oerlikon
leybold vacuum

TRIVAC

Rotary Vane Vacuum Pumps, Oil-Sealed; 1.5 to 65 $m^3 \times h^{-1}$ (0.7 to 38.3 cfm)

S 1,5, Single-Stage

TRIVAC E, Two-Stage

TRIVAC B, Two-Stage

171.01.02
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Product Section C01
Edition July 2007

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TRIVAC B


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TRIVAC BCS

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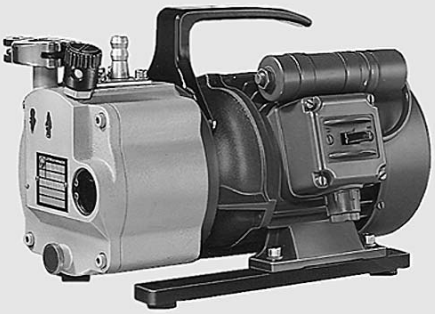
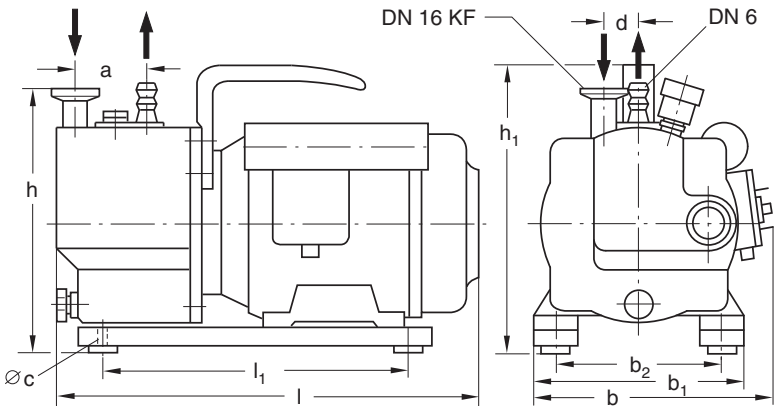
Accessories	Page															
Condensate traps / separators AK	C01.46/66	■	■	■	■	■	■	■	■	■		■	■	■	■	■	■
Exhaust filters AF	C01.46/56		■	■	■	■	■	■	■	■		■	■	■			
Exhaust filter drain tap	C01.44		■														
Oil drain tap	C01.44	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Oil drain kit	C01.44	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Oil suction facility [1] AR-V	C01.45		■														
Oil suction facility [1] AR-M	C01.45		■														
Dust separators AS	C01.48		■		■	■	■	■	■			■	■	■	■	■	■
Molecular filters MF	C01.48		■	■	■	■	■	■	■			■	■	■	■	■	■
Fine vacuum adsorption traps FA	C01.50	■	■	■	■	■	■	■	■			■	■	■	■	■	■
Dust filters FS	C01.51	■	■	■	■	■	■	■	■			■	■	■	■	■	■
Cold trap TK	C01.52		■	■	■												
Exhaust filters with lubricant return ARP / AR	C01.58			■	■	■	■	■	■	■		■	■	■			
Exhaust filters with lubricant return ARS	C01.59											■	■	■	■	■	■
Mechanical oil filters OF	C01.60			■	■	■	■	■	■								
Chemical oil filters CF	C01.60			■	■	■	■	■	■			■	■	■	■	■	■
Chemical filters with safety isolation valve CFS	C01.62											■	■	■	■	■	■
Inert gas system IGS	C01.63											■	■	■	■	■	■
Limit switch system LSS	C01.64											■	■	■	■	■	■
Electrical indicator system EIS	C01.65											■	■	■	■	■	■
Roots pump adaptor	C01.67							■	■				■	■		■	■
Flange components, valves	C01.72	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Vacuum pump oils	C01.74	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

[1] For pumps with gas ballast only

Small Compact Pump S 1,5

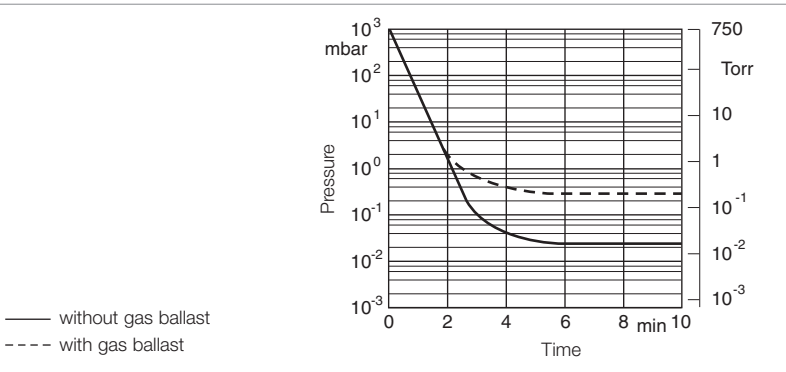


The S 1,5 is a single-stage, oil-sealed rotary vane pump with a gas ballast valve. It is driven by a flange mounted AC motor. The shaft of the pump and the shaft of the motor are linked by means of a pinned coupling.



	a	b	b_1	b_2	c	d	h	h_1	l
mm	45	≈185	145	100	9	20	160	192	285
in.	1.77	≈7.3	5.71	3.94	0.35	0.79	6.30	7.56	11.22

Dimensional drawing for the S 1,5



Pump-down characteristics of a 10 l vessel at 50 Hz

Advantages to the User

- Very small and light-weight
- Low ultimate pressure
- High water vapor tolerance
- Low noise operation
- Simple to connect
- Easy to maintain and use

Typical Applications

- In all areas of vacuum engineering where a low intake pressure is required
- Evacuation of refrigerant circuits
- For suction, lifting, emptying, filling and tensioning
- For installation in mobile instruments

Supplied Equipment

- DN 16 small flange connection on the intake side
- Centering ring and clamping ring
- Exhaust port designed as a DN 6 hose nozzle
- Carrying handle
- Built-in ON/OFF switch and overcurrent circuit breaker
- Oil filling

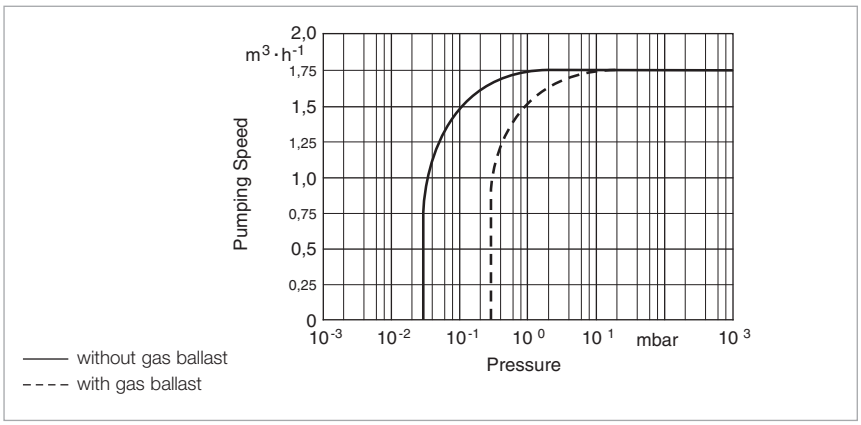
Technical Data

		S 1,5	
		50 Hz	60 Hz
Nominal pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	1.9 (1.1)	2.3 (1.3)
Pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	1.75 (1)	2.1 (1.2)
Ultimate partial pressure without gas ballast [1]	mbar (Torr)	3×10^{-2} (2.3×10^{-2})	3×10^{-2} (2.3×10^{-2})
Ultimate total pressure with gas ballast [1]	mbar (Torr)	5×10^{-1} (3.8×10^{-1})	5×10^{-1} (3.8×10^{-1})
Water vapor tolerance [1]	mbar (Torr)	> 15 (> 11.3)	> 15 (> 11.3)
Water vapor capacity	g/h (lbs/hr)	19 (42)	19 (42)
Oil filling, min. / max.	l (qt)	0.11 / 0.14	0.11 / 0.14
Admissible ambient temperature	°C (°F)	40 (104)	40 (104)
Motor rating	W (hp)	80 (0.11)	80 (0.11)
Nominal speed	rpm	1500	1800
Weight	kg (lbs)	10 (22.1)	10 (22.1)
Connections Intake Exhaust	DN	 16 KF 6 mm hose	 16 KF 6 mm hose

Ordering Information

	S 1,5
S 1,5 with AC motor, 230 V (208-252 V ±5%), 50/60 Hz, with 2 m long mains cord and EURO plug	**Part No. 101 01**
Transition connector (250 V AC, 10 A, L+N+PE) only necessary in Switzerland for 1~ pumps	**Part No. 800 001 274**
AK 8 condensate trap	**Part No. 190 60**
Exhaust filter drain tap (G 1/4")	**Part No. 190 95**
Connection components Elbow (1x) DN 16 KF Centering ring with O-ring (2x) DN 16 KF Clamping ring (2x) DN 16 KF	 **Part No. 184 36** **Part No. 183 26** **Part No. 183 41**

[1] To DIN 28 400 and following numbers



Pumping speed characteristics at 50 Hz

TRIVAC E, Two-Stage, Oil-Sealed Rotary Vane Vacuum Pump

TRIVAC D 2,5 E

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

New customers' requirements as well as increased environmental requirements gave rise to the further development of the successful range of TRIVAC B pumps.

The result is the TRIVAC E rotary vane vacuum pump.

Beyond the usual quality and reliability of the B series pumps, the TRIVAC E pump offers improvements in the area of quieter operation, smaller size and improved service-friendliness.

The intake and exhaust ports are equipped with small flanges. Besides standard voltages and frequencies, Oerlikon Leybold Vacuum offers world motors, which are specially required by OEMs.

The TRIVAC E pump includes also a set of accessories which also fit the TRIVAC D 4 - 16 B pumps.

Advantages to the User

- Highly reliable
- Small and compact
- Quiet operation
- Environmentally compatible (low oil consumption, EMI compatible; IP 54 protection)
- Process quality (little backstreaming of oil)
- Motors for all standard supply voltages and frequencies
- Safe and intelligent vacuum protection (hermetically sealed)
- Free of yellow metals
- Compliance with international standards (CE and CSA)
- Suitable for continuous operation at 1000 mbar (750 Torr)
- Low power consumption
- Better individual performance given by 3 stage gas ballast device
- High water vapor tolerance
- Simplified customizing ability

Typical Applications

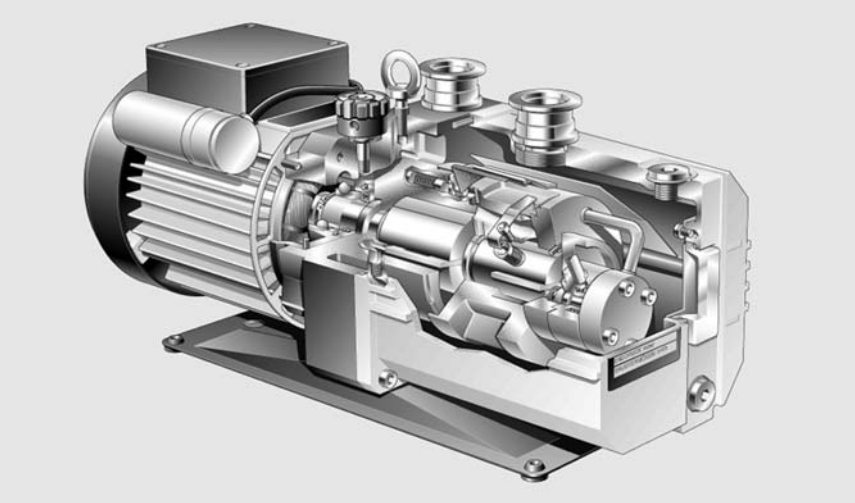
- Mass spectrometers
- Electron beam microscopes
- Sterilizers
- Freeze-drying systems
- Chemical and research labs
- TV tube
- General vacuum engineering
- Backing pump for high vacuum pump systems

Supplied Equipment

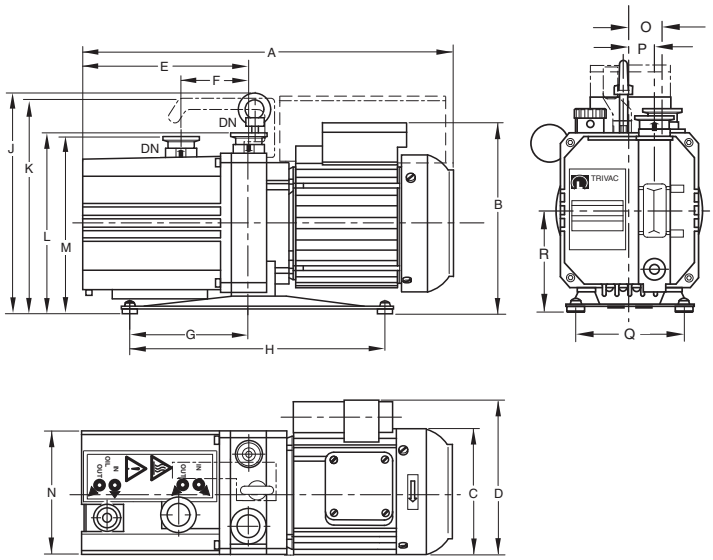
- Dirt trap
- Oil filling included separately (standard N 62; special oil HE-200 in the U.S.)
- Gas ballast device
- Main cord with the specific plug for Euro, USA and Japan motors
- Optional: Main cord with country specific plug for the world motor
- With handle

ALL PUMPS ARE SUBJECTED TO A VACUUM TEST BEFORE DELIVERY!

TRIVAC D 2,5 E



TRIVAC E



	A		B	
	Euro Jap, USA	World 1 ~	Euro Jap, USA	World 1 ~
mm	388.5	393.5	210.5	227.5
in.	15.3	115.7	8.29	8.96

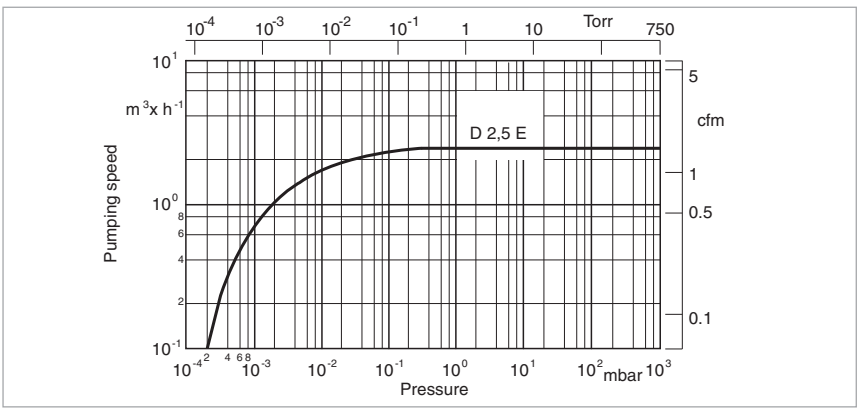
	C		D			
	Euro Jap, USA	World 1 ~	Euro	Jap	USA	World 1 ~
mm	127	127	148.5	153.5	153.5	1)
in.	5	5	5.85	6.04	6.04	1)

	E	F	G	H	J	K
mm	162.5	75.5	119.5	225	231.5	225
in.	6.4	2.97	4.7	8.86	9.90	8.86

	L	M	N	O	P	Q	R	DN
mm	182	177	113	27	15	83	84.5	16 KF
in.	7.16	6.97	4.45	1.06	.59	3.27	3.33	16 KF

1) Condensors in the connection box

Dimensional drawing for the TRIVAC D 2,5 E



Pumping speed of the TRIVAC D 2,5 E at 50 Hz (60 Hz curves at the end of the section)

Technical Data

		TRIVAC D 2,5 E	
		50 Hz	60 Hz
Nominal pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	3.2 (1.9)	3.6 (2.1)
Pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	2.7 (1.6)	3.3 (1.9)
Ultimate partial pressure without gas ballast	mbar (Torr)	≤ 5×10^{-4} (≤ 3.8×10^{-4})	≤ 5×10^{-4} (≤ 3.8×10^{-4})
Ultimate total pressure without gas ballast [2]	mbar (Torr)	≤ 2×10^{-3} (≤ 1.5×10^{-3})	≤ 2×10^{-3} (≤ 1.5×10^{-3})
Ultimate total pressure with gas ballast Step 2 [2]	mbar (Torr)	≤ 3×10^{-2} (≤ 2.3×10^{-2})	≤ 3×10^{-2} (≤ 2.3×10^{-2})
Water vapor tolerance			
Step 1	mbar (Torr)	10 (7.5)	10 (7.5)
Step 2	mbar (Torr)	20 (15)	20 (15)
Step 3	mbar (Torr)	30 (22.5)	30 (22.5)
Water vapor capacity			
Step 1	g/h	20	20
Step 2	g/h	40	40
Step 3	g/h	60	60
Oil filling, max. / min.	l (qt)	0.7 / 0.4 (0.7 / 0.4)	0.7 / 0.4 (0.7 / 0.4)
Noise level	dB(A)	≤ 47	≤ 47
Admissible ambient temperature	°C (°F)	10 to 50 (50 - 122) (Euro motor) / 10 to 40 (50 - 104) (USA/Japan motor)	10 to 50 (50 - 122) (Euro motor) / 10 to 40 (50 - 104) (USA/Japan motor)
Motor rating 50/60 Hz	W (HP)	250 (0.34)	300 (0.41)
Nominal speed 50/60 Hz	rpm	1400	1600
Type of protection	IP	54	54
Weight (with oil filling)	kg (lbs)	15.3 (33.7)	15.3 (33.7)
Dimensions (W x H x D)	mm (in.)	127 x 225 x 383 (5 x 8.86 x 15)	127 x 225 x 383 (5 x 8.86 x 15)
Connections (Intake and Exhaust)	DN	16 KF	16 KF

[1] To DIN 28 426 T1
[2] To DIN 28 400 and following numbers

Motor Dependent Data

Motors for D 2,5 E	Voltage (V)	Frequency (Hz)	Voltage tolerance	Power consumption (W (HP))	Nominal current (A)	Protection	Nominal speed (rpm)
Euro 1 ~	220-240/230	50/60	+/– 5 %	250/300 (0.34/0.41)	1.8/1.4	IP 54	1400/1600
Japan 1 ~	100	50/60	+/– 5 %	250/300 (0.34/0.41)	5.5/4.0	IP 54	1400/1600
USA 1 ~	110-120	60	+/– 5 %	300 (0.41)	3.3	IP 54	1600
World 1 ~	100-120; 200-240	50/60	+/– 5 %	250/300 (0.34/0.41)	4.4/3.0 2.2/1.5	IP 54	1400/1600

Ordering Information

TRIVAC D 2,5 E

TRIVAC E with 1.8 m (6 ft.) long mains cord	
Euro version, 1-ph., 220-240 V, 50 Hz; 230 V, 60 Hz	
Earthed plug	**Part No. 140 000**
UK plug	**Part No. 140 004**
CH plug	**Part No. 140 005**
USA version, 1-ph., 110-120 V, 60 Hz, NEMA plug	**Part No. 140 002**
Japan version,1-ph., 100 V, 50/60 Hz, NEMA plug	**Part No. 140 003**
Single phase world motor, 100-120 V, 200-240 V 50/60 Hz (without mains cord)	**Part No. 140 001**
Further variants upon request	
Accessories	
Connection cable for single phase world motor	
230 V earthed plug	**Part No. 200 81 091**
230 V UK plug	**Part No. 200 81 097**
230 V CH plug	**Part No. 200 81 099**
230 V NEMA plug (200-240 V)	**Part No. 200 81 141**
115 V NEMA plug (100-120 V)	**Part No. 200 81 090**
Exhaust filter AF 8	**Part No. 190 50**
Replacement filter elements FE 8 for AF 8 (pack of 5)	**Part No. 190 80**
Exhaust filter drain tap (G 1/4")	**Part No. 190 95**
Manual oil return AR-M via gas ballast inlet (kit for AF 8-16)	**Part No. 190 93**
Oil suction AR-V controlled by a solenoid valve via the gas ballast inlet (kit for AF 8-16)	**Part No. 190 92**
Condensate trap AK 8	**Part No. 190 60**
Oil drain tap (M 16 x 1.5)	**Part No. 190 90**
Oil drain kit (M 16 x 1.5)	**Part No. 190 94**
Connection components	
Elbow (1x) DN 16 KF	**Part No. 184 36**
Centering ring with O-ring (2x) DN 16 KF	**Part No. 183 26**
Clamping ring (2x) DN 16 KF	**Part No. 183 41**
Spare Parts	
Maintenance kit 1 (oil demister, oil box seal)	**Part No. 200 40 022**
Repair set 1 (motor side sealing, shaft sealing ring, coupling sleeves, compression spring)	**Part No. E 100 000 351**
Repair set 2 (valves, oil demister, oil box seal)	**Part No. 200 40 024**
Repair set 3 (oil demister, sealing, wearing parts)	**Part No. E 100 000 347**
For further accessories see Section “Accessories for TRIVAC E and B”	

TRIVAC B, Two-Stage Rotary Vane Vacuum Pumps TRIVAC D 4 B to D 65 B

The TRIVAC B is the logical step ahead within the well-proven TRIVAC concept. Here the performance and the characteristics of the pumps have been adapted without compromise to market requirements. The TRIVAC B pumps with their comprehensive range of accessories have proven themselves time and again as rugged pumps in many and varied applications.

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

All pumps from the D 4 B to the D 25 B model are equipped either with single-phase or three-phase motors. D 40 - 65 B models are equipped with three-phase motors. Moreover, all pumps of the B series are available also without the motor.

In the TRIVAC B, the pump unit and the motor are linked by an elastic coupling.

The TRIVAC B range is a modular system which divides into three groups:

TRIVAC 4/8 Series
TRIVAC 16/25 Series
TRIVAC 40/65 Series

Advantages to the User

- All basic models (single-phase and three-phase motor) are certified in accordance with 94/9/EG (ATEX) (Category 3 inside)
- High water vapor tolerance
- Continuous operation even at 1000 mbar
- Built-in oil pump; pressure-lubricated sliding bearings
- All controls as well as the oil sight glass are located on the front face
- Either vertical or horizontal intake and exhaust ports
- Exchangeable inner body
- Anti-suckback valve controlled via the oil pressure
- Free of yellow metals
- Service-friendly
- Ideal as backing pump for medium and high vacuum applications, because of low oil backstreaming
- Highly leaktight (He-3-capable)

Typical Applications

See section “General, Applications and Accessories”

Supplied Equipment

Small flanges, centering and clamping rings. The intake flange contains a dirt trap.

A carrying handle is standard for all pumps up to the D 25 B. TRIVAC B pumps with single-phase motors are delivered with ON/OFF switch, main cord and main plug, ready for immediate operation.

Standard TRIVAC B pumps come with a filling of N 62 special oil (HE-200 in the U.S.), others with special oil fillings can be specified.

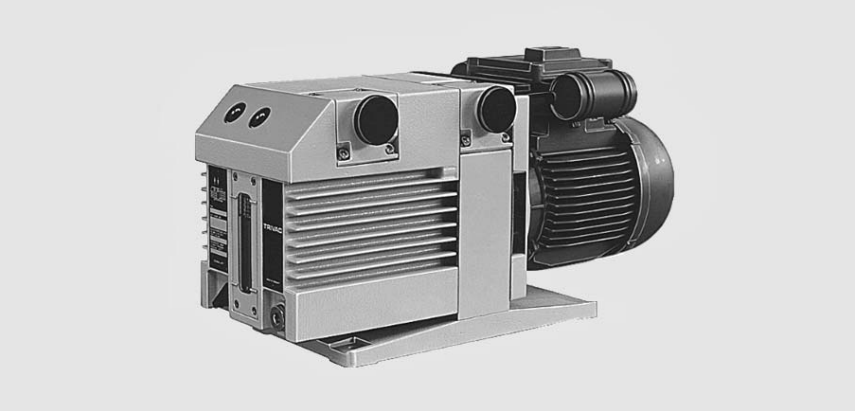
ALL PUMPS ARE SUBJECTED TO A VACUUM TEST BEFORE DELIVERY!

Custom Models

- ATEX (Category 3 inside and 3 outside)
- Brake fluid
- Oils for refrigerating machines, e.g. ester oils for refrigerant circuits with R 134 a

  Pressure burst resistant (for the new refrigerants propane and isobutane)
- He-3-tight (for cryostats)
- Special motors

TRIVAC D 16 B-DOT



The TRIVAC B-DOT pumps operate with brake fluid (DOT 4) as the sealing and lubricating agent. Therefore these pumps are equipped with EPDM seals. EPDM is highly compatible with brake fluid.

As to the D 8 B-DOT, D 25 B-DOT and D 40 B-DOT please ask us for a quotation.

