

The
Vacuum
Technology
Book
Volume II

 Vacuum generation



Vacuum generation

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Rotary vane pumps



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Rotary vane pumps

For all applications in the low and fine vacuum range

Rotary vane pumps have proven their usefulness for years in many applications. Coordinated accessories and the selection of suitable materials mean that your rotary vane pumps can be used in many different processes.

Pfeiffer Vacuum offers solutions for different applications with its varied model ranges. Pascal pumps are designed for users who need pumps for simple applications with a good price/performance ratio. The DuoLine meets all demands critical processes place on pumps. HenaLine pumps are used to generate high pumping speeds. The UnoLine Plus pumps are preferably used in drying processes. PentaLine pumps are for users who are interested in highly efficient pumps with affordable operating costs.

Our rotary vane pumps can be supplied with two different pump systems: The single-phase HenaLine and UnoLine Plus pumps cover an inlet pressure range of 1,000 to approximately 0.5 hPa.

The two-stage DuoLine, Pascal and PentaLine pumps, which come with a standard pumping system, have an extended inlet pressure range in high vacuum of up to $5 \cdot 10^{-3}$ hPa.



NORM Electronics Ltd www.norm.gr

Overview of series of applications

	Analytics					Semiconductors					Coating					Industry					R & D																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
	Electron microscopy	Leak detection	Mass spectrometry	Surface analysis	Plasma monitoring	Residual gas analysis	Lithography	PVD (Physical Vapor Deposition)	CVD (Chemical Vapor Deposition)	Plasma etching	Implantation – source	Implantation – beamline	Inspection	Bonding	MBE (Molecular Beam Epitaxy)	Load locks, transfer chambers, handling systems	Fat panel displays (FPD)	LED / OLED	Hard disk coating	Photovoltaics	Glass coating (PVD)	CD, DVD, Blu-ray production (PVD)	Optical coating (PVD)	Wear protection (PVD, CVD)	Hard coating	Medical technology	Industrial leak detection	Electron beam welding	Insulation vacuums	Bulb and tube manufacture	Heat treatment	Vacuum drying	Vacuum furnaces	Nuclear research	Fusion technology	Plasma research	Particle accelerators	Space simulation	Low temperature research	Elementary particle physics	Nanotechnology	Biotechnology	Page																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
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251</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td></td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td></td><td>■</td><td>38</td> </tr> <tr> <td>BA 501</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td></td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td></td><td>■</td><td>38</td> </tr> <p>Two-stage:</p> <p>PentaLine®</p> <tr> <td>Penta 20</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td></td><td>■</td><td>42</td> </tr> <tr> <td>Penta 35</td><td></td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td></td><td>■</td><td>44</td> </tr> <p>DuoLine™</p> <tr> <td>Duo 1.6 M</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td>48</td> </tr> <tr> <td>Duo 3 M</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td>50</td> </tr> <tr> <td>Duo 6 M</td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td>52</td> </tr> <tr> <td>Duo 11 M</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td>■</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>■</td><td>■</td><td>■</td><td>■</td><td>54</td> </tr> <tr> <td>Duo 20 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Pascal C2							■	■	■	■	■									■				■	■	■	■	■															■	■	■	■	84																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										

Features at a glance

	Connection flange (inlet)						Pumping speed class					Final pressure without gas ballast						Magnetic coupling	Corrosive gas version	Page
	DN 16	DN 25	DN 40	DN 63	DN 100	DN 160	1.3 to 10 m ³ /h	15 to 40 m ³ /h	60 to 100 m ³ /h	125 to 255 m ³ /h	300 to 1,600 m ³ /h	2 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	4 · 10 ⁻³ hPa	6 · 10 ⁻² hPa	≤ 0.3 hPa	0.7 hPa			
Single-stage:																				
HenaLine																				
Hena 25			■					■								■			16	
Hena 40			■					■								■			18	
Hena 60			■						■							■			20	
Hena 100			■						■							■			22	
Hena 200			■							■						■			24	
Hena 300					■						■					■			26	
Hena 400					■						■					■			28	
Hena 630					■						■					■			30	
Hena 1000						■					■							■	32	
Hena 1600						■					■						■		34	
UnoLine Plus																				
BA 251				■						■					■				38	
BA 501					■					■					■				38	
Two-stage:																				
PentaLine®																				
Penta 20		■						■				■							42	
Penta 35		■						■				■							44	
DuoLine™																				
Duo 1.6 / M	■						■					■						■	48	
Duo 3 / M	■						■					■						■	50	
Duo 6 / M	■						■					■						■	52	
Duo 11 / M	■						■					■						■	54	
Duo 20 / M		■							■			■						■	56	
Duo 35 M			■					■				■						■	60	
Duo 65 M			■					■				■						■	62	
Duo 125 / M				■						■		■						■	64	
Duo 255 / M					■					■		■						■	66	
Pascal																				
Pascal SD		■	■				■	■	■			■	■						84	
Pascal I		■					■	■	■			■							84	
Pascal C1		■	■				■	■	■			■	■					■	84	
Pascal C2		■	■				■	■	■			■	■					■	84	

**Customer benefits**

- Large selection of pumps with pumping speeds of 1.3 to 1,600 m³/h
- Compact and ideal for system integration
- High pumping speeds with small dimensions
- High reliability through pressure oil lubrication of the bearings
- Process-safe due to integrated high vacuum safety valve
- Non-ferrous metal free design offers additional operating safety
- Also available as corrosive gas version



HenaLine

Single-stage rotary vane pumps for low and medium vacuum applications



HenaLine

We offer a complete range of single-stage rotary vane pumps for all low and medium vacuum applications. These pumps have pumping speeds between 25 and 1,600 m³/h. Oil mist separators, oil return units and safety valves are standard features in this series.

Their reliability, performance and compact size round out the outstanding features of the HenaLine pumps. Moreover, the principle of operation of the HenaLine pumps assures low operating temperatures.

Customer benefits

- Low operating costs
- Suitable for the toughest applications under high thermal loads
- Cost savings through extended maintenance intervals
- Operating and process reliability
- Does not require vibration dampers

Typical applications

- Hard disk coating
- PVD coatings
- Solar cell production
- Mass spectrometry
- Vacuum drying/ thermal treatment
- Electron beam welding
- Surface coating



Mass spectrometry



Vacuum drying



Solar cells

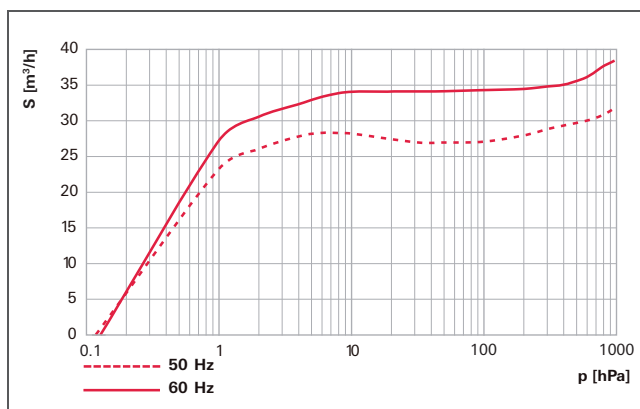
Hena 25

Single-stage, oil-sealed rotary vane pump with a pumping speed up to 30 m³/h.

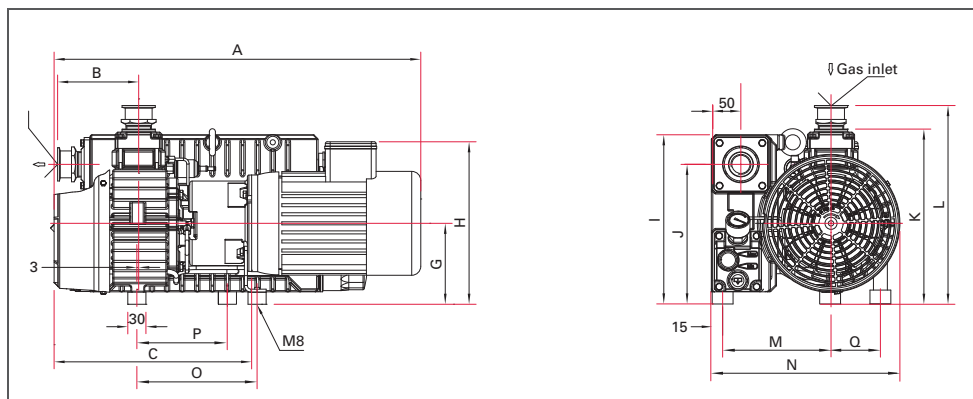


- Powerful rotary vane pump with a pumping speed up to 30 m³/h
- 3-phase motor for 190-208/380-415 V, 50 Hz or 220-230/440-460 V, 60 Hz supply voltages
- Integrated gas ballast and high vacuum safety valve
- For all low and medium vacuum applications

Pumping speed



Dimensions (in mm)



	Hena 25, 3-phase motor, 190-208/380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz	Hena 25, 1-phase motor, 220-240 V, 50 Hz	Hena 25, 1-phase motor, 100-120 V, 60 Hz	Hena 25, 1-phase motor, 220-240 V, 60 Hz
A	599 mm	564 mm	604 mm	604 mm
B	129 mm	129 mm	129 mm	129 mm
C	318 mm	318 mm	318 mm	318 mm
G	123 mm	123 mm	123 mm	123 mm
H	251 mm	240 mm	265 mm	265 mm
I	260 mm	260 mm	260 mm	260 mm
J	210 mm	210 mm	210 mm	210 mm
K	263 mm	263 mm	263 mm	263 mm
L	302 mm	302 mm	302 mm	302 mm
M	171 mm	171 mm	171 mm	171 mm
N	284 mm	284 mm	284 mm	284 mm
O	159 mm	159 mm	159 mm	159 mm
P	120 mm	120 mm	120 mm	120 mm
Q	67 mm	67 mm	67 mm	67 mm

Technical data	Hena 25, 3-phase motor, 190-208/380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz	Hena 25, 1-phase motor, 220-240 V, 50 Hz	Hena 25, 1-phase motor, 100-120 V, 60 Hz	Hena 25, 1-phase motor, 220-240 V, 60 Hz
Flange (out)	DN 40 ISO-KF, female thread G 5/4" pump housing	DN 40 ISO-KF, female thread G 5/4" pump housing	DN 40 ISO-KF, female thread G 5/4" pump housing	DN 40 ISO-KF, female thread G 5/4" pump housing
Flange (in)	DN 40 ISO-KF, female thread G 5/4" pump housing	DN 40 ISO-KF, female thread G 5/4" pump housing	DN 40 ISO-KF, female thread G 5/4" pump housing	DN 40 ISO-KF, female thread G 5/4" pump housing
Operating fluid	P3	P3	P3	P3
Operating fluid filling	1 l	1 l	1 l	1 l
Rotation speed at 50 Hz	1500 min ⁻¹	1500 min ⁻¹		
Rotation speed at 60 Hz	1800 min ⁻¹		1800 min ⁻¹	1800 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 60 dB (A)	≤ 60 dB (A)		
Emission sound pressure level without gas ballast at 60 Hz	≤ 63 dB (A)		≤ 63 dB (A)	≤ 63 dB (A)
Ultimate pressure with gas ballast	1.5 hPa	1.5 hPa	1.5 hPa	1.5 hPa
Ultimate pressure without gas ballast	0.3 hPa	0.3 hPa	0.3 hPa	0.3 hPa
Weight	35 kg	42 kg	40 kg	42 kg
Cooling method, standard	Air	Air	Air	Air
Motor protection	3TF			
Rated power 50 Hz	1.0 kW	1.1 kW		
Rated power 60 Hz	1.2 kW		1.5 kW	2.0 kW
Mains requirement: voltage 50 Hz	190-208/380-415 V	220-240 V		
Mains requirement: voltage 60 Hz	220-230/440-460 V		100-120 V	220-240 V
Pumping speed at 50 Hz	25 m ³ /h	25 m ³ /h		
Pumping speed at 60 Hz	30 m ³ /h		30 m ³ /h	30 m ³ /h
Switch	No	No	No	No
Protection category	IP 55	IP 55	IP 55	IP 55

Order number				
Hena 25	PK D02 200	PK D02 212	PK D02 207	PK D02 222

Accessories				
SAS 25, DN 25 ISO-KF, polyester filter	PK Z60 508	PK Z60 508	PK Z60 508	PK Z60 508
KAS 25 L, condensate separator for pumping speeds up to 34 m ³ /h	PK Z10 033	PK Z10 033	PK Z10 033	PK Z10 033
FAK 025, activated carbon filter	PK Z30 006	PK Z30 006	PK Z30 006	PK Z30 006
PTC-resistor tripping device	P 4768 051 FQ			

Hena 40

Single-stage, oil-sealed rotary vane pump with a pumping speed up to 48 m³/h.

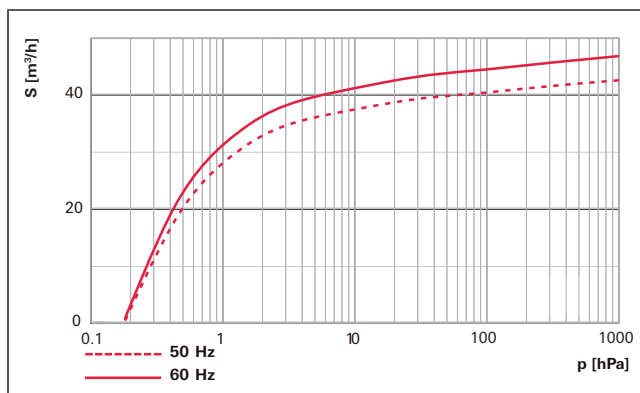


- Powerful rotary vane pump with a pumping speed of 40 m³/h
- 3-phase motor for 190-208/380-415 V, 50 Hz or 220-230/440-460 V, 60 Hz supply voltages
- Integrated gas ballast and high vacuum safety valve
- For all low and medium vacuum applications

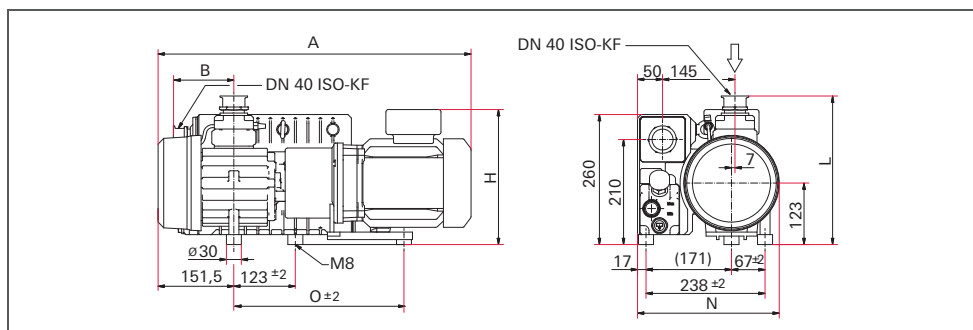
Hena 40 i

- Especially suitable for use in analytical applications
- Integrated oil mist filter with high separation rate
- Special vane material for long service life
- 1-phase motor according to IEC 60034
- Optimized final pressure

Pumping speed



Dimensions (in mm)



	Hena 40, 3-phase motor, 190-208/380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz	Hena 40 i, 1-phase motor, 230 V 50/60 Hz
A	626 mm	626 mm
B	121 mm	121 mm
H	270 mm	270 mm
L	302 mm	302 mm
N	284 mm	284 mm
O	179 ±2 mm	340 ±2 mm

Technical data	Hena 40, 3-phase motor, 190-208/380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz	Hena 40 i, 1-phase motor, 230 V 50/60 Hz
Flange (out)	DN 40 ISO-KF, female thread G 5/4" pump housing	DN 40 ISO-KF, female thread G 5/4" pump housing
Flange (in)	DN 40 ISO-KF, female thread G 5/4" pump housing	DN 40 ISO-KF, female thread G 5/4" pump housing
Operating fluid	P3	Inland 45
Operating fluid filling	1 l	1 l
Rotation speed at 50 Hz	1500 min ⁻¹	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹	1800 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 63 dB (A)	≤ 63 dB (A)
Emission sound pressure level without gas ballast at 60 Hz	≤ 66 dB (A)	≤ 66 dB (A)
Ultimate pressure with gas ballast	1.50 hPa	0.30 hPa
Ultimate pressure without gas ballast	0.30 hPa	0.20 hPa
Weight	48 kg	40 kg
Cooling method, standard	Air	Air
Motor protection	3TF	1TF
Rated power 50 Hz	1.4 kW	1.8 kW
Rated power 60 Hz	1.7 kW	2.0 kW
Mains requirement: voltage 50 Hz	190-208/380-415 V	230 V
Mains requirement: voltage 60 Hz	220-230/440-460 V	230 V
Pumping speed at 50 Hz	40 m ³ /h	40 m ³ /h
Pumping speed at 60 Hz	48 m ³ /h	48 m ³ /h
Switch	No	No
Protection category	IP 55	IP 55

Order number		
Hena 40	PK D02 250	PK D02 283

Accessories		
SAS 40, DN 40 ISO-KF, polyester filter	PK Z60 510	PK Z60 510
KAS 40, condensate separator for pumping speeds up to 100 m ³ /h	PK Z10 008	PK Z10 008
FAK 040, activated carbon filter	PK Z30 008	PK Z30 008
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ

Hena 60

Single-stage, oil-sealed rotary vane pump with a pumping speed up to 76 m³/h.

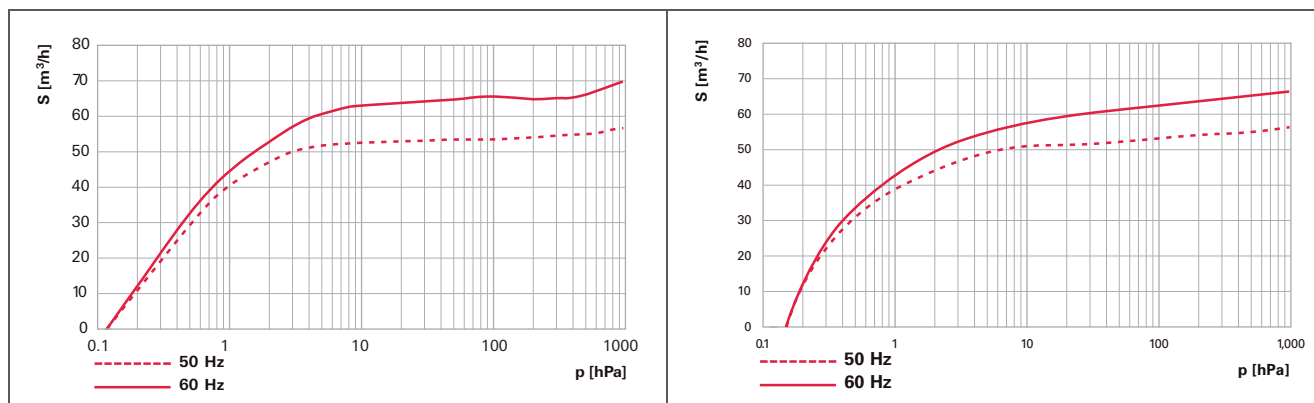


- Powerful rotary vane pump with a pumping speed up to 76 m³/h
- 3-phase motor for 190-208/380-415 V, 50 Hz or 220-230/440-460 V, 60 Hz supply voltages
- Integrated gas ballast and high vacuum safety valve
- For all low and medium vacuum applications

Hena 60 i

- Especially suitable for use in analytical applications
- Integrated oil mist filter with high separation rate
- Special vane material for long service life
- 1-phase motor according to IEC 60034
- Optimized final pressure

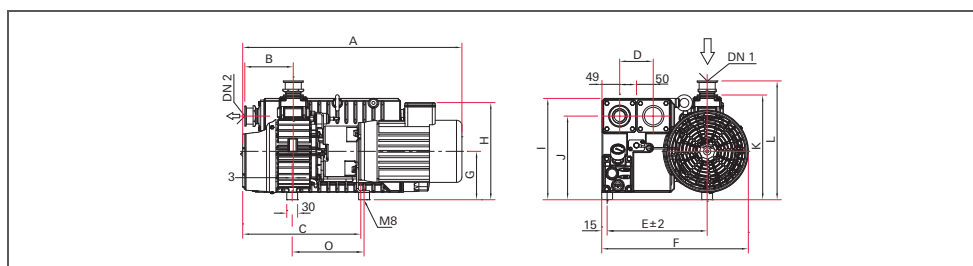
Pumping speed



Hena 60, 3-phase motor

Hena 60 i, 1-phase motor

Dimensions (in mm)



	Hena 60, 3-phase motor, 190-208/380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz	Hena 60 i, 1-phase motor, 1TF, 230 V, 50/60 Hz
A	640 mm	636 mm
B	134 mm	124 mm
C	327 mm	
D	93 mm	
E	277 mm	191 mm
F	406 mm	324 mm
G	134 mm	134 mm
H	294 mm	270 mm
I	280 mm	270 mm
J	231 mm	220 mm
K	290 mm	
L	329 mm	325 mm
O	199 mm	323 mm

Technical data	Hena 60, 3-phase motor, 190-208/380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz	Hena 60 i, 1-phase motor, 1TF, 230 V, 50/60 Hz
Flange (out)	DN 40 ISO-KF, female thread G 5/4" pump housing	DN 40 ISO-KF, female thread G 5/4" pump housing
Flange (in)	DN 40 ISO-KF, female thread G 5/4" pump housing	DN 40 ISO-KF, female thread G 5/4" pump housing
Operating fluid	P3	Inland 45
Operating fluid filling	2 l	1 l
Rotation speed at 50 Hz	1500 min ⁻¹	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹	1800 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 64 dB (A)	≤ 65 dB (A)
Emission sound pressure level without gas ballast at 60 Hz	≤ 66 dB (A)	≤ 68 dB (A)
Ultimate pressure with gas ballast	1.5 hPa	0.30 hPa
Ultimate pressure without gas ballast	0.3 hPa	0.20 hPa
Weight	68 kg	60 kg
Cooling method, optional	Water	
Cooling method, standard	Air	Air
Motor protection	3TF	1TF
Rated power 50 Hz	2.0 kW	1.8 kW
Rated power 60 Hz	2.4 kW	2 kW
Mains requirement: voltage 50 Hz	190-208, 380-415 V	230 V
Mains requirement: voltage 60 Hz	220-230, 440-460 V	230 V
Pumping speed at 50 Hz	63 m ³ /h	63 m ³ /h
Pumping speed at 60 Hz	76 m ³ /h	76 m ³ /h
Switch	No	No
Protection category	IP 55	IP 55

Order number		
Hena 60	PK D02 300	PK D02 333

Accessories		
SAS 40, DN 40 ISO-KF, polyester filter	PK Z60 510	PK Z60 510
KAS 40, condensate separator for pumping speeds up to 100 m ³ /h	PK Z10 008	PK Z10 008
FAK 040, activated carbon filter	PK Z30 008	PK Z30 008
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ

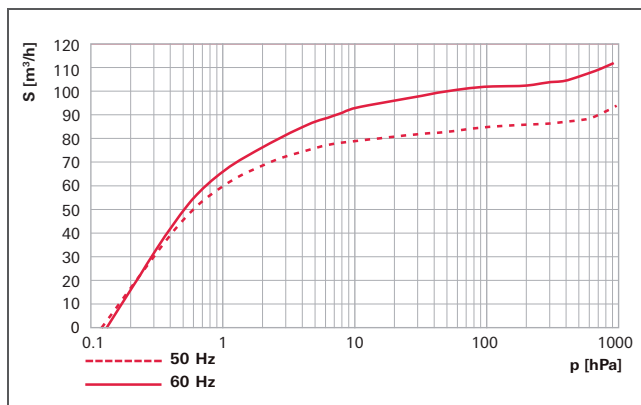
Hena 100

Single-stage, oil-sealed rotary vane pump with a pumping speed up to 120 m³/h

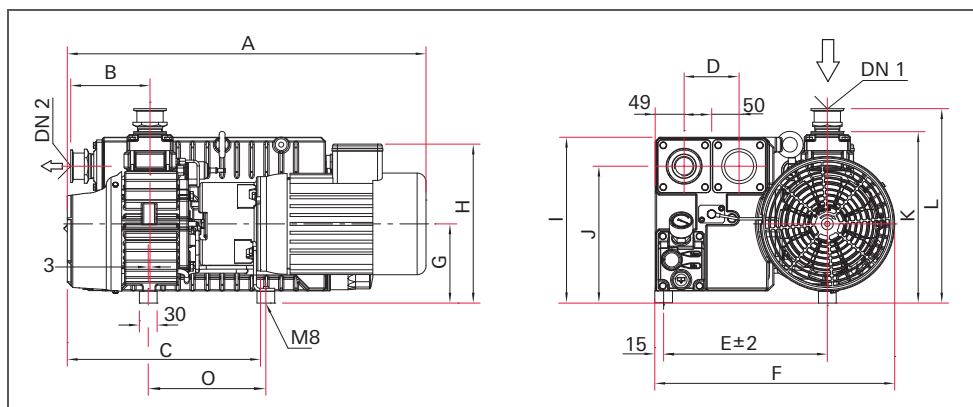


- Powerful rotary vane pump with a pumping speed up to 120 m³/h
- 3-phase motor for 190-208/380-415 V, 50 Hz or 220-230/440-460 V, 60 Hz supply voltages
- Integrated gas ballast and high vacuum safety valve
- For all low and medium vacuum applications

Pumping speed



Dimensions (in mm)



	Hena 100, 3-phase motor, 190-208/380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz
A	699 mm
B	131 mm
C	387 mm
D	93 mm
E	277 mm
F	406 mm
G	134 mm
H	294 mm
I	280 mm
J	231 mm
K	290 mm
L	329 mm
O	226 mm
Connections	
DN 1	DN 40 ISO-KF
DN 2	DN 40 ISO-KF

Technical data	Hena 100, 3-phase motor, 190-208/380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz
Flange (out)	DN 40 ISO-KF, female thread G 5/4" pump housing
Flange (in)	DN 40 ISO-KF, female thread G 5/4" pump housing
Operating fluid	P3
Operating fluid filling	2 l
Rotation speed at 50 Hz	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 65 dB (A)
Emission sound pressure level without gas ballast at 60 Hz	≤ 68 dB (A)
Ultimate pressure with gas ballast	1.5 hPa
Ultimate pressure without gas ballast	0.3 hPa
Weight	77 kg
Cooling method, standard	Air
Motor protection	3TF
Rated power 50 Hz	2.7 kW
Rated power 60 Hz	3.4 kW
Mains requirement: voltage 50 Hz	190-208/380-415 V
Mains requirement: voltage 60 Hz	220-230/440-460 V
Pumping speed at 50 Hz	100 m ³ /h
Pumping speed at 60 Hz	120 m ³ /h
Switch	No
Protection category	IP 55

Order number	
Hena 100	PK D02 350

Accessories	
SAS 40, DN 40 ISO-KF, polyester filter	PK Z60 510
KAS 40, condensate separator for pumping speeds up to 100 m ³ /h	PK Z10 008
FAK 040, activated carbon filter	PK Z30 008
PTC-resistor tripping device	P 4768 051 FQ

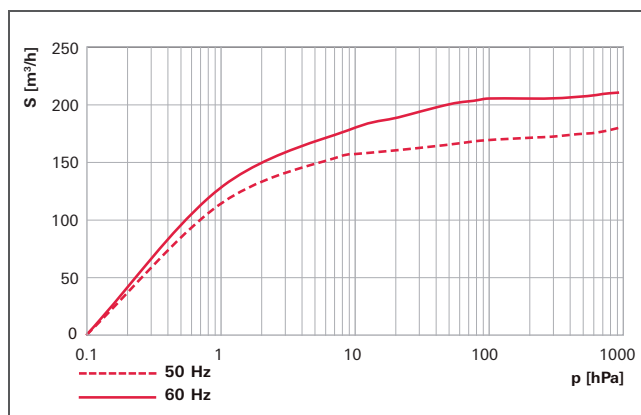
Hena 200

Single-stage, oil-sealed rotary vane pump with a pumping speed up to 240 m³/h

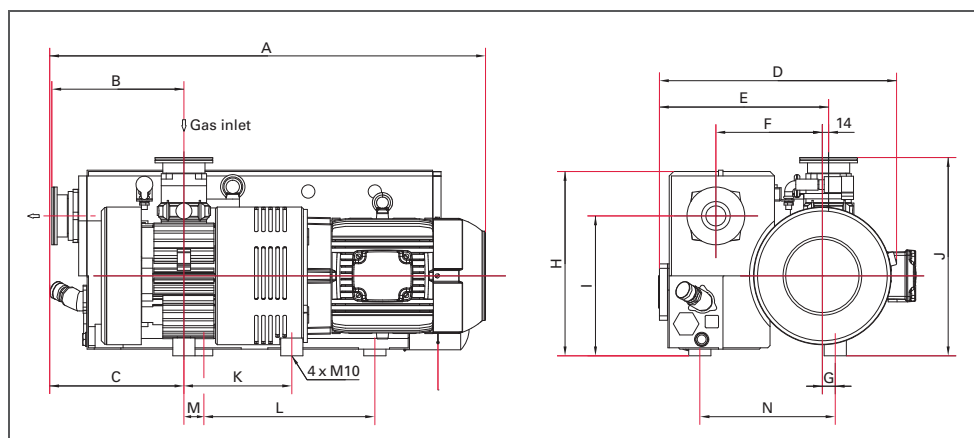


- Powerful rotary vane pump with a pumping speed up to 240 m³/h
- With IE2 motor
- Integrated gas ballast and high vacuum safety valve
- For all low and medium vacuum applications

Pumping speed



Dimensions (in mm)



**Hena 200,
3-phase motor,
200/220-240/
380-415 V,
50 Hz;
220-230/440-460 V,
60 Hz**

A	981 mm
B	298 mm
C	302 mm
D	534 mm
E	381 mm
F	240 mm
G	29 mm
H	415 mm
I	315 mm
J	446 mm
K	243 mm
L	390 mm
M	40 mm
N	305 mm

Technical data	Hena 200, 3-phase motor, 200/220-240/ 380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz
Flange (out)	DN 100 ISO-K, female thread G2" pump housing
Flange (in)	DN 100 ISO-K, female thread G2" pump housing
Operating fluid	P3
Operating fluid filling	6.5 l
Rotation speed at 50 Hz	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 72 dB (A)
Emission sound pressure level without gas ballast at 60 Hz	≤ 74 dB (A)
Ultimate pressure with gas ballast	0.7 hPa
Ultimate pressure without gas ballast	0.3 hPa
Weight	182 kg
Cooling method, optional	Water
Cooling method, standard	Air
Motor protection	3TF
Rated power 50 Hz	5.5 kW
Rated power 60 Hz	6,6 kW
Mains requirement: voltage 50 Hz	200/220-240/ 380-415 V
Mains requirement: voltage 60 Hz	220-230/ 440-460 V
Pumping speed at 50 Hz	200 m ³ /h
Pumping speed at 60 Hz	240 m ³ /h
Switch	No
Protection category	IP 55

Order number	
Hena 200	PK D02 400

Accessories	
SAS 100, DN 100 ISO-K, polyester filter	PK Z60 512
KAS 100, condensate separator for pumping speeds up to 630 m ³ /h	PK Z10 012
FAK 100, activated carbon filter	PK Z30 012
Operating fluid level monitoring	PK 100 116
Operating fluid temperature switch	PK 100 125
PTC-resistor tripping device	P 4768 051 FQ

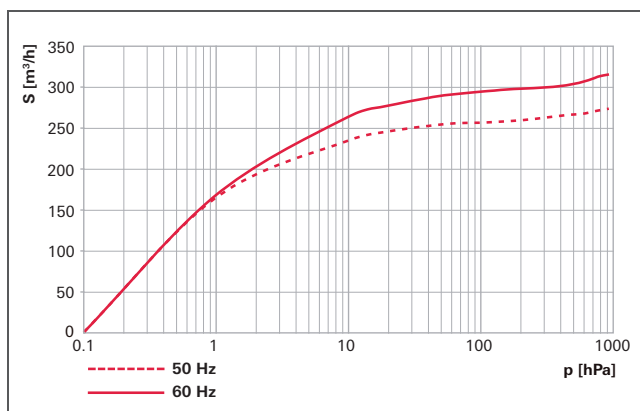
Hena 300

Single-stage, oil-sealed rotary vane pump with a pumping speed up to 360 m³/h

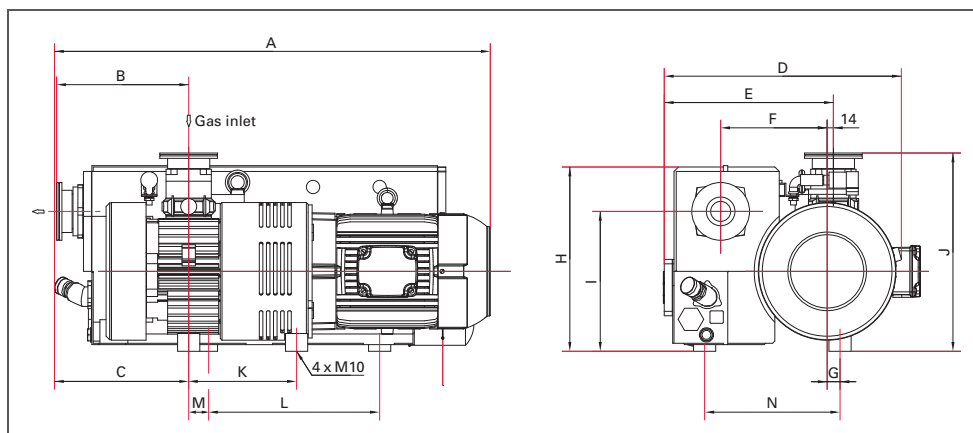


- Powerful rotary vane pump with a pumping speed up to 360 m³/h
- With IE2 motor
- Integrated gas ballast and high vacuum safety valve
- For all low and medium vacuum applications

Pumping speed



Dimensions (in mm)



**Hena 300,
3-phase motor,
200/220-240/
380-415 V,
50 Hz;
220-230/440-460 V,
60 Hz**

A	1081 mm
B	337 mm
C	342 mm
D	536 mm
E	383 mm
F	240 mm
G	29 mm
H	408 mm
I	305 mm
J	437 mm
K	243 mm
L	390 mm
N	350 mm

Technical data	Hena 300, 3-phase motor, 200/220-240/ 380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz
Flange (out)	DN 100 ISO-K, female thread G2" pump housing
Flange (in)	DN 100 ISO-K, female thread G2" pump housing
Operating fluid	P3
Operating fluid filling	6.5 l
Rotation speed at 50 Hz	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 74 dB (A)
Emission sound pressure level without gas ballast at 60 Hz	≤ 76 dB (A)
Ultimate pressure with gas ballast	0.7 hPa
Ultimate pressure without gas ballast	0.3 hPa
Weight	227 kg
Cooling method, optional	Water
Cooling method, standard	Air
Motor protection	3TF
Rated power 50 Hz	7.5 kW
Rated power 60 Hz	9.2 kW
Mains requirement: voltage 50 Hz	200/220-240/ 380-415 V
Mains requirement: voltage 60 Hz	220-230/ 440-460 V
Pumping speed at 50 Hz	300 m ³ /h
Pumping speed at 60 Hz	360 m ³ /h
Switch	No
Protection category	IP 55

Order number	
Hena 300	PK D02 450

Accessories	
SAS 100, DN 100 ISO-K, polyester filter	PK Z60 512
KAS 100, condensate separator for pumping speeds up to 630 m ³ /h	PK Z10 012
FAK 100, activated carbon filter	PK Z30 012
Operating fluid level monitoring	PK 100 116
Operating fluid temperature switch	PK 100 125
PTC-resistor tripping device	P 4768 051 FQ

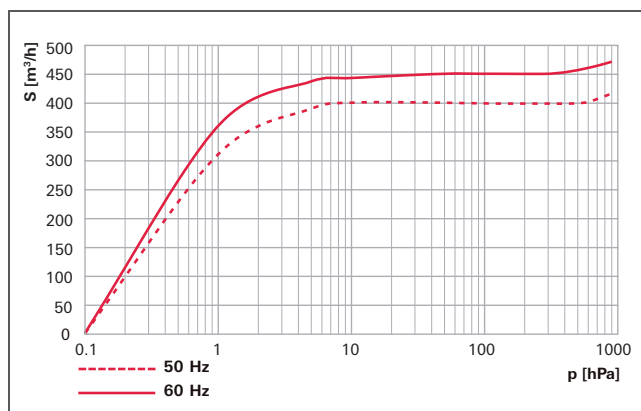
Hena 400

Single-stage, oil-sealed rotary vane pump with a pumping speed up to 480 m³/h

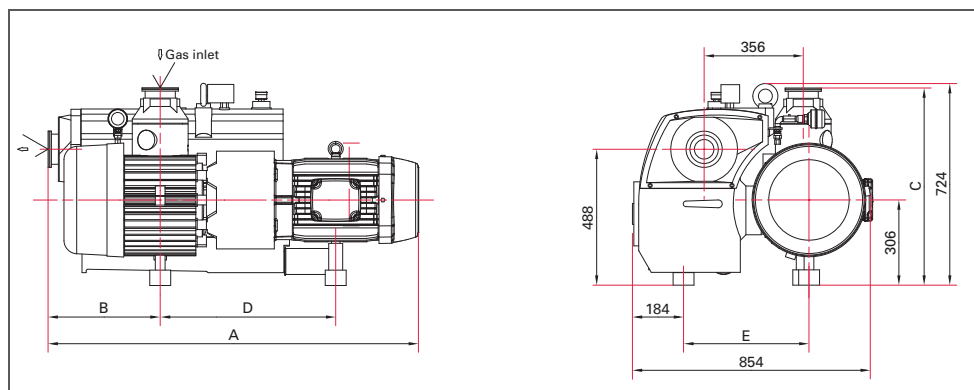


- Powerful rotary vane pump with a pumping speed up to 480 m³/h
- With IE2 motor
- Integrated gas ballast and high vacuum safety valve
- For all low and medium vacuum applications

Pumping speed



Dimensions (in mm)



**Hena 400,
3-phase motor,
200/220-240/
380-415 V,
50 Hz;
220-230/440-460 V,
60 Hz**

A	1392 mm
B	402 mm
C	708 mm
D	657 mm
E	451 mm

Technical data	Hena 400, 3-phase motor, 200/220-240/ 380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz
Flange (out)	DN 100 ISO-K, female thread G3" pump housing
Flange (in)	DN 100 ISO-K, female thread G3" pump housing
Operating fluid	P3
Operating fluid filling	12 l
Rotation speed at 50 Hz	1000 min ⁻¹
Rotation speed at 60 Hz	1200 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 77 dB (A)
Emission sound pressure level without gas ballast at 60 Hz	≤ 79 dB (A)
Ultimate pressure with gas ballast	0.7 hPa
Ultimate pressure without gas ballast	0.3 hPa
Weight	535 kg
Cooling method, optional	Water
Cooling method, standard	Air
Motor protection	3TF
Rated power 50 Hz	13.5 kW
Rated power 60 Hz	15 kW
Mains requirement: voltage 50 Hz	200/220-240/ 380-415 V
Mains requirement: voltage 60 Hz	220-230/ 440-460 V
Pumping speed at 50 Hz	400 m ³ /h
Pumping speed at 60 Hz	480 m ³ /h
Switch	No
Protection category	IP 55

Order number	
Hena 400	PK D02 500

Accessories	
SAS 100, DN 100 ISO-K, polyester filter	PK Z60 512
KAS 100, condensate separator for pumping speeds up to 630 m ³ /h	PK Z10 012
FAK 100, activated carbon filter	PK Z30 012
Operating fluid level monitoring	PK 100 116
Operating fluid temperature switch	PK 100 125
PTC-resistor tripping device	P 4768 051 FQ

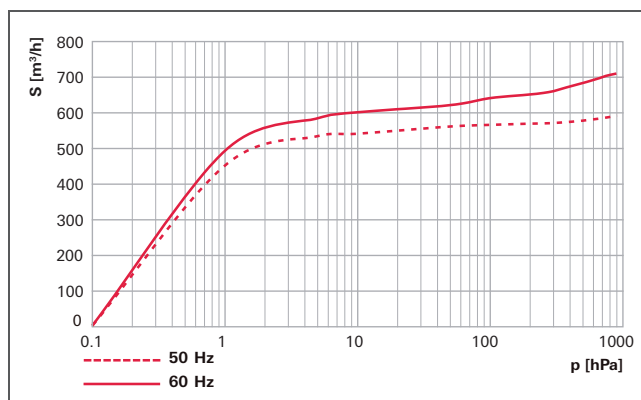
Hena 630

Single-stage, oil-sealed rotary vane pump with a pumping speed up to 760 m³/h

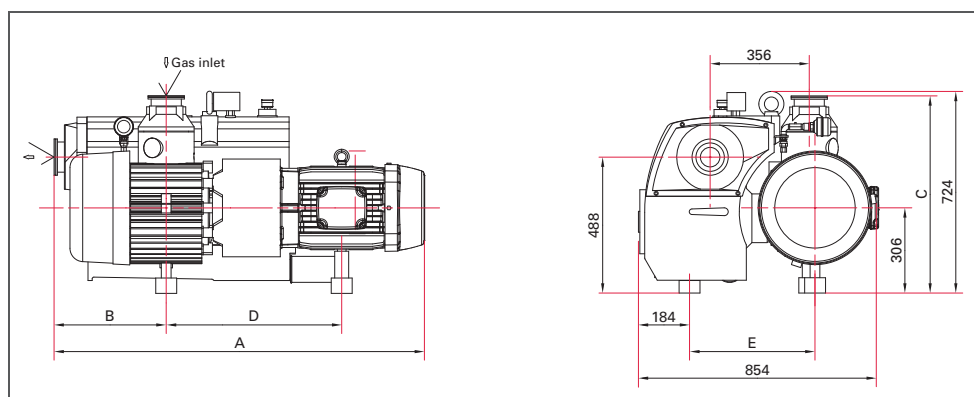


- Powerful rotary vane pump with a pumping speed up to 760 m³/h
- With IE2 motor
- Integrated gas ballast and high vacuum safety valve
- For all low and medium vacuum applications

Pumping speed



Dimensions (in mm)



	Hena 630, 3-phase motor, 220/220-240/ 380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz
A	1774 mm
B	556 mm
C	711 mm
D	846 mm
E	451 mm

Technical data	Hena 630, 3-phase motor, 220/220-240/ 380-415 V, 50 Hz; 220-230/440-460 V, 60 Hz
Flange (out)	DN 100 ISO-K, female thread G3" pump housing
Flange (in)	DN 100 ISO-K, female thread G3" pump housing
Operating fluid	P3
Operating fluid filling	15 l
Rotation speed at 50 Hz	1000 min ⁻¹
Rotation speed at 60 Hz	1200 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 77 dB (A)
Emission sound pressure level without gas ballast at 60 Hz	≤ 79 dB (A)
Ultimate pressure with gas ballast	0.7 hPa
Ultimate pressure without gas ballast	0.3 hPa
Weight	650 kg
Cooling method, optional	Water
Cooling method, standard	Air
Motor protection	3TF
Rated power 50 Hz	15 kW
Rated power 60 Hz	18.5 kW
Mains requirement: voltage 50 Hz	220/220-240/ 380-415 V
Mains requirement: voltage 60 Hz	220-230/ 440-460 V
Pumping speed at 50 Hz	630 m ³ /h
Pumping speed at 60 Hz	760 m ³ /h
Switch	No
Protection category	IP 55

Order number	
Hena 630	PK D02 600

Accessories	
SAS 100, DN 100 ISO-K, polyester filter	PK Z60 512
KAS 100, condensate separator for pumping speeds up to 630 m ³ /h	PK Z10 012
FAK 100, activated carbon filter	PK Z30 012
Operating fluid level monitoring	PK 100 116
Operating fluid temperature switch	PK 100 125
PTC-resistor tripping device	P 4768 051 FQ

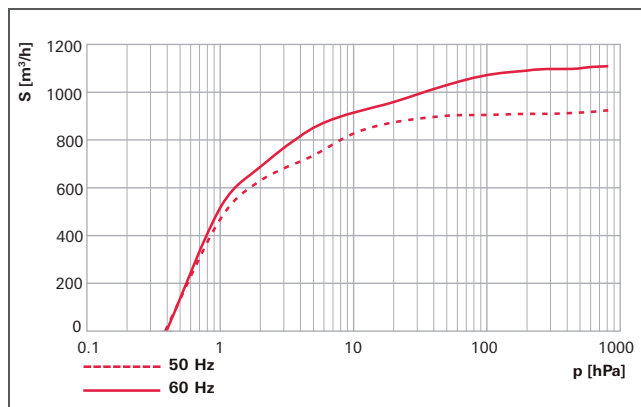
Hena 1000

Single-stage, oil-sealed rotary vane pump with a pumping speed up to 1200 m³/h

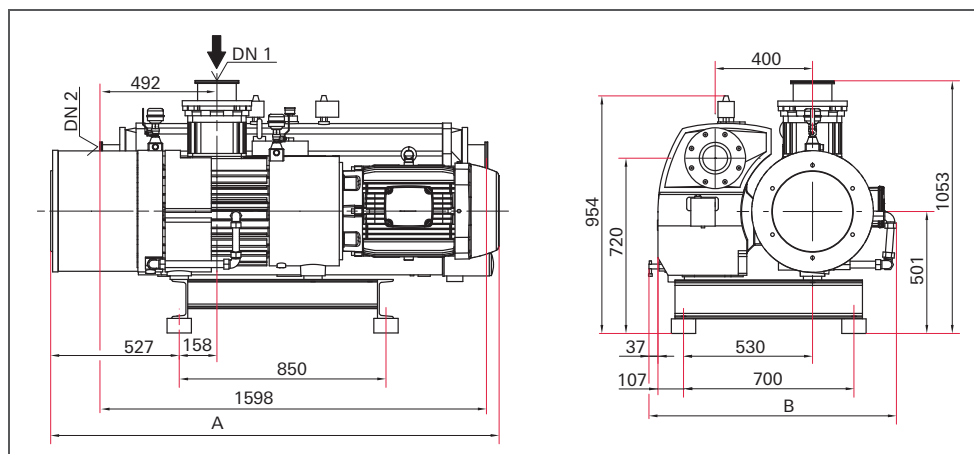


- Powerful rotary vane pump with a pumping speed up to 1200 m³/h
- With IE2 motor
- Integrated gas ballast and high vacuum safety valve
- For all low and medium vacuum applications

Pumping speed



Dimensions (in mm)



	Hena 1000, 3-phase motor, 380-415/690 V, 50 Hz	Hena 1000, 3-phase motor 220/380 V, 60 Hz
A	1841 mm	1894 mm
B	1019 mm	1050 mm

Technical data	Hena 1000, 3-phase motor, 380-415/690 V, 50 Hz	Hena 1000, 3-phase motor 220/380 V, 60 Hz
Flange (out)	DN 100 ISO-K (2 x)	DN 100 ISO-K (2 x)
Flange (in)	DN 160 ISO-K	DN 160 ISO-K
Operating fluid	P3	P3
Operating fluid filling	30 l	30 l
Rotation speed at 50 Hz	1000 min ⁻¹	
Rotation speed at 60 Hz		1200 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 82 dB (A)	
Emission sound pressure level without gas ballast at 60 Hz		≤ 82 dB (A)
Ultimate pressure with gas ballast	1.2 hPa	1.2 hPa
Ultimate pressure without gas ballast	1 hPa	1 hPa
Weight	1200 kg	1230 kg
Cooling method, optional	Water	Water
Cooling method, standard	Air	Air
Motor protection	3TF	3TF
Rated power 50 Hz	22 kW	
Rated power 60 Hz		30 kW
Mains requirement: voltage 50 Hz	380-415/690 V	
Mains requirement: voltage 60 Hz		220/380 V
Pumping speed at 50 Hz	1000 m ³ /h	
Pumping speed at 60 Hz		1200 m ³ /h
Switch	No	No
Protection category	IP 55	IP 55

Order number		
Hena 1000	PK D02 700	PK D02 701

Accessories		
SAS 160, DN 160 ISO-K, polyester filter	PK Z60 514	PK Z60 514
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ

Technical data	Hena 1600, 3-phase motor, 400/690 V, 50 Hz	Hena 1600, 3-phase motor, 220-380 V, 60 Hz
Flange (out)	DN 100 ISO-K (2 x)	DN 100 ISO-K (2 x)
Flange (in)	DN 160 ISO-K	DN 160 ISO-K
Operating fluid	P3	P3
Operating fluid filling	36 l	36 l
Rotation speed at 50 Hz	1000 min ⁻¹	
Rotation speed at 60 Hz		1200 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 82 dB (A)	
Emission sound pressure level without gas ballast at 60 Hz		≤ 83 dB (A)
Ultimate pressure with gas ballast	1.2 hPa	1.2 hPa
Ultimate pressure without gas ballast	0.7 hPa	0.7 hPa
Weight	1474 kg	1484 kg
Cooling method, standard	Water	Water
Motor protection	3TF	3TF
Rated power 50 Hz	30 kW	
Rated power 60 Hz		37.0 kW
Mains requirement: voltage 50 Hz	400/690 V	
Mains requirement: voltage 60 Hz		220-380 V
Pumping speed at 50 Hz	1600 m ³ /h	
Pumping speed at 60 Hz		1920 m ³ /h
Switch	No	No
Protection category	IP 55	

Order number		
Hena 1600	PK D02 810	PK D02 811

Accessories		
SAS 160, DN 160 ISO-K, polyester filter	PK Z60 514	PK Z60 514
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ



UnoLine Plus

Rugged single-stage rotary vane pump for the harshest industrial applications



UnoLine Plus

UnoLine Plus is ideally suited for industrial applications. This rotary vane pump has a proven track record as both a stand-alone pump and as a backing pump for Pfeiffer Vacuum Roots pumps.

This pump is water-cooled and extremely insensitive to dust and dirt. It is equipped with an oil regeneration system. Separating the process oil from the bearing oil supply extends the life of the pumps. Condensates, contaminants and dust particles can be separated from the operating medium, collected in the vapor separator and drained.

The adjustable cooling water controller enables the UnoLine Plus pumps to maintain the required operating temperature. These pumps are equipped with a gas ballast in order to pump down vapors.

Customer benefits

- Low operating costs
- Maximum process capability
- Long life due to minimal wear
- Ideally suited for drying processes

Typical applications

- Drying processes
- Electron beam welding
- Vacuum furnaces
- Fusion technology
- Biotechnology
- Heat treatment



Vacuum drying



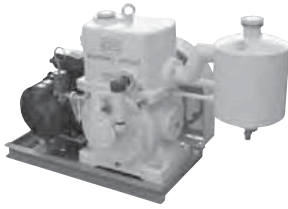
Vacuum furnaces



Electron beam welding

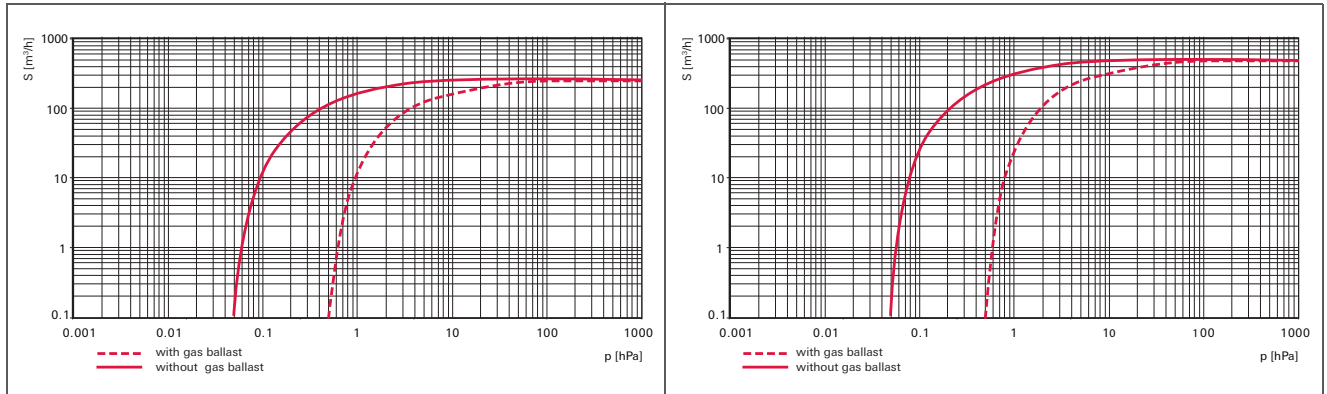
UnoLine Plus

Single-stage rotary vane pump with pumping speeds of 251 m³/h and 501 m³/h:

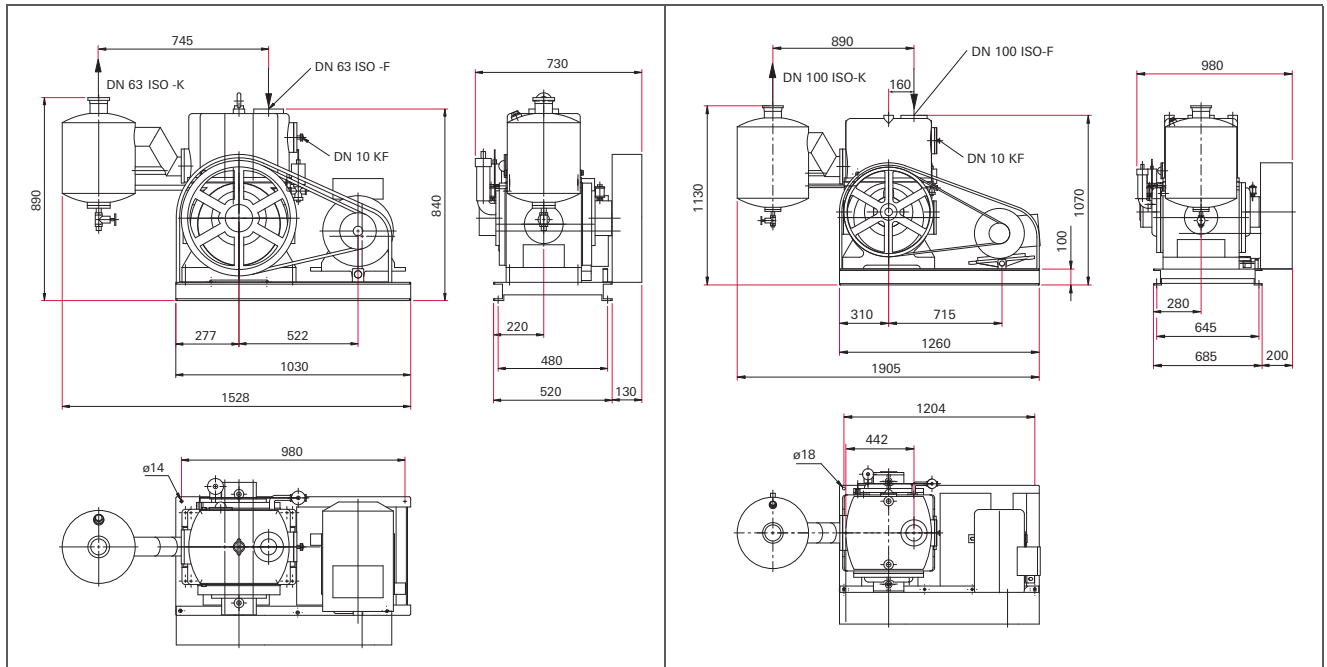


- Single-stage, high-performance rotary vane pump with a pumping speed of 250 m³/h
- 3-phase motor for 220-240 V, 50 Hz or 380-420 V, 50 Hz supply voltages
- Process integrity thanks to integrated gas ballast valve
- Without HV safety valve
- For low and medium vacuum applications
- Other motor voltages available on request

Pumping speed



Dimensions (in mm)



BA 251, 3-phase motor, 220-240/380-420 V

BA 501, 3-phase motor, 220-240/380-420 V

Technical data	BA 251, 3-phase motor, 220-240/380-420 V, 50 Hz, without HV safety valve	BA 251, 3-phase motor, 440-480 V, 60 Hz, without HV safety valve	BA 501, 3-phase motor, 220-240/380-420 V, 50 Hz, without HV safety valve	BA 501, 3-phase motor, 440-480 V, 60 Hz, without HV safety valve
Flange (out)	DN 63 ISO-K	DN 63 ISO-K	DN 100 ISO-K	DN 100 ISO-K
Flange (in)	DN 63 ISO-F	DN 63 ISO-F	DN 100 ISO-F	DN 100 ISO-F
Exhaust pressure, max.	1500 hPa	1500 hPa	1500 hPa	1500 hPa
Exhaust pressure, min.	Atmospheric pressure	Atmospheric pressure	Atmospheric pressure	Atmospheric pressure
Operating fluid	P3	P3	P3	P3
Operating fluid filling	17 l	17 l	45 l	45 l
Rotation speed at 50 Hz	490 min ⁻¹	490 min ⁻¹	345 min ⁻¹	345 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 63 dB (A)		≤ 65 dB (A)	
Emission sound pressure level without gas ballast at 60 Hz		≤ 63 dB (A)		≤ 65 dB (A)
Ultimate pressure with gas ballast	1 hPa	1 hPa	1 hPa	1 hPa
Ultimate pressure without gas ballast	6 · 10 ⁻² hPa	6 · 10 ⁻² hPa	6 · 10 ⁻² hPa	6 · 10 ⁻² hPa
Weight: with motor	570 kg	570 kg	1100 kg	1100 kg
Cooling method, standard	Water	Water	Water	Water
Cooling water pressure	200-1000 kPa	200-1000 kPa	200-1000 kPa	200-1000 kPa
Cooling water temperature	10-30 °C	10-30 °C	10-30 °C	10-30 °C
Cooling water consumption	> 50 l/h	> 50 l/h	> 90 l/h	> 90 l/h
Motor protection	3TF	3TF	3TF	3TF
Nominal rotation speed at 50 Hz	1500 min ⁻¹		1500 min ⁻¹	
Nominal rotation speed at 60 Hz		1800 min ⁻¹		1800 min ⁻¹
Rated power 50 Hz	11 kW		15 kW	
Rated power 60 Hz		13 kW		18 kW
Mains requirement: voltage (range)	220-240/380-420 V (± 5 %) 50 Hz	440-480 V (± 5 %) 60 Hz	220-240/380-420 V (± 5 %) 50 Hz	440-480 V (± 5 %) 60 Hz
Mains requirement: voltage 50 Hz	230/400 V		230/400 V	
Mains requirement: voltage 60 Hz		265/460 V		460 V
Mains cable	No	No	No	No
Pumping speed at 50 Hz	250 m ³ /h		500 m ³ /h	
Pumping speed at 60 Hz		250 m ³ /h		500 m ³ /h
Switch	No	No	No	No
Protection category	IP 55	IP 55	IP 55	IP 55
Temperature: Operating	80 °C	80 °C	80 °C	80 °C
Ambient temperature	12-40 °C	12-40 °C	12-40 °C	12-40 °C

Order number				
UnoLine Plus	PK C42 602	PK C42 637	PK C43 602	PK C43 637

Accessories				
SAS 63, DN 63 ISO-K, polyester filter	PK Z60 511	PK Z60 511	PK Z60 511	PK Z60 511
KAS 63, condensate separator for pumping speeds up to 250 m ³ /h	PK Z10 010	PK Z10 010	PK Z10 010	PK Z10 010
ONF 100, oil mist filter for pumping speeds up to 300 m ³ /h	PK Z40 012	PK Z40 012	PK Z40 012	PK Z40 012
Oil return unit, ORF 005, standard version	PK Z90 065	PK Z90 065	PK Z90 065	PK Z90 065
ZFO 063, zeolite trap	PK Z70 010	PK Z70 010	PK Z70 010	PK Z70 010
FAK 063, activated carbon filter	PK Z30 010	PK Z30 010	PK Z30 010	PK Z30 010
KLF 063, cold trap	PK Z80 010	PK Z80 010	PK Z80 010	PK Z80 010
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ	P 4768 051 FQ	P 4768 051 FQ
Operating fluid level monitoring, 24 V DC for BA 251/501	PK 133 115 -T	PK 133 115 -T	PK 133 115 -T	PK 133 115 -T
Cooling water connection unit for BA 251/501	PK 133 100 -T	PK 133 100 -T	PK 133 100 -T	PK 133 100 -T
Pressure monitor for cooling water circulation system BA 251/501	P 4747 161 MF	P 4747 161 MF	P 4747 161 MF	P 4747 161 MF
EVB 063 PA, Angle valve with position indicator (PI), with pilot valve (PV), 24 V DC	PF B18 201	PF B18 201	PF B18 201	PF B18 201

PentaLine®

Two-stage rotary vane pumps for energy-saving operation



PentaLine®

PentaLine® innovative two-stage rotary vane pumps with a pumping speed of 34 m³/h are the perfect solution for applications in the low and medium vacuum range of up to 10⁻³ hPa. Operating safety and reliability are second nature to them even under the harshest conditions. Industrial uses such as drying and metallurgical processes, analytical tasks or coating applications as well as research and development are easily mastered with the PentaLine pumps.

The optimized drive system in the pumps is both environmentally friendly and efficient. Operating costs are significantly lower than for conventional rotary vane pumps thanks to the roughly 50 % reduction in energy consumption.

Compact and hermetically sealed – the innovative PentaLine is clean and low maintenance. It gives off less heat and has a longer life due to its innovative standby operation.

The innovative motor concept makes them easy to deploy anywhere in the world and meets the ecological design requirements of the EU directive 2005/32/EC. The motor achieves premium efficiency and already exceeds the minimum requirements of efficiency level IE3 which apply from 2017.

The PentaLine pumps run extremely quiet and with a minimum of vibration. They enhance working conditions and make it easier to concentrate.

Customer benefits

- Lower installation costs
- No premature maintenance stops
- Reduced operating costs
- Ultra-quiet operation (particularly in standby mode)

Typical applications

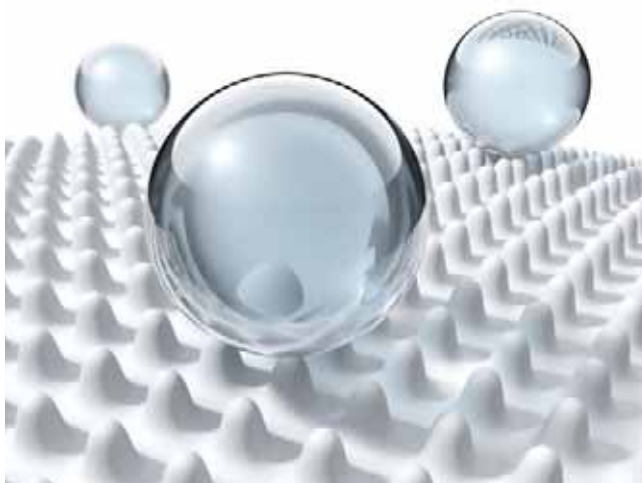
- Mass spectrometry
- Electron microscopy
- Freeze drying
- Metallurgy
- Industrial leak detection
- Hard disk coating
- Optical coating
- Medical technology
- Nanotechnology
- Plasma research



Optical coating



Medical technology



Nanotechnology

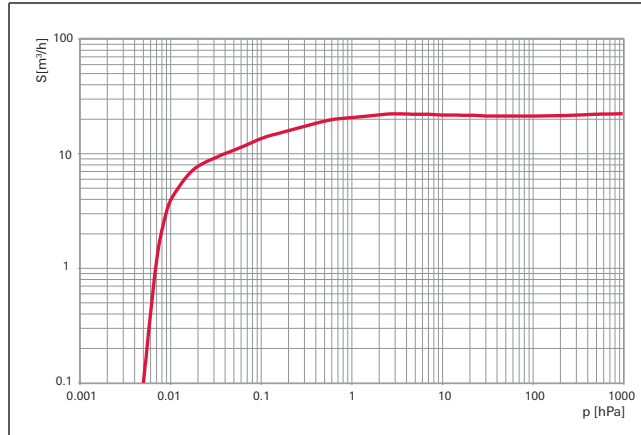
Penta 20



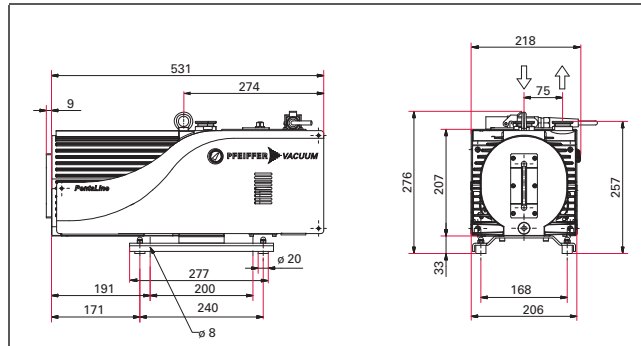
Innovative rotary vane pumps with a pumping speed up to 22 m³/h, power-saving worldwide motor and standby function

- Compact and innovative two-stage rotary vane pump with a pumping speed up to 22 m³/h
- Ideal for nearly all low and medium vacuum applications
- Saves up to 50 % of drive power consumption compared to ordinary rotary vane pumps
- Separating drive and suction chamber affords a clean and hermetically sealed solution

Pumping speed



Dimensions (in mm)



Technical data	Penta 20, 1-ph motor, 110-220 V, 50/60 Hz
Flange (out)	DN 25 ISO-KF
Flange (in)	DN 25 ISO-KF
Operating fluid	P3
Operating fluid filling	1.8 l
Rotation speed at stand-by	900 min ⁻¹
Rotation speed max.	1800 min ⁻¹
Emission sound pressure level without gas ballast	58 dB (A)
Recommended mains fuse capacity	9 A
Ultimate pressure with gas ballast	5 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	3 · 10 ⁻³ hPa
Weight	43 kg
Cooling method, standard	Air
Nominal rotation speed at 50 Hz	1800 min ⁻¹
Nominal rotation speed at 60 Hz	1800 min ⁻¹
Power consumption at 1 hPa	0.41 kW
Power consumption in stand-by mode	0.225 kW
Rated current absorption	100-120 V 50/60 Hz, 6.4 A ; 200-240 V 50/60 Hz, 3.1 A
Mains requirement: voltage (selectable)	100-120 V (± 10 %) 50/60 Hz ; 200-240 V (± 10 %) 50/60 Hz
Mains cable	No
Pumping speed, max.	22 m ³ /h
Switch	No
Temperature: Operating	12-40 °C

Ultimate pressure according to PNEUROP

Order number	
Penta 20	PK D74 010

Accessories	
SAS 25, DN 25 ISO-KF, polyester filter	PK Z60 508
KAS 25 L, condensate separator for pumping speeds up to 34 m ³ /h	PK Z10 033
ONF 25 L, oil mist filter for pumping speeds of up to 30 m ³ /h	PK Z40 158
Oil return unit from ONF 25 M, 25 L, 25 XL	PK 198 545 -T
ZFO 025, zeolite trap	PK Z70 006
FAK 025, activated carbon filter	PK Z30 006
KLF 025, cold trap	PK Z80 006
URB 025, catalytic trap, 230 V	PT U10 760
URB 025, catalytic trap, 115 V	PT U10 761
Oil pressure switch for DUO 5/10/20 M and Penta 20/35	PK 196 484 -T
Mains cable 230 V AC with safety plug, VII-HAN 3A, 3 m	P 4564 309 HA
Mains supply socket	PM 061 200 -T
Customizable release connector	PK 198 548

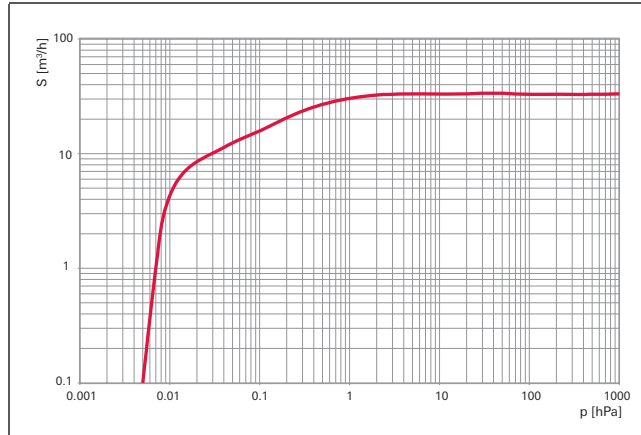
Penta 35



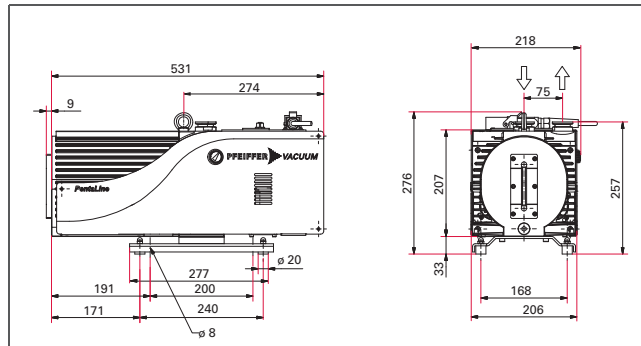
Innovative rotary vane pumps with a pumping speed up to 34 m³/h, power-saving worldwide motor and standby function

- Compact and innovative two-stage rotary vane pump with a pumping speed up to 34 m³/h
- Ideal for nearly all low and medium vacuum applications
- Saves up to 50% of drive power consumption compared to ordinary rotary vane pumps
- Separating drive and suction chamber affords a clean and hermetically sealed solution

Pumping speed



Dimensions (in mm)



Technical data	Penta 35, 1-ph motor, 110-220 V, 50/60 Hz
Flange (in)	DN 25 ISO-KF
Flange (out)	DN 25 ISO-KF
Operating fluid	P3
Operating fluid filling	1.5 l
Rotation speed at stand-by	900 min ⁻¹
Rotation speed max.	1800 min ⁻¹
Emission sound pressure level without gas ballast	58 dB (A)
Ultimate pressure with gas ballast	5 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	3 · 10 ⁻³ hPa
Weight	45 kg
Cooling method, standard	Air
Nominal rotation speed at 50 Hz	1800 min ⁻¹
Nominal rotation speed at 60 Hz	1800 min ⁻¹
Power consumption at 1 hPa	0.41 kW
Power consumption in stand-by mode	0.225 kW
Rated current absorption	100-120 V 50/60 Hz, 7.5 A; 200-240 V 50/60 Hz, 3.7 A
Mains requirement: voltage (selectable)	100-120 V (± 10 %) 50/60 Hz; 200-240 V (± 10 %) 50/60 Hz
Mains cable	No
Pumping speed, max.	34 m ³ /h
Switch	No
Temperature: Operating	12-40 °C

Ultimate pressure according to PNEURO P

Order number	
Penta 35	PK D75 010

Accessories	
SAS 25, DN 25 ISO-KF, polyester filter	PK Z60 508
KAS 25 L, condensate separator for pumping speeds up to 34 m ³ /h	PK Z10 033
ONF 25 XL, oil mist filter for pumping speeds up to 42 m ³ /h	PK Z40 160
Oil return unit from ONF 25 M, 25 L, 25 XL	PK 198 545 -T
ZFO 025, zeolite trap	PK Z70 006
FAK 025, activated carbon filter	PK Z30 006
KLF 025, cold trap	PK Z80 006
URB 025, catalytic trap, 230 V	PT U10 760
URB 025, catalytic trap, 115 V	PT U10 761
Oil pressure switch for DUO 5/10/20 M and Penta 20/35	PK 196 484 -T
Mains cable 230 V AC with safety plug, VII-HAN 3A, 3 m	P 4564 309 HA
Mains supply socket	PM 061 200 -T
Customizable release connector	PK 198 548

DuoLine™

Two-stage rotary vane pumps for low and medium vacuum



DuoLine™

DuoLine rotary vane pumps with a pumping speed of 1.3 to 250 m³/h cover all applications in the low and medium vacuum range of up to 10⁻³ hPa. These pumps operate reliably either as a stand-alone pump or a backing pump in Roots or turbo pumping stations even for critical industrial applications such as drying procedures, metallurgical processes or resin casting systems.

The use of a magnetic coupling reduces maintenance and generates significant cost savings per pump and maintenance interval.

The innovative drive concept, alternatively available with a magnetic coupling, means that these pumps are hermetically sealed and therefore clean and environmentally friendly. Oil leakages found in pumps with a conventional radial shaft seal ring no longer occur.

Customer benefits

- High operating safety
- Optimal adjustment to processes
- Easy system integration
- Low maintenance costs

Typical applications

- Electron microscopy
- Optical coating
- Hard disk coating
- Electron beam welding
- Biotechnology
- Heat treatment
- Vacuum drying
- Vacuum furnaces
- Nanotechnology
- Mass spectrometry



Optical coating



Electron microscopy



Electron beam welding

DUO 1.6

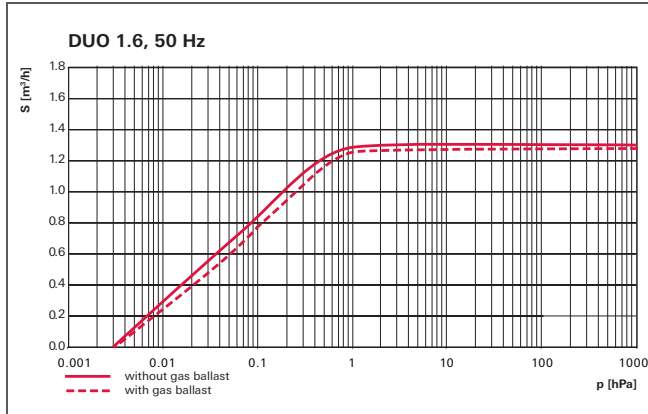
Dual-stage rotary vane pumps with a pumping speed of 1.5 m³/h:



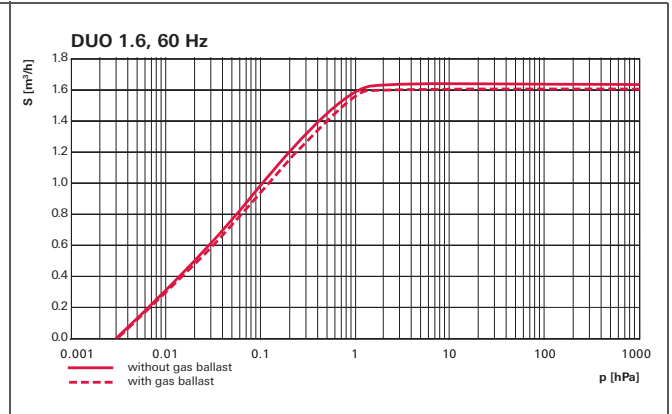
- Dual-stage, high-performance rotary vane pump with a pumping speed of 1.5 m³/h
- With Single-phase motor
- Integrated gas ballast and safety valve
- For all low and medium vacuum applications
- With magnetic coupling
- Special feature: Various motor voltages for worldwide employment
- Other motor voltages available on request

M = Magnetically coupled

Pumping speed

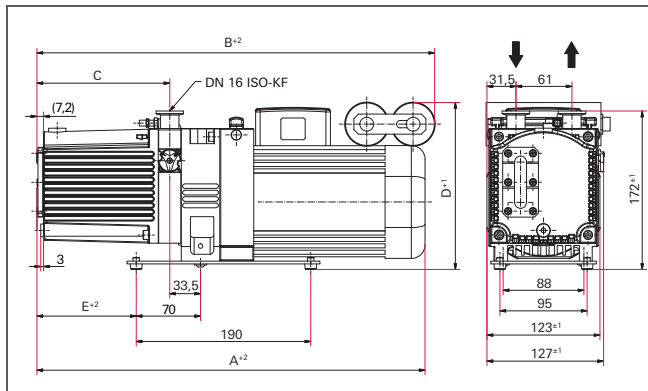


DUO 1.6, 1-phase motor

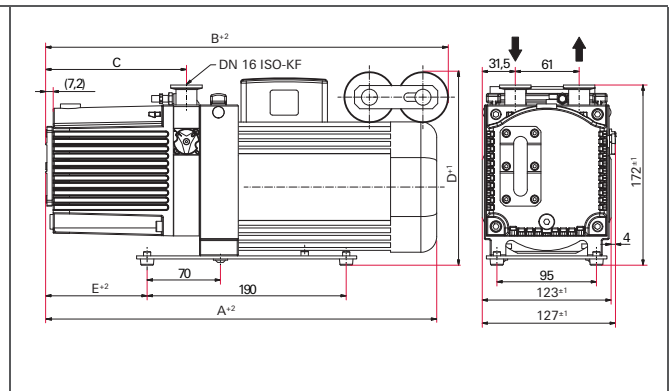


DUO 1.6, 1-phase motor

Dimensions (in mm)



DUO 1.6 M, 1-phase motor



DUO 1.6, 1-phase motor

	DUO 1.6 M, 1-phase motor, 100-105 V, 50 Hz; 100-130 V, 60 Hz	DUO 1.6 M, 1-phase motor, 220-240 V, 50/60 Hz	DUO 1.6, 1-phase motor, 100-105 V, 50 Hz; 100-130 V, 60 Hz	DUO 1.6, 1-phase motor, 220-240 V, 50/60 Hz
A	357 mm	357 mm	315 mm	315 mm
B	376 mm	357 mm	335 mm	315 mm
C	123 mm	123 mm	123 mm	123 mm
D	192 mm	189 mm	192 mm	189 mm
E	85.5 mm	85.5 mm	85.5 mm	85.5 mm

Technical data	DUO 1.6 M, 1-phase motor, 100-105 V, 50 Hz; 100-130 V, 60 Hz	DUO 1.6 M, 1-phase motor, 220-240 V, 50/60 Hz	DUO 1.6, 1-phase motor, 100-105 V, 50 Hz; 100-130 V, 60 Hz	DUO 1.6, 1-phase motor, 220-240 V, 50/60 Hz
Flange (out)	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Flange (in)	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Exhaust pressure, max.	1500 hPa	1500 hPa	1500 hPa	1500 hPa
Exhaust pressure, min.	250 hPa	250 hPa	250 hPa	250 hPa
Operating fluid	P3	P3	P3	P3
Operating fluid filling	0.4 l	0.4 l	0.4 l	0.4 l
Rotation speed at 50 Hz	1500 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹	1800 min ⁻¹	1800 min ⁻¹	1800 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 48 dB (A)	≤ 48 dB (A)	≤ 48 dB (A)	≤ 48 dB (A)
Ultimate pressure with gas ballast	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa
Weight	10.5 kg	10.5 kg	9.6 kg	9.6 kg
Cooling method, standard	Air	Air	Air	Air
Leak rate safety valve	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s
Magnetic coupling	Yes	Yes		
Rated power 50 Hz	0.075 kW	0.075 kW	0.075 kW	0.075 kW
Rated power 60 Hz	0.090 kW	0.090 kW	0.090 kW	0.090 kW
Mains requirement: voltage 50 Hz	100-105 V	220-240 V	100-105 V	220-240 V
Mains requirement: voltage 60 Hz	110-130 V	220-240 V	110-130 V	220-240 V
Mains cable	No	No	No	No
Pumping speed at 50 Hz	1.25 m ³ /h	1.25 m ³ /h	1.25 m ³ /h	1.25 m ³ /h
Pumping speed at 60 Hz	1.50 m ³ /h	1.50 m ³ /h	1.50 m ³ /h	1.50 m ³ /h
Switch	Yes	Yes	Yes	Yes
Protection category	IP 40	IP 40	IP 40	IP 40
Ambient temperature	12-40 °C	12-40 °C	12-40 °C	12-40 °C

Order number				
DUO 1.6	PK D56 107	PK D56 112	PK D56 707	PK D56 712

Accessories				
KAS 16, condensate separator for pumping speeds from 1.6 to 12 m ³ /h	PK Z10 003	PK Z10 003	PK Z10 003	PK Z10 003
ONF 16 S, oil mist filter for pumping speeds up to 12 m ³ /h	PK Z40 001	PK Z40 001	PK Z40 001	PK Z40 001
Oil return unit from ONF 16 S to DUO 1.6 / DUO 3	PK 005 986 -T	PK 005 986 -T	PK 005 986 -T	PK 005 986 -T
ONF 16 M, oil mist filter for pumping speeds of up to 12 m ³ /h	PK Z40 003	PK Z40 003	PK Z40 003	PK Z40 003
ZFO 16, zeolite trap	PK Z70 003	PK Z70 003	PK Z70 003	PK Z70 003
Operations monitoring unit 3 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 141 -T	PK 196 141 -T	PK 196 141 -T	PK 196 141 -T
Operations monitoring unit 2 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 142 -T	PK 196 142 -T	PK 196 142 -T	PK 196 142 -T
Operations monitoring unit 1 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 157 -T	PK 196 157 -T	PK 196 157 -T	PK 196 157 -T
Mains cable 230 V with safety plug CEE 7, right angle IEC 320/C13 socket, 2 m	PK 050 109	PK 050 109	PK 050 109	PK 050 109
Mains cable 115 V with NEMA-plug, right angle IEC 320/C13 socket, 2 m	PK 050 110	PK 050 110	PK 050 110	PK 050 110
SAS 16, DN 16 ISO-KF, polyester filter	PK Z60 506	PK Z60 506	PK Z60 506	PK Z60 506
Oil return unit from ONF 16 M to DUO 1.6, 3	PK 006 080 -T	PK 006 080 -T	PK 006 080 -T	PK 006 080 -T
Mains cable 115 / 230 V without plug, right angle IEC 320/C13 socket, 3 m	PK 050 111	PK 050 111	PK 050 111	PK 050 111

DUO 3

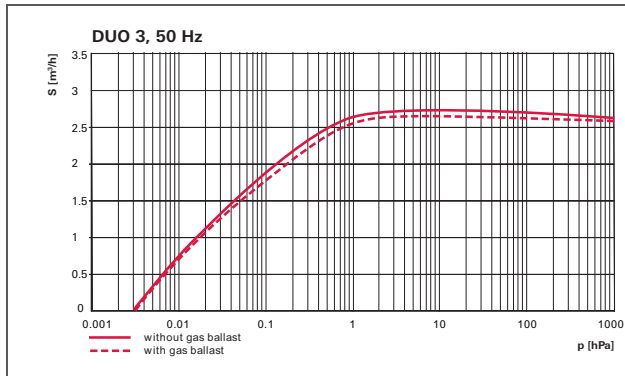
Dual-stage rotary vane pumps with a pumping speed up to 2.9 m³/h:



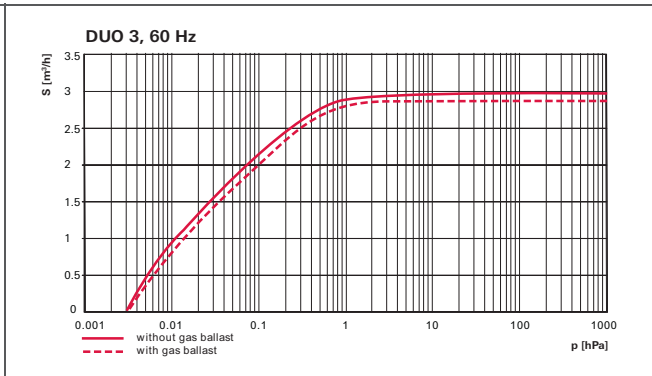
- Dual-stage, high-performance rotary vane pump with a pumping speed up to 2.9 m³/h
- With Single-phase motor
- Integrated gas ballast and safety valve
- For all low and medium vacuum applications
- Magnetic coupling
- Special feature: Various motor voltages for worldwide employment
- Other motor voltages available on request

M = Magnetically coupled

Pumping speed

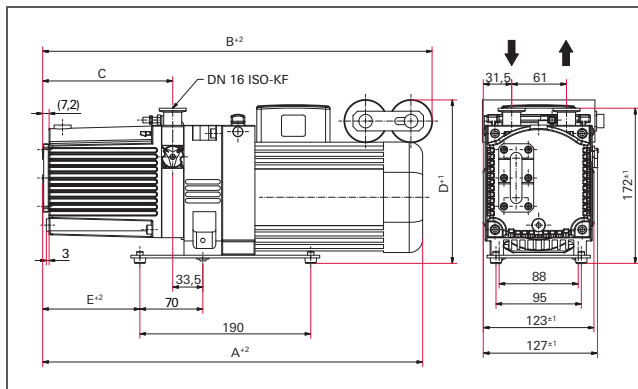


DUO 3, 1-phase motor

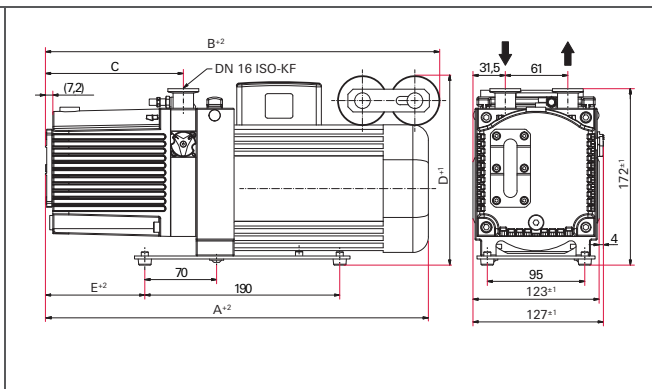


DUO 3, 1-phase motor

Dimensions (in mm)



DUO 3 M, 1-phase motor



DUO 3, 1-phase motor

	DUO 3 M, 1-phase motor, 115/230 V, 50/60 Hz	DUO 3 M, 1-phase motor, 220-240 V, 50/60 Hz	DUO 3, 1-phase motor, 115/230 V, 50/60 Hz	DUO 3, 1-phase motor, 220-240 V, 50/60 Hz
A	351 mm	351 mm	309 mm	309 mm
B	386 mm	351 mm	344 mm	309 mm
C	123 mm	123 mm	123 mm	123 mm
D	176 mm	176 mm	176 mm	176 mm
E	85.5 mm	85.5 mm	85.5 mm	85.5 mm

Technical data	DUO 3 M, 1-phase motor, 115/230 V, 50/60 Hz	DUO 3 M, 1-phase motor, 220-240 V, 50/60 Hz	DUO 3, 1-phase motor, 115/230 V, 50/60 Hz	DUO 3, 1-phase motor, 220-240 V, 50/60 Hz
Flange (out)	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Flange (in)	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Exhaust pressure, max.	1500 hPa	1500 hPa	1500 hPa	1500 hPa
Exhaust pressure, min.	250 hPa	250 hPa	250 hPa	250 hPa
Operating fluid	P3	P3	P3	P3
Operating fluid filling	0.4 l	0.4 l	0.4 l	0.4 l
Rotation speed at 50 Hz	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Rotation speed at 60 Hz	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 53 dB (A)	≤ 53 dB (A)	≤ 53 dB (A)	≤ 53 dB (A)
Ultimate pressure with gas ballast	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa
Weight	12 kg	12 kg	11.5 kg	11.3 kg
Cooling method, standard	Air	Air	Air	Air
Leak rate safety valve	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s
Magnetic coupling	Yes	Yes		
Rated power 50 Hz	0.15 kW	0.15 kW	0.15 kW	0.15 kW
Rated power 60 Hz	0.18 kW	0.18 kW	0.18 kW	0.18 kW
Mains requirement: voltage (selectable)	230 V		230 V	
Mains requirement: voltage 50 Hz	115 V	220-240 V	115 V	220-240 V
Mains requirement: voltage 60 Hz	115 V	220-240 V	115 V	220-240 V
Mains cable	No	No	No	No
Pumping speed at 50 Hz	2.5 m ³ /h	2.5 m ³ /h	2.5 m ³ /h	2.5 m ³ /h
Pumping speed at 60 Hz	2.9 m ³ /h	2.9 m ³ /h	2.9 m ³ /h	2.9 m ³ /h
Switch	Yes	Yes	Yes	Yes
Protection category	IP 55	IP 55	IP 55	IP 55
Ambient temperature	12-40 °C	12-40 °C	12-40 °C	12-40 °C

Order number				
DUO 3	PK D57 111	PK D57 112	PK D57 711	PK D57 712

Accessories				
KAS 16, condensate separator for pumping speeds from 1.6 to 12 m ³ /h	PK Z10 003	PK Z10 003	PK Z10 003	PK Z10 003
ONF 16 S, oil mist filter for pumping speeds up to 12 m ³ /h	PK Z40 001	PK Z40 001	PK Z40 001	PK Z40 001
Oil return unit from ONF 16 S to DUO 1.6 / DUO 3	PK 005 986 -T	PK 005 986 -T	PK 005 986 -T	PK 005 986 -T
ONF 16 M, oil mist filter for pumping speeds of up to 12 m ³ /h	PK Z40 003	PK Z40 003	PK Z40 003	PK Z40 003
ZFO 16, zeolite trap	PK Z70 003	PK Z70 003	PK Z70 003	PK Z70 003
Operations monitoring unit 3 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 141 -T	PK 196 141 -T	PK 196 141 -T	PK 196 141 -T
Operations monitoring unit 2 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 142 -T	PK 196 142 -T	PK 196 142 -T	PK 196 142 -T
Operations monitoring unit 1 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 157 -T	PK 196 157 -T	PK 196 157 -T	PK 196 157 -T
Mains cable 230 V with safety plug CEE 7, right angle IEC 320/C13 socket, 2 m	PK 050 109	PK 050 109	PK 050 109	PK 050 109
Mains cable 115 V with NEMA-plug, right angle IEC 320/C13 socket, 2 m	PK 050 110	PK 050 110	PK 050 110	PK 050 110
SAS 16, DN 16 ISO-KF, polyester filter	PK Z60 506	PK Z60 506	PK Z60 506	PK Z60 506
Oil return unit from ONF 16 M to DUO 1.6, 3	PK 006 080 -T	PK 006 080 -T	PK 006 080 -T	PK 006 080 -T
Mains cable 115 / 230 V without plug, right angle IEC 320/C13 socket, 3 m	PK 050 111	PK 050 111	PK 050 111	PK 050 111

DUO 6

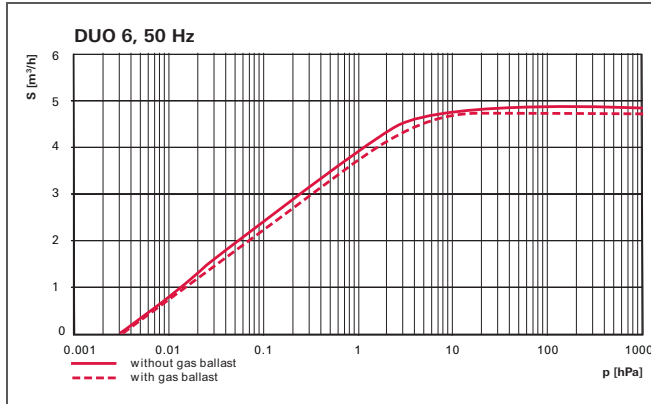
Dual-stage rotary vane pumps with a pumping speed up to 6 m³/h:



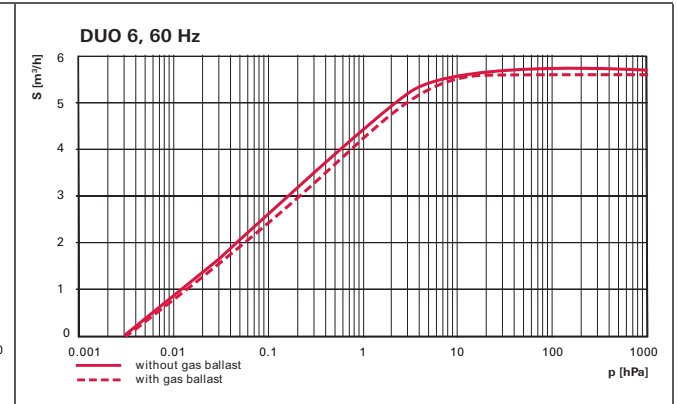
- Dual-stage, high-performance rotary vane pump with a pumping speed up to 6 m³/h
- With Single-phase motor
- Integrated gas ballast and HV safety valve
- For all low and medium vacuum applications
- With magnetic coupling
- Other motor voltages available on request

M = Magnetically coupled

Pumping speed

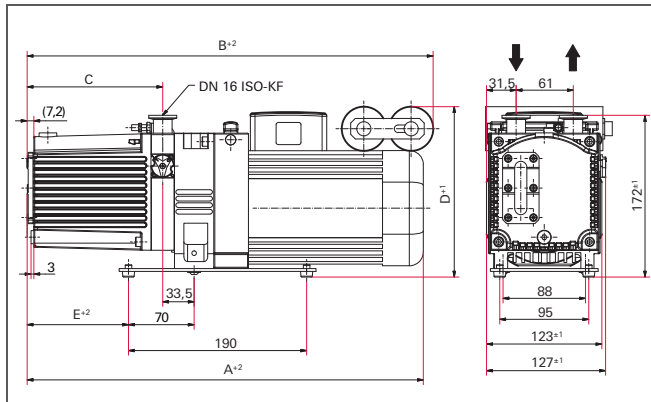


DUO 6, 1-phase motor

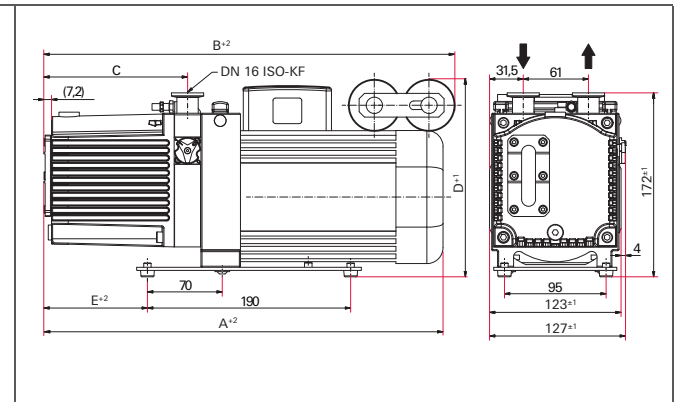


DUO 6, 1-phase motor

Dimensions (in mm)



DUO 6 M, 1-phase motor



DUO 6, 1-phase motor

	DUO 6 M, 1-phase motor, 95-115, 50 Hz; 95-130, 60 Hz	DUO 6 M, 1-phase motor, 220-265 V, 50/60 Hz	DUO 6, 1-phase motor, 95-115, 50 Hz; 95-130, 60 Hz	DUO 6, 1-phase motor, 200-265 V, 50/60 Hz
A	423 mm	413 mm	381 mm	371 mm
B	433 mm	413 mm	391 mm	371 mm
C	145 mm	145 mm	145 mm	145 mm
D	182 mm	177.5 mm	182 mm	177 mm
E	108.5 mm	108.5 mm	107.5 mm	107.5 mm

Technical data	DUO 6 M, 1-phase motor, 95-115, 50 Hz; 95-130, 60 Hz	DUO 6 M, 1-phase motor, 220-265 V, 50/60 Hz	DUO 6, 1-phase motor, 95-115, 50 Hz; 95-130, 60 Hz	DUO 6, 1-phase motor, 200-265 V, 50/60 Hz
Flange (out)	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Flange (in)	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Exhaust pressure, max.	1500 hPa	1500 hPa	1500 hPa	1500 hPa
Exhaust pressure, min.	250 hPa	250 hPa	250 hPa	250 hPa
Operating fluid	P3	P3	P3	P3
Operating fluid filling	0.5 l	0.5 l	0.5 l	0.5 l
Rotation speed at 50 Hz	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Rotation speed at 60 Hz	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 53 dB (A)	≤ 53 dB (A)	≤ 53 dB (A)	≤ 53 dB (A)
Ultimate pressure with gas ballast	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa
Weight	17.5 kg	17.5 kg	16 kg	16 kg
Cooling method, standard	Air	Air	Air	Air
Leak rate safety valve	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s
Magnetic coupling	Yes	Yes		
Rated power 50 Hz	0.25 kW	0.25 kW	0.25 kW	0.25 kW
Rated power 60 Hz	0.30 kW	0.30 kW	0.30 kW	0.30 kW
Mains requirement: voltage 50 Hz	95-115 V	200-265 V	95-115 V	200-265 V
Mains requirement: voltage 60 Hz	95-130 V	200-265 V	95-130 V	200-265 V
Mains cable	No	No	No	No
Pumping speed at 50 Hz	5 m ³ /h	5 m ³ /h	5 m ³ /h	5 m ³ /h
Pumping speed at 60 Hz	6 m ³ /h	6 m ³ /h	6 m ³ /h	6 m ³ /h
Switch	Yes	Ja	Yes	Yes
Protection category	IP 55	IP 55	IP 55	IP 55
Ambient temperature	12-40 °C	12-40 °C	12-40 °C	12-40 °C

Order number				
DUO 6	PK D58 107	PK D58 112	PKD58 707	PK D58 712

Accessories				
KAS 16, condensate separator for pumping speeds from 1.6 to 12 m ³ /h	PK Z10 003	PK Z10 003	PK Z10 003	PK Z10 003
ONF 16 S, oil mist filter for pumping speeds up to 12 m ³ /h	PK Z40 001	PK Z40 001	PK Z40 001	PK Z40 001
Oil return unit from ONF 16 S to DUO 1.6 / DUO 3	PK 005 986 -T	PK 005 986 -T	PK 005 986 -T	PK 005 986 -T
ONF 16 M, oil mist filter for pumping speeds of up to 12 m ³ /h	PK Z40 003	PK Z40 003	PK Z40 003	PK Z40 003
ZFO 16, zeolite trap	PK Z70 003	PK Z70 003	PK Z70 003	PK Z70 003
Operations monitoring unit 3 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 141 -T	PK 196 141 -T	PK 196 141 -T	PK 196 141 -T
Operations monitoring unit 2 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 142 -T	PK 196 142 -T	PK 196 142 -T	PK 196 142 -T
Operations monitoring unit 1 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 157 -T	PK 196 157 -T	PK 196 157 -T	PK 196 157 -T
Mains cable 230 V with safety plug CEE 7, right angle IEC 320/C13 socket, 2 m	PK 050 109	PK 050 109	PK 050 109	PK 050 109
Mains cable 115 V with NEMA-plug, right angle IEC 320/C13 socket, 2 m	PK 050 110	PK 050 110	PK 050 110	PK 050 110
SAS 16, DN 16 ISO-KF, polyester filter	PK Z60 506	PK Z60 506	PK Z60 506	PK Z60 506
Oil return unit from ONF 16 M to DUO 1.6, 3	PK 006 080 -T	PK 006 080 -T	PK 006 080 -T	PK 006 080 -T
Mains cable 115 / 230 V without plug, right angle IEC 320/C13 socket, 3 m	PK 050 111	PK 050 111	PK 050 111	PK 050 111

DUO 11

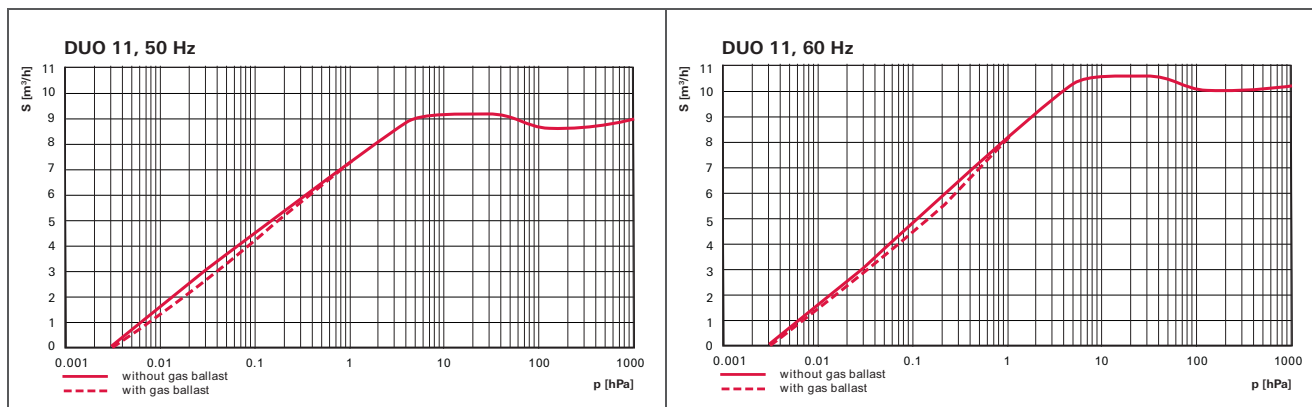
Dual-stage rotary vane pumps with a pumping speed up to 10.5 m³/h:



- Dual-stage, high-performance rotary vane pump with a pumping speed up to 10.5 m³/h
- With Single-phase motor
- Integrated gas ballast and HV safety valve
- For all low and medium vacuum applications
- With magnetic coupling
- Other motor voltages available on request

M = Magnetically coupled

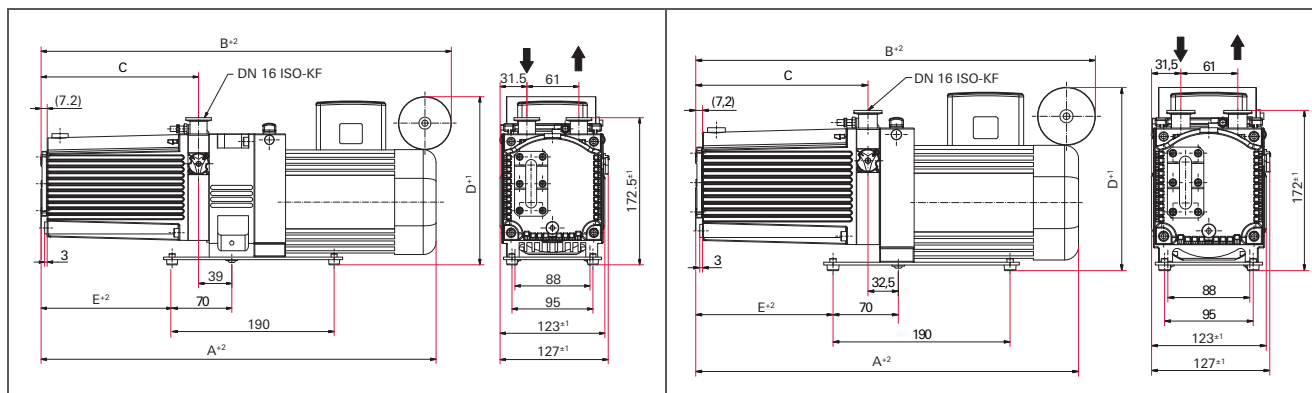
Pumping speed



DUO 11, 1-phase motor, 90-130 V

DUO 11, 1-phase motor, 90-130 V

Dimensions (in mm)



DUO 11 M, 1-phase motor

DUO 11, 1-phase motor, 90-130 V

	DUO 11 M, 1-phase motor, 90-130 V, 50/60 Hz	DUO 11 M, 1-phase motor, 180-265 V, 50/60 Hz	DUO 11, 1-phase motor, 90-130 V, 50/60 Hz	DUO 11, 1-phase motor, 180-265 V, 50/60 Hz
A	463 mm	463 mm	411 mm	411 mm
B	481 mm	460 mm	429 mm	409 mm
C	185 mm	185 mm	185 mm	185 mm
D	154 mm	154 mm	197 mm	191 mm
E	197 mm	192 mm	147.5 mm	147.5 mm

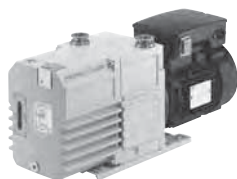
Technical data	DUO 11 M, 1-phase motor, 90-130 V, 50/60 Hz	DUO 11 M, 1-phase motor, 180-265 V, 50/60 Hz	DUO 11, 1-phase motor, 90-130 V, 50/60 Hz	DUO 11, 1-phase motor, 180-265 V, 50/60 Hz
Flange (out)	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Flange (in)	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Exhaust pressure, max.	1500 hPa	1500 hPa	1500 hPa	1500 hPa
Exhaust pressure, min.	250 hPa	250 hPa	250 hPa	250 hPa
Operating fluid	P3	P3	P3	P3
Operating fluid filling	0.6 l	0.6 l	0.6 l	0.6 l
Rotation speed at 50 Hz	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Rotation speed at 60 Hz	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 55 dB (A)	≤ 55 dB (A)	≤ 55 dB (A)	≤ 55 dB (A)
Ultimate pressure with gas ballast	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa
Weight	19 kg	19 kg	17 kg	17 kg
Cooling method, standard	Air	Air	Air	Air
Leak rate safety valve	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s
Magnetic coupling	Yes	Yes		
Rated power 50 Hz	0.25 kW	0.25 kW	0.25 kW	0.25 kW
Rated power 60 Hz	0.30 kW	0.30 kW	0.30 kW	0.30 kW
Mains requirement: voltage 50 Hz	90-130 V	180-265 V	90-130 V	180-265 V
Mains requirement: voltage 60 Hz	90-130 V	180-265 V	90-130 V	180-265 V
Mains cable	No	No	No	No
Pumping speed at 50 Hz	9.0 m ³ /h	9.0 m ³ /h	9.0 m ³ /h	9.0 m ³ /h
Pumping speed at 60 Hz	10.5 m ³ /h	10.5 m ³ /h	10.5 m ³ /h	10.5 m ³ /h
Switch	Yes	Yes	Yes	Yes
Protection category	IP 55	IP 55	IP 55	IP 55
Ambient temperature	12-40 °C	12-40 °C	12-40 °C	12-40 °C

Order number				
DUO 11	PK D59 107	PK D59 112	PK D59 707	PK D59 712

Accessories				
KAS 16, condensate separator for pumping speeds from 1.6 to 12 m ³ /h	PK Z10 003	PK Z10 003	PK Z10 003	PK Z10 003
ONF 16 S, oil mist filter for pumping speeds up to 12 m ³ /h	PK Z40 001	PK Z40 001	PK Z40 001	PK Z40 001
Oil return unit from ONF 16 S to DUO 1.6 / DUO 3	PK 005 986 -T	PK 005 986 -T	PK 005 986 -T	PK 005 986 -T
ONF 16 M, oil mist filter for pumping speeds of up to 12 m ³ /h	PK Z40 003	PK Z40 003	PK Z40 003	PK Z40 003
ZFO 16, zeolite trap	PK Z70 003	PK Z70 003	PK Z70 003	PK Z70 003
Operations monitoring unit 3 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 141 -T	PK 196 141 -T	PK 196 141 -T	PK 196 141 -T
Operations monitoring unit 2 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 142 -T	PK 196 142 -T	PK 196 142 -T	PK 196 142 -T
Operations monitoring unit 1 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 157 -T	PK 196 157 -T	PK 196 157 -T	PK 196 157 -T
Mains cable 230 V with safety plug CEE 7, right angle IEC 320/C13 socket, 2 m	PK 050 109	PK 050 109	PK 050 109	PK 050 109
Mains cable 115 V with NEMA-plug, right angle IEC 320/C13 socket, 2 m	PK 050 110	PK 050 110	PK 050 110	PK 050 110
SAS 16, DN 16 ISO-KF, polyester filter	PK Z60 506	PK Z60 506	PK Z60 506	PK Z60 506
Oil return unit from ONF 16 M to DUO 1.6, 3	PK 006 080 -T	PK 006 080 -T	PK 006 080 -T	PK 006 080 -T
Mains cable 115 / 230 V without plug, right angle IEC 320/C13 socket, 3 m	PK 050 111	PK 050 111	PK 050 111	PK 050 111

DUO 20 M

Dual-stage rotary vane pumps with a pumping speed up to 24 m³/h :



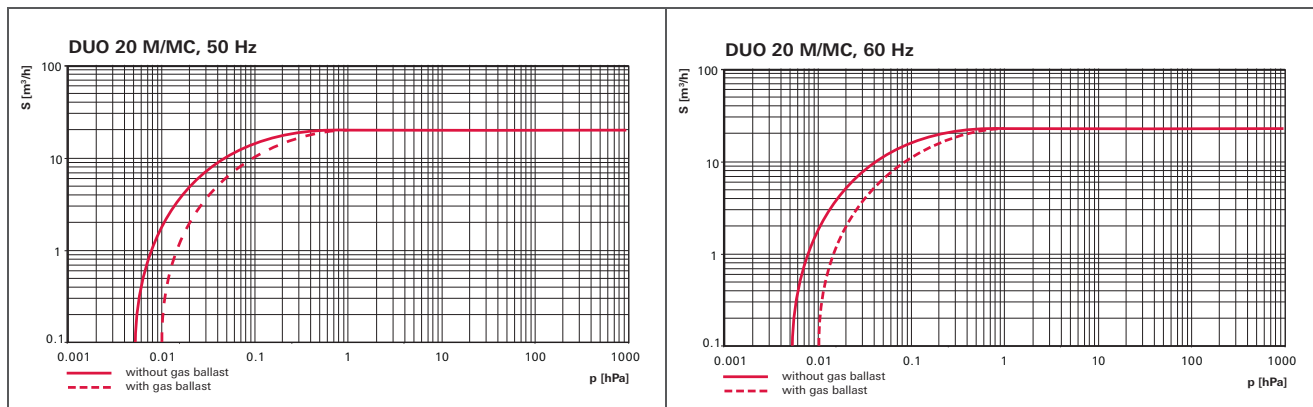
- Dual-stage, high-performance rotary vane pump with a pumping speed up to 24 m³/h
- With 3-phase motor
- With temperature sensor (3TF) for optimum motor protection
- Integrated gas ballast and HV safety valve
- For all low and medium vacuum applications
- Magnetically coupled
- Special feature: Various motor voltages for worldwide employment
- Other motor voltages available on request

M = Magnetically coupled

MC = Corrosive gas version, magnetically coupled

TF = Temperature sensor

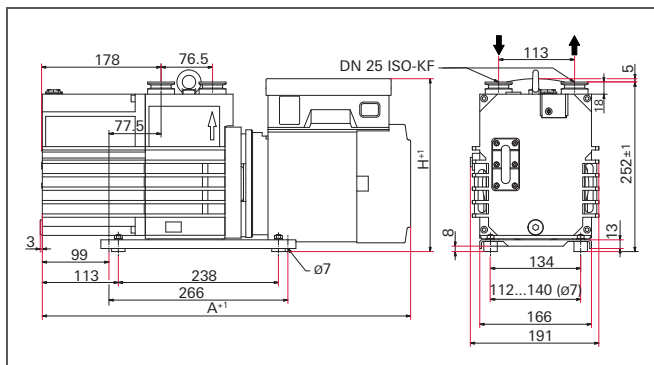
Pumping speed



DUO 20 M, 3-phase motor, 3TF

DUO 20 M, 3-phase motor, 3TF

Dimensions (in mm)



	DUO 20 M, 3-phase motor, 3TF, 220-240/380-420 V, 50 Hz; 250-277/440-480 V, 60 Hz	DUO 20 M, 1-phase motor, 100-110 V, 50 Hz; 100-120 V, 60 Hz	DUO 20 M, 1-phase motor, 200-230 V, 50 Hz; 200-240 V, 60 Hz
A	542 mm	548 mm	548 mm
H	212 mm	257 mm	257 mm

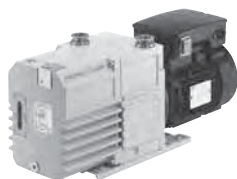
Technical data	DUO 20 M, 3-phase motor, 3TF, 220-240/380-420 V, 50 Hz; 250-277/440-480 V, 60 Hz	DUO 20 M, 1-phase motor, 100-110 V, 50 Hz; 100-120 V, 60 Hz	DUO 20 M, 1-phase motor, 200-230 V, 50 Hz; 200-240 V, 60 Hz
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Exhaust pressure, max.	1500 hPa	1500 hPa	1500 hPa
Exhaust pressure, min.	250 hPa	250 hPa	250 hPa
Operating fluid	P3	P3	P3
Operating fluid filling	1.1 l	1.1 l	1.1 l
Rotation speed at 50 Hz	1500 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹	1800 min ⁻¹	1800 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 55 dB (A)	≤ 57 dB (A)	≤ 57 dB (A)
Ultimate pressure with gas ballast	4 · 10 ⁻³ hPa	4 · 10 ⁻³ hPa	4 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	2 · 10 ⁻³ hPa	2 · 10 ⁻³ hPa	2 · 10 ⁻³ hPa
Weight	33 kg	44 kg	44 kg
Cooling method, standard	Air	Air	Air
Leak rate safety valve	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s
Magnetic coupling	Yes	Yes	Yes
Motor protection	3TF		
Rated power 50 Hz	0.55 kW	0.75 kW	0.75 kW
Rated power 60 Hz	0.66 kW	0.90 kW	0.90 kW
Mains requirement: voltage (selectable)		200-230, 50 Hz; 200-240, 60 Hz V	100-110, 50 Hz; 100-120, 60 Hz V
Mains requirement: voltage 50 Hz	220-240/380-420 (± 5 %) V	100-110 (± 5 %) V	200-230 (± 5 %) V
Mains requirement: voltage 60 Hz	250-277/440-480 (± 5 %) V	100-120 (± 5 %) V	200-240 (± 5 %) V
Mains cable	No	Yes	Yes
Pumping speed at 50 Hz	20 m ³ /h	20 m ³ /h	20 m ³ /h
Pumping speed at 60 Hz	24 m ³ /h	24 m ³ /h	24 m ³ /h
Switch	No	Yes, with 2 m mains cable and US plug	Yes, with 2 m cable and safety plug
Protection category	IP 55	IP 54	IP 54
Ambient temperature	12-40 °C	12-40 °C	12-40 °C

Order number			
DUO 20 M	PK D63 105	PK D63 707	PK D63 712

Accessories			
SAS 25, DN 25 ISO-KF, polyester filter	PK Z60 508	PK Z60 508	PK Z60 508
KAS 25 L, condensate separator for pumping speeds up to 34 m ³ /h	PK Z10 033	PK Z10 033	PK Z10 033
ONF 25 L, oil mist filter for pumping speeds of up to 30 m ³ /h	PK Z40 158	PK Z40 158	PK Z40 158
Oil return unit from ONF 16 M to DUO 5 M, from ONF 25 M to DUO 10 M, from ONF 25 L to DUO 20 M, standard version	PK 196 172 -T	PK 196 172 -T	PK 196 172 -T
ZFO 025, zeolite trap	PK Z70 006	PK Z70 006	PK Z70 006
FAK 025, activated carbon filter	PK Z30 006	PK Z30 006	PK Z30 006
KLF 025, cold trap	PK Z80 006	PK Z80 006	PK Z80 006
URB 025, catalytic trap, 230 V	PT U10 760	PT U10 760	PT U10 760
URB 025, catalytic trap, 115 V	PT U10 761	PT U10 761	PT U10 761
Oil pressure switch for DUO 5/10/20 M and Penta 20/35	PK 196 484 -T	PK 196 484 -T	PK 196 484 -T
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ	P 4768 051 FQ
Operations monitoring unit 3 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 141 -T	PK 196 141 -T	PK 196 141 -T
Operations monitoring unit 2 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 142 -T	PK 196 142 -T	PK 196 142 -T
Operations monitoring unit 1 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 157 -T	PK 196 157 -T	PK 196 157 -T

DUO 20 MC

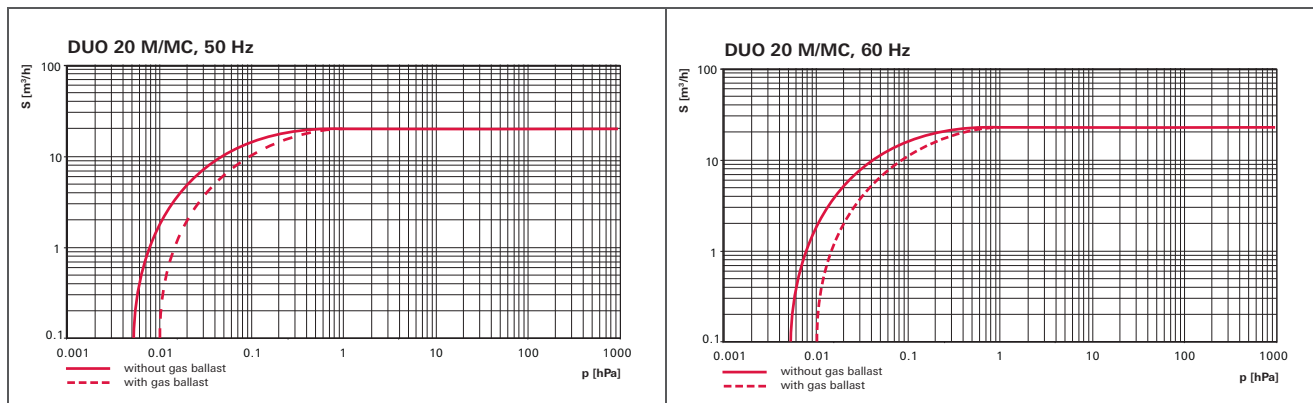
Dual-stage rotary vane pumps with a pumping speed up to 24 m³/h :



- Dual-stage, high-performance rotary vane pump with a pumping speed up to 24 m³/h
- With 3-phase motor
- With temperature sensor (3TF) for optimum motor protection
- Integrated gas ballast and HV safety valve
- For all low and medium vacuum applications
- Magnetically coupled
- Special feature: Various motor voltages for worldwide employment
- Other motor voltages available on request

M = Magnetically coupled
 MC = Corrosive gas version, magnetically coupled
 TF = Temperature sensor

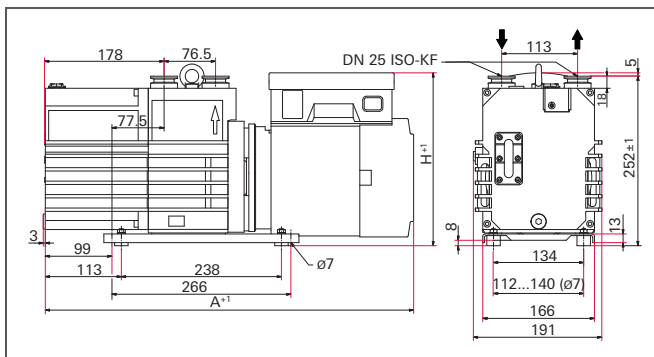
Pumping speed



DUO 20 MC, 3-phase motor, 3TF

DUO 20 MC, 3-phase motor, 3TF

Dimensions (in mm)



	DUO 20 MC, 1-phase motor, 100-110 V, 50 Hz; 100-120 V, 60 Hz	DUO 20 MC, 1-phase motor, 200-230 V, 50 Hz; 200-240 V, 60 Hz
A	548 mm	548 mm
H	257 mm	257 mm

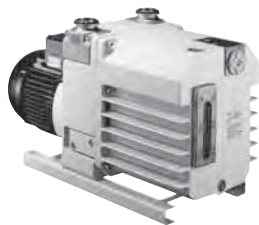
Technical data	DUO 20 MC, 1-phase motor, 100-110 V, 50 Hz; 100-120 V, 60 Hz	DUO 20 MC, 1-phase motor, 200-230 V, 50 Hz; 200-240 V, 60 Hz
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 25 ISO-KF	DN 25 ISO-KF
Exhaust pressure, max.	1500 hPa	1500 hPa
Exhaust pressure, min.	250 hPa	250 hPa
Operating fluid	F4	F4
Operating fluid filling	1.1 l	1.1 l
Rotation speed at 50 Hz	1500 min ⁻¹	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹	1800 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 57 dB (A)	≤ 57 dB (A)
Ultimate pressure with gas ballast	7 · 10 ⁻³ hPa	7 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	4 · 10 ⁻³ hPa	4 · 10 ⁻³ hPa
Weight	44 kg	44 kg
Corrosive gas version	Yes	Yes
Cooling method, standard	Air	Air
Leak rate magnetic coupling	≤ 1 · 10 ⁻⁶ Pa m ³ /s	≤ 1 · 10 ⁻⁶ Pa m ³ /s
Leak rate safety valve	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s
Magnetic coupling	Yes	Yes
Rated power 50 Hz	0.75 kW	0.75 kW
Rated power 60 Hz	0.90 kW	0.90 kW
Mains requirement: voltage (selectable)	200-230, 50 Hz; 200-240, 60 Hz V	100-110, 50 Hz; 100-120, 60 Hz V
Mains requirement: voltage 50 Hz	100-110 (± 5 %) V	200-230 (± 5 %) V
Mains requirement: voltage 60 Hz	100-120 (± 5 %) V	200-240 (± 5 %) V
Mains cable	Yes	Yes
Pumping speed at 50 Hz	20 m ³ /h	20 m ³ /h
Pumping speed at 60 Hz	24 m ³ /h	24 m ³ /h
Switch	Yes, with 2 m mains cable and US plug	Yes, with 2 m mains cable and safety plug
Protection category	IP 54	IP 54
Ambient temperature	12-40 °C	12-40 °C

Order number		
DUO 20 MC	PK D63 727	PK D63 732

Accessories		
SAS 25, DN 25 ISO-KF, polyester filter	PK Z60 508	PK Z60 508
KAS 25 L, condensate separator for pumping speeds up to 34 m ³ /h	PK Z10 033	PK Z10 033
ONF 25 L, oil mist filter for pumping speeds of up to 30 m ³ /h	PK Z40 158	PK Z40 158
Oil return unit from ONF 16 M to DUO 5 M, from ONF 25 M to DUO 10 M, from ONF 25 L to DUO 20 M, standard version	PK 196 172 -T	PK 196 172 -T
ZFO 025, zeolite trap	PK Z70 006	PK Z70 006
FAK 025, activated carbon filter	PK Z30 006	PK Z30 006
KLF 025, cold trap	PK Z80 006	PK Z80 006
URB 025, catalytic trap, 230 V	PT U10 760	PT U10 760
URB 025, catalytic trap, 115 V	PT U10 761	PT U10 761
Oil pressure switch for DUO 5/10/20 M and Penta 20/35	PK 196 484 -T	PK 196 484 -T
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ
Operations monitoring unit 3 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 141 -T	PK 196 141 -T
Operations monitoring unit 2 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 142 -T	PK 196 142 -T
Operations monitoring unit 1 for DUO 1.6/3/6/11 and DUO 5/10/20 M	PK 196 157 -T	PK 196 157 -T
KAS 40 C, condensate separator, corrosive version for pumping speeds up to 34 m ³ /h	PK Z10 406	PK Z10 406
ONF 025 C, oil mist filter, corrosive gas version up to 24 m ³ /h	PK Z40 406	PK Z40 406

DUO 35

Dual-stage rotary vane pumps with a pumping speed up to 36 m³/h:



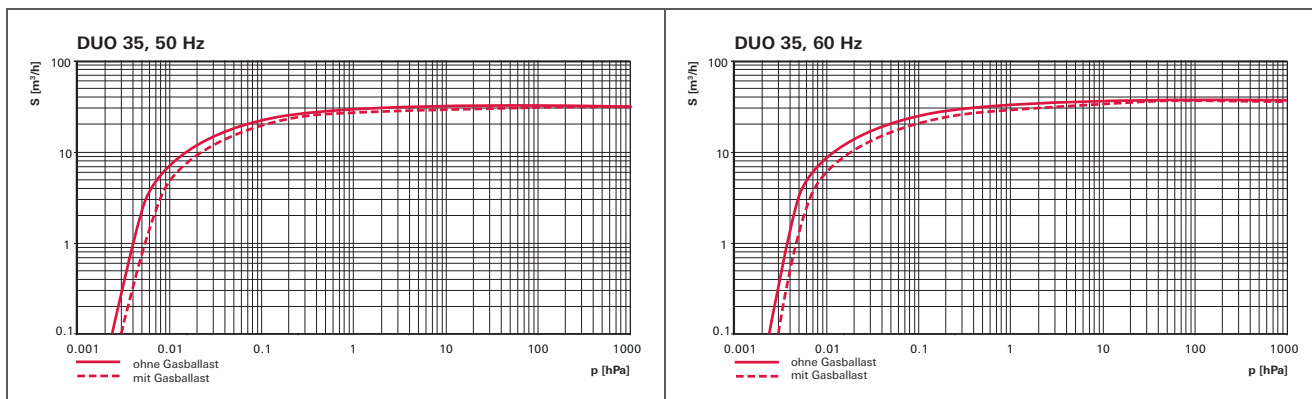
- Dual-stage, high-performance rotary vane pump with a pumping speed up to 36 m³/h
- With 3-phase motor
- With temperature sensor (3TF) for optimum motor protection
- Integrated gas ballast and HV safety valve
- For all low and medium vacuum applications
- Special feature: Various motor voltages for worldwide employment
- Other motor voltages available on request

M = Magnetically coupled

MC = Corrosive gas version with magnetic coupling

TF = Temperature sensor

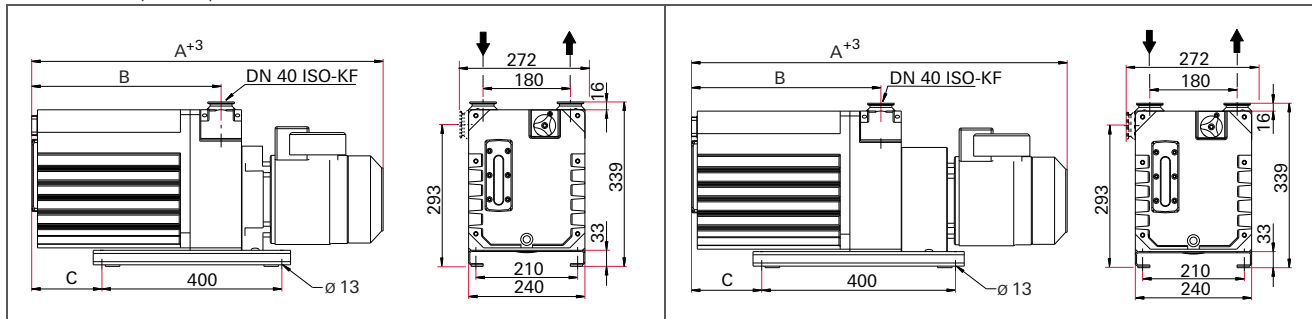
Pumping speed



DUO 35, 3-phase motor, 3TF

DUO 35, 3-phase motor, 3TF

Dimensions (in mm)



DUO 35, 3-phase motor, 3TF

DUO 35 M, 3-phase motor, 3TF

	DUO 35, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz	DUO 35 M, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz	DUO 35 MC, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz
A	658 mm	704 mm	739 mm
B	312 mm	312 mm	312 mm
C	66 mm	66 mm	66 mm

