlet pressure	mbar	1013					
Maximum permissible discharge pressure (relative to ambient)	mbar	+200					
Integral leak rate	mbar · l/s	$< 1 \cdot 10^{-4}$					
Water vapor tolerance with purge gas (SV40)	mbar Nl/min	60 ≥ 20					
Water vapor capacity	kg/h	15		25		30	
Permissible ambient temperature	°C	+5 ... +35					
Storage temperature	°C	-10 ... +60					
Noise level (rigid exhaust pipe) [6] Screw Roots	 dB(A) dB(A)	 65 (K_{pA} = 3) < 63				70 (K_{pA} = 3)	
Relative atmospheric humidity		95 %, non-condensing					
Installation location		up to 2000 [2]		up to 1000 [2]		up to 2000 [2]	up to 1000 [2]
Cooling		Water / air					
Mains voltages and frequencies		380 – 440 V 50 Hz / 420 – 480 V 60 Hz					
Frequency (± 5%)	Hz	50 / 60 Hz					
Phases		3-ph					
Rated power 400 V 50 Hz / 460 V 60 Hz (± 0.8) Screw Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	 kW kW kW	 11 6.2 / 7.4 17.2 / 18.4	 15 6.2 / 7.4 21.2 / 22.4	 11 11 22	 15 11 26	 19.6 6.2 / 7.4 25.8/27	 19.6 11 30.6
Rated current (400 V 50 Hz / 460 V 60 Hz) Screw Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	 A A A	 24 / 21 11.6 35.6 / 32.6	 31 / 27 11.6 42 / 38.6	 24 / 21 20 / 17 44 / 38	 31 / 27 20 / 17 51 / 44	 38 11.6 49.6	 38 20 / 17 58 / 55
Power consumption at ultimate pressure (50/60 Hz)		5.6 / 5.7	7.8 / 7.9	6.2 / 6.2	8.4 / 8.4	8.6/8.7	9.2
Motor efficiency class, calculated and configured acc. to EN 60034-30		IE2					
Electrical power rating (400 V 50 Hz / 460 V 60 Hz) Screw Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	 kVA kVA kVA	 17 / 14.9 8.4 25.4 / 23.3	 21.8 / 19.1 8.4 30.2 / 27.5	 17 / 14.9 14.2 / 12.1 31.2 / 27	 21.8 / 19.1 14.2 / 12.1 36 / 31.2	 23 8.4 31.4	 23 14.2 / 12.1 37.2/35.1
Speed Screw / Roots (50 Hz) Screw / Roots (60 Hz)		7200 / 3000/min 7200 / 3600/min					
Min. permissible speed Screw [3] Min. permissible speed Roots (off) [4]		1200/min off					
Protection class	IP	IP54					

Technical Data

		DRYVAC-SYSTEM DS					
		25H(U) 45(S/C) b(T)	25H(U) 65(S/C) b(T)	25HF 45(S/C) b(T)	25HF 65(S/C) b(T)	25H(U) 80Sb	25HF 80Sb
Lubricant filling							
Screw		LVO 210 / 410				LVO 210	
Roots		LVO 210 / 410				LVO 210	
Total lubricant quantity (± 5 %)							
Screw LVO 210	l	1.2					
Screw LVO 410	l	1.2					
Roots LVO 210	l	1.2					
Roots LVO 400	l						
Roots LVO 410	l	1.2					
Intake flange	DN	250 ISO-K					
Discharge flange	DN	63 ISO-K					
Materials (gas contacting components)		Grey cast iron /graphite cast iron / steel/stainless steel /epoxy paint / FKM					
Materials sealing the pump in the chamber to the outside		FKM, grey cast iron					
Weight, approx. (± 40 kg)	kg	1160		1190		1160	1190
Dimensions (L x W x H) (±10 mm)							
Conn. flange, w/o acc., side exhaust		1349 x 700 x 1074 mm					
Conn. flange, w/o acc., rear exhaust		1355 x 660 x 1074 mm					
Water							
Water connection		G1/2" (female)					
Water temperature							
pumps with LVO 210		5 – 35 °C					
pumps with LVO 400 / 410		5 – 25 °C					
Minimum supply pressure (free outflow, no counterpressure)	bar(g)	2 [5]					
Minimum supply pressure	bar(g)	6 [5]					
Nominal flow							
Screw	l/min	6	7.5	6	7.5	10	10
Roots	l/min	2.2	2.2	2.2	2.2	2.2	2.2
total	l/min	8.2	9.7	8.2	9.7	12.2	12.2
Purge-Gas							
Connection		plug-in connection D10					
Nom.setting pressure “Purge gas” (at nominal flow, valves open)	bar(g)	2.8 [5] (±5%)					
Permissible setting pressure “Purge gas” (at purge gas flow)	bar(g)	2.8 to 4.5 [5] (±5%)					
Permissible supply pressure “Purge gas”	bar(g)	4.0 to 10.0 [5] (±5%)					
Purge gas flow shaft seal 2.8 bar(g) nozzle out- / inlet (d = 0.9 / 2.0 mm)	slm	22 / 92 (±10%)				22 / 107 (±10%)	
Rotor purge gas flow 2.8 bar(g) nozzle inlet (d = 1.0 mm)	slm	28 (±10%)					

Additional information regarding the technical data

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U“-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1000 m. If the altitude exceeds 1000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling and permanent operation at nominal power the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

4) The minimum permissible frequency is 20 Hz for both the DRYVAC and the RUVAC.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for 50Hz operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

Technical Data

DRYVAC-SYSTEM DS

		44H(U) 65(S/C) b(T)	44HF 65(S/C) b(T)	44H(U) 80Sb	44HF 80Sb
Max. pump speed w/o gas ballast 50/60 Hz (± 5 %)	m^3/h	4400 / 5280	7040	4400 / 5280	7040
Max. effective pumping speed 50/60 Hz (± 5 %)	m^3/h	3600 / 4200	5150	3700/4300	5250
Ult. total pressure w/o rotor and inlet purge (± 10 %)	mbar	$< 5 \cdot 10^{-3}$			
Max. permissible inlet pressure	mbar	1013			
Maximum permissible discharge pressure (relative to ambient)	mbar	+200			
Integral leak rate	mbar · l/s	$< 1 \cdot 10^{-4}$			
Water vapor tolerance with purge gas (SV40)	mbar Nl/min	60 ≥ 20			
Water vapor capacity	kg/h	25		30	
Permissible ambient temperature	°C	+5 ... +35			
Storage temperature	°C	-10 ... +60			
Noise level (rigid exhaust pipe) [6] Screw Roots	 dB(A) dB(A)	 65 (K_{pA} = 3) < 63		70 (K_{pA} = 3)	
Relative atmospheric humidity		95 %, non-condensing			
Installation location		up to 2000 [2]		up to 1000 [2]	
Cooling		Water			
Mains voltages and frequencies		380 – 440 V 50 Hz 420 – 480 V 60 Hz	380-480 V 50/60 Hz	380 – 440 V 50 Hz 420 – 480 V 60 Hz	380-480 V 50/60 Hz
Frequency (± 5%)	Hz	50 / 60 Hz			
Phases		3-ph			
Rated power 400 V 50 Hz / 460 V 60 Hz (± 0.8) Screw Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	 kW kW kW 	 15 11 18.5 26 33.5	 15 11 26 	 19.6 11 30.6 37.9	 19.6 11 30.6
Rated current (400 V 50 Hz / 460 V 60 Hz) Screw Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	 A A A 	 31 / 27 20 / 17 35 / 29 51 / 44 66 / 56	 31 / 27 20 / 17 51 / 44 	 38 31 / 27 35 / 29 69 / 65 73 / 67	 38 31 / 27 69 / 65
Power consumption at ultimate pressure (50/60 Hz)		8.1 / 8.3 kW	8.9 kW	8.2 / 8.3 kW	8.5 kW
Motor efficiency class, calculated and configured acc. to EN 60034-30		IE2			
Electrical power rating (400 V 50 Hz / 460 V 60 Hz) Screw Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	 kVA kVA kVA 	 21.8 / 19.1 14.2 / 12.1 24.6 / 20.4 36 / 31.2 46.4 / 39.5	 21.8 / 19.1 14.2 / 12.1 36 / 31.2 	 23 14.2 / 12.1 24.6 / 20.4 37.2 / 35.1 47.6 / 43.4	 23 14.2 / 12.1 37.2 / 35.1
Speed Screw / Roots (50 Hz) Screw / Roots (60 Hz)		7200 / 3000/min 7200 / 3600/min	7200 / 4800/min 7200 / 4800/min	7200 / 3000/min 7200 / 3600/min	7200 / 4800/min 7200 / 4800/min
Min. permissible speed Screw [3] Min. permissible speed Roots (off) [4]		1200/min off	1200/min 1.200/min	1200/min off	1200/min 1.200/min
Protection class	IP	IP54			

Technical Data

		DRYVAC-SYSTEM DS			
		44H(U) 65(S/C) b(T)	44HF 65(S/C) b(T)	44H(U) 80Sb	44HF 80Sb
Lubricant filling					
Screw		LVO 210 / 410		LVO 210	
Roots		LVO 210 / 410		LVO 210	
Total lubricant quantity (± 5 %)					
Screw LVO 210	l	1.2			
Screw LVO 410	l	1.2			
Roots LVO 210	l	4.75			
Roots LVO 400	l	4.75			
Roots LVO 410	l				
Intake flange	DN	250 ISO-K	320 ISO-K	250 ISO-K	320 ISO-K
Discharge flange	DN	63 ISO-K			
Materials (gas contacting components)		Grey cast iron /graphite cast iron / steel/stainless steel /epoxy paint / FKM			
Materials sealing the pump in the chamber to the outside		FKM, grey cast iron			
Weight, approx. (± 40 kg)	kg	1370	1400	1370	1400
Dimensions (L x W x H) (±10 mm)					
Conn. flange, w/o acc., side exhaust		1349 x 700 x 1074 mm			
Conn. flange, w/o acc., rear exhaust		1355 x 660 x 1074 mm			
Water					
Water connection		G1/2" (female)			
Water temperature					
pumps with LVO 210		5 – 35 °C			
pumps with LVO 400 / 410		5 – 25 °C			
Minimum supply pressure (free outflow, no counterpressure)	bar(g)	2 [5]			
Minimum supply pressure	bar(g)	6 [5]			
Nominal flow					
Screw	l/min	7.5		10	
Roots	l/min	5.7		5.7	
total	l/min	13.2		15.7	
Purge-Gas					
Connection		plug-in connection D10			
Nom.setting pressure “Purge gas” (at nominal flow, valves open)	bar(g)	2.8 [5] (±5%)			
Permissible setting pressure “Purge gas” (at purge gas flow)	bar(g)	2.8 to 4.5 [5] (±5%)			
Permissible supply pressure “Purge gas”	bar(g)	4.0 to 10.0 [5] (±5%)			
Purge gas flow shaft seal 2.8 bar(g) nozzle out- / inlet (d = 0.9 / 2.0 mm)	slm	22 / 92 (±10%)		22 / 107 (±10%)	
Rotor purge gas flow 2.8 bar(g) nozzle inlet (d = 1.0 mm)	slm	28 (±10%)			

Additional information regarding the technical data

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U“-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1000 m. If the altitude exceeds 1000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling and permanent operation at nominal power the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

4) The minimum permissible frequency is 20 Hz for both the DRYVAC and the RUVAC.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for 50Hz operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

Technical Data

DRYVAC-SYSTEM DS

		70H(U) 65(S/C) b(T)	70HF 65(S/C) b(T)	70H(U) 80Sb	70HF 80Sb
Max. pump speed w/o gas ballast 50/60 Hz (± 5 %)	m^3/h	7040 / 8400	9800	7040 / 8400	9800
Max. effective pumping speed 50/60 Hz (± 5 %)	m^3/h	5200	6800	5400/6250	6970
Ult. total pressure w/o rotor and inlet purge (± 10 %)	mbar	$< 5 \cdot 10^{-3}$			
Max. permissible inlet pressure	mbar	1013			
Maximum permissible discharge pressure (relative to ambient)	mbar	+200			
Integral leak rate	mbar · l/s	$< 1 \cdot 10^{-4}$			
Water vapor tolerance with purge gas (SV40)	mbar Nl/min	60 ≥ 20			
Water vapor capacity	kg/h	25		30	
Permissible ambient temperature	°C	+5 ... +35			
Storage temperature	°C	-10 ... +60			
Noise level (rigid exhaust pipe) [6] Screw Roots	 dB(A) dB(A)	 65 (K_{pA} = 3) < 63		70 (K_{pA} = 3)	
Relative atmospheric humidity		95 %, non-condensing			
Installation location		bis 2000 [2]		bis 1000 [2]	
Cooling		Water			
Mains voltages and frequencies		380 – 440 V 50 Hz 420 – 480 V 60 Hz	380 – 480 V 50/60 Hz	380 – 440 V 50 Hz 420 – 480 V 60 Hz	380 – 480 V 50/60 Hz
Frequency (± 5%)	Hz	50 / 60 Hz			
Phases		3-ph			
Rated power 400 V 50 Hz / 460 V 60 Hz (± 0.8) Screw Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	 kW kW kW 	 15 kW 11 kW 18.5 kW 26 kW 33.5 kW	 15 11 26 	 19.6 11 30.6 37.9	 19.6 11 30.6
Rated current (400 V 50 Hz / 460 V 60 Hz) Screw Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	 A A A 	 31 / 27 20 / 17 35 / 29 51 / 44 66 / 56	 31 / 27 20 / 17 51 / 44 	 38 31 / 27 35 / 29 69 / 65 73 / 67	 38 31 / 27 69/65
Power consumption at ultimate pressure (50/60 Hz)		8.1 / 8.3 kW	8.6 kW	8.4 / 8.5 kW	8.7 kW
Motor efficiency class, calculated and configured acc. to EN 60034-30		IE2			
Electrical power rating (400 V 50 Hz / 460 V 60 Hz) Screw Roots Roots with 18.5 kW (U) totalling totalling with 18.5 kW (U)	 kVA kVA kVA 	 21.8 / 19.1 14.2 / 12.1 24.6 / 20.4 36 / 31.2 46.4 / 39.5	 21.8 / 19.1 14.2 / 12.1 36 / 31.2 	 23 14.2 / 12.1 24.6 / 20.4 37.2/35.1 47.6/43.4	 23 14.2 / 12.1 37.2/35.1
Speed Screw / Roots (50 Hz) Screw / Roots (60 Hz)		7200 / 3000/min 7200 / 3600/min	7200 / 4200/min 7200 / 4200/min	7200 / 3000/min 7200 / 3600/min	7200 / 4200/min 7200 / 4200/min
Min. permissible speed Screw [3] Min. permissible speed Roots (off) [4]		1200/min off	1200/min 1.200/min	1200/min off	1200/min 1.200/min
Protection class	IP	IP54			

Technical Data

DRYVAC-SYSTEM DS

		70H(U) 65(S/C) b(T)	70HF 65(S/C) b(T)	70H(U) 80Sb	70HF 80Sb
Lubricant filling					
Screw		LVO 210 / 410		LVO 210	
Roots		LVO 210 / 410		LVO 210	
Total lubricant quantity (± 5 %)					
Screw LVO 210	l	1.2			
Screw LVO 410	l	1.2			
Roots LVO 210	l	4.75			
Roots LVO 400	l	4.75			
Roots LVO 410	l				
Intake flange	DN	250 ISO-K	320 ISO-K	250 ISO-K	320 ISO-K
Discharge flange	DN	63 ISO-K			
Materials (gas contacting components)		Grey cast iron /graphite cast iron / steel/stainless steel /epoxy paint / FKM			
Materials sealing the pump in the chamber to the outside		FKM, grey cast iron			
Weight, approx. (± 40 kg)	kg	1465	1495	1465	1495
Dimensions (L x W x H) (±10 mm)					
Conn. flange, w/o acc., side exhaust		1460x700x1076			
Conn. flange, w/o acc., rear exhaust		1460x660x1076			
Water					
Water connection		G1/2" (female)			
Water temperature					
pumps with LVO 210		5 – 35 °C			
pumps with LVO 400 / 410		5 – 25 °C			
Minimum supply pressure (free outflow, no counterpressure)	bar(g)	2 [5]			
Minimum supply pressure	bar(g)	6 [5]			
Nominal flow					
Screw	l/min	7.5		10	
Roots	l/min	5.7		5.7	
total	l/min	13.2		15.7	
Purge-Gas					
Connection		plug-in connection D10			
Nom.setting pressure “Purge gas” (at nominal flow, valves open)	bar(g)	2.8 [5] (±5%)			
Permissible setting pressure “Purge gas” (at purge gas flow)	bar(g)	2.8 to 4.5 [5] (±5%)			
Permissible supply pressure “Purge gas”	bar(g)	4.0 to 10.0 [5] (±5%)			
Purge gas flow shaft seal 2.8 bar(g) nozzle out- / inlet (d = 0.9 / 2.0 mm)	slm	22 / 92 (±10%)		22 / 107 (±10%)	
Rotor purge gas flow 2.8 bar(g) nozzle inlet (d = 1.0 mm)	slm	28 (±10%)			

Additional information regarding the technical data

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U“-pumps).

2) The frequency converter standard ratings are valid for an installation altitude up to 1000 m. If the altitude exceeds 1000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling and permanent operation at nominal power the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

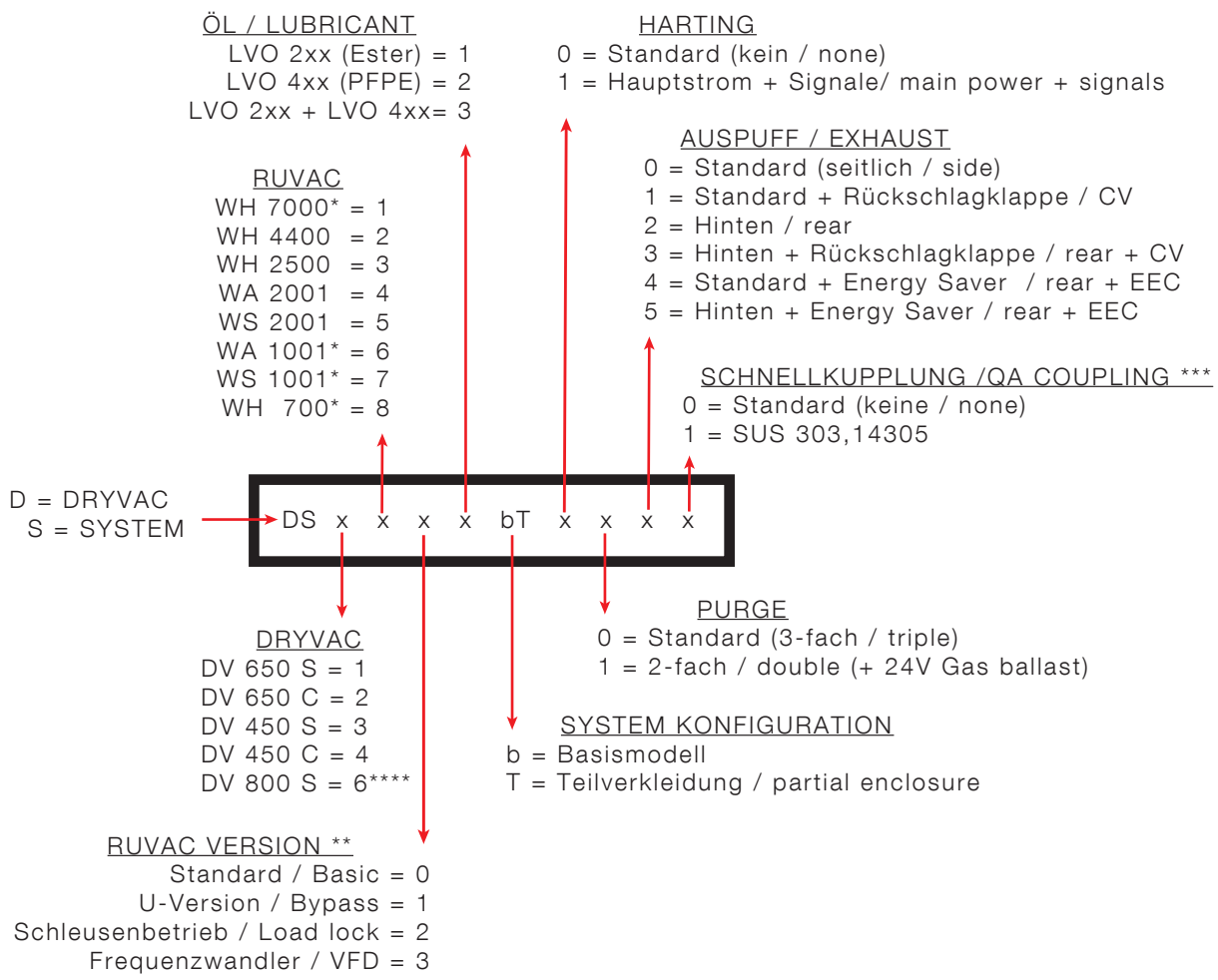
4) The minimum permissible frequency is 20 Hz for both the DRYVAC and the RUVAC.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for 50Hz operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.

Configuration matrix

Part numbers for DRYVAC SYSTEMS are based on the matrix shown in the figure above and give hints on the individual configuration and features of the pump combination in question:



* auf Anfrage; wenden Sie sich an Leybold Köln / upon request; pls. contact Leybold Cologne

** Hinweis: wenden Sie sich an Leybold für den FW-Einsatz mit RUVAC WA & WS / Note: pls. contact Leybold for operating RUVAC WA & WS + VFD

*** für Kupplungsgegenstücke wenden Sie sich an Leybold Köln / for counter couplings pls. contact Leybold Cologne

**** nicht alle Kombinationen sind mit der DV 800 möglich. Bitte wenden Sie sich zur Beratung an Leybold / not every combination is possible with the DV 800. Please contact Leybold for advice.

Ordering Information

DRYVAC SYSTEMS

Part No.	Description	Lubricants Screw	Lubricants Roots	Purge gas module	Exhaust / Check valve	Quick-release coupling (one-sided)
DS3411b0000	DS 20AU45S-b	LVO210	LVO210	triple	side / no	no
DS1411b0000	DS 20AU65S-b	LVO210	LVO210	triple	side / no	no
DS3301b0000	DS 25H45S-b	LVO210	LVO210	triple	side / no	no
DS1201b0000	DS 44H65S-b	LVO210	LVO210	triple	side / no	no
DS1211b0000	DS 44HU65S-b	LVO210	LVO210	triple	side / no	no
DS1212b0000	DS 44HU65S-b	LVO4x0	LVO4x0	triple	side / no	no
DS2512b0000	DS 20SU65C-b	LVO4x0	LVO4x0	triple	side / no	no
DS1511b0000	DS 20SU65S-b	LVO210	LVO210	triple	side / no	no
DS1301b0000	DS 25H65S-b	LVO210	LVO210	triple	side / no	no
DS1311b0000	DS 25HU65S-b	LVO210	LVO210	triple	side / no	no
DS1312b0000	DS 25HU65S-b	LVO4x0	LVO4x0	triple	side / no	no
DS3511b0000	DS 20SU45S-b	LVO210	LVO210	triple	side / no	no

... to be continued

Accessories

	Part No.
Synthetic Oil LEYBONOL LVO 210, 1 l	**L21001**
Synthetic Oil LEYBONOL LVO 210, 5 l	**L21005**
PFPE LEYBONOL LVO 400, 1 l	**L40001**
PFPE LEYBONOL LVO 410, 1 l	**L41001**
Non-return valve DRYVAC, DN 63 ISO-K	**112005A15**
Silencer DN 63 ISO-K for DRYVAC SYSTEMS	**119002**
Serviceable Silencer DN 63 ISO-K for DRYVAC SYSTEMS	**119003V**
External Display	**155213V**
Purge gas nozzle set for DRYVAC	**112005A30**
Permanent purge gas inlet kit	**112005A32**
Ground fixation	**503637V001**
Rotatable crane eyes (M 20 x 30; set of 4)	**504397V901**

GSD file and manual for the Profibus interface see the Leybold homepage.

Dry Compressing Pump Systems DRYVAC Smart System Configuration



The two-stage DRYVAC SYSTEMS consist of a combination of dry compressing Roots pumps and screw pumps. The Roots pump installed on top of the backing pump serves as a booster for increasing the pumping speed.

Various types of pumps may be used with DRYVAC SYSTEMS:

Roots Pumps

RUVAC WA
RUVAC WAU
RUVAC WH
RUVAC WHU
RUVAC WS
RUVAC WSU

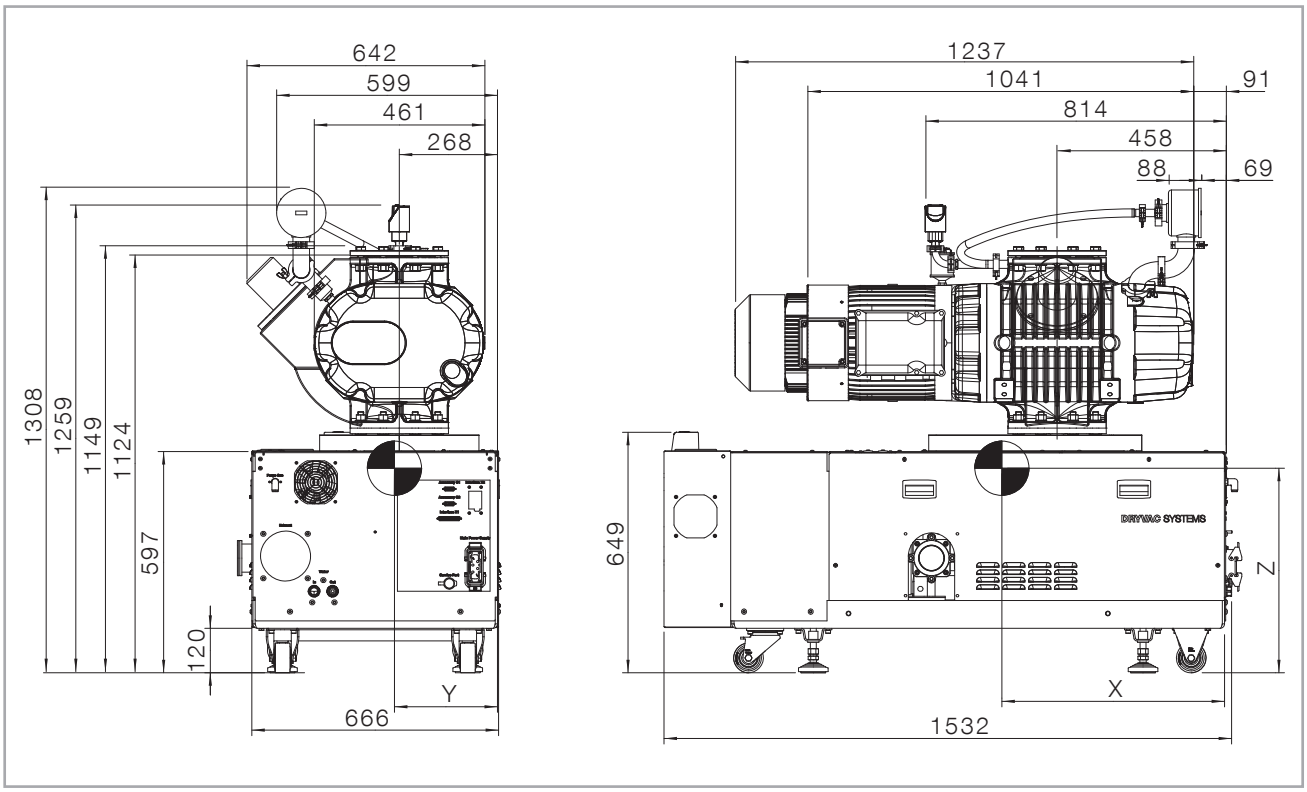
Backing Pumps

DRYVAC DV S
DRYVAC DV C

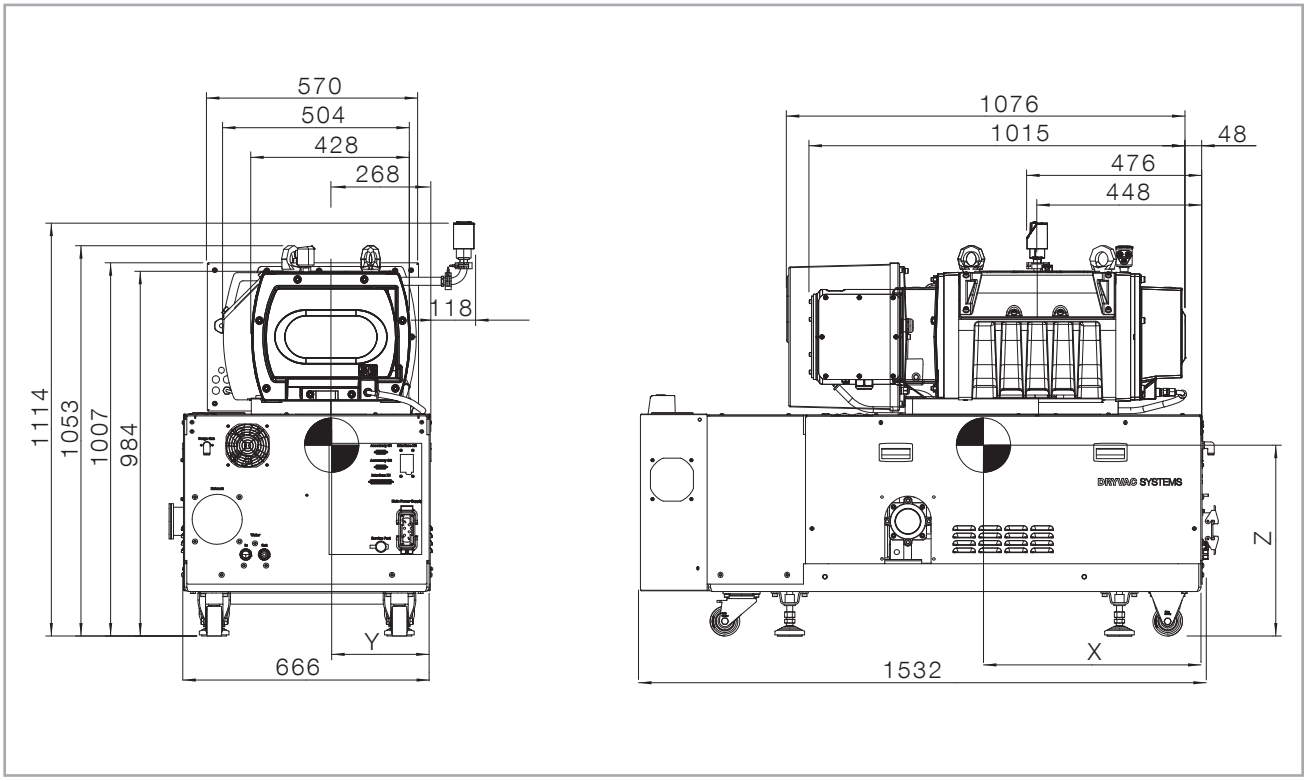
All DRYVAC SYSTEMS (i versions) described hereinafter are equipped with:

- Microcontroller with touchscreen
- Connectivity options for gauge heads
- Harting connections (power supply)
- Digital I/O communication interface (DC37-P)
- Housing, castors and adjustable feet

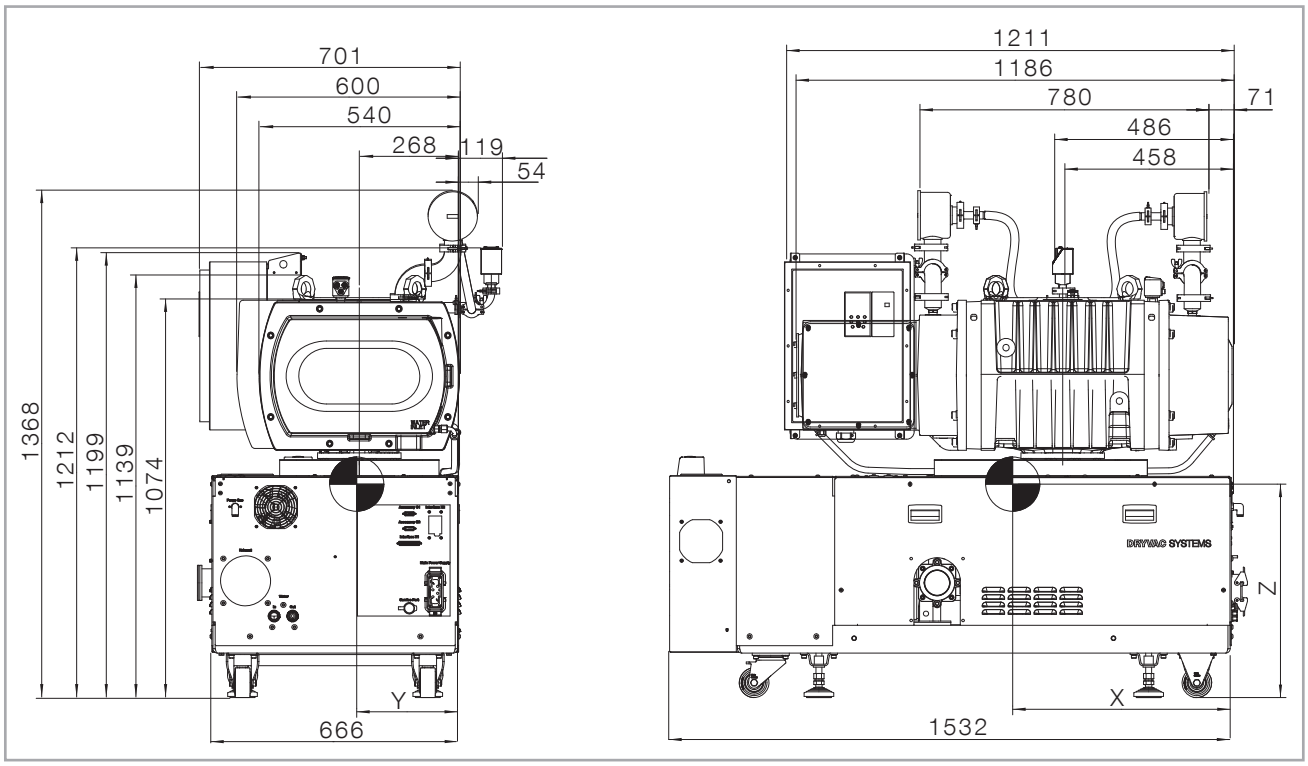
They are water-cooled and lubricated either with synthetic oil or PFPE.



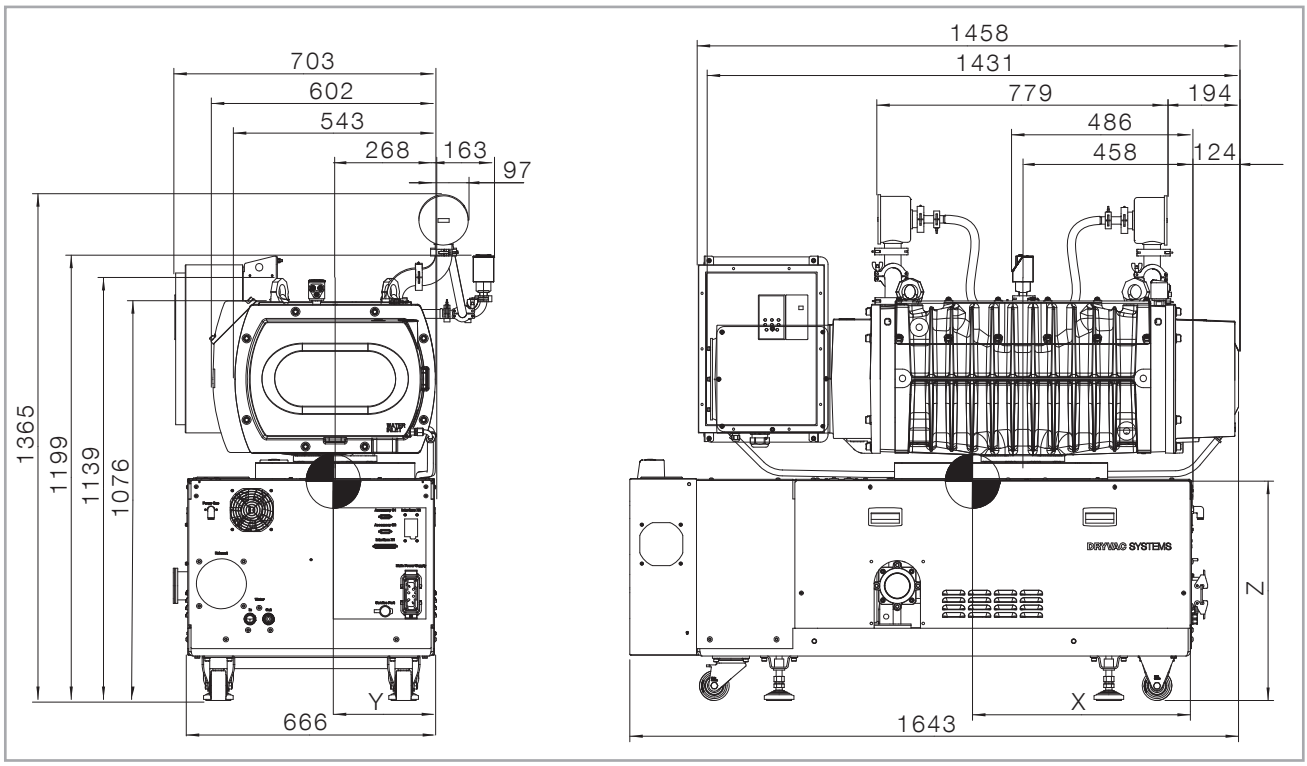
Dimensional drawing for DS 20A(U) 45(S/C) iT, DS 20A(U) 65(S/C) iT, DS 20S(U) 45(S/C) iT, DS 20S(U) 65(S/C) iT (Dimensions in mm)



Dimensional drawing for DS 25H(U) 45(S/C) iT, DS25H(U) 65(S/C) iT, DS 25HF 45(S/C) iT, DS 25HF 65(S/C) iT (Dimensions in mm)



Dimensional drawing for DS 44H(U) 45(S/C) iT, DS 44H(U) 65(S/C) iT, DS 44HF 65(S/C) iT (Dimensions in mm)



Dimensional drawing for DS 70H(U) 65(S/C) iT, DS 70HF 65(S/C) iT (Dimensions in mm)

Notes

Technical Data

	DRYVAC SYSTEMS DS			
	20A(U) 45(S/C) iT	**20S(U) 45(S/C) iT**	**20A(U) 65(S/C) iT**	**20S(U) 65(S/C) iT**
Max. pump speed w/o gas ballast (50/60 Hz) (± 5 %)	2000 / 2400 m^3/h			
Max. effective pumping speed (50/60 Hz) (± 5 %)	1600 / 1850 m^3/h		1750 / 2050 m^3/h	
Ult. total pressure w/o rotor and inlet purge (± 10 %)	$\leq 5 \times 10^{-3}$ mbar			
Maximum permissible inlet pressure	1013 mbar			
Maximum permissible discharge pressure (relative to ambient)	+200 mbar			
Integral leak rate	$< 5 \times 10^{-4}$ mbar x l/s	$< 1 \times 10^{-4}$ mbar x l/s	$< 5 \times 10^{-4}$ mbar x l/s	$< 1 \times 10^{-4}$ mbar x l/s
Water vapor tolerance with purge gas (SV40)	60 mbar ≥ 20 Nl/min			
Water vapor capacity	15 kg/h		25 kg/h	
Permissible ambient temperature	+5 ... + 35 °C			
Lagerungstemperatur	-10 ... + 60 °C			
Noise level (rigid exhaust pipe) [6]				
Screw	65 dB(A) (K_{pA} = 3 dB)			
Roots	< 80 dB(A)	< 72 dB(A)	< 80 dB(A)	< 72 dB(A)
Relative atmospheric humidity	95 %, non condensing			
Installation location	up to 2000 m (NHN) [2]			
Cooling	Water / air			
Mains voltages and frequencies	380 – 440 V 50 Hz / 420 – 480 V 60 Hz			
Frequency (± 5 %)	50 / 60 Hz			
Phases	3-ph			
Rated power at 400 V 50 Hz / 460 V 60 Hz at 400 V 50 Hz / 460 V 60 Hz with RUVAC 18,5 kW	18.5 kW	18.5 / 19.5 kW	22.5 kW	22.5 / 23.5 kW
Rated current at 400 V 50 Hz / 460 V 60Hz	38.1 / 33,5 A	39.5 / 36.5 A	45.1 / 39.5 A	46.5 / 42.5 A
Power consumption at ultimate pressure				
Motor efficiency class, calculated and configured acc. to EN 60034-30	IE2			
Electrical power rating				
400V 50Hz	26.4 kVA	27.4 kVA	31.2 kVA	32.2 kVA
460V 60Hz	23.2 kVA	25.3 kVA	27.4 kVA	29.4 kVA
RUVAC rated current f. motor protection 380 – 440 V 50 Hz / 420 – 480 V 60 Hz	14 / 12 A	15 / 15 A	14 / 12 A	15 / 15 A
Speed Screw / Roots (50 Hz)	7200 / 3000 rpm			
Screw / Roots (60 Hz)	7200 / 3600 rpm			
Min. permissible speed Screw [3]	1200 rpm			
Min. permissible speed Roots (off) [4]	off			
Protection class	IP20			

Technical Data

	DRYVAC-SYSTEM DS			
	20A(U) 45(S/C) iT	20S(U) 45(S/C) iT	20A(U) 65(S/C) iT	20S(U) 65(S/C) iT
Lubricant filling Screw Roots	 LVO 210 / 410 LVO 210	 LVO 210 / 410 LVO 210 / 400	 LVO 210 / 410 LVO 210	 LVO 210 / 410 LVO 210 / 400
Total lubricant quantity (± 5 %) Screw LVO 210 Screw LVO 410 Roots LVO 210 Roots LVO 400 Roots LVO 410	 1.2 l 1.2 l 3.6 l	 1.2 l 1.2 l 3.6 l 2.7 l	 1.2 l 1.2 l 3.6 l	 1.2 l 1.2 l 3.6 l 2.7 l
Intake flange	DN 160 ISO-K			
Discharge flange	DN 63 ISO-K			
Materials (components in contact with gas in the pump chamber) Materials sealing the pump off in the pump chamber towards the outside	Grey cast iron /graphite cast iron / steel/stainless steel /epoxy paint / FKM FKM, grey cast iron			
Weight, approx. (± 40 kg)	1156 kg	1215 kg	1156 kg	1215 kg
Dimensions (L x W x H) Conn. flange, w/o acc., side exhaust Conn. flange, w/o acc., rear exhaust w acc., side exhaust (cf. hint [2]) w acc., rear exhaust (cf. hint [3])	 1532 x 708 x 1124 mm 1532 x 666 x 1124 mm			
Water				
Water connection	G1/2" (female)			
Water temperature pumps with LVO 210 pumps with LVO 400 / 410	 5 – 35 °C 5 – 25 °C			
Minimum supply pressure (unobstructed discharge, no backpressure)	2 bar(g) [5]			
Maximum supply pressure	6 bar(g) [5]			
Nominal flow Screw Roots total	 6 l/min 6 l/min	 6 l/min 6 l/min	 7.5 l/min 7.5 l/min	 7.5 l/min 7.5 l/min
Purge gas				
Connection	plug-in connection D10			
Nominal setting pressure “Purge gas” (at nominal flow, valves open)	2.8 bar(g) [5] (± 5 %)			
Permissible setting pressure “Purge gas” (at purge gas flow)	2.8 to 4.5 bar(g) [5] (± 5 %)			
Permissible supply pressure “Purge gas”	4.0 to 10.0 bar(g) [5] (± 5 %)			
Purge gas flow shaft seal 2.8 bar(g) nozzle out- / inlet (d = 0.9 / 2.0 mm)	22 / 92 slm (± 10 %)			
Rotor purge gas flow 2.8 bar(g) nozzle inlet (d = 1.0 mm)	28 slm (± 10 %)			

Technical Data

DRYVAC-SYSTEM DS

	25H(U) 45(S/C) iT	25H(U) 65(S/C) iT	25HF 45(S/C) iT	25HF 65(S/C) iT
Max. pump speed w/o gas ballast (50/60 Hz) (± 5 %)	2500 / 3000 m^3/h ± 5 %		5000 m^3/h ± 5 %	
Max. effective pumping speed (50/60 Hz) (± 5 %)	2100 / 2400 m^3/h	2150 / 2500 m^3/h	3500 m^3/h	3750 m^3/h
Ult. total pressure w/o rotor and inlet purge (± 10 %)	< 5 x 10^{-3} mbar			
Maximum permissible inlet pressure	1013 mbar			
Maximum permissible discharge pressure (relative to ambient)	+200 mbar			
Integral leak rate	< 1 x 10^{-4} mbar x l/s			
Water vapor tolerance with purge gas (SV40)	60 mbar ≥ 20 Nl/min			
Water vapor capacity	15 kg/h	25 kg/h	15 kg/h	25 kg/h
Permissible ambient temperature	+5 ... + 35 °C			
Lagerungstemperatur	-10 ... + 60 °C			
Noise level (rigid exhaust pipe) [6] Screw Roots	65 dB(A) (K_{pA} = 3 dB) < 63 dB(A)			
Relative atmospheric humidity	95 %, non condensing			
Installation location	up to 2000 m (NHN) [2]		up to 1000 m (NHN) [2]	
Cooling	Water			
Mains voltages and frequencies	380 – 440 V 50 Hz / 420 – 480 V 60 Hz		380 – 480 V 50/60 Hz	
Frequency (± 5 %)	50 / 60 Hz			
Phases	3-ph			
ated power at 400 V 50 Hz / 460 V 60 Hz at 400 V 50 Hz / 460 V 60 Hz with RUVAC 18,5 kW	17.2 / 18.5 kW	21.1/ 22.5 kW	22 kW	26 kW
Rated current at 400 V 50 Hz / 460 V 60 Hz	36.1 / 33.1 A	43.1 / 39.1 A	44.5 / 38.5 A	51.5 / 44.5 A
Power consumption at ultimate pressure	5.6 / 5.7 kW	7.8 / 7.9 kW	6.2 / 6.2 kW	8.4 / 8.4 kW
Motor efficiency class, calculated and configured acc. to EN 60034-30	IE2			
Electrical power rating 400V 50Hz 460V 60Hz	25 kVA 22.9 kVA	29.9 kVA 27.1 kVA	30.8 kVA 26.7 kVA	35.7 kVA 30.8 kVA
RUVAC rated current f. motor protection 380 – 440 V 50 Hz / 420 – 480 V 60 Hz	12 / 12 A	12 / 12 A		
Speed Screw / Roots (50 Hz) Screw / Roots (60 Hz)	7200 / 3000 rpm 7200 / 3600 rpm		7200 / 6000 rpm 7200 / 6000 rpm	
Min. permissible speed Screw 3) Min. permissible speed Roots (off) 4)	1200 rpm off		1200 rpm 1200 rpm	
Protection class	IP 20			

Technical Data

	DRYVAC-SYSTEM DS			
	25H(U) 45(S/C) iT	25H(U) 65(S/C) iT	25HF 45(S/C) iT	25HF 65(S/C) iT
Lubricant filling				
Screw	LVO 210 / 410			
Roots	LVO 210 / 410			
Total lubricant quantity (± 5 %)				
Screw LVO 210	1.2 l			
Screw LVO 410	1.2 l			
Roots LVO 210	1.2 l			
Roots LVO 400				
Roots LVO 410	1.2 l			
Intake flange	DN 250 ISO-K			
Discharge flange	DN 63 ISO-K			
Materials (components in contact with gas in the pump chamber)	Grey cast iron /graphite cast iron / steel/stainless steel /epoxy paint / FKM			
Materials sealing the pump off in the pump chamber towards the outside	FKM, grey cast iron			
Weight, approx. (± 40 kg)	1160 kg		1190 kg	
Dimensions (L x W x H)				
Conn. flange, w/o acc., side exhaust	1532 x 708 x 984 mm			
Conn. flange, w/o acc., rear exhaust	1532 x 666 x 984 mm			
w acc., side exhaust (cf. hint [2])				
w acc., rear exhaust (cf. hint [3])				
Water				
Water connection	G1/2" (female)			
Water temperature				
pumps with LVO 210	5 – 35 °C			
pumps with LVO 400 / 410	5 – 25 °C			
Minimum supply pressure (unobstructed discharge, no backpressure)	2 bar(g) [5]			
Maximum supply pressure	6 bar(g) [5]			
Nominal flow				
Screw	6 l/min	7.5 l/min	6 l/min	7.5 l/min
Roots	2.2 l/min	2.2 l/min	2.2 l/min	2.2 l/min
total	8.2 l/min	9.7 l/min	8.2 l/min	9.7 l/min
Purge gas				
Connection	plug-in connection D10			
Nominal setting pressure “Purge gas” (at nominal flow, valves open)	2.8 bar(g) [5] (± 5 %)			
Permissible setting pressure “Purge gas” (at purge gas flow)	2.8 to 4.5 bar(g) [5] (± 5 %)			
Permissible supply pressure “Purge gas”	4.0 to 10.0 bar(g) [5] (± 5 %)			
Purge gas flow shaft seal 2.8 bar(g) nozzle out- / inlet (d = 0.9 / 2.0 mm)	22 / 92 slm (± 10 %)			
Rotor purge gas flow 2.8 bar(g) nozzle inlet (d = 1.0 mm)	28 slm (± 10 %)			

Technical Data

	DRYVAC-SYSTEM DS			
	44H(U) 65(S/C) iT	44HF 65(S/C) iT	70H(U) 65(S/C) iT	70HF 65(S/C) iT
Max. pump speed w/o gas ballast (50/60 Hz) (± 5 %)	4400 / 5280 m^3/h	7040 m^3/h	7040 / 8400 m^3/h	9 800 m^3/h
Max. effective pumping speed (50/60 Hz) (± 5 %)	3600 / 4200 m^3/h	5150 m^3/h	5200 m^3/h	6 800 m^3/h
Ult. total pressure w/o rotor and inlet purge (± 10 %)	< 5 x 10^{-3} mbar			
Maximum permissible inlet pressure	1013 mbar			
Maximum permissible discharge pressure (relative to ambient)	+200 mbar			
Integral leak rate	< 1 x 10^{-4} mbar x l/s			
Water vapor tolerance with purge gas (SV40)	60 mbar ≥ 20 Nl/min			
Water vapor capacity	25 kg/h			
Permissible ambient temperature	+5 ... + 35 °C			
Lagerungstemperatur	-10 ... + 60 °C			
Noise level (rigid exhaust pipe) [6] Screw Roots	65 dB(A) (K_{pA} = 3 dB) < 63 dB(A)			
Relative atmospheric humidity	95 %, non condensing			
Installation location	up to 2000 m	up to 1000 m	up to 2000 m	up to 1000 m
Cooling	Water			
Mains voltages and frequencies	380 – 440 V 50 Hz 420 – 480 V 60 Hz	380 – 480 V 50/60 Hz	380 – 440 V 50 Hz 420 – 480 V 60 Hz	380 – 480 V 50/60 Hz
Frequency (± 5 %)	50 / 60 Hz			
Phases	3-ph			
ated power at 400 V 50 Hz / 460 V 60 Hz at 400 V 50 Hz / 460 V 60H z with RUVAC 18,5 kW	26 kW			
Rated current at 400 V 50 Hz / 460 V 60 Hz	51.5 / 44.5 A	51.5 / 44.5 A	51.5 / 44.5 A	51.5 / 44.5 A
Power consumption at ultimate pressure	8.1 / 8.3 kW	8.9 kW	8.1 / 8.3 kW	8.6 kW
Motor efficiency class, calculated and configured acc. to EN 60034-30	IE2			
Electrical power rating 400V 50 Hz 460V 60 Hz	35.7 kVA 30.8 kVA			
RUVAC rated current f. motor protection 380 – 440V 50Hz / 420 – 480V 60Hz	20 / 17 A		20 / 17 A	
Speed Screw / Roots (50 Hz) Screw / Roots (60 Hz)	35 / 29 A		35 / 29 A	
Min. permissible speed Screw [3] Min. permissible speed Roots (off) [4]	7200 / 3000 rpm 7200 / 3600 rpm	7200 / 4800 rpm 7200 / 4800 rpm	7200 / 3,000 rpm 7200 / 3,600 rpm	7200 / 4200 rpm 7200 / 4200 rpm
Protection class	1200 rpm off	1200 rpm 1200 rpm	1200 rpm off	
Schutzart	IP20			
Lubricant filling Screw Roots	LVO 210 / 410 LVO 210 / 400			
Total lubricant quantity (± 5 %) Screw LVO 210 Screw LVO 410 Roots LVO 210 Roots LVO 400 Roots LVO 410	1.2 l 1.2 l 4.75 l 4.75 l 4.75 l			

Technical Data

	DRYVAC-SYSTEM DS			
	44H(U) 65(S/C) iT	44HF 65(S/C) iT	70H(U) 65(S/C) iT	70HF 65(S/C) iT
Intake flange	DN 250 ISO-K	DN 320 ISO-K		
Discharge flange	DN 63 ISO-K			
Materials (components in contact with gas in the pump chamber) Materials sealing the pump off in the pump chamber towards the outside	Grey cast iron /graphite cast iron / steel/stainless steel /epoxy paint / FKM FKM, grey cast iron			
Weight, approx. (± 40 kg)	1370 kg	1400 kg	1465 kg	1495 kg
Dimensions (L x W x H) Conn. flange, w/o acc., side exhaust Conn. flange, w/o acc., rear exhaust w acc., side exhaust (cf. hint [2]) w acc., rear exhaust (cf. hint [3])	1532 x 708 x 1074 mm 1532 x 666 x 1074 mm		1643 x 708 x 1074 mm 1643 x 666 x 1074 mm	
Water				
Water connection	G1/2" (female)			
Water temperature pumps with LVO 210 pumps with LVO 400 / 410	5 – 35 °C 5 – 25 °C			
Minimum supply pressure (unobstructed discharge, no backpressure)	2 bar(g) [5]			
Maximum supply pressure	6 bar(g) [5]			
Nominal flow Screw Roots total	7.5 l/min 5.7 l/min 13.2 l/min			
Purge gas				
Connection	plug-in connection D10			
Nominal setting pressure “Purge gas” (at nominal flow, valves open)	2.8 bar(g) [5] (± 5 %)			
Permissible setting pressure “Purge gas” (at purge gas flow)	2.8 to 4.5 bar(g) [5] (± 5 %)			
Permissible supply pressure “Purge gas”	4.0 to 10.0 bar(g) [5] (± 5 %)			
Purge gas flow shaft seal 2.8 bar(g) nozzle out- / inlet (d = 0.9 / 2.0 mm)	22 / 92 slm (± 10 %)			
Rotor purge gas flow 2.8 bar(g) nozzle inlet (d = 1.0 mm)	28 slm (± 10 %)			

Additional information regarding the technical data

1) Noise levels of > 100 dB(a) may occur with cyclic operation conditions, e.g. with load-lock operations or plain pump-downs, In this case we recommend to use RUVAC pumps with a pressure balance line („U“-pumps).

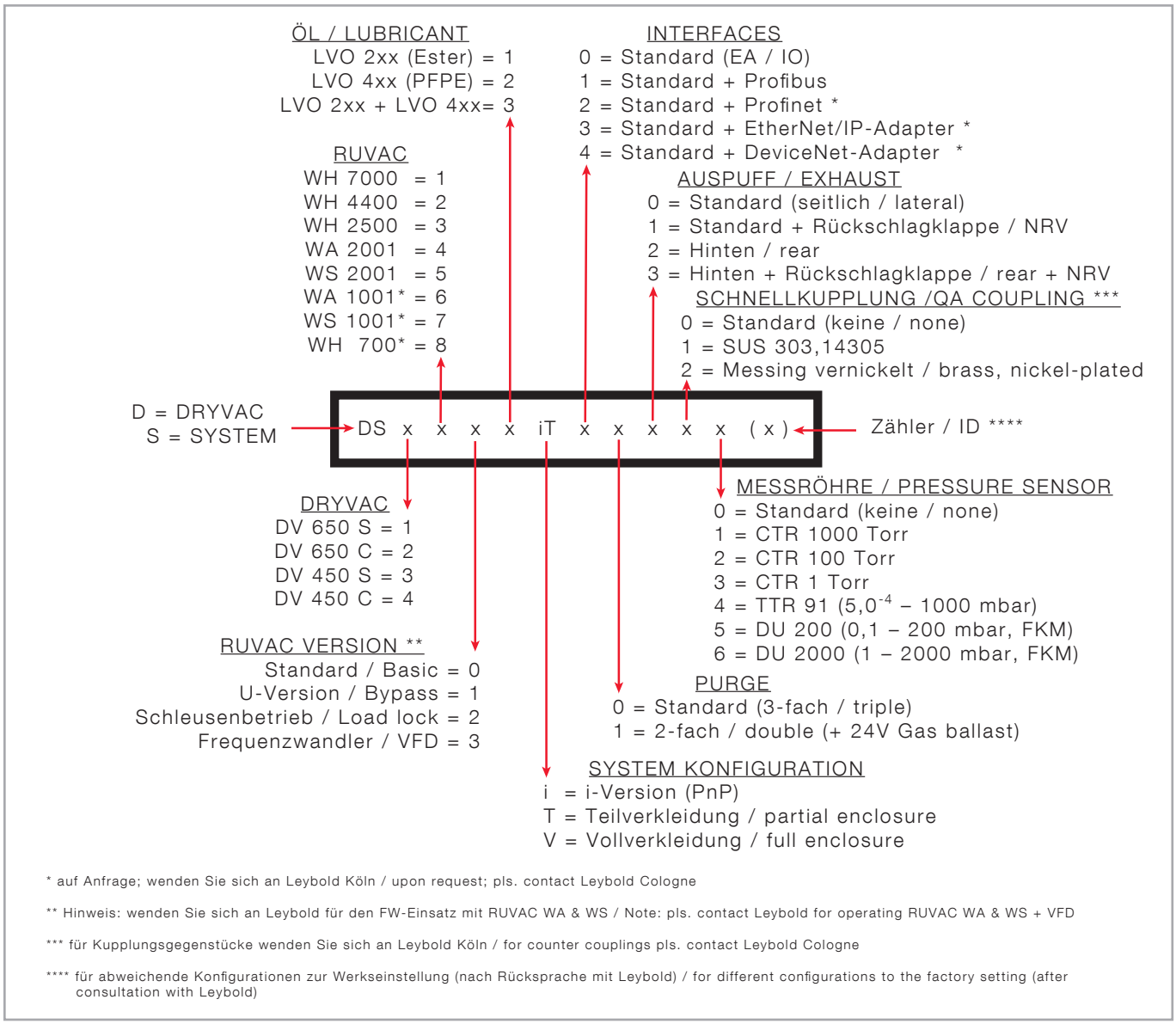
2) The frequency converter standard ratings are valid for an installation altitude up to 1000 m. If the altitude exceeds 1000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

3) In case of overvoltage (> 480 V), bad cooling and permanent operation at nominal power the output power may be reduced in order to prevent thermal overload of the frequency converter. In case of undervoltage (< 380 V) the maximum power is not available by design.