Advantages to the User

- Matching exhaust filters with EPDM gaskets (AF-DOT)
- Except for the seals and the fluid the TRIVAC B-DOT pumps are identical to the oil-sealed TRIVAC B pumps

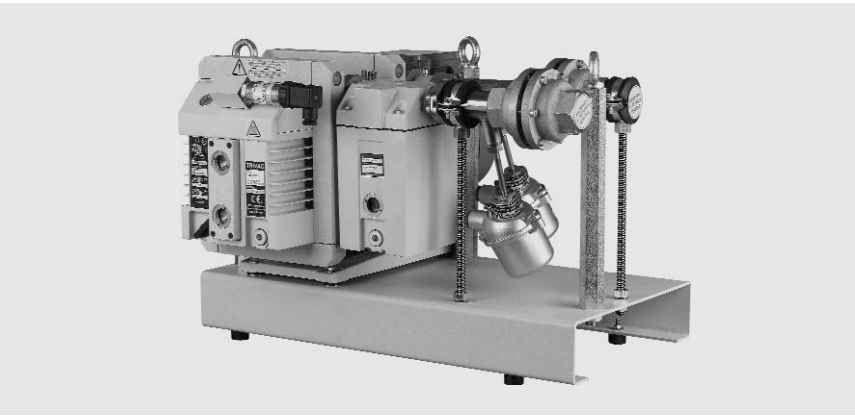
Typical Applications

- For filling of brake fluid circuits in the automotive industry

Supplied Equipment

- The brake fluid is inside the pump when shipped

TRIVAC D 16 B-Ex, Explosion Protected and Pressure Burst Resistant



ATEX

Category 1 inside and 2 outside

Typical Applications

- Pumping of gases belonging to Group IIB3 and IIC [1] from Zone 0

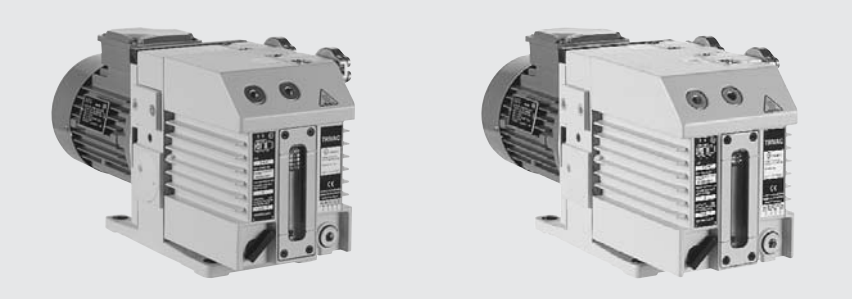
Vacuum pumps TRIVAC D 16 B-Ex meet the requirements of the European Directive 94/9/EG (ATEX Directive). TRIVAC D 16 B-Ex pumps are classified inside as Category 1, outside as Category 2. Thus these pumps are suited for pumping explosive gases from Zone 0, the pump itself may be located in Zone 1.

The vacuum pumps TRIVAC D 16 B-Ex are qualified for gases of Explosion Groups IIC [1] and IIB3. The temperature class is T4. TRIVAC D 16 B-Ex pumps are explosion resistant and correspond to the state-of-the-art. They are equipped as standard with one each temperature sensor on the intake and delivery side.

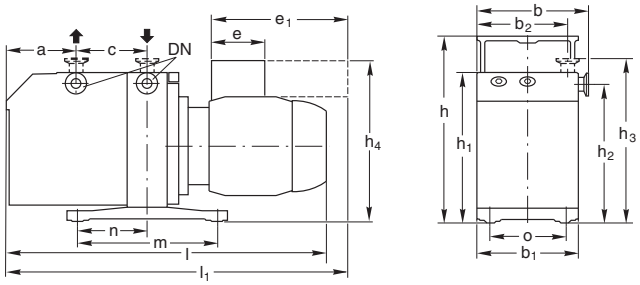
Moreover, the pressure inside the pump is monitored. Flame arresters on the intake and delivery side protect the upstream and downstream system sections. Also provided as standard is an exhaust filter for every pump.

[1] with the exception of acetylene and carbon bisulphide

TRIVAC D 4 B and D 8 B



TRIVAC D 4 B (left) and TRIVAC D 8 B (right)

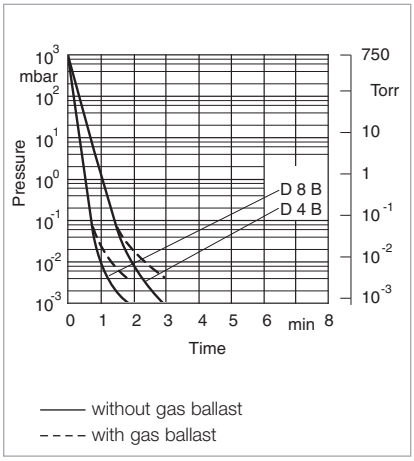


USA pumps max. length
D 4 B: 485 mm (19.1“)
D 8 B: 555 mm (21.9“)

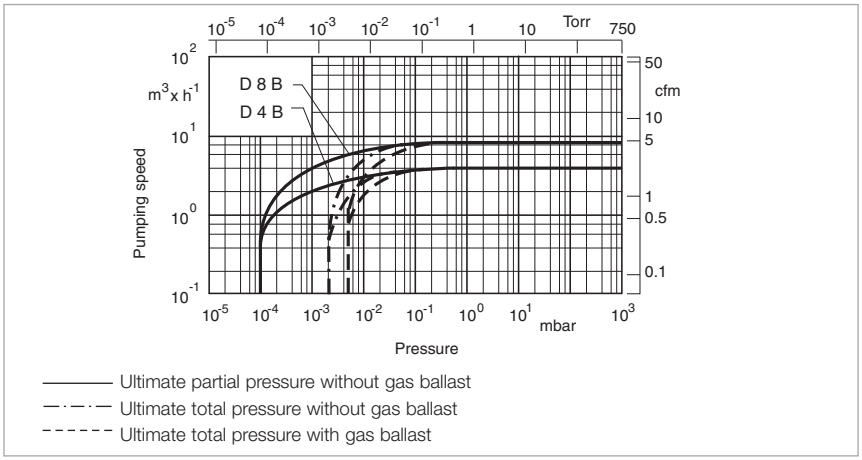
Type	DN		a	b	b_1	b_2	c	e	e_1	h	h_1	h_2	h_3	h_4	l	l_1	m	n	o
D 4 B (Part No. 113 09)	16 KF	mm	75	162	147	132	100	–	170	265	215	200	230	259	–	455	198	99	108
		in.	2.95	6.38	5.79	5.23	3.94	–	6.69	10.43	8.46	7.87	9.06	10.20	–	17.91	7.80	3.90	4.25
D 4 B (Part No. 112 45)	16 KF	mm	75	162	147	132	100	102	–	265	215	200	230	234	437	–	198	99	108
		in.	2.95	6.38	5.79	5.23	3.94	4.02	–	10.43	8.46	7.87	9.06	9.21	17.21	–	7.80	3.90	4.25
D 4 B (Part No. 112 46)	16 KF	mm	75	162	147	132	100	89	–	265	215	200	230	223	438	–	198	99	108
		in.	2.95	6.38	5.79	5.23	3.94	3.5	–	10.43	8.46	7.87	9.06	8.78	17.24	–	7.80	3.90	4.25
D 4 B (Part No. 140 140)	16 KF		u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.
D 4 B (Part No. 140 081)	16 KF	mm	75	162	147	132	100	185	–	265	215	200	230	264	455	–	198	99	108
		in.	2.95	6.38	5.79	5.23	3.94	7.28	–	10.43	8.46	7.87	9.06	10.39	17.91	–	7.80	3.90	4.25
D 8 B (Part No. 113 21)	16 KF	mm	100	162	147	132	100	–	170	265	215	200	230	259	–	480	198	99	108
		in.	3.94	6.38	5.79	5.23	3.94	–	6.69	10.43	8.46	7.87	9.06	10.20	–	18.90	7.80	3.90	4.25
D 8 B (Part No. 112 55)	16 KF	mm	100	162	147	132	100	102	–	265	215	200	230	234	462	–	198	99	108
		in.	3.94	6.38	5.79	5.23	3.94	4.02	–	10.43	8.46	7.87	9.06	9.21	18.19	–	7.80	3.90	4.25
D 8 B (Part No. 112 56)	16 KF	mm	100	162	147	132	100	89	–	265	215	200	230	223	463	–	198	99	108
		in.	3.94	6.38	5.79	5.23	3.94	3.5	–	10.43	8.46	7.87	9.06	8.78	18.23	–	7.80	3.90	4.25
D 8 B (Part No. 140 150)	16 KF		u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.	u. r.
D 8 B (Part No. 140 082)	16 KF	mm	100	162	147	132	100	185	–	265	215	200	230	264	480	–	198	99	108
		in.	3.94	6.38	5.79	5.23	3.94	7.28	–	10.43	8.46	7.87	9.06	10.39	18.90	–	7.80	3.90	4.25

u. r. = upon request

Dimensional drawing for the TRIVAC D 4 B and D 8 B



Pump-down characteristics of a 10 l vessel at 50 Hz



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

Technical Data

		TRIVAC D 4 B two-stage		TRIVAC D 8 B two-stage	
		50 Hz	60 Hz	50 Hz	60 Hz
Nominal pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	4.8 (2.8)	5.8 (3.4)	9.7 (5.7)	11.6 (6.9)
Pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	4.2 (2.5)	5 (3)	8.5 (5)	10.2 (6)
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)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)
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)	30 (22.5)	30 (22.5)	25 (18.8)	25 (18.8)
Water vapor capacity	g/h	93	93	157	157
Oil filling, min. / max.	l (qt)	0.3 / 0.8 (0.3 / 0.85)	0.3 / 0.8 (0.3 / 0.85)	0.3 / 0.9 (0.3 / 0.95)	0.3 / 0.9 (0.3 / 0.95)
Noise level [2] to DIN 45 635, without / with gas ballast	dB(A)	50 / 52	50 / 52	50 / 52	50 / 52
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)	370 (0.50)	370 (0.50)	370 (0.50)	370 (0.50)
Nominal speed	rpm	1500	1800	1500	1800
Type of protection [3]	IP	54	54	54	54
Weight [2]	kg (lbs)	18.7 (41.2)	18.7 (41.2)	21.2 (46.7)	21.2 (46.7)
Connections, Intake and Exhaust	DN	16 KF	16 KF	16 KF	16 KF

[1] To DIN 28 400 and following numbers

[2] Weight, motor rating and noise levels for the pumps with global version 230 V, 50 Hz AC motor 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 4 B two-stage	TRIVAC D 8 B two-stage
TRIVAC B		
without motor	**Part No. 113 07**	**Part No. 113 17**
with 1-phase motor		
230 V, 50 Hz [1]	**Part No. 112 45**	**Part No. 112 55**
with 3-phase motor		
230/400 V, 50 Hz / 250/440 V, 60 Hz [1]	**Part No. 112 46**	**Part No. 112 56**
230/400 V, 50 Hz, ATEX Category 3 inside and 3 outside inside: II (i) 3G IIC T4 (50 Hz) outside: II (o) 3G IIC T3 (50 Hz)	**Part No. 140 140**	**Part No. 140 150**
with dual voltage motor [2]		
100-120 V, 50/60 Hz and 200-240 V, 50/60 Hz	**Part No. 140 081** [2]	**Part No. 140 082** [2]
Mains cord for dual voltage motor [2]		
230 V earthed plug	**Part No. 200 81 091**	**Part No. 200 81 091**
230 V UK plug	**Part No. 200 81 097**	**Part No. 200 81 097**
230 V CH plug	**Part No. 200 81 099**	**Part No. 200 81 099**
230 V NEMA plug (200-240 V)	**Part No. 200 81 141**	**Part No. 200 81 141**
115 V NEMA plug (100-120 V)	**Part No. 200 81 090**	**Part No. 200 81 090**
Transition connector (250 V AC, 10 A, L+N+PE) only necessary in Switzerland for 1~ pumps	**Part No. 800 001 274**	**Part No. 800 001 274**
Accessories		
FS 2-4 dust filter	**Part No. 186 05**	**Part No. 186 05**
FA 2-4 fine vacuum adsorption trap	**Part No. 187 05**	**Part No. 187 05**
Adsorption trap with aluminium oxide	**Part No. 854 14**	**Part No. 854 14**
Activated aluminium oxide, 1.3 kg (2 l approx.)	**Part No. 854 10**	**Part No. 854 10**
TK 4-8 cold trap	**Part No. 188 20**	**Part No. 188 20**
AF 4-8 exhaust filter	**Part No. 189 06**	**Part No. 189 06**
AR 4-8 exhaust filter with lubricant return	**Part No. 189 20**	**Part No. 189 20**
AK 4-8 condensate trap	**Part No. 188 06**	**Part No. 188 06**
OF 4-25 mechanical oil filter	**Part No. 101 91**	**Part No. 101 91**
CF 4-25 chemical oil filter	**Part No. 101 96**	**Part No. 101 96**
Connector for gas ballast inlet M 16 x 1.5 – DN 16 KF	**Part No. 168 40**	**Part No. 168 40**
Oil drain tap M 16 x 1.5	**Part No. 190 90**	**Part No. 190 90**
Spare Parts		
Inside section	**Part No. E 200 10 989**	**Part No. E 200 10 991**
Seal kit	**Part No. 197 20**	**Part No. 197 20**

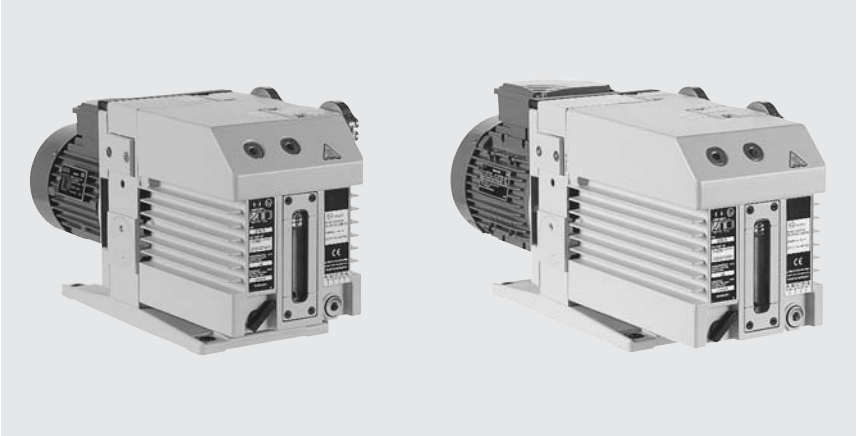
[1] Certification after 94/9/EG (ATEX), Category 3 inside. Inside: II (i) 3G IIC T4 (50 Hz), T3 (60 Hz)

[2] A mains cord needs to be ordered additionally

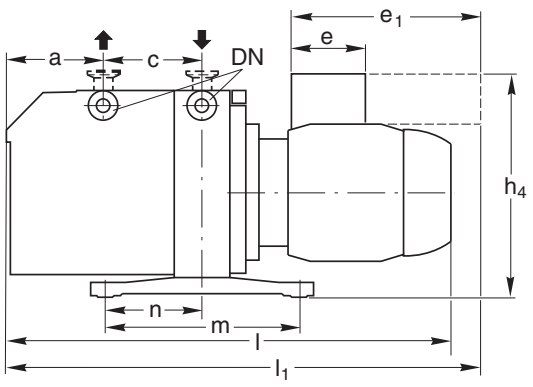
Only available for purchase in North and South America

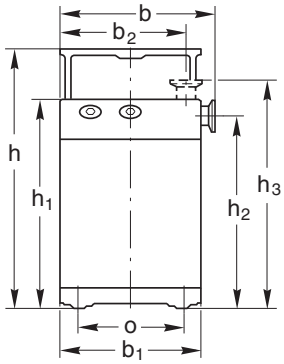
Ordering Information	TRIVAC D 4 B two-stage	TRIVAC D 8 B two-stage
TRIVAC B		
with 1-phase motor		
115 V, 60/50 Hz, NEMA plug	**Part No. 912 45-1**	**Part No. 912 55-1**
208-230 V, 60/50 Hz, NEMA plug	**Part No. 912 45-2**	**Part No. 912 55-2**
with 3-phase motor		
208-230/460 V, 60 Hz / 200-220/380 V, 50 Hz	**Part No. 912 46-2**	**Part No. 912 56-2**

TRIVAC D 16 B and D 25 B



TRIVAC D 16 B (left) and TRIVAC D 25 B (right)





USA pumps max. length
D 16 B: 560 mm (22.1“)
D 25 B: 660 mm (26“)

Type	DN		a	b	b_1	b_2	c	e	e_1	h	h_1	h_2	h_3	h_4	l	l_1	m	n	o
D 16 B (Part No. 113 29)	25 KF	mm	82	190	177	150	135	–	266	298	250	226	263	271	–	566	280	140	132
		in.	3.23	7.48	6.97	5.91	5.32	–	10.47	11.73	9.84	8.90	10.35	10.67	–	22.28	11.02	5.51	5.20
D 16 B (Part No. 112 66, 113 33)	25 KF	mm	82	190	175	150	135	89	–	298	250	226	263	236	490	–	280	140	132
		in.	3.23	7.48	6.89	5.91	5.32	3.50	–	11.73	9.84	8.90	10.35	9.29	19.29	–	11.02	5.51	5.20
D 16 B (Part No. 140 160)	25 KF	mm	82	190	175	150	135	127	–	u. r.	u. r.	u. r.	u. r.	262	515	–	u. r.	u. r.	u. r.
		in.	3.23	7.48	6.89	5.91	5.32	5.0	–	u. r.	u. r.	u. r.	u. r.	10.32	20.28	–	u. r.	u. r.	u. r.
D 16 B (Part No. 112 65, 113 34)	25 KF	mm	82	190	175	150	135	111	–	298	250	226	263	262	507	–	280	140	132
		in.	3.23	7.48	6.89	5.91	5.32	4.37	–	11.73	9.84	8.90	10.35	10.32	19.96	–	11.02	5.51	5.20
D 16 B (Part No. 113 25)	25 KF	mm	82	190	175	150	135	111	–	298	250	226	263	262	512	–	280	140	132
		in.	3.23	7.48	6.89	5.91	5.32	4.37	–	11.73	9.84	8.90	10.35	10.32	20.16	–	11.02	5.51	5.20
D 25 B (Part No. 113 36, 113 39, 113 48)	25 KF	mm	142	190	177	150	135	–	266	298	250	226	263	271	–	626	280	140	132
		in.	5.59	7.48	6.97	5.91	5.32	–	10.47	11.73	9.84	8.90	10.35	10.67	–	24.65	11.02	5.51	5.20
D 25 B (Part No. 112 76)	25 KF	mm	142	190	177	150	135	111	–	298	250	226	263	262	566	–	280	140	132
		in.	5.59	7.48	6.97	5.91	5.32	4.37	–	11.73	9.84	8.90	10.35	10.32	22.28	–	11.02	5.51	5.20
D 25 B (Part No. 112 75)	25 KF	mm	142	190	177	150	135	111	–	298	250	226	263	262	568	–	280	140	132
		in.	5.59	7.48	6.97	5.91	5.32	4.37	–	11.73	9.84	8.90	10.35	10.32	22.36	–	11.02	5.51	5.20
D 25 B (Part No. 113 35)	25 KF	mm	142	190	177	150	135	111	–	298	250	226	263	262	573	–	280	140	132
		in.	5.59	7.48	6.97	5.91	5.32	4.37	–	11.73	9.84	8.90	10.35	10.32	22.56	–	11.02	5.51	5.20
D 25 B (Part No. 140 170)	25 KF	mm	142	190	177	150	135	127	–	u. r.	u. r.	u. r.	u. r.	262	576	–	u. r.	u. r.	u. r.
		in.	5.59	7.48	6.97	5.91	5.32	5.0	–.	u. r.	u. r.	u. r.	u. r.	10.32	20.28	–	u. r.	u. r.	u. r.

u. r. = upon request

Dimensional drawing for the TRIVAC D 16 and D 25 B

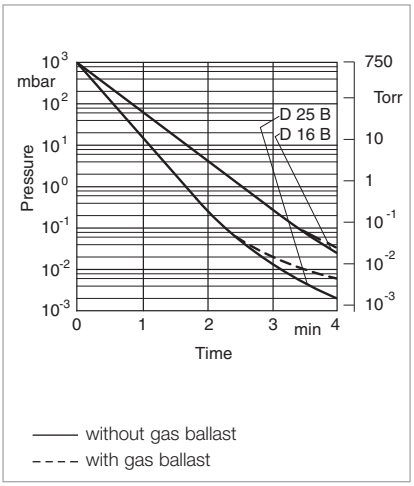
Technical Data

		TRIVAC D 16 B two-stage		TRIVAC D 25 B two-stage	
		50 Hz	60 Hz	50 Hz	60 Hz
Nominal pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	18.9 (11.1)	22.7 (13.4)	29.5 (17.4)	35.4 (20.9)
Pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	16.5 (9.7)	19.8 (11.7)	25.7 (15.1)	30.8 (18.2)
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)	$< 2 \times 10^{-3}$ (1.5×10^{-3})	$< 2 \times 10^{-3}$ (1.5×10^{-3})	$< 2 \times 10^{-3}$ (1.5×10^{-3})	$< 2 \times 10^{-3}$ (1.5×10^{-3})
Ultimate total pressure with gas ballast [1]	mbar (Torr)	$< 5 \times 10^{-3}$ (3.8×10^{-3})	$< 5 \times 10^{-3}$ (3.8×10^{-3})	$< 5 \times 10^{-3}$ (3.8×10^{-3})	$< 5 \times 10^{-3}$ (3.8×10^{-3})
Water vapor tolerance [1]	mbar (Torr)	25 (18.8)	25 (18.8)	25 (18.8)	25 (18.8)
Water vapor capacity	g/h	305	305	476	476
Oil filling, min. / max.	l (qt)	0.5 / 1.0 (0.5 / 1.1)	0.5 / 1.0 (0.5 / 1.1)	0.6 / 1.4 (0.6 / 1.5)	0.6 / 1.4 (0.6 / 1.5)
Noise level [2] to DIN 45 635, without / with gas ballast	dB(A)	52 / 62	52 / 62	52 / 62	52 / 62
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 - 750 (0.75 - 1.0)	550 - 750 (0.75 - 1.0)	750 (1)	750 (1)
Nominal speed	rpm	1500	1800	1500	1800
Type of protection [3]	IP	54	54	54	54
Weight [2]	kg (lbs)	26 (57.3)	26 (57.3)	32 (70.6)	32 (70.6)
Connections, Intake and Exhaust	DN	25 KF	25 KF	25 KF	25 KF

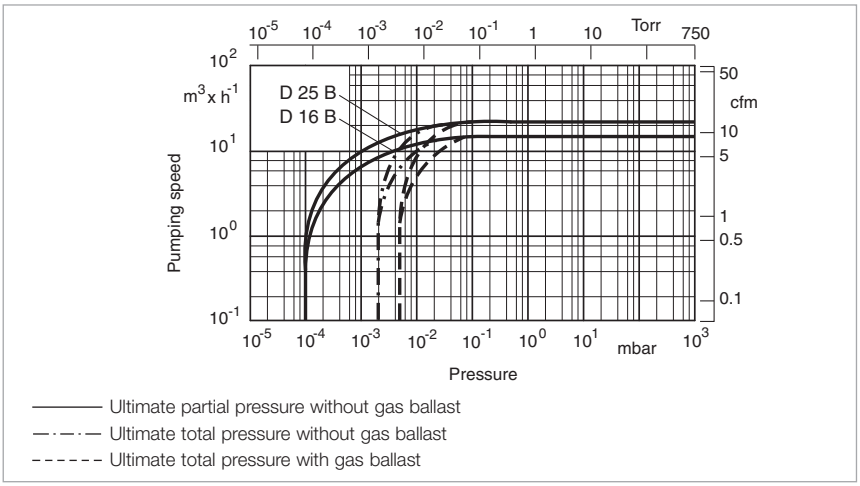
[1] To DIN 28 400 and following numbers

[2] Weight, motor rating and noise levels for the pumps with global version AC 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



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 B two-stage	TRIVAC D 25 B two-stage
TRIVAC B		
without motor	**Part No. 113 28**	**Part No. 113 38**
with 1-phase motor		
230 V, 50 Hz [1]	**Part No. 112 65**	**–**
230 V, 50/60 Hz [1]	**Part No. 113 25** [2]	**Part No. 113 35** [2] **/ 112 75**
100 V, 50 Hz / 110 V, 60 Hz	**upon request**	**upon request**
115 V, 60 Hz	**–**	**Part No. 113 48**
with 3-phase motor		
230/400 V, 50 Hz / 250/440 V, 60 Hz [1]	**Part No. 112 66**	**Part No. 112 76**
230/400 V, 50 Hz / 250/440 V, 60 Hz	**Part No. 113 33 (RCF - E96N)**	**–**
200/346 V, 50 Hz / 208/360 V, 60 Hz	**Part No. 113 34 (RCF - E96N)**	**–**
230/400 V, 50 Hz, ATEX Category 3 inside and 3 outside inside: II (i) 3G IIC T4 (50 Hz) outside: II (o) 3G IIC T3 (50 Hz)	**Part No. 140 160**	**Part No. 140 170**
Accessories		
FS 8-16 dust filter	**Part No. 186 10**	**Part No. 186 10**
AS 8-16 dust separator	**Part No. 186 11**	**Part No. 186 11**
MF 8-16 molecular filter	**Part No. 186 12**	**Part No. 186 12**
FA 8-16 fine vacuum adsorption trap	**Part No. 187 10**	**Part No. 187 10**
Adsorption trap with aluminium oxide	**Part No. 854 15**	**Part No. 854 15**
Activated aluminium oxide, 1.3 kg (2 l approx.)	**Part No. 854 10**	**Part No. 854 10**
AF 16-25 exhaust filter	**Part No. 189 11**	**Part No. 189 11**
AR 16-25 exhaust filter with lubricant return	**Part No. 189 21**	**Part No. 189 21**
AK 16-25 condensate trap	**Part No. 188 11**	**Part No. 188 11**
OF 4-25 mechanical oil filter	**Part No. 101 91**	**Part No. 101 91**
CF 4-25 chemical oil filter	**Part No. 101 96**	**Part No. 101 96**
Connector for gas ballast inlet M 16 x 1.5 – DN 16 KF	**Part No. 168 40**	**Part No. 168 40**
Oil drain tap	**Part No. 190 90**	**Part No. 190 90**
Spare Parts		
Inside section		
Seal kit		

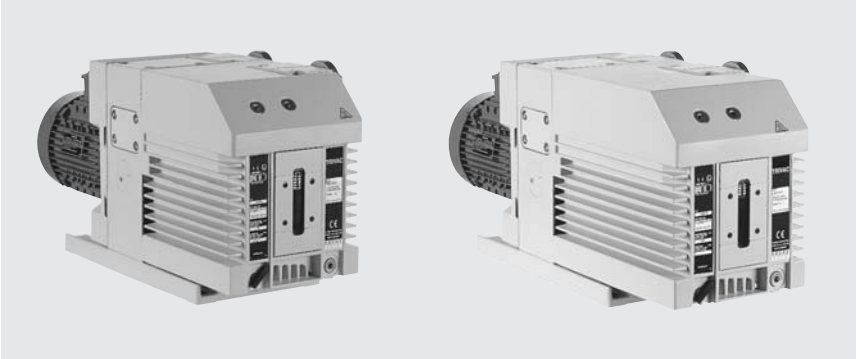
[1] Certification after 94/9/EG (ATEX), Category 3 inside. Inside: II (i) 3G IIC T4 (50 Hz), T3 (60 Hz)