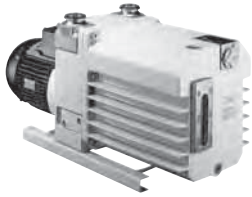
Technical data	DUO 35, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz	DUO 35 M, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz	DUO 35 MC, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Exhaust pressure, max.	1500 hPa	1500 hPa	1500 hPa
Exhaust pressure, min.	250 hPa	250 hPa	250 hPa
Operating fluid	P3	P3	F5
Operating fluid filling	3.2 l	3.2 l	3.2 l
Rotation speed at 50 Hz	1500 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹	1800 min ⁻¹	1800 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 61 dB (A)	≤ 61 dB (A)	≤ 61 dB (A)
Ultimate pressure with gas ballast	3 · 10 ⁻³ hPa	≤ 3 · 10 ⁻³ hPa	≤ 4 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	2 · 10 ⁻³ hPa	≤ 2 · 10 ⁻³ hPa	≤ 3 · 10 ⁻³ hPa
Weight	68 kg	70 kg	74 kg
Cooling method, standard	Air	Air	Air
Leak rate magnetic coupling		≤ 1 · 10 ⁻⁷ Pa m ³ /s	≤ 1 · 10 ⁻⁷ Pa m ³ /s
Leak rate safety valve	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s
Magnetic coupling		Yes	Yes
Motor protection	3TF	3TF	3TF
Rated power 50 Hz	1.1 kW	1.1 kW	1.1 kW
Rated power 60 Hz	1.3 kW	1.3 kW	1.3 kW
Mains requirement: voltage 50 Hz	230/400 (± 5 %) V	230/400 (± 5 %) V	230/400 (± 5 %) V
Mains requirement: voltage 60 Hz	265/460 (± 5 %) V	265/460 (± 5 %) V	265/460 (± 5 %) V
Mains cable	No	No	No
Pumping speed at 50 Hz	32 m ³ /h	32 m ³ /h	32 m ³ /h
Pumping speed at 60 Hz	36 m ³ /h	36 m ³ /h	36 m ³ /h
Switch	No	No	No
Protection category	IP 55	IP 55	IP 55
Ambient temperature	12-40 °C	12-40 °C	12-40 °C

Order number			
DUO 35	PK D45 602	PK D45 028	PK D45 027

Accessories			
SAS 40, DN 40 ISO-KF, polyester filter	PK Z60 510	PK Z60 510	
KAS 40, condensate separator for pumping speeds up to 100 m ³ /h	PK Z10 008	PK Z10 008	
ONF 35/65, oil mist filter for DUO 35/65, DUO 35/65 M	PK Z40 150	PK Z40 150	
Oil return unit from ONF 35/65 to DUO 35/65	PK 005 950 -T	PK 005 950 -T	PK 005 950 -T
ONFR 35/65, oil mist filter with oil return to pump for DUO 35/65, DUO 35/65 M	PK Z40 151	PK Z40 151	
OFC 35/65, chemical oil filter	PK Z90 320	PK Z90 320	PK Z90 320
OFM 35/65, mechanical oil filter	PK Z90 321	PK Z90 321	
ZFO 040, zeolite trap	PK Z70 008	PK Z70 008	
FAK 040, activated carbon filter	PK Z30 008	PK Z30 008	
KLF 040, cold trap	PK Z80 008	PK Z80 008	PK Z80 008
URB 040, catalytic trap, 230 V	PT U10 260	PT U10 260	
URB 040, catalytic trap, 115 V	PT U10 261	PT U10 261	
Oil pressure switch for DUO 35/65; DUO 35/65 MC	PK 223 720 -U	PK 223 720 -U	PK 223 720 -U
Oil pressure switch for DUO 35/65 with OFC/OFM	PK 223 741 -U	PK 223 741 -U	PK 223 741 -U
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ	P 4768 051 FQ
Operations monitoring unit 3 for DUO 35/65, DUO 125/255	PK 223 739 -U	PK 223 739 -U	PK 223 739 -U
Operations monitoring unit 1 for DUO 35/65	PK 223 718 AU	PK 223 718 AU	PK 223 718 AU
KAS 40 C, condensate separator, corrosive version for pumping speeds up to 100 m ³ /h			PK Z10 408
ONF 35/65 C, oil mist filter, corrosive gas version for DUO 35/65 MC			PK Z40 152
ONFR 35/65 C, oil mist separator with oil return to pump, corrosive gas version for DUO 35/65 MC			PK Z40 153

DUO 65

Dual-stage rotary vane pumps with a pumping speed up to 70 m³/h:



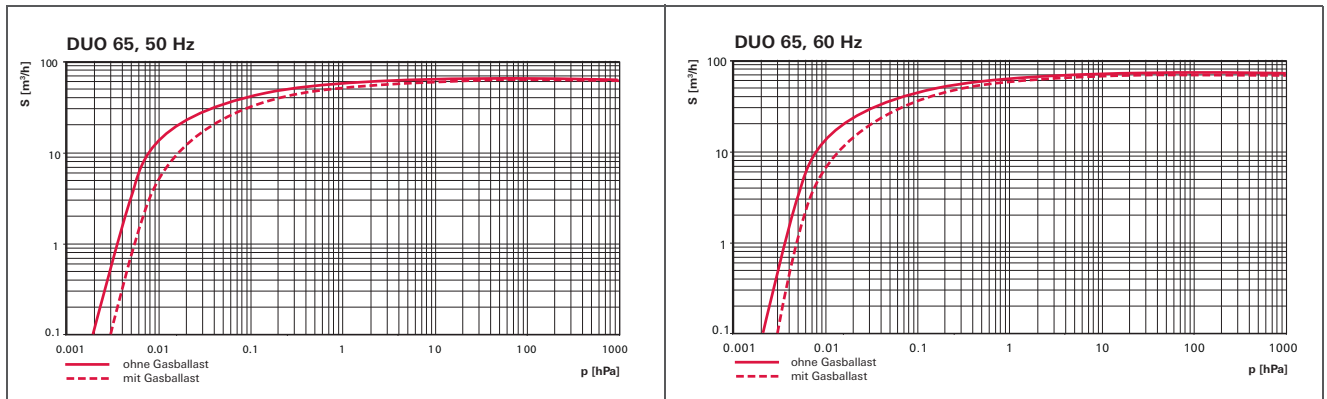
- Dual-stage, high-performance rotary vane pump with a pumping speed up to 70 m³/h
- With 3-phase motor
- With temperature sensor (3TF) for optimum motor protection
- Integrated gas ballast and HV safety valve
- For all low and medium vacuum applications
- Special feature: Various motor voltages for worldwide employment

M = Magnetically coupled

MC = Corrosive gas version, magnetically coupled

TF = Temperature sensor

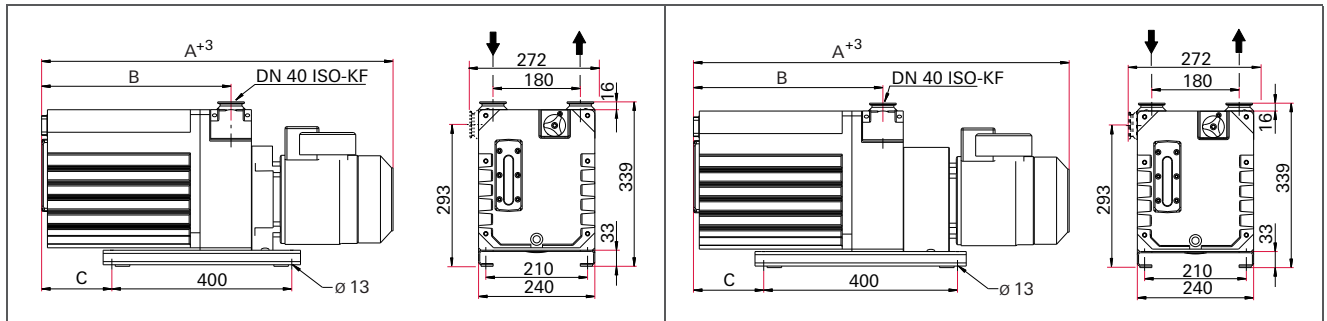
Pumping speed



DUO 65, 3-phase motor, 3TF

DUO 65, 3-phase motor, 3TF

Dimensions (in mm)



DUO 65, 3-phase motor, 3TF

DUO 65 M, 3-phase motor, 3TF

	DUO 65, 3-phase motor, 3TF, 230/400 V, 50 Hz; 465/460 V, 60 Hz	DUO 65 M, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz	DUO 65 MC, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz
A	738 mm	784 mm	819 mm
B	392 mm	392 mm	392 mm
C	146 mm	146 mm	146 mm

Technical data	DUO 65, 3-phase motor, 3TF, 230/400 V, 50 Hz; 465/460 V, 60 Hz	DUO 65 M, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz	DUO 65 MC, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Exhaust pressure, max.	1500 hPa	1500 hPa	1500 hPa
Exhaust pressure, min.	250 hPa	250 hPa	250 hPa
Operating fluid	P3	P3	F5
Operating fluid filling	4.2 l	4.2 l	4.2 l
Rotation speed at 50 Hz	1500 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹	1800 min ⁻¹	1800 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 61 dB (A)	≤ 61 dB (A)	≤ 61 dB (A)
Ultimate pressure with gas ballast	≤ 3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa	4 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	≤ 2 · 10 ⁻³ hPa	2 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa
Weight	75 kg	78 kg	83 kg
Cooling method, standard	Air	Air	JA
Leak rate magnetic coupling		≤ 1 · 10 ⁻⁷ Pa m ³ /s	≤ 1 · 10 ⁻⁷ Pa m ³ /s
Leak rate safety valve	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s
Magnetic coupling		Yes	JA
Motor protection	3TF	3TF	3TF
Rated power 50 Hz	1.5 kW	1.5 kW	1.5 kW
Rated power 60 Hz	1.8 kW	1.8 kW	1.8 kW
Mains requirement: voltage 50 Hz	230/400 (± 5 %) V	230/400 (± 5 %) V	230/400 (± 5 %) V
Mains requirement: voltage 60 Hz	265/460 (± 5 %) V	265/460 (± 5 %) V	265/460 (± 5 %) V
Mains cable	No	No	No
Pumping speed at 50 Hz	62 m ³ /h	62 m ³ /h	62 m ³ /h
Pumping speed at 60 Hz	70 m ³ /h	70 m ³ /h	70 m ³ /h
Switch	No	No	No
Protection category	IP 55	IP 55	IP 55
Ambient temperature	12-40 °C	12-40 °C	12-40 °C

Order number			
DUO 65	PK D46 602	PK D46 035	PK D46 036

Accessories			
SAS 40, DN 40 ISO-KF, polyester filter	PK Z60 510	PK Z60 510	
KAS 40, condensate separator for pumping speeds up to 100 m ³ /h	PK Z10 008	PK Z10 008	
ONF 35/65, oil mist filter for DUO 35/65, DUO 35/65 M	PK Z40 150	PK Z40 150	
Oil return unit from ONF 35/65 to DUO 35/65	PK 005 950 -T	PK 005 950 -T	PK 005 950 -T
ONFR 35/65, oil mist filter with oil return to pump for DUO 35/65, DUO 35/65 M	PK Z40 151	PK Z40 151	
OFC 35/65, chemical oil filter	PK Z90 320	PK Z90 320	PK Z90 320
OFM 35/65, mechanical oil filter	PK Z90 321	PK Z90 321	
ZFO 040, zeolite trap	PK Z70 008	PK Z70 008	
FAK 040, activated carbon filter	PK Z30 008	PK Z30 008	
KLF 040, cold trap	PK Z80 008	PK Z80 008	PK Z80 008
URB 040, catalytic trap, 230 V	PT U10 260	PT U10 260	
URB 040, catalytic trap, 115 V	PT U10 261	PT U10 261	
Oil pressure switch for DUO 35/65; DUO 35/65 MC	PK 223 720 -U	PK 223 720 -U	PK 223 720 -U
Oil pressure switch for DUO 35/65 with OFC/OFM	PK 223 741 -U	PK 223 741 -U	PK 223 741 -U
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ	P 4768 051 FQ
Operations monitoring unit 3 for DUO 35/65, DUO 125/255	PK 223 739 -U	PK 223 739 -U	PK 223 739 -U
Operations monitoring unit 1 for DUO 35/65	PK 223 718 AU	PK 223 718 AU	PK 223 718 AU
KAS 40 C, condensate separator, corrosive version for pumping speeds up to 100 m ³ /h			PK Z10 408
ONF 35/65 C, oil mist filter, corrosive gas version for DUO 35/65 MC			PK Z40 152
ONFR 35/65 C, oil mist separator with oil return to pump, corrosive gas version for DUO 35/65 MC			PK Z40 153

DUO 125

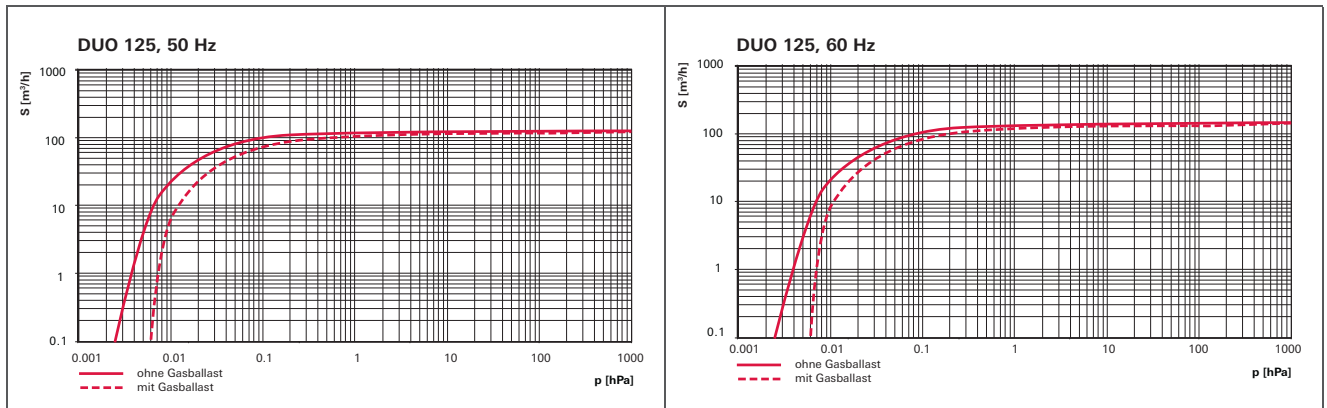
Dual-stage rotary vane pumps with a pumping speed up to 135 m³/h:



- Dual-stage, high-performance rotary vane pump with a pumping speed up to 135 m³/h
- With 3-phase motor
- With temperature sensor (3TF) for optimum motor protection
- Integrated gas ballast and HV safety valve
- For all low and medium vacuum applications
- Special feature: Various motor voltages for wide application field
- Other motor voltages available on request

TF = Temperature sensor
M = Magnetic coupling

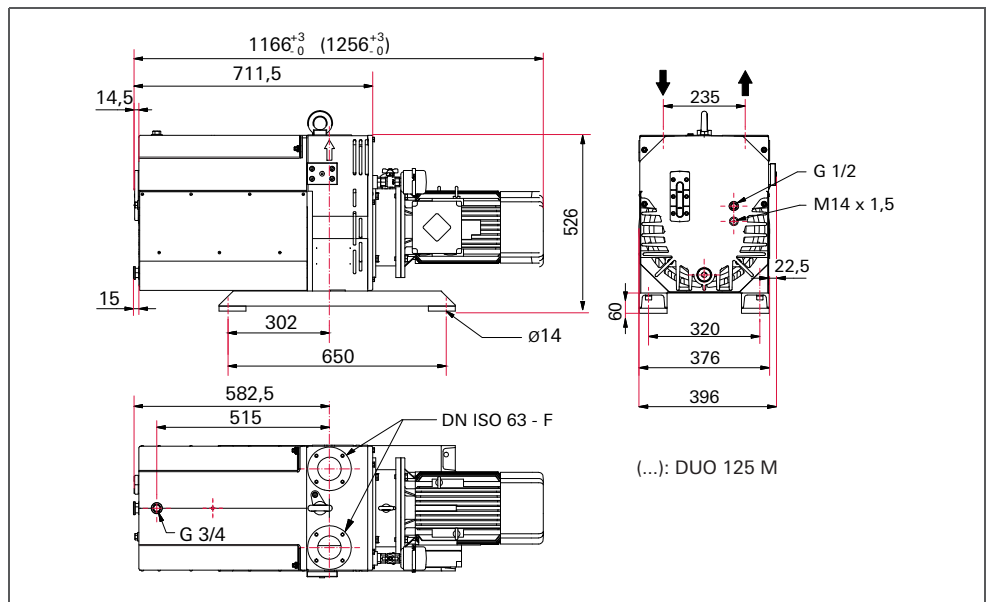
Pumping speed



DUO 125, 3-phase motor

DUO 125, 3-phase motor

Dimensions (in mm)



Technical data	DUO 125, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz	DUO 125 M, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz
Flange (out)	DN 63 ISO-F	DN 63 ISO-F
Flange (in)	DN 63 ISO-F	DN 63 ISO-F
Exhaust pressure, max.	1500 hPa	1500 hPa
Exhaust pressure, min.	250 hPa	250 hPa
Operating fluid	P3	P3
Operating fluid filling	14 l	14 l
Rotation speed at 50 Hz	1000 min ⁻¹	1000 min ⁻¹
Rotation speed at 60 Hz	1200 min ⁻¹	1200 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 75 dB (A)	≤ 75 dB (A)
Ultimate pressure with gas ballast	4 · 10 ⁻³ hPa	4 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	2 · 10 ⁻³ hPa	2 · 10 ⁻³ hPa
Weight	225 kg	245 kg
Cooling method, standard	Air	Air
Leak rate magnetic coupling		≤ 1 · 10 ⁻⁷ Pa m ³ /s
Leak rate safety valve	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s
Magnetic coupling		Yes
Motor protection	3TF	3TF
Rated power 50 Hz	4.0 kW	4.0 kW
Rated power 60 Hz	4.5 kW	4.5 kW
Mains requirement: voltage 50 Hz	230/400 V	230/400 V
Mains requirement: voltage 60 Hz	265/460 V	265/460 V
Mains cable	No	No
Pumping speed at 50 Hz	115 m ³ /h	115 m ³ /h
Pumping speed at 60 Hz	135 m ³ /h	135 m ³ /h
Switch	No	No
Protection category	IP 55	IP 55
Ambient temperature	12-40 °C	12-40 °C

Order number		
DUO 125	PK D47 602	PK D47 152

Accessories		
SAS 63, DN 63 ISO-K, polyester filter	PK Z60 511	PK Z60 511
KAS 63, condensate separator for pumping speeds up to 250 m ³ /h	PK Z10 010	PK Z10 010
ONF 63, oil mist filter for pumping speeds of up to 135 m ³ /h	PK Z40 010	PK Z40 010
Oil return unit, ORF 005, standard version	PK Z90 065	PK Z90 065
OFM 125, mechanical oil filter	PK Z90 340	PK Z90 340
ZFO 063, zeolite trap	PK Z70 010	PK Z70 010
FAK 063, activated carbon filter	PK Z30 010	PK Z30 010
KLF 063, cold trap	PK Z80 010	PK Z80 010
Oil pressure switch for DUO 125/255	PK 223 806 -T	PK 223 806 -T
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ
Operations monitoring unit 3 for DUO 35/65, DUO 125/255	PK 223 739 -U	PK 223 739 -U
Operating fluid level monitoring	PK 006 001 -T	PK 006 001 -T
Temperature sensor for operating fluid	PK 006 040 -T	PK 006 040 -T

DUO 255

Dual-stage rotary vane pumps with a pumping speed up to 300 m³/h:

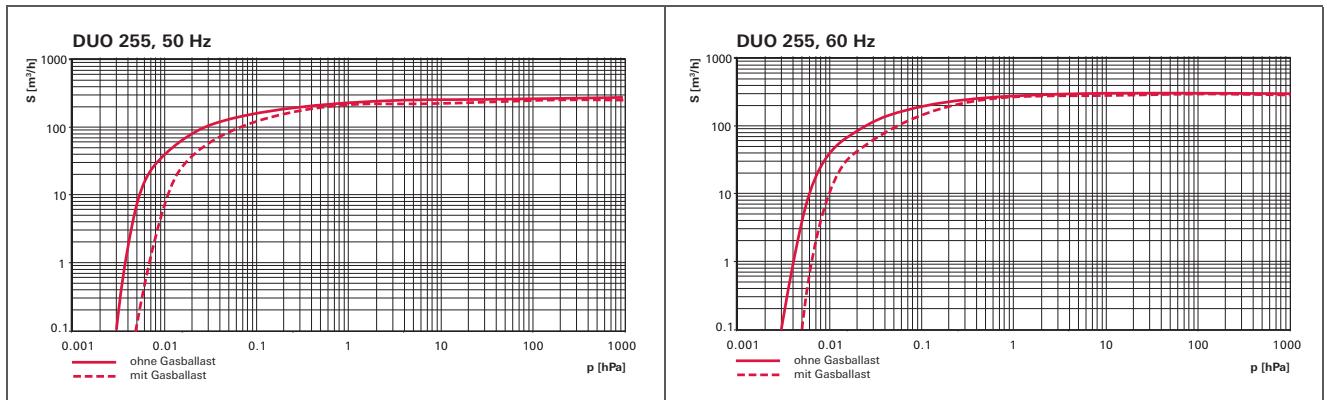


- Dual-stage, high-performance rotary vane pump with a pumping speed up to 255 m³/h
- 3-phase motor for 230/400 V (± 5 %) 50 Hz or 265/460 V (± 5 %) 60 Hz supply voltages
- With temperature sensor (3TF) for optimum motor protection
- Integrated gas ballast and HV safety valve
- For all low and medium vacuum applications
- Special feature: Various motor voltages for worldwide employment
- Other motor voltages available on request

TF = Temperature sensor

M = Magnetic coupling

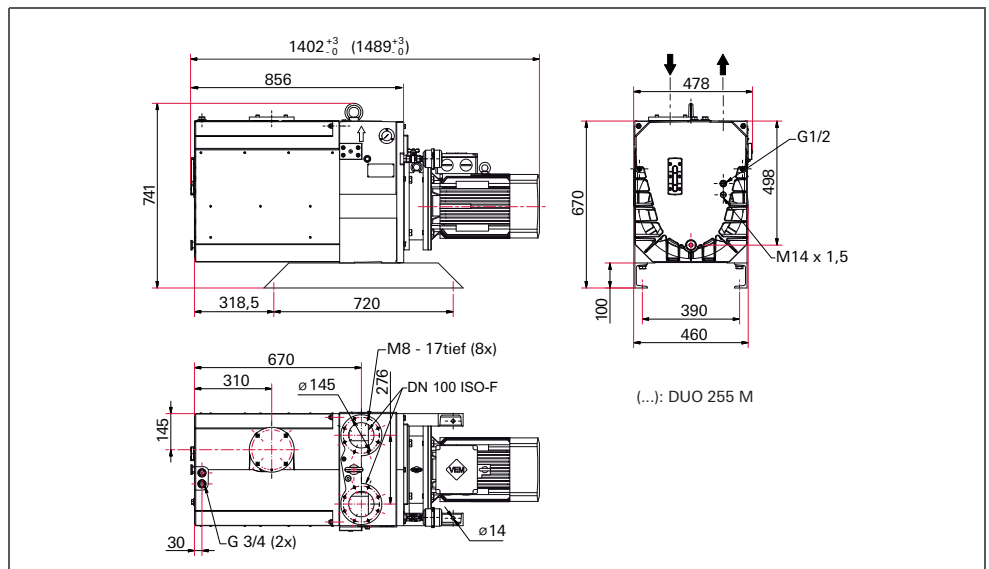
Pumping speed



DUO 255, 3-phase motor, 3TF

DUO 255, 3-phase motor, 3TF

Dimensions (in mm)



Technical data	DUO 255, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz	DUO 255 M, 3-phase motor, 3TF, 230/400 V, 50 Hz; 265/460 V, 60 Hz
Flange (out)	DN 100 ISO-F	DN 100 ISO-F
Flange (in)	DN 100 ISO-F	DN 100 ISO-F
Exhaust pressure, max.	1500 hPa	1500 hPa
Exhaust pressure, min.	250 hPa	250 hPa
Operating fluid	P3	P3
Operating fluid filling	25 l	25 l
Rotation speed at 50 Hz	1000 min ⁻¹	1000 min ⁻¹
Rotation speed at 60 Hz	1200 min ⁻¹	1200 min ⁻¹
Emission sound pressure level without gas ballast at 50 Hz	≤ 75 dB (A)	≤ 75 dB (A)
Ultimate pressure with gas ballast	4 · 10 ⁻³ hPa	4 · 10 ⁻³ hPa
Ultimate pressure without gas ballast	3 · 10 ⁻³ hPa	3 · 10 ⁻³ hPa
Weight	360 kg	397 kg
Cooling method, standard	Air	Air
Leak rate magnetic coupling		≤ 1 · 10 ⁻⁷ Pa m ³ /s
Leak rate safety valve	≤ 1 · 10 ⁻⁵ Pa m ³ /s	≤ 1 · 10 ⁻⁵ Pa m ³ /s
Magnetic coupling		Yes
Motor protection	3TF	3TF
Rated power 50 Hz	7.5 kW	7.5 kW
Rated power 60 Hz	9.0 kW	9.0 kW
Mains requirement: voltage 50 Hz	230/400 V	230/400 V
Mains requirement: voltage 60 Hz	265/460 V	265/460 V
Mains cable	No	No
Pumping speed at 50 Hz	250 m ³ /h	250 m ³ /h
Pumping speed at 60 Hz	300 m ³ /h	300 m ³ /h
Switch	No	No
Protection category	IP 55	IP 55
Ambient temperature	12-40 °C	12-40 °C

Order number		
DUO 255	PK D48 602	PK D48 152

Accessories		
SAS 100, DN 100 ISO-K, polyester filter	PK Z60 512	PK Z60 512
KAS 100, condensate separator for pumping speeds up to 630 m ³ /h	PK Z10 012	PK Z10 012
ONF 100, oil mist filter for pumping speeds up to 300 m ³ /h	PK Z40 012	PK Z40 012
Oil return unit, ORF 005, standard version	PK Z90 065	PK Z90 065
OFM 255, mechanical oil filter	PK Z90 341	PK Z90 341
FAK 100, activated carbon filter	PK Z30 012	PK Z30 012
Oil pressure switch for DUO 125/255	PK 223 806 -T	PK 223 806 -T
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ
Operations monitoring unit 3 for DUO 35/65, DUO 125/255	PK 223 739 -U	PK 223 739 -U
Operating fluid level monitoring	PK 006 001 -T	PK 006 001 -T
Temperature sensor for operating fluid	PK 006 040 -T	PK 006 040 -T

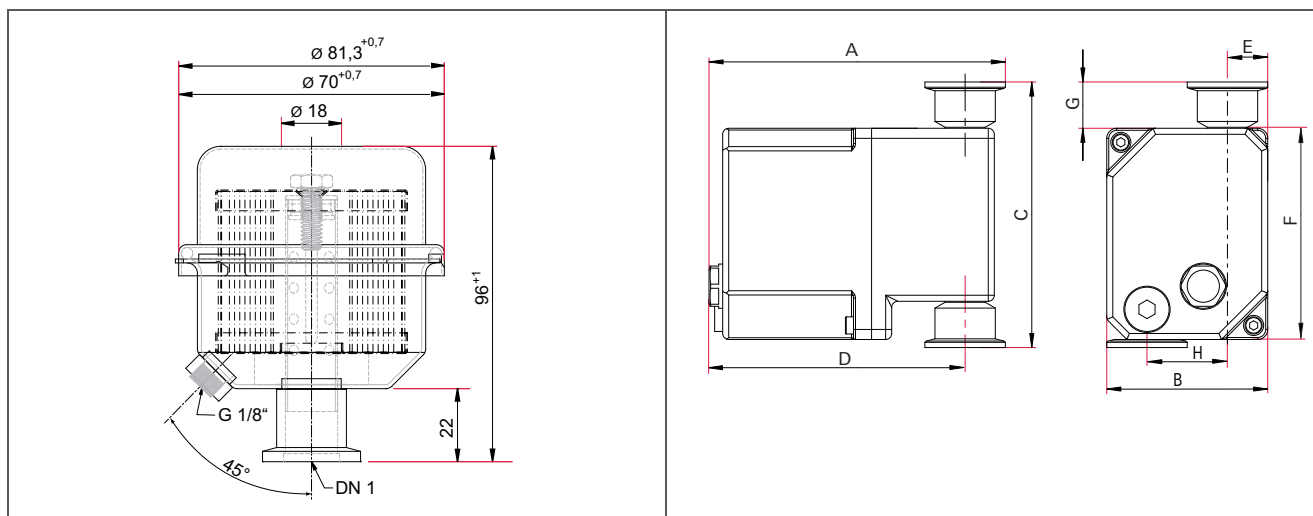
Oil mist filter

Mounted on the pump's exhaust port, they prevent contamination of the air by oil mist. Satisfies the limits established by the German Clean Air Ordinance if a clean filter is employed (separation rate > 99.98 %).



- Sits on the pump's exhaust port and sustainably prevents contamination of the air by oil mist

Dimensions (in mm)



ONF 16 S, oil mist filter

ONF 16 M, oil mist filter

	ONF 16 M, oil mist filter for pumping speeds of up to 12 m ³ /h
A	142 mm
B	80 mm
C	120 mm
D	127 mm
E	16 mm
F	105 mm
G	17 mm
H	48 mm

Technical data	ONF 16 S, oil mist filter for pumping speeds up to 12 m ³ /h	ONF 16 M, oil mist filter for pumping speeds of up to 12 m ³ /h
Flange (out)		DN 16 ISO-KF
Flange (in)	DN 16 ISO-KF	DN 16 ISO-KF
Degree of separation	99.98 %	99.98 %
Pressure max. (absolute)	1500 hPa	1500 hPa
Capacity	0.02 l	0.15 l
For pumping speed	12 m ³ /h	12 m ³ /h
Weight	0.35 kg	1.35 kg

Order number		
Oil mist filter	PK Z40 001	PK Z40 003

Accessories		
Oil return unit from ONF 16 S to DUO 1.6 / DUO 3	PK 005 986 -T	
Oil return unit from ONF 16 S / ONF 25 S to DUO 5 M / DUO 10 M	PK 005 987 -T	
Oil return unit from ONF 16 M to DUO 5 M, from ONF 25 M to DUO 10 M, from ONF 25 L to DUO 20 M, standard version		PK 196 172 -T
Oil return unit from ONF 16 M to DUO 1.6, 3		PK 006 080 -T

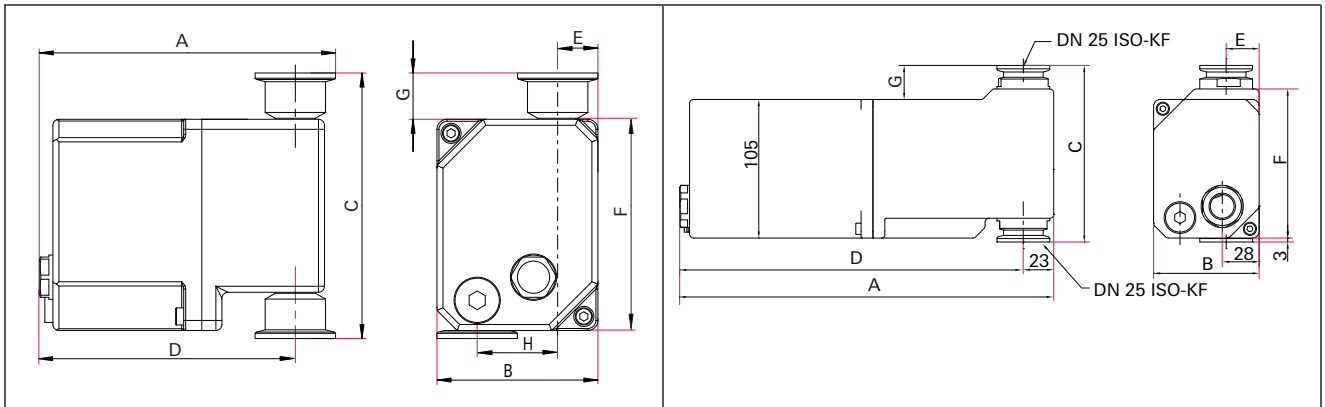
Oil mist filter

Mounted on the pump's exhaust port, they prevent contamination of the air by oil mist. Satisfies the limits established by the German Clean Air Ordinance if a clean filter is employed (separation rate > 99.98 %).



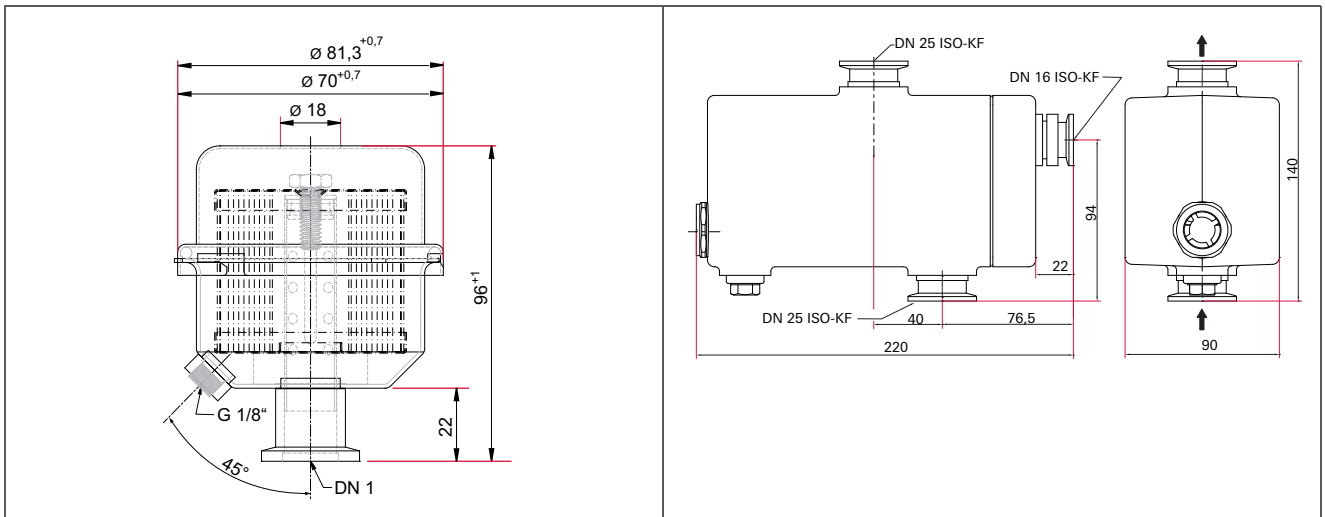
- Sits on the pump's exhaust port and sustainably prevents contamination of the air by oil mist

Dimensions (in mm)



ONF 25 M, oil mist filter
ONF 25 L, oil mist filter

ONF 25 XL, oil mist filter



ONF 25 S, oil mist filter

ONF 025 C, oil mist filter

	ONF 25 M, oil mist filter for pumping speeds of up to 12 m ³ /h	ONF 25 L, oil mist filter for pumping speeds of up to 30 m ³ /h	ONF 25 XL, oil mist filter for pumping speeds up to 42 m ³ /h
A	147 mm	218 mm	284 mm
B	80 mm	80 mm	80 mm
C	132 mm	134 mm	134 mm
D	127 mm	182 mm	261 mm
E	16 mm	25 mm	25 mm
F	105 mm	105 mm	105 mm
G	23 mm	27 mm	26 mm
H	48 mm		

Technical data	ONF 25 M, oil mist filter for pumping speeds of up to 12 m³/h	ONF 25 S, oil mist filter for pumping speeds of up to 12 m³/h	ONF 25 L, oil mist filter for pumping speeds of up to 30 m³/h
Flange (out)	DN 25 ISO-KF	No	DN 25 ISO-KF
Flange (in)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Degree of separation	99.98 %	99.98 %	99.98 %
Pressure max. (absolute)	1500 hPa	1500 hPa	1500 hPa
Capacity	0.15 l	0.02 l	0.25 l
For pumping speed	12 m³/h	12 m³/h	30 m³/h
Weight	1.4 kg	0.35 kg	1.6 kg

Order number			
Oil mist filter	PK Z40 157	PK Z40 004	PK Z40 158

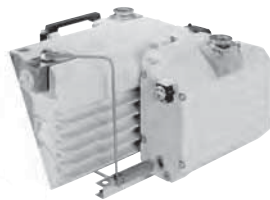
Accessories			
Oil return unit from ONF 16 S / ONF 25 S to DUO 5 M / DUO 10 M		PK 005 987 -T	
Oil return unit from ONF 16 M to DUO 5 M, from ONF 25 M to DUO 10 M, from ONF 25 L to DUO 20 M, standard version	PK 196 172 -T		PK 196 172 -T

Technical data	ONF 25 XL, oil mist filter for pumping speeds up to 42 m³/h	ONF 025 C, oil mist filter, corrosive gas version up to 24 m³/h
Flange (out)	DN 25 ISO-KF	DN 25 ISO-K
Flange (in)	DN 25 ISO-KF	DN 25 ISO-K
Degree of separation	99.98 %	98 %
Pressure max. (absolute)	1500 hPa	1500 hPa
Capacity	0.35 l	0.20 l
For pumping speed	42 m³/h	24 m³/h
Weight	1.9 kg	1.8 kg

Order number		
Oil mist filter	PK Z40 160	PK Z40 406

Accessories		
Oil return unit from ONF 25 M, 25 L, 25 XL	PK 198 545 -T	PK 196 177 -T

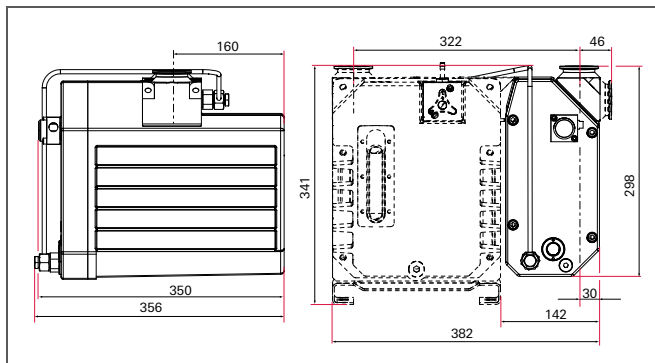
Oil mist filter



Mounted on the pump's exhaust port, they prevent contamination of the air by oil mist. Satisfies the limits established by the German Clean Air Ordinance if a clean filter is employed (separation rate > 99.98 %).

- Sits on the pump's exhaust port and sustainably prevents contamination of the air by oil mist

Dimensions (in mm)



ONFR 35/65, oil mist filter

Technical data	ONF 35/65, oil mist filter for DUO 35/65, DUO 35/65 M	ONF 35/65 C, oil mist filter, corrosive gas version for DUO 35/65 MC	ONFR 35/65, oil mist filter with oil return to pump for DUO 35/65, DUO 35/65 M	ONFR 35/65 C, oil mist separator with oil return to pump, corrosive gas version for DUO 35/65 MC
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 40 flange	DN 40 flange	DN 40 flange	DN 40 flange
Degree of separation	98 %	98 %	98 %	98 %
Pressure max. (absolute)	1500 hPa	1500 hPa	1500 hPa	
Capacity	0.7 l	0.7 l	0.7 l	0.7 l
For pumping speed	35-70 m ³ /h	35-70 m ³ /h	35-70 m ³ /h	35-70 m ³ /h
Weight	11 kg	11 kg	11 kg	11 kg

Order number				
Oil mist filter	PK Z40 150	PK Z40 152	PK Z40 151	PK Z40 153

Accessories				
Oil return unit from ONF 35/65 to DUO 35/65	PK 005 950 -T	PK 005 950 -T		
Oil return unit - conversion kit ONFR 35/65 in gas ballast to suction side of DUO 35/65	PK 005 951 -T	PK 005 951 -T		
Saturation indicator, optical/electrically for ONF 35/65	P 0991 684	P 0991 684	P 0991 684	P 0991 684

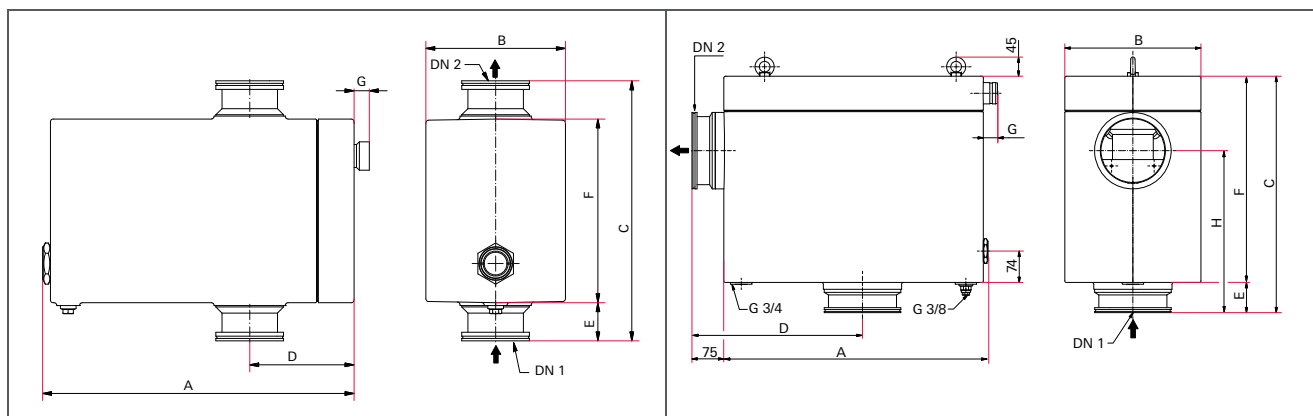
Oil mist filter

Mounted on the pump's exhaust port, they prevent contamination of the air by oil mist. Satisfies the limits established by the German Clean Air Ordinance if a clean filter is employed (separation rate > 99.98 %).

- Sits on the pump's exhaust port and sustainably prevents contamination of the air by oil mist



Dimensions (in mm)



ONF 63, oil mist filter
ONF 100, oil mist filter

ONF 160, oil mist filter

	ONF 63, oil mist filter for pumping speeds of up to 135 m ³ /h	ONF 100, oil mist filter for pumping speeds up to 300 m ³ /h	ONF 160, oil mist filter for pumping speeds of up to 500 m ³ /h
A	440 mm	457 mm	621 mm
B	196 mm	260 mm	320 mm
C	366 mm	494 mm	556 mm
D	147 mm	150 mm	401 mm
F	260 mm	400 mm	485 mm
G	22 mm	22 mm	34 mm
H			381 mm

Technical data	ONF 63, oil mist filter for pumping speeds of up to 135 m ³ /h	ONF 100, oil mist filter for pumping speeds up to 300 m ³ /h	ONF 160, oil mist filter for pumping speeds of up to 500 m ³ /h
Flange (out)	DN 63 ISO-K	DN 100 ISO-K	DN 160 ISO-K
Flange (in)	DN 63 ISO-K	DN 100 ISO-K	DN 160 ISO-K
Degree of separation	99.98 %	99.98 %	99.98 %
Pressure max. (absolute)	1500 hPa	1500 hPa	1500 hPa
Capacity	1.7 l	2.3 l	7.0 l
Capacity ONF with ORF	1.7 l	2.2 l	3.7 l
For pumping speed	135 m ³ /h	300 m ³ /h	500 m ³ /h
Weight	13.5 kg	27 kg	41 kg

Order number			
Oil mist filter	PK Z40 010	PK Z40 012	PK Z40 014

Accessories			
Oil return unit, ORF 005, standard version	PK Z90 065	PK Z90 065	PK Z90 065

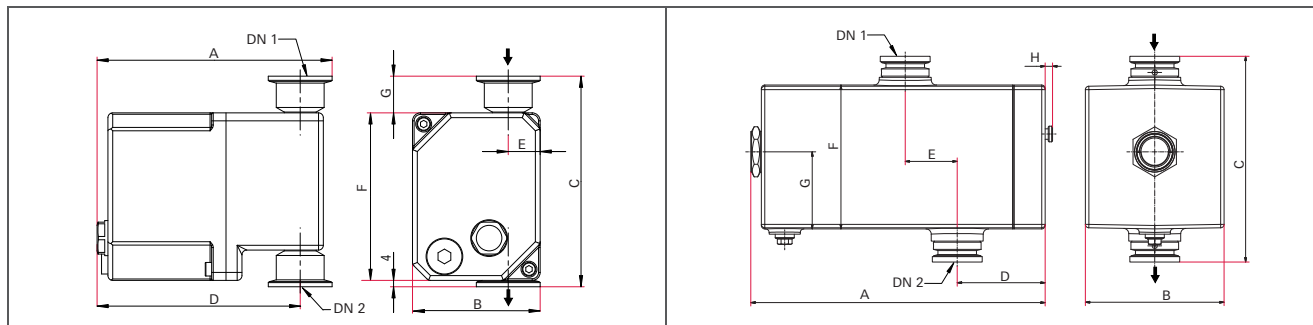
Condensate separators

Sits on the pump's intake port and prevent condensate from entering the pump.



- For inlet and outlet ports
- Protects the rotary vane pump against sucked in liquids and condensate return

Dimensions (in mm)



KAS 16, condensate separator
KAS 25, condensate separator
KAS 25 L, condensate separator

KAS 40, condensate separator

	KAS 16, condensate separator for pumping speeds from 1.6 to 12 m ³ /h	KAS 25, condensate separator for pumping speeds up to 12 m ³ /h	KAS 25 L, condensate separator for pumping speeds up to 34 m ³ /h	KAS 40 C, condensate separator, corrosive version for pumping speeds up to 34 m ³ /h	KAS 40, condensate separator for pumping speeds up to 100 m ³ /h
A	142 mm	147 mm	202 mm	195 mm	340 mm
B	80 mm	80 mm	80 mm	90 mm	160 mm
C	120 mm	132 mm	132 mm	140 mm	237 mm
D	127 mm	127 mm	182 mm	54 mm	102 mm
DN 1	DN 16 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF
DN 2	DN 16 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF
E	20 mm	20 mm	20 mm	40 mm	60 mm
F	105 mm	105 mm	105 mm	100 mm	166 mm
G	17 mm	23 mm	23 mm	22 mm	89 mm

Technical data	KAS 16, condensate separator for pumping speeds from 1.6 to 12 m ³ /h	KAS 25, condensate separator for pumping speeds up to 12 m ³ /h	KAS 25 L, condensate separator for pumping speeds up to 34 m ³ /h	KAS 40 C, condensate separator, corrosive version for pumping speeds up to 34 m ³ /h	KAS 40, condensate separator for pumping speeds up to 100 m ³ /h
Flange (out)	DN 16 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 16 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF
Pressure max. (absolute)	1500 hPa	1500 hPa	1500 hPa	1500 hPa	1500 hPa
Capacity	0.2 l	0.2 l	0.3 l	0.5 l	3 l
For pumping speed	< 12 m ³ /h	< 12 m ³ /h	< 34 m ³ /h	< 34 m ³ /h	< 100 m ³ /h
Weight	1.35 kg	1.4 kg	1.5 kg	1.6 kg	6.1 kg
Leak rate	< 1 · 10 ⁻⁶ Pa m ³ /s	< 1 · 10 ⁻⁶ Pa m ³ /s	< 1 · 10 ⁻⁶ Pa m ³ /s	< 1 · 10 ⁻⁶ Pa m ³ /s	< 1 · 10 ⁻⁶ Pa m ³ /s

Order number					
Condensate separators	PK Z10 003	PK Z10 032	PK Z10 033	PK Z10 406	PK Z10 008

Condensate separators

Sits on the pump's intake port and prevent condensate from entering the pump.



- For inlet and outlet ports
- Protects the rotary vane pump against sucked in liquids and condensate return

	KAS 40 C, condensate separator, corrosive version for pumping speeds up to 100 m ³ /h	KAS 63, condensate separator for pumping speeds up to 250 m ³ /h	KAS 63 C, condensate separator, corrosive version for pumping speeds up to 250 m ³ /h	KAS 100, condensate separator for pumping speeds up to 630 m ³ /h	KAS 63 C, condensate separator, corrosive version for pumping speeds up to 630 m ³ /h
A	340 mm	436 mm	436 mm	457 mm	457 mm
B	160 mm	196 mm	196 mm	260 mm	260 mm
C	237 mm	366 mm	366 mm	494 mm	494 mm
D	102 mm	146 mm	146 mm	150 mm	150 mm
E	60 mm				
F	166 mm	260 mm	260 mm	400 mm	400 mm

Technical data	KAS 40 C, condensate separator, corrosive version for pumping speeds up to 100 m ³ /h	KAS 63, condensate separator for pumping speeds up to 250 m ³ /h	KAS 63 C, condensate separator, corrosive version for pumping speeds up to 250 m ³ /h	KAS 100, condensate separator for pumping speeds up to 630 m ³ /h	KAS 63 C, condensate separator, corrosive version for pumping speeds up to 630 m ³ /h
Flange (out)	DN 40 ISO-KF	DN 63 ISO-K	DN 63 ISO-KF	DN 100 ISO-K	DN 100 ISO-K
Flange (in)	DN 40 ISO-KF	DN 63 ISO-K	DN 63 ISO-KF	DN 100 ISO-K	DN 100 ISO-K
Pressure max. (absolute)	1500 hPa	1500 hPa	1500 hPa	1500 hPa	1500 hPa
Capacity	3 l	12 l	12 l	19 l	19 l
For pumping speed	< 100 m ³ /h	< 250 m ³ /h	< 250 m ³ /h	< 630 m ³ /h	< 630 m ³ /h
Weight	6.1 kg	13.2 kg	13.2 kg	25 kg	25 kg
Leak rate	< 1 · 10 ⁻⁶ Pa m ³ /s	< 1 · 10 ⁻⁶ Pa m ³ /s	< 1 · 10 ⁻⁶ Pa m ³ /s	< 1 · 10 ⁻⁶ Pa m ³ /s	< 1 · 10 ⁻⁶ Pa m ³ /s

Order number					
Condensate separators	PK Z10 408	PK Z10 010	PK Z10 410	PK Z10 012	PK Z10 412

Adsorption filter

Filters for employment in conjunction with nitrous gases, acids and bases in the pump.



- For adsorption of inorganic media
- Protects rotary vane pump and operating fluid against gaseous contaminants when installed on the intake side
- Reduces the concentration of harmful exhaust products in combination with oil mist separator when installed on the outlet side
- For employment in conjunction with gases, acids and bases

Technical data	FAK 025, activated carbon filter	FAK 040, activated carbon filter	FAK 063, activated carbon filter	FAK 100, activated carbon filter
Flange (out)	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-K	DN 100 ISO-K
Flange (in)	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-K	DN 100 ISO-K
Mounting orientation	Vertical	Vertical	Vertical	Vertical
Filling quantity	1 l	2 l	7.5 l	20 l
For pumping speed up to	30 m ³ /h	65 m ³ /h	120 m ³ /h	500 m ³ /h
Weight with contents	4 kg	5.5 kg	16 kg	40 kg
Conductance	1 · 10 ⁻² hPa: 2 l/s; 1 hPa: 10 l/s; 100 hPa: 500 l/s	1 · 10 ⁻² hPa: 16 l/s; 1 hPa: 150 l/s; 100 hPa: 1000 l/s	1 · 10 ⁻² hPa: 5 l/s; 1 hPa: 9 l/s; 100 hPa: 400 l/s	1 · 10 ⁻² : 5 l/s; 1 hPa: 6 l/s; 100 hPa: 100 l/s

Order number				
Adsorption filter	PK Z30 006	PK Z30 008	PK Z30 010	PK Z30 012

Technical data	ZFO 16, zeolite trap	ZFO 025, zeolite trap	ZFO 040, zeolite trap	ZFO 063, zeolite trap
Flange (out)	DN 16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-K
Flange (in)	DN 16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-K
Mounting orientation	Horizontal	Vertical	Vertical	Vertical
Filling quantity	0.5 l	2 l	2.3 l	4.3 l
For pumping speed up to	5 m ³ /h	30 m ³ /h	65 m ³ /h	120 m ³ /h
Weight with contents	1.5 kg	7 kg	13 kg	17 kg
Heating rod	No	Voltage: 230 V, power input: 200 W, weight: 1.7 kg	Voltage: 230 V, power input: 300 W, weight: 2.7 kg	Voltage: 230 V Power input: 400 W Weight: 3.4 kg
Conductance	1 · 10 ⁻² hPa: 0,3 l/s; 1 hPa: 0,7 l/s; 100 hPa: 31 l/s	1 · 10 ⁻² hPa: 4 l/s; 1 hPa: 40 l/s; 100 hPa: 900 l/s	1 · 10 ⁻² hPa: 7 l/s; 1 hPa: 80 l/s; 100 hPa: 1300 l/s	1 · 10 ⁻² hPa: 22 l/s; 1 hPa: 600 l/s; 100 hPa: 4000 l/s

Order number				
Adsorption filter	PK Z70 003	PK Z70 006	PK Z70 008	PK Z70 010

Technical data		Heating rod for ZFO 025, 220 V, 50/60 Hz	Heating rod for ZFO 040, 220 V, 50/60 Hz	Heating rod for ZFO 063, 220 V, 50/60 Hz
Power consumption		200 W	300 W	400 W
Mains requirement		220 V, 50/60 Hz	220 V, 50/60 Hz	220 V, 50/60 Hz

Order number				
Zeolite trap heating		PK Z90 012 A	PK Z90 020 A	PK Z90 030 A

Technical data	KLF 025, cold trap	KLF 040, cold trap	KLF 063, cold trap
Flange (out)	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-K
Flange (in)	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-K
Mounting orientation	Vertical	Vertical	Vertical
Filling quantity condensate max.	0,1 l	0,4 l	0,75 l
Filling quantity coolant	0.7 l	1.5 l	3.8 l
For pumping speed up to	30 m ³ /h	65 m ³ /h	120 m ³ /h
Weight	3.5 kg	6.5 kg	11.5 kg
Conductance	1 · 10 ⁻² hPa: 10 l/s; 1 hPa: 60 l/s; 100 hPa: 800 l/s	1 · 10 ⁻² hPa: 16 l/s; 1 hPa: 150 l/s; 100 hPa: 1000 l/s	1 · 10 ⁻² hPa: 30 l/s; 1 hPa: 800 l/s; 100 hPa: 3000 l/s

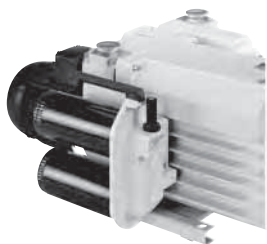
Order number			
Adsorption filter	PK Z80 006	PK Z80 008	PK Z80 010

Technical data	URB 025, catalytic trap, 115 V	URB 025, catalytic trap, 230 V	URB 040, catalytic trap, 115 V	URB 040, catalytic trap, 230 V
Flange (in)	DN 25 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Mounting orientation	Any	Any	Normal operation: any/with water cooling: vertical	Normal operation: any/with water cooling: vertical
Filling quantity	180 g	180 g	480 g	480 g
Weight with contents	1.8 kg	1.8 kg	3.6 kg	3.6 kg
Cooling			Water	Water
Power consumption	25 W	25 W	50 W	50 W
Conductance	1 · 10 ⁻² hPa: 3 l/s; 1 hPa: 9 l/s	1 · 10 ⁻² hPa: 3 l/s; 1 hPa: 9 l/s	1 · 10 ⁻² hPa: 9 l/s; 1 hPa: 45 l/s	1 · 10 ⁻² hPa: 9 l/s; 1 hPa: 45 l/s
Voltage	115 V	230 V	115 V	230 V

Order number				
Adsorption filter	PT U10 761	PT U10 760	PT U10 261	PT U10 260

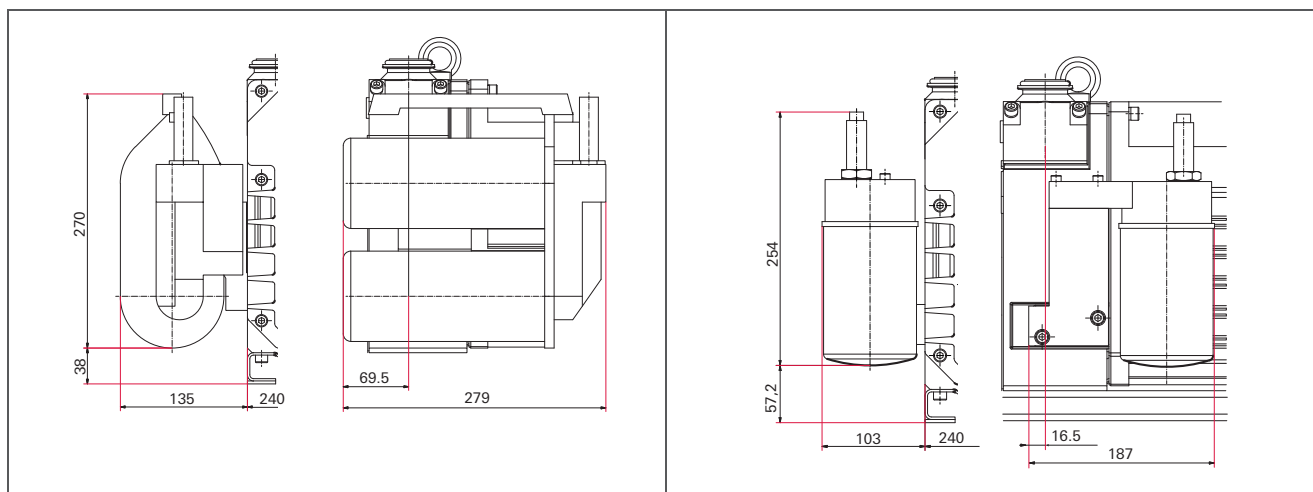
Oil filter

The oil filters are designed for partial-flow installation in the rotary vane pump's oil circulation system: The oil filters filter out dust and particulate matter from the production process in the operating fluid. This reduces pump wear.



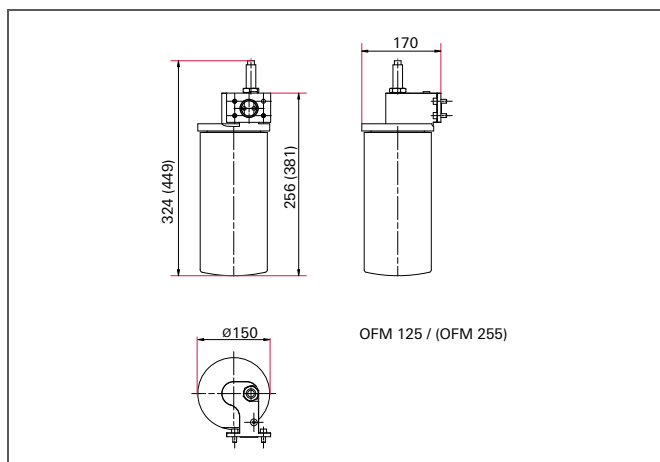
- The chemical oil filter is designed for partial-flow installation in the oil circulation system of rotary vane pumps
- The oil filter filters out dust and particulate matter from the production filter in the operating fluid
- Moreover, corrosive substances are also adsorbed from the operating fluid. This reduces pump wear

Dimensions (in mm)



OFC 35/65, chemical oil filter

OFM 35/65, mechanical oil filter



OFM 125, mechanical oil filter

OFM 255, mechanical oil filter

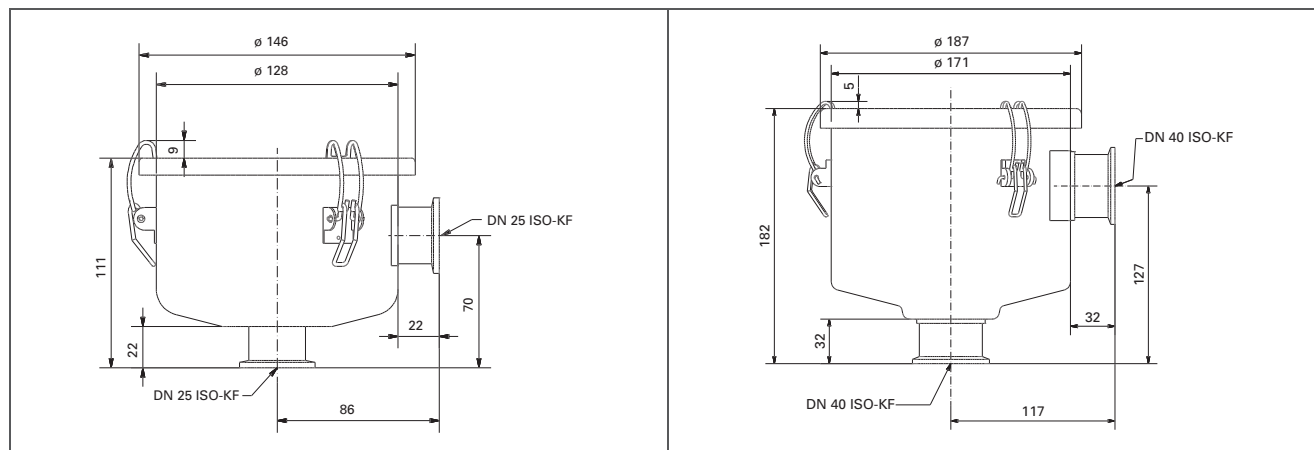
Technical data	OFC 35/65, chemical oil filter	OFM 35/65, mechanical oil filter	OFM 125, mechanical oil filter	OFM 255, mechanical oil filter
Capacity		0.8 l	2.2 l	4.0 l
Capacity chem. filter	0.8 l			
Capacity mech. filter	1.2 l	0.8 l	2.2 l	4.0 l
Filter poresize	12 µm	12 µm	10 µm	10 µm
For	Duo 35/65	Duo 35/65	Duo 125	Duo 255
For pumping speed	35-65 m ³ /h	35-65 m ³ /h	125 m ³ /h	255 m ³ /h
Weight	8 kg	3.2 kg	2.0 kg	2.5 kg

Order number				
Oil filter	PK Z90 320	PK Z90 321	PK Z90 340	PK Z90 341

Dust separators

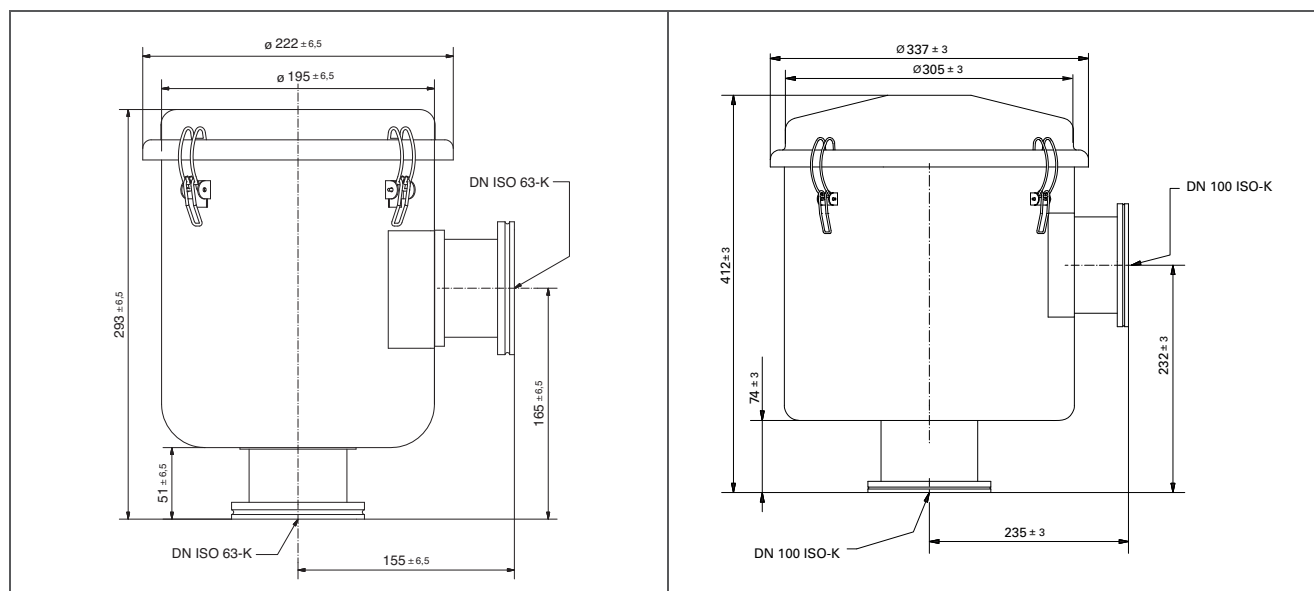
Prevents dust from reaching the pump through the intake tract.

Dimensions (in mm)



SAS 25, DN 25 ISO-KF

SAS 40, DN 40 ISO-KF



SAS 63, DN 63 ISO-K

SAS 100, DN 100 ISO-K

Technical data	SAS 25, DN 25 ISO-KF	SAS 40, DN 40 ISO-KF	SAS 63, DN 63 ISO-K	SAS 100, DN 100 ISO-K
Flange (out)	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-K	DN 100 ISO-K
Flange (in)	DN 25 ISO-KF	DN 40 ISO-KF	DN 63 ISO-K	DN 100 ISO-K
Degree of separation	99.7 %	99.7 %	99.7 %	99.7 %
Operating range	1.0 abs.	1.0 abs.	1.0 abs	1.0 abs
Mounting orientation	Vertical/horizontal	Vertical/horizontal	Vertical/horizontal	Vertical/horizontal
For pumping speed up to	20 m ³ /h	90 m ³ /h	250 m ³ /h	630 m ³ /h
Weight	1.055 kg	2.06 kg	5.95 kg	12.8 kg
Grain size limit (separable)	5 μm	5 μm	5 μm	5 μm
Leak rate	< 1 · 10 ⁻⁵ Pa m ³ /s	< 1 · 10 ⁻⁵ Pa m ³ /s	< 1 · 10 ⁻⁵ Pa m ³ /s	< 1 · 10 ⁻⁵ Pa m ³ /s
Conductance	1 hPa: 150 l/s, 100 hPa: 750 l/s	1 hPa: 380 l/s, 100 hPa: 2250 l/s	1 hPa: 2500 l/s, 100 hPa: 20000 l/s	1 hPa: 2000 l/s, 100 hPa: 30000 l/s
Ambient temperature	-26+104 °C	-26+104 °C	-26+104 °C	-26+104 °C

Order number				
Dust separators	PK Z60 508	PK Z60 510	PK Z60 511	PK Z60 512

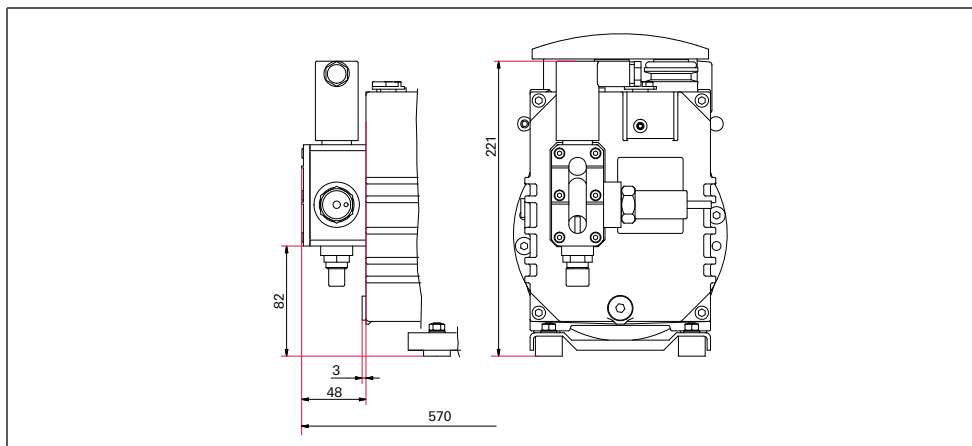
Operations monitoring unit

For integration into control and process monitoring system

- Monitors operating fluid level/temperature and exhaust pressure
- Mounted at the sight glass



Dimensions (in mm)



Order number	Operations monitoring unit 3 for DUO 1.6/3/6/11 and DUO 5/10/20 M	Operations monitoring unit 2 for DUO 1.6/3/6/11 and DUO 5/10/20 M	Operations monitoring unit 1 for DUO 1.6/3/6/11 and DUO 5/10/20 M	Operations monitoring unit 3 for DUO 35/65, DUO 125/255	Operations monitoring unit 1 for DUO 35/65
Operations monitoring unit	PK 196 141 -T	PK 196 142 -T	PK 196 157 -T	PK 223 739 -U	PK 223 718 AU
Accessories					
Operating fluid level monitoring	PK 006 001 -T	PK 006 001 -T	PK 006 001 -T	PK 006 001 -T	PK 006 001 -T
Temperature sensor for operating fluid	PK 006 040 -T	PK 006 040 -T		PK 006 040 -T	
Exhaust pressure	PK 196 380 -T			PK 196 380 -T	

Operating fluid level monitoring

Level switch

- Monitors the operating fluid level
- Mounted at sight glass adapter or casing depending on the pump model

Technical data	Operating fluid level monitoring
Contact	Closing contact, normally open at min. filling level
Contact rating	PNP output, max. 20 mA
Protection category	IP 67
Current max.	35 mA
Supply: Voltage	12-30 V DC

Order number	
Operating fluid level monitoring	PK 006 001 -T

Exhaust pressure

- Monitors the exhaust pressure
- Mounted at the sight glass adapter

Technical data	Exhaust pressure
Contact	Two-way contact
Set point	500 hPa
Switching voltage	250 V AC
Switching current V AC	6 A
Protection category	IP 55

Order number	
Exhaust pressure	PK 196 380 -T

Pressure monitoring

Pressure switch

- Monitors the oil pressure of the rotary vane pump
- Mounted at the stand

Technical data	Oil pressure switch for DUO 35/65; DUO 35/65 MC	Oil pressure switch for DUO 35/65 with OFC/OFM	Oil pressure switch for DUO 125/255	Oil pressure switch for DUO 5/10/20 M and Penta 20/35
Contact	Closing contact, normally open	Closing contact, normally open	Closing contact, normally open	Closing contact, normally open
Set point	1500 hPa	1500 hPa	1500 hPa	1000 hPa
Switching voltage	250 V	250 V	250 V	250 V
Switching current V AC	2 A	2 A	2 A	2 A
Protection category	IP 55	IP 55	IP 55	IP 55

Order number				
Pressure monitoring	PK 223 720 -U	PK 223 741 -U	PK 223 806 -T	PK 196 484 -T

Temperature monitoring

- Monitors the operating fluid temperature
- Mounted at sight glass adapter or casing depending on the pump model

Technical data	Temperature sensor
Method of measurement	PT 100
Protection category	IP 65
Temperature range	-50-+300 °C

Order number	
Temperature monitoring	PK 006 040 -T

Pascal

Two-stage rotary vane pumps for low and medium vacuum



Pascal

Two-stage Pascal rotary vane pumps are the result of decades of experience in the design and industrial production of vacuum pumps.

Pumps in the Pascal series with a pumping speed between 5 and 60 m³/h are used in the most demanding applications in industry, analytics and research & development.

They are distinguished by their high quality and reliability. Four versions of oil-lubricated Pascal pumps allow for optimal adjustment to different requirements. The following versions are available:

- SD-version for all vacuum applications with non-corrosive gases
- I-version for the requirements of instrumental analytics
- C1-version for applications with aggressive or corrosive gases
- C2-version for harsh duty applications with the most aggressive pumping environment

Customer benefits

- High process reliability
- Easy to use and integrate
- Low oil back-streaming
- Low cost of ownership

Typical applications

- Electron microscopy
- Residual gas analysis
- Hard disk coating
- Wear protection
- CD, DVD, Blu-ray production
- Optical coatings
- Vacuum drying
- Space simulation
- Medical applications



Medical applications



Microscopy



Wear protection

Pascal 2005

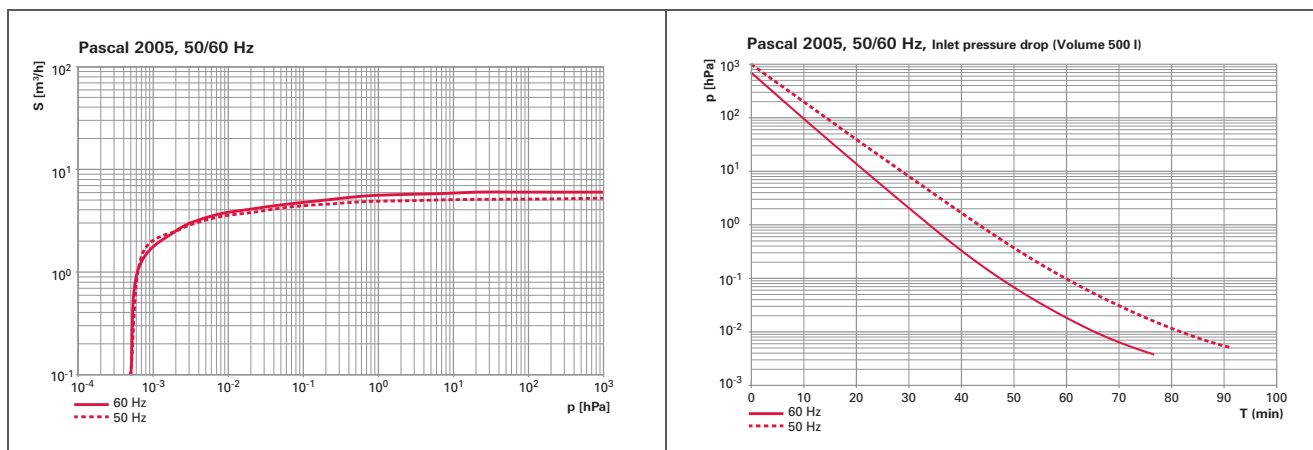
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- Low backstreaming rate
- Compact design
- Adjustable inlet and outlet ports, horizontal or vertical orientation for better integration
- Universal 1-phase motors (high & low voltage, 50/60 Hz)
- Easy integration by large OEMs

SD, I, C1 versions are delivered with mineral oil, and C2 versions are prepared for operation with PFPE oil but fluid must be ordered separately

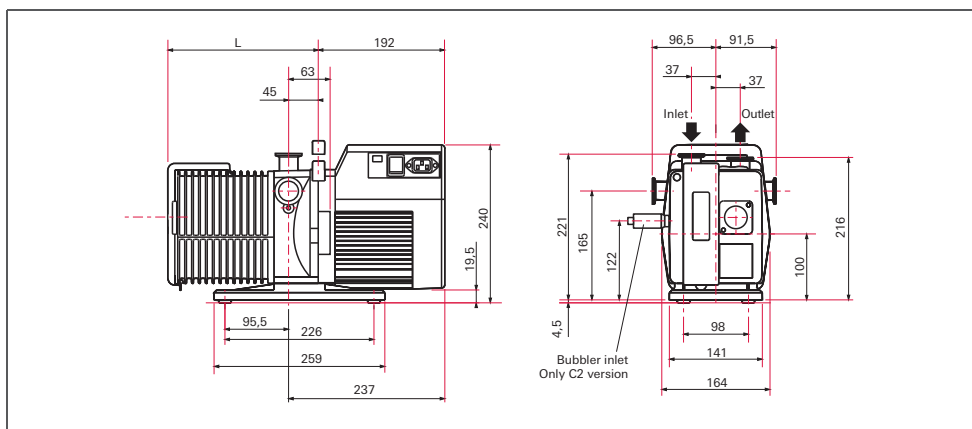
Pumping speed



Pascal 2005

Pascal 2005

Dimensions (in mm)



Pascal 2005	
L	228 mm

Technical data	Pascal 2005, 1-phase motor, 180-254 V, 50 Hz/60 Hz, CE/UL/CSA	Pascal 2005, 1-phase motor, 90-132 V, 50 Hz/60 Hz, CE/UL/CSA	Pascal 2005, 3-phase motor, 342-460 V, 50 Hz; 342-520 V, 60 Hz, CE/UL/CSA	Pascal 2005, 3-phase motor, 170-254 V, 50 Hz; 170-300 V, 60 Hz, CE/UL/CSA
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Operating fluid	Mineral oil	Mineral oil	Mineral oil	Mineral oil
Ultimate pressure with gas ballast	10 ⁻² hPa	10 ⁻² hPa	10 ⁻² hPa	10 ⁻² hPa
Weight	25 kg	25 kg	25 kg	25 kg
Rated power 50 Hz	0.45 kW	0.45 kW	0.55 kW	0.55 kW
Rated power 60 Hz	0.55 kW	0.55 kW	0.66 kW	0.66 kW
Pumping speed at 50 Hz	5 m ³ /h	5 m ³ /h	5 m ³ /h	5 m ³ /h
Pumping speed at 60 Hz	6 m ³ /h	6 m ³ /h	6 m ³ /h	6 m ³ /h

Order number				
Pascal 2005 SD (5 m ³ /h)	205SDMHEM	205SDMLAM	205SDTHEM	205SDTLAM
Pascal 2005 I (5 m ³ /h)	205AEMHEM	205AEMLAM	205AETHEM	205AETLAM

Accessories				
Oil mist eliminator OME 25 S	104200	104200	104200	104200
Oil mist eliminator OME 25 HP	104199	104199	104199	104199
Oil mist eliminator OME 25 HP+	108341	108341	108341	108341
Oil drain kit ODK 1	104360	104360	104360	104360
Oil drain kit ODK 2, 230 V, 50/60 Hz	104361	104361	104361	104361
Sorption trap ST 25 S	104107	104107	104107	104107
Inlet dust filter DFT 25	104202	104202	104202	104202
Liquid nitrogen trap LNT 25 S	104197	104197	104197	104197
Liquid nitrogen trap LNT 25 P1	786346	786346	786346	786346
Condensate trap CT 25	104201	104201	104201	104201
Automatic gas ballast AGB 4, 230 V, 50/60 Hz	104086	104086	104086	104086
Oil level switch OLS 4	104376	104376	104376	104376

Order number				
Pascal 2005 C1 (5 m ³ /h)	205C1MHEM	205C1MLAM	205C1THEM	205C1TLAM

Accessories				
Oil mist eliminator OME 25 C/H	066849	066849	066849	066849
Sorption trap ST 25 C, 220 V	066841	066841	066841	066841
Liquid nitrogen trap LNT 25 C	066889	066889	066889	066889
External oil filter DE 1, 230 V, 50 Hz	068990	068990	068990	068990

Pascal 2010

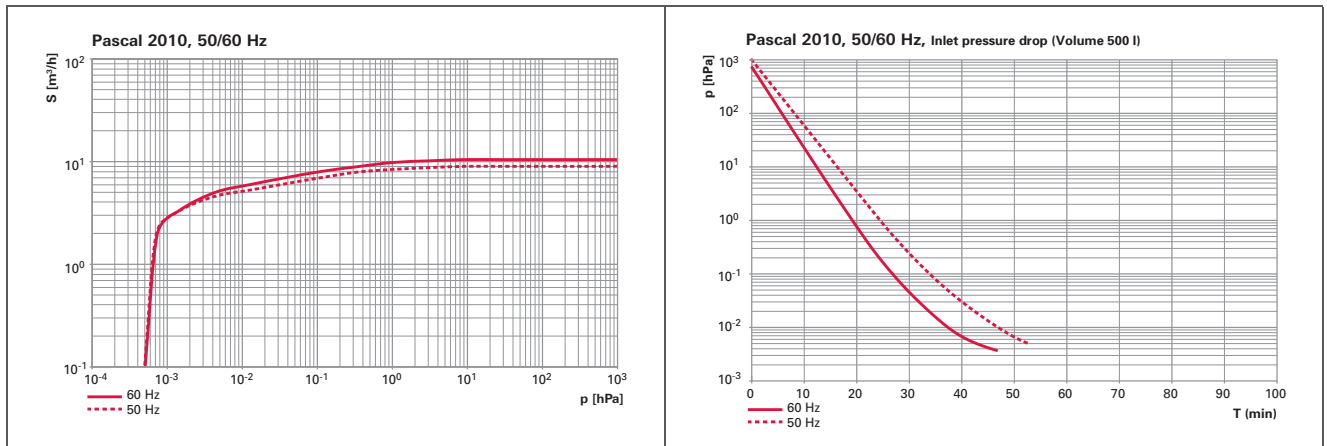
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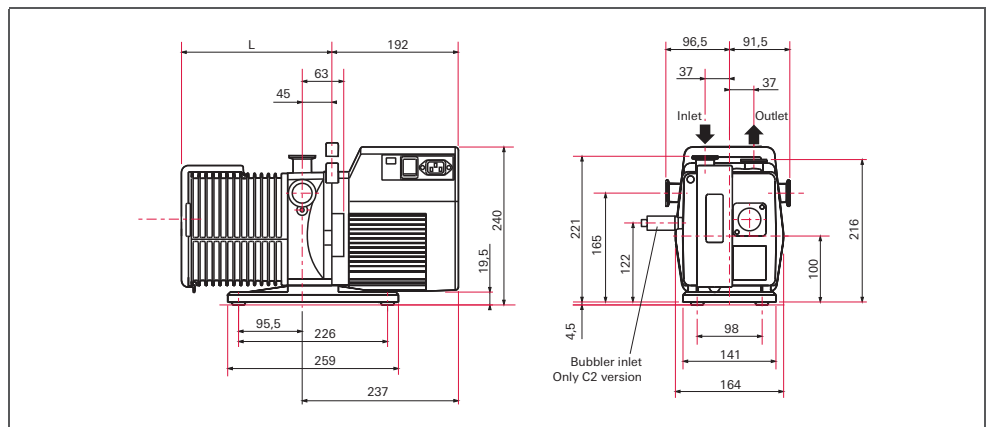
Pumping speed



Pascal 2010

Pascal 2010

Dimensions (in mm)



Pascal 2010	
L	245 mm

Technical data	Pascal 2010, 1-phase motor, 180-254 V, 50 Hz/60 Hz, CE/UL/CSA	Pascal 2010, 1-phase motor, 90-132 V, 50 Hz/60 Hz, CE/UL/CSA	Pascal 2010, 3-phase motor, 342-460 V, 50 Hz; 342-520 V, 60 Hz, CE/UL/CSA	Pascal 2010, 3-phase motor, 170-254 V, 50 Hz; 170-300 V, 60 Hz, CE/UL/CSA
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Operating fluid	Mineral oil	Mineral oil	Mineral oil	Mineral oil
Ultimate pressure with gas ballast	10 ⁻² hPa	10 ⁻² hPa	10 ⁻² hPa	10 ⁻² hPa
Weight	26 kg	26 kg	26 kg	26 kg
Rated power 50 Hz	0.45 kW	0.45 kW	0.55 kW	0.55 kW
Rated power 60 Hz	0.55 kW	0.55 kW	0.66 kW	0.66 kW
Pumping speed at 50 Hz	9 m ³ /h	9 m ³ /h	9 m ³ /h	9 m ³ /h
Pumping speed at 60 Hz	10.5 m ³ /h	10.5 m ³ /h	10.5 m ³ /h	10.5 m ³ /h

Order number				
Pascal 2010 SD (10 m ³ /h)	210SDMHEM	210SDMLAM	210SDTHEM	210SDTLAM
Pascal 2010 I (10 m ³ /h)	210AEMHEM	210AEMLAM	210AETHEM	210AETLAM

Accessories				
Oil mist eliminator OME 25 S	104200	104200	104200	104200
Oil mist eliminator OME 25 HP	104199	104199	104199	104199
Oil mist eliminator OME 25 HP+	108341	108341	108341	108341
Oil drain kit ODK 1	104360	104360	104360	104360
Oil drain kit ODK 2, 230 V, 50/60 Hz	104361	104361	104361	104361
Sorption trap ST 25 S	104107	104107	104107	104107
Inlet dust filter DFT 25	104202	104202	104202	104202
Liquid nitrogen trap LNT 25 S	104197	104197	104197	104197
Liquid nitrogen trap LNT 25 P1	786346	786346	786346	786346
Condensate trap CT 25	104201	104201	104201	104201
Automatic gas ballast AGB 4, 230 V, 50/60 Hz	104086	104086	104086	104086
Oil level switch OLS 4	104376	104376	104376	104376

Order number				
Pascal 2010 C1 (10 m ³ /h)	210C1MHEM	210C1MLAM	210C1THEM	210C1TLAM
Pascal 2010 C2 (10 m ³ /h)	210C2MHEN	210C2MLAN	210C2THEN	210C2TLAN

Accessories				
Sorption trap ST 25 C, 220 V	066841	066841	066841	066841
Liquid nitrogen trap LNT 25 C	066889	066889	066889	066889
External oil filter DE 1, 230 V, 50 Hz	068990	068990	068990	068990

Pascal 2015

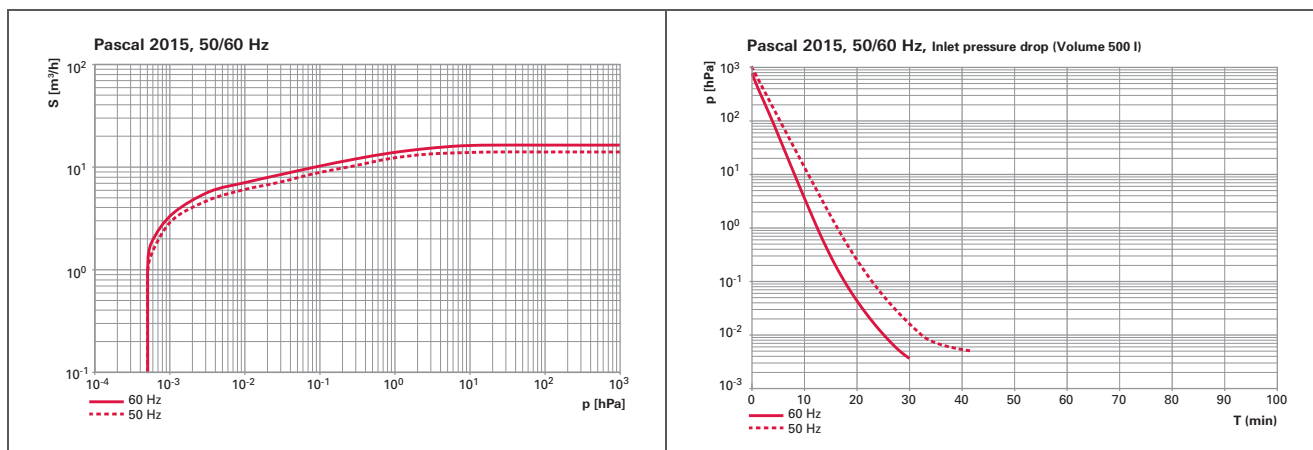
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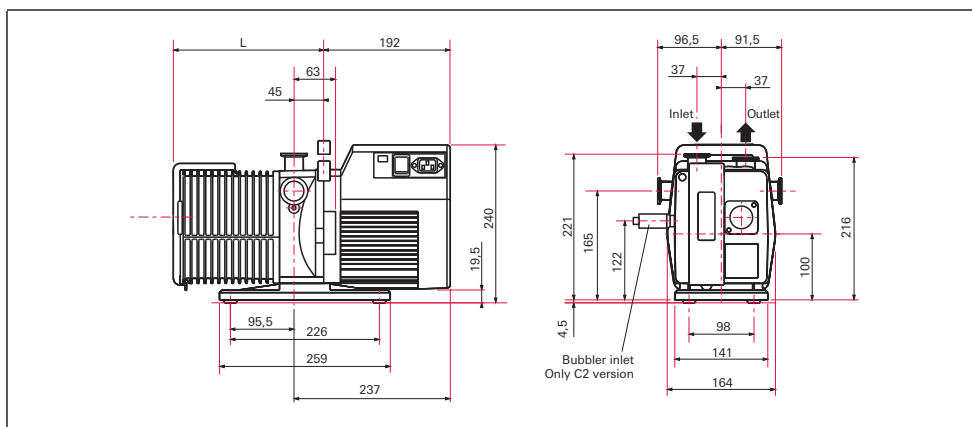
Pumping speed



Pascal 2015

Pascal 2015

Dimensions (in mm)



Pascal 2015	
L	270 mm

Technical data	Pascal 2015, 1-phase motor, 180-254 V, 50 Hz/60 Hz, CE/UL/CSA	Pascal 2015, 1-phase motor, 90-132 V, 50 Hz/60 Hz, CE/UL/CSA	Pascal 2015, 3-phase motor, 342-460 V, 50 Hz; 342-520 V, 60 Hz, CE/UL/CSA	Pascal 2015, 3-phase motor, 170-254 V, 50 Hz; 170-300 V, 60 Hz, CE/UL/CSA
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Operating fluid	Mineral oil	Mineral oil	Mineral oil	Mineral oil
Ultimate pressure with gas ballast	10 ⁻² hPa	10 ⁻² hPa	10 ⁻² hPa	10 ⁻² hPa
Weight	27 kg	27 kg	27 kg	27 kg
Rated power 50 Hz	0.45 kW	0.45 kW	0.55 kW	0.55 kW
Rated power 60 Hz	0.55 kW	0.55 kW	0.66 kW	0.66 kW
Pumping speed at 50 Hz	14 m ³ /h	14 m ³ /h	14 m ³ /h	14 m ³ /h
Pumping speed at 60 Hz	16.5 m ³ /h	16.5 m ³ /h	16.5 m ³ /h	16.5 m ³ /h

Order number				
Pascal 2015 SD (15 m ³ /h)	215SDMHEM	215SDMLAM	215SDTHEM	215SDTLAM
Pascal 2015 I (15 m ³ /h)	215AEMHEM	215AEMLAM	215AETHEM	215AETLAM

Accessories				
Oil mist eliminator OME 25 S	104200	104200	104200	104200
Oil mist eliminator OME 25 HP	104199	104199	104199	104199
Oil mist eliminator OME 25 HP+	108341	108341	108341	108341
Oil drain kit ODK 1	104360	104360	104360	104360
Oil drain kit ODK 2, 230 V, 50/60 Hz	104361	104361	104361	104361
Sorption trap ST 25 S	104107	104107	104107	104107
Inlet dust filter DFT 25	104202	104202	104202	104202
Liquid nitrogen trap LNT 25 S	104197	104197	104197	104197
Liquid nitrogen trap LNT 25 P1	786346	786346	786346	786346
Condensate trap CT 25	104201	104201	104201	104201
Automatic gas ballast AGB 4, 230 V, 50/60 Hz	104086	104086	104086	104086
Oil level switch OLS 4	104376	104376	104376	104376

Order number				
Pascal 2015 C1 (15 m ³ /h)	215C1MHEM	215C1MLAM	215C1THEM	215C1TLAM
Pascal 2015 C2 (15 m ³ /h)	215C2MHEN	215C2MLAN	215C2THEN	215C2TLAN

Accessories				
Sorption trap ST 25 C, 220 V	066841	066841	066841	066841
Liquid nitrogen trap LNT 25 C	066889	066889	066889	066889
External oil filter DE 1, 230 V, 50 Hz	068990	068990	068990	068990

Pascal 2021

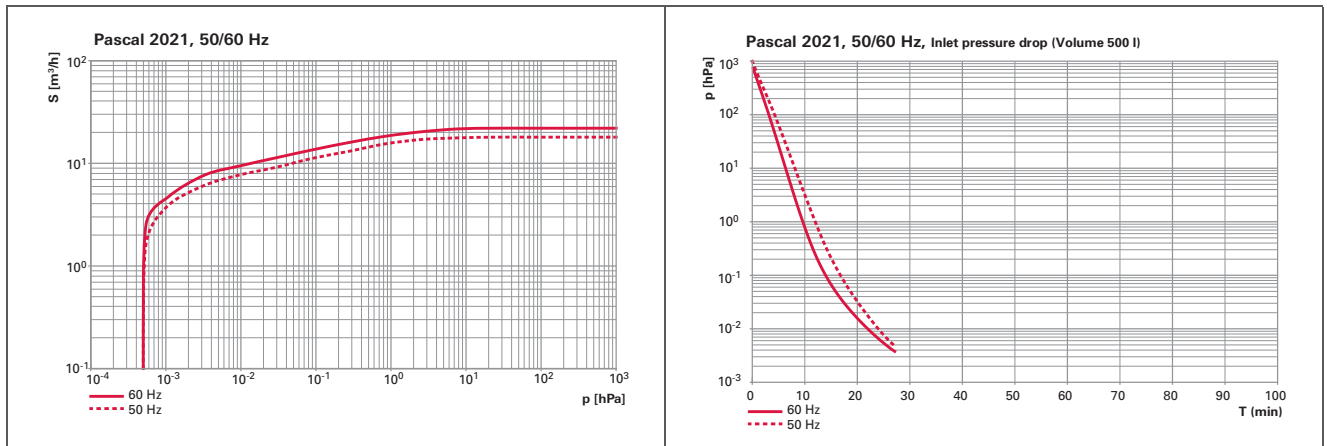
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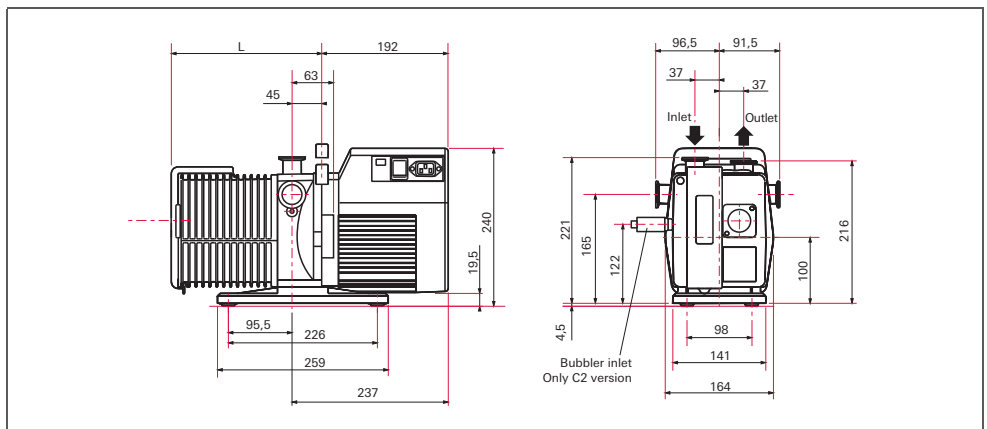
Pumping speed



Pascal 2021

Pascal 2021

Dimensions (in mm)



Pascal 2021	
L	291 mm

Technical data	Pascal 2021, 1-phase motor, 180-254 V, 50 Hz/60 Hz, CE/UL/CSA	Pascal 2021, 1-phase motor, 90-132 V, 50 Hz/60 Hz, CE/UL/CSA	Pascal 2021, 3-phase motor, 342-460 V, 50 Hz; 342-520 V, 60 Hz, CE/UL/CSA	Pascal 2021, 3-phase motor, 170-254 V, 50 Hz; 170-300 V, 60 Hz, CE/UL/CSA
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Operating fluid	Mineral oil	Mineral oil	Mineral oil	Mineral oil
Ultimate pressure with gas ballast	10 ⁻² hPa	10 ⁻² hPa	10 ⁻² hPa	10 ⁻² hPa
Weight	28 kg	28 kg	28 kg	28 kg
Rated power 50 Hz	0.45 kW	0.45 kW	0.55 kW	0.55 kW
Rated power 60 Hz	0.55 kW	0.55 kW	0.66 kW	0.66 kW
Pumping speed at 50 Hz	18 m ³ /h	18 m ³ /h	18 m ³ /h	18 m ³ /h
Pumping speed at 60 Hz	22 m ³ /h	22 m ³ /h	22 m ³ /h	22 m ³ /h

Order number				
Pascal 2021 SD (21 m ³ /h)	221SDMHEM	221SDMLAM	221SDTHEM	221SDTLAM
Pascal 2021 I (21 m ³ /h)	221AEMHEM	221AEMLAM	221AETHEM	221AETLAM

Accessories				
Oil mist eliminator OME 25 S	104200	104200	104200	104200
Oil mist eliminator OME 25 HP	104199	104199	104199	104199
Oil mist eliminator OME 25 HP+	108341	108341	108341	108341
Oil drain kit ODK 1	104360	104360	104360	104360
Oil drain kit ODK 2, 230 V, 50/60 Hz	104361	104361	104361	104361
Sorption trap ST 25 S	104107	104107	104107	104107
Inlet dust filter DFT 25	104202	104202	104202	104202
Liquid nitrogen trap LNT 25 S	104197	104197	104197	104197
Liquid nitrogen trap LNT 25 P1	786346	786346	786346	786346
Condensate trap CT 25	104201	104201	104201	104201
Automatic gas ballast AGB 4, 230 V, 50/60 Hz	104086	104086	104086	104086
Oil level switch OLS 4	104376	104376	104376	104376

Order number				
Pascal 2021 C1 (21 m ³ /h)	221C1MHEM	221C1MLAM	221C1THEM	221C1TLAM
Pascal 2021 C2 (21 m ³ /h)	221C2MHEN	221C2MLAN	221C2THEN	221C2TLAN

Accessories				
Sorption trap ST 25 C, 220 V	066841	066841	066841	066841
Liquid nitrogen trap LNT 25 C	066889	066889	066889	066889
External oil filter DE 1, 230 V, 50 Hz	068990	068990	068990	068990

Pascal 2033

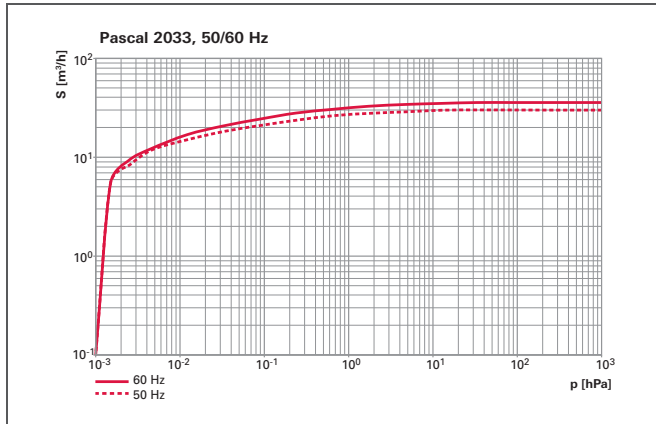
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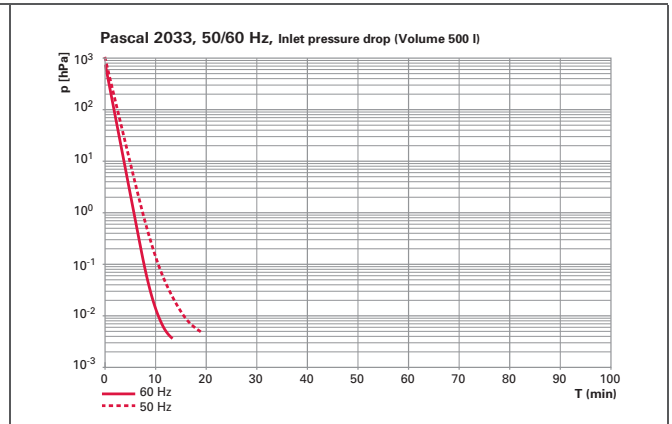
- All major vacuum applications in a wide range of industries
- Low backstreaming rate

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Pumping speed

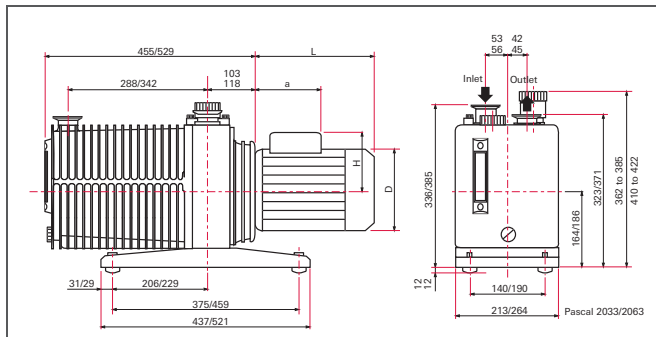


Pascal 2033

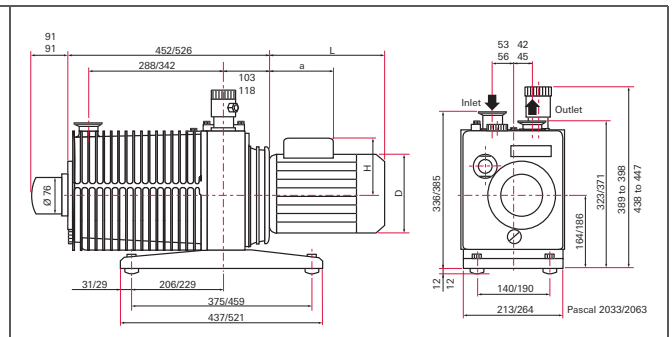


Pascal 2033

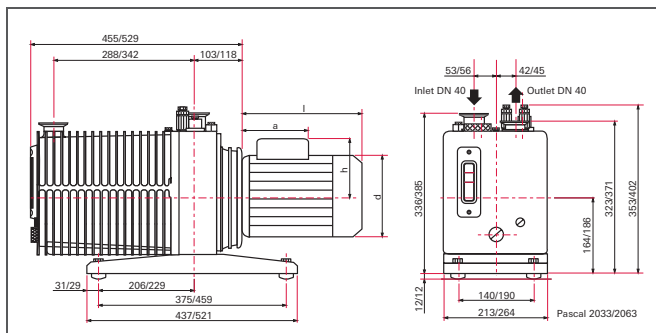
Dimensions (in mm)



Pascal 2033, SD version



Pascal 2033, C1 version



Pascal 2033, C2 version

	3-phase motor Europe	3-phase motor USA/Japan	3-phase motor Rest of the world
A	143 mm	143 mm	200 mm
D	177 mm	177 mm	170 mm
H	137 mm	137 mm	140 mm
L	267 mm	267 mm	270 mm

Technical data	Pascal 2033, 3-phase motor, Europe, 380-415 V, 50 Hz; 380-480 V, 60 Hz, CE	Pascal 2033, 3-phase motor, USA/Japan, 180-220 V, 50 Hz; 190-230 V, 60 Hz, CE/UL/CSA	Pascal 2033, 3-phase motor, Rest of the world, 360-415 V, 50 Hz; 380-480 V, 60 Hz, CE	Pascal 2033, 3-phase motor, Rest of the world, 180-240 V, 50 Hz; 180-240 V, 60 Hz, CE
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Operating fluid	Mineral oil	Mineral oil	Mineral oil	Mineral oil
Ultimate pressure with gas ballast	$2 \cdot 10^{-2}$ hPa	$2 \cdot 10^{-2}$ hPa	$2 \cdot 10^{-2}$ hPa	$2 \cdot 10^{-2}$ hPa
Rated power 50 Hz	1.1 kW	1.5 kW	1.5 kW	1.5 kW
Rated power 60 Hz	1.3 kW	1.8 kW	1.8 kW	1.8 kW
Pumping speed at 50 Hz	30 m ³ /h	30 m ³ /h	30 m ³ /h	30 m ³ /h
Pumping speed at 60 Hz	36 m ³ /h	36 m ³ /h	36 m ³ /h	36 m ³ /h

Order number				
Weight	65.5 kg	67.5 kg	69 kg	69 kg
Pascal 2033 SD (33 m ³ /h)	233SDT1HWMNX	233SDT2LWMNX	233SDT3HWMNX	233SDT3LWMNX

Accessories				
Oil mist eliminator OME 40 S	104887	104887	104887	104887
Oil mist eliminator OME 40 HP+	200024	200024	200024	200024
Oil drain kit ODK 136	118773	118773	118773	118773
Oil drain kit ODK 236, 230 V, 50/60 Hz	118776	118776	118776	118776
Sorption trap ST 40, 230 V (without adsorbent charge)	053380	053380	053380	053380
Automatic gas ballast AGB 36, 230 V, 50/60 Hz	068391	068391	068391	068391
Oil level switch OLS 36	104377	104377	104377	104377
External oil filter DE 1, 230 V, 50 Hz	068990	068990	068990	068990
External oil filter DE 2, 230 V, 50 Hz	104374	104374	104374	104374

Order number				
Weight	68,5 kg	70,5 kg	72 kg	72 kg
Pascal 2033 C1 (33 m ³ /h)	233C1T1HWMNX	233C1T2LWMNX	233C1T3HWMNX	233C1T3LWMNX
Weight	66,5 kg	68,5 kg	70 kg	70 kg
Pascal 2033 C2 (33 m ³ /h)	233C2T1HWNNX	233C2T2LWNNX	233C2T3HWNNX	233C2T3LWNNX

Accessories				
Oil mist eliminator OME 40 C1	068785	068785	068785	068785
External oil filter DE 1, 230 V, 50 Hz	068990	068990	068990	068990
External oil filter DE 2, 230 V, 50 Hz	104374	104374	104374	104374

Pascal 2063

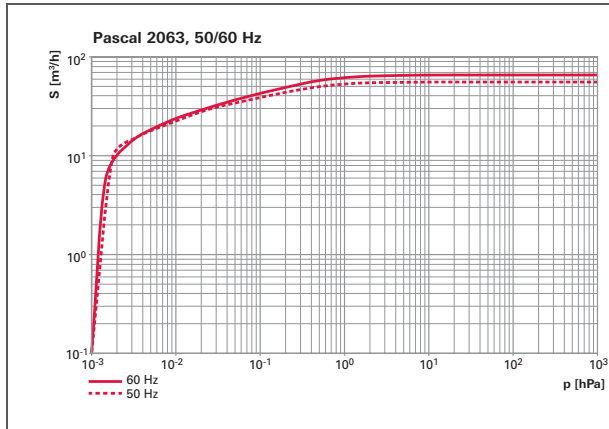
Two-stage Rotary Vane pumps for all major vacuum applications in a wide range of industries.



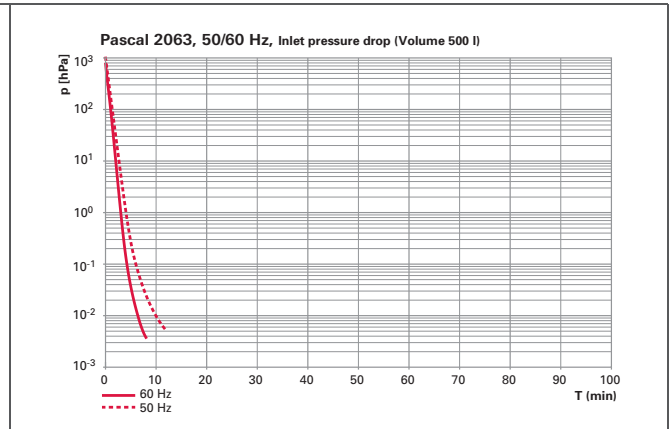
- All major vacuum applications in a wide range of industries
- Low backstreaming rate

SD, I, C1 versions are delivered with mineral oil, and C2 versions are prepared for operation with PFPE oil but fluid must be ordered separately

Pumping speed

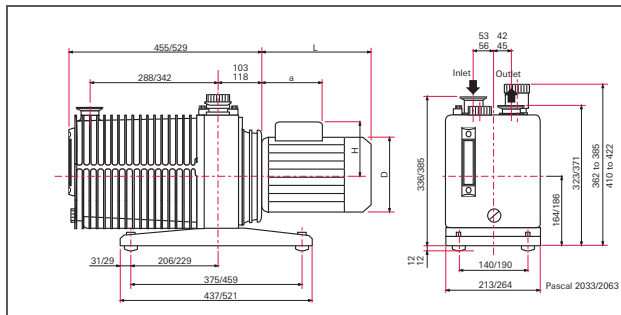


Pascal 2063

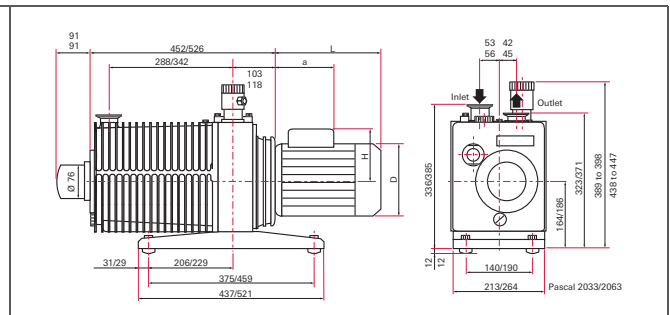


Pascal 2063

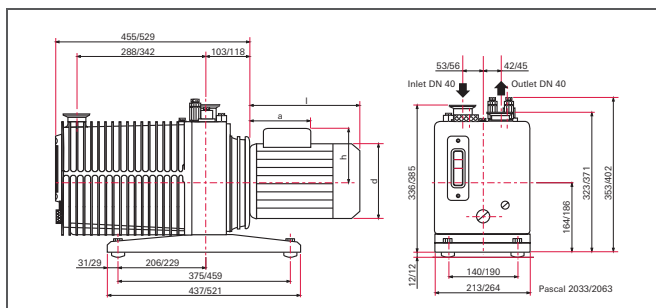
Dimensions (in mm)



Pascal 2063, SD version



Pascal 2063, C1 version



Pascal 2063, C2 version

	3-phase motor Europe	3-phase motor USA/Japan	3-phase motor Rest of the world
A	149 mm	149 mm	230 mm
D	196 mm	196 mm	190 mm
H	144 mm	144 mm	150 mm
L	321 mm	321 mm	300 mm

Technical data	Pascal 2063, 3-phase motor, Europe,	Pascal 2063, 3-phase motor, USA/Japan,	Pascal 2063, 3-phase motor, Rest of the world,	Pascal 2063, 3-phase motor, Rest of the world,
	380-415 V, 50 Hz; 380-480 V, 60 Hz, CE	180-220 V, 50 Hz; 190-280 V, 60 Hz, CE/UL/CSA	360-415 V, 50 Hz; 380-480 V, 60 Hz, CE	180-240 V, 50 Hz; 180-240 V, 60 Hz, CE
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Operating fluid	Mineral oil	Mineral oil	Mineral oil	Mineral oil
Ultimate pressure with gas ballast	$2 \cdot 10^{-2}$ hPa	$2 \cdot 10^{-2}$ hPa	$2 \cdot 10^{-2}$ hPa	$2 \cdot 10^{-2}$ hPa
Rated power 50 Hz	2.2 kW	2.2 kW	2.2 kW	2.2 kW
Rated power 60 Hz	2.6 kW	2.6 kW	2.6 kW	2.6 kW
Mains requirement: voltage 50 Hz	380-415 V	180-220 V	360-415 V	180-240 V
Mains requirement: voltage 60 Hz	380-480 V	190-280 V	380-480 V	180-240 V
Pumping speed at 50 Hz	56 m ³ /h	56 m ³ /h	56 m ³ /h	56 m ³ /h
Pumping speed at 60 Hz	66 m ³ /h	66 m ³ /h	66 m ³ /h	66 m ³ /h

Order number				
Weight	104 kg	104 kg	103.5 kg	103.5 kg
Pascal 2063 SD (63 m ³ /h)	263SDT1HWMNX	263SDT2LWMNX	263SDT3HWMNX	263SDT3LWMNX

Accessories				
Oil mist eliminator OME 40 S	104887	104887	104887	104887
Oil mist eliminator OME 40 HP+	200024	200024	200024	200024
Oil drain kit ODK 136	118773	118773	118773	118773
Oil drain kit ODK 236, 230 V, 50/60 Hz	118776	118776	118776	118776
Sorption trap ST 40, 230 V (without adsorbent charge)	053380	053380	053380	053380
Automatic gas ballast AGB 36, 230 V, 50/60 Hz	068391	068391	068391	068391
Oil level switch OLS 36	104377	104377	104377	104377
External oil filter DE 1, 230 V, 50 Hz	068990	068990	068990	068990
External oil filter DE 2, 230 V, 50 Hz	104374	104374	104374	104374

Order number				
Weight	107,5 kg	107,5 kg	107 kg	107 kg
Pascal 2063 C1 (63 m ³ /h)	263C1T1HWMNX	263C1T2LWMNX	263C1T3HWMNX	263C1T3LWMNX
Weight	104,5 kg	104,5 kg	104 kg	104 kg
Pascal 2063 C2 (63 m ³ /h)	263C2T1HWNNX	263C2T2LWNNX	263C2T3HWNNX	263C2T3LWNNX

Accessories				
Oil mist eliminator OME 40 C1	068785	068785	068785	068785
External oil filter DE 1, 230 V, 50 Hz	068990	068990	068990	068990
External oil filter DE 2, 230 V, 50 Hz	104374	104374	104374	104374

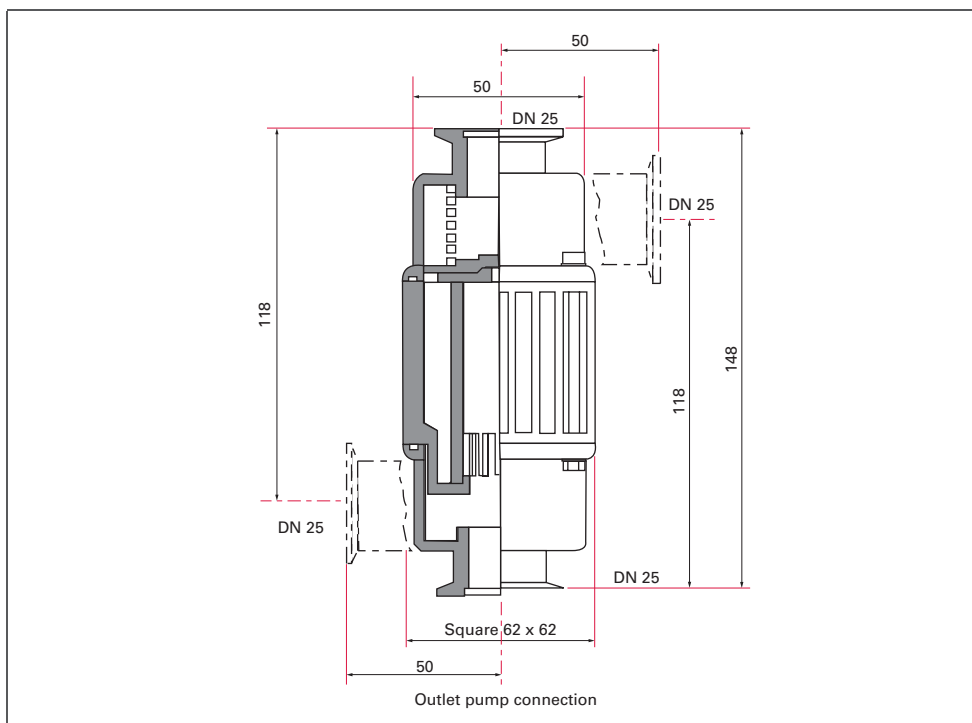
Oil mist eliminator OME 25 S



Oil mist eliminators retain oil mist contained in the exhausted gases with a high level of separation; an internal over pressure valve prevents exceeding the maximum permissible exhaust pressure.

- Body material: Polyamide
- Cartridge material: Epoxy/glass microfiber
- Weight: 0.217 kg
- Inlet/Exhaust port: DN 25 ISO-KF
- Supplied with: 1 centering ring, 1 clamp, 1 additional angle port
- Replacement cartridge, single: Order number 068304. Orders must be placed for quantities multiple of 5 (5, 10, 15...)

Dimensions (in mm)



Order number	
Oil mist eliminator OME 25 S	104200

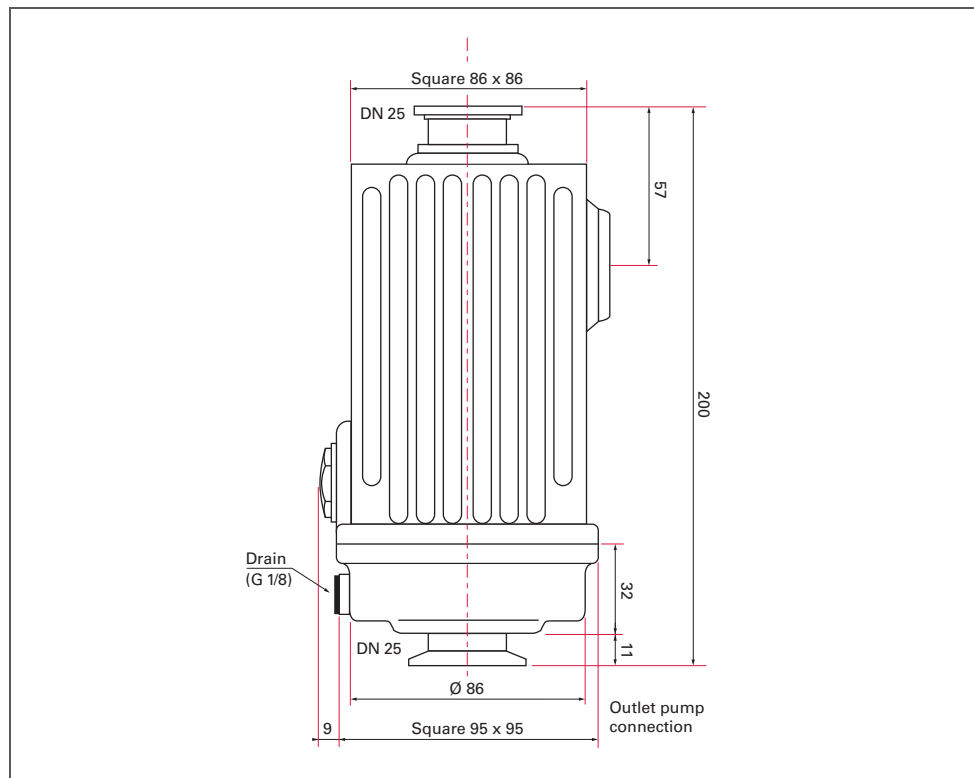
Oil mist eliminator OME 25 HP



Oil mist eliminators retain oil mist contained in the exhausted gases with a high level of separation; an internal over pressure valve prevents exceeding the maximum permissible exhaust pressure.

- Body material: Aluminum
- Cartridge material: Epoxy/glass microfiber
- Weight: 1.2 kg
- Inlet/Exhaust port: DN 25 ISO-KF
- Supplied with: 1 centering ring and 1 clamp
- Replacement cartridge (single): Order number 100522

Dimensions (in mm)



Order number

Oil mist eliminator OME 25 HP

104199

Oil mist eliminator OME 25 HP+



Oil mist eliminators retain oil mist contained in the exhausted gases with a high level of separation; an internal over pressure valve prevents exceeding the maximum permissible exhaust pressure.

- Body material: Aluminum
- Cartridge material: PU/PET/glass micro-fiber/PA
- Weight: 1.2 kg
- Inlet/Exhaust port: DN 25 ISO-KF
- Supplied with: 1 centering ring and 1 clamp
- Replacement cartridge (single): Order number 107494

Order number

Oil mist eliminator OME 25 HP+

108341

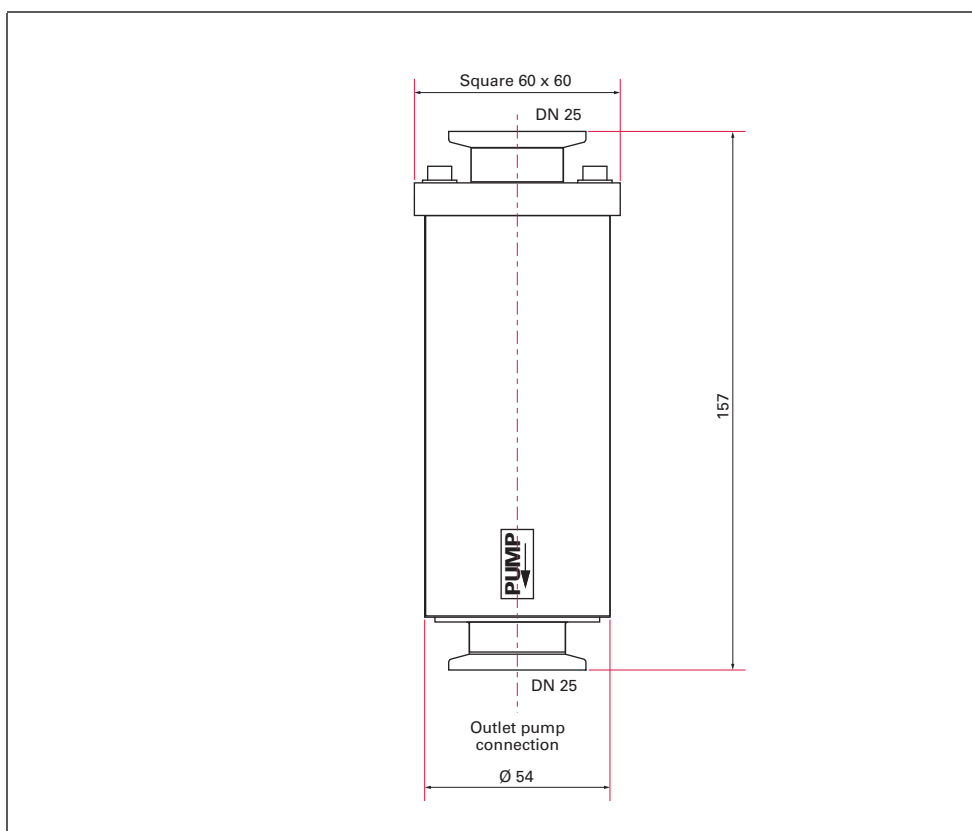
Oil mist eliminator OME 25 C/H



Oil mist eliminators retain oil mist contained in the exhausted gases with a high level of separation; an internal over pressure valve prevents exceeding the maximum permissible exhaust pressure.

- Body material: Stainless steel
- Cartridge material: PTFE/glass microfiber
- Weight: 0.53 kg
- Leak rate $< 2 \cdot 10^{-8}$ Pa m³/s
- Inlet/Exhaust port: DN 25 ISO-KF
- Supplied with: 1 centering ring and 1 clamp
- Replacement cartridge: Order number 066800

Dimensions (in mm)



Order number

Oil mist eliminator OME 25 C/H

066849

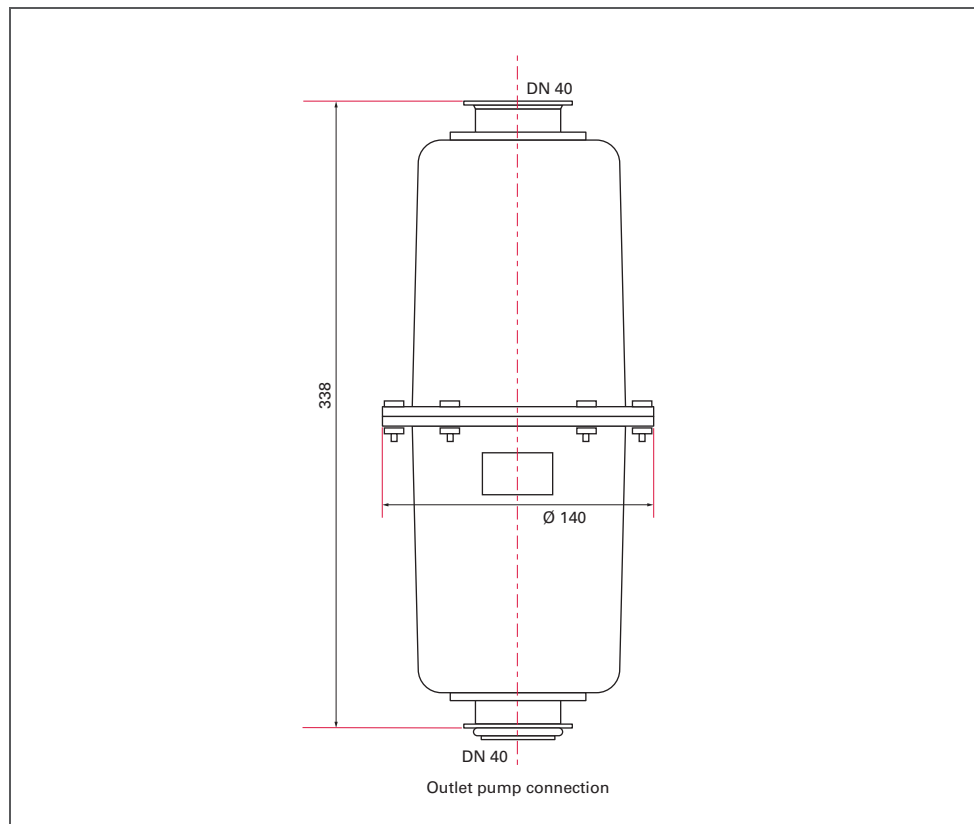
Oil mist eliminator OME40S



Oil mist eliminators retain oil mist contained in the exhausted gases with a high level of separation; an internal over pressure valve prevents exceeding the maximum permissible exhaust pressure.

- Body material: Aluminum
- Cartridge material: Epoxy/glass microfiber
- Weight: 0.9 kg
- Leak rate $< 2 \cdot 10^{-8}$ Pa m³/s
- Inlet/Exhaust port: DN 40 ISO-KF
- Replacement cartridge (single): Order number 068443

Dimensions (in mm)



Order number	
Oil mist eliminator OME40S	104887

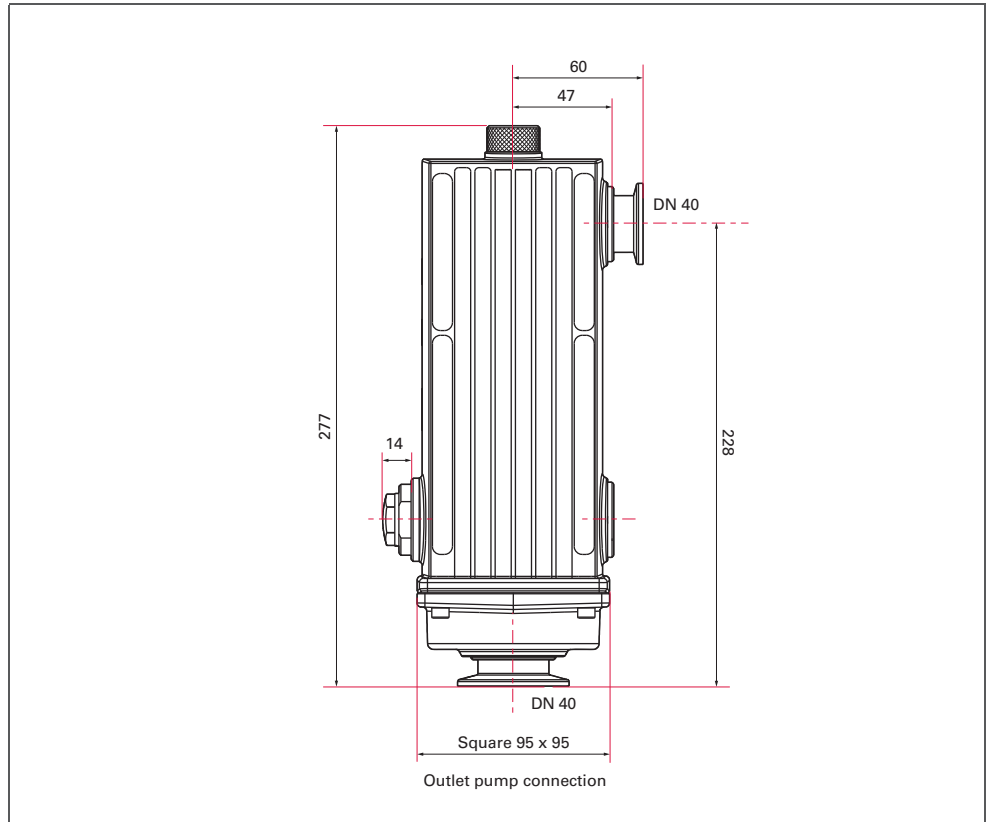
Oil mist eliminator OME40HP+



Oil mist eliminators retain oil mist contained in the exhausted gases with a high level of separation; an internal over pressure valve prevents exceeding the maximum permissible exhaust pressure.

