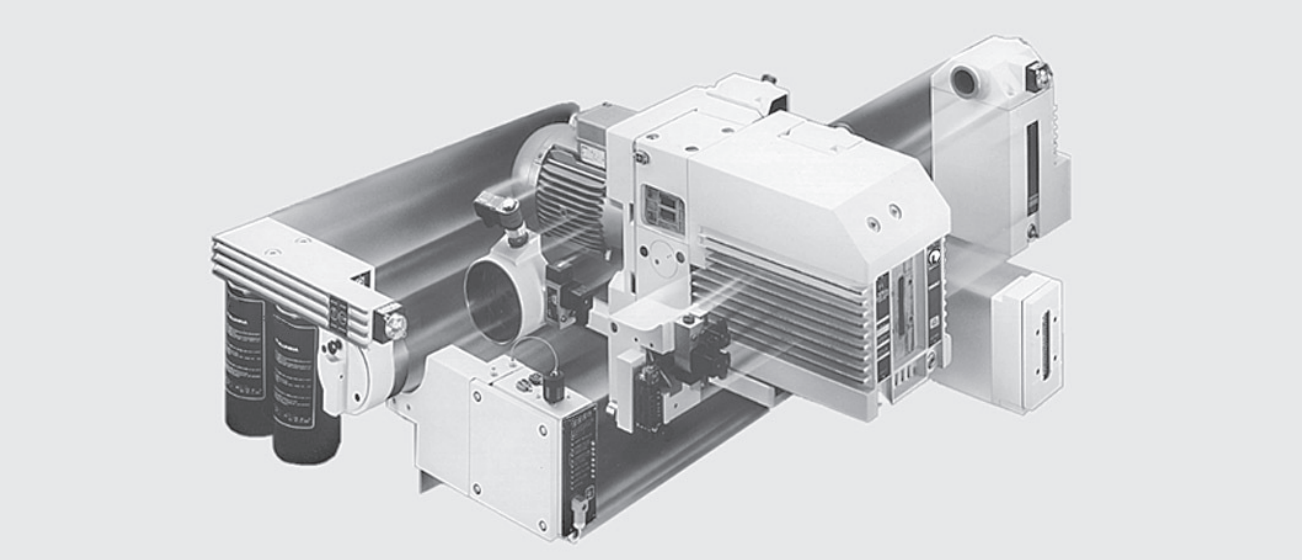
TRIVAC BCS,
Two-Stage Rotary Vane Vacuum Pumps



TRIVAC SYSTEM

The TRIVAC BCS pumps are oil-sealed vacuum pumps operating according to the rotary vane principle. Oil which is injected into the pump chamber is used for sealing, lubrication and cooling purposes.

The pump body is assembled from individual parts without sealing components. The parts are pinned in order to ensure easy disassembly and reassembly of the parts.

The TRIVAC BCS are available with a three-phase motor (The North and South American TRIVAC D 16/25 BCS are also available with single-phase motors). The motor is connected to the pumping section via an elastic coupling.

In addition, the TRIVAC BCS is ready for system integration (adaptable to different applications).

Advantages to the User

- Compact design
- Low noise operation with hardly any vibrations
- Built-in oil pump
- Continuous operation even at 1000 mbar (750 Torr)
- Pressure-lubricated sliding bearings
- Anti-suckback valve controlled via the oil pressure, no backstreaming of oil, independent of the operating mode, with or without gas ballast
- Low backstreaming of oil within the pump
- High pumping speed down to ultimate pressure
- Either vertical or horizontal intake and exhaust ports
- All controls as well as the oil sight glass are located on the face side
- Low power consumption
- Produces very little heat
- Exchangeable inner section
- Main flow oil filters may be fitted
- Very long service life
- Modular system
- Service-friendly
- Built-in temperature switch for temperature monitoring
- Corrosion protected – the use of yellow metals has been avoided; only grey cast iron, surface treated aluminium, steel and stainless steel is used
- Double shaft seal

Typical Applications

- In all areas of vacuum engineering
- Pumping of corrosive or aggressive media
- Production of semiconductors and in the area of chemistry
- Research and production
- Generation of rough and medium vacuum
- Backing pump in pump sets, i.e. in connection with Roots, diffusion, turbo or cryopumps

Supplied Equipment

- Small flanges
- Centering, sealing and clamping rings
- The intake port includes a dirt trap

BCS pumps are supplied with a filling of mineral oil N 62, HE-200 oil or perfluoropolyether (PFPE) synthetic oil.