[2] with cable Euro-Schuko. Other cables upon request

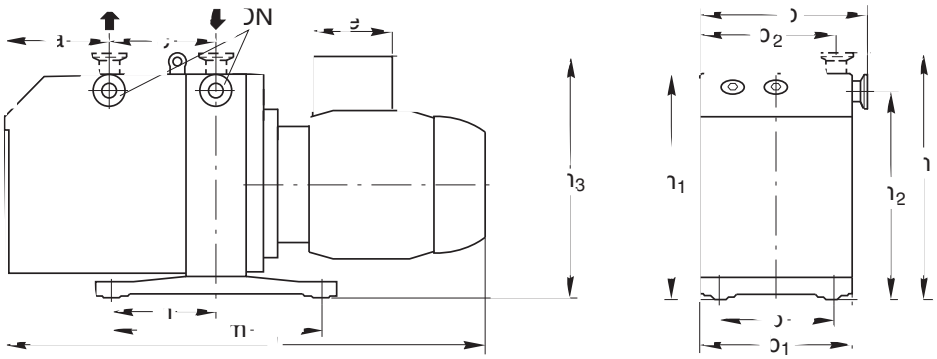
Only available for purchase in North and South America

Ordering Information	TRIVAC D 16 B two-stage	TRIVAC D 25 B two-stage
TRIVAC B		
with 1-phase motor		
115 V, 60/50 Hz, NEMA plug	**Part No. 912 65-1**	**Part No. 912 75 V 001**
208-230 V, 60/50 Hz, NEMA plug	**Part No. 912 65-2**	**Part No. 912 75-2**
with 3-phase motor		
208-230/460 V, 60 Hz / 200-220/380 V, 50 Hz	**Part No. 912 66-2**	**Part No. 912 76-2**

TRIVAC D 40 B and D 65 B



TRIVAC D 40 B (left) and TRIVAC D 65 B (right)



USA pumps max. length
D 40 B: 760 mm (30“)
D 65 B: 840 mm (33.1“)

Type	DN		a	b	b_1	b_2	c	e	h	h_1	h_2	h_3	l	m	n	o
D 40 B (Part No. 112 86)	40 KF	mm	136	255	235	208	166	90	357	339	310	306	715	382	191	190
		in.	5.35	10.40	9.25	8.19	6.54	3.54	14.06	13.35	12.20	12.05	28.15	15.04	7.52	7.48
D 40 B (Part No. 113 45, 140 180)	40 KF	mm	136	255	235	208	166	127	357	339	310	326	716	382	191	190
		in.	5.35	10.40	9.25	8.19	6.54	5.00	14.06	13.35	12.20	12.83	28.19	15.04	7.52	7.48
D 40 B (Part No. 113 47)	40 KF	mm	136	255	235	208	166	90	357	339	310	293	675	382	191	190
		in.	5.35	10.40	9.25	8.19	6.54	3.54	14.06	13.35	12.20	11.54	26.57	15.04	7.52	7.48
D 65 B (Part No. 112 96)	40 KF	mm	214	255	235	208	166	90	357	339	310	306	793	382	191	190
		in.	8.46	10.40	9.25	8.19	6.54	3.54	14.06	13.35	12.20	12.05	31,22	15.04	7.52	7.48
D 65 B (Part No. 113 55, 140 190)	40 KF	mm	214	255	235	208	166	127	357	339	310	326	794	382	191	190
		in.	8.46	10.40	9.25	8.19	6.54	5.00	14.06	13.35	12.20	12.83	31.26	15.04	7.52	7.48
D 65 B (Part No. 113 57)	40 KF	mm	214	255	235	208	166	90	357	339	310	293	753	382	191	190
		in.	8.46	10.40	9.25	8.19	6.54	3.54	14.06	13.35	12.20	11.54	29.65	15.04	7.52	7.48

Dimensional drawing for the TRIVAC D 40 and D 65 B

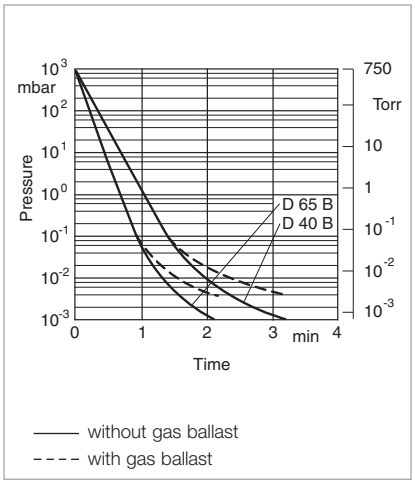
Technical Data

		TRIVAC D 40 B two-stage		TRIVAC D 65 B two-stage	
		50 Hz	60 Hz	50 Hz	60 Hz
Nominal pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	46 (27)	55 (32.5)	75 (44)	90 (53)
Pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	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)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)	$< 2 \times 10^{-3}$ ($< 1.5 \times 10^{-3}$)
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)	40 (30)	40 (30)	40 (30)	40 (30)
Water vapor capacity	g/h	1184	1184	1925	1925
Oil filling, min. / max.	l (qt)	1.7 / 2.6 (1.8 / 2.7)	1.7 / 2.6 (1.8 / 2.7)	2.0 / 3.3 (2.1 / 3.5)	2.0 / 3.3 (2.1 / 3.5
Noise level [2] to DIN 45 635, without / with gas ballast	dB(A)	57 / 59	57 / 59	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)	2200 (3.0)	2200 (3.0)	2200 (3.0)	2200 (3.0)
Nominal speed	rpm	1420	1710	1420	1710
Type of protection [3]	IP	54	54	54	54
Weight [2]	kg (lbs)	68 (150)	68 (150)	80 (177)	80 (177)
Connections, Intake and Exhaust	DN	40 KF	40 KF	40 KF	40 KF

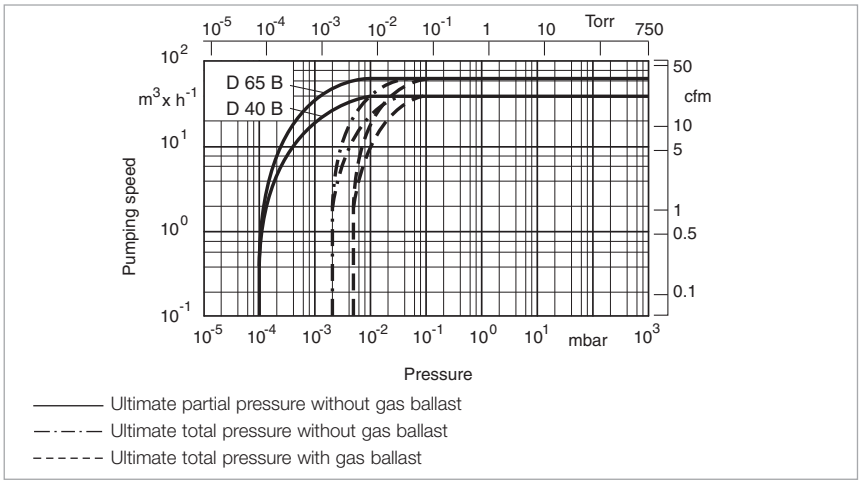
[1] To DIN 28 400 and following numbers

[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



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)

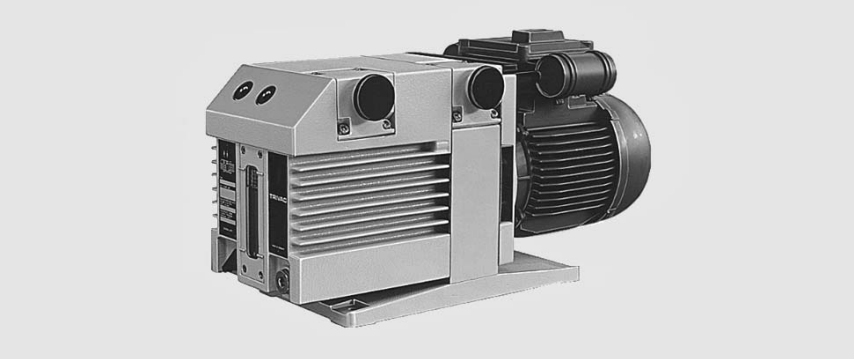
Ordering Information	TRIVAC D 40 B two-stage	TRIVAC D 65 B two-stage
TRIVAC B		
without motor	**Part No. 113 46**	**Part No. 113 56**
with 3-phase motor		
230/400 V, 50 Hz / 250/440 V, 60 Hz [1)]	**Part No. 112 86**	**Part No. 112 96**
200/346 V, 50 Hz / 208/360 V, 60 Hz	**Part No. 113 47**	**Part No. 113 57**
230/400 V, 50 Hz, ATEX Category 3 inside and 3 outside inside: II (i) 3G IIC T4 (50 Hz) outside: II (o) 3G IIC T3 (50 Hz)	**Part No. 140 180**	**Part No. 140 190**
Accessories		
Roots pump adaptor	**Part No. 168 30**	**Part No. 168 30**
FS 30-60 dust filter	**Part No. 186 15**	**Part No. 186 15**
AS 30-60 dust separator	**Part No. 186 16**	**Part No. 186 16**
MF 30-60 molecular filter	**Part No. 186 17**	**Part No. 186 17**
FA 30-60 fine vacuum adsorption trap	**Part No. 187 15**	**Part No. 187 15**
Adsorption trap with aluminium oxide	**Part No. 854 16**	**Part No. 854 16**
Activated aluminium oxide, 1.3 kg (2 l approx.)	**Part No. 854 10**	**Part No. 854 10**
AF 40-65 exhaust filter	**Part No. 189 16**	**Part No. 189 16**
AR 40-65 exhaust filter with lubricant return	**Part No. 189 22**	**Part No. 189 22**
AK 40-65 condensate trap	**Part No. 188 16**	**Part No. 188 16**
OF 40-65 mechanical oil filter	**Part No. 101 92**	**Part No. 101 92**
CF 40-65 chemical oil filter	**Part No. 101 97**	**Part No. 101 97**
Connector for gas ballast inlet M 16 x 1.5 – DN 16 KF	**Part No. 168 40**	**Part No. 168 40**
Oil drain tap	**Part No. 190 90**	**Part No. 190 90**
Spare Parts		
Inside section	**Part No. E 200 10 933**	**Part No. E 200 10 944**
Seal kit	**Part No. 197 22**	**Part No. 197 22**

[1)] Certification after 94/9/EG (ATEX), Category 3 inside. Inside: II (i) 3G IIC T4 (50 Hz), T3 (60 Hz)

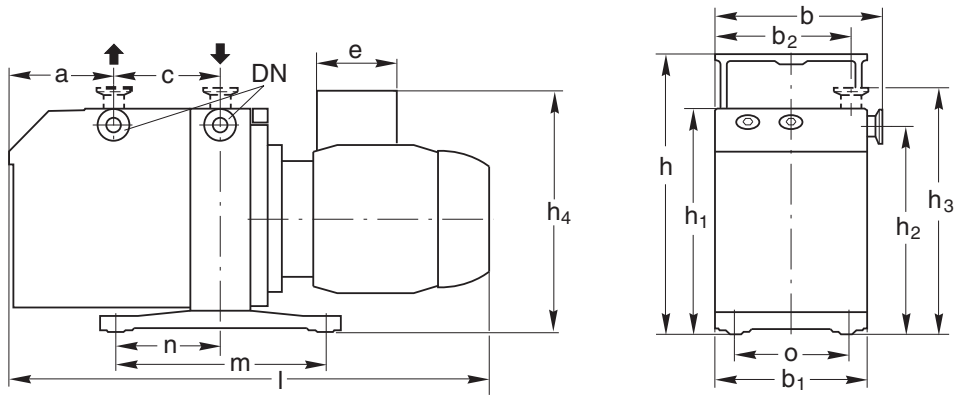
Only available for purchase in North and South America

Ordering Information	TRIVAC D 40 B two-stage	TRIVAC D 65 B two-stage
TRIVAC B with 3-phase motor 208-230/460 V, 60 Hz / 200-220/380 V, 50 Hz	**Part No. 912 86-2**	**Part No. 912 96-2**

TRIVAC D 16 B-DOT

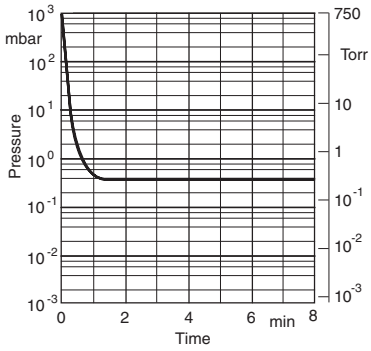


TRIVAC D 16 B-DOT

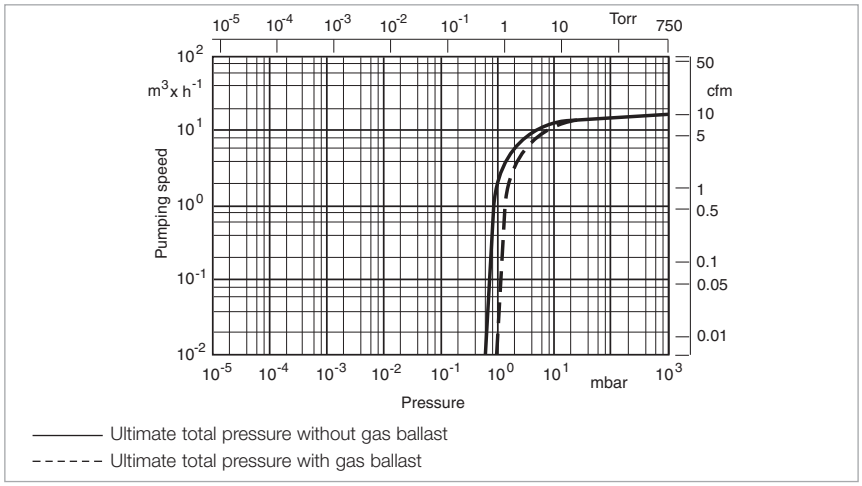


Type	DN		a	b	b_1	b_2	c	h	h_1	h_2	h_3	l	m	n	o
D 16 B-DOT (Part No. 114 06/10)	25 KF	mm	82	190	175	150	135	298	250	226	265	482	280	140	132
		in.	3.23	7.48	6.89	5.91	5.31	11.7	9.84	8.90	10.4	19	11	5.51	5.20

Dimensional drawing for the TRIVAC D 16 B-DOT



Pump-down characteristics of a 10 l vessel at 50 Hz



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

Technical Data

		TRIVAC D 16 B-DOT	
		50 Hz	60 Hz
Nominal pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	18.9 (11.1)	22.7 (13.4)
Pumping speed [1]	$m^3 \times h^{-1}$ (cfm)	16.5 (9.7)	19.8 (11.7)
Ultimate total pressure without gas ballast [1]	mbar (Torr)	$< 6 \times 10^{-1}$ ($< 4.5 \times 10^{-1}$)	$< 6 \times 10^{-1}$ ($< 4.5 \times 10^{-1}$)
Ultimate total pressure with gas ballast [1]	mbar (Torr)	$< 9 \times 10^{-1}$ ($< 6.75 \times 10^{-1}$)	$< 9 \times 10^{-1}$ ($< 6.75 \times 10^{-1}$)
Water vapor tolerance [1]	mbar (Torr)	25 (18.75)	25 (18.75)
Water vapor capacity	g/h	259	259
Brake fluid filling, min. / max.	l (qt)	0.45 / 1.0 (0.5 / 1.1)	0.45 / 1.0 (0.5 / 1.1)
Noise level to DIN 45 635, without / with gas ballast	dB(A)	52 / 52	52 / 52
Admissible ambient temperature	°C (°F)	12 - 40 (54 - 104)	12 - 40 (54 - 104)
Motor rating	W (HP)	550 (0.75)	550 (0.75)
Nominal speed	rpm	1500	1800
Type of protection [2]	IP	54	54
Weight	kg (lbs)	26 (57.3)	26 (57.3)
Connections, Intake and Exhaust	DN	25 KF	25 KF

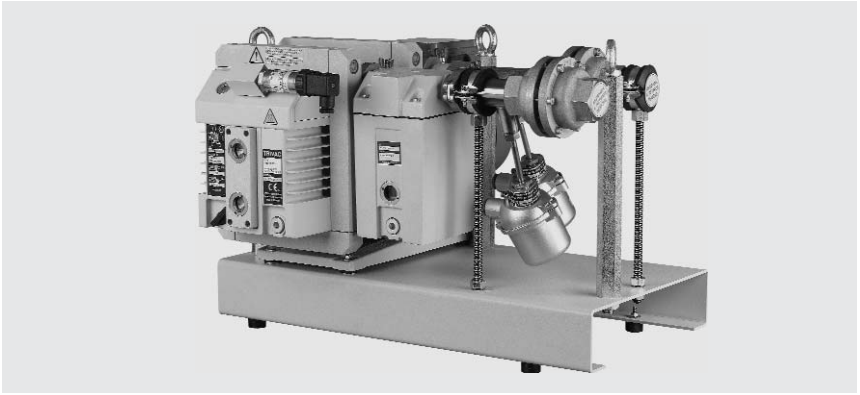
Ordering Information

	TRIVAC D 16 B-DOT	
	Global Version	North and South America Version
TRIVAC B-DOT		
with 3-phase motor		
230/400 V, 50 Hz; 250/440 V, 60 Hz	**Part No. 114 06**	
230/400 V, 50 Hz; 250/440 V, 60 Hz	**Part No. 114 10 (with float switch)**	–
with 1-phase motor 115 V, 60 Hz	–	**Part No. 914 62**
with 3-phase motor 208-230/460 V, 60 Hz		
208-220/380 V, 50 Hz	–	**Part No. 914 63**
AF 16-25 DOT exhaust filter	**Part No. 124 16**	**Part No. 124 16**
AK 16 DOT condensate trap	**Part No. 110 78**	**Part No. 110 78**
Seal kit	**Part No. 200 39 059**	**Part No. 200 39 059**

[1] To DIN 28 400 and following numbers
[2] Global versions only. North and South American versions are TEFC

As to the D 8 B-DOT, D 25 B-DOT and D 40 B-DOT please ask us for a quotation.

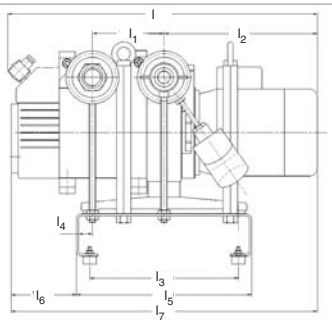
TRIVAC D 16 B-Ex (Explosion Protected and Pressure Burst Resistant)

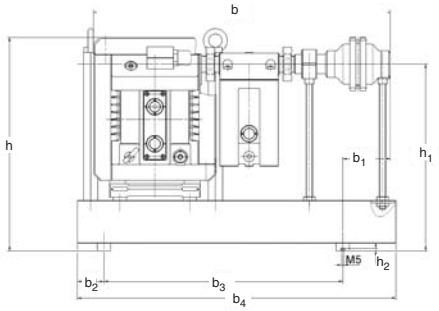


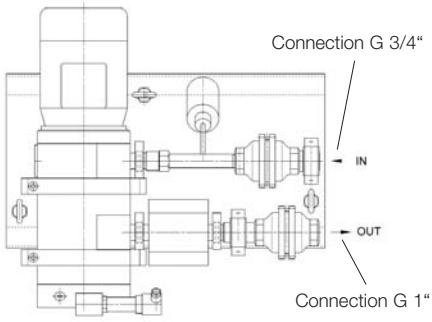
TRIVAC D 16 B-Ex

ATEX

Category 1 inside and 2 outside



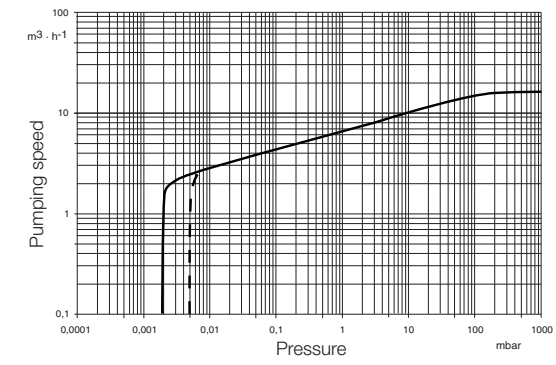




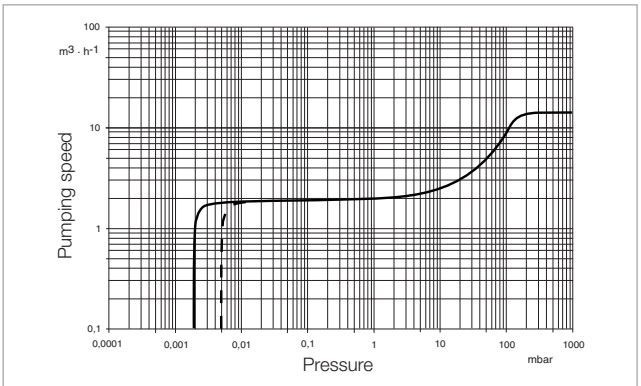
Type		b	b_1	b_2	b_3	b_4	h	h_1	h_2
D 16 B-Ex	mm	559	89.5	50	450	600	404	353	5
	in.	22.01	3.52	1.97	17.72	23.62	15.91	13.90	0.20

		l	l_1	l_2	l_3	l_4	l_5	l_6	l_7
	mm	583	135	289	280	30	330	123	577
	in.	22.95	5.31	11.38	11.02	1.18	12.99	4.84	22.72

Dimensional drawing for the TRIVAC 16 B-Ex (explosion protected and pressure burst resistant)



Pumping speed characteristics of TRIVAC D 16 B-Ex [IIB3 T4]
(Part No. 140 091)



Pumping speed characteristics of TRIVAC D 16 B-Ex [IIC T4]
(Part No. 140 092)

Technical Data

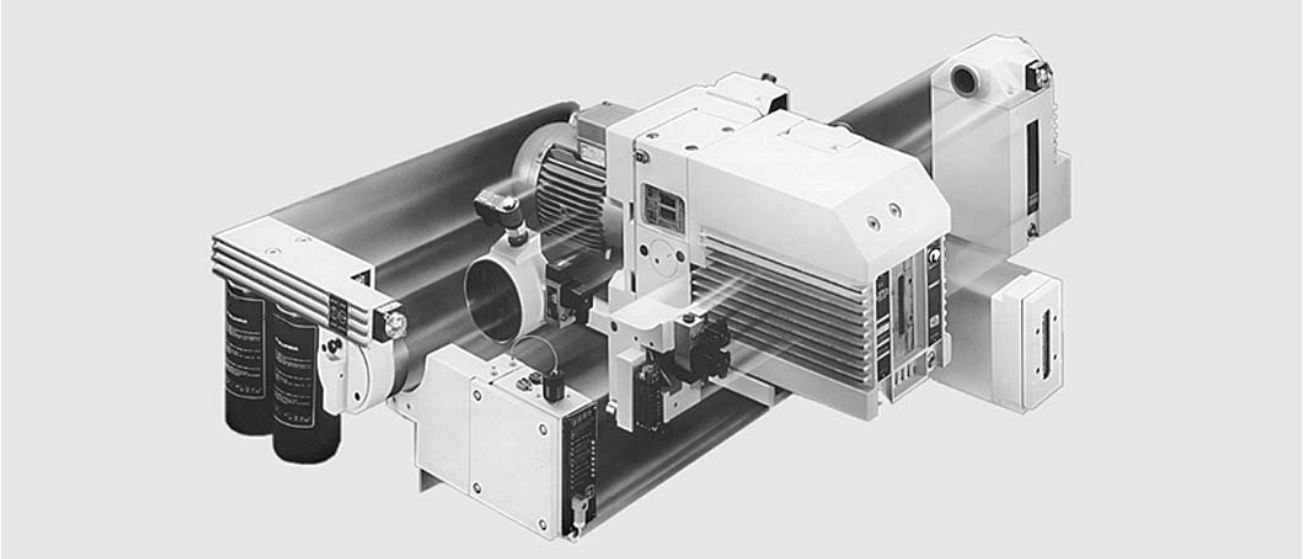
	TRIVAC D 16 B-Ex (Explosion Protected and Pressure Burst Resistant) Two-Stage
Nominal pumping speed [1] $m^3 \times h^{-1}$ (cfm)	18.9 (11.1)
Pumping speed (for Part No. 140 091 / 140 092) [1] $m^3 \times h^{-1}$ (cfm)	16 / 15 (9.4/8.8)
Ultimate total pressure without gas ballast [1] mbar (Torr)	1×10^{-4} ($< 0.75 \times 10^{-3}$)
Ultimate total pressure with gas ballast [1] mbar (Torr)	$< 5 \times 10^{-3}$ ($< 3.8 \times 10^{-3}$)
Water vapor tolerance [1] mbar (Torr)	25 (18.75)
Water vapor capacity gm/h	305
Oil filling, min. / max. l (qt)	0.55 / 1.3 (0.58 / 1.4)
Motor	3~, 230 V / 400 V, 50 Hz, EEx e II T4
Type of protection IP	54
Maximum gas inlet temperature °C (°F)	60 (260)
Highest permissible pressure in the oil box mbar (Torr)	500 (375)
Ambient temperature (t_a) °C (°F)	12 - 40 (46 - 104)
Maximum surface temperature °C (°F)	135 (275)
Max. Inlet pressure mbar (Torr)	Atmospheric pressure
Weight (complette systems) kg (lbs)	72 (159)
Connections	
Intake side Inside thread	G 3/4"
Pressure side Inside thread	G 1"

Ordering Information

	TRIVAC D 16 B-Ex (Explosion Protected and Pressure Burst Resistant) Two-Stage
TRIVAC D 16 B-Ex IIB3 T4 in accordance with 94/9/EC [⟨Ex⟩ II inside: 1G IIB3 T4 outside: 2G IIB T4 (12 °C < t_a < 40 °C) X EC Type Examination Certificate: IBExU03ATEX1017 X]	**Part No. 140 091**
TRIVAC D 16 B-Ex IIC T4 [2] in accordance with 94/9/EC [⟨Ex⟩ II inside: 1G IIC (no C_2H_2, CS_2) T4 outside: 2G IIC T4 (12 °C < t_a < 40 °C) X EC Type Examination Certificate: IBExU03ATEX1016 X]	**Part No. 140 092** [2]

[1] To DIN 28 400 and following numbers
[2] with the exception of acetylene and carbon bisulphide

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

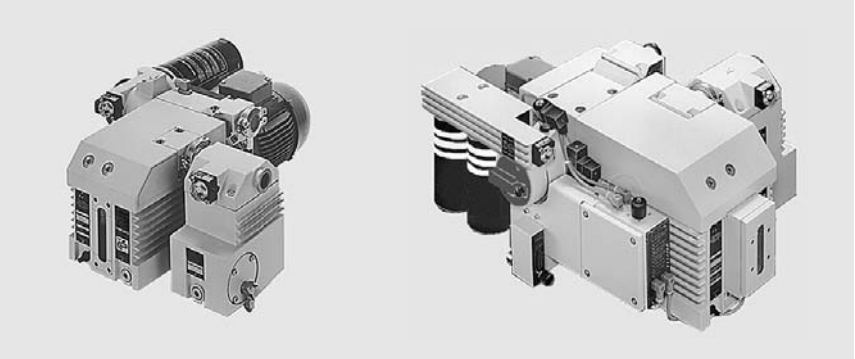
In many applications the use of synthetic lubricants like perfluoro-polyether (PFPE) offers superior characteristics compared to mineral oils.

