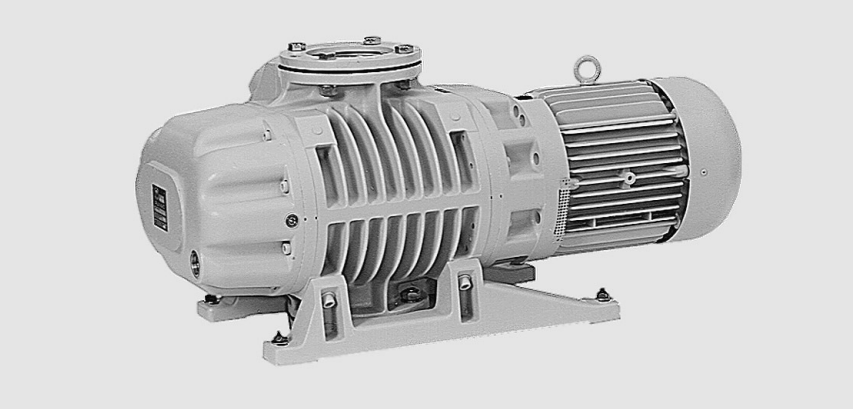
RUVAC WS/WSU Roots Vacuum Pumps with Air-Cooled Canned Motors



Single-stage Roots vacuum pump RUVAC WSU 1001 shown with ISO-K 100 rotatable flanges

Advantages to the User

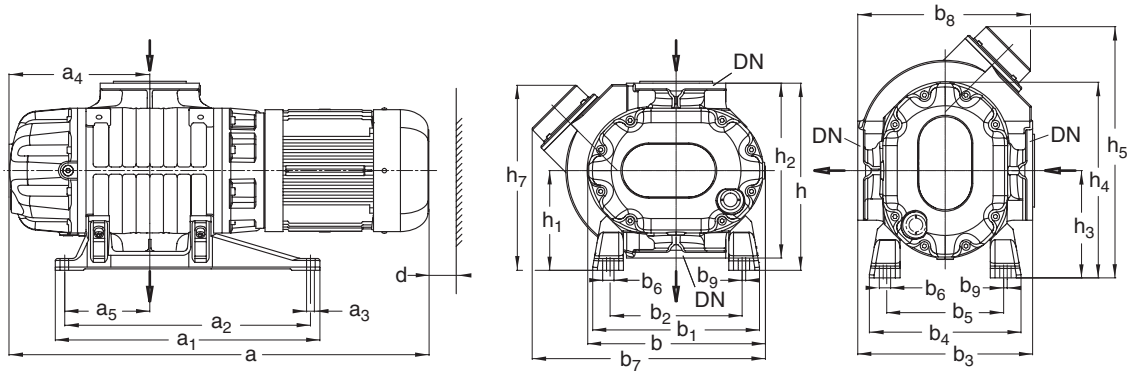
- Two series, each with four models
- Highly leak-tight air-cooled pumps driven by a air-cooled canned motor
- Lubricated with mineral oil. RUVAC WS/WSU PFPE with perfluoropolyether (PFPE)
- WS and WS PFPE pumps are identical except for the lubricant and the shipping package
- No thermal problems due to the speed independent cooling arrangement using a separately connected fan, thus no thermal problems at low speeds
- Over-temperature switch in the stator coil of the motor
- All elastomer seals made of FPM/ Viton
- Integrated pressure equalization line with differential pressure valve prevents overloading on WSU model
- RUVAC WS 251 to 2001 for use with a frequency inverter for a wide frequency range
- No shaft feedthrough to the atmosphere, thus particularly leak-tight
- Pumping direction may be changed as required

Typical Applications

- For applications which require a high pumping speed at pressures between 10^{-2} and 10^{-4} mbar (0.75×10^{-2} and 0.75×10^{-4} Torr)
- Used where the possibility of contamination due air ingress or pumped media leakage must be avoided
- Suction or pumping of high-purity or radioactive gases
- Is used in clean rooms were the air must not be recirculated by the motor‘s fan

