Vapour Pumps for Scientific Instruments and R&D Applications



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Scientific and R&D applications require special vapour pumps and accessories. It is important to minimize any backstreaming of the vapour pump fluid, and the number of elastomer seals used in system design needs to be kept to a minimum, to give clean pumping with minimal outgassing. For bench-top or transportable instruments, compact air-cooled pumps are essential.

Edwards offers a range of vapour pumps and accessories which are designed to meet these needs.

Diffstak Vapour Diffusion Pumps

The compact water-cooled Diffstak pumps with an integral cooled baffle offer exceptionally clean pumping with very low backstreaming, reduced outgassing, and a reduction in the number of elastomer seals required for installation.

The Diffstak design has been proven over many years with thousands of pumps installed. They are supplied in two types: standard, and unvalved. (C - collar model pumps).

The Edwards Diffstak 63 (ISO 63 inlet), 100 (ISO100 inlet), 160 (ISO160 inlet), 250 (ISO250 inlet), design has been proven over many years with thousands of pumps installed.

The standard Diffstak pumps have integral high vacuum valves and water-cooled baffles, which are supplied as either manually operated (M-model pumps) or pneumatically operated (P-model pumps). When comparing pumping speeds, note that the speeds quoted for valved Diffstaks are the speeds above the high vacuum valve, taking full account of the valve's impedance.

The unvalved Diffstaks are for systems requiring the highest possible ultimate vacuum or for those which do not need a high vacuum valve. All sizes are available with ISO flanges while two sizes are also available with CF flanges. (F – ConFlat[®] model pump).

The complete range is shown in the table below. Refer to the following pages for full technical data for each of the pumps and also for full details of installations, spares and accessories

Standard	Unvalved Diffstak		
Diffstak	ISO Flange	CF Flange	
63/150M or P	63/150C	-	
100/300M or P	100/300C	100/300F	
160/700M or P	160/700C	160/700F	
250/2000M or P	250/2000C	-	

The following table shows the critical backing and ultimate pressures for the diffusion pump range:

	Critical Backing Pressure	Ultimate Pressure
Fluid	(mbar)	(mbar)
Santovac [®] 5	0.6	5 × 10 ⁻⁹
Silicone DC702	1.2	7 × 10 ⁻⁶
Silicone DC704EU	0.8	7 × 10 ⁻⁸
Silicone DC705	0.6	3 × 10 ⁻⁸

 ${\rm ConFlat}^{\otimes}$ is a registered trademark of Varian, Inc Santovac^{\otimes} is a registered trademark of Santovac Fluids, Inc, USA

Data summary vapour pumps

Pump		63/150M 63/150P	63/150C
Pumping speed (M&P/C)			
Nitrogen	ls⁻¹	135	150
Hydrogen	ls⁻¹	200	225
Minimum backing pump displacement [*]	m ³ h⁻¹	5	5
Inlet connection		ISO63	ISO63
Backing connection		NW10	NW10
Oil charge capacity		60 ml	60 ml
Heater Power		450 W	450 W
Weight (M&P/C)		9 kg / 5 kg	9 kg / 5 kg
Pump		100/300M 100/300P	100/300C 100/300F
Pumping speed (M&P/C)			
Nitrogen	ls⁻¹	280	300
Hydrogen	ls⁻¹	500	535
Minimum backing pump displacement*	m ³ h⁻¹	5	5
Inlet connection		ISO100	ISO100 / 6 inch
Backing connection		NW25	NW25
Oil charge capacity		125 ml	125 ml
Heater Power		650 W	650 W
Weight (M/P/C/F)		12 kg / 13 kg / 9 kg / 10 kg	12 kg / 13 kg / 9 kg / 10 kg
Pump		160/700M 160/700P	160/700C 160/700F
Pumping speed (M&P/C)			
Nitrogen	ls⁻¹	700	760
Hydrogen	ls⁻¹	1300	1410
Minimum backing pump displacement*	m ³ h⁻¹	12	12
Inlet connection		ISO160	ISO160 / 8 inch
Backing connection		NW25	NW25
Oil charge capacity		250 ml	250 ml
Heater Power		1350 W	1350 W
Weight (M/P/C/F)		26 kg / 27 kg / 18 kg / 20 kg	26 kg / 27 kg / 18 kg / 20 kg
Pump		250/2000M 250/2000P	250/2000C
Pumping speed (M&P/C)			
Nitrogen	ls⁻¹	2000	2130
Hydrogen	ls⁻¹	3000	3200
Minimum backing pump displacement [*]	m ³ h⁻¹	40	40
Inlet connection		ISO250	ISO250
Backing connection		NW40	NW40
Oil charge capacity		500 ml	500 ml
Heater Power		2250 W	2250 W
Weight (M/P/C)		59 kg / 60 kg /	59 kg / 60 kg /

 For maximum throughput. (63/150M and 63/150P – For applications where maximum throughput is not required, use an RV3.)