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

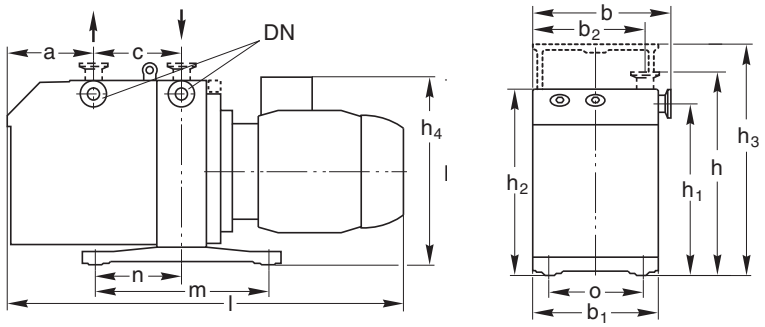
- Practically inert against all chemical and oxidizing influences.
- No polymerization under the influence of high energy radiation.
- In part significantly increased oil change intervals.
- Thermally highly stable. Thermal decomposition will only occur at temperatures over 290 °C (554 °F).

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



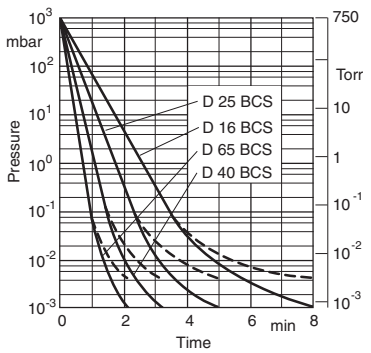
TRIVAC D 25 BCS with ARS and CFS (left)
and TRIVAC D 65 BCS with CFS, ARS, IGS, LSS, EIS – TRIVAC SYSTEM (right)



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“)

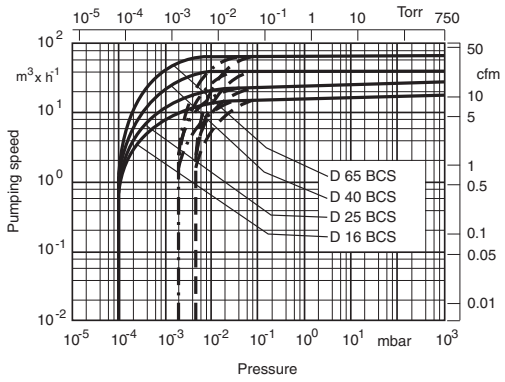
Type	DN		a	b	b_1	b_2	c	h	h_1	h_2	h_3	h_4	l	m	n	o
D 16 BCS (Part No. 113 68)	40 KF	mm	82	190	175	150	135	263	226	250	298	236	505	280	140	132
		in.	3.23	7.48	6.89	5.91	5.32	10.35	8.90	9.84	11.73	9.29	19.88	11.02	5.51	5.20
D 25 BCS (Part No. 113 78)	40 KF	mm	143	190	175	150	135	236	226	250	298	262	566	280	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



——— without gas ballast
– – – – with gas ballast

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



——— Ultimate partial pressure without gas ballast
—·—·— Ultimate total pressure without gas ballast
– – – – – – Ultimate total pressure with gas ballast

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

Technical Data, 50 Hz

		TRIVAC			
		D 16 BCS two-stage	D 25 BCS two-stage	D 40 BCS two-stage	D 65 BCS 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

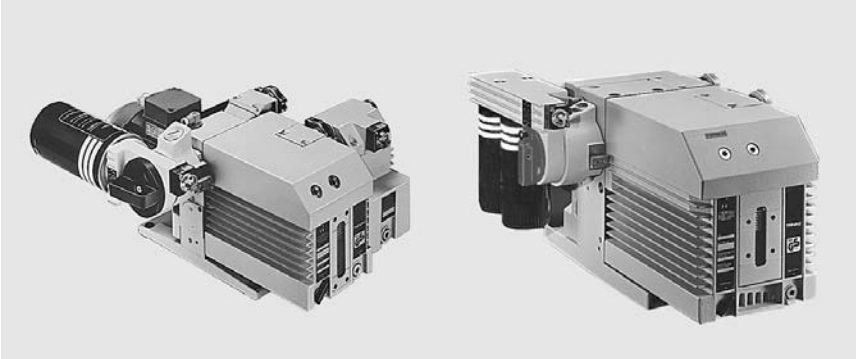
	TRIVAC			
	D 16 BCS two-stage	D 25 BCS two-stage	D 40 BCS two-stage	D 65 BCS two-stage
TRIVAC BCS with 3-phase motor 230/400 V, 50 Hz / 250/440 V, 60 Hz	Part No. 113 68	Part No. 113 78	Part No. 113 88	Part No. 113 98
Accessories				
Roots pump adaptor	–	–	Part No. 168 30	Part No. 168 30
Exhaust filter 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

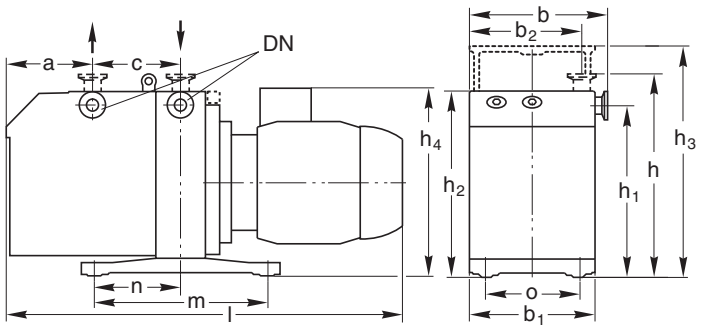
Ordering Information

	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

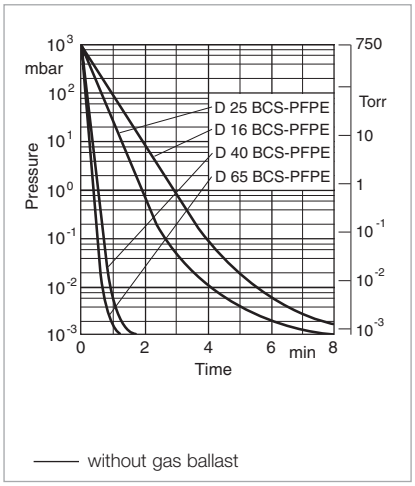
		TRIVAC			
		D 16 BCS-PFPE	D 25 BCS-PFPE	D 40 BCS-PFPE	D 65 BCS-PFPE
		two-stage	two-stage	two-stage	two-stage
Nominal pumping speed 50/60 Hz [1]	$m^3 \times h^{-1}$ (cfm)	18.9 (11.1) / 22.7 (13.4)	29.5 (17.4) / 35.4 (20.9)	46 (27) / 55 (32.5)	75 (44) / 90 (53)
Pumping speed 50/60 Hz [1]	$m^3 \times h^{-1}$ (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

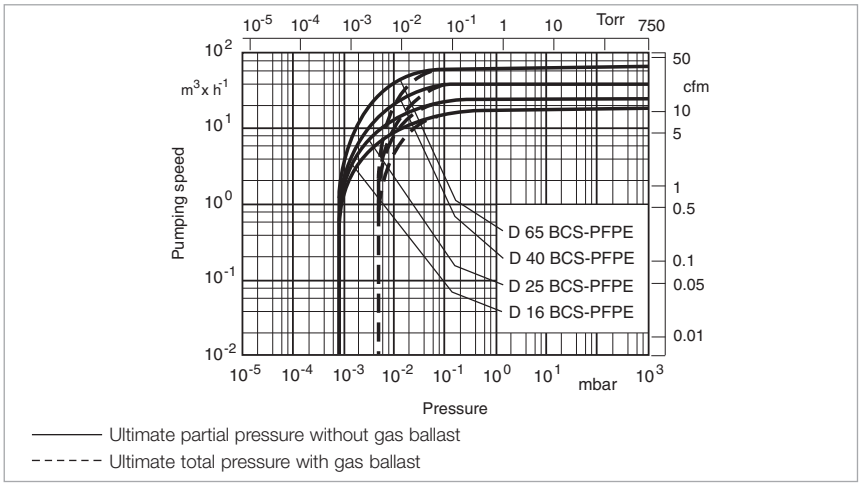
[2] Weight, motor rating and noise levels for the pumps with global version 3-phase motor, 50 Hz, only. Any data that deviate from the above for pumps with other motors, and other motor-dependent data are given in section “Products”, paragraph “Motor Dependent Data for the TRIVAC B, BCS and BCS-PFPE”

[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

Only available for purchase in North and South America

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 1-phase motor				
115 V, 60/50 Hz, NEMA plug	**Part No. 913 69-1**	–	–	–
200-230 V, 60 Hz, NEMA plug	–	**Part No. 913 79-2**	–	–
with 3-phase motor				
208-230/460 V, 60 Hz / 200-220/380 V, 50 Hz	**Part No. 913 69-2**	**Part No. 913 79-3**	**Part No. 913 89-2**	**Part No. 913 99-2**

Motor Dependent Data for the TRIVAC B, BCS and BCS-PFPE

Ordering Information

	D 4 B	D 8 B
TRIVAC D 4 + 8 B	Part No. 140 081	Part No. 140 082
	Part No. 112 45	Part No. 112 55
	Part No. 112 46	Part No. 112 56
	Part No. 140 140	Part No. 140 150
	Part No. 912 45-1	–
	Part No. 912 45-2	–
	Part No. 912 46-2	–
	–	Part No. 912 55-1
	–	Part No. 912 55-2
	–	Part No. 912 56-2

	D 16 B D 16 BCS D 16 BCS-PFPE	D 25 B D 25 BCS D 25 BCS-PFPE
TRIVAC D 16 + 25 B (BCS(-PFPE))	– – –	Part No. 113 48 – –
	Part No. 113 25 – –	Part No. 113 35 – –
	Part No. 112 65 – –	– – –

	D 4/8 B	D 16/25	D 40	D 65 B	S 1,5
Shaft dimensions ⌀ d / l	14 / 30	19 / 40	24 / 50	28 / 60	11 / 23
Size of flange A/B	140 / 95	160 / 110	160 / 110	160 / 110	120 / 100

Type of protection	IP 54
Type of motor	B 14
Rotational speed 50/60 Hz	1500 / 1800

Ref. No. 1- or 3-ph	Motor voltage (V)	Frequency (Hz) ± 5%	Voltage range (V)	Power ((kW) (HP))	Nominal current (A)	Size	Region
100 002 292 1 ~	100-120 200-240	50/60 50/60	100-120 200-240	0.57 0.66	7.7/5.6 4.0/2.8	80	World
380 66 008 1 ~	230	50	218-242	0.37 0.5	2.9	70	Euro
380 66 006 3 ~	230/400 250/440	50 60	218-242/380-420 240-277/415-480	0.37 0.5	1.95/1.12 1.73/1.0	70	Euro (USA)
200 10 406 3 ~ Exe II CT3	230/400	50	219-242/380-420	0.37	1.84/1.06	71L	Euro (USA)
722 60 095 1 ~	115 110	60 50	103-126 99-121	0.25 0.33	7.0 8.8	NEMA 56 C	USA
722 60 096 1 ~	200-230 200-220	60 50	180-253 180-220	0.25 0.33	3.2-3.5 3.6-4.4	NEMA 56 C	USA
722 60 067 3 ~	200-230/460 200/380	60 50	180-253/414-506 180-220/342-418	0.25 0.33	1.5-1.6/0.8 1.6/0.8	NEMA 56 C	USA
722 60 117 1 ~	115 115	60 50	103-126 103-126	0.55 0.75	9.4 13.0	NEMA 56 C	USA
722 60 005 1 ~	208-230 208-230	60 50	187-253 187-253	0.55 0.75	4.8-4.7 5.5-6.5	NEMA 56 C	USA
722 60 135 3 ~	208-230/460 208-220/380	60 50	187-253/414-506 187-242/342-418	0.75 1.0	3.4/1.7 3.1/1.7	NEMA 56 C	USA

Ref. No. 1- or 3-ph	Motor voltage (V)	Frequency (Hz) ± 5%	Voltage range (V)	Power ((kW) (HP))	Nominal current (A)	Size	Region
200 10 679 1 ~	115	60	109-121	0.75 1.0	12.5	90	USA
110 001 212	230	50 60	208-252	0.75 1.0	5.7 4.9	90	Wide range
380 66 003	230	50	218-242	0.55 0.75	5.0	80	Euro

Motor Dependent Data for the TRIVAC B, BCS and BCS-PFPE

TRIVAC D 16 + 25 B (BCS(-PFPE))

Ordering Information	D 16 B D 16 BCS D 16 BCS-PFPE	D 25 B D 25 BCS D 25 BCS-PFPE
	– – –	Part No. 112 75 – –
	Part No. 112 66 / 113 33 (RCF - E68N)	Part No. 112 76
	Part No. 113 68	
		Part No. 113 78
	Part No. 113 69	Part No. 113 79
	Part No. 140 160 – –	Part No. 140 170 – –
	Part No. 113 34 (RCF - E68N) – –	– – –
	Part No. 114 06 DOT / 114 10 DOT LSS – –	– – –
	– – Part No. 154 50	– – Part No. 154 51
	Part No. 912 65-1 – Part No. 913 69-1	– – –
	Part No. 912 65-2 – –	– – –
	Part No. 912 66-2 Part No. 913 68-2 Part No. 913 69-2	– – –
	– – –	Part No. 912 75-2 – Part No. 913 79-2
	– – –	Part No. 912 76-2 Part No. 913 78-3 Part No. 913 79-3
	– – –	Part No. 912 75 V 001 – –

	D 4/8 B	D 16/25	D 40	D 65 B	S 1,5
Shaft dimensions ⌀ d / l	14 / 30	19 / 40	24 / 50	28 / 60	11 / 23
Size of flange A/B	140 / 95	160 / 110	160 / 110	160 / 110	120 / 100

Type of protection	IP 54
Type of motor	B 14
Rotational speed 50/60 Hz	1500 / 1800

Ref. No. 1- or 3-ph	Motor voltage (V)	Frequency (Hz) ± 5%	Voltage range (V)	Power ((kW) (HP))	Nominal current (A)	Size	Region
110 001 200	230	50 60	218-242	0.55 0.75	5.0 4.2	80	Euro
380 66 002 3 ~	230/400 250/440	50 60	218-242/380-420 240-277/415-480	0.75 1.0	3.8/2.05 4.3/2.5	80	Euro (USA)
380 66 001 3 ~	230/400 250/440	50 60	212-242/380-420 240-277/415-480	0.55 1.0	2.85/1.65 2.5/1.45	70	Euro (USA)
380 66 002 3 ~	230/400 250/440	50 60	218-242/380-420 240-277/415-480	0.75 1.0	3.8/2.05 4.3/2.5	80	Euro (USA)
380 66 002 3 ~	230/400 250/440	50 60	218-242/380-420 240-277/415-480	0.75 1.0	3.8/2.05 4.3/2.5	80	Euro (USA)
200 10 409 3 ~ Exe II CT3	230/400	50	218-242/380-420	0.75 1.0	3.4/1.97	80	Euro
200 10 410 3 ~	200/346 208/360	50 60	190-210/330-365 190-230/330-400	0.75 1.0	4.3/2.5 4.3/2.5	80	Japan, South and Central America, USA
200 10 299 3 ~	230/400 250/440	50 60	218-242/380-420 240-265/415-460	0.55 0.75	3.2/1.85 2.8/1.6	70	Euro
100 000 807 3 ~	200/400 220/440	50 60	190-220/380-440 190-240/380-480	0.75 1.0	4.3/2.15 4.0/2.0	80	Wide range
722 60 117 1 ~	115 115	60 50	103-126 103-126	0.55 0.75	9.4 13.0	NEMA 56 C	USA
722 60 005 1 ~	208-230 208-230	60 50	187-253 187-253	0.55 0.75	4.8-4.7 5.5-6.5	NEMA 56 C	USA
722 60 135 3 ~	208-230/460 208-220/380	60 50	187-253/414-506 187-242/342-418	0.75 1.0	3.4-3.4/1.7 3.1/1.7	NEMA 56 C	USA
722 60 022 1 ~	200-230	60	180-253	1.1 1.5	9.6-9.2	NEMA 56 C	USA
722 60 071 3 ~	200-230/460 200/380	60 50	180-253/414-506 180-220/342-418	1.1 1.5	9.0-8.0 9.6-9.2	NEMA 56 C	USA
722 60 186 1 ~	115	60	103-126	1.1 1.5	18.0	NEMA 56 C	USA

Motor Dependent Data for the TRIVAC B, BCS and BCS-PFPE

Ordering Information

TRIVAC D 40 + 65 B (BCS(-PFPE))

	D 40 B D 40 BCS D 40 BCS-PFPE	D 65 B D 65 BCS D 65 BCS-PFPE
	Part No. 112 86 **Part No. 113 88** **Part No. 113 89**	**Part No. 112 96** **Part No. 113 98** **Part No. 113 99**
	Part No. 140 180 **–** **–**	**Part No. 140 190** **–** **–**
	Part No. 113 47 **–** **–**	**Part No. 113 57** **–** **–**
	– **–** **Part No. 154 52**	**–** **–** **Part No. 154 54**
	Part No. 912 86-2 **Part No. 912 88-2** **Part No. 912 89-2**	**Part No. 912 96-2** **Part No. 912 98-2** **Part No. 912 99-2**

	D 4/8 B	D 16/25	D 40	D 65 B	S 1,5
Shaft dimensions ⌀ d / l	14 / 30	19 / 40	24 / 50	28 / 60	11 / 23
Size of flange A/B	140 / 95	160 / 110	160 / 110	160 / 110	120 / 100

Type of protection	IP 54
Type of motor	B 14
Rotational speed 50/60 Hz	1500 / 1800

Ref. No. 1- or 3-ph	Motor voltage (V)	Frequency (Hz) ± 5%	Voltage range (V)	Power ((kW)	(HP))	Nominal current (A)	Size	Region
380 66 012 3 ~	230/400 250/440	50 60	218-242/380-420 240-277/414-480	2.2	3.0	9.9/5.7 8.5/4.9	100	Euro (USA)
200 10 411 3 ~ Exe II CT3	230/400	50	218-242/380-420	2.5	3.4	9.4/5.4	100	Euro
200 10 412 3 ~	200/346 208/360	50 60	190-210/330-365 190-230/330-400	2.2	3.0	10.1/5.85 10.1/5.85	90	Japan, South and Central America, USA
200 15 402 3 ~	200/400 220/440	50 60	190-220/380-440 190-240/380-480	2.2	3.0	15.0/7.5 11.5/5.9	100	Wide range
722 60 011 3 ~	200-230/460 200-220/380-415	60 50	180-253/414-506 180-242/342-418	2.2	3.0	9.0-8.4/4.2 9.4-9.6/4.6-4.7	NEMA 182 TC	USA

Accessories

Accessories for TRIVAC E

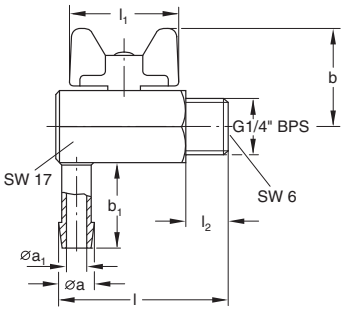
Exhaust Filter Drain Tap

The exhaust filter drain tap simplifies draining of the oil from the exhaust filter.

Technical Note

May also be used in connection with the condensate separator AK.

	a	a_1	b	b_1	l	l_1	l_2
mm	8.5	5	23	20	41	26	10
in.	0.33	0.20	0.90	0.79	1.61	1.02	0.39

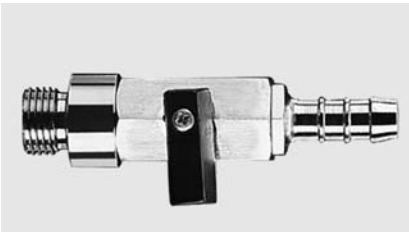


Dimensional drawing for the exhaust filter drain tap

Technical Data		Exhaust Filter Drain Tap
Leak rate	mbar x l x s^{-1}	≤ 10^{-5}

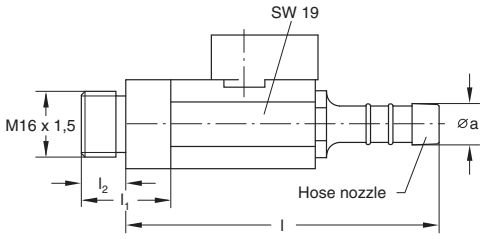
Ordering Information	Exhaust Filter Drain Tap
Exhaust filter drain tap	**Part No. 190 95**

Oil Drain Tap



This oil drain tap may be screwed into the oil drain when wanting to change the oil in the rotary vane pumps. It is also suited for the condensate separators and exhaust filters of the TRIVAC B series.

	a	l	l_1	l_2
mm	10.5	76	22	11
in.	0.41	2.99	0.87	0.43

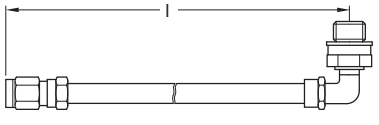


Dimensional drawing for the oil drain tap

Technical Data		Oil Drain Tap
Leak rate	mbar x l x s^{-1}	≤ 10^{-5}

Ordering Information	Oil Drain Tap
Oil drain tap	**Part No. 190 90**

Oil Drain Kit



l = 280 mm = 11 in.

Dimensional drawing for the oil drain kit

Technical Data		Oil Drain Kit
Length	mm (in.)	280 (11)
Leak rate	mbar x l x s^{-1}	≤ 10^{-5}

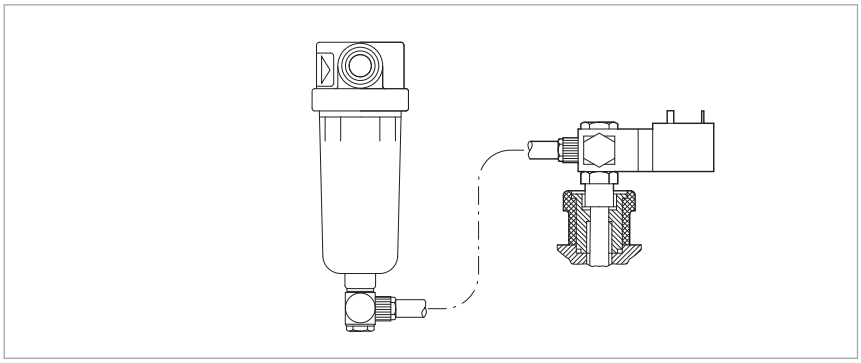
Ordering Information	Oil Drain Kit
Oil drain kit	**Part No. 190 94**

Oil Suction Facility AR-V Controlled by Solenoid Valve

Suited for the AF 8 or AK 8 when connected to the D 2.5 E, the oil suction facility AR-V with its solenoid valve allows the removal of oil via the gas ballast which has collected in the exhaust filter. When the valve is closed the gas ballast remains fully operational.
For this, a hose link is provided between the exhaust filter and the gas ballast.

Technical Note

If oil which has collected in the exhaust filter is to be removed, the solenoid valve is opened briefly.



AR-V oil suction facility controlled by solenoid valve (kit without exhaust filter)

Technical Data		AR-V Oil Suction Facility Controlled by Solenoid Valve
Leak rate	mbar x l x s^{-1}	≤ 10^{-5}

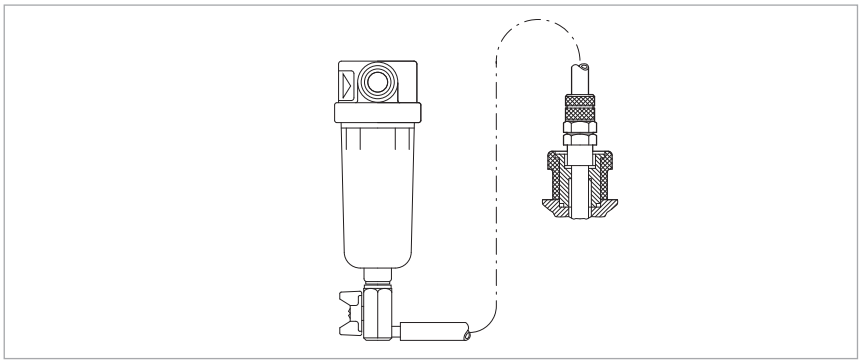
Ordering Information	AR-V Oil Suction Facility Controlled by Solenoid Valve
AR-V oil suction facility controlled by solenoid valve 24 V DC, 4 W, normally closed	**Part No. 190 92**

Manually Operated Oil Suction Facility AR-M

Suited for the AF 8 or AK 8 when connected to the D 2,5 E, the oil suction facility AR-M allows the removal of oil via the gas ballast which has collected in the exhaust filter, whereby the gas ballast remains fully operational as long as the angled ball valve remains closed.
For this, a hose link is provided between the exhaust filter and the gas ballast.

