



TURBOPUMPS

For perfect vacuum solutions to challenging applications

TURBOPUMPS

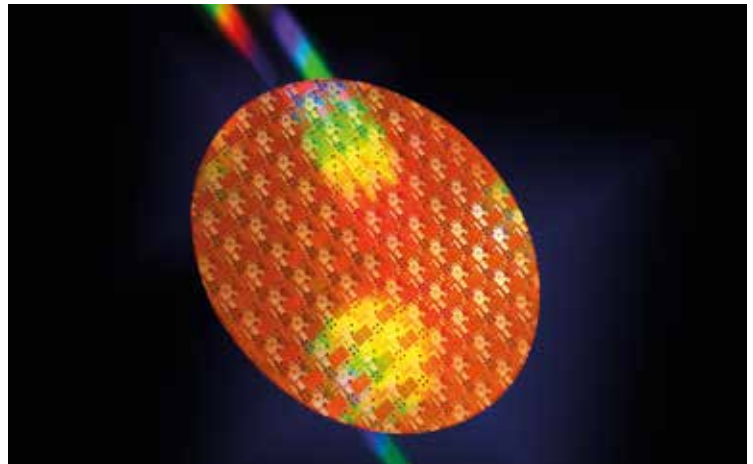
The complete range



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TURBOPUMPS

For perfect vacuum solutions to challenging applications



The origin

Why are all turbopumps called turbopumps? Because the multitasking pacesetters were invented by Pfeiffer Vacuum over 50 years ago under this very name: a definitive milestone in vacuum technology! Our turbopumps represent the latest generation of future-orientated vacuum solutions for a wide spectrum of uses. This spectrum includes not only analytics, vacuum process and semiconductor technology but also coating, research and development as well as industrial applications.

The turbopump family includes a wide product spectrum in the pumping speed range of 10 to 2,800 l/s. The pumps provide high cost-efficiency and flexibility. Well-proven bearing systems offer optimized reliability. Thanks to the proven rotor design, extremely high values are achieved where pumping speeds, backing pump compatibility and gas throughput, as well as compression for light gases, are concerned.

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. Short 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 backing pump compatibility. Very high gas throughput. Outstanding long-term stability.