Supplied Equipment

- The required oil or PFPE filling is included in separate bottle
- If no other type of oil is stated, then mineral oil N 62 is used as standard
- Purged with nitrogen for corrosion protection
- Gasket in the intake flange with integrated dirt sieve



Type		DN/DN1	DN_1	a	a_1	a_2	a_3	a_4	a_5
WS/WSU 251	mm	65	63 ISO-K	694	405	365	14	212	120
	in.			27.32	15.94	14.37	0.55	8.35	4.72
WS/WSU 501	mm	65	63 ISO-K	752	486	450	14	237	155
	in.			29.61	19.13	17.72	0.55	9.33	6.10
WS/WSU 501H	mm	65	63 ISO-K	752	486	450	14	237	155
	in.			29.61	19.13	17.72	0.55	9.33	6.10
WS/WSU 1001	mm	100	100 ISO-K	885	560	520	16,5	298	180
	in.			34.84	22.05	20.47	0.65	11.73	7.09
WS/WSU 1001H	mm	100	100 ISO-K	885	560	520	16,5	298	180
	in.			34.84	22.05	20.47	0.65	11.73	7.09
WS/WSU 2001	mm	150	160 ISO-K	1042	800	740	18	367	220
	in.			41.02	31.50	29.13	0.71	14.45	8.66
WS/WSU 2001H	mm	150	160 ISO-K	1042	800	740	18	367	220
	in.			41.02	31.50	29.13	0.71	14.45	8.66
WS 2001 FC	mm	150	160 ISO-K	1042	800	740	18	367	220
	in.			41.02	31.50	29.13	0.71	14.45	8.66

		b	b_1	b_2	b_3	b_4	b_5	b_6	b_7 [1)]	b_8
WS/WSU 251	mm	250	270	210	280	230	170	24	305	285
	in.	9.84	10.63	8.27	11.02	9.06	6.69	0.94	12.01	11.22
WS/WSU 501	mm	310	299	229	320	271	201	24	390	313
	in.	1220	11.77	9.02	12.60	10.67	7.91	0.94	15.35	12.32
WS/WSU 501H	mm	310	299	229	320	271	201	24	414	330
	in.	12.20	11.77	9.02	12.60	10.67	7.91	0.94	16.30	12.99
WS/WSU 1001	mm	376	352	278	370	320	246	24	494	366
	in.	14.80	13.86	10.94	14.57	12.60	9.69	0.94	19.45	14.41
WS/WSU 1001H	mm	376	352	278	370	320	246	24	524	398
	in.	14.80	13.86	10.94	14.57	12.60	9.69	0.94	20.63	15.67
WS/WSU 2001	mm	463	518	388	460	422	292	24	638	456
	in.	18.23	20.39	15.28	18.11	16.61	11.50	0.94	25.12	17.95
WS/WSU 2001H	mm	463	518	388	460	422	292	24	642	460
	in.	18.23	20.39	15.28	18.11	16.61	11.50	0.94	25.28	18.11
WS 2001 FC	mm	463	518	388	460	422	292	24	–	–
	in.	18.23	20.39	15.28	18.11	16.61	11.50	0.94	–	–

		b_9	d	h	h_1	h_2	h_3	h_4	h_5 [1)]	h_6
WS/WSU 251	mm	7.5	50	300	160	280	180	306	360	307
	in.	0.30	2.00	11.81	6.3	11.02	7.09	12.05	14.17	12.09
WS/WSU 501	mm	7.5	50	340	180	320	194	348	430	332
	in.	0.30	2.00	13.39	7.09	12.60	7.48	13.70	16.93	13.07
WS/WSU 501H	mm	7.5	50	340	180	320	194	348	450	350
	in.	0.30	2.00	13.39	7.09	12.60	7.48	13.70	17.72	13.78
WS/WSU 1001	mm	7.5	50	396	211	370	227	414	532	392
	in.	0.30	2.00	15.59	8.31	14.57	8.94	16.30	20.94	15.43
WS/WSU 1001H	mm	7.5	50	396	211	370	227	414	564	424
	in.	0.30	2.00	15.59	8.31	14.57	8.94	16.30	22.20	16.69
WS/WSU 2001	mm	7.5	50	530	300	460	351	578	760	523
	in.	0.30	2.00	20.87	11.81	18.11	13.82	22.76	29.92	20.59
WS/WSU 2001H	mm	7.5	50	530	300	460	351	578	753	530
	in.	0.30	2.00	20.87	11.81	18.11	13.82	22.76	29.65	20.87
WS 2001 FC	mm	7.5	50	530	300	460	351	578	–	–
	in.	0.30	2.00	20.87	11.81	18.11	13.82	22.76	–	–