Technical Note

If oil which has collected in the exhaust filter is to be removed, the angled ball valve is manually opened briefly.



AR-M manually operated oil suction facility (kit without exhaust filter)

Technical Data		AR-M Manually Operated Oil Suction Facility
Leak rate	mbar x l x s^{-1}	≤ 10^{-5}

Ordering Information	AR-M Manually Operated Oil Suction Facility
AR-M manually operated oil suction facility	**Part No. 190 93**

Accessories for TRIVAC E and B

Exhaust Filters AF 8, AF 10, AF 25
Condensate Traps AK 8, AK 10, AK 25

Exhaust filter (left) and condensate trap (right)

Exhaust-Filter

Oil mists and aerosols are retained in the exhaust filter.

Advantages to the User

- Filtering of the exhaust gas by removal of entrained lubricant particles
- Emptying via drain screw or exhaust filter drain tap
- Separation efficiency > 99 %
- Filter elements (made of glass fiber) are exchangeable

Condensate Trap

Condensate traps prevent the formation of condensate in the pump as well as the backstreaming of fluids.

Advantages to the User

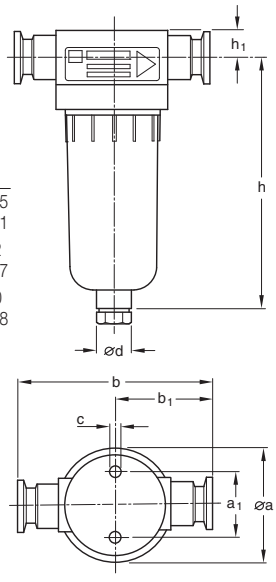
- Can be connected to either the intake or the exhaust side
- Protects against condensate forming from sucked in vapors or gases (intake line)
- Protects against backstreaming liquids (exhaust line)
- Emptying via drain screw/drain tap

Technical Information

The exhaust filter is not capable of retaining toxic and/or aggressive gases. For such applications we recommend the use of an exhaust gas line (e.g. a gas washer).

Since the material is not resistant to all gases and solvents, a materials compatibility chart is available upon request.

Type		a	a_1	b	b_1	c	d	h	h_1
AF 8 / AK 8	mm	66.4	38	115	57.5	M 6	20	145	15.5
	in.	2.61	1.50	4.53	2.26		0.79	5.71	0.61
AF 10 / AK 10	mm	90	64	140	70	M 10	20	200	22
	in.	3.54	2.52	5.51	2.76		0.79	7.87	0.87
AF 25 / AK 25	mm	115	80	165	82.5	M 10	20	250	30
	in.	4.53	3.15	6.50	3.25		0.79	9.84	1.18



Dimensional drawing for the exhaust filters and condensate trap

Technical Data

	AF 8	AK 8	AF 10	AK 10	AF 25	AK 25
Connection to pump TRIVAC (necessary accessories: elbow)	D 2,5 E; D 4 B D 8 B	D 2,5 E; D 4 B D 8 B	D 10 E	D 10 E	D 16 B D 25 B	D 16 B D 25 B
Connection flanges DN	16 KF	16 KF	25 KF	25 KF	25 KF	25 KF
Max. filling level (for vertical installation) ml (qt)	60	60	145	145	285	285
Permissible leak rate mbar x l x s^{-1}	≤ 1 x 10^{-5}	≤ 1 x 10^{-5}	≤ 1 x 10^{-5}	≤ 1 x 10^{-5}	≤ 1 x 10^{-5}	≤ 1 x 10^{-5}
Max. continuous temperature °C (°F)	90	90	90	90	90	90
Material	PA 6	PA 6	PA 6	PA 6	PA 6	PA 6

Ordering Information

	AF 8	AK 8	AF 10	AK 10	AF 25	AK 25
Exhaust filter	**Part No. 190 50**	–	**Part No. 190 51**	–	**Part No. 190 53**	–
Exhaust filter drain tap	**Part No. 190 95**	**Part No. 190 95**	**Part No. 190 95**	**Part No. 190 95**	**Part No. 190 95**	**Part No. 190 95**
Condensate trap	–	**Part No. 190 60**	–	**Part No. 190 61**	–	**Part No. 190 63**
Replacement filter element (pack of 5)						
FE 8	**Part No. 190 80**	–			–	–
FE 10	–	–	**Part No. 190 81**	**Part No. 190 81**	**Part No. 190 83**	–
FE 25	–	–	–	–	**Part No. 190 83**	–
Elbow (1x)	**Part No. 184 36**	**Part No. 184 36**	**Part No. 184 37**	**Part No. 184 37**	**Part No. 184 37**	**Part No. 184 37**
Centering ring with O-ring (2x)						
aluminium / NBR	**Part No. 183 26**	**Part No. 183 26**	**Part No. 183 27**	**Part No. 183 27**	**Part No. 183 27**	**Part No. 183 27**
stainless steal / FPM	**Part No. 883 46**	**Part No. 883 46**	**Part No. 883 47**	**Part No. 883 47**	**Part No. 883 47**	**Part No. 883 47**
Clamping ring (2x)	**Part No. 183 41**	**Part No. 183 41**	**Part No. 183 42**	**Part No. 183 42**	**Part No. 183 42**	**Part No. 183 42**

Dust Separators AS 8-16 and AS 30-60 / Molecular Filters MF 8-16 and MF 30-60

AS 30-60 dust separator
(MF 30-60 molecular filter is similar)

Dust separators protect pumps against contamination and damage by sucked-in dust.

Advantages to the User

- Dust separators for large quantities of dust
- Two-stage, thus hardly any throttling
- Cyclone (for coarse dust) and wet filter (for fine dust)
- Dust separator and molecular filter have the same housing (for easy conversion)

Typical Application

- Separation of coarse and medium size dust starting at a grain size of 2 µm.

Technical Information

Installing a dust filter in the intake line of the pump will throttle its pumping speed at low intake pressures more than at higher intake pressures. This must be taken into account when designing a vacuum system.

Even when large quantities of dust are deposited, the throttling effect will hardly increase.

Supplied Equipment

Blanked off drain port.

Molecular filters are used to separate vapors of a high molecular weight (i.e. monomers, vapors from resins).

Advantages to the User

- Molecular filter and dust separator have the same housing (for easy conversion)
- Separation of high-molecular weight vapors
- Protection of the pump's oil against damaging vapors

Technical Information

Installing a molecular filter in the intake line of the pump will throttle its pumping speed at low intake pressures more than at higher intake pressures. This must be taken into account when designing a vacuum system.

Supplied Equipment

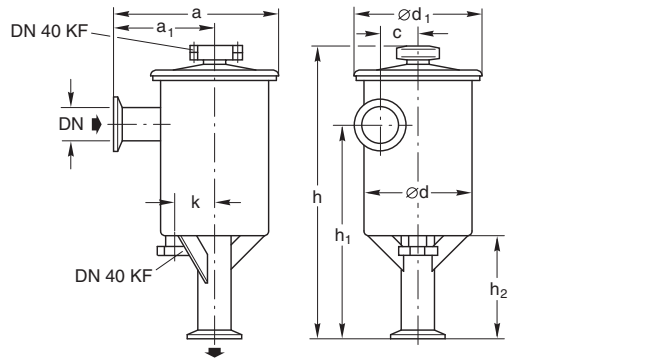
Blanked off drain port.

Technical Data

Connection to pump	TRIVAC	AS 8-16 D 16 B	AS 8-16 D 25 B	AS 30-60 D 40 B	AS 30-60 D 65 B	MF 8-16 D 16 B/BCS	MF 8-16 D 25 B/BCS	MF 30-60 D 40 B/BCS	MF 30-60 D 65 B/BCS
Throttling of the pumping speed									
at 1 mbar (0.75 Torr) intake pressure, approx.	%	10	15	8	16	10	15	8	16
at 10 mbar (7.5 Torr) intake pressure, approx.	%	5	7	4	9	5	7	4	9
Capacity for dust	l (qt)	0.6 (0.6)	0.6 (0.6)	2.0 (2.1)	2.0 (2.1)	–	–	–	–
Capacity for resin vapors or similar	kg (lbs)	–	–	–	–	0.15 (0.3)	0.15 (0.3)	0.35 (0.8)	0.35 (0.8)
Impact ring filling	l (qt)	0.5 (0.5)	0.5 (0.5)	3.5 (3.7)	3.5 (3.7)	–	–	–	–
Active charcoal filling	kg (lbs)	–			–	0.6 (1.3)	0.6 (1.3)	1.4 (3.1)	1.4 (3.1)
Weight	kg (lbs)	4.5 (9.9)	4.5 (9.9)	18.4 (40.6)	18.4 (40.6)	4.5 (9.9)	4.5 (9.9)	18.4 (40.6)	18.4 (40.6)

Ordering Information

	AS 8-16	AS 30-60	MF 8-16	MF 30-60
Dust separator	**Part No. 186 11**	**Part No. 186 16**	–	–
Molecular filter	–	–	**Part No. 186 12**	**Part No. 186 17**
Replacement filter insert	–	**Part No. 178 43**	–	–
Replacement active charcoal insert	–	–	**Part No. 178 07**	**Part No. 178 08**
Active charcoal, undried, 5 kg (11 lbs)	–	–	**Part No. 178 10**	**Part No. 178 10**



Type	DN		a	a_1	c	ϕ d	ϕ d_1	h	h_1	h_2	k
AS/MF 8-16	25 KF	mm	181	100	43	133	162	247	150	37	–
		in.	7.13	3.94	1.69	5.24	6.38	9.72	5.91	1.46	–
AS/MF 30-60	40 KF	mm	310	190	70	205	234	530	395	190	75
		in.	12.2	7.48	2.76	8.07	9.12	20.9	15.6	7.48	2.95

Dimensional drawing for the AS dust separators and MF molecular filters

Fine Vacuum Adsorption Traps FA 2-4, FA 8-16, FA 30-60

Heating rod and fine vacuum adsorption trap

Fine vacuum adsorption traps are vacuum-tight vessels which offer a high adsorption capacity especially for water vapor.

Advantages to the User

- Total pressures of 1.5 x 10^{-5} mbar (1.125 x 10^{-5} Torr) can be attained with a two-stage rotary vane vacuum pump
- Zeolite filling can be easily regenerated (baked at 300 °C (572 °F))
- High conductance

Typical Application

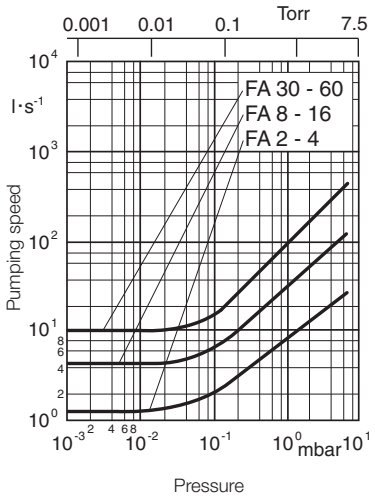
- Producing a vacuum which is free of water vapor

Technical Information

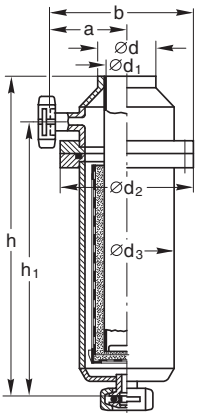
Liquid nitrogen in the adsorption trap will increase its adsorption capacity.

The conductance of the adsorption trap is higher than the pumping speed of the corresponding pump. See figure where the average pressure ahead and after the fine vacuum adsorption trap is plotted on the horizontal axis.

The adsorption traps may be installed in the intake line.



Conductances of fine vacuum adsorption traps as a function of the intake pressure of the TRIVAC



Type	DN		a	b	d	d_1
FA 2-4	16 KF	mm	70	128	42	38
		in.	2.76	5.04	1.65	1.50
FA 8-16	25 KF	mm	90	157,5	52	48
		in.	3.54	6.20	2.05	1.89
FA 30-60	40 KF	mm	110	200	62	58
		in.	4.33	7.87	2.44	2.28

Type	DN		d_2	d_3	h	h_1
FA 2-4	16 KF	mm	115	80	330	291
		in.	4.53	3.15	13	11.5
FA 8-16	25 KF	mm	135	100	390	345
		in.	5.34	3.94	15.4	13.6
FA 30-60	40 KF	mm	160	120	460	406
		in.	6.30	4.72	18.1	16

Dimensional drawing for the FA fine vacuum adsorption trap

Technical Data

		FA 2-4	FA 8-16	FA 30-60
Connection to pump	TRIVAC	D 2,5 E D 4/8 B	D 16/25 B/BCS	D 40/65 B/BCS
Zeolite filling, approx.	kg (lbs)	0.3 (0.7)	0.7 (1.5)	1.25 (2.8)
Conductance below 10^{-2} mbar (0.075 Torr)	l x s^{-1}	1	4	9
Power rating of the heating rod at a main voltage of 220 V	W	200	200	300

Ordering Information

	FA 2-4	FA 8-16	FA 30-60
Fine vacuum adsorption trap filled with zeolite, without heating rod	**Part No. 187 05**	**Part No. 187 10**	**Part No. 187 15**
Heating rod for adsorption trap	**Part No. 854 21**	**Part No. 854 21**	**Part No. 854 23**
Molecular sieve zeolite 13 X, 1 kg (2.2 lbs)	**Part No. 854 20**	**Part No. 854 20**	**Part No. 854 20**

Dust Filters
FS 2-4, FS 8-16, FS 30-60

Dust filter

The dust filters protect the pumps against the intake of dust.

Advantages to the User

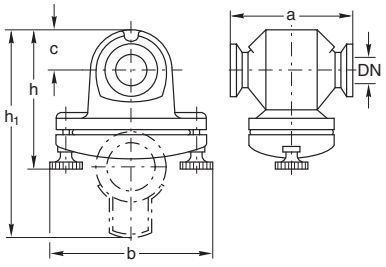
- Easy to disassemble
- Vacuum-tight cast iron casing
- Replacement filters may be easily exchanged
- Separates dusts from a grain size of 1 µm

Technical Information

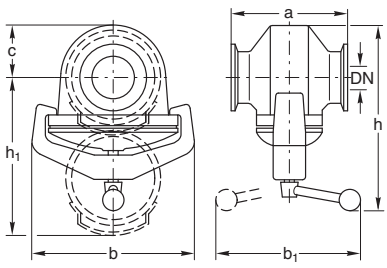
Installing a dust filter in the intake line of the pump will throttle its pumping speed at low intake pressures more than at higher intake pressures. This must be taken into account when designing a vacuum system.

Since the dust filters have only a small dust collecting chamber, we recommend – in the case of larger dust quantities – the two-stage dust separators from the AS range.

The dust filters should be installed in a horizontal flow so that the filter insert may be removed by pulling it down and out.



FS 2-4, FS 8-16



FS 30-60

Type	DN		a	b	ϕ b_1	c	h, approx.	h_1, approx.
FS 2-4	16 KF	mm	90	112	–	30	105	165
		in.	3.54	4.41	–	1.18	4.13	6.50
FS 8-16	25 KF	mm	110	150	–	50	125	205
		in.	4.33	5.91	–	1.97	4.92	8.07
FS 30-60	40 KF	mm	130	190	170	60	225	250
		in.	5.12	7.48	6.69	2.36	8.86	9.84

Dimensional drawing for the FS dust filters

Technical Data

		FS 2-4	FS 8-16	FS 30-60			
Connection to pump	**TRIVAC**	D 2,5 E D 4 B	D 8 B	D 16 B	D 25 B	D 40 B	D 65 B
Throttling of the pumping speed							
at 1 mbar (0.75 Torr), approx.	**%**	6	10	12	18	12	25
at 10 mbar (7.5 Torr), approx.	**%**	4	7	6	9	3	8
Weight	**kg (lbs)**	1.0 (2.2)	1.0 (2.2)	1.6(3.5)	1.6 (3.5)	7.5816.5)	7.516.5)

Ordering Information

	FS 2-4	FS 8-16	FS 30-60
Dust filter	**Part No. 186 05**	**Part No. 186 10**	**Part No. 186 15**
Replacement filter insert	**Part No. 178 32**	**Part No. 178 33**	**Part No. 178 35**
Replacement wadding cartridges (1 set = 10 pieces)	**Part No. 200 39 050**	**Part No. 200 39 051**	**Part No. 971 78 251**

Cold Trap TK 4-8

TK 4-8 cold trap

The cold trap protects the pump against damaging vapors.

Advantages to the User

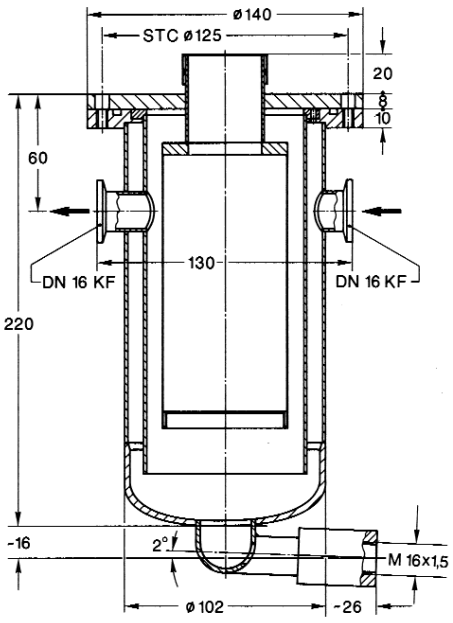
- Rugged and implosion resistant
- May be fitted directly on the flange of the pump
- Safe draining of the condensate without problems
- Casing made of corrosion resistant stainless steel
- Simple filling with refrigerant (liquid nitrogen (LN_2) or a mixture of acetone and carbon di-oxide ice)

Typical Applications

- Prevention of oil from backstreaming into the vacuum system when operating at ultimate pressure
- Freezing of gases and vapors in the laboratory

	a	a_1	b	b_1	b_2
mm	140	125	130	102	≈ 26
in.	5.51	4.92	5.12	4.02	≈ 1

	d_1	d_2	d_3	h	h_1	h_2
mm	20	8	10	220	60	≈ 16
in.	0.79	0.31	0.39	8.66	2.36	≈ 0.6



Dimensional drawing for the TK 4-8 cold trap

Technical Data — TK 4-8

Connection to pump	TRIVAC	D 2,5 E D 4/8 B
Capacity for refrigerant, approx.	l (qt)	0.4 (0.4)
Connections	DN	16 KF
Weight	kg (lbs)	4 (8.8)

Ordering Information — TK 4-8

Cold trap	**Part No. 188 20**
Drain tap for the intake side, vacuum-tight	**Part No. 190 90**
Elbow (1x)	**Part No. 184 36**
Centering ring aluminum/NBR (2x) stainless steel/FPM (2x)	 **Part No. 183 26** **Part No. 883 46**
Clamping ring (2x)	**Part No. 183 41**

Only available for purchase in North and South America

RST Refillable Traps

RST refillable trap

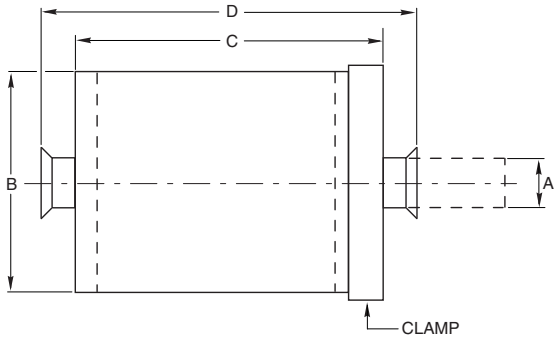
The RST traps are made from 304 stainless steel, and when specified with stainless steel filtration media, are fully suited for corrosive applications. The media is inserted directly into the trap. This ensures direct contact with the trap walls. There is no oil path between the trap wall and the retainer gasket to reduce trap effectiveness.

Advantages to the User

- Refillable
- Two filtration media
- Easy to clean
- Easy to recharge
- KF flanges

Applications

Foreline traps are utilized whenever long-term effects of mechanical pump oil back migration into the pumped chamber or higher vacuum (oil diffusion) pump may be undesirable. Copper wool for standard applications and stainless steel wool for corrosive applications are available.



Model	Flange	Dimension	ϕ A	ϕ B	C	D
RST16KF	DN 16 KF both ends	mm	KF 16	63	83	133
		in.		$2^1/_2$	$3^1/_4$	$5^1/_4$
RST25KF	DN 25 KF both ends	mm	KF 25	76	108	171
		in.		3	$4^1/_4$	$6^3/_4$
RST40KF	DN 40 KF both ends	mm	KF 40	102	102	178
		in.		4	4	7

Dimensional drawing for the RST

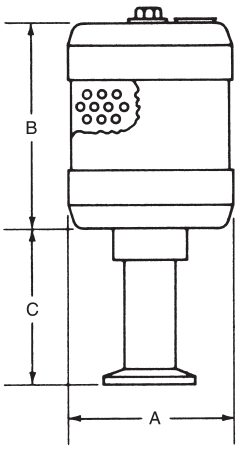
Technical Data		**RST16KF**	**RST25KF**	**RST40KF**
Connection to pump	TRIVAC	D 4/8 B/BCS	D 16/25 B/BCS	D 40/65 B/BCS

Ordering Information	**RST16KF**	**RST25KF**	**RST40KF**
RST16KF 1.9 lb (0.9 kg)	**Part No. 99 171 135**	–	–
RST25KF 2.6 lb (1.2 kg)	–	**Part No. 99 171 136**	–
RST40KF 4.1 lb (1.9 kg)	–	–	**Part No. 99 171 137**
Filtering media			
Stainless steel	**Part No. 99 171 141**	**Part No. 99 171 141**	**Part No. 99 171 141**
RF copper	**Part No. 99 171 145**	**Part No. 99 171 146**	**Part No. 99 171 147**
BUNA-N gasket	**Part No. 725 80 005**	**Part No. 725 80 006**	**Part No. 725 80 007**

Only available for purchase in North and South America

SE Smoke Eliminator

SE smoke eliminator



Model	Flange	Dimension	A	B	C
SE 2-4	DN 16 KF	mm	64	76	70
		in.	$2^1/_2$	3	$2^3/4$
SE 8-16	DN 25 KF	mm	127	152	51
		in.	5	6	2
SE 30-60	DN 40 KF	mm	267	121	57
		in.	$10^1/_2$	$4^3/_4$	$2^1/_4$

Dimensional drawing for the SE

The Oerlikon Leybold Vacuum SE smoke eliminator can be utilized on all TRIVAC B rotary vane pumps where pump fluid loss at the exhaust port must be eliminated. These filters consist of a replaceable two-stage coalescing element mounted in a steel housing. For maintenance purposes, the top of the housing can be removed by loosening a single bolt. The filter assembly attaches to the exhaust port of the TRIVAC pump by means of a KF flange. Since three models are available, an SE smoke eliminator is available for each TRIVAC pump model.

Advantages to the User

- Two stage design
- Three sizes for all TRIVAC B models
- KF flanges

Applications

When any oil sealed mechanical vacuum pump is used to pump a fixed volume from atmospheric pressure to some lower pressure or when a dynamic gas flow from a process stream is pumped, some mechanical pump fluid loss will occur at the exhaust of the pump. The more often a fixed volume is cycled from atmospheric pressure to a lower pressure or the longer a pump operates at a relatively high inlet pressure in a dynamic flow condition, the greater will be the fluid loss at the exhaust port of the pump.

By utilizing a coalescing exhaust filter for these applications, the fluid and exhaust gases are separated, and in the case of the SE smoke eliminator, the coalesced fluid is allowed to drain back into the pump fluid reservoir. Annoying oil fog to the atmosphere is thus eliminated.

Eventually, after about a year's normal operation, the coalescing element will become totally saturated and oil fog will be apparent when high inlet pressures are prevailing. The low cost coalescing element can be easily replaced.

Note: For applications where toxic, corrosive, radioactive or precious gases are pumped, we highly recommend the use of our AF coalescing exhaust filters instead of the SE smoke eliminator. The AF is an in-line type coalescing filter and much more suitable for these applications.