- Body material: Aluminum
- Cartridge material: phenolic resin/glass micro-fiber/polnoter
- Weight: 1.4 kg
- Inlet/Exhaust port: DN 40 ISO-KF
- Supplied with: 1 centering ring and 1 clamp
- Replacement cartridge (single): Order number 115937

Dimensions (in mm)



Order number	
Oil mist eliminator OME40HP+	200024

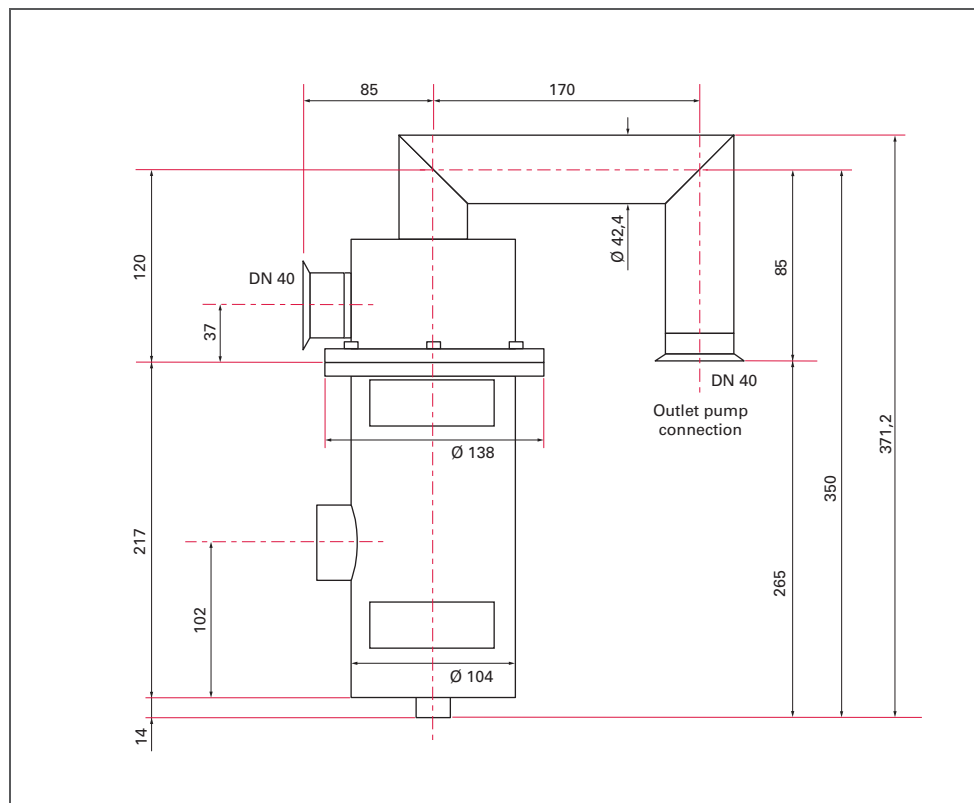
Oil mist eliminator OME40C1



Oil mist eliminators retain oil mist contained in the exhausted gases with a high level of separation; an internal over pressure valve prevents exceeding the maximum permissible exhaust pressure.

- Body material: Stainless steel
- Cartridge material: PTFE/glass microfiber
- Weight: 4.1 kg
- Inlet/Exhaust port: DN 40 ISO-KF
- Replacement cartridge (single): Order number 068778

Dimensions (in mm)



Order number

Oil mist eliminator OME40C1

068785

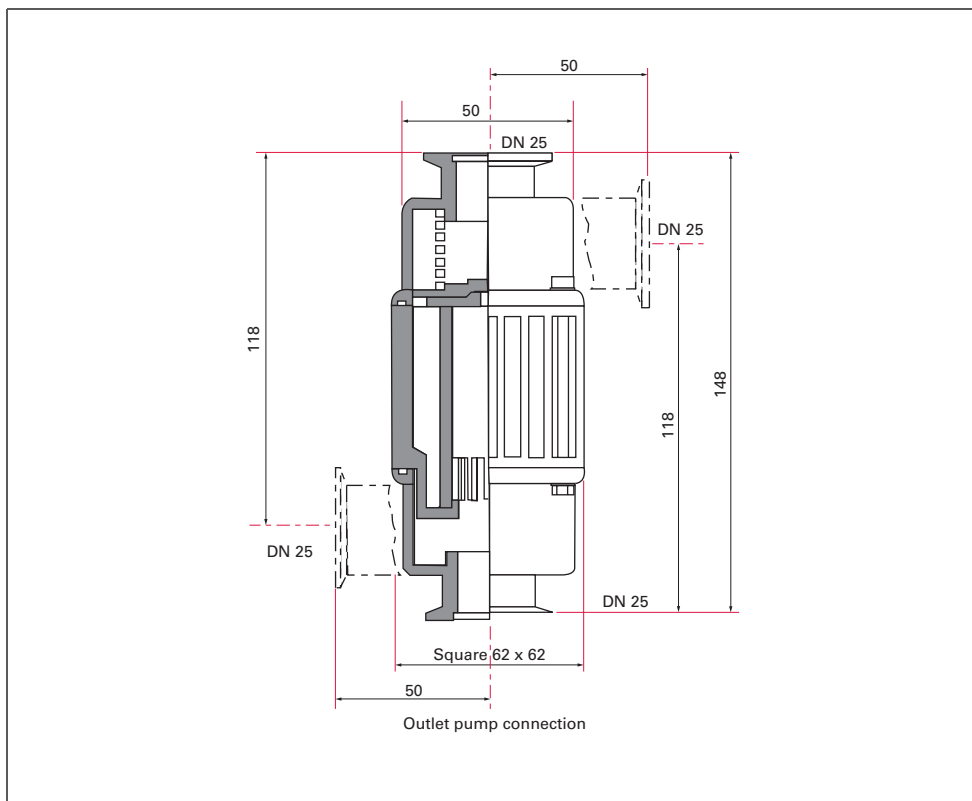
Oil mist eliminator OME40C2



Oil mist eliminators retain oil mist contained in the exhausted gases with a high level of separation; an internal over pressure valve prevents exceeding the maximum permissible exhaust pressure.

- Body material: Stainless steel
- Cartridge material: Polypropylene
- Weight: 4.1 kg
- Inlet/Exhaust port: DN 40 ISO-KF
- Replacement cartridge (single): Order number 100802

Dimensions (in mm)



Order number	
Oil mist eliminator OME40C2	068942

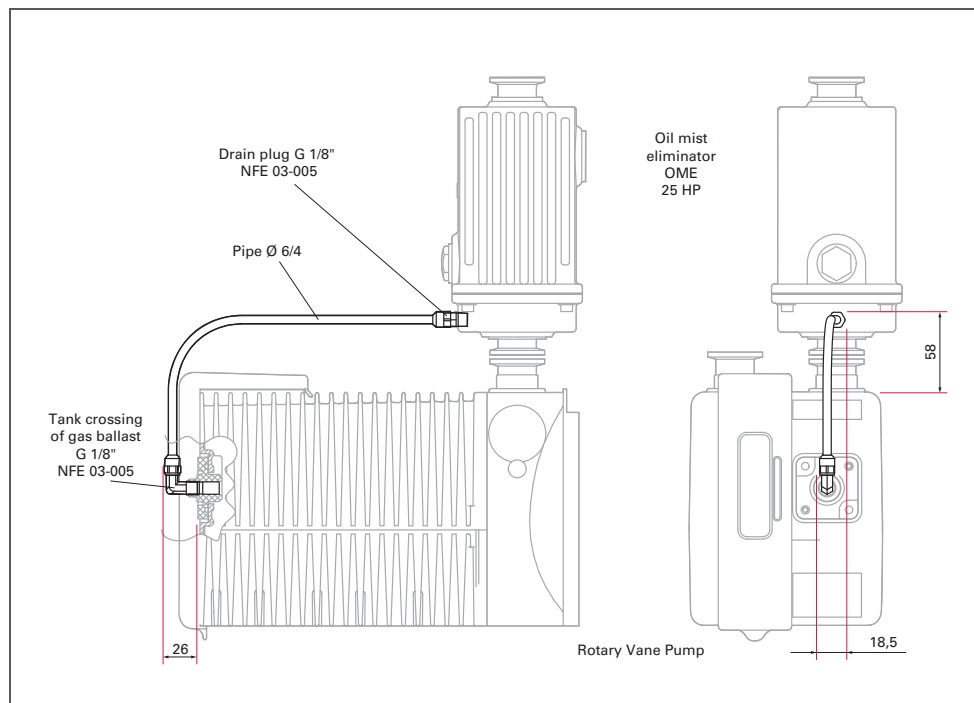
Oil drain kit ODK 1

Oil Drain Kit 1 must be used with oil mist eliminator OME 25 HP. It consists of a drain pipe which is connected on one end to the bottom of the OME 25 HP, and on the other end to the inlet of the gas ballast.



- Weight: 0.1 kg

Dimensions (in mm)



Order number

Oil drain kit ODK 1

104360

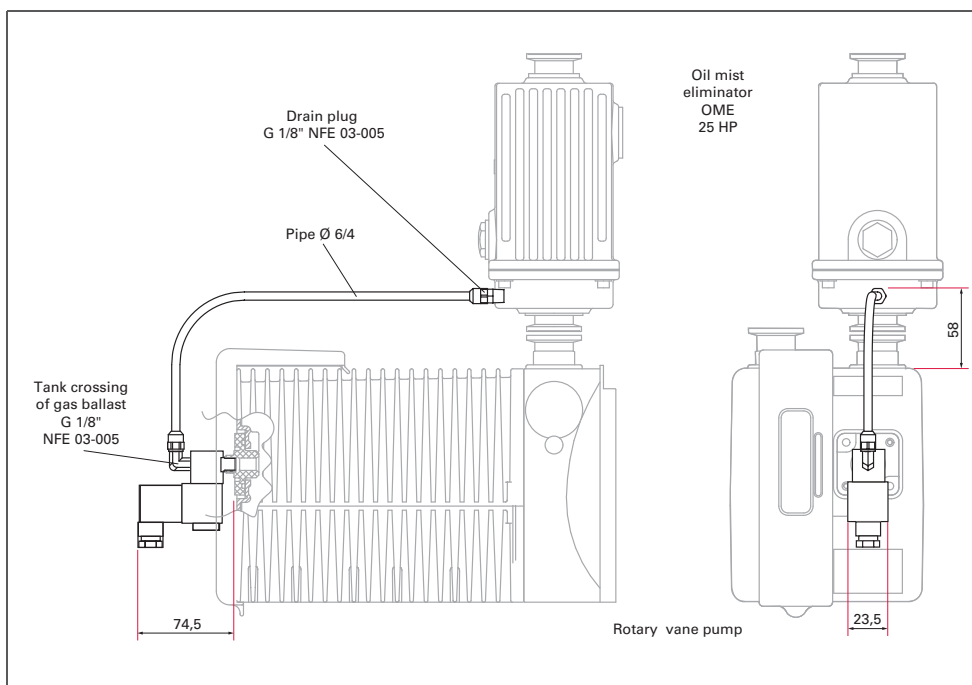
Oil drain kit ODK 2

Oil Drain Kit 2 must be used with oil mist eliminator OME 25 HP. It consists of a drain pipe which is connected on one end to the bottom of the OME 25 HP, and on the other end to the inlet of the gas ballast through a solenoid valve. ODK2 are recommended for 5 to 21 m³/h pumps I/SD series.



- Weight: 0.3 kg
- Solenoid Valve Voltage: 230 V 50/60 Hz
- Further voltage ranges are available on request

Dimensions (in mm)



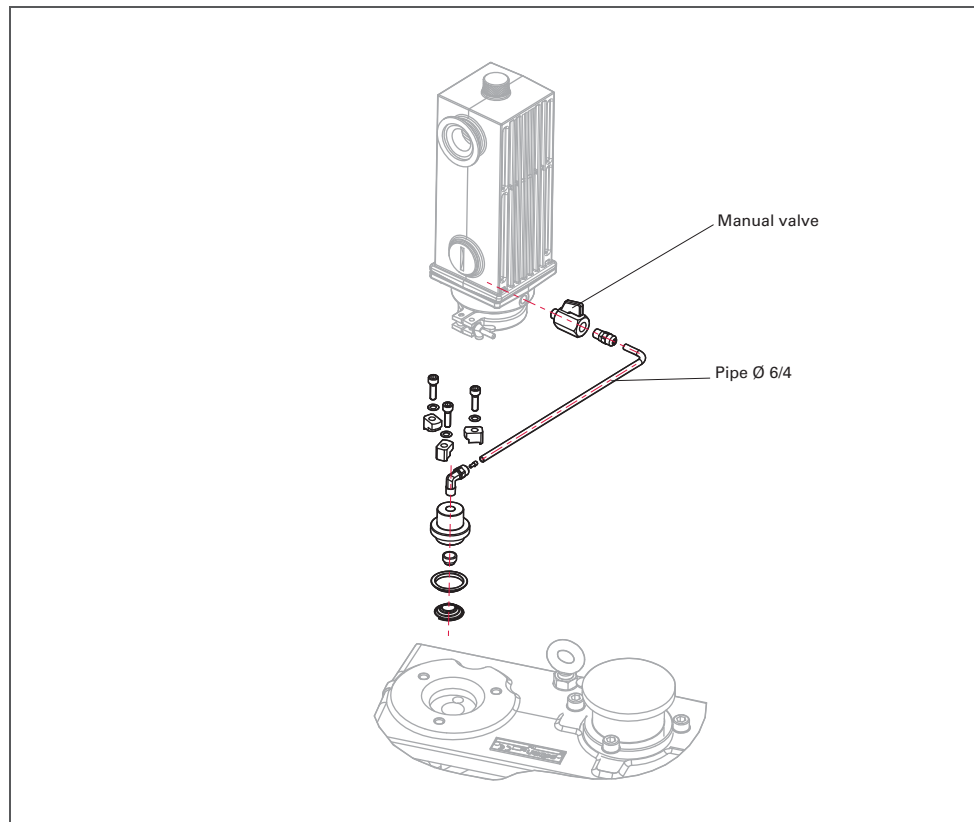
Order number	
Oil drain kit ODK 2	104361

Oil drain kit ODK 136

Oil Drain Kit 136 must be used with oil mist eliminator OME 40 HP+. It consists of a drain pipe which is connected on one end to the bottom of the OME 40 HP+, and on the other end to the inlet of the gas ballast through a solenoid valve.



Dimensions (in mm)



Order number

Oil drain kit ODK 136

118773

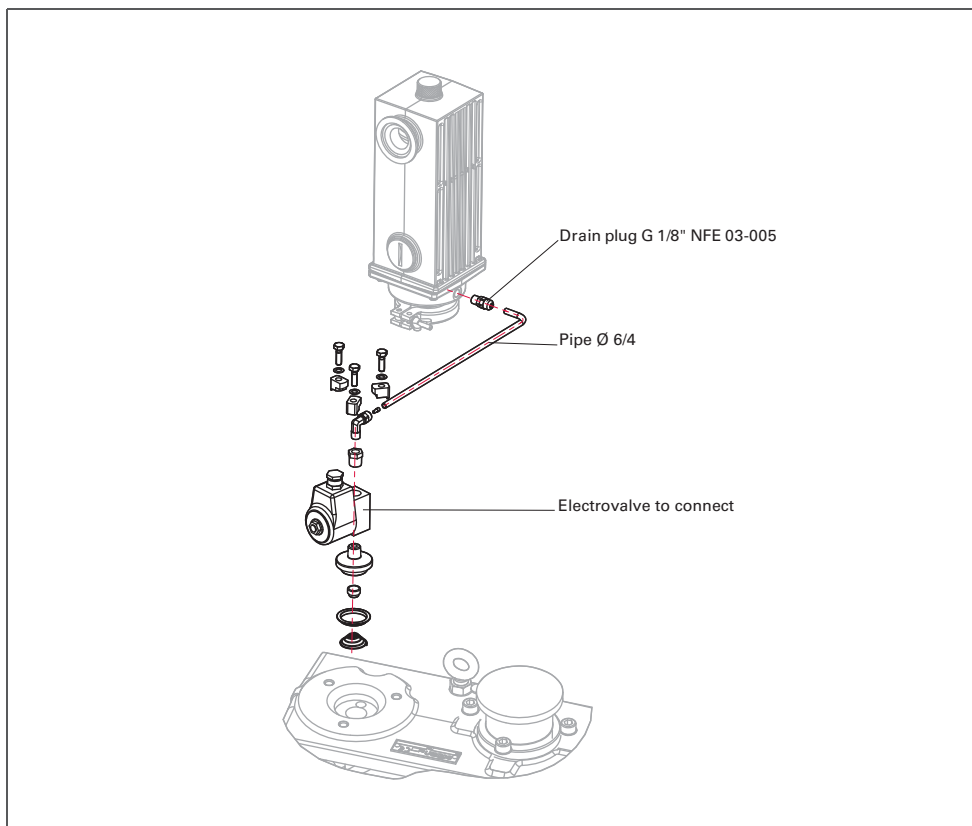
Oil drain kit ODK 236

Oil Drain Kit 236 must be used with oil mist eliminator OME 40 HP+. It consists of a drain pipe which is connected on one end to the bottom of the OME 40 HP+, and on the other end to the inlet of the gas ballast through a solenoid valve.



- Solenoid Valve Voltage: 230 V 50/60 Hz
- Further voltage ranges are available on request

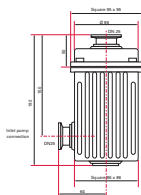
Dimensions (in mm)



Order number	
Oil drain kit ODK 236, 230 V, 50/60 Hz	118776

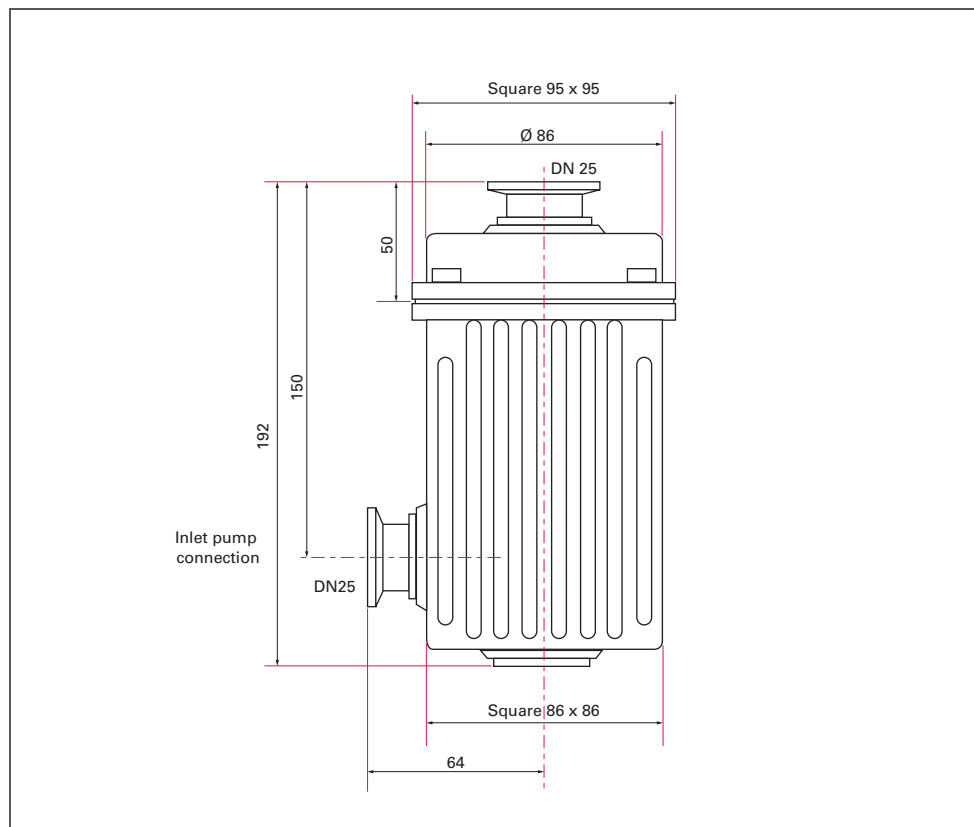
Sorption trap ST 25 S

Sorption traps consist of a sealed body filled with adsorbent media which contains extremely porous surfaces adsorb water or hydrocarbon molecules contained in the pumped gases.



- Body material: Aluminum
- Cartridge material: Stainless steel
- Trap Weight: 1.15 kg
- Adsorbent Weight: 0.36 kg
- Inlet/Exhaust port: DN 25 ISO-KF
- Conductance at 10^{-1} hPa inlet pressure: 45 l/s
- Conductance at 10^{-2} hPa inlet pressure: 11 l/s
- Adsorbent charge: activated alumina: Order number 068779
- Adsorbent charge: zeolite: Order number 068182
- Supplied with: 1 centering ring and 1 clamp

Dimensions (in mm)



Order number

Sorption trap ST 25 S

104107

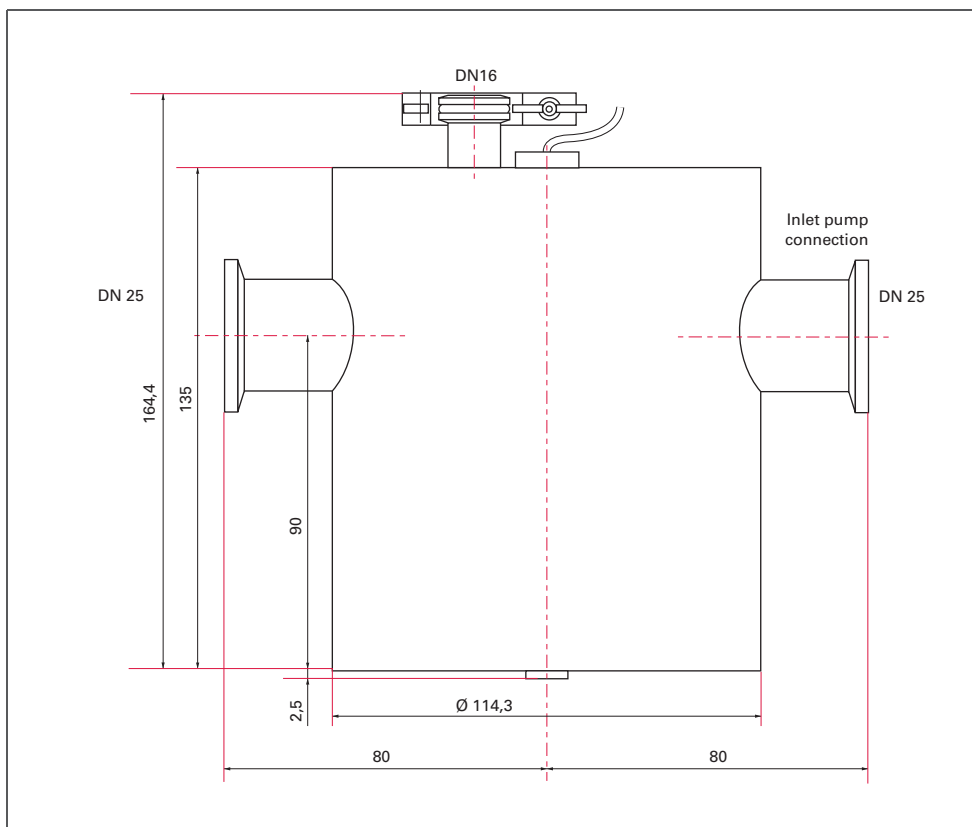
Sorption trap ST25C



Sorption traps consist of a sealed body filled with adsorbent media which contains extremely porous surfaces adsorb water or hydrocarbon molecules contained in the pumped gases.

- Body material: Stainless steel
- Cartridge material: Stainless steel
- Trap Weight: 1.4 kg
- Adsorbent Weight: 0.26 kg
- Inlet/Exhaust port: DN 25 ISO-KF
- Conductance at 10^{-1} hPa inlet pressure: 45 l/s
- Conductance at 10^{-2} hPa inlet pressure: 11 l/s
- Adsorbent charge: activated alumina: Order number 068779
- Adsorbent charge: zeolite: Order number 068182
- Heating element: 220 V Order number: 068319
- Supplied with: 1 centering ring and 1 clamp
- Further voltage ranges are available on request

Dimensions (in mm)



Order number

Sorption trap ST 25 C, 220 V

066841

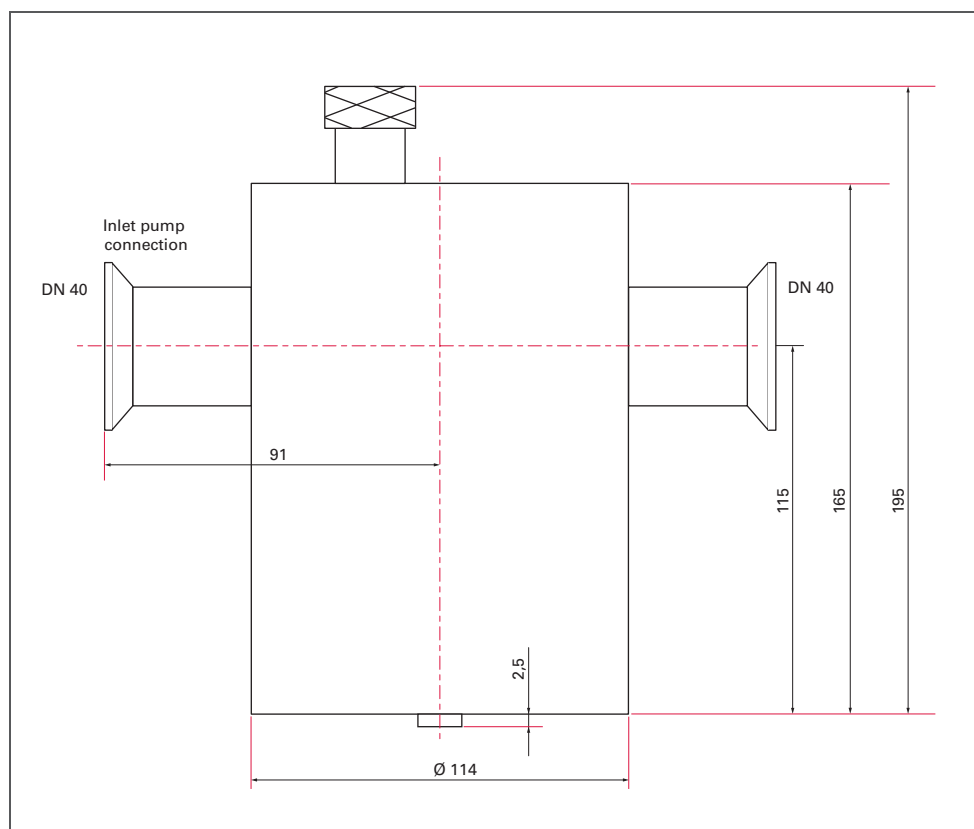
Sorption trap ST40



Sorption traps consist of a sealed body filled with adsorbent media which contains extremely porous surfaces adsorb water or hydrocarbon molecules contained in the pumped gases.

- Body material: Stainless steel
- Cartridge material: Stainless steel
- Trap Weight: 1.7 kg
- Adsorbent Weight: 0.36 kg
- Inlet/Exhaust port: DN 40 ISO-KF
- Conductance at 10^{-2} hPa inlet pressure: 25 l/s
- Adsorbent charge: activated alumina: Order number 068779
- Adsorbent charge: zeolite: Order number 068182
- Heating element: 220 V Order number: 068319
- Supplied with: 1 centering ring and 1 clamp
- Trap is supplied with zeolite charge
- Further voltage ranges are available on request

Dimensions (in mm)



Order number

Sorption trap ST 40, 230 V
(without adsorbend charge)

053380

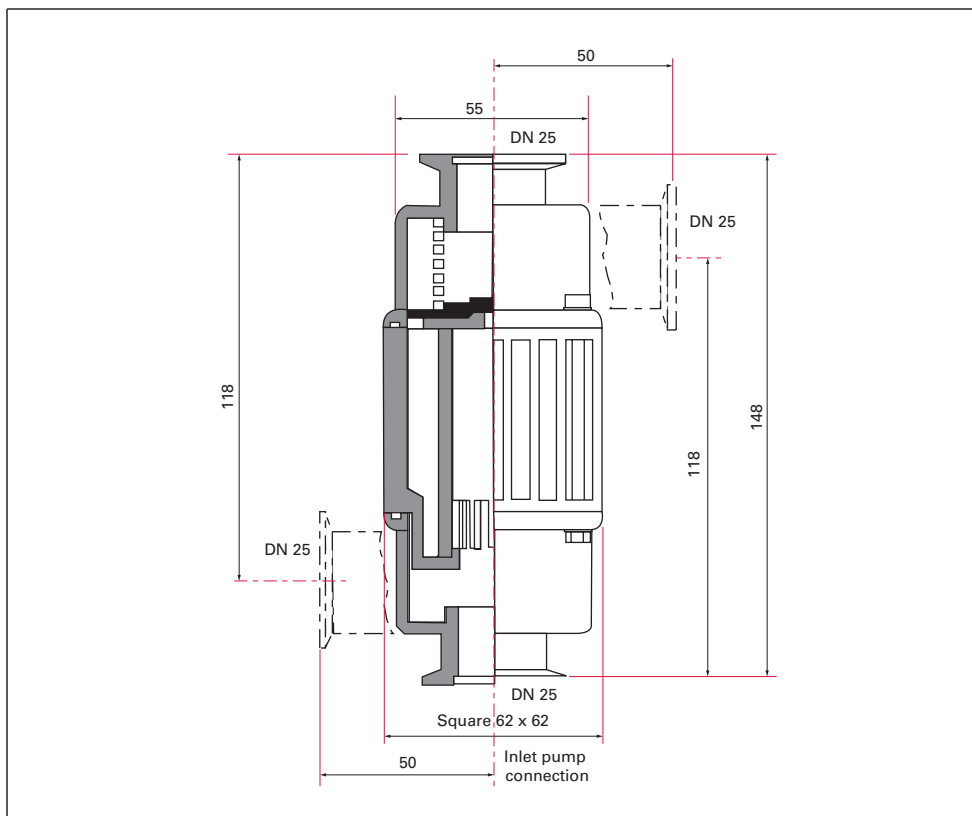
Inlet dust filter DFT 25



Using inlet dust filters will prevent solid particles from entering into the rotary vane pump and avoid concentration of solid media which can act as an abrasive and shorten the pump lifetime.

- Body material: Polyamide
- Cartridge material: Epoxy/glass microfiber
- Weight: 0.217 kg
- Filtration threshold: 6 μm
- Inlet/Exhaust port: DN 25 ISO-KF
- Conductance at 10^{-2} hPa inlet pressure: 2 l/s
- Conductance at 10^{-2} hPa inlet pressure: 0.6 l/s
- Replacement cartridge (set of 1) Order number 068445
- Supplied with: 1 centering ring, 1 clamp and additional angle port

Dimensions (in mm)



Order number

Inlet dust filter DFT 25

104202

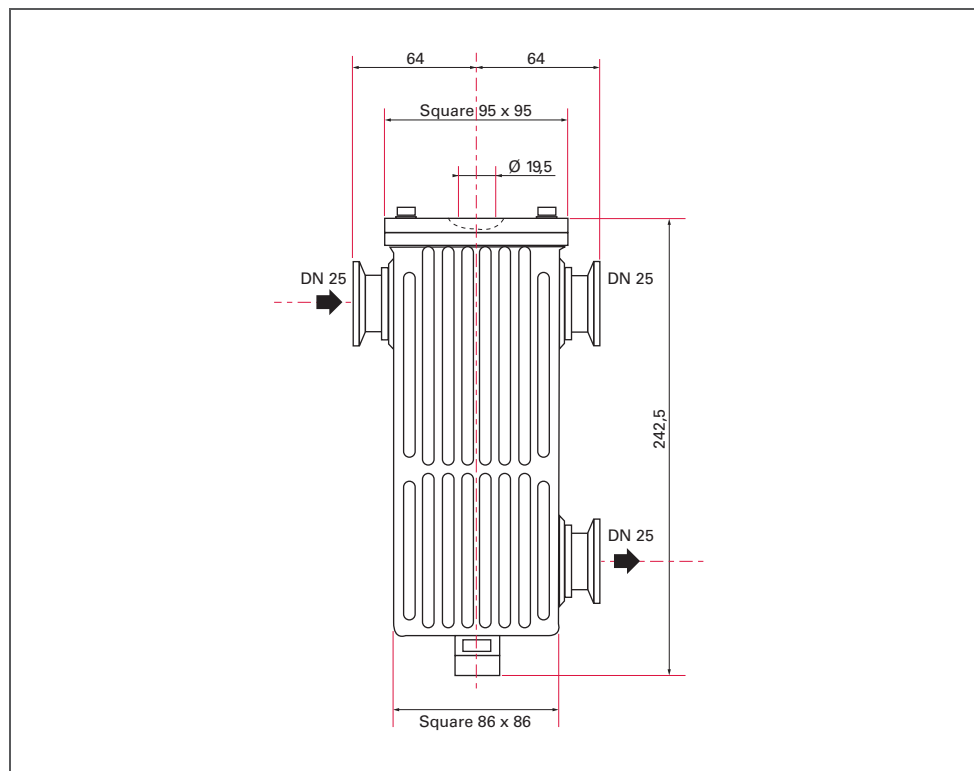
Liquid nitrogen trap LNT 25 S



Liquid nitrogen traps condense all gases at the pump inlet whose critical condensation temperature is above -196°C (77K).

- Body material: Aluminum
- Thimble material: Stainless steel
- Weight: 1.690 kg
- Liquid nitrogen capacity: 0.5 l
- Inlet/Exhaust port: DN 25 ISO-KF
- Conductance at 10^{-1} hPa inlet pressure: 44 l/s
- Conductance at 10^{-2} hPa inlet pressure: 10 l/s
- Fill interval at 10^{-2} hPa inlet pressure: 5 h
- Fill interval at ultimate inlet pressure: 11 h
- Supplied with: 1 centering ring, 1 clamp and additional angle port

Dimensions (in mm)



Order number

Liquid nitrogen trap LNT 25 S

104197

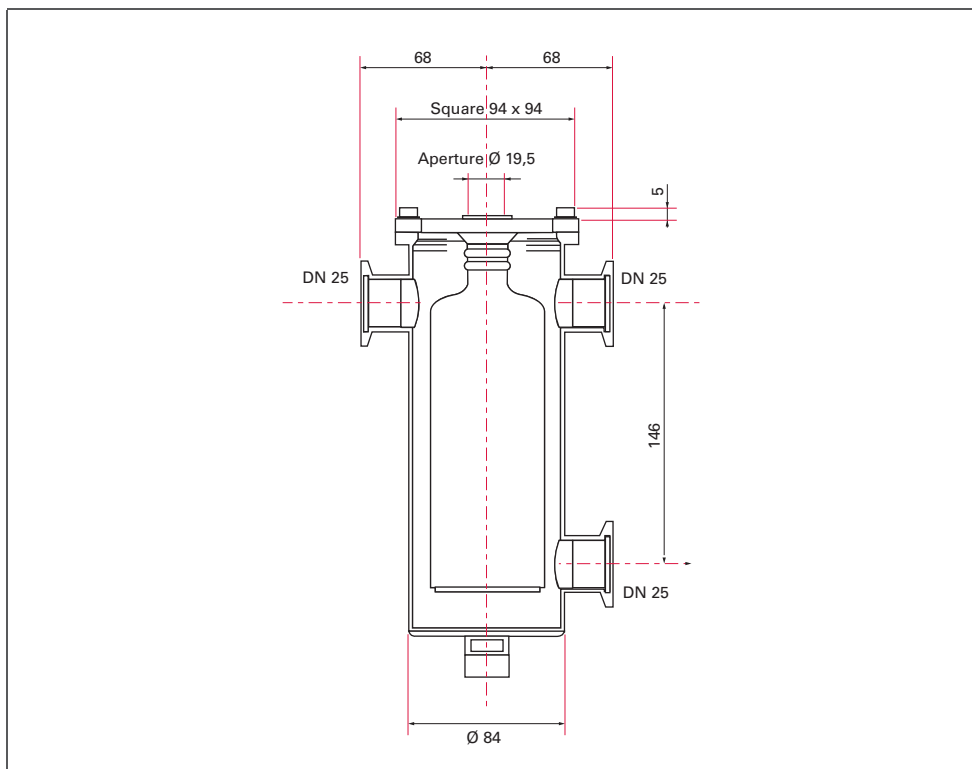
Liquid nitrogen trap LNT 25 C



Liquid nitrogen traps condense all gases at the pump inlet whose critical condensation temperature is above -196°C (77K).

- Body material: Stainless steel
- Thimble material: Stainless steel
- Weight: 1.885 kg
- Liquid nitrogen capacity: 0.5 l
- Inlet/Exhaust port: DN 25 ISO-KF
- Conductance at 10^{-1} hPa inlet pressure: 33 l/s
- Conductance at 10^{-2} hPa inlet pressure: 6 l/s
- Fill interval at 10^{-2} hPa inlet pressure: 5 h 30
- Fill interval at ultimate inlet pressure: 14 h
- Supplied with: 1 centering ring and 1 clamp

Dimensions (in mm)



Order number	
Liquid nitrogen trap LNT 25 C	066889

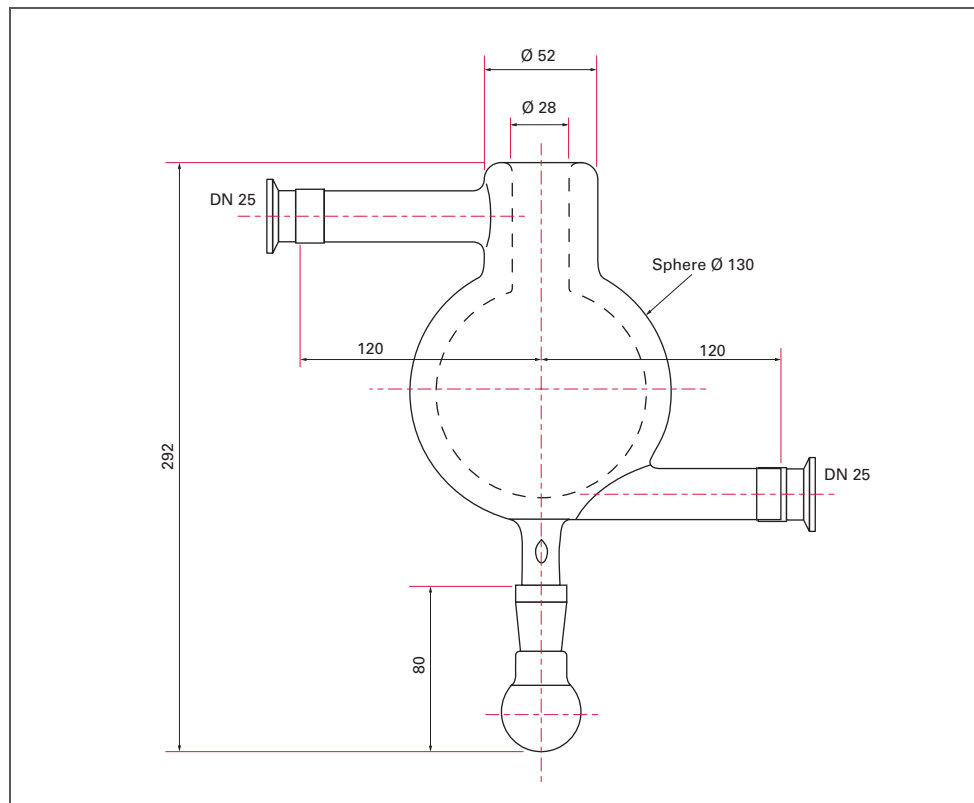
Liquid nitrogen trap LNT 25 P1



Liquid nitrogen traps condense all gases at the pump inlet whose critical condensation temperature is above -196°C (77K).

- Body material: Glass
- Flanges material: Aluminum
- Weight: 1 kg
- Liquid nitrogen capacity: 0.5 l
- Inlet/Exhaust port: DN 25 ISO-KF
- Conductance at 10^{-2} hPa inlet pressure: 6 l/s
- Fill interval at ultimate inlet pressure: 5 h

Dimensions (in mm)



Order number

Liquid nitrogen trap LNT 25 P1

786346

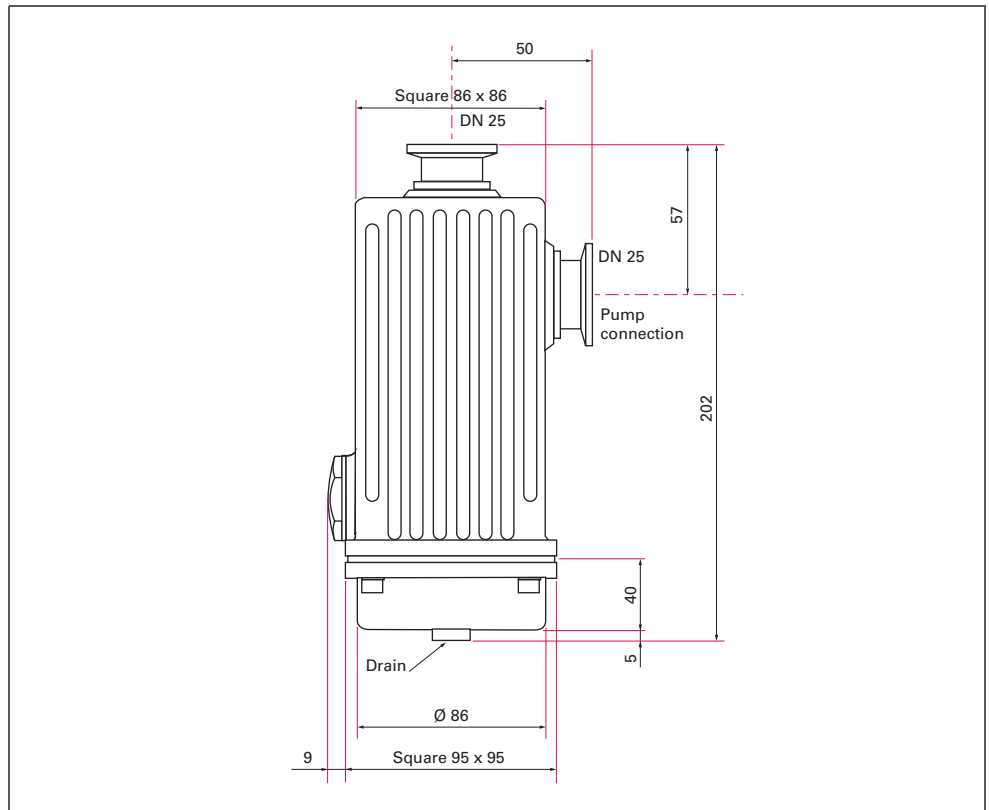
Condensate trap CT 25



Using condensate traps at the pump inlet will prevent introduction of some solid or liquid products (foam, deposits...) which could mix with the oil and reduce pump lifetime.

- Body material: Aluminum
- Filter material: Stainless steel
- Weight: 1.2 kg
- Trap capacity: 0.6 l
- Inlet/Exhaust port: DN 25 ISO-KF
- Conductance at 10^{-1} hPa inlet pressure: 15 l/s
- Conductance at 10^{-2} hPa inlet pressure: 6 l/s
- Replacement filter Order number: 066825
- Supplied with: 1 centering ring and 1 clamp

Dimensions (in mm)



Order number	
Condensate trap CT 25	104201

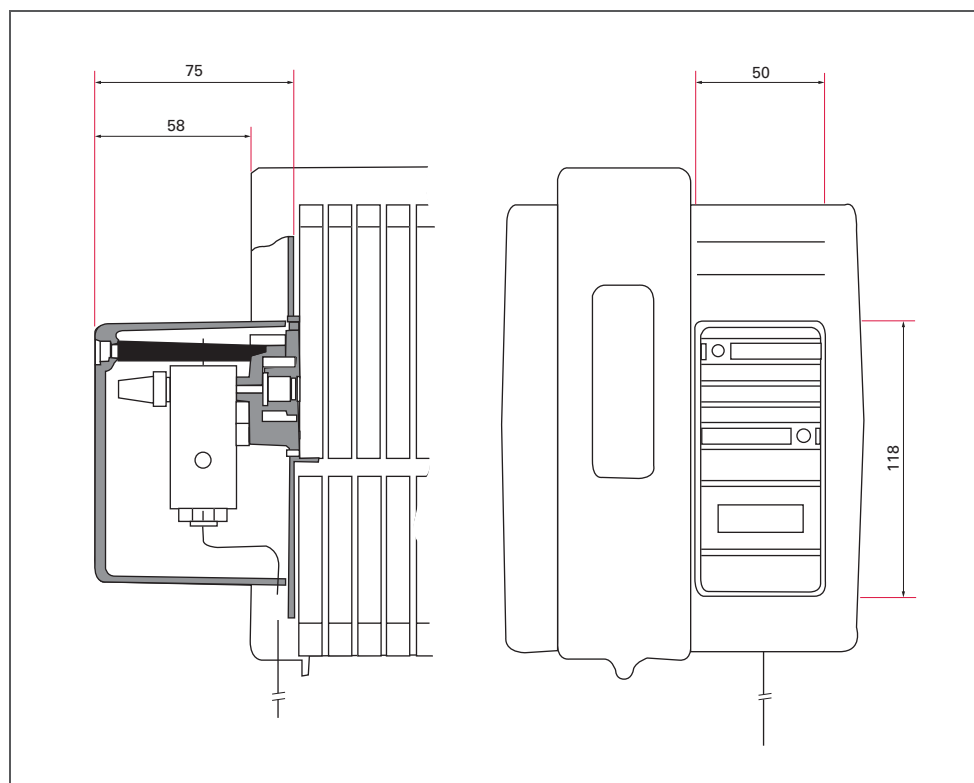
Automatic gas ballast AGB 4



Electrically operated gas ballast is the remote controlled version of the manual gas ballast of the rotary vane pump. It consists of a Normally Closed solenoid valve which enables air injection into the high pressure stage of the pump.

- Delivered with: 600 mm cable (without plug) all necessary connection parts
- Weight: 0.3 kg
- Spare coil 230 V 50/60 Hz: Order number 103552
- Further voltage ranges are available on request

Dimensions (in mm)



Order number

Automatic gas ballast AGB 4, 230 V, 50/60 Hz

104086

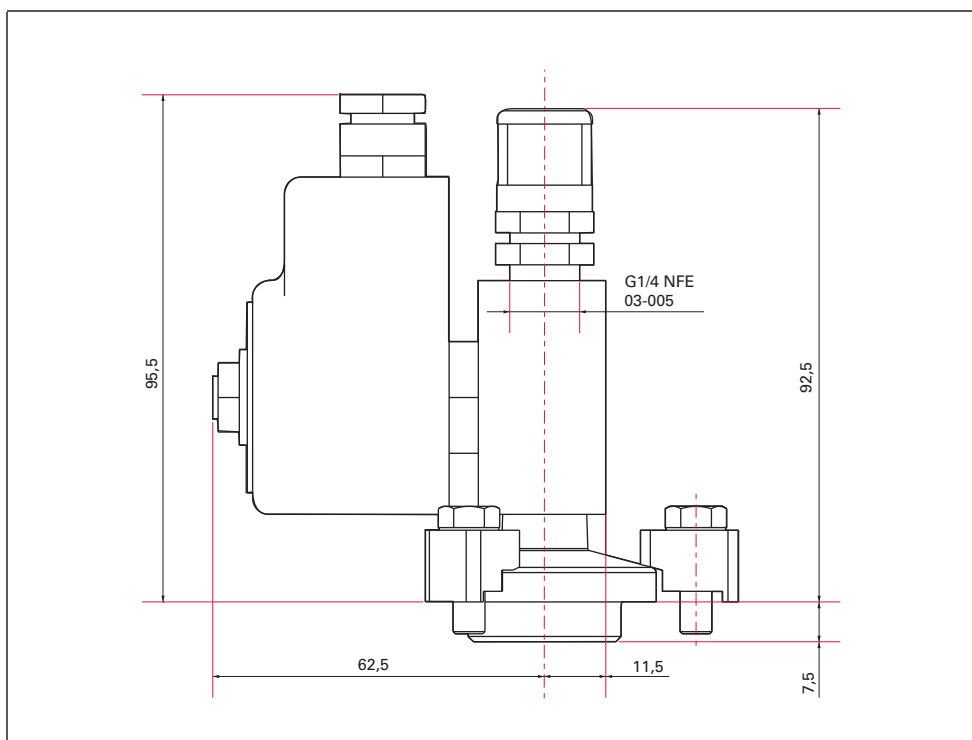
Automatic gas ballast AGB36



Electrically operated gas ballast is the remote controlled version of the manual gas ballast of the rotary vane pump. It consists of a Normally Closed solenoid valve which enables air injection into the high pressure stage of the pump.

- Delivered without cable and plug. All necessary connection parts
- Weight: 0.7 kg
- Spare coil 230 V 50/60 Hz: Order number 104866
- Further voltage ranges are available on request

Dimensions (in mm)



Order number

Automatic gas ballast AGB 36, 230 V, 50/60 Hz

068391

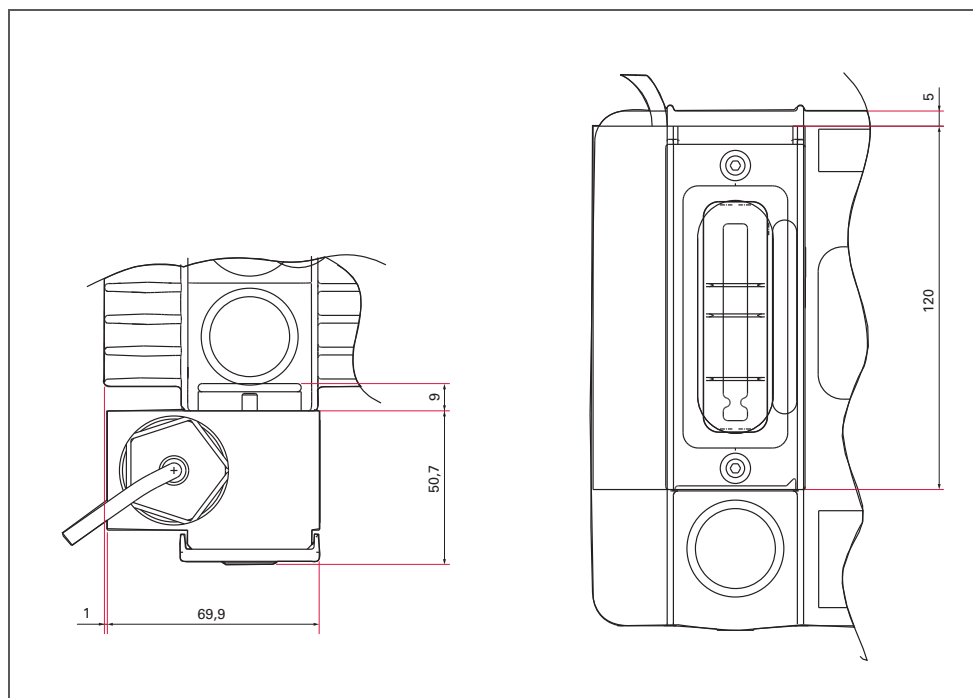
Oil level switch OLS 4

Oil Level Switch provide information about oil level inside the oil casing of the rotary vane pump.



- Material: Stainless steel/aluminum
- Number of contacts: 2
- Open status when below oil level
- Closed status when above oil level
- Switching capacity: 10 VA 250 V AC/DC 0.5 A
- Cable: 1 m, without plug
- Weight: 0.85 kg
- Supplied with all necessary components for installation on the oil casing.

Dimensions (in mm)



Order number

Oil level switch OLS 4

104376

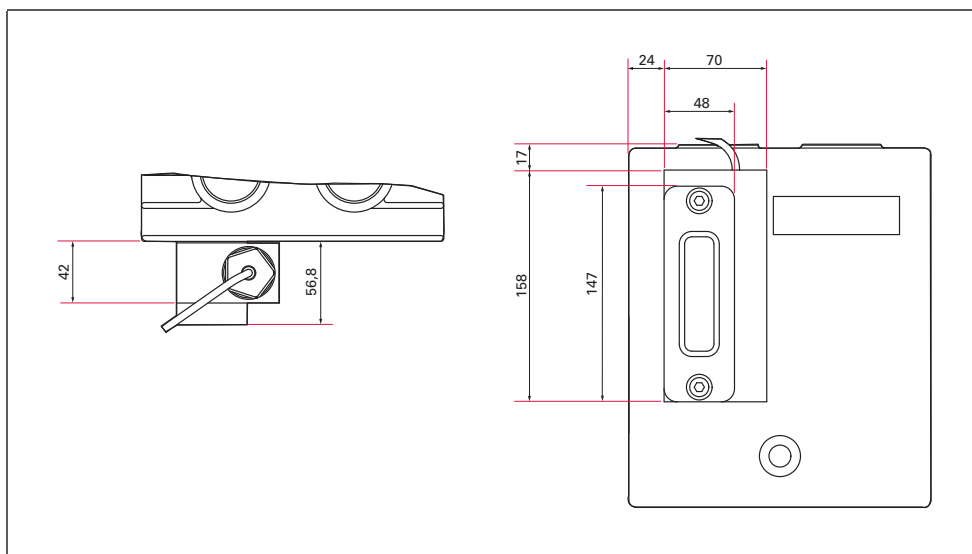
Oil level switch OLS 36

Oil Level Switch provide information about oil level inside the oil casing of the rotary vane pump.



- Material: Stainless steel/aluminum
- Number of contacts: 2
- Open status when below oil level
- Closed status when above oil level
- Switching capacity: 10 VA 250 V AC/DC 0.5 A
- Cable: 1 m, without plug
- Weight: 1.1 kg
- Supplied with all necessary components for installation on the oil casing.

Dimensions (in mm)



Order number	
Oil level switch OLS 36	104377

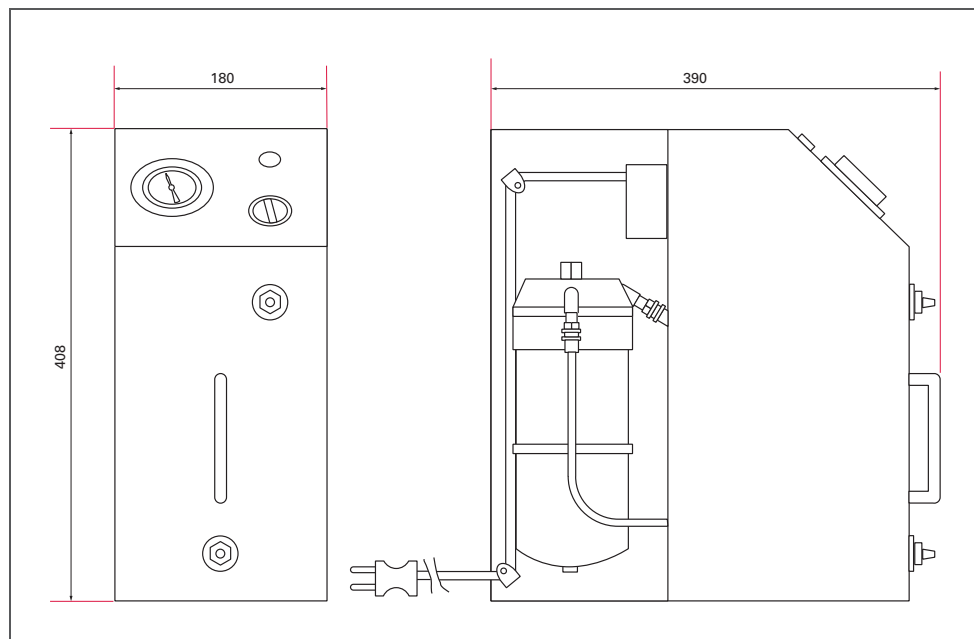
External oil filter DE 1



DE filtration system is a stand-alone unit consisting of a magnetically driven gear pump which circulates oil through 1 filtration cartridge.

- Weight: 12 kg
- Mains requirement voltage: 110/220 V, 50 Hz or 115/230 V, 60 Hz
- Hydrocarbon oil flow: 1000 - 1500 cm³/min at 65 °C
- Synthetic oil flow: 1000 cm³/min at 65 °C
- Replacement cartridge activated alumina: Order number: 068880
- Replacement cartridge activated charcoal: Order number: 112953
- Replacement cartridge cellulose: Order number: 078212
- Replacement cartridge cellulose (for USA): Order number: 12633
- Standard factory installed cartridges are activated alumina
- Oil volume: 1.2 l

Dimensions (in mm)



Order number	
External oil filter DE 1, 230 V, 50 Hz	068990

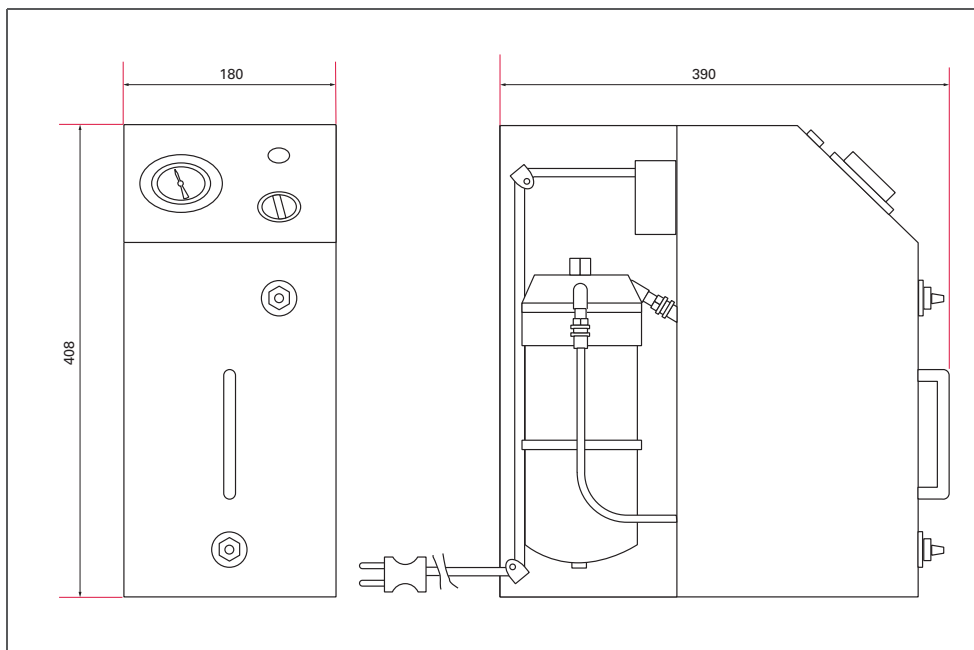
External oil filter DE 2



DE filtration system is a stand-alone unit consisting of a magnetically driven gear pump which circulates oil through 2 filtration cartridges.

- Weight: 17 kg
- Mains requirement voltage: 110/220 V, 50 Hz or 115/230 V, 60 Hz
- Hydrocarbon oil flow: 1000 - 1500 cm³/min at 65 °C
- Synthetic oil flow: 1000 cm³/min at 65 °C
- Replacement cartridge activated alumina: Order number: 068880
- Replacement cartridge activated charcoal: Order number: 112953
- Replacement cartridge cellulose: Order number: 078212
- Replacement cartridge cellulose (for USA): Order number: 12633
- Standard factory installed cartridges are activated alumina
- Oil volume: 1.8 l

Dimensions (in mm)



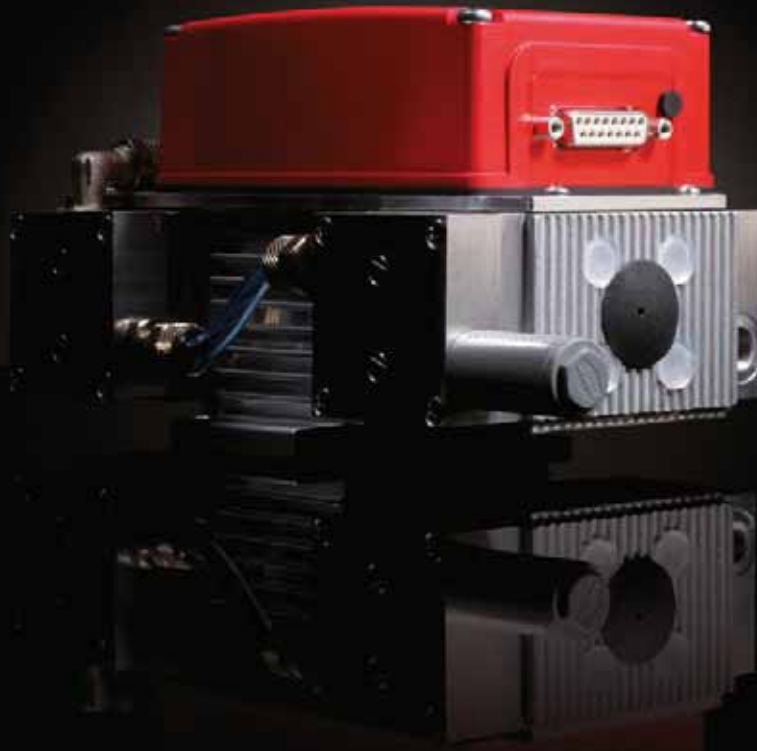
Order number

External oil filter DE 2, 230 V, 50 Hz

104374

Diaphragm pumps

The ideal backing pump for Pfeiffer Vacuum turbopumps



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 MVP 030-3 136
 MVP 040-2 138
 MVP 070-3 140

Diaphragm pumps

The ideal backing pump for Pfeiffer Vacuum turbopumps

Thanks to their compact design, diaphragm pumps are excellently suited for integration in increasingly small analytical systems and turbopumping stations. They have pumping speeds ranging from 0.25 to 4.3 m³/h.

Our diaphragm pumps work completely without oil, making them ideal for all processes where a clean, dry vacuum is needed. They are reliable pumps that operate with minimum of vibration and noise.



NORM Electronics Ltd www.norm.gr

Overview of series and applications

	Analytics					Semiconductors					Coating					Industry					R & D																										
	Electron microscopy	Leak detection	Mass spectrometry	Surface analysis	Plasma monitoring	Residual gas analysis	Lithography	PVD (Physical Vapor Deposition)	CVD (Chemical Vapor Deposition)	Plasma etching	Implantation – source	Implantation – beamline	Inspection	Bonding	MBE (Molecular Beam Epitaxy)	Load locks, transfer chambers, handling systems	Film panel displays (FPD)	LED / OLED	Hard disk coating	Photovoltaics	Glass coating (PVD)	CD, DVD, Blu-ray production (PVD)	Optical coating (PVD)	Wear protection (PVD, CVD)	Hard coating	Medical technology	Industrial leak detection	Electron beam welding	Insulation vacuums	Bulb and tube manufacturing	Heat treatment	Vacuum drying	Vacuum furnaces	Nuclear research	Fusion technology	Plasma research	Particle accelerators	Space simulation	Low temperature research	Elementary particle physics	Nanotechnology	Biotechnology	Page				
Diaphragm pumps																																															
MVP 006-4	■	■	■																																										130		
MVP 015-2	■	■	■	■	■	■																																								132	
MVP 020-3	■	■	■	■	■	■								■													■																				134
MVP 030-3	■	■	■	■	■	■								■													■																				136
MVP 040-2	■	■	■	■	■	■								■													■		■																		138
MVP 070-3	■	■	■	■	■	■																					■		■																		140

Features at a glance

	Connection flange (inlet)				Pumping speed class						Final pressure without gas ballast					Page	
	G 1/8"	G 1/4"	DN 16 ISO-KF / G 1/8"	DN 16 ISO-KF	0.3 m ³ /h	1 m ³ /h	1.2 m ³ /h	1.8 m ³ /h	2.3 m ³ /h	3.8 m ³ /h	< 5 · 10 ⁻¹ hPa	< 1 hPa	< 1.5 hPa	< 2 hPa	< 3.5 hPa		< 4 hPa
Diaphragm pumps																	
MVP 006-4	■				■									■			130
MVP 015-2 / MVP 015-4	■		■			■					■				■		132
MVP 020-3	■						■							■			134
MVP 030-3	■							■							■		136
MVP 040-2		■							■							■	138
MVP 070-3		■		■						■		■	■				140



Medical technology

Typical applications

- Mass spectrometry
- Leak detection
- Medical technology
- Nuclear research
- Nanotechnology



Nanotechnology



Customer benefits

- High process safety
- Low operating costs
- Long maintenance intervals
- Extremely maintenance friendly

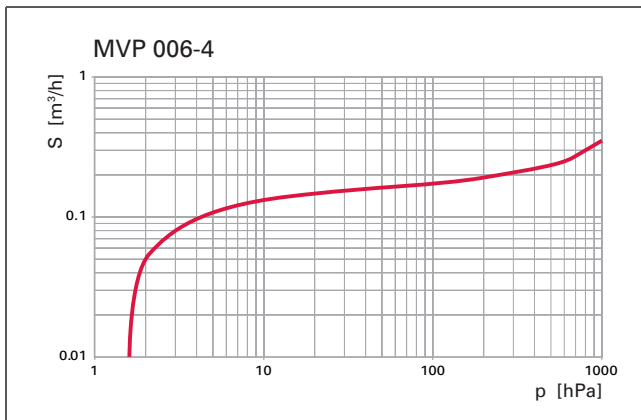
MVP 006

Dry and oil-free diaphragm pumps with a pumping speed of up to 0.25 m³/h:

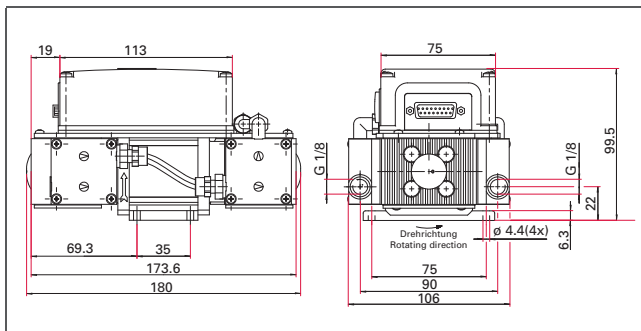


- Extremely small but high-performance diaphragm pump with a pumping speed up to 0.25 m³/h
- Due to compact measures and little weight it is ideally suited for integration in analysis systems and turbo pumping stations
- Lower costs due to long service life of diaphragms and valves
- Suitable for worldwide and flexible applications thanks to direct voltage
- Substantial accessories expand the field of applications
- For all applications where a dry and oil-free vacuum is required

Pumping speed



Dimensions (in mm)



Technical data	MVP 006-4, Diaphragm pump, 24 V DC
Flange (out)	G 1/8" + Silencer
Flange (in)	G 1/8"
Intake pressure max.	1050 hPa
Exhaust pressure, max.	1300 hPa
Rotation speed at stand-by	1000 min ⁻¹
Rotation speed max.	3000 min ⁻¹
Rotation speed min.	1000 min ⁻¹
Emission sound pressure level without gas ballast	≤ 50 dB (A)
Ultimate pressure without gas ballast	≤ 2 hPa
Exhaust pressure max.	1300 hPa
Weight	1.8 kg
Cooling method, standard	Air
Leak rate	6 · 10 ⁻³ Pa m ³ /s
Pumping speed, max.	0.25 m ³ /h
Protection category	IP 20
Current consumption	0.9 A
Ambient temperature	5-40 °C
Supply: Voltage	24 (± 10 %) V DC

Order number	
MVP 006	PK T05 070

Accessories	
TPS 110, mains pack for wall/ standard rail fitting	PM 061 340 -T
TPS 180, mains pack for wall/ standard rail fitting	PM 061 341 -T
Connection cable TPS - MVP 006, 3 m	PM 061 892 -T
Connection cable TPS 180 - MVP 006-4 with HiPace 80/HiPace 10, 2 x 0.5 m	PM 061 399 -T
Mains cable 230 V AC with safety plug, Euro socket C13 (straight), 3 m	P 4564 309 ZA
Mains cable 115 V AC with UL plug, Euro socket C 13 (straight), 3 m	P 4564 309 ZE
Mains cable 115 / 230 V without plug, IEC 320/C13 socket, 3 m	P4 564 309 ZH
Screw-in flange DN 16 ISO-KF / G 1/8" incl. seal	PK 050 108 -T
Hose connection DN 6x400 mm with straight fitting G 1/8" and G 1/4" including sealing rings	P 0920 739 E
Screw-in-flange, DN 16 KF/ G 1/4"	PM 006 994
Angled screw coupling, G 1/8" for hose of MVP 015	P 0920 773 E

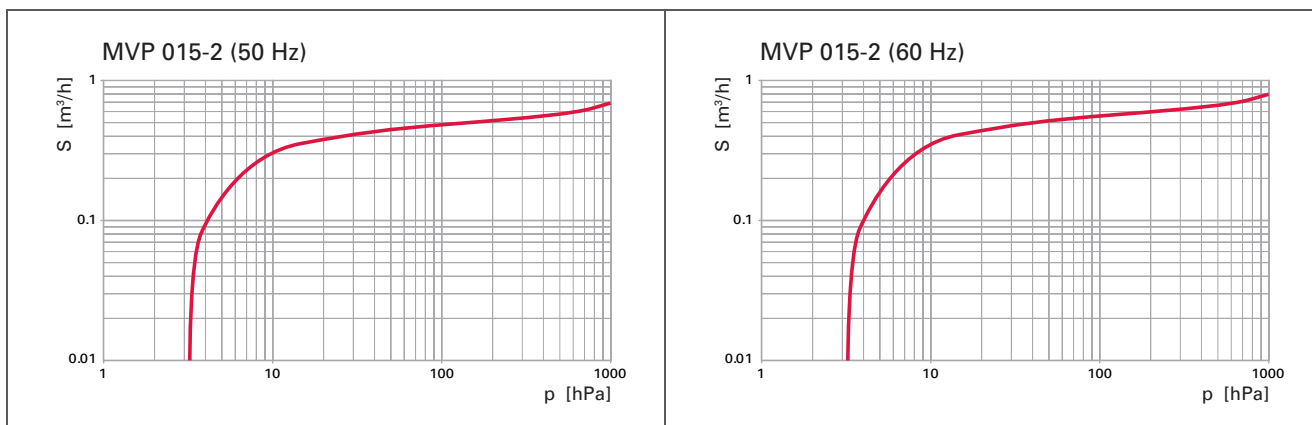
MVP 015

Dry and oil-free diaphragm pumps with a pumping speed of up to 0.7 m³/h:



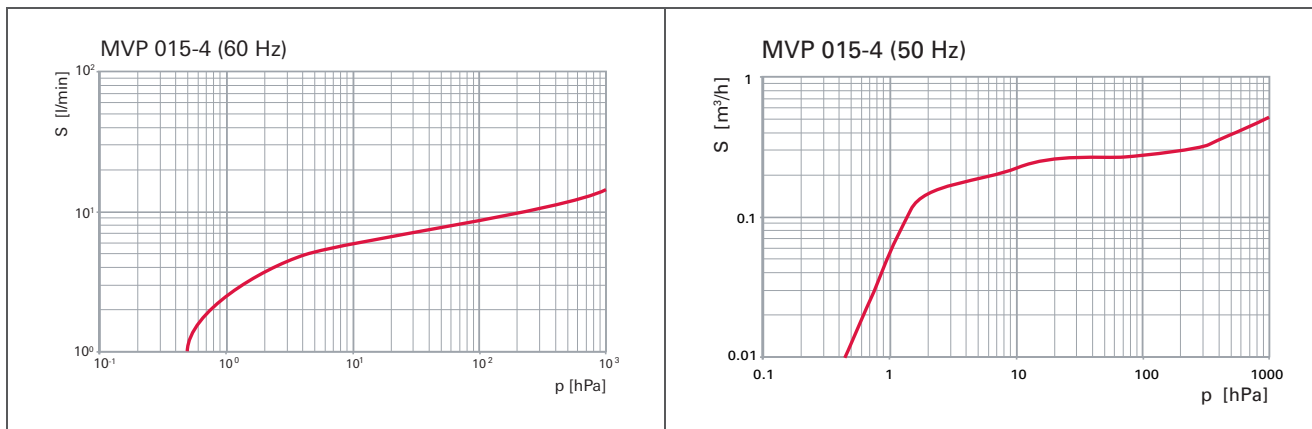
- Compact diaphragm pump with a pumping speed of up to 0.7 m³/h
- For mains voltage: 90-127 V, 50 Hz, respectively 187-265 V, 60 Hz
- Ideal for applications where a dry and oil-free vacuum is required

Pumping speed



MVP 015-2, Diaphragm pump

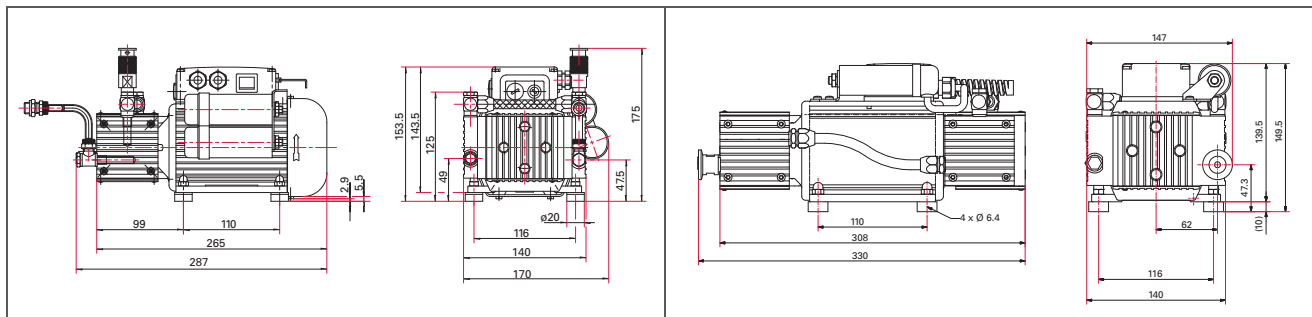
MVP 015-2, Diaphragm pump



MVP 015-4, Diaphragm pump

MVP 015-4, Diaphragm pump

Dimensions (in mm)



MVP 015-2, Diaphragm pump

MVP 015-4, Diaphragm pump

Technical data	MVP 015-2, Diaphragm pump, 100-115/208-236 V, 50/60 Hz	MVP 015-4, Diaphragm pump, 120 V, 60 Hz	MVP 015-4, Diaphragm pump, 230 V, 50 Hz
Flange (out)	G 1/8" + silencer	G 1/8" + silencer	G 1/8" + silencer
Flange (in)	G 1/8" elbow union + enclosed hose DN 6 x 1000 mm with a straight union in G 1/4" at the end	DN 16 ISO-KF / G 1/8"	DN 16 ISO-KF / G 1/8"
Intake pressure max.		1100 hPa	1100 hPa
Exhaust pressure, max.	1100 hPa	1100 hPa	1100 hPa
Rotation speed at 50 Hz	1500 min ⁻¹		1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹	1800 min ⁻¹	
Emission sound pressure level without gas ballast	≤ 52 dB (A)	≤ 52 dB (A)	≤ 52 dB (A)
Ultimate pressure with gas ballast	≤ 4.5 hPa		
Ultimate pressure without gas ballast	≤ 3.5 hPa	≤ 0.50 hPa	≤ 0,50 hPa
Weight	6.5 kg	7.5 kg	7.5 kg
Cooling method, standard	Air	Air	Air
Leak rate	5 · 10 ⁻⁴ Pa m ³ /s	< 5 · 10 ⁻⁴ Pa m ³ /s	< 5 · 10 ⁻⁴ Pa m ³ /s
Mains requirement: voltage 50 Hz	100-115; 208-236 V		230 V
Mains requirement: voltage 60 Hz	100-115; 208-236 V	120 V	
Pumping speed at 50 Hz	0.50 m ³ /h		0.50 m ³ /h
Pumping speed at 60 Hz	0.70 m ³ /h	0.60 m ³ /h	
Switch	Yes	No	No
Protection category	IP 20	IP 54	IP 54
Current consumption	1.1 A	0.8 A	0.3 A
Ambient temperature	12-40 °C	12-40 °C	12-40 °C

Order number			
MVP 015	PK T05 100	PK T05 064	PK T05 065

Accessories			
Backing pump relay box, shielded, 1-phase 7A for TC 110 and TCP 350, M8 plug	PM 071 282 -X	PM 071 282 -X	PM 071 282 -X
Backing pump relay box, shielded, 1-phase 7 A for TC 400/1200, TM 700 and TCP 350, M12 plug	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
Mains cable 230 V AC with safety plug, Euro socket C13 (straight), 3 m	P 4564 309 ZA		
Mains cable 115 V AC with UL plug, Euro socket C 13 (straight), 3 m	P 4564 309 ZE		
Mains cable 115 / 230 V without plug, IEC 320/C13 socket, 3 m	P4 564 309 ZH		
Screw-in flange DN 16 ISO-KF / G 1/8" incl. seal	PK 050 108 -T		
Screw-in-flange, DN 16 KF/ G 1/4"	PM 006 994	PM 006 994	PM 006 994
Hose connection DN 6x400 mm with straight fitting G 1/8" and G 1/4" including sealing rings		P 0920 739 E	P 0920 739 E

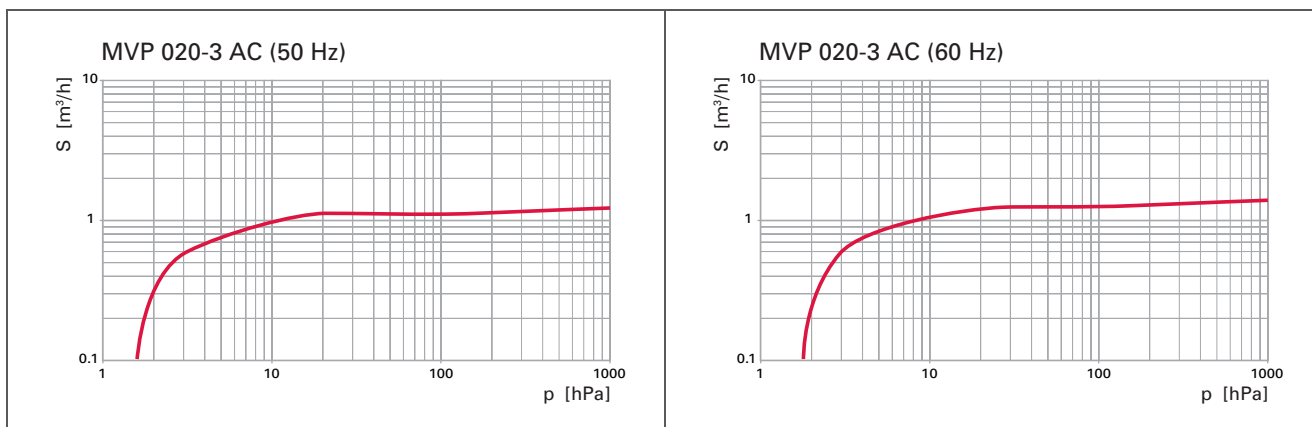
MVP 020

Dry and oil-free diaphragm pumps with a pumping speed of up to 1.4 m³/h:

- High-performance diaphragm pump with a pumping speed of up to 1.4 m³/h
- For mains voltage: 100-120 V, 50 Hz respectively 200-230 V, 60 Hz
- Ideal for applications where a dry and oil-free vacuum is required



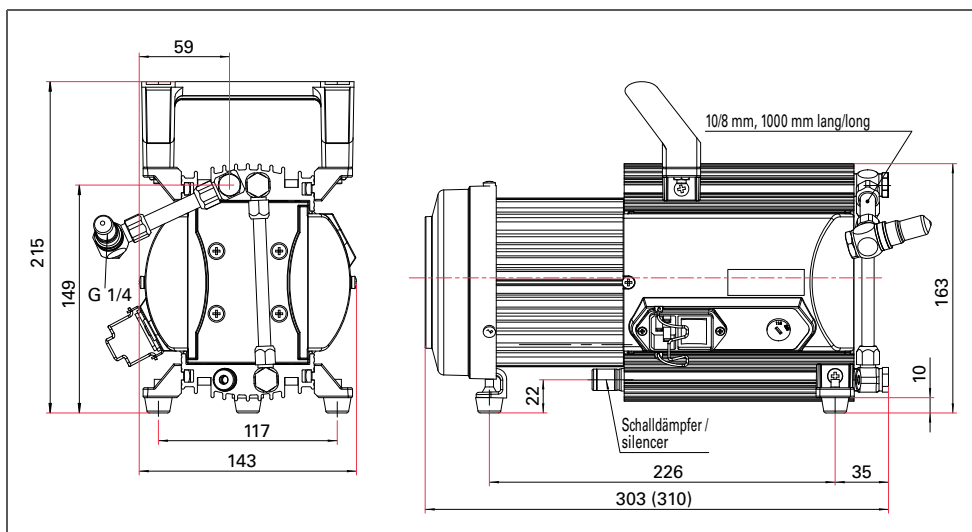
Pumping speed



MVP 020-3 AC, Diaphragm pump

MVP 020-3 AC, Diaphragm pump

Dimensions (in mm)



Technical data	MVP 020-3 AC, Diaphragm pump, 100-120/200-230 V, 50/60 Hz
Flange (out)	G 1/8" + silencer
Flange (in)	G 1/8" elbow union + enclosed hose DN 6 x 1000 mm with a elbow union in G 1/4" at the end
Intake pressure max.	1100 hPa
Exhaust pressure, max.	1100 hPa
Rotation speed at 50 Hz	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹
Emission sound pressure level without gas ballast	≤ 48 dB (A)
Ultimate pressure without gas ballast	≤ 2 hPa
Weight	6.5 kg
Cooling method, standard	Air
Leak rate	1 · 10 ⁻² Pa m ³ /s
Mains requirement: voltage 50 Hz	100-115; 200-230 V
Mains requirement: voltage 60 Hz	100-115; 120 ; 200-230 V
Pumping speed at 50 Hz	1.2 m ³ /h
Pumping speed at 60 Hz	1.4 m ³ /h
Switch	Yes
Protection category	IP 40
Current consumption	1.7 A
Ambient temperature	12-40 °C

Order number	
MVP 020	PK T01 100

Accessories	
Backing pump relay box, shielded, 1-phase 7A for TC 110 and TCP 350, M8 plug	PM 071 282 -X
Backing pump relay box, shielded, 1-phase 7 A for TC 400/1200, TM 700 and TCP 350, M12 plug	PM 071 284 -X
Mains cable 115 / 230 V without plug, right angle IEC 320/C13 socket, 3 m	PK 050 111
Mains cable 230 V with safety plug CEE 7, right angle IEC 320/C13 socket, 2 m	PK 050 109
Mains cable 115 V with NEMA-plug, right angle IEC 320/C13 socket, 2 m	PK 050 110
Screw-in flange DN 16 ISO-KF / G 1/8" incl. seal	PK 050 108 -T
Flushing gas nozzle for MVP 020-3 / MVP 030-3	PK 050 122

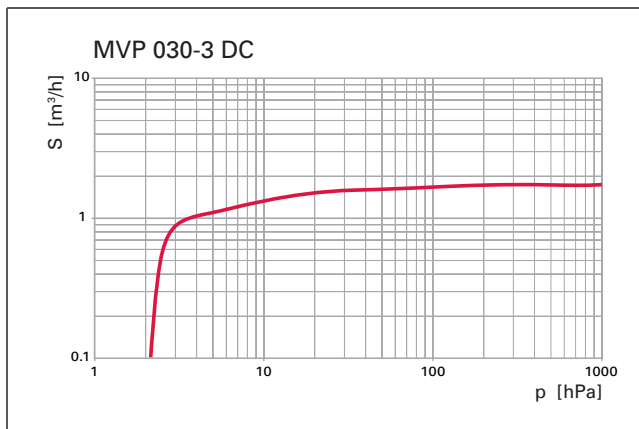
MVP 030

Dry and oil-free diaphragm pumps with a pumping speed of up to 1.8 m³/h:



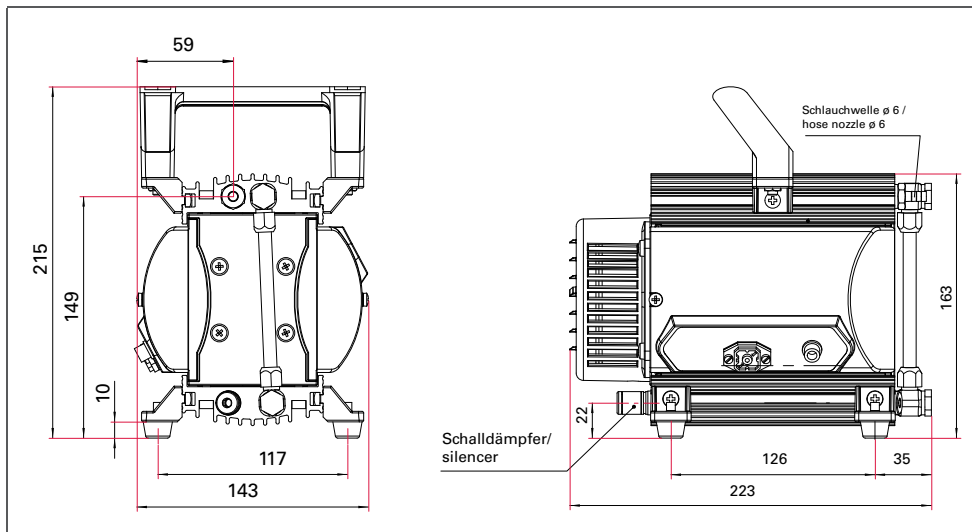
- High-performance diaphragm pump with a pumping speed of up to 1.8 m³/h
- For 24 V DC direct voltage supply
- Interval operation and rotation speed control
- Optimal process adaptation
- Ideal for applications where a dry and oil-free vacuum is required

Pumping speed



MVP 030-3 DC, Diaphragm pump

Dimensions (in mm)



Technical data	MVP 030-3 DC, Diaphragm pump, 24 V
Flange (out)	G 1/8" + silencer
Flange (in)	G 1/8" + hose wave DN 6
Intake pressure max.	1100 hPa
Exhaust pressure, max.	1100 hPa
Rotation speed at 50 Hz	2400 min ⁻¹
Emission sound pressure level without gas ballast	≤ 48 dB (A)
Ultimate pressure with gas ballast	3.0 hPa
Ultimate pressure without gas ballast	2.5 hPa
Weight	4.3 kg
Cooling method, standard	Air
Leak rate	1 · 10 ⁻² Pa m ³ /s
Pumping speed	1.8 m ³ /h
Switch	No
Protection category	IP 40
Current consumption	4.5 A
Ambient temperature	12-40 °C
Supply: Voltage	24 V DC

Order number	
MVP 030	PK T01 190

Accessories	
Flushing gas nozzle for MVP 020-3 / MVP 030-3	PK 050 122
TPS 110, mains pack for wall/ standard rail fitting	PM 061 340 -T
TPS 180, mains pack for wall/ standard rail fitting	PM 061 341 -T
Mains cable 115 V AC with UL plug, Euro socket C 13 (straight), 3 m	P 4564 309 ZE
Mains cable 230 V AC with safety plug, Euro socket C13 (straight), 3 m	P 4564 309 ZA
Mains cable 115 / 230 V without plug, IEC 320/C13 socket, 3 m	P4 564 309 ZH
Connection cable TPS - MVP	PM 061 441- T
Screw-in flange DN 16 ISO-KF / G 1/8" incl. seal	PK 050 108 -T

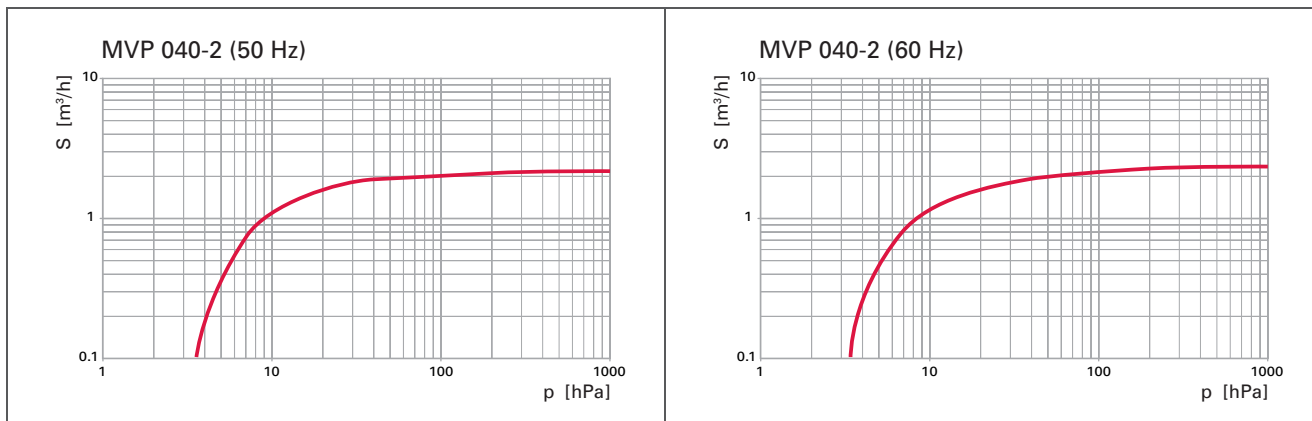
MVP 040

Dry and oil-free diaphragm pumps with a pumping speed up to 2.5 m³/h:



- Robust and high-performance diaphragm pump with a pumping speed of up to 2.5 m³/h
- For mains voltage: 90-126/180-254 V, 50/60 Hz
- Integrated gas ballast allows few amounts of humidity
- Ideal for applications where a dry and oil-free vacuum is required

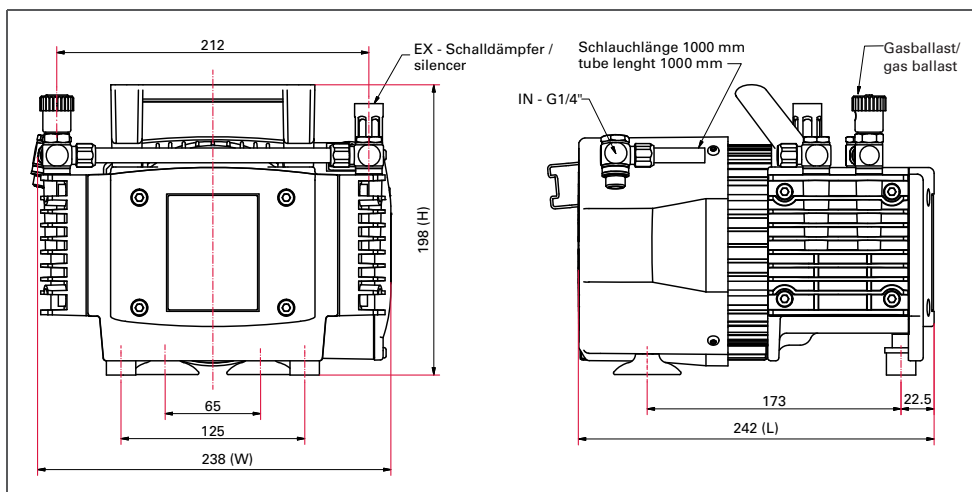
Pumping speed



MVP 040-2, Diaphragm pump

MVP 040-2, Diaphragm pump

Dimensions (in mm)



Technical data	MVP 040-2, Diaphragm pump, 100-115 V, 50/60 Hz; 120 V, 60 Hz; 200-230 V, 50/60 Hz
Flange (out)	G 1/4" + silencer
Flange (in)	G 1/4" elbow union with enclosed hose 10/8, 1000 mm with an elbow union in G 1/4" at the end
Intake pressure max.	1100 hPa
Exhaust pressure, max.	1100 hPa
Rotation speed at 50 Hz	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹
Emission sound pressure level without gas ballast	≤ 53 dB (A)
Ultimate pressure with gas ballast	5 hPa
Ultimate pressure without gas ballast	4 hPa
Weight	11.4 kg
Cooling method, standard	Air
Leak rate	2 · 10 ⁻³ Pa m ³ /s
Mains requirement: voltage 50 Hz	100-115; 00-230 V
Mains requirement: voltage 60 Hz	100-115; 120; 200-230 V
Pumping speed at 50 Hz	2.3 m ³ /h
Pumping speed at 60 Hz	2.5 m ³ /h
Switch	Yes
Protection category	IP 40
Current consumption	3.4 A
Ambient temperature	12-40 °C

Order number	
MVP 040	PK T01 210

Accessories	
Backing pump relay box, shielded, 1-phase 7A for TC 110 and TCP 350, M8 plug	PM 071 282 -X
Backing pump relay box, shielded, 1-phase 7 A for TC 400/1200, TM 700 and TCP 350, M12 plug	PM 071 284 -X
Mains cable 115 / 230 V without plug, right angle IEC 320/C13 socket, 3 m	PK 050 111
Mains cable 230 V with safety plug CEE 7, right angle IEC 320/C13 socket, 2 m	PK 050 109
Mains cable 115 V with NEMA-plug, right angle IEC 320/C13 socket, 2 m	PK 050 110
Screw-in flange DN 16 ISO-KF / G1/4" incl. seal (for MVP 040-2, MVP 070-3 inlet/outlet)	PK 050 114 -T

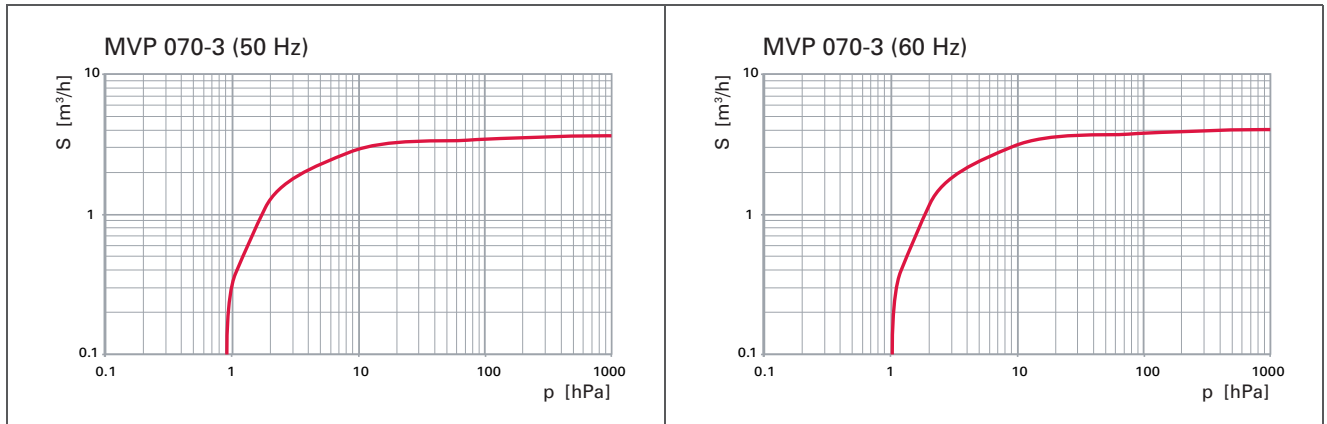
MVP 070

Dry and oil-free diaphragm pumps with a pumping speed of up to 4.3 m³/h:



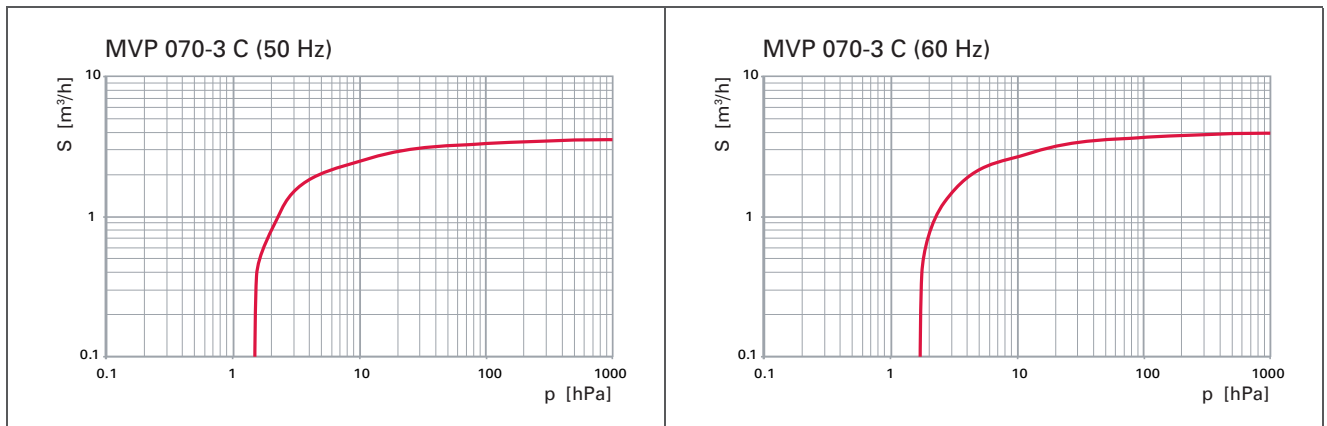
- Diaphragm pump with a pumping speed of up to 4.3 m³/h
- For mains voltage: 90-126/180-254 V, 50/60 Hz
- Ideal for applications, where a dry and oil-free vacuum is required

Pumping speed



MVP 070-3, Diaphragm pump

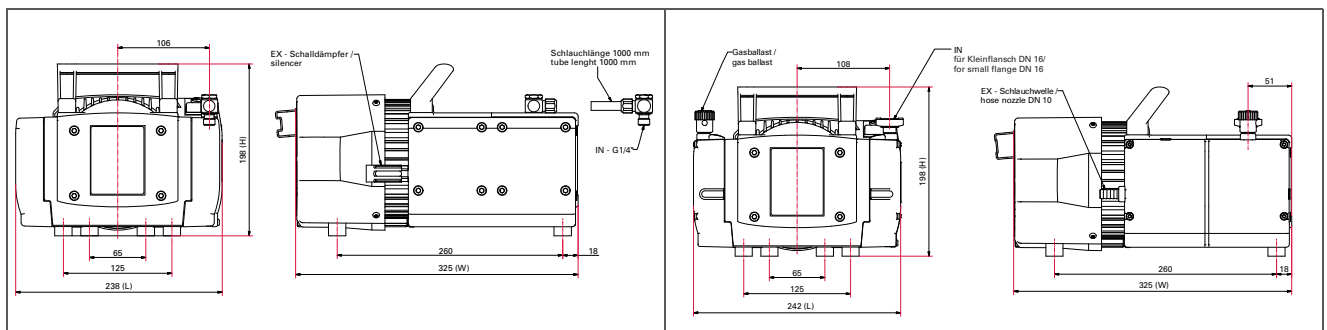
MVP 070-3, Diaphragm pump



MVP 070-3 C, Diaphragm pump

MVP 070-3 C, Diaphragm pump

Dimensions (in mm)



MVP 070-3, Diaphragm pump

MVP 070-3 C, Diaphragm pump

Technical data	MVP 070-3, Diaphragm pump, 100-115 V, 50/60 Hz; 120 V, 60 Hz; 200-230 V, 50/60 Hz	MVP 070-3 C, Diaphragm pump, 100-115 V, 50/60 Hz; 120 V, 60 Hz; 200-230 V, 50/60 Hz
Flange (out)	G 1/4" + silencer	Hose nipple 10 mm
Flange (in)	G 1/4" elbow union + enclosed hose 10/8, 1000 mm with a elbow union in G 1/4" at the end	DN 16 ISO-KF
Intake pressure max.	1100 hPa	1100 hPa
Exhaust pressure, max.	1100 hPa	1100 hPa
Rotation speed at 50 Hz	1500 min ⁻¹	1500 min ⁻¹
Rotation speed at 60 Hz	1800 min ⁻¹	1800 min ⁻¹
Emission sound pressure level without gas ballast	≤ 55 dB (A)	≤ 50 dB (A)
Ultimate pressure with gas ballast		3.0 hPa
Ultimate pressure without gas ballast	1.0 hPa	1.5 hPa
Weight	16.4 kg	14.3 kg
Cooling method, standard	Air	Air
Leak rate	2 · 10 ⁻³ Pa m ³ /s	2 · 10 ⁻³ Pa m ³ /s
Mains requirement: voltage 50 Hz	100-115 ; 200-230 V	100-115 ; 200-230 V
Mains requirement: voltage 60 Hz	100-115 ; 120 ; 200-230 V	100-115 ; 120 ; 200-230 V
Pumping speed at 50 Hz	3.8 m ³ /h	3.4 m ³ /h
Pumping speed at 60 Hz	4.3 m ³ /h	3.8 m ³ /h
Switch	Yes	Yes
Protection category	IP 40	IP 40
Current consumption	5.7 A	5.7 A
Ambient temperature	12-40 °C	12-40 °C

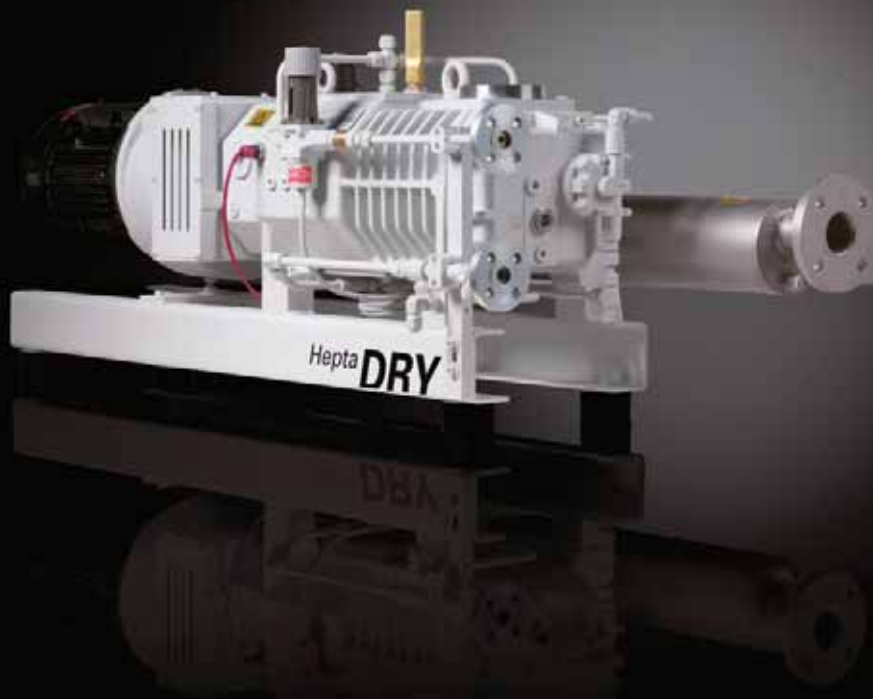
Order number		
MVP 070	PK T01 310	PK T01 360

Accessories		
Backing pump relay box, shielded, 1-phase 7A for TC 110 and TCP 350, M8 plug	PM 071 282 -X	PM 071 282 -X
Backing pump relay box, shielded, 1-phase 7 A for TC 400/1200, TM 700 and TCP 350, M12 plug	PM 071 284 -X	PM 071 284 -X
Mains cable 115 / 230 V without plug, right angle IEC 320/C13 socket, 3 m	PK 050 111	PK 050 111
Mains cable 230 V with safety plug CEE 7, right angle IEC 320/C13 socket, 2 m	PK 050 109	PK 050 109
Mains cable 115 V with NEMA-plug, right angle IEC 320/C13 socket, 2 m	PK 050 110	PK 050 110
Screw-in flange DN 16 ISO-KF / G1/4" incl. seal (for MVP 040-2, MVP 070-3 inlet/outlet)	PK 050 114 -T	



Screw pumps

Optimum ultimate pressure. Absolutely oil-free. Cool running.



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Screw pumps

Optimum ultimate pressure. Absolutely oil-free. Cool running.

HeptaDry is a full series of dry compressing screw pumps with pumping speeds from 100 to 600 m³/h. They can be used for both industrial applications and coating.

One special advantage consists of their single-piece, variable-pitch rotors. They assure the efficient internal compression to reduce energy cost requirements in the HeptaDry pumps.

In addition, thermally sensitive gases can also be pumped. High quality seals between the bearing and suction chamber increase operating safety.

The innovative design and low speed of the pumps result in low stressing of the bearings and seals, which are easy and straightforward to clean.

Ideal for use as stand-alone pumps or in combination with OktaLine Roots pumps.



Features at a glance

	Connection flange (inlet)		Pumping speed class					Ultimate pressure		Page
	DN 63 ISO-K	DN 100 ISO-K	100 m ³ /h	200 m ³ /h	300 m ³ /h	400 m ³ /h	600 m ³ /h	< 0.01 hPa (at 60 Hz)	< 0.05 hPa (at 60 Hz)	
HeptaDry										
Hepta 100	■		■					■	■	148
Hepta 200	■			■				■	■	150
Hepta 300	■				■			■	■	152
Hepta 400	■					■		■	■	154
Hepta 600		■					■	■	■	156

Screw pumps



Glass coating

Typical applications

- Solar cell production
- Glass coating
- CD, DVD, Blu-ray production
- Electron beam welding
- Vacuum furnaces
- Space simulation
- Biotechnology



Space simulation

**Customer benefits**

- Absolutely dry and oil-free
- Low cost of ownership
- Complete series with pumping capacity of 100 to 600 m³/h
- Low energy consumption, low noise level
- Cost saving through long maintenance intervals
- Highest process safety

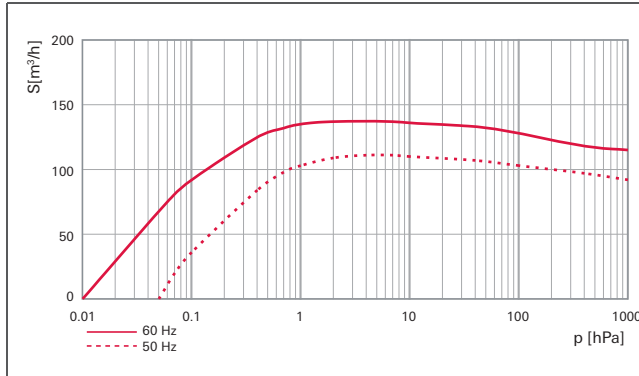
Hepta 100



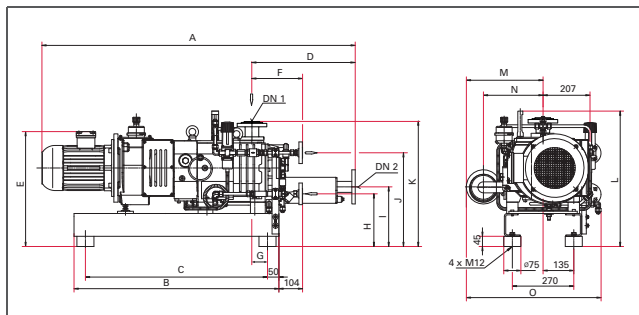
Dry screw pumps with a pumping speed of 110 m³/h at 50 Hz and 130 m³/h at 60 Hz:

- For mains voltage: 190-208/380-415, 50 Hz, 3 ph
- Ideal solution for all areas in which oil-free vacuum is required
- Lower energy costs thanks to internal compression
- For applications in the low and medium vacuum

Pumping speed



Dimensions (in mm)



	Hepta 100 P, 190-208/380-415 V, 50 Hz	Hepta 100 P, 3TF, 220-230/440-460 V, 60 Hz	Hepta 100 P, 3TF, 220/380 V, 60 Hz
A	1395 mm	1395 mm	1395 mm
B	900 mm	900 mm	900 mm
C	800 mm	800 mm	800 mm
D	454 mm	454 mm	454 mm
E	505 mm	505 mm	505 mm
F	222 mm	222 mm	222 mm
G	68 mm	68 mm	68 mm
H	232 mm	232 mm	232 mm
I	262 mm	262 mm	262 mm
J	412 mm	412 mm	412 mm
K	533 mm	533 mm	533 mm
L	597 mm	597 mm	597 mm
M	337 mm	337 mm	337 mm
N	262 mm	262 mm	262 mm
O	586 mm	586 mm	586 mm
Connections			
DN 1	DN 63 ISO-K	DN 63 ISO-K	DN 63 ISO-K
DN 2	DN 40 PN 16	DN 40 PN 16	DN 40 PN 16

Technical data	Hepta 100 P, 190-208/380-415 V, 50 Hz	Hepta 100 P, 3TF, 220-230/440-460 V, 60 Hz	Hepta 100 P, 3TF, 220/380 V, 60 Hz
Flange (in)	DN 63 ISO-K	DN 63 ISO-K	DN 63 ISO-K
Flange (out)	DN 40 PN 16	DN 40 PN 16	DN 40 PN 16
Operating fluid	D1	D1	D1
Operating fluid filling	1.6 l	1.6 l	1.6 l
Ultimate pressure	≤ 0.05 hPa	≤ 0.01 hPa	≤ 0.01 hPa
Weight	275 kg	275 kg	275 kg
Cooling water pressure	300-600 kPa	300-600 kPa	300-600 kPa
Cooling water temperature	10-30 °C	10-30 °C	10-30 °C
Cooling water consumption	2-6 l/min	2-6 l/min	2-6 l/min
Motor rating 50 Hz	3.5 kW		
Motor rating 60 Hz		4.8 kW	4.8 kW
Nominal rotation speed at 50 Hz	3000 min ⁻¹		
Nominal rotation speed at 60 Hz		3600 min ⁻¹	3600 min ⁻¹
Nominal pumping speed at 50 Hz	110 m ³ /h		
Nominal pumping speed at 60 Hz		130 m ³ /h	130 m ³ /h
Mains requirement: voltage 50 Hz	190-208/380-415 V		
Mains requirement: voltage 60 Hz		220-230/440-460 V	220-380 V
Sound pressure level	70 dB (A)	74 dB (A)	74 dB (A)
Protection category	IP 55	IP 55	IP 55
Ambient temperature	0-50 °C	0-50 °C	0-50 °C

Order number			
Hepta 100	PU V11 420	PU V11 422	PU V11 423

Accessories			
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ	P 4768 051 FQ

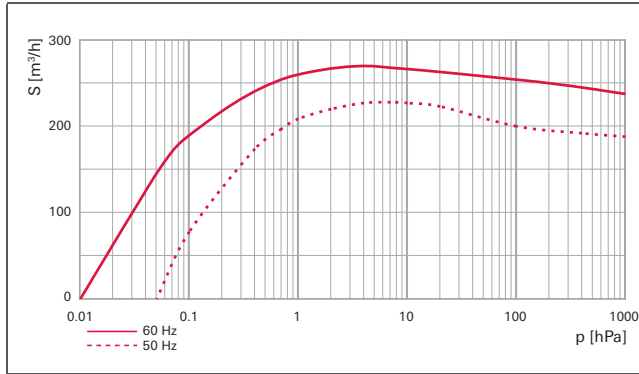
Hepta 200



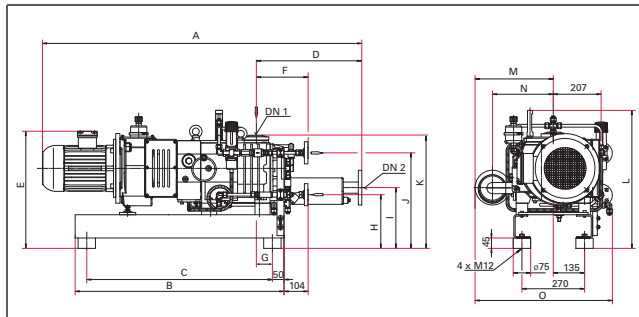
Dry screw pumps with a pumping speed of 220 m³/h at 50 Hz and 265 m³/h at 60 Hz:

- For mains voltage: 190-208/380-415, 50 Hz, 3 ph
- Ideal solution for all areas in which oil-free vacuum is required
- Lower energy costs thanks to internal compression
- For applications in the low and medium vacuum

Pumping speed



Dimensions (in mm)



	Hepta 200 P, 190-208/380-415 V, 50 Hz	Hepta 200 P, 220-230/440-460 V, 60 Hz	Hepta 200 P, 220/380 V, 60 Hz
A	1664 mm	1664 mm	1664 mm
B	1160 mm	1160 mm	1160 mm
C	1060 mm	1060 mm	1060 mm
D	602 mm	602 mm	602 mm
E	552 mm	552 mm	552 mm
F	237 mm	278 mm	278 mm
G	83 mm	83 mm	83 mm
H	232 mm	232 mm	232 mm
I	278 mm	264 mm	264 mm
J	412 mm	412 mm	412 mm
K	491 mm	491 mm	491 mm
L	609 mm	609 mm	609 mm
M	365 mm	365 mm	365 mm
N	282 mm	282 mm	282 mm
O	619 mm	619 mm	619 mm
Connections			
DN 1	DN 63 ISO-K	DN 63 ISO-K	DN 63 ISO-K
DN 2	DN 50 PN 16	DN 50 PN 16	DN 50 PN 16

Technical data	Hepta 200 P, 190-208/380-415 V, 50 Hz	Hepta 200 P, 220-230/440-460 V, 60 Hz	Hepta 200 P, 220/380 V, 60 Hz
Flange (in)	DN 63 ISO-K	DN 63 ISO-K	DN 63 ISO-K
Flange (out)	DN 50 PN 16	DN 50 PN 16	DN 50 PN 16
Operating fluid	D1	D1	D1
Operating fluid filling	1.6 l	1.6 l	1.6 l
Ultimate pressure	≤ 0.05 hPa	≤ 0.01 hPa	≤ 0.01 hPa
Weight	326 kg	326 kg	356 kg
Cooling water pressure	300-600 kPa	300-600 kPa	300-600 kPa
Cooling water temperature	10-30 °C	10-30 °C	10-30 °C
Cooling water consumption	2-6 l/min	2-6 l/min	2-6 l/min
Motor rating 50 Hz	6 kW		
Motor rating 60 Hz		7.6 kW	7.6 kW
Nominal rotation speed at 50 Hz	3000 min ⁻¹		
Nominal rotation speed at 60 Hz		3600 min ⁻¹	3600 min ⁻¹
Nominal pumping speed at 50 Hz	220 m ³ /h		
Nominal pumping speed at 60 Hz		265 m ³ /h	265 m ³ /h
Mains requirement: voltage 50 Hz	190-208/380-415 V		
Mains requirement: voltage 60 Hz		220-230/440-460 V	220-380 V
Sound pressure level	71 dB (A)	76 dB (A)	76 dB (A)
Protection category	IP 55	IP 55	IP 55
Ambient temperature	0-50 °C	0-50 °C	0-50 °C

Order number			
Hepta 200	PU V21 420	PU V21 422	PU V21 423

Accessories			
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ	P 4768 051 FQ

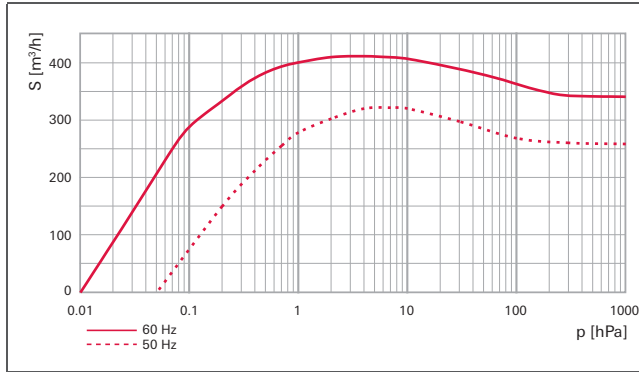
Hepta 300



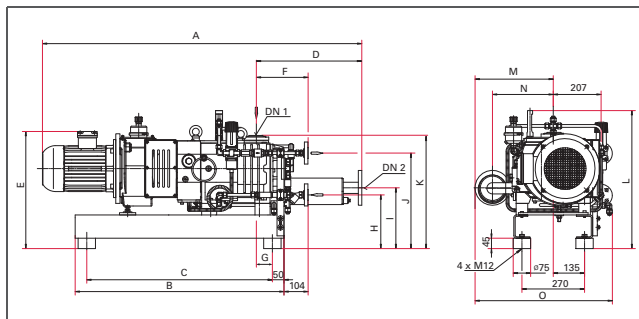
Dry screw pumps with a pumping speed of 320 m³/h at 50 Hz and 410 m³/h at 60 Hz:

- For mains voltage: 190-208/220-240/380-415, 50 Hz, 3 ph
- Ideal solution for all areas in which oil-free vacuum is required
- Lower energy costs thanks to internal compression
- For applications in the low and medium vacuum

Pumping speed



Dimensions (in mm)



	Hepta 300 P, 190-208/220-240/ 380-415 V, 50 Hz	Hepta 300 P, 220-230/440-460 V, 60 Hz	Hepta 300 P, 220/380 V, 60 Hz
A	1660 mm	1660 mm	1660 mm
B	1230 mm	1230 mm	1230 mm
C	1130 mm	1130 mm	1130 mm
D	533 mm	533 mm	533 mm
E	552 mm	552 mm	552 mm
F	236 mm	236 mm	236 mm
G	81 mm	81 mm	81 mm
H	231 mm	231 mm	231 mm
I	262 mm	262 mm	262 mm
J	411 mm	411 mm	411 mm
K	495 mm	495 mm	495 mm
L	609 mm	609 mm	609 mm
M	364 mm	364 mm	364 mm
N	282 mm	282 mm	282 mm
O	620 mm	620 mm	620 mm
Connections			
DN 1	DN 63 ISO-K	DN 63 ISO-K	DN 63 ISO-F
DN 2	DN 50 PN 16	DN 50 PN 16	DN 50 PN 16

Technical data	Hepta 300 P, 190-208/220-240/ 380-415 V, 50 Hz	Hepta 300 P, 220-230/440-460 V, 60 Hz	Hepta 300 P, 220/380 V, 60 Hz
Flange (in)	DN 63 ISO-K	DN 63 ISO-K	DN 63 ISO-K
Flange (out)	DN 50 PN 16	DN 50 PN 16	DN 50 PN 16
Operating fluid	D1	D1	D1
Operating fluid filling	1.6 l	1.6 l	1.6 l
Ultimate pressure	≤ 0.05 hPa	≤ 0.01 hPa	≤ 0.01 hPa
Weight	330 kg	381 kg	381 kg
Cooling water pressure	300-600 kPa	300-600 kPa	300-600 kPa
Cooling water temperature	10-30 °C	10-30 °C	10-30 °C
Cooling water consumption	2-6 l/min	2-6 l/min	2-6 l/min
Motor rating 50 Hz	7.5 kW		
Motor rating 60 Hz		9.5 kW	9.5 kW
Nominal rotation speed at 50 Hz	3000 min ⁻¹		
Nominal rotation speed at 60 Hz		3600 min ⁻¹	3600 min ⁻¹
Nominal pumping speed at 50 Hz	320 m ³ /h		
Nominal pumping speed at 60 Hz		410 m ³ /h	410 m ³ /h
Mains requirement: voltage 50 Hz	190-208/220-240/ 380-415 V		
Mains requirement: voltage 60 Hz		220-230/440-460 V	220-380 V
Sound pressure level	72 dB (A)	77 dB (A)	77 dB (A)
Protection category	IP 55	IP 55	IP 55
Ambient temperature	0-50 °C	0-50 °C	0-50 °C

Order number			
Hepta 300	PU V31 420	PU V31 422	PU V31 423

Accessories			
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ	P 4768 051 FQ

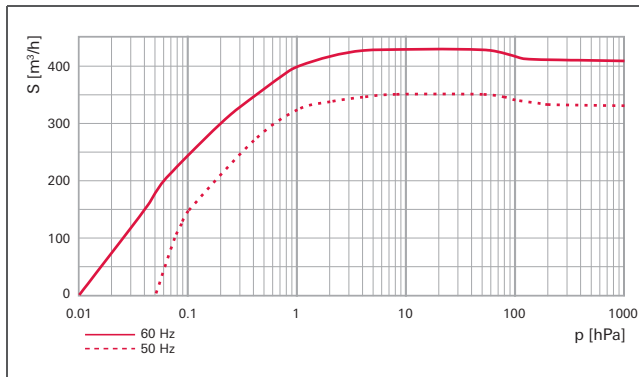
Hepta 400



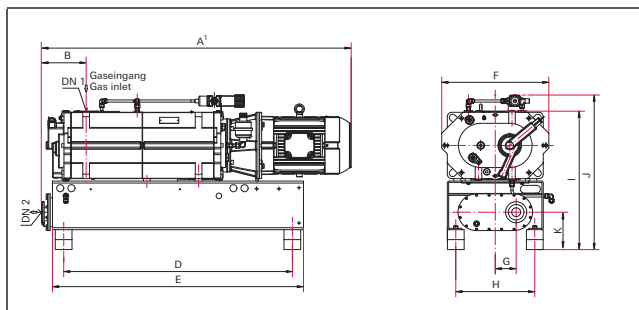
Dry screw pumps with a pumping speed of 350 m³/h at 50 Hz and 420 m³/h at 60 Hz:

- For mains voltage: 190-208/220-240/380-415 V, 50 Hz
- Ideal solution for all areas in which oil-free vacuum is required
- Lower energy costs thanks to internal compression
- For applications in the low and medium vacuum

Pumping speed



Dimensions (in mm)



	Hepta 400 P, 190-208/220-240/ 380-415 V, 50 Hz	Hepta 400 P, 220-230/440-460 V, 60 Hz	Hepta 400 P, 220/380 V, 60 Hz
A	1429 mm	1429 mm	1429 mm
B	243 mm	243 mm	243 mm
D	1025 mm	1025 mm	1025 mm
E	1125 mm	1125 mm	1125 mm
F	480 mm	480 mm	480 mm
G	94 mm	94 mm	94 mm
H	354 mm	354 mm	354 mm
I	630 mm	630 mm	630 mm
J	700 mm	700 mm	700 mm
K	169 mm	169 mm	169 mm
Connections			
DN 1	DN 63 ISO-K	DN 63 ISO-K	DN 63 ISO-K
DN 2	DN 80 PN 16	DN 80 PN 16	DN 80 PN 16

Technical data	Hepta 400 P, 190-208/220-240/ 380-415 V, 50 Hz	Hepta 400 P, 220-230/440-460 V, 60 Hz	Hepta 400 P, 220/380 V, 60 Hz
Flange (in)	DN 63 ISO-K	DN 63 ISO-K	DN 63 ISO-K
Flange (out)	DN 80 PN 16	DN 80 PN 16	DN 80 PN 16
Operating fluid	D1	D1	D1
Operating fluid filling	1.6 l	1.6 l	1.6 l
Ultimate pressure	≤ 0.05 hPa	≤ 0.01 hPa	≤ 0.01 hPa
Weight	526 kg	526 kg	526 kg
Cooling water pressure	300-600 kPa	300-600 kPa	300-600 kPa
Cooling water temperature	10-30 °C	10-30 °C	10-30 °C
Cooling water consumption	4-8 l/min	4-8 l/min	4-8 l/min
Motor rating 50 Hz	7.5 kW		
Motor rating 60 Hz		9.5 kW	9.5 kW
Nominal rotation speed at 50 Hz	3000 min ⁻¹		
Nominal rotation speed at 60 Hz		3600 min ⁻¹	3600 min ⁻¹
Nominal pumping speed at 50 Hz	350 m ³ /h		
Nominal pumping speed at 60 Hz		420 m ³ /h	420 m ³ /h
Mains requirement: voltage 50 Hz	190-208/220-240/ 380-415 V		
Mains requirement: voltage 60 Hz		220-230/440-460 V	220-380 V
Sound pressure level	66 dB (A)	69 dB (A)	69 dB (A)
Protection category	IP 55	IP 55	IP 55
Ambient temperature	0-50 °C	0-50 °C	0-50 °C

Order number			
Hepta 400	PU V41 420	PU V41 422	PU V41 423

Accessories			
SAS 63, DN 63 ISO-K, polyester filter	PK Z60 511	PK Z60 511	PK Z60 511
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ	P 4768 051 FQ

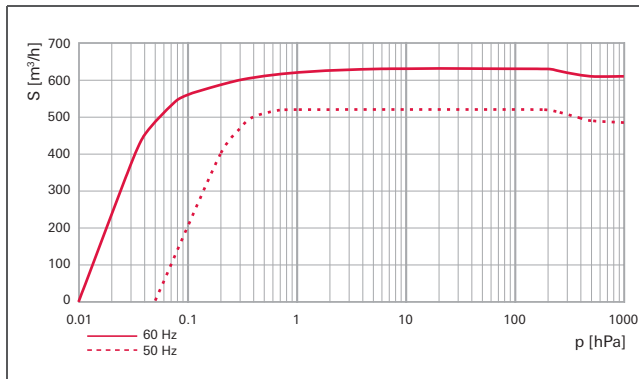
Hepta 600



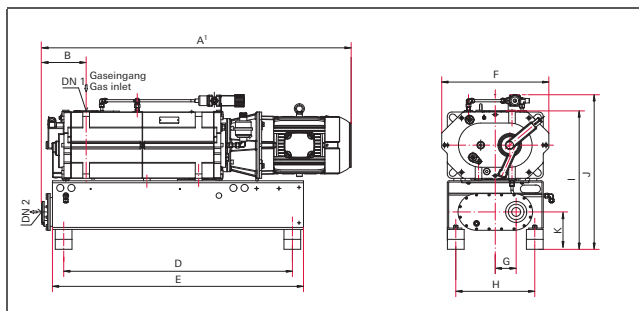
Dry screw pumps with a pumping speed of 525 m³/h at 50 Hz and 630 m³/h at 60 Hz:

- For mains voltage: 190-208/220-240/380-415 V, 50 Hz
- Ideal solution for all areas in which oil-free vacuum is required
- Lower energy costs thanks to internal compression
- For applications in the low and medium vacuum

Pumping speed



Dimensions (in mm)



	Hepta 600 P, 190-208/220-240/ 380-415 V, 50 Hz	Hepta 600 P, 220-230/440-460 V, 60 Hz	Hepta 600 P, 220/380 V, 60 Hz
A	1540 mm	1540 mm	1540 mm
B	367 mm	367 mm	367 mm
D	800 mm	800 mm	800 mm
E	1000 mm	1000 mm	1000 mm
F	563 mm	563 mm	563 mm
G	94 mm	94 mm	94 mm
H	400 mm	400 mm	400 mm
I	616 mm	616 mm	616 mm
J	686 mm	686 mm	685 mm
K	123 mm	123 mm	123 mm
Connections			
DN 1	DN 100 ISO-K	DN 100 ISO-K	DN 100 ISO-K
DN 2	DN 80 PN 16	DN 80 PN 16	DN 80 PN 16

Technical data	Hepta 600 P, 190-208/220-240/ 380-415 V, 50 Hz	Hepta 600 P, 220-230/440-460 V, 60 Hz	Hepta 600 P, 220/380 V, 60 Hz
Flange (in)	DN 100 ISO-K	DN 100 ISO-K	DN 100 ISO-K
Flange (out)	DN 80 PN 16	DN 80 PN 16	DN 80 PN 16
Operating fluid	D1	D1	D1
Operating fluid filling	1.3 l	1.3 l	1.3 l
Ultimate pressure	≤ 0.05 hPa	≤ 0.01 hPa	≤ 0.01 hPa
Weight	747 kg	747 kg	780 kg
Cooling water pressure	300-600 kPa	300-600 kPa	300-600 kPa
Cooling water temperature	10-30 °C	10-30 °C	10-30 °C
Cooling water consumption	0-6 l/min	0-6 l/min	0-6 l/min
Motor rating 50 Hz	15 kW		
Motor rating 60 Hz		17.3 kW	17 kW
Nominal rotation speed at 50 Hz	3000 min ⁻¹		
Nominal rotation speed at 60 Hz		3600 min ⁻¹	3600 min ⁻¹
Nominal pumping speed at 50 Hz	525 m ³ /h		
Nominal pumping speed at 60 Hz		630 m ³ /h	630 m ³ /h
Mains requirement: voltage 50 Hz	190-208/220-240/ 380-415 V		
Mains requirement: voltage 60 Hz		220-230/440-460 V	220-380 V
Sound pressure level	70 dB (A)	75 dB (A)	75 dB (A)
Protection category	IP 55	IP 55	IP 55
Ambient temperature	0-50 °C	0-50 °C	0-50 °C

Order number			
Hepta 600	PU V61 420	PU V61 422	PU V61 423

Accessories			
SAS 100, DN 100 ISO-K, polyester filter	PK Z60 512	PK Z60 512	PK Z60 512
PTC-resistor tripping device	P 4768 051 FQ	P 4768 051 FQ	P 4768 051 FQ



Multi-stage Roots pumps

Clean and dry vacuum for various applications and markets

Multi-stage
Roots pumps



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Multi-stage Roots pumps

Clean and dry vacuum for various applications and markets

Multi-stage Roots pumps by Pfeiffer Vacuum are used in various application. Small air-cooled ACP pumps are very low maintenance and are distinguished by their reliable performance. They are used in analytical applications as well as in clean processes for semiconductor production and plasma cleaning. The compact Roots pumps A 100 L and A 180 L can be easily integrated in systems due to their small dimensions. Load-locks and transfer chambers in semiconductor and photovoltaic production systems are typical areas of application for this type of pump. The large water-cooled ACP 120 with its high pumping speed and low final pressure are used in research and development, vacuum coating and metallurgy. Process pumps in the A3P, A3H and AD 73 KH series, as well as the A4 series, are used in large numbers in aggressive applications in the semiconductor and coating industry.