[1)] For RUVAC WSU only

Outside dimensions +/- 3 mm (0.12 in.)

DN = ND 6 pump flange in accordance with DIN 2501

DN_1 = Collar flange with gasket for connecting ISO-K standard components

Dimensional drawing for the RUVAC WS/WSU pumps

Technical Data		WS/WSU 251		WS/WSU(H) 501	
		50 Hz	60 Hz	50 Hz	60 Hz
Nominal pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	253 (149)	304 (179)	505 (297.4)	606 (357)
Max. pumping speed with backing pump	$m^3 \times h^{-1}$ (cfm) TRIVAC SOGEVAC	210.0 (123.7) D 65 B –	251.0 (148.0) D 65 B –	410.0 (241.0) – SV 200	530.0 (312.0) – SV 200
Ultimate partial pressure [2]	mbar (Torr)	$< 2 \times 10^{-5}$ ($< 1.5 \times 10^{-5}$)	$< 2 \times 10^{-5}$ ($< 1.5 \times 10^{-5}$)	$< 8 \times 10^{-3}$ ($< 6 \times 10^{-3}$)	$< 8 \times 10^{-3}$ ($< 6 \times 10^{-3}$)
Ultimate total pressure [2]	mbar (Torr)	$< 8 \times 10^{-4}$ ($< 6 \times 10^{-4}$)	$< 8 \times 10^{-4}$ ($< 6 \times 10^{-4}$)	$< 4 \times 10^{-2}$ ($< 3 \times 10^{-2}$)	$< 4 \times 10^{-2}$ ($< 3 \times 10^{-2}$)
Permissible cut-in pressure [2] RUVAC WS	mbar (Torr)	90.0 (67.5)	60.0 (45.0)	100.0 (75.0)	80.0 (60.0)
Max. permissible pressure difference during continuous operation [3]	mbar (Torr)	80.0 (60.0)	80.0 (60.0)	80.0 (60.0)	80.0 (60.0)
Main supply Δ / Y Δ / Y	V V	200 / – 230 / 400	200-208 / – 265 / 460	200 / – 208-265 / 460	200-208 / – 265 / 460
Thermal class		F	F	F	F
Motor power, 50/60 Hz	kW (hp)	1.1 (1.5) / 1.4 (1.9)	1.1 (1.5) / 1.4 (1.9)	2.2 (3.0) / 2.4 (3.3)	2.2 (3.0) / 2.4 (3.3)
Nominal speed, approx. (50/60 Hz)	rpm	3000/3600	3000/3600	3000/3600	3000/3600
Max. permissible speed	rpm	6000	6000	6000	6000
Type of protection	IP	20	20	20	20
Oil filling for the bearing chamber [4]		1. Filling [5] / 2. Filling	1. Filling [5] / 2. Filling	1. Filling [5] / 2. Filling	1. Filling [5] / 2. Filling
PFPE					
vertical pumping action, approx.	l (qt)	0.6 (0.63) / 0.55 (0.58)	0.6 (0.63) / 0.55 (0.58)	0.85 (0.9) / 0.75 (0.79)	0.85 (0.9) / 0.75 (0.79)
horizontal pumping action, approx.	l (qt)	0.5 (0.53) / 0.45 (0.48)	0.5 (0.53) / 0.45 (0.48)	0.75 (0.79) / 0.7 (0.74)	0.75 (0.79) / 0.7 (0.74)
other oils					
vertical pumping action, approx.	l (qt)	0.65 (0.69) / 0.6 (0.63)	0.65 (0.69) / 0.6 (0.63)	0.9 (0.95) / 0.8 (0.85)	0.9 (0.95) / 0.8 (0.85)
horizontal pumping action, approx.	l (qt)	0.5 (0.53) / 0.45 (0.48)	0.5 (0.53) / 0.45 (0.48)	0.75 (0.79) / 0.7 (0.74)	0.75 (0.79) / 0.7 (0.74)
Connection flanges	DN	63 ISO-K	63 ISO-K	63 ISO-K	63 ISO-K
Weight WS/WSU	kg (lbs)	90.0/95.0 (198.5/209.5)	90.0/95.0 (198.5/209.5)	130.0/135.0 (286.7/297.7)	130.0/135.0 (286.7/297.7)
Noise level [6]	dB(A)	< 63	< 63	< 63	< 63