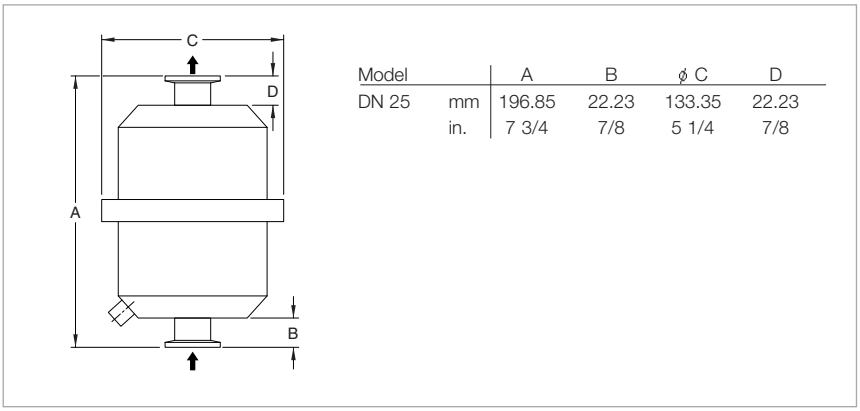
Technical Data		**SE 2-4**	**SE 8-16**	**SE 30-60**
Connection to pump	**TRIVAC**	D 4/8 B	D 16/25 B	D 40/65 B

Ordering Information	**SE 2-4**	**SE 8-16**	**SE 30-60**
Smoke eliminator	**Part No. 99 171 125**	**Part No. 99 171 126**	**Part No. 99 171 127**
Replacement element			
RE 2-4	**Part No. 99 171 128**	–	–
RE 8-16	–	**Part No. 99 171 129**	–
RE 30-60	–	–	**Part No. 99 171 130**

Only available for purchase in North and South America

Compact Oil Mist Exhaust Filters

Compact oil mist exhaust filter



Model		A	B	ϕ C	D
DN 25	mm	196.85	22.23	133.35	22.23
	in.	7 3/4	7/8	5 1/4	7/8

Dimensional drawing for the compact oil mist exhaust filter

Applications and Equipment

- Rotary vane pumps
- Vacuum furnaces, ovens and degassing
- Refrigeration and air condition
- Vacuum freeze drying
- Vacuum metallizing
- Vacuum coating
- Laboratory furnaces, test stands
- Autoclaving, sterilization
- Leak detection

Features and Specifications

- Minimum 99.97 % D.O.P. on 3 micron particles
- Captures oil fog, mist or smoke from exhaust of oil lubricated vacuum pumps
- Compact, low profile design
- Stainless steel housing and internals
- Pleated filter element provides increased surface area for low back pressure
- Back pressure valve designed to release element at 7.35 PSI (0.5 bar) differential for pump safety
- 1/8" NPT oil drain
- Easy release V-band clamp
- Seamless drawn housings - no welds to rust or vibrate apart
- Easy field maintenance
- Operating temperature: 40 °F (4 °C) to 220 °F (104 °C)

Technical Data

	Compact Oil Mist Exhaust Filter
Connection to pump **TRIVAC**	D16/25B
ISO inlet and outlet	DN 25
Nominal vacuum pump rating **scfm (m^3/hr)**	20 (34)
Element rating **scfm (m^3/hr)**	20 (34)
Weight, approx. **kg (lbs)**	1 (2.2)

Ordering Information

	Compact Oil Mist Exhaust Filter
Compact oil mist exhaust filter	**Part No. 721-87-113**
Replacement filter insert filter	**Part No. 721-87-099**

Accessories for TRIVAC B

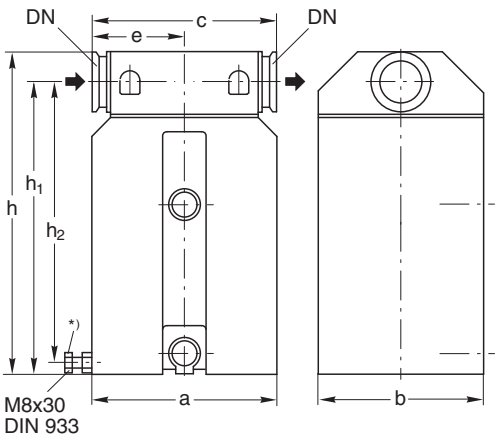
Exhaust Filters
AF 4-8, AF 16-25, AF 40-65

AF 4-8 exhaust filter

Exhaust filters retain oil mists and aerosols.

Advantages to the User

- Can be fitted without additional accessories
- Separation efficiency over 99 %
- Exchangeable filter inserts
- Built-in over-pressure relief valve (threshold at about 1.5 bar (7.2 psi, differential))
- Sight glass for checking of the quantity of collected oil
- Resistant against solvents
- All seals made of FPM
- Easy to clean and use
- Retains dirt and cracked products



Type	DN		a	b	c	e	h	h_1	h_2
AF 4-8	16 KF	mm	90	90	120	60	194	178	–
		in.	3.54	3.54	4.72	2.36	7.64	7.01	–
AF 16-25	25 KF	mm	110	125	142	71	214	193	–
		in.	4.33	4.92	5.59	2.80	8.43	7.60	–
AF 40-65	40 KF	mm	140	156	170	85	300	271	261
		in.	5.51	6.14	6.69	3.35	11.8	10.7	10.3

*) Supporting screw only for AF 40-65

Dimensional drawing for the AF exhaust filter

Typical Application

- Improvement of oil separating capacity

Technical Information

An exhaust line must be connected in case of hazardous exhaust gases.

Technical Data		AF 4-8	AF 16-25	AF 40-65
Connection to pump	TRIVAC	D 4/8 B	D 16/25 B/BCS	D 40/65 B/BCS
Max. capacity for condensate, approx.	l (qt)	0.4 (0.4)	0.5 (0.5)	1.0 (1.0)
Weight	kg (lbs)	1.9 (4.1)	3.2 (7.1)	6.5 (14.3)

Ordering Information	AF 4-8	AF 16-25	AF 40-65
Exhaust filter	**Part No. 189 06**	**Part No. 189 11**	**Part No. 189 16**
Replacement filter element			
FE 4-8	**Part No. 189 71**	**–**	**–**
FE 16-25	**–**	**Part No. 189 72**	**–**
FE 40-65	**–**	**–**	**Part No. 189 73**
Oil drain tap M 16 x 1.5 (vacuum-tight)	**Part No. 190 90**	**Part No. 190 90**	**Part No. 190 90**

Technical Data		AF 16-25 DOT	
Connection to pump	TRIVAC	–	D 16 B-DOT	–

Ordering Information	AF 16-25 DOT	
Exhaust filter	**–**	**Part No. 124 16**	**–**
Replacement filter element			
FE 16-25 DOT	**–**	**Part No. 200 10 304**	**–**

Exhaust Filters with Lubricant Return
ARP 4-8, AR 4-8, AR 16-25, AR 40-65

AR 4-8 exhaust filter with lubricant return

ARP 4-8 exhaust filter with lubricant return

This combination of an exhaust filter with a float-controlled valve considerably extends the maintenance intervals for the TRIVAC B.

Advantages to the User

- Filtering the exhaust air of entrained lubricant particles
- Lubricant return with the aid of a float-controlled valve back into the intake port
- No operating costs caused by lost lubricant
- Hardly any oil consumption
- Standard filter element
- Built-in over-pressure relief valve
- Resists solvents
- All seals made of FPM
- The top head may be easily rotated (either parallel or perpendicular to bottom body)
  [only AR 4-8 to AR 16-25]

Typical Application

- Extending the maintenance intervals

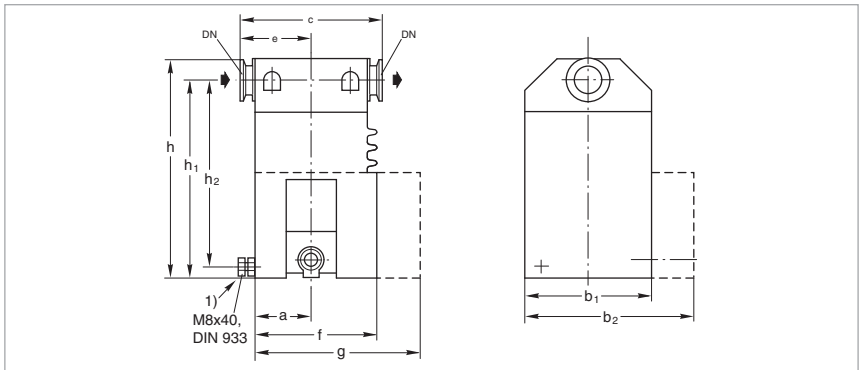
Supplied Equipment

Intermediate flange, connecting lines with hollow screws, required gaskets as well as mounting screws for the intake flange.

Technical Information

The AR is connected to the exhaust port of the TRIVAC B, the return line is connected at the intermediate flange under the intake port.

An exhaust line must be connected in case of hazardous exhaust gases.



Type	DN		a	b_1	b_2	c	e	f	g	h	h_1	h_2
AR 4-8	16 KF	mm	45	90	136	120	60	100	113	194	179	167
		in.	1.77	3.54	5.35	4.72	2.36	3.94	4.37	7.64	7.05	6.57
AR 16-25	25 KF	mm	55	125	167	142	71	120	–	214	194	182
		in.	2.17	4.92	6.57	5.59	2.80	4.72	–	8.43	7.64	7.17
AR 40-65	40 KF	mm	70	156	–	170	85	152	195	300	271	261
		in.	2.76	6.14	–	6.69	3.35	5.98	7.68	11.8	10.7	10.3

1) Supporting screw only for AR 40-65

Dimensional drawing for the AR exhaust filters with lubricant return
(dimensions for the ARP exhaust filter with lubricant return upon request)

Technical Data

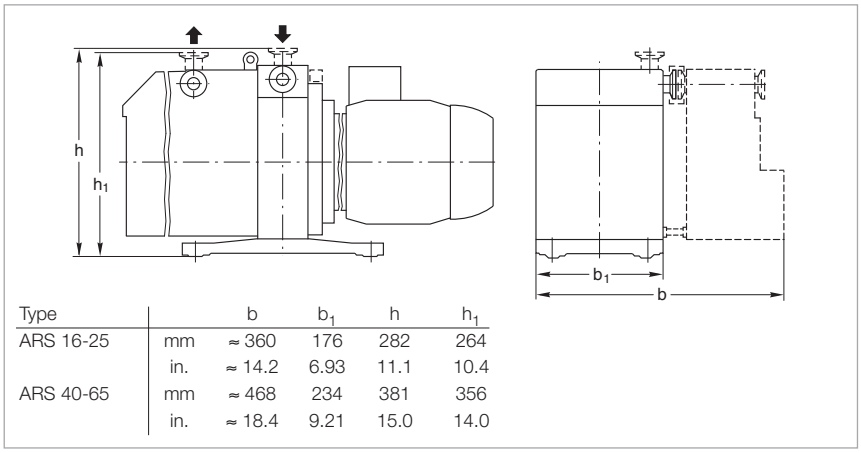
		ARP 4-8	AR 4-8	AR 16-25	AR 40-65
Connection to pump	TRIVAC	D 4/8 B	D 4/8 B	D 16/25 B/BCS	D 40/65 B/BCS
For opening the float-controlled valve					
required amount of oil N 62	cm^3 (qt)	–	430 (0.45)	510 (0.54)	760 (0.80)
remaining amount of oil N 62	cm^3 (qt)	–	350 (0.37)	430 (0.45)	700 (0.74)
Weight	kg (lbs)	1.7 (3.8)	3.1 (6.89	4.7 (10.4)	8.5 (18.7)

Ordering Information

Exhaust filter with lubricant return	ARP 4-8 Part No. 140 065	AR 4-8 Part No. 189 20	AR 16-25 Part No. 189 21	AR 40-65 Part No. 189 22
Replacement filter element				
FE 8	190 80	–	–	–
FE 4-8	–	189 71	–	–
FE 16-25	–	–	189 72	–
FE 40-65	–	–	–	189 73

Exhaust Filters with Lubricant Return ARS 16-25 and ARS 40-65

ARS 40-65



Type		b	b_1	h	h_1
ARS 16-25	mm	≈ 360	176	282	264
	in.	≈ 14.2	6.93	11.1	10.4
ARS 40-65	mm	≈ 468	234	381	356
	in.	≈ 18.4	9.21	15.0	14.0

Dimensional drawing for the ARS mounted on a TRIVAC BCS

This combination of an exhaust filter with a float-controlled valve considerably extends the maintenance intervals of the TRIVAC BCS.

The ARS is part of the TRIVAC SYSTEM.

Advantages to the User

- Lubricant return with the aid of a float-controlled valve back into the intake port
- The intake port may be easily exchanged (either vertical or horizontal orientation)
- No operating costs caused by lost lubricant
- Hardly any oil consumption
- Visual indication of the differential pressure
- Standard filter element
- All aluminium parts are surface protected
- Built-in over-pressure relief valve
- Resists solvents
- All seals made of FPM
- May also be used on the TRIVAC B

Typical Application

- Filtering the exhaust air of entrained lubricant particles

Technical Information

An exhaust line must be connected in case of hazardous exhaust gases.

The ARS is connected to the exhaust port of the TRIVAC BCS, the return line is connected at the intermediate flange under the intake port.

The ARS is cleaned in the factory to such an extent, that it may be operated either with mineral oil (e.g. N 62 or HE-200) or perfluoropolyther (PFPE e.g. NC 1/14 or HE-1600).

Supplied Equipment

Intermediate flange, connecting lines with hollow screws, required gaskets as well as mounting screws for the intake flange.

Wrapped in foil for shipping.

Technical Data		ARS 16-25	ARS 40-65
Connection to pump	TRIVAC	D 16/25 B; D 16/25 B/BCS (-PFPE)	D 40/65 B/BCS (-PFPE)
Connection flanges	DN	25 KF	40 KF
Amount of oil required for opening the float-controlled valve			
N 62/HE-200	cm^3 (qt)	510 (0.54)	760 (0.80)
PFPE	cm^3 (qt)	340 (0.36)	420 (0.44)
Remaining amount of oil			
N 62/HE-200	cm^3 (qt)	430 (0.45)	700 (0.74)
PFPE	cm^3 (qt)	300 (0.31)	390 (0.41)
Weight with intermediate flange, tubing and filter, without lubricant	kg (lbs)	4.7 (10.4)	8.5 (16.7)

Ordering Information	ARS 16-25	ARS 40-65
Exhaust filter with lubricant return	**Part No. 189 56**	**Part No. 189 57**
Replacement filter element		
FE 16-25	**Part No. 189 72**	**–**
FE 40-65	**–**	**Part No. 189 73**

Mechanical Oil Filters OF 4-25 and OF 40-65 / Chemical Oil Filters CF 4-25 and CF 40-65

OF 4-25 mechanical oil filter

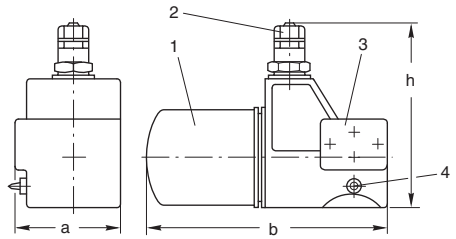
Since there is a pressure-lubrication system with an oil pump in every TRIVAC B, it is possible to connect main flow oil filters.

These filters are available either for mechanical filtering (OF types) or combined chemical/mechanical filtering (CF types).

Advantages to the User

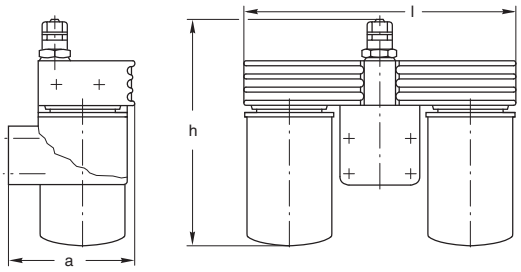
- Main flow oil filter
- Longer service life for the oil depending on the type of application
- Can be installed without problems to the TRIVAC B
- Hose connections are not required
- Easily interchangeable filters
- Only a small amount of oil needs to be added when changing the filters
- Expansion of the range of applications in case of special requirements
- Same casing for OF and CF types
- Greater reliability by standard maintenance indicator
- Built-in bypass valve
- Owing to the highly effective adsorbent for polar substances, an up to ten-fold adsorption effect is attained over normal bleaching earth (CF)
- Prevents mechanical damage to the pump

OF/CF 4-25



1 Interchangeable filter
2 Maintenance indicator
3 Connection flange
4 Pin for protection against twisting

OF/CF 40-65



Type		a	b	h	l
OF 4-25	mm	≈ 100	200	150	–
	in.	≈ 4.0	7.87	5.91	–
CF 4-25	mm	≈ 100	315	160	–
	in.	≈ 4.0	12.4	6.30	–
OF 40-65	mm	135	–	239	296
	in.	5.31	–	9.41	11.7
CF 40-65	mm	135	–	307	296
	in.	5.31	–	12.1	11.7

Dimensional drawings for the OF mechanical oil filters and CF chemical oil filters

Typical Application

- Separation of fine particles from the pump's oil (sizes between 5 and 10 µm (OF))

Technical Data		OF 4-25	CF 4-25	OF 40-65	CF 40-65
Connection to pump	TRIVAC	D 4/8 B, D 16/25 B	D 4/8 B, D 16/25 B	D 40/65 B	D 40/65 B
Nominal throughput	l x h^{-1}	900	900	2000	2000
Separation					
mechanical oil filter	µm	5 to 10	5 to 10	5 to 10	5 to 10
chemical oil filter	µm	to 3	to 3	to 3	to 3
Permissible operating pressure	bar (psig)	2.5 (21.7)	2.5 (21.7)	2.5 (21.7)	2.5 (21.7)
Opening pressure,					
non-return valve	bar (psid)	0.12 (1.7)	0.12 (1.7)	0.12 (1.7)	0.12 (1.7)
bypass valve	bar (psid)	2.5 ± 0.3 (21.7 ± 4.3)	2.5 ± 0.3 (21.7 ± 4.3)	2.5 ± 0.3 (21.7 ± 4.3)	2.5 ± 0.3 (21.7 ± 4.3)
Topping up amount during					
first time installation	l (qt)	1.0 (1.0)	1.0 (1.0)	2.5 (2.6)	2.5 (2.6)
filter exchange	l (qt)	1.0 (1.0)	1.0 (1.0)	2.0 (2.1)	2.0 (2.1)
Weight, ready for operation, dry	kg (lbs)	4.0 (8.8)	4.0 (8.8)	10.0 (22.1)	10.0 (22.1)

Ordering Information	OF 4-25	CF 4-25	OF 40-65	CF 40-65
Mechanical oil filter	**Part No. 101 91**	–	**Part No. 101 92**	–
Chemical oil filter	–	**Part No. 101 96**	–	**Part No. 101 97**
WF 4-25 interchangeable filter, paper, 0.5 l (0.5 qt)	**Part No. 189 91**	–	–	–
WF 40-65 interchangeable filter, paper 0.75 l (0.8 qt)	–	–	**Part No. 189 92 (2x)**	**Part No. 189 92 (2x)**
WF Alu 4-65 interchangeable filter, paper and Al_2O_3, 1 l (1 qt)	–	**Part No. 189 96**	–	**Part No. 189 96 (2x)**

Chemical Filters with Safety Isolation Valve CFS 16-25 and CFS 40-65

CFS 40-65

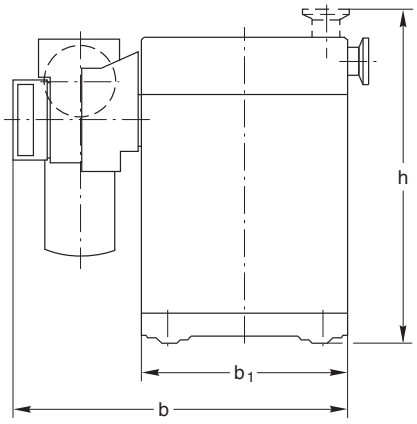
The CFS chemical filters with safety isolation valve are main flow oil filters for the TRIVAC B and BCS pumps.

The CFS is part of the TRIVAC SYSTEM.

Advantages to the User

- The CFS is included in the main lubricant flow
- Rapid filter exchange – the pump may contniue to operate while changing the filters
- Visual indication of the filter's condition through a maintenance indicator
- Aluminum component with isolation valve for one or two interchangeable filters
- All aluminium parts are surface protected
- May be operated with different interchangeable filters
- Over-pressure relief valve in the interchangeable filters
- Prepared for connection of a differential pressure switch and an oil pressure switch
- May also be used on the TRIVAC B pumps

Type		b	b_1	h
CFS 16-25	mm	≈ 327	176	264
	in.	≈ 12.9	6.9	10.4
CFS 40-65	mm	≈ 390	234	356
	in.	≈ 15.4	9.21	14.0



Dimensional drawing for the CFS (mounted on a TRIVAC BCS)

Technical Information

The CFS is cleaned in the factory to such an extent, that it may be operated either with mineral oil (e.g. N 62 or HE-200) or perfluoropolyther (PFPE e.g. NC 1/14 or HE-1600).

Supplied Equipment

All gaskets and mounting parts required for installation.

Aluminium particle filters (WF Alu-Part) sealed for shipping are included separately.

Technical Data		CFS 16-25	CFS 40-65
Connection to pump	TRIVAC	D 16/25 B/BCS (-PFPE)	D 40/65 B/BCS (-PFPE)
Nominal throughput	l x h^{-1}	900	2000
Permissible operating pressure	bar (psig)	2.5 (21.7)	2.5 (21.7)
Opening pressure			
Non-return valve	bar (psid)	2.5 (21.7)	2.5 (21.7)
Bypass valve	bar (psid)	2.5 ± 0.3 (21.7 ± 4.3)	2.5 ± 0.3 (21.7 ± 4.3)
Filter medium		Al_2O_3	Al_2O_3
Lubricant filling when using WF Alu-Part	l (qt)	1.4 (1.5)	3.3 (3.5)
Weight, ready for operation, dry	kg (lbs)	7.0 (15.4)	15.5 (34.1)

Ordering Information	CFS 16-25	CFS 40-65
Chemical filter with safety isolation valve	**Part No. 101 76**	**Part No. 101 77**
WF Alu-Part combination filter, paper and Al_2O_3, 1.6 l (1.7 qt)	**Part No. 189 99**	**Part No. 189 99 (2x)**
WF particle filter, paper, 1.6 l (1.7 qt)	**Part No. 200 09 804**	**Part No. 200 09 804 (2x)**
WFG particle filter, paper with support mesh, 1 l (1 qt)	**Part No. 189 90**	**Part No. 189 90 (2x)**

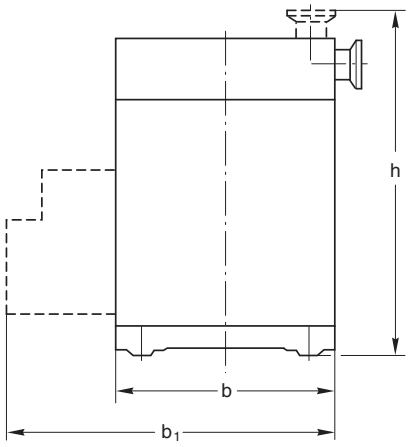
Inert Gas System
IGS 16-25 and IGS 40-65

IGS

This accessory, which is controlled via solenoid valves, permits the controlled admission of special gases into the TRIVAC BCS.

The IGS is part of the TRIVAC SYSTEM.

Type		b	b_1	h
IGS 16-25	mm	176	≈ 294	264
	in.	6.93	≈ 11.6	10.4
IGS 40-65	mm	234	≈ 369	356
	in.	9.21	≈ 14.5	14.0



Dimensional drawing for the IGS (mounted on a TRIVAC BCS)

Advantages to the User

- Ready for connection to an inert gas supply
- Solenoid valve for reduced gas ballast
- Solenoid valve for purging the oil box
- Float throughput gauge with throttling valve adjustable from 200 to 700 l x h^{-1}
- The flowing quantity can be read directly
- System protection by a non-return valve (requires a reservoir pressure of at least 3 bar (29 psi, gauge)) – this reliably prevents the reservoir vessel from being evacuated
- Connects directly on to the TRIVAC BCS

Typical Applications

- Reduction of the contamination levels in the lubricant
- Reduction in the dwell time of volatile substances within the pump

Technical Information

The amount of inert gas ballast is restricted by a nozzle to 200 l x h^{-1}. Larger quantities are used for purging.

Supplied Equipment

Solenoid valves with connection cables and plugs for connection to the electric indicator system EIS, the required connecting pieces, mounting screws and cover panel.

Technical Data		IGS 16-25	IGS 40-65
Connection to pump	TRIVAC	D 16/25 BCS (-PFPE)	D 40/65 BCS (-PFPE)
Min. amount of admitted gas at a reservoir pressure of 3.0 bar (29 psig)	l x h^{-1}	200	200
Max. amount of admitted gas at a reservoir pressure of 6.0 bar (72.5 psig)	l x h^{-1}	1450	1450
Supply voltage for the solenoid valves	V DC	24	24
Power consumption	W	10	10
Weight	kg (lbs)	1.0 (2.2)	1.4 (3.1)
Connection thread	G (BPS)	1/8"	1/8"

Ordering Information	IGS 16-25	IGS 40-65
Inert gas system	**Part No. 161 76**	**Part No. 161 77**

Limit Switch System
LSS 16-25 and LSS 40-65

LSS

This accessory consists of a package of limit switches. It is used to monitor system functions.

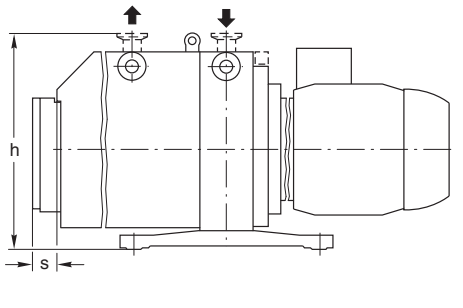
The LSS is part of the TRIVAC SYSTEM.

The package of limit switches includes:

- Differential pressure switch to monitor the CFS
- Oil pressure switch to monitor the operating pressure
- Flow switch to monitor the inert gas flow
- Pressure switch to monitor the pressure in the oil box of the pump
- Connection cable and plug for the temperature switch used for temperature monitoring
- Float switch with housing to monitor the oil level

Advantages to the User

- Errors are indicated well in advance so that it will in most cases be possible to complete the process for the running batch
- The switching action is independent of the optical displays (for optimum reliability)
- The temperature switch is already present in the TRIVAC BCS



Type		b	b_1	h	h_1	s
LSS 16-25	mm	176	≈ 327	264	≈ 279	60
	in.	6.9	≈ 12.9	10.4	≈ 11.0	2.36
LSS 40-65	mm	234	≈ 390	356	≈ 371	60
	in.	9.21	≈ 15.4	14.0	≈ 14.6	2.36

Dimensional drawing for the LSS (mounted on a TRIVAC BCS)

Typical Application

- Changing the status in case operating conditions arise which are not permissible

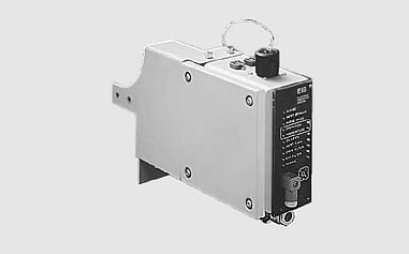
Supplied Equipment

Fully wired-up switches with plugs as well as all required gaskets and mounting parts.