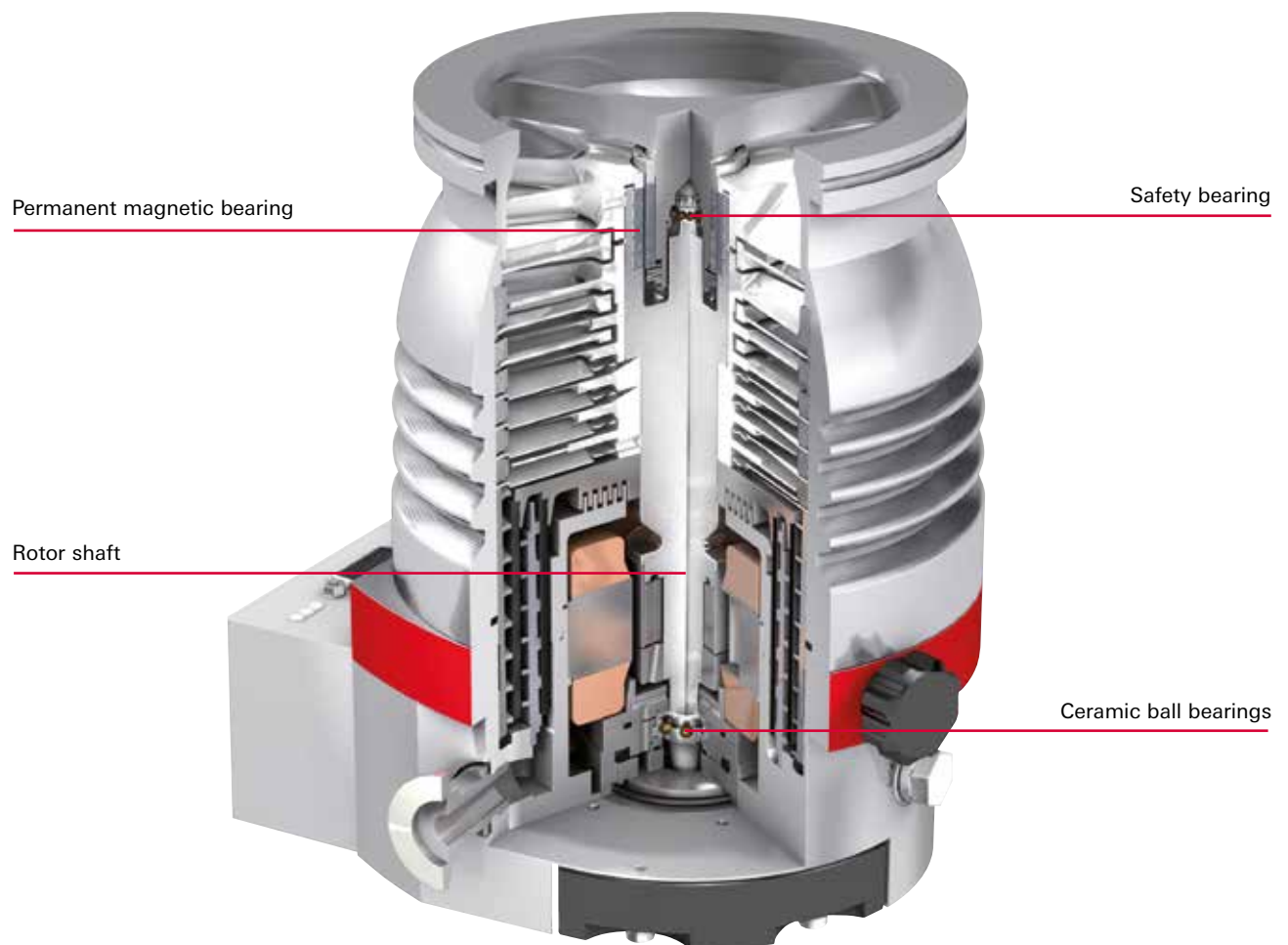


TURBOPUMPS

Bearing technologies

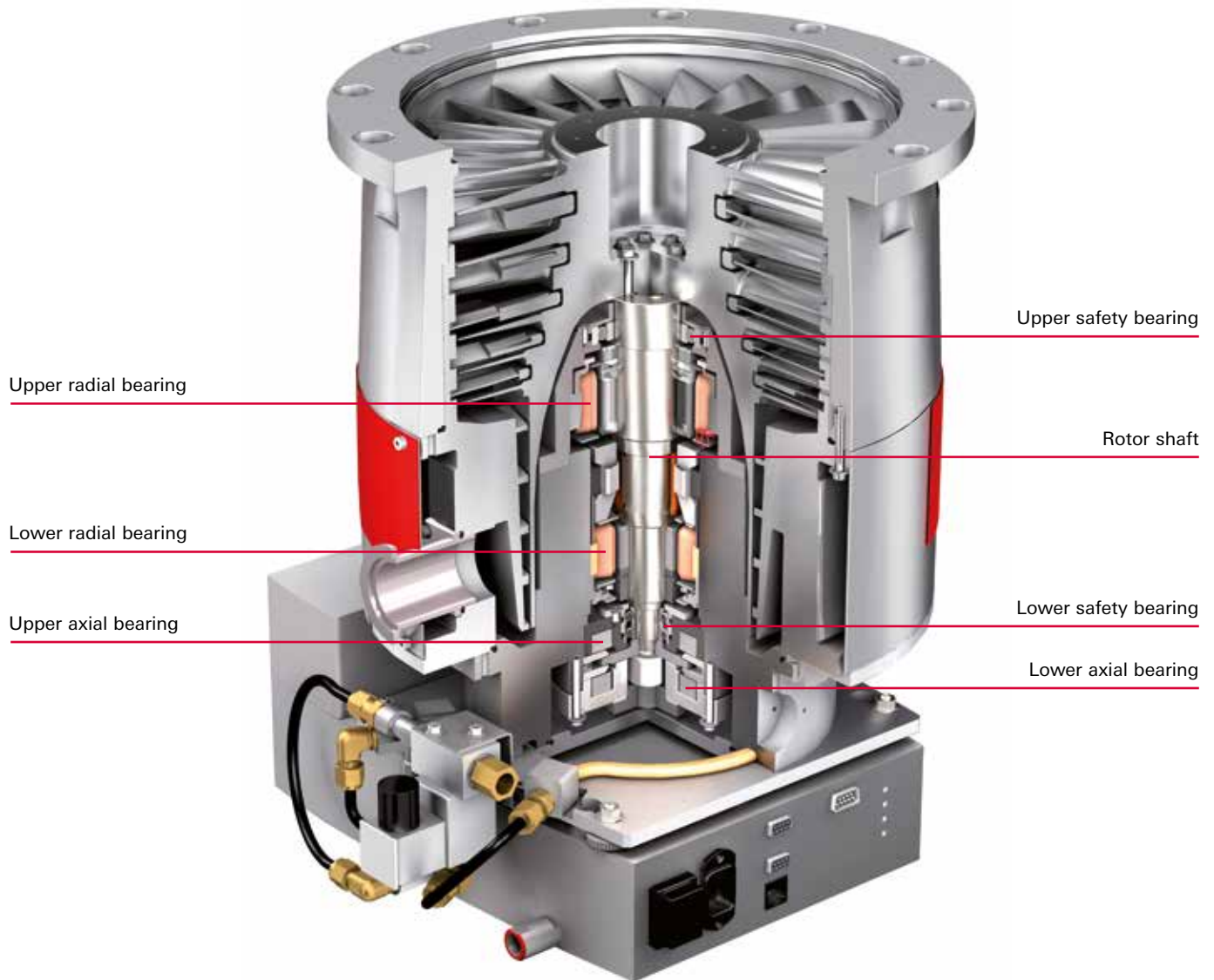
Hybrid bearing

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.



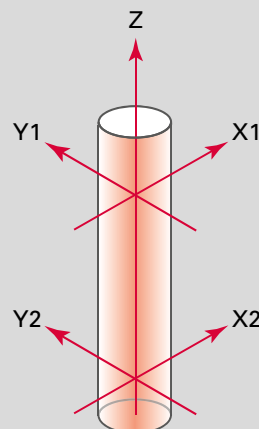
Magnetic levitation

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.



Mounting a turbopump rotor

There are five degrees of freedom altogether for mounting a turbopump rotor, two degrees of freedom in the lower and upper radial levels and one in the axial direction.



HIPACE® 10–800

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

What is HiPace®?

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 speeds, high backing pump compatibility and high gas throughput as well as excellent compression for light gases are made possible by the innovative rotor design.

Integrated drive electronics

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



HiPace® 10



HiPace® 80



HiPace® 300



HiPace® 800

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 needs due to compact construction
- High gas throughput and high pumping speed
- Installation in any orientation¹⁾
- Suitable for industrial use thanks to protection class IP 54
- Corrosive gas version available
- SEMI S2 und UL certification
- Full range of accessories extends the possible uses
- Extended maintenance intervals
- Bearing replacement on site

¹⁾ HiPace C: 0° to 90° / HiPace Plus: 0°

Fast run-up time

The run-up time of the HiPace has been significantly reduced. It makes the pumps ready for action more quickly. This is an incalculable benefit for your production. In addition, we provide extended remote and sensor functionalities which allow you to assess pump data such as temperature, for example. The improved diagnostics make it possible to improve pump availability and support service.

High-performance technology

We are setting trends with the well thought-out design of the HiPace. The functional housing is partly responsible, as it makes the pumps extremely light and extends the application spectrum. Also, the innovative rotor geometry provides quiet operation and sets standards for significantly improved gas loads.