ALL PUMPS ARE SUBJECTED TO A VACUUM TEST BEFORE DELIVERY!

TRIVAC SYSTEM

The TRIVAC BCS and its accessories

- CFS, chemical filter with safety isolation valve
- ARS, exhaust filter with lubricant return
- IGS, inert gas system
- LSS, limit switch system and
- EIS, electrical indicator system

make up the TRIVAC SYSTEM.

TRIVAC BCS-PFPE

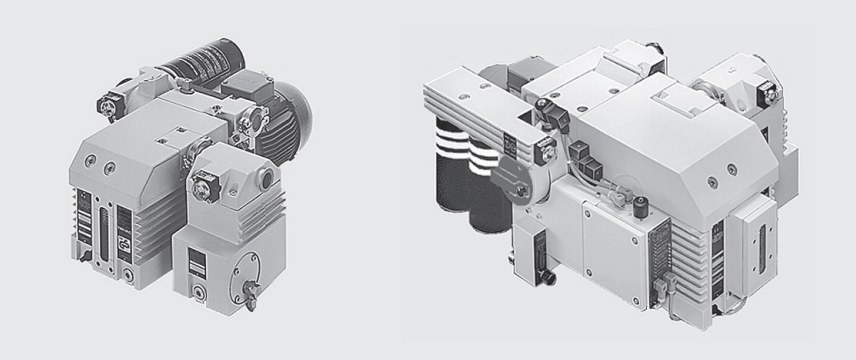
In many applications the use of synthetic lubricants like perfluoro-polyether (PFPE) offers superior characteristics compared to mineral oils.

Advantages of perfluoropolyether (PFPE) NC 1/14 and HE-1600:

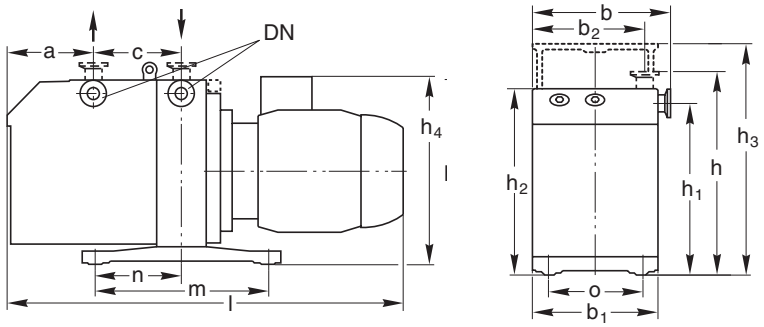
- Practically inert against all chemical and oxidizing influences.
- No polymerization under the influence of high energy radiation.
- In part significantly increased oil change intervals.
- Thermally highly stable. Thermal decomposition will only occur at temperatures over 290 °C (554 °F).

BCS-PFPE pumps have been especially prepared for operation with PFPE and are supplied without the oil filling. We recommend using our operating fluid PFPE NC 1/14 or HE-1600 and always to install a chemical oil filter CF/CFS.