Nevertheless, all of these areas have one thing in common: they require a clean and dry vacuum. The technology of the multi-stage Roots pumps is the perfect solution. Lubricants and sealing material between the rotor and stator are not required by the contact-free working pumping module. Thus, hydrocarbon vapor backstreaming can be avoided. In the suction chamber of the pumps, no sealing materials have been used. This means the pumps are free of particles, extremely reliable and stable over a long period of time and also stand out due to their low cost of ownership.



NORM Electronics Ltd www.norm.gr

Features at a glance

	Connection flange (inlet)					Pumping speed class							Typical final pressure				Version			Pro-cesses		Cool-ing		Page														
	DN 16 ISO-KF	DN 25 ISO-KF	DN 40 ISO-KF	DN 50 ISO KF	DN 100 ISO-K	DN 160 ISO-K	15 m ³ /h	28 m ³ /h	40 m ³ /h	100 m ³ /h	120 m ³ /h	160 m ³ /h	180 m ³ /h	480 m ³ /h	560 m ³ /h	700 m ³ /h	900 m ³ /h	1200 m ³ /h	1700 m ³ /h	0.03 hPa without gas ballast	6.6 · 10 ⁻³ hPa	6.5 · 10 ⁻³ hPa	5 · 10 ⁻⁴ hPa		3 · 10 ⁻⁴ hPa	2 · 10 ⁻² hPa	Standard	Corrosive Gas	Energy Saving	For condensable gases	SEMI S2	Clean Processes	Medium Duty Applications	Harsh Duty Applications	Air	Water		
Clean processes – Air cooled																																						
SD versions																																						
ACP 15																																					166	
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G versions																																						
ACP 15 G																																					166	
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Multi-stage Roots pumps



Customer benefits

- Clean and dry vacuum
- Particle-free, extremely reliable with long-term stability
- Low maintenance
- Low operating costs



ACP 15 / 28 / 40

**Dry compact multi-stage Roots pumps, clean vacuum,
high reliability**



ACP 15 / 28 / 40

The multi-stage Roots pump technology of the ACP series meets the requirements of applications where a clean and dry vacuum is needed.

Series at a glance:

Standard version (SD version):

The SD version is designed for applications that require the pumping of clean (dust-free) and non-corrosive gases. Standard pumps are equipped with a gas ballast device to improve the pumping of light gases and avoid vapor condensation inside the pump. Three gas ballast options are available to satisfy customer needs.

Version for corrosive gases (G version):

The G version pump is compatible with traces of corrosive gases. An inert purge gas protects low pressure and high pressure bearings and dilutes corrosive gases in the suction chamber.

Version for condensable vapors (CV version):

The CV version is specially designed for avoiding vapor condensation inside the pump block. This occurs through:

- a high gas ballast throughput for heating up pumps and diluting condensable gases.
- A silencer with a drain screw for releasing liquid at the lowest point of the exhaust.
- Purge gas injection to protect the ball bearings and the shaft seals.

The CV version has a water vapor capacity of up to 1,000 grams per hour.

Customer benefits

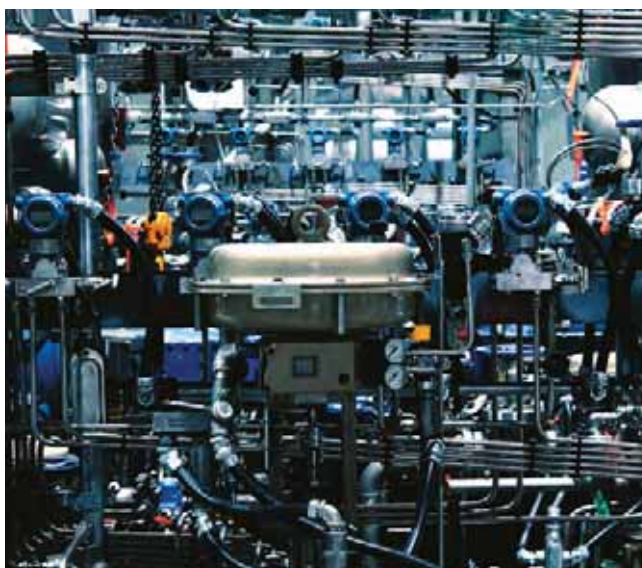
- Enhanced process quality thanks to oil-free pump system
- Ideal replacement for scroll pumps and oil-lubricated pumps
- Low operating costs due to long maintenance intervals and air cooling
- Longterm stability of process conditions
- Pump parameters can be adjusted to the process using the integrated frequency converter

Typical applications

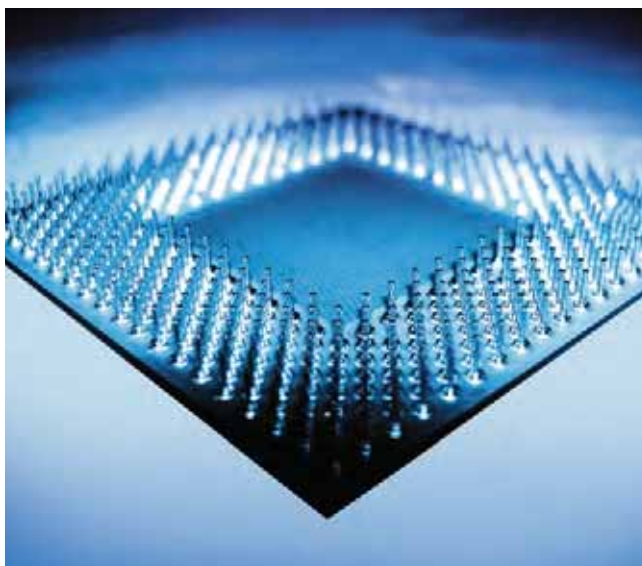
- Analytical instruments
- Research & development
- Plasma cleaning
- Load-lock and transfer chambers
- Portable turbopumping stations



Microscopy



Industry



Semiconductors



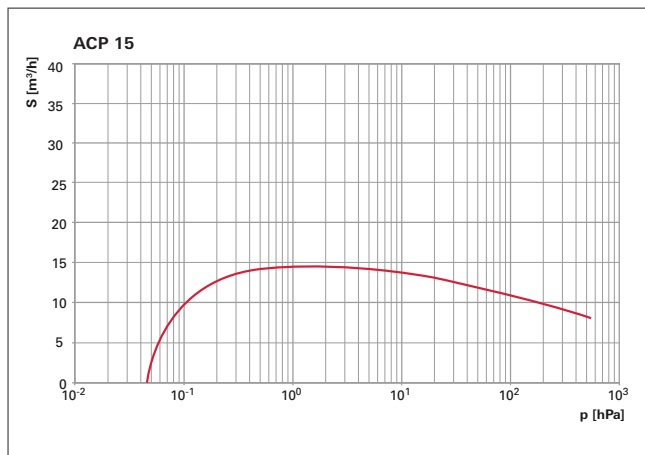
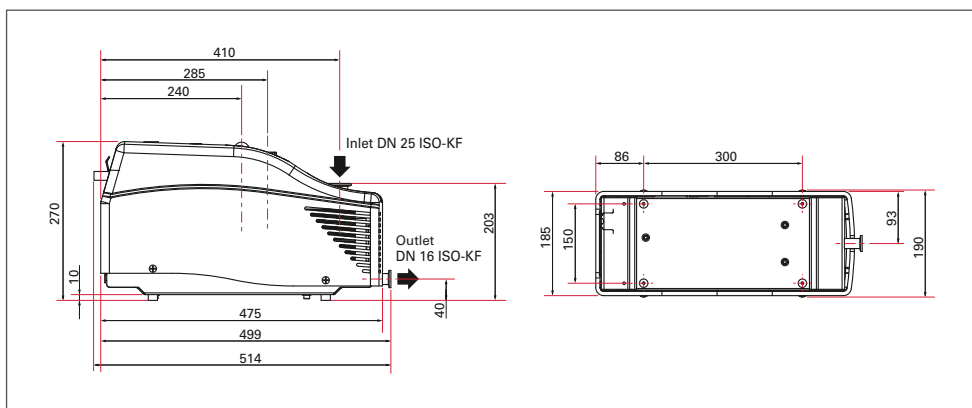
ACP 15

Dry, compact multi-stage Roots pumps with a pumping speed of max. 14 m³/h

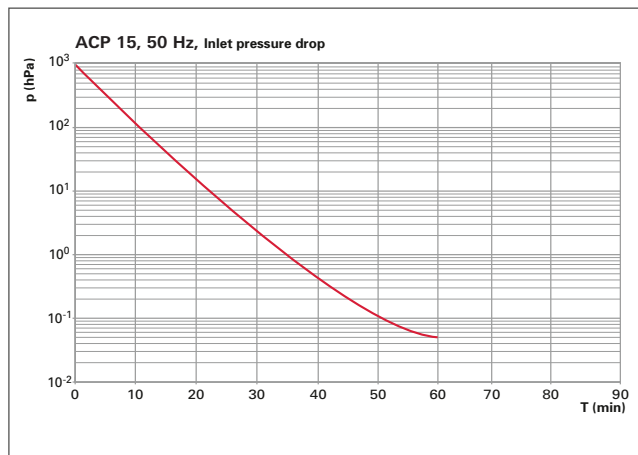
Due to frictionless design, no contamination through particles: no wearing parts in the path of the gas flow

- No hydrocarbon vapor backstreaming: pumps in the ACP series are lubricant-free in the pumping module
- Constant performance (pumping speed, maximum continuous inlet pressure and ultimate pressure)
- High reliability: thanks to extensive experience with dry Roots pumps since 1988
- Low maintenance costs: no annual service, complete overhaul only every 20,000 hours (ACP 15)
- Suitable for condensable vapors: with gas ballast and drainable silencer

Dimensions



ACP 15 pumping speed



ACP 15 pump down time

Technical data	ACP 15, standard	ACP 15, G version
Dimensions (L x W x H)	514 x 190 x 270 mm	514 x 190 x 270 mm
Flange (out)	DN 16 ISO-KF	DN 16 ISO-KF
Flange (in)	DN 25 ISO-KF	DN 25 ISO-KF
Weight	23 kg	23 kg
Helium leak rate, max.	$5 \cdot 10^{-8}$ Pa m ³ /s	$5 \cdot 10^{-8}$ Pa m ³ /s
Continuous inlet pressure, max.	1013 hPa	1013 hPa
Corrosive gas		Yes (light duty)
Cooling	Air	Air
Power consumption at ultimate pressure	450 W	450 W
N ₂ purge gas flow, min.		5 slm
Mains requirement: Voltage	100-230 V +/-10%, 50/60 Hz, 200-440 V +/-10%, 50/60 Hz	100-230 V +/-10%, 50/60 Hz, 200-440 V +/-10%, 50/60 Hz
Processes	Clean Processes	Light duty applications
Pumping speed, max.	14 m ³ /h	14 m ³ /h
Typical ultimate pressure	0.03 hPa	0.03 hPa
Typical ultimate pressure with gas ballast	0.1 hPa	
Typical ultimate pressure with N ₂ purge		0.1 hPa
Ambient temperature	12 to 40 °C	12 to 40 °C
Version	Standard	Corrosive gas
Water vapor capacity, max.	80 g/h	

Accessories		
External silencer ES 25 S, DN 25	109873	109873
Noise Reduction Cover NRC 15, for ACP 15 pumps	111968	111968
Sound Enclosure kit SEK 15, for ACP 15 pumps	112779	112779

Order number guide ACP 15

V5	a	T	S	b	c	d	F
Pump model	Versions	Inlet port DN 25	Exhaust port DN 16	Gas ballast	Frequency converter	Power cord	Rubber feet
ACP 15	SA, GA	T	S	M, B, R ¹⁾ , F	F, T	K, A, S, J, E, Z, R ²⁾	F

¹⁾ R is the only option for G version

²⁾ R is the only option for three phased pump

**Order number matrix
ACP 15**

Order number

V5 a TS b c d F

Versions		a
SD version		SA
G version		GA

Gas ballast		b
Manual (On/Off)		M
Blanked		B
R 1/4" port (GA version)		R ¹⁾
Permanent filter (mesh) with defined gas throughput		F

Frequency converter		c
1-phase		F
3-phase		T

Power cord		c
UK		K
US		A
Switzerland		S
Japan (1 cable only)		J
Europe		E
Without		Z
3-phase (without plug)		R ²⁾

¹⁾ R is the only option for G version

²⁾ R is the only option for three phased pump

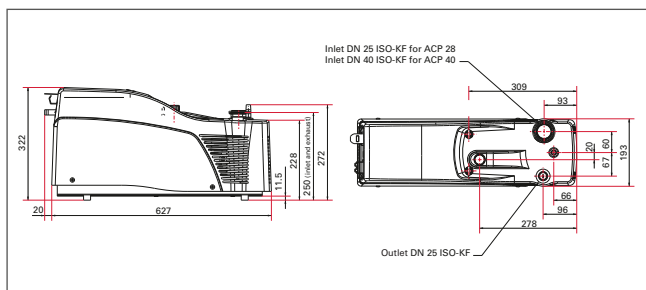
ACP 28



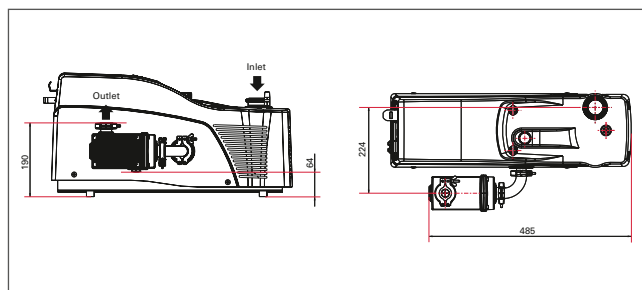
Dry, compact multi-stage Roots pumps with a pumping speed of max. 27 m³/h

- Due to frictionless design, no contamination due to particles: no wearing parts in the path of the gas flow
- No hydrocarbon vapor backstreaming: pumps in the ACP series are lubricant-free in the pumping module
- Constant performance (pumping speed, maximum continuous inlet pressure and ultimate pressure)
- High reliability: thanks to extensive experience with dry Roots pumps since 1988
- Low maintenance costs: no annual service, complete overhaul only every 22,000 hours of operation for the ACP 28/40
- Suitable for condensable vapors: with gas ballast and drainable silencers.

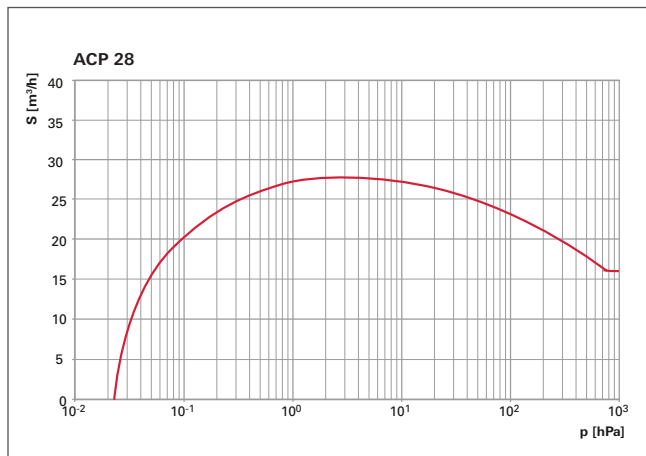
Dimensions



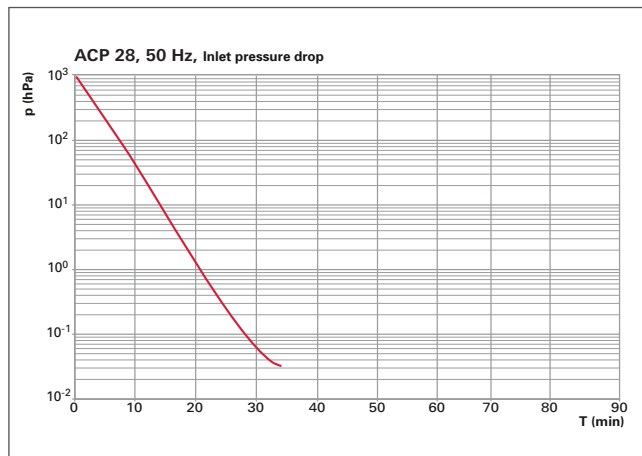
ACP 28 Standard



ACP 28 CV version



ACP 28 pumping speed



ACP 28 pump down time

Technical data:	ACP 28, standard	ACP 28, G version	ACP 28, CV version
Dimensions (L x W x H)	647 x 193 x 322 mm	647 x 193 x 322 mm	647 x 308 x 322 mm
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Weight	30 kg	30 kg	30 kg
Helium leak rate, max.	$5 \cdot 10^{-8}$ Pa m ³ /s	$5 \cdot 10^{-8}$ Pa m ³ /s	$5 \cdot 10^{-8}$ Pa m ³ /s
Continuous inlet pressure, max.	1013 hPa	1013 hPa	1013 hPa
Corrosive gas		Yes (light duty)	Yes (light duty)
Cooling	Air	Air	Air
Power consumption at ultimate pressure	700 W	700 W	700 W
N ₂ purge gas flow, min.		3.7 slm	
Mains requirement: Voltage	100-230 V +/-10%, 50/60 Hz; 200-440 V +/-10%, 50/60 Hz	100-230 V +/-10%, 50/60 Hz; 200-440 V +/-10%, 50/60 Hz	100-230 V +/-10%, 50/60 Hz; 200-440 V +/-10%, 50/60 Hz
Processes	Clean Processes	Light duty applica- tions	Light duty applications
Pumping speed, max.	27 m ³ /h	27 m ³ /h	27 m ³ /h
Typical ultimate pressure	0.03 hPa	0.03 hPa	0.03 hPa
Typical ultimate pressure with gas ballast	0.1 hPa		0.2 hPa
Typical ultimate pressure with N ₂ purge		0.1 hPa	
Ambient temperature	12 to 40 °C	12 to 40 °C	12 to 40 °C
Version	Standard	Corrosive gas	For condensable gases
Water vapor capacity, max.	120 g/h		700 g/h

Accessories			
Inlet particle filter IPF 25, DN 25	111649	111649	111649
External silencer ES 25 S, DN 25	109873	109873	109873
Noise Reduction Cover NRC 28/40, for ACP 28 and ACP 40	112637	112637	
Sound Enclosure Kit SEK 28/40, for ACP 28 and ACP 40	114379	114379	

Order number guide ACP 28

V6	a	T	S	b	c	d	e
Pump model	Versions	Inlet/Exhaust	Motor	Frequency converter	Power cord	Gas ballast	Options
ACP 28	SA, GA, GV	DN 25/ DN 25	S	F, T	K, A, S, J, E, Z, R ¹⁾	M, B ²⁾ , F, V ³⁾ , H ³⁾	F, R

- ¹⁾ R is the only option for 3-phased pumps
- ²⁾ B is the only option for G version
- ³⁾ V or H are the only options for CV versions

Order number matrix
ACP 28

Order number

V6 a TS b c d e

Versions	a
SD version	SA
G version	GA
CV version	GV

Frequency converter	b
1-phase	F
3-phase	T

Power cord	c
UK	K
US	A
Switzerland	S
Japan (1 cable only)	J
Europe	E
Without	Z
3-phase (without plug)	R¹⁾

Gas ballast	d
Manual (On/Off)	M
Blanked	B²⁾
Permanent filter (mesh)	F
Manual (On/Off) (CV version)	V³⁾
Permanent filter (CV version)	H³⁾

Options	e
Rubber feet	F
Wheels	R

¹⁾ R is the only option for 3-phased pumps
²⁾ B is the only option for G version
³⁾ V or H are the only options for CV versions

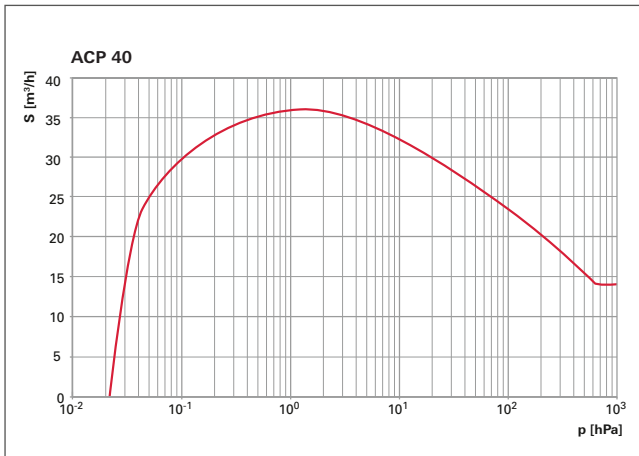
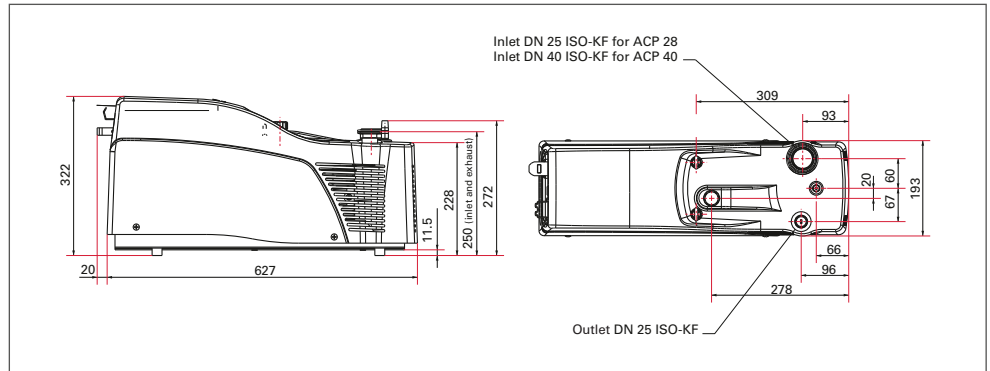
ACP 40



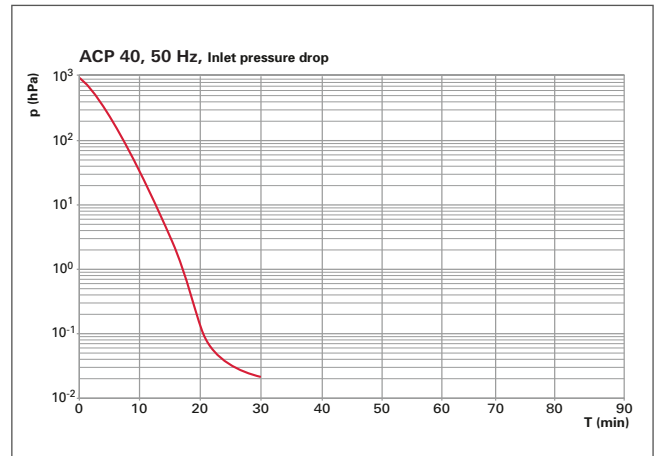
Dry, compact multi-stage Roots pumps with a pumping speed of max, 37 m³/h

- Due to frictionless design, no contamination due to particles: no wearing parts in the path of gas flow
- No hydrocarbon vapor backstreaming: pumps in the ACP series are lubricant-free in the pumping module
- Constant performance (pumping speed, maximum continuous inlet pressure and ultimate pressure)
- High reliability: thanks to extensive experience with dry Roots pumps since 1988
- Low maintenance costs: no annual service, complete overhaul only every 22,000 hours for the ACP 28/40
- Suitable for condensable vapors: with gas ballast and drainable silencers.

Dimensions



ACP 40 pumping speed



ACP 40 pump down time

Technical data	ACP 40, standard	ACP 40, G version	ACP 40, CV version
Dimensions (L x W x H)	647 x 193 x 322 mm	647 x 193 x 322 mm	647 x 308 x 322 mm
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
flange (in)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Weight	32 kg	32 kg	32 kg
Helium leak rate, max.	$5 \cdot 10^{-8}$ Pa m ³ /s	$5 \cdot 10^{-8}$ Pa m ³ /s	$5 \cdot 10^{-8}$ Pa m ³ /s
Continuous inlet pressure, max.	1013 hPa	1013 hPa	1013 hPa
Corrosive gas		Yes (light duty)	Yes (light duty)
Cooling	Air	Air	Air
Power consumption at ultimate pressure	700 W	700 W	700 W
N ₂ Sperrgasfluss, min		3,7 Slm	
Mains requirement: Voltage	100–230 V +/-10%, 50/60 Hz, 200–440 V +/-10%, 50/60 Hz	100–230 V +/-10%, 50/60 Hz, 200–440 V +/-10%, 50/60 Hz	100–230 V +/-10%, 50/60 Hz, 200–440 V +/-10%, 50/60 Hz
Processes	Clean Processes	Light duty applications	Light duty applications
Pumping speed, max.	37 m ³ /h	37 m ³ /h	37 m ³ /h
Typical ultimate pressure	0.03 hPa	0.03 hPa	0.03 hPa
Typical ultimate pressure with gas ballast	0.1 hPa		0.2 hPa
Typical ultimate pressure with N ₂ purge		0.1 hPa	
Ambient temperature			12 to 40 °C
Version	Standard	Corrosive gas	For condensable gases
Water vapor capacity, max.	120 g/h		700 g/h

Accessories			
Inlet particle filter IPF 40, DN40	111647	111647	111647
External silencer ES 25 S, DN 25	109873	109873	109873
Noise Reduction Cover NRC 28/40, for ACP 28 and ACP 40	112637	112637	
Sound Enclosure Kit SEK 28/40, for ACP 28 and ACP 40	114379	114379	

Order number guide ACP 40

V8	a	C	S	b	c	d	e
Pump model	Versions	Inlet/Exhaust	Motor	Frequency converter	Power cord	Gas ballast	Options
ACP 40	SA, GA, GV	DN 40/ DN 25	S	F, T	K, A, S, J, E, Z, R ¹⁾	M, B ²⁾ , F, V ³⁾ , H ³⁾	F, R

¹⁾ R is the only option for 3-phased pumps

²⁾ B is the only option for G version

³⁾ V or H are the only options for CV versions

**Order number matrix
ACP 40**

Order number

V8 a CS b c d e

Versions	a
SD version	SA
G version	GA
CV version	GV

Frequency converter	b
1-phase	F
3-phase	T

Power cord	c
UK	K
US	A
Switzerland	S
Japan (1 cable only)	J
Europe	E
Without	Z
3-phase (without plug)	R¹⁾

Gas ballast	d
Manual (On/Off)	M
Blanked	B²⁾
Permanent filter (mesh)	F
Manual (On/Off) (CV version)	V³⁾
Permanent filter (CV version)	H³⁾

Options	e
Rubber feet	F
Wheels	R

¹⁾ R is the only option for 3-phased pumps
²⁾ B is the only option for G version
³⁾ V or H are the only options for CV versions

A 100 L and A 180 L

Integrated pump for light duty processes



A 100 L and A 180 L

Since the market launch of A 100 L Series, they have revolutionized the pump integration into semiconductor production facilities. Despite their compact dimensions, A 100 L and A 180 L pumps provide high pumping speeds and short pumpdown times. Today, integrated pumps are state of the art and the A 100 L is installed worldwide in many 300 mm semiconductor fabs. When used in clean processes such as load-locks and transfer chambers these pumps eliminate vacuum line effects in pump installations. High reliability and long-term stability distinguish these pumps.

Series at a glance:

A 100 L (Standard version):

Compact dry pump for light duty applications with a pumping speed of 100 m³/h.

A 100 L ES (Energy-saving version):

Compact oil-free pump for light duty applications with a pumping speed of 100 m³/h and integrated automatic energy-saving mode which reduces operating costs by up to 50 %.

A 180 L (Standard version):

Our new compact oil-free pump with a pumping speed of 180 m³/h designed for heavy cycling.

Customer benefits

- Low operating costs
- Easy and flexible integration in systems thanks to compact size
- High performance for high throughput
- Low vibration and noise level
- Low power consumption
- High reliability

Typical applications

- Load-locks and transfer chambers
- Semiconductor industry
- Photovoltaics
- Research & Development
- Cryogenics

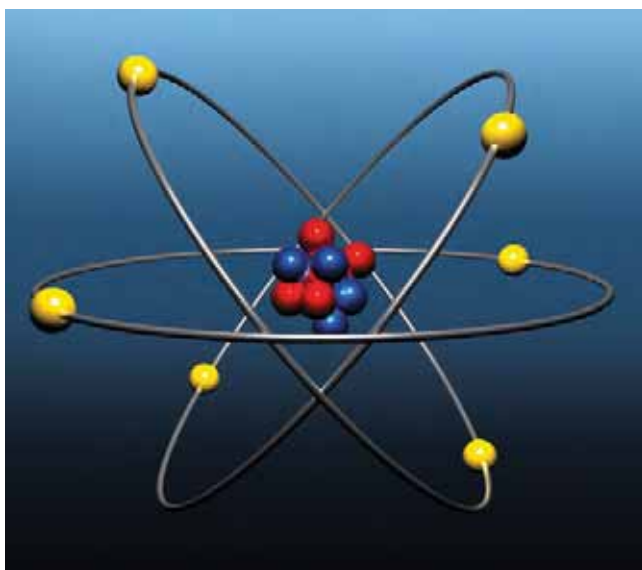
A 180 L

- Pumping speed of 180 m³/h
- Designed for heavy pumpdown cycles
- Energy-efficient for low operating costs
- Easy system integration due to compact size

Find out more information about this product here:



Semiconductor industry



Research & Development



Photovoltaics

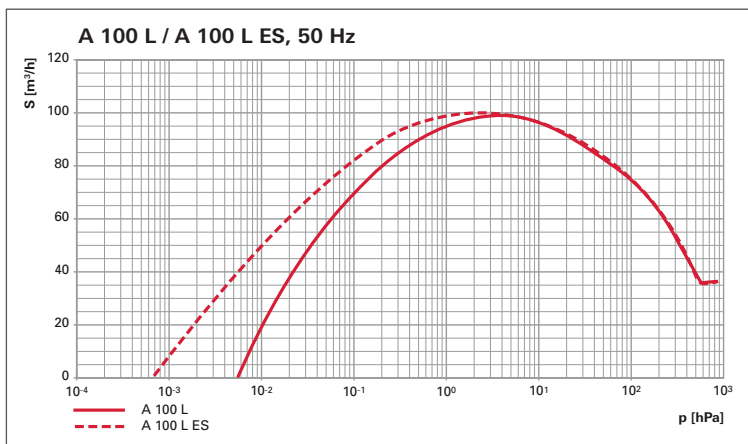
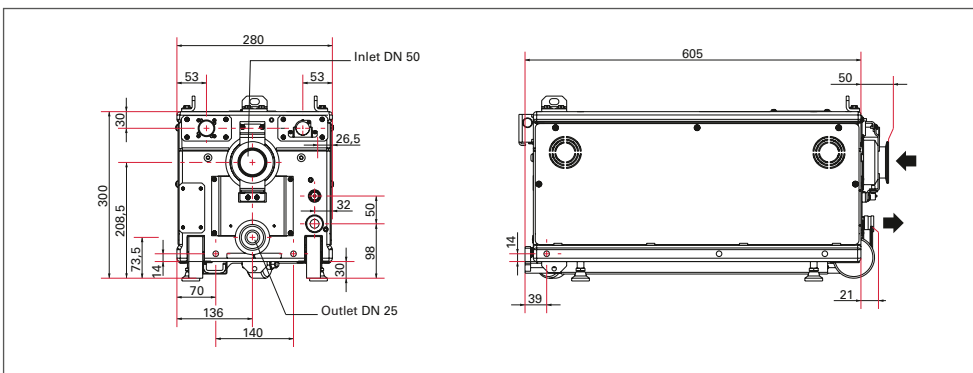
A 100 L / A 100 L ES



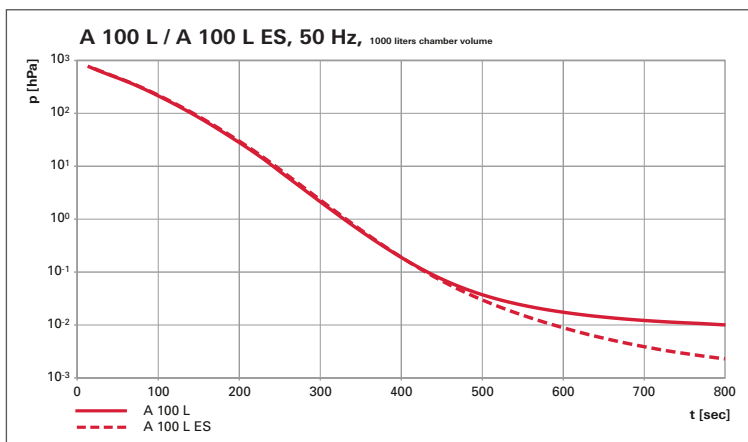
Compact dry pump for light duty applications with a pumping speed of 100 m³/h.

- Pump is equipped with water cooling circuit
- Hour counter and three color LEDs provide information about pump status on its front panel
- 16 pin or 19 pin interface connector transfers discrete Input/Output information to the tool
- Optional RS232 or RS485 serial interface provides control and monitoring functions
- High throughput, pumping speed 100 m³/h

Dimensions



Pumping speed



Pumpdown time

NORM Electronics Ltd www.norm.gr

Technical data	A 100 L	A 100 L ES
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 50 ISO-KF	DN 50 ISO-KF
I/O interfaces	SPI 16 pin, SPI 19 pin	SPI 16 pin, SPI 19 pin
Frequency	50–60 Hz	50–60 Hz
Weight	100 kg	100 kg
Cooling	Water	Water
Power consumption at ultimate pressure	1.6 kW	< 0.8 kW
Power consumption in standby mode	0.50–1.2 kW	0.2–0.5 kW
Noise level, max.	58 dB (A)	55 dB (A)
Continuous inlet flow, max.	20 slm	20 slm
Cooling water flow, min.	1.6 l/mn	1.6 l/mn
Power supply voltage, 3 phases	200-208 V; 380-400 V	200-208 V; 380-400 V
Pumping speed	100 m ³ /h	100 m ³ /h
Interface	RS-232/-485	RS-232/-485
Typical ultimate pressure	6.6 · 10 ⁻³ hPa	7 · 10 ⁻⁴ hPa
Typical vibration displacement (at inlet flange 10–1,000 Hz)	1.5 µm	1.5 µm
Typical vibration acceleration (at inlet flange 10–1,000 Hz)	0.1 m.s ⁻²	0.1 m.s ⁻²
Typical vibration speed (at inlet flange 10–1,000 Hz)	1 mm.s ⁻¹	1 mm.s ⁻¹
Water connection	Quick connect 1/4 NPT	Quick connect 1/4 NPT
Cycle frequency, max.	For 25 liter volume: 40 s	For 25 liter volume: 40 s

Accessories		
Anti-earthquake square kit	109790	109790
N ₂ pressurization kit	107956S	107956S
Anti-noise device	110868	110868
RS-232/-485 interface board	111923	111923
Emergency stop	107849	107849

Order number guide A 100 L / A 100 L ES

A 100L	a	1	b	c	4
Pump model	Power supply	Electrical Connection	RS232 Network	Remote plug	Reserved
A 100 L	3, 4, 5	1	3, 4	2, 3	4

**Order number matrix A
100 L / A 100 L ES**

Order number

A 100 L a 1 b c 4

Power supply	a
Low Voltage	3
High Voltage	4
Low Voltage (A 100 L ES)	5

RS232 Network	b
Without	3
With	4

Remote plug	c
16 pins	2
19 pins	3



ACP 120 and ACG 600

Dry pumps for industrial use



ACP 120 and ACG 600

Based on the tens of thousands of semiconductor process pumps installed worldwide, the ACP 120 brings the advantages of multi-stage Roots pumps to bear in industrial applications as well. The ACP 120 can be combined into different pumping stations with additional Roots pumps. The roots pumping station ACG 600 can form the basis for a completely lubricant-free pump system for vacuum solutions in decorative or tool coating.

Series at a glance:

Standard version:

The Standard version is designed for applications that require the pumping of clean (dust-free) and non-corrosive gases.

Version for corrosive gases (G version):

With a purge gas port for slightly corrosive processes or for pumping down condensable media.

Customer benefits

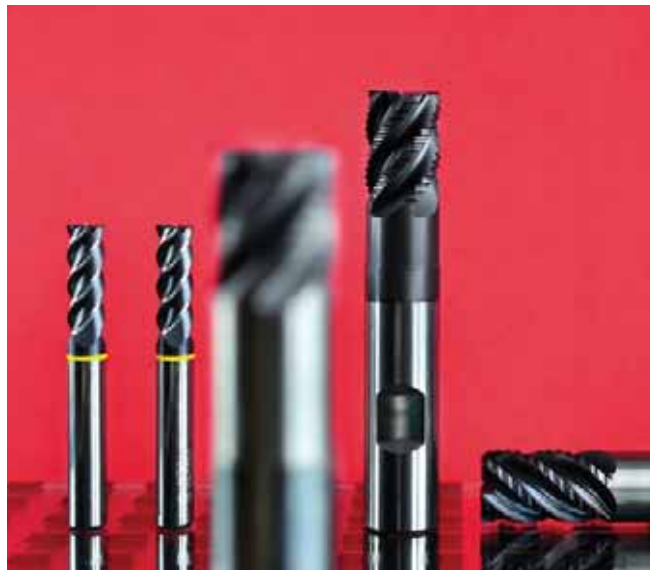
- Cleanliness, no risk of particulate contamination
- Low power consumption
- High reliability
- Extended life time between maintenance

Typical applications

- Coating
- Research & Development
- Freeze drying
- Glass coating
- Cylinder evacuation
- Leak detection systems



Freeze drying



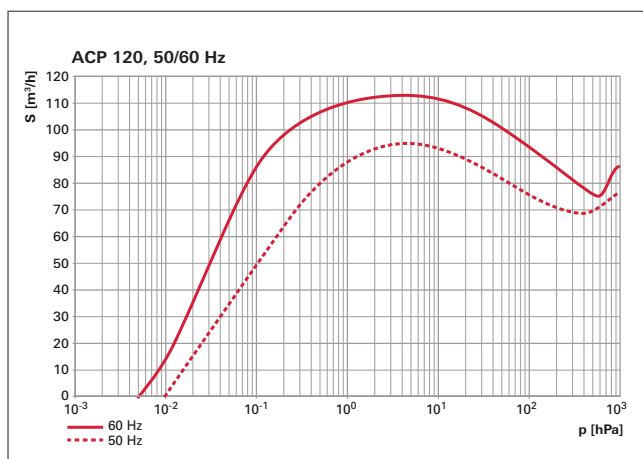
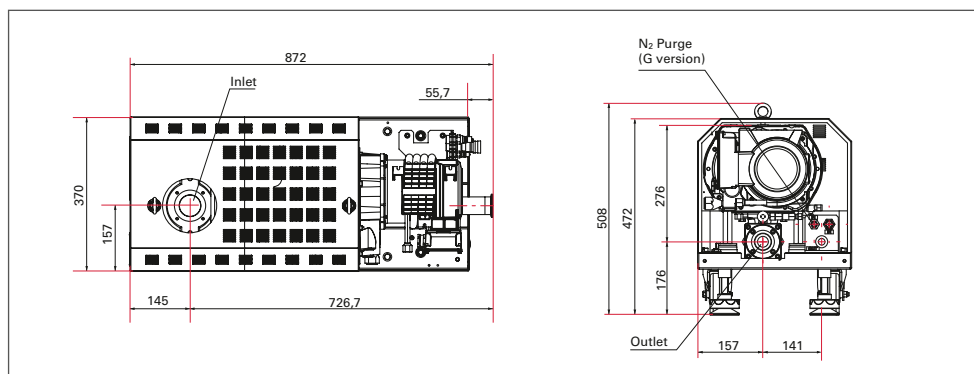
Coating

ACP 120

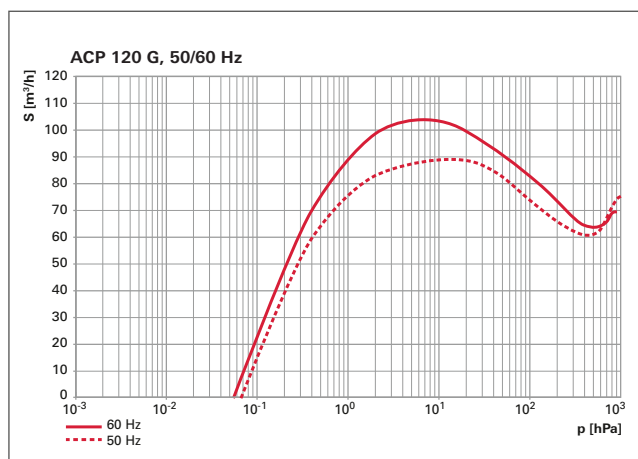


- Water cooled
- Optional version with DN 50 ISO-K inlet pipe
- Optional large volume version
- High throughput, pumping speed 110 m³/h
- 3-phase motor – 200 V to 480 V

Dimensions



ACP 120 standard version



ACP 120 G version

Technical data	ACP 120 Standard version	ACP 120 Standard version, large volumes	ACP 120 G version	ACP 120 G version, large volumes
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 50 ISO-KF	DN 50 ISO-KF	DN 50 ISO-KF	DN 50 ISO-KF
Dimensions (L x W x H)	872 x 370 x 469 mm	872 x 370 x 469 mm	872 x 370 x 469 mm	872 x 370 x 469 mm
Frequency	50-60 Hz	60 Hz	50-60 Hz	60 Hz
Weight	205 kg	205 kg	205 kg	205 kg
Cooling	Water	Water	Water	Water
Power consumption at ultimate pressure, 50 Hz	1.3 kW		1.3 kW	
Power consumption at ultimate pressure, 60 Hz	1.5 kW	1.5 kW	1.5 kW	1.5 kW
Noise level, max.	65 dB (A)	65 dB (A)	65 dB (A)	65 dB (A)
Continuous inlet flow, max.	80 slm	80 slm	80 slm	80 slm
Cooling water flow, min.	5 l/mn	5 l/mn	5 l/mn	5 l/mn
Power supply voltage, 3 phase	200-480 V	200-230 V; 380-480 V	200-480 V	200-230 V; 380-480 V
Pumping speed at 50 Hz	95 m ³ /h		95 m ³ /h	
Saugvermögen bei 60 Hz	112 m ³ /h	112 m ³ /h	112 m ³ /h	112 m ³ /h
Typical ultimate pressure, 50 Hz	3 · 10 ⁻² hPa			
Typical ultimate pressure, 60 Hz	1.5 · 10 ⁻² hPa	1.5 · 10 ⁻² hPa		5 · 10 ⁻² hPa
Typical ultimate pressure with N ₂ purge, 50 Hz			9 · 10 ⁻² hPa	
Typical ultimate pressure with N ₂ purge, 60 Hz			5 · 10 ⁻² hPa	
Volume size, max.	1 m ³	10 m ³	1 m ³	10 m ³
Ambient temperature	5 to 40 °C	5 to 40 °C	5 to 40 °C	5 to 40 °C

G = Version with gas ballast

Accessories				
Inlet pipe, DN 50 ISO-KF	106308	106308	106308	106308
Isolation valve, DN 50 ISO-KF, manual	30501M	30501M	30501M	30501M

Order number guide ACP 120

ACP 120	a	SP	b	1	c	d	1
Pump model	Versions	Standard 3ph motor	Inlet	Cables	Silencer	Frequency converter	Reserved
ACP 120	S, G	SP	1, 2	1	1, 2	1, 2, 3	1

Notes:

A) G version is recommended for pumping small amounts of condensable or corrosive gases.
It includes a N₂ purge circuit with injection points.

B) with APC 120 frequency converter option, the maximum volume to be evacuated (not cycling) is 10 m³
without APC 120 frequency converter option, the maximum volume to be evacuated (not cycling) is 1 m³.

**Order number matrix
ACP 120**

Order number

ACP120 **a** SP **b** 1 **c** **d** 1

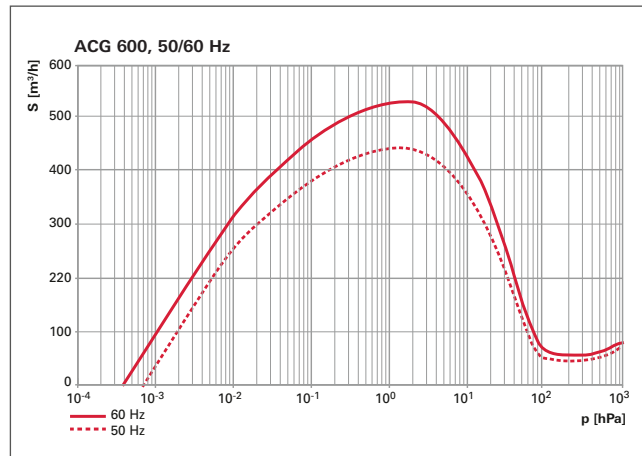
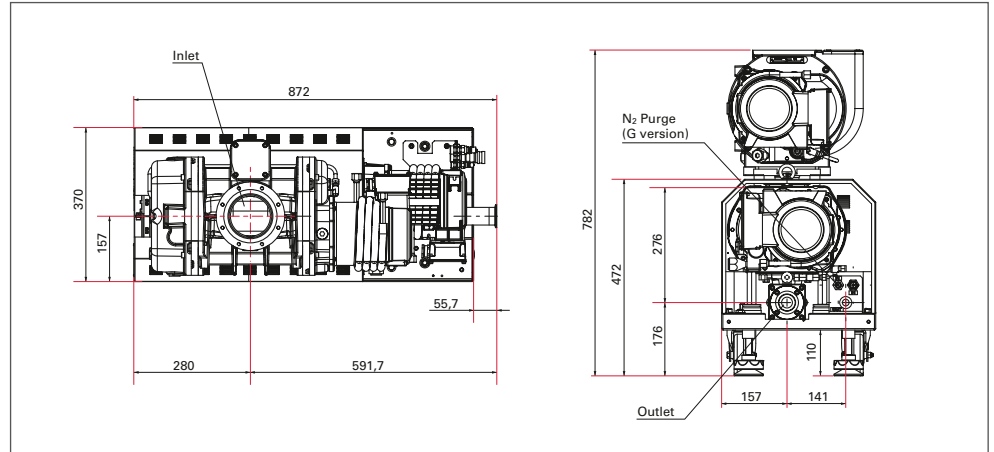
Versions	a
Standard version	S
G version	G
Inlet	b
without inlet spool	1
with DN 50 ISO-KF spool	2
Silencer	c
standard	1
drainable	2
Frequency converter	d
without	1
with – Low voltage (60 Hz large volume)	2
with – High voltage (60 Hz large volume)	3

ACG 600



- Water cooled
- Optional nitrogen gas ballast to protect the pump from corrosive or condensable gases
- Inlet flange DN 100 ISO-K
- Optional large volume version
- High throughput, pumping speed 560 m³/h
- 3-phase motor – 200 V to 480 V
- Integrated N₂-gas ballast

Dimensions



ACG 600 standard version

Technical data	ACG 600 Standard version	ACG 600 Standard version, large volumes	ACG 600 G version	ACG 600 G version, large volumes
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 100 ISO-K	DN 100 ISO-K	DN 100 ISO-K	DN 100 ISO-K
Dimensions (L x W x H)	872 x 370 x 779 mm	872 x 370 x 779 mm	872 x 370 x 779 mm	872 x 370 x 779 mm
Frequency	50–60 Hz	60 Hz	50–60 Hz	60 Hz
Weight	320 kg	320 kg	320 kg	320 kg
Cooling	Water	Water	Water	Water
Power consumption at ultimate pressure, 50 Hz	1.8 kW		1.8 kW	
Power consumption at ultimate pressure, 60 Hz	2 kW	2 kW	2 kW	2 kW
Noise level, max.	68 dB (A)	68 dB (A)	68 dB (A)	68 dB (A)
Continuous inlet flow, max.	60 slm	60 slm	60 slm	60 slm
Cooling water flow, min.	5 l/mn	5 l/mn	5 l/mn	5 l/mn
Power supply voltage, 3 phase	200-480 V	200-230 V; 380-480 V	200-480 V	200-230 V; 380-480 V
Pumping speed at 50 Hz	480 m ³ /h		480 m ³ /h	
Pumping speed at 60 Hz	560 m ³ /h	560 m ³ /h	560 m ³ /h	560 m ³ /h
Typischer Enddruck 50 Hz	8 · 10 ⁻³ hPa			
Typical ultimate pressure, 60 Hz	9 · 10 ⁻⁴ hPa	9 · 10 ⁻⁴ hPa		
Typical ultimate pressure with N ₂ purge, 50 Hz			9 · 10 ⁻³ hPa	
Typical ultimate pressure with N ₂ purge, 60 Hz			6 · 10 ⁻³ hPa	6 · 10 ⁻³ hPa
Volume size, max.	1 m ³	10 m ³	1 m ³	10 m ³
Ambient temperature	5 to 40 °C	5 to 40 °C	5 to 40 °C	5 to 40 °C

G = Version with gas ballast

Accessories				
Isolation valve, DN 100 ISO-KF, manual	30503M	30503M	30503M	30503M

Order number guide ACG 600

ACG 600	a	SP	1	1	b	c	1
Pump model	Versions	Standard 3 ph Motor	Inlet	Cables	Silencer	Frequency converter	Reserved
ACG 600	S, G	SP	1	1	1, 2	1, 2, 3	1

Notes:

- A) G version is recommended for pumping small amounts of condensable or corrosive gases. It includes a N₂ purge circuit with injection points.
- B) with APC 120 frequency converter option, the maximum volume to be evacuated (not cycling) is 10 m³.
without APC 120 frequency converter option, the maximum volume to be evacuated (not cycling) is 1 m³.

Order number matrix
ACG 600

Order number

ACG600 a SP 1 1 b c 1

Versions		a
Standard version		S
G version		G

Silencer		b
standard		1
drainable		2

Frequency converter		c
without		1
with – Low voltage (60Hz large volume)		2
with – High voltage (60Hz large volume)		3

A3P series

Advanced, energy-efficient technology for medium duty processes

Multi-stage
Roots pumps



A3P series

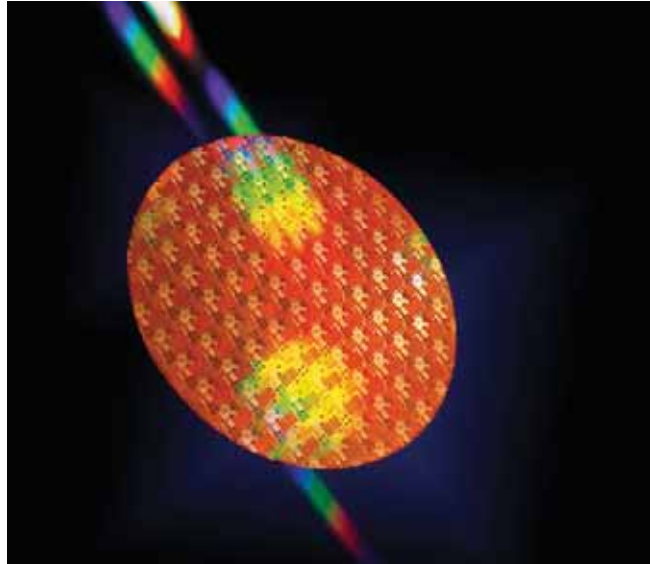
The A3P series of vacuum pumps, offer high reliability and the necessary equipment to withstand traces of aggressive and corrosive media. The three models available in the series cover a wide spectrum of pumping speeds. Compared to conventional pumps, energy savings of up to 50% can be achieved with the A3P range. These pumps are designed for quiet and low-vibration operation and are CE and SEMI S2 compliant. Due to their compact dimensions, they can easily be integrated into existing systems and save up to 50% space compared to conventional pumps.

Customer benefits

- Low power consumption
- Easy integration into existing systems due to their compact and lightweight design
- Longer service life through high resistance to corrosive media
- No need for an external silencer
- Reduced operating costs
- Compatible with semiconductor fab requirements

Recommended applications

- Oxide etching
- Poly etching
- Stripping
- Ashing
- Implant source



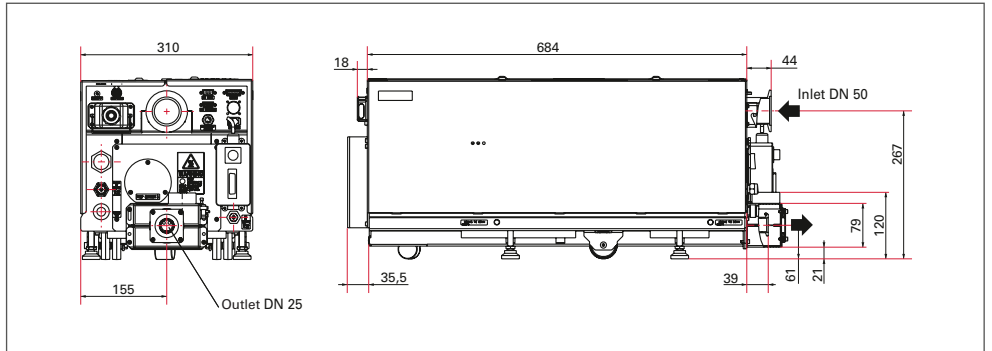
Semiconductors



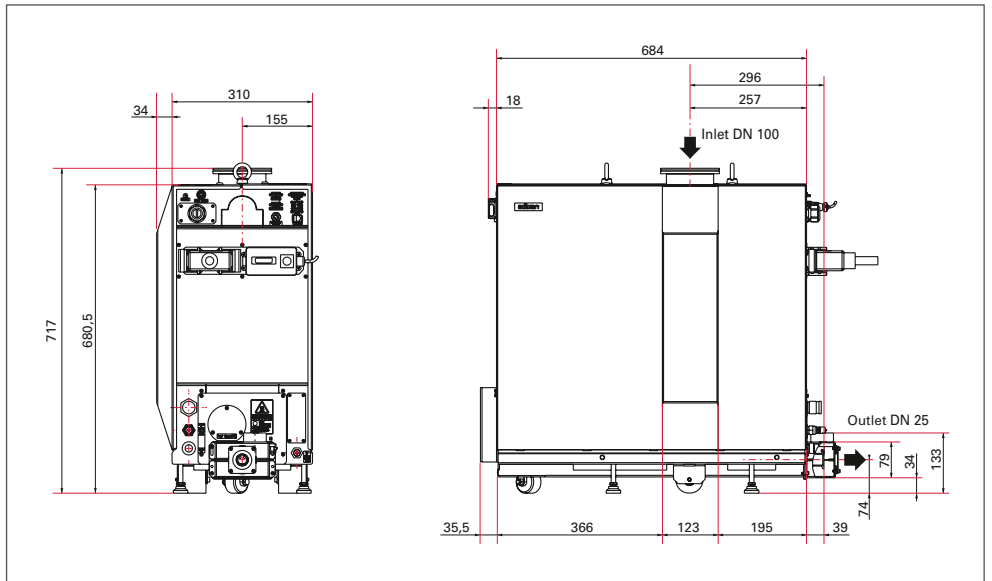
A3P series

- Low operating costs
- Small footprint
- Light weight for simpler assembly
- High reliability in medium duty applications
- Compatible with semiconductor fab requirements

Dimensions



A 103 P



A 603 P, A 1003 P

Multi-stage
Roots pumps

Technical data	A 103 P	A 603 P	A 1003 P
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 50 ISO-K	DN 100 ISO-K	DN 100 ISO-K
Dimensions (L x W x H)	684 x 310 x 323 mm	684 x 342 x 662 mm	684 x 342 x 662 mm
Weight	125 kg	270 kg	270 kg
Cooling	Water	Water	Water
Power consumption at ultimate pressure	1 kW	1.3 kW	1.6 kW
Continuous inlet flow, max.	50 slm	25 slm	25 slm
Cooling water flow, min.	1.5 l/mn	1.5 l/mn	1.5 l/mn
Nominal motor rating	2.5 kW	4.7 kW	5 kW
N ₂ purge gas flow, max.	60 slm	60 slm	60 slm
N ₂ purge gas flow, min.	5 slm	5 slm	5 slm
Power supply voltage, 3 phase	200-230 V; 380-440 V	200-230 V; 380-440 V	200-230 V; 380-440 V
Pumping speed	120 m ³ /h		900 m ³ /h
Pumping speed at 50 Hz		480 m ³ /h	
Pumping speed at 60 Hz		570 m ³ /h	
Noise level	< 58 dB (A)	< 65 dB (A)	< 65 dB (A)
Typical ultimate pressure	6.5 · 10 ⁻³ hPa		3 · 10 ⁻⁴ hPa
Typical ultimate pressure, 50 Hz		5 · 10 ⁻⁴ hPa	
Typical ultimate pressure, 60 Hz		3 · 10 ⁻⁴ hPa	
Typical ultimate pressure with N ₂ purge	(with 20 slm purge) 2.6 · 10 ⁻² hPa		(with 20 slm purge) 1 · 10 ⁻³ hPa
Typical ultimate pressure with N ₂ purge, 50 Hz		(with 20 slm purge) 2 · 10 ⁻³ hPa	
Typical ultimate pressure with N ₂ purge, 60 Hz		(with 20 slm purge) 1 · 10 ⁻³ hPa	
Full load current	11.4 A (for 200-230 V); 6 A (380-440 V)	17.6 A (for 220-230 V); 9.4 A (for 380-440 V)	22.8 A (for 220-230 V); 12 A (for 380-440 V)
Volume size, max.	1 m ³	1 m ³	1 m ³
Water temperature	10 to 25 °C	10 to 25 °C	10 to 25 °C
Water connector	Brass, stainless steel	Brass, stainless steel	Brass, stainless steel

Accessories			
Isolation valve, manual	30501M	30503M	30503M
Isolation valve, 24 V DC	30501B	30503B	30503B
Cable for isolation valve, 24 V DC, 2.5 m	A330071	A330071	A330071
Seismic brackets kit	110914	110914	110914
Hand held remote display, 1.5 m cable	118952S	118952S	118952S

Order number guide A3P series

A3P	a	2	b	c	d	0	e	f	0	g	0
Product	Pump model	Pump type	Voltage	Inlet port	Water connector	Purge system	Cable type	Purge configuration	OEM	SEMI S2	Reserved
A 203 P	G	2	1, 2	5	0, 1	0	1, 2	0, 1, 2	0	0, 1	0
A 603 P	D	2	1, 2	6	0, 1	0	1, 2	0, 1, 2	0	0, 1	0
A 1003 P	C	2	1, 2	6	0, 1	0	1, 2	0, 1, 2	0	0, 1	0

Order number matrix
A3P series

Order number

A3P a 2 b c d 0 e f 0 g 0

Pump model	a
A 203 P	G
A 603 P	D
A 1003 P	C
Voltage	b
Low Voltage	1
High Voltage	2
Inlet port	c
DN 50	5
DN 100	6
Water connector	d
Brass	0
Stainless Steel	1
Cable type	e
Hard wire	1
Plug	2
Purge configuration	f
Without standby	0
With standby	1
Single purge	2
SEMI S2	g
Without	0
With	1



A3H series

Energy and cost efficient solutions for the most demanding applications

Multi-stage
Roots pumps



NORM Electronics Ltd www.norm.gr

A3H series

Harsh duty processes in semiconductor production always provide new challenges for vacuum pumps. Based on the proven multi-stage Roots technology, Pfeiffer Vacuum offers pump solutions with the A3H series with different pumping speeds for 300 mm wafer semiconductor fabs with 45 nm technology nodes and less.

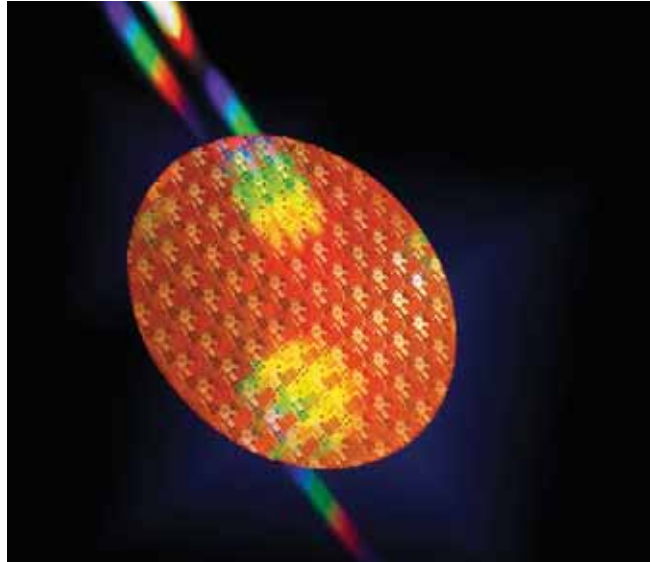
Through the use of corrosion-resistant materials and a high gas throughput, this pump series is ideal for use in demanding CVD processes. A high particle tolerance and condensation resistance distinguishes the pumps of the A3H series. Their compact and modular construction allows for space-saving integration in existing systems. Long maintenance intervals and low energy consumption provide for low operating costs.

Customer benefits

- Reduced operating costs through low energy consumption
- Reduced space needed through compact construction
- Proven durability
- High process-safety
- Longer maintenance intervals through improved particle tolerance and condensation resistance

Typical applications

- Metal etching
- CVD processes (PECVD, SACVD, LPCVD)
- ALD
- Diffusion processes
- Epitaxy



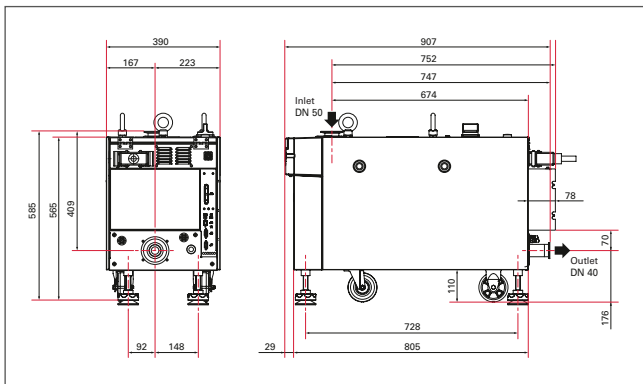
Semiconductors

A3H series

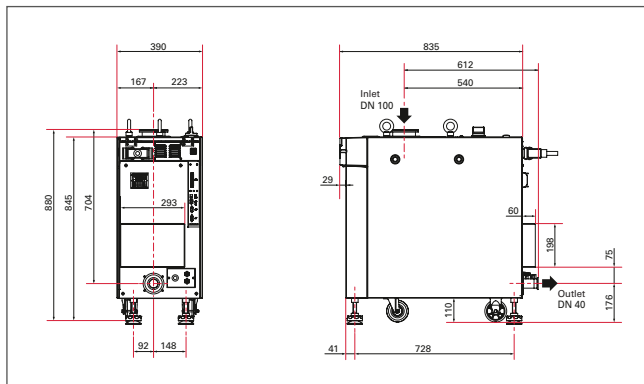


- Longer maintenance intervals through improved particle tolerance and condensation resistance.
- Optimal efficiency for demanding CVD processes through the use of corrosion-resistant materials and high gas throughput
- Reduced operating costs through low energy consumption
- Reduced space needed through compact design
- Low noise emission and low vibration level
- Compliant with CE and SEMI S2 standards

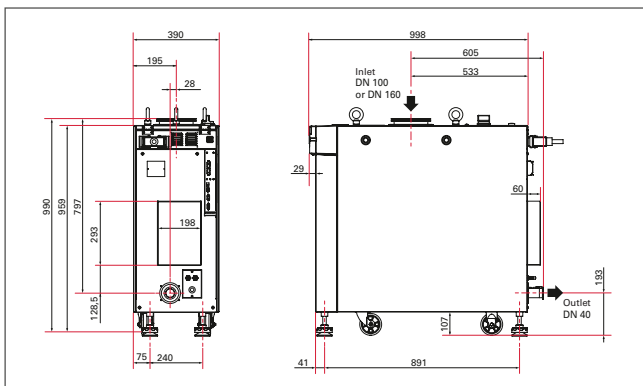
Dimensions



A 203 H



A 803 H



A 1503 H

Technical data (general)	A 203 H	A 803 H	A 1503 H	A 1803 H
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 50 ISO-K	DN 100 ISO-K	DN 100 ISO-K	DN 100 ISO-K
Dimensions (L x W x H)	907 x 390 x 585 mm	894 x 390 x 880 mm	1,058 x 390 x 986mm	1,058 x 390 x 986mm
Cooling	Water	Water	Water	Water
Noise level, max.	65 dB (A)	68 dB (A)	69 dB (A)	69 dB (A)
Continuous inlet flow, max.	150 slm	100 slm	100 slm	70 slm
Cooling water flow, min.	2 l/mn	2.5 l/mn	2.5 l/mn	2.5 l/mn
N ₂ purge gas flow, max.	120 slm	120 slm	120 slm	120 slm
N ₂ purge gas flow, min.	20 slm	20 slm	20 slm	20 slm
Power supply voltage, 3 phase	200-208 V; 380-400 V; 415 V; 460 V; 480 V	200-208 V; 380-400 V; 415 V; 460 V; 480 V	200-208 V; 380-400 V; 415 V; 460 V; 480 V	200-208 V; 380-400 V; 415 V; 460 V; 480 V
Ambient temperature	5 to 40 °C	5 to 40 °C	5 to 40 °C	5 to 40 °C
Full load current	10 A; 20 A (for 200-208 V)	20 A; 27 A (for 200-208 V)	10 A; 32 A (for 200-208 V)	10 A; 32 A (for 200-208 V)
Water connector	Brass, stainless steel; 1/4 inch, 3/8 inch NPT	Brass, stainless steel; 1/4 inch, 3/8 inch NPT	Brass, stainless steel; 1/4 inch, 3/8 inch NPT	Brass, stainless steel; 1/4 inch, 3/8 inch NPT

Technical data	A 203 H Standard version	A 803 H Standard version	A 1503 H Standard version	A 1503 H Standard version
Frequency	50 Hz	60 Hz	60 Hz	60 Hz
Weight	265 kg	385 kg	545 kg	545 kg
Power consumption at ultimate pressure, 50 Hz	1.8 kW	2.2 kW		
Power consumption at ultimate pressure, 60 Hz		2.4 kW	3.4 kW	2.8 kW
Pumping speed at 50 Hz	130 m ³ /h	600 m ³ /h		
Pumping speed at 60 Hz	160 m ³ /h	700 m ³ /h	1200 m ³ /h	1700 m ³ /h
Typical base pressure, 50 Hz	6 · 10 ⁻² hPa	1 · 10 ⁻³ hPa		
Typical base pressure, 60 Hz	2 · 10 ⁻² hPa	5 · 10 ⁻⁴ hPa	5 · 10 ⁻⁴ hPa	5 · 10 ⁻⁴ hPa
Typical base pressure with N ₂ purge, 50 Hz	5 · 10 ⁻¹ hPa	1 · 10 ⁻² hPa		
Typical base pressure with N ₂ purge, 60 Hz	1 · 10 ⁻¹ hPa	5 · 10 ⁻³ hPa	5 · 10 ⁻³ hPa	5 · 10 ⁻³ hPa
Volume size, max.	1 m ³	1 m ³	1 m ³	1 m ³

Accessories				
Isolation valve, manual		30503M	30503M	30503M
Isolation valve, 24 V DC		30503E	30503E	30503E
Cable for isolation valve, 24 V DC, 3.5 m		106532	106532	106532
Hand held remote display, 1.5 m cable	119988S	119988S	119988S	119988S
Hand Held Remote control	110942	110942	110942	110942
Cable for hand held remote display, 15 m	107079	107079	107079	107079
Seismic brackets kit	A328947	A328947	A328947	A328947

Technical data	A 203 H Large volume version			A 1803 H Large volume version
Frequency	60 Hz			60 Hz
Power consumption at ultimate pressure, 60 Hz	2 kW			2.6 kW
Noise level, max.	65 dB (A)			69 dB (A)
Continuous inlet flow, max.	150 slm			100 slm
Pumping speed at 60 Hz	160 m ³ /h			1200 m ³ /h
Typical ultimate pressure, 60 Hz	2 · 10 ⁻² hPa			5 · 10 ⁻⁴ hPa
Typical ultimate pressure with N ₂ purge, 60 Hz	1 · 10 ⁻¹ hPa			5 · 10 ⁻³ hPa
Volume size, max.	50 m ³			50 m ³

Accessories				
Hand held remote display, 1.5 m cable	119988S			119988S
Hand Held Remote control	110942			110942
Cable for hand held remote display, 15 m	107079			107079
Seismic brackets kit	A328947			A328947

Order number guide A3H series

A3H	a	b	C	c	d	e	f	g	h	i	j	O
Product	Pump model	Application	Customer specific	Temperature Control	Power supply	Water & N ₂ Quick connects	Exhaust	Inlet flange	Roots By-pass	Purge line	ADK specific	Reserved
A203H	A	1 4 7	C	S	X	X	1	0	0	1	0	0
A308H	B	1 3 4 5	C	S L S S	X	X	1 0 1 1	1	1 1 2	1	0	0
A1503H	C	1 3 5 7	C	S or H L H S or H	X	X	1 0 1 1	1	1 1 2 1	1 1 1 1	0	0
A1803H	D	1 3 4 7	C	S or H L S or H or L S or H	X	X	1 0 1 1	1 or 2	1	1	0 or 1	0

HHR SD (Hand-held Remote Data Record) included

ELT versions includes frequency converter on Roots (all models) & intermediate heat exchanger (A 1503 H & A 1803 H only) / No Exhaust Heater

EHT version includes Hot roots kit (A 1503 H & A 1803 H)

Appendix: Ordering guide A3H – Notes on Digits

b – Applications

- **1:** Standard
- **3:** Standard cold
- **4:** Large volumes
- **5:** High flows
- **7:** Standard 60 Hz

c – Temperature Control

- **S:** Standard version (STD) – Exhaust heater
- **L:** Extended low temperature version (ELT) Roots/FB heat exchanger (A 1503 H & A 1803 H) No exhaust heater
- **H:** Extended high temperature version: Hot Roots Kit (A 1503 H & A 1803 H) Exhaust heater

e – Water & N₂ Quick connects

- **Material:** applies to both Water & N₂ Quick Connect – Brass or Stainless Steel
- **Size:** 1/4" NPT or 3/8" NPT

f – Exhaust

- **0:** Without check-valve
- **1:** With Check-valve (standard configuration)

h – Roots By-Pass

- **1:** Standard by-pass – For most of the applications
- **2:** Blocked by-pass – For specific powdery applications or high H₂ flows applications

j – ADK specific

- **1:** With – for 2nd Roots pumps interface cable

Order number matrix
A3H series

Order number

A3H a b C c d e f g h i j 0

Pump model	a
A 203 H	A
A 308 H	B
A 1503 H	C
A 1803 H	D

Application	b
Standard	1
Standard cold	3
Large volume	4
High flows	5
Standard 60Hz	7

Temperature control	c
Standard version (STD)	S
Extended low temperature (ELT)	L
Extended high temperature (EHT)	H

Power supply	d
200-208 V 60 Hz	1
380-400 V 50 Hz	3
415 V 50 Hz	4
460 V 60 Hz	5
480 V 60 Hz	6
200-208 V 50 Hz	7

Water & N2 / Quick connects	e
Brass 1/4" NPT	1
Stainless steel 1/4" NPT	2
Brass 3/8" NPT	3
Stainless steel 3/8" NPT	4

Exhaust	f
Without check valve	0
With check valve	1

Inlet flange	g
DN 50	0
DN 100	1
DN 160	2

Roots By-pass	h
NA	0
Standard	1
Blocked	2

Purge line	i
Standard	1

ADK specific	j
Without	0
With	1

Multi-stage Roots pumps

A4 series

The latest dry pump generation for the most demanding processes

Multi-stage
Roots pumps



A4 series

The new generation dry process pumps are specially developed for demanding processes in the semiconductor and coating industry. These pumps are made of sturdy materials to prevent corrosion. Their extended temperature range enables them to be perfectly adapted to the particular process and prevents deposits of particles from building up inside the pump.

Energy-efficient motors coupled with an optimized idling mode help to reduce fab operating costs. This new pump generation comes with extended monitoring options which enable the operating history of the pumps to be accessed. An early warning system for upcoming maintenance is also integrated.



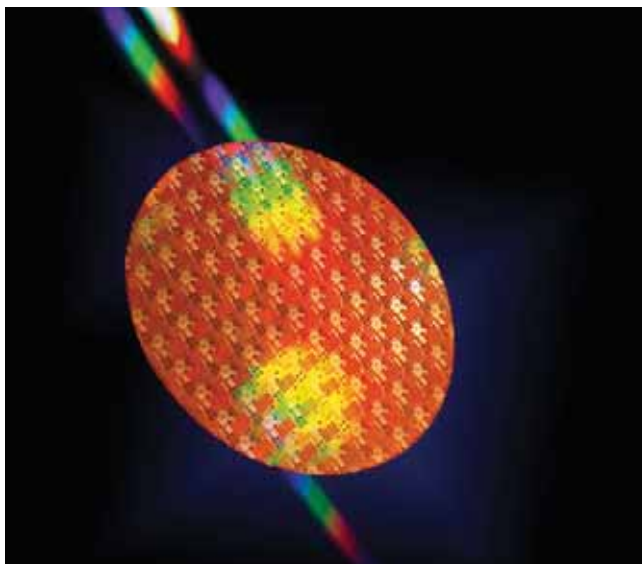
Find out more information on pumps in this series here:

Customer benefits

- Increased process resistance
- Reduced operating costs
- Extended monitoring options for detailed operating information
- Fully compatible with pumps from predecessor series

Typical applications

- Semiconductors
- Photovoltaics



Semiconductors



Photovoltaics



AD 73 KH

The new dry high-performance pump for process applications

Multi-stage
Roots pumps



AD 73 KH

The AD 73 KH pump was developed specifically for applications in demanding processes. It is distinguished particularly by its high pumping speed and low ultimate pressure. The outstanding ratio of pumping speed to energy use of the AD 73 KH is unparalleled in the market place. These pumps are tolerant to corrosion and particles and provide extensive options for adjusting them to your particular process.

Customer benefits

- Specially developed for demanding processes
- Very small footprint of less than 1 m²
- Low energy consumption
- Reliable due to its anticorrosion and particle handling capability
- Enhanced safety due to a static strength of all internal components of 20 bar

Typical applications

- Photovoltaics
- Semiconductors
- Flat screen production



Photovoltaics



Semiconductors



Flat screen production

Roots pumps

For all low and medium vacuum applications



Contents

Roots pumps

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Okta 500 / M	222
Okta 1000 / M	224
Okta 2000 / M	226
Okta 4000 / M	228
Okta 6000 / M	230
Okta 8000	232
Okta 18000	234

Gas-circulation-cooled OktaLine G **236**

Okta 500 G	236
Okta 1500 G	238
Okta 4000 G	240
Okta 8000 G	242

OktaLine ATEX **244**

Okta 500 ATEX	244
Okta 1000 ATEX	246
Okta 2000 ATEX	248
Okta 4000 ATEX	250



Roots pumps

For all low and medium vacuum applications

The OktaLine series Roots pumps can be perfectly tailored to customer-specific requirements by different pumping speeds and versions. This type of pump needs a backing pump both suited to the application and designed for the gas stream.

The high-precision production technology makes it possible to achieve very high compression values, which in turn allows for maximum pumping speed at very low gas exit temperatures. Pfeiffer Vacuum Roots pumps offer low operating costs at high uptime, since electrical power and (depending on the process) a gaseous purge medium (e.g. air) are all that they require. A high cost water-cooling unit is not required. The magnet coupled version makes leaks at the shaft feedthrough a thing of the past.

Used in combination with other Roots pumps or appropriate backing pumps, Roots pumps can be adapted perfectly to any application. Pfeiffer Vacuum as the leading supplier of vacuum solutions has more than 50 years of experience in the design of customer-specific solutions.



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Features at a glance

	Connection flange (inlet)								Coating								Leak rate		Version				Page		
	DN 63	DN 100	DN 150	DN 160	DN 250	DN 300	DN 320	DN 400	250 m ³ /h	500 m ³ /h	1,000 m ³ /h	1,500 m ³ /h	2,000 m ³ /h	4,000 m ³ /h	6,000 m ³ /h	8,000 m ³ /h	18,000 m ³ /h	1 · 10 ⁻² hPa l/s	1 · 10 ⁻⁵ hPa l/s	Standard with motor	Standard without motor	Standard with motor and magnetic coupling		ATEX with motor and magnetic coupling ¹⁾	
Roots pumps																									
Convection-cooled OktaLine																									
Okta 250	■								■									■	■	■	■	■	■	■	220
Okta 500		■								■								■	■	■	■	■	■	■	222
Okta 1000				■							■							■	■	■	■	■	■	■	224
Okta 2000				■								■						■	■	■	■	■	■	■	226
Okta 4000					■								■					■	■	■	■	■	■	■	228
Okta 6000					■									■				■	■	■	■	■	■	■	230
Okta 8000						■										■		■	■	■	■	■	■	■	232
Okta 18000								■ ²⁾									■	■	■	■	■	■	■	■	234
Gas-circulation-cooled OktaLine G																									
Okta 500 G		■								■								■	■	■	■	■	■	■	236
Okta 1500 G				■								■						■	■	■	■	■	■	■	238
Okta 4000 G					■								■					■	■	■	■	■	■	■	240
Okta 8000 G						■									■			■	■	■	■	■	■	■	242
OktaLine ATEX																									
Okta 500 ATEX		■ ³⁾								■								■	■	■	■	■	■	■	244
Okta 1000 ATEX			■ ³⁾								■							■	■	■	■	■	■	■	246
Okta 2000 ATEX			■ ³⁾									■						■	■	■	■	■	■	■	248
Okta 4000 ATEX				■ ³⁾									■					■	■	■	■	■	■	■	250

¹⁾ With blocked overflow valve, ATEX in accordance with directive 94/ EC: group II, device category 3G, IIB, temperature class T3 X for ambient temperatures of + 5 °C to + 40 °C

²⁾ PN 10

³⁾ PN 16



Customer benefits

- Large pumping speed range from 145 to 27,400 m³/h
- Long life thanks to robust, compact design
- Short pumpdown time through high compression ratio and overflow valve
- Maintenance free, high operating safety and maximum availability due to the optional magnetic coupling
- Low operating costs through air cooling and optional magnetic coupling
- A cooling water unit is not required
- Pumps available in stainless steel versions upon request



Steel degassing



Vacuum drying



Electron beam welding

Available series

- Convection-cooled
- Gas-circulation-cooled
- ATEX (in accordance with Directive 94/9/EC)

The integrated overflow valve is standard in all convection-cooled pumps. This makes it possible to switch the pump on at atmospheric pressure. The pump is thus automatically protected from thermal overload. The additional pumping speed gains allow for shorter cycle times in load lock applications and time-critical processes. Monitoring with fault-prone pressure switches and slow start up with cost-intensive frequency converters is no longer needed.

Typical applications:

- Glass and foil coating
- Plasma etching
- PVD and CVD
- Vacuum metallurgy
- Space simulation
- Vacuum drying / freeze drying
- Steel degassing / secondary metallurgy
- Electron beam welding

Note:

- Additional equipment and motor voltages available upon request.
- The differential pressure at the overflow valve is based on a nominal speed at 60 Hz; for higher speeds or pressure differentials please contact the Pfeiffer Vacuum sales department.

Convection-cooled OktaLine Roots pumps for all low and medium vacuum applications

The pumping speeds of convection-cooled Roots pumps range from 145 to 27,400 m³/h. They can easily be combined and used in low and medium vacuum applications. Typical uses include industrial applications, coating, the semiconductor industry and research and development, or in chemical and process technology applications.

The gear box and bearings in our Roots pumps are separated from the gas pumping chamber. The contactless operating principle of the Roots pistons allows for technically dry operations.

A further advantage: thanks to convection cooling, installation and operating costs are significantly lower than for water-cooled pumps. The OktaLine can therefore be universally used.

The design concept for our proven Roots pumps was expanded to include magnetic couplings. These hermetically sealed pumps in the OktaLine M series mean that critical gases such as helium can be pumped without any problem and operating costs are minimized as the system works without a shaft feedthrough.



OktaLine



Space simulation



OktaLine M magnetic coupling



OktaLine G

OktaLine G gas-circulation-cooled Roots pumps. High differential pressures with lower power consumption

High pressure ranges and maximum differential pressures, in continuous operation up to 870 hPa, are ideal operating conditions for gas-circulation-cooled Roots pumps in the OktaLine G series.

At various power ratings from 5.5 kW up to a nominal rating of 200 kW, a pumping speed of 210 to 12,000 m³/h can be achieved. Gas-circulation-cooled Roots pumps can be operated without backing pumps.

Thanks to the frequency converter, energy use can be significantly reduced. Pumping speeds can be precisely adjusted. Gas-circulation-cooled Roots pumps are characterized by maximum reproducibility in process technologies and significantly lower operating costs compared to vacuum process pumps, such as injectors or liquid ring pumps.

Used as stand-alone pumps, they can be used in the pressure range from 130 to 1,013 hPa. Connecting two of these pumps in series enables the ultimate pressure to be reduced to 20 to 30 hPa. In combination with further Roots pumps the possible ultimate pressure can be reduced to the medium vacuum range. The motors and gas coolers needed for operation are both designed to meet process-specific requirements. In combination with Roots pumps it is possible in many cases to dispense with a pumping stage by using the OktaLine G, which saves money and significantly increases operating reliability. Other specific parts such as couplings, temperature sensors, spray equipment and base frames are available as optional components.



Vacuum furnaces

OktaLine ATEX – For processes in explosion hazardous environments or for the evacuation of explosive gases

The pumps were developed in compliance with the ATEX directive and meet the highest explosion protection standards.

- The instructions in the operating manual must be followed when operating the pump. Please contact our technical department for additional support for your particular application.
- Outdoors: The pumps are suitable for use in device group II. Device category 3(G) for gases and vapors in explosion groups IIA and IIB in temperature class T3 according to the requirements of Directive 94/9/EC.
- Indoors: The pumps are suitable for conveying explosive mixtures in explosion groups IIA and IIB from Zone 2 (device category 3(G)) in temperature class T3 in accordance with Directive 94/9/EC.
- When the intervals for inspection, maintenance or review given in the operating manual are exceeded, or if repair, review, maintenance or inspection work is not performed properly then all guarantee and liability claims against Pfeiffer Vacuum shall be void. This shall also apply to the use of non-original Pfeiffer Vacuum replacement parts.

All ATEX pumps are hermetically sealed due to the magnetic coupling.

- Graphite cast iron, flange connection dimensions in accordance with DIN/EN 1092 PN 16



OktaLine ATEX



Chemical plants

Okta 250



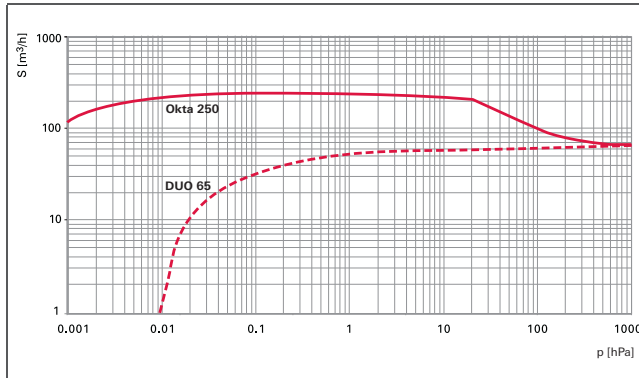
Roots pumps with a pumping speed from 145 to 440 m³/h:

- High-performance Roots pump with a pumping speed of 145 to 440 m³/h
- With 3-phase motor, IE2
- No thermal overload thanks to integral overflow valve
- For applications in the low and medium vacuum

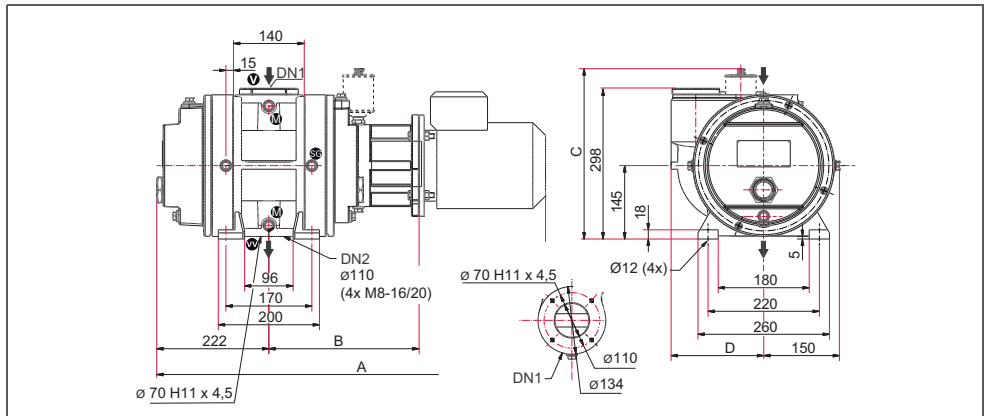
Okta = Standard pumps with radial shaft sealing rings, housing parts made of gray cast iron or nodular graphite cast iron, flange connection in accordance with ISO-F

Okta M = Standard pumps, hermetically sealed thanks to magnetic coupling, housing parts made of gray cast iron nodular graphite cast iron, flange connection in accordance with ISO-F

Pumping speed



Dimensions (in mm)



	Okta 250, Roots pump, 230/400 V, 50 Hz; 265/460 V, 60 Hz	Okta 250, Roots pump without motor	Okta 250 M, Roots pump, 230/400 V, 50 Hz; 265/460 V, 60 Hz
A	769 mm	-	799 mm
B	297 mm	297 mm	327 mm
C	337 mm	337 mm	298 mm
D	183 mm	183 mm	183 mm
Connections			
DN 1	DN 63 ISO-F	DN 63 ISO-F	DN 63 ISO-F
DN 2	DN 63 ISO-F	DN 63 ISO-F	DN 63 ISO-F

Technical data	Okta 250, Roots pump, 230/400 V, 50 Hz; 265/460 V, 60 Hz	Okta 250, Roots pump without motor	Okta 250 M, Roots pump, 230/400 V, 50 Hz; 265/460 V, 60 Hz
Flange (out)	DN 63 ISO-F	DN 63 ISO-F	DN 63 ISO-F
Flange (in)	DN 63 ISO-F	DN 63 ISO-F	DN 63 ISO-F
Version	Standard with motor	Standard without motor	Standard with motor and magnetic coupling
Operating fluid	P3	P3	P3
Operating fluid filling	1.5 l	1.5 l	1.5 l
Differential pressure at the overflow valve	75 hPa	75 hPa	75 hPa
Rotation speed	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹
Rotation speed max.	4500 min ⁻¹	4500 min ⁻¹	4500 min ⁻¹
Rotation speed min.	1500 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	75 dB (A)	75 dB (A)	75 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	70 dB (A)	70 dB (A)	70 dB (A)
Weight: with motor	95 kg		122 kg
Weight: without motor		85 kg	
Cooling method, standard	Air	Air	Air
Leak rate	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻⁶ Pa m ³ /s
Motor protection	3TF		3TF
Nominal rotation speed at 50 Hz	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹
Rated power 50 Hz	0.75 kW		0.75 kW
Rated power 60 Hz	0.90 kW		0.90 kW
Nominal pumping speed	145-440 m ³ /h	145-440 m ³ /h	145-440 m ³ /h
Nominal pumping speed at 50 Hz	290 m ³ /h	290 m ³ /h	290 m ³ /h
Nominal pumping speed at 60 Hz	350 m ³ /h	350 m ³ /h	350 m ³ /h
Mains requirement: voltage 50 Hz	230/400 V		230/400 V
Mains requirement: voltage 60 Hz	265/460 V		265/460 V
Protection category	IP 55	IP 55	IP 55
Ambient temperature	5-40 °C	5-40 °C	5-40 °C

Order number			
Okta 250	PP W21 000	PP W21 001	PP W22 000

Accessories			
Splinter shield for Okta 250 / 250 M	PK 300 010 -X	PK 300 010 -X	PK 300 010 -X

Okta 500



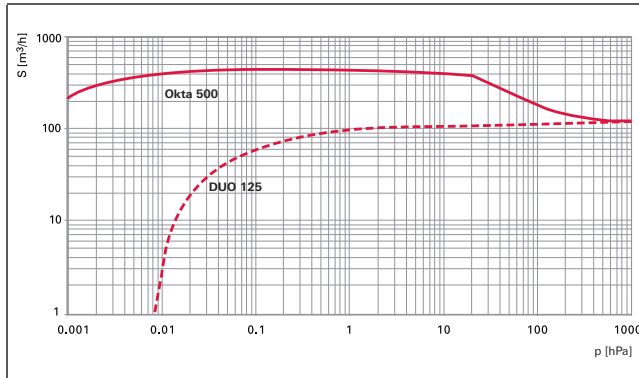
Roots pumps with a pumping speed of 280 to 840 m³/h:

- High-performance Roots pump with a pumping speed of 280 to 840 m³/h
- With 3-phase motor, IE2
- No thermal overload thanks to integral overflow valve
- For applications in the low and medium vacuum

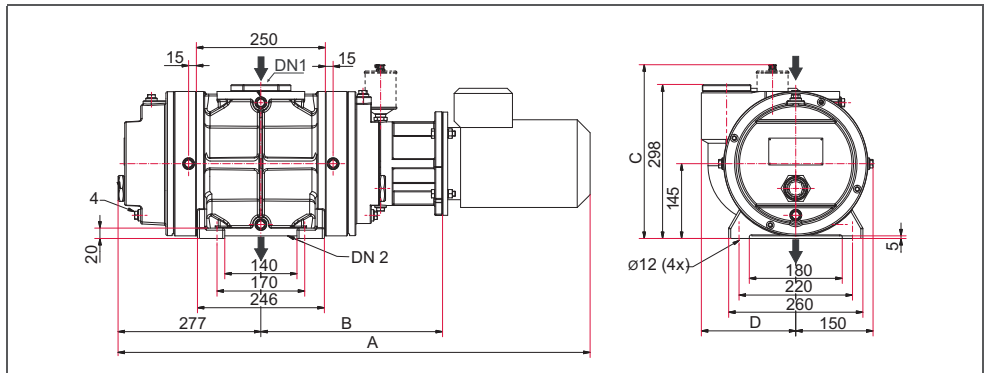
Okta = Standard pumps with radial shaft sealing rings, housing parts made of gray cast iron or nodular graphite cast iron, flange connection in accordance with ISO-F

Okta M = Standard pumps, hermetically sealed thanks to magnetic coupling, housing parts made of gray cast iron or nodular graphite cast iron, flange connection in accordance with ISO-F

Pumping speed



Dimensions (in mm)



	Okta 500, Roots pump, 230/400 V, 50 Hz ; 265/460 V, 60 Hz	Okta 500, Roots pump without motor	Okta 500 M, Roots pump, 230/400 V, 50 Hz ; 265/460 V, 60 Hz
A	915 mm	-	950 mm
B	352 mm	352 mm	382 mm
C	337 mm	337 mm	298 mm
D	183 mm	183 mm	183 mm
Connections			
DN 1	DN 100 ISO-F	DN 100 ISO-F	DN 100 ISO-F
DN 2	DN 100 ISO-F	DN 100 ISO-F	DN 100 ISO-F

Technical data	Okta 500, Roots pump, 230/400 V, 50 Hz ; 265/460 V, 60 Hz	Okta 500, Roots pump without motor	Okta 500 M, Roots pump, 230/400 V, 50 Hz ; 265/460 V, 60 Hz
Flange (out)	DN 100 ISO-F	DN 100 ISO-F	DN 100 ISO-F
Flange (in)	DN 100 ISO-F	DN 100 ISO-F	DN 100 ISO-F
Version	Standard with motor	Standard without motor	Standard with motor and magnetic coupling
Operating fluid	P3	P3	P3
Operating fluid filling	1.5 l	1.5 l	1.5 l
Differential pressure at the overflow valve	75 hPa	75 hPa	75 hPa
Rotation speed	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹
Rotation speed max.	4500 min ⁻¹	4500 min ⁻¹	4500 min ⁻¹
Rotation speed min.	1500 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	75 dB (A)	75 dB (A)	75 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	70 dB (A)	70 dB (A)	70 dB (A)
Weight: with motor	132 kg		145 kg
Weight: without motor		115 kg	
Cooling method, standard	Air	Air	Air
Leak rate	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻⁶ Pa m ³ /s
Motor protection	3TF		3TF
Nominal rotation speed at 50 Hz	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹
Rated power 50 Hz	1.5 kW		1.5 kW
Rated power 60 Hz	1.8 kW		1.8 kW
Nominal pumping speed	280-840 m ³ /h	280-840 m ³ /h	280-840 m ³ /h
Nominal pumping speed at 50 Hz	560 m ³ /h	560 m ³ /h	560 m ³ /h
Nominal pumping speed at 60 Hz	670 m ³ /h	670 m ³ /h	670 m ³ /h
Mains requirement: voltage 50 Hz	230/400 V		230/400 V
Mains requirement: voltage 60 Hz	265/460 V		265/460 V
Protection category	IP 55	IP 55	IP 55
Ambient temperature	5-40 °C	5-40 °C	5-40 °C

Order number			
Okta 500	PP W31 000	PP W31 001	PP W32 000

Accessories			
Splinter shield for Okta 500 / 500 M / 500 G	PP 030 149 AX	PP 030 149 AX	PP 030 149 AX

Okta 1000



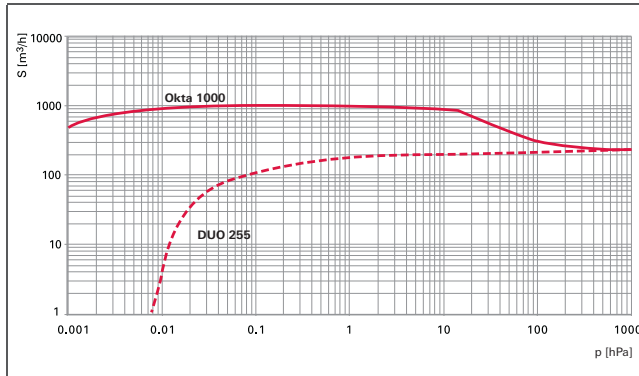
Roots pump with a pumping speed of 590 to 1775 m³/h:

- High-performance Roots pump with a pumping speed of 590 to 1775 m³/h
- For mains voltage: 230/400 V, 50 Hz respectively 265/460 V, 60 Hz
- No thermal overload thanks to integral overflow valve
- For applications in the low and medium vacuum

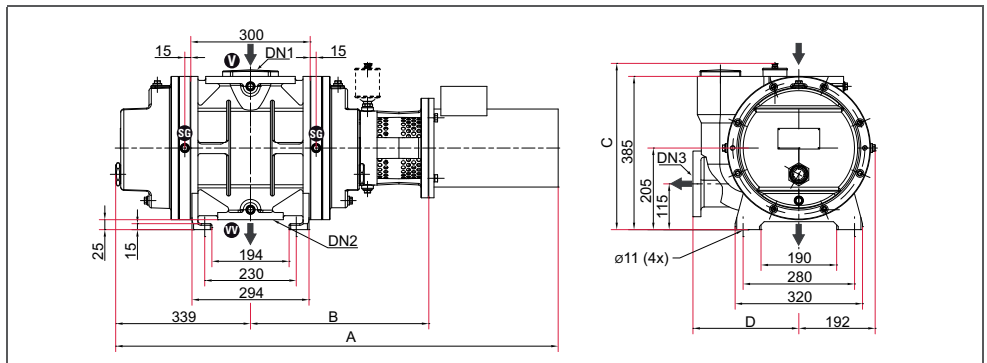
Okta = Standard pumps with radial shaft sealing rings, housing parts made of gray cast iron or nodular graphite cast iron, flange connection in accordance with ISO-F

Okta = Standard pumps, hermetically sealed thanks to magnetic coupling, housing parts made of gray cast iron or nodular graphite cast iron, flange connection in accordance with ISO-F

Pumping speed



Dimensions (in mm)



	Okta 1000, Roots pump, 230/400 V, 50 Hz ; 265/460 V, 60 Hz	Okta 1000, Roots pump without motor	Okta 1000 M, Roots pump, 230/400 V, 50 Hz ; 265/460, 60 Hz
A	1112 mm	-	1125 mm
B	448 mm	448 mm	461 mm
C	418 mm	418 mm	402 mm
D	266 mm	266 mm	266 mm
Connections			
DN 1	DN 160 ISO-F	DN 160 ISO-F	DN 160 ISO-F
DN 2	DN 100 ISO-F	DN 100 ISO-F	DN 100 ISO-F
DN 3	DN 100 ISO-F	DN 100 ISO-F	DN 100 ISO-F

Technical data	Okta 1000, Roots pump, 230/400 V, 50 Hz ; 265/460 V, 60 Hz	Okta 1000, Roots pump without motor	Okta 1000 M, Roots pump, 230/400 V, 50 Hz ; 265/460, 60 Hz
Flange (out)	DN 100 ISO-F	DN 100 ISO-F	DN 100 ISO-F
Flange (in)	DN 160 ISO-F	DN 160 ISO-F	DN 160 ISO-F
Version	Standard with motor	Standard without motor	Standard with motor and magnetic coupling
Operating fluid	P3	P3	P3
Operating fluid filling	2.9 l	2.9 l	2.9 l
Differential pressure at the overflow valve	45 hPa	45 hPa	45 hPa
Rotation speed	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹
Rotation speed max.	4500 min ⁻¹	4500 min ⁻¹	4500 min ⁻¹
Rotation speed min.	1500 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	75 dB (A)	75 dB (A)	75 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	72 dB (A)	72 dB (A)	72 dB (A)
Weight: with motor	240 kg		265 kg
Weight: without motor		215 kg	
Cooling method, standard	Air	Air	Air
Leak rate	1 · 10 ⁻³ Pa m ³ /s	< 1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻⁶ Pa m ³ /s
Motor protection	3TF		3TF
Nominal rotation speed at 50 Hz	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹
Rated power 50 Hz	3.0 kW		3.0 kW
Rated power 60 Hz	3.5 kW		3.5 kW
Nominal pumping speed	590-1775 m ³ /h	590-1775 m ³ /h	590-1775 m ³ /h
Nominal pumping speed at 50 Hz	1180 m ³ /h	1180 m ³ /h	1180 m ³ /h
Nominal pumping speed at 60 Hz	1420 m ³ /h	1420 m ³ /h	1420 m ³ /h
Mains requirement: voltage 50 Hz	230/400 V		230/400 V
Mains requirement: voltage 60 Hz	265/460 V		265/460 V
Protection category	IP 55	IP 55	IP 55
Ambient temperature	5-40 °C	5-40 °C	5-40 °C

Order number			
Okta 1000	PP W41 000	PP W41 001	PP W42 000

Accessories			
Splinter shield for Okta 1000 / 1000 M / 1500 G / 2000 / 2000 M	PP 031 114 -X	PP 031 114 -X	PP 031 114 -X

Okta 2000



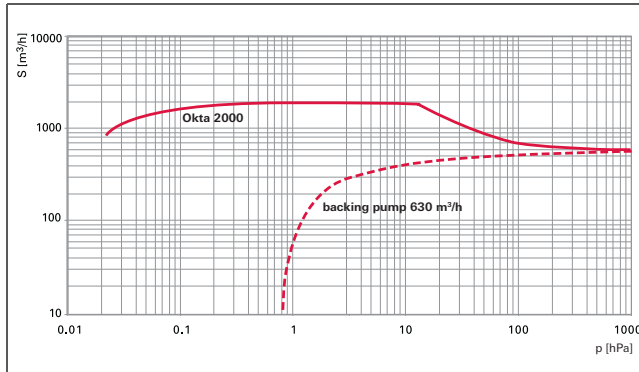
Roots pump with a pumping speed of 1075 to 3230 m³/h:

- High-performance Roots pump with a pumping speed of 1075 to 3230 m³/h
- For mains voltage: 230/400 V, 50 Hz respectively 265/460 V, 60 Hz
- No thermal overload thanks to integral overflow valve
- For applications in the low and medium vacuum

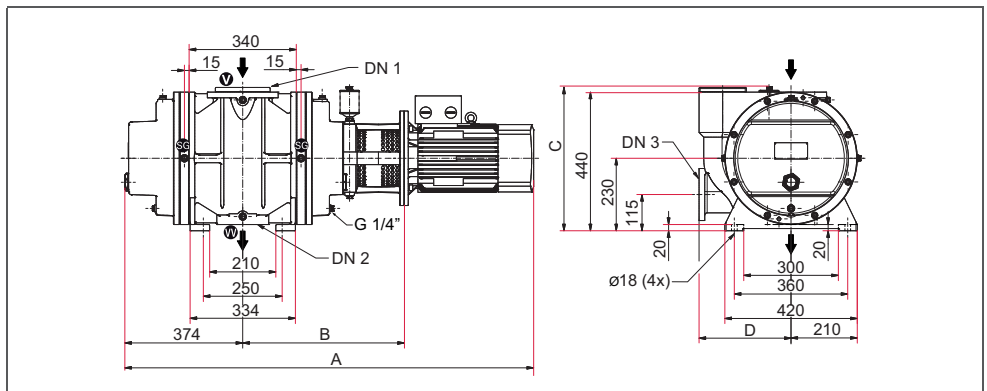
Okta = Standard pumps with radial shaft sealing rings, housing parts made of gray cast iron or nodular graphite cast iron, flange connection in accordance with ISO-F

Okta M = Standard pumps, hermetically sealed thanks to magnetic coupling, housing parts made of gray cast iron nodular graphite cast iron, flange connection in accordance with ISO-F

Pumping speed



Dimensions (in mm)



	Okta 2000, Roots pump, 230/400 V, 50 Hz ; 265/460 V, 60 Hz	Okta 2000, Roots pump without motor	Okta 2000 M, Roots pump, 230/400 V, 50 Hz ; 265/460 V, 60 Hz
A	1297 mm	-	1317 mm
B	513 mm	513 mm	532 mm
C	458 mm	458 mm	458 mm
D	292 mm	292 mm	292 mm
Connections			
DN 1	DN 160 ISO-F	DN 160 ISO-F	DN 160 ISO-F
DN 2	DN 100 ISO-F	DN 100 ISO-F	DN 100 ISO-F
DN 3	DN 100 ISO-F	DN 100 ISO-F	DN 100 ISO-F

Technical data	Okta 2000, Roots pump, 230/400 V, 50 Hz ; 265/460 V, 60 Hz	Okta 2000, Roots pump without motor	Okta 2000 M, Roots pump, 230/400 V, 50 Hz ; 265/460 V, 60 Hz
Flange (out)	DN 100 ISO-F	DN 100 ISO-F	DN 100 ISO-F
Flange (in)	DN 160 ISO-F	DN 160 ISO-F	DN 160 ISO-F
Version	Standard with motor	Standard without motor	Standard with motor and magnetic coupling
Operating fluid	P3	P3	P3
Operating fluid filling	5 l	5 l	5 l
Differential pressure at the overflow valve	35 hPa	35 hPa	35 hPa
Rotation speed	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹
Rotation speed max.	4500 min ⁻¹	4500 min ⁻¹	4500 min ⁻¹
Rotation speed min.	1500 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	75 dB (A)	75 dB (A)	75 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	72 dB (A)	72 dB (A)	72 dB (A)
Weight: with motor	340 kg		360 kg
Weight: without motor		290 kg	
Cooling method, standard	Air	Air	Air
Leak rate	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻⁶ Pa m ³ /s
Motor protection	3TF		3TF
Nominal rotation speed at 50 Hz	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹
Rated power 50 Hz	5.5 kW		5.5 kW
Rated power 60 Hz	6.3 kW		6.3 kW
Nominal pumping speed	1075-3230 m ³ /h	1075-3230 m ³ /h	1075-3230 m ³ /h
Nominal pumping speed at 50 Hz	2155 m ³ /h	2155 m ³ /h	2155 m ³ /h
Nominal pumping speed at 60 Hz	2585 m ³ /h	2585 m ³ /h	2585 m ³ /h
Mains requirement: voltage 50 Hz	230/400 V		230/400 V
Mains requirement: voltage 60 Hz	265/460 V		265/460 V
Protection category	IP 55	IP 55	IP 55
Ambient temperature	5-40 °C	5-40 °C	5-40 °C

Order number			
Okta 2000	PP W61 000	PP W61 001	PP W62 000

Accessories			
Splinter shield for Okta 1000 / 1000 M / 1500 G / 2000 / 2000 M	PP 031 114 -X	PP 031 114 -X	PP 031 114 -X

Okta 4000



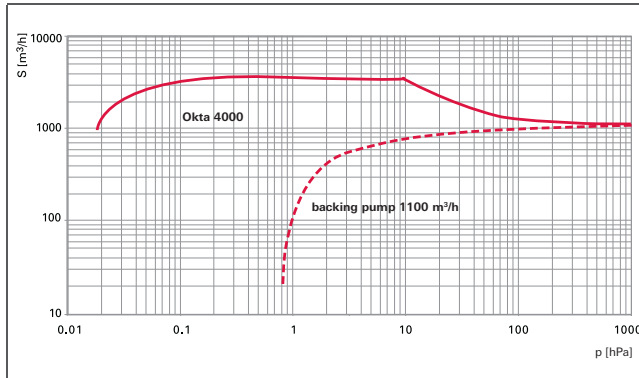
Roots pump with a pumping speed of 2160 to 6490 m³/h:

- High-performance Roots pump with a pumping speed of 2160 to 6490 m³/h
- For mains voltage: 400/690 V, 50 Hz respectively 460 V, 60 Hz
- No thermal overload thanks to integral overflow valve
- For applications in the low and medium vacuum

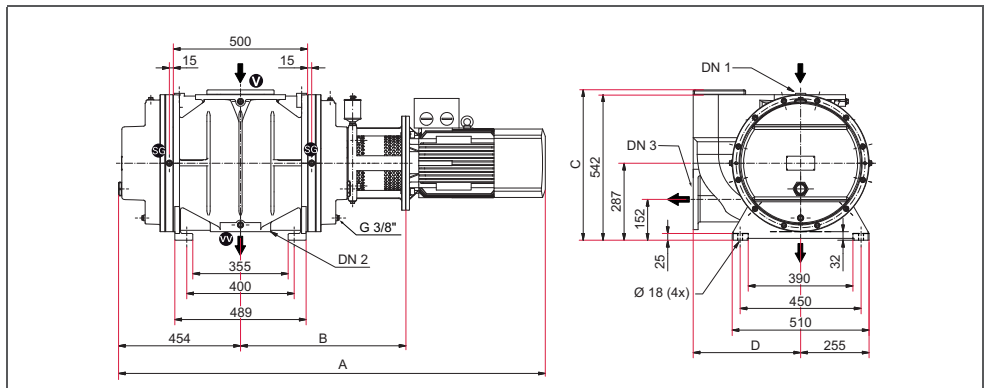
Okta = Standard pumps with radial shaft sealing rings, housing parts made of gray cast iron or nodular graphite cast iron, flange connection in accordance with ISO-F

Okta M = Standard pumps, hermetically sealed thanks to magnetic coupling, housing parts made of gray cast iron or nodular graphite cast iron, flange connection in accordance with ISO-F

Pumping speed



Dimensions (in mm)



	Okta 4000, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz	Okta 4000, Roots pump without motor	Okta 4000 M, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz
A	1589 mm	-	1651 mm
B	616 mm	616 mm	678 mm
C	560 mm	560 mm	560 mm
D	400 mm	400 mm	400 mm
Connections			
DN 1	DN 250 ISO-F	DN 250 ISO-F	DN 250 ISO-F
DN 2	DN 160 ISO-F	DN 160 ISO-F	DN 160 ISO-F
DN 3	DN 160 ISO-F	DN 160 ISO-F	DN 160 ISO-F

Technical data	Okta 4000, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz	Okta 4000, Roots pump without motor	Okta 4000 M, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz
Flange (out)	DN 160 ISO-F	DN 160 ISO-F	DN 160 ISO-F
Flange (in)	DN 250 ISO-F	DN 250 ISO-F	DN 250 ISO-F
Version	Standard with motor	Standard without motor	Standard with motor and magnetic coupling
Operating fluid	P3	P3	P3
Operating fluid filling	6.8 l	6.8 l	6.8 l
Differential pressure at the overflow valve	25 hPa	25 hPa	25 hPa
Rotation speed	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹
Rotation speed max.	4500 min ⁻¹	4500 min ⁻¹	4500 min ⁻¹
Rotation speed min.	1500 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	79 dB (A)	79 dB (A)	79 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	74 dB (A)	74 dB (A)	74 dB (A)
Weight: with motor	640 kg		655 kg
Weight: without motor		520 kg	
Cooling method, standard	Air	Air	Air
Leak rate	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻⁶ Pa m ³ /s
Motor protection	3TF		3TF
Nominal rotation speed at 50 Hz	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹
Rated power 50 Hz	11 kW		11 kW
Rated power 60 Hz	13.2 kW		13.2 kW
Nominal pumping speed	2160-6490 m ³ /h	2160-6490 m ³ /h	2160-6490 m ³ /h
Nominal pumping speed at 50 Hz	4325 m ³ /h	4325 m ³ /h	4325 m ³ /h
Nominal pumping speed at 60 Hz	5190 m ³ /h	5190 m ³ /h	5190 m ³ /h
Mains requirement: voltage 50 Hz	400/690 V		400/690 V
Mains requirement: voltage 60 Hz	460 V		460 V
Protection category	IP 55	IP 55	IP 55
Ambient temperature	5-40 °C	5-40 °C	5-40 °C

Order number			
Okta 4000	PP W71 000	PP W71 001	PP W72 000

Accessories			
Splinter shield for Okta 4000 / 4000 M / 4000 G / 6000 / 6000 M	PP 031 136 -X	PP 031 136 -X	PP 031 136 -X

Okta 6000



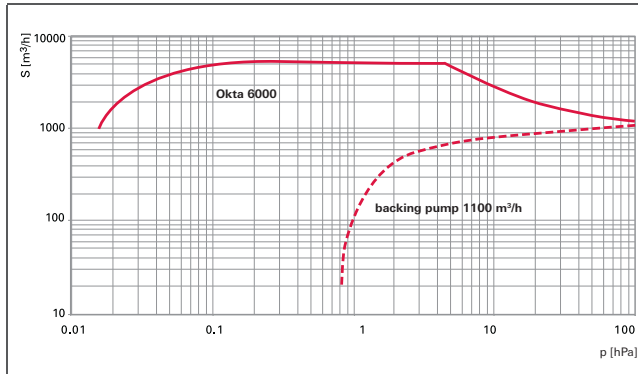
Roots pump with a pumping speed of 3240 to 9730 m³/h:

- High-performance Roots pump with a pumping speed of 3240 to 9730 m³/h
- For mains voltage: 400 V, 50 Hz respectively 460 V, 60 Hz
- No thermal overload thanks to integral overflow valve
- For applications in the low and medium vacuum

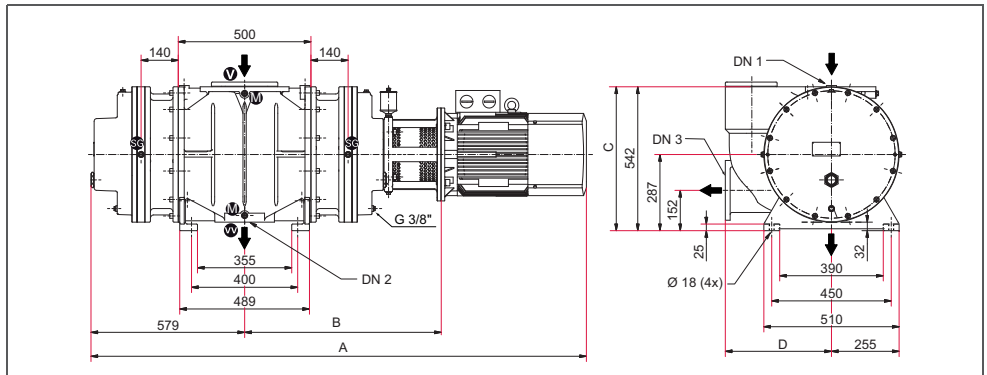
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Okta M = Standard pumps, hermetically sealed thanks to magnetic coupling, housing parts made of gray cast iron or nodular graphite cast iron, flange connection in accordance with ISO-F

Pumping speed



Dimensions (in mm)



	Okta 6000, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz	Okta 6000, Roots pump without motor	Okta 6000 M, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz
A	1867 mm	-	1954 mm
B	741 mm	655 mm	828 mm
C	560 mm	510 mm	560 mm
D	400 mm	390 mm	400 mm
Connections			
DN 1	DN 250 ISO-F	DN 250 ISO-F	DN 250 ISO-F
DN 2	DN 160 ISO-F	DN 160 ISO-F	DN 160 ISO-F
DN 3	DN 160 ISO-F	DN 160 ISO-F	DN 160 ISO-F

Technical data	Okta 6000, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz	Okta 6000, Roots pump without motor	Okta 6000 M, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz
Flange (out)	DN 160 ISO-F	DN 160 ISO-F	DN 160 ISO-F
Flange (in)	DN 250 ISO-F	DN 250 ISO-F	DN 250 ISO-F
Version	Standard with motor	Standard without motor	Standard with motor and magnetic coupling
Operating fluid	P3	P3	P3
Operating fluid filling	6.8 l	6.8 l	6.8 l
Differential pressure at the overflow valve	20 hPa	20 hPa	20 hPa
Rotation speed	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹	from 1500 to 4500 min ⁻¹
Rotation speed max.	4500 min ⁻¹	4500 min ⁻¹	4500 min ⁻¹
Rotation speed min.	1500 min ⁻¹	1500 min ⁻¹	1500 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	79 dB (A)	79 dB (A)	79 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	74 dB (A)	74 dB (A)	74 dB (A)
Weight: with motor	840 kg		875 kg
Weight: without motor		715 kg	
Cooling method, standard	Air	Air	Air
Leak rate	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻⁶ Pa m ³ /s
Motor protection	3TF		3TF
Nominal rotation speed at 50 Hz	3000 min ⁻¹	3000 min ⁻¹	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹	3600 min ⁻¹	3600 min ⁻¹
Rated power 50 Hz	15.0 kW		15.0 kW
Rated power 60 Hz	18.5 kW		18.5 kW
Nominal pumping speed	3240-9730 m ³ /h	3240-9730 m ³ /h	3240-9730 m ³ /h
Nominal pumping speed at 50 Hz	6485 m ³ /h	6485 m ³ /h	6485 m ³ /h
Nominal pumping speed at 60 Hz	7785 m ³ /h	7785 m ³ /h	7785 m ³ /h
Mains requirement: voltage 50 Hz	400/690 V		400/690 V
Mains requirement: voltage 60 Hz	460 V		460 V
Protection category	IP 55	IP 55	IP 55
Ambient temperature	5-40 °C	5-40 °C	5-40 °C

Order number			
Okta 6000	PP W76 000	PP W76 001	PP W77 000

Accessories			
Splinter shield for Okta 4000 / 4000 M / 4000 G / 6000 / 6000 M	PP 031 136 -X	PP 031 136 -X	PP 031 136 -X

Okta 8000

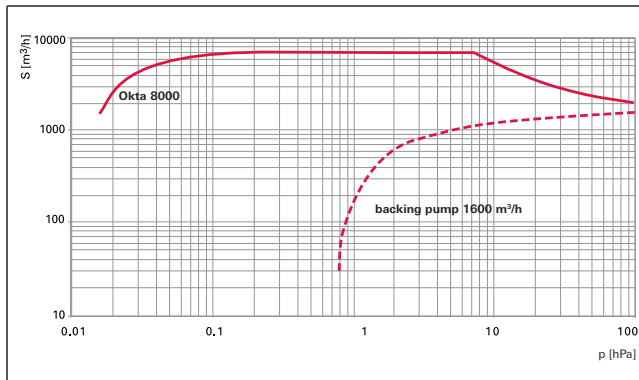


Roots pump with a pumping speed of 3350 to 12550 m³/h:

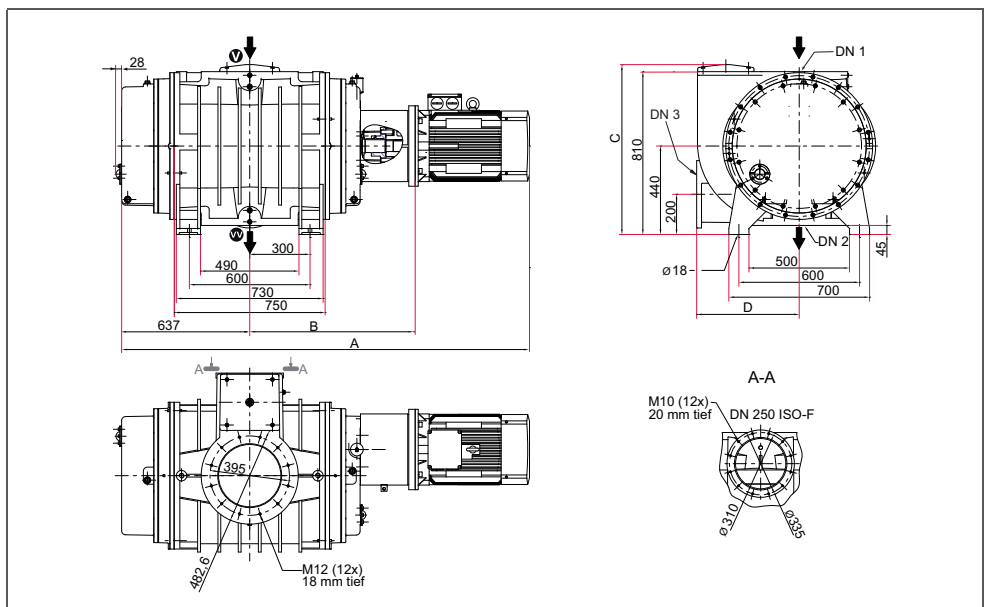
- High-performance Roots pump with a pumping speed of 3350 to 12550 m³/h
- For mains voltage: 400 V, 50 Hz respectively 400/690 V, 50 Hz
- No thermal overload thanks to integral overflow valve
- For applications in the low and medium vacuum

Okta = Standard pumps with radial shaft sealing rings, housing parts made of gray cast iron or nodular graphite cast iron, flange connection in accordance with ISO-F

Pumping speed



Dimensions (in mm)

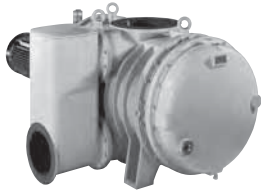


	Okta 8000, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz	Okta 8000, Roots pump without motor
A	2156 mm	-
B	791 mm	791 mm
C	845 mm	845 mm
D	510 mm	510 mm
Connections		
DN 1	DN 320 ISO-F	DN 320 ISO-F
DN 2	DN 320 ISO-F	DN 320 ISO-F
DN 3	DN 250 ISO-F	DN 250 ISO-F

Technical data	Okta 8000, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz	Okta 8000, Roots pump without motor
Flange (out)	DN 320 ISO-F	DN 320 ISO-F
Flange (in)	DN 320 ISO-F	DN 320 ISO-F
Version	Standard with motor	Standard without motor
Operating fluid	P3	P3
Operating fluid filling	21 l	21 l
Differential pressure at the overflow valve	23 hPa	23 hPa
Rotation speed	from 1200 to 2250 min ⁻¹	from 1200 to 2250 min ⁻¹
Rotation speed max.	2250 min ⁻¹	2250 min ⁻¹
Rotation speed min.	1200 min ⁻¹	1200 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	78 dB (A)	78 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	74 dB (A)	74 dB (A)
Weight: with motor	1660 kg	
Weight: without motor		1480 kg
Cooling method, standard	Air	Air
Leak rate	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻³ Pa m ³ /s
Motor protection	3TF	
Nominal rotation speed at 50 Hz	1500 min ⁻¹	1500 min ⁻¹
Nominal rotation speed at 60 Hz	1800 min ⁻¹	1800 min ⁻¹
Rated power 50 Hz	22 kW	
Rated power 60 Hz	25 kW	
Nominal pumping speed	3350-12550 m ³ /h	3350-12550 m ³ /h
Nominal pumping speed at 50 Hz	8370 m ³ /h	8370 m ³ /h
Nominal pumping speed at 60 Hz	10040 m ³ /h	10040 m ³ /h
Mains requirement: voltage 50 Hz	400/690 V	
Mains requirement: voltage 60 Hz	460 V	
Protection category	IP 55	IP 55
Ambient temperature	5-40 °C	5-40 °C
Order number		
Okta 8000	PP W80 000	PP W80 001
Accessories		
Splinter shield for Okta 8000/Okta 8000 G	PP 030 152 -X	PP 030 152 -X

Okta 18000

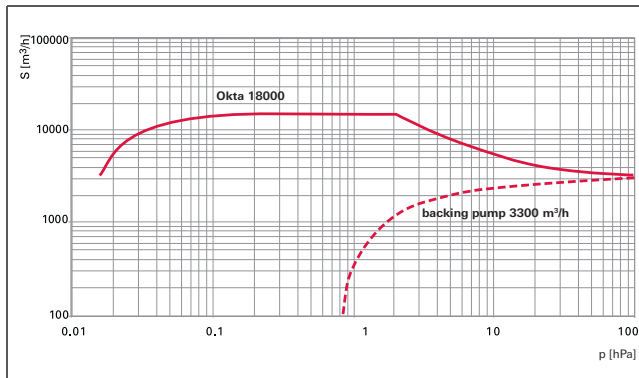
Roots pump with a pumping speed of 7310 to 27400 m³/h:



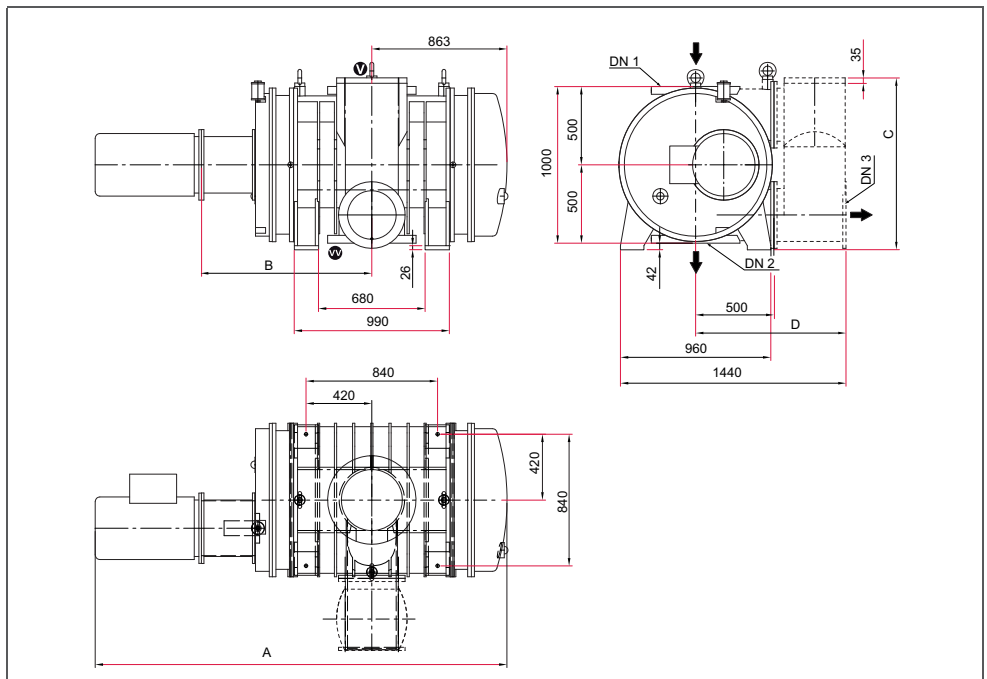
- High-performance Roots pump with a pumping speed of 7310 to 27400 m³/h
- For mains voltage: 400 V, 50 Hz respectively 460 V, 60 Hz
- No thermal overload thanks to integral overflow valve
- For applications in the low and medium vacuum