4) The minimum permissible frequency is 20 Hz for both the DRYVAC and the RUVAC.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

5) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

6) Valid for 50Hz operations at ult. pressure conditions. Higher speeds, especially pressures >10 mbar, generate higher noise levels.



* auf Anfrage; wenden Sie sich an Leybold Köln / upon request; pls. contact Leybold Cologne

** Hinweis: wenden Sie sich an Leybold für den FW-Einsatz mit RUVAC WA & WS / Note: pls. contact Leybold for operating RUVAC WA & WS + VFD

*** für Kupplungsgegenstücke wenden Sie sich an Leybold Köln / for counter couplings pls. contact Leybold Cologne

**** für abweichende Konfigurationen zur Werkseinstellung (nach Rücksprache mit Leybold) / for different configurations to the factory setting (after consultation with Leybold)

Configuration matrix

Part numbers for DRYVAC SYSTEMS are based on the matrix shown in the figure above and give hints on the individual configuration and features of the pump combination in question:

Ordering Information

DRYVAC SYSTEMS

Part No.	Description	Lubricants Screw	Lubricants Roots	Purge gas module	Exhaust / Check valve	Quick-release coupling (one-sided)
DS3411iT00000	DS 20AU45S iT	LVO210	LVO210	triple	side / no	no
DS1411iT00000	DS 20AU65S iT	LVO210	LVO210	triple	side / no	no
DS2512iT00000	DS 20SU65C iT	LVO410	LVO400	triple	side / no	no
DS1512iT00000	DS 20SU65S iT	LVO410	LVO400	triple	side / no	no
DS1511iT00000	DS 20SU65S iT	LVO210	LVO210	triple	side / no	no
DS2302iT00000	DS 25H65C iT	LVO410	LVO410	triple	side / no	no
DS1303iT00320	DS 25H65S iT	LVO210	LVO410	triple	rear / yes	yes
DS1303iT00000	DS 25H65S iT	LVO210	LVO410	triple	side / no	no
DS4332iT00320	DS 25HF45C iT	LVO410	LVO410	triple	rear / yes	yes
DS3332iT00320	DS 25HF45S iT	LVO410	LVO410	triple	rear / yes	yes
DS3331iT00000	DS 25HF45S iT	LVO210	LVO210	triple	side / no	no
DS2332iT00320	DS 25HF65C iT	LVO410	LVO410	triple	rear / yes	yes
DS1333iT00320	DS 25HF65S iT	LVO210	LVO410	triple	rear / yes	yes
DS3313iT00320	DS 25HU45S iT	LVO210	LVO410	triple	rear / yes	yes
DS1313iT00320	DS 25HU65S iT	LVO210	LVO410	triple	rear / yes	yes
DS1311iT00000	DS 25HU65S iT	LVO210	LVO210	triple	side / no	no
DS2202iT00000	DS 44H65C iT	LVO410	LVO400	triple	side / no	no
DS1201iT00000	DS 44H65S iT	LVO210	LVO210	triple	side / no	no
DS2232iT00320	DS 44HF65C iT	LVO410	LVO400	triple	rear / yes	yes
DS1223iT00320	DS 44HU65S iT	LVO210	LVO400	triple	rear / yes	yes
DS1223iT00000	DS 44HU65S iT	LVO210	LVO400	triple	side / no	no
DS1212iT00000	DS 44HU65S iT	LVO410	LVO400	triple	side / no	no
DS1211iT00000	DS 44HU65S iT	LVO210	LVO210	triple	side / no	no
DS2132iT00320	DS 70HF65C iT	LVO410	LVO400	triple	rear / yes	yes

... to be continued

Accessories

	Part No.
Synthetic Oil LEYBONOL LVO 210, 1 l	**L21001**
Synthetic Oil LEYBONOL LVO 210, 5 l	**L21005**
PFPE LEYBONOL LVO 400, 1 l	**L40001**
PFPE LEYBONOL LVO 410, 1 l	**L41001**
Silencer DN 63 ISO-K for DRYVAC SYSTEMS	**119002**
Serviceable Silencer DN 63 ISO-K for DRYVAC SYSTEMS	**119003V**
Harting plug for DRYVAC S-i/RS-i/DV-i/DVR-i	**112 005A20**
Active sensors / gauge heads	
Kit CTR 1 Torr	**504391V901**
Kit CTR 100 Torr	**504392V901**
Kit CTR 1000 Torr	**504393V901**
Kit DU 200	**504394V901**
Kit DU 2000	**504395V901**
Kit TTR 91	**504396V901**
Rotatable crane eyes (M 20 x 30; set of 4)	**504397V901**
Counter coupling water, BNP	**504406V901**
Counter coupling water, stainless-steel	**504407V901**

GSD file and manual for the Profibus interface see the Leybold homepage.

Dry Compressing Pump Systems DRYVAC PowerBoost

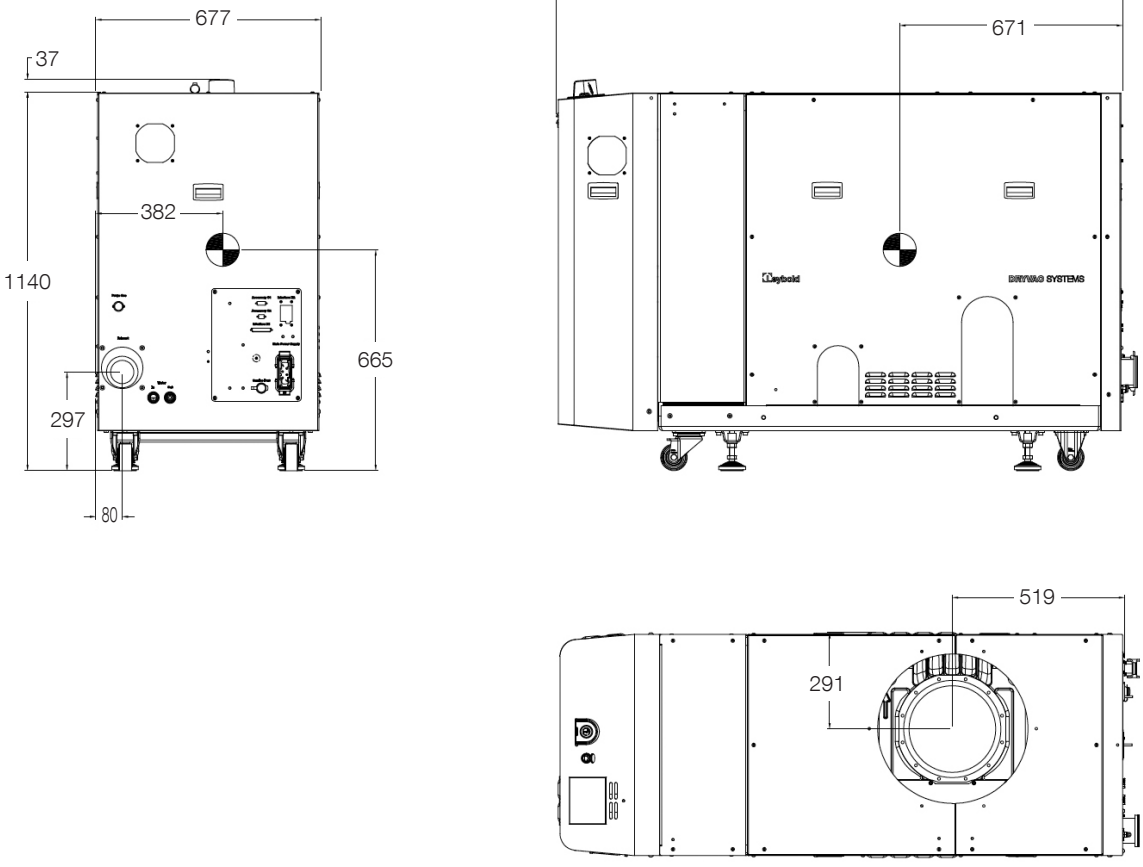


The DRYVAC SYSTEM 44HUF65S iV (DS 4465-U2) consists of a combination of a dry compressing screw pump and a Roots pump. Its design has been specifically optimized for a fast load lock pump-downs, it is equipped with an automatic cycle detection system, and the Roots pump shows a special speed management. Thus, with an optimum utilization of the power, the mechanical stress due to pressure bursts was minimized, and the noise level during pump-downs was significantly reduced.

Furthermore the system described hereinafter is equipped with:

- integrated frequency converters
- Microcontroller with touchscreen
- digital I/O communication interface (DC37-P)
- Harting connections (power supply)
- housing, castors and adjustable feet

The system is water-cooled and lubricated with synthetic oil.



Dimensional drawing for PowerBoost DS 4465 U2 (Dimensions in mm)

Technical Data	DRYVAC SYSTEM DS 44HUF65S iV
Ultimate total pressure w/o purge gas or with purge gas for shaft seal outlet (± 10 %)	< 5 x 10^{-3} mbar
Maximum permissible inlet pressure	1050 mbar
Maximum permissible discharge pressure (relative to ambient)	+200 mbar
Integral leak rate	< 1 x 10^{-4} mbar x l/s
Permissible gas inlet temperature	+5 ... +40 °C
Permissible ambient temperature	+5 ... +30 °C
Storage temperature	-10 ... +60 °C
Noise level with rigid exhaust pipe, at ultimate pressure (acc. to DIN EN ISO 2151)	Screw = 65 dB(A) Roots = 63 dB(A) [5] (K_{pA} = 3 dB)
Relative atmospheric humidity	95 %, non-condensing
Installation location	up to 1000 m (NHN) [1]
Cooling	Water
Mains voltage	360 – 440 V 50/60 Hz [2]
Frequency (± 5%)	50 / 60 Hz
Phasen	3-ph
Rated power at 400 V (± 0,8 kW)	57 kW
Rated current at 400 V	95 A
Power consumption at ultimate pressure (± 0,8 kW)	9 kW
Motor efficiency class, calculated and configured acc. to EN 60034-30	IE2
Min. permissible speed [3]	1200 rpm
Protection class	IP20
Lubricant filling	LVO 210
Total lubricant quantity (± 5%)	5.7 l
Intake flange	DN 250 ISO-K
Discharge flange	DN 63 ISO-K
Materials (components in contact with gas in the pump chamber) Materials sealing the pump off in the pump chamber towards the outside	Grey cast iron /graphite cast iron / steel/stainless steel /epoxy paint / FKM FKM, grey cast iron
Weight, approx. (± 40 kg)	1500 kg
Dimensions (L x W x H) (± 10 mm)	1704 x 677 x 1140 mm
Water	
Water connection	G1/2" (female)
Water temperature	5 – 35 °C
Minimum supply pressure (unobstructed discharge, no backpressure)	2 bar(g) [4]
Maximum supply pressure	7 bar(g) [4]
Nominal flow	14 l/min

Technical Data

	DRYVAC SYSTEM DS 44HUF65S iV
Purge gas	
Connection	G1/4" (female)
Nominal setting pressure “Purge gas” (at nominal flow, valves open)	2.8 bar(g) [4]
Permissible setting pressure “Purge gas” (at purge gas flow)	2.8 to 4.5 bar(g) [4]
Permissible supply pressure “Purge gas”	4.0 to 10.0 bar(g) [4]
Purge gas flow shaft seal inlet (d = 2.0 mm) / outlet (d = 0.9 mm) at nominal setting pressure (2.8 bar(g)) at max. setting pressure (3.5 bar(g))	 92 slm / 22 slm 107 slm / 26 slm

Additional information regarding the technical data

1) The frequency converter standard ratings are valid for an installation altitude up to 1000 m. If the altitude exceeds 1000 m both the input voltage and the rated output current must be derated for 1% per 100 m.

2) In case of undervoltage (< 380 V) the maximum power is not available by design.

3) The minimum permissible frequency is 20 Hz for both the DRYVAC and the RUVAC.
The minimum permissible speed is relevant for the oil lubrication of bearings and gears. Running the pump at less than the minimum speed for more than 1 hour can cause damage to the pump due to a lack of lubrication.

4) bar(g): bar (gauge) is the overpressure, i.e. atmospheric pressure = 0 bar(g)

5) The noise level is significantly higher due to flow generated noises during load lock operations. Its accurate value depends on the operational mode used as well as the intake line’s design. The pump system DS 44HUF65S iV is equipped with an automatic cycle detection system. With detecting vacuum cycles the pump system will reduce the noise level to a minimum during pump-downs.

Ordering Information

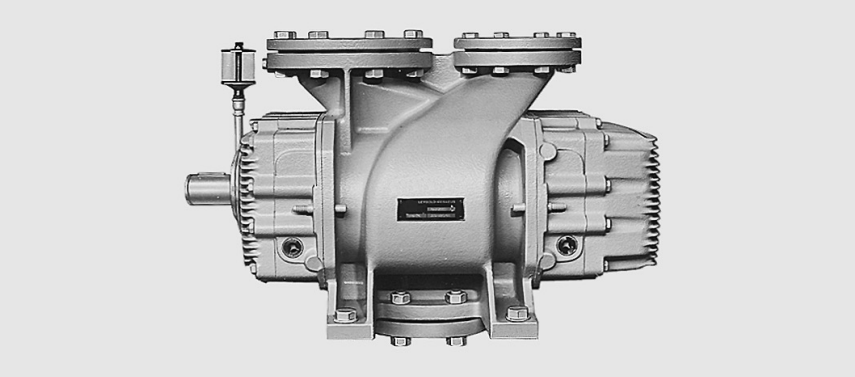
DRYVAC-SYSTEM DS 44HUF65S iV

	Part No.
DRYVAC PowerBoost	
DS 4465 U2	**DS1241iV01320**
Harting plug for 100 A	**504613V901**
Counter coupling water, BNP	**504406V901**
DRYVAC PowerBoost Plus	
DS 4465 U2	**DS1241iV01320**
Harting plug for 100 A	**504613V901**
DV650 Plus Upgrade kit	**504595V901**
Harting plug for 65 A	**112005A20**
Counter coupling water, BNP (2x)	**504406V901**

Accessories

	Part No.
Synthetic Oil LEYBONOL LVO 210, 1 litre	**L21001**
Floor mount (optional; set of 4 with foundation bolts)	**503637V001**
Rotatable crane eyes	**6521504**

RUVAC RAV Roots Vacuum Pumps with Pre-Admission Cooling

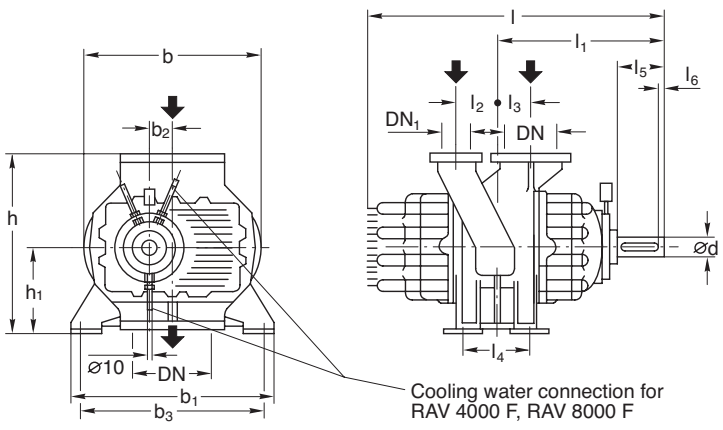


Typical Applications

- Short pump-down cycles on large volumes
- Oil-free compression of high volume flows of gases and vapors against atmospheric pressure
- Single-stage (G) or in combination with RAV F as backing pump
- Operating pressures in the rough vacuum range
- CE approval

Advantages to the User

- **RUVAC RAV G**
  Operating pressure range of 150 mbar (112.5 Torr) against atmospheric pressure;
  total leak rate < 10^{-1} mbar x l/s (7.5×10^{-2} Torr x l/s)
- **RUVAC RAV F**
  In combination with backing pumps the attainable operating pressures extend down into the medium vacuum range;
  leak rate < 10^{-2} mbar x l/s (7.5×10^{-3} Torr x l/s)
- When series-connected the operating pressures extend down into the medium vacuum range:
  - two-stages to 25 mbar (18.75 Torr)
  - multiple stage to 10^{-3} mbar (7.5×10^{-4} Torr)
- Motors for special supply voltages and frequencies or protected types are available
- Pre-admission silencer and filter for the cooling gas inlet as well as silencers for the exhaust side (option/single-stage)
- Downstream gas cooler (option/ multistage)
- C version (chemical version/option)
- Special materials (option)
- Pressure burst resistant version (option)



Type RUVAC RAV		DN DIN 2533	DN1 DIN 2533	l	l1	l2	l3	l4	l5	l6	b	b1	b2	b3	Type F d	Type G d	h	h1
250 F/G	mm	80	50	529	283	90	100	125	50	5	321	332	34	300	25 k6	28 k6	313	132
	in.			20.83	11.14	3.54	3.94	4.92	1.97	0.20	12.64	13.07	1.34	11.81	0.98 k6	1.10 k6	12.32	5.20
500 F/G	mm	100	50	604	324	120	100	150	70	5	321	390	42.6	350	25 k6	38 k6	370	160
	in.			23.78	12.76	4.72	3.94	5.91	2.76	0.20	12.64	15.35	1.68	13.78	0.98 k6	1.50 k6	14.57	6.30
1000 F/G	mm	100	80	705	380	125	115	210	90	5	427	440	53.3	400	42 k6	45 k6	410	180
	in.			27.76	14.96	4.92	4.53	8.27	3.54	0.20	16.81	17.32	2.10	15.75	1.65 k6	1.77 k6	16.14	7.09
2000 F/G	mm	150	100	806	423	160	130	270	80	5	476	570	67.6	510	42 k6	55 k6	450	200
	in.			31.73	16.65	6.30	5.12	10.63	3.15	0.20	18.74	22.44	2.66	20.08	1.65 k6	2.17 k6	17.72	7.87
4000 F/G	mm	250 [1]	150	1143	610	250	200	410	95	5	682	800	106	720	55 k6	70 m6	680	315
	in.			45.0	24.02	9.84	7.87	16.14	3.74	0.20	26.85	31.50	4.17	28.35	2.17 k6	2.76 m6	26.77	12.40
8000 F/G	mm	300 [1]	200 [1]	1337	717	300	230	525	100	8	954	910	135	830	70 k6	90 m6	760	355
	in.			52.64	28.23	11.81	9.06	20.67	3.94	0.31	37.56	35.83	5.31	32.68	2.76 k6	3.54 m6	29.92	13.98

[1] DIN 2532 DN1 = Pre-inlet

Dimensional drawing for the RUVAC RAV pumps

Technical Data, 50 Hz

		RUVAC RAV					
		250 G	500 G	1000 G	2000 G	4000 G	8000 G
Pumping speed [1]	m^3/h (cfm)	250 (147)	500 (295)	1000 (589)	2000 (1178)	3700 (2179)	8100 (4771)
Nominal speed	min^{-1} (rpm)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	1500 (1500)	1500 (1500)
Max. permissible pressure difference [2]	mbar (Torr)	850 (637)					
Connecting flange	DN	80	100	100	150	250	300
Max. permissible motor power							
for direct drive	kW (hp)	11.0 (15.0)	18.5 (25.2)	30.0 (40.8)	55.0 (74.8)	95.0 (129.3)	200.0 (272.1)
for belt drive	kW (hp)	11.0 (15.0)	18.5 (25.2)	30.0 (40.8)	55.0 (74.8)	95.0 (129.3)	200.0 (272.1)
Weight	kg (lbs)	95 (210)	160 (353)	225 (496)	310 (684)	720 (1588)	1230 (2712)

Ordering Information

	RUVAC RAV					
	250 G	500 G	1000 G	2000 G	4000 G	8000 G
	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
Roots vacuum pump RUVAC RAV G	upon request	upon request	upon request	upon request	upon request	upon request

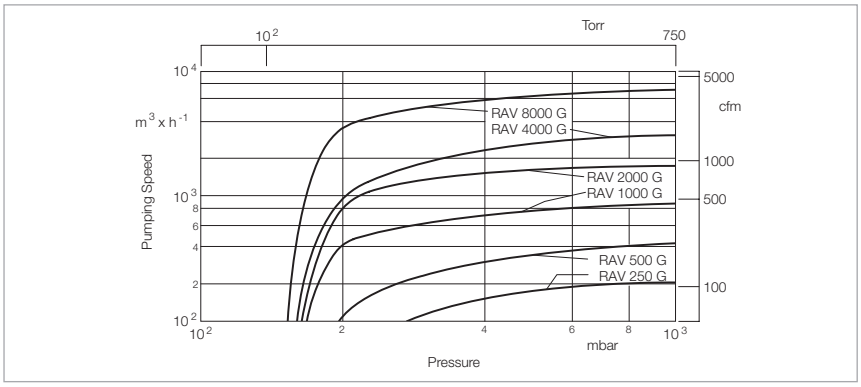
Technical Data, 50 Hz

		RUVAC RAV					
		250 F	500 F	1000 F	2000 F	4000 F	8000 F
Pumping speed [1]	m^3/h (cfm)	250 (147)	500 (295)	1000 (589)	2000 (1178)	3700 (2179)	8100 (4771)
Nominal speed	min^{-1} (rpm)	3000 (3000)	3000 (3000)	3000 (3000)	3000 (3000)	1500 (1500)	1500 (1500)
Max. permissible pressure difference [2]	mbar (Torr)	850 (637)					
Connecting flange	DN	80	100	100	150	250	300
Max. permissible motor power							
for direct drive	kW (hp)	11.0 (15.0)	18.5 (25.2)	30.0 (40.8)	55.0 (74.8)	95.0 (129.3)	200.0 (272.1)
for belt drive	kW (hp)	4.0 (5.4)	4.0 (5.4)	7.5 (10.2)	15.0 (20.4)	37.0 (50.3)	75 (102.0)
Gear oil, approx.	l (qt)	0.9 (0.95)	1.1 (1.6)	1.5 (1.59)	2.5 (2.64)	12.0 (12.68)	11.0 (11.63)
Weight	kg (lbs)	95 (210)	160 (353)	225 (496)	310 (684)	720 (1588)	1230 (2712)
Cooling water connection, fitting for tube		–	–	–	–	10 x 1	10 x 1
Cooling water requirement, approx.	l x h^{-1}	–	–	–	–	60	60

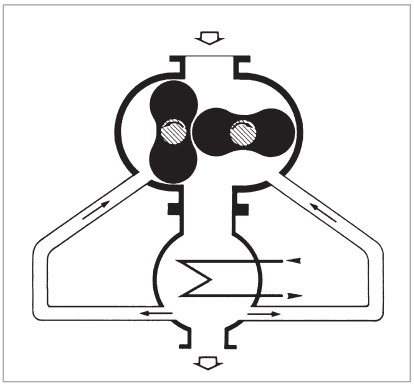
Ordering Information

	RUVAC RAV					
	250 F	500 F	1000 F	2000 F	4000 F	8000 F
	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
Roots vacuum pump RUVAC RAV F	upon request	upon request	upon request	upon request	upon request	upon request

[1] To DIN 28 400 and following numbers
[2] RUVAC RAV G and RAV F with direct drive

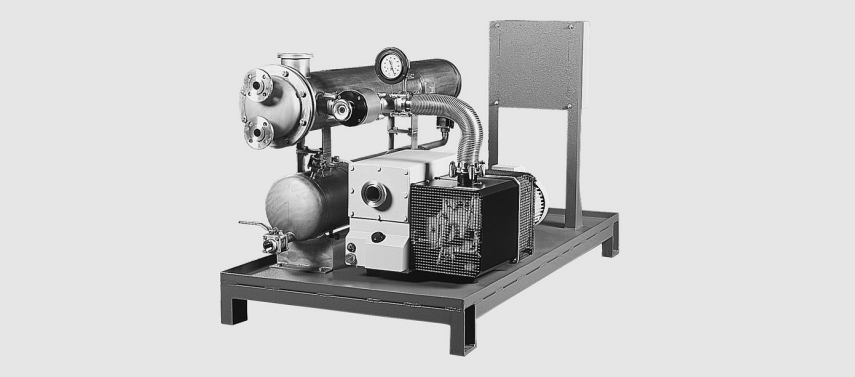


Pumping speed diagram of RUVAC RAV at 50 Hz



Operating diagram of RUVAC RAV vacuum pumps with pre-admission cooling

TVD Pump Systems for Drying, Evaporation and Distillation Applications



TVD 200

Advantages to the User

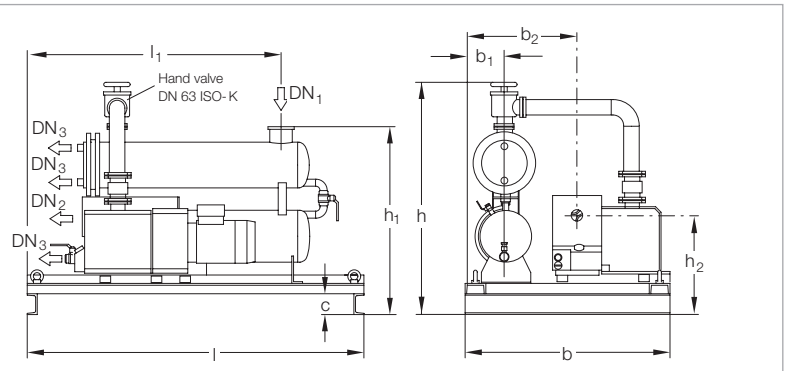
- Operating agent may be reused, for example by returning cleaned water to the process
- Reduction of the quantities which need to be disposed of by 80%
- Low temperature distillation/drying
- Condensate may be drained during vacuum operation
- CE approval

Typical Applications

- Drying of powders and solids, for example
- Cleaning of waste water
- Vacuum distillation

Standard Equipment

- Condenser at the intake side
- Receiver with condensate level indicator
- Manually operated valves on the receiver
- SOGEVAC rotary vane vacuum pump with integrated exhaust filters, anti-suckback valve and gas ballast valve



Type		DN1	DN2	DN3	l	l1	b	b1	b2	h	h1	h2	c
TVD 40	mm	63 ISO-K	1 1/4"	1"	1000	590	700	160	445	1000	785	341	100
	in.			1"	39.37	23.23	27.56	6.30	17.52	39.37	30.91	13.43	3.94
TVD 65	mm	63 ISO-K	1 1/4"	1"	1280	755	700	160	445	1165	950	341	100
	in.			1"	50.39	29.72	27.56	6.30	17.52	45.87	33.46	13.43	3.94
TVD 100	mm	100 ISO-K	2"	1"	1400	755	940	160	561	1165	950	345	100
	in.			1"	55.12	29.72	37.01	6.30	22.09	45.87	33.46	13.58	3.94
TVD 200	mm	100 ISO-K	2"	1"	1800	765	940	150	501	1175	960	473	100
	in.			1"	70.87	30.12	37.01	6.30	19.72	46.25	37.80	18.62	3.94

Dimensional drawing for the TVD pump systems

Options

- Valve between condenser and rotary vane vacuum pump
- Pressure gauge for checking the condensate pressure
- Solenoid valves at the receiver
- Receiver with proximity switch for monitoring the condensate level
- Electric control for automatic operation of the pump system
- Mobile pallet with castors
- Cold water replacement for mobile applications

Technical Data, 50 Hz

		TVD 40	TVD 65	TVD 100	TVD 200
Condenser, effective surface area, approx.	m^2	1	2	3	5
Receiver, usable volume	l (qt)	30.0 (31.71)	50.0 (52.85)	50.0 (52.85)	50.0 (52.85)
Rotary vane vacuum pump SOGEVAC		SV 40	SV 65	SV 100	SV 200
Nominal pumping speed	m^3/h (cfm)	46.0 (27.1)	65.0 (38.3)	100.0 (58.9)	180.0 (106.0)
Pumping speed at 50 Hz					
for air	m^3/h (cfm)	46.0 (27.1)	53.0 (31.2)	94.0 (55.4)	170.0 (100.1)
for water vapor at 50 mbar (37.5 Torr)	m^3/h (cfm)	280.0 (165.0)	560.0 (330.0)	840.0 (495.0)	1400.0 (825.0)
Ultimate total pressure with standard gas ballast	mbar (Torr)	< 1.5 (< 1.1)	< 1.5 (< 1.1)	< 1.5 (< 1.1)	< 0.7 (< 0.53)
Noise level [1]	dB(A)	63	64	70	69
Condensing capacity for water	l/h	10	20	30	50
Installed motor power 400 V, 50 Hz	kW (hp)	1.1 (1.5)	1.5 (2.0)	2.2 (3.0)	4.0 (4.2)

Technical Data, 50 Hz

		SV 40	SV 65	SV 100	SV 200
Weight (with oil filling), approx.	kg (lbs)	125 (276)	150 (331)	200 (441)	300 (662)
Oil filling	l (qt)	2.0 (2.11)	2.0 (2.11)	3.5 (3.70)	5.0 (5.29)
Connecting flanges					
Inlet port	DN_1	63 ISO-K	63 ISO-K	100 ISO-K	100 ISO-K
Outlet port	DN_2	1 1/4"	1 1/4"	2"	2"

Ordering Information

	TVD 40	TVD 65	TVD 100	TVD 200
	Part No.	Part No.	Part No.	Part No.
Pump system	021 01	021 02	021 03	021 04

[1] Operating at ultimate pressure with gas ballast

Accessories for oil sealed and dry compressing Pump Systems

Sound Proofing

A sound proofing box is available as an optional extra so as to reduce the noise down to the permissible level.