TRIVAC D 16 BCS to D 65 BCS



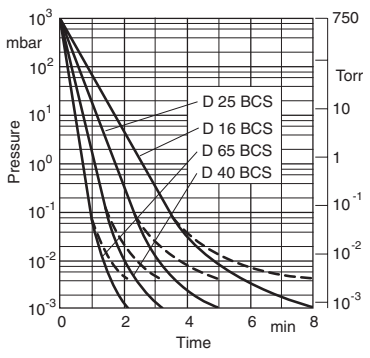
TRIVAC D 25 BCS with ARS and CFS (left)
and TRIVAC D 65 BCS with CFS, ARS, IGS, LSS, EIS – TRIVAC SYSTEM (right)



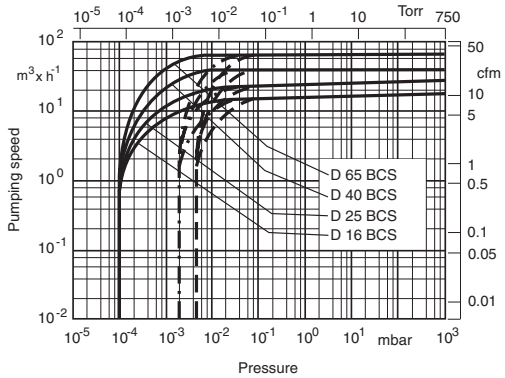
USA pumps max. length
D 16 BCS: 560 mm (22.1“)
D 25 BCS: 660 mm (26“)
D 40 BCS: 760 mm (30“)
D 65 BCS: 840 mm (33.1“)

Type	DN		a	b	b_1	b_2	c	h	h_1	h_2	h_3	h_4	l	m	n	o
D 16 BCS (Part No. 113 68)	40 KF	mm	82	190	175	150	135	263	226	250	298	236	505	280	140	132
		in.	3.23	7.48	6.89	5.91	5.32	10.35	8.90	9.84	11.73	9.29	19.88	11.02	5.51	5.20
D 25 BCS (Part No. 113 78)	40 KF	mm	143	190	175	150	135	236	226	250	298	262	566	280	140	132
		in.	5.63	7.48	6.89	5.91	5.32	9.29	8.90	9.84	11.73	10.32	22.28	11.02	5.51	5.20
D 40 BCS (Part No. 113 88)	40 KF	mm	135	264	234	206	166	355	308	336	–	302	715	382	191	190
		in.	5.32	10.39	9.21	8.11	6.54	13.98	12.13	13.23	–	11.89	28.15	15.04	7.52	7.48
D 65 BCS (Part No. 118 98)	40 KF	mm	213	264	234	206	166	355	308	336	–	302	793	382	191	190
		in.	8.39	10.39	9.21	8.11	6.54	13.98	12.13	13.23	–	11.89	31.22	15.04	7.52	7.48

Dimensional drawing for the TRIVAC D 16 to D 65 BCS



Pump-down characteristics of a 100 l vessel at 50 Hz



Pumping speed characteristics at 50 Hz (60 Hz curves at the end of the section)