1) To DIN 28 400 and subsequent numbers
2) With double-stage rotary vane vacuum pump TRIVAC or single-stage rotary vane vacuum pump SOGEVAC (Type of backing pump look at max. pumping speed)
When using 2-stage backing pumps the ultimate pressures will be correspondingly lower
3) Applicable for ratio up to 1 : 10 between backing pump and Roots vacuum pump at 3000 rpm
4) Authoriative, however, is the oil level at the oil-level glass
5) After a complete disassembly
6) At an operating pressure < 10^{-1} mbar (< 0.75×10^{-1} Torr)

Technical Data

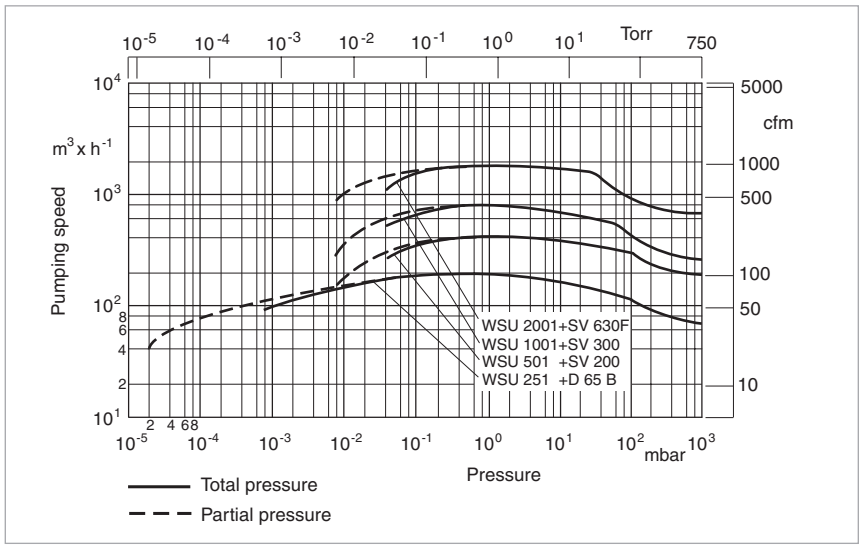
		RUVAC WS/WSU (H) 1001		RUVAC WS/WSU (H) 2001		RUVAC WS FC 2001 [1] until 100 Hz	
		50 Hz	60 Hz	50 Hz	60 Hz	ANDEROL	PFPE
Nominal pumping speed [2]	$m^3 \times h^{-1}$ (cfm)	(2415)1000 (589)	1200 (707)	2050 (1207.5)	2460 (1449)	4100 (2415)	4100
Max. pumping speed with backing pump	$m^3 \times h^{-1}$ (cfm)	800 (470)	1000 (588)	1850 (1089)	2100 (1236)	3400 (2003)	3400 (2003)
	SOGEVAC	SV 300	SV 300	SV 630 F	SV 630 F	–	–
	SCREWLINE	–	–	–	–	SP 630	SP 630
Ultimate partial pressure [3]	mbar	$< 8 \times 10^{-3}$	$< 8 \times 10^{-3}$	$< 8 \times 10^{-3}$	$< 8 \times 10^{-3}$	$< 8 \times 10^{-3}$	$< 8 \times 10^{-3}$
	(Torr)	($< 6 \times 10^{-3}$)	($< 6 \times 10^{-3}$)	($< 6 \times 10^{-3}$)	($< 6 \times 10^{-3}$)	($< 6 \times 10^{-3}$)	($< 6 \times 10^{-3}$)
Ultimate total pressure [3]	mbar	$< 4 \times 10^{-2}$	$< 4 \times 10^{-2}$	$< 4 \times 10^{-2}$	$< 4 \times 10^{-2}$	$< 4 \times 10^{-2}$	$< 4 \times 10^{-2}$
	(Torr)	($< 3 \times 10^{-2}$)	($< 3 \times 10^{-2}$)	($< 3 \times 10^{-2}$)	($< 3 \times 10^{-2}$)	($< 3 \times 10^{-2}$)	($< 3 \times 10^{-2}$)
Possible cut-in pressure [3] RUVAC WS	mbar (Torr)	60.0 (45.0)	45.0 (33.5)	30.0 (22.5)	25.0 (18.5)	< 10 (< 7.5)	< 10 (< 7.5)