Depending on the size of the pumping system, noise reductions between 15 and 20 dB(A) are obtained using our standard sound proofing arrangements.

Custom designs of the sound proofing box allow the noise level to be reduced by up to 35 dB(A).



RUTA RA 3001/S630F/G with sound proofing box

The maintenance side is designed as a door component. A window insert may be provided in the door or in the side walls to facilitate checking of the oil levels.

Ventilation is performed by means of an electric fan, the fresh air and exhaust ducts are located within the sound proofing box. Further optional extras which may be fitted include closed air circulation with integrated, water-cooled heat exchanger and a connection port for a central exhaust system.

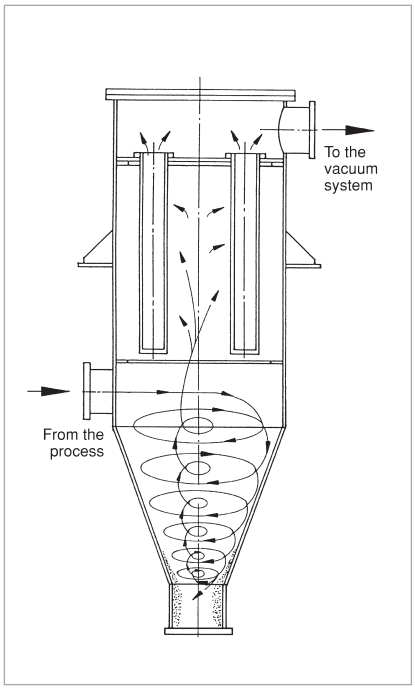
Isolation against Vibrations

RUTA vacuum pump systems produce only slight vibrations. To reduce these vibrations even further, vibration absorbers can be fitted under the pump system.

Dust Separators

Vacuum processes where large amounts of particles or dusts are contributed by the process require special devices to protect the vacuum pumps.

Leybold has developed – even for high flow rate applications – special dust separators, which can be installed ahead of the intake of the RUTA vacuum pump systems. The dust separators have two stages. The first stage is a cyclone that collects dust particles of coarse and medium size, the fine dust are trapped in filter elements. Dust separators are customdesigned for the specific process and the required pumping speed.



Diagrammatic section through a dust separator

Dust Filter without Cyclone

See further down in this chapter.

Filtering surface	m^2	0.2	0.5	1.0	2.0	3.0	5.0
suitable for pumping speeds							
min.	m^3/h (cfm)	100 (58.9)	300 (176.7)	600 (353.4)	1000 (589)	1500 (883.5)	3000 (1767)
max.	m^3/h (cfm)	300 (176.7)	800 (471.2)	1500 (883.5)	3000 (1767)	4000 (2356)	8000 (4712)
Reduction of pumping speed at							
≤ 1 mbar (< 0.75 Torr)	%	11	11	11	11	11	11
≤ 6 mbar (< 4.5 Torr)	%	9	9	9	9	9	9
≤ 20 mbar (< 15 Torr)	%	5	5	5	5	5	5
without dust load							

Frequency converter RUVATRONIC RT 5

The electronic frequency inverters RUVATRONIC RT 5/251 to 5/16000 have been designed specially for use in connection with Leybold Roots pumps of the RUVAC type.
For each Roots vacuum pump size, a matching frequency converter is available.

The main characteristics of the RUVATRONIC RT 5 are:

Simulation of a pressure equalization line

The software of the frequency inverters is adapted to each pump and ensures that the risk of mechanically overloading the pump can be excluded. In the case of too high pressure differences, the rotational speed will be decreased automatically until the load is reduced to within the pump's limits.

RUVAC Roots vacuum pumps of the types WA, WS and RA (without pressure equalization line) can be switched on together with the forepump at atmospheric pressure. Through this, the pumpdown time can be reduced drastically.
The minimum pumping speed of the backing pump needs to be considered in this case.

Pump	Required pumping speed for the backing pump
WA/WS 251	50 m^3/h (29 cfm)
WA/WS 501	100 m^3/h (59 cfm)
WA/WS 1001	200 m^3/h (118 cfm)
WA/WS 2001	410 m^3/h (241 cfm)
RA 3001	650 m^3/h (383 cfm)
RA 5001	930 m^3/h (547 cfm)
RA 7001	1250 m^3/h (736 cfm)
RA 9001	3240 m^3/h (1907 cfm)

Operation at up to 3 predefined speeds
Via floating contacts, the pump can be operated at one of the 3 predefined speeds. Switching over to another pre-defined speed is possible during operation.

Operation at any rotational speed
With a 0 to 10 V signal, any speed can be pre-defined to operate the pump between the minimum and maximum rotational speed. The software reliably ensures that the rotational speed cannot drop below the minimum speed or exceed the maximum speed.

Increase in the pumping speed
By operating the Roots vacuum pumps at frequencies over 50 Hz, the nominal pumping speed of the pumps can be increased. Depending on the type of pump, an increase between 20 and 100% is possible.

Note
Please enquire about possible application limitations (process dependent).

Electric Controller

In order to drive all electrical appliances within the pump systems, the pump systems may be equipped with standard control cabinets which contain:

- Motor protection switch (rated for the pumps used in each case)
- Contactors
- Main switch interlocked in accordance with VDE 0113
- Relays for necessary control/ sub-systems
- ON/OFF push-button for each pump
- Power supply for the installed monitoring facilities
- Fault indicators arranged on a lamp panel
- Switch-over (through an external contact) from local to remote operation.

The control cabinet may be fitted either to the frame of the pump system or it may be wallmounted.

Beside the standard systems, we manufacture control systems for much more complex systems:

- Remote control module as a 19" rack module (1/4 width, 3 HU). The start/stop push-buttons and the related indicators for operation and fault are located on the front panel
- Pre- and post-operation control
- Pressure dependent control
- Time-dependent control
- Program control
- Control for explosion hazard areas
- Combinations of the aforementioned versions
- Programmable control (PC)
- Vacuum gauge with pressure read-out in the control cabinet.

Pressure Control

Basically there are several ways in which to control the pressure.

The equipment which is supplied as standard for the **DOWNSTREAM** or **BYPASS** control systems selected by Leybold consists of:

- Pressure measurement
- Controller with control unit
- Control valve with position indicator
- Engineering.

The **Downstream Control System** throttles the pumping speed of the vacuum pump by changing the conductance of the valve.

The advantages offered by this arrangement are:

- No supply of other gases
- Closed system
- The intake pressure of the pump system is lower than its operating pressure (thus saving energy, among other things).

The second method is the **Bypass Control System**. Here the pressure is maintained at a constant level by admitting an additional quantity of gas.

The advantages offered by this arrangement are:

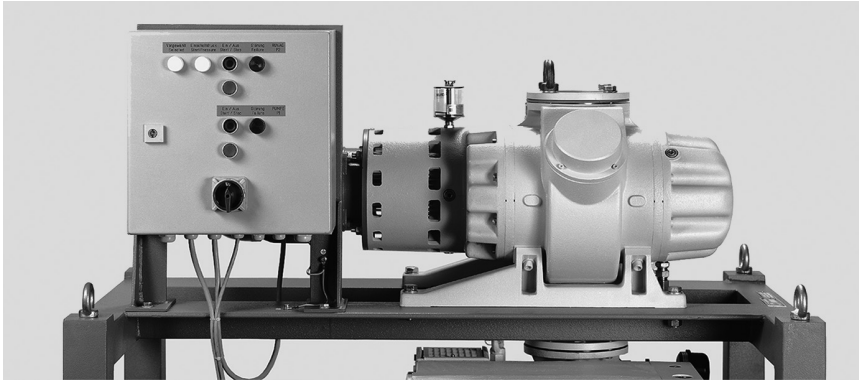
- Simple design
- Much smaller valve
- No reduction of the intermediate pressure within the pump.

In order to design a pressure control system we need the following information:

- Amount of gas
- Type of gas
- Pressure
- Length of the piping
- Type of auxiliary energy (electric/ pneumatic)
- Explosion protection required yes/no.

Additional complex control arrangements are available, for example with:

- Adjustable pressure characteristic
- Adjustable timing
- Speed control
- Combination with other control facilities.



Control panel on RUTA WAU1001/SV200/G

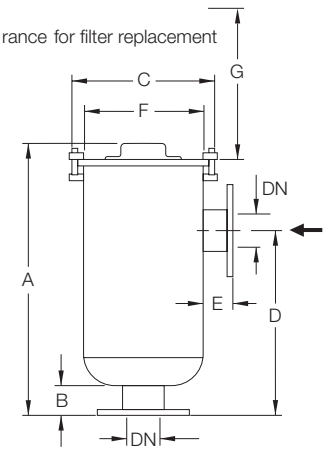
Dust Filter F-xxx-C

The highly efficient dust filters F-xxx-C are fitted to the inlet of the RUVAC pumps. The filter protects the Roots vacuum pumps against the intake of dust.

The dust filters are equipped with an easy to replace filter element. In the case of the filters F-1001-C or larger, the gas enters into the housing above the filter element. Thus the likelihood of puncturing the filter is reduced.

In the case of the dust filter F-501-C, the filter element is protected by a baffle.

All vacuum dust filters are rated for pressures up to 1200 mbar (900 Torr) abs. max.



Type		DN	A	B	ø C	D	E	F	G
F-501-C	mm	65 [1]	312	76	222	185	76	195	235
	in.		12.28	2.99	8.74	7.28	2.99	7.68	9.25
F-1001-C	mm	100 [1]	692	76	356	470	74	310	381
	in.		27.24	2.99	14.02	18.50	2.91	12.20	15.00
F-2001-C	mm	150 [1]	740	102	470	521	102	406	254
	in.		29.13	4.02	18.50	20.51	4.02	15.98	10.00
F-2001-C plus	mm	150 [1]	740	102	470	521	99	413	508
	in.		29.13	4.02	18.50	20.51	3.90	16.26	20.00
F-5001-C	mm	200 [2]	1031	102	572	648	103	505	508
	in.		40.59	4.02	22.52	25.51	4.02	19.88	20.00
F-7001-C	mm	250 [2]	1454	102	686	1143	99	616	838
	in.		57.24	4.02	27.01	45.00	3.90	24.33	32.99
F-9001-C	mm	300 [2]	1454	102	686	1143	99	616	838
	in.		57.24	4.02	27.01	45.00	3.90	24.33	32.99
F-13001-C	mm	300 [2]	1784	102	686	1448	99	616	635
	in.		70.24	4.02	27.01	57.01	3.90	24.33	25.00

[1] The hole pattern corresponds to PN 6 and may be connected by using collar flanges to ISO-K components

[2] The hole pattern corresponds to PN 10

Dimensional drawing for the dust filters F-xxx-C

Technical Data — Dust Filter F-xxx-C

		Polyester filter cartridge	Paper filter cartridge
Separation at 10 µm	%	> 99,9	–
Separation at 5 µm	%	> 99,0	> 99,9
Separation at 2 µm	%	–	> 99,0
Temperature	°C (°F)	-25 to +100 (-13 to +212)	
Dust Filter for			
WA/WS/WAU/WSU 501		F-501-C	
WA/WS/WAU/WSU 1001, WH 700		F-1001-C	
WA/WS/WAU/WSU 2001, WH 2500		F-2001-C / F-2001-C plus	
RA 3001, RA 5001, WH 4400, WH 7000		F-5001-C	
RA 7001		F-7001-C	
RA 9001		F-9001-C	
RA 13000		F-13001-C	

Technical Data — Dust Filter

		F-501-C	F-1001-C	F-2001-C	F-2001-C plus
Surface area, approx.					
Polyester	m²	0.4	1.0	1.5	2.6
Paper	m²	1.3	3.0	4.0	6.3
Weight, approx.	kg (lbs)	7.0 (15.45)	29.0 (64.02)	50.0 (110.38)	51.0 (112.58)

Technical Data — Dust Filter

		F-5001-C	F-7001-C	F-9001-C	F-13001-C
Surface area, approx.					
Polyester	m²	4.5	9.0	9.0	14.0
Paper	m²	11.5	26.0	26.0	37.0
Weight, approx.	kg (lbs)	83.0 (138.22)	171.0 (377.48)	171.0 (377.48)	209.0 (461.37)

Ordering Information — Dust Filter F-xxx-C

Dust Filter	Part No. Polyester filter element	Part No. Paper filter element
F-501-C	**500 001 403**	**500 001 404**
Replacement filter element FE-501-C	**500 005 629**	**500 005 630**
F-1001-C	**500 000 301**	**500 000 302**
Replacement filter element FE-1001-C	**500 000 313**	**500 000 314**
F-2001-C	**500 000 303**	**500 000 304**
Replacement filter element FE-2001-C	**500 000 315**	**500 000 316**
F-2001-C plus [1]	**500 001 367**	**500 001 368**
Replacement filter element FE-2001-C plus	**500 000 631**	**500 000 632**
F-5001-C	**500 000 305**	**500 000 306**
Replacement filter element FE-5001-C	**500 000 317**	**500 000 318**
F-7001-C	**500 000 307**	**500 000 308**
Replacement filter element FE-7001/9001-C	**500 000 319**	**500 000 320** (2 pieces are required)
F-9001-C	**500 000 309**	**500 000 310**
Replacement filter element FE-7001/9001-C	**500 000 319**	**500 000 320** (2 pieces are required)
F-13001-C	**500 000 311**	**500 000 312**
Replacement filter element FE-13001-C	**500 000 321** (2 pieces are required)	**500 000 322** (2 pieces are required)

[1] For increased quantities of dust

Bellows with Vibration Absorbers



Bellows with vibration absorbers

The bellows serve the purpose of connecting pipes to vacuum pumps without introducing any mechanical tensions.

Technical Data

Bellows with Vibration Absorbers

		KIT DN 63 ISO-K	KIT DN 100 ISO-K	KIT DN 160 ISO-K
Length	mm (in.)	132 (5.20)	132 (5.20)	150 (5.91)
Lateral movement, max.	mm (in.)	7.5 (0.30)	9.5 (0.37)	3.5 (0.14)
Axial movement, max.	mm (in.)	20 (0.79)	28 (1.10)	22 (0.87)

Ordering Information

Bellows with Vibration Absorbers

		KIT DN 63 ISO-K	KIT DN 100 ISO-K	KIT DN 160 ISO-K
		Part No.	Part No.	Part No.
Bellows with Vibration Absorbers consisting of		503 189 V001	503 189 V002	503 189 V003
Bellows	Quantity	1	1	1
Centering ring	Quantity	2	2	2
Clamp (set of 4 pieces)	Quantity	2	2	2
Support bracket	Quantity	4	8	8
Rubber/metal absorber	Quantity	2	4	4
Hexagon nut M 12	Quantity	12	24	24
Threaded rod M 12				
105 mm long	Quantity	4	8	8
Washer	Quantity	12	24	24

Technical Data

Bellows with Vibration Absorbers

		KIT DN 200 ISO-K	KIT DN 250 ISO-K	KIT DN 320 ISO-K
Length	mm (in.)	150 (5.91)	200 (7.87)	250 (9.84)
Lateral movement, max.	mm (in.)	3.5 (0.14)	4.5 (0.18)	4.5 (0.18)
Axial movement, max.	mm (in.)	20 (0.79)	30 (1.18)	50 (1.97)

Ordering Information

Bellows with Vibration Absorbers

		KIT DN 200 ISO-K	KIT DN 250 ISO-K	KIT DN 320 ISO-K
		Part No.	Part No.	Part No.
Bellows with Vibration Absorbers consisting of		503 189 V004	503 189 V005	503 189 V006
Bellows	Quantity	1	1	1
Centering ring	Quantity	2	2	2
Clamp (set of 4 pieces)	Quantity	3	3	4
Support bracket	Quantity	12	12	16
Rubber/metal absorber	Quantity	6	6	8
Hexagon nut M 12	Quantity	36	36	48
Threaded rod M 12				
90 mm long	Quantity	12	12	–
105 mm long	Quantity	–	–	16
Washer	Quantity	36	36	48

Bus Interfaces for Monitoring



Wi-Fi and Profibus interface kit for SP-GUARD

Bus interfaces for remote reading of the SP-GUARD monitoring system for the screw pumps SCREWLINE SP 250 and SP 630.
Item can be ordered as retrofit kit or together with the pump unit.

Advantages to the User

- Interface box for assembly on screw pump SCREWLINE SP 250 and SP 630
- Read out of vibration levels, oil temperatures, warning and failure functions
- The interface box is mounted next to the SP-GUARD
- Interface box needs a 24 V DC supply on-site (24 V DC supply of the SP-GUARD can be used)

Available Interfaces

- Profibus
- Wi-Fi

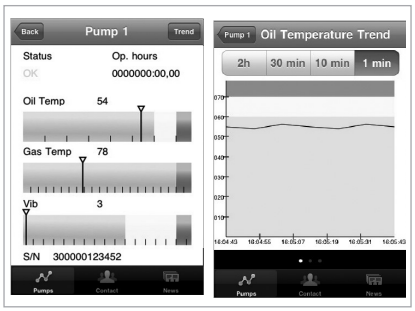
Further interfaces upon request:

- Profinet
- DeviceNet
- Ethernet
- CAN bus
- Interbus
- etc.

Ordering Information

Interface Kit SP-GUARD

	Part No.
Interface kit SP-GUARD Profibus	**502 898 V001**
Profibus interface kit and Wi-Fi for SP-GUARD	**upon request**
SCREWLINE SP 630 screw pump with Profibus interface	**502 899 V001**
Further combinations	**upon request**



Various indications on the mobile equipment



Profibus interface kit for SP-GUARD



Smart phone / tablet PC for readout (Wi-Fi)

Miscellaneous to oil sealed and dry compressing Pump Systems

Checklist for Inquiries

To Leybold GmbH

Dept. Systems

Fax: +49 (0)221/347 - 31206

e-Mail:
vacuum.solutions@leybold.com

From company: _____

Name/Department: _____

Phone: _____ Date: _____

Fax: _____ First page of: _____

MAKE USE OF OUR KNOW-HOW !

Simply fax the completed checklist to us. Our engineers will design a pump system which exactly matches your requirements. You will receive an offer shortly.

1. In what kind of application will the pump system be used (e.g. drying, distillation)?

_____

_____

_____

2. Is the process run

❑ continuously ❑ in batches:

_____

_____

_____

3. What is the volume of the vacuum chamber?

_____ m^3

_____

4. What pump-down times are required/desired?

_____ $min^3 \times h^{-1}$

_____

5. What operating pressures are planned?

_____ mbar

_____

6. How high is the ambient temperature?

- when installed in the building:

min. _____ °C / max. _____ °C

- when installed out in the open

min. _____ °C / max. _____ °C

7. How high is the intake temperature?

_____ °C

8. What is the composition of the gas which is to be pumped.

Designation:

a) _____ b) _____

c) _____ d) _____

e) _____ f) _____

9. Quantity (kg/h or Nm^3/h), traces (%):

a) _____ b) _____

c) _____ d) _____

e) _____ f) _____

10. In case of materials not commonly listed in the tables please state:

a) Molecular mass _____

b) Thermal capacity _____

c) Vapor pressure _____

d) Viscosity _____

e) Melting point _____

f) Special characteristics _____

11. Must explosion hazard regulations be observed?

❑ yes ❑ no

if yes, which? _____

_____

_____

12. What kind of electrical supplies are available?

a) Voltage _____

b) Frequency _____

13. What kind of mechanical connection specifications are planned?

a) Length of the intake line

_____

b) Diameter of the intake line

_____

14. Which cooling media are available (water, brine, etc.)? Which temperature?

_____ min. _____ °C

_____ max. _____ °C

General
to High Vacuum Pump Systems TMP

The requirements of production or research engineers concerning the vacuum technology they have to employ are usually widely different. In most cases pumping speed and operating pressure must be accurately matched to suit a particular process. The wide range of vacuum pumps and standard accessories available offers many options.

Sometimes it is just this flexibility which causes difficulties when having to decide between the various configurations of a particular pump system. Based on our experience and by listening to our customers' demands, we have therefore compiled a range of turn-key vacuum systems based on standard components.

Before leaving the factory they are subjected to both functional tests and leak tests. By adding components from our standard range or special of accessories they may be easily adapted to meet specific requirements.

Application and Accessories

Pump systems	TURBOLAB 90	TURBOLAB 250	TURBOLAB 350	TURBOLAB 450
Application				
Microbalances	■	■	■	■
Sputtering	■	■	■	■
Spectroscopy	■	■	■	■
Production of TV and monitor picture tubes	■	■	■	■
Surface refining	■	■	■	■
Evaporation coating systems	■	■	■	■
Beam guidance systems	■	■	■	■
Laboratory pump systems	■	■	■	■
Accessories				
Control unit for turbomolecular pump systems				
Air cooling unit	■	■	■	■
Flange heater	■	■	■	■
Venting valve	■	■	■	■
Power failure venting valve	■	■	■	■
Purge gas and venting valve	■	■	■	■
Water cooling unit	■	■	■	■

■ Possible

Products
Dry Pump Systems

Turbomolecular Pump Systems TURBOLAB 90 i, 250 i, 350 i, 450 i



Turbomolecular pump system TURBOLAB 350 i (top left), TURBOLAB 90 i (down left) and TURBOLAB 350 i Cart (right)

This new smart TURBOLAB generation is built on one basic design platform with the opportunity to create two different variants (Tabletop or Cart-System).
Each version can be customized to individual needs regarding add-ons like vacuum measurement devices, a choice of accessories, e.g. valves and heaters.

Basic Equipment

Turbomolecular pump

TURBOVAC i models from 90 l/s to 450 l/s including frequency converter

Backing pump

Dry or oil-sealed, 1 m^3/h - 20 m^3/h, 24 V DC/110-230 V

Backlight display

Every TURBOLAB comes with the Turbo Pressure Unit TPU for control, configuration and monitoring of the pump system

Built-in support for accessories

- Purge
- Vent
- Air or water cooling unit
- Flange heaters
- Two pressure gauges (1000 mbar to 1 x 10^{-9} mbar)
- Foreline safety valve

Built-in webserver

- Condition monitoring
- Data analysis
- Software updates
- Control, monitor and configure your TURBOLAB system

Easily relocate pump
away from the frame and on your chamber

Remote control
via the X1 Interface

- Configurable X1 Digital/Analog I/O
- Start/Stop
- Error
- Warning
- Analog Output

Advantage to the User

- Enhanced pump performance
- Compact mobile design
- Small foot print
- Easy to relocate pumps out and away from the frame
- Backlight display (control/monitoring/configuration)
- Monitored data like frequency, temperature, current, pressure are automatically stored to a data log file in the TURBOLAB. Users easily view the log file with the TURBOLAB data viewer software tool which can be downloaded for free from the Leybold website or the last 512 data points can be viewed from the TURBOLAB data viewer in the web server
- Covering more applications with a full range of high vacuum and dry or wet forevacuum pumps to cover more high vacuum applications
- Benchmark turbostation offering dedicated ports for the connection of
  - six different accessories
  - two gauges
- Benchmark functionality, reliability and design
- Prepared for worldwide voltage coverage
- Price-to-performance ratio

Typical Applications

- Analytical Instruments
- Spectroscopy
- Tube manufacturing
- Beam guidance systems
- Micro balances
- Sputtering and evaporation systems
- Surface physics
- Laboratory pump systems

Options

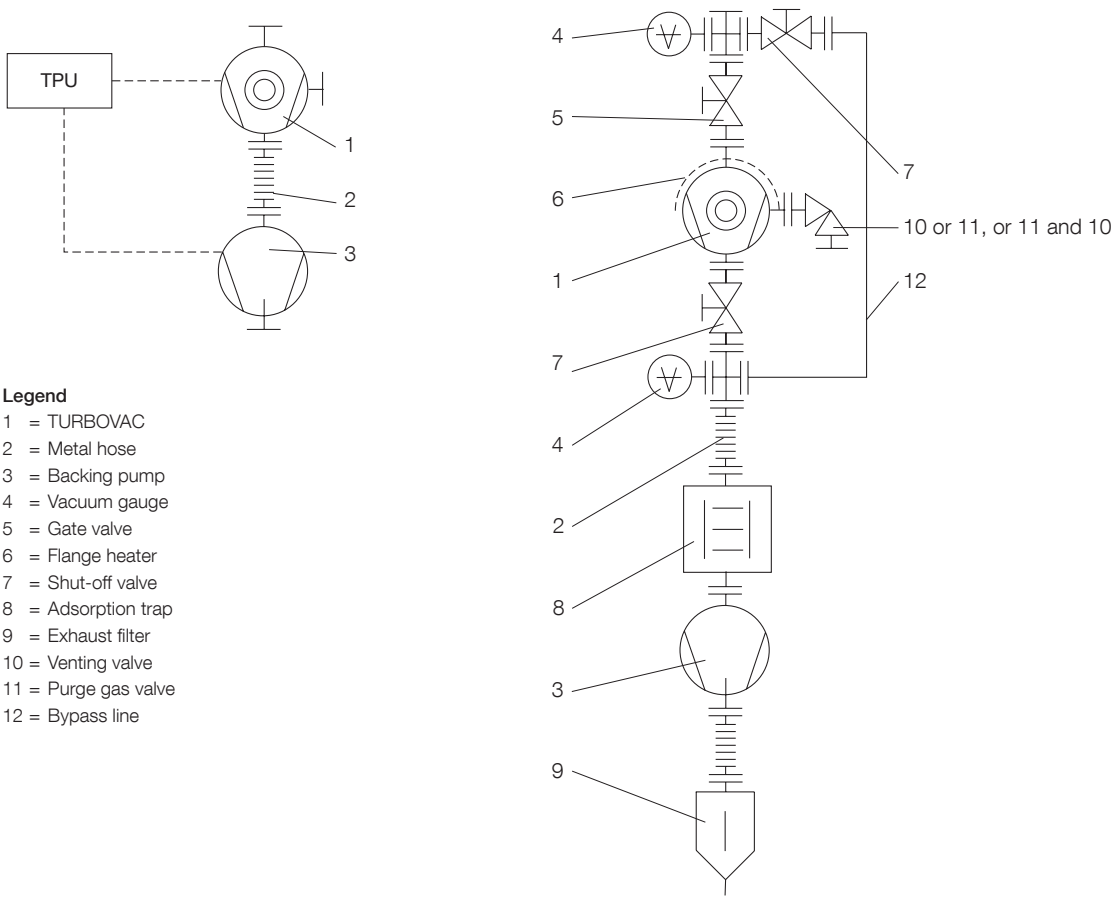
- Alternatively ISO-K or CF connection
- The Cart version comprises a base-plate, mounting column, castors or a benchtop frame with rubber feet
- Relocation kits available to relocate the pumps away from the frame and onto your chamber

The pump system can be upgraded with further components:

- Vacuum gauges: TTR 91 (N), TTR 101 (N), PTR 91 (N). Simultaneous operation of two gauges is possible
- Adsorption trap
- Exhaust filter
- Air cooling unit
- Water cooling unit
- Flange heater
- Venting valve
- Purge gas valve
- Foreline venting valve
- Vacuum safety valve SECUVAC DN 15/25/40 ISO-KF

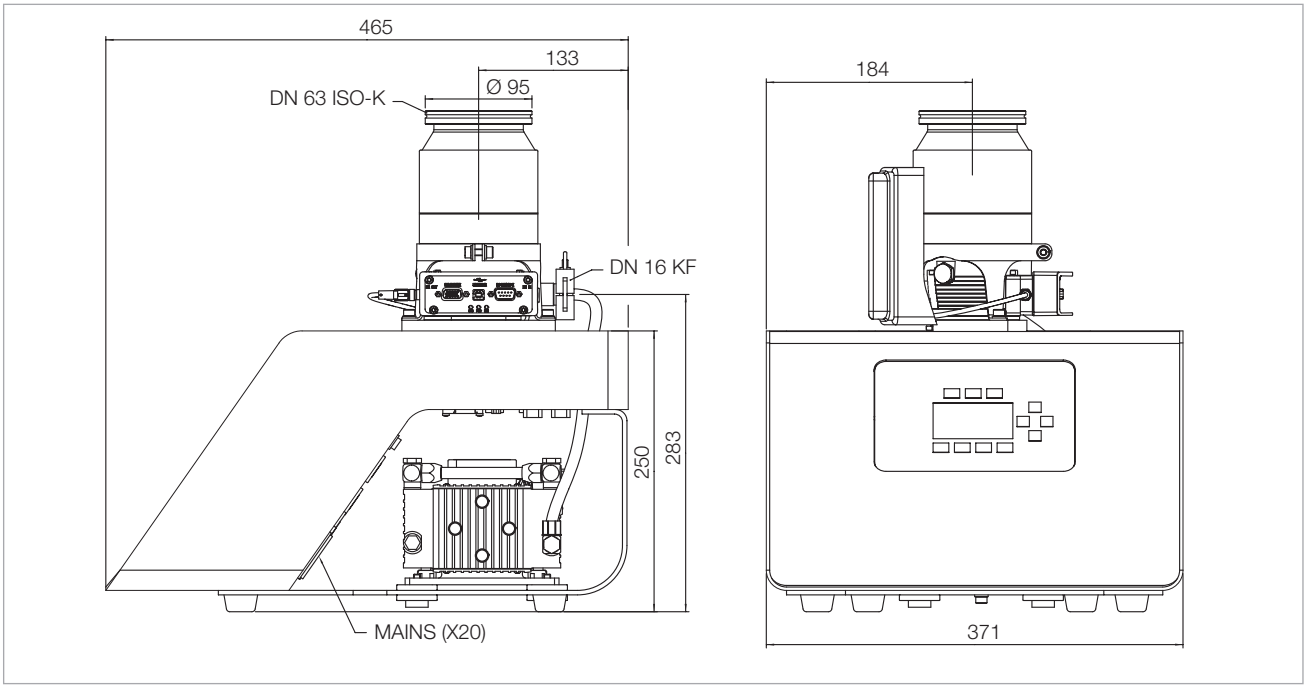
Scope of delivery

- Transport lock at the high vacuum flange by way of a Plexiglas disc
- Covering caps for the threads of the transport lock
- Exhaust side: centering ring and clamping ring
- Documentation
- The TRIVAC and SOGEVAC are filled with LVO oil