Okta = Standard pumps with radial shaft sealing rings, housing parts made of gray cast iron or nodular graphite cast iron, flange connection in accordance with ISO-F

Pumping speed



Dimensions (in mm)



	Okta 18000, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz	Okta 18000, Roots pump without motor
A	2789 mm	-
B	1090 mm	1090 mm
C	1099 mm	1099 mm
D	960 mm	960 mm
Connections		
DN 1	DN 400 PN 10	DN 400 PN 10
DN 2	DN 400 PN 10	DN 400 PN 10
DN 3	DN 320 ISO-F	DN 320 ISO-F

Technical data	Okta 18000, Roots pump, 400/690 V, 50 Hz ; 460 V, 60 Hz	Okta 18000, Roots pump without motor
Flange (out)	DN 400 PN 10	DN 400 PN 10
Flange (in)	DN 400 PN 10	DN 400 PN 10
Version	Standard with motor	Standard without motor
Operating fluid	P3	P3
Operating fluid filling	68 l	68 l
Differential pressure at the overflow valve	7 hPa	7 hPa
Rotation speed	from 1200 to 2250 min ⁻¹	from 1200 to 2250 min ⁻¹
Rotation speed max.	2250 min ⁻¹	2250 min ⁻¹
Rotation speed min.	1200 min ⁻¹	1200 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	79 dB (A)	79 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	75 dB (A)	75 dB (A)
Weight: with motor	3100 kg	
Weight: without motor		2800 kg
Cooling method, standard	Air	Air
Leak rate	1 · 10 ⁻³ Pa m ³ /s	1 · 10 ⁻³ Pa m ³ /s
Motor protection	3TF	
Nominal rotation speed at 50 Hz	1500 min ⁻¹	
Nominal rotation speed at 60 Hz	1800 min ⁻¹	
Rated power 50 Hz	45 kW	
Rated power 60 Hz	52 kW	
Nominal pumping speed	7310-27400 m ³ /h	7310-27400 m ³ /h
Nominal pumping speed at 50 Hz	18270 m ³ /h	18270 m ³ /h
Nominal pumping speed at 60 Hz	21925 m ³ /h	21925 m ³ /h
Mains requirement: voltage 50 Hz	400/690 V	
Mains requirement: voltage 60 Hz	460 V	
Protection category	IP 55	
Ambient temperature	5-40 °C	5-40 °C
Order number		
Okta 18000	PP W90 000	PP W90 001
Accessories		
Splinter shield for Okta 18000	PP 030 336 -T	PP 030 336 -T

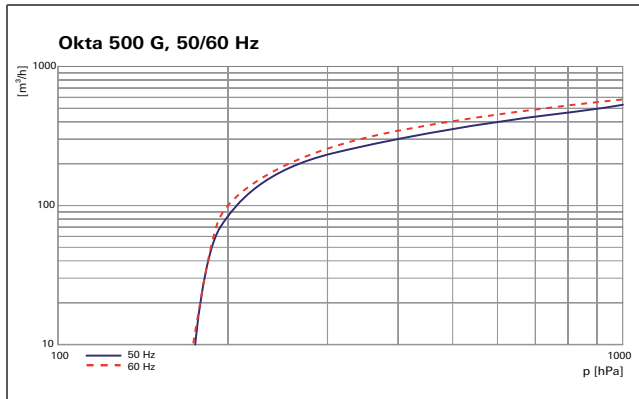
Okta 500 G

Gas-cooled Roots pump with a pumping speed range from 210 to 630 m³/h

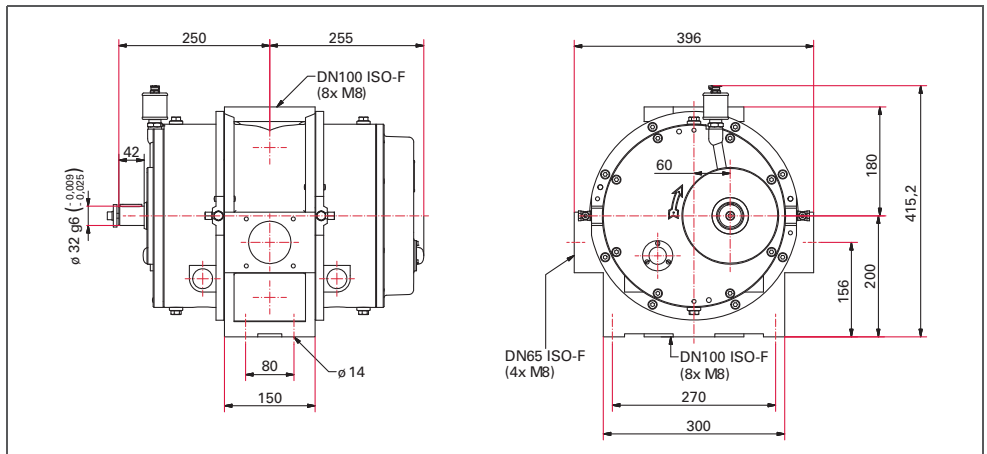


- High-performance gas cooled roots pump with a pumping speed from 210 to 630 m³/h
- For applications in the low and medium vacuum
- Single stage pressure range from 130 to 1013 hPa, in series with smaller final pressure
- Connection flange DN 100 ISO-F
- No thermal overload thanks to gas cooling
- With sealing gas connection
- Customized design and offer of a complete unit for motor, gas cooler and coupling on request

Pumping speed



Dimensions (in mm)



Technical data	Okta 500 G, gas-cooled Roots pump without motor, DN 100 ISO-F
Flange (out)	DN 100 ISO-F
Flange (in)	DN 100 ISO-F
Operating fluid	P3
Operating fluid filling	3 l
Rotation speed	from 1200 to 3600 min ⁻¹
Rotation speed max.	3600 min ⁻¹
Rotation speed min.	1200 min ⁻¹
Ultimate pressure without gas ballast	130 hPa
Weight: without motor	125 kg
Cooling method, standard	gas-cooled
Cooling gas connection	DN 63 ISO-F
Leak rate	1 · 10 ⁻³ Pa m ³ /s
Motor rating	max. 18.5 kW
Nominal rotation speed at 50 Hz	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹
Nominal pumping speed	210-630 m ³ /h
Nominal pumping speed at 50 Hz	520 m ³ /h
Nominal pumping speed at 60 Hz	630 m ³ /h
Noise level with connected exhaust line	75-105 dB (A)
Protection category	IP 55
Sealing gas	Yes
Ambient temperature	5-40 °C

Order number	
Okta 500 G	PP G30 001

Accessories	
Splinter shield for Okta 500 / 500 M / 500 G	PP 030 149 AX

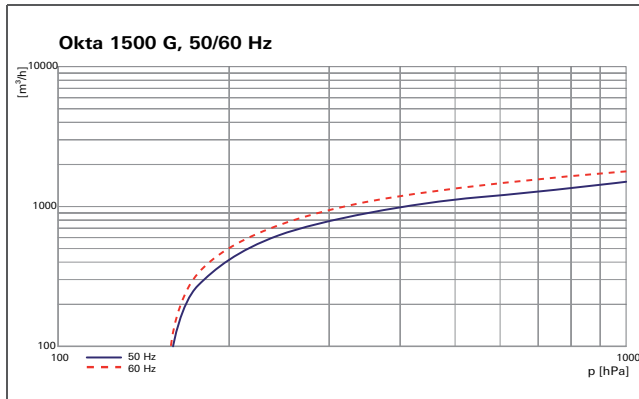
Okta 1500 G

Gas-cooled Roots pump with a pumping speed range from 750 to 3600 m³/h

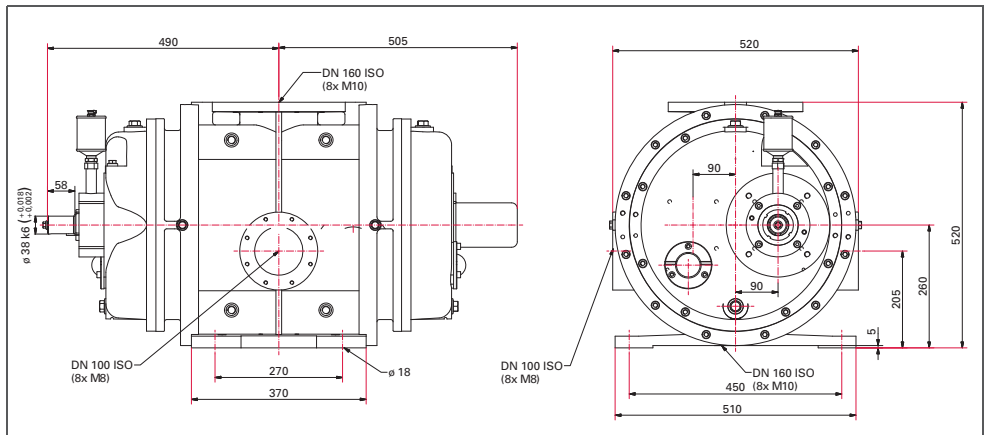


- High-performance gas cooled roots pump with a pumping speed from 750 to 3600 m³/h
- For applications in the low and medium vacuum
- Single stage pressure range from 130 to 1013 hPa, in series with smaller final pressure
- Connection flange DN 160 ISO-F
- No thermal overload thanks to gas cooling
- With sealing gas connection
- Customized design and offer for motor, gas cooler, and coupling on request

Pumping speed



Dimensions (in mm)



Technical data	Okta 1500 G, gas-cooled Roots pump without motor, DN 160 ISO-F
Flange (out)	DN 160 ISO-F
Flange (in)	DN 160 ISO-F
Operating fluid	P3
Operating fluid filling	7 l
Rotation speed	from 750 to 3600 min ⁻¹
Rotation speed max.	3600 min ⁻¹
Rotation speed min.	750 min ⁻¹
Ultimate pressure without gas ballast	130 hPa
Weight: without motor	460 kg
Cooling method, standard	gas-cooled
Cooling gas connection	DN 100 ISO-F
Leak rate	1 · 10 ⁻³ Pa m ³ /s
Motor rating	max. 2 x 30 kW
Nominal rotation speed at 50 Hz	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹
Nominal pumping speed	750-3600 m ³ /h
Nominal pumping speed at 50 Hz	1500 m ³ /h
Nominal pumping speed at 60 Hz	1800 m ³ /h
Noise level with connected exhaust line	75-105 dB (A)
Protection category	IP 55
Sealing gas	Yes
Ambient temperature	5-40 °C

Order number	
Okta 1500 G	PP G50 001

Accessories	
Splinter shield for Okta 1000 / 1000 M / 1500 G / 2000 / 2000 M	PP 031 114 -X

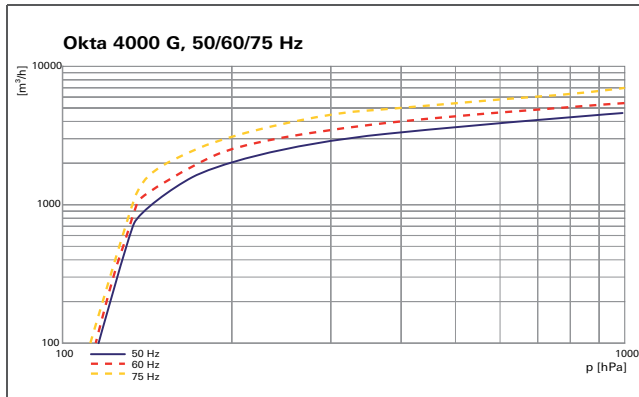
Okta 4000 G

Gas-cooled Roots pump with a pumping speed range from 2300 to 6900 m³/h

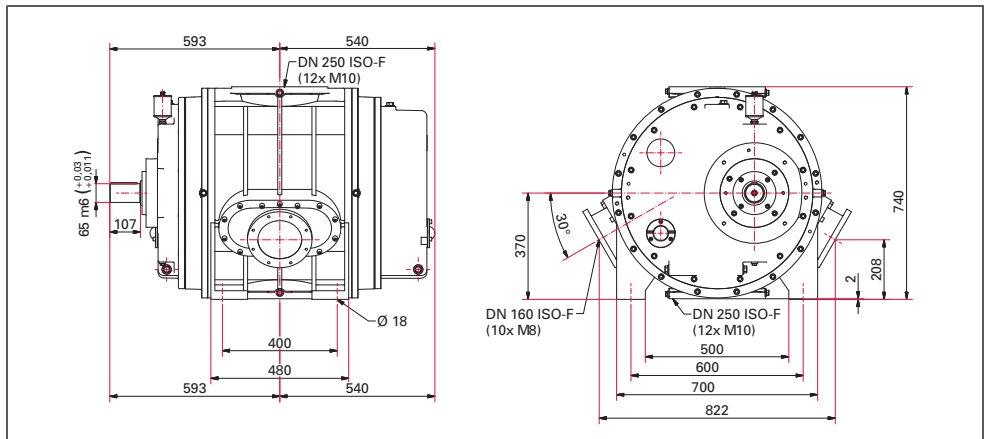


- High-performance gas cooled roots pump with a pumping speed from 2300 to 6900 m³/h
- For applications in the low and medium vacuum
- Single stage pressure range from 130 to 1013 hPa, in series with smaller final pressure
- Connection flange DN 250 ISO-F
- No thermal overload thanks to gas cooling
- With sealing gas connection
- Customized design and offer for motor, gas cooler, and coupling on request

Pumping speed



Dimensions (in mm)



Technical data	Okta 4000 G, gas-cooled Roots pump without motor, DN 250 ISO-F
Flange (out)	DN 250 ISO-F
Flange (in)	DN 250 ISO-F
Operating fluid	P3
Operating fluid filling	21 l
Rotation speed	from 750 to 2250 min ⁻¹
Rotation speed max.	2250 min ⁻¹
Rotation speed min.	750 min ⁻¹
Ultimate pressure without gas ballast	130 hPa
Weight: without motor	1150 kg
Cooling method, standard	gas-cooled
Cooling gas connection	DN 160 ISO-F
Leak rate	1 · 10 ⁻³ Pa m ³ /s
Motor rating	max. 132 kW
Nominal rotation speed at 50 Hz	1500 min ⁻¹
Nominal rotation speed at 60 Hz	1800 min ⁻¹
Nominal pumping speed	2300-6900 m ³ /h
Nominal pumping speed at 50 Hz	4600 m ³ /h
Nominal pumping speed at 60 Hz	5500 m ³ /h
Noise level with connected exhaust line	75-105 dB (A)
Protection category	IP 55
Sealing gas	Yes
Ambient temperature	5-40 °C

Order number	
Okta 4000 G	PP G70 001

Accessories	
Splinter shield for Okta 4000 / 4000 M / 4000 G / 6000 / 6000 M	PP 031 136 -X

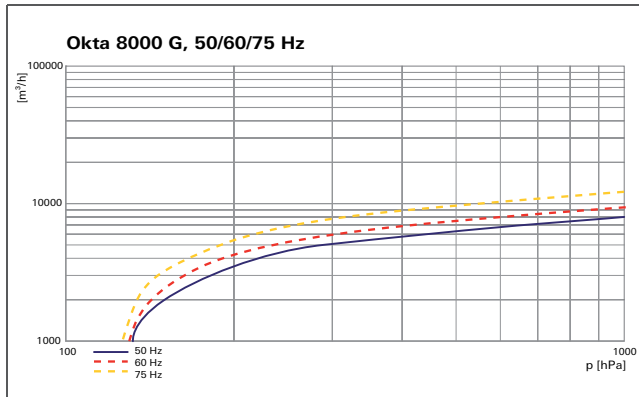
Okta 8000 G

Gas-cooled Roots pump with a pumping speed range from 4000 to 12000 m³/h

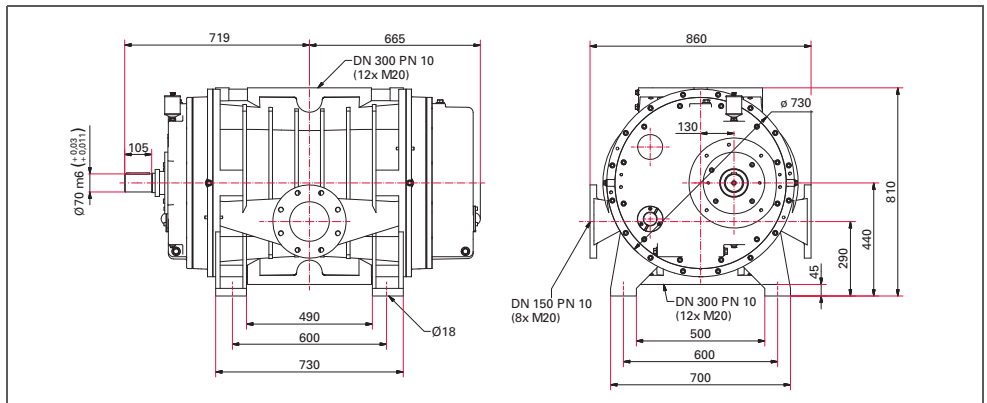


- High-performance gas cooled roots pump with a pumping speed from 4000 to 12000 m³/h
- For applications in the low and medium vacuum
- Single stage pressure range from 130 to 1013 hPa, in series with smaller final pressure
- Connection flange DN 300 PN 10
- No thermal overload thanks to gas cooling
- With sealing gas connection
- Customized design and offer for motor, gas cooler, and coupling on request

Pumping speed



Dimensions (in mm)



Technical data	Okta 8000 G, gas-cooled Roots pump without motor, DN 300 PN 10
Flange (out)	DN 300 PN 10
Flange (in)	DN 300 PN 10
Dimensions (L x W x H)	1384 x 860 x 810 mm
Operating fluid	P3
Operating fluid filling	21 l
Rotation speed	from 750 to 2250 min ⁻¹
Rotation speed max.	2250
Rotation speed min.	750
Ultimate pressure without gas ballast	130 hPa
Weight: without motor	1500 kg
Cooling method, standard	gas-cooled
Cooling gas connection	DN 150 PN 10
Leak rate	1 · 10 ⁻³ Pa m ³ /s
Motor rating	max. 200 kW
Nominal rotation speed at 50 Hz	1500 min ⁻¹
Nominal rotation speed at 60 Hz	1800 min ⁻¹
Nominal pumping speed	4000-12000 m ³ /h
Nominal pumping speed at 50 Hz	8000 m ³ /h
Nominal pumping speed at 60 Hz	9600 m ³ /h
Noise level with connected exhaust line	75-105 dB (A)
Protection category	IP 55
Sealing gas	Yes
Ambient temperature	5-40 °C

Order number	
Okta 8000 G	PP G80 001

Accessories	
Splinter shield for Okta 8000 G	PP 070 315 -U

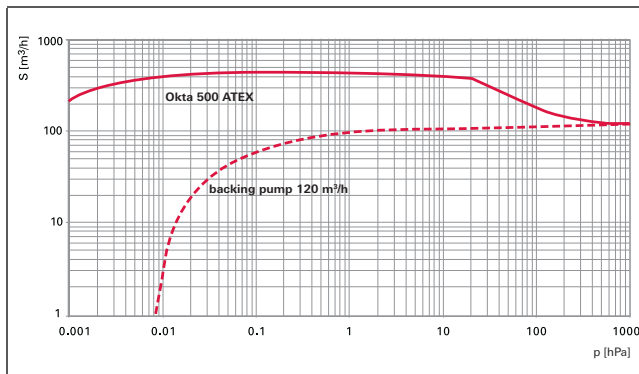
Okta 500 ATEX



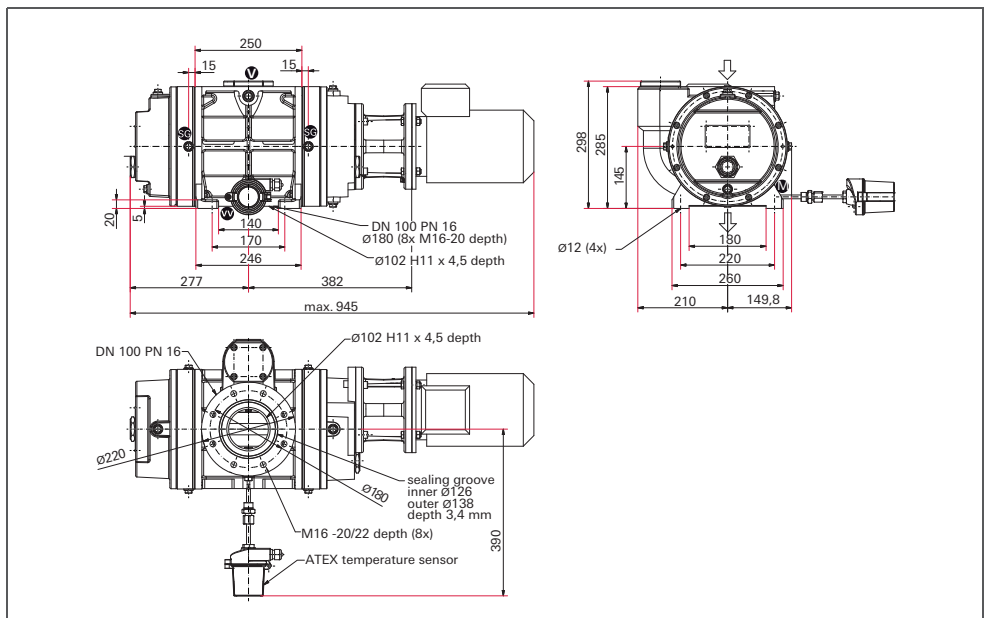
Roots pumps with a pumping speed of 280 to 670 m³/h:

- High-performance Roots pump with a pumping speed of 280 to 670 m³/h
- Hermetically sealed, through magnetic coupling, leakage rate $1 \cdot 10^{-5}$ hPa
- Pump without motor (coupling and motor lantern are included in delivery)
- Pressure-surge resistant up to 1600 kPa
- No thermal overload thanks to integrated temperature sensor
- For ATEX applications (directive 94/9/EC)

Pumping speed



Dimensions (in mm)



Technical data	Okta 500 ATEX, Roots pump, 230/400 V, 50 Hz; 265/460 V, 60 Hz
Flange (out)	DN 100 PN 16
Flange (in)	DN 100 PN 16
Version	ATEX with motor and magnetic coupling, blocked overflow-valve, ATEX according to directive 94/9/EC: group II, category 3G, equipment-group IIB, temperature class T3 $X + 5\text{ °C} \leq T_a \leq +40\text{ °C}$
Operating fluid	P3
Operating fluid filling	1.5 l
Rotation speed	from 1500 to 3600 min ⁻¹
Rotation speed max.	3600 min ⁻¹
Rotation speed min.	1500 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	75 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	70 dB (A)
Weight: with motor	154 kg
Cooling method, standard	Air
Leak rate	$1 \cdot 10^{-6}$ Pa m ³ /s
Motor protection	3TF
Nominal rotation speed at 50 Hz	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹
Rated power 50 Hz	1.5 kW
Rated power 60 Hz	1.8 kW
Nominal pumping speed	280-670 m ³ /h
Nominal pumping speed at 50 Hz	560 m ³ /h
Nominal pumping speed at 60 Hz	670 m ³ /h
Mains requirement: voltage 50 Hz	230/400 V
Mains requirement: voltage 60 Hz	265/460 V
Protection category	IP 55
Ambient temperature	5-40 °C
Order number	
Okta 500 ATEX	PP W33 300

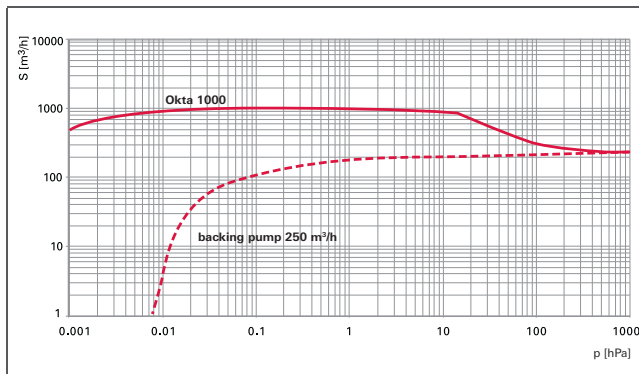
Okta 1000 ATEX

Roots pump with a pumping speed of 590 to 1420 m³/h:

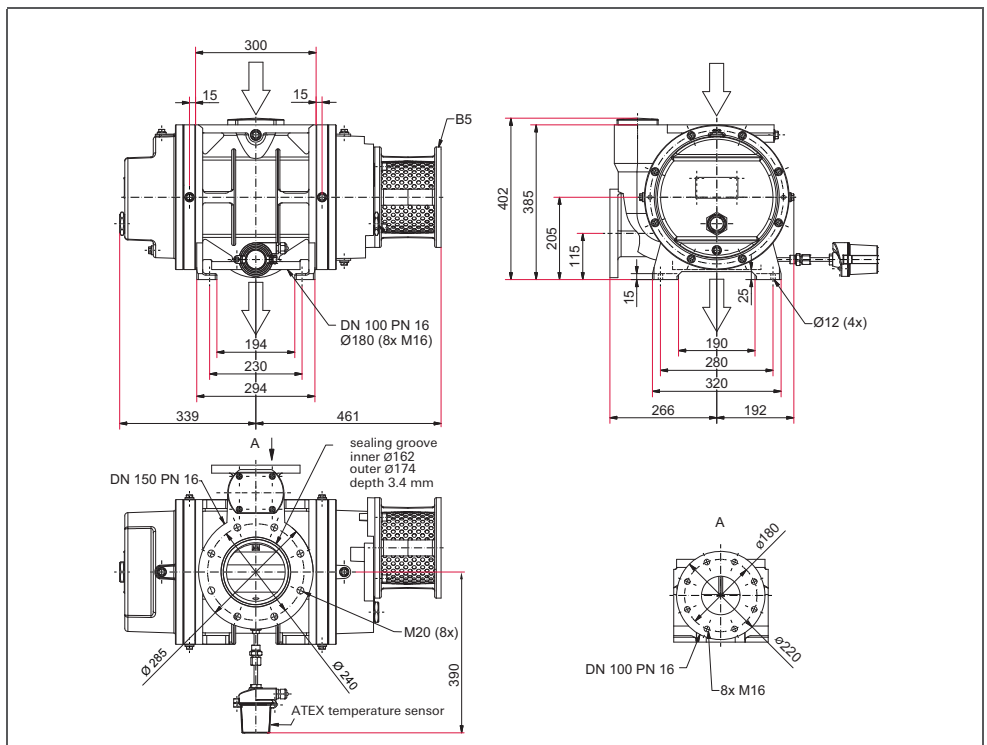


- High-performance Roots pump with a pumping speed of 590 to 1420 m³/h
- With 3-phase ATEX motor
- Hermetically sealed, through magnetic coupling, leakage rate $1 \cdot 10^{-5}$ hPa
- Pressure-surge resistant up to 1600 kPa
- No thermal overload thanks to integrated temperature sensor
- For ATEX applications (directive 94/9/EC)

Pumping speed



Dimensions (in mm)



Technical data	Okta 1000 ATEX, Roots pump, 230/400 V, 50 Hz; 265/460 V, 60 Hz
Flange (out)	DN 100 PN 16
Flange (in)	DN 150 PN 16
Version	ATEX with motor and magnetic coupling, blocked overflow-valve, ATEX according to directive 94/9/EC: group II, category 3G, equipment-group IIB, temperature class T3 $X + 5\text{ °C} \leq T_a \leq +40\text{ °C}$
Operating fluid	P3
Operating fluid filling	2.9 l
Rotation speed	from 1500 to 3600 min ⁻¹
Rotation speed max.	3600 min ⁻¹
Rotation speed min.	1500 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	75 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	72 dB (A)
Weight: with motor	255 kg
Cooling method, standard	Air
Leak rate	$1 \cdot 10^{-6}\text{ Pa m}^3/\text{s}$
Motor protection	3TF
Nominal rotation speed at 50 Hz	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹
Rated power 50 Hz	3.0 kW
Rated power 60 Hz	3.5 kW
Nominal pumping speed	590-1420 m ³ /h
Nominal pumping speed at 50 Hz	1180 m ³ /h
Nominal pumping speed at 60 Hz	1420 m ³ /h
Mains requirement: voltage 50 Hz	230/400 V
Mains requirement: voltage 60 Hz	265/460 V
Protection category	IP 55
Ambient temperature	5-40 °C
Order number	
Okta 1000 ATEX	PP W43 300

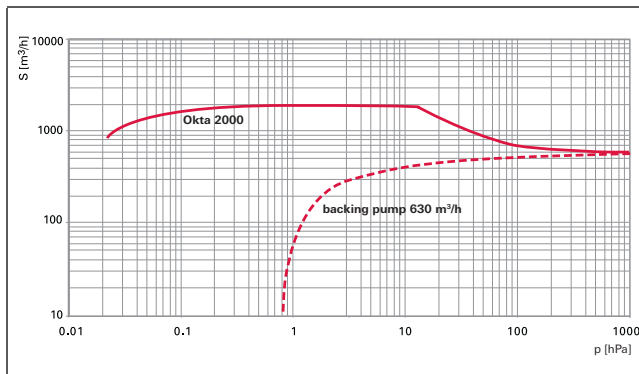
Okta 2000 ATEX

Roots pump with a pumping speed of 1080 to 2585 m³/h:

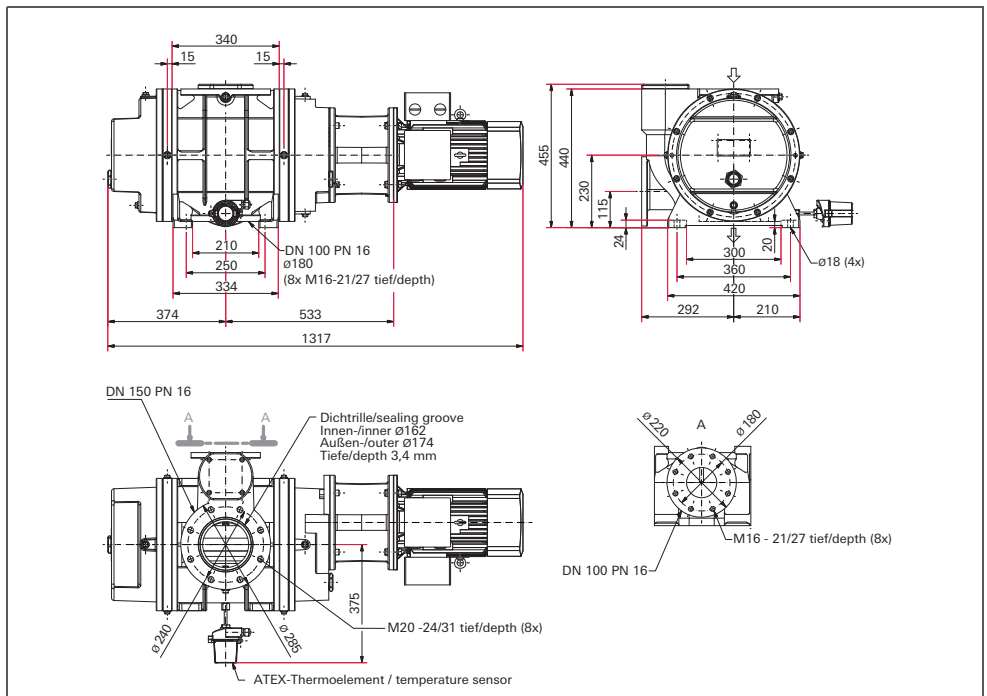


- High-performance Roots pump with a pumping speed of 1080 to 2585 m³/h
- With 3-phase ATEX motor
- Hermetically sealed, through magnetic coupling, leakage rate $1 \cdot 10^{-5}$ hPa
- Pressure-surge resistant up to 1600 kPa
- No thermal overload thanks to integrated temperature sensor
- For ATEX applications (directive 94/9/EC)

Pumping speed



Dimensions (in mm)



Technical data	Okta 2000 ATEX, Roots pump
Flange (out)	DN 100 PN 16
Flange (in)	DN 150 PN 16
Version	ATEX with motor and magnetic coupling, blocked overflow-valve, ATEX according to directive 94/9/EC: group II, category 3G, equipment-group IIB, temperature class T3 $X + 5\text{ °C} \leq T_a \leq +40\text{ °C}$
Operating fluid	P3
Operating fluid filling	5 l
Rotation speed	from 1500 to 3600 min ⁻¹
Rotation speed max.	3600 min ⁻¹
Rotation speed min.	1500 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	75 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	72 dB (A)
Weight: with motor	390 kg
Cooling method, standard	Air
Leak rate	$1 \cdot 10^{-6}$ Pa m ³ /s
Motor protection	3TF
Nominal rotation speed at 50 Hz	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹
Rated power 50 Hz	5.5 kW
Rated power 60 Hz	6.3 kW
Nominal pumping speed	1080-2585 m ³ /h
Nominal pumping speed at 50 Hz	2155 m ³ /h
Nominal pumping speed at 60 Hz	2585 m ³ /h
Mains requirement: voltage 50 Hz	230/400 V
Mains requirement: voltage 60 Hz	265/460 V
Protection category	IP 55
Ambient temperature	5-40 °C
Order number	
Okta 2000 ATEX	PP W63 300

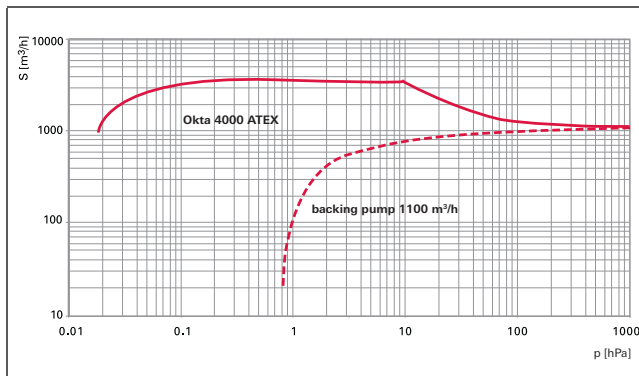
Okta 4000 ATEX

Roots pump with a pumping speed of 2160 to 5190 m³/h:

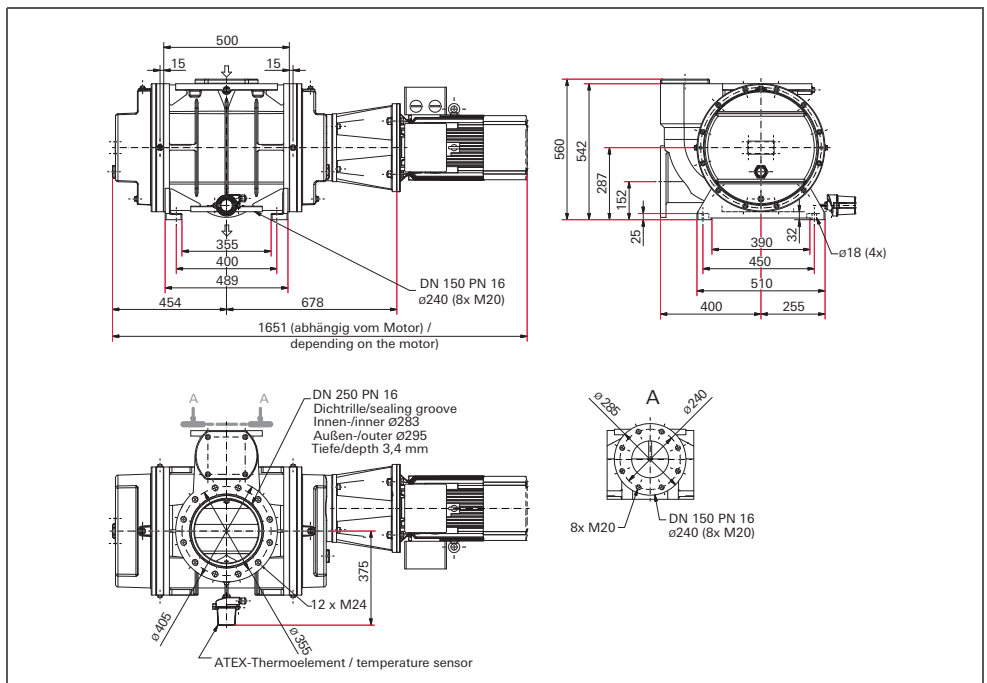


- High-performance Roots pump with a pumping speed of 2160 to 5190 m³/h
- With 3-phase ATEX motor
- Hermetically sealed, thanks to magnetic coupling, leakage rate <math> < 1 \cdot 10^{-5}</math> hPa
- Pressure-surge resistant up to 1600 kPa
- No thermal overload thanks to integrated temperature sensor
- For ATEX applications (directive 94/9/EC)

Pumping speed



Dimensions (in mm)



Technical data	Okta 4000 ATEX, Roots pump, 230/ 400 V, 50 Hz
Flange (out)	DN 150 PN 16
Flange (in)	DN 250 PN 16
Version	ATEX with motor and magnetic coupling, blocked overflow-valve, ATEX according to directive 94/9/EC: group II, category 3G, equipment-group IIB, temperature class T3 $X + 5\text{ °C} \leq T_a \leq +40\text{ °C}$
Operating fluid	P3
Operating fluid filling	7 l
Rotation speed	from 1500 to 3600 min ⁻¹
Rotation speed max.	3600 min ⁻¹
Rotation speed min.	1500 min ⁻¹
Emission sound pressure level (EN ISO 2151) at intake pressure 10 hPa	79 dB (A)
Emission sound pressure level (EN ISO 2151) at intake pressure 1 hPa	74 dB (A)
Weight: with motor	700 kg
Cooling method, standard	Air
Leak rate	$1 \cdot 10^{-6}$ Pa m ³ /s
Motor protection	3TF
Nominal rotation speed at 50 Hz	3000 min ⁻¹
Nominal rotation speed at 60 Hz	3600 min ⁻¹
Rated power 50 Hz	11 kW
Rated power 60 Hz	13 kW
Nominal pumping speed	2160-5190 m ³ /h
Nominal pumping speed at 50 Hz	4325 m ³ /h
Nominal pumping speed at 60 Hz	5190 m ³ /h
Mains requirement: voltage 50 Hz	230/400 V
Mains requirement: voltage 60 Hz	265/460 V
Protection category	IP 55
Ambient temperature	5-40 °C
Order number	
Okta 4000 ATEX	PP W73 300

Accessories

If there is a risk that solids (e.g. wealding beads, loose parts from within the pipeline) enter the pump during the operating phase, a suitable protective strainer should be used at the connection flange (inlet).

Splinter shield	
Splinter shield for Okta 250 / 250 M	PK 300 010 -X
Splinter shield for Okta 500 / 500 M / 500 G	PP 030 149 AX
Splinter shield for Okta 1000 / 1000 M / 1500 G / 2000 / 2000 M	PP 031 114 -X
Splinter shield for Okta 4000 / 4000 M / 4000 G / 6000 / 6000 M	PP 031 136 -X
Splinter shield for Okta 8000/Okta 8000 G	PP 030 152 -X
Splinter shield for Okta 18000	PP 030 336 -T
Splinter shield for Okta 8000 G	PP 070 315 -U

Operating fluid	
P3, mineral oil, 1 l	PK 001 106 -T
P3, mineral oil, 5 l	PK 001 107 -T
P3, mineral oil, 20 l	PK 001 108 -T
P3, mineral oil, 50 l	PK 001 109 -T
P3, mineral oil, 200 l	PK 001 110 -T



Roots pumping stations

Proven solutions for Roots pumping stations



What is a pumping station?

Pumping stations are combinations of individual pumps. The standard pumping stations in this chapter are composed of a Roots pump and an oil-lubricated or dry backing pump which compresses against atmospheric pressure.

Special pumping stations are two-stage or multi-stage pumping stations with different types of pumps connected in series or parallel.

The following pump types can be used:

- Single-stage and two-stage rotary vane pumps
- Dry pumps
- Roots pumps
- Turbopumps

The complete vacuum solution

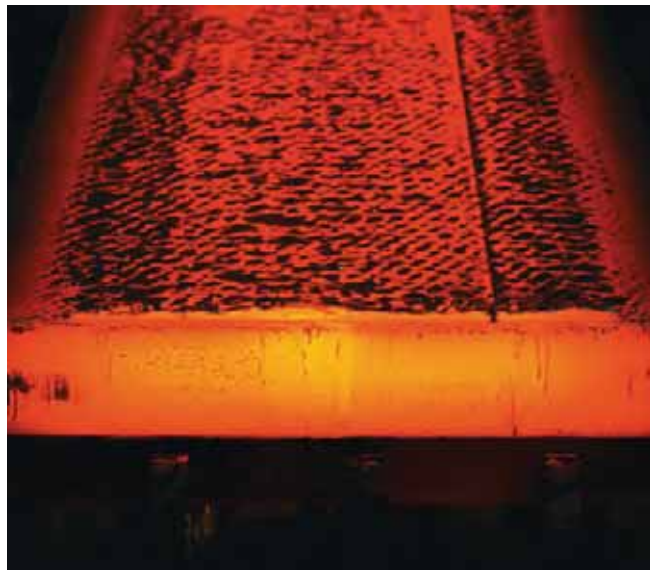
Pfeiffer Vacuum provides you with a complete customer-specific vacuum solution from a single source. Our pumping stations can be complemented with measuring and analytical devices as well as pumping station controls (SPS).

Typical applications

- Load locks and transfer chambers
- Optical coatings
- Electron beam welding
- Vacuum drying
- Metallurgy
- Wear protection
- Photovoltaics
- Space simulation



Electron beam welding



Metallurgy



Photovoltaics



CombiLine WU with UnoLine Plus



CombiLine WU with HenaLine



LRS 1



LRS 2



LRS 3

Series

Pumping stations with single-stage rotary vane pumps:

CombiLine WU with UnoLine Plus

- Pumping speeds of up to 5,000 m³/h
- Ultimate pressure of up to 2 · 10⁻³ hPa
- Air cooled (water cooling for backing pump)
- Integrated oil mist separator and oil return unit
- Components mounted on a common frame and connected up

CombiLine WU with HenaLine

- Pumping speeds of up to 5,700 m³/h
- Ultimate pressure of up to 8 · 10⁻³ hPa
- Air cooled (water cooling for backing pump optional)
- Integrated oil mist separator and oil return unit
- Components mounted on a common frame and connected up

Pumping stations with two-stage rotary vane pumps:

LRS 1

- Pumping speeds of up to 360 m³/h
- Ultimate pressure of up to 2 · 10⁻⁴ hPa
- Integrated overflow valve
- Air-cooled
- Compact

LRS 2

- Pumping speeds of up to 360 m³/h
- Ultimate pressure of up to 2 · 10⁻⁴ hPa
- Air-cooled
- Modular configuration
- Components mounted on a common frame and connected up

LRS 3

- Pumping speeds of 360 to 720 m³/h
- Ultimate pressure of up to 2 · 10⁻⁴ hPa
- Air-cooled
- Modular configuration
- Components mounted on a common frame and connected up

CombiLine WD with DuoLine

- Pumping speeds of up to 3,000 m³/h
- Ultimate pressure of up to $5 \cdot 10^{-4}$ hPa
- Integrated safety and gas ballast valve
- Complete pumping station with optional magnetic coupling
- Components mounted on a common frame and connected up

Oil-free pumping station, with dry compressing backing pump:**DRS 1**

- Pumping speeds of up to 285 m³/h
- Ultimate pressure of up to $3 \cdot 10^{-3}$ hPa
- Combination of single-stage and multi-stage Roots pumps
- Air-cooled
- Components mounted on a common frame and connected up

CombiLine WH with UniDry 50

- Pumping speeds of up to 470 m³/h
- Ultimate pressure of up to $5 \cdot 10^{-3}$ hPa
- Versions available with convection cooling or water cooling as well as an optional inert gas panel
- Contact-free compression
- Components mounted on a common frame and connected up

CombiLine WH with HeptaDry

- Pumping speeds of up to 5,800 m³/h
- Ultimate pressure of up to $5 \cdot 10^{-4}$ hPa
- Combination of Roots pumps and screw pumps
- Contact-free compression
- Components mounted on a common frame and connected up



CombiLine WD with DuoLine



DRS 1



CombiLine WH with UniDry 50



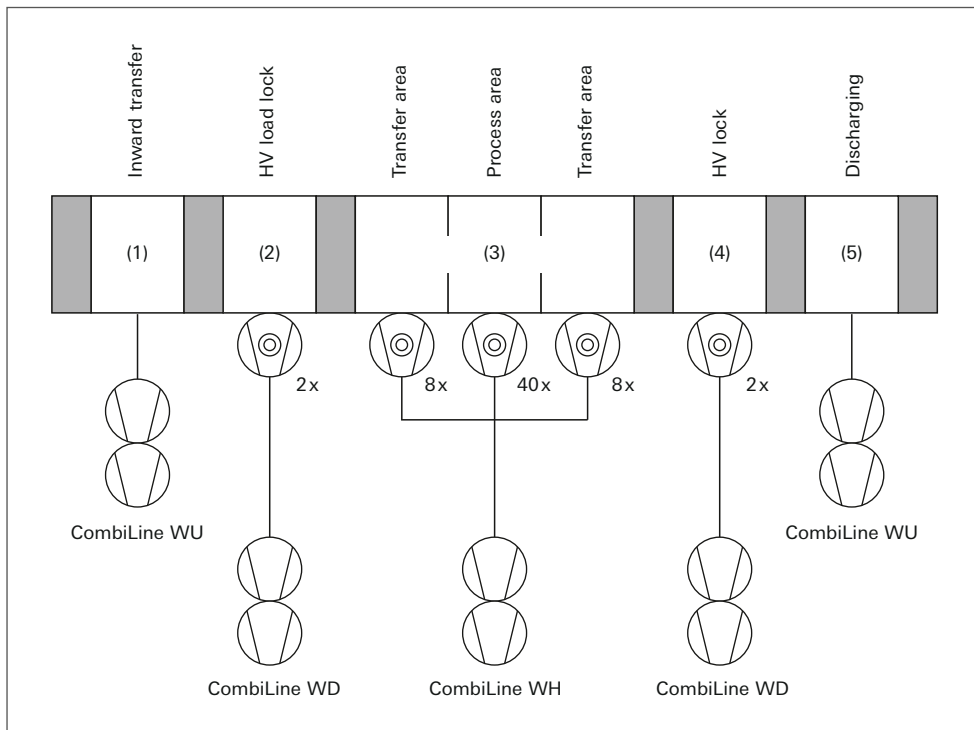
CombiLine WH with HeptaDry



Further information on our
Roots pumping stations can be found at
www.pfeiffer-vacuum.com

Customized pumping stations (special pumping stations)

The versatility of Roots pumping stations is shown by the following example of a glass coating plant:



Example of a glass coating plant

(1) Quickest possible inwards transfer of a substrate with atmospheric pressure at a high pumping speed of the mechanical backing pump (in this case a single-stage rotary vane pump) and a high pumping speed of the Roots pump to the transfer pressure of the subsequent HV load lock.

(2) In the HV load lock a combination of a Roots pump is used as a backing pump for turbopumps to lower the pressure to the high vacuum range. This pumping station uses a two-stage rotary vane pump for an optimal backing pressure for the turbopumps.

(3) In the processing and transfer area a dry Roots pumping station with a high pumping speed serves as a backing pump system for a large number of turbopumps. In this chamber a low base pressure needs to be generated and high gas loads must also be evacuated from the chamber during the process and compressed against atmospheric pressure.

(4) and (5) The outlet side load locks are structured symmetrically to the inlet-side load locks.

ATEX-certified Roots pumps are available for flammable gas mixtures. For applications with extreme backing pump pumping speed requirements, our gas-circulation-cooled Roots pumps can be supplied in a stage which compresses against atmospheric pressure.

For requirements of extremely high pumping speeds and/or ultimate pressures 10^{-3} hPa:

We offer multi-stage pumping stations with maximized pumping speeds as well as variations with Pfeiffer Vacuum turbopumps for use in high vacuum. We develop and manufacture individual solutions for you which are adapted to fit your application.

Your benefits: our expertise

- Complete design of vacuum systems
- Precise dimensioning of components, based on in-house developed calculation programs
- Perfectly adapted to your process requirements

If you give us the design specifications we will calculate the:

- Pumping speed
- Evacuation times
- Conductivity
- Intermediate pressures
- Gas outlet temperature
- Cooling effect



Three-stage pumping station for steel degassing



Three-stage module for steel degassing



Gas-cooled pumping station for high pumping speed at low vacuum

Side channel pumps

OnTool Booster – High vacuum pump that works against atmosphere



Side channel pumps

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OnTool Booster

OnTool Booster 150 264



Side channel pumps

OnTool Booster – High vacuum pump that works against atmosphere

The OnTool Booster combines high performance and compact design to blaze a new trail in vacuum technology.

It has very high pumping speeds of up to 130 m³/h and an ultimate pressure of $< 1 \cdot 10^{-5}$ hPa. The OnTool Booster is the perfect solution for clean applications in coating, the semiconductor industry or research and development – without any particles or condensation. It can be used in many applications, either as a stand-alone pump or as a backing pump for turbopumps.



NORM Electronics Ltd www.norm.gr

Overview of series and applications

	Analytics	Semiconductors	Coating	Industry	R & D	
■ = recom- mended	Electron microscopy Leak detection Mass spectrometry Surface analysis Plasma monitoring Residual gas analysis Lithography PVD (Physical Vapor Deposition) CVD (Chemical Vapor Deposition) Plasma etching Implantation – source Implantation – beamline Inspection Bonding MBE (Molecular Beam Epitaxy) Load locks, transfer chambers, handling systems Flat panel displays (FPD) LED / OLED Hard disk coating Photovoltaics Glass coating (PVD) CD, DVD, Blu-ray production (PVD) Optical coating (PVD) Wear protection (PVD, CVD) Hard coating Medical technology Industrial leak detection Electron beam welding Insulation vacuums Bulb and tube manufacturing Heat treatment Vacuum drying Vacuum furnaces Nuclear research Fusion technology Plasma research Particle accelerators Space simulation Low temperature research Elementary particle physics Nanotechnology Biotechnology					Page
Side channel pumps						
OnTool Booster						
OnTool Booster 150	■	■	■	■	■	264

Features at a glance

	Pumping speed class 130 m ³ /h	Connection flange (inlet) DN 50 ISO-KF	Ultimate pressure < 1 · 10 ⁻⁵ hPa	
Side channel pumps				
OnTool Booster				
OnTool Booster 150	■	■	■	264

Customer benefits

- Easy and flexible integration in systems due to compact size
- Short cycle times – optimized for a low transfer pressure
- Cost saving – runs without a backing pump
- Low noise and vibrations

Typical applications

- Transfer chambers
- Load locks
- EUV lithography
- Mass spectrometry
- Solar cell coating
- Optical coating
- Surface processing
- Simulation chambers



Optical coating



Solar cell production

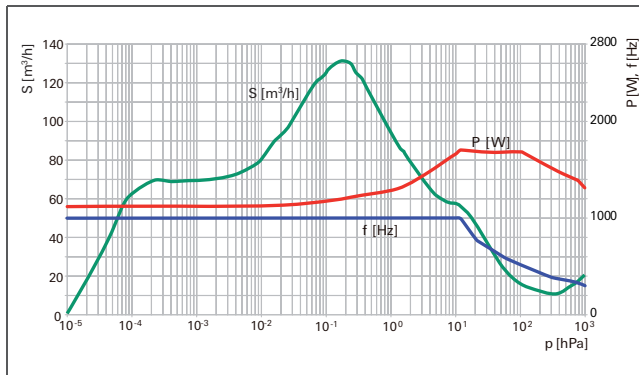
OnTool Booster 150

Compact, powerful high-vacuum pump against atmosphere with a pumping speed of up to 130 m³/h and an ultimate pressure of < 1·10⁻⁵ hPa:

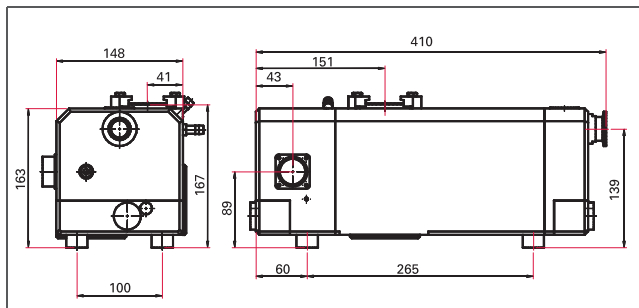


- Compact, powerful high-vacuum pump that works against atmosphere (no backing pump required) with a maximum pumping speed of up to 130 m³/h
- The pump reaches an ultimate pressure of < 1 · 10⁻⁵ hPa and is water-cooled as standard
- Can be used as either a stand-alone or backing pump

Pumping speed



Dimensions (in mm)



Technical data	OnTool Booster 150 for TCP 3000, DN 50 ISO-KF
Flange (out)	DN 25 ISO-KF
Flange (in)	DN 50 ISO-KF
Intake pressure max.	1030 hPa
Exhaust pressure, max.	1100 hPa
Operating fluid	F3
Operating fluid filling	24 ml
Rotation speed	60000 min ⁻¹
Inlet pressure max.	1013 hPa
Ultimate pressure	< 1 · 10 ⁻⁵ hPa
Gas ballast	20 hPa l/s
Gas ballast carrier and cooling gas	5 hPa l/s
Gas throughput for Ar	17 hPa l/s
Weight	35 kg
Run-up time	25 sec.
Cooling method, standard	Water
Cooling water temperature	15-30 °C
Cooling water consumption	120 l/h
Power consumption at zero throughput	1.1 kW
Max. power consumption: pump	2 kW
Permissible magnetic field max.	2.5 mT
Motor rating 50 Hz	1700 W
Motor rating 60 Hz	1700 W
Mains requirement: voltage 50 Hz	1~230-240/ 3~208-240 V
Mains requirement: voltage 60 Hz	1~230-240 /3~208-240 V
Pumping speed	130 m ³ /h
Pumping speed at 1000 hPa	18 m ³ /h
Pumping speed for Ar	129 m ³ /h
Pumping speed for N ₂	135 m ³ /h
Pumping speed: air	130 m ³ /h
Noise level with connected exhaust line	< 64 dB (A)
Protection category	IP 51
Quantity of sealing gas	400 hPa l/s
Ambient temperature	12-40 °C

Order number	
OnTool Booster 150	PR P00 010

Accessories	
Non-return flap, DN 25 ISO-KF	PK 004 521 -U
Sintering filter for sealing gas inlet G 1/8"	PR 003 505 -T
Spacer, stainless steel, DN 50 ISO-KF	PF 123 250 -X
Bellow, stainless steel, DN 50 ISO-KF	PF 130 250 -X
TCP 2000, 1-phase	PR C01 000
TCP 2000, 3-phase	PR C01 001
TCP 2000, 1-phase, with Profibus	PR C01 004
TCP 2000, 3-phase, with Profibus	PR C01 005
Connection cable with connection box	PR 003 543 -T
Connection cable with connection box	PR 003 544 -T
Elbow union with orifice for gas ballast, 0.2 mm	PR 003 578 -U

Turbopumps



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The turbopump family includes a wide range of pumping speeds from 10 to 2,800 l/s. The pumps provide high cost-efficiency and flexibility. Well-proven bearing systems offer optimized reliability.

Due to the proven rotor design we are able to achieve high pumping speeds, high gas throughput as well high compression for light gases. These features allow the turbopumps to be used with a variety of backing pumps.

Series

- HiPace 10 – 800:
Compact, ball or hybrid bearing turbopumps in the pumping speed class from 10 to 800 l/s. Robust design. Minimal space needs. High reliability.
- HiPace 1200 – 2300:
Compact hybrid bearing turbopumps in the pumping speed class from 1,000 to 2,000 l/s. High pumping speed. High gas throughput. Fast run-up time.
- HiPace 300 – 800 M, ATH 500 M:
Compact magnetically levitated turbopumps in the pumping speed class from 300 to 800 l/s. High gas throughput. Low vibration operation. Low energy consumption.
- ATH 1600 – 3200 M:
Compact magnetically levitated turbopumps in the pumping speed class from 1,400 to 2,800 l/s. High critical backing pressure. Very high gas throughput. Outstanding longterm stability.

Service

One advantage of Pfeiffer Vacuum turbopumps with hybrid bearing is the on-site service provided by Pfeiffer Vacuum Field Service. Maintenance intervals of up to 4 years are made possible by the unique bearing design. Maintenance costs are therefore only a fraction of those of rival products.



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**Customer benefits**

- Extensive range of pumps for a wide variety of applications
- Maximum reliability and safety
- High cost-efficiency and flexibility
- Easy systems integration
- Extensive range of accessories

Important information relating to the technical data

Pumping speed

The pumping speed of a turbopump depends on its size and design. It is stated in liters per second and is a function of the intake pressure. The pumping speed characteristics are assigned to the respective products.

Compression ratio

The compression ratio of a turbopump is the ratio between forevacuum pressure measured at the forevacuum flange of the pump and the high vacuum pressure at the intake flange. Compression is stated for different types of gas and is measured without gas load. With the compression ratio it is possible to determine for a given backing pump the theoretical final pressure of the entire pumping station configuration.

Ultimate pressure

The data stated for the ultimate pressure apply for the conditions defined in DIN 28428. These values are measured in clean dry conditions, using metal seals in the high vacuum area and after baking out or degassing the pump for 48 hours. Pumps with an aluminum housing are unsuitable for baking out, therefore the ultimate pressure is stated without baking the pump out and with clean FKM seals. The ultimate pressures stated in the technical data are typical conservative measured values. We can easily exceed these values by pretreatment of the vacuum system (venting with dry inert gas, degassing by heating). The theoretically attainable minimum values depend on the gas type-specific compression ratios K_{oi} and the partial pressures P_{vvi} on the forevacuum side as well as the system-specific gas flows Q_{total} like, for example, desorption from the surface being pumped down by a turbopump having an effective pumping speed of S_{eff} .

$$P_{end\ min} = \frac{Q_{total}}{S_{eff}} + \frac{P_{vv1}}{K_{01}} + \dots + \frac{P_{vvn}}{K_{0n}}$$

As a rule, these theoretical ultimate pressures that can be achieved are only approximations since the system-specific conditions will generally have a significant influence on the final pressures.

Ultimate pressures for turbopumps depending on housing material, flange type, backing pump used and rotor coating:

Ultimate pressure conforms to DIN 28 428, attained in a measuring dome 48 hours after bake-out.

	Rotary vane pump or dry backing pump with $p < 0.05$ hPa	Diaphragm pump with $p < 5$ hPa	Corrosive gas version with rotary vane pump or dry backing pump with $p < 0.05$ hPa
Stainless steel housing with CF-F ¹⁾	$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-8}$ hPa	$< 1 \cdot 10^{-8}$ hPa
Stainless steel housing with ISO-K ²⁾	$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-8}$ hPa	$< 1 \cdot 10^{-8}$ hPa
Aluminum housing with ISO-K ³⁾	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa

¹⁾ Bakeable with copper seal, ²⁾ Bakeable with aluminum seal ³⁾ Not bakeable, with elastomer seal

Gas throughput

The term gas throughput is used to describe the ability of the turbopump to pump quantities of gas at a specific pressure. There are certain parameters influenced by the specific application. All gas throughput data stated in the technical data apply under the following conditions:

- Operation with a backing pump which offers the minimum performance data of the backing pump specified in connection with the gas load data.
- Operation with water cooling at the specified water flow and a water supply temperature of 25° C, a maximum ambient temperature of 25° C and the use of sealing gas (in connection with heavy gases)

A turbopump cannot be operated simultaneously at its maximum gas load and at its maximum forevacuum pressure.

Maximum permissible forevacuum pressure

The maximum permissible forevacuum pressure of the turbopump is the pressure at which the turbopump still produces a compression of 100. It depends on the gas load pumped through the turbopump and the pumping speed of the backing system used. For gas load operation, the forevacuum pressure should not exceed more than approximately 50 % of the maximum permissible forevacuum pressure.

Safety is important

Notes relating to the mounting materials for turbopumps

Our turbopumps are distinguished by a high degree of safety. This is based on our own theoretical and practical analyses of the crash behavior and the high safety margins in the design of the pumps. We also apply the same standards to the interface between the pumps and the customer's system. For this reason, we are offering a full range of installation components which ensure safe interface connections and which are presented together with the pump accessories.

Drive electronics at a glance

General – standards

Common features of all drive electronics:

- Protection class IP 54
- Optionally RS-485 interface, Profibus, DeviceNet or E74
- Accessory outputs and remote inputs and outputs



TC 110 – Smallest integrated solution

- Compact installation dimensions
- 24 V DC operating voltage with a power rating of up to 150 W
- Power supply, RS-485 interface, remote connection with the 15 pin D-Sub 9
- Optionally available as TC 110 RS (RS-485) Profibus or E74, with additional connections for accessories and interface connection



TC 400 – Medium-sized integrated solution with connector panel

- Operating voltage: 48 V DC or 24 V DC with a power rating of up to 350 W
- Power supply, RS-485 interface, accessories and remote connection through the respective plug and socket connections
- Optionally with Profibus, DeviceNet or E74



TM 700 – Medium-sized integrated solution with connector panel for magnetically levitated turbopumps

- Operating voltage: 48 V DC with a power rating of up to 300 W
- Power supply, RS-485 interface, accessories and remote connection with the relevant plug and socket connections
- Optionally with Profibus, DeviceNet or E74
- Combines the advantages of the TC 400 with an integrated digital 5-axis magnetic bearing controller



TC 1200 – Large integrated solution with connector panel

- Mains connection: 115 – 230 V AC
- Power supply, RS-485 interface, accessories and remote connection with the relevant plug and socket connections
- Input power up to 1,200 W
- Optionally with Profibus, DeviceNet or E74



OBC V4 – Large integrated solution with connector panel

- Mains connection: Voltage: 230 V AC
- Integrated digital with 5-axis magnetic bearing controller



TCP 350 – External electronic drive unit

- Mains connection: 95 – 265 V AC
- Complete electronics in a single unit



Magpower – External electronic drive unit

- Mains connection: 200 – 240 V AC
- ½ (of 19”) rack size



Electronic drive units at a glance

	Integrated					External	
	TC 110	TC 400	TM 700	TC 1200	OBC V4	TCP 350	Magpower
HiPace 10	■						
HiPace 60 P	■						
HiPace 80	■					■	
HiPace 300	■	■				■	
HiPace 400 – 800		■				■	
HiPace 300 P / C		■					
HiPace 300 Plus	■						
HiPace 700 Plus		■					
HiPace 300 – 800 M			■				
HiPace 1200 – 2300				■			
ATH 1603 – 2303 M					■		■
ATH 1600 – 2300 MT					■		■
ATH 2800 – 3200 M/MT							■
ATP 2300 M					■		■

Integrated drive electronics

Integrated solutions for drive electronics are standard today. Integrating the power supply pack at the same time saves expensive cabling and reduces the space needed in the control cabinet.

OPS 40, 70 and 100 are optimized for convection cooled or air cooled operation. The power rating is therefore adjusted to suit these types of operation. OPS 400, TC 1200 and OBC V4 with protection class IP 54 are suitable for industrial environments and provide the same power rating as standard external power supply packs.

Examples of optional power supply packs (On-board Power Supply, OPS)



Examples of optional power supply packs (On-board Power Supply, OPS)



Optional integrated power supply packs at a glance

	External			
	OPS 40	OPS 70	OPS 100	OPS 400
HiPace® 10	■			
HiPace® 60 P		■		
HiPace® 80		■		
HiPace® 300 with TC 110			■	
HiPace® 300 with TC 400				■
HiPace® 400-800 with TC 400				■
HiPace® 300 P / C				■
HiPace® 300 Plus			■	
HiPace® 700 Plus				■
HiPace® 300-800 M				■





Hybrid bearing

The outstanding features of the Pfeiffer Vacuum HiPace series are its unique rotor design with proven hybrid bearings. This represents a new class of industrial suitability, while simultaneously reducing operating costs. All Pfeiffer Vacuum HiPace turbopumps incorporate an integrated drive electronics. In fact, even the power supply unit is integrated in the HiPace 1200 to 2300.

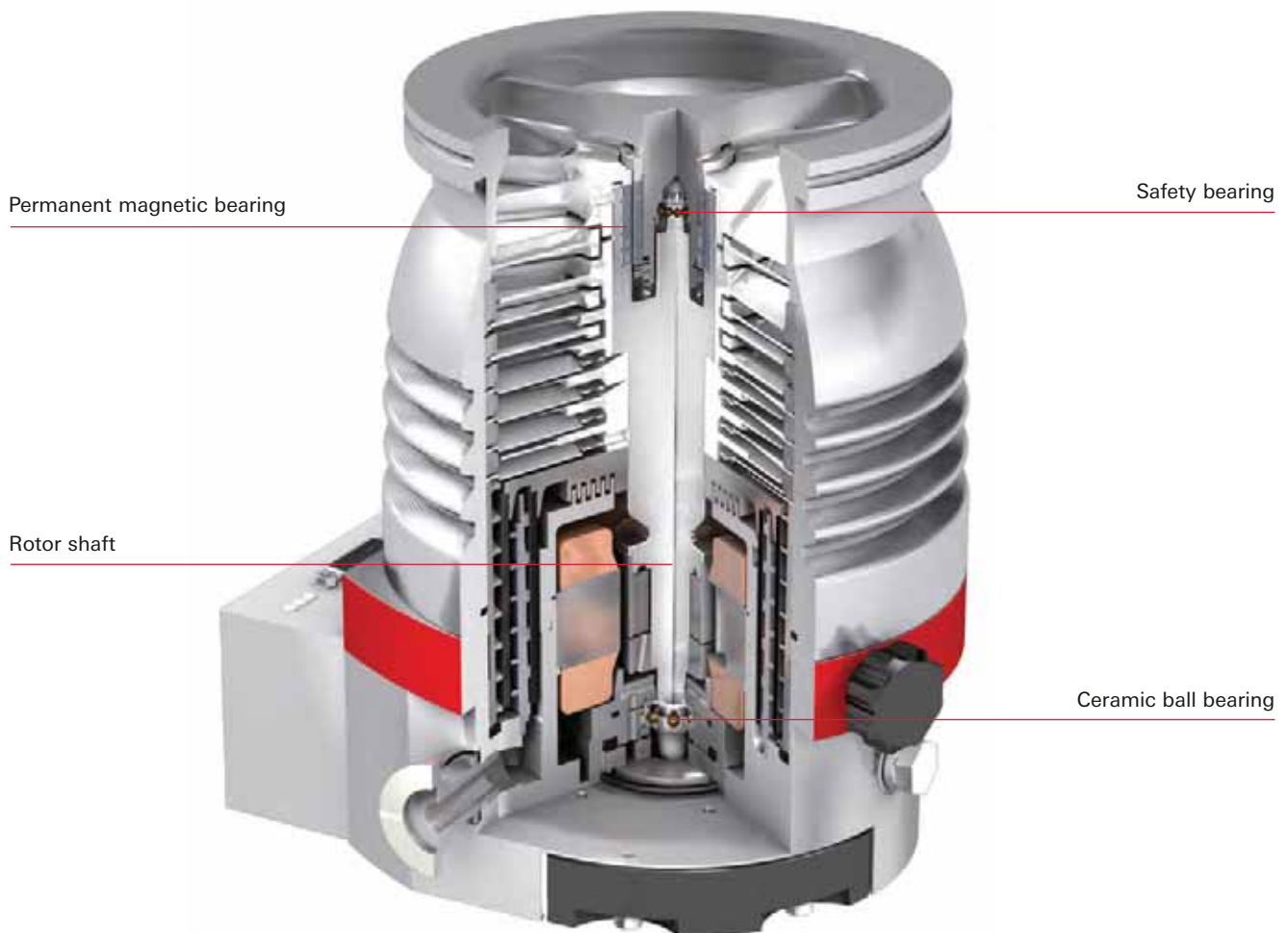
It's advanced design is started with reliability and ruggedness. Even with difficult applications, the pump provides safe and dependable operation. The pump features integration security concepts and patented venting mechanisms. All turbopumps in the HiPace series conform to the SEMI S2 standard. The pump also has outstanding accessibility as all the connections are within 120 degrees.

Versions

The turbopumps in the 80–800 l/s range are also offered with an integrated Holweck stage. The advantages of this design include:

- Higher backing pressure
- Lower power consumption
- Higher compression

From the 300 l/s pumping speed class onward, the HiPace is also available in a corrosive-gas version. These pumps have a highly developed rotor coating and come with an integrated sealing gas supply system with electrical shutoff valve as standard. Corrosive-gas versions do not incorporate a Holweck stage. In addition to the standard design with RS-485 interface, Pfeiffer Vacuum also offers optional versions with DeviceNet or Profibus in response to modern control concepts.



The combination of a ceramic ball bearing on the fore-vacuum side and a permanent magnetic radial bearing on the high vacuum side is called hybrid bearing.

This bearing technology does not require electromagnets and has a long service life with maintenance intervals of approximately 4 years. The ball bearing and the operating fluid reservoir can be replaced on site within less than 30 minutes.

HiPace® 10 – 800

**Compact, ball or hybrid bearing turbopumps
in the pumping speed class from 10 to 800 l/s**

HiPace stands for a full range of compact and powerful turbopumps in the pumping speed range of 10 to 2,000 l/s. It provides high cost-efficiency and flexibility which allows almost all pumps of this range to be installed in any orientation. The proven bearing system guarantees unrivaled reliability. High pumping speed, high critical backing pressure and high gas throughput as well as excellent compression for light gases are made possible by the innovative rotor design.

Integrated electronic drive unit

The integrated drive electronics prevent costly cabling. In addition, various interface versions – Profibus, DeviceNet or E74 – are available. Due to the innovative electronic components we have doubled the lifetime of these powerful drive units.

Fast run-up time

The run-up time of the HiPace has been significantly reduced. This makes the pumps ready for action quicker than ever. This is an incalculable benefit for your production. In addition, we provide extended remote and sensor functions. These allow you to evaluate pump data such as temperatures. Improved diagnostics ensure maximum pump availability and support service.



HiPace® 10



HiPace® 80



HiPace® 300



HiPace® 800

High-performance technology

Due to the well thought-out design of the HiPace turbopumps, the housing makes the pumps extremely light and extends the application spectrum. Another design achievement results in an innovative rotor geometry providing quiet operation and sets standards for significantly improving gas loads.

For universal applications

HiPace Plus pumps are specially designed for electron microscopy and high-end mass spectrometry. Our HiPace C series provides turbopumps especially for corrosive applications. In addition, we have HiPace P pumps which are suitable for industrial use, as they are insensitive to process dust and intruding particles.

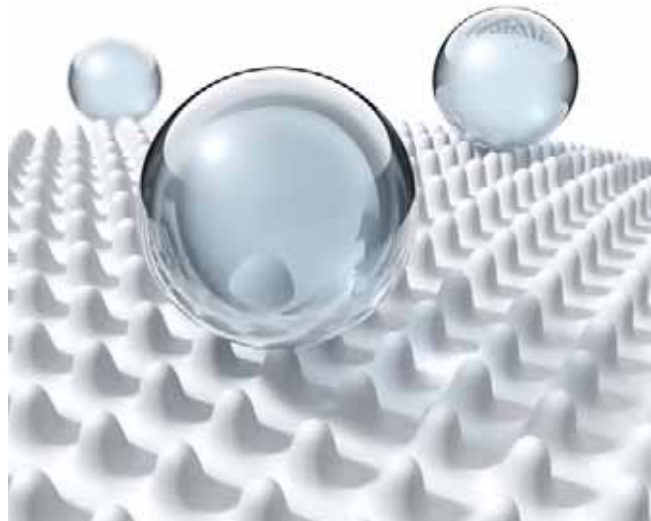
Customer benefits

- Complete series with pumping speeds from 10 to 800 l/s
- Robust design and proven bearing system offer the highest reliability
- Minimal space requirements to compact construction
- High gas throughput and high pumping speed
- Installation in any orientation¹⁾
- Suitable for industrial use due to protection class IP 54
- Corrosive gas version available
- SEMI S2 and UL certification
- Full range of accessories extends the possible uses
- Extended maintenance intervals
- Bearing replacement on site

¹⁾ HiPace 700C, 0 to 90° / HiPace Plus, 0°

Typical applications

- Mass spectrometry
- Leak detection
- Electron microscopy
- Residual gas analysis
- Particle accelerators
- Nanotechnology



Nanotechnology



Electron microscopy



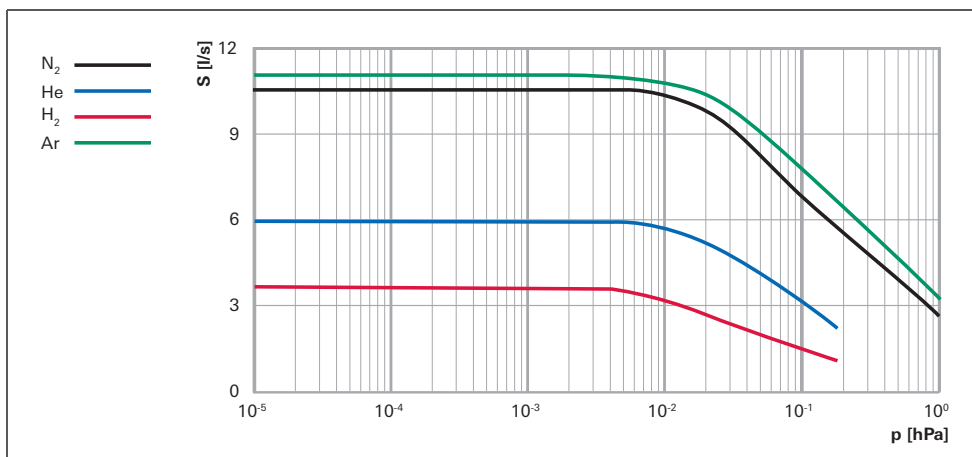
Particle accelerator

HiPace® 10



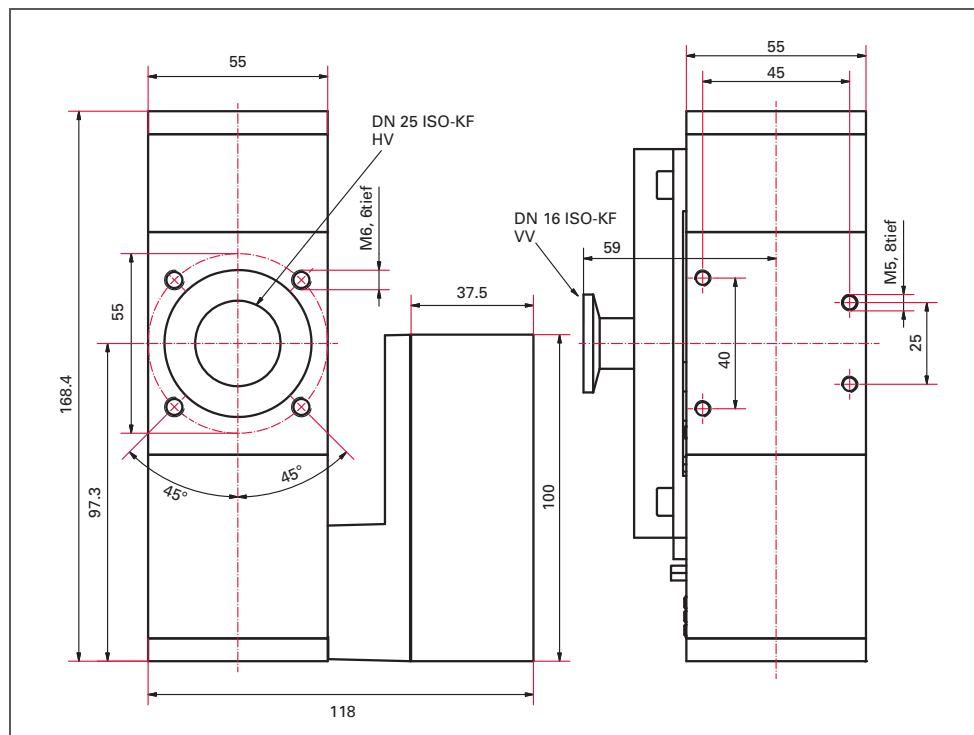
- The world's smallest series-production turbopump
- A powerful, rugged turbopump with a pumping speed of 10 l/s for N₂
- DN 25 connection
- Integrated drive electronics with 24 V supply voltage
- Mobile usable
- Requires no additional cooling
- Electronic connection in direction of fore-vacuum connection

Pumping speed



HiPace® 10

Dimensions (in mm)

HiPace[®] 10 with TC 110, DN 25

Technical data	HiPace® 10 with TC 110, DN 25
Connection nominal diameter	
Flange (out)	DN 16 ISO-KF / G 1/8"
Flange (in)	DN 25
Pumping speed	
Pumping speed for Ar	11.5 l/s
Pumping speed for H ₂	3.7 l/s
Pumping speed for He	6 l/s
Pumping speed for N ₂	10 l/s
Compression	
Compression ratio for Ar	$2.5 \cdot 10^7$
Compression ratio for H ₂	$3 \cdot 10^2$
Compression ratio for He	$3 \cdot 10^3$
Compression ratio for N ₂	$3 \cdot 10^6$
Fore-vacuum max. for N₂	
	25 hPa
Gas throughput	
Gas throughput at full rotational speed for Ar	0.37 hPa l/s
Gas throughput at full rotational speed for H ₂	2.78 hPa l/s
Gas throughput at full rotational speed for He	0.48 hPa l/s
Gas throughput at full rotational speed for N ₂	0.37 hPa l/s
Electronic drive unit	with TC 110
Operating voltage	24 (± 5 %) V DC
Rotation speed ± 2 %	90000 min ⁻¹
Rotation speed variable	50-100 %
Mounting orientation	in any orientation
Ultimate pressure*	$< 5 \cdot 10^{-6}$ hPa
Weight	1.8 kg
Run-up time	0.9 min
Cooling method, standard	Convection
Bearing	Ball bearing
Sound pressure level	< 50 dB (A)
Interfaces	RS-485, Remote
Protection category	IP 54
Permissible magnetic field max.	3 mT
Order number pump Pumpe	PM P03 960

*Ultimate pressure please find description on page 272

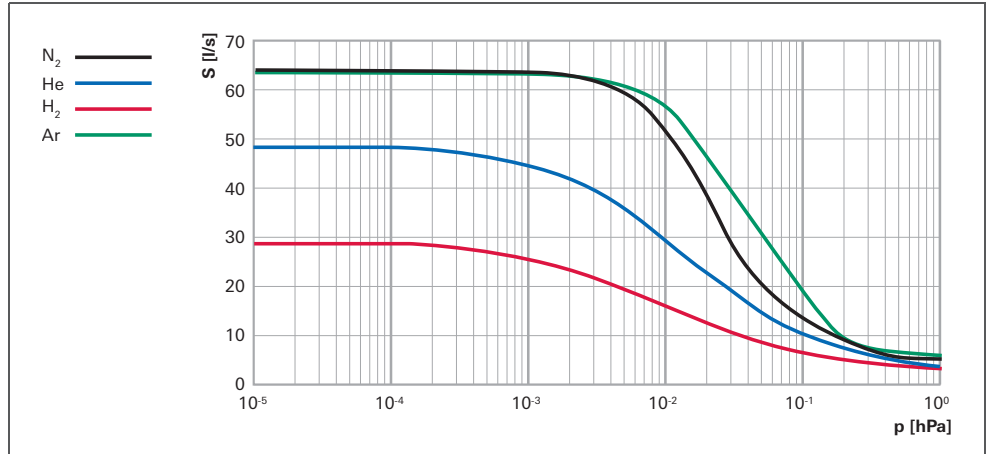
Accessories	HiPace® 10 with TC 110, DN 25
Order number pump Pumpe	PM P03 960
Power supplies/power	
DCU - power supply with display control unit	PM C01 820
TPS - mains pack for wall/standard rail fitting	PM 061 340 -T
TPS - mains packl 19" rack module 3 RU	PM 061 344 -T
Control units	
DCU - Display Control Unit	PM 061 348 -T
HPU - Handheld Programming Unit	PM 051 510 -T
Accessories for HPU	PM 061 005 -T
Mains cable DCU/TPS/TCP, 3 m	
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA
115 V AC mains cable with UL plug	P 4564 309 ZE
208 V AC mains cable with UL plug	P 4564 309 ZF
Connection cable, length 3 m between	
Connection cable for HiPace with TC 110 to TPS/DCU 110/111/180/181 with accessorie ports and RS-485	PM 061 351 -T
Connection cable for HiPace with TC 110 to power supply TPS/DCU 110/111/180/181	PM 061 350 -T
Backing pump control	
Backing pump relay box, shielded, 1-phase 20 A	PM 061 373 -T
Backing pump relay box, shielded, 1-phase 7 A	PM 071 282 -X
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206
TCS 15 for controlling backing pumps	PM 061 685 -X
HiPace-ACP connection cable	PM 071 142 -X
General accessories	
Connecting adapter DN 25 ISO-KF	PM 093 315 -T
Centering ring	PF 110 125 -T
Centering ring with integrated mesh screen	PF 113 225 -T
USB/RS-485-Converter	PM 061 207 -T
Interface cable 3 m	PM 061 283 -T
Y-connector M12 for RS-485	P 4723 010
Connection cable RJ 45 on M 12	PM 051 726 -T
TCS 11, adapter for TC 110 with interface RS-485	PM 061 636 -U
TCS 12, adapter for TC 110 with interface RS-485, 4 accessory ports	PM 061 638 -U
Mounting materials	
Centering ring with 4 prackets, screws and U-washers	PM 016 627 -T

HiPace® 60 P



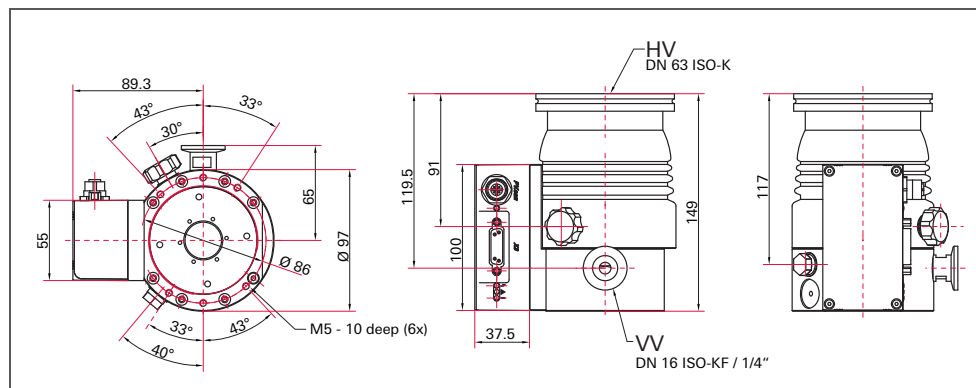
- Small yet powerful turbo molecular pump without Holweck-stage with a pumping speed of up to 64 l/s for N₂
- Integrated TC 110 drive electronics
- Installation in any orientation
- Simple and reliable system integration
- Insensitive to dust
- Extensive accessories expand the range of applications

Pumping speed



HiPace® 60 P

Dimensions (in mm)



HiPace® 60 P with TC 110, DN 63 ISO-K

Technical data	HiPace® 60 P with TC 110, DN 63 ISO-K
Connection nominal diameter	
Flange (out)	DN 16 ISO-KF / G 1/4"
Flange (in)	DN 63 ISO-K
Venting connection	G 1/8"
Pumping speed	
Pumping speed for Ar	63 l/s
Pumping speed for H ₂	28 l/s
Pumping speed for He	48 l/s
Pumping speed for N ₂	64 l/s
Compression	
Compression ratio for Ar	$2 \cdot 10^6$
Compression ratio for H ₂	$2 \cdot 10^2$
Compression ratio for He	$3.5 \cdot 10^2$
Compression ratio for N ₂	$1 \cdot 10^6$
Fore-vacuum max. for N₂	
	4 hPa
Gas throughput	
Gas throughput at full rotational speed for Ar	0.83 hPa l/s
Gas throughput at full rotational speed for H ₂	55 hPa l/s
Gas throughput at full rotational speed for He	55 hPa l/s
Gas throughput at full rotational speed for N ₂	9.2 hPa l/s
Electronic drive unit	
Operating voltage	24 (± 5 %) V DC
Rotation speed ± 2 %	90000 min ⁻¹
Rotation speed variable	50-100 %
Mounting orientation	in any orientation
Ultimate pressure*	$< 1 \cdot 10^{-6}$ hPa
Weight	2.2 kg
Run-up time	1.1 min
Cooling method, optional	Air/Water
Cooling method, standard	Convection
Cooling water temperature	5-25 °C
Cooling water consumption	75 l/h
Bearing	Hybrid
Sound pressure level	≤ 48 dB (A)
Interfaces	RS-485, Remote
Protection category	IP 54
Permissible magnetic field max.	4 mT
Order number pump Pumpe	PM P04 000

*Ultimate pressure please find description on page 272

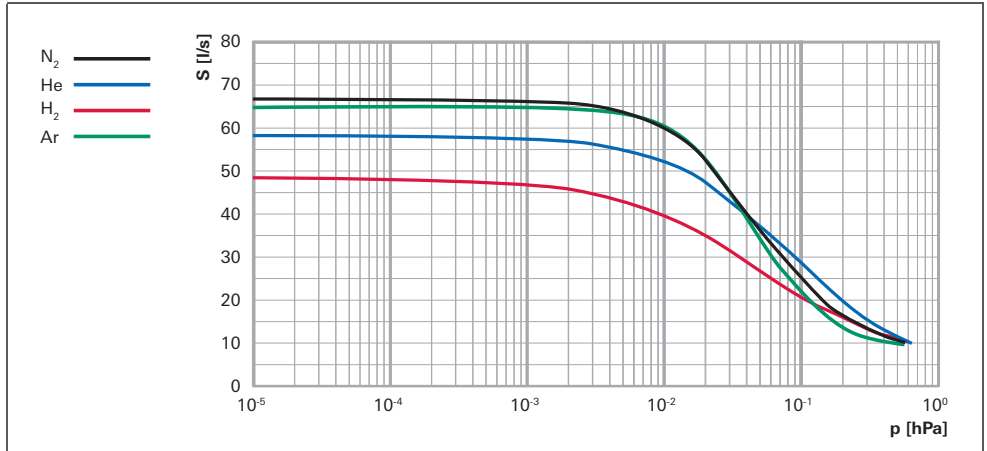
Accessories	HiPace® 60 P with TC 110, DN 63 ISO-K
Order number pump Pumpe	PM P04 000
Power supplies/power	
DCU - power supply with display control unit	PM C01 820 PM C01 821
TPS - mains pack for wall/standard rail fitting	PM 061 340 -T PM 061 341 -T
TPS - mains packl 19" rack module 3 RU	PM 061 344 -T PM 061 345 -T
Control units	
DCU - Display Control Unit	PM 061 348 -T
HPU - Handheld Programming Unit	PM 051 510 -T
Accessories for HPU	PM 061 005 -T
Mains cable DCU/TPS/TCP, 3 m	
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA
115 V AC mains cable with UL plug	P 4564 309 ZE
208 V AC mains cable with UL plug	P 4564 309 ZF
Connection cable, length 3 m between	
Connection cable for HiPace with TC 110 to TPS/DCU 110/111/180/181 with accessorie ports and RS-485	PM 061 351 -T
Connection cable for HiPace with TC 110 to power supply TPS/DCU 110/111/180/181	PM 061 350 -T
Venting accessories	
Venting valve	PM Z01 290
Air drier TTV 001	PM Z00 121
Cooling accessories	
Air cooling	PM Z01 300
Water cooling	PM 016 623 -T
Backing pump control	
Backing pump relay box, shielded, 1-phase 20 A	PM 061 373 -T
Backing pump relay box, shielded, 1-phase 7 A	PM 071 282 -X
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206
TCS 15 for controlling backing pumps	PM 061 685 -X
HiPace-ACP connection cable	PM 071 142 -X
General accessories	
Sealing gas valve	PM Z01 310
Sealing gas throttle	PM Z01 316
Centering ring coated	PM 016 206 -U
Centering ring coated with protection screen	PM 016 208 -U
Centering ring coated with splinter shield	PM 016 207 -U
Vibration dampers	PM 006 800 -X
USB/RS-485-Converter	PM 061 207 -T
Interface cable 3 m	PM 061 283 -T
Y-connector M12 for RS-485	P 4723 010
TCS 11, adapter for TC 110 with interface RS-485	PM 061 636 -U
TCS 12, adapter for TC 110 with interface RS-485, 4 accessory ports	PM 061 638 -U
Mounting materials	
Centering ring coated, bracket screws	PM 016 360 -T
Centering ring coated with protection screen, bracket screws	PM 016 362 -T
Centering ring coated with splinter shield, bracket screws	PM 016 361 -T
Centering ring coated DN 63 ISO-K, 4 prackets M8	PM 016 510 -T
Centering ring coated DN 63 ISO-K, 4 prackets M8, protection screen	PM 016 512 -T
Centering ring coated DN 63 ISO-K, 4 prackets M8, splinter shield	PM 016 511 -T

HiPace® 80



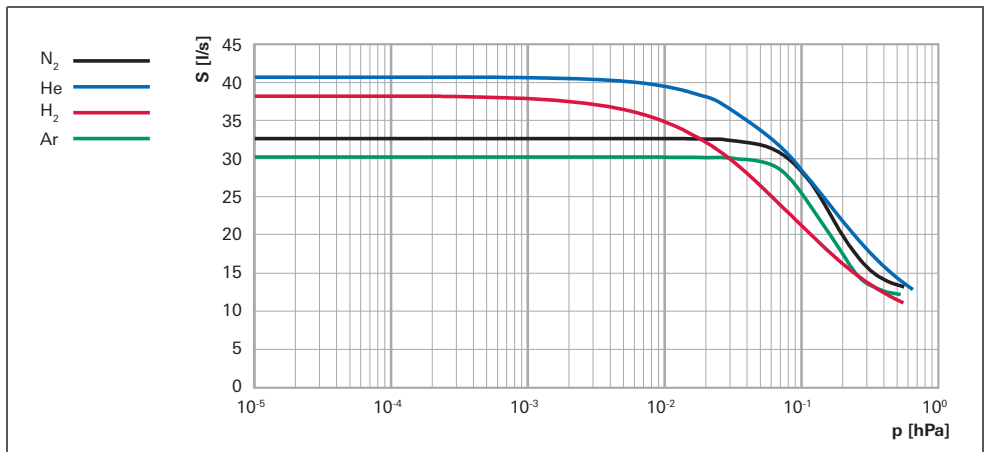
- Small yet powerful turbopump with a pumping speed of up to 67 l/s for N₂
- Integrated TC 110 drive electronics
- For installation in any orientation
- Ideal for dependable systems integration
- Extensive accessories expand the range of applications

Pumping speed



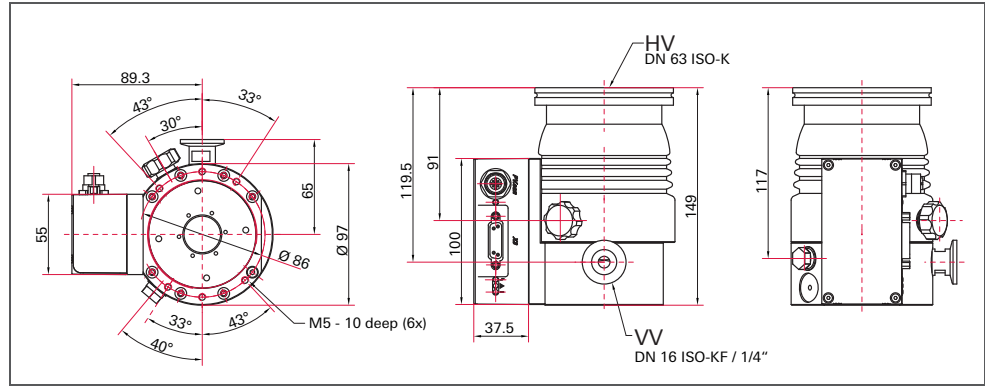
HiPace® 80 with TC 110, DN 63 ISO-K

HiPace® 80 with TC 110, DN 63 CF-F

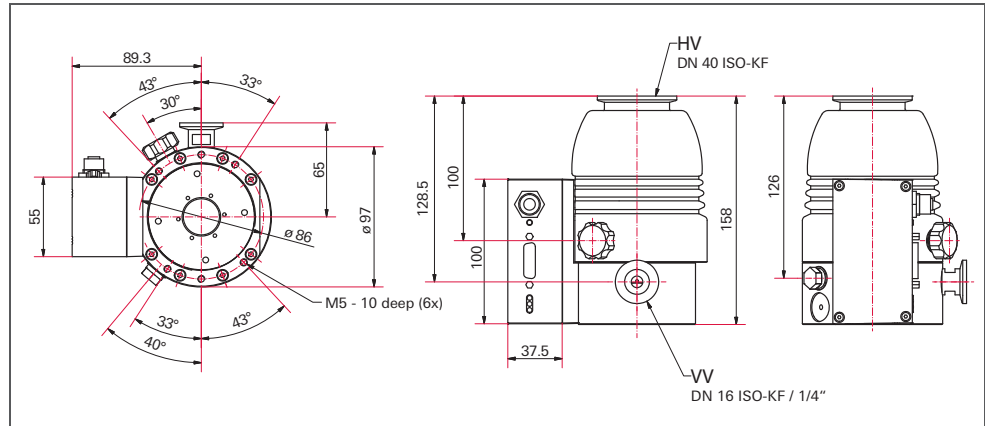


HiPace® 80 with TC 110, DN 40 ISO-KF

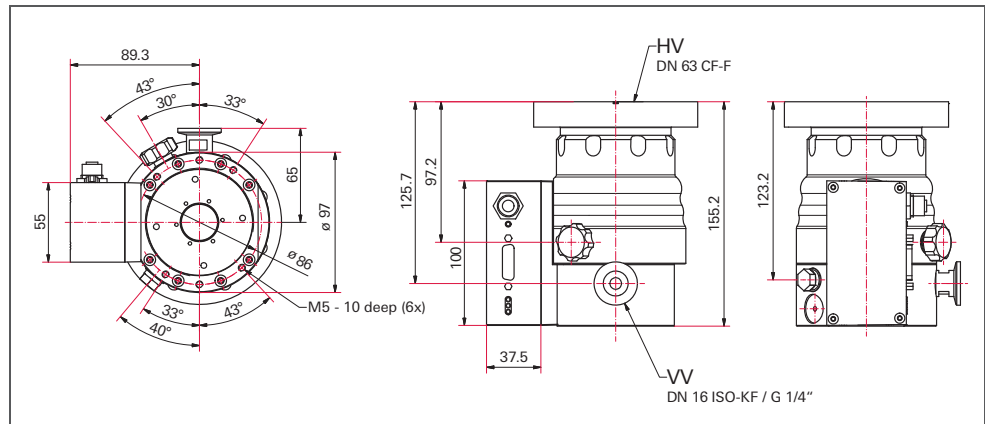
Dimensions (in mm)



HiPace[®] 80 with TC 110, DN 63 ISO-K



HiPace[®] 80 with TC 110, DN 40 ISO-KF



HiPace[®] 80 with TC 110, DN 63 CF-F

Technical data	HiPace® 80 with TC 110, DN 63 ISO-K	HiPace® 80 with TC 110, DN 63 CF-F	HiPace® 80 with TC 110, DN 40 ISO-KF
Connection nominal diameter			
Flange (out)	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"
Flange (in)	DN 63 ISO-K	DN 63 CF-F	DN 40 ISO-KF
Venting connection	G 1/8"	G 1/8"	G 1/8"
Pumping speed			
Pumping speed for Ar	66 l/s	66 l/s	30 l/s
Pumping speed for H ₂	48 l/s	48 l/s	38 l/s
Pumping speed for He	58 l/s	58 l/s	41 l/s
Pumping speed for N ₂	67 l/s	67 l/s	35 l/s
Compression			
Compression ratio for Ar	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Compression ratio for H ₂	$1.4 \cdot 10^5$	$1.4 \cdot 10^5$	$1.4 \cdot 10^5$
Compression ratio for He	$1.3 \cdot 10^7$	$1.3 \cdot 10^7$	$1.3 \cdot 10^7$
Compression ratio for N ₂	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Fore-vacuum max. for N₂			
	22 hPa	22 hPa	22 hPa
Gas throughput			
Gas throughput at full rotational speed for Ar	0.54 hPa l/s	0.54 hPa l/s	0.54 hPa l/s
Gas throughput at full rotational speed for H ₂	15.3 hPa l/s	15.3 hPa l/s	15.3 hPa l/s
Gas throughput at full rotational speed for He	2.7 hPa l/s	2.7 hPa l/s	2.7 hPa l/s
Gas throughput at full rotational speed for N ₂	1.3 hPa l/s	1.3 hPa l/s	1.3 hPa l/s
Electronic drive unit			
Separate electronic drive unit	with TC 110	with TC 110	with TC 110
Operating voltage	24 (± 5 %) V DC	24 (± 5 %) V DC	24 (± 5 %) V DC
Rotation speed ± 2 %	90000 min ⁻¹	90000 min ⁻¹	90000 min ⁻¹
Rotation speed variable	50-100 %	50-100 %	50-100 %
Mounting orientation	in any orientation	in any orientation	in any orientation
Ultimate pressure*	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa
Weight	2.4 kg	3.8 kg	2.4 kg
Run-up time	1.7 min	1.7 min	1.7 min
Cooling method, optional	Air/Water	Air/Water	Air/Water
Cooling method, standard	Convection	Convection	Convection
Cooling water temperature	5-25 °C	5-25 °C	5-25 °C
Cooling water consumption	75 l/h	75 l/h	75 l/h
Bearing	Hybrid	Hybrid	Hybrid
Sound pressure level	≤ 48 dB (A)	≤ 48 dB (A)	≤ 48 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54
Permissible magnetic field max.	3.3 mT	3.3 mT	3.3 mT
Order number pump Pumpe	PM P03 940	PM P03 941	PM P03 942

*Ultimate pressure please find description on page 272

	HiPace® 80 for TCP 350, DN 63 ISO-K	HiPace® 80 for TCP 350, DN 63 CF-F	HiPace® 80 for TCP 350, DN 40 ISO-KF
	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"
	DN 63 ISO-K	DN 63 CF-F	DN 40 ISO-KF
	G 1/8"	G 1/8"	G 1/8"
	66 l/s	66 l/s	30 l/s
	48 l/s	48 l/s	38 l/s
	58 l/s	58 l/s	41 l/s
	67 l/s	67 l/s	35 l/s
	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
	$1.4 \cdot 10^5$	$1.4 \cdot 10^5$	$1.4 \cdot 10^5$
	$1.3 \cdot 10^7$	$1.3 \cdot 10^7$	$1.3 \cdot 10^7$
	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
	22 hPa	22 hPa	22 hPa
	0.54 hPa l/s	0.54 hPa l/s	0.54 hPa l/s
	15.3 hPa l/s	15.3 hPa l/s	15.3 hPa l/s
	2.7 hPa l/s	2.7 hPa l/s	2.7 hPa l/s
	1.3 hPa l/s	1.3 hPa l/s	1.3 hPa l/s
	for TCP 350	for TCP 350	for TCP 350
	YES	YES	YES
	90000 min ⁻¹	90000 min ⁻¹	90000 min ⁻¹
	50-100 %	50-100 %	50-100 %
	in any orientation	in any orientation	in any orientation
	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa
	2.1 kg	3.5 kg	2.1 kg
	1.7 min	1.7 min	1.7 min
	Air/Water	Air/Water	Air/Water
	Convection	Convection	Convection
	5-25 °C	5-25 °C	5-25 °C
	75 l/h	75 l/h	75 l/h
	Hybrid	Hybrid	Hybrid
	≤ 48 dB (A)	≤ 48 dB (A)	≤ 48 dB (A)
	RS-485, Remote	RS-485, Remote	RS-485, Remote
	IP 54	IP 54	IP 54
	3.3 mT	3.3 mT	3.3 mT
	PM P03 943	PM P03 944	PM P03 945

Accessories	HiPace® 80 with TC 110, DN 63 ISO-K	HiPace® 80 with TC 110, DN 63 CF-F	HiPace® 80 with TC 110, DN 40 ISO-KF
Order number pump Pumpe	PM P03 940	PM P03 941	PM P03 942
Power supplies/power			
DCU - power supply with display control unit	PM C01 820 PM C01 821	PM C01 820 PM C01 821	PM C01 820 PM C01 821
TPS - mains pack for wall/standard rail fitting	PM 061 340 -T PM 061 341 -T	PM 061 340 -T PM 061 341 -T	PM 061 340 -T PM 061 341 -T
TPS - mains pack1 19" rack module 3 RU	PM 061 344 -T PM 061 345 -T	PM 061 344 -T PM 061 345 -T	PM 061 344 -T PM 061 345 -T
Control units			
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T
Mains cable DCU/TPS/TCP, 3 m			
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
115 V AC mains cable with UL plug	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
208 V AC mains cable with UL plug	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF
Connection cable, length 3 m between			
Connection cable for HiPace with TC 110 to TPS/DCU 110/111/180/181 with accessorie ports and RS-485	PM 061 351 -T	PM 061 351 -T	PM 061 351 -T
Connection cable for HiPace with TC 110 to power supply TPS/DCU 110/111/180/181	PM 061 350 -T	PM 061 350 -T	PM 061 350 -T
Connection cable TCP 350 - HiPace with 2 accessorie ports M8, 3 m			
External drive units			
TCP 350			
TCP 350 PB - Profibus			
TCP 350 DN - DeviceNet			
Venting accessories			
Venting valve	PM Z01 290	PM Z01 290	PM Z01 290
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121
Cooling accessories			
Air cooling	PM Z01 300	PM Z01 300	PM Z01 300
Water cooling	PM 016 623 -T	PM 016 623 -T	PM 016 623 -T
Heating accessories			
Heating jacket 230 V AC, Euro-style safety plug		PM 061 360 -T	
Heating jacket 208 V AC, UL plug		PM 061 361 -T	
Heating jacket 115 V AC, UL plug		PM 061 362 -T	
Backing pump control			
Backing pump relay box, shielded, 1-phase 20 A	PM 061 373 -T	PM 061 373 -T	PM 061 373 -T
Backing pump relay box, shielded, 1-phase 7 A	PM 071 282 -X	PM 071 282 -X	PM 071 282 -X
Connection cable from TCP 350 to backing pump relay box (length 2 m)			
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206
TCS 15 for controlling backing pumps	PM 061 685 -X	PM 061 685 -X	PM 061 685 -X
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X

Accessories	HiPace® 80 with TC 110, DN 63 ISO-K	HiPace® 80 with TC 110, DN 63 CF-F	HiPace® 80 with TC 110, DN 40 ISO-KF	
Order number pump Pumpe	PM P03 940	PM P03 941	PM P03 942	
General accessories				
Sealing gas valve	PM Z01 310	PM Z01 310	PM Z01 310	
Sealing gas throttle	PM Z01 316	PM Z01 316	PM Z01 316	
Centering ring			PF 110 140 -T	
Centering ring with integrated mesh screen			PF 113 240 -T	
Centering ring coated	PM 016 206 -U			
Centering ring coated with protection screen	PM 016 208 -U			
Centering ring coated with splinter shield	PM 016 207 -U		PM 006 375 -X	
Protection screen		PM 016 333		
Splinter shield		PM 016 312		
Vibration dampers	PM 006 800 -X	PM 006 801 -X	PM 006 799 -X	
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	
Connection cable, plug M12, RJ 45, 3 m				
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010	
TCS 11, adapter for TC 110 with interface RS-485	PM 061 636 -U	PM 061 636 -U	PM 061 636 -U	
TCS 12, adapter for TC 110 with interface RS-485, 4 accessory ports	PM 061 638 -U	PM 061 638 -U	PM 061 638 -U	
Mounting materials				
Centering ring coated, bracket screws	PM 016 360 -T			
Centering ring coated with protection screen, bracket screws	PM 016 362 -T			
Centering ring coated with splinter shield, bracket screws	PM 016 361 -T			
Set of hexagon screws for trough hole (CF-F)		PM 016 683 -T		
Set of stud screws for tapped hole (CF-F)		PM 016 684 -T		
Set of stud screws for trough hole (CF)		PM 016 733 -T		
Clamping ring with Centering ring			PM 016 625 -T	
Clamping ring with Centering ring with splinter shield			PM 016 626-T	
Centering ring coated DN 63 ISO-K, 4 prackets M8	PM 016 510 -T			
Centering ring coated DN 63 ISO-K, 4 prackets M8, protection screen	PM 016 512 -T			
Centering ring coated DN 63 ISO-K, 4 prackets M8, splinter shield	PM 016 511 -T			

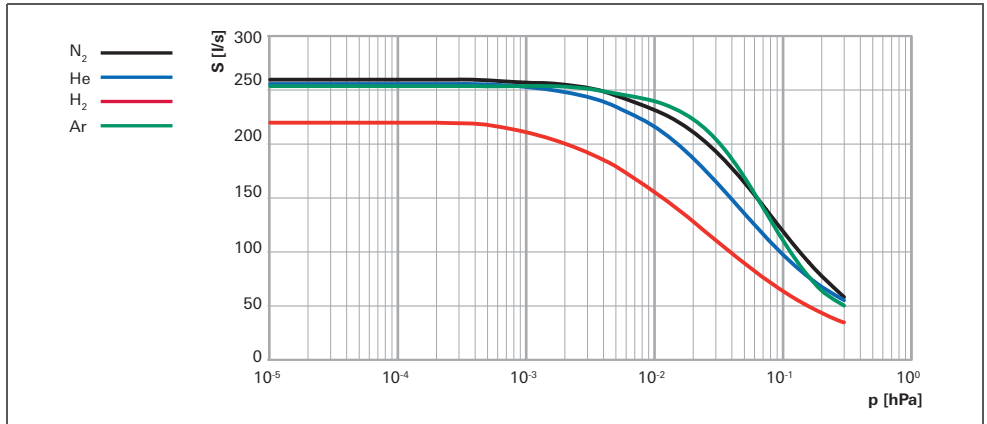
HiPace® 80 for TCP 350, DN 63 ISO-K	HiPace® 80 for TCP 350, DN 63 CF-F	HiPace® 80 for TCP 350, DN 40 ISO-KF
PM P03 943	PM P03 944	PM P03 945
PM Z01 310	PM Z01 310	PM Z01 310
PM Z01 316	PM Z01 316	PM Z01 316
		PF 110 140 -T
		PF 113 240 -T
PM 016 206 -U		
PM 016 208 -U		
PM 016 207 -U		PM 006 375 -X
	PM 016 333	
	PM 016 312	
PM 006 800 -X	PM 006 801 -X	PM 006 799 -X
PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
PM 051 726 -T	PM 051 726 -T	PM 051 726 -T
PM 016 360 -T		
PM 016 362 -T		
PM 016 361 -T		
	PM 016 683 -T	
	PM 016 684 -T	
	PM 016 733 -T	
		PM 016 625 -T
		PM 016 626-T
PM 016 510 -T		
PM 016 512 -T		
PM 016 511 -T		

HiPace® 300

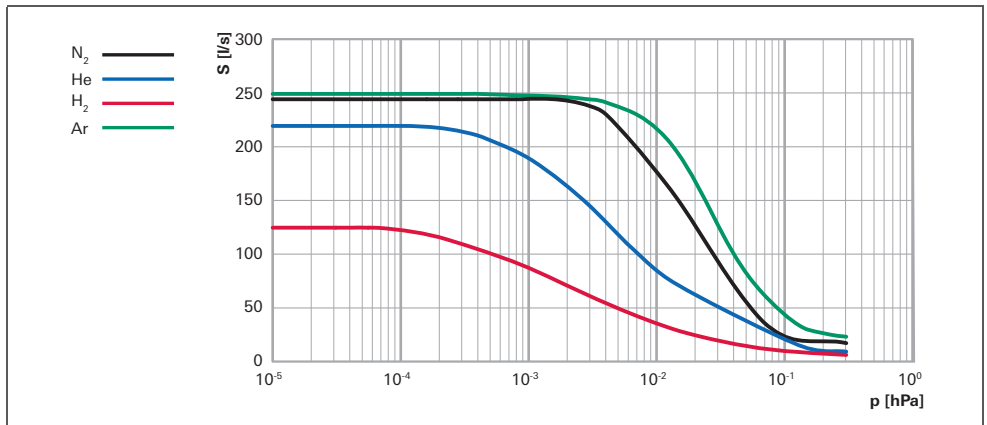


- Rugged, powerful turbopump with a pumping speed of up to 260 l/s for N₂
 - Integrated TC 400 drive electronics
 - Ideal for analytical and industrial applications
 - For installation in any orientation
 - With integrated water cooling for maximum gas throughput
 - Flexible through the ability to employ up to 4 accessories
 - Ideal for fast cycles
 - Extensive accessories expand the range of applications
- C=Corrosive gas version

Pumping speed

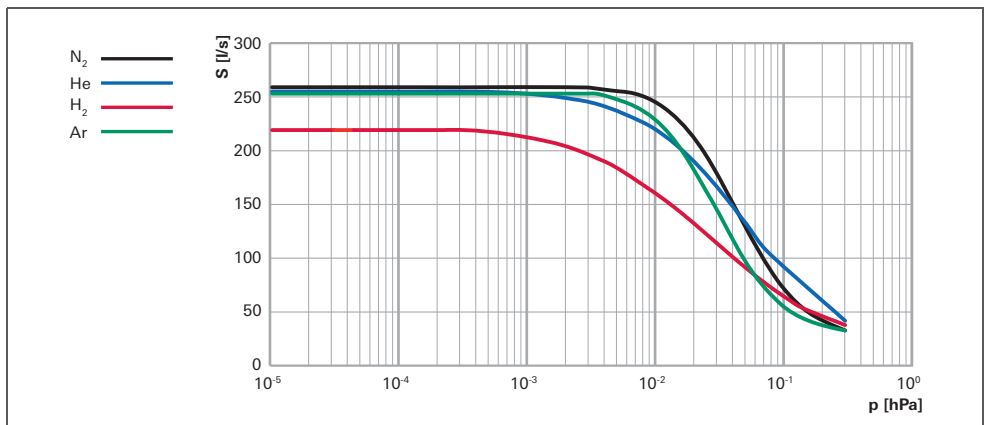


HiPace® 300 with TC 400



HiPace® 300 C with TC 400

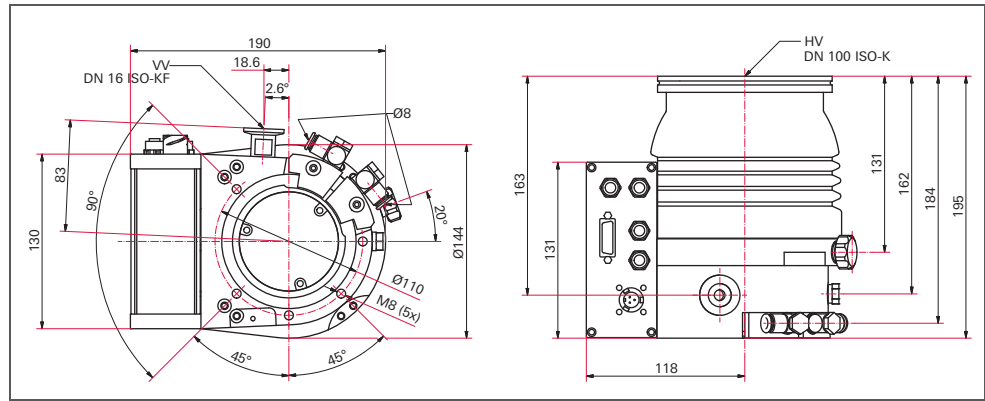
HiPace® 300 P with TC 400



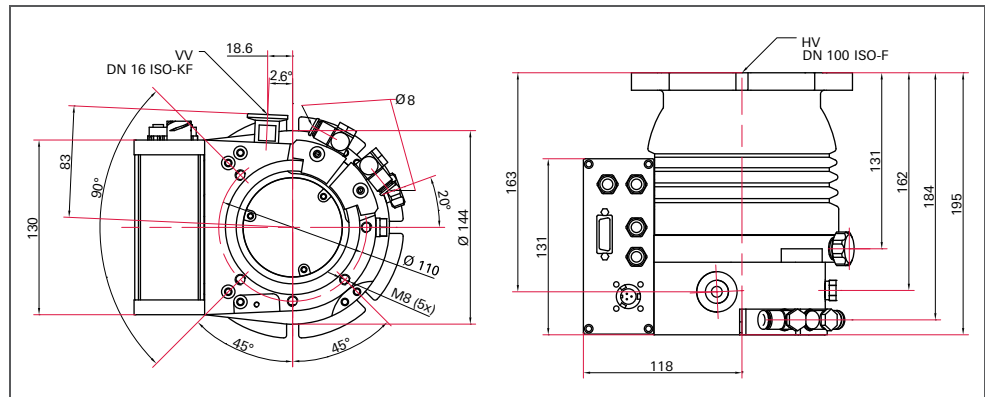
HiPace® 300 with TC 110

HiPace® 300 Plus with TC 110

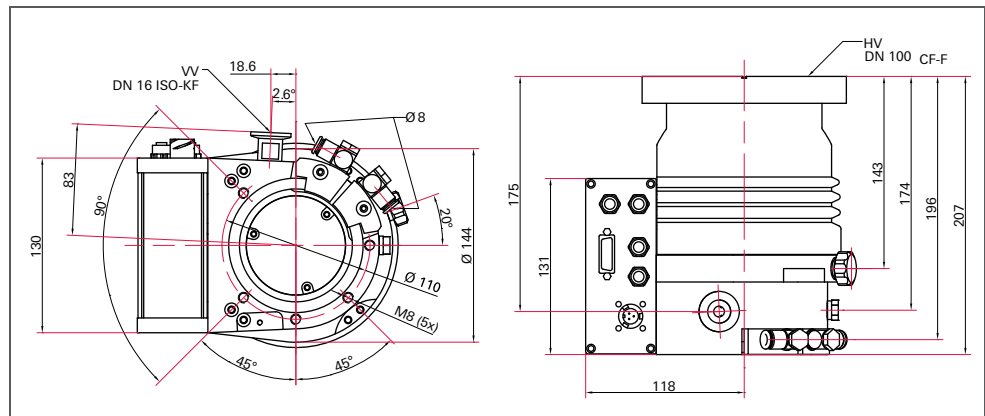
Dimensions (in mm)



HiPace® 300 with TC 400, DN 100 ISO-K



HiPace® 300 with TC 400, DN 100 ISO-F



HiPace® 300 with TC 400, DN 100 CF-F

Technical data	HiPace® 300 with TC 400, DN 100 ISO-K	HiPace® 300 with TC 400, DN 100 CF-F	HiPace® 300 with TC 400, DN 100 ISO-F	HiPace® 300 P with TC 400, DN 100 ISO-K
Connection nominal diameter				
Flange (out)	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"
Flange (in)	DN 100 ISO-K	DN 100 CF-F	DN 100 ISO-F	DN 100 ISO-K
Venting connection	G 1/8"	G 1/8"	G 1/8"	G 1/8"
Pumping speed				
Pumping speed for Ar	255 l/s	255 l/s	255 l/s	250 l/s
Pumping speed for H ₂	220 l/s	220 l/s	220 l/s	125 l/s
Pumping speed for He	255 l/s	255 l/s	255 l/s	220 l/s
Pumping speed for N ₂	260 l/s	260 l/s	260 l/s	245 l/s
Compression				
Compression ratio for Ar	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ⁷
Compression ratio for H ₂	9 · 10 ⁵	9 · 10 ⁵	9 · 10 ⁵	3 · 10 ²
Compression ratio for He	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	2 · 10 ³
Compression ratio for N ₂	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ⁶
Fore-vacuum max. for N₂				
	20 hPa	20 hPa	20 hPa	1 hPa
Gas throughput				
Gas throughput at full rotational speed for Ar	7 hPa l/s	7 hPa l/s	7 hPa l/s	2.9 hPa l/s
Gas throughput at full rotational speed for H ₂	> 14 hPa l/s	> 14 hPa l/s	> 14 hPa l/s	> 20 hPa l/s
Gas throughput at full rotational speed for He	10 hPa l/s	10 hPa l/s	10 hPa l/s	> 10 hPa l/s
Gas throughput at full rotational speed for N ₂	14 hPa l/s	14 hPa l/s	14 hPa l/s	14 hPa l/s
Electronic drive unit	with TC 400	with TC 400	with TC 400	with TC 400
Separate electronic drive unit				
Operating voltage	24 (± 5 %) V DC	24 (± 5 %) V DC	24 (± 5 %) V DC	24 (± 5 %) V DC
Rotation speed ± 2 %	60000 min ⁻¹	60000 min ⁻¹	60000 min ⁻¹	60000 min ⁻¹
Rotation speed variable	35-100 %	35-100 %	35-100 %	35-100 %
Mounting orientation	in any orientation	in any orientation	in any orientation	in any orientation
Ultimate pressure*	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa
Weight	6.7 kg	8.7 kg	7 kg	6.4 kg
Run-up time	1.8 min	1.8 min	1.8 min	1.2 min
Corrosive gas version				
Cooling method, optional	Air	Air	Air	Air
Cooling method, standard	Water	Water	Water	Water
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	50 l/h	50 l/h	50 l/h	50 l/h
Bearing	Hybrid	Hybrid	Hybrid	Hybrid
Particulate matter				YES
Sound pressure level	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54	IP 54
Low vibrations				
Permissible magnetic field max.	5.5 mT	5.5 mT	5.5 mT	5.5 mT
Order number pump	PM P03 900	PM P03 901	PM P03 902	PM P04 710

*Ultimate pressure please find description on page 272

HiPace® 300 P with TC 400, DN 100 CF-F	HiPace® 300 P with TC 400, DN 100 ISO-F	HiPace® 300 C with TC 400, DN 100 ISO-K	HiPace® 300 C with TC 400, DN 100 CF-F	HiPace® 300 C with TC 400, DN 100 ISO-F
DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"
DN 100 CF-F	DN 100 ISO-F	DN 100 ISO-K	DN 100 CF-F	DN 100 ISO-F
G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"
250 l/s	250 l/s	250 l/s	250 l/s	250 l/s
125 l/s	125 l/s	125 l/s	125 l/s	125 l/s
220 l/s	220 l/s	220 l/s	220 l/s	220 l/s
245 l/s	245 l/s	245 l/s	245 l/s	245 l/s
$> 1 \cdot 10^7$	$> 1 \cdot 10^7$	$> 1 \cdot 10^7$	$> 1 \cdot 10^7$	$> 1 \cdot 10^7$
$3 \cdot 10^2$	$3 \cdot 10^2$	$3 \cdot 10^2$	$3 \cdot 10^2$	$3 \cdot 10^2$
$2 \cdot 10^3$	$2 \cdot 10^3$	$2.2 \cdot 10^3$	$2.2 \cdot 10^3$	$2.2 \cdot 10^3$
$> 1 \cdot 10^6$	$> 1 \cdot 10^6$	$> 1 \cdot 10^6$	$> 1 \cdot 10^6$	$> 1 \cdot 10^6$
1 hPa	1 hPa	1 hPa	1 hPa	1 hPa
2.9 hPa l/s	2.9 hPa l/s	4.4 hPa l/s	4.4 hPa l/s	4.4 hPa l/s
> 20 hPa l/s	> 20 hPa l/s	> 50 hPa l/s	> 50 hPa l/s	> 50 hPa l/s
> 10 hPa l/s	> 10 hPa l/s	> 20 hPa l/s	> 20 hPa l/s	> 20 hPa l/s
14 hPa l/s	14 hPa l/s	17 hPa l/s	17 hPa l/s	17 hPa l/s
with TC 400	with TC 400	with TC 400	with TC 400	with TC 400
24 (± 5 %) V DC	24 (± 5 %) V DC	24 (± 5 %) V DC	24 (± 5 %) V DC	24 (± 5 %) V DC
60000 min ⁻¹	60000 min ⁻¹	60000 min ⁻¹	60000 min ⁻¹	60000 min ⁻¹
35-100 %	35-100 %	35-100 %	35-100 %	35-100 %
in any orientation	in any orientation	Standard (0°-90°)	Standard (0°-90°)	Standard (0°-90°)
$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa
8.4 kg	6.7 kg	6.4 kg	8.4 kg	6.7 kg
1.2 min	1.2 min	1.2 min	1.2 min	1.2 min
		YES	YES	YES
Air	Air	Air	Air	Air
Water	Water	Water	Water	Water
15-35 °C	15-35 °C	15-35 °C	15-35 °C	15-35 °C
50 l/h	50 l/h	50 l/h	50 l/h	50 l/h
Hybrid	Hybrid	Hybrid	Hybrid	Hybrid
YES	YES	YES	YES	YES
≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote
IP 54	IP 54	IP 54	IP 54	IP 54
5.5 mT	5.5 mT	5.5 mT	5.5 mT	5.5 mT
PM P04 711	PM P04 712	PM P03 906	PM P03 996	PM P03 907

Accessories	HiPace® 300 with TC 400, DN 100 ISO-K	HiPace® 300 with TC 400, DN 100 CF-F	HiPace® 300 with TC 400, DN 100 ISO-F	HiPace® 300 P with TC 400, DN 100 ISO-K	
Order number pump Pumpe	PM P03 900	PM P03 901	PM P03 902	PM P04 710	
Power supplies/power					
DCU - power supply with display control unit	PM C01 822	PM C01 822	PM C01 822	PM C01 822	
TPS - mains pack for wall/standard rail fitting	PM 061 342 -T	PM 061 342 -T	PM 061 342 -T	PM 061 342 -T	
TPS - mains pack 19" rack module 3 RU	PM 061 346 -T	PM 061 346 -T	PM 061 346 -T	PM 061 346 -T	
Control units					
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T	
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T	
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T	
Mains cable DCU/TPS/TCP, 3 m					
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	
115 V AC mains cable with UL plug	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	
208 V AC mains cable with UL plug	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	
Connection cable, length 3 m between					
Connection cable for HiPace with TC 110 to TPS/DCU 110/111/180/181 with accessorie ports and RS-485					
Connection cable for HiPace with TC 110 to power supply TPS/DCU 110/111/180/181					
Connection cable for HiPace with TC 400/TM 700 to power supply TPS/DCU 310/311/400/401	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T	
TCP 350 - HiPace					
Venting accessories					
Venting valve	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291	
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	
Cooling accessories					
Air cooling	PM Z01 302	PM Z01 302	PM Z01 302	PM Z01 302	
Water cooling					
Heating accessories					
Heating jacket 230 V AC, Euro-style safety plug		PM 061 366 -T			
Heating jacket 208 V AC, UL plug		PM 061 367 -T			
Heating jacket 115 V AC, UL plug		PM 061 368 -T			
Backing pump control					
Backing pump relay box, shielded, 1-phase 20 A	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	
Backing pump relay box, shielded, 1-phase 7 A	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	
Control cable for pumping stations 0.7 m	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	
TCS 15 for controlling backing pumps					
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X	

HiPace® 300 P with TC 400, DN 100 CF-F	HiPace® 300 P with TC 400, DN 100 ISO-F	HiPace® 300 C with TC 400, DN 100 ISO-K	HiPace® 300 C with TC 400, DN 100 CF-F	HiPace® 300 C with TC 400, DN 100 ISO-F
PM P04 711	PM P04 712	PM P03 906	PM P03 996	PM P03 907
PM C01 822	PM C01 822	PM C01 822	PM C01 822	PM C01 822
PM 061 342 -T	PM 061 342 -T	PM 061 342 -T	PM 061 342 -T	PM 061 342 -T
PM 061 346 -T	PM 061 346 -T	PM 061 346 -T	PM 061 346 -T	PM 061 346 -T
PM 061 348 -T	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T
PM 051 510 -T	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T
PM 061 005 -T	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T
P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF
PM 061 352 -T	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T
PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291
PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121
PM Z01 302	PM Z01 302	PM Z01 302	PM Z01 302	PM Z01 302
PM 061 366 -T			PM 061 366 -T	
PM 061 367 -T			PM 061 367 -T	
PM 061 368 -T			PM 061 368 -T	
PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T
PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T
PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205
PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206
PM 071 142 -X	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X

Accessories	HiPace® 300 with TC 400, DN 100 ISO-K	HiPace® 300 with TC 400, DN 100 CF-F	HiPace® 300 with TC 400, DN 100 ISO-F	HiPace® 300 P with TC 400, DN 100 ISO-K	
Order number pump Pumpe	PM P03 900	PM P03 901	PM P03 902	PM P04 710	
General accessories					
Sealing gas valve	PM Z01 312	PM Z01 312	PM Z01 312	PM Z01 312	
Sealing gas throttle	PM Z01 317	PM Z01 317	PM Z01 317	PM Z01 317	
Centering ring coated	PM 016 210 -U		PM 016 210 -U	PM 016 210 -U	
Centering ring coated with protection screen	PM 016 212 -U		PM 016 212 -U	PM 016 212 -U	
Centering ring coated with splinter shield	PM 016 211 -U		PM 016 211 -U	PM 016 211 -U	
Protection screen		PM 016 336			
Splinter shield		PM 016 315			
Vibration dampers	PM 006 459 -X	PM 006 488 -X		PM 006 459 -X	
Vibration isolator					
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010	P 4723 010	
Y-connector M12 for accessories	P 4723 013	P 4723 013	P 4723 013		
TCS 11, adapter for TC 110 with interface RS-485					
TCS 12, adapter for TC 110 with interface RS-485, 4 accessory ports					
Mounting materials					
Centering ring coated, bracket screws	PM 016 365 -T			PM 016 365 -T	
Centering ring coated with protection screen, bracket screws	PM 016 367 -T			PM 016 367 -T	
Centering ring coated with splinter shield, bracket screws	PM 016 366 -T			PM 016 366 -T	
Centering ring coated with hexagon bolts			PM 016 450 -T		
Centering ring coated with protection screen, hexagon bolts			PM 016 452 -T		
Centering ring coated with splinter shield, hexagon bolts			PM 016 451 -T		
Centering ring coated with stud screws			PM 016 455 -T		
Centering ring coated with protection screen with stud screws			PM 016 457 -T		
Centering ring coated with splinter shield with stud screws			PM 016 456 -T		
Set of hexagon screws for trough hole (CF-F)		PM 016 690 -T			
Set of stud screws for tapped hole (CF-F)		PM 016 692 -T			
Set of stud screws for trough hole (CF)		PM 016 734 -T			