Technical Data, 50 Hz

		TRIVAC			
		D 16 BCS	D 25 BCS	D 40 BCS	D 65 BCS
		two-stage	two-stage	two-stage	two-stage
Nominal pumping speed 50/60 Hz [1]	$m^3 \times h^{-1}$ (cfm)	18.9 (11.1) / 22.7 (13.4)	29.5 (17.4) / 35.4 (20.9)	46 (27) / 55 (32.5)	75 (44) / 90 (53)
Pumping speed 50/60 Hz [1]	$m^3 \times h^{-1}$ (cfm)	16.5 (9.7) / 19.8 (11.7)	25.7 (15.1) / 30.8 (18.2)	40 (24) / 48 (28)	65 (38) / 78 (46)
Ultimate partial pressure without gas ballast [1]	mbar (Torr)	10^{-4} (0.75×10^{-4})	10^{-4} (0.75×10^{-4})	10^{-4} (0.75×10^{-4})	10^{-4} (0.75×10^{-4})
Ultimate total pressure without gas ballast [1]	mbar (Torr)	$< 2.5 \times 10^{-3}$ ($< 1.9 \times 10^{-3}$)	$< 2.5 \times 10^{-3}$ ($< 1.9 \times 10^{-3}$)	$< 2 \times 10^{-3}$) ($< 1.5 \times 10^{-3}$)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)
Ultimate total pressure with gas ballast [1]	mbar (Torr)	$< 5 \times 10^{-3}$ ($< 3.8 \times 10^{-3}$)	$< 5 \times 10^{-3}$ ($< 3.8 \times 10^{-3}$)	$< 5 \times 10^{-3}$ ($< 3.8 \times 10^{-3}$)	$< 5 \times 10^{-3}$ ($< 3.8 \times 10^{-3}$)
Water vapor tolerance [1]	mbar (Torr)	25 (18.8)	25 (18.8)	40 (30)	40 (30)
Water vapor capacity	g/h	305	476	1184	1925
Oil filling, min. / max.	l (qt)	0.45 / 1.0 (0.5/1.1)	0.6 / 1.4 (0.6/1.5)	1.7 / 2.6 (1.8/2.7)	2.0 / 3.3 (2.1/3.5)
Noise level [2] to DIN 45 635, without / with gas ballast	dB(A)	52 / 54	52 / 54	57 / 59	57 / 59
Admissible ambient temperature	°C (°F)	12 - 40 (54 - 104)	12 - 40 (54 - 104)	12 - 40 (54 - 104)	12 - 40 (54 - 104)
Motor rating [2]	W (HP)	550 (0.75)	750 (1)	2200 (3)	2200 (3)
Nominal speed 50/60 Hz	rpm	1500 / 1800	1500 / 1800	1500 / 1800	1500 / 1800
Type of protection [3]	IP	55	55	55	55
Weight [2]	kg (lbs)	26 (57.3)	32 (70.6)	68 (150)	80 (176.4)
Connections, Intake and Exhaust	DN	25 KF	25 KF	40 KF	40 KF

[1] To DIN 28 400 and following numbers

[2] Weight, motor rating and noise levels for the pumps with global version 3-phase motor, 50 Hz, only. Any data that deviate from the above for pumps with other motors, and other motor-dependent data are given in section “Products”, paragraph “Motor Dependent Data for the TRIVAC B, BCS and BCS-PFPE”

[3] Global versions only. North and South American versions are TEFC

Ordering Information

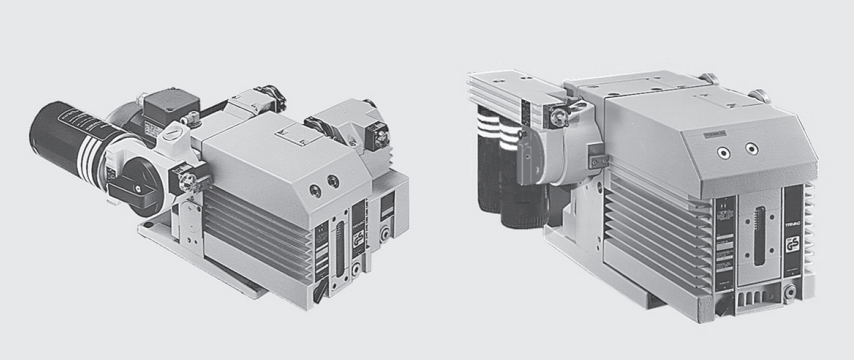
	TRIVAC			
	D 16 BCS two-stage	D 25 BCS two-stage	D 40 BCS two-stage	D 65 BCS two-stage
TRIVAC BCS with 3-phase motor 230/400 V, 50 Hz / 250/440 V, 60 Hz	Part No. 113 68	Part No. 113 78	Part No. 113 88	Part No. 113 98
Accessories				
Roots pump adaptor	–	–	Part No. 168 30	Part No. 168 30
Exhaust filter with lubricant return ARS 16-25 ARS 40-65	Part No. 189 56 –	Part No. 189 56 –	– Part No. 189 57	– Part No. 189 57
Condensate separator AK 16-25 AK 40-65	Part No. 188 11 –	Part No. 188 11 –	– Part No. 188 16	– Part No. 188 16
Chemical filter with safety blocking valve CFS 16-25 CFS 40-65	Part No. 101 76 –	Part No. 101 76 –	– Part No. 101 77	– Part No. 101 77
Inert gas system IGS 16-25 IGS 40-65	Part No. 161 76 –	Part No. 161 76 –	– Part No. 161 77	– Part No. 161 77
Limit switch system LSS 16-25 LSS 40-65	Part No. 161 06 –	Part No. 161 06 –	– Part No. 161 07	– Part No. 161 07
Electrical indicator system EIS 16-25 EIS 40-65	Part No. 160 96 –	Part No. 160 96 –	– Part No. 160 97	– Part No. 160 97
Spare Parts				
Inside section	Part No. 200 39 762	Part No. 200 39 764	Part No. 200 39 758	Part No. 200 39 760
Seal kit	Part No. 197 31	Part No. 197 31	Part No. 197 32	Part No. 197 32