Max. permissible pressure difference during continuous operation [4]	mbar (Torr)	80.0 (60.0)	80.0 (60.0)	50.0 (37.5)	50.0 (37.5)	40.0 (30.0)	35.0 (26.0)
Main supply							
Δ / Y	V	200 / –	200-208 / –	200 / –	200-208 / –	400	400
Δ / Y	V	230 / 400	265 / 460	230 / 400	265 / 460	400	400
Thermal class		F	F	F	F	F	F
Motor power, 50/60 Hz	kW	4.0/4.4	4.0/4.4	7.5 /8.5	7.5/8.5	7.5 / 8.5	7.5 / 8.5
	(hp)	(5.4/6.0)	(5.4/6.0)	(10.0/11.6)	(10.0/11.6)	(10.0/11.6)	(10.0/11.6)
Nominal speed, approx. (50/60 Hz)	rpm	3000/3600	3000/3600	3000/3600	3000/3600	3000	3000
Max. permissible speed	rpm	6000	6000	4200 [5]	4200 [5]	6000	6000
Type of protection to EN 60 529	IP	20	20	20	20	20	20
Oil filling for the bearing chamber [6]		1. Filling [7] /	1. Filling [7] /	1. Filling [7] /	1. Filling [7] /	1. Fillung [7]/	1. Fillung [7]
PFPE		2. Filling	2. Filling	2. Filling	2. Filling	2. Fillung	2. Fillung
vertical pumping action, approx.	l	1.95 / 1.75	1.95 / 1.75	3.0 / 2.7	3.0 / 2.7	–	3,0 / 2,7
	(qt)	(2.06 / 1.85)	(2.06 / 1.85)	(3.17 / 2.85)	(3.17 / 2.85)		
horizontal pumping action, approx.	l	1.2 / 1.1	1.2 / 1.1	2.1 / 1.9	2.1 / 1.9	–	1.8 / 1.6
	(qt)	(1.27 / 1.16)	(1.27 / 1.16)	(2.22 / 2.00)	(2.22 / 2.00)		(1.9 / 1.7)
other oils							
vertical pumping action, approx.	l	2.0 / 1.8	2.0 / 1.8	3.85 / 3.6	3.85 / 3.6	3.3 / 3.0	–
	(qt)	2.11 / 1.90	2.11 / 1.90)	(4.07 / 3.81)	(4.07 / 3.81)	(3.49 / 3.17)	
horizontal pumping action, approx.	l	1.2 / 1.1	1.2 / 1.1	2.6 / 2.4	2.6 / 2.4	2.2 / 2.0	–
	(qt)	(1.27 / 1.16)	(1.27 / 1.16)	(2.75 / 2.54)	(2.75 / 2.54)	(2.33 / 2.11)	
Connection flanges	DN	100 ISO-K	100 ISO-K	160 ISO-K	160 ISO-K	160 ISO-K	160 ISO-K
Weight WS/WSU	kg	228.0/233.0	228.0/233.0	458.0/465.0	458.0/465.0	465.0	465.0
	(lbs)	(502.7/513.8)	(502.7/513.8)	(1009.9/1025.3)	(1009.9/1025.3)	(1025.3)	(1025.3)
Noise level [8]	dB(A)	< 68	< 68	< 72	< 72	< 72	< 72