HiPace® 300 P with TC 400, DN 100 CF-F	HiPace® 300 P with TC 400, DN 100 ISO-F	HiPace® 300 C with TC 400, DN 100 ISO-K	HiPace® 300 C with TC 400, DN 100 CF-F	HiPace® 300 C with TC 400, DN 100 ISO-F
PM P04 711	PM P04 712	PM P03 906	PM P03 996	PM P03 907
PM Z01 312	PM Z01 312	PM Z01 312	PM Z01 312	PM Z01 312
PM Z01 317	PM Z01 317	PM Z01 317	PM Z01 317	PM Z01 317
	PM 016 210 -U	PM 016 210 -U		PM 016 210 -U
	PM 016 212 -U	PM 016 212 -U		PM 016 212 -U
	PM 016 211 -U	PM 016 211 -U		PM 016 211 -U
PM 016 336			PM 016 336	
PM 016 315			PM 016 315	
PM 006 488 -X		PM 006 459 -X	PM 006 488 -X	
PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T
P 4723 010	P 4723 010	P 4723 010	P 4723 010	P 4723 010
		P 4723 013	P 4723 013	P 4723 013
		PM 016 365 -T		
		PM 016 367 -T		
		PM 016 366 -T		
	PM 016 450 -T			PM 016 450 -T
	PM 016 452 -T			PM 016 452 -T
	PM 016 451 -T			PM 016 451 -T
	PM 016 455 -T			PM 016 455 -T
	PM 016 457 -T			PM 016 457 -T
	PM 016 456 -T			PM 016 456 -T
PM 016 690 -T			PM 016 690 -T	
PM 016 692 -T			PM 016 692 -T	
PM 016 734 -T			PM 016 734 -T	

Technical data	HiPace® 300 Plus with TC 110, DN 100 ISO-K	HiPace® 300 Plus with TC 110, DN 100 CF-F	HiPace® 300 Plus with TC 110, DN 100 ISO-F	HiPace® 300 with TC 110, DN 100 ISO-K
Connection nominal diameter				
Flange (out)	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"
Flange (in)	DN 100 ISO-K	DN 100 CF-F	DN 100 ISO-F	DN 100 ISO-K
Venting connection	G 1/8"	G 1/8"	G 1/8"	G 1/8"
Pumping speed				
Pumping speed for Ar	255 l/s	255 l/s	255 l/s	255 l/s
Pumping speed for H ₂	220 l/s	220 l/s	220 l/s	220 l/s
Pumping speed for He	255 l/s	255 l/s	255 l/s	255 l/s
Pumping speed for N ₂	260 l/s	260 l/s	260 l/s	260 l/s
Compression				
Compression ratio for Ar	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Compression ratio for H ₂	9 · 10 ⁵	9 · 10 ⁵	9 · 10 ⁵	9 · 10 ⁵
Compression ratio for He	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸
Compression ratio for N ₂	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Fore-vacuum max. for N₂				
	15 hPa	15 hPa	15 hPa	15 hPa
Gas throughput				
Gas throughput at full rotational speed for Ar	2 hPa l/s	2 hPa l/s	2 hPa l/s	2 hPa l/s
Gas throughput at full rotational speed for H ₂	> 14 hPa l/s	> 14 hPa l/s	> 14 hPa l/s	> 14 hPa l/s
Gas throughput at full rotational speed for He	8 hPa l/s	8 hPa l/s	8 hPa l/s	8 hPa l/s
Gas throughput at full rotational speed for N ₂	5 hPa l/s	5 hPa l/s	5 hPa l/s	5 hPa l/s
Electronic drive unit	with TC 110	with TC 110	with TC 110	with TC 110
Separate electronic drive unit				
Operating voltage	24 (± 5 %) V DC	24 (± 5 %) V DC	24 (± 5 %) V DC	24 (± 5 %) V DC
Rotation speed ± 2 %	60000 min ⁻¹	60000 min ⁻¹	60000 min ⁻¹	60000 min ⁻¹
Rotation speed variable	35-100 %	35-100 %	35-100 %	35-100 %
Mounting orientation	vertical, flange up	vertical, flange up	vertical, flange up	in any orientation
Ultimate pressure*	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa
Weight	5.8 kg	7.8 kg	6.1 kg	6.2 kg
Run-up time	3.5 min	3.5 min	3.5 min	3.5 min
Corrosive gas version				
Cooling method, optional	Water	Water	Water	Water
Cooling method, standard	Air	Air	Air	Air
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	50 l/h	50 l/h	50 l/h	50 l/h
Bearing	Hybrid	Hybrid	Hybrid	Hybrid
Particulate matter				
Sound pressure level	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54	IP 54
Low vibrations	YES	YES	YES	
Permissible magnetic field max.	5.5 mT	5.5 mT	5.5 mT	5.5 mT
Order number pump Pumpe	PM P03 980	PM P03 981	PM P03 982	PM P03 990

*Ultimate pressure please find description on page 272

HiPace® 300 with TC 110, DN 100 CF-F	HiPace® 300 with TC 110, DN 100 ISO-F	HiPace® 300 for TCP 350, DN 100 ISO-K	HiPace® 300 for TCP 350, DN 100 CF-F	HiPace® 300 for TCP 350, DN 100 ISO-F
DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"
DN 100 CF-F	DN 100 ISO-F	DN 100 ISO-K	DN 100 CF-F	DN 100 ISO-F
G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"
255 l/s	255 l/s	255 l/s	255 l/s	255 l/s
220 l/s	220 l/s	220 l/s	220 l/s	220 l/s
255 l/s	255 l/s	255 l/s	255 l/s	255 l/s
260 l/s	260 l/s	260 l/s	260 l/s	260 l/s
$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
$9 \cdot 10^5$	$9 \cdot 10^5$	$9 \cdot 10^5$	$9 \cdot 10^5$	$9 \cdot 10^5$
$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
15 hPa	15 hPa	17 hPa	17 hPa	17 hPa
2 hPa l/s	2 hPa l/s	4 hPa l/s	4 hPa l/s	4 hPa l/s
> 14 hPa l/s	> 14 hPa l/s	> 14 hPa l/s	> 14 hPa l/s	> 14 hPa l/s
8 hPa l/s	8 hPa l/s	11 hPa l/s	11 hPa l/s	11 hPa l/s
5 hPa l/s	5 hPa l/s	7 hPa l/s	7 hPa l/s	7 hPa l/s
with TC 110	with TC 110	for TCP 350	for TCP 350	for TCP 350
		YES	YES	YES
24 (± 5 %) V DC	24 (± 5 %) V DC			
60000 min ⁻¹	60000 min ⁻¹	60000 min ⁻¹	60000 min ⁻¹	60000 min ⁻¹
35-100 %	35-100 %	35-100 %	35-100 %	35-100 %
in any orientation	in any orientation	in any orientation	in any orientation	in any orientation
$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa
8.2 kg	6.5 kg	5.8 kg	7.8 kg	6.1 kg
3.5 min	3.5 min	2.5 min	2.5 min	2.5 min
Water	Water	Air	Air	Air
Air	Air	Water	Water	Water
15-35 °C	15-35 °C	15-35 °C	15-35 °C	15-35 °C
50 l/h	50 l/h	50 l/h	50 l/h	50 l/h
Hybrid	Hybrid	Hybrid	Hybrid	Hybrid
≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote
IP 54	IP 54	IP 54	IP 54	IP 54
5.5 mT	5.5 mT	5.5 mT	5.5 mT	5.5 mT
PM P03 991	PM P03 992	PM P03 993	PM P03 994	PM P03 995

Accessories	HiPace® 300 Plus with TC 110, DN 100 ISO-K	HiPace® 300 Plus with TC 110, DN 100 CF-F	HiPace® 300 Plus with TC 110, DN 100 ISO-F	HiPace® 300 with TC 110, DN 100 ISO-K	
Order number pump Pumpe	PM P03 980	PM P03 981	PM P03 982	PM P03 990	
Power supplies/power					
DCU - power supply with display control unit	PM C01 821	PM C01 821	PM C01 821	PM C01 821	
TPS - mains pack for wall/standard rail fitting	PM 061 341 -T	PM 061 341 -T	PM 061 341 -T	PM 061 341 -T	
TPS - mains pack 19" rack module 3 RU	PM 061 345 -T	PM 061 345 -T	PM 061 345 -T	PM 061 345 -T	
Control units					
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T	
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T	
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T	
Mains cable DCU/TPS/TCP, 3 m					
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	
115 V AC mains cable with UL plug	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	
208 V AC mains cable with UL plug	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	
Connection cable, length 3 m between					
Connection cable for HiPace with TC 110 to TPS/DCU 110/111/180/181 with accessorie ports and RS-485	PM 061 351 -T	PM 061 351 -T	PM 061 351 -T	PM 061 351 -T	
Connection cable for HiPace with TC 110 to power supply TPS/DCU 110/111/180/181	PM 061 350 -T	PM 061 350 -T	PM 061 350 -T	PM 061 350 -T	
Connection cable for HiPace with TC 400/TM 700 to power supply TPS/DCU 310/311/400/401					
TCP 350 - HiPace					
External drive units					
TCP 350					
TCP 350 PB - Profibus					
TCP 350 DN - DeviceNet					
Venting accessories					
Venting valve	PM Z01 290	PM Z01 290	PM Z01 290	PM Z01 290	
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	
Cooling accessories					
Air cooling	PM Z01 301	PM Z01 301	PM Z01 301	PM Z01 301	
Water cooling	PM 016 624 -T	PM 016 624 -T	PM 016 624 -T	PM 016 624 -T	
Heating accessories					
Heating jacket 230 V AC, Euro-style safety plug		PM 061 363 -T			
Heating jacket 208 V AC, UL plug		PM 061 364 -T			
Heating jacket 115 V AC, UL plug		PM 061 365 -T			
Backing pump control					
Backing pump relay box, shielded, 1-phase 20 A	PM 061 373 -T	PM 061 373 -T	PM 061 373 -T	PM 061 373 -T	
Backing pump relay box, shielded, 1-phase 7 A	PM 071 282 -X	PM 071 282 -X	PM 071 282 -X	PM 071 282 -X	
Control cable for pumping stations 0.7 m					
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	
TCS 15 for controlling backing pumps	PM 061 685 -X	PM 061 685 -X	PM 061 685 -X	PM 061 685 -X	
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X	

HiPace® 300 with TC 110, DN 100 CF-F	HiPace® 300 with TC 110, DN 100 ISO-F	HiPace® 300 for TCP 350, DN 100 ISO-K	HiPace® 300 for TCP 350, DN 100 CF-F	HiPace® 300 for TCP 350, DN 100 ISO-F
PM P03 991	PM P03 992	PM P03 993	PM P03 994	PM P03 995
PM C01 821	PM C01 821			
PM 061 341 -T	PM 061 341 -T			
PM 061 345 -T	PM 061 345 -T			
PM 061 348 -T	PM 061 348 -T			
PM 051 510 -T	PM 051 510 -T			
PM 061 005 -T	PM 061 005 -T			
P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF
PM 061 351 -T	PM 061 351 -T			
PM 061 350 -T	PM 061 350 -T			
		PM 061 356 -T	PM 061 356 -T	PM 061 356 -T
		PM C01 740	PM C01 740	PM C01 740
		PM C01 741	PM C01 741	PM C01 741
		PM C01 742	PM C01 742	PM C01 742
PM Z01 290	PM Z01 290	PM Z01 291	PM Z01 291	PM Z01 291
PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121
PM Z01 301	PM Z01 301	PM Z01 302	PM Z01 302	PM Z01 302
PM 016 624 -T	PM 016 624 -T			
PM 061 363 -T			PM 061 366 -T	
PM 061 364 -T			PM 061 367 -T	
PM 061 365 -T			PM 061 368 -T	
PM 061 373 -T	PM 061 373 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T
PM 071 282 -X	PM 071 282 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205
PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206
PM 061 685 -X	PM 061 685 -X			
PM 071 142 -X	PM 071 142 -X			

Accessories	HiPace® 300 Plus with TC 110, DN 100 ISO-K	HiPace® 300 Plus with TC 110, DN 100 CF-F	HiPace® 300 Plus with TC 110, DN 100 ISO-F	HiPace® 300 with TC 110, DN 100 ISO-K	
Order number pump Pumpe	PM P03 980	PM P03 981	PM P03 982	PM P03 990	
General accessories					
Sealing gas valve	PM Z01 311	PM Z01 311	PM Z01 311	PM Z01 311	
Sealing gas throttle	PM Z01 317	PM Z01 317	PM Z01 317	PM Z01 317	
Centering ring coated	PM 016 210 -U		PM 016 210 -U	PM 016 210 -U	
Centering ring coated with protection screen	PM 016 212 -U		PM 016 212 -U	PM 016 212 -U	
Centering ring coated with splinter shield	PM 016 211 -U		PM 016 211 -U	PM 016 211 -U	
Protection screen		PM 016 336			
Splinter shield		PM 016 315			
Vibration dampers	PM 006 459 -X	PM 006 488 -X		PM 006 459 -X	
Vibration isolator	PM 016 600 -U	PM 016 715 -U	PM 016 600 -U		
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010	P 4723 010	
Y-connector M12 for accessories					
Connection cable RJ 45 on M 12					
TCS 11, adapter for TC 110 with interface RS-485	PM 061 636 -U	PM 061 636 -U	PM 061 636 -U	PM 061 636 -U	
TCS 12, adapter for TC 110 with interface RS-485, 4 accessory ports	PM 061 638 -U	PM 061 638 -U	PM 061 638 -U	PM 061 638 -U	
Mounting materials					
Centering ring coated, bracket screws	PM 016 365 -T			PM 016 365 -T	
Centering ring coated with protection screen, bracket screws	PM 016 367 -T			PM 016 367 -T	
Centering ring coated with splinter shield, bracket screws	PM 016 366 -T			PM 016 366 -T	
Centering ring coated with hexagon bolts			PM 016 450 -T		
Centering ring coated with protection screen, hexagon bolts			PM 016 452 -T		
Centering ring coated with splinter shield, hexagon bolts			PM 016 451 -T		
Centering ring coated with stud screws			PM 016 455 -T		
Centering ring coated with protection screen with stud screws			PM 016 457 -T		
Centering ring coated with splinter shield with stud screws			PM 016 456 -T		
Set of hexagon screws for trough hole (CF-F)		PM 016 690 -T			
Set of stud screws for tapped hole (CF-F)		PM 016 692 -T			
Set of stud screws for trough hole (CF)		PM 016 734 -T			

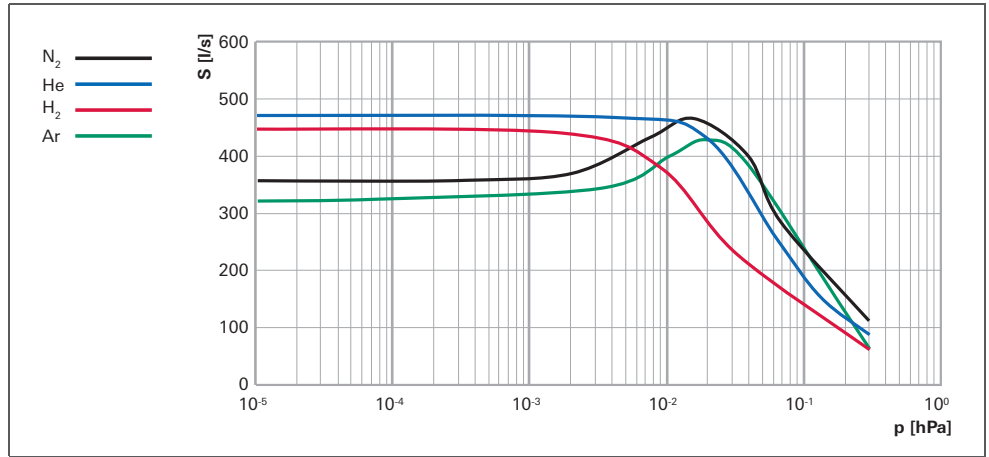
HiPace® 300 with TC 110, DN 100 CF-F	HiPace® 300 with TC 110, DN 100 ISO-F	HiPace® 300 for TCP 350, DN 100 ISO-K	HiPace® 300 for TCP 350, DN 100 CF-F	HiPace® 300 for TCP 350, DN 100 ISO-F
PM P03 991	PM P03 992	PM P03 993	PM P03 994	PM P03 995
PM Z01 311	PM Z01 311	PM Z01 311 PM Z01 312	PM Z01 311 PM Z01 312	PM Z01 311 PM Z01 312
PM Z01 317	PM Z01 317	PM Z01 317	PM Z01 317	PM Z01 317
	PM 016 210 -U	PM 016 210 -U		PM 016 210 -U
	PM 016 212 -U	PM 016 212 -U		PM 016 212 -U
	PM 016 211 -U	PM 016 211 -U		PM 016 211 -U
PM 016 336			PM 016 336	
PM 016 315			PM 016 315	
PM 006 488 -X		PM 006 459 -X	PM 006 488 -X	
PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
PM 061 283 -T	PM 061 283 -T			
P 4723 010	P 4723 010			
		PM 051 726 -T	PM 051 726 -T	PM 051 726 -T
PM 061 636 -U	PM 061 636 -U			
PM 061 638 -U	PM 061 638 -U			
		PM 016 365 -T		
		PM 016 367 -T		
		PM 016 366 -T		
	PM 016 450 -T			PM 016 450 -T
	PM 016 452 -T			PM 016 452 -T
	PM 016 451 -T			PM 016 451 -T
	PM 016 455 -T			PM 016 455 -T
	PM 016 457 -T			PM 016 457 -T
	PM 016 456 -T			PM 016 456 -T
PM 016 690 -T			PM 016 690 -T	
PM 016 692 -T			PM 016 692 -T	
PM 016 734 -T			PM 016 734 -T	

HiPace® 400

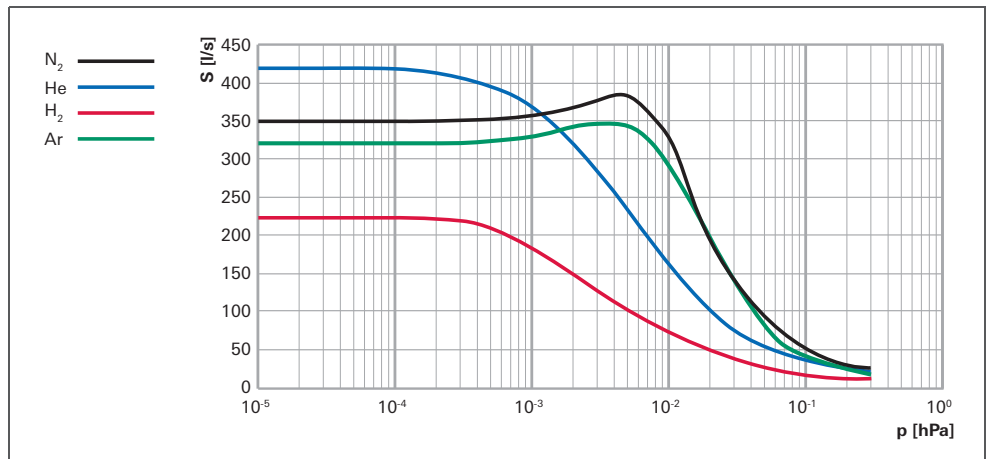


- Compact yet powerful turbopump with a pumping speed up to 355 l/s for N₂
- Integrated TC 400 drive electronics
- For installation in any orientation
- Integrated, powerful cooling system

Pumping speed

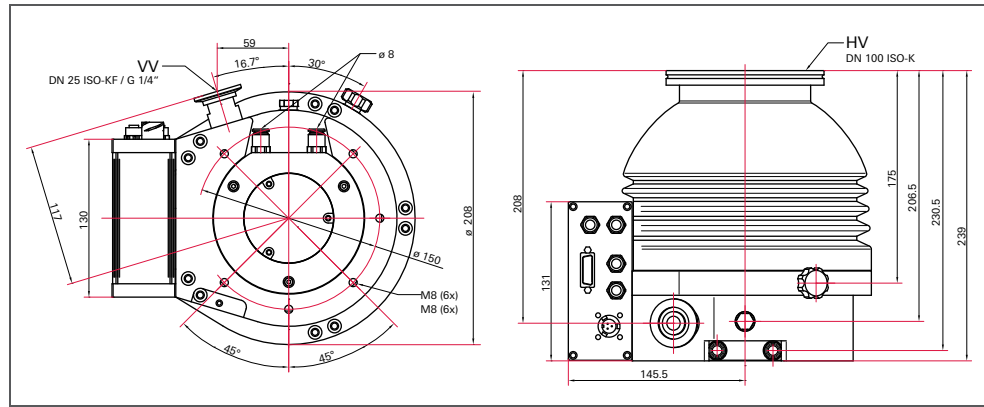


HiPace® 400

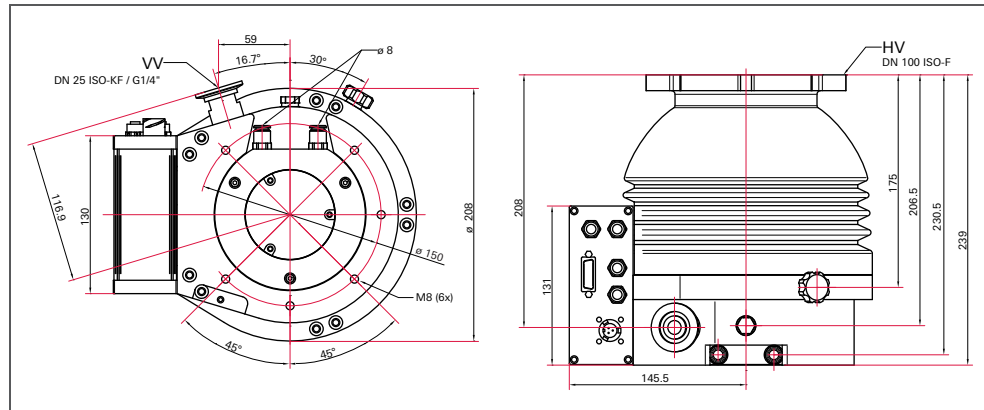


HiPace® 400 P with TC 400

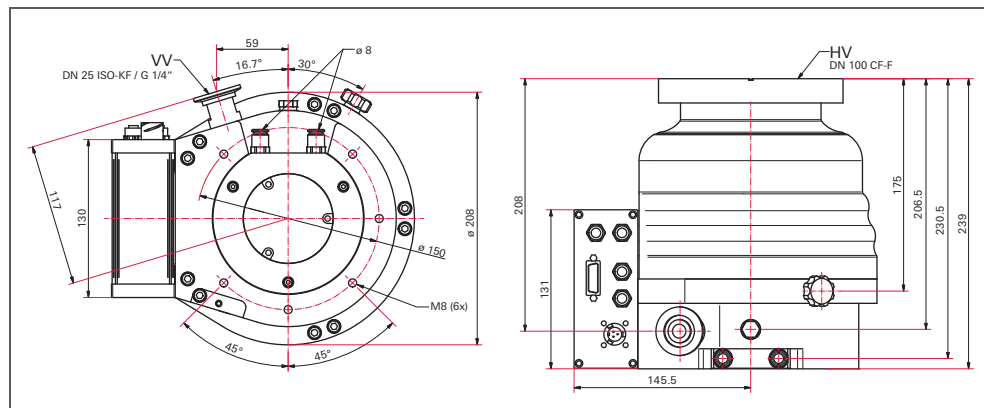
Dimensions (in mm)



HiPace® 400 with TC 400, DN 100 ISO-K



HiPace® 400 with TC 400, DN 100 ISO-F



HiPace® 400 with TC 400, DN 100 CF-F

Technical data	HiPace® 400 with TC 400, DN 100 ISO-K	HiPace® 400 with TC 400, DN 100 CF-F	HiPace® 400 with TC 400, DN 100 ISO-F	HiPace® 400 for TCP 350, DN 100 ISO-K
Connection nominal diameter				
Flange (out)	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"
Flange (in)	DN 100 ISO-K	DN 100 CF-F	DN 100 ISO-F	DN 100 ISO-K
Venting connection	G 1/8"	G 1/8"	G 1/8"	G 1/8"
Pumping speed				
Pumping speed for Ar	320 l/s	320 l/s	320 l/s	320 l/s
Pumping speed for H ₂	445 l/s	445 l/s	445 l/s	445 l/s
Pumping speed for He	470 l/s	470 l/s	470 l/s	470 l/s
Pumping speed for N ₂	355 l/s	355 l/s	355 l/s	355 l/s
Compression				
Compression ratio for Ar	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Compression ratio for H ₂	4 · 10 ⁵	4 · 10 ⁵	4 · 10 ⁵	4 · 10 ⁵
Compression ratio for He	3 · 10 ⁷	3 · 10 ⁷	3 · 10 ⁷	3 · 10 ⁷
Compression ratio for N ₂	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Fore-vacuum max. for N₂				
	11 hPa	11 hPa	11 hPa	10 hPa
Gas throughput				
Gas throughput at full rotational speed for Ar	3.5 hPa l/s	3.5 hPa l/s	3.5 hPa l/s	1.5 hPa l/s
Gas throughput at full rotational speed for H ₂	> 14 hPa l/s	> 14 hPa l/s	> 14 hPa l/s	> 8 hPa l/s
Gas throughput at full rotational speed for He	20 hPa l/s	20 hPa l/s	20 hPa l/s	5 hPa l/s
Gas throughput at full rotational speed for N ₂	6.5 hPa l/s	6.5 hPa l/s	6.5 hPa l/s	3 hPa l/s
Electronic drive unit	with TC 400	with TC 400	with TC 400	for TCP 350
Separate electronic drive unit				YES
Operating voltage	48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC	
Rotation speed ± 2 %	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹
Rotation speed variable	60-100 %	60-100 %	60-100 %	60-100 %
Mounting orientation	in any orientation	in any orientation	in any orientation	in any orientation
Ultimate pressure*	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa
Weight	11.6 kg	17.5 kg	12 kg	10.7 kg
Run-up time	2 min	2 min	2 min	5.5 min
Cooling method, optional	Air	Air	Air	Air
Cooling method, standard	Water	Water	Water	Water
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	100 l/h	100 l/h	100 l/h	100 l/h
Bearing	Hybrid	Hybrid	Hybrid	Hybrid
Particulate matter				
Sound pressure level	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54	IP 54
Permissible magnetic field max.	6 mT	6 mT	6 mT	6 mT
Order number pump Pumpe				
	PM P04 023	PM P04 024	PM P04 025	PM P04 026

*Ultimate pressure please find description on page 272

HiPace® 400 for TCP 350, DN 100 CF-F	HiPace® 400 for TCP 350, DN 100 ISO-F	HiPace® 400 P with TC 400, DN 100 ISO-K	HiPace® 400 P with TC 400, DN 100 CF-F	HiPace® 400 P with TC 400, DN 100 ISO-F
DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"
DN 100 CF-F	DN 100 ISO-F	DN 100 ISO-K	DN 100 CF-F	DN 100 ISO-F
G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"
320 l/s	320 l/s	320 l/s	320 l/s	320 l/s
445 l/s	445 l/s	225 l/s	225 l/s	225 l/s
470 l/s	470 l/s	420 l/s	420 l/s	420 l/s
355 l/s	355 l/s	350 l/s	350 l/s	350 l/s
$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^7$	$> 1 \cdot 10^7$	$> 1 \cdot 10^7$
$4 \cdot 10^5$	$4 \cdot 10^5$	$4 \cdot 10^2$	$4 \cdot 10^2$	$4 \cdot 10^2$
$3 \cdot 10^7$	$3 \cdot 10^7$	$3 \cdot 10^3$	$3 \cdot 10^3$	$3 \cdot 10^3$
$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^6$	$> 1 \cdot 10^6$	$> 1 \cdot 10^6$
10 hPa	10 hPa	0.9 hPa	0.9 hPa	0.9 hPa
1.5 hPa l/s	1.5 hPa l/s	1 hPa l/s	1 hPa l/s	1 hPa l/s
> 8 hPa l/s	> 8 hPa l/s	4 hPa l/s	4 hPa l/s	4 hPa l/s
5 hPa l/s	5 hPa l/s	4 hPa l/s	4 hPa l/s	4 hPa l/s
3 hPa l/s	3 hPa l/s	2 hPa l/s	2 hPa l/s	2 hPa l/s
for TCP 350	for TCP 350	with TC 400	with TC 400	with TC 400
YES	YES			
		48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC
49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹
60-100 %	60-100 %	60-100 %	60-100 %	60-100 %
in any orientation	in any orientation	in any orientation	in any orientation	in any orientation
$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa
16.6 kg	11.1 kg	10.9 kg	16.8 kg	11.3 kg
5.5 min	5.5 min	1.6 min	1.6 min	1.6 min
Air	Air	Air	Air	Air
Water	Water	Water	Water	Water
15-35 °C	15-35 °C	15-35 °C	15-35 °C	15-35 °C
100 l/h	100 l/h	100 l/h	100 l/h	100 l/h
Hybrid	Hybrid	Hybrid	Hybrid	Hybrid
		YES	YES	YES
≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote
IP 54	IP 54	IP 54	IP 54	IP 54
6 mT	6 mT	6 mT	6 mT	6 mT
PM P04 027	PM P04 028	PM P04 740	PM P04 741	PM P04 742

Accessories	HiPace® 400 with TC 400, DN 100 ISO-K	HiPace® 400 with TC 400, DN 100 CF-F	HiPace® 400 with TC 400, DN 100 ISO-F	HiPace® 400 for TCP 350, DN 100 ISO-K	
Order number pump Pumpe	PM P04 023	PM P04 024	PM P04 025	PM P04 026	
Power supplies/power					
DCU - power supply with display control unit	PM C01 823	PM C01 823	PM C01 823		
TPS - mains pack for wall/standard rail fitting	PM 061 343 -T	PM 061 343 -T	PM 061 343 -T		
TPS - mains pack1 19" rack module 3 RU	PM 061 347 -T	PM 061 347 -T	PM 061 347 -T		
Control units					
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T		
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T		
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T		
Mains cable DCU/TPS/TCP, 3 m					
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	
115 V AC mains cable with UL plug	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	
208 V AC mains cable with UL plug	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	
Connection cable, length 3 m between					
Connection cable for HiPace with TC 400/TM 700 to power supply TPS/DCU 310/311/400/401	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T		
TCP 350 - HiPace				PM 061 356 -T	
External drive units					
TCP 350				PM C01 740	
TCP 350 PB - Profibus				PM C01 741	
TCP 350 DN - DeviceNet				PM C01 742	
Venting accessories					
Venting valve	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291	
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	
Cooling accessories					
Air cooling	PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303	
Heating accessories					
Heating jacket 230 V AC, Euro-style safety plug		PM 061 369 -T			
Heating jacket 208 V AC, UL plug		PM 061 370 -T			
Heating jacket 115 V AC, UL plug		PM 061 371 -T			
Backing pump control					
Backing pump relay box, shielded, 1-phase 20 A	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	
Backing pump relay box, shielded, 1-phase 7 A	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	
Control cable for pumping stations 0.7 m	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T		
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	
Adapter cable, TCP 350 - backing pump relay box, M12				PM 061 377 -T	
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X		

HiPace® 400 for TCP 350, DN 100 CF-F	HiPace® 400 for TCP 350, DN 100 ISO-F	HiPace® 400 P with TC 400, DN 100 ISO-K	HiPace® 400 P with TC 400, DN 100 CF-F	HiPace® 400 P with TC 400, DN 100 ISO-F
PM P04 027	PM P04 028	PM P04 740	PM P04 741	PM P04 742
		PM C01 822	PM C01 822	PM C01 822
		PM 061 342 -T	PM 061 342 -T	PM 061 342 -T
		PM 061 346 -T	PM 061 346 -T	PM 061 346 -T
		PM 061 348 -T	PM 061 348 -T	PM 061 348 -T
		PM 051 510 -T	PM 051 510 -T	PM 051 510 -T
		PM 061 005 -T	PM 061 005 -T	PM 061 005 -T
P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF
		PM 061 352 -T	PM 061 352 -T	PM 061 352 -T
PM 061 356 -T	PM 061 356 -T			
PM C01 740	PM C01 740			
PM C01 741	PM C01 741			
PM C01 742	PM C01 742			
PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291
PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121
PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303
PM 061 369 -T			PM 061 369 -T	
PM 061 370 -T			PM 061 370 -T	
PM 061 371 -T			PM 061 371 -T	
PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T
PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
		PM 061 675 -T	PM 061 675 -T	PM 061 675 -T
PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205
PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206
PM 061 377 -T	PM 061 377 -T			
		PM 071 142 -X	PM 071 142 -X	PM 071 142 -X

Accessories	HiPace® 400 with TC 400, DN 100 ISO-K	HiPace® 400 with TC 400, DN 100 CF-F	HiPace® 400 with TC 400, DN 100 ISO-F	HiPace® 400 for TCP 350, DN 100 ISO-K	
Order number pump Pumpe	PM P04 023	PM P04 024	PM P04 025	PM P04 026	
General accessories					
Sealing gas valve	PM Z01 312	PM Z01 312	PM Z01 312	PM Z01 312	
Sealing gas throttle	PM Z01 317	PM Z01 317	PM Z01 317	PM Z01 317	
Centering ring coated	PM 016 210 -U		PM 016 210 -U	PM 016 210 -U	
Centering ring coated with protection screen	PM 016 212 -U		PM 016 212 -U	PM 016 212 -U	
Centering ring coated with splinter shield	PM 016 211 -U		PM 016 211 -U	PM 016 211 -U	
Protection screen		PM 016 336			
Splinter shield		PM 016 315			
Vibration dampers	PM 006 459 -X	PM 006 488 -X		PM 006 459 -X	
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T		
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010		
Y-connector M12 for accessories	P 4723 013	P 4723 013	P 4723 013		
Connection cable RJ 45 on M 12				PM 051 726 -T	
Mounting materials					
Centering ring coated, bracket screws	PM 016 380 -T			PM 016 380 -T	
Centering ring coated with protection screen, bracket screws	PM 016 382 -T			PM 016 382 -T	
Centering ring coated with splinter shield, bracket screws	PM 016 381 -T			PM 016 381 -T	
Centering ring coated with hexagon bolts			PM 016 450 -T		
Centering ring coated with protection screen, hexagon bolts			PM 016 452 -T		
Centering ring coated with splinter shield, hexagon bolts			PM 016 451 -T		
Centering ring coated with stud screws			PM 016 455 -T		
Centering ring coated with protection screen with stud screws			PM 016 457 -T		
Centering ring coated with splinter shield with stud screws			PM 016 456 -T		
Set of hexagon screws for trough hole (CF-F)		PM 016 690 -T			
Set of stud screws for tapped hole (CF-F)		PM 016 692 -T			
Set of stud screws for trough hole (CF)		PM 016 734 -T			

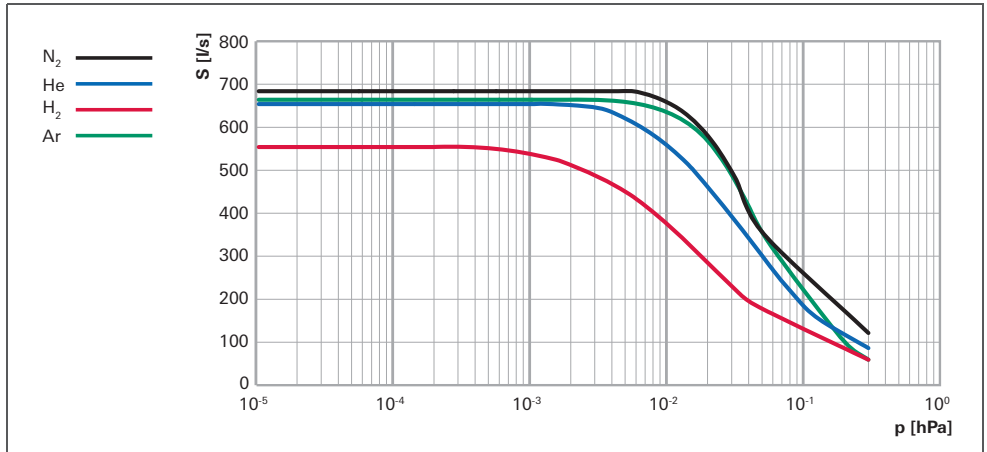
HiPace® 400 for TCP 350, DN 100 CF-F	HiPace® 400 for TCP 350, DN 100 ISO-F	HiPace® 400 P with TC 400, DN 100 ISO-K	HiPace® 400 P with TC 400, DN 100 CF-F	HiPace® 400 P with TC 400, DN 100 ISO-F
PM P04 027	PM P04 028	PM P04 740	PM P04 741	PM P04 742
PM Z01 312	PM Z01 312	PM Z01 313	PM Z01 313	PM Z01 313
PM Z01 317	PM Z01 317	PM Z01 318	PM Z01 318	PM Z01 318
	PM 016 210 -U	PM 016 210 -U		PM 016 210 -U
	PM 016 212 -U	PM 016 212 -U		PM 016 212 -U
	PM 016 211 -U	PM 016 211 -U		PM 016 211 -U
PM 016 336			PM 016 336	
PM 016 315			PM 016 315	
PM 006 488 -X		PM 006 459 -X	PM 006 488 -X	
PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
		PM 061 283 -T	PM 061 283 -T	PM 061 283 -T
		P 4723 010	P 4723 010	P 4723 010
		P 4723 013	P 4723 013	P 4723 013
PM 051 726 -T	PM 051 726 -T			
		PM 016 380 -T		
		PM 016 382 -T		
		PM 016 381 -T		
	PM 016 450 -T			PM 016 450 -T
	PM 016 452 -T			PM 016 452 -T
	PM 016 451 -T			PM 016 451 -T
	PM 016 455 -T			PM 016 455 -T
	PM 016 457 -T			PM 016 457 -T
	PM 016 456 -T			PM 016 456 -T
PM 016 690 -T			PM 016 690 -T	
PM 016 692 -T			PM 016 692 -T	
PM 016 734 -T			PM 016 734 -T	

HiPace® 700

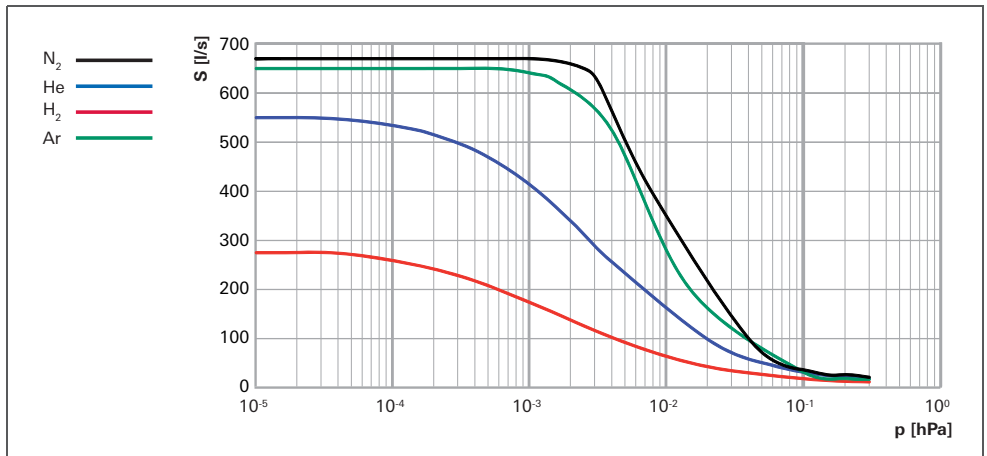


- Compact yet powerful turbopump with a pumping speed of up to 685 l/s for N₂
- Maximum vacuum performance with minimum power consumption
- For installation in any orientation
- Integrated TC 400 drive electronics
- Integrated, powerful cooling system
- Corrosive gas version available

Pumping speed

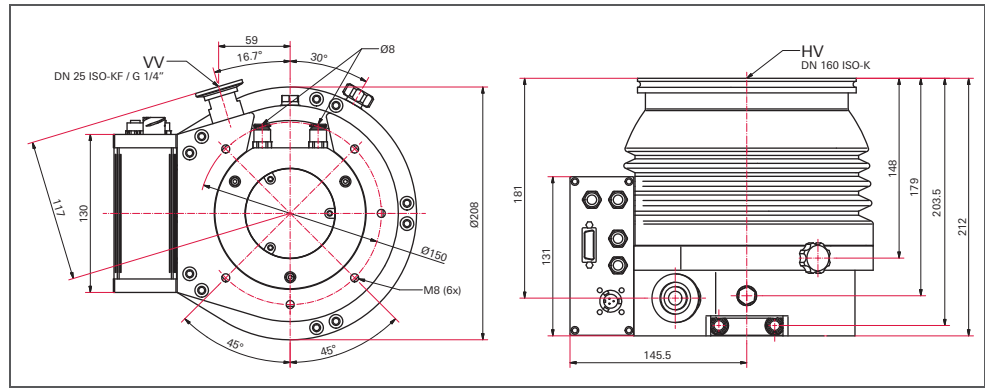


HiPace® 700

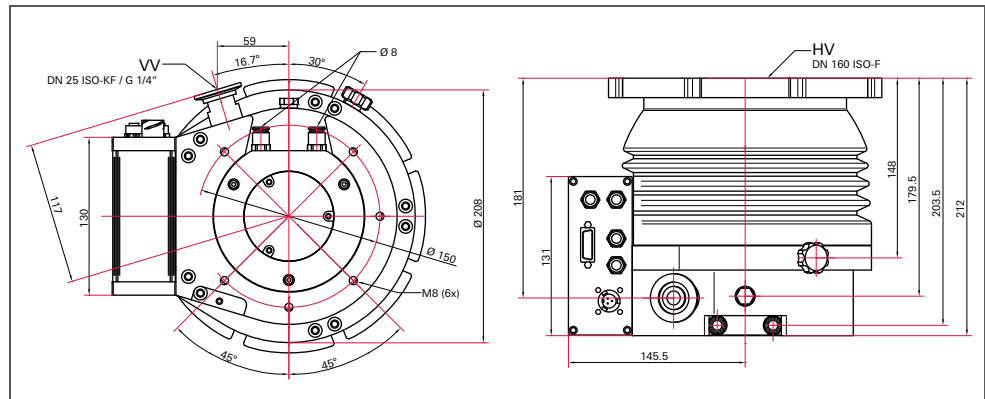


HiPace® 700 P with TC 400

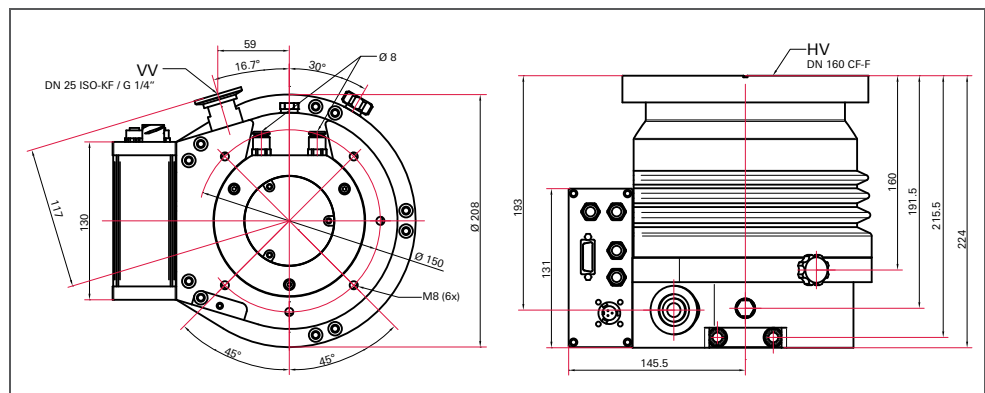
Dimensions (in mm)



HiPace® 700 with TC 400, DN 160 ISO-K



HiPace® 700 with TC 400, DN 160 ISO-F



HiPace® 700 with TC 400, DN 160 CF-F

Technical data	HiPace® 700 with TC 400, DN 160 ISO-K	HiPace® 700 with TC 400, DN 160 CF-F	HiPace® 700 with TC 400, DN 160 ISO-F	HiPace® 700 for TCP 350, DN 160 ISO-K	HiPace® 700, for TCP 350, DN 160 CF-F
Connection nominal diameter					
Flange (out)	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"
Flange (in)	DN 160 ISO-K	DN 160 CF-F	DN 160 ISO-F	DN 160 ISO-K	DN 160 CF-F
Venting connection	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"
Pumping speed					
Pumping speed for Ar	665 l/s	665 l/s	665 l/s	665 l/s	665 l/s
Pumping speed for H ₂	555 l/s	555 l/s	555 l/s	555 l/s	555 l/s
Pumping speed for He	655 l/s	655 l/s	655 l/s	655 l/s	655 l/s
Pumping speed for N ₂	685 l/s	685 l/s	685 l/s	685 l/s	685 l/s
Compression					
Compression ratio for Ar	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Compression ratio for H ₂	$4 \cdot 10^5$	$4 \cdot 10^5$	$4 \cdot 10^5$	$4 \cdot 10^5$	$4 \cdot 10^5$
Compression ratio for He	$3 \cdot 10^7$	$3 \cdot 10^7$	$3 \cdot 10^7$	$3 \cdot 10^7$	$3 \cdot 10^7$
Compression ratio for N ₂	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Fore-vacuum max. for N₂					
	11 hPa	11 hPa	11 hPa	10 hPa	10 hPa
Gas throughput					
Gas throughput at full rotational speed for Ar	3.5 hPa l/s	3.5 hPa l/s	3.5 hPa l/s	1.5 hPa l/s	1.5 hPa l/s
Gas throughput at full rotational speed for H ₂	> 14 hPa l/s	> 14 hPa l/s	> 14 hPa l/s	> 8 hPa l/s	> 8 hPa l/s
Gas throughput at full rotational speed for He	20 hPa l/s	20 hPa l/s	20 hPa l/s	5 hPa l/s	5 hPa l/s
Gas throughput at full rotational speed for N ₂	6.5 hPa l/s	6.5 hPa l/s	6.5 hPa l/s	3 hPa l/s	3 hPa l/s
Electronic drive unit	with TC 400	with TC 400	with TC 400	for TCP 350	for TCP 350
Separate electronic drive unit				YES	YES
Operating voltage	48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC		
Rotation speed ± 2 %	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹
Rotation speed variable	60-100 %	60-100 %	60-100 %	60-100 %	60-100 %
Mounting orientation	in any orientation	in any orientation	in any orientation	in any orientation	in any orientation
Ultimate pressure*	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa
Weight	11.5 kg	17.4 kg	12.1 kg	10.6 kg	16.5 kg
Run-up time	2 min	2 min	2 min	5.5 min	5.5 min
Cooling method, optional	Air	Air	Air	Air	Air
Cooling method, standard	Water	Water	Water	Water	Water
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	100 l/h	100 l/h	100 l/h	100 l/h	100 l/h
Bearing	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid
Particulate matter					
Sound pressure level	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54	IP 54	IP 54
Low vibrations					
Permissible magnetic field max.	6 mT	6 mT	6 mT	6 mT	6 mT
Order number pump Pumpe	PM P03 933	PM P03 934	PM P03 935	PM P04 080	PM P04 081

*Ultimate pressure please find description on page 272

HiPace® 700, for TCP 350, DN 160 ISO-F	HiPace® 700 P with TC 400, DN 160 ISO-K	HiPace® 700 P with TC 400, DN 160 ISO-F	HiPace® 700 P with TC 400, DN 160 CF-F	HiPace® 700 Plus with TC 400, DN 160 ISO-K	HiPace® 700 Plus with TC 400, DN 160 CF-F	HiPace® 700 Plus with TC 400, DN 160 ISO-F
DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"
DN 160 ISO-F G 1/8"	DN 160 ISO-K G 1/8"	DN 160 ISO-F G 1/8"	DN 160 CF-F G 1/8"	DN 160 ISO-K G 1/8"	DN 160 CF-F G 1/8"	DN 160 ISO-F G 1/8"
665 l/s	650 l/s	650 l/s	650 l/s	665 l/s	665 l/s	665 l/s
555 l/s	275 l/s	275 l/s	275 l/s	555 l/s	555 l/s	555 l/s
655 l/s	550 l/s	550 l/s	550 l/s	655 l/s	655 l/s	655 l/s
685 l/s	670 l/s	670 l/s	670 l/s	685 l/s	685 l/s	685 l/s
> 1 · 10 ¹¹	> 1 · 10 ⁷	> 1 · 10 ⁷	> 1 · 10 ⁷	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
4 · 10 ⁵	4 · 10 ²	4 · 10 ²	4 · 10 ²	4 · 10 ⁵	4 · 10 ⁵	4 · 10 ⁵
3 · 10 ⁷	3 · 10 ³	3 · 10 ³	3 · 10 ³	3 · 10 ⁷	3 · 10 ⁷	3 · 10 ⁷
> 1 · 10 ¹¹	> 1 · 10 ⁶	> 1 · 10 ⁶	> 1 · 10 ⁶	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
10 hPa	1.1 hPa	1.1 hPa	1.1 hPa	11 hPa	11 hPa	11 hPa
1.5 hPa l/s	1 hPa l/s	1 hPa l/s	1 hPa l/s	3.5 hPa l/s	3.5 hPa l/s	3.5 hPa l/s
> 8 hPa l/s	6 hPa l/s	6 hPa l/s	6 hPa l/s	> 14 hPa l/s	> 14 hPa l/s	> 14 hPa l/s
5 hPa l/s	4 hPa l/s	4 hPa l/s	4 hPa l/s	20 hPa l/s	20 hPa l/s	20 hPa l/s
3 hPa l/s	2 hPa l/s	2 hPa l/s	2 hPa l/s	6.5 hPa l/s	6.5 hPa l/s	6.5 hPa l/s
for TCP 350 YES	with TC 400	with TC 400	with TC 400	with TC 400	with TC 400	with TC 400
	48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC	24 (± 5 %) V DC	24 (± 5 %) V DC	24 (± 5 %) V DC
49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹
60-100 %	60-100 %	60-100 %	60-100 %	60-100 %	60-100 %	60-100 %
in any orientation	in any orientation	in any orientation	in any orientation	vertical, flange up	vertikal, flange up	vertical, flange up
< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa
11.2 kg	10.8 kg	11.4 kg	16.7 kg	11.5 kg	17.4 kg	12.1 kg
5.5 min	1.6 min	1.6 min	1.6 min	4 min	4 min	4 min
Air	Air	Air	Air	Air	Air	Air
Water	Water	Water	Water	Water	Water	Water
15-35 °C	15-35 °C	15-35 °C	15-35 °C	15-35 °C	15-35 °C	15-35 °C
100 l/h	100 l/h	100 l/h	100 l/h	100 l/h	100 l/h	100 l/h
Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid
YES	YES	YES	YES	YES	YES	YES
≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote
IP 54	IP 54	IP 54	IP 54	IP 54	IP 54	IP 54
				YES	YES	Yes
6 mT	6 mT	6 mT	6 mT	6 mT	6 mT	6 mT
PM P04 082	PM P04 275	PM P04 680	PM P04 681	PM P04 440	PM P04 441	PM P04 442

Accessories	HiPace® 700 with TC 400, DN 160 ISO-K	HiPace® 700 with TC 400, DN 160 CF-F	HiPace® 700 with TC 400, DN 160 ISO-F	HiPace® 700 for TCP 350, DN 160 ISO-K	HiPace® 700, for TCP 350, DN 160 CF-F
Order number pump Pumpe	PM P03 933	PM P03 934	PM P03 935	PM P04 080	PM P04 081
Power supplies/power					
DCU - power supply with display control unit	PM C01 823	PM C01 823	PM C01 823		
TPS - mains pack for wall/standard rail fitting	PM 061 343 -T	PM 061 343 -T	PM 061 343 -T		
TPS - mains pack1 19" rack module 3 RU	PM 061 347 -T	PM 061 347 -T	PM 061 347 -T		
Control units					
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T		
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T		
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T		
Mains cable DCU/TPS/TCP, 3 m					
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
115 V AC mains cable with UL plug	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
208 V AC mains cable with UL plug	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF
Connection cable, length 3 m between					
Connection cable for HiPace with TC 400/TM 700 to power supply TPS/DCU 310/311/400/401	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T		
TCP 350 - HiPace				PM 061 356 -T	PM 061 356 -T
External drive units					
TCP 350				PM C01 740	PM C01 740
TCP 350 PB - Profibus				PM C01 741	PM C01 741
TCP 350 DN - DeviceNet				PM C01 742	PM C01 742
Venting accessories					
Venting valve	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121
Cooling accessories					
Air cooling	PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303
Heating accessories					
Heating jacket 230 V AC, Euro-style safety plug		PM 061 369 -T			PM 061 369 -T
Heating jacket 208 V AC, UL plug		PM 061 370 -T			PM 061 370 -T
Heating jacket 115 V AC, UL plug		PM 061 371 -T			PM 061 371 -T
Backing pump control					
Backing pump relay box, shielded, 1-phase 20 A	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T
Backing pump relay box, shielded, 1-phase 7 A	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
Control cable for pumping stations 0.7 m	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206
Adapter cable, TCP 350 - backing pump relay box, M12				PM 061 377 -T	PM 061 377 -T
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X		

HiPace® 700, for TCP 350, DN 160 ISO-F	HiPace® 700 P with TC 400, DN 160 ISO-K	HiPace® 700 P with TC 400, DN 160 ISO-F	HiPace® 700 P with TC 400, DN 160 CF-F	HiPace® 700 Plus with TC 400, DN 160 ISO-K	HiPace® 700 Plus with TC 400, DN 160 CF-F	HiPace® 700 Plus with TC 400, DN 160 ISO-F
PM P04 082	PM P04 275	PM P04 680	PM P04 681	PM P04 440	PM P04 441	PM P04 442
	PM C01 823	PM C01 823	PM C01 823	PM C01 822	PM C01 822	PM C01 822
	PM 061 343 -T	PM 061 343 -T	PM 061 343 -T	PM 061 342 -T	PM 061 342 -T	PM 061 342 -T
	PM 061 347 -T	PM 061 347 -T	PM 061 347 -T	PM 061 346 -T	PM 061 346 -T	PM 061 346 -T
	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T
	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T
	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T
P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF
	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T
PM 061 356 -T						
PM C01 740						
PM C01 741						
PM C01 742						
PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291
PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121
PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303
			PM 061 369 -T		PM 061 369 -T	
			PM 061 370 -T		PM 061 370 -T	
			PM 061 371 -T		PM 061 371 -T	
PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T
PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T
PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205
PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206
PM 061 377 -T						
	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X

Accessories	HiPace® 700 with TC 400, DN 160 ISO-K	HiPace® 700 with TC 400, DN 160 CF-F	HiPace® 700 with TC 400, DN 160 ISO-F	HiPace® 700 for TCP 350, DN 160 ISO-K	HiPace® 700, for TCP 350, DN 160 CF-F
Order number pump Pumpe	PM P03 933	PM P03 934	PM P03 935	PM P04 080	PM P04 081
General accessories					
Sealing gas valve	PM Z01 312	PM Z01 312	PM Z01 312	PM Z01 312	PM Z01 312
Sealing gas throttle	PM Z01 317	PM Z01 317	PM Z01 317	PM Z01 317	PM Z01 317
Centering ring coated	PM 016 216 -U		PM 016 216 -U	PM 016 216 -U	
Centering ring coated with protection screen	PM 016 218 -U		PM 016 218 -U	PM 016 218 -U	
Centering ring coated with splinter shield	PM 016 217 -U		PM 016 217 -U	PM 016 217 -U	
Protection screen		PM 016 339			PM 016 339
Splinter shield		PM 016 318			PM 016 318
Vibration dampers	PM 006 492 -X	PM 006 493 -X		PM 006 492 -X	PM 006 493 -X
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T		
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010		
Y-connector M12 for accessories	P 4723 013	P 4723 013	P 4723 013		
Connection cable RJ 45 on M 12				PM 051 726 -T	PM 051 726 -T
Mounting materials					
Centering ring coated, bracket screws	PM 016 375 -T			PM 016 375 -T	
Centering ring coated with protection screen, bracket screws	PM 016 377 -T			PM 016 377 -T	
Centering ring coated with splinter shield, bracket screws	PM 016 376 -T			PM 016 376 -T	
Centering ring coated with hexagon bolts			PM 016 460 -T		
Centering ring coated with protection screen, hexagon bolts			PM 016 462 -T		
Centering ring coated with splinter shield, hexagon bolts			PM 016 461 -T		
Centering ring coated with stud screws			PM 016 465 -T		
Centering ring coated with protection screen with stud screws			PM 016 467 -T		
Centering ring coated with splinter shield with stud screws			PM 016 466 -T		
Set of hexagon screws for trough hole (CF-F)		PM 016 691 -T			PM 016 691 -T
Set of stud screws for tapped hole (CF-F)		PM 016 693 -T			PM 016 693 -T
Set of stud screws for trough hole (CF)		PM 016 735 -T			PM 016 735 -T

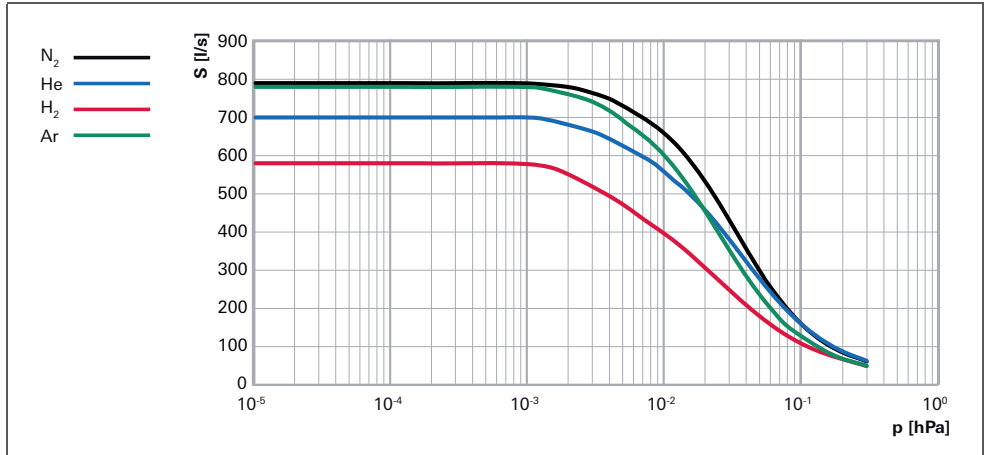
HiPace® 700, for TCP 350, DN 160 ISO-F	HiPace® 700 P with TC 400, DN 160 ISO-K	HiPace® 700 P with TC 400, DN 160 ISO-F	HiPace® 700 P with TC 400, DN 160 CF-F	HiPace® 700 Plus with TC 400, DN 160 ISO-K	HiPace® 700 Plus with TC 400, DN 160 CF-F	HiPace® 700 Plus with TC 400, DN 160 ISO-F
PM P04 082	PM P04 275	PM P04 680	PM P04 681	PM P04 440	PM P04 441	PM P04 442
PM Z01 312	PM Z01 313	PM Z01 313	PM Z01 313	PM Z01 312	PM Z01 312	PM Z01 312
PM Z01 317	PM Z01 318	PM Z01 318	PM Z01 318	PM Z01 317	PM Z01 317	PM Z01 317
PM 016 216 -U	PM 016 216 -U	PM 016 216 -U		PM 016 216 -U		PM 016 216 -U
PM 016 218 -U	PM 016 218 -U	PM 016 218 -U		PM 016 218 -U		PM 016 218 -U
PM 016 217 -U	PM 016 217 -U	PM 016 217 -U		PM 016 217 -U		PM 016 217 -U
			PM 016 339		PM 016 339	
			PM 016 318		PM 016 318	
	PM 006 492 -X		PM 006 493 -X	PM 006 492 -X	PM 006 493 -X	
PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T
	P 4723 010	P 4723 010	P 4723 010	P 4723 010	P 4723 010	P 4723 010
	P 4723 013	P 4723 013	P 4723 013	P 4723 013	P 4723 013	P 4723 013
PM 051 726 -T						
	PM 016 375 -T			PM 016 375 -T		
	PM 016 377 -T			PM 016 377 -T		
	PM 016 376 -T			PM 016 376 -T		
PM 016 460 -T		PM 016 460 -T				PM 016 460 -T
PM 016 462 -T		PM 016 462 -T				PM 016 462 -T
PM 016 461 -T		PM 016 461 -T				PM 016 461 -T
PM 016 465 -T		PM 016 465 -T				PM 016 465 -T
PM 016 467 -T		PM 016 467 -T				PM 016 467 -T
PM 016 466 -T		PM 016 466 -T				PM 016 466 -T
			PM 016 691 -T		PM 016 691 -T	
			PM 016 693 -T		PM 016 693 -T	
			PM 016 735 -T		PM 016 735 -T	

HiPace® 800

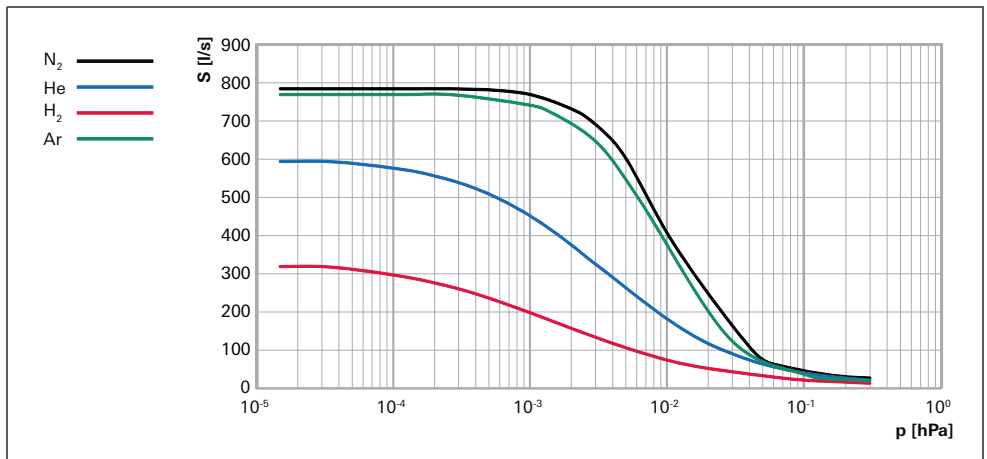


- Compact yet powerful turbopump with a pumping speed of up to 790 l/s for N₂
- Maximum vacuum performance with minimum power consumption
- Integrated TC 400 drive electronics
- For installation in any orientation
- Integrated, powerful cooling system

Pumping speed

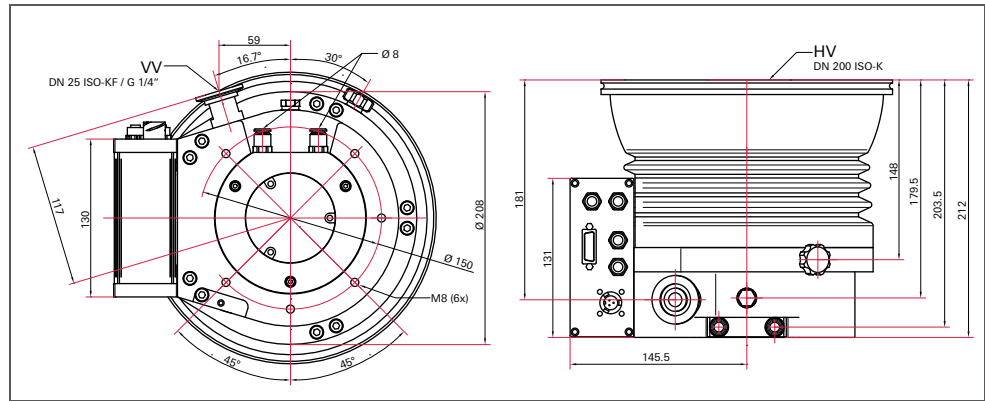


HiPace® 800

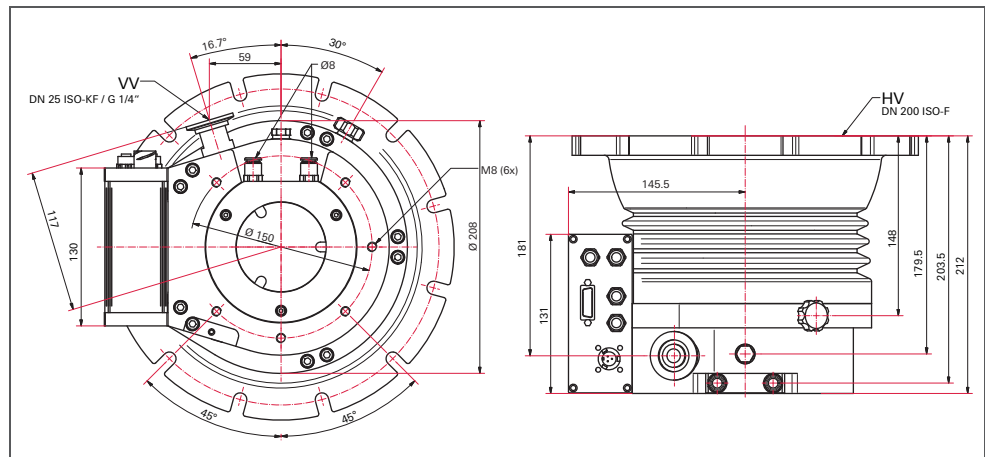


HiPace® 800 P with TC 400

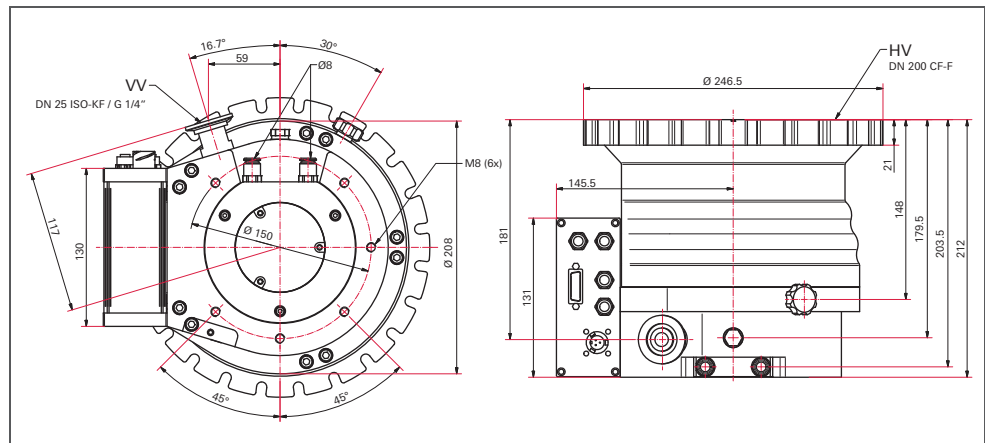
Dimensions (in mm)



HiPace® 800 with TC 400, DN 200 ISO-K



HiPace® 800 with TC 400, DN 200 ISO-F



HiPace® 800 with TC 400, DN 200 CF-F

Technical data	HiPace® 800 with TC 400, DN 200 ISO-K	HiPace® 800 with TC 400, DN 200 CF-F	HiPace® 800 with TC 400, DN 200 ISO-F	HiPace® 800 with TCP 350, DN 200 ISO-F
Connection nominal diameter				
Flange (out)	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 KF
Flange (in)	DN 200 ISO-K	DN 200 CF-F	DN 200 ISO-F	DN 200 ISO-K / G 1/4"
Venting connection	G 1/8"	G 1/8"	G 1/8"	G 1/8"
Pumping speed				
Pumping speed for Ar	780 l/s	780 l/s	780 l/s	780 l/s
Pumping speed for H ₂	580 l/s	580 l/s	580 l/s	580 l/s
Pumping speed for He	700 l/s	700 l/s	700 l/s	700 l/s
Pumping speed for N ₂	790 l/s	790 l/s	790 l/s	790 l/s
Compression				
Compression ratio for Ar	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Compression ratio for H ₂	4 · 10 ⁵	4 · 10 ⁵	4 · 10 ⁵	4 · 10 ⁵
Compression ratio for He	3 · 10 ⁷	3 · 10 ⁷	3 · 10 ⁷	3 · 10 ⁷
Compression ratio for N ₂	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Fore-vacuum max. for N₂	11 hPa	11 hPa	11 hPa	10 hPa
Gas throughput				
Gas throughput at full rotational speed for Ar	3.5 hPa l/s	3.5 hPa l/s	3.5 hPa l/s	1.5 hPa l/s
Gas throughput at full rotational speed for H ₂	> 14 hPa l/s	> 14 hPa l/s	> 14 hPa l/s	> 8 hPa l/s
Gas throughput at full rotational speed for He	20 hPa l/s	20 hPa l/s	20 hPa l/s	5 hPa l/s
Gas throughput at full rotational speed for N ₂	6.5 hPa l/s	6.5 hPa l/s	6.5 hPa l/s	3 hPa l/s
Electronic drive unit	with TC 400	with TC 400	with TC 400	TCP 350
Operating voltage	48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC	
Rotation speed ± 2 %	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹
Rotation speed variable	60-100 %	60-100 %	60-100 %	60-100 %
Mounting orientation	in any orientation	in any orientation	in any orientation	in any orientation
Ultimate pressure*	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa	
Weight	12.8 kg	19.1 kg	13.6 kg	11.9 kg
Run-up time	2 min	2 min	2 min	5.5 min
Cooling method, optional	Air	Air	Air	Air
Cooling method, standard	Water	Water	Water	Water
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	100 l/h	100 l/h	100 l/h	100 l/h
Bearing	Hybrid	Hybrid	Hybrid	Hybrid
Particulate matter				
Sound pressure level	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54	IP 54
Fore-vacuum max. for Ar	11 hPa			11 hPa
Fore-vacuum max. for H ₂	6 hPa			6 hPa
Fore-vacuum max. for He	11 hPa			13 hPa
Permissible magnetic field max.	6 mT	6 mT	6 mT	6 mT
Order number pump Pumpe	PM P04 300	PM P04 301	PM P04 302	PM P04 670

*Ultimate pressure please find description on page 272

	HiPace® 800 with TCP 350, DN 200 CF-F	HiPace® 800 with TCP 350, DN 200 ISO-F	HiPace® 800 P with TC 400, DN 200 ISO-K	HiPace® 800 P with TC 400, DN 200 CF-F	HiPace® 800 P with TC 400, DN 200 ISO-F
	DN 25 KF	DN 25 KF	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"
	DN 200 CF-F / G 1/4" G 1/8"	DN 200 ISO-F / G 1/4" G 1/8"	DN 200 ISO-K G 1/8"	DN 200 CF-F G 1/8"	DN 200 ISO-F G 1/8"
	780 l/s	780 l/s	770 l/s	770 l/s	770 l/s
	580 l/s	580 l/s	320 l/s	320 l/s	320 l/s
	700 l/s	700 l/s	595 l/s	595 l/s	595 l/s
	790 l/s	790 l/s	785 l/s	785 l/s	785 l/s
	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^7$	$> 1 \cdot 10^7$	$> 1 \cdot 10^7$
	$4 \cdot 10^5$	$4 \cdot 10^5$	$4 \cdot 10^2$	$4 \cdot 10^2$	$4 \cdot 10^2$
	$3 \cdot 10^7$	$3 \cdot 10^7$	$3 \cdot 10^3$	$3 \cdot 10^3$	$3 \cdot 10^3$
	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^6$	$> 1 \cdot 10^6$	$> 1 \cdot 10^6$
	10 hPa	10 hPa	1.1 hPa	1.1 hPa	1.1 hPa
	1.5 hPa l/s	1.5 hPa l/s	2 hPa l/s	2 hPa l/s	2 hPa l/s
	> 8 hPa l/s	> 8 hPa l/s	8 hPa l/s	8 hPa l/s	8 hPa l/s
	5 hPa l/s	5 hPa l/s	5 hPa l/s	5 hPa l/s	5 hPa l/s
	3 hPa l/s	3 hPa l/s	2.5 hPa l/s	2.5 hPa l/s	2.5 hPa l/s
	TCP 350	TCP 350	with TC 400	with TC 400	with TC 400
			48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC
	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹
	60-100 %	60-100 %	60-100 %	60-100 %	60-100 %
	in any orientation	in any orientation	in any orientation	in any orientation	in any orientation
			$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa
	18.2 kg	12.7 kg	12.7 kg	18.9 kg	13.5 kg
	5.5 min	5.5 min	1.6 min	1.6 min	1.6 min
	Air	Air	Air	Air	Air
	Water	Water	Water	Water	Water
	15-35 °C	15-35 °C	15-35 °C	15-35 °C	15-35 °C
	100 l/h	100 l/h	100 l/h	100 l/h	100 l/h
	Hybrid	Hybrid	Hybrid	Hybrid	Hybrid
			YES	YES	YES
	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote
	IP 54	IP 54	IP 54	IP 54	IP 54
	11 hPa	11 hPa			
	6 hPa	6 hPa			
	13 hPa	13 hPa			
	6 mT	6 mT	6 mT	6 mT	6 mT
	PM P04 671	PM P04 672	PM P04 790	PM P04 791	PM P04 276

Accessories	HiPace® 800 with TC 400, DN 200 ISO-K	HiPace® 800 with TC 400, DN 200 CF-F	HiPace® 800 with TC 400, DN 200 ISO-F	HiPace® 800 with TCP 350, DN 200 ISO-F	
Order number pump Pumpe	PM P04 300	PM P04 301	PM P04 302	PM P04 670	
Power supplies/power					
DCU - power supply with display control unit	PM C01 823	PM C01 823	PM C01 823		
TPS - mains pack for wall/standard rail fitting	PM 061 343 -T	PM 061 343 -T	PM 061 343 -T		
TPS - mains pack1 19" rack module 3 RU	PM 061 347 -T	PM 061 347 -T	PM 061 347 -T		
Control units					
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T		
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T		
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T		
Mains cable DCU/TPS/TCP, 3 m					
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	
115 V AC mains cable with UL plug	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	
208 V AC mains cable with UL plug	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	
Connection cable, length 3 m between					
Connection cable for HiPace with TC 400/TM 700 to power supply TPS/DCU 310/311/400/401	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T		
TCP 350 - HiPace				PM 061 356 -T	
External drive units					
TCP 350				PM C01 740	
TCP 350 PB - Profibus				PM C01 741	
TCP 350 DN - DeviceNet				PM C01 742	
Venting accessories					
Venting valve	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291	
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	
Cooling accessories					
Air cooling	PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303	
Heating accessories					
Heating jacket 230 V AC, Euro-style safety plug		PM 061 369 -T		PM 061 369 -T	
Heating jacket 208 V AC, UL plug		PM 061 370 -T		PM 061 370 -T	
Heating jacket 115 V AC, UL plug		PM 061 371 -T		PM 061 371 -T	
Backing pump control					
Backing pump relay box, shielded, 1-phase 20 A	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	
Backing pump relay box, shielded, 1-phase 7 A	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	
Control cable for pumping stations 0.7 m	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T		
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	
Adapter cable, TCP 350 - backing pump relay box, M12				PM 061 377 -T	
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X		

HiPace® 800 with TCP 350, DN 200 CF-F	HiPace® 800 with TCP 350, DN 200 ISO-F	HiPace® 800 P with TC 400, DN 200 ISO-K	HiPace® 800 P with TC 400, DN 200 CF-F	HiPace® 800 P with TC 400, DN 200 ISO-F
PM P04 671	PM P04 672	PM P04 790	PM P04 791	PM P04 276
		PM C01 823	PM C01 823	PM C01 823
		PM 061 343 -T	PM 061 343 -T	PM 061 343 -T
		PM 061 347 -T	PM 061 347 -T	PM 061 347 -T
		PM 061 348 -T	PM 061 348 -T	PM 061 348 -T
		PM 051 510 -T	PM 051 510 -T	PM 051 510 -T
		PM 061 005 -T	PM 061 005 -T	PM 061 005 -T
P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF
		PM 061 352 -T	PM 061 352 -T	PM 061 352 -T
PM 061 356 -T	PM 061 356 -T			
PM C01 740	PM C01 740			
PM C01 741	PM C01 741			
PM C01 742	PM C01 742			
PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291
PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121
PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303	PM Z01 303
PM 061 369 -T	PM 061 369 -T		PM 061 369 -T	
PM 061 370 -T	PM 061 370 -T		PM 061 370 -T	
PM 061 371 -T	PM 061 371 -T		PM 061 371 -T	
PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T	PM 061 375 -T
PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
		PM 061 675 -T	PM 061 675 -T	PM 061 675 -T
PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205
PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206
PM 061 377 -T	PM 061 377 -T			
		PM 071 142 -X	PM 071 142 -X	PM 071 142 -X

Accessories	HiPace® 800 with TC 400, DN 200 ISO-K	HiPace® 800 with TC 400, DN 200 CF-F	HiPace® 800 with TC 400, DN 200 ISO-F	HiPace® 800 with TCP 350, DN 200 ISO-F	
Order number pump Pumpe	PM P04 300	PM P04 301	PM P04 302	PM P04 670	
General accessories					
Sealing gas valve	PM Z01 312	PM Z01 312	PM Z01 312	PM Z01 312	
Sealing gas throttle	PM Z01 317	PM Z01 317	PM Z01 317	PM Z01 317	
Centering ring coated	PM 016 220 -U		PM 016 220 -U	PM 016 220 -U	
Centering ring coated with protection screen	PM 016 222 -U		PM 016 222 -U	PM 016 222 -U	
Centering ring coated with splinter shield	PM 016 221 -U		PM 016 221 -U	PM 016 221 -U	
Protection screen		PM 016 342			
Splinter shield		PM 016 321			
Vibration dampers	PM 006 668 -X	PM 006 669 -X		PM 006 668 -X	
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010	P 4723 010	
Y-connector M12 for accessories	P 4723 013	P 4723 013	P 4723 013	P 4723 013	
Connection cable RJ 45 on M 12	PM 051 726 -T	PM 051 726 -T	PM 051 726 -T	PM 051 726 -T	
Mounting materials					
Centering ring coated, bracket screws	PM 016 390 -T			PM 016 390 -T	
Centering ring coated with protection screen, bracket screws	PM 016 392 -T			PM 016 392 -T	
Centering ring coated with splinter shield, bracket screws	PM 016 391 -T			PM 016 391 -T	
Centering ring coated with hexagon bolts			PM 016 470 -T		
Centering ring coated with protection screen, hexagon bolts			PM 016 472 -T		
Centering ring coated with splinter shield, hexagon bolts			PM 016 471 -T		
Centering ring coated with stud screws			PM 016 475 -T		
Centering ring coated with protection screen with stud screws			PM 016 477 -T		
Centering ring coated with splinter shield with stud screws			PM 016 476 -T		
Set of hexagon screws for trough hole (CF-F)		PM 016 687 -T			
Set of stud screws for tapped hole (CF-F)		PM 016 688 -T			
Set of stud screws for trough hole (CF)		PM 016 736 -T			

HiPace® 800 with TCP 350, DN 200 CF-F	HiPace® 800 with TCP 350, DN 200 ISO-F	HiPace® 800 P with TC 400, DN 200 ISO-K	HiPace® 800 P with TC 400, DN 200 CF-F	HiPace® 800 P with TC 400, DN 200 ISO-F
PM P04 671	PM P04 672	PM P04 790	PM P04 791	PM P04 276
PM Z01 312	PM Z01 312	PM Z01 313	PM Z01 313	PM Z01 313
PM Z01 317	PM Z01 317	PM Z01 318	PM Z01 318	PM Z01 318
PM 016 220 -U	PM 016 220 -U	PM 016 220 -U		PM 016 220 -U
	PM 016 222 -U	PM 016 222 -U		PM 016 222 -U
	PM 016 221 -U	PM 016 221 -U		PM 016 221 -U
PM 016 342			PM 016 342	
PM 016 321			PM 016 321	
PM 006 669 -X		PM 006 668 -X	PM 006 669 -X	
PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T
P 4723 010	P 4723 010	P 4723 010	P 4723 010	P 4723 010
P 4723 013	P 4723 013	P 4723 013	P 4723 013	P 4723 013
PM 051 726 -T	PM 051 726 -T			
		PM 016 390 -T		
		PM 016 392 -T		
		PM 016 391 -T		
	PM 016 470 -T			PM 016 470 -T
	PM 016 472 -T			PM 016 472 -T
	PM 016 471 -T			PM 016 471 -T
	PM 016 475 -T			PM 016 475 -T
	PM 016 477 -T			PM 016 477 -T
	PM 016 476 -T			PM 016 476 -T
PM 016 687 -T			PM 016 687 -T	
PM 016 688 -T			PM 016 688 -T	
PM 016 736 -T			PM 016 736 -T	

HiPace® 1200 – 2300

Compact hybrid bearing turbopumps
Pumping speed class from 1,000 to 2,000 l/s

Intelligent sensors

The HiPace 1200 to 2300 turbopumps can also be mounted upside down. Our bearing system guarantees unrivaled reliability. Thanks to advanced rotor design, high pumping speeds are achieved along with high compression ratio for light gases and high gas throughput. Combined with a reliable sensor system, the HiPace series achieves the highest level of reliability on the market.

Efficient technology

With the proven and optimized bearing system, we offer you not just enhanced product performance compared to competitors but also first and foremost a longer service life. In this series, a sealing gas valve protects the bearings from particles or reactive gases. The HiPace is therefore not only compact, but also extremely rugged and suitable for industrial use. It results in an optimized integration capability. Time is money – extended service intervals and problem-free on-site bearing replacement speak for themselves.



HiPace® 1200



HiPace® 1500



HiPace® 1800



HiPace® 2300

Integrated electronic drive unit

The integrated drive electronics eliminates costly cabling. In addition, they are available with various interface versions in the same package. Through innovative electronic components, we have doubled the lifetime of these powerful drive units. The run-up time of the HiPace has also been considerably reduced, which makes the pump ready to operate in an even shorter time. In addition, we provide extended remote and sensor functions. These allow you to monitor pump data such as temperatures. Improved diagnostics ensure maximum pump availability through status-based maintenance and support service in an intelligent manner.

Sophisticated design

We have set the market trend with our well-thought-out design of the HiPace. This is evidenced by its functional housing which makes the pumps extremely light and extends the spectrum of applications. Also, the innovative rotor geometry designed for low vibration operation set the industry standard. The integrated cooling system ensures that turbopumps can become more powerful without overheating.

Customer benefits

- Four sizes with pumping speeds from 1,000 to 2,000 l/s
- High pumping speed for light gases (H₂, He) and heavy gases (Ar, CF₄)
- High gas throughput, even for heavy gases (Ar, CF₄)
- Installation position 0° to 90° and 90° to 180° available
- Corrosive gas version (C-types) available
- Integrated sealing gas system with throttle and valve
- Wide voltage range: 90 to 265 V
- Interfaces: RS-485, Remote; Profibus or DeviceNet optional
- Semi S2-compatible, UL, CSA and TÜV certification
- Suitable for industrial use due to protection class IP 54
- Highest process capability, resistant to particles

Typical applications

- Photovoltaics
- PVD/CVD processes
- Implantation
- Space simulation
- Vacuum furnaces
- Hard coating



Photovoltaics



Vacuum furnaces



Space simulation

HiPace® 1200

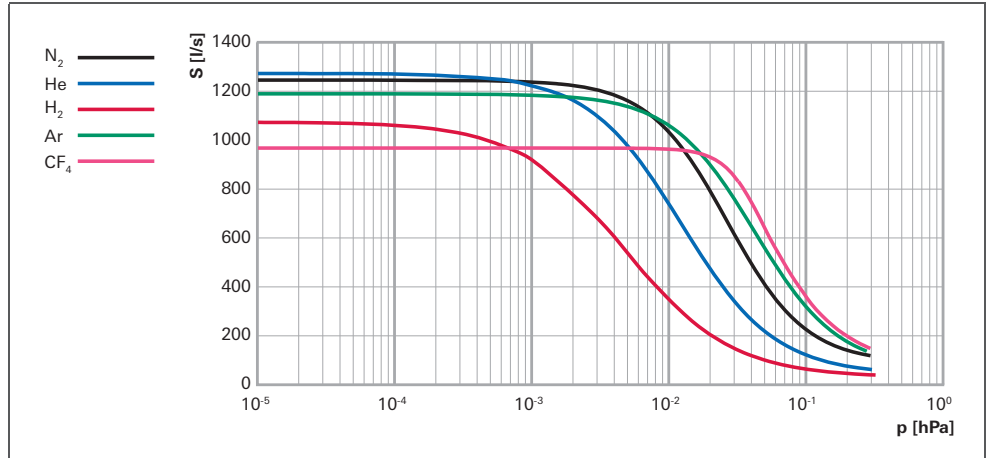


- Powerful turbopump with a pumping speed of up to 1250 l/s for N₂
- Integrated TC 1200 drive electronics with power supply
- Cooling: Water cooling
- Integrated sealing gas system with electric sealing gas valve 24 V DC
- Protection Class: IP 54
- Interfaces: RS-485, Remote (Profibus/DeviceNet on request)
- Extensive accessories expand the range of applications

C = Corrosive gas version

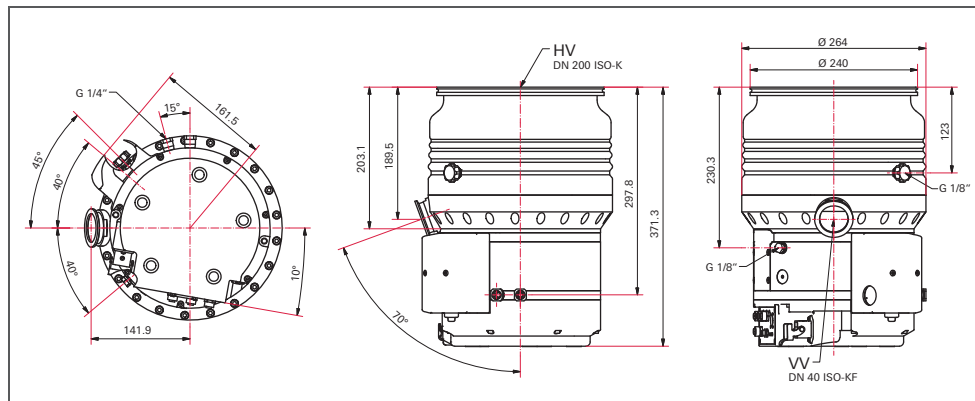
U = Upside-down installation orientation

Pumping speed

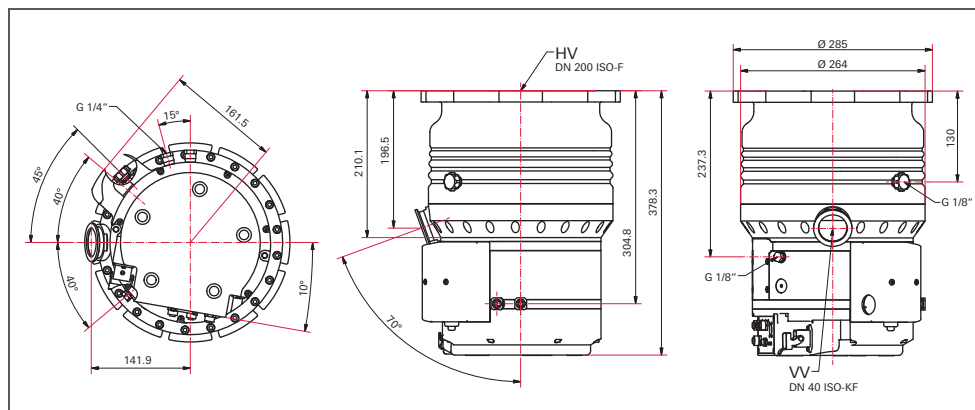


HiPace® 1200

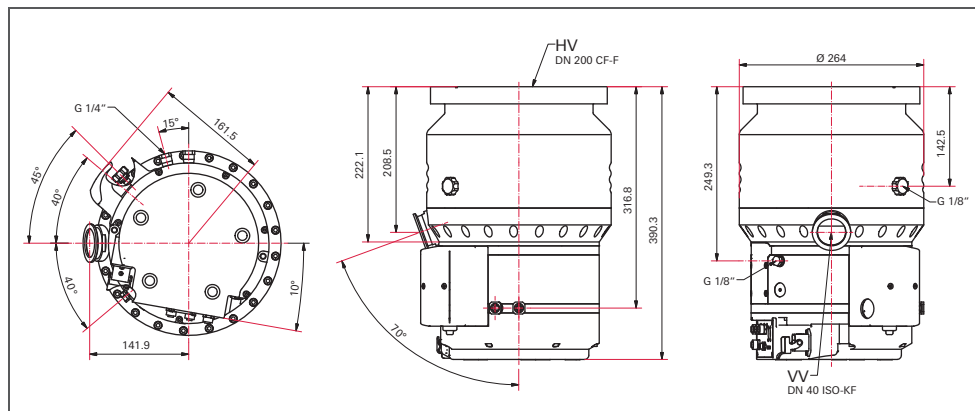
Dimensions (in mm)



HiPace® 1200 with TC 1200, DN 200 ISO-K



HiPace® 1200 with TC 1200, DN 200 ISO-F



HiPace® 1200, with TC 1200, DN 200 CF-F

Technical data	HiPace® 1200 with TC 1200, DN 200 ISO-K	HiPace® 1200 with TC 1200, DN 200 ISO-F	HiPace® 1200, with TC 1200, DN 200 CF-F
Connection nominal diameter			
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 200 ISO-K	DN 200 ISO-F	DN 200 CF-F
Venting connection	G 1/8"	G 1/8"	G 1/8"
Pumping speed			
Pumping speed for Ar	1200 l/s	1200 l/s	1200 l/s
Pumping speed for H ₂	1100 l/s	1100 l/s	1100 l/s
Pumping speed for He	1300 l/s	1300 l/s	1300 l/s
Pumping speed for N ₂	1250 l/s	1250 l/s	1250 l/s
Pumping speed for CF ₄			
Compression			
Compression ratio for Ar	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸
Compression ratio for H ₂	6 · 10 ³	6 · 10 ³	6 · 10 ³
Compression ratio for He	2 · 10 ⁵	2 · 10 ⁵	2 · 10 ⁵
Compression ratio for N ₂	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸
Compression ratio for CF ₄			
Fore-vacuum max. for N₂			
	2 hPa	2 hPa	2 hPa
Gas throughput			
Gas throughput at full rotational speed for Ar	11 hPa l/s	11 hPa l/s	6 hPa l/s
Gas throughput at full rotational speed for H ₂	> 30 hPa l/s	> 30 hPa l/s	> 30 hPa l/s
Gas throughput at full rotational speed for He	> 30 hPa l/s	> 30 hPa l/s	16 hPa l/s
Gas throughput at full rotational speed for N ₂	20 hPa l/s	20 hPa l/s	16 hPa l/s
Gas throughput at full rotational speed for CF ₄			
Electronic drive unit	with TC 1200	with TC 1200	with TC 1200
Operating voltage	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz
Rotation speed ± 2 %	37800 min ⁻¹	37800 min ⁻¹	37800 min ⁻¹
Rotation speed variable	50-100 %	50-100 %	50-100 %
Ultimate pressure*	< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa
Weight	27 kg	28 kg	40 kg
Run-up time	2.5 min	2.5 min	2.5 min
Integrated power supply	YES	YES	YES
Corrosive gas version			
Cooling method, standard	Water	Water	Water
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	100 l/h	100 l/h	100 l/h
Bearing	Hybrid	Hybrid	Hybrid
Particulate matter	YES	YES	YES
Sound pressure level	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54
Permissible magnetic field max.	6 mT	6 mT	6 mT

*Ultimate pressure please find description on page 272

Order number pump Pumpe			
Installation orientation: Standard 0-90°	PM P03 910	PM P03 911	PM P03 912
Installation orientation: Upside-down 90-180°	PM P03 913	PM P03 914	PM P03 915
Installation orientation: Standard 0-90°, Profibus	PM P04 110	PM P04 111	PM P04 112
Installation orientation: Upside-down 90-180°, Profibus	PM P04 113	PM P04 114	PM P04 115

	HiPace® 1200 C with TC 1200, DN 200 ISO-K, corrosive	HiPace® 1200 C with TC 1200, DN 200 ISO-F, corrosive	HiPace® 1200 C with TC 1200, DN 200 CF-F, corrosive
	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
	DN 200 ISO-K	DN 200 ISO-F	DN 200 CF-F
	G 1/8"	G 1/8"	G 1/8"
	1200 l/s	1200 l/s	1200 l/s
	1100 l/s	1100 l/s	1100 l/s
	1300 l/s	1300 l/s	1300 l/s
	1250 l/s	1250 l/s	1250 l/s
	950 l/s	950 l/s	950 l/s
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	$6 \cdot 10^3$	$6 \cdot 10^3$	$6 \cdot 10^3$
	$2 \cdot 10^5$	$2 \cdot 10^5$	$2 \cdot 10^5$
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	2 hPa	2 hPa	2 hPa
	11 hPa l/s	11 hPa l/s	6 hPa l/s
	> 30 hPa l/s	> 30 hPa l/s	> 30 hPa l/s
	> 30 hPa l/s	> 30 hPa l/s	16 hPa l/s
	20 hPa l/s	20 hPa l/s	16 hPa l/s
	12 hPa l/s	12 hPa l/s	6 hPa l/s
	with TC 1200	with TC 1200	with TC 1200
	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz
	37800 min ⁻¹	37800 min ⁻¹	37800 min ⁻¹
	50-100 %	50-100 %	50-100 %
	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-8}$ hPa
	27 kg	28 kg	40 kg
	2.5 min	2.5 min	2.5 min
	YES	YES	YES
	YES	YES	YES
	Water	Water	Water
	15-35 °C	15-35 °C	15-35 °C
	100 l/h	100 l/h	100 l/h
	Hybrid	Hybrid	Hybrid
	YES	YES	YES
	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
	RS-485, Remote	RS-485, Remote	RS-485, Remote
	IP 54	IP 54	IP 54
	6 mT	6 mT	6 mT

	PM P03 916	PM P03 917	PM P04 190
	PM P03 918	PM P03 919	PM P04 191
	PM P04 116	PM P04 117	
	PM P04 118	PM P04 119	

Accessories	HiPace® 1200 with TC 1200, DN 200 ISO-K	HiPace® 1200 with TC 1200, DN 200 ISO-F	HiPace® 1200, with TC 1200, DN 200 CF-F	
Order number pump Pumpe	PM P03 910 PM P03 913 PM P04 110 PM P04 113	PM P03 911 PM P03 914 PM P04 111 PM P04 114	PM P03 912 PM P03 915 PM P04 112 PM P04 115	
Control units				
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T	
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T	
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T	
Mains cable DCU/TPS/TCP, 3 m				
230 V AC mains cable with Euro-style safety plug	P 4564 309 HA	P 4564 309 HA	P 4564 309 HA	
208 V AC mains cable with UL plug	P 4564 309 HB	P 4564 309 HB	P 4564 309 HB	
Venting accessories				
Venting valve	PM Z01 291	PM Z01 291	PM Z01 291	
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121	
Heating accessories				
Heating jacket 230 V AC, Euro-style safety plug			PM 071 272 -T	
Heating jacket 208 V AC, UL plug			PM 071 273 -T	
Heating jacket 115 V AC, UL plug			PM 071 274 -T	
Backing pump control				
Backing pump relay box, shielded, 1-phase 7 A	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	
Backing pump relay box, shielded, 1-phase 20 A	PM 071 285 -X	PM 071 285 -X	PM 071 285 -X	
Control cable for pumping stations 0.7 m	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205	
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206	
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X	
General accessories				
Sealing gas valve	PM Z01 313	PM Z01 313	PM Z01 313	
Sealing gas throttle	PM Z01 318	PM Z01 318	PM Z01 318	
Centering ring coated	PM 016 220 -U	PM 016 220 -U		
Centering ring coated with protection screen	PM 016 222 -U	PM 016 222 -U		
Centering ring coated with splinter shield	PM 016 221 -U	PM 016 221 -U		
Protection screen			PM 016 342	
Splinter shield			PM 016 321	
Vibration dampers	PM 006 668 -X		PM 006 669 -X	
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010	
Y-connector M12 for accessories	P 4723 013	P 4723 013	P 4723 013	
Mounting materials				
Centering ring coated, bracket screws	PM 016 390 -T			
Centering ring coated with protection screen, bracket screws	PM 016 392 -T			
Centering ring coated with splinter shield, bracket screws	PM 016 391 -T			
Centering ring coated with hexagon bolts		PM 016 470 -T		
Centering ring coated with protection screen, hexagon bolts		PM 016 472 -T		
Centering ring coated with splinter shield, hexagon bolts		PM 016 471 -T		
Centering ring coated with stud screws		PM 016 475 -T		
Centering ring coated with protection screen with stud screws		PM 016 477 -T		
Centering ring coated with splinter shield with stud screws		PM 016 476 -T		
Set of hexagon screws for trough hole (CF-F)			PM 016 687 -T	
Set of stud screws for tapped hole (CF-F)			PM 016 688 -T	
Set of stud screws for trough hole (CF)			PM 016 736 -T	

HiPace® 1200 C with TC 1200, DN 200 ISO-K, corrosive	HiPace® 1200 C with TC 1200, DN 200 ISO-F, corrosive	HiPace® 1200 C with TC 1200, DN 200 CF-F, corrosive
PM P03 916 PM P03 918 PM P04 116 PM P04 118	PM P03 917 PM P03 919 PM P04 117 PM P04 119	PM P04 190 PM P04 191
PM 061 348 -T PM 051 510 -T PM 061 005 -T	PM 061 348 -T PM 051 510 -T PM 061 005 -T	PM 061 348 -T PM 051 510 -T PM 061 005 -T
P 4564 309 HA P 4564 309 HB	P 4564 309 HA P 4564 309 HB	P 4564 309 HA P 4564 309 HB
PM Z01 291 PM Z00 121	PM Z01 291 PM Z00 121	PM Z01 291 PM Z00 121
		PM 071 272 -T PM 071 273 -T PM 071 274 -T
PM 071 284 -X PM 071 285 -X PM 061 675 -T PM Z01 205 PM Z01 206 PM 071 142 -X	PM 071 284 -X PM 071 285 -X PM 061 675 -T PM Z01 205 PM Z01 206 PM 071 142 -X	PM 071 284 -X PM 071 285 -X PM 061 675 -T PM Z01 205 PM Z01 206 PM 071 142 -X
PM Z01 313 PM Z01 318 PM 016 220 -U PM 016 222 -U PM 016 221 -U	PM Z01 313 PM Z01 318 PM 016 220 -U PM 016 222 -U PM 016 221 -U	PM Z01 313 PM Z01 318 PM 016 342 PM 016 321
PM 006 668 -X PM 061 207 -T PM 061 283 -T P 4723 010 P 4723 013	PM 061 207 -T PM 061 283 -T P 4723 010 P 4723 013	PM 006 669 -X PM 061 207 -T PM 061 283 -T P 4723 010 P 4723 013
PM 016 390 -T PM 016 392 -T PM 016 391 -T		
	PM 016 470 -T PM 016 472 -T PM 016 471 -T PM 016 475 -T PM 016 477 -T PM 016 476 -T	
		PM 016 687 -T PM 016 688 -T PM 016 736 -T

HiPace® 1500

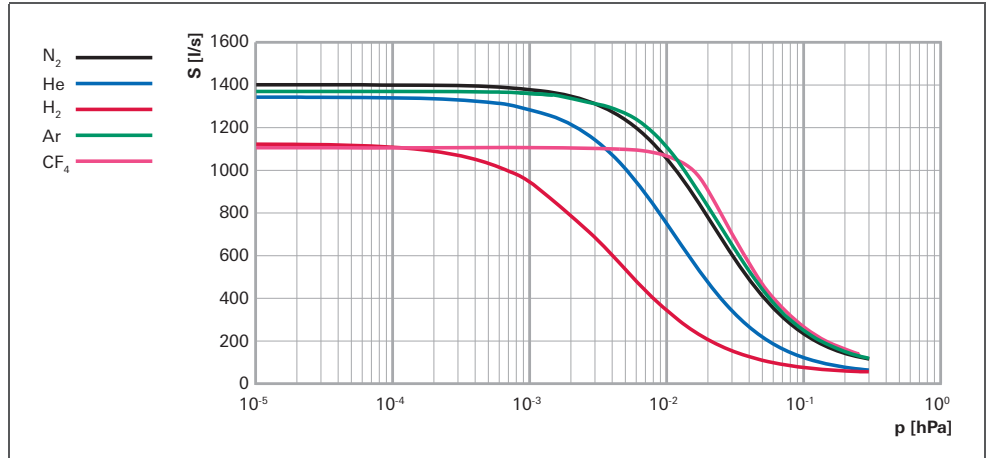


- Powerful turbopump with a pumping speed of up to 1450 l/s for N₂
- Integrated TC 1200 drive electronics with power supply
- Integrated sealing gas system with electric sealing gas valve 24 V DC
- Cooling: Water cooling
- Protection Class: IP 54
- Interfaces: RS-485, Remote (Profibus/DeviceNet on request)
- Extensive accessories expand the range of applications

C = Corrosive gas version

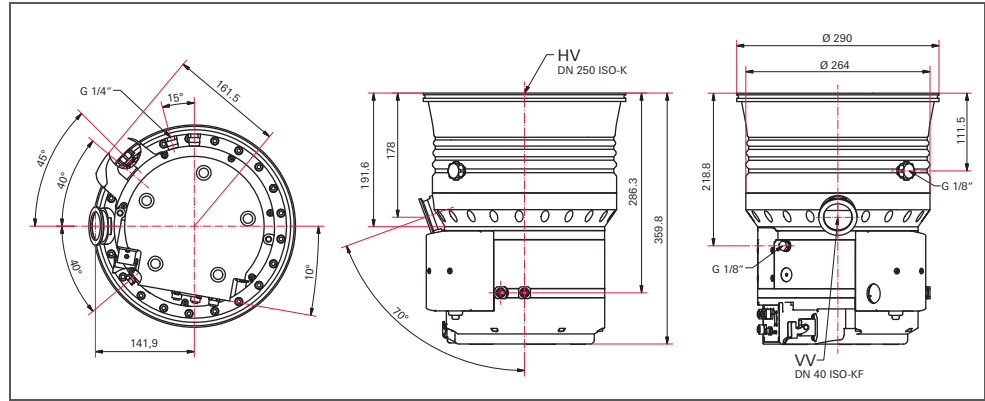
U = Upside-down installation orientation

Pumping speed

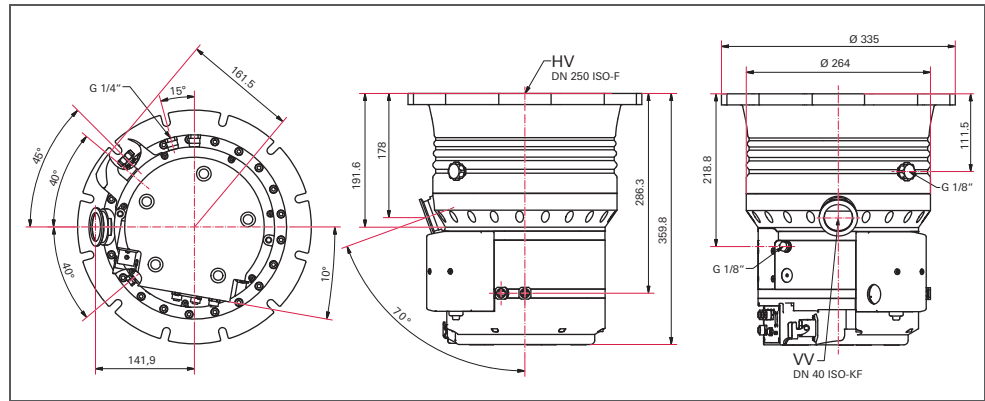


HiPace® 1500

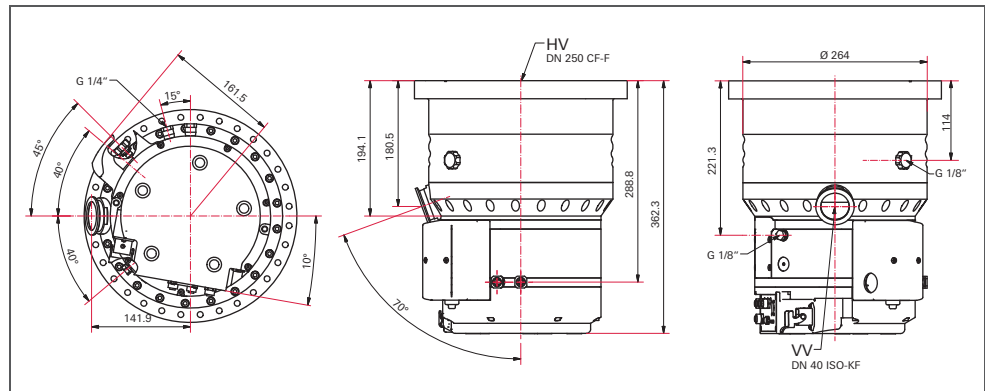
Dimensions (in mm)



HiPace® 1500 with TC 1200, DN 250 ISO-K



HiPace® 1500 with TC 1200, DN 250 ISO-F



HiPace® 1500 with TC 1200, DN 250 CF-F

Technical data	HiPace® 1500 with TC 1200, DN 250 ISO-K	HiPace® 1500 with TC 1200, DN 250 ISO-F	HiPace® 1500 with TC 1200, DN 250 CF-F
Connection nominal diameter			
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 250 ISO-K	DN 250 ISO-F	DN 250 CF-F
Venting connection	G 1/8"	G 1/8"	G 1/8"
Pumping speed			
Pumping speed for Ar	1350 l/s	1350 l/s	1350 l/s
Pumping speed for H ₂	1150 l/s	1150 l/s	1150 l/s
Pumping speed for He	1350 l/s	1350 l/s	1350 l/s
Pumping speed for N ₂	1400 l/s	1400 l/s	1400 l/s
Pumping speed for CF ₄			
Compression			
Compression ratio for Ar	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Compression ratio for H ₂	$6 \cdot 10^3$	$6 \cdot 10^3$	$6 \cdot 10^3$
Compression ratio for He	$2 \cdot 10^5$	$2 \cdot 10^5$	$2 \cdot 10^5$
Compression ratio for N ₂	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Compression ratio for CF ₄			
Fore-vacuum max. for N₂			
	2 hPa	2 hPa	2 hPa
Gas throughput			
Gas throughput at full rotational speed for Ar	11 hPa l/s	11 hPa l/s	6 hPa l/s
Gas throughput at full rotational speed for H ₂	> 30 hPa l/s	> 30 hPa l/s	> 30 hPa l/s
Gas throughput at full rotational speed for He	> 30 hPa l/s	> 30 hPa l/s	16 hPa l/s
Gas throughput at full rotational speed for N ₂	20 hPa l/s	20 hPa l/s	16 hPa l/s
Gas throughput at full rotational speed for CF ₄			
Electronic drive unit	with TC 1200	with TC 1200	with TC 1200
Operating voltage	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz
Rotation speed $\pm 2\%$	37800 min ⁻¹	37800 min ⁻¹	37800 min ⁻¹
Rotation speed variable	50-100 %	50-100 %	50-100 %
Ultimate pressure*	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa
Weight	29 kg	30 kg	41 kg
Run-up time	2.5 min	2.5 min	2.5 min
Integrated power supply	YES	YES	YES
Corrosive gas version			
Cooling method, standard	Water	Water	Water
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	100 l/h	100 l/h	100 l/h
Bearing	Hybrid	Hybrid	Hybrid
Particulate matter	YES	YES	YES
Sound pressure level	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54
Permissible magnetic field max.	6 mT	6 mT	6 mT

*Ultimate pressure please find description on page 272

Order number pump Pumpe			
Installation orientation: Standard 0-90°	PM P04 060	PM P04 061	PM P04 062
Installation orientation: Upside-down 90-180°	PM P04 063	PM P04 064	PM P04 065
Installation orientation: Standard 0-90°, Profibus	PM P04 120	PM P04 121	PM P04 122
Installation orientation: Upside-down 90-180°, Profibus	PM P04 123	PM P04 124	PM P04 125

	HiPace® 1500 C with TC 1200, DN 250 ISO-K, corrosive	HiPace® 1500 C with TC 1200, DN 250 ISO-F, corrosive	HiPace® 1500 C with TC 1200, DN 250 CF-F, corrosive
	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
	DN 250 ISO-K	DN 250 ISO-F	DN 250 CF-F
	G 1/8"	G 1/8"	G 1/8"
	1350 l/s	1350 l/s	1350 l/s
	1150 l/s	1150 l/s	1150 l/s
	1350 l/s	1350 l/s	1350 l/s
	1400 l/s	1400 l/s	1400 l/s
	1100 l/s	1100 l/s	1100 l/s
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	$6 \cdot 10^3$	$6 \cdot 10^3$	$6 \cdot 10^3$
	$2 \cdot 10^5$	$2 \cdot 10^5$	$2 \cdot 10^5$
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	2 hPa	2 hPa	2 hPa
	11 hPa l/s	11 hPa l/s	6 hPa l/s
	> 30 hPa l/s	> 30 hPa l/s	> 30 hPa l/s
	> 30 hPa l/s	> 30 hPa l/s	16 hPa l/s
	20 hPa l/s	20 hPa l/s	16 hPa l/s
	12 hPa l/s	12 hPa l/s	6 hPa l/s
	with TC 1200	with TC 1200	with TC 1200
	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz
	37800 min ⁻¹	37800 min ⁻¹	37800 min ⁻¹
	50-100 %	50-100 %	50-100 %
	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-8}$ hPa
	29 kg	30 kg	41 kg
	2.5 min	2.5 min	2.5 min
	YES	YES	YES
	YES	YES	YES
	Water	Water	Water
	15-35 °C	15-35 °C	15-35 °C
	100 l/h	100 l/h	100 l/h
	Hybrid	Hybrid	Hybrid
	YES	YES	YES
	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
	RS-485, Remote	RS-485, Remote	RS-485, Remote
	IP 54	IP 54	IP 54
	6 mT	6 mT	6 mT

	PM P04 066	PM P04 067	PM P04 192
	PM P04 068	PM P04 069	PM P04 193
	PM P04 126	PM P04 127	
	PM P04 128	PM P04 129	

Accessories	HiPace® 1500 with TC 1200, DN 250 ISO-K	HiPace® 1500 with TC 1200, DN 250 ISO-F	HiPace® 1500 with TC 1200, DN 250 CF-F
Order number pump Pumpe	PM P04 060 PM P04 063 PM P04 120 PM P04 123	PM P04 061 PM P04 064 PM P04 121 PM P04 124	PM P04 062 PM P04 065 PM P04 122 PM P04 125
Control units			
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T
Mains cable DCU/TPS/TCP, 3 m			
230 V AC mains cable with Euro-style safety plug	P 4564 309 HA	P 4564 309 HA	P 4564 309 HA
208 V AC mains cable with UL plug	P 4564 309 HB	P 4564 309 HB	P 4564 309 HB
Venting accessories			
Venting valve	PM Z01 291	PM Z01 291	PM Z01 291
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121
Heating accessories			
Heating jacket 230 V AC, Euro-style safety plug			PM 071 272 -T
Heating jacket 208 V AC, UL plug			PM 071 273 -T
Heating jacket 115 V AC, UL plug			PM 071 274 -T
Backing pump control			
Backing pump relay box, shielded, 1-phase 7 A	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
Backing pump relay box, shielded, 1-phase 20 A	PM 071 285 -X	PM 071 285 -X	PM 071 285 -X
Control cable for pumping stations 0.7 m	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X
General accessories			
Sealing gas valve	PM Z01 313	PM Z01 313	PM Z01 313
Sealing gas throttle	PM Z01 318	PM Z01 318	PM Z01 318
Centering ring coated	PM 016 225 -U	PM 016 225 -U	
Centering ring coated with protection screen	PM 016 227 -U	PM 016 227 -U	
Centering ring coated with splinter shield	PM 016 226 -U	PM 016 226 -U	
Protection screen			PM 016 345
Splinter shield			PM 016 324
Vibration dampers	PM 006 670 -X		PM 006 671 -X
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010
Y-connector M12 for accessories	P 4723 013	P 4723 013	P 4723 013
Mounting materials			
Centering ring coated, bracket screws	PM 016 395 -T		
Centering ring coated with protection screen, bracket screws	PM 016 397 -T		
Centering ring coated with splinter shield, bracket screws	PM 016 396 -T		
Centering ring coated with hexagon bolts		PM 016 480 -T	
Centering ring coated with protection screen, hexagon bolts		PM 016 482 -T	
Centering ring coated with splinter shield, hexagon bolts		PM 016 481 -T	
Centering ring coated with stud screws		PM 016 485 -T	
Centering ring coated with protection screen with stud screws		PM 016 487 -T	
Centering ring coated with splinter shield with stud screws		PM 016 486 -T	
Set of hexagon screws for trough hole (CF-F)			PM 016 694 -T
Set of stud screws for tapped hole (CF-F)			PM 016 695 -T
Set of stud screws for trough hole (CF)			PM 016 737 -T

	HiPace® 1500 C with TC 1200, DN 250 ISO-K, corrosive	HiPace® 1500 C with TC 1200, DN 250 ISO-F, corrosive	HiPace® 1500 C with TC 1200, DN 250 CF-F, corrosive
	PM P04 066 PM P04 068 PM P04 126 PM P04 128	PM P04 067 PM P04 069 PM P04 127 PM P04 129	PM P04 192 PM P04 193
	PM 061 348 -T PM 051 510 -T PM 061 005 -T	PM 061 348 -T PM 051 510 -T PM 061 005 -T	PM 061 348 -T PM 051 510 -T PM 061 005 -T
	P 4564 309 HA P 4564 309 HB	P 4564 309 HA P 4564 309 HB	P 4564 309 HA P 4564 309 HB
	PM Z01 291 PM Z00 121	PM Z01 291 PM Z00 121	PM Z01 291 PM Z00 121
			PM 071 272 -T PM 071 273 -T PM 071 274 -T
	PM 071 284 -X PM 071 285 -X PM 061 675 -T PM Z01 205 PM Z01 206 PM 071 142 -X	PM 071 284 -X PM 071 285 -X PM 061 675 -T PM Z01 205 PM Z01 206 PM 071 142 -X	PM 071 284 -X PM 071 285 -X PM 061 675 -T PM Z01 205 PM Z01 206 PM 071 142 -X
	PM Z01 313 PM Z01 318 PM 016 225 -U PM 016 227 -U PM 016 226 -U	PM Z01 313 PM Z01 318 PM 016 225 -U PM 016 227 -U PM 016 226 -U	PM Z01 313 PM Z01 318 PM 016 345 PM 016 324
	PM 006 670 -X PM 061 207 -T PM 061 283 -T P 4723 010 P 4723 013	PM 061 207 -T PM 061 283 -T P 4723 010 P 4723 013	PM 006 671 -X PM 061 207 -T PM 061 283 -T P 4723 010 P 4723 013
	PM 016 395 -T PM 016 397 -T PM 016 396 -T		
		PM 016 480 -T PM 016 482 -T PM 016 481 -T PM 016 485 -T PM 016 487 -T PM 016 486 -T	
			PM 016 694 -T PM 016 695 -T PM 016 737 -T

HiPace® 1800

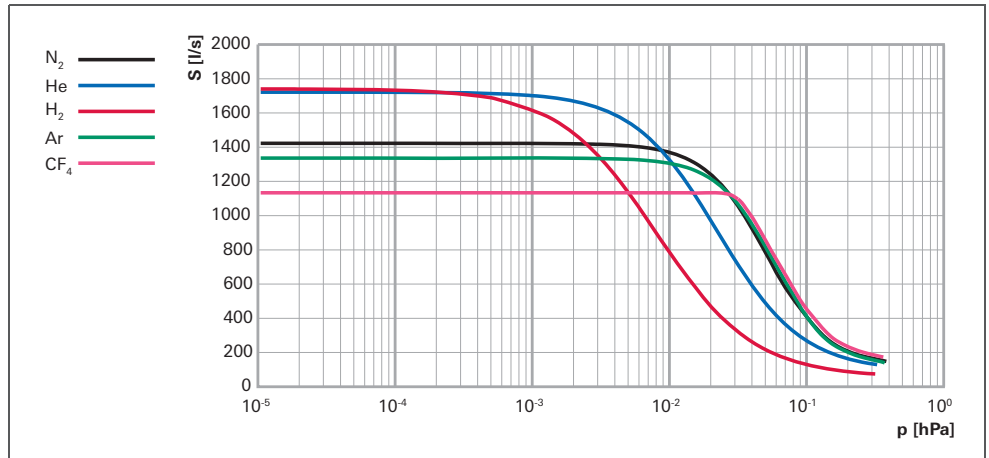


- Powerful turbopump with a pumping speed of up to 1450 l/s for N₂
- Integrated TC 1200 drive electronics with power supply
- Integrated sealing gas system with electric sealing gas valve 24 V DC
- Cooling: Water cooling
- Protection Class: IP 54
- Interfaces: RS-485, Remote (Profibus/DeviceNet on request)
- Extensive accessories expand the range of applications

C = Corrosive gas version

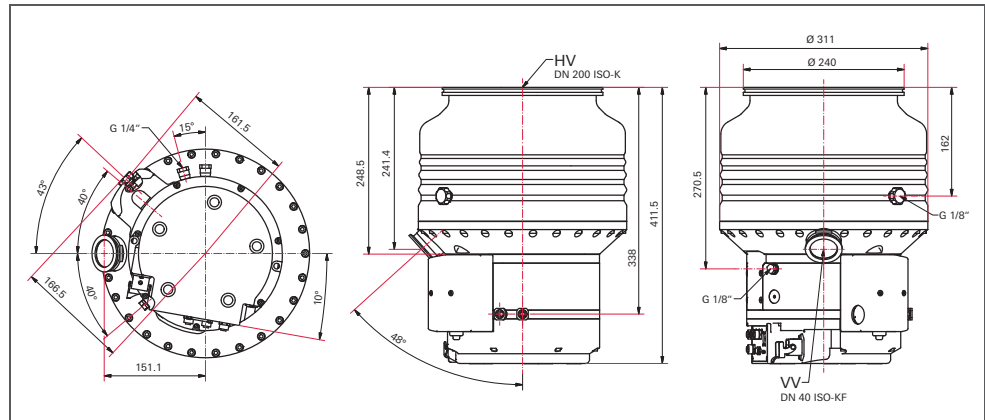
U = Upside-down installation orientation

Pumping speed

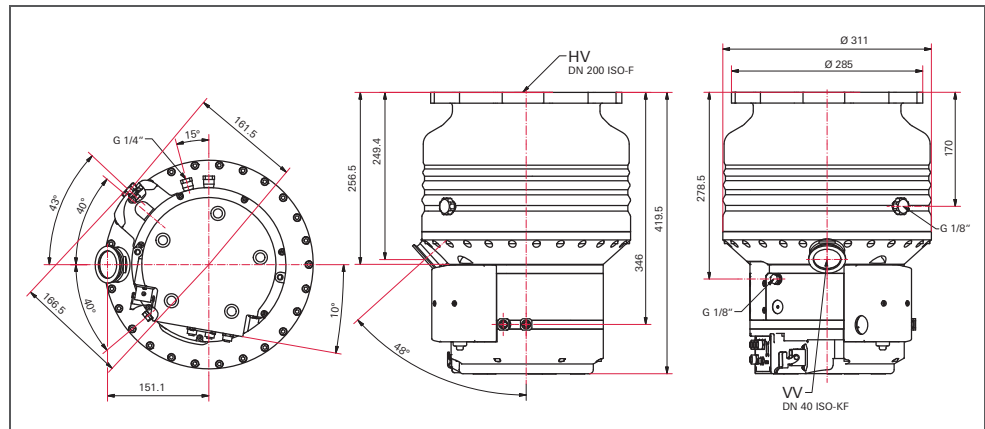


HiPace® 1800

Dimensions (in mm)



HiPace® 1800 with TC 1200, DN 200 ISO-K



HiPace® 1800 with TC 1200, DN 200 ISO-F

Technical data	HiPace® 1800 with TC 1200, DN 200 ISO-K	HiPace® 1800 with TC 1200, DN 200 ISO-F	HiPace® 1800 U with TC 1200, DN 200 ISO-K, upside down version	HiPace® 1800 U with TC 1200, DN 200 ISO-F, upside down version
Connection nominal diameter				
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 200 ISO-K	DN 200 ISO-F	DN 200 ISO-K	DN 200 ISO-F
Venting connection	G 1/8"	G 1/8"	G 1/8"	G 1/8"
Pumping speed				
Pumping speed for Ar	1370 l/s	1370 l/s	1370 l/s	1370 l/s
Pumping speed for H ₂	1700 l/s	1700 l/s	1700 l/s	1700 l/s
Pumping speed for He	1650 l/s	1650 l/s	1650 l/s	1650 l/s
Pumping speed for N ₂	1450 l/s	1450 l/s	1450 l/s	1450 l/s
Pumping speed for CF ₄			1050 l/s	1050 l/s
Compression				
Compression ratio for Ar	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸
Compression ratio for H ₂	2 · 10 ⁴	2 · 10 ⁴	2 · 10 ⁴	2 · 10 ⁴
Compression ratio for He	3 · 10 ⁵	3 · 10 ⁵	3 · 10 ⁵	3 · 10 ⁵
Compression ratio for N ₂	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸
Compression ratio for CF ₄			> 1 · 10 ⁸	> 1 · 10 ⁸
Fore-vacuum max. for N₂				
	1.8 hPa	1.8 hPa	1.8 hPa	1.8 hPa
Gas throughput				
Gas throughput at full rotational speed for Ar	16 hPa l/s	16 hPa l/s	16 hPa l/s	16 hPa l/s
Gas throughput at full rotational speed for H ₂	> 30 hPa l/s	> 30 hPa l/s	> 30 hPa l/s	> 30 hPa l/s
Gas throughput at full rotational speed for He	20 hPa l/s	20 hPa l/s	20 hPa l/s	20 hPa l/s
Gas throughput at full rotational speed for N ₂	20 hPa l/s	20 hPa l/s	20 hPa l/s	20 hPa l/s
Gas throughput at full rotational speed for CF ₄			14 hPa l/s	14 hPa l/s
Electronic drive unit				
Operating voltage	with TC 1200 100-120/200-240 V AC, 50/60 Hz	with TC 1200 100-120/200-240 V AC, 50/60 Hz	with TC 1200 100-120/200-240 V AC, 50/60 Hz	with TC 1200 100-120/200-240 V AC, 50/60 Hz
Rotation speed ± 2 %	31500 min ⁻¹	31500 min ⁻¹	31500 min ⁻¹	31500 min ⁻¹
Rotation speed variable	50-100 %	50-100 %	50-100 %	50-100 %
Ultimate pressure*	< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa
Weight	33 kg	34 kg	33 kg	34 kg
Run-up time	4 min	4 min	4 min	4 min
Integrated power supply	YES	YES	YES	YES
Corrosive gas version			YES	YES
Cooling method, standard	Water	Water	Water	Water
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	100 l/h	100 l/h	100 l/h	100 l/h
Bearing	Hybrid	Hybrid	Hybrid	Hybrid
Particulate matter	YES	YES	YES	YES
Sound pressure level	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54	IP 54
Permissible magnetic field max.	7 mT	7 mT	7 mT	7 mT

*Ultimate pressure please find description on page 272

Order number pump Pumpe				
Installation orientation: Standard 0-90°	PM P04 070	PM P04 071	PM P04 076	PM P04 077
Installation orientation: Upside-down 90-180°	PM P04 073	PM P04 074	PM P04 078	PM P04 079
Installation orientation: Standard 0-90°, Profibus	PM P04 130	PM P04 131	PM P04 136	PM P04 137
Installation orientation: Upside-down 90-180°, Profibus	PM P04 133	PM P04 134	PM P04 138	PM P04 139

Accessories	HiPace® 1800 with TC 1200, DN 200 ISO-K	HiPace® 1800 with TC 1200, DN 200 ISO-F	HiPace® 1800 U with TC 1200, DN 200 ISO-K, upside down version	HiPace® 1800 U with TC 1200, DN 200 ISO-F, upside down version
Order number pump Pumpe	PM P04 070 PM P04 073 PM P04 130 PM P04 133	PM P04 071 PM P04 074 PM P04 131 PM P04 134	PM P04 076 PM P04 078 PM P04 136 PM P04 138	PM P04 077 PM P04 079 PM P04 137 PM P04 139
Control units				
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T
Mains cable DCU/TPS/TCP, 3 m				
230 V AC mains cable with Euro-style safety plug	P 4564 309 HA	P 4564 309 HA	P 4564 309 HA	P 4564 309 HA
208 V AC mains cable with UL plug	P 4564 309 HB	P 4564 309 HB	P 4564 309 HB	P 4564 309 HB
Venting accessories				
Venting valve	PM Z01 291	PM Z01 291	PM Z01 291	PM Z01 291
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121	PM Z00 121
Backing pump control				
Backing pump relay box, shielded, 1-phase 7 A	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
Backing pump relay box, shielded, 1-phase 20 A	PM 071 285 -X	PM 071 285 -X	PM 071 285 -X	PM 071 285 -X
Control cable for pumping stations 0.7 m	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205	PM Z01 205
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206	PM Z01 206
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X
General accessories				
Sealing gas valve	PM Z01 313	PM Z01 313	PM Z01 313	PM Z01 313
Sealing gas throttle	PM Z01 318	PM Z01 318	PM Z01 318	PM Z01 318
Centering ring coated	PM 016 220 -U	PM 016 220 -U	PM 016 220 -U	PM 016 220 -U
Centering ring coated with protection screen	PM 016 222 -U	PM 016 222 -U	PM 016 222 -U	PM 016 222 -U
Centering ring coated with splinter shield	PM 016 221 -U	PM 016 221 -U	PM 016 221 -U	PM 016 221 -U
Vibration dampers	PM 006 668 -X		PM 006 668 -X	
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010	P 4723 010
Y-connector M12 for accessories	P 4723 013	P 4723 013	P 4723 013	P 4723 013
Mounting materials				
Centering ring coated, bracket screws	PM 016 410 -T		PM 016 410 -T	
Centering ring coated with protection screen, bracket screws	PM 016 412 -T		PM 016 412 -T	
Centering ring coated with splinter shield, bracket screws	PM 016 411 -T		PM 016 411 -T	
Centering ring coated with hexagon bolts		PM 016 470 -T		PM 016 470 -T
Centering ring coated with protection screen, hexagon bolts		PM 016 472 -T		PM 016 472 -T
Centering ring coated with splinter shield, hexagon bolts		PM 016 471 -T		PM 016 471 -T
Centering ring coated with stud screws		PM 016 475 -T		PM 016 475 -T
Centering ring coated with protection screen with stud screws		PM 016 477 -T		PM 016 477 -T
Centering ring coated with splinter shield with stud screws		PM 016 476 -T		PM 016 476 -T

HiPace® 2300

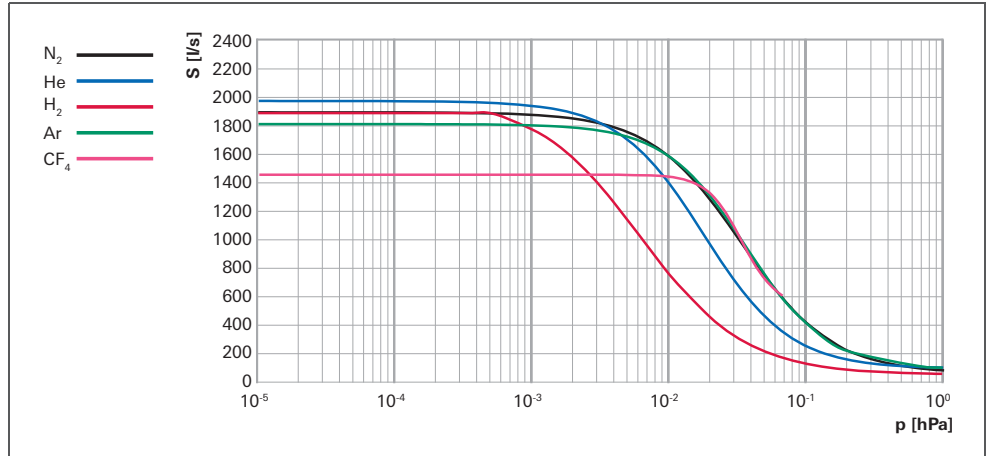


- Powerful turbopump with a pumping speed of up to 1900 l/s for N₂
- DN 250 ISO-K flange
- Integrated TC 1200 drive electronics with power supply
- Integrated sealing gas system with electric sealing gas valve 24 V DC
- Cooling: Water cooling
- Protection Class: IP 54
- Interfaces: RS-485, Remote (Profibus/DeviceNet on request)
- Extensive accessories expand the range of applications

C=Corrosive gas version

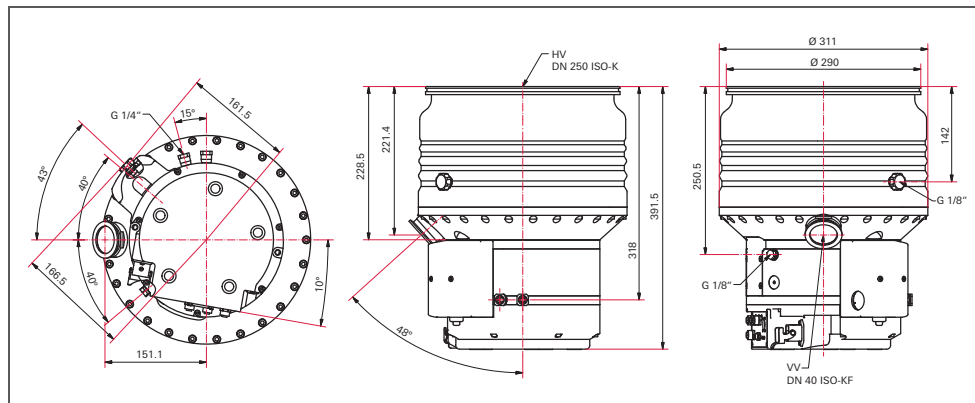
U=Upside-down installation orientation

Pumping speed

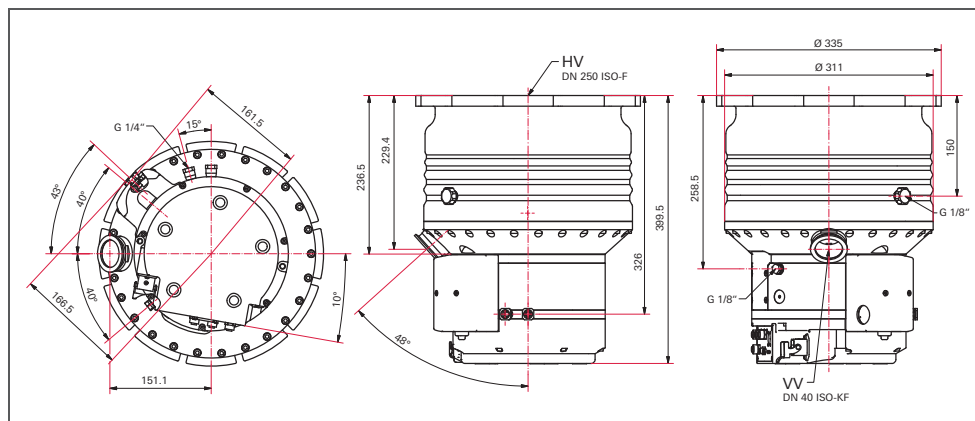


HiPace® 2300

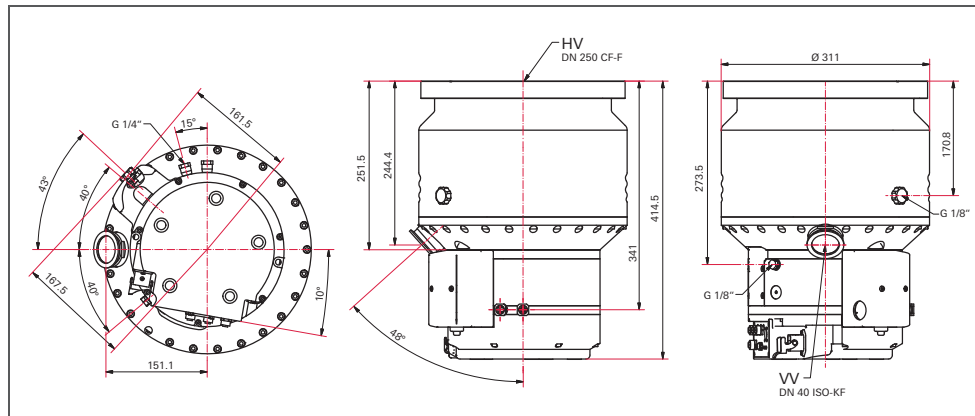
Dimensions (in mm)



HiPace® 2300 with TC 1200, DN 250 ISO-K



HiPace® 2300 with TC 1200, DN 250 ISO-F



HiPace® 2300 with TC 1200, DN 250 CF-F

Technical data	HiPace® 2300 with TC 1200, DN 250 ISO-K	HiPace® 2300 with TC 1200, DN 250 ISO-F	HiPace® 2300 with TC 1200, DN 250 CF-F
Connection nominal diameter			
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 250 ISO-K	DN 250 ISO-F	DN 250 CF-F
Venting connection	G 1/8"	G 1/8"	G 1/8"
Pumping speed			
Pumping speed for Ar	1800 l/s	1800 l/s	1800 l/s
Pumping speed for H ₂	1850 l/s	1850 l/s	1850 l/s
Pumping speed for He	2000 l/s	2000 l/s	2000 l/s
Pumping speed for N ₂	1900 l/s	1900 l/s	1900 l/s
Pumping speed for CF ₄			
Compression			
Compression ratio for Ar	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Compression ratio for H ₂	$2 \cdot 10^4$	$2 \cdot 10^4$	$2 \cdot 10^4$
Compression ratio for He	$3 \cdot 10^5$	$3 \cdot 10^5$	$3 \cdot 10^5$
Compression ratio for N ₂	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Compression ratio for CF ₄			
Fore-vacuum max. for N₂			
	1.8 hPa	1.8 hPa	1.8 hPa
Gas throughput			
Gas throughput at full rotational speed for Ar	16 hPa l/s	16 hPa l/s	8 hPa l/s
Gas throughput at full rotational speed for H ₂	> 30 hPa l/s	> 30 hPa l/s	> 30 hPa l/s
Gas throughput at full rotational speed for He	20 hPa l/s	20 hPa l/s	10 hPa l/s
Gas throughput at full rotational speed for N ₂	20 hPa l/s	20 hPa l/s	11 hPa l/s
Gas throughput at full rotational speed for CF ₄			
Electronic drive unit	with TC 1200	with TC 1200	with TC 1200
Operating voltage	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz
Rotation speed ± 2 %	31500 min ⁻¹	31500 min ⁻¹	31500 min ⁻¹
Rotation speed variable	50-100 %	50-100 %	50-100 %
Ultimate pressure*	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa
Weight	34 kg	35 kg	47 kg
Run-up time	4 min	4 min	4 min
Integrated power supply	YES	YES	YES
Corrosive gas version			
Cooling method, standard	Water	Water	Water
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	100 l/h	100 l/h	100 l/h
Bearing	Hybrid	Hybrid	Hybrid
Particulate matter	YES	YES	YES
Sound pressure level	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54
Permissible magnetic field max.	7 mT	7 mT	7 mT

*Ultimate pressure please find description on page 272

Order number pump Pumpe			
Installation orientation: Standard 0-90°	PM P03 920	PM P03 921	PM P03 922
Installation orientation: Upside-down 90-180°	PM P03 923	PM P03 924	PM P03 925
Installation orientation: Standard 0-90°, Profibus	PM P04 140	PM P04 141	PM P04 142
Installation orientation: Upside-down 90-180°, Profibus	PM P04 143	PM P04 144	PM P04 145

	HiPace® 2300 C with TC 1200, DN 250 ISO-K, corrosive	HiPace® 2300 C with TC 1200, DN 250 ISO-F, corrosive	HiPace® 2300 C with TC 1200, DN 250 CF-F, corrosive
	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
	DN 250 ISO-K	DN 250 ISO-F	DN 250 CF-F
	G 1/8"	G 1/8"	G 1/8"
	1800 l/s	1800 l/s	1800 l/s
	1850 l/s	1850 l/s	1850 l/s
	2000 l/s	2000 l/s	2000 l/s
	1900 l/s	1900 l/s	1900 l/s
	1450 l/s	1450 l/s	1450 l/s
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	$2 \cdot 10^4$	$2 \cdot 10^4$	$2 \cdot 10^4$
	$3 \cdot 10^5$	$3 \cdot 10^5$	$3 \cdot 10^5$
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	1.8 hPa	1.8 hPa	1.8 hPa
	16 hPa l/s	16 hPa l/s	8 hPa l/s
	> 30 hPa l/s	> 30 hPa l/s	> 30 hPa l/s
	20 hPa l/s	20 hPa l/s	10 hPa l/s
	20 hPa l/s	20 hPa l/s	11 hPa l/s
	14 hPa l/s	14 hPa l/s	8 hPa l/s
	with TC 1200	with TC 1200	with TC 1200
	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz	100-120/200-240 V AC, 50/60 Hz
	31500 min ⁻¹	31500 min ⁻¹	31500 min ⁻¹
	50-100 %	50-100 %	50-100 %
	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-8}$ hPa
	34 kg	35 kg	47 kg
	4 min	4 min	4 min
	YES	YES	YES
	YES	YES	YES
	Water	Water	Water
	15-35 °C	15-35 °C	15-35 °C
	100 l/h	100 l/h	100 l/h
	Hybrid	Hybrid	Hybrid
	YES	YES	YES
	≤ 50 dB (A)	≤ 50 dB (A)	≤ 50 dB (A)
	RS-485, Remote	RS-485, Remote	RS-485, Remote
	IP 54	IP 54	IP 54
	7 mT	7 mT	7 mT

	PM P03 926	PM P03 927	PM P04 194
	PM P03 928	PM P03 929	PM P04 195
	PM P04 146	PM P04 147	PM P04 200
	PM P04 148	PM P04 149	PM P04 201

Accessories	HiPace® 2300 with TC 1200, DN 250 ISO-K	HiPace® 2300 with TC 1200, DN 250 ISO-F	HiPace® 2300 with TC 1200, DN 250 CF-F
Order number pump Pumpe	PM P03 920 PM P03 923 PM P04 140 PM P04 143	PM P03 921 PM P03 924 PM P04 141 PM P04 144	PM P03 922 PM P03 925 PM P04 142 PM P04 145
Control units			
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T
Mains cable DCU/TPS/TCP, 3 m			
230 V AC mains cable with Euro-style safety plug	P 4564 309 HA	P 4564 309 HA	P 4564 309 HA
208 V AC mains cable with UL plug	P 4564 309 HB	P 4564 309 HB	P 4564 309 HB
Venting accessories			
Venting valve	PM Z01 291	PM Z01 291	PM Z01 291
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121
Heating accessories			
Heating jacket 230 V AC, Euro-style safety plug			PM 071 275 -T
Heating jacket 208 V AC, UL plug			PM 071 276 -T
Heating jacket 115 V AC, UL plug			PM 071 277 -T
Backing pump control			
Backing pump relay box, shielded, 1-phase 7 A	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
Backing pump relay box, shielded, 1-phase 20 A	PM 071 285 -X	PM 071 285 -X	PM 071 285 -X
Control cable for pumping stations 0.7 m	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X
General accessories			
Sealing gas valve	PM Z01 313	PM Z01 313	PM Z01 313
Sealing gas throttle	PM Z01 318	PM Z01 318	PM Z01 318
Centering ring coated	PM 016 225 -U	PM 016 225 -U	
Centering ring coated with protection screen	PM 016 227 -U	PM 016 227 -U	
Centering ring coated with splinter shield	PM 016 226 -U	PM 016 226 -U	
Protection screen			PM 016 345
Splinter shield			PM 016 324
Vibration dampers	PM 006 670 -X		PM 006 671 -X
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010
Y-connector M12 for accessories	P 4723 013	P 4723 013	P 4723 013
Mounting materials			
Centering ring coated, bracket screws	PM 016 415 -T		
Centering ring coated with protection screen, bracket screws	PM 016 417 -T		
Centering ring coated with splinter shield, bracket screws	PM 016 416-T		
Centering ring coated with hexagon bolts		PM 016 480 -T	
Centering ring coated with protection screen, hexagon bolts		PM 016 482 -T	
Centering ring coated with splinter shield, hexagon bolts		PM 016 481 -T	
Centering ring coated with stud screws		PM 016 485 -T	
Centering ring coated with protection screen with stud screws		PM 016 487 -T	
Centering ring coated with splinter shield with stud screws		PM 016 486 -T	
Set of hexagon screws for trough hole (CF-F)			PM 016 694 -T
Set of stud screws for tapped hole (CF-F)			PM 016 695 -T
Set of stud screws for trough hole (CF)			PM 016 737 -T

HiPace® 2300 C with TC 1200, DN 250 ISO-K, corrosive	HiPace® 2300 C with TC 1200, DN 250 ISO-F, corrosive	HiPace® 2300 C with TC 1200, DN 250 CF-F, corrosive
PM P03 926 PM P03 928 PM P04 146 PM P04 148	PM P03 927 PM P03 929 PM P04 147 PM P04 149	PM P04 194 PM P04 195 PM P04 200 PM P04 201
PM 061 348 -T PM 051 510 -T PM 061 005 -T	PM 061 348 -T PM 051 510 -T PM 061 005 -T	PM 061 348 -T PM 051 510 -T PM 061 005 -T
P 4564 309 HA P 4564 309 HB	P 4564 309 HA P 4564 309 HB	P 4564 309 HA P 4564 309 HB
PM Z01 291 PM Z00 121	PM Z01 291 PM Z00 121	PM Z01 291 PM Z00 121
		PM 071 275 -T PM 071 276 -T PM 071 277 -T
PM 071 284 -X PM 071 285 -X PM 061 675 -T PM Z01 205 PM Z01 206 PM 071 142 -X	PM 071 284 -X PM 071 285 -X PM 061 675 -T PM Z01 205 PM Z01 206 PM 071 142 -X	PM 071 284 -X PM 071 285 -X PM 061 675 -T PM Z01 205 PM Z01 206 PM 071 142 -X
PM Z01 313 PM Z01 318 PM 016 225 -U PM 016 227 -U PM 016 226 -U	PM Z01 313 PM Z01 318 PM 016 225 -U PM 016 227 -U PM 016 226 -U	PM Z01 313 PM Z01 318 PM 016 345 PM 016 324
PM 006 670 -X PM 061 207 -T PM 061 283 -T P 4723 010 P 4723 013	PM 061 207 -T PM 061 283 -T P 4723 010 P 4723 013	PM 006 671 -X PM 061 207 -T PM 061 283 -T P 4723 010 P 4723 013
PM 016 415 -T PM 016 417 -T PM 016 416-T	PM 016 480 -T PM 016 482 -T PM 016 481 -T PM 016 485 -T PM 016 487 -T PM 016 486 -T	PM 016 694 -T PM 016 695 -T PM 016 737 -T

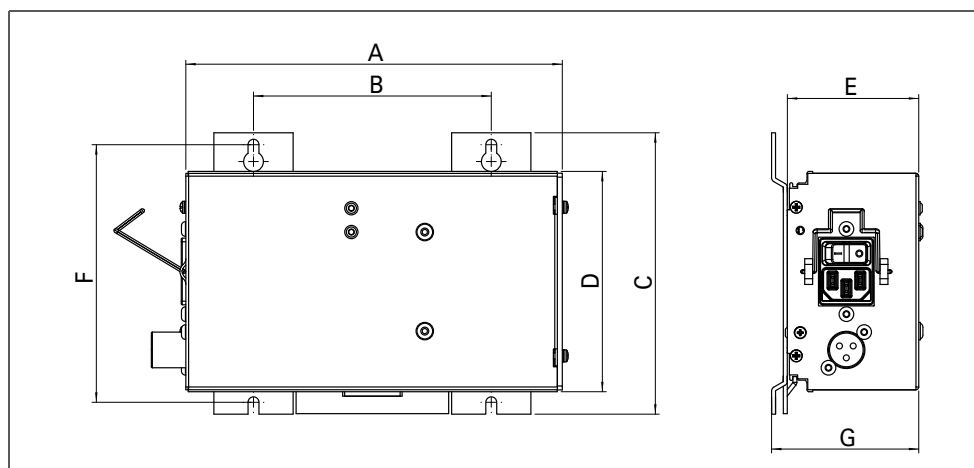
TPS wall rail fitting

Power supplies for wall and standard-rail mounting. Simple integration and Plug and Play-ready. Performance ideally matched to the respective pump model. Satisfies international standards.