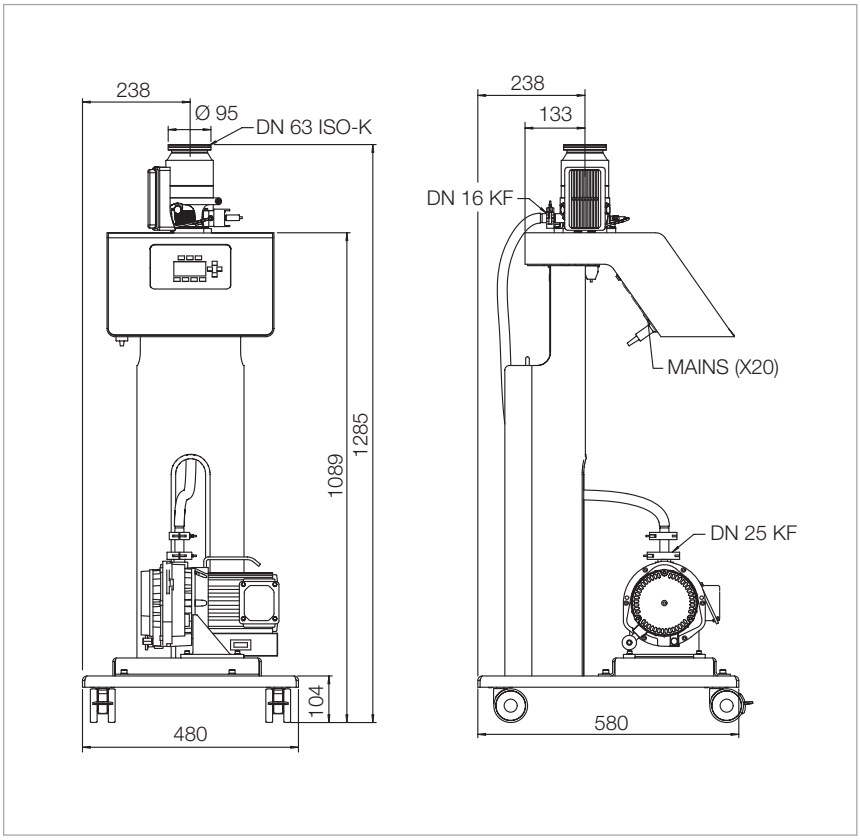


Legend
1 = TURBOVAC
2 = Metal hose
3 = Backing pump
4 = Vacuum gauge
5 = Gate valve
6 = Flange heater
7 = Shut-off valve
8 = Adsorption trap
9 = Exhaust filter
10 = Venting valve
11 = Purge gas valve
12 = Bypass line

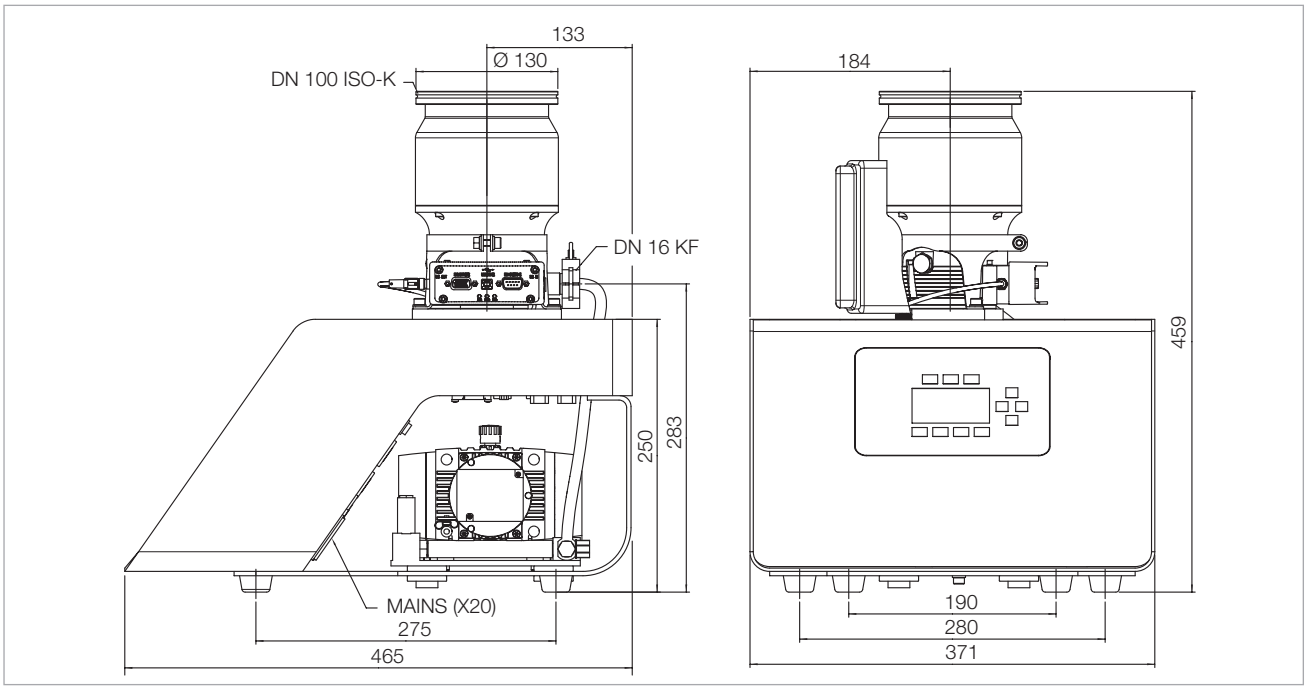
Schematic diagram of the turbomolecular pump systems TURBOLAB (left basic version, right equipment with accessories (TPU not shown)



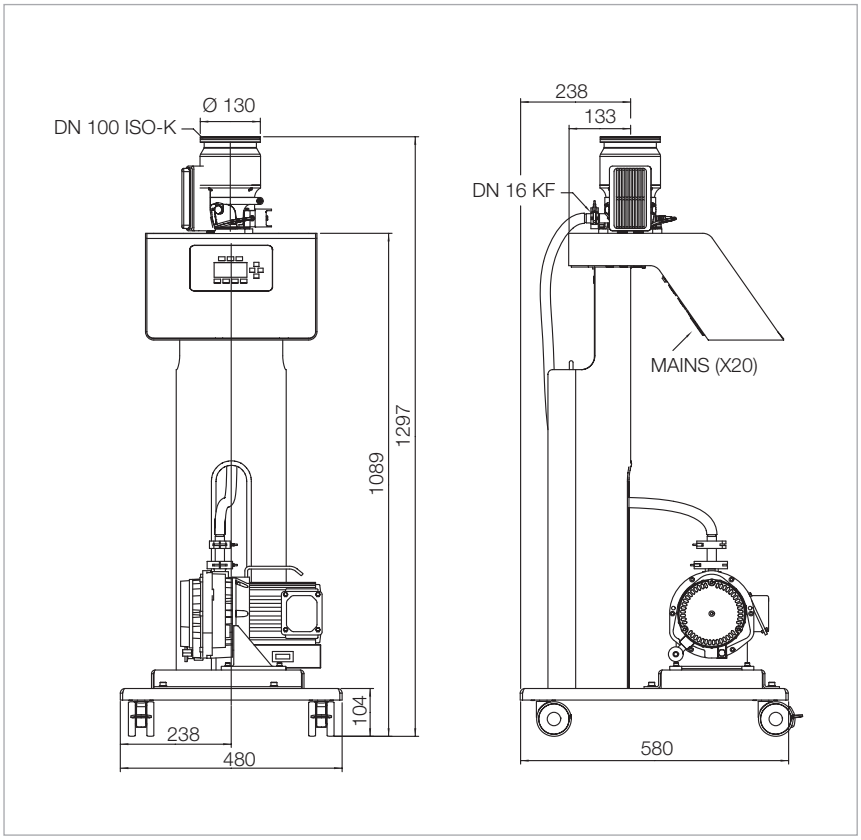
Dimensional drawing TURBOLAB 90 i, dimensions in mm



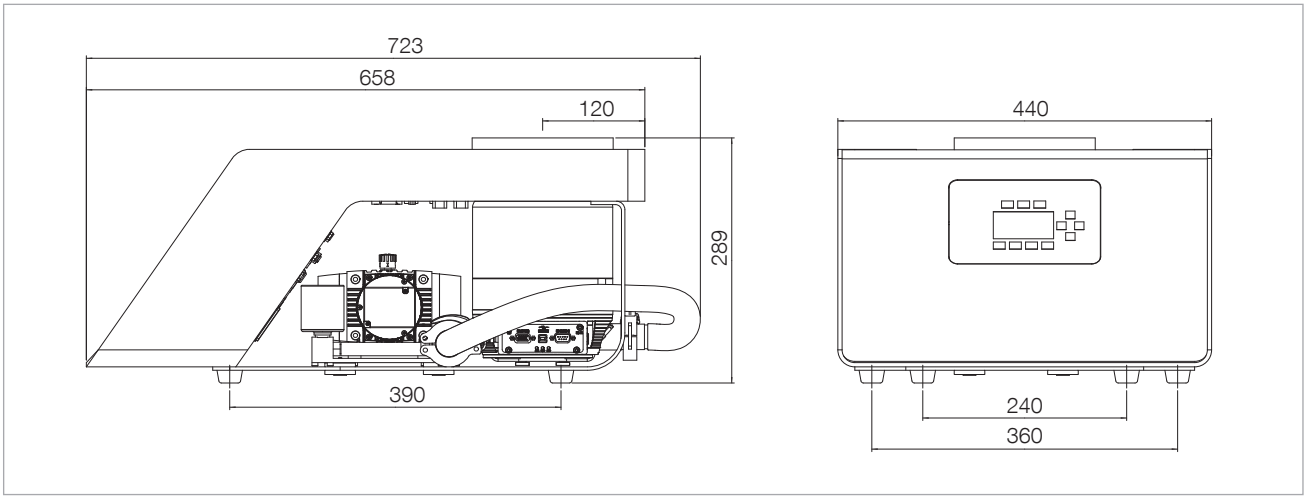
Dimensional drawing TURBOLAB 90 i Cart, dimensions in mm



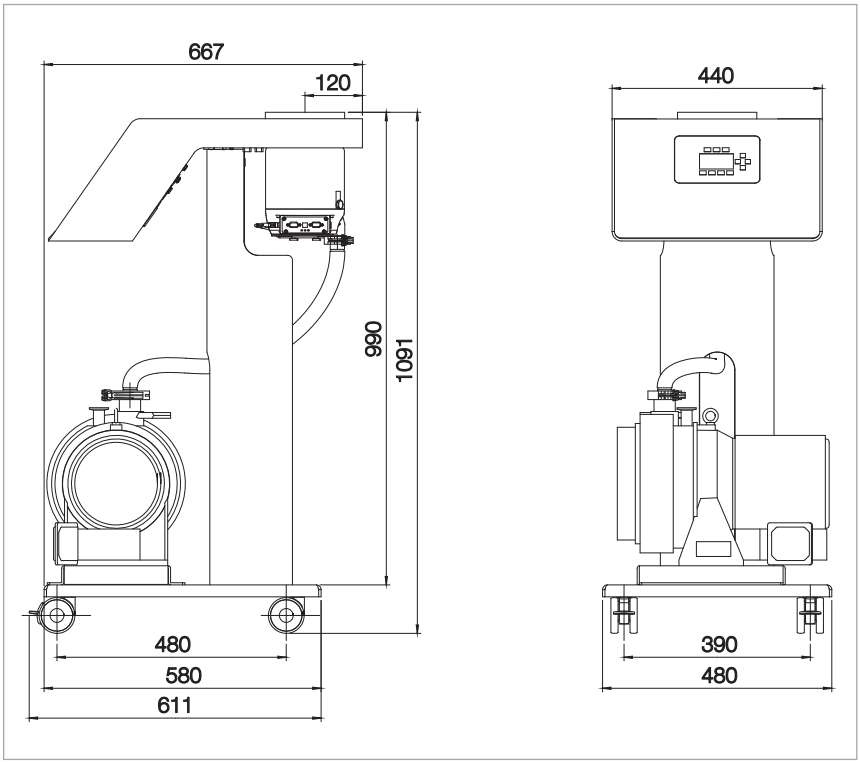
Dimensional drawing TURBOLAB 250 i, dimensions in mm



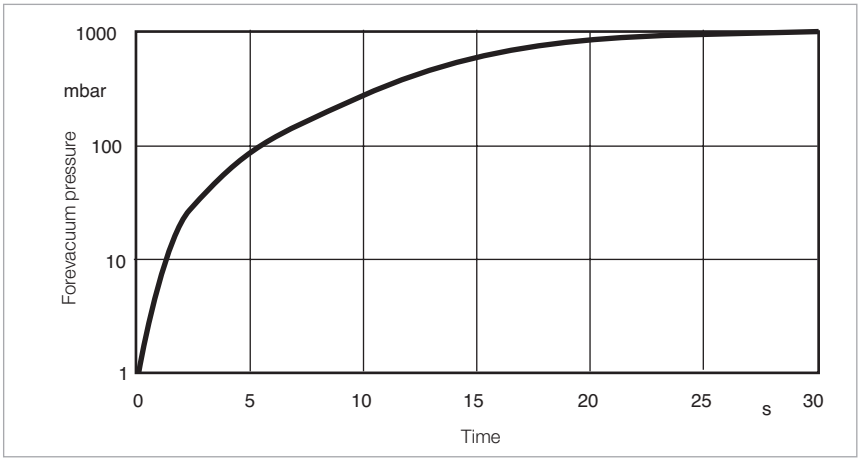
Dimensional drawing TURBOLAB 250 i Cart, dimensions in mm



Dimensional drawing TURBOLAB 350 i / 450 i, dimensions in mm



Dimensional drawing TURBOLAB 350 i / 450 i Cart, dimensions in mm



Maximum rise in pressure

Technical Data Pump system

		TURBOLAB							
		90 i		250 i		350 i		450 i	
Inlet flange	DN	63 ISO-K	63 CF	100 ISO-K	100 CF	100 ISO-K	100 CF	160 ISO-K	160 CF
Forevacuum connection	DN	16 ISO-KF		16 ISO-KF		25 ISO-KF		25 ISO-KF	
Pumping speed	l/s	90		225		290		430	
Ultimate pressure	mbar	< 8 x 10^{-8}	< 5 x10^{-10}	< 8 x 10^{-8}	< 5 x10^{-10}	< 8 x 10^{-8}	< 5 x10^{-10}	< 8 x 10^{-8}	< 5 x10^{-10}
Mains Supply 50/60 Hz	V AC	110 ± 10% / 230 ± 10%							
Power consumption, max.	VA	1760 / 3680							
Weight (ISO-KF / CF)	kg								
Table top unit		20		20		35		35	
Cart		100		100		110		110	
Number of accessories, max.		6		6		6		6	
Number of gauges, max.		2		2		2		2	
CBM		Internal condition monitoring							
Software		Internal webserver (no software to install)							

Technical Data Backing pumps

Diaphragm vacuum pump	DIVAC	**3.0**	
Pumping speed	m³/h	3.0	
Exhaust connection	DN	Silencer	
Noise level	dB(A)	54	
Scroll vacuum pump	SCROLLVAC	**SC 7 plus**	**SC 15 plus**
Pumping speed	m³/h	6.1	14.5
Exhaust connection	DN	25 KF	25 KF
Noise level	dB(A)	55	55
Rotary vane vacuum pump	TRIVAC	**D 4 B**	**D 8 B**
Pumping speed	m³/h	4.8	9.7
Exhaust connection	DN	16 ISO-KF	16 ISO-KF
Noise level	dB(A)	52	52
Rotary vane vacuum pump	SOGEVAC	**SV 16 D**	
Pumping speed	m³/h	16.0	
Exhaust connection	DN	1/2"	
Noise level	dB(A)	59	

Ordering Information

TURBOLAB 90 i

	Part. No.	Part. No.
Pump system with TURBOVAC 90 i	230 V, 50/60 Hz	110 V, 50/60 Hz
Table top unit with DIVAC 3.0		
DN 63 ISO-K	**501592V00001000**	
DN 63 CF	**501592V01001000**	
Cart with SCROLLVAC SC 7 plus		
DN 63 ISO-K	**501592V00021000**	
DN 63 CF	**501592V01021000**	
Cart with SCROLLVAC SC 15 plus		
DN 63 ISO-K	**501592V00041000**	
DN 63 CF	**501592V01041000**	
Cart with TRIVAC D 4 B		
DN 63 ISO-K	**501592V00120000**	**501592V00080000**
DN 63 CF	**501592V01120000**	**501592V01080000**
Cart with TRIVAC D 8 B		
DN 63 ISO-K	**501592V00130000**	**501592V00090000**
DN 63 CF	**501592V01130000**	**501592V01090000**
Cart with SOGEVAC SV 16 D		
DN 63 ISO-K	**501592V00100000**	
DN 63 CF	**501592V01100000**	
Table top unit without Forevacuum pump		
DN 63 ISO-K	**501592V00200000**	
DN 63 CF	**501592V01200000**	
Cart without Forevacuum pump		
DN 63 ISO-K	**501592V00210000**	
DN 63 CF	**501592V01210000**	

Ordering Information

TURBOLAB 250 i

	Part. No.	Part. No.
Pump system with TURBOVAC 250 i	230 V, 50/60 Hz	110 V, 50/60 Hz
Table top unit with DIVAC 3.0		
DN 100 ISO-K	**501592V08001000**	
DN 100 CF	**501592V09001000**	
Cart with SCROLLVAC SC 7 plus		
DN 100 ISO-K	**501592V08021000**	
DN 100 CF	**501592V09021000**	
Cart with SCROLLVAC SC 15 plus		
DN 100 ISO-K	**501592V08041000**	
DN 100 CF	**501592V09041000**	
Cart with TRIVAC D 4 B		
DN 100 ISO-K	**501592V08120000**	**501592V08080000**
DN 100 CF	**501592V09120000**	**501592V09080000**
Cart with TRIVAC D 8 B		
DN 100 ISO-K	**501592V08130000**	**501592V08090000**
DN 100 CF	**501592V09130000**	**501592V09090000**
Cart with SOGEVAC SV 16 D		
DN 100 ISO-K	**501592V08100000**	
DN 63 CF	**501592V09100000**	
Table top unit without Forevacuum pump		
DN 100 ISO-K	**501592V08200000**	
DN 100 CF	**501592V09200000**	
Cart without Forevacuum pump		
DN 100 ISO-K	**501592V08210000**	
DN 100 CF	**501592V09210000**	

Ordering Information

TURBOLAB 350 i

	Part. No.	Part. No.
Pump system with TURBOVAC 350 i	230 V, 50/60 Hz	110 V, 50/60 Hz
Table top unit with DIVAC 3.0		
DN 100 ISO-K	**501592V04001000**	
DN 100 CF	**501592V05001000**	
Cart with SCROLLVAC SC 7 plus		
DN 100 ISO-K	**501592V04021000**	
DN 100 CF	**501592V05021000**	
Cart with SCROLLVAC SC 15 plus		
DN 100 ISO-K	**501592V04041000**	
DN 100 CF	**501592V05041000**	
Cart with TRIVAC D 4 B		
DN 100 ISO-K	**501592V04120000**	**501592V04080000**
DN 100 CF	**501592V05120000**	**501592V05080000**
Cart with TRIVAC D 8 B		
DN 100 ISO-K	**501592V04130000**	**501592V04090000**
DN 100 CF	**501592V05130000**	**501592V05090000**
Cart with SOGEVAC SV 16 D		
DN 100 ISO-K	**501592V04100000**	
DN 100 CF	**501592V05100000**	
Table top unit without Forevacuum pump		
DN 100 ISO-K	**501592V04200000**	
DN 100 CF	**501592V05200000**	
Cart without Forevacuum pump		
DN 100 ISO-K	**501592V04210000**	
DN 100 CF	**501592V05210000**	

Ordering Information

TURBOLAB 450 i

	Part. No.	Part. No.
Pump system with TURBOVAC 450 i	230 V, 50/60 Hz	110 V, 50/60 Hz
Table top unit with DIVAC 3.0		
DN 160 ISO-K	**501592V06001000**	
DN 160 CF	**501592V07001000**	
Cart with SCROLLVAC SC 7 plus		
DN 160 ISO-K	**501592V06021000**	
DN 160 CF	**501592V07021000**	
Cart with SCROLLVAC SC 15 plus		
DN 160 ISO-K	**501592V06041000**	
DN 160 CF	**501592V07041000**	
Cart with TRIVAC D 4 B		
DN 160 ISO-K	**501592V06120000**	**501592V0608000**
DN 160 CF	**501592V07120000**	**501592V07080000**
Cart with TRIVAC D 8 B		
DN 160 ISO-K	**501592V06130000**	**501592V06090000**
DN 160 CF	**501592V07130000**	**501592V07090000**
Cart with SOGEVAC SV 16 D		
DN 160 ISO-K	**501592V06100000**	
DN 160 CF	**501592V07100000**	
Table top unit without Forevacuum pump		
DN 160 ISO-K	**501592V06200000**	
DN 160 CF	**501592V07200000**	
Cart without Forevacuum pump		
DN 160 ISO-K	**501592V06210000**	
DN 160 CF	**501592V07210000**	

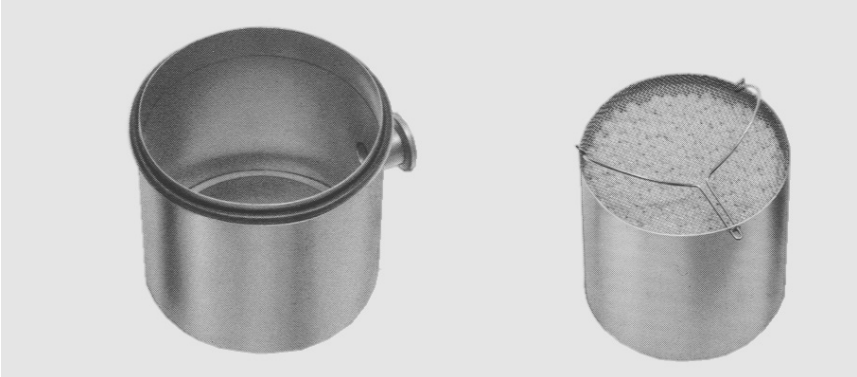
Ordering Information

	TURBOLAB 90 i	TURBOLAB 250 i	TURBOLAB 350 i / 450 i
	Part. No.	**Part. No.**	**Part. No.**
Accessories			
Mains cable TURBOLAB			
230 V, 5.0 m		**800103V0030**	
110 V, 5.0 m		**800103V0031**	
230 V, UK, 5.0 m		**800103V0037**	
Accessory cable TURBOVAC i (air cooling & valve connection)			
M 8 - M 8, 0.3 m		**800103V0001**	
M 8 - M 8, 2.0 m		**800110V0016**	
Y cable TURBOVAC i, M 8		**800110V0020**	
Start stop switch for connection to X1 Remote		**800110V0021**	
USB cable 2.0, Type A/B, 1.8 m		**800110V0108**	
Accessory cable TURBOLAB			
M 8 - M 8, 0.3 m (air cooling & valve connection)		**800103V0001**	
M 8 - M 8, 5.0 m (air cooling & valve connection)		**800103V0003**	
M 12 - M 12, 5.0 m (DIVAC 0.8, 3.0)		**800103V0005**	
C13 - C14, 5.0 m (SOGEVAC)		**800103V0017**	
C14 - NEMA, 5.0 m (SCROLLVAC 110 V)		**800103V0008**	
C14 - Schuko, 5.0 m (SCROLLVAC 230 V)		**800103V0011**	
C14 - C16-1 (230 V), 5.0 m (TRIVAC 230 V)		**800103V0014**	
C14 - C16-1 (110 V), 5.0 m (TRIVAC 110 V)		**800103V0016**	
Accessory cable TURBOLAB			
TURBOVAC i, 5.0 m (24 V DC voltage supply)		**800103V0020**	
Communication TURBOLAB – TMP			
5.0 m		**800103V0029**	
1.0 m		**800103V0027**	
Connection cable Type A			
1.5 m		**800103V0032**	
5.0 m		**12426**	
Connection cable C14 – valve plug, 1.8 m (Control 110/230 V AC SECUVAC valve)		**800103V0033**	
Connection cable C14 – valve plug, 5 m (Control 110/230 V AC SECUVAC valve)		**800103V0035**	
Connection cable C14 – valve plug, 1.8 m (Control 24 V DC SECUVAC valve)		**800103V0034**	
Connection cable C14 – valve plug, 5 m (Control 24 V DC SECUVAC valve)		**800103V0036**	
LEYASSIST software for TMPs		**230439V01**	
Air cooling TURBOVAC 90 i radial	**800136V0007**	-	-
Air cooling TURBOVAC 200 i / 250 i radial	-	**800136V0009**	-
Air cooling TURBOVAC 350 i / 450 i radial	-	-	**800136V0005**
Water cooling TURBOVAC 350 i / 450 i with G 1/8" connections	-	-	**800135V0005**
Water cooling TURBOVAC 350 i / 450 i with G 1/8" connections	-	-	**800135V0006**

	Part. No.
Accessories	
Venting valve 24 V DC, G 1/8"	**800120V0012**
Power failure venting valve 24 V DC, G 1/8"	**800120V0022**
Purge gas valve 24 V DC, G 1/8", 24 sccm	**800120V0013**
Purge gas throttle G 1/8", 24 sccm	**800120V0014**
Air filter for TMP G 1/8"	**800110V0022**
Flange heater	
DN 63 CF, 230 V	**800137V0003**
DN 63 CF, 115 V	**800137V0004**
DN 100 CF, 230 V	**800137V0005**
DN 100 CF, 115 V	**800137V0006**
DN 160 CF, 230 V	**800137V0007**
DN 160 CF, 115 V	**800137V0008**
Vibration absorber	
DN 63 ISO-K	**upon request**
DN 63 CF	**upon request**
DN 100 ISO-K	**800131V1100**
DN 160 ISO-K	**upon request**
DN 160 CF	**upon request**
Centering ring	
with protection screen	
DN 63 ISO-K	**800133V0011**
DN 100 ISO-K	**800133V0021**
DN 160 ISO-K	**800133V0031**
Centering ring	
with splinter guard	
DN 63 ISO-K	**800133V0012**
DN 100 ISO-K	**800133V0022**
DN 160 ISO-K	**800133V0032**
Splinter guard	
DN 63 CF	**800132V0012**
DN 100 ISO-K coarse)	**800132V0101**
DN 100 ISO-K (fine)	**800132V0102**
DN 100 CF (0.8 mm)	**800132V0022**
DN 160 CF (0,8 mm.	**800132V0032**
Protection screen	
DN 63 CF	**800132V0011**
DN 100 CF (3.2 mm)	**800132V0021**
DN 160 CF (3.2 mm)	**800132V0031**

Accessories for High Vacuum Pump Systems TMP

Adsorption Traps with Aluminium Oxide Insert



Adsorption trap (left) and insert (right)

Adsorption traps are installed in all those cases where an oil-free vacuum is to be produced with oil-sealed vacuum pumps.