Only available for purchase in North and South America

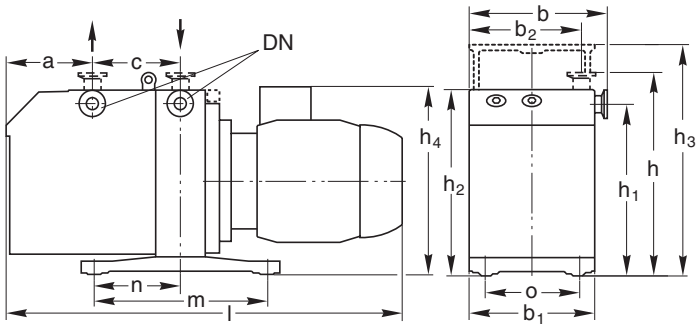
Ordering Information

	TRIVAC			
	D 16 BCS two-stage	D 25 BCS two-stage	D 40 BCS two-stage	D 65 BCS two-stage
TRIVAC BCS with 3-phase motor 208-230/460 V, 60 Hz / 200-220/380 V, 50 Hz	**Part No. 913 68-2**	**Part No. 913 78-3**	**Part No. 913 88-2**	**Part No. 913 98-2**

TRIVAC D 16 BCS-PFPE to D 65 BCS-PFPE



TRIVAC D 25 BCS-PFPE with CFS 16-25 and ARS 16-25 (left) and
TRIVAC D 65 BCS-PFPE with CFS 40-65 (right)



USA pumps max. length
D 16 BCS-PFPE: 560 mm (22.1“)
D 25 BCS-PFPE: 660 mm (26“)
D 40 BCS-PFPE: 760 mm (30“)
D 65 BCS-PFPE: 840 mm (33.1“)

Type	DN		a	b	b_1	b_2	c	h	h_1	h_2	h_3	h_4	l	m	n	o
D 16 BCS-PFPE (Part No. 113 69, 154 50)	25 KF	mm	82	190	175	150	135	263	226	250	298	262	506	280	140	132
		in.	3.23	7.48	6.89	5.91	5.32	10.35	8.90	9.84	11.73	10.32	19.96	11.02	5.51	5.20
D 25 BCS-PFPE (Part No. 113 79, 154 51)	25 KF	mm	142	190	175	150	135	263	226	250	298	262	567	280	140	132
		in.	5.59	7.48	6.89	5.91	5.32	10.35	8.90	9.84	11.73	10.32	22.32	11.02	5.51	5.20
D 40 BCS-PFPE (Part No. 113 89)	40 KF	mm	135	264	234	206	166	355	308	336	–	302	716	382	191	190
		in.	5.32	10.39	9.21	8.11	6.54	13.98	12.13	13.23	–	11.90	28.19	15.04	7.52	7.48
D 40 BCS-PFPE (Part No. 154 52)	40 KF	mm	135	264	234	206	166	355	308	336	–	302	716	382	191	190
		in.	5.32	10.39	9.21	8.11	6.54	13.98	12.13	13.23	–	11.90	28.19	15.04	7.52	7.48
D 65 BCS-PFPE (Part No. 113 99)	40 KF	mm	213	264	234	206	166	355	308	336	–	302	794	382	191	190
		in.	8.39	10.39	9.21	8.11	6.54	13.98	12.13	13.23	–	11.90	31.26	15.04	7.52	7.48
D 65 BCS-PFPE (Part No. 154 54)	40 KF	mm	213	264	234	206	166	355	308	336	–	302	794	382	191	190
		in.	8.39	10.39	9.21	8.11	6.54	13.98	12.13	13.23	–	11.90	31.26	15.04	7.52	7.48