- Power supply for wall or standard-rail mounting
- Ideally matched to HiPace 10 and HiPace 80



Dimensions (in mm)



TPS 110
 TPS 180
 TPS 310
 TPS 400

	TPS 110	TPS 180	TPS 310	TPS 400
A	169 mm	190 mm	190 mm	190 mm
B	120 mm	120 mm	120 mm	120 mm
C	142 mm	142 mm	142 mm	142 mm
D	111.2 mm	111.2 mm	111.2 mm	111.2 mm
E	48.7 mm	58.4 mm	67.3 mm	104.6 mm
F	130 mm	130 mm	130 mm	130 mm
G	56.6 mm	66.5 mm	75.3 mm	112.5 mm

Technical data	TPS 110	TPS 180	TPS 310	TPS 400
Output voltage	24 (± 2 %) V DC	24 (± 2 %) V DC	24 (± 2 %) V DC	48 (± 2 %) V DC
Output current	4.6 A	7.5 A	12.5 A	8.4 A
Weight	0.7 kg	1.0 kg	1.1 kg	1.75 kg
Mains requirement: frequency (range)	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Mains requirement: power consumption	130 VA	210 VA	340 VA	450 VA
Mains requirement: voltage (range)	115-230 (-20/+15 %) V AC	115-230 (-20/+15 %) V AC	115-230 (-20/+15 %) V AC	115-230 (-20/+15 %) V AC
Protection category	IP 20	IP 20	IP 20	IP 20
Ambient temperature	5-50 °C	5-50 °C	5-50 °C	5-50 °C

Order number				
TPS wall rail fitting	PM 061 340 -T	PM 061 341 -T	PM 061 342 -T	PM 061 343 -T

Accessories				
Mains cable 230 V AC with safety plug, Euro socket C13 (straight), 3 m	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
Mains cable 115 V AC with UL plug, Euro socket C 13 (straight), 3 m	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
Mains cable 208 V DC with UL plug, Euro socket C 13 (straight), 3 m	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF

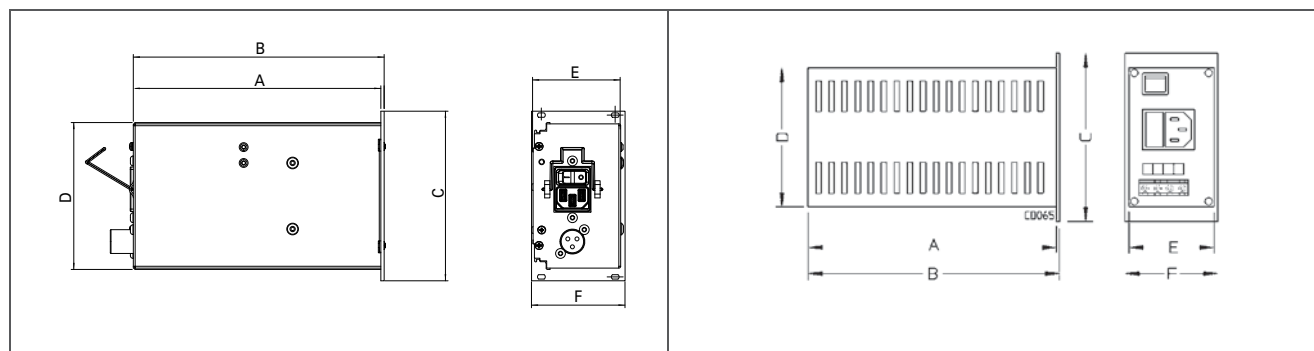
TPS-19" rack module

Power supply in the form of a 3HU 19" rack module with front panel; for installation directly in 19" rack systems. Performance ideally matched to the respective HiPace pump model. Plug and Play-ready. Satisfies international standards.

- Mains pack as 19" partial plug-in 3HU with front plate
- Ideally matched to HiPace 10/60/80 and SplitFlow 50



Dimensions (in mm)



TPS 111
TPS 181

TPS 311
TPS 401

	TPS 111	TPS 181	TPS 311	TPS 401
A	161.5 mm	187.5 mm	187.5 mm	187.5 mm
B	164 mm	190 mm	190 mm	190 mm
C	128.4 mm	128.4 mm	128.4 mm	128.4 mm
D	111.2 mm	111.2 mm	111.2 mm	111.2 mm
E	48.7 mm	58.4 mm	67.3 mm	104.6 mm
F	50.5 mm	60.7 mm	70.8 mm	106.4 mm

Technical data	TPS 111	TPS 181	TPS 311	TPS 401
Output voltage	24 (± 2 %) V DC	24 (± 2 %) V DC	24 (± 2 %) V DC	48 (± 2 %) V DC
Output current	4.6 A	7.5 A	12.5 A	8.4 A
Weight	0.7 kg	1.0 kg	1.1 kg	1.75 kg
Mains requirement: frequency (range)	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Mains requirement: power consumption	130 VA	210 VA	340 VA	450 VA
Mains requirement: voltage (range)	115-230 (-20-+15 %) V AC	115-230 (-20 - +15 %) V AC	115-230 (-20-+15 %) V AC	115-230 (-20-+15 %) V AC
Protection category	IP 20	IP 20	IP 20	IP 20
Ambient temperature	5-50 °C	5-50 °C	5-50 °C	5-50 °C

Order number				
TPS-19" rack module	PM 061 344 -T	PM 061 345 -T	PM 061 346 -T	PM 061 347 -T

Accessories				
Mains cable 230 V AC with safety plug, Euro socket C13 (straight), 3 m	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
Mains cable 115 V AC with UL plug, Euro socket C 13 (straight), 3 m	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
Mains cable 208 V DC with UL plug, Euro socket C 13 (straight), 3 m	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF

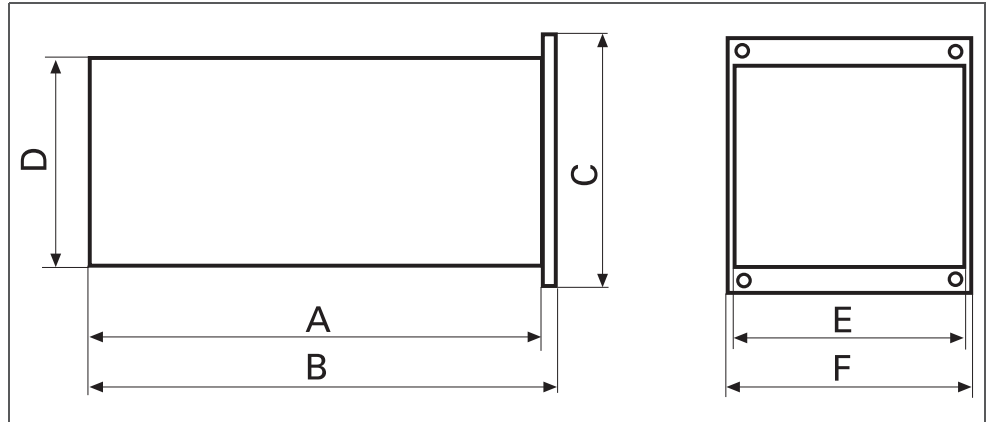
DCU with integrated power supply

Display Control Unit (DCU) with integrated power supply for electrical supply to the HiPace series of pumps. 3HU 19" rack module with easy-to-read, backlit display. The DCU affords operation and monitoring of all parameters of the HiPace turbopumps.



- To control and monitor all parameters of the drive electronics
- With integrated power supply
- Ideally matched to HiPace 10 and HiPace 80

Dimensions (in mm)



- DCU 110
- DCU 180
- DCU 310
- DCU 400

	DCU 110	DCU 180	DCU 310	DCU 400
A	197.5 mm	227.5 mm	227.5 mm	227.5 mm
B	200 mm	230 mm	230 mm	230 mm
C	128.5 mm	128.5 mm	128.5 mm	128.5 mm
D	111.2 mm	111.2 mm	111.2 mm	111.2 mm
E	106 mm	106 mm	106 mm	106 mm
F	106.4 mm	106.4 mm	106.4 mm	106.4 mm

Technical data	DCU 110	DCU 180	DCU 310	DCU 400
Output voltage	24 ($\pm 2\%$) V DC	24 ($\pm 2\%$) V DC	24 ($\pm 2\%$) V DC	48 ($\pm 2\%$) V DC
Output current	4.6 A	7.5 A	12.5 A	8.4 A
Weight	1.2 kg	1.7 kg	1.85 kg	2.3 kg
Mains requirement: frequency (range)	50/60 Hz	50/60 Hz	50/60 Hz	50/60 Hz
Mains requirement: power consumption	130 VA	210 VA	340 VA	450 VA
Mains requirement: voltage (range)	115-230 (-20-+15 %) V AC	115-230 (-20-+15 %) V AC	115-230 (-20-+15 %) V AC	115-230 (-20-+15 %) V AC
Protection category	IP 20	IP 20	IP 20	IP 20
Ambient temperature	5-50 °C	5-50 °C	5-50 °C	5-50 °C

Order number				
DCU with integrated power supply	PM C01 820	PM C01 821	PM C01 822	PM C01 823

Accessories				
Mains cable 230 V AC with safety plug, Euro socket C13 (straight), 3 m	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
Mains cable 115 V AC with UL plug, Euro socket C 13 (straight), 3 m	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
Mains cable 208 V DC with UL plug, Euro socket C 13 (straight), 3 m	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF

Control and display units

Control and display units for setting and monitoring the operating parameters of the turbopumps.

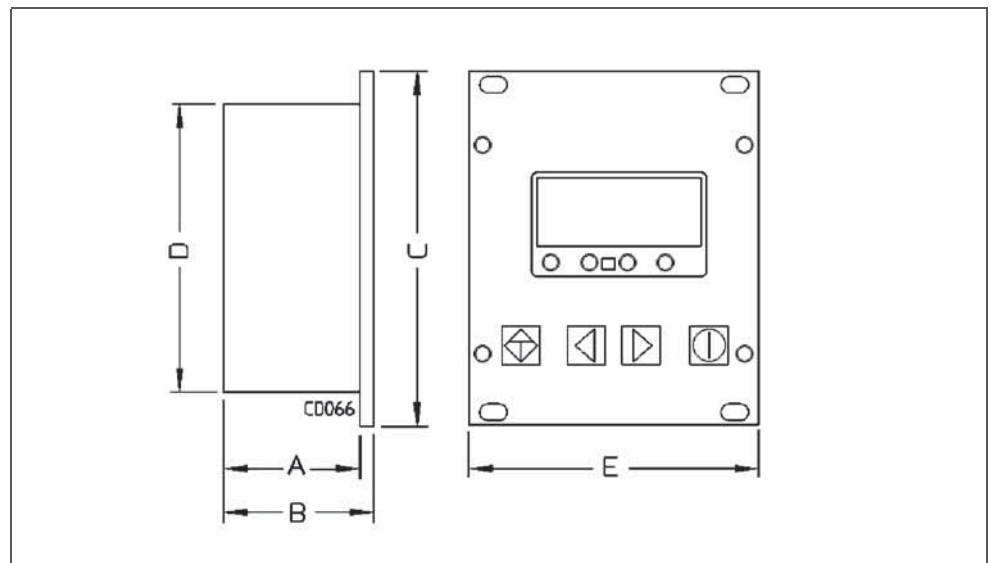
DCU 002

DCU 002, Display control unit

- For operating and monitoring all parameters of the drive electronics
- Power supplied exclusively from the drive electronics
- Suitable for all HiPace turbopumps
- 19" rack module, 3HU
- Connects to the pump's drive electronics via RS-485 interface
- Interface cable (3 m) for drive electronics included in scope of delivery
- Various Pfeiffer Vacuum gauges can be connected and read



Dimensions (in mm)



DCU 002, Display control unit

	DCU 002, Display control unit
A	50 mm
B	52.5 mm
C	128.5 mm
D	106 mm
E	106.3 mm

Technical data	DCU 002, Display control unit
Connection	12-30 V DC
Weight	0.4 kg
Power consumption	5 VA
Protection category	IP 20
Ambient temperature	5-50 °C

Order number	
DCU 002, Display control unit	PM 061 348 -T

Accessories	
Connection cable, plug M12, RJ 45, 3 m	PM 051 726 -T

HPU 001

HPU 001, handheld programming unit

- The ideal assistant for controlling and monitoring the pump parameters
- Administration of complete pump configurations / parameter records
- Connects to the pump's drive electronics via RS-485 interface
- Connection cable (3 m) for drive electronics included in scope of delivery
- Multilingual menus
- For loading and copying parameter records
- Graphical display



Technical data	HPU 001, handheld programming unit
Dimensions (L x W x H)	150 x 80 x 30 mm
Connection	9-24 V DC
Weight	0.25 kg
Power consumption	2 W
Protection category	IP 20
Ambient temperature	5-40 °C

Order number	
HPU 001, handheld programming unit	PM 051 510 -T

Accessories	
Connection cable, plug M12, RJ 45, 3 m	PM 051 726 -T
Accessories package for HPU - Power supply, software and PC cable	PM 061 005 -T

Accessories package for HPU

Accessories package for HPU - Power supply, software and PC cable

- Scope of delivery: CD (with HPU Communicator software), HPU-PC connection cable, power supply for HPU, 3 power cord plug adapters (America, UK, Southern Europe)
- The HPU Communicator software enables the pump parameter records to be displayed and administered on the PC and/or sent via e-mail
- The HPU-PC connection cable is used to exchange data between PC and HPU



Technical data	Accessories package for HPU - Power supply, software and PC cable
Dimensions (L x W x H)	150 x 80 x 30 mm
Connection	9-24 V DC
Weight	0.23 kg
Power consumption	2 W
Protection category	IP 20
Ambient temperature	5-40 °C

Order number	
Accessories package for HPU	PM 061 005 -T

Mains cables and connection cables

Various mains and connection cables afford a secure electrical connection.
Other lengths upon request.



Mains cables and connection cables	Order number
Mains cable 230 V AC with safety plug, Euro socket C13 (straight), 3 m	P 4564 309 ZA
Mains cable 115 V AC with UL plug, Euro socket C 13 (straight), 3 m	P 4564 309 ZE
Mains cable 208 V DC with UL plug, Euro socket C 13 (straight), 3 m	P 4564 309 ZF
Mains cable 230 V AC with safety plug, VII-HAN 3A, 3 m	P 4564 309 HA
Mains cable 208 V AC with UL plug-HAN 3A, 3 m	P 4564 309 HB
Connection cable for HiPace with TC 110 and RS-485 interface to power supply TPS/DCU 110/111/180/181	PM 061 350 -T
Connection cable for HiPace with TC 110 and RS-485 interface and 2 accessory ports to power supply TPS/DCU 110/111/180/181	PM 061 351 -T
Connection cable for HiPace with TC 400/TM 700 to power supply TPS/DCU 310/311/400/401	PM 061 352 -T
Connection cable from TCP 350 to HiPace with 2 accessory ports M8, 3 m	PM 061 353 -T
Connection cable from TCP 350 to HiPace with 2 accessory ports M12, 3 m	PM 061 356 -T

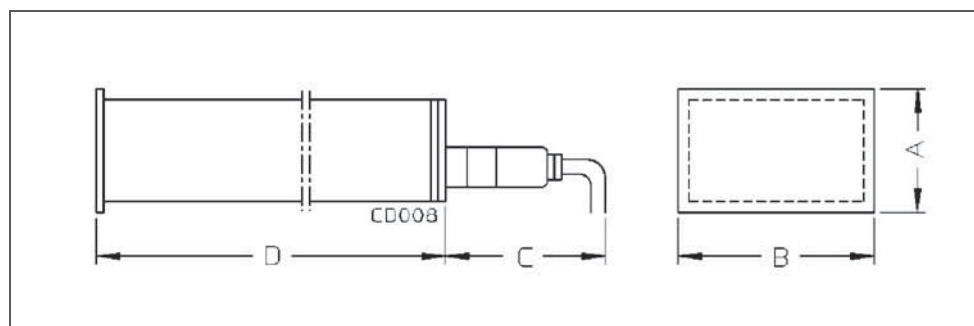
External drive units

External drives for HiPace pumps via connection cables.

- The TCP 350 drive electronics unit is employed for driving and monitoring the HiPace 80, 300, 400, 700 und 800
- Complete electronics in a single unit
- Mating plug for "Remote" connector included in scope of delivery



Dimensions (in mm)



TCP 350

	TCP 350 drive electronics	TCP 350 drive electronics	TCP 350 DN, drive electronics
A	128.5 mm	128.5 mm	128.5 mm
B	141.9 mm	141.9 mm	141.9 mm
C	120 mm	120 mm	120 mm
D	232 mm	232 mm	232 mm

Technical data	TCP 350 drive electronics	TCP 350 drive electronics	TCP 350 DN, drive electronics
Frequency	50/60 Hz	50-60 Hz	50-60 Hz
Weight	2.8 kg	2.8 kg	2.8 kg
Cable length Turbo-TCP max.	100 m	100 m	100 m
Mains requirement: power consumption	400 VA	400 VA	400 VA
Mains requirement: voltage (range)	95-265 V AC	95-265 V AC	95-265 V AC
Interface	RS-485/RS-232/ Remote (SPS-compatible)	RS-485/RS-232/ Remote (SPS-compatible) and Profibus	RS-485/RS-232/ Remote (SPS-compatible) and DeviceNet
Protection category	IP 20	IP 20	IP 20
Ambient temperature	5-40 °C	5-40 °C	5-40 °C

Order number			
External drive units	PM C01 740	PM C01 741	PM C01 742

Venting accessories

Venting valve, shielded

Accessories for safe and secure venting of the HiPace turbopumps. For secure processes and maximum reliability.



Venting valve, shielded, 24 V DC, G 1/8", for connection to TC 110

- Cable for connection to TC 110 and TCP 350 included in scope of delivery
- Venting mode, venting time and venting period adjustable via electronic drive unit and DCU/HPU
- Connection: G 1/8"
- Normally closed valve
- Connects with M8 plug directly to accessory outputs of connection cable, TCS 12/TCS 13 and TC 100 with interface (PB, E74, RS)

Venting valve, shielded, 24 V DC, G 1/8", for connection to TC 400/1200 and TM 700

- Cable for connection to devices included in the scope of delivery
- Venting mode, venting time and venting period adjustable via electronic drive unit and DCU/HPU
- Connection: G 1/8"
- Normally closed valve
- Can be connected with M12 plug directly to the accessory outputs of the electronic drive unit

Technical data	Venting valve, shielded, 24 V DC, G 1/8", for connection to TC 110	Venting valve, shielded, 24 V DC, G 1/8", for connection to TC 400/1200 and TM 700
Flange (out)	G 1/8"	G 1/8"
Flange (in)	G 1/8"	G 1/8"
Venting gas excess pressure, max.	150 kPa (absolute)	150 kPa (absolute)
Gas flow at atmospheric pressure	130 hPa l/s	130 hPa l/s
Weight	100 g	100 g
Control voltage	24 V DC	24 V DC

Order number		
Venting valve, shielded	PM Z01 290	PM Z01 291

Accessories		
TTV 001, air drier for venting turbopumps	PM Z00 121	PM Z00 121

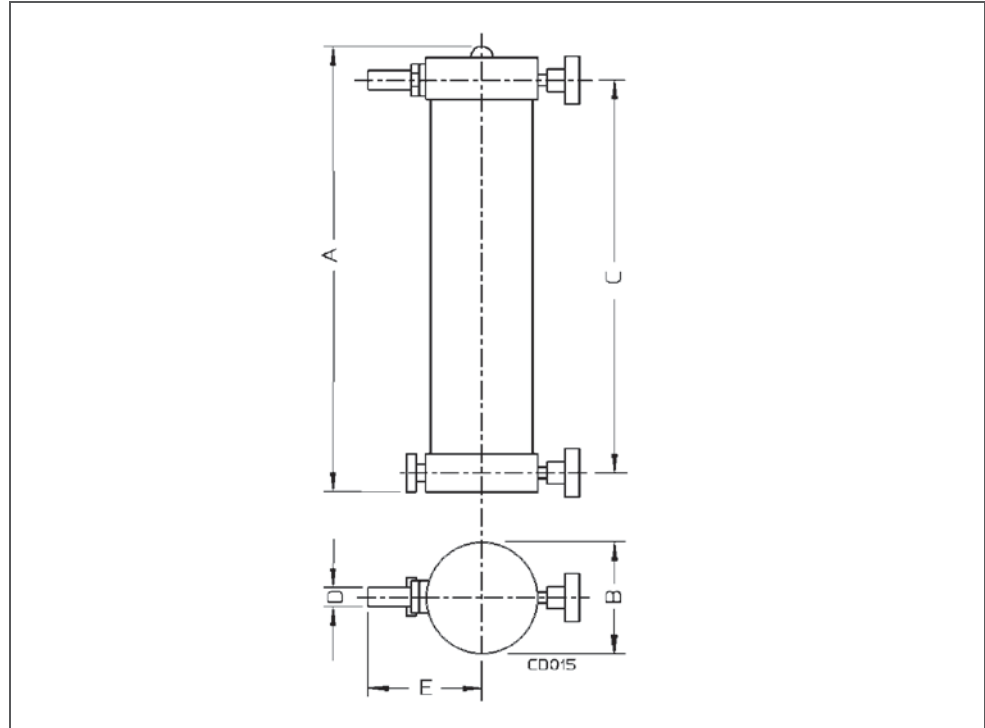
TTV 001

TTV 001, air drier for venting turbopumps

- Dries air securely for venting the turbopumps
- Shortens pump-down time
- Color indicator shows saturation of drying agent
- Simple connection to venting valves
- Hose nozzle G 1/8" for 9 mm hose
- G 1/8" connection for additional accessories



Dimensions (in mm)



TTV 001, air drier

	TTV 001, air drier for venting turbopumps
A	235 mm
B	59 mm
C	206 mm
D	9 mm
E	57 mm

Order number	
TTV 001, air drier	PM Z00 121

Cooling accessories

Accessories for cooling. For maximum reliability and process flexibility.

Air cooling

Ideal for systems integration, does not require additional water supply.



Air cooling	Control voltage	Order number
Air cooling for SplitFlow 50, HiPace 60/80 with TC 110	24 V DC	PM Z01 300
Air cooling for HiPace 300 with TC 110	24 V DC	PM Z01 301
Air cooling for HiPace 300 with TC 400	24 V DC	PM Z01 302
Air cooling for HiPace 400/700 and 800 with TC 400/TM 700	24 V DC	PM Z01 303
Air cooling, shielded, for HiPace 400/700/800 and 300700/800 M with TC 400/TM 700	24 V DC	PM Z01 363

Water cooling

For maximum performance and additional process flexibility.

Required for maximum performance and fast cycling. Indispensable for UHV applications when pump is heated.



Water cooling	Order number
Water cooling for HiPace 60/80 for plug-in connection 8 mm	PM 016 623 -T
Water cooling for HiPace 300 with plug-in connection 8 mm	PM 016 624 -T

Heating accessories

In many cases, it is necessary to condition the turbopump for cleaning in UHV operation or for process adaptation. Matching heating elements are available. Automatic control by means of integrated TC 110, TC 400, TC 1200 and TM 700 drive electronics.



Heating accessories	Order number
Heating sleeve for HiPace 80 with TC 110, 230 V AC, safety plug	PM 061 360 -T
Heating sleeve for HiPace 80 with TC 110, 208 V AC, UL plug	PM 061 361 -T
Heating sleeve for HiPace 80 with TC 110, 115 V AC, UL plug	PM 061 362 -T
Heating sleeve for HiPace 300 with TC 110, 230 V AC, safety plug	PM 061 363 -T
Heating sleeve for HiPace 300 with TC 110, 208 V AC, UL plug	PM 061 364 -T
Heating sleeve for HiPace 300 with TC 110, 208 V AC, UL plug	PM 061 365 -T
Heating sleeve for HiPace 300 with TC 400, 230 V AC, safety plug	PM 061 366 -T
Heating sleeve for HiPace 300 with TC 400, 208 V AC, UL plug	PM 061 367 -T
Heating sleeve for HiPace 300 with TC 400, 115 V AC, UL plug	PM 061 368 -T
Heating sleeve for HiPace 400/700 and 800 with TC 400, 230 V AC, safety plug	PM 061 369 -T
Heating sleeve for HiPace 400/700 and 800 with TC 400, 208 V AC, UL plug	PM 061 370 -T
Heating sleeve for HiPace 400/700 and 800 with TC 400, 115 V AC, UL plug	PM 061 371 -T
Heating sleeve, shielded, for HiPace 400/700/800 with TC 400 PB/TM 700, 230 V AC, safety plug	PM 071 269 -T
Heating sleeve, shielded, for HiPace 400/700/800 with TC 400 PB/TM 700, 208 V AC, UL plug	PM 071 270 -T
Heating sleeve, shielded, for HiPace 400/700/800 with TC 400 PB/TM 700, 115 V AC, UL plug	PM 071 271 -T
Heating sleeve, shielded, for HiPace 1200/1500 with TC1200, 230 V AC, safety plug	PM 071 272 -T
Heating sleeve, shielded, for HiPace 1200/1500 with TC 1200, 208 V AC, UL plug	PM 071 273 -T
Heating sleeve, shielded, for HiPace 1200/1500 with TC 1200, 115 V AC, UL plug	PM 071 274 -T
Heating sleeve, shielded, for HiPace 2300 with TC 1200, 230 V AC, safety plug	PM 071 275 -T
Heating sleeve, shielded, for HiPace 2300 with TC 1200, 208 V AC, UL plug	PM 071 276 -T
Heating sleeve, shielded, for HiPace 2300 with TC 1200, 115 V AC, UL plug	PM 071 277 -T

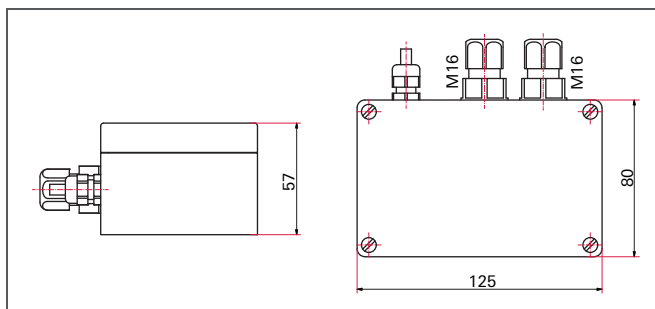
Backing pump control

HiPace turbopumps afford meaningful control of backing pumps. Pumping station control is effected via TC 110, TC 400, TC 1200 and TM 700 as well as TCP 350. Parameter setting with DCU. Process adaptation performed in interval mode.



- The fore-vacuum safety valve is installed in the fore-vacuum line of the pump combination, between turbopump and backing pump
- Additional security against gas backstreaming in the event of a power failure
- 230 V AC connection voltage

Dimensions (in mm)



Backing pump relay box, shielded

Technical data	TVV 001 fore-vacuum safety valve, 230 V AC	TVV 001 fore-vacuum safety valve, 115 V AC	Backing pump relay box, single phase 20 A, for TC 110 and TCP 350, M8 plug	Backing pump relay box, single phase 20 A, for TC 400 and TCP 350, M12 plug
Flange (out)	DN 16 ISO-KF	DN 16 ISO-KF		
Flange (in)	DN 16 ISO-KF	DN 16 ISO-KF		
Permanent current max.	0.6 A	0.6 A		
Pressure max. (absolute)	100 kPa	100 kPa		
Weight	0.4 kg	0.4 kg		
Contact rating			20 A	20 A
Leak rate	$1 \cdot 10^{-5}$ Pa m ³ /s	$1 \cdot 10^{-5}$ Pa m ³ /s		
Mains requirement: frequency (range)			50/60 Hz	50/60 Hz
Mains requirement: voltage	230 V AC, 50/60 Hz	115 V AC, 50/60 Hz		
Mains requirement: voltage (range)			100-240 (± 10 %) V AC	100-240 (± 10 %) V AC
Protection category	IP 65	IP 65		
Control voltage			24 V DC	24 V DC
Ambient temperature	0-55 °C	0-55 °C		
Time delay	0.5-35 s	0.5-35 s		

Order number				
Fore-vacuum safety valves	PM Z01 205	PM Z01 206	PM 061 373 -T	PM 061 375 -T

Technical data	Backing pump relay box, shielded, 1-phase 7A for TC 110 and TCP 350, M8 plug	Backing pump relay box, shielded, single phase 7 A for TC 400/1200 and TM 3000	Backing pump relay box, shielded, 1-phase 20 A for TC 400/1200, TM 700 and TCP 350, M12 plug
Contact rating	7 A	7.0 A	20 A
Control voltage	24 V DC	24 V DC	24 V DC

Order number			
Backing pump relay boxes	PM 071 282 -X	PM 071 284 -X	PM 071 285 -X

Technical data	Control cable for pumping stations 0.7 m	TCS 15 for controlling backing pumps	HiPace-ACP connection cable	Adapter cable, TCP 350 - backing pump relay box, M8
	D-Sub 26- pole for connecting TC 400/ 1200 and TM 700	For connecting to TC 110	D-Sub 15-pin plug / 15-pin connector with M12 plug as control lead	D-Sub - M8
	For controlling Penta Line, XtraDry and Adixen backing pumps (ACP series) via M12 plug	For controlling Penta Line, XtraDry and adixen backing pumps (ACP series) via M12 bushing	Controls rotation speed of ACP backing pumps	Length: 2 m, other lengths on request
	For controlling a fore-vacuum safety valve through strands	Control of a fore-vacuum safety valve on M8 socket	Connection to M12 connector via control cable PM 061 675 -T or to control adapter PM 061 685 -X	

Order number				
Control cables	PM 061 675 -T	PM 061 685 -X	PM 071 142 -X	PM 061 376 -T

Mounting materials

Mounting kits

Installation materials for the safest possible mounting of turbopumps.

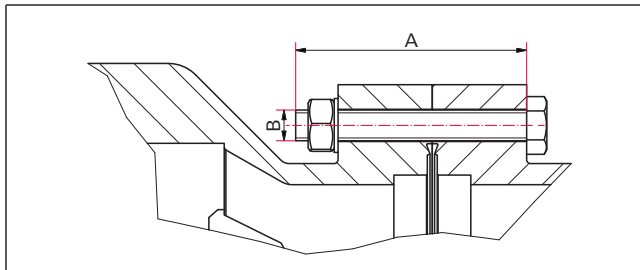
Mounting kits	Order number
Mounting kit for HiPace 10, DN 25 ISO-KF, including centering ring with 4 claws, screws and U-washers	PM 016 627 -T
Mounting kit for HiPace 80, DN 40 ISO-KF, including centering ring and clamping ring	PM 016 625 -T
Mounting kit for HiPace 80, DN 63 ISO-K, including coated centering ring, bracket screws	PM 016 360 -T
Mounting kit for HiPace 300, DN 100 ISO-K, including coated centering ring, bracket screws	PM 016 365 -T
Mounting kit for HiPace 400, DN 100 ISO-K, including coated centering ring	PM 016 380 -T
Mounting kit for HiPace 700, DN 160 ISO-K, including coated centering ring, bracket screws	PM 016 375 -T
Mounting kit for HiPace 1200, DN 200 ISO-K, including coated centering ring, bracket screws	PM 016 390 -T
Mounting kit for HiPace 1500, DN 250 ISO-K, including coated centering ring, bracket screws	PM 016 395 -T
Mounting kit for HiPace 1800, DN 200 ISO-K, including coated centering ring, bracket screws	PM 016 410 -T
Mounting kit for HiPace 2300, DN 250 ISO-K, including coated centering ring, bracket screws	PM 016 415 -T
Mounting kit for HiPace 2400 MC, DN 250 ISO-K, including coated centering ring, bracket screws	PM 016 420 -T
Mounting kit for HiPace 80, DN 63 ISO-K, including coated centering ring, protection screen, bracket screws	PM 016 362 -T
Mounting kit for HiPace 300, DN 100 ISO-K, including coated centering ring, protection screen, bracket screws	PM 016 367 -T
Mounting kit for HiPace 400, DN 100 ISO-K, including coated centering ring, protection screen, bracket screws	PM 016 382 -T
Mounting kit for HiPace 700, DN 160 ISO-K, including coated centering ring, protection screen, bracket screws	PM 016 377 -T
Mounting kit for HiPace 1200, DN 200 ISO-K, including coated centering ring, protection screen, bracket screws	PM 016 392 -T
Mounting kit for HiPace 1500, DN 250 ISO-K, including coated centering ring, protection screen, bracket screws	PM 016 397 -T
Mounting kit for HiPace 1800, DN 200 ISO-K, including coated centering ring, protection screen, bracket screws	PM 016 412 -T
Mounting kit for HiPace 2300, DN 250 ISO-K, including coated centering ring, protection screen, bracket screws	PM 016 417 -T
Mounting kit for HiPace 2400 MC, DN 250 ISO-K, including coated centering ring, protection screen, bracket screws	PM 016 422 -T
Mounting kit for HiPace 80, DN 40 ISO-KF, splinter shield, clamping ring	PM 016 626-T
Mounting kit for HiPace 80, DN 63 ISO-K, including coated centering ring, splinter shield, bracket screws	PM 016 361 -T
Mounting kit for HiPace 300, DN 100 ISO-K, including coated centering ring, splinter shield, bracket screws	PM 016 366 -T
Mounting kit for HiPace 400, DN 100 ISO-K, including coated centering ring, splinter shield, bracket screws	PM 016 381 -T
Mounting kit for HiPace 700, DN 160 ISO-K, including coated centering ring, splinter shield, bracket screws	PM 016 376 -T
Mounting kit for HiPace 1200, DN 200 ISO-K, including coated centering ring, splinter shield, bracket screws	PM 016 391 -T
Mounting kit for HiPace 1500, DN 250 ISO-K, including coated centering ring, splinter shield, bracket screws	PM 016 396 -T
Mounting kit for HiPace 1800, DN 200 ISO-K, including coated centering ring, splinter shield, bracket screws	PM 016 411 -T
Mounting kit for HiPace 2300, DN 250 ISO-K, including coated centering ring, splinter shield, bracket screws	PM 016 416-T
Mounting kit for HiPace 2400 MC, DN 250 ISO-K, including coated centering ring, splinter shield, bracket screws	PM 016 421 -T
Mounting kit for HiPace 80, DN 63 ISO-K to DN 63 ISO-F, including coated centering ring, claws	PM 016 510 -T
Mounting kit for HiPace 300 and HiPace 400, DN 100 ISO-F, including coated centering ring, hexagon screws	PM 016 450 -T
Mounting kit for HiPace 700, DN 160 ISO-F, including coated centering ring, hexagon screws	PM 016 460 -T
Mounting kit for HiPace 1200/1800, DN 200 ISO-F, including coated centering ring, hexagon screws	PM 016 470 -T
Mounting kit for HiPace 1500 and HiPace 2300, DN 250 ISO-F, including coated centering ring, hexagon screws	PM 016 480 -T
Mounting kit for HiPace 3400 MC, DN 320 ISO-F, including coated centering ring, hexagon screws	PM 016 490 -T

Mounting kits	Order number
Mounting kit for HiPace 80, DN 63 ISO-K to DN 63 ISO-F, including coating centering ring, protection screen, claws	PM 016 512 -T
Mounting kit for HiPace 300/400, DN 100 ISO-F, including coated centering ring, protective screen, hexagon screws	PM 016 452 -T
Mounting kit for HiPace 700, DN 160 ISO-F, including coated centering ring, protection screen, hexagon screws	PM 016 462 -T
Mounting kit for HiPace 1200/1800, DN 200 ISO-F, including coated centering ring, protective screen, hexagon screws	PM 016 472 -T
Mounting kit for HiPace 1500 and HiPace 2300, DN 250 ISO-F, including coated centering ring, protective screen, hexagon screws	PM 016 482 -T
Mounting kit for HiPace 3400 MC, DN 320 ISO-F, including coated centering ring, protection screen, hexagon screws	PM 016 492 -T
Mounting kit for HiPace 80, DN 63 ISO-K to DN 63 ISO-F, including coated centering ring, splinter and claws	PM 016 511 -T
Mounting kit for HiPace 300/400, DN 100 ISO-F, including coated centering ring, splinter shield, hexagon screws	PM 016 451 -T
Mounting kit for HiPace 700, DN 160 ISO-F, including coated centering ring, splinter shield, hexagon screws	PM 016 461 -T
Mounting kit for HiPace 1200/1800, DN 200 ISO-F, including coated centering ring, splinter shield, hexagon screws	PM 016 471 -T
Mounting kit for HiPace 1500 and HiPace 2300, DN 250 ISO-F, including coated centering ring, splinter shield, hexagon screws	PM 016 481 -T
Mounting kit for HiPace 3400 MC, DN 320 ISO-F, including coated centering ring, splinter shield, hexagon screws	PM 016 491 -T
Mounting kit for HiPace 300 and HiPace 400, DN 100 ISO-F, including coated centering ring, stud screws	PM 016 455 -T
Mounting kit for HiPace 700, DN 160 ISO-F, including coated centering ring, stud screws	PM 016 465 -T
Mounting kit for HiPace 1200 and HiPace 1800, DN 200 ISO-F, including coated centering ring, stud screws	PM 016 475 -T
Mounting kit for HiPace 1500 and HiPace 2300, DN 250 ISO-F, including coated centering ring, stud screws	PM 016 485 -T
Mounting kit for HiPace 3400 MC, DN 320 ISO-F, including coated centering ring, stud screws	PM 016 495 -T
Mounting kit for HiPace 300 and HiPace 400, DN 100 ISO-F, including coated centering ring, protection screen, stud screws	PM 016 457 -T
Mounting kit for HiPace 700, DN 160 ISO-F, including coated centering ring, protection screen, stud screws	PM 016 467 -T
Mounting kit for HiPace 1200/1800, DN 200 ISO-F, including coated centering ring, protective screen, stud screws	PM 016 477 -T
Mounting kit for HiPace 1500 and HiPace 2300, DN 250 ISO-F, including coated centering ring, protective screen, stud screws	PM 016 487 -T
Mounting kit for HiPace 3400 MC, DN 320 ISO-F, including coated centering ring, protection screen, stud screws	PM 016 497 -T
Mounting kit for HiPace 300/400, DN 100 ISO-F, including coated centering ring, splinter shield, stud screws	PM 016 456 -T
Mounting kit for HiPace 700, DN 160 ISO-F, including coated centering ring, splinter shield, stud screws	PM 016 466 -T
Mounting kit for HiPace 1200/1800, DN 200 ISO-F, including coated centering ring, splinter shield, stud screws	PM 016 476 -T
Mounting kit for HiPace 1500 and 2300, DN 250 ISO-F, including coated centering ring, splinter shield, stud screws	PM 016 486 -T
Mounting kit for HiPace 3400 MC, DN 320 ISO-F, including coated centering ring, splinter shield, stud screws	PM 016 496 -T

Mounting materials

Set of hexagon screws for trough hole

Dimensions (in mm)

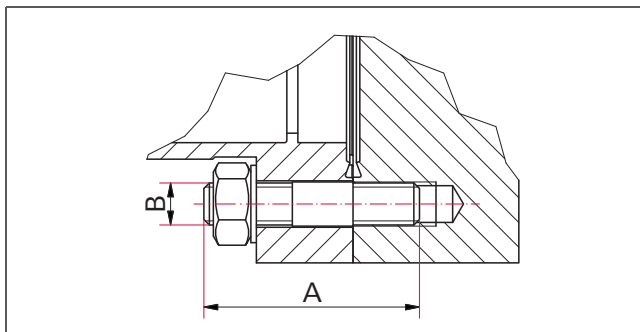


Flange (in)	A	B	C	Order number
DN 63 CF-F	45	M8	8	PM 016 683 -T
DN 100 CF-F	50	M8	16	PM 016 690 -T
DN 160 CF-F	55	M8	20	PM 016 691 -T
DN 200 CF-F	60	M8	25	PM 016 687 -T
DN 250 CF-F	60	M8	32	PM 016 694 -T

C = quantity delivered

Set of stud screws for tapped hole, 8 count M8

Dimensions (in mm)

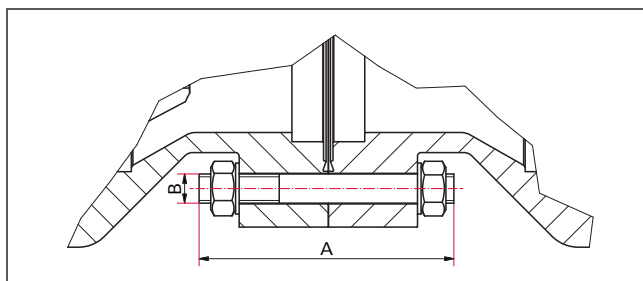


Flange (in)	A	B	C	Order number
DN 63 CF-F	39	M8	8	PM 016 684 -T
DN 100 CF-F	39	M8	16	PM 016 692 -T
DN 160 CF-F	44	M8	20	PM 016 693 -T
DN 200 CF-F	47	M8	24	PM 016 688 -T
DN 250 CF-F	47	M8	32	PM 016 695 -T

C = quantity delivered

Set of stud screws for trough hole

Dimensions (in mm)



Flange (in)	Order number
DN 63 CF-F	PM 016 733 -T
DN 100 CF-F	PM 016 734 -T
DN 160 CF-F	PM 016 735 -T
DN 200 CF-F	PM 016 736 -T
DN 250 CF-F	PM 016 737 -T

General accessories

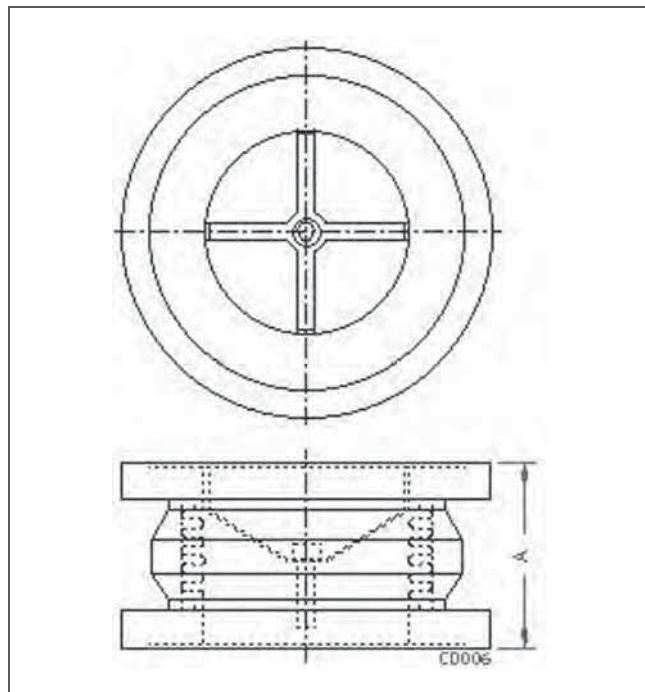
These accessories broaden the range of potential applications and offer maximum reliability.

General accessories	Order number
Y-Connector M12 to RS-485	P 4723 010
Y-connector, shielded, M12 for accessories	P 4723 013
Sealing gas valve for HiPace 80	PM Z01 310
Sealing gas valve, shielded for HiPace 300 with TC 110	PM Z01 311
Sealing gas valve, shielded for HiPace 300/400/700 and 800 with TC 400 and TM 700	PM Z01 312
Sealing gas valve, shielded, HiPace 400/700/800 P and C with TC 400 and HiPace 1200 - 2300 with TC 1200	PM Z01 313
Sealing gas throttle for HiPace 60/80	PM Z01 316
Sealing gas throttle for HiPace 300/400/700 and 800	PM Z01 317
Sealing gas throttle for HiPace 400/700/800 P and C version and HiPace 1200 - 2300	PM Z01 318
Connection adapter DN 25 ISO-KF	PM 093 315 -T
USB converter to RS-485 interface	PM 061 207 -T
Interface cable, M12 m straight / M12 m straight, 3.0 m	PM 061 283 -T
TCS 11, adapter for TC 110 with interface RS-485	PM 061 636 -U
TCS 12, adapter for TC 110 with interface RS-485, 4 accessory ports and coupling set	PM 061 638 -U
Vibration isolator for DN 100 ISO-F / DN 100 ISO-K	PM 016 600 -U
Connection cable, plug M12, RJ 45, 3 m	PM 051 726 -T

Vibration dampers

For employment of turbopumps on systems and plants that are extremely sensitive to vibration. Reliable damping in vertical attitude. Integral securing means eliminate the need for support.

Dimensions (in mm)



Vibration dampers	A	Order number
Vibration damper for HiPace 60/80, DN 63 ISO-K	87 mm	PM 006 800 -X
Vibration damper for HiPace 60/80, DN 63 CF-F	98 mm	PM 006 801 -X
Vibration damper for HiPace 80, DN 40 ISO-KF	85 mm	PM 006 799 -X
Vibration damper for HiPace 300/400, DN 100 ISO-K		PM 006 459 -X
Vibration damper for HiPace 300/400, DN 100 CF-F	99 mm	PM 006 488 -X
Vibration damper for HiPace 700, DN 160 ISO-K	84 mm	PM 006 492 -X
Vibration damper for HiPace 700, DN 160 CF-F	104 mm	PM 006 493 -X
Vibration damper for HiPace 800/1200/1800, DN 200 ISO-K	83 mm	PM 006 668 -X
Vibration damper for HiPace 800/1200, DN 200 CF-F	108 mm	PM 006 669 -X
Vibration damper for HiPace 1500/2300, DN 250 ISO-K	84 mm	PM 006 670 -X
Vibration damper for HiPace 1500/2300, DN 250 CF-F	112 mm	PM 006 671 -X

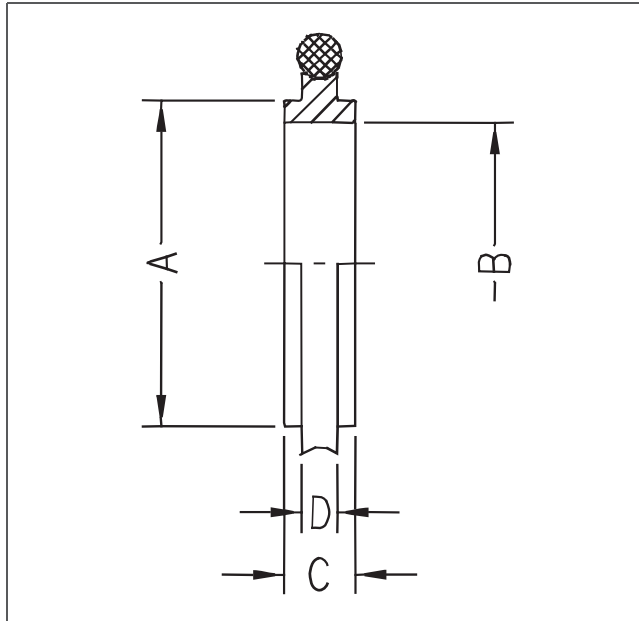
Centering rings, protection screens, splinter shields

These elements offer maximum protection against foreign objects with the lowest conductivity losses. Optimally matched to the respective pump size, engineered in accordance with the latest containment analysis findings.

- DN 25 ISO-KF



Dimensions (in mm)



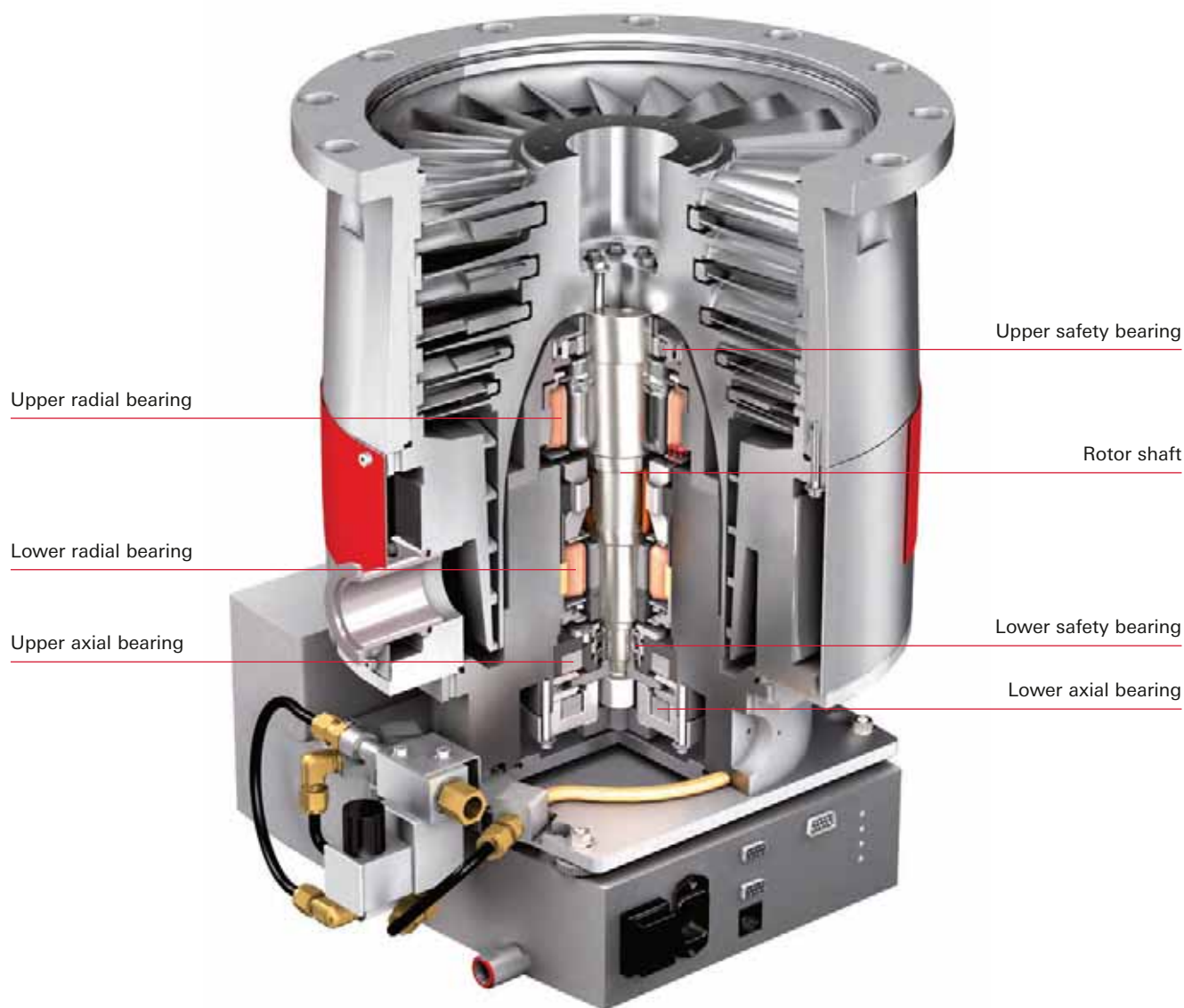
Centering ring	Materials	Flange (in)	A	B	C	D	Order number
Centering ring, FPM/Aluminum, DN 25 ISO-KF	FPM/Aluminum	DN 25 ISO-KF	26	25	8	3.9	PF 110 125 -T
Centering ring with integrated mesh screen, DN 25 ISO-KF	FPM/stainless steel	DN 25 ISO-KF	26	19.5	8	3.9	PF 113 225 -T
Centering ring with integrated mesh screen, DN 40 ISO-KF	FPM/stainless steel	DN 40 ISO-KF	41	32	8	3.9	PF 113 240 -T

Centering ring	Order number
Centering ring with multifunction coating, DN 63 ISO-K/-F	PM 016 206 -U
Centering ring with multifunction coating, DN 100 ISO-K/-F	PM 016 210 -U
Centering ring with multifunction coating, DN 160 ISO-K/-F	PM 016 216 -U
Centering ring with multifunction coating, DN 200 ISO-K/-F	PM 016 220 -U
Centering ring with multifunction coating, DN 250 ISO-K/-F	PM 016 225 -U
Centering ring with multifunction coating, DN 320 ISO-K/-F	PM 016 232 -U
Centering ring with multifunction coating and integrated protection screen, DN 63 ISO-K/-F	PM 016 208 -U
Centering ring with multifunction coating and integrated protection screen, DN 100 ISO-K/-F	PM 016 212 -U
Centering ring with multifunction coating and integrated protection screen, DN 160 ISO-K/-F	PM 016 218 -U
Centering ring with multifunction coating and integrated protection screen, DN 200 ISO-K/-F	PM 016 222 -U
Centering ring with multifunction coating and integrated protection screen, DN 250 ISO-K/-F	PM 016 227 -U
Centering ring with integrated splinter shield, DN 40 ISO-KF	PM 006 375 -X
Centering ring with multifunction coating and integrated splinter shield, DN 63 ISO-K/-F	PM 016 207 -U
Centering ring with multifunction coating and integrated splinter shield, DN 100 ISO-K/-F	PM 016 211 -U
Centering ring with multifunction coating and integrated splinter shield, DN 160 ISO-K/-F	PM 016 217 -U
Centering ring with multifunction coating and integrated splinter shield, DN 200 ISO-K/-F	PM 016 221 -U
Centering ring with multifunction coating and integrated splinter shield, DN 250 ISO-K/-F	PM 016 226 -U
Protection screen for turbopumps, DN 63 CF-F	PM 016 333
Protection screen for turbopumps, DN 100 CF-F	PM 016 336
Protection screen for turbopumps, DN 160 CF-F	PM 016 339
Protection screen for turbopumps, DN 200 CF-F	PM 016 342
Protection screen for turbopumps, DN 250 CF-F	PM 016 345
Splinter shield for turbopumps, DN 63 CF-F	PM 016 312
Splinter shield for turbopumps, DN 100 CF-F	PM 016 315
Splinter shield for turbopumps, DN 160 CF-F	PM 016 318
Splinter shield for turbopumps, DN 200 CF-F	PM 016 321
Splinter shield for turbopumps, DN 250 CF-F	PM 016 324



Magnetic bearing

Electromagnetic bearings are also called 'active magnetically levitated', because the rotor position is continuously monitored and adjusted accordingly. This enables wear-free, low vibration operation with an automatic out-of-balance compensation. Continuous rotor stability is assured. These bearings are maintenance-free and require no lubrication.





HiPace[®] 300 – 800 M, ATH 500 M

**Compact magnetically levitated turbopumps
in the pumping speed class from 300 to 800 l/s**

Technically perfect

The HiPace M and ATH 500 M/MT have an active 5-axis magnetic bearing. Using this bearing technology, the rotor position is controlled in real-time. During operation, automatic out-of-balance compensation occurs. It allows minimal vibrations for the best possible process tolerance. The low energy consumption and ultra-low service costs guarantee cost-efficient operation.

Compatible

Do the different interface standards make your life difficult? We offer integrated drive electronics for all magnetically levitated turbopumps with standardized interfaces and connectors. The choice is yours..



HiPace[®] 300 M



ATH 500 M



HiPace[®] 700 M



HiPace[®] 800 M

Leading

The highest pumping speeds, compression and gas throughput or minimal vibration are classic vacuum parameters which our customers expect. All 5-axis magnetically levitated pumps in the series deliver excellent performance data in their specialized fields. This makes them the perfect answer for all noncorrosive applications in analytics, research & development as well as in reactive processes in the coating and semiconductor sectors.

ATH 500 MT is the smallest temperature controlled magnetically levitated bearing turbopump in the market. These pumps can be used in applications with aggressive chemicals in order to minimize the condensation or corrosions in the pump.

Safe

Our maintenance-free, magnetically levitated turbopumps only use high-quality safety bearings which ensure safety during operation. Even the harshest environments are no problem for our HiPace thanks to its IP 54 protection class. Product tests according to ISO 27892 also show that all pumps meet the most stringent safety requirements.

Customer benefits

- Very easy installation
- Any mounting orientation
- Integrated electronic drive unit
- Clean vacuum due to lubricant-free magnetic bearings
- High gas throughput for all process gases
- Low vibrations and low magnetic stray field
- Automatic out-of-balance compensation
- Broad rotation speed range
- Outstanding long-term stability and reliability
- Corrosive applications for heated pump (ATH 500 MT)

Typical applications

- High-end electron microscopy
- Residual gas analysis
- Optical coating
- Plasma research
- Biotechnology
- Medical technology
- Semiconductor applications
- Thin film technology
- Hard disc production



Optical coating



Medical technology



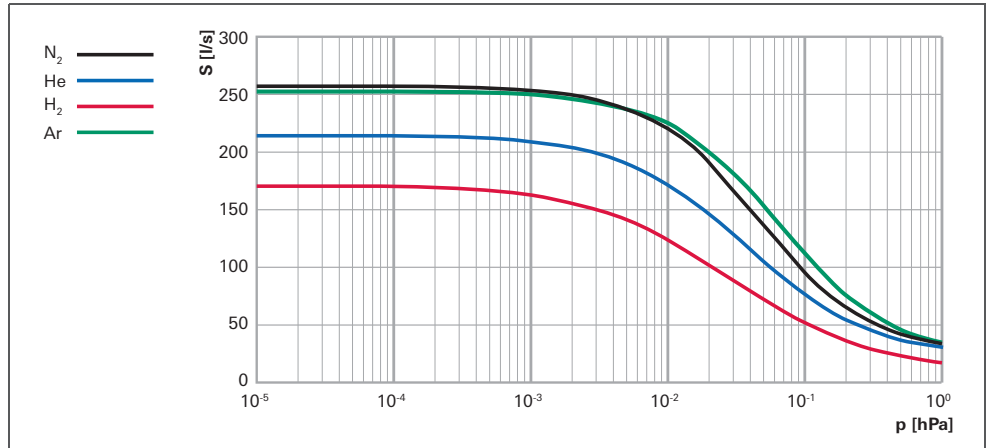
Electron microscopy

HiPace® 300 M



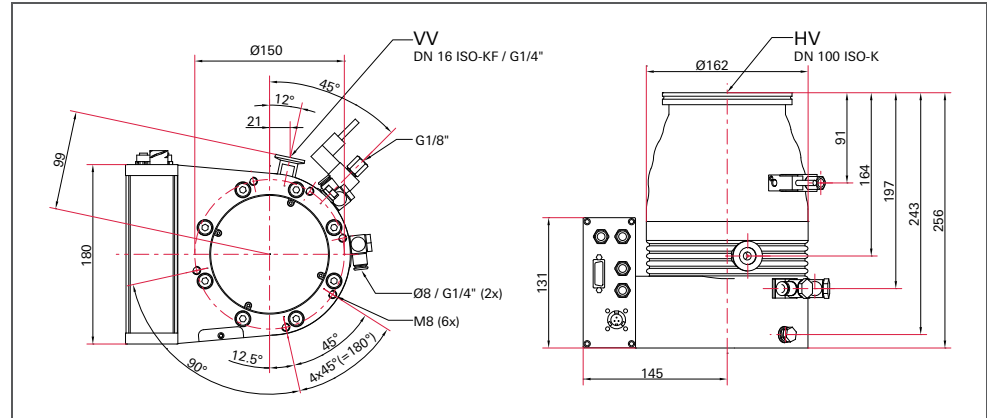
- 5-axis magnetically levitated turbopump with a pumping speed of 255 l/s for N₂
- Integrated digital magnetic bearing controller TM 700
- Installation in any orientation; flexible through connectivity of up to 4 accessory parts
- With integrated water cooling for maximum gas throughput
- Interfaces: RS-485, Remote (Profibus/DeviceNet on request)
- The turbopump features extremely low vibration and is oil-free
- With patented In-field sensor calibration
- Including venting valve and patented "pulsed venting"
- Protection Class: IP 54
- Extensive accessories expand the range of applications

Pumping speed

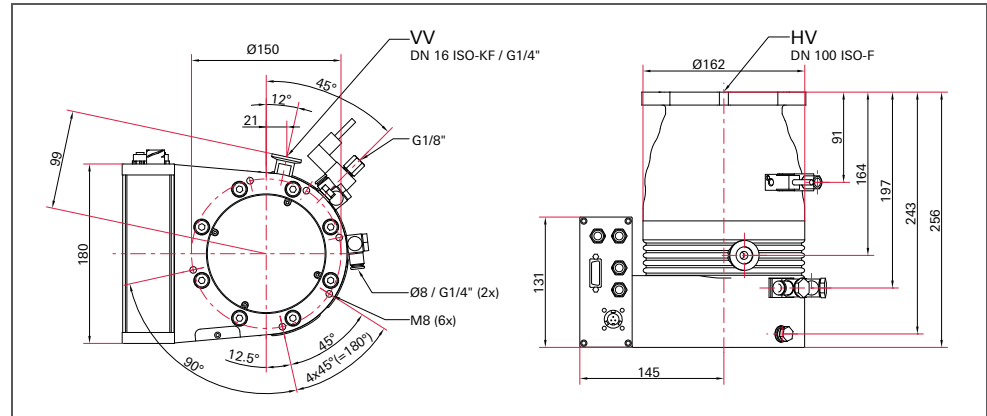


HiPace® 300 M

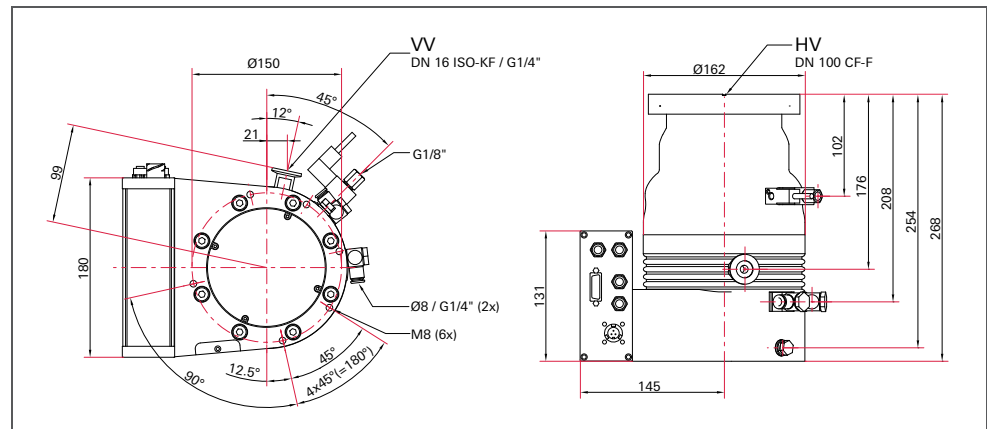
Dimensions (in mm)



HiPace® 300 M with TM 700, DN 100 ISO-K



HiPace® 300 M with TM 700, DN 100 ISO-F



HiPace® 300 M with TM 700, DN 100 CF-F

Technical data	HiPace® 300 M with TM 700, DN 100 ISO-K	HiPace® 300 M with TM 700, DN 100 CF-F	HiPace® 300 M with TM 700, DN 100 ISO-F
Connection nominal diameter			
Flange (out)	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Flange (in)	DN 100 ISO-K	DN 100 CF-F	DN 100 ISO-F
Venting connection	G 1/8"	G 1/8"	G 1/8"
Pumping speed			
Pumping speed for Ar	250 l/s	250 l/s	250 l/s
Pumping speed for H ₂	170 l/s	170 l/s	170 l/s
Pumping speed for He	215 l/s	215 l/s	215 l/s
Pumping speed for N ₂	255 l/s	255 l/s	255 l/s
Compression			
Compression ratio for Ar	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Compression ratio for H ₂	5 · 10 ⁵	5 · 10 ⁵	5 · 10 ⁵
Compression ratio for He	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸
Compression ratio for N ₂	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Fore-vacuum max. for N₂			
	20 hPa	20 hPa	20 hPa
Gas throughput			
Gas throughput at 0.1 hPa HV for Ar	11 hPa l/s	11 hPa l/s	11 hPa l/s
Gas throughput at 0.1 hPa HV for H ₂	5 hPa l/s	5 hPa l/s	5 hPa l/s
Gas throughput at 0.1 hPa HV for He	8 hPa l/s	8 hPa l/s	8 hPa l/s
Gas throughput at 0.1 hPa HV for N ₂	10 hPa l/s	10 hPa l/s	10 hPa l/s
Gas throughput at full rotational speed for Ar	13 hPa l/s	13 hPa l/s	13 hPa l/s
Gas throughput at full rotational speed for N ₂	28 hPa l/s	28 hPa l/s	28 hPa l/s
Electronic drive unit	with TM 700	with TM 700	with TM 700
Operating voltage	48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC
Rotation speed ± 2 %	60000 min ⁻¹	60000 min ⁻¹	60000 min ⁻¹
Rotation speed variable	20-100 %	20-100 %	20-100 %
Mounting orientation	in any orientation	in any orientation	in any orientation
Ultimate pressure*	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa
Weight	13.1 kg	17.2 kg	13.4 kg
Run-up time	< 2 min	< 2 min	< 2 min
Cooling method, optional	Air, convection	Air, convection	Air, convection
Cooling method, standard	Water	Water	Water
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	80 l/h	80 l/h	80 l/h
Bearing	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated
Sound pressure level	≤ 45 dB (A)	≤ 45 dB (A)	≤ 45 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54
Low vibrations	YES	YES	YES
Permissible magnetic field max.	5 mT	5 mT	5 mT
Order number pump Pumpe	PM P03 950	PM P03 952	PM P03 951

*Ultimate pressure please find description on page 272

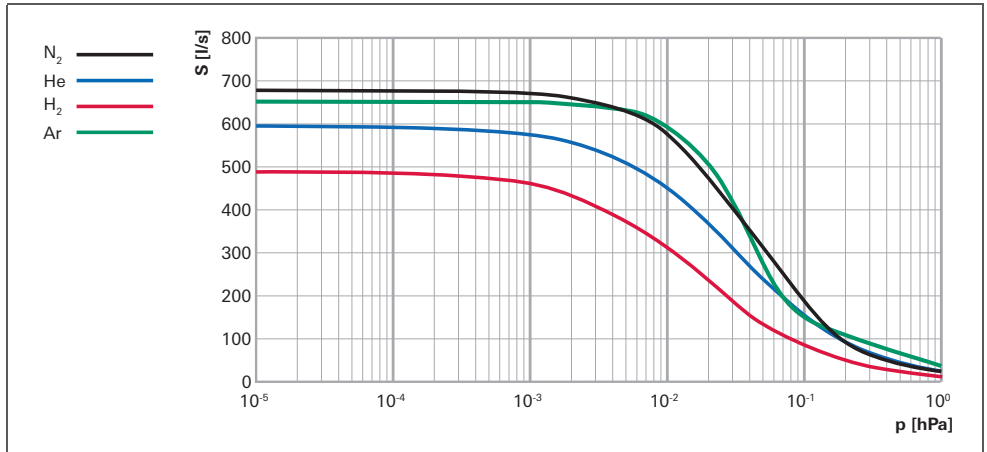
Accessories	HiPace® 300 M with TM 700, DN 100 ISO-K	HiPace® 300 M with TM 700, DN 100 CF-F	HiPace® 300 M with TM 700, DN 100 ISO-F
Order number pump Pompe	PM P03 950	PM P03 952	PM P03 951
Power supplies/power			
DCU - power supply with display control unit	PM C01 823	PM C01 823	PM C01 823
TPS - mains pack for wall/standard rail fitting	PM 061 343 -T	PM 061 343 -T	PM 061 343 -T
TPS - mains pack 19" rack module 3 RU	PM 061 347 -T	PM 061 347 -T	PM 061 347 -T
Control units			
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T
Mains cable DCU/TPS/TCP, 3 m			
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
115 V AC mains cable with UL plug	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
208 V AC mains cable with UL plug	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF
Connection cable, length 3 m between			
Connection cable for HiPace with TC 400/TM 700 to power supply TPS/DCU 310/311/400/401	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T
Venting accessories			
Venting valve	PM Z01 291	PM Z01 291	PM Z01 291
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121
Cooling accessories			
Air cooling	PM Z01 363	PM Z01 363	PM Z01 363
Heating accessories			
Heating jacket 208 V AC, UL plug		PM 071 267 -T	
Heating jacket 115 V AC, UL plug		PM 071 268 -T	
Heating jacket 230 V AC, Euro-style safety plug		PM 071 266 -T	
Backing pump control			
Backing pump relay box, shielded, 1-phase 7 A	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
Backing pump relay box, shielded, 1-phase 20 A	PM 071 285 -X	PM 071 285 -X	PM 071 285 -X
Control cable for pumping stations 0.7 m	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206
General accessories			
Sealing gas valve	PM Z01 312	PM Z01 312	PM Z01 312
Sealing gas throttle	PM Z01 317	PM Z01 317	PM Z01 317
Centering ring coated	PM 016 210 -U		PM 016 210 -U
Centering ring coated with protection screen	PM 016 212 -U		PM 016 212 -U
Centering ring coated with splinter shield	PM 016 211 -U		PM 016 211 -U
Protection screen		PM 016 336	
Splinter shield		PM 016 315	
Vibration dampers	PM 006 459 -X	PM 006 488 -X	
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010
Y-connector M12 for accessories	P 4723 013	P 4723 013	P 4723 013
Mounting materials			
Centering ring coated with splinter shield, hexagon bolts			PM 016 450 -T
Centering ring coated with protection screen, hexagon bolts			PM 016 452 -T
Centering ring coated with splinter shield, hexagon bolts			PM 016 451 -T
Centering ring coated with stud screws			PM 016 455 -T
Centering ring coated with protection screen with stud screws			PM 016 457 -T
Centering ring coated with splinter shield with stud screws			PM 016 456 -T
Set of hexagon screws for trough hole (CF-F)		PM 016 690 -T	
Set of stud screws for tapped hole (CF-F)		PM 016 692 -T	
Set of stud screws for trough hole (CF)		PM 016 734 -T	
Coated centering ring, bracket screws	PM 016 775 -T		
Centering ring coated with protection screen, bracket screws	PM 016 776 -T		
Centering ring coated with splinter shield, bracket screws	PM 016 777 -T		

HiPace® 700 M



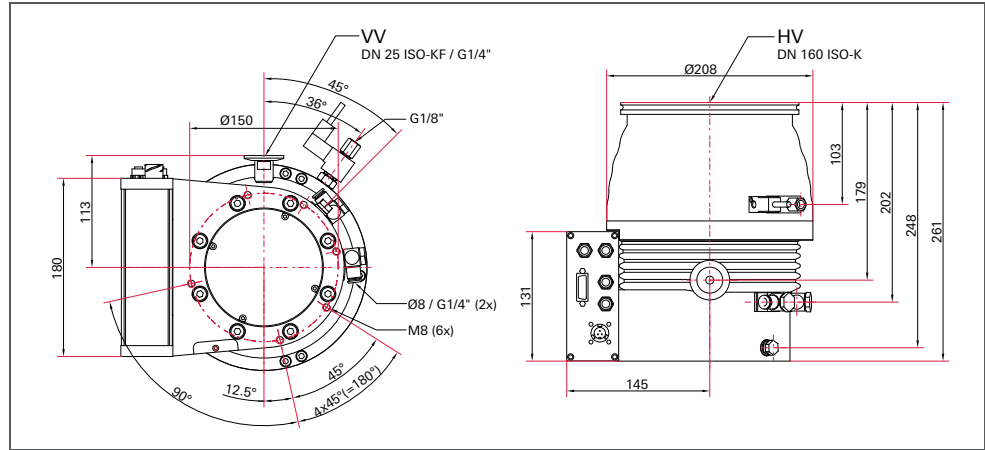
- 5-axis magnetically levitated turbopump with a pumping speed of 685 l/s for N₂
- Integrated digital magnetic bearing controller TM 700
- Installation in any orientation; flexible through connectivity of up to 4 accessory parts
- With integrated water cooling for maximum gas throughput
- Interfaces: RS-485, Remote (Profibus/DeviceNet on request)
- The turbopump features extremely low vibration and is oil-free
- With patented In-field sensor calibration
- Including venting valve and patented "pulsed venting"
- Protection Class: IP 54
- Extensive accessories expand the range of applications

Pumping speed

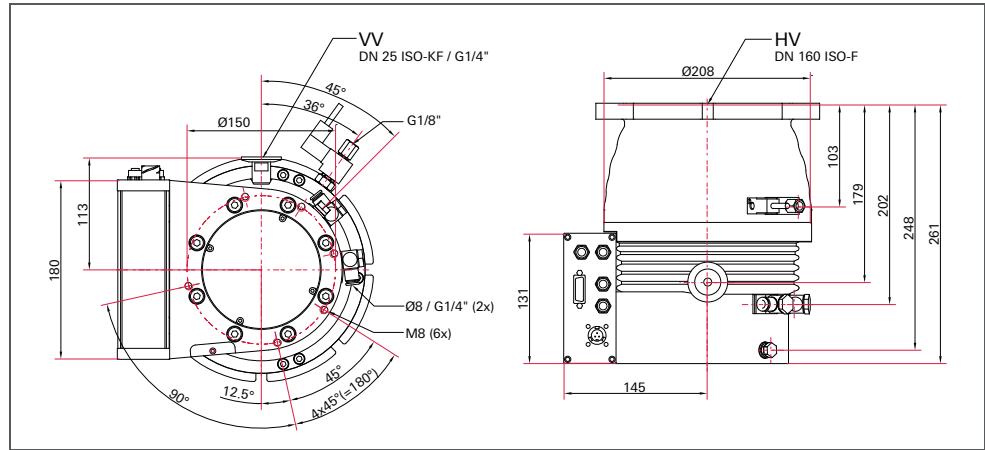


HiPace® 700 M

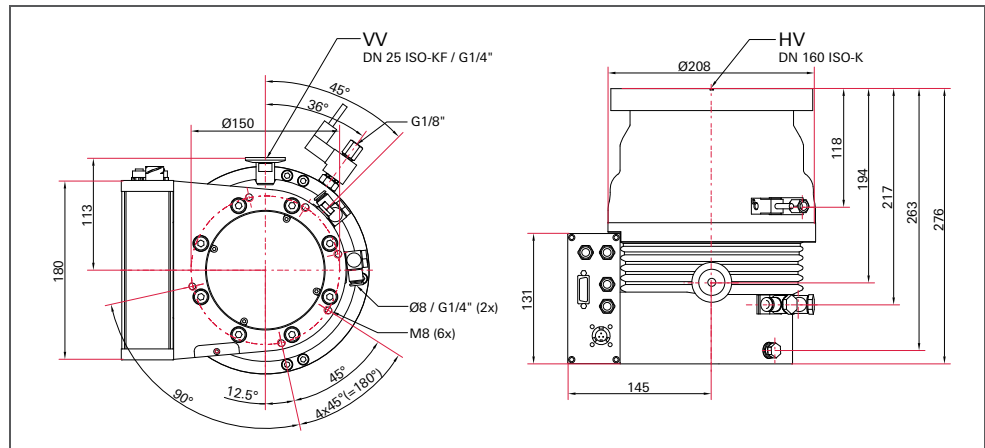
Dimensions (in mm)



HiPace[®] 700 M with TM 700, DN 160 ISO-K



HiPace[®] 700 M with TM 700, DN 160 ISO-F



HiPace[®] 700 M with TM 700, DN 160 CF-F

Technical data	HiPace® 700 M with TM 700, DN 160 ISO-K	HiPace® 700 M with TM 700, DN 160 CF-F	HiPace® 700 M with TM 700, DN 160 ISO-F
Connection nominal diameter			
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 160 ISO-K	DN 160 CF-F	DN 160 ISO-F
Venting connection	G 1/8"	G 1/8"	G 1/8"
Pumping speed			
Pumping speed for Ar	660 l/s	660 l/s	660 l/s
Pumping speed for H ₂	480 l/s	480 l/s	480 l/s
Pumping speed for He	600 l/s	600 l/s	600 l/s
Pumping speed for N ₂	685 l/s	685 l/s	685 l/s
Compression			
Compression ratio for Ar	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Compression ratio for H ₂	2 · 10 ⁵	2 · 10 ⁵	2 · 10 ⁵
Compression ratio for He	> 1 · 10 ⁷	> 1 · 10 ⁷	> 1 · 10 ⁷
Compression ratio for N ₂	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Fore-vacuum max. for N₂			
	8 hPa	8 hPa	8 hPa
Gas throughput			
Gas throughput at 0.1 hPa HV for Ar	16 hPa l/s	16 hPa l/s	16 hPa l/s
Gas throughput at 0.1 hPa HV for H ₂	9 hPa l/s	9 hPa l/s	9 hPa l/s
Gas throughput at 0.1 hPa HV for He	16 hPa l/s	16 hPa l/s	16 hPa l/s
Gas throughput at 0.1 hPa HV for N ₂	16 hPa l/s	16 hPa l/s	16 hPa l/s
Gas throughput at full rotational speed for Ar	8 hPa l/s	8 hPa l/s	8 hPa l/s
Gas throughput at full rotational speed for N ₂	13 hPa l/s	13 hPa l/s	13 hPa l/s
Electronic drive unit			
Operating voltage	48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC
Rotation speed ± 2 %	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹
Rotation speed variable	20-100 %	20-100 %	20-100 %
Mounting orientation	in any orientation	in any orientation	in any orientation
Ultimate pressure*	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa
Weight	15.7 kg	20.8 kg	16.4 kg
Run-up time	4 min	4 min	4 min
Cooling method, optional	Air, Convection	Air, Convection	Air, Convection
Cooling method, standard	Water	Water	Water
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	80 l/h	80 l/h	80 l/h
Bearing	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated
Sound pressure level	≤ 45 dB (A)	≤ 45 dB (A)	≤ 45 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54
Low vibrations	YES	YES	YES
Permissible magnetic field max.	5 mT	5 mT	5 mT
Order number pump Pumpe	PM P04 450	PM P04 452	PM P04 451

*Ultimate pressure please find description on page 272

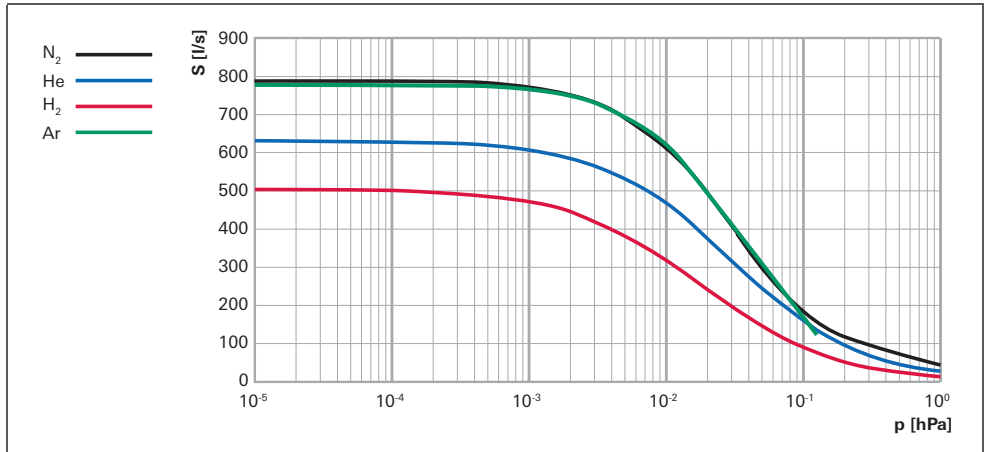
Accessories	HiPace® 700 M with TM 700, DN 160 ISO-K	HiPace® 700 M with TM 700, DN 160 CF-F	HiPace® 700 M with TM 700, DN 160 ISO-F
Order number pump Pompe	PM P04 450	PM P04 452	PM P04 451
Power supplies/power			
DCU - power supply with display control unit	PM C01 823	PM C01 823	PM C01 823
TPS - mains pack for wall/standard rail fitting	PM 061 343 -T	PM 061 343 -T	PM 061 343 -T
TPS - mains pack 19" rack module 3 RU	PM 061 347 -T	PM 061 347 -T	PM 061 347 -T
Control units			
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T
Mains cable DCU/TPS/TCP, 3 m			
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
115 V AC mains cable with UL plug	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
208 V AC mains cable with UL plug	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF
Connection cable, length 3 m between			
Connection cable for HiPace with TC 400/TM 700 to power supply TPS/DCU 310/311/400/401	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T
Venting accessories			
Venting valve	PM Z01 291	PM Z01 291	PM Z01 291
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121
Cooling accessories			
Air cooling	PM Z01 363	PM Z01 363	PM Z01 363
Heating accessories			
Heating jacket 208 V AC, UL plug		PM 071 270 -T	
Heating jacket 115 V AC, UL plug		PM 071 271 -T	
Heating jacket 230 V AC, Euro-style safety plug		PM 071 269 -T	
Backing pump control			
Backing pump relay box, shielded, 1-phase 7 A	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
Backing pump relay box, shielded, 1-phase 20 A	PM 071 285 -X	PM 071 285 -X	PM 071 285 -X
Control cable for pumping stations 0.7 m	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206
General accessories			
Sealing gas valve	PM Z01 312	PM Z01 312	PM Z01 312
Sealing gas throttle	PM Z01 317	PM Z01 317	PM Z01 317
Centering ring coated	PM 016 216 -U		PM 016 216 -U
Centering ring coated with protection screen	PM 016 218 -U		PM 016 218 -U
Centering ring coated with splinter shield	PM 016 217 -U		PM 016 217 -U
Protection screen		PM 016 339	
Splinter shield		PM 016 318	
Vibration dampers	PM 006 492 -X	PM 006 493 -X	
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010
Y-connector M12 for accessories	P 4723 013	P 4723 013	P 4723 013
Mounting materials			
Centering ring coated with splinter shield, hexagon bolts			PM 016 460 -T
Centering ring coated with protection screen, hexagon bolts			PM 016 462 -T
Centering ring coated with splinter shield, hexagon bolts			PM 016 461 -T
Centering ring coated with stud screws			PM 016 465 -T
Centering ring coated with protection screen with stud screws			PM 016 467 -T
Centering ring coated with splinter shield with stud screws			PM 016 466 -T
Set of hexagon screws for trough hole (CF-F)		PM 016 691 -T	
Set of stud screws for tapped hole (CF-F)		PM 016 693 -T	
Set of stud screws for trough hole (CF)		PM 016 735 -T	
Coated centering ring, bracket screws	PM 016 385 -T		
Centering ring coated with protection screen, bracket screws	PM 016 387 -T		
Centering ring coated with splinter shield, bracket screws	PM 016 386 -T		

HiPace® 800 M



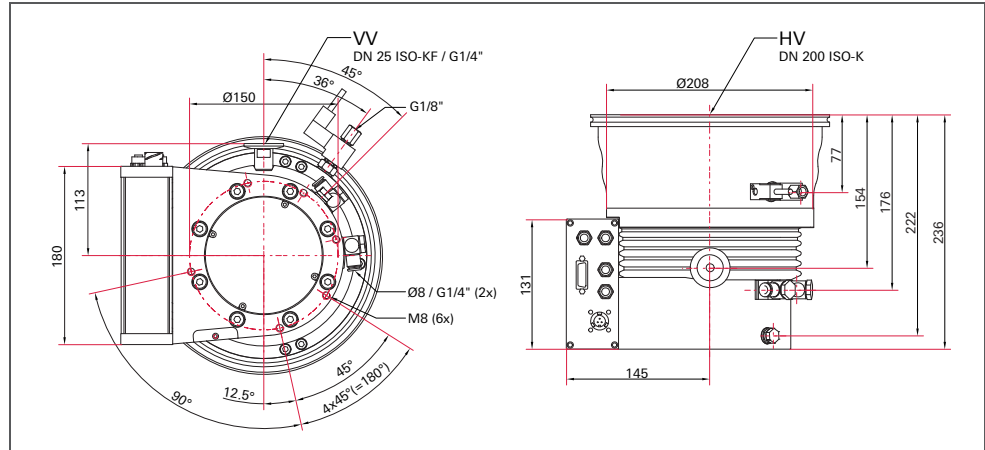
- 5-axis magnetically levitated turbopump with a pumping speed of 790 l/s for N₂
- Integrated digital magnetic bearing controller TM 700
- Installation in any orientation; flexible through connectivity of up to 4 accessory parts
- With integrated water cooling for maximum gas throughput
- Interfaces: RS-485, Remote (Profibus/DeviceNet on request)
- The turbopump features extremely low vibration and is oil-free
- With patented in-field sensor calibration
- Including venting valve and patented "pulsed venting"
- Protection Class: IP 54
- Extensive accessories expand the range of applications

Pumping speed

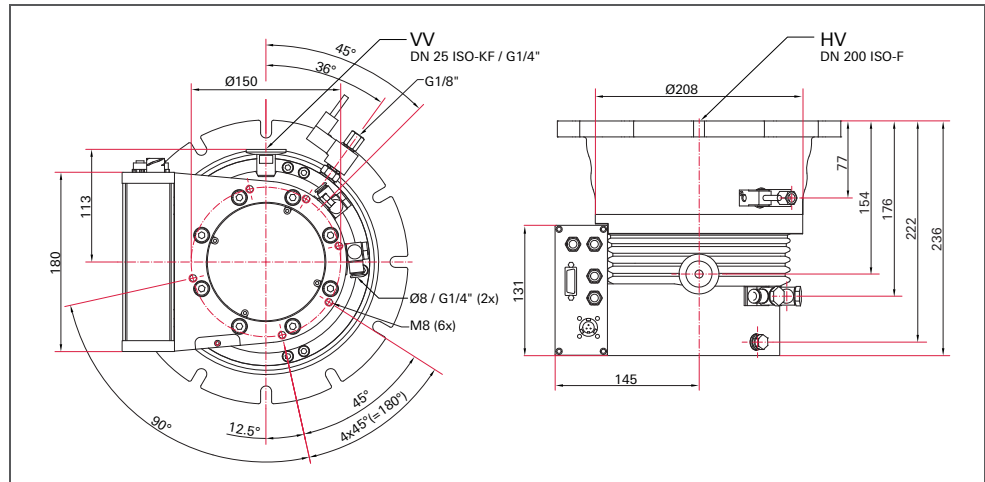


HiPace® 800 M

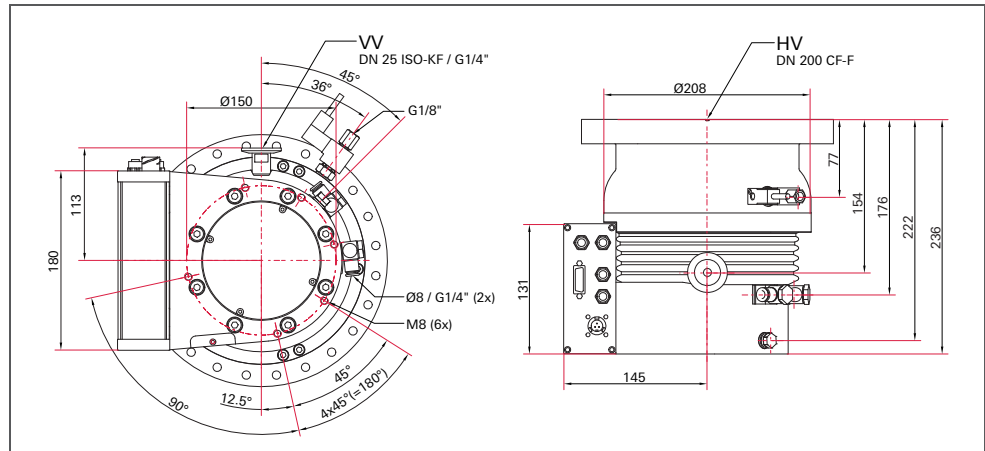
Dimensions (in mm)



HiPace® 800 M with TM 700, DN 200 ISO-K



HiPace® 800 M with TM 700, DN 200 ISO-F



HiPace® 800 M with TM 700, DN 200 CF-F

Technical data	HiPace® 800 M with TM 700, DN 200 ISO-K	HiPace® 800 M with TM 700, DN 200 CF-F	HiPace® 800 M with TM 700, DN 200 ISO-F
Connection nominal diameter			
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 200 ISO-K	DN 200 CF-F	DN 200 ISO-F
Venting connection	G 1/8"	G 1/8"	G 1/8"
Pumping speed			
Pumping speed for Ar	775 l/s	775 l/s	775 l/s
Pumping speed for H ₂	500 l/s	500 l/s	500 l/s
Pumping speed for He	625 l/s	625 l/s	625 l/s
Pumping speed for N ₂	790 l/s	790 l/s	790 l/s
Compression			
Compression ratio for Ar	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Compression ratio for H ₂	2 · 10 ⁵	2 · 10 ⁵	2 · 10 ⁵
Compression ratio for He	> 1 · 10 ⁷	> 1 · 10 ⁷	> 1 · 10 ⁷
Compression ratio for N ₂	> 1 · 10 ¹¹	> 1 · 10 ¹¹	> 1 · 10 ¹¹
Fore-vacuum max. for N₂			
	8 hPa	8 hPa	8 hPa
Gas throughput			
Gas throughput at 0.1 hPa HV for Ar	16 hPa l/s	16 hPa l/s	16 hPa l/s
Gas throughput at 0.1 hPa HV for H ₂	9 hPa l/s	9 hPa l/s	9 hPa l/s
Gas throughput at 0.1 hPa HV for He	16 hPa l/s	16 hPa l/s	16 hPa l/s
Gas throughput at 0.1 hPa HV for N ₂	16 hPa l/s	16 hPa l/s	16 hPa l/s
Gas throughput at full rotational speed for Ar	8 hPa l/s	8 hPa l/s	8 hPa l/s
Gas throughput at full rotational speed for N ₂	13 hPa l/s	13 hPa l/s	13 hPa l/s
Electronic drive unit			
Operating voltage	48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC
Rotation speed ± 2 %	49200 min ⁻¹	49200 min ⁻¹	49200 min ⁻¹
Rotation speed variable	20-100 %	20-100 %	20-100 %
Mounting orientation	in any orientation	in any orientation	in any orientation
Ultimate pressure*	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa
Weight	17.2 kg	21.6 kg	18 kg
Run-up time	4 min	4 min	4 min
Cooling method, optional	Air, Convection	Air, Convection	Air, Convection
Cooling method, standard	Water	Water	Water
Cooling water temperature	15-35 °C	15-35 °C	15-35 °C
Cooling water consumption	80 l/h	80 l/h	80 l/h
Bearing	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated
Sound pressure level	≤ 45 dB (A)	≤ 45 dB (A)	≤ 45 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54	IP 54
Low vibrations	YES	YES	YES
Permissible magnetic field max.	5 mT	5 mT	5 mT
Order number pump Pumpe	PM P04 460	PM P04 462	PM P04 461

*Ultimate pressure please find description on page 272

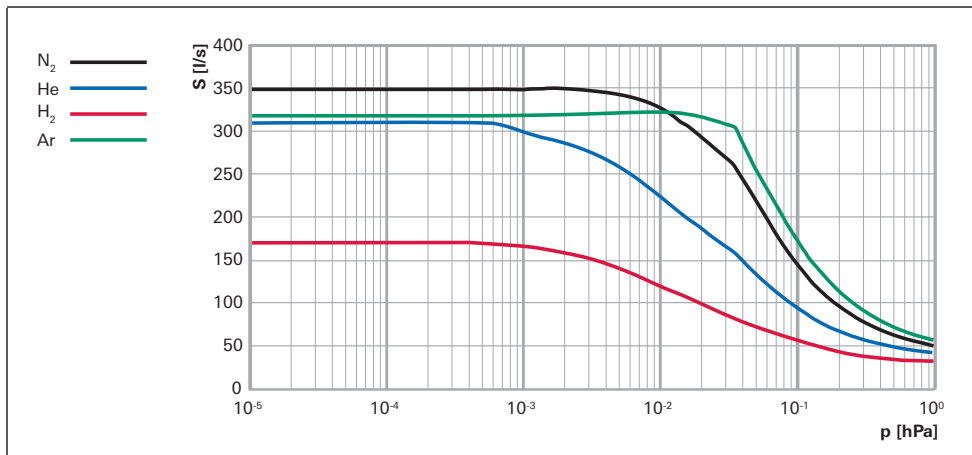
Accessories	HiPace® 800 M with TM 700, DN 200 ISO-K	HiPace® 800 M with TM 700, DN 200 CF-F	HiPace® 800 M with TM 700, DN 200 ISO-F
Order number pump Pompe	PM P04 460	PM P04 462	PM P04 461
Power supplies/power			
DCU - power supply with display control unit	PM C01 823	PM C01 823	PM C01 823
TPS - mains pack for wall/standard rail fitting	PM 061 343 -T	PM 061 343 -T	PM 061 343 -T
TPS - mains pack 19" rack module 3 RU	PM 061 347 -T	PM 061 347 -T	PM 061 347 -T
Control units			
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T	PM 061 348 -T
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T	PM 051 510 -T
Accessories for HPU	PM 061 005 -T	PM 061 005 -T	PM 061 005 -T
Mains cable DCU/TPS/TCP, 3 m			
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA
115 V AC mains cable with UL plug	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE
208 V AC mains cable with UL plug	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF
Connection cable, length 3 m between			
Connection cable for HiPace with TC 400/TM 700 to power supply TPS/DCU 310/311/400/401	PM 061 352 -T	PM 061 352 -T	PM 061 352 -T
Venting accessories			
Venting valve	PM Z01 291	PM Z01 291	PM Z01 291
Air drier TTV 001	PM Z00 121	PM Z00 121	PM Z00 121
Cooling accessories			
Air cooling	PM Z01 363	PM Z01 363	PM Z01 363
Heating accessories			
Heating jacket 208 V AC, UL plug		PM 071 270 -T	
Heating jacket 115 V AC, UL plug		PM 071 271 -T	
Heating jacket 230 V AC, Euro-style safety plug		PM 071 269 -T	
Backing pump control			
Backing pump relay box, shielded, 1-phase 7 A	PM 071 284 -X	PM 071 284 -X	PM 071 284 -X
Backing pump relay box, shielded, 1-phase 20 A	PM 071 285 -X	PM 071 285 -X	PM 071 285 -X
Control cable for pumping stations 0.7 m	PM 061 675 -T	PM 061 675 -T	PM 061 675 -T
HiPace-ACP connection cable	PM 071 142 -X	PM 071 142 -X	PM 071 142 -X
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206
General accessories			
Sealing gas valve	PM Z01 312	PM Z01 312	PM Z01 312
Sealing gas throttle	PM Z01 317	PM Z01 317	PM Z01 317
Centering ring coated	PM 016 220 -U		PM 016 220 -U
Centering ring coated with protection screen	PM 016 222 -U		PM 016 222 -U
Centering ring coated with splinter shield	PM 016 221 -U		PM 016 221 -U
Protection screen		PM 016 342	
Splinter shield		PM 016 321	
Vibration dampers	PM 006 668 -X	PM 006 669 -X	
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T	PM 061 207 -T
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T	PM 061 283 -T
Y-connector M12 for RS-485	P 4723 010	P 4723 010	P 4723 010
Y-connector M12 for accessories	P 4723 013	P 4723 013	P 4723 013
Mounting materials			
Coated centering ring, bracket screws	PM 016 390 -T		
Centering ring coated with protection screen, bracket screws	PM 016 392 -T		
Centering ring coated with splinter shield, bracket screws	PM 016 391 -T		
Centering ring coated with splinter shield, hexagon bolts			PM 016 470 -T
Centering ring coated with protection screen, hexagon bolts			PM 016 472 -T
Centering ring coated with splinter shield, hexagon bolts			PM 016 471 -T
Centering ring coated with stud screws			PM 016 475 -T
Centering ring coated with protection screen with stud screws			PM 016 477 -T
Centering ring coated with splinter shield with stud screws			PM 016 476 -T
Set of hexagon screws for trough hole (CF-F)		PM 016 687 -T	
Set of stud screws for tapped hole (CF-F)		PM 016 688 -T	
Set of stud screws for trough hole (CF)		PM 016 736 -T	
Coated centering ring, bracket screws	PM 016 390 -T		
Centering ring coated with protection screen, bracket screws	PM 016 392 -T		
Centering ring coated with splinter shield, bracket screws	PM 016 391 -T		

ATH 500 M



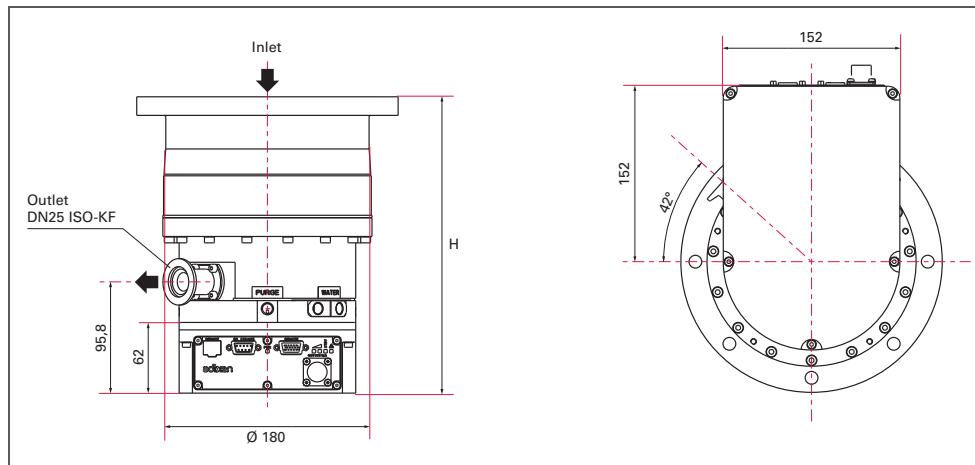
- Compact integrated drive electronics
- Installation in any orientation
- Water or air cooled
- CE marked and ROHS compliant
- Heated version (MT) available for corrosive applicaitons.

Pumping speed



ATH 500 M

Dimensions (in mm)



ATH 500 M

	ATH 500 M, DN 100 ISO-F	ATH 500 M, DN 100 ISO-K	ATH 500 M, DN 100 CF-F	ATH 500 M, DN 160 ISO-F	ATH 500 M, DN 160 ISO-K	ATH 500 M, DN 160 CF-F
H	294,5 mm	294,5 mm	304,9 mm	254,9 mm	254,9 mm	275,9 mm

Technical data	ATH 500 M, DN 100 ISO-F	ATH 500 M, DN 100 ISO-K	ATH 500 M, DN 100 CF-F	ATH 500 M, DN 160 ISO-F	ATH 500 M, DN 160 ISO-K
Connection nominal diameter					
Flange (out)	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF	DN 25 ISO-KF
Flange (in)	DN 100 ISO-F	DN 100 ISO-K	DN 100 CF-F	DN 160 ISO-F	DN 160 ISO-K
Pumping speed					
Pumping speed for Ar	320 l/s	320 l/s	320 l/s	530 l/s	530 l/s
Pumping speed for H ₂	170 l/s	170 l/s	170 l/s	190 l/s	190 l/s
Pumping speed for He	310 l/s	310 l/s	310 l/s	390 l/s	390 l/s
Pumping speed for N ₂	350 l/s	350 l/s	350 l/s	550 l/s	550 l/s
Compression					
Compression ratio for Ar	> 8 · 10 ⁶	> 8 · 10 ⁶	> 8 · 10 ⁶	> 8 · 10 ⁶	> 8 · 10 ⁶
Compression ratio for H ₂	> 2 · 10 ²	> 2 · 10 ²	> 2 · 10 ²	> 2 · 10 ²	> 2 · 10 ²
Compression ratio for He	> 1 · 10 ⁴	> 1 · 10 ⁴	> 1 · 10 ⁴	> 1 · 10 ⁴	> 1 · 10 ⁴
Compression ratio for N ₂	> 2 · 10 ⁷	> 2 · 10 ⁷	> 2 · 10 ⁷	> 2 · 10 ⁷	> 2 · 10 ⁷
Fore-vacuum max. for N₂					
	2.6 hPa	2.6 hPa	2.6 hPa	2.6 hPa	2.6 hPa
Gas throughput					
Gas throughput at full rotational speed for Ar, heated pump at 65 C					
Gas throughput at full rotational speed for H ₂ , heated pump at 65 C					
Gas throughput at full rotational speed for N ₂ , heated pump at 65 C					
Gas throughput for Ar	42.3 hPa l/s	42.3 hPa l/s	42.3 hPa l/s	42.3 hPa l/s	42.3 hPa l/s
Gas throughput for H ₂	> 169 hPa l/s	> 169 hPa l/s	> 169 hPa l/s	> 169 hPa l/s	> 169 hPa l/s
Gas throughput for He	> 169 hPa l/s	> 169 hPa l/s	> 169 hPa l/s	> 169 hPa l/s	> 169 hPa l/s
Gas throughput for N ₂	67.6 hPa l/s	67.6 hPa l/s	67.6 hPa l/s	67.6 hPa l/s	67.6 hPa l/s
Electronic drive unit	Integrated drive electronics	Integrated drive electronics	Integrated drive electronics	Integrated drive electronics	Integrated drive electronics
Operating voltage	48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC	48 (± 5 %) V DC
Rotation speed ± 2 %	50000 min ⁻¹	50000 min ⁻¹	50000 min ⁻¹	50000 min ⁻¹	50000 min ⁻¹
Mounting orientation	in any orientation	in any orientation	in any orientation	in any orientation	in any orientation
Ultimate pressure	< 1 · 10 ⁻⁸ hPa	< 1 · 10 ⁻⁸ hPa	< 1 · 10 ⁻⁸ hPa	< 1 · 10 ⁻⁸ hPa	< 1 · 10 ⁻⁸ hPa
Weight	17 kg	17 kg	17 kg	17 kg	17 kg
Run-up time	< 2 min	< 2 min	< 2 min	< 2 min	< 2 min
Corrosive gas version					
Cooling water temperature	15-25 °C	15-25 °C	15-25 °C	15-25 °C	15-25 °C
Cooling water consumption	1.0 l/min	1.0 l/min	1.0 l/min	1.0 l/min	1.0 l/min
Bearing	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated
Power consumption at ultimate pressure	100 W	100 W	100 W	100 W	100 W
Sound pressure level	≤ 42 dB (A)	≤ 42 dB (A)	≤ 42 dB (A)	≤ 42 dB (A)	≤ 42 dB (A)

Order number pump Pumpe					
Profibus, water cooling	VY362100	VY312100	VY322100	VY462100	VY412100
Remote, water cooling	V2362100	V2312100	V2322100	V2462100	V2412100
Profibus, air cooling	VY361100	VY311100	VY321100	VY461100	VY411100
Remote, air cooling	V2361100	V2311100	V2321100	V2461100	V2411100

	ATH 500 M, DN 160 CF-F	ATH 500 MT, DN 100 ISO-K	ATH 500 MT, DN 100 ISO-F	ATH 500 MT, DN 100 CF-F	ATH 500 MT, DN 160 ISO-F	ATH 500 MT, DN 160 ISO-K	ATH 500 MT, DN 160 CF-F
	DN 25 ISO-KF DN 160 CF-F	DN 40 ISO-KF DN 100 ISO-K	DN 40 ISO-KF DN 100 ISO-F	DN 40 ISO-KF DN 100 CF-F	DN 40 ISO-KF DN 160 ISO-F	DN 40 ISO-KF DN 160 ISO-K	DN 40 ISO-KF DN 160 CF-F
	530 l/s 190 l/s 390 l/s 550 l/s	320 l/s 170 l/s 310 l/s 350 l/s	320 l/s 170 l/s 310 l/s 350 l/s	320 l/s 170 l/s 310 l/s 350 l/s	530 l/s 190 l/s 390 l/s 550 l/s	530 l/s 190 l/s 390 l/s 550 l/s	530 l/s 190 l/s 390 l/s 550 l/s
	> 8 · 10 ⁶ > 2 · 10 ² > 1 · 10 ⁴ > 2 · 10 ⁷	> 8 · 10 ⁶ > 2 · 10 ² > 1 · 10 ⁴ > 2 · 10 ⁷	> 8 · 10 ⁶ > 2 · 10 ² > 1 · 10 ⁴ > 2 · 10 ⁷	> 8 · 10 ⁶ > 2 · 10 ² > 1 · 10 ⁴ > 2 · 10 ⁷	> 8 · 10 ⁶ > 2 · 10 ² > 1 · 10 ⁴ > 2 · 10 ⁷	> 8 · 10 ⁶ > 2 · 10 ² > 1 · 10 ⁴ > 2 · 10 ⁷	> 8 · 10 ⁶ > 2 · 10 ² > 1 · 10 ⁴ > 2 · 10 ⁷
	2.6 hPa	2.6 hPa	2.6 hPa	2.6 hPa	2.6 hPa	2.6 hPa	2.6 hPa
		5.1 hPa l/s > 16.9 hPa l/s 8.5 hPa l/s	5.1 hPa l/s > 16.9 hPa l/s 8.5 hPa l/s	5.1 hPa l/s > 16.9 hPa l/s 8.5 hPa l/s	5.1 hPa l/s > 16.9 hPa l/s 8.5 hPa l/s	5.1 hPa l/s > 16.9 hPa l/s 8.5 hPa l/s	5.1 hPa l/s > 16.9 hPa l/s 8.5 hPa l/s
	42.3 hPa l/s > 169 hPa l/s > 169 hPa l/s 67.6 hPa l/s	42.3 hPa l/s > 169 hPa l/s > 169 hPa l/s 67.6 hPa l/s	42.3 hPa l/s > 169 hPa l/s > 169 hPa l/s 67.6 hPa l/s	42.3 hPa l/s > 169 hPa l/s > 169 hPa l/s 67.6 hPa l/s	42.3 hPa l/s > 169 hPa l/s > 169 hPa l/s 67.6 hPa l/s	42.3 hPa l/s > 169 hPa l/s > 169 hPa l/s 67.6 hPa l/s	42.3 hPa l/s > 169 hPa l/s > 169 hPa l/s 67.6 hPa l/s
	Integrated drive electronics 48 (± 5 %) V DC 50000 min ⁻¹ in any orientation < 1 · 10 ⁻⁸ hPa 17 kg < 2 min	Integrated drive electronics 48 (± 5 %) V DC 50000 min ⁻¹ in any orientation < 1 · 10 ⁻⁸ hPa 18 kg < 2 min YES	Integrated drive electronics 48 (± 5 %) V DC 50000 min ⁻¹ in any orientation < 1 · 10 ⁻⁸ hPa 18 kg < 2 min YES	Integrated drive electronics 48 (± 5 %) V DC 50000 min ⁻¹ in any orientation < 1 · 10 ⁻⁸ hPa 18 kg < 2 min YES	Integrated drive electronics 48 (± 5 %) V DC 50000 min ⁻¹ in any orientation < 1 · 10 ⁻⁸ hPa 18 kg < 2 min YES	Integrated drive electronics 48 (± 5 %) V DC 50000 min ⁻¹ in any orientation < 1 · 10 ⁻⁸ hPa 18 kg < 2 min YES	Integrated drive electronics 48 (± 5 %) V DC 50000 min ⁻¹ in any orientation < 1 · 10 ⁻⁸ hPa 18 kg < 2 min YES
	15-25 °C 1.0 l/min	15-25 °C 1.0 l/min	15-25 °C 1.0 l/min	15-25 °C 1.0 l/min	15-25 °C 1.0 l/min	15-25 °C 1.0 l/min	15-25 °C 1.0 l/min
	Magnetically Levitated 100 W ≤ 42 dB (A)	Magnetically Levitated 100 W ≤ 42 dB (A)	Magnetically Levitated 100 W ≤ 42 dB (A)	Magnetically Levitated 100 W ≤ 42 dB (A)	Magnetically Levitated 100 W ≤ 42 dB (A)	Magnetically Levitated 100 W ≤ 42 dB (A)	Magnetically Levitated 100 W ≤ 42 dB (A)
	VY422100 V2422100 VY421100 V2421100	VR312103	VR362103	VR322103	VR462103	VR412103	VR422103

Accessories	ATH 500 M, DN 100 ISO-F	ATH 500 M, DN 100 ISO-K	ATH 500 M, DN 100 CF-F	ATH 500 M, DN 160 ISO-F	ATH 500 M, DN 160 ISO-K	
Order number pump Pumpe	VY362100 V2362100 VY361100 V2361100	VY312100 V2312100 VY311100 V2311100	VY322100 V2322100 VY321100 V2321100	VY462100 V2462100 VY461100 V2461100	VY412100 V2412100 VY411100 V2411100	
Power supplies/power						
External power supply for ATH 500 M/MT	114866	114866	114866	114866	114866	
Control units						
Hand Held Remote with cable	114461	114461	114461	114461	114461	
Mains cable DCU/TPS/TCP						
Mains cable 2,0 m Euro-style safety plug 200 - 240 V AC 48 VDC power supply (for ATH 500M)	103566	103566	103566	103566	103566	
Mains cable 2,0 m UL plug 200 - 240 V AC 48 VDC power supply (for ATH 500M)	103567	103567	103567	103567	103567	
Mains cable 3,5 m 48 V DC (for ATH 500 M)	A331328-035	A331328-035	A331328-035	A331328-035	A331328-035	
Venting accessories						
Air venting valve	200043	200043	200043	200043	200043	
Cooling accessories						
Air cooling kit (for ATH500M)	118543S	118543S	118543S	118543S	118543S	
General accessories						
Purge valve kit 24 DVC (for ATH 500 M)	115303S	115303S	115303S	115303S	115303S	
Purge plug with O-ring (for ATH 500 M)	115298S	115298S	115298S	115298S	115298S	
Stainless inlet screen kit	118001	118001	118001	118002	118002	
Mounting materials						
Set of screws			118690	110676S	117996	
Set of screws with Centering ring				110675		

ATH 500 M, DN 160 CF-F	ATH 500 MT, DN 100 ISO-K	ATH 500 MT, DN 100 ISO-F	ATH 500 MT, DN 100 CF-F	ATH 500 MT, DN 160 ISO-F	ATH 500 MT, DN 160 ISO-K	ATH 500 MT, DN 160 CF-F
VY422100 V2422100 VY421100 V2421100	VR312103	VR362103	VR322103	VR462103	VR412103	VR422103
114866	114866	114866	114866	114866	114866	114866
114461	114461	114461	114461	114461	114461	114461
103566	103566	103566	103566	103566	103566	103566
103567	103567	103567	103567	103567	103567	103567
A331328-035	A331328-035	A331328-035	A331328-035	A331328-035	A331328-035	A331328-035
200043	200043	200043	200043	200043	200043	200043
118543S						
115303S						
115298S	115298S	115298S	115298S	115298S	115298S	115298S
118002	118001	118001	118001	118002	118002	118002
118690			118690	110676S 110675	117996	118690



ATH 1603 – 2303 M, ATH 1600 – 2300 MT, ATH 2800 – 3200 M/MT, ATP 3200 M

**Compact magnetically levitated turbopumps
pumping speed class from 1,400 to 2,800 l/s**

Reliable

Our turbopumps in the ATH M and ATP¹⁾ M series are more than just magnetically levitated – an active 5-axis magnetic bearing monitors the position of the rotor and regulates any deviation from the correct position in real-time. Through the use of this high-quality bearing technology, we achieve the best possible long-term stability and reliability coupled with quiet running properties. The bearing technology and process equipment of the high vacuum pumps make our ATH M and ATP M series a benchmark for high-performance turbopumps in semiconductor production, thin film or glass coating, as well as in many industrial and R&D applications.