Advantages to the User

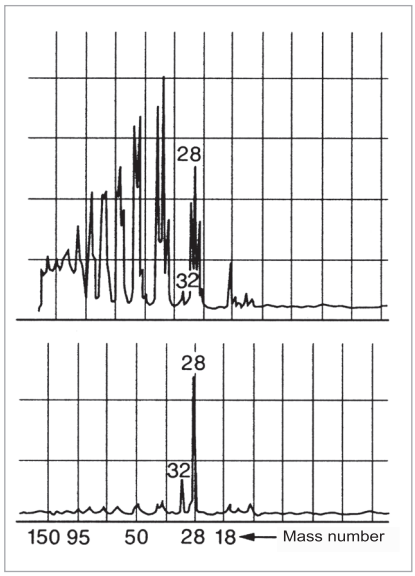
- Backstreaming of oil is reduced by 99%
- Long service life
- High conductance
- Filling can be easily exchanged
- Improvement in the ultimate pressure attained by backing pumps by one order of magnitude
- Stainless steel housing and insert
- NBR gasket

Typical Applications

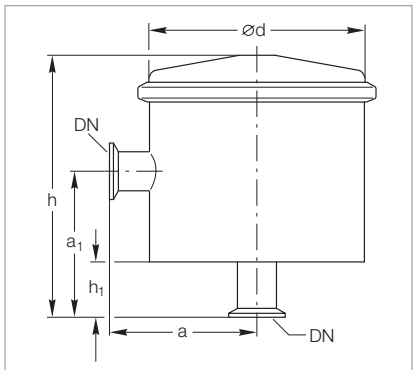
- Product of an oil-free vacuum

Supplied Equipment

- Complete with insert
- Without adsorbent



Residual gas spectrum; top ahead of a rotary vacuum pump, bottom ahead of a rotary vacuum pump with adsorption trap



DN		a	a_1	Ø d	h	h_1
16 ISO-KF	mm	82	82	135	147	32
	in.	3.23	3.23	5.31	5.79	1.25
25 ISO-KF	mm	102	102	175	155	33
	in.	4.02	4.02	6.89	6.10	1.26
40 ISO-KF	mm	132	65	235	160	20
	in.	5.19	2.56	9.25	6.3	0.79

Dimensional drawing for the adsorption traps

Technical Data

		Adsorption Traps		
		16 ISO-KF	25 ISO-KF	40 ISO-KF
Conductance at 10^{-2} mbar (Torr)	l/s	4	6	12
Service live with Al oxide	Months	3		
Al oxide filling	l (qts)	0.5 (0.53)	1.0 (1.06)	2.0 (2.1)
Weight, approx.	kg (lbs)	1.3 (2.9)	1.3 (2.9)	4.0 (8.8)

Ordering Information

	Adsorption Traps		
	16 ISO-KF	25 ISO-KF	40 ISO-KF
	Part No.	Part No.	Part No.
Adsorption trap	854 14	854 15	854 16
Activated aluminum oxide in tin 1.6 l (approx. 1.2 kg (2.65 lbs))		854 10	

UNIVEX
High Vacuum Experimentation Systems

General

The UNIVEX system family was developed by Leybold for applications in research and development as well as for setting up pilot production units.

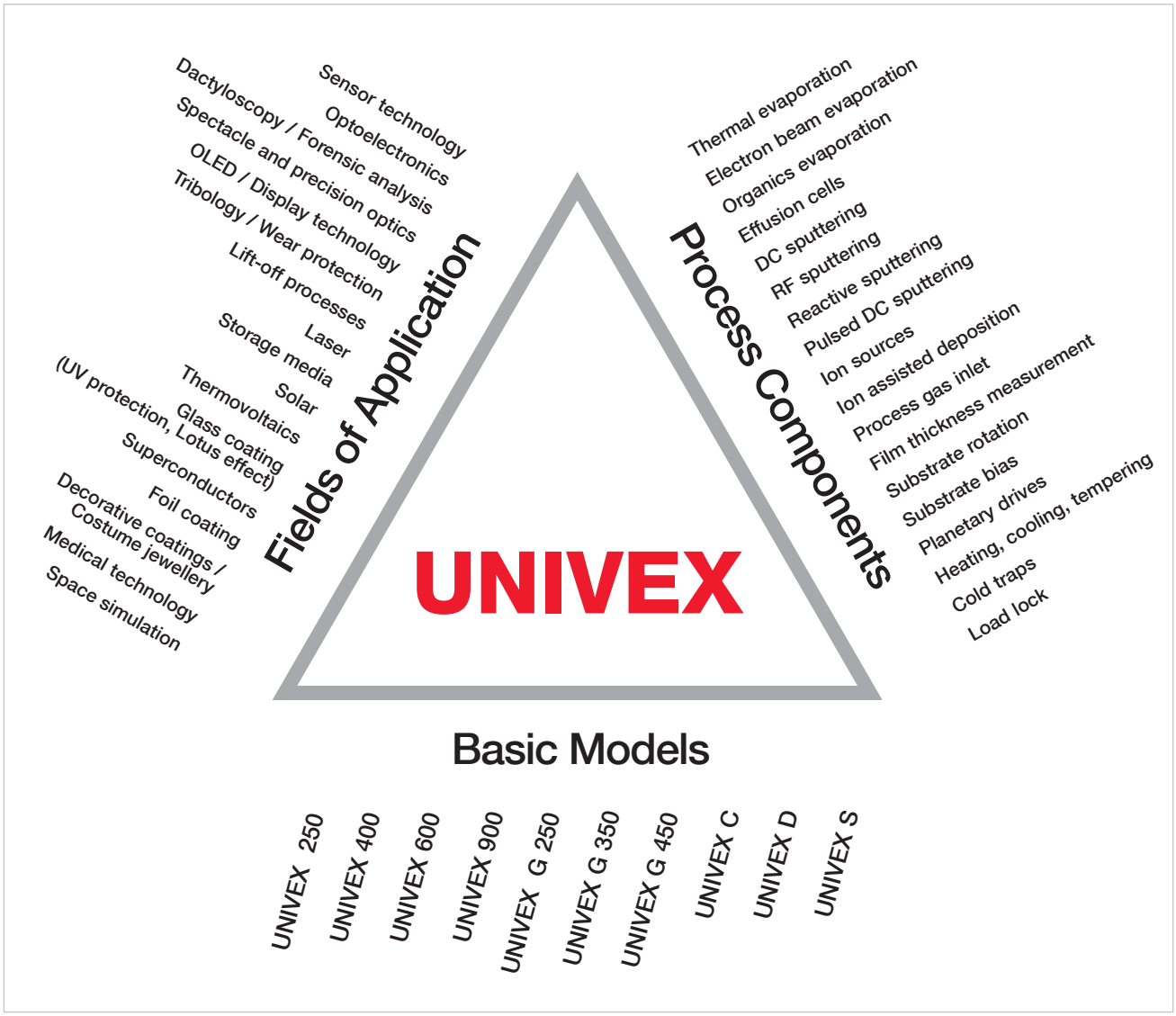
Their range of applications focuses chiefly on vacuum coating technology as well as vacuum process engineering experiments.

The multi-purpose experimentation systems from Leybold are modular and can be specified according to specific customer requirements.

For this purpose, a corresponding questionnaire is provided on the last pages of this chapter.

UNIVEX System Types

- UNIVEX Box Coating Systems UNIVEX 250, UNIVEX 400, UNIVEX 600, UNIVEX 900
- UNIVEX Glove Boc Systems (G): UNIVEX G 250, UNIVEX G 350, UNIVEX G 450
- UNIVEX Cluster and Custom Systems (C)
- UNIVEX Daktyloskopy (D)
- UNIVEX Space (S)



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Box Coating Systems

Multi-purpose Vacuum Coating Systems

Design

- Compact unit with direct access to the process chamber
- The UNIVEX box coaters systems consist of a process and a control module
- The process module includes the vacuum chamber, the coating components and the pump system
- The control module includes the PLC, respectively PC controller including the visualisation as well as the power supplies for the process components

Vacuum Chamber

- Box-shaped stainless steel vacuum chambers UNIVEX 250-600
- Octagonal stainless steel vacuum chamber UNIVEX 900
- Hinged front door for simple chamber access
- Viewing window with coating protection
- Removable stainless steel coating protection panels
- Flexible connections for chamber bottom and chamber top
- Connecting flanges for pump system and process components
- Coolable and heatable chamber walls optional

Vacuum System

- Mechanical forevacuum pump (dry compressing or oil sealed)
- High vacuum pump (turbomolecular or cryo pump)
- Vacuum valves
- Pressure measurement devices

Advantages to the User

- Modular system design
- Application-wise optimised pump system
- Multi-purpose vacuum chamber
- Convenient access to the chamber installations
- Very simple to operate and use via programmable control
- Suited for retrofitting of process components (configuration dependent)
- For installation into clean-room walls
- From UNIVEX 400 onwards, fully automatic system with recipe control

Basic Models

UNIVEX 250



UNIVEX 400



UNIVEX 600



UNIVEX 900



UNIVEX 250



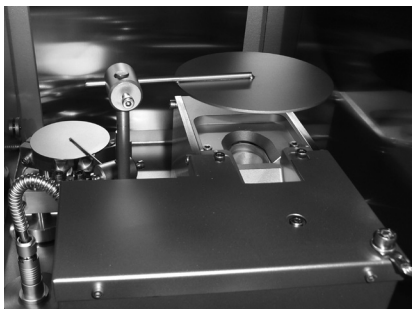
Design example UNIVEX 250

The UNIVEX 250 is a cost-effective and compact entry-level coating system for the laboratory.
Owing to its low height of only approximately 1.2 meters it is ideally placed on a benchtop or installed in a frame.
In the vacuum chamber which is 270 mm wide, substrates up to an overall diameter of 220 mm max. can be rotated and coated.
The integrated PLC controller allows you to run manual, respectively semi-automatic coating processes.

Examples of equipped vacuum chambers



Chamber bottom:
double thermal evaporator with source shutter
Chamber top:
rotating substrate table with substrate shutter



Electron beam evaporator with fourfold rotating crucible as well as additional double thermal evaporator, each with source shutter

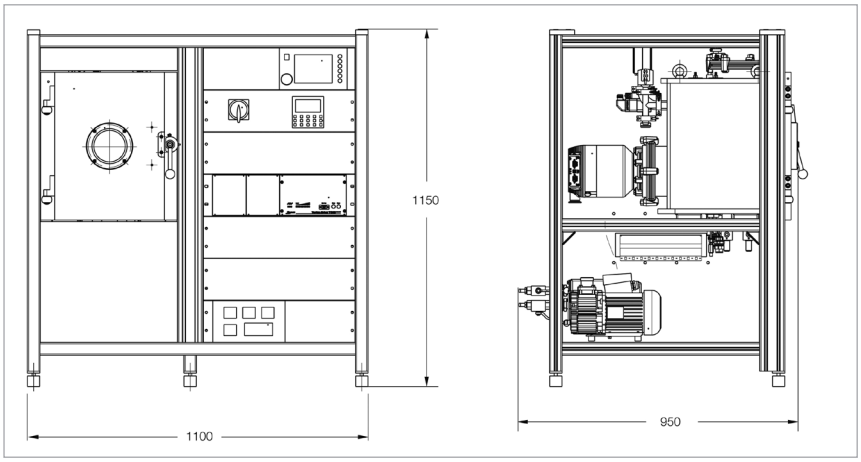
Technical Data — UNIVEX 250

Vacuum chamber		
Material		
Chamber body		Stainless steel
Chamber door		Aluminum
Dimensions		
Inside width	mm	270
Inside depth	mm	370
HInside height	mm	400
Connections [1]		
Front side		door with window
Rear side	DN	1x 160 ISO-K (pump system connection), 2 x 16 ISO-KF, 1 x 25 ISO-KF, 2 x 40 ISO-KF
Bottom plate		variable connections
Cover plate		variable connections
High vacuum pump [1]		TURBOVAC 450 i
Nominal pumping speed for N_2	l/s	430
Backing pump [1]		TRIVAC D 8 T or SCROLLVAC 10 plus
Nominal pumping speed	m^3/h	8 / 10.6
Controller		PLC with graphic touchscreen
Required supplies		
Voltage		400 V, 3 phases / N / 50 Hz [2]
Cooling water		
Inlet pressure	bar (abs.)	4 to 6
Consumption, approx.	l/min	dependent on chamber installations
Feed temperature	°C	+18 to +25
Compressed air	bar (abs.)	4 to 6
Weight, approx.	kg	300 [3]

[1] Standard configuration, other hole patterns / flanges / viewing windows / pumps upon request
[2] Other voltages and frequencies upon request
[3] Total weight without chamber installations/process components

Ordering Information — UNIVEX 250

	Part No.
UNIVEX 250	**upon request**



Dimensional drawing for the UNIVEX 250

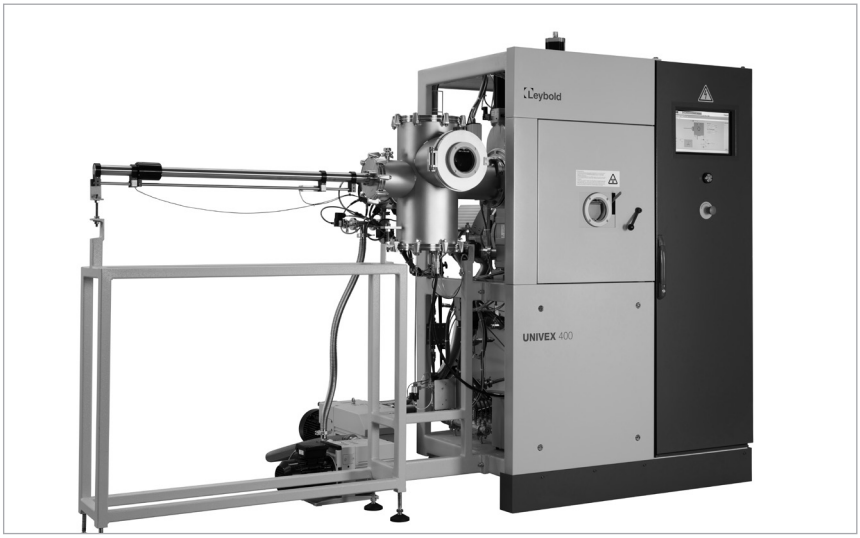
UNIVEX 400



Design example UNIVEX 400

The UNIVEX 400 is a compact coating system for laboratory tasks, respectively pilot production runs.
Due to its chamber dimensions, it is ideal for coating of small to medium-sized substrates.
In the vacuum chamber which is 420 mm wide, substrates respectively substrate holders up to an overall diameter of 350 mm max. can be rotated and coated.
The integrated PC/PLC controller allows you to run manual, semiautomatic and fully automatic coating processes.

UNIVEX 400 mit Loadlock



UNIVEX 400 with loadlock

Examples of equipped vacuum chamber



Special chamber height 800 mm
Chamber bottom: Electron beam evaporator with multiple rotary crucibles, ion source for substrate treatment and thermal double evaporator.
Chamber ceiling: Substrate stage for four square substrates, with manual adjustment of the coating angle.

Technical Data

UNIVEX 400

Vacuum chamber		coolable / heatable
Material		
Chamber body		Stainless steel
Chamber door		Stainless steel
Dimensions		
Inside width	mm	420
Inside depth	mm	480
HInside height	mm	550
Connections [1]		
Front side		door with window
Rear side	DN	1x 200 ISO-K (pump system connection), 2 x 16 ISO-KF, 2 x 25 ISO-KF, 2 x 40 ISO-KF
Bottom plate		variable connections
Cover plate		variable connections
High vacuum pump [1]		TURBOVAC 950 i
Nominal pumping speed for N_2	l/s	900
Backing pump [1]		TRIVAC D 30 T or ECODRY 35
Nominal pumping speed	m^3/h	30 / 35
Controller		PLC with graphic touchscreen
Required supplies		
Voltage		400 V, 3 phases / N / PE / 50 Hz [2]
Cooling water		
Inlet pressure	bar (abs.)	4 to 6
Consumption, approx.	l/min	dependent on chamber installations
Feed temperature	°C	+18 to +25
Compressed air	bar (abs.)	4 to 6
Weight, approx.	kg	500 [3]

[1] Standard configuration, other hole patterns / flanges / viewing windows / pumps upon request

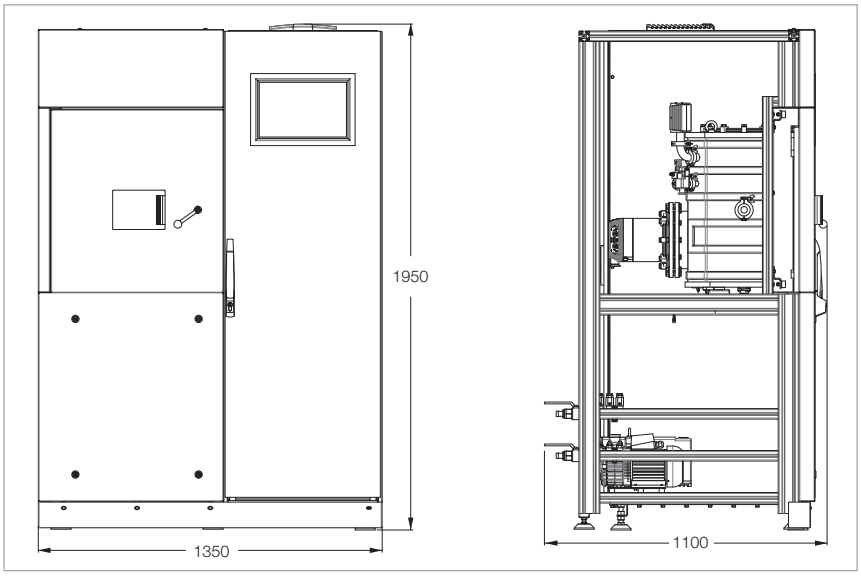
[2] Other voltages and frequencies upon request

[3] Total weight without chamber installations/process components

Ordering Information

UNIVEX 400

	Part No.
UNIVEX 400	**upon request**



Dimensional drawing for the UNIVEX 400

UNIVEX 600



Design example UNIVEX 600

The UNIVEX 600 is a compact coating system for the laboratory, respectively pilot production runs.
Because of its chamber size it is suited for medium to large substrate sizes.
The attainable substrate throughput meets the general requirements for small series production runs.
In the vacuum chamber which is 600 mm wide, substrates respectively substrate holders up to an overall diameter of 550 mm max. can be rotated and coated.
The integrated PC/PLC controller allows you to run manual, semiautomatic and fully automatic coating processes.

Examples of equipped vacuum chambers



Chamber bottom: electron beam evaporator with sixfold rotating crucible
Chamber ceiling: planetary drive for substrate rotation



Chamber bottom:
In the front, an ion source and an electron electron beam evaporator with multiple rotating crucible. In the rear, two magnetron sputter sources.
Chamber ceiling:
Substrate stage with load-lock transfer and substrate aperture.



Multiple targets for ion sputtering

Technical Data

UNIVEX 600

Vacuum chamber		coolable / heatable
Material		
Chamber body		Stainless steel
Chamber door		Stainless steel
Dimensions		
Inside width	mm	600
Inside depth	mm	600
HInside height	mm	800 evaporator version (550 sputter version)
Connections [1]		
Front side		Door with window
Rear side	DN	1x 250 ISO-K (pump system connection), 2 x 16 ISO-KF, 2 x 25 ISO-KF, 2 x 40 ISO-KF
Bottom plate		variable connections
Cover plate		variable connections
High vacuum pump [1]		TURBOVAC 1450 i
Nominal pumping speed for N_2	l/s	1380
Backing pump [1]		TRIVAC D 65 B oder ECODRY 65
Nominal pumping speed	m^3/h	75 / 65
Controller		PLC with graphic touchscreen
Required supplies		
Voltage		400 V, 3 phases / N / PE / 50 Hz [2]
Cooling water		
Inlet pressure	bar (abs.)	4 to 6
Consumption, approx.	l/min	dependent on chamber installations
Feed temperature	°C	+18 to +25
Compressed air	bar (abs.)	4 to 6
Weight, approx.	kg	1000 [3]

[1] Standard configuration, other hole patterns / flanges / viewing windows / pumps upon request

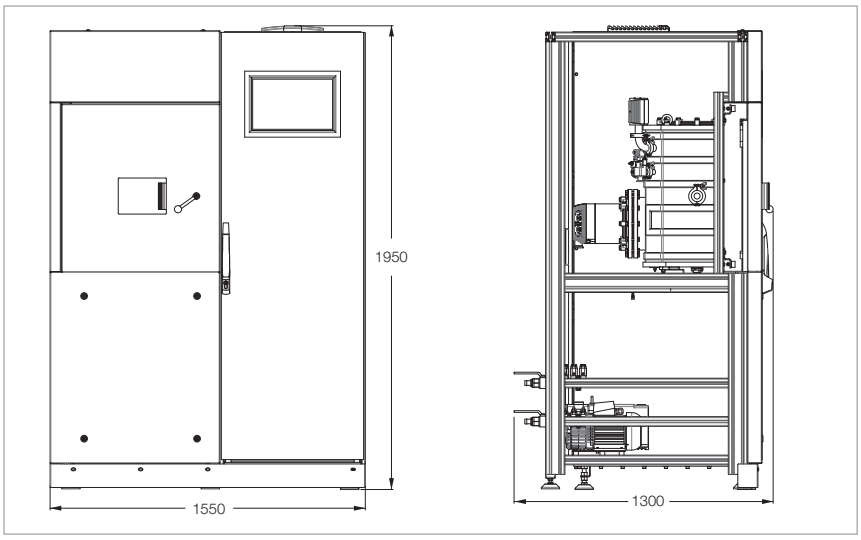
[2] Other voltages and frequencies upon request

[3] Total weight without chamber installations/process components

Ordering Information

UNIVEX 600

	Part No.
UNIVEX 600	**upon request**



Dimensional drawing for the UNIVEX 600

UNIVEX 900



Design example UNIVEX 900

The UNIVEX 900 is the sophisticated solution for medium to large substrate sizes, respectively for higher substrate throughputs.
In the octagonal vacuum chamber which is 900 mm wide, substrates respectively substrate holders up to an overall diameter of 800 mm max. can be rotated and coated.
The integrated PC/PLC controller allows you to run manual, semiautomatic and fully automatic coating processes

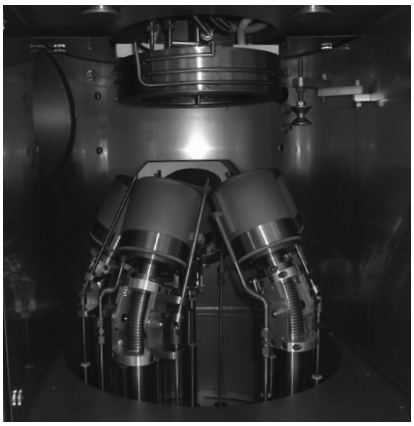
Examples of equipped vacuum chambers



Chamber bottom: electron beam evaporator, thermal evaporator, ion source
Chamber top: rotating substrate dome with turnover device



Substrate calotte rotating on the chamber ceiling with central measurement of the layer thickness based on oscillating quartz. Chamber bottom: Electron beam evaporator with multi-changing crucible and ion source.



Confocal sputter-up arrangement with rotating high-temperature substrate heater

Technical Data

UNIVEX 900

Vacuum chamber		coolable / heatable
Material		
Chamber body		Stainless steel
Chamber door		Stainless steel
Dimensions		
Inside width	mm	900 (octagonal)
Inside depth	mm	900 (octagonal)
HInside height	mm	1100
Connections [1]		
Front side		Door with window
Rear side	DN	2x 250 ISO-K (pump system connection), 2 x 16 ISO-KF, 2 x 25 ISO-KF, 2 x 40 ISO-KF, 1 x DN 63 ISO-K
Bottom plate		variable connections
Cover plate		variable connections
High vacuum pump [1]		up to 2x TURBOVAC W 2200 iP
Nominal pumping speed for N_2	l/s	2100
Backing pump [1]		SV 100 B / VARODRY VD 160
Nominal pumping speed	m^3/h	97.5 / 150
Controller		PLC with graphic touchscreen
Required supplies		
Voltage		400 V, 3 phases / N / PE / 50 Hz [2]
Cooling water		
Inlet pressure	bar (abs.)	4 to 6
Consumption, approx.	l/min	dependent on chamber installations
Feed temperature	°C	+18 to +25
Compressed air	bar (abs.)	4 to 6
Weight, approx.	kg	1500 [3]

[1] Standard configuration, other hole patterns / flanges / viewing windows / pumps upon request

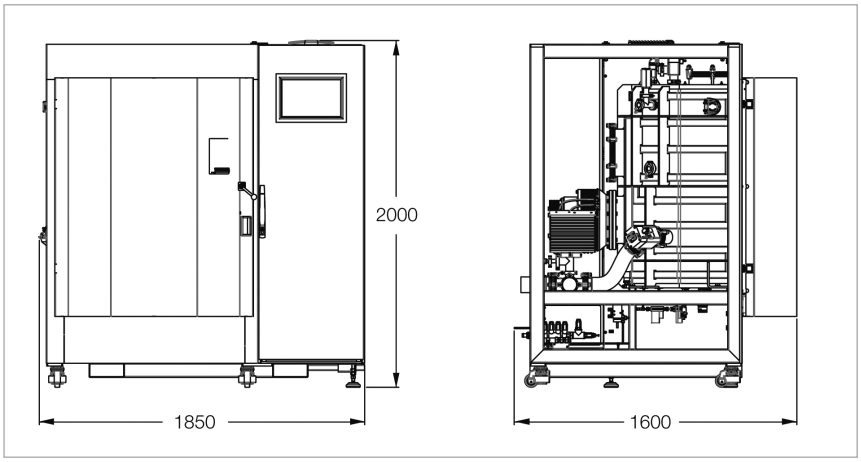
[2] Other voltages and frequencies upon request

[3] Total weight without chamber installations/process components

Ordering Information

UNIVEX 900

	Part No.
UNIVEX 900	**upon request**



Dimensional drawing for the UNIVEX 900

Glove Box Systems

Multi-purpose Vacuum Coating System for Fitting to a Glove Box

The UNIVEX glove box systems were developed to coat materials which are sensitive with respect to the environmental conditions like oxygen or humidity, for example

Design

- The UNIVEX glove box systems consist of a process module and a separate electrical cabinet
- The process module includes the vacuum chamber, the coating components and the pump system
- The control module includes the PLC, respectively PC controller including the visualisation as well as the power supplies for the process components

Vacuum Chamber

- Box-shaped stainless steel vacuum chambers UNIVEX G 250 – 450
- Sliding front door for easy chamber access through the glove box
- Swivelling rear door for simple chamber access
- Viewing window with coating protection
- Removable stainless steel coating protection panels
- Flexible connections for chamber bottom and chamber top
- Connecting flanges for pump system and process components

Vacuum System

- Mechanical forevacuum pump (dry compressing or oil sealed)
- High vacuum pump (turbomolecular or cryo pump)
- Vacuum valves
- Pressure measurement devices



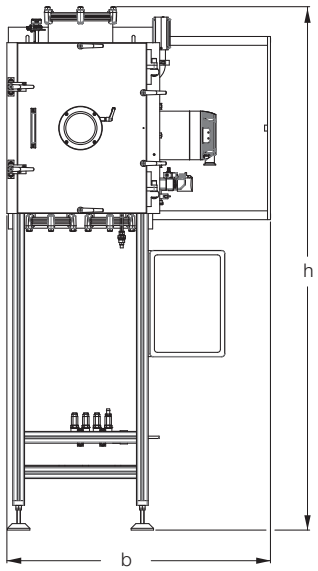
Design example
UNIVEX G 350, consisting of electrical cabinet (left) and coating module (right)

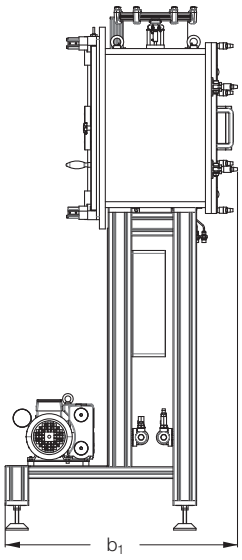
Advantages to the User

- Modular system design
- Application-optimised pump system
- Flexibly usable vacuum chamber
- Space saving installation to the rear of the glove box
- Convenient process access through the glove box by means of a front sliding door
- Easy access to the chamber unit through the rear service door
- Very simple to operate and use
- Suited for retrofitting of process components (configuration dependent)
- All system components with exception of the sliding door are accessible from outside the glove box



View into the vacuum chamber
Chamber floor:
Three thermal single evaporators.
Chamber ceiling: substrate stage with gradient aperture and two thickness gauges.





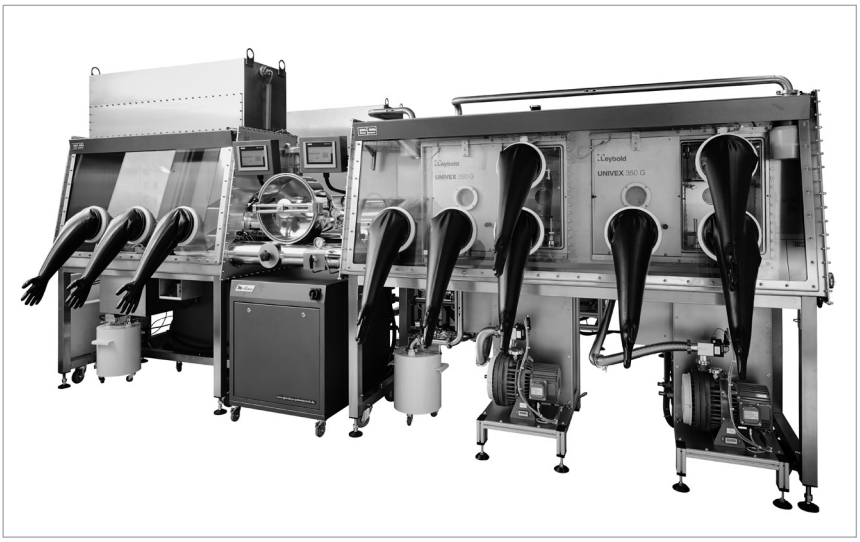
Type	h	b	b_1
UNIVEX G 250	1700	700	800
UNIVEX G 350	1800	900	800
UNIVEX G 450	1950	1150	1000

Dimensional drawing of the glove box units, shown without process installations

Complete Solutions, including Glove Box

Upon request Leybold will also arrange the delivery of turnkey solutions consisting of the UNIVEX 350 G coating system and a glove box from a single source.

Please send us your enquiry.



Glove box system with UNIVEX G 350 coating modules fitted to the rear



UNIVEX G 350 rear side

UNIVEX G 250

The UNIVEX G 250 is a convenient and cost-effective solution for coating tasks requiring not much space.