Dimensional drawing for the TRIVAC D 16 to D 65 BCS-PFPE

Technical Data

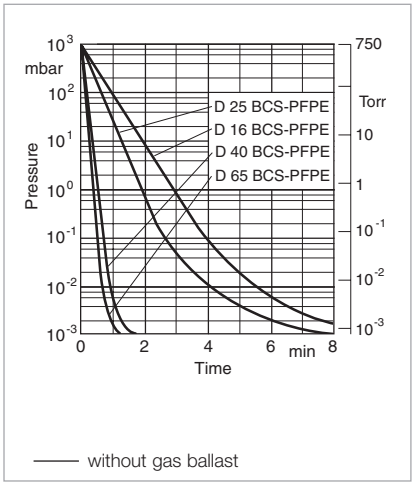
		TRIVAC			
		D 16 BCS-PFPE	D 25 BCS-PFPE	D 40 BCS-PFPE	D 65 BCS-PFPE
		two-stage	two-stage	two-stage	two-stage
Nominal pumping speed 50/60 Hz [1]	$m^3 \times h^{-1}$ (cfm)	18.9 (11.1) / 22.7 (13.4)	29.5 (17.4) / 35.4 (20.9)	46 (27) / 55 (32.5)	75 (44) / 90 (53)
Pumping speed 50/60 Hz [1]	$m^3 \times h^{-1}$ (cfm)	16.5 (9.7) / 19.8 (11.7)	25.7 (15.1) / 30.8 (18.2)	40 (24) / 48 (28)	65 (38) / 78 (46)
Ultimate partial pressure without gas ballast [1]	mbar (Torr)	$< 8 \times 10^{-4}$ ($< 6 \times 10^{-4}$)	$< 8 \times 10^{-4}$ ($< 6 \times 10^{-4}$)	$< 8 \times 10^{-4}$ ($< 6 \times 10^{-4}$)	$< 8 \times 10^{-4}$ ($< 6 \times 10^{-4}$)
Ultimate total pressure with gas ballast [1]	mbar (Torr)	$< 5 \times 10^{-3}$ ($< 3.8 \times 10^{-3}$)	$< 5 \times 10^{-3}$ ($< 3.8 \times 10^{-3}$)	$< 5 \times 10^{-3}$ ($< 3.8 \times 10^{-3}$)	$< 5 \times 10^{-3}$ ($< 3.8 \times 10^{-3}$)
Ultimate total pressure with reduced gas ballast, 200 l x h^{-1} [1]	mbar (Torr)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)	–	–
Lubricant filling					
min. / max.	l (qt)	0.45 / 1.0 (0.5 / 1.1)	0.6 / 1.4 (0.6 / 1.5)	1.5 / 2.5 (1.6 / 2.6)	2.0 / 3.5 (2.1 / 3.7)
upon delivery	l (qt)	0.2 (0.2)	0.4 (0.4)	0.6 (0.6)	0.75 (0.8)
Noise level [2] to DIN 45 635, without / with gas ballast	dB(A)	52 / 54	52 / 54	57 / 59	57 / 59
Admissible ambient temperature	°C (°F)	12 [3] - 40 (54 - 104)	12 - 40 (54 - 104)	12 - 40 (54 - 104)	12 - 40 (54 - 104)
Motor rating [2]	W (HP)	550 (0.75)	750 (1)	2200 (3)	2200 (3)
Nominal speed 50/60 Hz	rpm	1500 / 1800	1500 / 1800	1500 / 1800	1500 / 1800
Type of protection [4]	IP	55	55	55	55
Weight [2]	kg (lbs)	27 (59.5)	33 (72.8)	71 (156.6)	83 (183)
Connections, Intake and Exhaust	DN	25 KF	25 KF	40 KF	40 KF