Technical Data		LSS 16-25	LSS 40-65
Connection to pump	TRIVAC	D 16/25 BCS (-PFPE)	D 40/65 BCS (-PFPE)
Operating voltage	V DC	24	24
Switching capacity	W / A	10.0 / 0.4	10.0 / 0.4
Type of protection	IP	54	54
Weight, approx.	kg (lbs)	2.5 (5.5)	2.5 (5.5)

Ordering Information	LSS 16-25	LSS 40-65
Limit switch system	Part No. 161 06	Part No. 161 07

Electrical Indicator System EIS 40-65



EIS

This accessory electrically links all switches from the limit switch system and the electrical indicator system so that the position of each switch is indicated optically by LEDs.

The EIS is part of the TRIVAC SYSTEM.

Advantages to the User

- Connects directly to the LSS
- LEDs arranged conveniently on the side of the BCS which carries the controls
- Socket and plug for supplying and controlling the connected valves, no soldering is required
- Socket for remote signal transmission
- For direct, compact installation to the IGS
- IP 54 protection
- Each pair of LEDs (red or green) is clearly marked

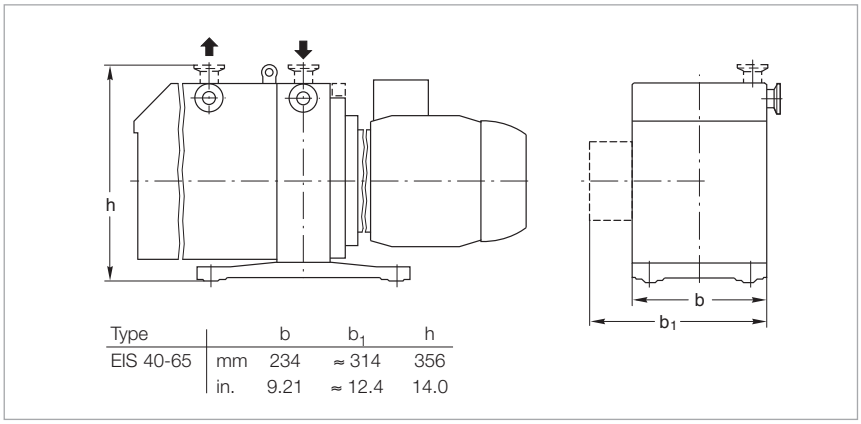
Supplied Equipment

Housing, complete with all sockets for the components of the system.

Socket and plug for 24 V DC supply.

Socket for operating the solenoid valves of the IGS and remote data transmission.

Cover panel and all required mounting screws.



Type		b	b_1	h
EIS 40-65	mm	234	≈ 314	356
	in.	9.21	≈ 12.4	14.0

Dimensional drawing for the EIS (mounted on a TRIVAC BCS)

Technical Data — EIS 40-65

Connection to pump	**TRIVAC**	D 40/65 BCS (-PFPE)
Input voltage	**V DC**	24
Output voltage	**V DC**	24
Maximum current	**A**	3
Type of protection	**IP**	54
Weight		
without cover panel	**kg (lbs)**	2.5 (5.5)
with cover panel	**kg (lbs)**	4.0 (8.8)

Ordering Information — EIS 40-65

Electrical indicator system	**Part No. 160 97**
Connection plug for transmission of the “green” signals	**Part No. 200 80 078**

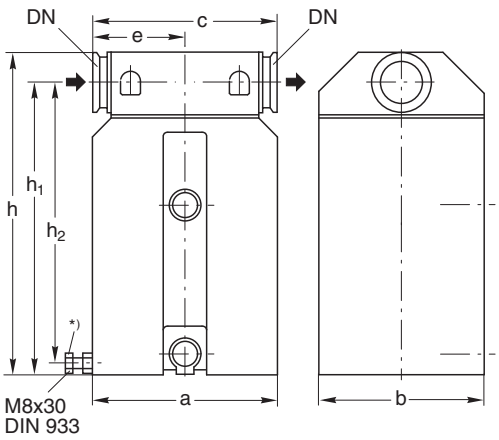
Condensate Separators
AK 4-8, AK 16-25, AK 40-65

AK 4-8 condensate separator

Separators protect the pump against condensate

Advantages to the User

- May be installed without accessories
- May be used either on the intake or the exhaust side
- Independent of the direction of flow
- Condensate level check via inspection glass
- Resists solvents
- All seals made of FPM
- Simple to clean
- Easy to use
- Drained via drain screw or drain tap



Type	DN		a	b	c	e	h	h_1	h_2
AK 4-8	16 KF	mm	90	90	120	60	194	178	–
		in.	3.54	3.54	4.72	2.36	7.64	7.01	–
AK 16-25	25 KF	mm	110	125	142	71	214	193	–
		in.	4.33	4.92	5.59	2.80	8.43	7.60	–
AK 40-65	40 KF	mm	140	156	170	85	300	271	261
		in.	5.51	6.14	6.69	3.35	11.8	10.7	10.3

*) Supporting screw, only for AK 40-65

Dimensional drawing for the AK condensate separators

Typical Application

- Prevention of the collection of liquids in the intake line

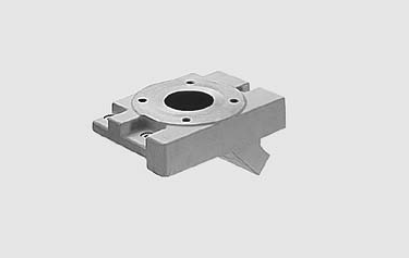
Technical Information

Depending upon the layout and pipe run of an exhaust line, it may be necessary to install a separator to prevent condensate draining back to the pump.

Technical Data		AK 4-8	AK16-25	AK 40-65
Connection to pump	TRIVAC	D 4 B D 8 B	D 16 B/BCS (-PFPE) D 25 B/BCS (-PFPE)	D 40 B/BCS (-PFPE) D 65 B/BCS (-PFPE)
Capacity for condensate	l (qt)	0.66 (0.7)	1.2 (1.3)	3.0 (3.2)
Weight	kg (lbs)	1.7 (3.7)	2.4 (5.3)	5.5 (12.1)

Ordering Information	AK 4-8	AK16-25	AK 40-65
Condensate separator	**Part No. 188 06**	**Part No. 188 11**	**Part No. 188 16**
Oil Drain tap M 16 x 1.5 (vacuum-tight)	**Part No. 190 90**	**Part No. 190 90**	**Part No. 190 90**
Adaptor DN 16 KF – hose nozzle DN 7	**Part No. 182 90**	**–**	**–**

Roots Pump Adaptor



Roots pump adaptor

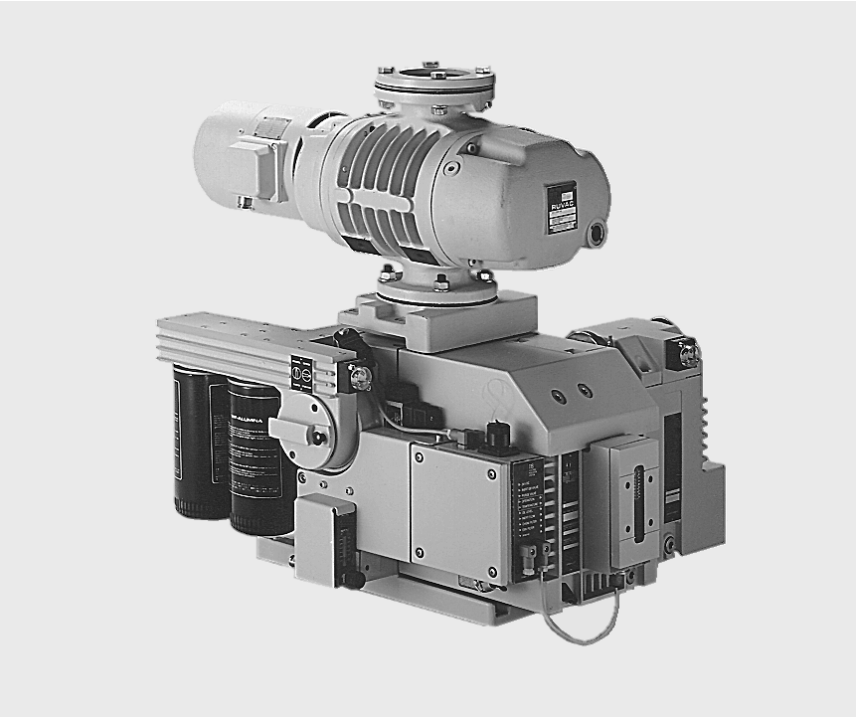
The Roots pump adaptor allows the direct installation of a Roots pump on a TRIVAC D 40/65 B/BCS.

Advantages to the User

- Compact and space-saving
- Short and direct connection between the pumps
- Minimal conductance loss
- Easy installation

Typical Application

- Simple assembly of a small pump system



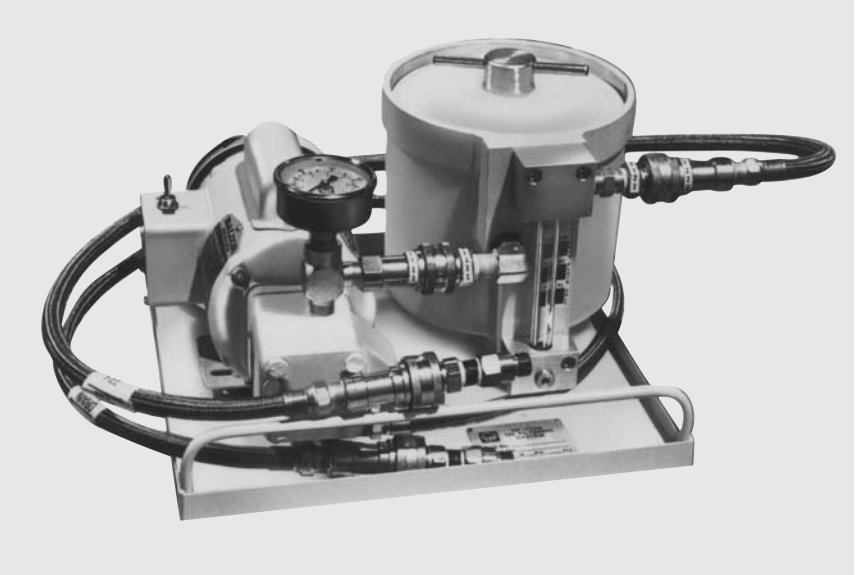
Pump system consisting of a TRIVAC D 65 BCS and a RUVAC WS 251

Technical Data		Roots Pump Adaptor
Connection to pump	TRIVAC	D 40/65 B/BCS (-PFPE) and RUVAC WA/WAU/WS/WSU 251
Weight, approx.	kg (lbs)	11.5 (25.4)

Ordering Information	Roots Pump Adaptor
Roots pump adaptor	**Part No. 168 30**

Only available for purchase in North and South America

OF1000 Oil Filtering System



OF1000 Oil Filtering System

Advantages to the User

- Choice of single- and dual-canister models for standard or chemically severe applications
- Compact design
- Reliable operation
- Choice of four filtering elements
- Dripless quick disconnects for easy removal and replacement of filter elements
- Recessed lid and oil level – no oil spillage
- Conductive Teflon hoses for static charge dissipation – no oil leakage due to static burning
- Integral gear pump with built-in bypass
- Fluid sight glass and flow monitor
- Pressure gauge
- Small precharge fluid volume
- Single phase 50/60 Hz motors standard

Applications

Standard series models are widely used in silicon production processes, including LPCVD, low-pressure epitaxy, ion implantation, reactive ion etching and several plasma processes. Such processes employ a variety of gases which can react with pump fluid, resulting in the formation of sludge, particulates and acids. The standard OF1000 model has proven effective at extending maintenance intervals in such applications.

Similarly, chemically resistant OF1000C models have proven successful in aluminum etching and other processes where boron trichloride and other highly toxic gases are employed. The canister, gear pump, fittings and quick disconnects of the corrosive-service model have been specially treated with a fluorocarbon material that substantially increases the life of these components.

OF 1000 oil filtering systems are designed to remove acids and particulates from the lubricating fluid used in Oerlikon Leybold Vacuum mechanical vacuum pumps. The systems are located externally from the vacuum pump, and utilize their own integral gear pump in conjunction with a bypass to continuously recycle fluid through a filtering medium; the medium is housed in an element/canister assembly which additionally serves to absorb heat, and thus reduce the operating temperature of the vacuum pump.

OF1000 systems are available in both single- and dual-canister designs. Both types are highly compact and reliable, and can be supplied in models for standard or chemically severe applications. Single-canister OF1000 models are distinguished by their smaller footprint while dual-canister configurations afford the advantages of multi-media filtration and increased oil capacity. Dual-canister models are designed for series flow through two side-by-side mounted canisters, and thus can be used to filter oil through two different media on the same pass or for double filtration through elements containing the same medium. The models also enable the vacuum pump to operate at somewhat lower temperatures, while providing it with a larger supply of clean, filtered oil.

All OF1000 models are supplied with a choice of four filtering elements. The Fullers Earth element provides high capacity for standard acids and can be used to trap particulates down to 10 micron in size. Hydrophilic, activated alumina and fiberglass particulate elements are also available. The Hydrophilic element is particularly effective for hydrolized acids, and can also be used to trap particles as small as 1 micron. The Activated Alumina element provides 10 micron particulate retention and is extremely effective for Lewis acids and polar compounds. The fiberglass element is suitable for particulate removal down to 10 micron.

The element/canister assembly of OF1000 systems is easy to install, extremely easy to remove and replace. The recessed lid and oil level of the assembly safeguards against the possibility of spillage. Dripless quick disconnects are also provided for easy canister removal and safer disposal of the filtering element and oil.

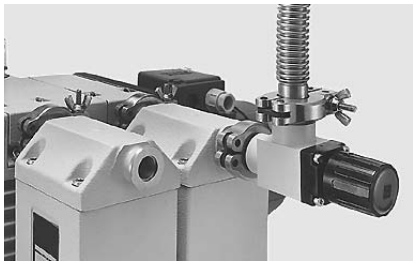
OF1000 systems also come equipped with flexible Teflon hoses designed to resist dielectric breakdown. The systems thus ward against the possibility of oil leaks due to pinholing or static burning of the hose.

Technical Data		Single-Canister Systems	Dual-Canister Systems
Gear pump motor		1/6 HP, 115/208/220V, single phase, 50/60Hz, wired for 115V, with on/off switch [1]	1/6 HP, 115/208/220V, single phase, 50/60Hz, wired for 115V, with on/off switch [1]
Gear pump		0.7 gpm @ 1800 RPM	0.7 gpm @ 1800 RPM
Pressure gauge		0 to 100 psig (0 to 70 kPa)	0 to 100 psig (0 to 70 kPa)
Pump fluid capacity		15 lb perfluorinated polyether or 3.75 qt hydrocarbon oil	29 lb perfluorinated polyether or 7.25 qt hydrocarbon oil
Flexible hoses		3/8 in. I.D. teflon/carbon black with stainless steel braid – 4 ft lengths [2]	3/8 in. I.D. teflon/carbon black with stainless steel braid – 4 ft lengths [2]
Dimensions	**in. (mm)**	16 x 14 x 11 (406 x 356 x 279)	23 x 14 x 11 (585 x 356 x 279)
Flow arrangement		–	series [3]
Weight (Dry)	**lbs (kg)**	45 (20.4)	60 (27.2)

[1] Hazardous duty models and special voltages also available
[2] Optional 6, 10 and 15 feet hoses available
[3] Optional parallel flow arrangement also available

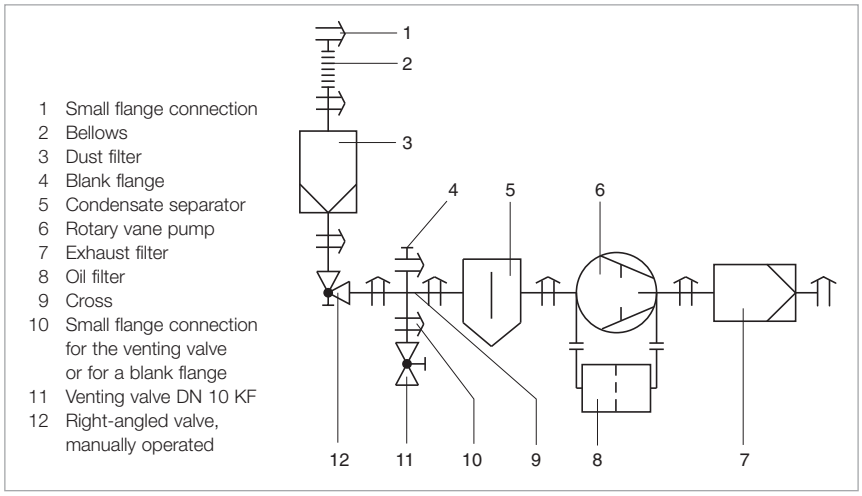
Ordering Information	Single-Canister Systems	Dual-Canister Systems
Oil filtering system		
OF1000 less filtering element and oil	**Part No. 898 550**	**Part No. 898 552**
OF1000 prepared for PFPE, less filtering element and oil	**Part No. 898 551**	**Part No. 898 553**
OF1000C chemically severe service, prepared for PFPE fluid	**Part No. 898 561**	**Part No. 898 554**
Accessories		
Spare filter canister sssembly with quick disconnect	**Part No. 898 555**	**Part No. 898 557 (front), Part No. 898 555 (rear)**
prepared for PFPE, with quick disconnect	**Part No. 898 556**	**Part No. 898 558 (front), Part No. 898 556 (rear)**
chemically severe service	**Part No. 898 566**	**Part No. 898 559 (front), Part No. 898 566 (rear)**
Filtering Elements		
Aluminum Oxide high capacity for reagent grade HCl; removes Lewis acids and polar compounds; 10 micron particulate retention	**Part No. 898 504**	**Part No. 898 504**
Fullers Earth acid and particulate filter with capacity of 34 ml reagent grade HCl; 10 micron particulate retention	**Part No. 898 505**	**Part No. 898 505**
Hydrophilic water and HCl acid absorbing capabilities; 1 micron particulate retention	**Part No. 898 506**	**Part No. 898 506**
Particulate fiberglass element with 10 micron particulate retention	**Part No. 898 507**	**Part No. 898 507**

Flange Components, Valves



Our range of flange components and valves is described in detail in Product Sections C13 and C14.

Given in the following are only some components which you might find particularly useful when planning your system.



Example of connecting a pump with accessories

Isolation Valve

- The pump is allowed to warm up with the intake line isolated
- The pump may continue to operate in the energy-saving and environmentally compatible ultimate pressure mode when the vacuum chamber is vented briefly
- The pump may be left on after completion of the process so as to regenerate the oil

Branch (Cross)

- Installing a cross in the intake line permits the connection of a vacuum gauge and a venting valve

Flange Connections

Each flange connection requires one each centering and clamping ring.

Ordering Information	DN 16 KF	DN 25 KF	DN 40 KF
Small flange connection			
Clamping ring	Part No. 183 41	Part No. 183 42	Part No. 183 43
Centering ring, aluminum/CR	Part No. 183 26	Part No. 183 27	Part No. 183 28
Centering ring, stainless steel/FPM	Part No. 883 46	Part No. 883 47	Part No. 883 48
Bellows	Part No. 872 41	Part No. 872 43	Part No. 872 45
Right-angled valve, manually operated			
Aluminum casing	Part No. 287 11	Part No. 287 12	Part No. 287 13
Stainless steel casing	Part No. 288 11	Part No. 288 12	Part No. 288 13
Blank flange for (reducing) cross			
Aluminium	Part No. 184 46	Part No. 184 41	Part No. 184 41
Stainless steel	Part No. 884 36	Part No. 884 41	Part No. 884 41
Reducing cross (to DN 10 KF)			
Aluminum	–	Part No. 184 17	Part No. 184 19
Stainless steel	–	Part No. 884 92	Part No. 884 94
Cross DN 16 KF			
Aluminum	Part No. 184 71	–	–
Stainless steel	Part No. 884 85	–	–
Small flange connection for venting valve or blank flange			
Clamping ring	Part No. 183 41	Part No. 183 41	Part No. 183 41
(Adaptor) centering ring, aluminum/NBR	Part No. 183 56	Part No. 183 21	Part No. 183 21
(Adaptor) centering ring, stainless steel/FPM	Part No. 883 56	Part No. 883 21	Part No. 883 21
Venting valve DN 10 KF			
Aluminum	Part No. 173 24	Part No. 173 24	Part No. 173 24
Stainless steel	Part No. 173 37	Part No. 173 37	Part No. 173 37

Notes

Vacuum Pump Oils

Lubricating oils for rotary vacuum pumps need to fulfil demanding requirements. Their vapor pressure must be low at high temperatures and the water content and water uptake must be minimal. Their viscosity characteristics need to be flat, lubricating properties need to be excellent and they must resist cracking upon being mechanically stressed.

All the vacuum pump oils listed in the following have been subjected in our factory laboratories to very comprehensive tests closely resembling the conditions encountered in practice by the pumps from the TRIVAC series.

We therefore recommend the exclusive use of vacuum pump oils fully qualified by Oerlikon Leybold Vacuum so as to ensure optimum performance of the Oerlikon Leybold Vacuum vacuum pumps and also to ensure optimum oil change intervals.

Under vacuum conditions lubricating oils, especially those with additives may behave quite differently than expected. Additives may adversely affect the attainable ultimate pressure and may react with the media being pumped.

When using not suitably qualified third party oils, the oil change intervals and the performance of the vacuum pump may be reduced. Also unwanted deposits may occur which may even cause severe damage to the vacuum pump.

Therefore please understand that we must make our warranty commitment dependent on the use of lubricant oils which have been qualified by us. Damage caused by usage of unsuitable, not qualified lubricant oils is not covered by our warranty.

In order to adapt the pumps to the different applications of our customers, different types of oil are used in the TRIVAC pumps.

Please note that owing to differing properties not all types of oil may be used in all pumps of the TRIVAC series. If you can not find the combination of pump and oil you require please ask us for a quotation.

Lubricant Types

Mineral Oils

Mineral oils are products distilled and refined from crude oil. These do not consist of precisely defined compounds but rather consist of a complex mixture. The way in which the mineral oil is pre-treated and its composition is decisive as to the applications it will be suited for. Depending on the distribution of the hydrocarbons and the dominance of certain properties, mineral oils are grouped according to paraffin-base, naphthenic and aromatic. For the purpose of attaining especially low ultimate pressures, mineral oils must be selected on the basis of a core fraction.

The thermal and chemical resistance of mineral oils has been found to be adequate in the majority of applications. They offer a high degree of compatibility with elastomers and resistance to hydrolysis.

Synthetic Oils

Synthetic oils are man-made. The group of synthetic oils includes liquids differing widely as to their chemical structure and composition. Correspondingly their physical and chemical properties differ considerably. Synthetic oils are used in those cases where special properties of the oil are required which can not be fulfiled by mineral oils.

The oils given in the following belong to the group of synthetic oils:

Polyalphaolefin (PAO) Oils

Polyalphaolefin oils are synthetic hydrocarbons which are paraffin like, but have a uniform structure. Thermal and chemical resistance is better compared to mineral oils. Elastomer compatibility and resistance against hydrolysis are comparable to mineral oils.

Ester oils

Ester oils are organic compounds which excel especially through their high thermal resistance to cracking compared to mineral oils. Chemical resistance is generally quite good, but will depend on the type of ester oil. Elastomer compatibility and resistance against hydrolysis are not so good compared to mineral oils.

Perfluorinated polyether (PFPE)

These are oils which are only composed of carbon (C), fluorine (F) and oxygen atoms (O). The existing C-O and C-F bonds are highly stable. For this reason PFPE oils are practically inert against all chemical and oxidising influences.

Perfluorinated polyethers will not polymerise under the influence of high energy radiation.

PFPE is non-flammable. Oerlikon Leybold Vacuum NC 1/14 has the approval of BAM (Federal Institute for Materials Research and Testing) for pumping of pure oxygen.

Perfluorinated polyethers are used when pumping strongly reactive substances like oxygen (O_2), fluorine (F_2) and uranium hexafluoride (UF_6). Regarding Lewis acids (for example, boron trifluoride (BF_3), aluminum trichloride ($AlCl_3$) they are not completely inert. Here reactions may take place at temperatures over 100 °C (212 °F).

Perfluorinated polyethers are thermally highly stable. Thermal decomposition may only take place at temperatures of over 290 °C (554 °F)
Caution: Perfluorinated polyethers will – when decomposed – release toxic and corrosive gases: hydrogen fluoride (HF), carbonyl difluoride (COF_2). For this reason open fires must be avoided in the workspace where PFPE is being used. Do not smoke in the workspace where PFPE is being used.

Only suitably prepared pumps must be used in connection with perfluorinated polyethers, since it is essential that the pump be free of hydrocarbons. Changing from one basic type of oil to PFPE must be left exclusively to authorised Service Centers. The pumps will have to be fully disassembled and carefully cleaned. Gaskets and filters will have to be exchanged and suitable greases will have to be used.

Safety data sheets are available to professional users from:
e-mail “documentation.vacuum@oerlikon.com” or Internet “www.oerlikon.com”.