Substrates, respectively substrate holders up to an overall diameter of approximately 220 mm can be processed.

Technical Data

UNIVEX G 250

Vacuum chamber		
Material		
Chamber body		Stainless steel
Front sliding door		Stainless steel
Rear swivelling door		Aluminum
Dimensions		
Inside width	mm	270
Inside depth	mm	370
HInside height	mm	400
Connections [1]		
Front side		Sliding door for glove box access; manually operated and pneumatically closing
Rear side		turning door for service access; manually locked
Bottom plate		variable connections
Cover plate		1x 200 ISO-K, 2 x installation bore ø 34,5 mm
Left side	DN	1x 160 ISO-K (pump system connection), 2 x 16 ISO-KF, 1 x 25 ISO-KF
High vacuum pump [1]		TURBOVAC 450 i
Nominal pumping speed for N_2	l/s	430
Backing pump [1]		TRIVAC D 8 T or SCROLLVAC 10 plus
Nominal pumping speed	m^3/h	8 / 10.6
Controller		PLC with graphic touchscreen
Required supplies		
Voltage		400 V, 3 phases / N / PE / 50 Hz [2]
Cooling water		
Inlet pressure	bar (abs.)	4 to 6
Consumption, approx.	l/min	dependent on chamber installations
Feed temperature	°C	+18 to +25
Compressed air	bar (abs.)	4 to 6
Weight, approx.	kg	350 [3]

[1] Standard configuration, other hole patterns / flanges / viewing windows / pumps upon request

[2] Other voltages and frequencies upon request

[3] Total weight without chamber installations/process components

Ordering Information

UNIVEX G 250

	Part No.
UNIVEX G 250	**upon request**

UNIVEX G 350

The UNIVEX G 350 G combines a compact design with plenty of chamber space.

For many coating tasks the UNIVEX G 350 offers optimum space conditions and operator convenience as to process components and substrate processing.

Substrates, respectively substrate holders up to an overall diameter of approximately 300 mm can be processed.

Technical Data

UNIVEX G 350

Vacuum chamber		
Material		
Chamber body		Stainless steel
Front sliding door		Stainless steel
Rear swivelling door		Stainless steel
Dimensions		
Inside width	mm	370
Inside depth	mm	380
HInside height	mm	500
Connections [1]		
Front side		Sliding door for glove box access; manually operated and pneumatically closing
Rear side		turning door for service access; manually locked
Bottom plate		variable connections
Cover plate		1x 200 ISO-K, 4 x installation bore ø 34,5 mm
Left side	DN	1 x 160 ISO-K (pump system connection), 2 x 16 ISO-KF, 1 x 25 ISO-KF, 1 x 40 ISO-KF
High vacuum pump [1]		TURBOVAC TV 950 i
Nominal pumping speed for N_2	l/s	900
Backing pump [1]		TRIVAC D 30 T or ECODRY 35
Nominal pumping speed	m^3/h	30 / 35
Controller		PLC with graphic touchscreen
Required supplies		
Voltage		400 V, 3 phases / N / PE / 50 Hz [2]
Cooling water		
Inlet pressure	bar (abs.)	4 to 6
Consumption, approx.	l/min	dependent on chamber installations
Feed temperature	°C	+18 to +25
Compressed air	bar (abs.)	4 to 6
Weight, approx.	kg	400 [3]

[1] Standard configuration, other hole patterns / flanges / viewing windows / pumps upon request

[2] Other voltages and frequencies upon request

[3] Total weight without chamber installations/process components

Ordering Information

UNIVEX G 350

	Part No.
UNIVEX G 350	**upon request**

UNIVEX G 450

Owing to its chamber dimensions, the UNIVEX G 450 is suited for all coating tasks requiring much space.

Substrates, respectively substrate holders up to an overall diameter of over 400 mm can be processed.

With a height of 650 mm, the vacuum chamber is also suited for lift-off applications.

Technical Data

		UNIVEX G 450
Vacuum chamber		
Material		
Chamber body		Stainless steel
Front sliding door		Stainless steel
Rear swivelling door		Aluminum
Dimensions		
Inside width	mm	500
Inside depth	mm	500
HInside height	mm	650
Connections [1]		
Front side		Sliding door for glove box access; manually operated and pneumatically closing
Rear side		turning door for service access; manually locked
Bottom plate		variable connections
Cover plate		1x 250 ISO-K, 4 x installation bore ø 34,5 mm
Left side	DN	1 x 250 ISO-K (pump system connection), 2 x 16 ISO-KF, 1 x 25 ISO-KF, 1 x 40 ISO-KF
High vacuum pump [1]		TURBOVAC 950 i
Nominal pumping speed for N_2	l/s	900
Backing pump [1]		TRIVAC D 30 T or ECODRY 35
Nominal pumping speed	m^3/h	30 / 35
Controller		PLC with graphic touchscreen
Required supplies		
Voltage		400 V, 3 phases / N / PE / 50 Hz [2]
Cooling water		
Inlet pressure	bar (abs.)	4 to 6
Consumption, approx.	l/min	dependent on chamber installations
Feed temperature	°C	+18 to +25
Compressed air	bar (abs.)	4 to 6
Weight, approx.	kg	500 [3]

[1] Standard configuration, other hole patterns / flanges / viewing windows / pumps upon request

[2] Other voltages and frequencies upon request

[3] Total weight without chamber installations/process components

Ordering Information

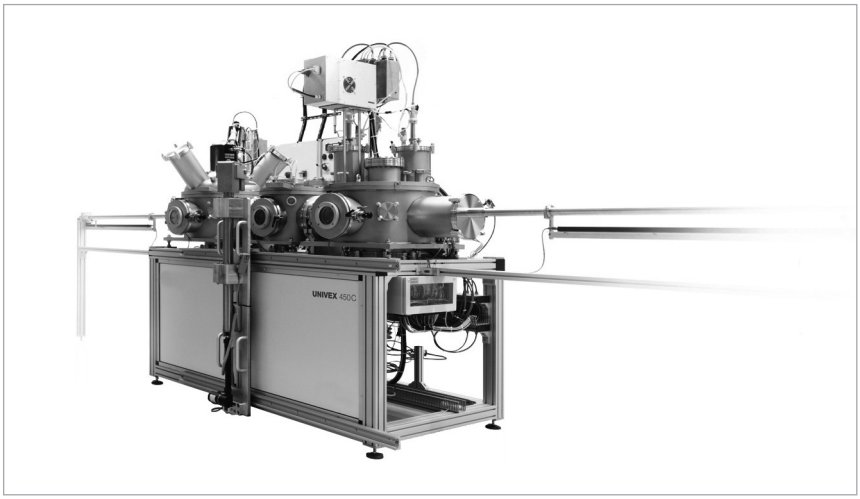
	UNIVEX G 450
	Part No.
UNIVEX G 450	**upon request**

Notes

Cluster-Tool Systems UNIVEX C



Design example:
UNIVEX C 450 with coating module and electrical cabinet
The coating module consists of two process chambers (left and right) and, arranged in between, the load lock and transfer chambers.
The substrate transfer between the chambers is done with the help of a vacuum robot.



Design example:
UNIVEX C 450 with two process chambers as well as load lock chamber arranged at the centre.
The substrates are moved using linear transfer rods (left and right).

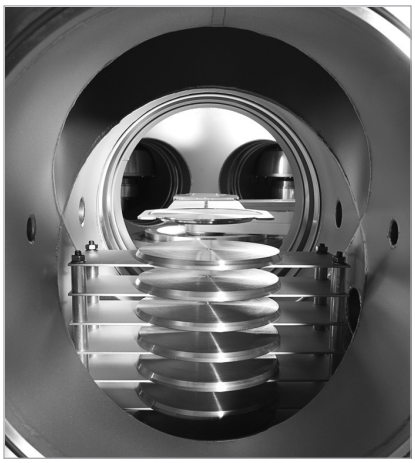
For special applications we also supply cluster tool or customised systems based on the UNIVEX module concept.

These systems are equipped according to the application and customer requirements with separate process chambers, load-lock and transfer chambers

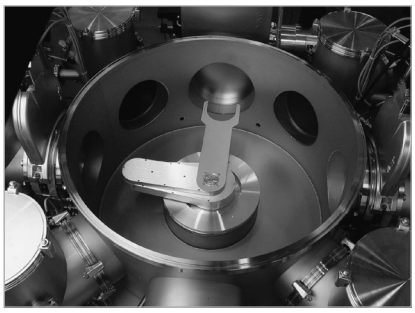
Frequently sputter applications are involved since sputter targets remain in place for a long time and because of this, the process chambers need to be vented rarely.

Usually each vacuum chamber has its own high-vacuum pump system. The load-lock chamber is in the simplest case manually loaded with individual substrates. But also a fully automatic magazine processing of several substrates per batch is possible.

Please contact us for a system tailored to your application.



Design example:
Automatically controlled substrate magazine with robot arm access

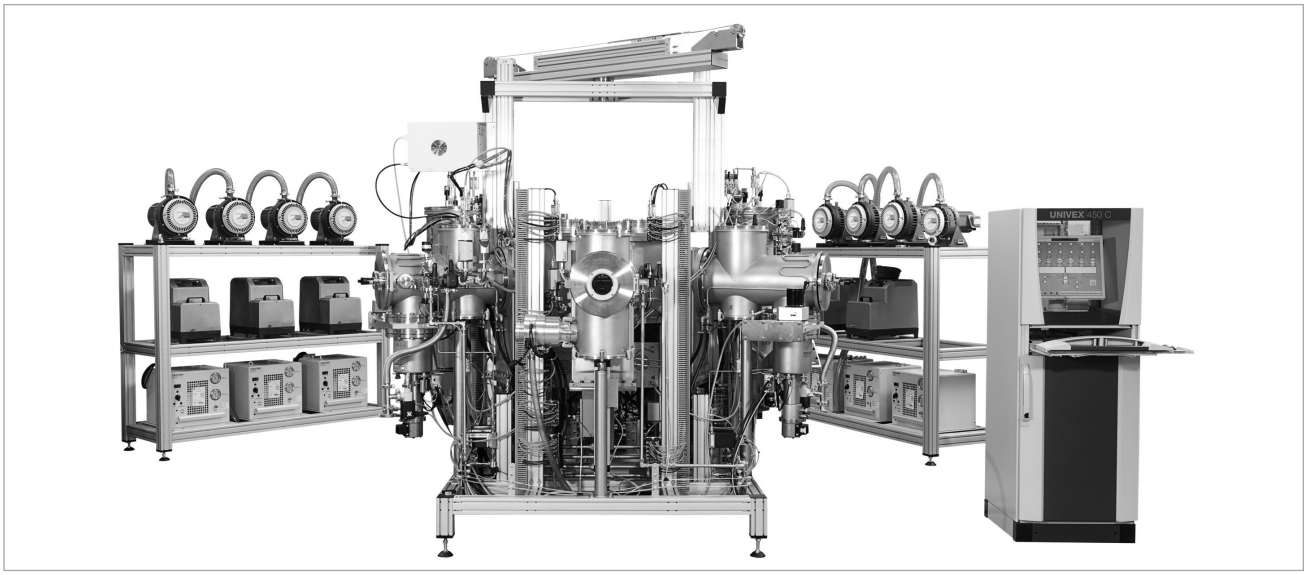


Design example:
Load lock chamber with central vacuum robot for substrate transportation into radially arranged process chambers

For transporting the substrates between the individual vacuum chambers, motor driven robot arms or linear transfer drive units are used.

The UNIVEX control software is customised according to the specific application requirements and will generally allow fully automatic running of the process including recipe processing

Additional features like data logging, password protected and priority dependent user access as well as remote access for servicing are integrated.



Design example:
Coating module (centre) with decentralised pump systems (left and right) and control panel

Dactyloscopy Systems UNIVEX D

Leybold has developed a coating system, which relies on a recognized metal evaporation process to reveal fingerprints on items containing fingerprint evidence.

Advantages to the User

- Easily controllable thermal coating process
- Coating of large areas is possible up to 840 x 550 mm
- Short cycle times are possible (depending on the material with the fingerprint evidence)
- Good contrast on multicolor surfaces
- The material containing the fingerprint evidence remains undamaged



Design example:
UNIVEX D 600, compact unit for dactyloscopy



Detailed view on UNIVEX D 600:
View into the chamber with two thermal dual evaporators in the chamber floor.
A substrate holder positioned on the chamber ceiling.

Example System UNIVEX D 600

This compact system includes a removable substrate holder on telescopic rails, which allows the coating of large substrates.

A 400 mm diameter viewing window with LED illumination provides good sample visibility. The system is operated via a touch panel with reduced number of push buttons and automatic sequences.

The system is equipped with a low-maintenance turbomolecular pump to achieve the necessary process pressure within a few minutes.

Please contact us for a system tailored to your application.

Technical Data

UNIVEX D 600

Vacuum chamber		
Material		
Chamber body		Stainless steel
Chamber door		Stainless steel
Dimensions		
Inside width	**mm**	600
Inside depth	**mm**	600
HInside height	**mm**	550
Connections [1]		
Front side		door with window Ø 400 mm
Rear side	**DN**	1x DN 250 ISO (pump system connection), 2 x DN 40 KF, 2 x DN 25 KF, 2 x DN 16 KF
Bottom plate	**mm**	18 x 34.5 mm
High vacuum pump [1]		TURBOVAC MAG 2207 iS
Nominal pumping speed for N_2	**l/s**	2 200
Backing pump [1]		TRIVAC D 30 T or ECODRY 35
Nominal pumping speed	**m^3/h**	23,9 / 35
Controller		PLC with graphic touchscreen
Required supplies		
Voltage		230V / 50 Hz / 1-ph / N / PE [2]
Cooling water		
Inlet pressure	**bar (abs.)**	max. 4 pressureless
Consumption, approx.	**l/min**	2 (for turbomolecular pump only)
Feed temperature	**°C**	+15 to +25
Compressed air	**bar (abs.)**	not necessary
Weight, approx.	**kg**	700

[1] Standard configuration, other hole patterns / flanges / viewing windows / pumps upon request

[2] Other voltages and frequencies upon request

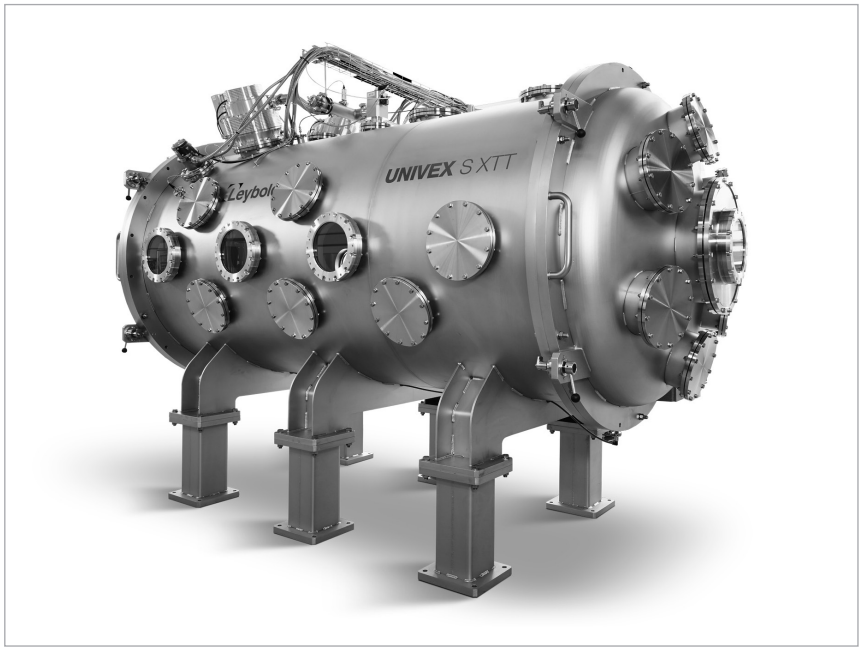
Space Simulation Systems UNIVEX S

The UNIVEX S is designed for testing space equipment under high and ultra-high vacuum conditions.

The test chambers can vary in size from several litres for testing e.g. small circuit boards to several dozen cubic metres to prove the space suitability of complete modules.

The UNIVEX S systems are turnkey, with fully automatic vacuum systems and a user-friendly operator control.

The modular vacuum systems are equipped with integrated fore-vacuum and high vacuum pumps to meet individual requirements.



Design example:
UNIVEX S XTT for testing ion thrusters

UNIVEX S XTT

The UNIVEX S XTT is a customised system for research and industry for testing ion thrusters under simulated space conditions.

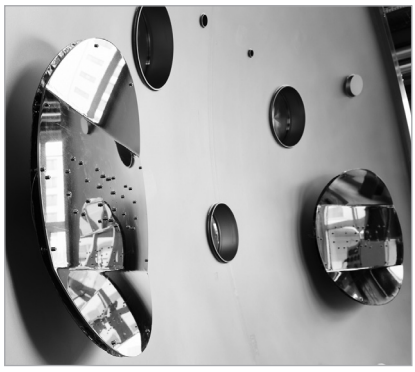
Modern ion thrusters emit high-energy xenon or krypton ions which, at a gas flow of 0.1 to 10 mg/s, require a pumping speed of 10,000 to to >100,000 l/s in order to achieve the required working pressure (high vacuum).

Single-stage cold heads, with specially tuned cold surfaces, have proven to be the optimum solution for pumping large volumes of noble gases (e.g. xenon, argon, krypton) during ion thruster tests.

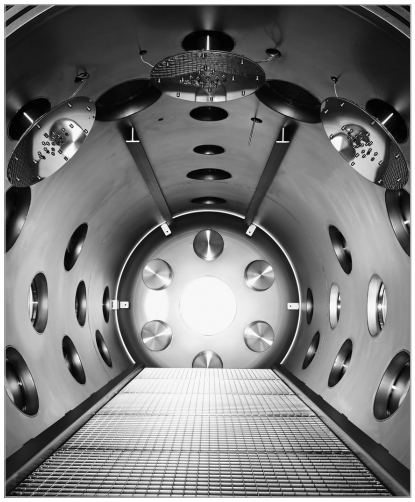
Leybold offers turnkey systems with vacuum chamber, pump system and automatic control for the thruster tests. We focus on long-term suitability, especially since the tests regularly last for several months.

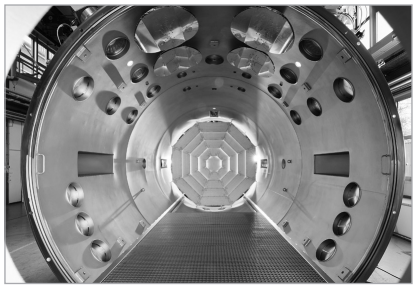


Design example:
UNIVEX S XTT for testing ion thrusters



UNIVEX S XTT cryopanel details





Examples for
UNIVEX S XTT chambers with cryopanels

Please contact us for a system tailored to your application.

UNIVEX S BC

The UNIVEX S BC enable the targeted heating and thus degassing of materials under high vacuum conditions over days and weeks. UNIVEX S BC are designed for baking out all kinds of space hardware such as sensors, insulating foils, components, etc. For a wide range of materials and designs, Leybold offers tailor-made systems with vacuum chamber, pump system, temperature control unit and automated process sequence.
Depending on customer requirements additional cold traps, TQCMs or mass spectrometers are available.

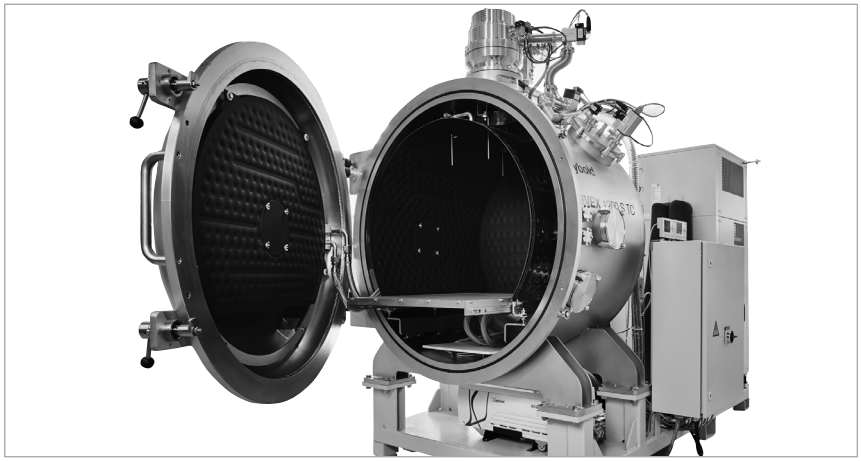


Design example:
UNIVEX S BC system with vacuum bake-out chamber

UNIVEX S TC

The UNIVEX S TC is a thermal-vacuum test chamber which, in addition to the vacuum conditions in space, can also simulate the temperature conditions prevailing there (-80°C to +180°C).

For the most different temperature test cycles Leybold offers turnkey systems with vacuum chamber, pump system, temperature control unit and automated process sequence.



Design example:
UNIVEX S TC system with thermal vacuum test chamber

UNIVEX S TML

The UNIVEX S TML is a test apparatus for evaluating the mass loss of materials under space conditions.

Every material used in the space industry must successfully pass a TML test prior to being used in space.
In this test material samples are heated to 125°C in a high vacuum and the escaping vapours are condensed on a cooled measuring plate.

Our UNIVEX S TML allows an automatic test procedure according to the ASTM and ECSS standards.



Design example:
UNIVEX S TML testing device

Thermal Evaporation of High Melting Point Materials (metals)

Single Thermal Evaporator

Consisting of two water-cooled high voltage feedthroughs with terminal blocks for 34.5 mm dia. holes.



Single thermal evaporator

Technical Data — Single Thermal Evaporator

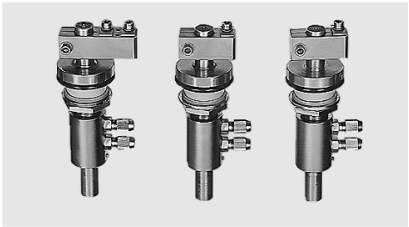
Rating per conductor	V A	max. 100 500
Seals		FPM
Water connection	mm	Hose 4/6 ⌀
Weight	kg	2.5

Ordering Information — Single Thermal Evaporator

	Part No.
Single thermal evaporator	**upon request**

Dual Thermal Evaporator

Consisting of three water-cooled high voltage feedthroughs with terminal blocks for 34.5 mm dia. holes.



Dual thermal evaporator

Technical Data — Dual Thermal Evaporator

Rating per conductor	V A	max. 100 500
Seals		FPM
Water connection	mm	Hose 4/6 ⌀
Weight	kg	3.9

Ordering Information — Dual Thermal Evaporator

	Part No.
Dual thermal evaporator	**upon request**

High Current Cable

For single and dual thermal evaporators, equipped with terminals and clamping pieces.

Technical Data — High Current Cable

Length	m	2 [1]
Rating	V A	max. 100 500
Cross section	mm^2	120
Weight	kg	3.5

Ordering Information — High Current Cable

	Part No.
Power supply cable	**upon request** [2]

[1] Standard length. Other lengths can be specified

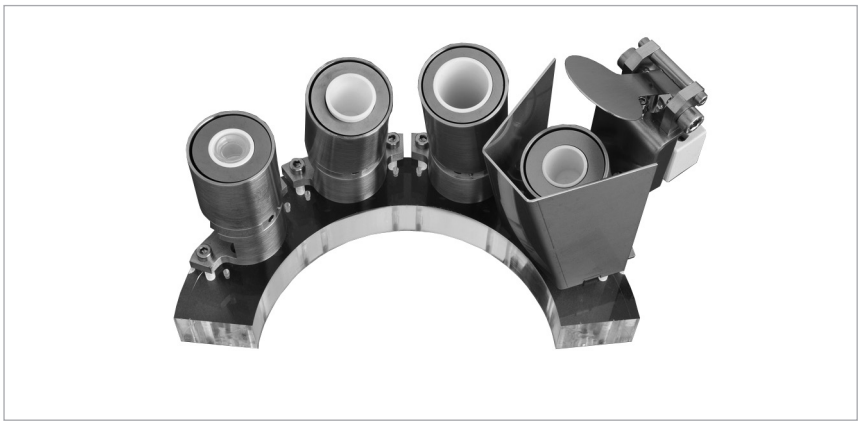
[2] For the single thermal evaporator, two high current cables are required
For the dual thermal evaporator, three high current cables are required

Thermal Evaporation of Low Melting Point Materials (organics)

Organic material evaporators are special instruments based on the thermal principle developed to evaporate mostly temperature sensitive organic materials.

Such instrumentation ensures a coating process at precisely controlled heating temperatures in the range between 50 °C and 600 °C.

For installation within the UNIVEX systems, Leybold supplies organic material evaporators as a complete package, consisting of evaporator source, automatic evaporator shutter and 19" rack mount controller.



Four organic material evaporators, arranged in a semicircle



Single organic material evaporator with shutter, fitted to a DN 40 CF flange

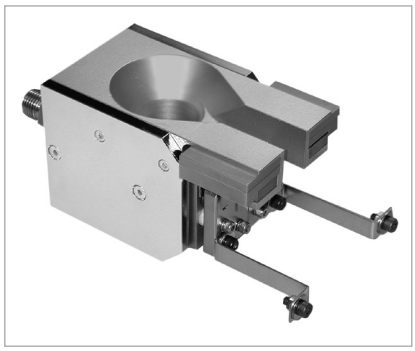
Please contact us for a system tailored to your application.

Electron Beam Evaporation

Various models of electron beam evaporators and power supplies are available for installation in the UNIVEX systems.

Electron Beam Evaporator

The selection of a suitable electron beam evaporator will primarily depend on the amount of available space, the desired evaporation rate and the film thickness as well as the number and type of materials which need to be evaporated. Single crucible as well as rotatable multi-crucible evaporators are available.



Electron beam evaporator with single crucible



Electron beam evaporator with rotatable six-pocket crucible

Power Supplies

The power supply unit for the individual electron beam evaporators is selected depending on the maximum evaporation power which is required, as well as the demanded properties for X/Y beam deflection. Models with output power ratings ranging from 3 kW to 10 kW are available.

Please contact us for a system tailored to your application.

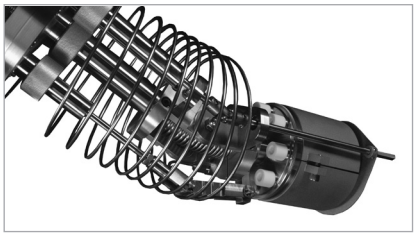
Sputtering

Magnetron Sputter Sources

The magnetron sputter sources, which can be built into the UNIVEX systems, are DC/RF compatible. This means, they may be operated either with a DC or also with a RF power supply.
In addition, pulsed DC power supplies are possible.
Here as standard round planar sputter sources with target diameters ranging from 2-in. to 6-in. are available.
Selection and equipping here depends on the substrate size to be coated, the specified sputtering process and the target material as well as the available installation space.
Other target sizes and magnetron types (rectangular sources, for example) are available upon request.



2-in. magnetron with in-situ tiltable sputter head, pneumatically actuated target shutter and gas feed



4-in. magnetron with in-situ tiltable sputter head, pneumatically actuated target shutter and gas feed



Confocal arrangement of 3-in. sputter sources, aligned for sputter-up

DC Power Supplies

For DC sputtering, power supply units with a rated output power ranging between 500 W and 3 kW are available. These are 19-in. rack mount units which can be installed in the UNIVEX cabinets.

RF Power Supplies

For RF sputtering, power supply units with a rated output power ranging between 300 W and 2 kW are available. These are 19-in. rack mount units which can be installed in the UNIVEX cabinets.

Moreover, automatically controlled RF matchboxes are supplied for impedance matching between the RF power supply and the magnetron.

Gas Inlet

Sputtering sources can only be operated with a process gas present. For this, manually operated variable leak valves or automatically controlled mass flow controllers are available options.

Throttling the Pumping Speed and Process Pressure Control

In order to protect the high vacuum pump against the high pressures present during plasma operation and to control the process pressure, the UNIVEX systems are fitted with suitable components for throttling the high vacuum pumping speed. These may be butterfly valves, control gate valves or also speed controlled turbomolecular pumps

Please contact us for a system tailored to your application.

Ion Sources

Ion sources are frequently used to either clean or etch the substrates before running the actual coating process, or to optimise the thin film properties during deposition. In the case of the latter process, the ion source serves to support the coating process (IBAD – Ion Beam Assisted Deposition). However, there are also some PVD processes, during which the ion source is directly needed to produce the thin films, for example during ion beam sputtering

As to design and operating principle, different types of ion sources are available, for example

- Gridded and gridless ion sources
- DC ion sources and RF ion sources
- Flange mounted ion sources and ion sources built in/aligned in the vacuum



Gridless DC ion source with filament for plasma neutralisation



Filamentless RF grid type ion source

We shall be pleased to assist you in connection with your UNIVEX application. Please send us your request.

Process Gas Inlet

In plasma supported processes (sputtering, etching, glow discharge, bias) or reactive deposition methods, generally a gas supply from the outside is necessary. The gas may be supplied either manually with a gas-dosing valve or program-controlled by way of a gas flow controller (MFC – Mass Flow Controller). The MFC control range is depending on the requirements between approximately 0 to 10 sccm and 0 to 500 sccm.
The available MFC models are equipped either with a 0 to 5 V analogue interface or a EtherCAT interface. The possible gases respectively gas mixtures within a UNIVEX system depend on the type of required application and the installed system hardware (in particular the pump system).