[1] To DIN 28 400 and following numbers

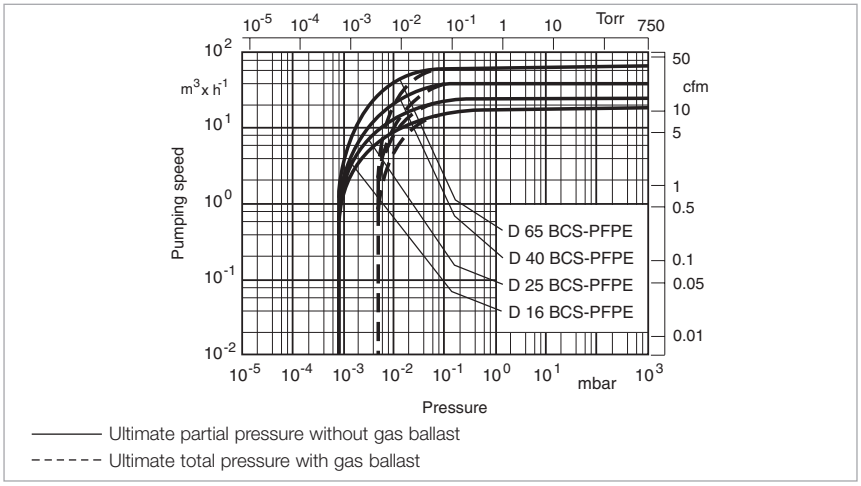
[2] Weight, motor rating and noise levels for the pumps with global version 3-phase motor, 50 Hz, only. Any data that deviate from the above for pumps with other motors, and other motor-dependent data are given in section “Products”, paragraph “Motor Dependent Data for the TRIVAC B, BCS and BCS-PFPE”

[3] Cold start temperature to DIN

[4] Global versions only. North and South American versions are TEFC



Pump-down characteristics of a 100 l vessel at 50 Hz



Pumping speed characteristics at 50 Hz (60 Hz curves at the end of the section)

Ordering Information

	TRIVAC			
	D 16 BCS-PFPE	D 25 BCS-PFPE	D 40 BCS-PFPE	D 65 BCS-PFPE
	two-stage	two-stage	two-stage	two-stage
TRIVAC BCS-PFPE				
with 3-phase motor				
230/400 V, 50 Hz / 250/440 V, 60 Hz	Part No. 113 69	Part No. 113 79	Part No. 113 89	Part No. 113 99
200/400 V, 50 Hz / 220/440 V, 60 Hz	Part No. 154 50	Part No. 154 51	Part No. 154 52	Part No. 154 54
Accessories				
Roots pump adaptor	–	–	Part No. 168 30	Part No. 168 30
Exhaust filter with lubricant return				
ARS 16-25	Part No. 189 56	Part No. 189 56	–	–
ARS 40-65	–	–	Part No. 189 57	Part No. 189 57
Condensate trap				
AK 16-25	Part No. 188 11	Part No. 188 11	–	–
AK 40-65	–	–	Part No. 188 16	Part No. 188 16
Chemical filter with				
safety isolation valve				
CFS 16-25	Part No. 101 76	Part No. 101 76	–	–
CFS 40-65	–	–	Part No. 101 77	Part No. 101 77
Inert gas system				
IGS 16-25	Part No. 161 76	Part No. 161 76	–	–
IGS 40-65	–	–	Part No. 161 77	Part No. 161 77
Limit switch system				
LSS 16-25	Part No. 161 06	Part No. 161 06	–	–
LSS 40-65	–	–	Part No. 161 07	Part No. 161 07
Electrical indicator system				
EIS 16-25	Part No. 160 96	Part No. 160 96	–	–
EIS 40-65	–	–	Part No. 160 97	Part No. 160 97
Spare Parts				
Inside section	Part No. 200 39 763	Part No. 200 39 765	–	Part No. 200 39 156
Seal kit	Part No. 197 41	Part No. 197 41	Part No. 197 42	Part No. 197 42