Oil Recommendations for Various Areas of Application

Application Data	Special Oil N62	White Oil NC2
Type of oil	Paraffin-base mineral oil, core faction, free of additives	Medicinal, high purity white oil, paraffin-base, core fraction, free of additives, sulphur and aromatic compounds
Examples of areas of application and process media	Standard oil for Oerlikon Leybold Vacuum Germany For pumping air, chemically inert permanent gases (noble gases, for example), water vapor, solvent vapors in the case of laboratory pumps operated with cold traps	For pumping small quantities of chemically reactive substances like halogens (for example, hydrogen chloride HCl, hydrogen bromide HBr), halogenated hydrocarbons (for example, bromomethane CH_3Br, trichloromethane $CHCl_3$), Lewis acids (for example, aluminum chloride $AlCl_3$, titanium tetrachloride $TiCl_4$), acetic acid CH_3COOH
Remarks	The ultimate pressures stated in our catalogs are based on operation of the pump with N62 (except for the DOT and PFPE pumps) Service life may be extended through the use of an oil filter	When pumping the aforementioned process media, humidity must be avoided Service life may be extended through the use of an oil filter
Elastomer compatibility FPM (Viton) NBR (Perbunan) [1] EPDM	 Suited Conditionally suited Not suited	 Suited Conditionally suited Not suited

Technical Data		Special Oil N62	White Oil NC2
Viscosity at 40 °C (104 °F) at 100 °C (212 °F)	 mm^2/s (= cSt) mm^2/s (= cSt)	 90 10	 60 8
Flash point	°C (°F)	> 255 (> 491)	> 240 (> 464)
Vapor pressure at 20 °C (68 °F) at 100 °C (212 °F)	 mbar (Torr) mbar (Torr)	 $< 1 \times 10^{-5}$ ($< 8 \times 10^{-6}$) $< 3 \times 10^{-3}$ ($< 2 \times 10^{-3}$)	 $< 1 \times 10^{-5}$ ($< 8 \times 10^{-6}$) 5×10^{-3} ($< 4 \times 10^{-3}$)
Density at 15 °C (59 °F)	g/ml	0.88 [2]	0.86
Pour point	°C (°F)	< -9 (< 16)	< -12 (< 10)
Middle molecular weight	g/mol	550	480

Ordering Information	Special Oil N62	White Oil NC2
1 litre (1.1 qt)	**Part No. 177 01**	–
5 litres (5.3 qt)	**Part No. 177 02**	**Part No. 177 29**
20 litres (21.1 qt)	**Part No. 177 03**	**Part No. 177 27**
180 kg (397.4 lbs)	**Part No. 177 05**	–

Please note that the technical data stated are only typical data. Slight variations from batch to batch must be expected.
The technical data stated here can not be taken as assured properties

[1] Resistance to decomposing is very much dependent on the share of acrylonitrile in the NBR

[2] at 20 °C (68 °F)

Application Data	SHC 224	ANDEROL® 555
Type of oil	Polyalphaolefin PAO	Diester oil
Examples of areas of application and process media	Cold starting at low temperatures is possible. Pumping of chemically inert permanent gases (for example, noble gases) water vapor in small quantities, refrigerants R 717 (ammonia NH_3)	Used at elevated temperatures, pumping of air, chemically inert permanent gases (noble gases, for example), carbon dioxide CO_2, carbon monoxide CO, aliphatic compounds (for example methane CH_4, propane C_3H_8, ethylene C_2H_4), organic solvent vapors
Remarks	Service life may be extended through the use of an oil filter	Do not pump any inorganic acids (HCl, HF, for example), no free halogens (Cl_2, F_2, for example) or alkaline media (NH_3, for example)
Elastomer compatibility FPM (Viton) NBR (Perbunan) [1)] EPDM	 Suited Conditionally suited Not suited	 Suited Conditionally suited Not suited

Technical Data		SHC 224	ANDEROL® 555
Viscosity at 40 °C (104 °F) at 100 °C (212 °F)	 mm^2/s (= cSt) mm^2/s (= cSt)	 29 5.6	 94 9
Flash point	°C (°F)	230 (446)	250 (482)
Vapor pressure at 20 °C (68 °F) at 100 °C (212 °F)	 mbar (Torr) mbar (Torr)	 1×10^{-5} (< 0.75×10^{-5}) 8×10^{-3} (< 6×10^{-3})	 7×10^{-5} (< 5×10^{-5}) 1.5×10^{-3} (< 1×10^{-3})
Density at 15 °C (59 °F)	g/ml	0.83	0.96
Pour point	°C (°F)	< -55 (< -67)	-42 (< -44)
Middle molecular weight	g/mol	476	530

Ordering Information	SHC 224	ANDEROL® 555
1 litre (1.1 qt)	**Part No. 200 28 181**	**Part No. 200 10 272**
5 litres (5.3 qt)	–	**Part No. 200 10 891**
20 litres (21.1 qt)	–	**Part No. 200 00 193**

Please note that the technical data stated are only typical data. Slight variations from batch to batch must be expected.
The technical data stated here can not be taken as assured properties

[1)] Resistance to decomposing is very much dependent on the share of acrylonitrile in the NBR

Application Data	ANDEROL® RCF-E68N	NC 10
Type of oil	Polycarboxylic acid ester	Alkyl sulphonic acid ester
Examples of areas of application and process media	Cooling and air-conditioning applications. For refrigerants (for example halocarbon, R134a), HCFC (for example, R123), HFC (for example, R218), CFC (for example, R12) and HC (for example, R600a)	When pumping process media which tend to polymerise (for example, styrene C_8H_8, butadiene C_4H_6).
Remarks	Use only correspondingly modified pumps Mixing with other types of oil must be absolutely avoided Do not pump any inorganic acids (for example HCl, HF)	Do not use a chemical oil filter Mixing with other types of oil must be absolutely avoided Do not pump any inorganic acids (for example HCl, HF)
Elastomer compatibility FPM (Viton) NBR (Perbunan) [1] EPDM	 Suited Conditionally suited Not suited	 Suited Not suited Not suited

Technical Data		ANDEROL® RCF-E68N	NC 10
Viscosity at 40 °C (104 °F) at 100 °C (212 °F)	 mm^2/s mm^2/s	 68 10	 38 4
Flash point	°C (°F)	260 (500)	225 (437)
Vapor pressure at 20 °C (68 °F) at 100 °C (212 °F)	 mbar (Torr) mbar (Torr)	 No known No known	 1×10^{-4} (8×10^{-5}) No known
Density at 15 °C (59 °F)	g/ml	1.00	1.05 [2]
Pour point	°C (°F)	-54 (-65)	-30 (-22)
Middle molecular weight	g/mol	Not applicable	Not applicable

Ordering Information	ANDEROL® RCF-E68N	NC 10
1 litre (1.1 qt)	**Part No. 200 02 754**	–
20 litres (21.1 qt)	–	**Part No. 177 25**

Please note that the technical data stated are only typical data. Slight variations from batch to batch must be expected.
The technical data stated here can not be taken as assured properties

[1] Resistance to decomposing is very much dependent on the share of acrylonitrile in the NBR

[2] at 20 °C (68 °F)

Application Data	DOT 4	NC 1/14
Type of oil	Brake fluid	PFPE
Examples of areas of application and process media	Filling of brake fluid circuits in the car industry	For pumping strong oxidants like oxygen, O_2, ozone O_3, nitrogen oxides NOx and sulphur oxides (SO_2, SO_3) as well as reactive substances like halogens (for example fluorine F_2, chlorine Cl_2), hydrogen halides (for example hydrogen chloride HCl, hydrogen bromide HBr), uranium hexafluoride UF_6, and conditionally Lewis acids (for example, boron trichloride BCl_3)
Remarks	Use only in pumps modified for DOT 4 Mixing with other types of oil must be absolutely avoided	Use only in pumps modified for PFPE Mixing with other types of oil must be absolutely avoided Avoid pumping water vapor, especially with corrosive media (see above) The use of a chemical oil filter CF / CFS is strongly recommended
Elastomer compatibility		
FPM (Viton)	Not suited	Suited
NBR (Perbunan) [1]	Not suited	Suited
EPDM	Suited	Suited

Technical Data		DOT 4	NC 1/14
Viscosity			
at 40 °C (104 °F)	**mm^2/s (= cSt)**	No known	47
at 100 °C (212 °F)	**mm^2/s (= cSt)**	> 2	5
Flash point	**°C (°F)**	> 120 (> 248)	– [2]
Vapor pressure			
at 20 °C (68 °F)	**mbar (Torr)**	1.3 (0.98)	3×10^{-7} (2.25×10^{-7})
at 100 °C (212 °F)	**mbar (Torr)**	No known	6×10^{-4} (4.5×10^{-4})
Density at 15 °C (59 °F)	**g/ml**	1.05	1.89 [3]
Pour point	**°C (°F)**	Not applicable	-40 (-40)
Middle molecular weight	**g/mol**	Not applicable	2500

Ordering Information	DOT 4	NC 1/14
1 litre (1.1 qt)	**Part No. 200 10 037**	**Part No. 177 38**

Please note that the technical data stated are only typical data. Slight variations from batch to batch must be expected.
The technical data stated here can not be taken as assured properties

[1] Resistance to decomposing is very much dependent on the share of acrylonitrile in the NBR

[2] **Caution:** Perfluorinated polyether compounds will, when being decomposed at temperatures over 290 °C (554 °F), release toxic and corrosive gases. For this reason open fires must be avoided in the workspace where PFPE is being used. Do not smoke in the workspace where PFPE is being used

[3] at 20 °C (68 °F)

Only available for purchase in North and South America

Application Data	HE-200	HE-1600
Type of oil	Paraffin-base mineral oil, core faction, free of additives	PFPE
Examples of areas of application and process media	Standard oil for Oerlikon Leybold Vacuum USA For pumping air, chemically inert permanent gases (noble gases, for example), water vapor, solvent vapors in the case of laboratory pumps operated with cold traps	For pumping strong oxidants like oxygen, O_2, ozone O_3, nitrogen oxides NOx and sulphur oxides (SO_2, SO_3) as well as reactive substances like halogens (for example fluorine F_2, chlorine Cl_2), hydrogen halides (for example hydrogen chloride HCl, hydrogen bromide HBr), uranium hexafluoride UF_6, and conditionally Lewis acids (for example, boron trichloride BCl_3)
Remarks	The ultimate pressures stated in our catalogs are based on operation of the pump with HE-200 (except for the DOT and PFPE pumps) Service life may be extended through the use of an oil filter	Use only correspondingly modified pumps Mixing with other types of oil must be absolutely avoided The uptake of water vapor must be avoided The use of an oil filter is strongly recommended
Elastomer compatibility FPM (Viton) NBR (Perbunan) [1] EPDM	 Suited Conditionally suited Not suited	 Suited Suited Suited

Technical Data		HE-200	HE-1600
Viscosity at 40 °C (104 °F) at 100 °C (212 °F)	 mm^2/s (= cSt) mm^2/s (= cSt)	 58 9.1	 140 [2] 7
Flash point	°C (°F)	224 (435)	– [3]
Vapor pressure at 25 °C (77 °F) at 100 °C (212 °F)	 mbar (Torr) mbar (Torr)	 4.7×10^{-6} (3.5×10^{-6}) 3.9×10^{-4} (2.9×10^{-4})	 7×10^{-7} (5×10^{-7}) [2] 3×10^{-4} (2×10^{-4})
Density at 20 °C (68 °F)	g/ml	0.88	1.86
Pour point	°C (°F)	-10 (14)	-40 (-40)
Molecular weight		480	3000

Ordering Information	HE-200	HE-1600
1 qt (1 l)	**Part No. 98 198 006**	–
1 gal (3.8 l)	**Part No. 98 198 007**	–
5 gal (18.9 l)	**Part No. 98 198 008**	–
55 gal (208 l)	**Part No. 98 198 010**	–
Bottle 2 lb (0.91 kg)	–	**Part No. 898 564-1**
Bottle 4 lb (1.81 kg)	–	**Part No. 898 564-2**
Bottle 16 lb (7.25 kg)	–	**Part No. 898 564-4**

Please note that the technical data stated are only typical data. Slight variations from batch to batch must be expected.
The technical data stated here can not be taken as assured properties

[1] Resistance to decomposing is very much dependent on the share of acrylonitrile in the NBR

[2] at 20 °C (68 °F)

[3] Caution: Perfluorinated polyether compounds will, when being decomposed at temperatures over 290 °C (554 °F), release toxic and corrosive gases. For this reason open fires must be avoided in the workspace where PFPE is being used. Do not smoke in the workspace where PFPE is being used

Notes

Services

On-site Replacement of the Dynamic Seals (with oil N62) [1)]

The on-site replacement of the dynamic seals includes the following:
Partial disassembly of the pump, replacement of the complete shaft seal, mounting of the pump including new gaskets and standard oil N62, electrical safety test, test run including check of the attained ultimate pressure levels

Ordering Information	On-site Replacement of the Dynamic Seals (with oil N62) [1)]
For pump	
TRIVAC S/D 4 B	**Part No. AS 1130 F**
TRIVAC S/D 8 B	**Part No. AS 1130 F**
TRIVAC S/D 16/25 B	**Part No. AS 1129 F**
TRIVAC S/D 40/65 B	**Part No. AS 1128 F**
TRIVAC S/D 40/65 BCS	**Part No. AS 1137 F**

Small On-site Maintenance (with oil N62) [1)]

The small on-site maintenance includes the following:
Oil change (standard oil N62), filter replacement, visual inspection of the subassemblies, cleaning of the pump module and the oil box, electrical safety test, test run including check of the attained ultimate pressure levels

Ordering Information	On-site Maintenance (with oil N62) [1)]
For pump	
TRIVAC S/D 4 B	**Part No. AS 1160 F**
TRIVAC S/D 8 B	**Part No. AS 1159 F**
TRIVAC S/D 16 B + BCS with standard gaskets	**Part No. AS 1158 F**
TRIVAC S/D 25 B + BCS with standard gaskets	**Part No. AS 1157 F**
TRIVAC S/D 40/65 B + BCS with standard gaskets	**Part No. AS 1156 F**

[1)] Standard oil N62

Comprehensive On-site Maintenance (with oil N62) [2)]

Comprehensive on-site maintenance includes the following:
Disassembly of the pump, cleaning of all individual components, replacement of all wearing parts, mounting of the pump including new gaskets and standard oil N62, electrical safety test, test run including check of the attained ultimate pressure levels

Ordering Information	Comprehensive On-site Maintenance (with oil N62) [2)]
For pump	
TRIVAC S 4 B	**Part No. AS 1127 F**
TRIVAC S 8 B	**Part No. AS 1126 F**
TRIVAC D 4 B	**Part No. AS 1125 F**
TRIVAC D 8 B	**Part No. AS 1124 F**
TRIVAC S 16 B	**Part No. AS 1123 F**
TRIVAC S 25 B	**Part No. AS 1122 F**
TRIVAC D 16 B	**Part No. AS 1121 F**
TRIVAC D 25 B	**Part No. AS 1120 F**
TRIVAC S 40 B	**Part No. AS 1119 F**
TRIVAC S 65 B	**Part No. AS 1118 F**
TRIVAC D 40 B	**Part No. AS 1117 F**
TRIVAC D 65 B	**Part No. AS 1116 F**
TRIVAC D 40 BCS with Viton gaskets	**Part No. AS 1136 F**
TRIVAC D 65 BCS with Viton gaskets	**Part No. AS 1135 F**
TRIVAC S 40 BCS with standard gaskets	**Part No. AS 1134 F**
TRIVAC S 65 BCS with standard gaskets	**Part No. AS 1133 F**
TRIVAC D 40 BCS with standard gaskets	**Part No. AS 1132 F**
TRIVAC D 65 BCS with standard gaskets	**Part No. AS 1131 F**

[2)] Notes on our on-site after sales service

The listed services include the costs for material and working hours on site for standard TRIVAC pumps. Services for pump variants upon request.
Transportation and travelling expenses are invoiced at cost. All services refer to the repair of freely accessible and not contaminated vacuum components.

Complete Refurbishing at the Service Centre (with oil N62)

Complete refurbishing at the service centre includes the following:
Disassembly of the pump, visual inspection of the subassemblies, replacement of all wearing parts, machined reworking of the pump module, mounting of the pump including new gaskets and standard oil N62, electrical safety test, test run including check of the attained ultimate pressure levels.

Ordering Information	Complete Refurbishing at the Service Centre (with oil N62)
For pump	
TRIVAC S 4 B	**Part No. AS 1127**
TRIVAC S 8 B	**Part No. AS 1126**
TRIVAC D 4 B	**Part No. AS 1125**
TRIVAC D 8 B	**Part No. AS 1124**
TRIVAC S 16 B	**Part No. AS 1123**
TRIVAC S 25 B	**Part No. AS 1122**
TRIVAC D 16 B	**Part No. AS 1121**
TRIVAC D 25 B	**Part No. AS 1120**
TRIVAC S 40 B	**Part No. AS 1119**
TRIVAC S 65 B	**Part No. AS 1118**
TRIVAC D 40 B	**Part No. AS 1117**
TRIVAC D 65 B	**Part No. AS 1116**
TRIVAC D 40 BCS with Viton gaskets	**Part No. AS 1136**
TRIVAC D 65 BCS with Viton gaskets	**Part No. AS 1135**
TRIVAC S 40 BCS with standard gaskets	**Part No. AS 1134**
TRIVAC S 65 BCS with standard gaskets	**Part No. AS 1133**
TRIVAC D 40 BCS with standard gaskets	**Part No. AS 1132**
TRIVAC D 65 BCS with standard gaskets	**Part No. AS 1131**

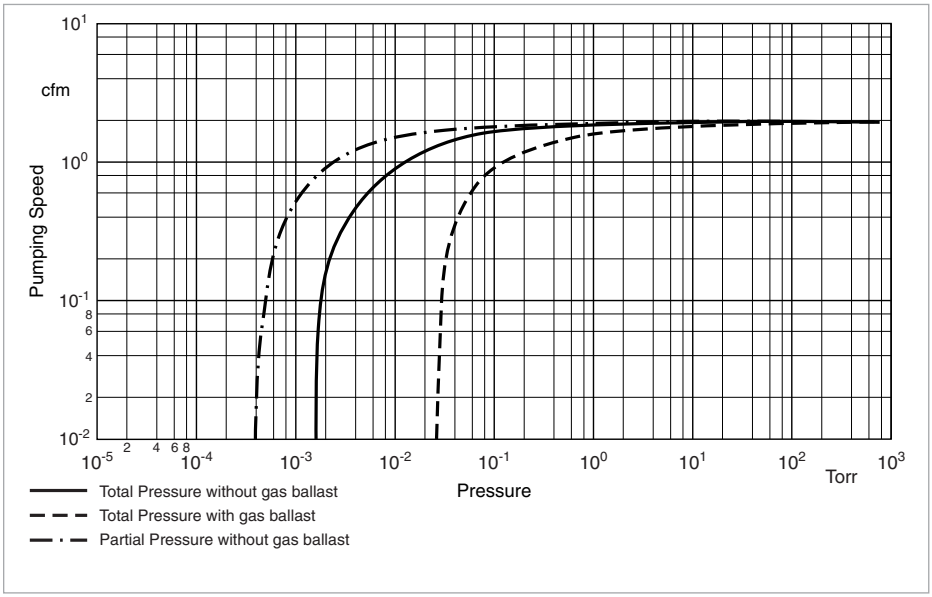
Complete Refurbishing with Decontamination at the Service Centre (with oil N62)

Complete refurbishing with decontamination at the service centre includes the following:
Disassembly of the pump, decontamination of the individual components, visual inspection of the individual subassemblies, replacement of all wearing parts, machined reworking of the pump module, mounting of the pump including new gaskets and standard oil N62, electrical safety test, test run including check of the attained ultimate pressure levels.

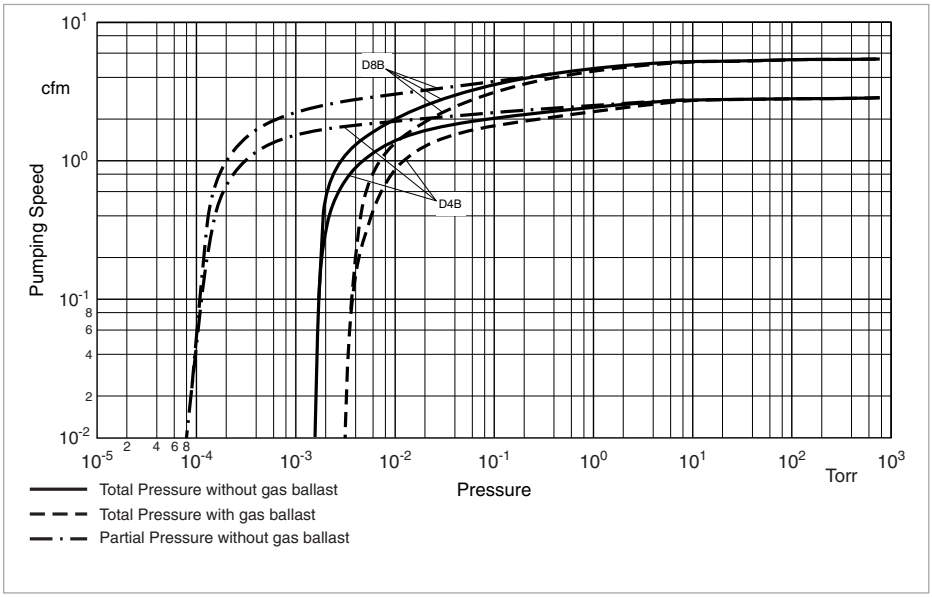
Ordering Information	Complete Refurbishing with Decontamination at the Service Centre (with oil N62)
For pump	
TRIVAC S 4 B	**Part No. AS 1127 D**
TRIVAC S 8 B	**Part No. AS 1126 D**
TRIVAC D 4 B	**Part No. AS 1125 D**
TRIVAC D 8 B	**Part No. AS 1124 D**
TRIVAC S 16 B	**Part No. AS 1123 D**
TRIVAC S 25 B	**Part No. AS 1122 D**
TRIVAC D 16 B	**Part No. AS 1121 D**
TRIVAC D 25 B	**Part No. AS 1120 D**
TRIVAC S 40 B	**Part No. AS 1119 D**
TRIVAC S 65 B	**Part No. AS 1118 D**
TRIVAC D 40 B	**Part No. AS 1117 D**
TRIVAC D 65 B	**Part No. AS 1116 D**
TRIVAC D 40 BCS with Viton gaskets	**Part No. AS 1155 D**
TRIVAC D 65 BCS with Viton gaskets	**Part No. AS 1154 D**
TRIVAC S 40 BCS with standard gaskets	**Part No. AS 1134 D**
TRIVAC S 65 BCS with standard gaskets	**Part No. AS 1133 D**
TRIVAC D 40 BCS with standard gaskets	**Part No. AS 1132 D**
TRIVAC D 65 BCS with standard gaskets	**Part No. AS 1131 D**

Only available for purchase in North and South America

60 Hz Curves

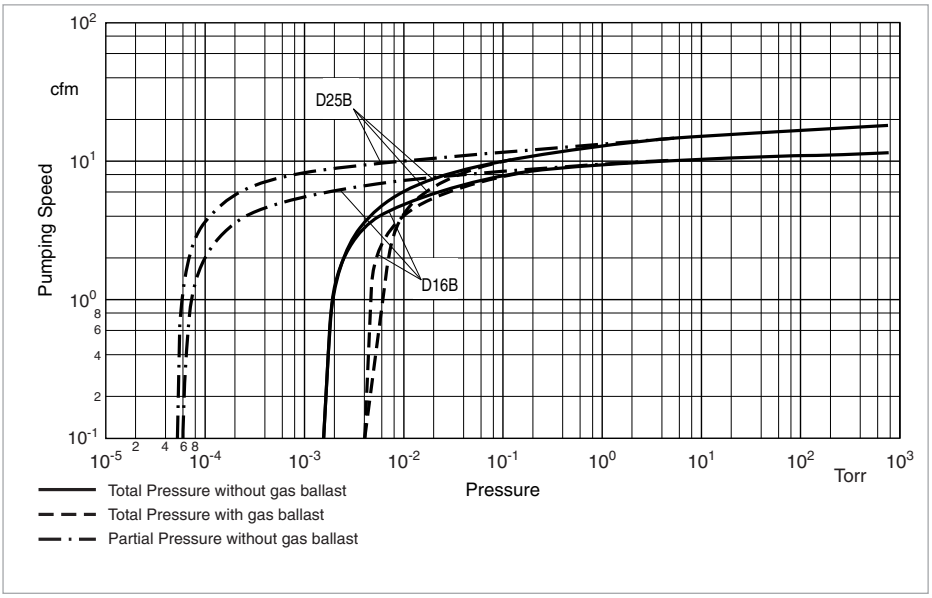


Pumping speed characteristics for the TRIVAC D 2.5 E at 60 Hz

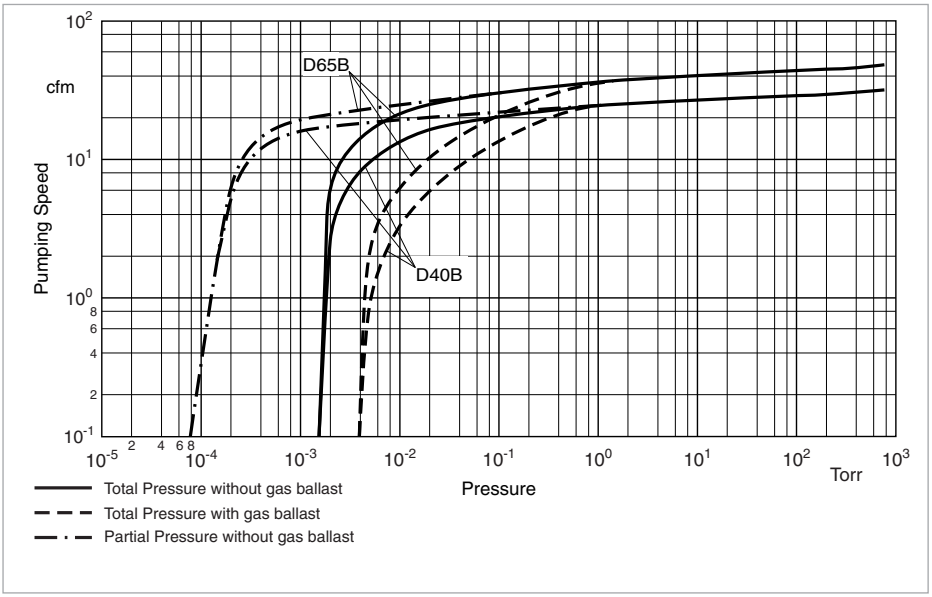


Pumping speed characteristics for the TRIVAC D 4 B and D 8 B at 60 Hz

Only available for purchase in North and South America



Pumping speed characteristics for the TRIVAC D 16 B/BCS and D 25 B/BCS at 60 Hz



Pumping speed characteristics for the TRIVAC D 40 B/BCS and D 65 B/BCS at 60 Hz

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