[1] FC = frequency controlled motor, max. operating pressure of 1013 mbar (760 Torr)
[2] To DIN 28 400 and subsequent numbers
[3] With single-stage rotary vane vacuum pump SOGEVAC or dry compressing vacuum pump SCREWLINE (Type of backing pump look at max. pumping speed)
When using 2-stage backing pumps the ultimate pressures will be correspondingly lower
[4] Applicable for ratio up to 1 : 10 between backing pump and Roots vacuum pump at 3000 rpm
[5] Also 6000 rpm upon order
[6] Authoriative, however, is the oil level at the oil-level glass
[7] After a complete disassembly
[8] At an operating pressure < 10^{-1} mbar (< 0.75 x 10^{-1} Torr)

Ordering Information

	WS/WSU 251	WS/WSU(H) 501	WS/WSU(H) 1001	WS/WSU(H) 2001	WS FC[1] 2001
Roots vacuum pump					
RUVAC WS	Part No. 117 22	Part No. 117 32	Part No. 117 42	Part No. 117 52	–
RUVAC WSU	Part No. 117 23	Part No. 117 33	Part No. 117 43	Part No. 117 53	–
RUVAC WS PFPE	Part No. 117 27	Part No. 117 37	Part No. 117 47	Part No. 117 57	–
RUVAC WSU PFPE	Part No. 117 28	Part No. 117 38	Part No. 200 00 763	Part No. 200 03 123	–
RUVAC WSU PFPE (US version)	–	–	Part No. 917 48	–	–
RUVAC WS 2001, ANDEROL 555 (max. 100 Hz)	–	–	–	Part No. 167 007	–
RUVAC WS 2001, PFPE (max. 100 Hz)	–	–	–	Part No. 150 95	–
RUVAC WSU 2001, ANDEROL 555 (max. 100 Hz)	–	–	–	Part No. 150 96	–
RUVAC WS FC, ANDEROL 555	–	–	–	–	Part No. 155 020
RUVAC WS FC, PFPE	–	–	–	–	Part No. 155 030
RUVAC WSU(H)	–	–	–	Part No.	
with special ACE vibration absorber	–	118 33	118 43	118 53	–
RUVAC WS/WSU(H) seal kit	Part No. 194 62	Kat.-Nr 194 66	Part No. 194 70	Part No. 194 74	Part No. 194 74
Flange adapter set, consisting of flange adapter with screws, bolts, washers and nuts for ANSI flange	(3" ANSI)	(3" ANSI)	(4" ANSI)	(6" ANSI)	(6" ANSI)
WA/WS pump	Part No. 200 03 179	Part No. 200 03 179	Part No. 200 03 180	Part No. 200 03 181	Part No. 200 03 181
WAU/WSU pump	Part No. 200 03 179	Part No. 200 03 179	Part No. 200 03 180	Part No. 200 03 182	–
Frequency inverter RUVATRONIC (see description in Section "General", paragraph "Accessories")	RT 5/251 Part No. 500 001 381	RT 5/501 Part No. 500 001 382	RT 5/1001 Part No. 500 001 383	RT 5/2001 Part No. 500 001 384	–

[1] FC = Frequency Controlled Motor



Pumping speed of the RUVAC WS/WSU, 50 Hz