46 kg

46 kg

Ordering information

Product description	Order No.
Standard Diffstak 63/150M	
110-125 V 1-ph 50/60 Hz	B34431976
210-225 V 1-ph 50/60 Hz	B34431977
230-250 V 1-ph 50/60 Hz	B34431978
Standard Diffstak 63/150P	
110-125 V 1-ph 50/60 Hz	B34432976
210-225 V 1-ph 50/60 Hz	B34432977
230-250 V 1-ph 50/60 Hz	B34432978
Unvalved Diffstak 63/150C	
110-125 V 1-ph 50/60 Hz	B34433976
210-225 V 1-ph 50/60 Hz	B34433977
230-250 V 1-ph 50/60 Hz	B34433978
Supplied with: NW10 elbow, NW10 centring-ring, NW10 clamp, water pipe couplings and ferrules, inlet ISO 63 Co-Seal.	
Standard Diffstak 100/300M	
110-125 V 1-ph 50/60 Hz	B34631976
210-225 V 1-ph 50/60 Hz	B34631977
230-250 V 1-ph 50/60 Hz	B34631978
Standard Diffstak 100/300P	
110-125 V 1-ph 50/60 Hz	B34632976
210-225 V 1-ph 50/60 Hz	B34632977
230-250 V 1-ph 50/60 Hz	B34632978
Unvalved Diffstak 100/300C	
110-125 V 1-ph 50/60 Hz	B34633976
210-225 V 1-ph 50/60 Hz	B34633977
230-250 V 1-ph 50/60 Hz	B34633978
Unvalved Diffstak 100/300F	
110-125 V 1-ph 50/60 Hz	B34640976
210-225 V 1-ph 50/60 Hz	B34640977
230-250 V 1-ph 50/60 Hz	B34640978
Supplied with: NW25 elbow, NW25 centring_ring	

Supplied with: NW25 elbow, NW25 centring-ring, NW25 clamp, water pipe couplings and ferrules inlet ISO Co-Seal (C version only).

Product description	Order No.
Standard Diffstak 160/700M	
110-125 V 1-ph 50/60 Hz	B34831976
210-225 V 1-ph 50/60 Hz	B34831977
230-250 V 1-ph 50/60 Hz	B34831978
Standard Diffstak 160/700P	
110-125 V 1-ph 50/60 Hz	B34832976
210-225 V 1-ph 50/60 Hz	B34832977
230-250 V 1-ph 50/60 Hz	B34832978
Unvalved Diffstak 160/700C	
110-125 V 1-ph 50/60 Hz	B34833976
210-225 V 1-ph 50/60 Hz	B34833977
230-250 V 1-ph 50/60 Hz	B34833978
Unvalved Diffstak 160/700F	
110-125 V 1-ph 50/60 Hz	B34840976
210-225 V 1-ph 50/60 Hz	B34840977
230-250 V 1-ph 50/60 Hz	B34840978
Supplied with: NW25 elbow, NW25 centring-ring, NW25 clamp, water pipe couplings and ferrules, inlet ISO 160 Co-Seal (C version only).	
Standard Diffstak 250/2000M	
110-125 V 1-ph 50/60 Hz	B35031976
210-225 V 1-ph 50/60 Hz	B35031977
230-250 V 1-ph 50/60 Hz	B35031978
Standard Diffstak 250/2000P	
110-125 V 1-ph 50/60 Hz	B35032976
210-225 V 1-ph 50/60 Hz	B35032977
230-250 V 1-ph 50/60 Hz	B35032978
Unvalved Diffstak 250/2000C	
110-125 V 1-ph 50/60 Hz	B35033976
210-225 V 1-ph 50/60 Hz	B35033977
230-250 V 1-ph 50/60 Hz	B35033978
Supplied with: NW40 elbow, NW40 centrina-rina.	

NW40 clamp, water pipe couplings and ferrules, inlet ISO 250 trapped O-ring.

Diffstak Installation

- M-model pumps have a manually operated high vacuum valve.
 P-model pumps have a pneumatically operated high vacuum valve. Both M-model and P-model pumps have inlet flanges which are compatible with ISO flanges: the internal diameter of the inlet flange is narrower and the flange is deeper than a standard ISO flange, to accommodate the high vacuum valve.
- C-model pumps do not have a high vacuum valve and have an ISO flange on the inlet.
- F-model pumps do not have a high vacuum valve and have a CF flange on the inlet.

63/150, 100/300, 160/700 Installation

Refer to the diagrams and the tables on these pages to identify the pipeline components and valves required to complete the typical Diffstak installation shown. Items supplied with the pump are shown as a dotted line. Read the footnotes below the diagrams and the tables for more information and for details of the installation requirements for the different models of Diffstaks.