¹⁾ ATP = no Holweck stage (optimized for high compression or light gas pumping)



ATH 1603 M, with integrated
electronic drive unit
OBC V4



ATH 2303 M, with integrated
electronic drive unit
OBC V4



ATH 2800 M



ATH 3200 M

High performance

Our magnetically levitated turbopumps are optimized for vacuum production processes with a high gas throughput. The ATH-MT models features a temperature management control through an intergrated heater. The process oriented regulation of the pump temperature keeps the process gas exposed part of the pump at constant temperature up to 75 °C in order to minimize undesirable by-product condensation or process gas corrosions in the pump.

Pfeiffer Vacuum's extensive experience in demanding vacuum applications assist in the optimization of our products for your specific applications.

Safe

In the event of a power loss, the rotor acts as a generator and supplies power to the battery-free controller. The rotor gradually slows down and smoothly goes into mechanical emergency bearing mode. In the event of an extreme air dump or a unexpected failure in the cable between the pump and the controller, the emergency bearings come into play. The status of the bearings is monitored by the controller. A venting valve regulated by the controller can slow down the rotor quickly and effectively in the event of a massive ingress of air or mechanical shock to prevent damage to the pump.

In R&D applications, the pumps are distinguished by their minimal low vibration signature even at a low final pressure. A variable rpm setting makes optimizing process conditions for direct replacement of old high vacuum pumps through adaptation to their pumping speed.

Customer benefits

- Clean vacuum due to lubricant-free magnetic bearings
- Very high gas throughput for all process gases
- Outstanding long-term stability and reliability
- High critical backing pressure
- High air ingress stability
- Low lifetime costs due to maintenance-free maglev technology
- Freely selectable rotation speed in a broad RPM range for optimized process customization
- Ultra-low noise and vibration
- Can be installed in any orientation
- Temperature management for corrosive applications

Typical applications

- Glass coating
- Semiconductor processes
- Flat panel display manufacture
- Load-lock applications
- Photovoltaics
- LED/OLED



Glass coating



Semiconductor manufactur



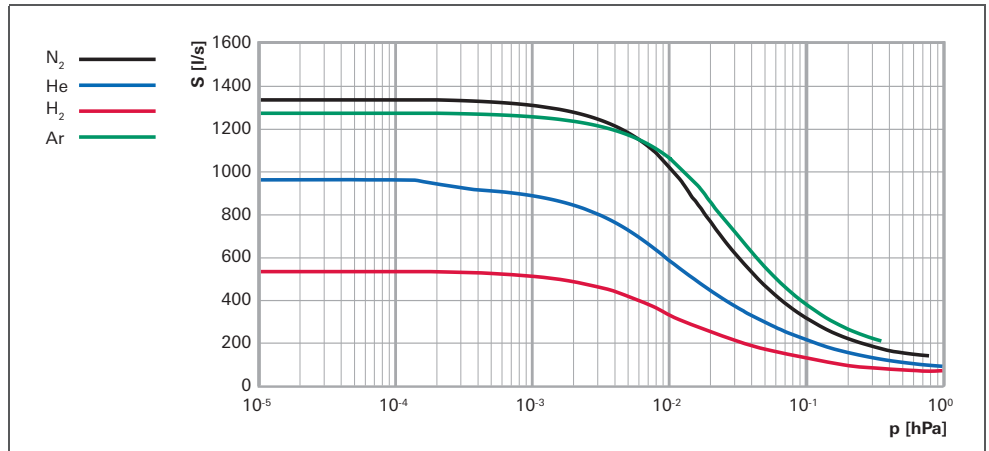
Photovoltaics

ATH 1600 M

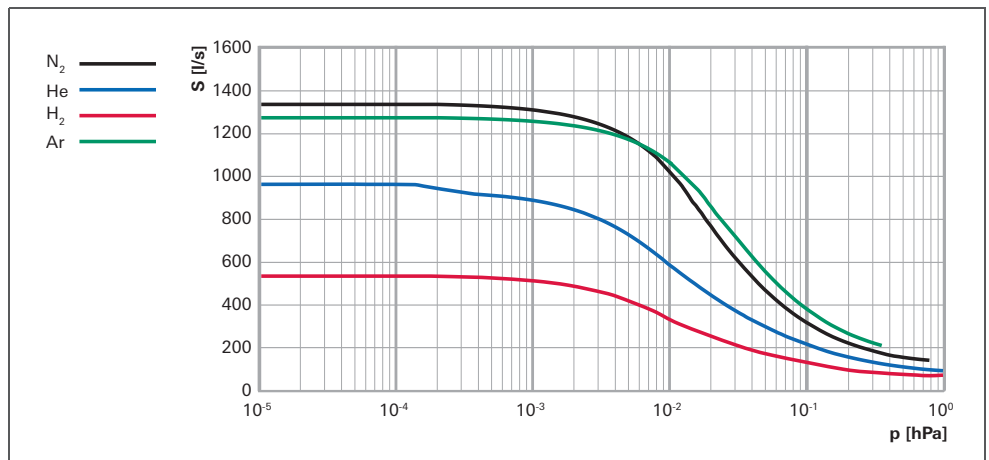


- Operation with integrated OBC drive electronics or Magpwer external drive electronics
- Installation in any orientation
- Water cooled
- CE marked and ROHS compliant
- Heated version (MT) available for corrosive applicaitons.

Pumping speed

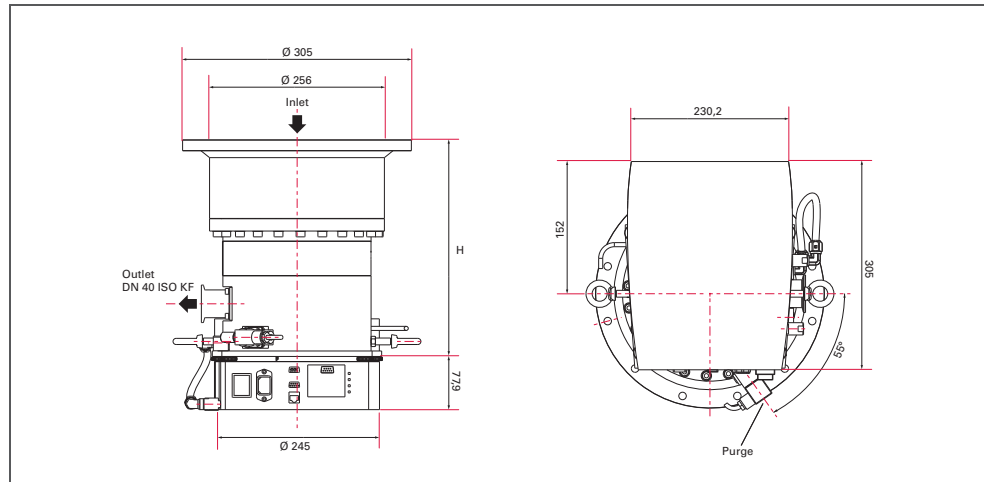


ATH 1603 M



ATH 1600 MT

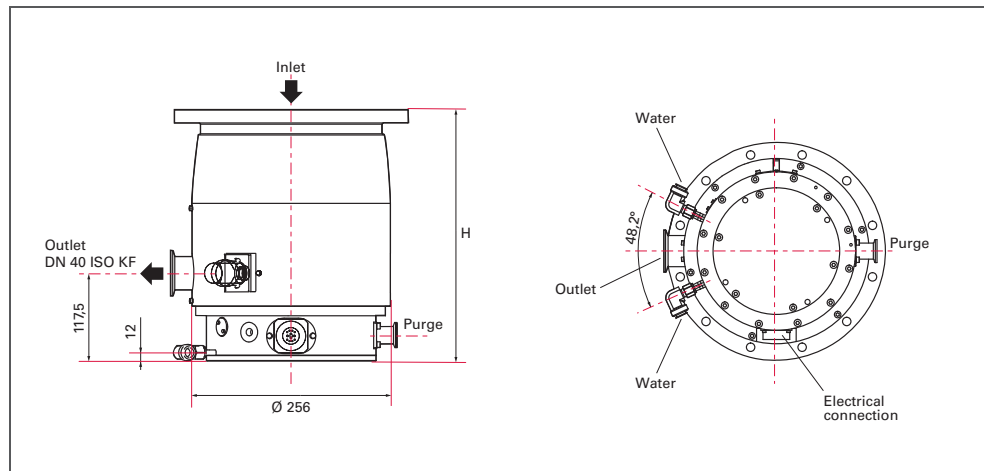
Dimensions (in mm)



ATH 1603 M

	ATH 1603 M, DN 200 ISO-F	ATH 1603 M, DN 200 CF-F	ATH 1603 M, DN 250 ISO-F	ATH 1603 M, DN 250 CF-F
H	320,2 mm	327,5 mm	317,2 mm	317,2 mm

Dimensions (in mm)



ATH 1600 MT

	ATH 1600 MT, DN 200 ISO-F	ATH 1600 MT, DN 200 CF-F	ATH 1600 MT, DN 250 ISO-F	ATH 1600 MT, DN 250 CF-F
H	316,9 mm	343,4 mm	316,9 mm	328,9 mm

Technical data	ATH 1603 M, DN 200 ISO-F	ATH 1603 M, DN 200 CF-F	ATH 1603 M, DN 250 ISO-F	ATH 1603 M, DN 250 CF-F	
Connection nominal diameter					
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	
Flange (in)	DN 200 ISO-F	DN 200 CF-F	DN 250 ISO-F	DN 250 CF-F	
Pumping speed					
Pumping speed for Ar	1280 l/s	1280 l/s	1350 l/s	1350 l/s	
Pumping speed for H ₂	540 l/s	540 l/s	540 l/s	540 l/s	
Pumping speed for He	940 l/s	940 l/s	970 l/s	970 l/s	
Pumping speed for N ₂	1360 l/s	1360 l/s	1400 l/s	1400 l/s	
Compression					
Compression ratio for Ar	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	
Compression ratio for H ₂	> 5 · 10 ²	> 5 · 10 ²	> 5 · 10 ²	> 5 · 10 ²	
Compression ratio for He	> 4 · 10 ⁴	> 4 · 10 ⁴	> 4 · 10 ⁴	> 4 · 10 ⁴	
Compression ratio for N ₂	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	
Fore-vacuum max. for N₂					
	1.7 hPa	1.7 hPa	1.7 hPa	1.7 hPa	
Gas throughput					
Gas throughput at full rotational speed for Ar, heated pump at 75 C					
Gas throughput at full rotational speed for H ₂ , heated pump at 75 C					
Gas throughput at full rotational speed for N ₂ , heated pump at 75 C					
Gas throughput for Ar	20.3 hPa l/s	20.3 hPa l/s	20.3 hPa l/s	20.3 hPa l/s	
Gas throughput for H ₂	> 67.6 hPa l/s	> 67.6 hPa l/s	> 67.6 hPa l/s	> 67.6 hPa l/s	
Gas throughput for He	> 67.6 hPa l/s	> 67.6 hPa l/s	> 67.6 hPa l/s	> 67.6 hPa l/s	
Gas throughput for N ₂	67.6 hPa l/s	67.6 hPa l/s	67.6 hPa l/s	67.6 hPa l/s	
Operating voltage					
	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz	
Rotation speed ± 2 %					
	39000 min ⁻¹	39000 min ⁻¹	39000 min ⁻¹	39000 min ⁻¹	
Mounting orientation					
	in any orientation	in any orientation	in any orientation	in any orientation	
Ultimate pressure					
	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa	
Weight					
	34 (pump) + 8 (controller) kg	34 (pump) + 8 (controller) kg	34 (pump) + 8 (controller) kg	34 (pump) + 8 (controller) kg	
Run-up time					
	< 6 min	< 6 min	< 6 min	< 6 min	
Corrosive gas version					
Cooling method					
	Water	Water	Water	Water	
Cooling water temperature					
	15-25 °C	15-25 °C	15-25 °C	15-25 °C	
Cooling water consumption					
	1.0 l/min	1.0 l/min	1.0 l/min	1.0 l/min	
Bearing					
	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated	
Power consumption at ultimate pressure					
	300 W	300 W	300 W	300 W	
Cooling water temperature max.					
	40 °C	40 °C	40 °C	40 °C	
Sound pressure level					
	≤ 48 dB (A)	≤ 48 dB (A)	≤ 48 dB (A)	≤ 48 dB (A)	
Protection category					
	IP 54	IP 54	IP 54	IP 54	
Order number pump Pumpe					
External drive electronics					
	Y2562100	Y2522100	Y2662100	Y2622100	
OBC V4 Profibus					
	YN56215A	YN52215A	YN66215A	YN62215A	
OBC V4 DeviceNet					
	YL56215A	YL52215A	YL66215A	YL62215A	
OBC V4 Remote					
	YJ56215A	YJ52215A	YJ66215A	YJ62215A	

	ATH 1600 MT, DN 200 ISO-F	ATH 1600 MT, DN 200 CF-F	ATH 1600 MT, DN 250 ISO-F	ATH 1600 MT, DN 250 CF-F
	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
	DN 200 ISO-F	DN 200 CF-F	DN 250 ISO-F	DN 250 CF-F
	1280 l/s	1280 l/s	1350 l/s	1350 l/s
	540 l/s	540 l/s	540 l/s	540 l/s
	940 l/s	940 l/s	970 l/s	970 l/s
	1360 l/s	1360 l/s	1400 l/s	1400 l/s
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	$> 5 \cdot 10^2$	$> 5 \cdot 10^2$	$> 5 \cdot 10^2$	$> 5 \cdot 10^2$
	$> 4 \cdot 10^3$	$> 4 \cdot 10^3$	$> 4 \cdot 10^3$	$> 4 \cdot 10^3$
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	2.2 hPa	2.2 hPa	2.2 hPa	2.2 hPa
	8.5 hPa l/s	8.5 hPa l/s	8.5 hPa l/s	8.5 hPa l/s
	> 16.9 hPa l/s	> 16.9 hPa l/s	> 16.9 hPa l/s	> 16.9 hPa l/s
	16.9 hPa l/s	16.9 hPa l/s	16.9 hPa l/s	16.9 hPa l/s
	20.3 hPa l/s	20.3 hPa l/s	20.3 hPa l/s	20.3 hPa l/s
	> 67.6 hPa l/s	> 67.6 hPa l/s	> 67.6 hPa l/s	> 67.6 hPa l/s
	> 67.6 hPa l/s	> 67.6 hPa l/s	> 67.6 hPa l/s	> 67.6 hPa l/s
	67.6 hPa l/s	67.6 hPa l/s	67.6 hPa l/s	67.6 hPa l/s
	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz
	39000 min ⁻¹	39000 min ⁻¹	39000 min ⁻¹	39000 min ⁻¹
	in any orientation	in any orientation	in any orientation	in any orientation
	$< 6 \cdot 10^{-9}$ hPa	$< 6 \cdot 10^{-9}$ hPa	$< 6 \cdot 10^{-9}$ hPa	$< 6 \cdot 10^{-9}$ hPa
	34 (pump) + 8 (controller) kg	34 (pump) + 8 (controller) kg	34 (pump) + 8 (controller) kg	34 (pump) + 8 (controller) kg
	< 6 min	< 6 min	< 6 min	< 6 min
	YES	YES	YES	YES
	Water	Water	Water	Water
	15-25 °C	15-25 °C	15-25 °C	15-25 °C
	1.0 l/min	1.0 l/min	1.0 l/min	1.0 l/min
	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated
	300 W	300 W	300 W	300 W
	40 °C	40 °C	40 °C	40 °C
	≤ 48 dB (A)	≤ 48 dB (A)	≤ 48 dB (A)	≤ 48 dB (A)
	IP 54	IP 54	IP 54	IP 54

	P6562100	P6522100	P6662100	P6622100
	PM56215A	PM52215A	PN66215A	PM62215A
	PI56215A	PI52215A	PI66215A	PI62215A

Accessories	ATH 1603 M, DN 200 ISO-F	ATH 1603 M, DN 200 CF-F	ATH 1603 M, DN 250 ISO-F	ATH 1603 M, DN 250 CF-F	
Order number pump Pumpe	Y2562100 YN56215A YL56215A YJ56215A	Y2522100 YN52215A YL52215A YJ52215A	Y2662100 YN66215A YL66215A YJ66215A	Y2622100 YN62215A YL62215A YJ62215A	
Power supplies/power					
Magpower drive electronic	120917	120917	120917	120917	
Cabel for mains connection					
Mains cable 2,5 m Euro-style safety plug 200 - 240 V WS	A328405	A328405	A328405	A328405	
Mains cable 2,5 m UL plug 200 - 240 V WS	A331729	A331729	A331729	A331729	
Connection cable					
Interconnecting cable (pump to Magpower external drive electronics), L = 1,0 m	A215300-010-C6-D	A215300-010-C6-D	A215300-010-C6-D	A215300-010-C6-D	
Interconnecting cable (pump to Magpower external drive electronics), L = 3,5 m	A215300-035-C6-D	A215300-035-C6-D	A215300-035-C6-D	A215300-035-C6-D	
Interconnecting cable (pump to Magpower external drive electronics), L = 5,0 m	A215300-050-C6-D	A215300-050-C6-D	A215300-050-C6-D	A215300-050-C6-D	
Interconnecting cable (pump to Magpower external drive electronics), L = 10,0 m	A215300-100-C6-D	A215300-100-C6-D	A215300-100-C6-D	A215300-100-C6-D	
Interconnecting cable (pump to Magpower external drive electronics), L = 20,0 m	A215300-200-C6-D	A215300-200-C6-D	A215300-200-C6-D	A215300-200-C6-D	
Venting accessories					
Venting valve (for OBC V4 and Magpower)	114280	114280	114280	114280	
Valve cable (Magpower external drive electronics to venting valve), L = 1,0 m	A462403-010	A462403-010	A462403-010	A462403-010	
Valve cable (Magpower external drive electronics to venting valve), L = 3,5 m	A462403-035	A462403-035	A462403-035	A462403-035	
Valve cable (Magpower external drive electronics to venting valve), L = 5,0 m	A462403-050	A462403-050	A462403-050	A462403-050	
Valve cable (Magpower external drive electronics to venting valve), L = 10,0 m	A462403-100	A462403-100	A462403-100	A462403-100	
Valve cable (Magpower external drive electronics to venting valve), L=20,0m	A462403-200	A462403-200	A462403-200	A462403-200	
Cooling accessories					
Water valve cable (for MT pumps only), L=1,0m					
Water valve cable (for MT pumps only), L=3,5m					
Water valve cable (for MT pumps only), L=5,0m					
Water valve cable (for MT pumps only), L=10,0m					
Water valve cable (for MT pumps only), L=20,0m					
Heating accessories					
Heater band cable (for MT pumps only), L=1,0m					
Heater band cable (for MT pumps only), L=3,5m					
Heater band cable (for MT pumps only), L=5,0m					
Heater band cable (for MT pumps only), L=10,0m					
Heater band cable (for MT pumps only), L=20,0m					
General accessories					
Purge valve, 25 sccm	118900	118900	118900	118900	
Purge valve, 50 sccm	111921	111921	111921	111921	
Rotatable flange		303131			
Aluminum inlet screen	109200	109200	111640	111640	
Stainless inlet screen kit	108872	108872	108762	108762	
Dust filter	106229	106229	106229	106229	
Mounting materials					
Set of screws	110676S	111664	110676S	111665	
Set of screws with Centering ring	110675		110675		

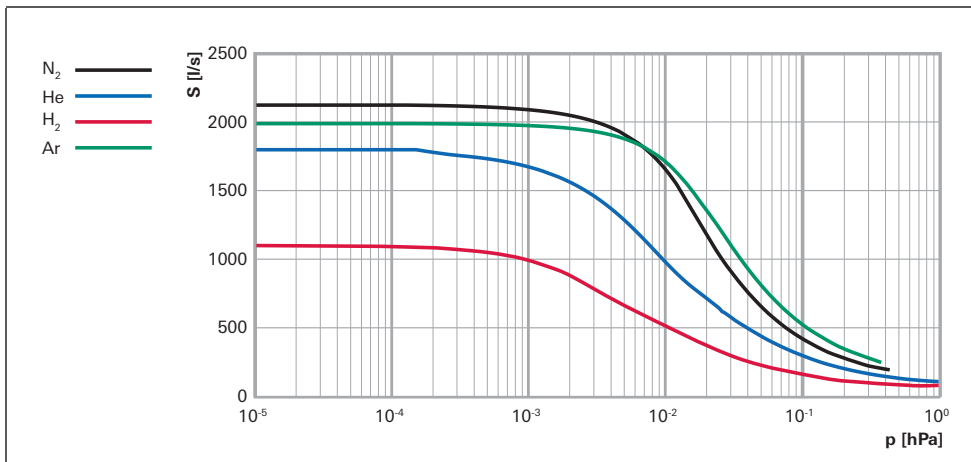
ATH 1600 MT, DN 200 ISO-F	ATH 1600 MT, DN 200 CF-F	ATH 1600 MT, DN 250 ISO-F	ATH 1600 MT, DN 250 CF-F
P6562100 PM56215A PI56215A	P6522100 PM52215A PI52215A	P6662100 PN66215A PI66215A	P6622100 PM62215A PI62215A
120917	120917	120917	120917
A328405	A328405	A328405	A328405
A331729	A331729	A331729	A331729
A215300-010-C6-D	A215300-010-C6-D	A215300-010-C6-D	A215300-010-C6-D
A215300-035-C6-D	A215300-035-C6-D	A215300-035-C6-D	A215300-035-C6-D
A215300-050-C6-D	A215300-050-C6-D	A215300-050-C6-D	A215300-050-C6-D
A215300-100-C6-D	A215300-100-C6-D	A215300-100-C6-D	A215300-100-C6-D
A215300-200-C6-D	A215300-200-C6-D	A215300-200-C6-D	A215300-200-C6-D
114280	114280	114280	114280
A462403-010	A462403-010	A462403-010	A462403-010
A462403-035	A462403-035	A462403-035	A462403-035
A462403-050	A462403-050	A462403-050	A462403-050
A462403-100	A462403-100	A462403-100	A462403-100
A462403-200	A462403-200	A462403-200	A462403-200
A462401-010	A462401-010	A462401-010	A462401-010
A462401-035	A462401-035	A462401-035	A462401-035
A462401-050	A462401-050	A462401-050	A462401-050
A462401-100	A462401-100	A462401-100	A462401-100
A462401-200	A462401-200	A462401-200	A462401-200
A460082-010	A460082-010	A460082-010	A460082-010
A460082-035	A460082-035	A460082-035	A460082-035
A460082-050	A460082-050	A460082-050	A460082-050
A460082-100	A460082-100	A460082-100	A460082-100
A460082-200	A460082-200	A460082-200	A460082-200
118900	118900	118900	118900
111921	111921 303131	111921	111921
109200	109200	111640	111640
108872	108872	108762	108762
106229	106229	106229	106229
110676S	111664	110676S	111665
110675		110675	

ATH 2300 M



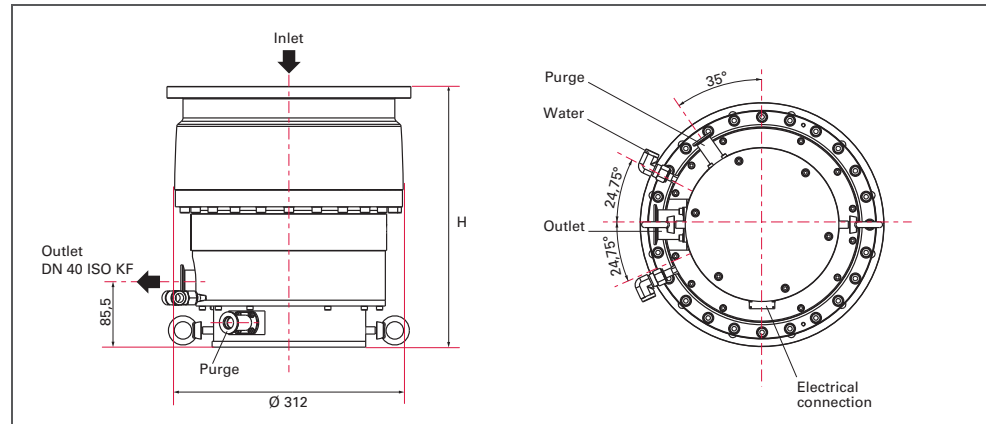
- Operation with integrated OBC drive electronics or Magpwr external drive electronics
- Installation in any orientation
- Water cooled
- CE marked and ROHS compliant
- Heated version (MT) available for corrosive applicaitons.

Pumping speed



ATH 2303 M

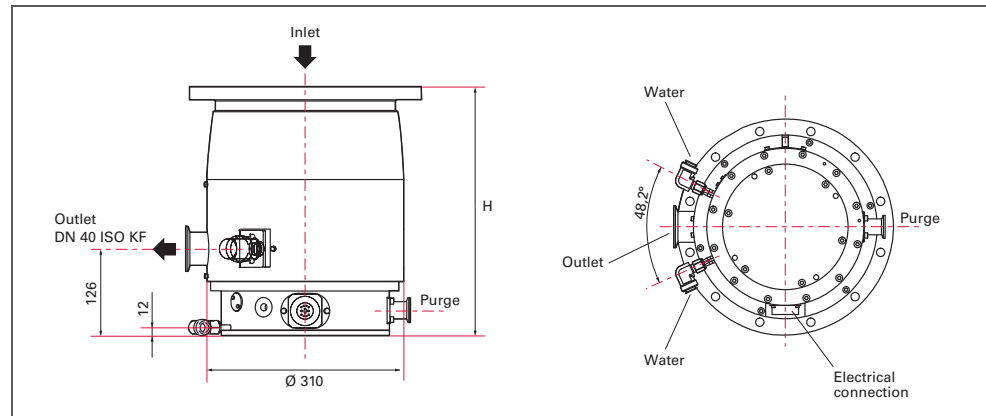
Dimensions (in mm)



ATH 2303 M

	ATH 2303 M, DN 250 ISO-F	ATH 2303 M, DN 250 CF-F
H	343,5 mm	398,1 mm

Dimensions (in mm)



ATH 2300 MT

	ATH 2300 MT, DN 200 ISO-F	ATH 2300 MT, DN 250 ISO-F	ATH 2300 MT, DN 250 CF-F
H	402,5 mm	358,5 mm	402,5 mm

Technical data	ATH 2303 M, DN 250 ISO-F	ATH 2303 M, DN 250 CF-F	ATH 2300 MT, DN 200 ISO-F	
Connection nominal diameter				
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	
Flange (in)	DN 250 ISO-F	DN 250 CF-F	DN 200 ISO-F	
Pumping speed				
Pumping speed for Ar	2000 l/s	2000 l/s	1450 l/s	
Pumping speed for H ₂	1100 l/s	1100 l/s	1100 l/s	
Pumping speed for He	1800 l/s	1800 l/s	1650 l/s	
Pumping speed for N ₂	2150 l/s	2150 l/s	1550 l/s	
Compression				
Compression ratio for Ar	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	
Compression ratio for H ₂	> 1 · 10 ³	> 1 · 10 ³	> 2 · 10 ³	
Compression ratio for He	> 3 · 10 ⁴	> 3 · 10 ⁴	> 3 · 10 ⁴	
Compression ratio for N ₂	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	
Fore-vacuum max. for N₂				
	2.9 hPa	2.9 hPa	2.8 hPa	
Gas throughput				
Gas throughput at full rotational speed for Ar, heated pump at 75 C			8.5 hPa l/s	
Gas throughput at full rotational speed for H ₂ , heated pump at 75 C			> 16.9 hPa l/s	
Gas throughput at full rotational speed for N ₂ , heated pump at 75 C			16.9 hPa l/s	
Gas throughput for Ar	25.4 hPa l/s	25.4 hPa l/s	25.4 hPa l/s	
Gas throughput for H ₂	> 67.6 hPa l/s	> 67.6 hPa l/s	> 67.6 hPa l/s	
Gas throughput for He	> 67.6 hPa l/s	> 67.6 hPa l/s	> 67.6 hPa l/s	
Gas throughput for N ₂	67.6 hPa l/s	67.6 hPa l/s	67.6 hPa l/s	
Operating voltage				
	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz	
Rotation speed ± 2 %				
	31000 min ⁻¹	31000 min ⁻¹	31000 min ⁻¹	
Mounting orientation				
	in any orientation	in any orientation	in any orientation	
Ultimate pressure				
	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa	
Weight				
	60 (pump) + 8 (controller) kg	60 (pump) + 8 (controller) kg	60 (pump) + 8 (controller) kg	
Run-up time				
	< 8 min	< 8 min	< 8 min	
Corrosive gas version				
			YES	
Cooling method				
	Water	Water	Water	
Cooling water temperature				
	15-25 °C	15-25 °C	15-25 °C	
Cooling water consumption				
	1.0 l/min	1.0 l/min	1.0 l/min	
Bearing				
	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated	
Power consumption at ultimate pressure				
	350 W	350 W	350 W	
Cooling water temperature max.				
	40 °C	40 °C	40 °C	
Sound pressure level				
	≤ 47 dB (A)	≤ 47 dB (A)	≤ 47 dB (A)	
Protection category				
	IP 54	IP 54	IP 54	
Order number pump Pumpe				
External drive electronics				
	X2662100	X2622100	Q6562100	
OBC V4 Profibus				
	XN66215A	XN62215A	QM56215A	
OBC V4 DeviceNet				
	XL66215A	XL62215A		
OBC V4 Remote				
	XJ66215A	XJ62215A	QI56215A	

	ATH 2300 MT, DN 250 ISO-F	ATH 2300 MT, DN 250 CF-F
	DN 40 ISO-KF	DN 40 ISO-KF
	DN 250 ISO-F	DN 250 CF-F
	2000 l/s	2000 l/s
	1100 l/s	1100 l/s
	1800 l/s	1800 l/s
	2150 l/s	2150 l/s
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	$> 2 \cdot 10^3$	$> 2 \cdot 10^3$
	$> 3 \cdot 10^4$	$> 3 \cdot 10^4$
	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
	2.8 hPa	2.8 hPa
	8.5 hPa l/s	8.5 hPa l/s
	> 16.9 hPa l/s	> 16.9 hPa l/s
	16.9 hPa l/s	16.9 hPa l/s
	25.4 hPa l/s	25.4 hPa l/s
	> 67.6 hPa l/s	> 67.6 hPa l/s
	> 67.6 hPa l/s	> 67.6 hPa l/s
	67.6 hPa l/s	67.6 hPa l/s
	200-240 V AC, 50/60 Hz	100-120/200- 240 V AC, 50/60 Hz
	31000 min ⁻¹	31000 min ⁻¹
	in any orientation	in any orientation
	$< 6 \cdot 10^{-9}$ hPa	$< 6 \cdot 10^{-9}$ hPa
	60 (pump) + 8 (controller) kg	60 (pump) + 8 (controller) kg
	< 8 min	< 8 min
	YES	YES
	Water	Water
	15-25 °C	15-25 °C
	1.0 l/min	1.0 l/min
	Magnetically Levitated	Magnetically Levitated
	350 W	350 W
	40 °C	40 °C
	≤ 47 dB (A)	≤ 47 dB (A)
	IP 54	IP 54

	Q6662100	Q6622100
	QM66215A	QM62215A
	QI66215A	QI62215A

Accessories	ATH 2303 M, DN 250 ISO-F	ATH 2303 M, DN 250 CF-F	ATH 2300 MT, DN 200 ISO-F	
Order number pump Pumpe	X2662100 XN66215A XL66215A XJ66215A	X2622100 XN62215A XL62215A XJ62215A	Q6562100 QM56215A QI56215A	
Power supplies/power				
Magpower drive electronic	120917	120917	120917	
Cabel for mains connection				
Mains cable 2,5 m Euro-style safety plug 200 - 240 V WS	A328405	A328405	A328405	
Mains cable 2,5 m UL plug 200 - 240 V WS	A331729	A331729	A331729	
Connection cable				
Interconnecting cable (pump to Magpower external drive electronics), L = 1,0 m	A215300-010-C6-D	A215300-010-C6-D	A215300-010-C6-D	
Interconnecting cable (pump to Magpower external drive electronics), L = 3,5 m	A215300-035-C6-D	A215300-035-C6-D	A215300-035-C6-D	
Interconnecting cable (pump to Magpower external drive electronics), L = 5,0 m	A215300-050-C6-D	A215300-050-C6-D	A215300-050-C6-D	
Interconnecting cable (pump to Magpower external drive electronics), L = 10,0 m	A215300-100-C6-D	A215300-100-C6-D	A215300-100-C6-D	
Interconnecting cable (pump to Magpower external drive electronics), L = 20,0 m	A215300-200-C6-D	A215300-200-C6-D	A215300-200-C6-D	
Venting accessories				
Venting valve (for OBC V4 and Magpower)	114280	114280	114280	
Valve cable (Magpower external drive electronics to venting valve), L = 1,0 m	A462403-010	A462403-010	A462403-010	
Valve cable (Magpower external drive electronics to venting valve), L = 3,5 m	A462403-035	A462403-035	A462403-035	
Valve cable (Magpower external drive electronics to venting valve), L = 5,0 m	A462403-050	A462403-050	A462403-050	
Valve cable (Magpower external drive electronics to venting valve), L = 10,0 m	A462403-100	A462403-100	A462403-100	
Valve cable (Magpower external drive electronics to venting valve), L=20,0m	A462403-200	A462403-200	A462403-200	
Cooling accessories				
Water valve cable (for MT pumps only), L=1,0m			A462401-010	
Water valve cable (for MT pumps only), L=3,5m			A462401-035	
Water valve cable (for MT pumps only), L=5,0m			A462401-050	
Water valve cable (for MT pumps only), L=10,0m			A462401-100	
Water valve cable (for MT pumps only), L=20,0m			A462401-200	
Heating accessories				
Heater band cable (for MT pumps only), L=1,0m			A460082-010	
Heater band cable (for MT pumps only), L=3,5m			A460082-035	
Heater band cable (for MT pumps only), L=5,0m			A460082-050	
Heater band cable (for MT pumps only), L=10,0m			A460082-100	
Heater band cable (for MT pumps only), L=20,0m			A460082-200	
General accessories				
Purge valve, 25 sccm	118900	118900	118900	
Purge valve, 50 sccm	111921	111921	111921	
Aluminum inlet screen	111640	111640	109200	
Stainless inlet screen kit	108762	108762	108872	
Dust filter	106229	106229	106229	
Mounting materials				
Set of screws	110676S	118690		
Set of screws with Centering ring	110034		110034 114510	

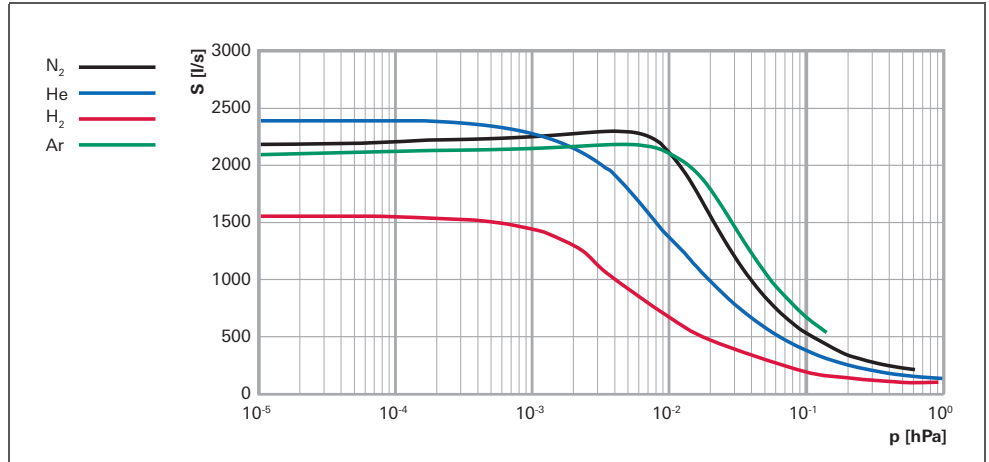
ATH 2300 MT, DN 250 ISO-F	ATH 2300 MT, DN 250 CF-F
Q6662100 QM66215A	Q6622100 QM62215A
QI66215A	QI62215A
120917	120917
A328405	A328405
A331729	A331729
A215300-010-C6-D	A215300-010-C6-D
A215300-035-C6-D	A215300-035-C6-D
A215300-050-C6-D	A215300-050-C6-D
A215300-100-C6-D	A215300-100-C6-D
A215300-200-C6-D	A215300-200-C6-D
114280	114280
A462403-010	A462403-010
A462403-035	A462403-035
A462403-050	A462403-050
A462403-100	A462403-100
A462403-200	A462403-200
A462401-010	A462401-010
A462401-035	A462401-035
A462401-050	A462401-050
A462401-100	A462401-100
A462401-200	A462401-200
A460082-010	A460082-010
A460082-035	A460082-035
A460082-050	A460082-050
A460082-100	A460082-100
A460082-200	A460082-200
118900	118900
111921	111921
111640	111640
108762	108762
106229	106229
110676S	118690
110034	

ATH 2800 M



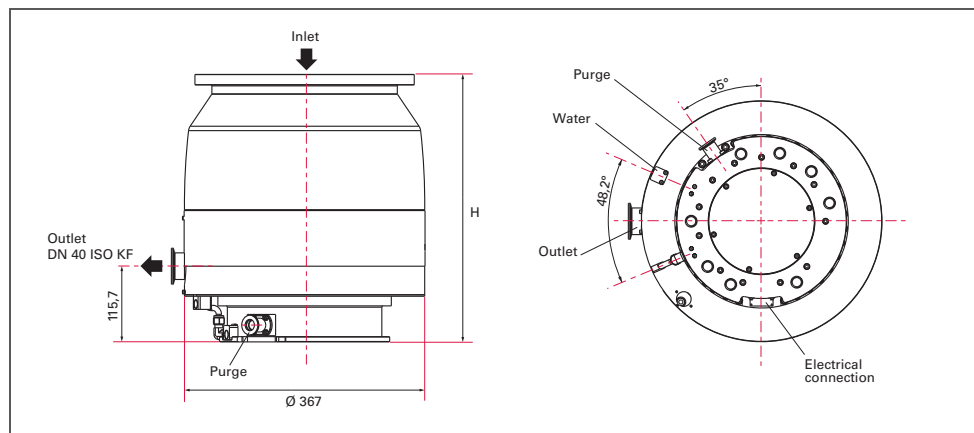
- Operation with Magpower external drive electronics
- Installation in any orientation
- Water cooled
- CE marked and ROHS compliant
- Heated version (MT) available for corrosive applicaitons.

Pumping speed



ATH 2800 M

Dimensions (in mm)



ATH 2800 M

	ATH 2800 M, DN 250 ISO-F	ATH 2800 M, VG 250
H	409 mm	409 mm

Technical data	ATH 2800 M, DN 250 ISO-F, External drive electronics, Water cooled, Non-heated	ATH 2800 M, VG 250, External drive electronics, Water cooled, Non-heated	ATH 2800 MT, DN 250 ISO-F, External drive electronics, Water cooled, Heated	ATH 2800 MT, VG 250, External drive electronics, Water cooled, Heated
Connection nominal diameter				
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 250 ISO-F	VG 250	DN 250 ISO-F	VG 250
Pumping speed				
Pumping speed for Ar	2100 l/s	2100 l/s	2100 l/s	2100 l/s
Pumping speed for H ₂	1550 l/s	1550 l/s	1550 l/s	1550 l/s
Pumping speed for He	2400 l/s	2400 l/s	2400 l/s	2400 l/s
Pumping speed for N ₂	2200 l/s	2200 l/s	2200 l/s	2200 l/s
Compression				
Compression ratio for Ar	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸
Compression ratio for H ₂	> 2 · 10 ³	> 2 · 10 ³	> 2 · 10 ³	> 2 · 10 ³
Compression ratio for He	> 3 · 10 ⁴	> 3 · 10 ⁴	> 3 · 10 ⁴	> 3 · 10 ⁴
Compression ratio for N ₂	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸
Fore-vacuum max. for N₂				
	2.1 hPa	2.1 hPa	2.1 hPa	2.1 hPa
Gas throughput				
Gas throughput at full rotational speed for Ar, heated pump at 75 C			11.8 hPa l/s	11.8 hPa l/s
Gas throughput at full rotational speed for H ₂ , heated pump at 75 C			> 16.9 hPa l/s	> 16.9 hPa l/s
Gas throughput at full rotational speed for N ₂ , heated pump at 75 C			16.9 hPa l/s	16.9 hPa l/s
Gas throughput for Ar	> 37.2 hPa l/s	> 37.2 hPa l/s	> 37.2 hPa l/s	> 37.2 hPa l/s
Gas throughput for H ₂	> 84.5 hPa l/s	> 84.5 hPa l/s	> 84.5 hPa l/s	> 84.5 hPa l/s
Gas throughput for He	> 84.5 hPa l/s	> 84.5 hPa l/s	> 84.5 hPa l/s	> 84.5 hPa l/s
Gas throughput for N ₂	84.5 hPa l/s	84.5 hPa l/s	84.5 hPa l/s	84.5 hPa l/s
Electronic drive unit	External drive electronics	External drive electronics	External drive electronics	External drive electronics
Operating voltage	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz
Rotation speed ± 2 %	25000 min ⁻¹	25000 min ⁻¹	25000 min ⁻¹	25000 min ⁻¹
Mounting orientation	in any orientation	in any orientation	in any orientation	in any orientation
Ultimate pressure	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa
Weight	85 (pump) + 8 (controller) kg	85 (pump) + 8 (controller) kg	85 (pump) + 8 (controller) kg	85 (pump) + 8 (controller) kg
Run-up time	< 10 min	< 10 min	< 10 min	< 10 min
Corrosive gas version			YES	YES
Cooling method	Water	Water	Water	Water
Cooling water temperature	15-25 °C	15-25 °C	15-25 °C	15-25 °C
Cooling water consumption	1.0 l/min	1.0 l/min	1.0 l/min	1.0 l/min
Bearing	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated
Power consumption at ultimate pressure	400 W	400 W	400 W	
Cooling water temperature max.	40 °C	40 °C	40 °C	
Sound pressure level	≤ 45 dB (A)	≤ 45 dB (A)	≤ 45 dB (A)	≤ 45 dB (A)
Interfaces	Via External drive electronics	Via External drive electronics	Via External drive electronics	Via External drive electronics
Order number pump Pumpe				
	U2662100	U26A2100	U6662100	U66A2100

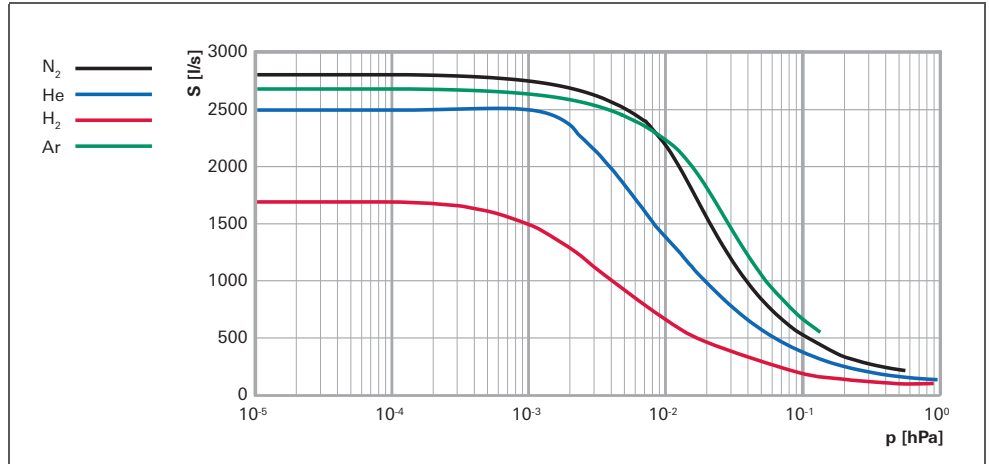
Accessories	ATH 2800 M, DN 250 ISO-F, External drive electronics, Water cooled, Non-heated	ATH 2800 M, VG 250, External drive electronics, Water cooled, Non-heated	ATH 2800 MT, DN 250 ISO-F, External drive electronics, Water cooled, Heated	ATH 2800 MT, VG 250, External drive electronics, Water cooled, Heated
Order number pump Pumpe	U2662100	U26A2100	U6662100	U66A2100
Power supplies/power				
Magpower drive electronic	120917	120917	120917	120917
Cabel for mains connection				
Mains cable 2,5 m Euro-style safety plug 200 - 240 V WS	A328405	A328405	A328405	A328405
Mains cable 2,5 m UL plug 200 - 240 V WS	A331729	A331729	A331729	A331729
Connection cable				
Interconnecting cable (pump to Magpower external drive electronics), L = 1,0 m	A215300-010-C6-D	A215300-010-C6-D	A215300-010-C6-D	A215300-010-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 3,5 m	A215300-035-C6-D	A215300-035-C6-D	A215300-035-C6-D	A215300-035-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 5,0 m	A215300-050-C6-D	A215300-050-C6-D	A215300-050-C6-D	A215300-050-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 10,0 m	A215300-100-C6-D	A215300-100-C6-D	A215300-100-C6-D	A215300-100-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 20,0 m	A215300-200-C6-D	A215300-200-C6-D	A215300-200-C6-D	A215300-200-C6-D
Venting accessories				
Venting valve (for OBC V4 and Magpower)	114280	114280	114280	
Valve cable (Magpower external drive electronics to venting valve), L = 1,0 m	A462403-010	A462403-010	A462403-010	A462403-010
Valve cable (Magpower external drive electronics to venting valve), L = 3,5 m	A462403-035	A462403-035	A462403-035	A462403-035
Valve cable (Magpower external drive electronics to venting valve), L = 5,0 m	A462403-050	A462403-050	A462403-050	A462403-050
Valve cable (Magpower external drive electronics to venting valve), L = 10,0 m	A462403-100	A462403-100	A462403-100	A462403-100
Valve cable (Magpower external drive electronics to venting valve), L=20,0m	A462403-200	A462403-200	A462403-200	A462403-200
Cooling accessories				
Water valve cable (for MT pumps only), L=1,0m			A462401-010	A462401-010
Water valve cable (for MT pumps only), L=3,5m			A462401-035	A462401-035
Water valve cable (for MT pumps only), L=5,0m			A462401-050	A462401-050
Water valve cable (for MT pumps only), L=10,0m			A462401-100	A462401-100
Water valve cable (for MT pumps only), L=20,0m			A462401-200	A462401-200
Heating accessories				
Heater band cable (for MT pumps only), L=1,0m			A460082-010	A460082-010
Heater band cable (for MT pumps only), L=3,5m			A460082-035	A460082-035
Heater band cable (for MT pumps only), L=5,0m			A460082-050	A460082-050
Heater band cable (for MT pumps only), L=10,0m			A460082-100	A460082-100
Heater band cable (for MT pumps only), L=20,0m			A460082-200	A460082-200
General accessories				
Purge valve, 25 sccm	118900	118900	118900	118900
Purge valve, 50 sccm	111921	111921	111921	111921
Stainless inlet screen kit	112128	112128	112128	112128
Dust filter	106229	106229	106229	106229
Mounting materials				
Set of screws	110676S		110676S	
Set of screws with Centering ring	110034	113189	110034	113189

ATH 3200 M



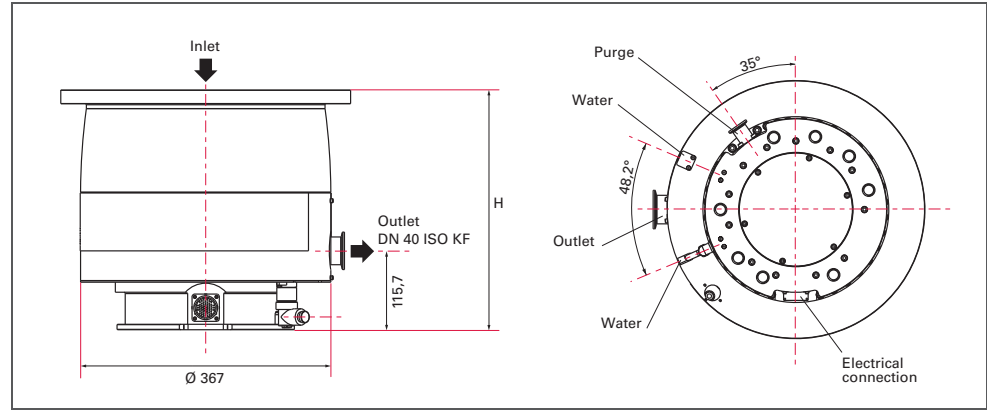
- Operation with Magpower external drive electronics
- Installation in any orientation
- Water cooled
- CE marked and ROHS compliant
- Heated version (MT) available for corrosive applicaitons.

Pumping speed



ATH 3200 M

Dimensions (in mm)



ATH 3200 M

	ATH 3200 M, DN 320 ISO-F	ATH 3200 M, VG 350
H	351,4 mm	351,4 mm

Technical data	ATH 3200 M, DN 320, ISO-F, External drive electronics, Water cooled, Non-heated	ATH 3200 M, VG 350, External drive electronics, Water cooled, Non-heated	ATH 3200 MT, DN 320 ISO-F, External drive electronics, Water cooled, Heated	ATH 3200 MT, VG 350, External drive electronics, Water cooled, Heated
Connection nominal diameter				
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 320 ISO-F	VG 350	DN 320 ISO-F	VG 350
Pumping speed				
Pumping speed for Ar	2700 l/s	2700 l/s	2700 l/s	2700 l/s
Pumping speed for H ₂	1700 l/s	1700 l/s	1700 l/s	1700 l/s
Pumping speed for He	2500 l/s	2500 l/s	2500 l/s	2500 l/s
Pumping speed for N ₂	2800 l/s	2800 l/s	2800 l/s	2800 l/s
Compression				
Compression ratio for Ar	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸
Compression ratio for H ₂	> 2 · 10 ³	> 2 · 10 ³	> 2 · 10 ³	> 2 · 10 ³
Compression ratio for He	> 3 · 10 ⁴	> 3 · 10 ⁴	> 3 · 10 ⁴	> 3 · 10 ⁴
Compression ratio for N ₂	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸	> 1 · 10 ⁸
Fore-vacuum max. for N₂				
	2.1 hPa	2.1 hPa	2.1 hPa	2.1 hPa
Gas throughput				
Gas throughput at full rotational speed for Ar, heated pump at 75 C			11.8 hPa l/s	11.8 hPa l/s
Gas throughput at full rotational speed for H ₂ , heated pump at 75 C			> 16.9 hPa l/s	> 16.9 hPa l/s
Gas throughput at full rotational speed for N ₂ , heated pump at 75 C			16.9 hPa l/s	16.9 hPa l/s
Gas throughput for Ar	> 37.2 hPa l/s	> 37.2 hPa l/s	> 37.2 hPa l/s	> 37.2 hPa l/s
Gas throughput for H ₂	> 84.5 hPa l/s	> 84.5 hPa l/s	> 84.5 hPa l/s	> 84.5 hPa l/s
Gas throughput for He	> 84.5 hPa l/s	> 84.5 hPa l/s	> 84.5 hPa l/s	> 84.5 hPa l/s
Gas throughput for N ₂	84.5 hPa l/s	84.5 hPa l/s	84.5 hPa l/s	84.5 hPa l/s
Electronic drive unit	External drive electronics	External drive electronics	External drive electronics	External drive electronics
Operating voltage	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz
Rotation speed ± 2 %	25000 min ⁻¹	25000 min ⁻¹	25000 min ⁻¹	25000 min ⁻¹
Mounting orientation	in any orientation	in any orientation	in any orientation	in any orientation
Ultimate pressure	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa
Weight	85 (pump) + 8 (controller) kg	85 (pump) + 8 (controller) kg	85 (pump) + 8 (controller) kg	85 (pump) + 8 (controller) kg
Run-up time	< 10 min	< 10 min	< 10 min	< 10 min
Corrosive gas version			YES	YES
Cooling method	Water	Water	Water	Water
Cooling water temperature	15-25 °C	15-25 °C	15-25 °C	15-25 °C
Cooling water consumption	1.0 l/min	1.0 l/min	1.0 l/min	1.0 l/min
Bearing	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated	Magnetically Levitated
Power consumption at ultimate pressure	400 W	400 W	400 W	400 W
Cooling water temperature max.	40 °C	40 °C	40 °C	40 °C
Sound pressure level	≤ 45 dB (A)	≤ 45 dB (A)	≤ 45 dB (A)	≤ 45 dB (A)
Interfaces	Via External drive electronics	Via External drive electronics	Via External drive electronics	Via External drive electronics
Order number pump Pumpe				
	U2C62100	U2DA2100	U6C62100	U6DA2100

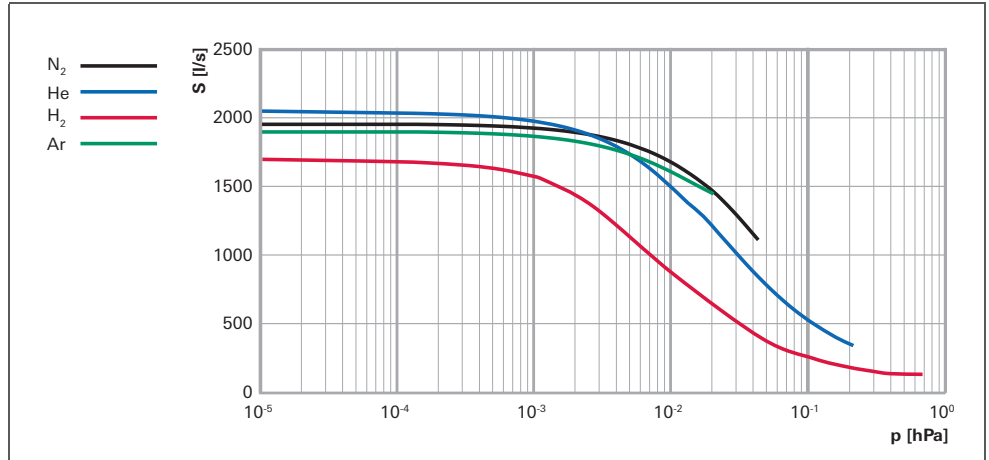
Accessories	ATH 3200 M, DN 320, ISO-F, External drive electronics, Water cooled, Non-heated	ATH 3200 M, VG 350, External drive electronics, Water cooled, Non-heated	ATH 3200 MT, DN 320 ISO-F, External drive electronics, Water cooled, Heated	ATH 3200 MT, VG 350, External drive electronics, Water cooled, Heated
Order number pump Pumpe	U2C62100	U2DA2100	U6C62100	U6DA2100
Power supplies/power				
Magpower drive electronic	120917	120917	120917	120917
Cabel for mains connection				
Mains cable 2,5 m Euro-style safety plug 200 - 240 V WS	A328405	A328405	A328405	A328405
Mains cable 2,5 m UL plug 200 - 240 V WS	A331729	A331729	A331729	A331729
Connection cable				
Interconnecting cable (pump to Magpower external drive electronics), L = 1,0 m	A215300-010-C6-D	A215300-010-C6-D	A215300-010-C6-D	A215300-010-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 3,5 m	A215300-035-C6-D	A215300-035-C6-D	A215300-035-C6-D	A215300-035-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 5,0 m	A215300-050-C6-D	A215300-050-C6-D	A215300-050-C6-D	A215300-050-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 10,0 m	A215300-100-C6-D	A215300-100-C6-D	A215300-100-C6-D	A215300-100-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 20,0 m	A215300-200-C6-D	A215300-200-C6-D	A215300-200-C6-D	A215300-200-C6-D
Venting accessories				
Venting valve (for OBC V4 and Magpower)	114280	114280	114280	114280
Valve cable (Magpower external drive electronics to venting valve), L = 1,0 m	A462403-010	A462403-010	A462403-010	A462403-010
Valve cable (Magpower external drive electronics to venting valve), L = 3,5 m	A462403-035	A462403-035	A462403-035	A462403-035
Valve cable (Magpower external drive electronics to venting valve), L = 5,0 m	A462403-050	A462403-050	A462403-050	A462403-050
Valve cable (Magpower external drive electronics to venting valve), L = 10,0 m	A462403-100	A462403-100	A462403-100	A462403-100
Valve cable (Magpower external drive electronics to venting valve), L=20,0m	A462403-200	A462403-200	A462403-200	A462403-200
Cooling accessories				
Water valve cable (for MT pumps only), L=1,0m			A462401-010	A462401-010
Water valve cable (for MT pumps only), L=3,5m			A462401-035	A462401-035
Water valve cable (for MT pumps only), L=5,0m			A462401-050	A462401-050
Water valve cable (for MT pumps only), L=10,0m			A462401-100	A462401-100
Water valve cable (for MT pumps only), L=20,0m			A462401-200	A462401-200
Heating accessories				
Heater band cable (for MT pumps only), L=1,0m			A460082-010	A460082-010
Heater band cable (for MT pumps only), L=3,5m			A460082-035	A460082-035
Heater band cable (for MT pumps only), L=5,0m			A460082-050	A460082-050
Heater band cable (for MT pumps only), L=10,0m			A460082-100	A460082-100
Heater band cable (for MT pumps only), L=20,0m			A460082-200	A460082-200
General accessories				
Purge valve, 25 sccm	118900	118900	118900	118900
Purge valve, 50 sccm	111921	111921	111921	111921
Stainless inlet screen kit	112132	114683	112132	114683
Dust filter	106229	106229	106229	106229
Mounting materials				
Set of screws with Centering ring	113189	113189	113189	113189

ATP 2300 M



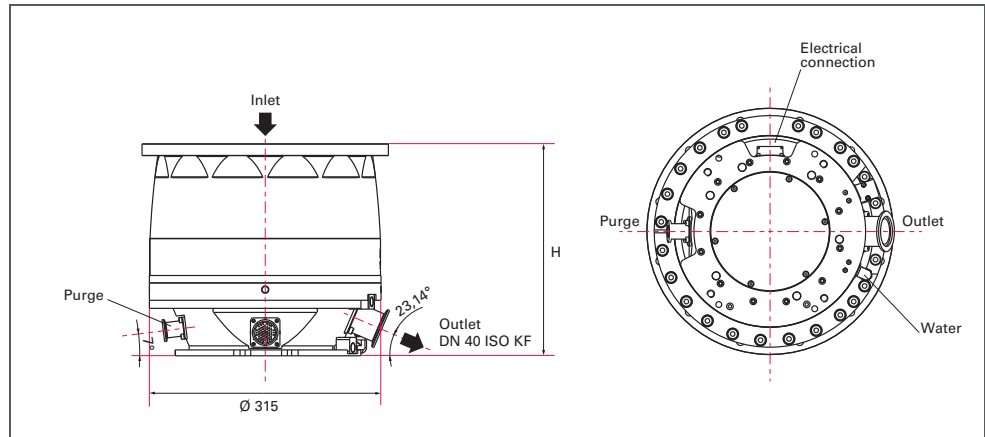
- Operation with integrated OBC drive electronics or Magpwer external drive electronics
- Installation in any orientation
- Water cooled
- CE marked and ROHS compliant
- Designed especially for light gas pumping applications

Pumping speed



ATP 2300 M

Dimensions (in mm)



ATP 2300 M

	ATP 2300 M, DN 250 ISO-F	ATP 2300 M, DN 250 CF-F
H	289,2 mm	333,2 mm

Technical data	ATP 2300 M, DN 250 ISO-F	ATP 2300 M, DN 250 CF-F
Connection nominal diameter		
Flange (out)	DN 40 ISO-KF	DN 40 ISO-KF
Flange (in)	DN 250 ISO-F	DN 250 CF-F
Pumping speed		
Pumping speed for Ar	1900 l/s	1900 l/s
Pumping speed for H ₂	1700 l/s	1700 l/s
Pumping speed for He	2050 l/s	2050 l/s
Pumping speed for N ₂	1950 l/s	1950 l/s
Compression		
Compression ratio for Ar	> 1 · 10 ⁸	> 1 · 10 ⁸
Compression ratio for H ₂	> 7 · 10 ³	> 7 · 10 ³
Compression ratio for He	> 1 · 10 ⁵	> 1 · 10 ⁵
Compression ratio for N ₂	> 1 · 10 ⁸	> 1 · 10 ⁸
Fore-vacuum max. for N₂		
	2.1 hPa	2.1 hPa
Gas throughput		
Gas throughput for Ar	15.2 hPa l/s	15.2 hPa l/s
Gas throughput for H ₂	> 50.7 hPa l/s	> 50.7 hPa l/s
Gas throughput for He	> 50.7 hPa l/s	> 50.7 hPa l/s
Gas throughput for N ₂	37.2 hPa l/s	37.2 hPa l/s
Operating voltage	200-240 V AC, 50/60 Hz	200-240 V AC, 50/60 Hz
Rotation speed ± 2 %	31000 min ⁻¹	31000 min ⁻¹
Mounting orientation	in any orientation	in any orientation
Ultimate pressure	< 6 · 10 ⁻⁹ hPa	< 6 · 10 ⁻⁹ hPa
Weight	52 (pump) + 8 (controller) kg	52 (pump) + 8 (controller) kg
Run-up time	< 8 min	< 8 min
Cooling method	Water	Water
Cooling water temperature	15-25 °C	15-25 °C
Cooling water consumption	1.0 l/min	1.0 l/min
Bearing	Magnetically Levitated	Magnetically Levitated
Power consumption at ultimate pressure	350 W	350 W
Cooling water temperature max.	40 °C	40 °C
Sound pressure level	≤ 46 dB (A)	≤ 46 dB (A)
Interfaces	Via External drive electronics	Via External drive electronics
Protection category	IP 54	IP 54

Order number pump Pumpe		
External drive electronics	T2662100	T2622100
OBC V4 Profibus	TN66215A	TN62215A
OBC V4 DeviceNet	TL66215A	TL62215A
OBC V4 Remote	TJ66215A	TJ62215A

Accessories	ATP 2300 M, DN 250 ISO-F	ATP 2300 M, DN 250 CF-F
Order number pump Pumpe	T2662100 TN66215A TL66215A TJ66215A	T2622100 TN62215A TL62215A TJ62215A
Power supplies/power		
Magpower drive electronic	120917	120917
Cabel for mains connection		
Mains cable 2,5 m	A328405	A328405
Euro-style safety plug 200 - 240 V WS		
Mains cable 2,5 m UL plug 200 - 240 V WS	A331729	A331729
Connection cable		
Interconnecting cable (pump to Magpower external drive electronics), L = 1,0 m	A215300-010-C6-D	A215300-010-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 3,5 m	A215300-035-C6-D	A215300-035-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 5,0 m	A215300-050-C6-D	A215300-050-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 10,0 m	A215300-100-C6-D	A215300-100-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 20,0 m	A215300-200-C6-D	A215300-200-C6-D
Venting accessories		
Venting valve (for OBC V4 and Magpower)	114280	114280
Valve cable (Magpower external drive electronics to venting valve), L = 1,0 m	A462403-010	A462403-010
Valve cable (Magpower external drive electronics to venting valve), L = 3,5 m	A462403-035	A462403-035
Valve cable (Magpower external drive electronics to venting valve), L = 5,0 m	A462403-050	A462403-050
Valve cable (Magpower external drive electronics to venting valve), L = 10,0 m	A462403-100	A462403-100
Valve cable (Magpower external drive electronics to venting valve), L=20,0m	A462403-200	A462403-200
General accessories		
Purge valve, 25 sccm	118900	118900
Purge valve, 50 sccm	111921	111921
Aluminum inlet screen	111640	111640
Stainless inlet screen kit	108762	108762
Dust filter	106229	106229
Mounting materials		
Set of screws	110676S	118690
Set of screws with Centering ring	110034	

Electronic controllers

Electronics for optimum maglev turbo pump control, minimum physical size and matching electrical supply rating offer maximum reliability. Control and display units for setting and monitoring the operating parameters of the turbopumps. Compact mounting with integrated drive electronics (OBC V4) and external drive electronics (Magpower) are available.

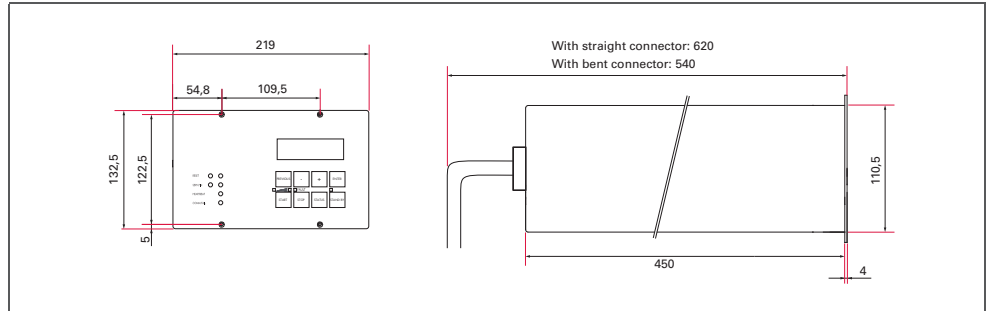
Magpower

Magpower controller

- Digital external drive electronics for ATH-M and ATP-M maglev pumps (except ATH 500 series)
- Compact 1/2 (of 19") rack size
- Full interchangeability to any ATH-M and ATP-M pumps
- CE marked and ROHS compliant



Dimensions (in mm)



Magpower external drive electronics

Technical data	Magpower controller
Dimensions (L x W x H)	450 x 219 x 132.5 mm
Weight	8.7 kg
Power consumption housing heater	0.25 kW
Mains requirement: power consumption	16 A
Power supply frequency	50 to 60 Hz
Power supply voltage	200 to 240 V
Ambient temperature	≤ 40 °C

Order number	
Magpower external drive electronics	120917

HHR

Hand Held Remote (HHR) with cable



- Hand held remote controller and display unit for operating the turbopump parameters. For pump OBC V4 integrated drive electronics and ATH500M.
- Compact size, with cable connection
- Power supplied exclusively from the pump controller
- CE marked and ROHS compliant

Technical data	Hand Held Remote (HHR) with cable
Weight	0.6 (with cable) kg

Order number	
Hand Held Remote (HHR) with cable	114461

Power supply

External power supply for ATH 500 M/MT

- Provide stable power supply for ATH 500 M during operation
- External power supply
- 48 V DC output
- Delivered without power cable
- CE marked and ROHS compliant

Technical data	External power supply for ATH 500 M/MT
Output voltage	48 V
Weight	6.0 kg
Power supply frequency	50 to 60 Hz
Power supply voltage	200 to 240 V

Order number	
External power supply for ATH 500 M/MT	114866

Interconnecting cable (pump to Magpower external drive electronics)

Interconnecting cable between pump and external drive electronics (not needed for pump equipped with integrated drive electronics OBC V4). Standard cable lengths are listed. For customized cables, please consult us.

- Between pump and Magpower external drive electronics.
Not required for OBC V4 equipped pumps.
- For all ATH-M and ATP-M series pumps except ATH 500 M

Interconnecting cable (pump to Magpower external drive electronics)	Order number
Interconnecting cable (pump to Magpower external drive electronics), L = 1.0 m	A215300-010-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 3.5 m	A215300-035-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 5.0 m	A215300-050-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 10.0 m	A215300-100-C6-D
Interconnecting cable (pump to Magpower external drive electronics), L = 20.0 m	A215300-200-C6-D

Valve cable (external drive electronics to venting valve)

Interconnecting cable between controller and venting valve (not needed for pump equipped with integrated drive electronics OBC V4). Standard cable lengths are listed. For customized cables, please consult us.

- Between Magpower external drive electronics and venting valve
- For all ATH-M and ATP-M series pumps except ATH 500 M

Valve cable (external drive electronics to venting valve)	Order number
Valve cable (Magpower external drive electronics to venting valve), L = 1.0 m	A462403-010
Valve cable (Magpower external drive electronics to venting valve), L = 3.5 m	A462403-035
Valve cable (Magpower external drive electronics to venting valve), L = 5.0 m	A462403-050
Valve cable (Magpower external drive electronics to venting valve), L = 10.0 m	A462403-100
Valve cable (Magpower external drive electronics to venting valve), L = 20.0 m	A462403-200

Heater band cables and water valve cables

Interconnecting cables between controller and heater band / water valve (not needed for pump equipped with integrated drive electronics OBC V4). Only for heated pumps of the MT series. Standard cable lengths are listed. For customized cables, please consult us.

- Interconnecting cable between Magpower external drive electronics and heater band
- For all ATH-MT series (temperature controlled) pumps except ATH 500 MT

	Heater band cable (for MT pumps only), L = 1.0 m	Heater band cable (for MT pumps only), L = 3.5 m	Heater band cable (for MT pumps only), L = 5.0 m	Heater band cable (for MT pumps only), L = 10.0 m	Heater band cable (for MT pumps only), L = 20.0 m
Power supply frequency	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz	50 to 60 Hz
Power supply voltage	200 to 240 V	200 to 240 V	200 to 240 V	200 to 240 V	200 to 240 V
Order number	A460082-010	A460082-035	A460082-050	A460082-100	A460082-200

	Water valve cable (for MT pumps only), L = 1.0 m	Water valve cable (for MT pumps only), L = 3.5 m	Water valve cable (for MT pumps only), L = 5.0 m	Water valve cable (for MT pumps only), L = 10.0 m	Water valve cable (for MT pumps only), L = 20.0 m
Power supply voltage	24 V	24 V	24 V	24 V	24 V
Order number	A462401-010	A462401-035	A462401-050	A462401-100	A462401-200

Mounting kits

Mounting bolts for ATH-M series installation. It is extremely important to use the designated high strength mounting materials and follow the installation safety instructions described in the operating manual. For any special mounting configuration request, please consult us.

- High strength turbopump mounting kit

Mounting kits	Order number
Mounting bolts for ISO-F (for ATH 500 M, DN160; ATH 1600 M, DN 200/250; ATH 2300 M, DN 250; ATH 2800 M, DN 250) without centering ring	110676S
Mounting bolts for ISO-F (for ATH 1600 M, DN 200/250) with centering ring	110675
Mounting bolts for ISO-F (for ATH 2300 M, DN 250; ATH 2800 M, DN 250) with centering ring	110034
Mounting bolts for ISO-F (for ATH 2300 M, DN 200) with centering ring	114510
Mounting bolts for ISO-F and VG (for ATH 2800 M, VG 250; ATH 3200 M, DN 320 / VG 350) with centering ring	113189
Mounting bolts for ISO-K (for ATH 500 M, DN 160)	117996
Mounting bolts for CF-F (for ATH 500 M, DN100/160; ATH 2300 M, DN 200/250)	118690
Mounting bolts for CF-F (for ATH 1600 M, DN 200)	111664
Mounting bolts for CF-F (for ATH 1600 M, DN 250)	111665

Power cord

Power supply cord to the drive electronics

Power cord	Order number
Power cord 2.5 m Europe standard 200 - 240 V AC	A328405
Power cord 2.5 m US standard 200 - 240 V AC	A331729
Power cord 3.5 m 48 V DC (for ATH 500 M)	A331328-035
Power cord 2.0 m Europe standard 200 - 240 V AC 48 VDC power supply (for ATH500M)	103566
Power cord 2.0 m US standard 200 - 240 V AC 48 VDC power supply (for ATH500M)	103567

Venting valves and other accessories

Venting valves, purge valves, air filters and associated accessories for ATH M series are found here.

Venting valves and other accessories	Order number
Air cooling kit (for ATH 500 M)	118543S
Purge valve kit 24 DVC (for ATH 500 M)	115303S
Purge plug with O-ring (for ATH 500 M)	115298S
Purge flow reduction device DN16 25 sccm	066950
Purge flow reduction device DN16 50 sccm	066752
Purge valve 25 sccm	118900
Purge valve 50 sccm	111921
Air venting valve (for OBC V4 and Magpower)	114280
Air venting valve (for ATH 500 M)	200043
Dust filter	106229
Water inlet valve 24 V DC	108668

Inlet screen

All ATH-M and ATP-M series are delivered with stainless inlet screens. The screen protects the pump against solid particles accidentally falling into the high speed rotating turbopump. It is important to protect the pump during the operation. The screen is integrated into the pump housing. For any special screen size, mesh size, or shape, please consult us.

- The screen protects the pump against solid particles
- It is integrated into the pump housing
- All ATH-M and ATP-M pumps are delivered with inlet screen

	Stainless inlet screen kit for DN100	Stainless inlet screen kit for DN160	Stainless inlet screen kit for DN200 - M 4.5	Stainless inlet screen kit for DN250 - M 5
Flange	DN100	DN160	DN200	DN250
Mesh	5 mm	5 mm	4,5 mm	5 mm
Material	Stainless	Stainless	Stainless	Stainless
Order number	118001	118002	108872	108762

	Stainless inlet screen kit for DN250 - M 8	Stainless inlet screen kit for DN320 - M 8	Stainless inlet screen kit for DN350 - M 8
Flange	DN250	DN320	DN350
Mesh	8 mm	8 mm	8 mm
Material	Stainless	Stainless	Stainless
Order number	112128	112132	114683

	Aluminum inlet screen kit for DN200	Aluminum inlet screen kit for DN250
Flange	DN200	DN200
Mesh	4,5 mm	5 mm
Material	Aluminum	Aluminum
Order number	109200	111640

Rotatable flange

Rotatable flanges are available for ISO-K and CF-F housing installation. For more information, please consult the general catalog.

- Rotatable flange for pump mounting

Rotatable flange	Order number
Rotatable flange DN100 ISO-K	068348
Rotatable flange DN160 ISO-K	068088
Rotatable flange DN100 CF-F	303127
Rotatable flange DN160 CF-F	303129
Rotatable flange DN200 CF-F	303131
Rotatable flange DN250 CF-F	303133

The ideal turbopump for mass spectrometry and electron microscopy



Differentially pumped vacuum solutions

Turbopumps from Pfeiffer Vacuum with more than one vacuum port are called SplitFlow. They are an economical alternative to discrete pumps for a number of multi-chamber systems. Applications, which are mainly found in analytics, are referred to as differentially pumped systems.

Features such as compact design, reliability, cost efficiency and flexible design are vital for this purpose. A SplitFlow pump can provide all of the above.

We work hand in hand with our customers in a joint development process to find the best possible solution. Customer-specific solutions developed by creating vacuum calculations and designs using state-of-the-art calculation procedures are important components of Pfeiffer Vacuum expertise. We have an extensive and flexible modular system on hand to put the resulting solution into practice. A SplitFlow pump can be created from tried and tested core components so that a cost-effective and reliable product is available after only a short development period.

Customer benefits

- Cost savings by replacing several discrete pumps with just one single SplitFlow pump
- Improved reliability through reduced number of components
- Smaller dimensions through very compact design
- Reduced power requirement, less installation work and reduced service costs
- Optimal adjustment of the vacuum performance
- Noise and vibration-optimized design for highly sensitive applications
- UL certification

Typical applications

- Electron microscopy
- Mass spectrometry
- Leak detection



Electron microscopy



Leak detection



a) Standard HiPace pump



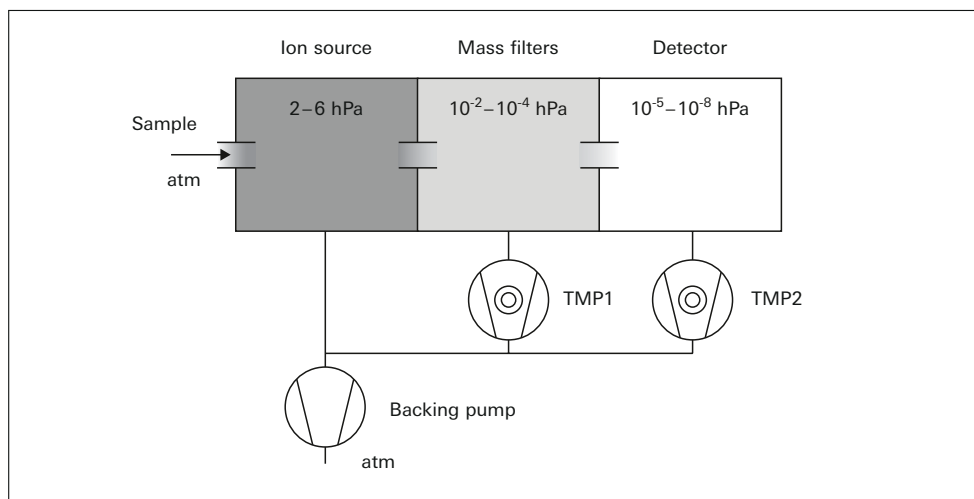
b) SplitFlow pump

There are two types that can be used:

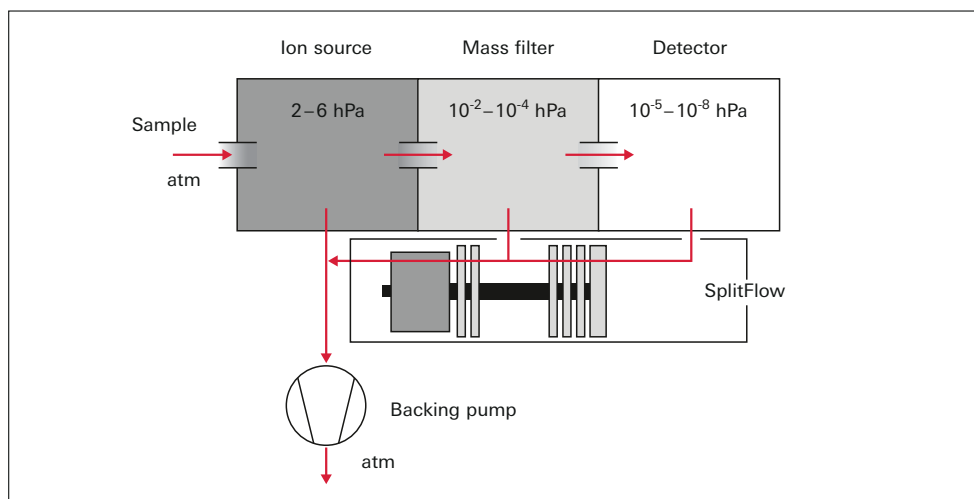
- a) Any standard HiPace pump with an additional side tap for all sizes and flange types
- b) SplitFlow pump with customer-specific dimensions and flange arrangement

These SplitFlow pumps are available with pumping speeds of up to 500 l/s. They can be designed for pressure ranges of up to 10^{-11} hPa. Due to the proven bearing system, with a ball bearing on the fore-vacuum side and a permanent magnetic bearing on the high vacuum side, very long rotors with several packs of rotor discs are possible. An optimal adaptation of the pumps to the size and required number of vacuum ports is possible for a number of applications.

A mass spectrometer provides an excellent illustration of the SplitFlow technology.



Schematic drawing of a mass spectrometer with discrete turbomolecular pumps



Schematic drawing of a mass spectrometer with SplitFlow pump

Service

The service concepts for SplitFlow pumps offer great flexibility and can be adjusted to meet customer needs. Maintenance intervals of up to four years are possible.

Drive concepts

SplitFlow pumps can be selected with any type of Pfeiffer Vacuum drive electronics. Both 24 V and 48 V power supply versions are available. Customer-specific parameterization of the drive electronic units can be carried out in the factory before delivery.

Extensive accessories

- Fans
- Venting and sealing gas valves
- Vacuum gauges
- Protective screens and splinter shields
- Special cables
- Power supply packs
- Valves
- Relay box

Complete vacuum solution

Pfeiffer Vacuum provides you with a complete customer-specific vacuum solution from a single source:

Vacuum chamber + SplitFlow turbopump + backing pump + gauges + valves + fasteners

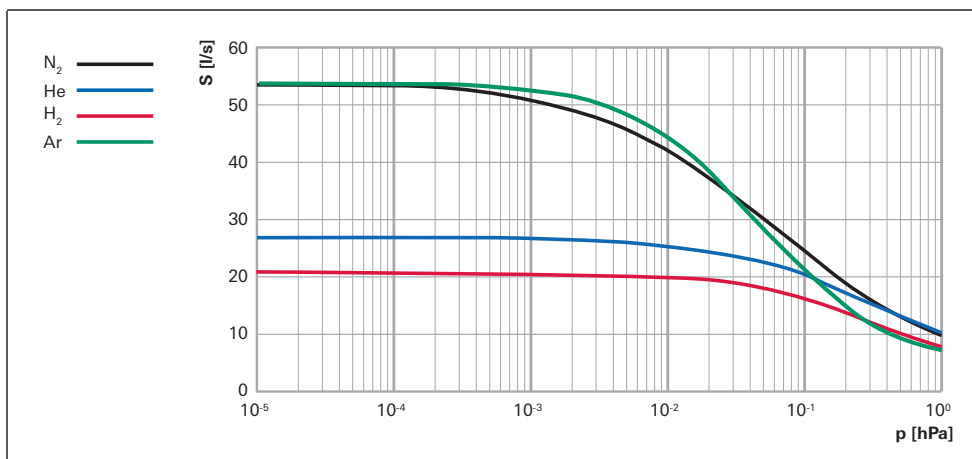
Save time and money and benefit from our years of experience, paired with optimally matched high quality products.

SplitFlow™ 50



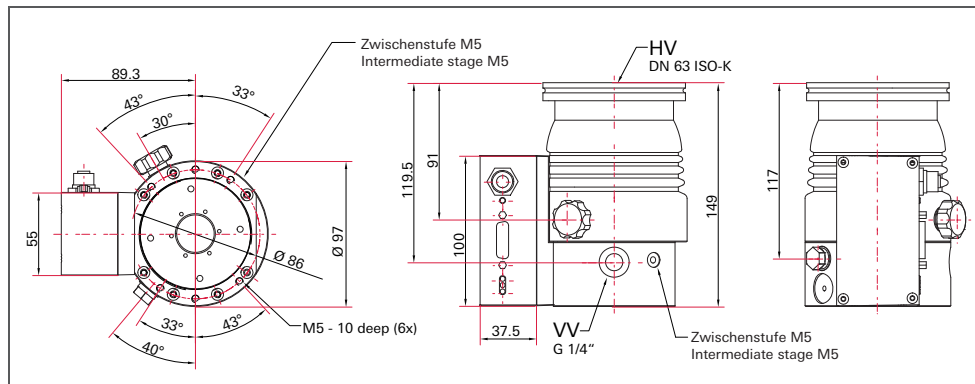
- Small yet powerful turbopump based on HiPace technology
- With a pumping speed up to 53 l/s for N₂ at the high vacuum flange and 0,15 l/s at interstage pumping
- Integrated TC 110 drive electronics
- For installation in any orientation
- Ideal for analytical applications such as leak detection and mass spectrometry
- Extensive accessories expand the range of applications

Pumping speed

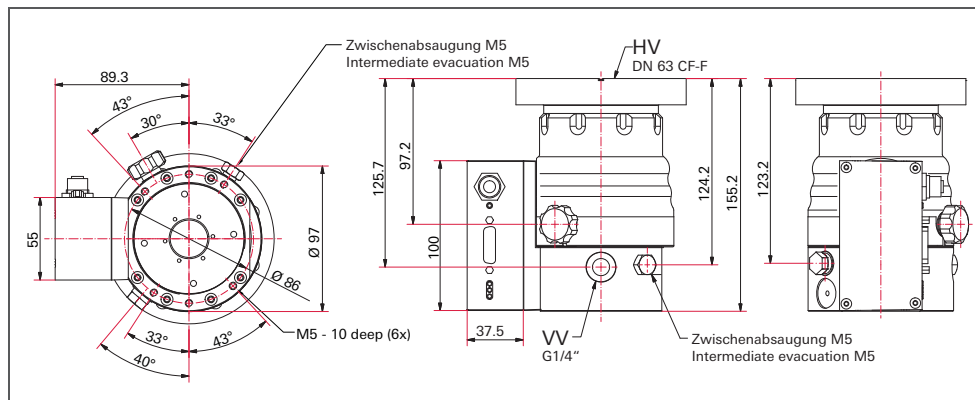


SplitFlow™ 50

Dimensions (in mm)



SplitFlow™ 50 with TC 110, DN 63 ISO-K



SplitFlow™ 50 with TC 110, DN 63 CF-F

Technical data	SplitFlow™ 50 with TC 110, DN 63 ISO-K	SplitFlow™ 50 with TC 110, DN 63 CF-F
Connection nominal diameter		
Flange (out)	G 1/4"	G 1/4"
Flange (in)	DN 63 ISO-K	DN 63 CF-F
Flange (interstage pumping)	M5	M5
Venting connection	G 1/8"	G 1/8"
Pumping speed (without gas ballast)		
Pumping speed (interstage pumping) for Ar	0.13 l/s	0.13 l/s
Pumping speed (interstage pumping) for H ₂	0.3 l/s	0.3 l/s
Pumping speed (interstage pumping) for He	0.16 l/s	0.16 l/s
Pumping speed (interstage pumping) for N ₂	0.15 l/s	0.15 l/s
Pumping speed for Ar	53 l/s	53 l/s
Pumping speed for H ₂	21 l/s	21 l/s
Pumping speed for He	27 l/s	27 l/s
Pumping speed for N ₂	53 l/s	53 l/s
Compression		
Compression ratio (interstage pumping/ fore-vacuum) for Ar	$1.50 \cdot 10^3$	$1.50 \cdot 10^3$
Compression ratio (interstage pumping/ fore-vacuum) for H ₂	$2 \cdot 10^1$	$2 \cdot 10^1$
Compression ratio (interstage pumping/ fore-vacuum) for He	$5 \cdot 10^1$	$5 \cdot 10^1$
Compression ratio (interstage pumping/ fore-vacuum) for N ₂	$9 \cdot 10^2$	$9 \cdot 10^2$
Compression ratio for Ar	$2.10 \cdot 10^8$	$2.10 \cdot 10^8$
Compression ratio for H ₂	$1.30 \cdot 10^4$	$1.30 \cdot 10^4$
Compression ratio for He	$1.8 \cdot 10^5$	$1.8 \cdot 10^5$
Compression ratio for N ₂	$1 \cdot 10^8$	$1 \cdot 10^8$
Fore-vacuum max. for N₂		
	20 hPa	20 hPa
Gas throughput		
Gas throughput at full rotational speed for Ar	0.46 hPa l/s	0.46 hPa l/s
Gas throughput at full rotational speed for H ₂	110 hPa l/s	110 hPa l/s
Gas throughput at full rotational speed for He	7.3 hPa l/s	7.3 hPa l/s
Gas throughput at full rotational speed for N ₂	1.8 hPa l/s	1.8 hPa l/s
Electronic drive unit		
Operating voltage	24 (± 5 %) V DC	24 (± 5 %) V DC
Rotation speed ± 2 %	90000 min ⁻¹	90000 min ⁻¹
Rotation speed variable	50-100 %	50-100 %
Mounting orientation	in any orientation	in any orientation
Ultimate pressure*	$< 4 \cdot 10^{-7}$ hPa	$< 4 \cdot 10^{-7}$ hPa
Weight	2.3 kg	3.7 kg
Run-up time	1.3 min	1.3 min
Cooling method, optional	Air/Water	Air/Water
Cooling method, standard	Convection	Convection
Cooling water temperature	5-25 °C	5-25 °C
Cooling water consumption	75 l/h	75 l/h
Bearing	Hybrid	Hybrid
Sound pressure level	≤ 48 dB (A)	≤ 48 dB (A)
Interfaces	RS-485, Remote	RS-485, Remote
Protection category	IP 54	IP 54
Permissible magnetic field max.	3 mT	3 mT
Order number pump	PM P04 340	PM P04 342

*Ultimate pressure please find description on page 272

Accessories	SplitFlow™ 50 with TC 110, DN 63 ISO-K	SplitFlow™ 50 with TC 110, DN 63 CF-F
Order number pump Pumpe	PM P04 340	PM P04 342
Power supplies/power		
DCU - power supply with display control unit	PM C01 820 PM C01 821	PM C01 820 PM C01 821
TPS - mains pack for wall/standard rail fitting	PM 061 340 -T PM 061 341 -T	PM 061 340 -T PM 061 341 -T
TPS - mains packl 19" rack module 3 RU	PM 061 344 -T PM 061 345 -T	PM 061 344 -T PM 061 345 -T
Control units		
DCU - Display Control Unit	PM 061 348 -T	PM 061 348 -T
HPU - Handheld Programming Unit	PM 051 510 -T	PM 051 510 -T
Accessories for HPU	PM 061 005 -T	PM 061 005 -T
Mains cable DCU/TPS/TCP, 3 m		
230 V AC mains cable with Euro-style safety plug	P 4564 309 ZA	P 4564 309 ZA
115 V AC mains cable with UL plug	P 4564 309 ZE	P 4564 309 ZE
208 V AC mains cable with UL plug	P 4564 309 ZF	P 4564 309 ZF
Connection cable, length 3 m between		
Connection cable for HiPace with TC 110 to TPS/ DCU 110/111/180/181 with accessorie ports and RS-485	PM 061 351 -T	PM 061 351 -T
Connection cable for HiPace with TC 110 to power supply TPS/DCU 110/111/180/181	PM 061 350 -T	PM 061 350 -T
Venting accessories		
Venting valve	PM Z01 290	PM Z01 290
Air drier TTV 001	PM Z00 121	PM Z00 121
Cooling accessories		
Air cooling	PM Z01 300	PM Z01 300
Water cooling	PM 016 623 -T	PM 016 623 -T
Heating accessories		
Heating jacket 230 V AC, Euro-style safety plug		PM 061 360 -T
Heating jacket 208 V AC, UL plug		PM 061 361 -T
Heating jacket 115 V AC, UL plug		PM 061 362 -T
Backing pump control		
Backing pump relay box, shielded, 1-phase 20 A	PM 061 373 -T	PM 061 373 -T
TVV 001 backing pump safety valve, 230 V AC	PM Z01 205	PM Z01 205
TVV 001 backing pump safety valve, 115 V AC	PM Z01 206	PM Z01 206
TCS 15 for controlling backing pumps	PM 061 685 -X	PM 061 685 -X

Accessories	SplitFlow™ 50 with TC 110, DN 63 ISO-K	SplitFlow™ 50 with TC 110, DN 63 CF-F
Order number pump Pumpe	PM P04 340	PM P04 342
General accessories		
Sealing gas valve	PM Z01 310	PM Z01 310
Sealing gas throttle	PM Z01 316	PM Z01 316
Centering ring coated	PM 016 206 -U	
Centering ring coated with protection screen	PM 016 208 -U	
Centering ring coated with splinter shield	PM 016 207 -U	
Protection screen		PM 016 333
Splinter shield		PM 016 312
Vibration dampers	PM 006 800 -X	PM 006 801 -X
USB/RS-485-Converter	PM 061 207 -T	PM 061 207 -T
Interface cable 3 m	PM 061 283 -T	PM 061 283 -T
Y-connector M12 for RS-485	P 4723 010	P 4723 010
Connection cable RJ 45 on M 12	PM 051 726 -T	PM 051 726 -T
TCS 11, adapter for TC 110 with interface RS-485	PM 061 636 -U	PM 061 636 -U
TCS 12, adapter for TC 110 with interface RS-485, 4 accessory ports	PM 061 638 -U	PM 061 638 -U
Mounting materials		
Centering ring coated, bracket screws	PM 016 360 -T	
Centering ring coated with protection screen, bracket screws	PM 016 362 -T	
Centering ring coated with splinter shield, bracket screws	PM 016 361 -T	
Set of hexagon screws for trough hole (CF-F)		PM 016 683 -T
Set of stud screws for tapped hole (CF-F)		PM 016 684 -T
Set of stud screws for trough hole (CF)		PM 016 733 -T
Centering ring coated DN 63 ISO-K, 4 prackets M8	PM 016 510 -T	
Centering ring coated DN 63 ISO-K, 4 prackets M8, protection screen	PM 016 512 -T	
Centering ring coated DN 63 ISO-K, 4 prackets M8, splinter shield	PM 016 511 -T	



Turbo pumping stations

Modular pumping stations for clean vacuum



HiCube®

With our HiCube® turbo pumping stations we have developed the perfect vacuum solution for a wide range of applications.

The modular design of the HiCube series allows for unprecedented diversity, which meet the demands of pumping speeds ranging from 35 l/s to 685 l/s. Turbopumps and backing pumps are perfectly matched: just “plug-and-play” whenever the need arises.

What makes the HiCube vacuum solution special is the combination of a turbopump from the HiPace series with a backing pump designed specifically to meet the application-specific requirements. We can offer you the new HiCube in the Eco, Classic and Pro versions; available with a dry or oil-sealed backing pump and a final pressure of up to $5 \cdot 10^{-10}$ hPa.

Thanks to their mobility, all HiCube pumping stations provide easy high vacuum generation precisely where it is needed. The robust engineering and the ready-to-connect, fully automated pump unit guarantee maximum reliability.

The use of HiPace allows us to offer you state-of-the-art turbopump technology in a compact pumping station. What you stand to gain is flexibility, high performance, long product life and easy integration into your applications. We can provide the appropriate ISO-KF, ISO-K or CF-F flanges.

Customer benefits

- The combination of turbopump and backing pump are ideally matched; usable for a wide variety of applications
- Modular design allows for easy modification to suit the application
- Service friendly thanks to easy access to the individual components
- Integrated drive electronics, no need for additional controls
- Plug-and-play – no installation or cabling needed
- Long service life and high level of safety thanks to robust design
- Fore-vacuum safety valve (optional) prevents venting of vacuum chambers during power failure
- Direct connection of gauges possible

Typical applications

- Research & Development
- Accelerators
- Analytics
- Surface physics
- Vacuum process technology
- General vacuum applications



Accelerators



Vacuum furnaces



Glass coating

Comparison of pumpdown times HiCube® Classic

Pump-down time to of 1,000 hPa at $1 \cdot 10^{-5}$ hPa for vacuum chambers with a volume of 10, 100, and 1,000 l (calculated values at 50 Hz, run-up time not taken into account)

Turbopump	Backing pump	10 l	100 l	1,000 l
HiCube® 80 Classic				
HiPace DN 80/DN 63	MVP 040	98 s	978 s	9,778 s
	MVP 070	59 s	594 s	5,941 s
	Duo 3	77 s	774 s	7,737 s
	Duo 5 M	43 s	426 s	4,257 s
HiCube® 300 Classic				
HiPace 300	MVP 040	87 s	867 s	8,670 s
	MVP 070	50 s	499 s	4,992 s
	Duo 3	68 s	682 s	6,820 s
	Duo 5 M	35 s	350 s	3,500 s
HiCube® 400 Classic				
HiPace 400	MVP 040	83 s	–	–
	MVP 070	48 s	485 s	4,847 s
	Duo 3	67 s	669 s	6,691 s
	Duo 5 M	34 s	342 s	3,416 s
HiCube® 700 Classic				
HiPace 700	MVP 040	82 s	–	–
	MVP 070	47 s	474 s	4,743 s
	Duo 3	65 s	653 s	6,534 s
	Duo 5 M	33 s	332 s	3,317 s

Comparison of pumpdown times HiCube® Pro

Pump-down time of 1,000 hPa at $1 \cdot 10^{-5}$ hPa for vacuum chambers with a volume of 10, 100, and 1,000 l (calculated value at 50 Hz, run-up time not taken into account)

Turbopump	Backing pump	10 l	100 l	1,000 l
HiCube® 80 Pro				
HiPace DN 80, DN 63	ACP 15	21 s	208 s	2,079 s
	ACP 28	12 s	116 s	1,161 s
	Penta 20	13 s	134 s	1,339 s
	Penta 35	10 s	99 s	990 s
HiCube® 300 Pro				
HiPace 300	ACP 15	18 s	178 s	1,780 s
	ACP 28	9 s	91 s	913 s
	Penta 20	9 s	93 s	934 s
	Penta 35	7 s	66 s	663 s
HiCube® 400 Pro				
HiPace 400	ACP 15	18 s	175 s	1,751 s
	ACP 28	9 s	89 s	892 s
	Penta 20	9 s	90 s	898 s
	Penta 35	6 s	64 s	644 s
HiCube® 700 Pro				
HiPace 700	ACP 15	17 s	169 s	1,692 s
	ACP 28	8 s	84 s	836 s
	Penta 20	8 s	84 s	838 s
	Penta 35	6 s	58 s	582 s



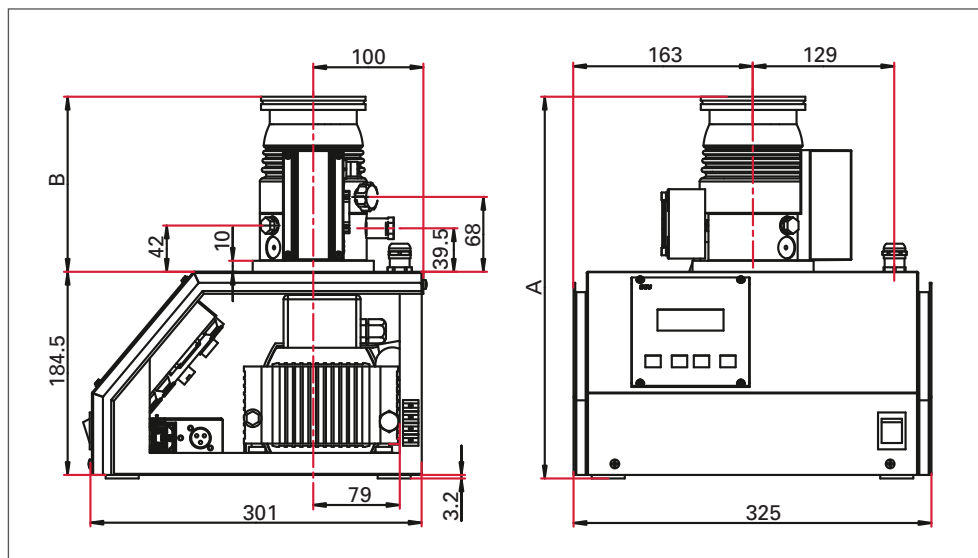
HiCube® Eco

Completely dry¹⁾ turbo pumping station with pumping speeds from 35 to 67 l/s

- Ready-for-use pumping station
- Compact and cost-effective
- Dry high vacuum pumping system with turbopump and diaphragm pump
- Flexible and versatile
- Extensive accessories
- Control unit with direct connection of vacuum gauges possible

¹⁾ Also available with water cooling

Dimensions (in mm)



Technical data	HiCube® Eco DN 40 ISO-KF	HiCube® Eco DN 63 ISO-K/CF-F
Connection flange (inlet)	DN 40 ISO-KF	DN 63 ISO-K/CF-F
Mains requirement: power consumption	230 W	230 W
Mains requirement	110 V, 50/60 Hz; 230 V, 50/60 Hz	110 V, 50/60 Hz; 230 V, 50/60 Hz
Pumping speed for N ₂	35 l/s	67 l/s
Backing pump pumping speed at 50 Hz	0.9 m ³ /h	0.9 m ³ /h
Pumping station components	HiPace 80, MVP 015-2, TPS 110, DCU 002	HiPace 80, MVP 015-2, TPS 110, DCU 002
Ultimate pressure	< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa
Weight	17 kg	17 kg

Order number		
HiCube® 80 Eco, DN 63 ISO-K, with DCU 002 ²		PM S03 555
HiCube® 80 Eco, DN 63 CF-F, with DCU 002 ²		PM S03 556
HiCube® 80 Eco, DN 40 ISO-K, with DCU 002 ²	PM S03 557	

²) DCU 002 – Display and control device. Allows easy operation and connection of vacuum gauges

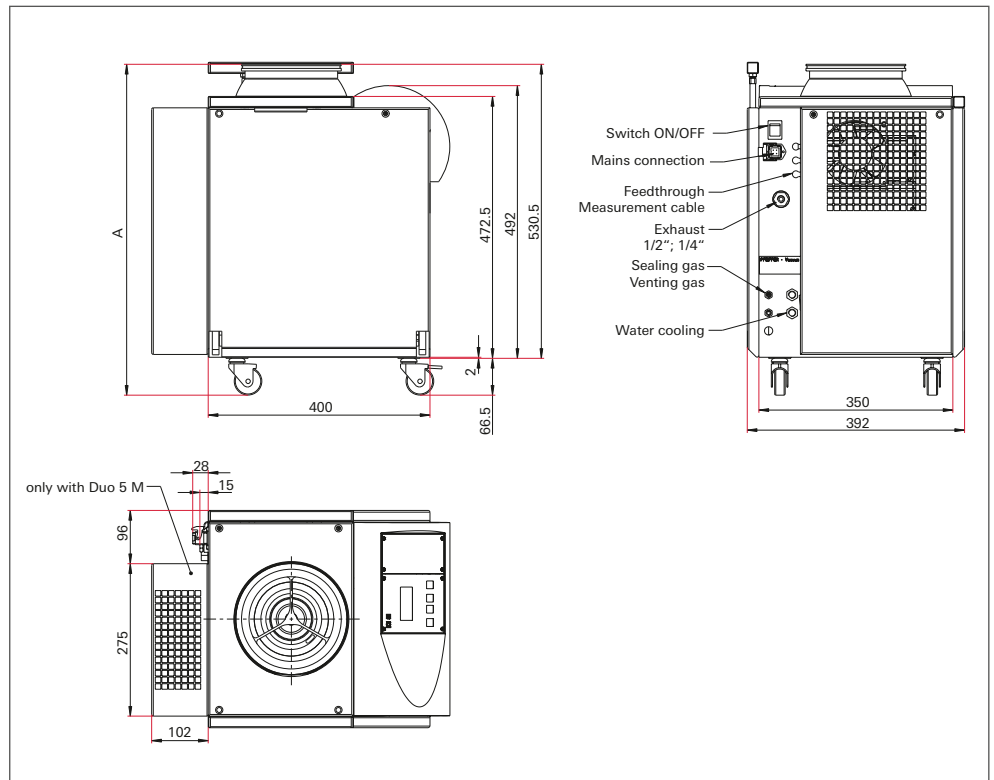


HiCube® Classic

Completely dry or oil-sealed turbo pumping station with pumping speeds from 35 to 685 l/s for short pumpdown times

- Combined pumping station with turbopump and backing pump for all high vacuum applications
- Air-cooled and ready for operation
- Also available with water cooling
- Compact and cost-effective
- Flexible and versatile
- Extensive accessories
- Control unit with integrated gauge connection

Dimensions (in mm)



Turbopump	A
HiPace® 80 DN 40 ISO-KF	590 mm
HiPace® 80 DN 63 ISO-K	581 mm
HiPace® 80 DN 63 CF-F	587 mm
HiPace® 300 DN 100 ISO-KF	580 mm
HiPace® 300 DN 100 CF-F	592 mm
HiPace® 400 DN 100 ISO-KF	624 mm
HiPace® 400 DN 100 CF-F	624 mm
HiPace® 700 DN 160 ISO-KF	597 mm
HiPace® 700 DN 160 CF-F	609 mm

Technical data	HiCube® 80 Classic DN 40 ISO-KF	HiCube® 80 Classic DN 63 ISO-K	HiCube® 80 Classic DN 63 CF-F	HiCube® 300 Classic DN 100 ISO-K	HiCube® 300 Classic DN 100 CF-F
Connection flange (inlet)	DN 40 ISO-KF	DN 63 ISO-K	DN 63 CF-F	DN 100 ISO-K	DN 100 CF-F
Pumping speed for nitrogen N ₂	35 l/s	67 l/s	67 l/s	260 l/s	260 l/s
Ultimate pressure					
with DuoLine rotary vane pump	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa
with MVP diaphragm pump	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-8}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-8}$ hPa
Backing pump pumping speed at 50 Hz					
MVP 040 diaphragm pump	2.3 m ³ /h	2.3 m ³ /h	2.3 m ³ /h	2.3 m ³ /h	2.3 m ³ /h
MVP 070 diaphragm pump	3.8 m ³ /h	3.8 m ³ /h	3.8 m ³ /h	3.8 m ³ /h	3.8 m ³ /h
Duo 3 rotary vane pump	2.5 m ³ /h	2.5 m ³ /h	2.5 m ³ /h	2.5 m ³ /h	2.5 m ³ /h
Duo 5 M rotary vane pump	5 m ³ /h	5 m ³ /h	5 m ³ /h	5 m ³ /h	5 m ³ /h
Pumping station weight:¹⁾					
with MVP 040 diaphragm pump	36.4 kg	36.4 kg	37.8 kg	41.2 kg	43.2 kg
with MVP 070 diaphragm pump	41.4 kg	41.4 kg	42.8 kg	46.2 kg	48.2 kg
with Duo 3 rotary vane pump	35.5 kg	35.5 kg	36.9 kg	40.3 kg	42.3 kg
with Duo 5 M rotary vane pump	44.0 kg	44.0 kg	45.4 kg	48.8 kg	50.8 kg
Power input					
with MVP 040 diaphragm pump	290 W	290 W	290 W	480 W	480 W
with MVP 070 diaphragm pump	360 W	360 W	360 W	550 W	550 W
with Duo 3 rotary vane pump	270 W	270 W	270 W	460 W	460 W
with Duo 5 M rotary vane pump	360 W	360 W	360 W	550 W	550 W

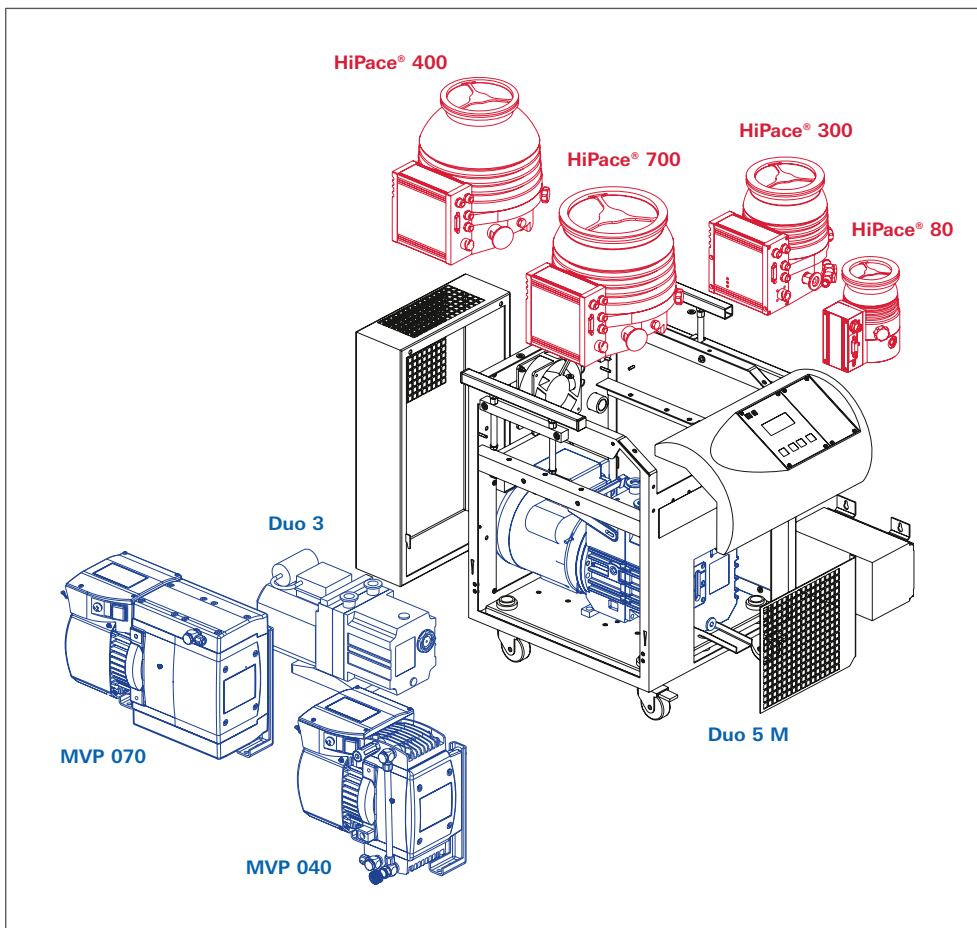
Technical data	HiCube® 400 Classic DN 100 ISO-K	HiCube® 400 Classic DN 100 CF-F	HiCube® 700 Classic DN 160 ISO-K	HiCube® 700 Classic DN 160 CF-F
Connection flange (inlet)	DN 100 ISO-K	DN 100 CF-F	DN 160 ISO-K	DN 160 CF-F
Pumping speed for nitrogen N ₂	355 l/s	355 l/s	685 l/s	685 l/s
Ultimate pressure				
with DuoLine rotary vane pump	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 5 \cdot 10^{-10}$ hPa
with MVP diaphragm pump	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-8}$ hPa	$< 1 \cdot 10^{-7}$ hPa	$< 1 \cdot 10^{-8}$ hPa
Backing pump pumping speed at 50 Hz				
MVP 070 diaphragm pump	3.8 m ³ /h	3.8 m ³ /h	3.8 m ³ /h	3.8 m ³ /h
Duo 3 rotary vane pump	2.5 m ³ /h	2.5 m ³ /h	2.5 m ³ /h	2.5 m ³ /h
Duo 5 M rotary vane pump	5 m ³ /h	5 m ³ /h	5 m ³ /h	5 m ³ /h
Pumping station weight:¹⁾				
with MVP 070 diaphragm pump	51.6 kg	57.5 kg	52.0 kg	57.9 kg
with Duo 3 rotary vane pump	45.7 kg	51.6 kg	46.1 kg	52.0 kg
with Duo 5 M rotary vane pump	54.2 kg	60.1 kg	54.6 kg	60.5 kg
Power input				
with MVP 070 diaphragm pump	670 W	670 W	670 W	670 W
with Duo 3 rotary vane pump	580 W	580 W	580 W	580 W
with Duo 5 M rotary vane pump	670 W	670 W	670 W	670 W

Final pressure in a measuring dome after 48-hour bakeout, only possible with metallic seals on the HV flange.

(final pressure with elastomer seal (standard, not bakeable): $< 1 \cdot 10^{-7}$ hPa)

¹⁾ without fore-vacuum safety valve

Modular design



Order number matrix
HiCube® Classic
Order number
PM S aa bb c d e

Turbopump			aa
HiPace® 80	DN 40 ISO-KF	TC 110	20
HiPace® 80	DN 63 ISO-K	TC 110	21
HiPace® 80	DN 63 CF-F	TC 110	22
HiPace® 300	DN 100 ISO-K	TC 400	23
HiPace® 300	DN 100 CF-F	TC 400	24
HiPace® 400	DN 100 ISO-K	TC 400	25
HiPace® 400	DN 100 CF-F	TC 400	26
HiPace® 700	DN 160 ISO-K	TC 400	27
HiPace® 700	DN 160 CF-F	TC 400	28

Diaphragm pumps and rotary vane pumps			bb
Diaphragm pump			
MVP 040	110 V AC 60 Hz		22
MVP 040	230 V AC 50/60 Hz		23
MVP 070	110 V AC 60 Hz		24
MVP 070	230 V AC 50/60 Hz		25
MVP 040	110 V AC 60 Hz	with TVV 001 ¹⁾	28
MVP 040	230 V AC 50/60 Hz	with TVV 001 ¹⁾	29
MVP 070	110 V AC 60 Hz	with TVV 001 ¹⁾	30
MVP 070	230 V AC 50/60 Hz	with TVV 001 ¹⁾	31
Rotary vane pump			
Duo 3	110 V AC 50/60 Hz		32
Duo 3	230 V AC 50/60 Hz		33
Duo 5 M	110 V AC 50/60 Hz		34
Duo 5 M	230 V AC 50/60 Hz		35
Duo 3	110 V AC 50/60 Hz	with AVC 016 ¹⁾	36
Duo 3	230 V AC 50/60 Hz	with AVC 016 ¹⁾	37
Duo 5 M	110 V AC 50/60 Hz	with AVC 016 ¹⁾	38
Duo 5 M	230 V AC 50/60 Hz	with AVC 016 ¹⁾	39

¹⁾ Fore-vacuum safety valve

General options		c
Standard, on rubber feet		0
on rollers, 4 steerable rollers, 2 brakes		1
Drier TTV 001 with connection to venting valve		2
on rollers + drier TTV 001		3

Cable options		d
Standard (without cable set for external operation)		0
Cable set and fore-vacuum line 3 m (for external operation of the turbopump)		1
Cable set and fore-vacuum line 5 m (for external operation of the turbopump)		2
Cable set and fore-vacuum line 10 m (for external operation of the turbopump)		3

Cooling options		e
Standard, air cooling		0
Water cooling		1
Water cooling + heating sleeve		2

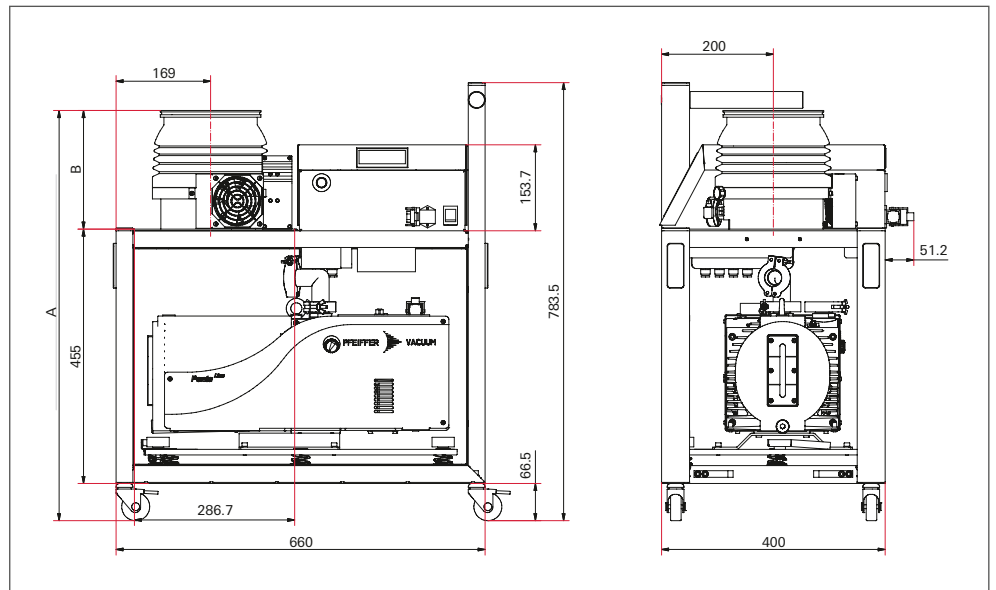


HiCube® Pro

Completely dry or oil-sealed turbo pumping station with pumping speeds from 35 to 685 l/s for particularly fast pumpdown times

- Combined pumping station with turbopump and backing pump for all high vacuum applications
- Air-cooled and ready for operation
- Also available with water cooling
- Compact and cost-effective
- Flexible and versatile
- Extensive accessories
- Control unit with direct connection of vacuum gauges possible

Dimensions (in mm)



Turbopump	A	B
HiPace® 80 DN 40 ISO-KF	679.5 mm	158 mm
HiPace® 80 DN 63 ISO-K	670.5 mm	149 mm
HiPace® 80 DN 63 CF-F	676.5 mm	155 mm
HiPace® 300 DN 100 ISO-KF	716.5 mm	195 mm
HiPace® 300 DN 100 CF-F	728.5 mm	207 mm
HiPace® 400 DN 100 ISO-KF	760.5 mm	239 mm
HiPace® 400 DN 100 CF-F	760.5 mm	239 mm
HiPace® 700 DN 160 ISO-KF	733.5 mm	212 mm
HiPace® 700 DN 160 CF-F	745.5 mm	224 mm

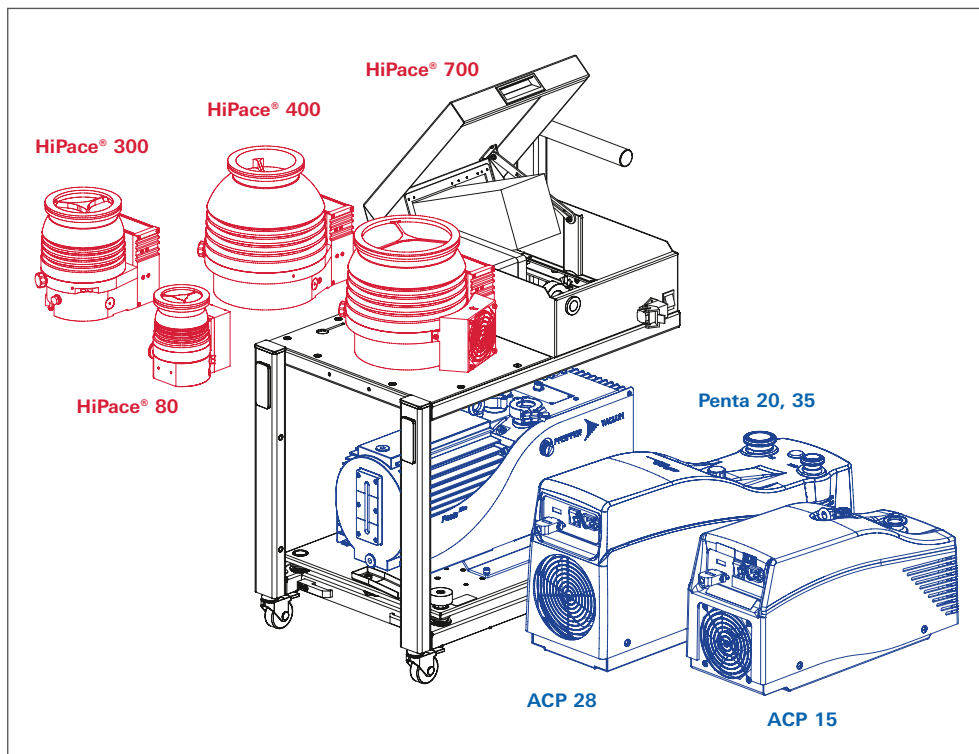
Technical data – Pumping station	HiCube® 80 Pro DN 40 ISO-KF	HiCube® 80 Pro DN 63 ISO-K	HiCube® 80 Pro DN 63 CF-F	HiCube® 300 Pro DN 100 ISO-K	HiCube® 300 Pro DN 100 CF-F
Connection flange (inlet)	DN 40 ISO-KF	DN 63 ISO-K	DN 63 CF-F	DN 100 ISO-K	DN 100 CF-F
Pumping speed for nitrogen N ₂	35 l/s	67 l/s	67 l/s	260 l/s	260 l/s
Ultimate pressure					
with ACP multi-stage Roots pump	< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa
with PentaLine rotary vane pump	< 1 · 10 ⁻⁷ hPa	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa
Backing pump pumping speed at 50 Hz					
ACP 15 multi-stage Roots pump	14 m ³ /h	14 m ³ /h	14 m ³ /h	14 m ³ /h	14 m ³ /h
ACP 28 multi-stage Roots pump	27 m ³ /h	27 m ³ /h	27 m ³ /h	27 m ³ /h	27 m ³ /h
Penta 20 rotary vane pump	22 m ³ /h	22 m ³ /h	22 m ³ /h	22 m ³ /h	22 m ³ /h
Penta 35 rotary vane pump	34 m ³ /h	34 m ³ /h	34 m ³ /h	34 m ³ /h	34 m ³ /h
Pumping station weight:1)					
ACP 15 multi-stage Roots pump	60.2 kg	60.2 kg	61.6 kg	65.0 kg	67.0 kg
ACP 28 multi-stage Roots pump	69.2 kg	69.2 kg	70.6 kg	74.0 kg	76.0 kg
Penta 20 rotary vane pump	82.2 kg	82.2 kg	83.6 kg	87.0 kg	89.0 kg
Penta 35 rotary vane pump	84.2 kg	84.2 kg	85.6 kg	89.0 kg	91.0 kg
Mains connection – power consumption					
ACP 15 multi-stage Roots pump	660 W	660 W	660 W	850 W	850 W
ACP 28 multi-stage Roots pump	1,160 W	1,160 W	1,160 W	1,350 W	1,350 W
Penta 20 rotary vane pump	1,100 W	1,100 W	1,100 W	1,290 W	1,290 W
Penta 35 rotary vane pump	1,585 W	1,585 W	1,585 W	1,775 W	1,775 W

Technical data – Pumping station	HiCube® 400 Pro DN 100 ISO-K	HiCube® 400 Pro DN 100 CF-F	HiCube® 700 Pro DN 160 ISO-K	HiCube® 700 Pro DN 160 CF-F
Connection flange (inlet)	DN 100 ISO-K	DN 100 CF-F	DN 160 ISO-K	DN 160 CF-F
Pumping speed for nitrogen N ₂	355 l/s	355 l/s	685 l/s	685 l/s
Ultimate pressure				
with multi-stage ACP Roots pump	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa
with PentaLine rotary vane pump	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa	< 1 · 10 ⁻⁷ hPa	< 5 · 10 ⁻¹⁰ hPa
Backing pump pumping speed at 50 Hz				
ACP 15 multi-stage Roots pump	14 m ³ /h	14 m ³ /h	14 m ³ /h	14 m ³ /h
ACP 28 multi-stage Roots pump	27 m ³ /h	27 m ³ /h	27 m ³ /h	27 m ³ /h
Penta 20 rotary vane pump	22 m ³ /h	22 m ³ /h	22 m ³ /h	22 m ³ /h
Penta 35 rotary vane pump	34 m ³ /h	34 m ³ /h	34 m ³ /h	34 m ³ /h
Pumping station weight: 1)				
ACP 15 multi-stage Roots pump	70.4 kg	76.3 kg	70.8 kg	76.7 kg
ACP 28 multi-stage Roots pump	79.4 kg	85.3 kg	79.8 kg	85.7 kg
Penta 20 rotary vane pump	92.4 kg	98.3 kg	92.8 kg	98.7 kg
Penta 35 rotary vane pump	94.4 kg	100.3 kg	94.8 kg	100.7 kg
Mains requirement – power consumption				
ACP 15 multi-stage Roots pump	970 W	970 W	970 W	970 W
ACP 28 multi-stage Roots pump	1,910 W	1,910 W	1,910 W	1,910 W
Penta 20 rotary vane pump	1,410 W	1,410 W	1,410 W	1,410 W
Penta 35 rotary vane pump	1,895 W	1,895 W	1,895 W	1,895 W

Final pressure in a measuring dome after 48-hour bakeout, only possible with metallic seals on the HV flange.
(final pressure with elastomer seal (standard, not bakeable): < 1 · 10⁻⁷ hPa

¹⁾ without fore-vacuum safety valve

Modular design



Order number matrix
HiCube® Pro
Order number
PM S aa bb c d e

Turbopump			aa
HiPace® 80	DN 40 ISO-KF	TC 110	40
HiPace® 80	DN 63 ISO-K	TC 110	41
HiPace® 80	DN 63 CF-F	TC 110	42
HiPace® 300	DN 100 ISO-K	TC 400	43
HiPace® 300	DN 100 CF-F	TC 400	44
HiPace® 400	DN 100 ISO-K	TC 400	45
HiPace® 400	DN 100 CF-F	TC 400	46
HiPace® 700	DN 160 ISO-K	TC 400	47
HiPace® 700	DN 160 CF-F	TC 400	48

Rotary vane and multi-stage Roots pump			bb
Rotary vane pump			
Penta 20	110 V AC 50/60 Hz		48
Penta 20	230 V AC 50/60 Hz		49
Penta 35	110 V AC 50/60 Hz		50
Penta 35	230 V AC 50/60 Hz		51
Penta 20	110 V AC 50/60 Hz	with AVC 025 MA ¹⁾	54
Penta 20	230 V AC 50/60 Hz	with AVC 025 MA ¹⁾	55
Penta 35	110 V AC 50/60 Hz	with AVC 025 MA ¹⁾	56
Penta 35	230 V AC 50/60 Hz	with AVC 025 MA ¹⁾	57
Multi-stage Roots pump			
ACP 15	110 V AC 50/60 Hz	with AVC 025 MA ¹⁾	58
ACP 15	230 V AC 50/60 Hz	with AVC 025 MA ¹⁾	59
ACP 28	110 V AC 50/60 Hz	with AVC 025 MA ¹⁾	60
ACP 28	230 V AC 50/60 Hz	with AVC 025 MA ¹⁾	61

¹⁾ fore-vacuum safety valve

General options		c
General		
Standard, 4 rollers		0
4 rollers, venting valve		1
4 rollers, venting valve + drier TTV 001 with connection to venting valve		2
4 rollers, oil mist separator (ONF)		3
4 rollers, venting valve, oil mist separator (ONF)		4
4 rollers, venting valve, drier TTV 001 with connection to venting valve, oil mist separator (ONF)		5

Cable options		d
Standard (without cable set for external operation)		0
Cable set and fore-vacuum line 3 m (for external operation of the turbopump)		1
Cable set and fore-vacuum line 5 m (for external operation of the turbopump)		2
Cable set and fore-vacuum line 10 m (for external operation of the turbopump)		3

Cooling options		e
Standard, air cooling		0
Water cooling		1
Water cooling + heating sleeve		2

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