Mass Flow Controller (MFC)

For controlled inlet of gas in connection with automated plasma processes (sputtering, etching, glow discharge). The MFC is controlled by a PC or a PLC provided from the side of the customer.



Technical Data — Mass Flow Controller (MFC)

Gas flow, max.	**sccm**	selectable between 10 and 500
Supply voltage	**V DC**	24
Control interface		analog 0 – 5 V or EtherCAT

Ordering Information — Mass Flow Controller (MFC)

	Part No.
Mass flow controller	**upon request**

Variable Leak Valve with Isolation Valve

For manually controlled inlet of gas in connection with plasma processes (sputtering, etching and glow discharge).



Technical Data — Variable Leak Valve with Isolation Valve

Gas inlet rate q_L	**mbar x l/s**	5×10^{-6} to 1×10^{3}
Connection flange	**DN**	16 ISO-KF

Ordering Information — Variable Leak Valve with Isolation Valve

	Part No.
Variable leak valve with isolation valve	**215 010**

see also catalog section “Valves”

Please contact us for detailed information.

Film Thickness Measurement

Various thin film thickness measuring instruments may be installed in the UNIVEX units.

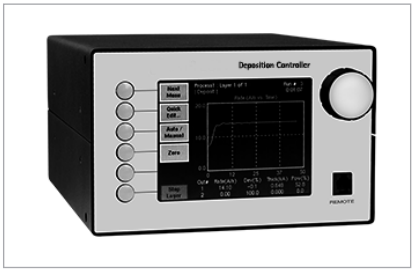
The selection depends on the measurements needed and the required degree of automation.

As standard, oscillating crystal systems are used. These may consist of one or several sensing heads with or without shutter, and upon request are available for UHV operation (i.e. are suitable for degassing).

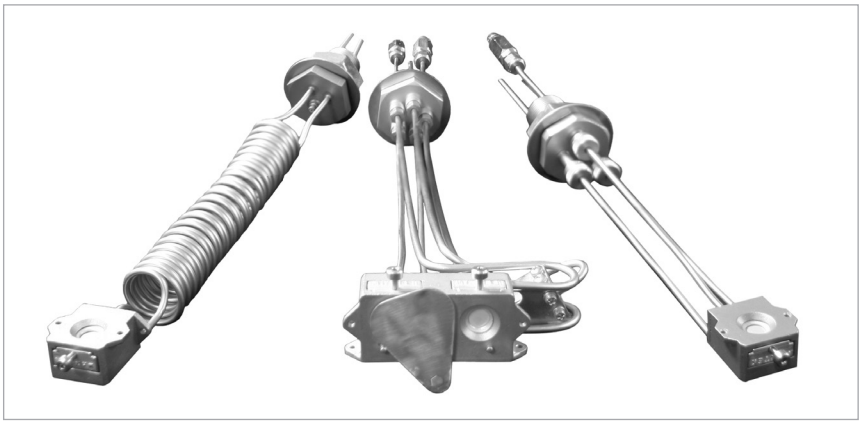
UNIVEX 250 / UNIVEX G 250:
The control is either carried out by a monitor (only measurement of deposition rate and layer thickness) or a controller (besides measurement-parameters as well as rate control and layer thickness shut-off possible).

From UNIVEX 400:
Control is fully automatic via the UNIVEX system control.

Please contact us for further information so that we can offer you the optimum solution for your application.



Example of a thin film controller

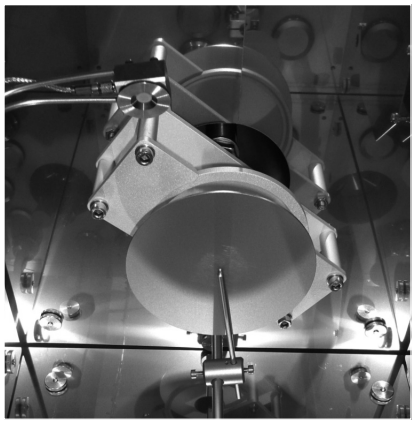


Examples of thin film measurement gauge heads

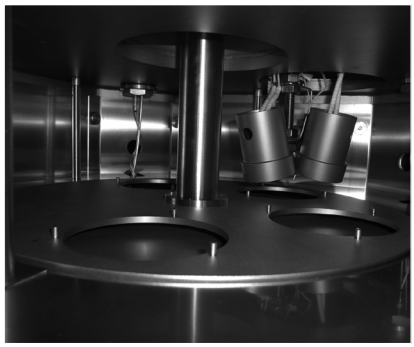
Substrate Rotation

To attain the desired film properties, a rotary movement of the substrates is very often necessary in deposition processes.

The Leybold UNIVEX system is available with a wide range of substrate rotation accessories.
A simple, manually operated rotation axis can be implemented just as a continuously revolving motor shaft or an angle positionable solution (for placement or transfer tasks).
In addition, coaxial drives with two independently operated rotating tables can be offered.



Motor driven rotary drive with a detachable substrate holder (bayonet coupling).
View from the bottom onto the closed substrate shutter

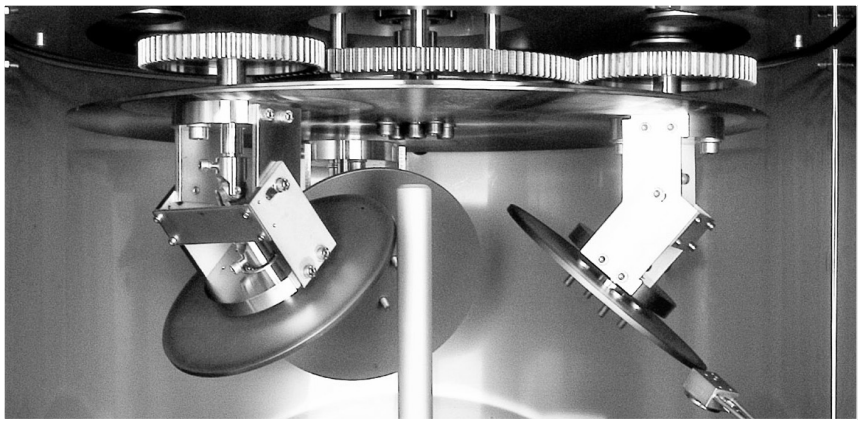


Coaxial hollow shaft drive for eccentric rotation and positioning of several substrates, with separate shutter table

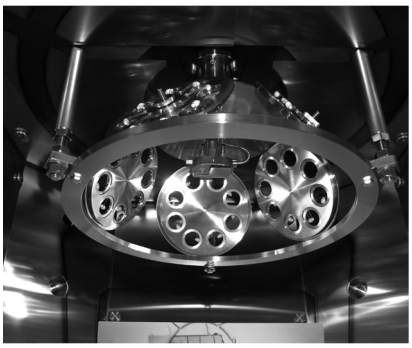
Planetary Drives

For high demands regarding thickness uniformity of the deposited film, planetary drives are suitable. Here the substrates, which are to be coated, are placed on so-called planets. The planets revolve eccentrically about a central axis but they additionally rotate about their own centre point.

Different types of planetary drives are possible depending on the specific kind of task (size and number of substrates, angle of inclination, throughput times).



Planetary drive with gear drive and three planets, firmly installed, but where the angle is adjustable



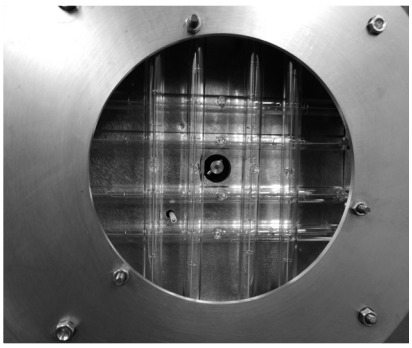
Planetary drive with central friction disc and five free-running planets

We will be pleased to advise you on the possibilities of substrate movement. Please send us your enquiry.

Heating, Cooling, Tempering, Bias

The thermal manipulation of substrates is an important method to optimise coating results. For this, Leybold Vacuum offers within the scope of its UNIVEX systems numerous solutions.

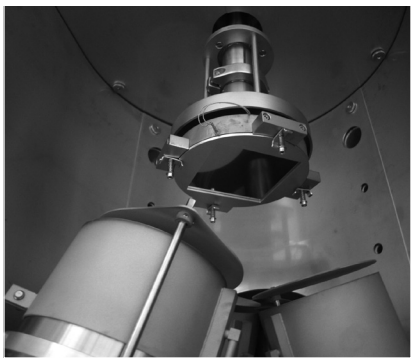
Depending on requirements and technical feasibility, thermal solutions may also be combined with other properties for example rotation or substrate bias.



Rotatable thermal radiation heater with quartz lamps

Substrate Heating

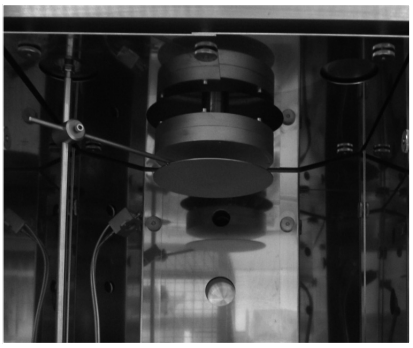
For temperature-controlled heating, different contact and thermal radiation heaters are available. The selection of the optimal solution depends above all on the desired temperature range, the substrate size and the substrate material.



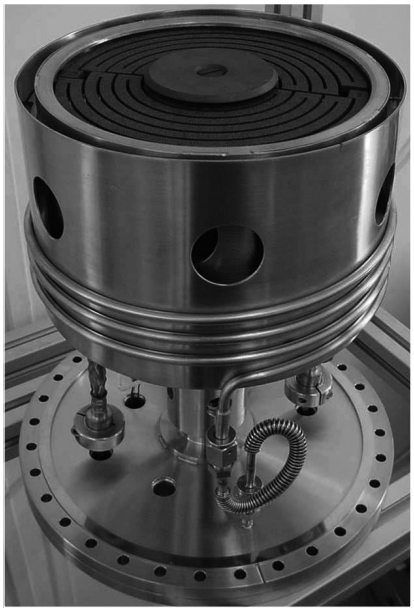
Rotating contact heater based on the resistance heating principle

Substrate Cooling

Heat sensitive substrates or substrate coatings necessitate during the deposition process some kind of cooling. Leybold offers both inactively as well as actively cooled substrate holders. As cooling media, water, liquid nitrogen (LN_2) or special cooling liquids can be used.



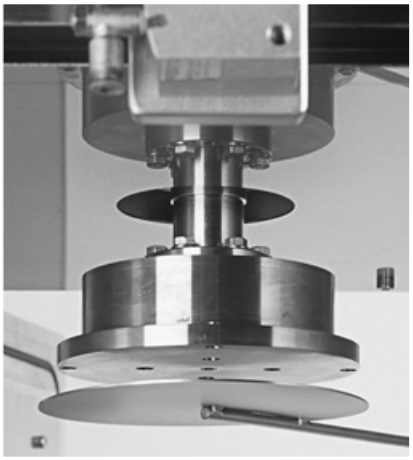
Rotating and water-cooled substrate table



Rotating high temperature thermal radiation heater with SIC heating element

Substrate Tempering

Through the utilisation of a special temperature control liquid, it is possible to heat or also cool a substrate. The possible temperature range lies between approximately -50 °C and +150 °C for static substrate holders, respectively -20 °C and +100 °C for rotating substrate holders.



Rotatable and temperature controllable substrate holder with substrate shutter

Substrate Bias

Pre-cleaning of the substrate with RF or DC biasing prior to deposition can improve the adhesive properties of the film. Leybold offers insulated substrate holders and upon request matching power supplies.

Load Lock Systems

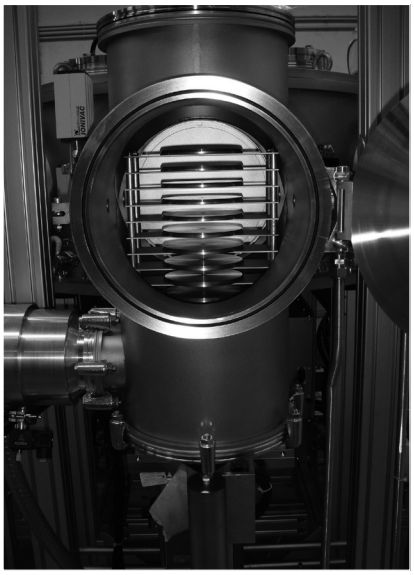
To improve the process conditions and to increase coating throughput, frequently additional load lock chambers are used.

These are connected to the process chamber and are vacuum-wise s eparated by a gate valve. By means of a transport facility (linear transfer rod, vacuum robot or alike) the substrate is transported between the chambers.

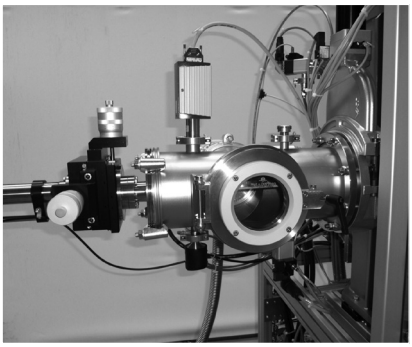
The load lock system offers the advantage to save time during pumpdown and the ability to attain significantly better vacuum pressures in the process chamber, since it will not have to be vented when changing the substrates. Usually the load lock chamber will be significantly smaller compared to the process chamber.

Selection of the load lock chamber and the pump system as well as the design for the substrate transport facility depend on the specific kind of application.

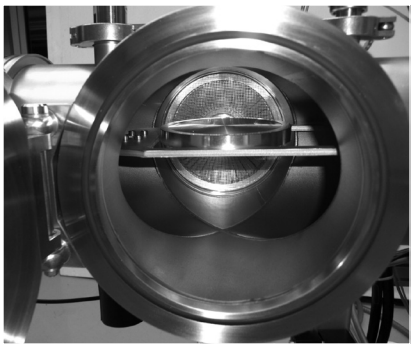
We will be pleased to advise you on the possibilities of a Load-Lock system in your UNIVEX application.



Manually operated load lock chamber with substrate magazine



Load lock chamber for a single substrate with automatically operated linear transfer unit



View into the opened load lock chamber onto the substrate end effector

General Accessories

Blank-Off Screw Fitting

For 34.5 mm dia. hole.



Blank-off screw fitting

Technical Data — Blank-Off Screw Fitting

Material		Stainless steel
Seal		FPM (FKM)
Weight	kg	0.1

Ordering Information — Blank-Off Screw Fitting

	Part No.
Blank-Off screw fitting	**030 40**

PS 113 A
Low Pressure Safety Switch

Safety interlock arrangements in connection with the UNIVEX system controller, respectively optionally connected power supply equipment (for sputtering or electron beam evaporation, for example).



PS 113 A Safety Switch

Technical Data — Low Pressure Safety Switch

Switching pressure	mbar	approx. 6 below atmospheric pressure
Return switching pressure	mbar	3 below atmospheric pressure
Switching inaccuracy	mbar	2
Switching contact		Changeover contacts, gold-plated, for prog. controls
Switching capacity	mA / V AC mA / V AC	100 / 24 30 / 24
Vacuum connection	DN	16 ISO-KF

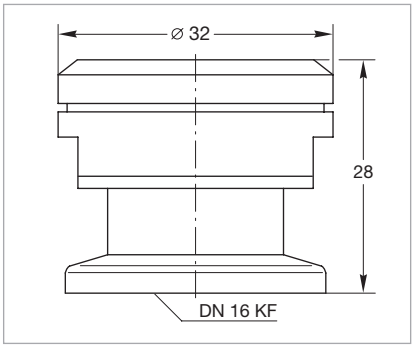
Ordering Information — Low Pressure Safety Switch

	Part No.
Low Pressure Safety Switch PS 113 A, DN 16 ISO-KF; complete with 3 m long cable	**230 011**

see also Catalog Part “Measuring, controlling”

Overpressure Safety Valve

For protecting the vacuum chamber against atmospheric overpressure during gas inlet



Dimensional drawing for overpressure safety valve

Technical Data — Overpressure Safety Valve

Responding pressure	mbar	1150 ± 40, over-pressure
Flow at 140 mbar	l/h	500
Valve disk		Spring loaded, with O-ring seal
Leak rate in the closed state	mbar x l/s (Torr x l/s)	$< 1 \times 10^{-8}$ $(< 0.75 \times 10^{-8})$
Connection	DN	16 ISO-KF

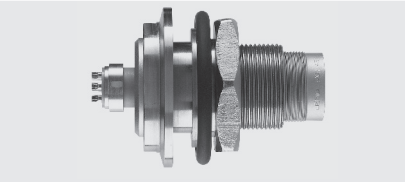
Ordering Information — Overpressure Safety Valve

	Part No.
Overpressure Safety Valve	**890 39**

see also Catalog Part “High Vacuum Pumps”

Vacuum Feedthrough for the Transfer of Electrical Signals

For installation in a 34.5 mm diameter installation bore.
Connection on the side of the atmosphere through a six-way plug (included in the delivery).
Connection on the vacuum side through a plug with soldered contacts (included in the delivery).



Vacuum feedthrough

Technical Data — Vacuum Feedthrough

Rating per conductor	V A	max. 700 16
Seal		FPM (FKM)
Weight	kg	0.3

Ordering Information — Vacuum Feedthrough

	Part No.
Vacuum feedthrough	**upon request**

Pneumatically Actuated Swivelling Shutter

For covering substrates or coating sources like thermal, respectively electron beam evaporators.
With pneumatic drive unit and shutter panel; for installation within installation bores having a diameter of 34.5 mm.

Technical Data — Pneumatically Actuated Swivelling Shutter

Control voltage	V DC	24
Dimensions of the shutter panel	mm	upon consultation

Ordering Information — Pneumatically Actuated Swivelling Shutter

	Part No.
Pneumatically actuated swivelling shutter	**upon request**

UNIVEX - Experimental vacuum coaters

Questionnaire

page 1

Customer: ☐

Substrate:

Max. substrate dimensions: ☐
Substrate material(s): ☐
Substrate per batch: ☐ pcs.

Substrate heating: ☐ yes, max. temp.: ☐ °C at substrate ☐ or at heater ☐
Substrate cooling: ☐ yes, min. temp.: ☐ °C at substrate ☐ or at cooler ☐
Substrate rotation: ☐ yes
Substrate shutter: ☐ yes

Substrate pre-treatment (cleaning)

Substrate bias: ☐ RF ☐ DC
Ion beam: ☐ yes
Sputter etching: ☐ yes

Deposited film:

Coating material(s): ☐
Layers per substrate: ☐ pcs.

Any materials incompatible with your coating process (e.g. aluminum, copper, FKM, etc.)

☐ yes, these materials are: ☐

Deposition process:

Thermal evaporation ☐ **yes**
Number of sources: ☐ pcs.
Number of power supplies: ☐ pcs.

Electron beam evaporation ☐ **yes**
Number of guns: ☐ pcs.
Number and size of pockets: ☐ (e.g. 1 x 8cc, 4 x 8cc, 6 x 20cc ...)
Evaporating power: ☐ 3 kW ☐ 5 kW ☐ 6 kW ☐ 10 kW

Thickness measurement ☐ monitor ☐ controller

Magnetron sputtering: ☐ **yes**
Target to substrate alignment: ☐ confocal ☐ face to face

Number of DC sputter sources: ☐ pcs.
Target w/circular diameter: ☐ 2" ☐ 3" ☐ 4" ☐ 6"
Targets with special size: ☐
Number of DC power supplies: ☐ pcs.

Number of RF sputter sources: ☐ pcs.
Target w/circular diameter: ☐ 2" ☐ 3" ☐ 4" ☐ 6"
Targets with special size: ☐
Number of RF power supplies: ☐ pcs.

Ion assisted deposition ☐ **yes**

Leybold Cologne, HV Systems, 2021

UNIVEX - Experimental vacuum coaters

Questionnaire page 2

Gas inlet (required for all plasma processes)

Required gases: ☐

Gas inlet system: ☐ MFC ☐ manual leak valve

Vacuum chamber

Best suited standard size: ☐ yes

If not, then special size: ☐

Chamber wall tempering: ☐ cooling ☐ heating (by water, max. 65 °C)

Additional load lock system: ☐ manual ☐ automatic ☐ with magazine for ☐ substrates

Pump system

Fore-vacuum pump: ☐ dry ☐ oil-sealed

High vacuum pump: ☐ cryo ☐ turbomolecular

Process pressure: ☐ mbar / Torr

Ultimate pressure: ☐ mbar / Torr

System control

Semi-automatic proc. control: ☐ yes (e.g. automatic single deposition steps; UNIVEX 250)

Automatic process control: ☐ yes (e.g. automatic coating batches, recipe-processing)

Installation

Location

in a clean room completely: ☐ yes

in the clean room wall: ☐ yes

Main power supply

Voltage: ☐ V

Number of phases: ☐

Frequency: ☐ Hz

Description of other process or system issues, if required

☐

Commercial aspects

Estimated budget: ☐ currency: ☐ EUR ☐ USD

Planned delivery date: ☐

Calibration Systems

General

CS Calibration Systems

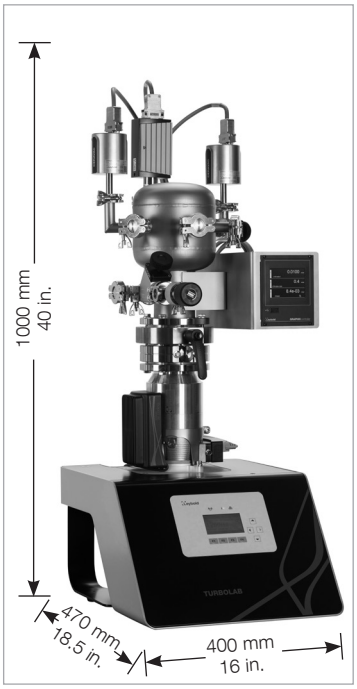
The requirements imposed on vacuum engineering with regard to accuracy of the measurements, reproducibility and unambiguity of the determined vacuum pressures have increased steadily over the last years

Routine calibrations of vacuum gauges are an important component of quality assurance schemes. The calibration systems from Leybold put the customer in a position to check and recalibrate on his own the specified and necessary accuracy of his vacuum gauges. Calibration systems are available for this purpose which cover a calibration range from 1000 mbar to 1 x 10^{-7} mbar (750 to 0.75 x 10^{-7} Torr).

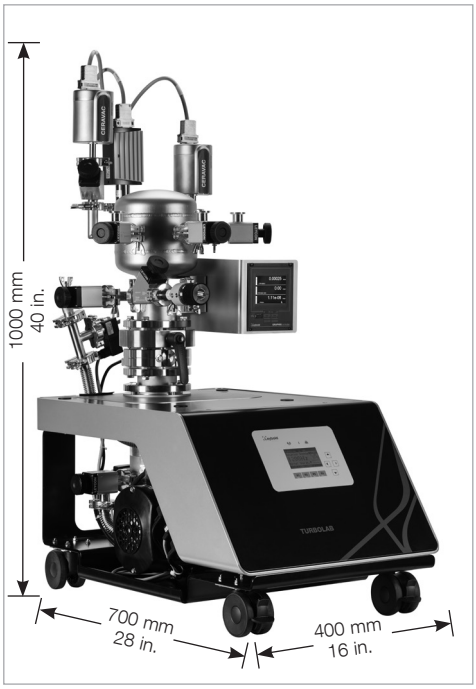
Each system is equipped with several certified reference pressure sensors (transmitter standards), which each cover a part of the specified range of calibration pressures. In the pump system, TURBOVAC turbomolecular pumps with DIVAC diaphragm pumps are used. A variable leak valve is used to let the gas into the calibration chamber. In the case of the calibration system CS7, the gas inlet line is, moreover, equipped with it's own pump system.

The CS3 Advanced is a compact, wheeled version and therefore movable. In addition, the CS3 Advanced has a manual pump bypass, which allows a continuous dynamic calibration across the entire pressure range.

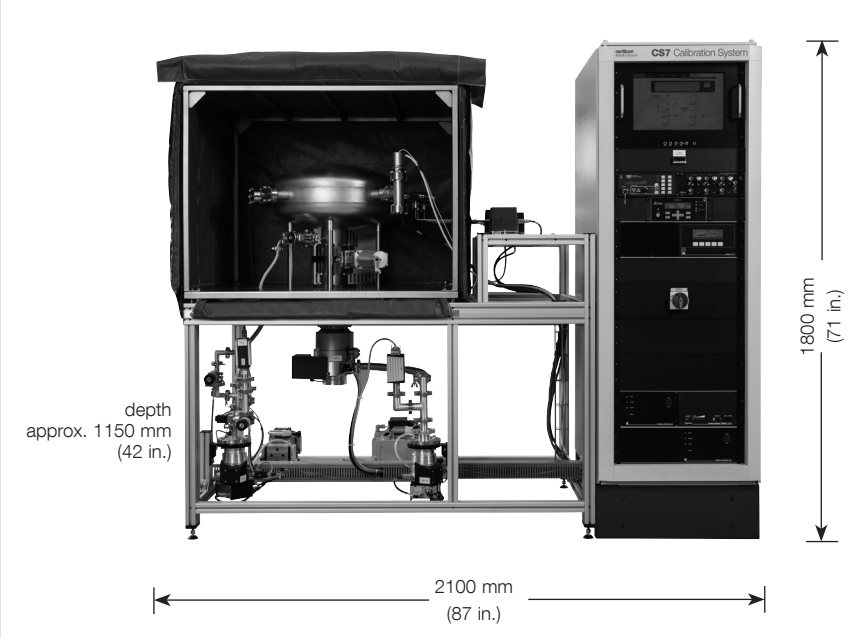
The CS7 is equipped with a heater for the vacuum chamber, for the purpose of attaining lower chamber pressures more rapidly. The temperature of the heating collars can be controlled whereby the maximum degassing temperature will depend on the components installed (flanges, pressure sensors, valves).



Calibration system CS3 Standard



Calibration system CS3 Advanced



CS7 calibration system

Advantages to the User

- Vacuum gauges and measurement systems of any make may be calibrated
- Designed in accordance with DIN 28 418 resp. ISO/DIS 3567
- Transfer standards with PTB-, DAkkS- or factory certificate
- Easier DIN/ISO 9000 approval
- Reliable and reproducible measurements
- Quick start-up
- Measurement system free of hydrocarbons through the utilisation of dry compressing vacuum pumps
- Simple operation
- CE approval

Products

Technical Data		Calibration System		
		CS3 Standard	CS3 Advanced	CS7
Calibration range	mbar (Torr)	1000 to 1 x 10^{-3} * (750 to 0.75 x 10^{-3})	1000 to 1 x 10^{-3} * (750 to 0.75 x 10^{-3})	1000 to 1 x 10^{-7} (750 to 0.75 x 10^{-7})
Pressure measurement range	mbar (Torr)	1000 to 2 x 10^{-6} (750 to 1.5 x 10^{-6})	1000 to 2 x 10^{-6} (750 to 1.5 x 10^{-6})	1000 to 2 x 10^{-9} (750 to 1.5 x 10^{-9})
Vacuum chamber connections (in brackets: disposable for user)		5 (3) x DN 16 ISO-KF 1 (0) x DN 25 ISO-KF	5 (3) x DN 16 ISO-KF 1 (0) x DN 25 ISO-KF	3 (0) x DN 16 CF 7 (5) x DN 40 CF
Pump system		Turbomolecular pump and diaphragm vacuum pump	Turbomolecular pump, two-stage rotary vane vacuum pump and pump bypass (manual valves)	Two turbomolecular pumps and diaphragm vacuum pump
Fixed / mobile		fixed	mobile (with castors)	fixed
Gas inlet		via variable leak valve	via variable leak valve	via variable leak valve
Dynamic calibration	mbar (Torr)	1 x 10^{-3} to 2 x 10^{-1} ((0.75 x 10^{-3} to 1.5 x 10^{-1})	1 x 10^{-3} to 1000 (0.75 x 10^{-3} to 1.5 x 10^{-1})	1 x 10^{-7} to 1000 (0.75 x 10^{-3} to 1.5 x 10^{-1})
Extra pump system for admitting gas		no	no	yes
Heater for the vacuum chamber		no	no	yes

* other calibration ranges are available down to 1 x 10^{-4} mbar, by individual combination of CTR reference gauges.

Application examples: Which pressure sensors may be calibrated with which system?

Type of Sensor	Calibration System	
	CS3	CS7
Diaphragm sensors		
BOURDONVAC	■	■
Capsule vacuum gauges	■	■
DIAVAC DV 1000	■	■
DI/DU 200/201/2000/2001	■	■
CTR 90, CTR 91, CTR 100 (1000 – 1 Torr full scale)	■	■
CTR 91 (0.1 Torr full scale) / CTR 101		■
THERMOVAC sensors		
TR 301, TR 306	■	■
TR 211, TR 216, TTR 211, TTR 216, TTR 90, TTR 91, TTR 96, TTR 100, TTR 101	■	■
SRG/VISCOVAC sensor (spinning rotor gauge)		
VK 201, SRG		■
PENNINGVAC sensors		
PR 25, PR 26, PR 27, PR 35, PR 36, PR 37, PTR 90, PTR 225		■
IONIVAC sensors		
ITR 90, ITR 100, ITR 200		■
IE 414, IE 514		■

Ordering Information	Calibration System
	Part No.
CS3 Standard	**504768V001**
CS3 Standard 100 to 1 x 10^{-4} mbar	**504768V002**
CS3 Advanced	**504874V001**
CS7	**upon request**

Notes

Notes

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