Diagram	Component	63/150 Co	omponent	100/300 C	omponent	160/700 C	omponent
Key	Description	Size	Quantity	Size	Quantity	Size	Quantity
1†	ISO tube/collar assembly	ISO63	1	ISO100	1	ISO160	1
2 † ‡	Rotable flange pack	ISO63	1	ISO100	1	ISO160	1
3 **	Bolts (size × minimum length, mm)						
	M- and P-model	M8 × 75	4	M8 × 75	8	M10 × 90	8
	F-model	_	_	M8 × 55	16	M8 × 60	20
4 ††	Inlet seal	ISO63	1	ISO100	1	ISO160	1
5	BRV valve, manual	BRV10M	1	BRV25M	1	BRV25M	1
	BRV valve, pneumatic	BRV10P	1	BRV25P	1	BRV25P	1
6	Clamp	NW10	1	NW25	1	NW25	1
7	O-ring assembly	NW10	1	NW25	1	NW25	1
8 #	4-port light-weight electropneumatic control valve	-	2	-	2	-	2
9 ‡‡	5-port electropneumatic control valve	_	1	_	1	_	1
10 ***	5-port electropneumatic control valve	-	1	-	1	-	1

* These items are supplied with the pumps, except that the inlet seal for the F-model pumps is not supplied.

† Not required for F-model pumps; use CF fittings (which must be obtained from another supplier)

‡ Not required for C-model pumps; use claw clamps to bolt the pump ISO inlet flange directly to the ISO tube/collar assembly.

** Bolts are not available from Edwards. Bolts are not required for C-model pumps; use claw clamps to bolt the pump ISO inlet flange directly to the ISO tube/collar assembly; use 4 claw clamps for ISO63, ISO100 and ISO160 flanges.

†† These inlet seals are suitable for standard, cryo-cooled and C-model pumps only; use CF fittings (which must be obtained from another supplier) for F-model pumps.

Required only for pneumatic operation BRV valves; use either 1 5-port control valve or 2 4-port control valves. If you use 2 4-port control valves, you can use the isolation position of the BRV valve.

Required only for P-model pumps, to control the operation of the high vacuum valve.

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250/2000 Installation



Diagram	Component	Component	
Key	Description	Size	Quantity
1	ISO tube/collar assembly	ISO250	1
2 †	Rotatable flange pack	ISO250	1
3‡	Bolts (size, minimum length, mm) M- & P-model	M10 × 110	12
4	Inlet seal, trapped O-ring	ISO250	1
5	PV40 valve, manual	PV40MK	2
	PV40 valve, pneumatic	PV40PK	2
6	Clamp	NW40	5
7	O-ring assembly	NW40	5
8	T-piece	NW40	1
9	Elbow	NW40	1
10 **	3-port electropneumatic control valve		2
11 ^{††}	5-port electropneumatic control valve	-	1

†

These items are supplied with the pump. Not required for C-model pumps; use 6 claw clamps to bolt the pump ISO inlet flange directly to the ISO tube/collar assembly. Bolts are not available from Edwards. Bolts are not required for Model-C pumps; use 6 claw clamps to clamp the pump ISO inlet flange directly to the ISO tube/collar assembly. Required only for pneumatic operation PVPK valves; use 1 3-port control valve for each of the two PVPK valves. Required only for P-model pumps, to control the high vacuum valve. ‡

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Vapour Pump Spares

Product description Diffstak 63 Heater (0.45 kW)

110-125 V

Order No.

H01700182

210-225 V	H01700186
230-250 V	H01700191
Diffstak 100 Heater (0.65kW)	
110-125 V	H01700199
210-225 V	H01700097
230-250 V	H01700190
Diffstak 160 Heaters (one of each power required)	
110-125 V 0.35 kW	H01700102
210-225 V 1 kW	H01700059
230-250 V 0.35 kW	H01700107
210-225 V 1 kW	H01700063
230-250 V 0.35 kW	H01700113
230-250 V 1 kW	H01700054
Diffstak 250 Heaters (one of each power required)	
110-125 V 0.85 kW	H01700140
110-125 V 1.4 kW	H01700161
210-225 V 0.85 kW	H01700134
210-225 V 1.4 kW	H01700155
230-250 V 0.85 kW	H01700137
230-250 V 1.4 kW	H01700158
HT10 Heater 1700 W, 50/60 Hz, 3-ph	
(three required)	
200 V	H01706010
220 V	H01706011
380 V	H01706012
400 V	H01706013
415 V	H01706014
460 V	H01706015
480 V	H01706016
HT16B Heater, 1500 W, 50/60 Hz, 3-phase	
(six required)	
200 V	H01706020
220 V	H01706021
380 V	H01706022
400 V	H01706023
415 V	H01706024
440 V	H01706028
460 V	H01706025
480 V	H01706026
HT20B Heater, 1400 W, 50/60 Hz, 3-phase	
(nine required)	
200 V	H01706113
220 V	H01706114
380 V	H01706115
400 V	H01706116
415 V	H01706117
440 V	H01706118
460 V	H01706119
480 V	H01706120