Universally applicable

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

Overview of series and applications

	Analytics					Semiconductor							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	Flat Panel Display (FPD)	LED / OLED	Hard disk coating	Photovoltaics	Glass coating (PVD)	CD / DVD / Blu-ray production (PVD)	Optical coating (PVD)	Wear protection (PVD, CVD)	Web coating	Medical technology	Industrial leak detection	Electron beam welding	Isolation vacuums	Lamp and tube manufacturing	Heat treatment	Vacuum drying	Vacuum furnaces	Nuclear research	Fusion technology	Plasma research	Particle accelerators	Space simulation	Cryogenic research	Elementary particle physics	Nanotechnology	Biotechnology							
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HiPace® 10	■	■	■	■		■																				■	■															■	■						
HiPace® 60 P																				■			■																										
HiPace® 80	■	■	■	■		■		■					■	■	■	■	■							■	■		■	■															■	■	■				
HiPace® 300	■	■	■	■		■		■	■			■	■	■	■	■	■				■		■	■	■		■	■	■	■	■														■	■	■		
HiPace® 300 C	■	■	■	■		■		■	■			■	■	■	■	■	■				■		■	■	■																				■	■	■		
HiPace® 300 P	■	■	■	■		■		■	■			■	■	■	■	■	■				■		■	■	■																				■	■	■		
HiPace® 300 Plus	■		■	■		■							■			■																																	
HiPace® 400			■	■		■		■	■			■	■	■	■	■	■				■		■	■	■		■	■	■	■	■														■	■	■		
HiPace® 400 P			■	■		■		■	■			■	■	■	■	■	■				■		■	■	■																					■	■	■	
HiPace® 700			■	■		■		■	■			■	■	■	■	■	■				■		■	■	■		■	■	■	■	■																■	■	■
HiPace® 700 P			■	■		■		■	■			■	■	■	■	■	■			■	■		■	■	■																					■	■	■	
HiPace® 700 Plus	■		■	■		■							■			■																																	
HiPace® 800			■	■		■		■	■			■	■	■	■	■	■					■	■	■	■		■		■																	■	■	■	
HiPace® 800 P			■	■		■		■	■			■	■	■	■	■	■			■	■		■	■	■																					■	■	■	

P = Process-appropriate, dust-insensitive

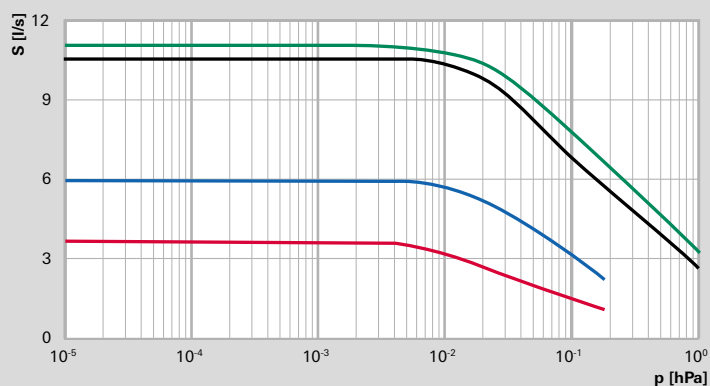
C = Corrosive gas version

HIPACE® 10–800

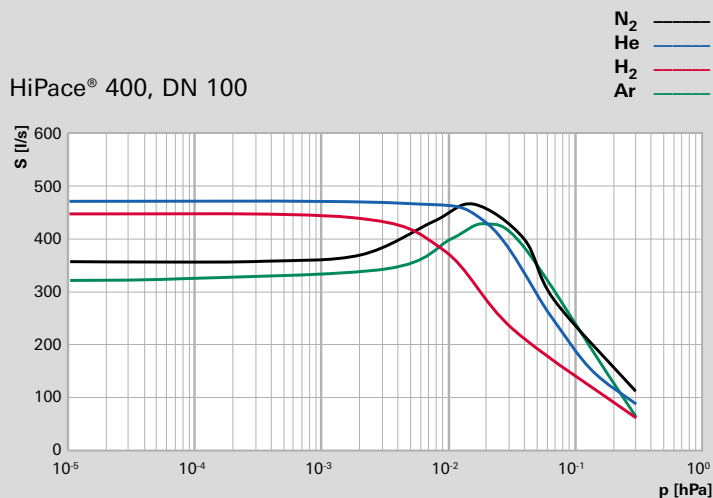
Pumping speeds and dimensions

Pumping speed

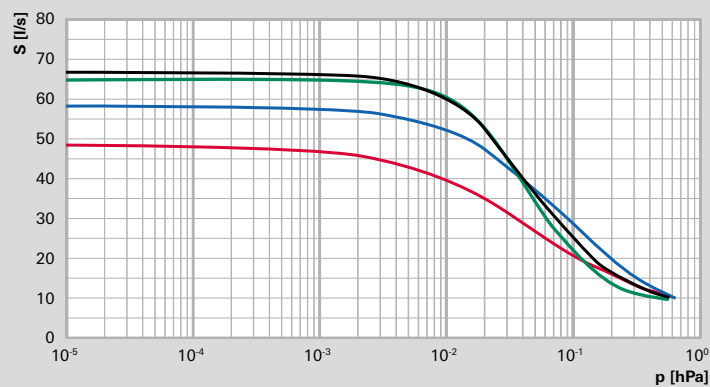
HiPace® 10, DN 25



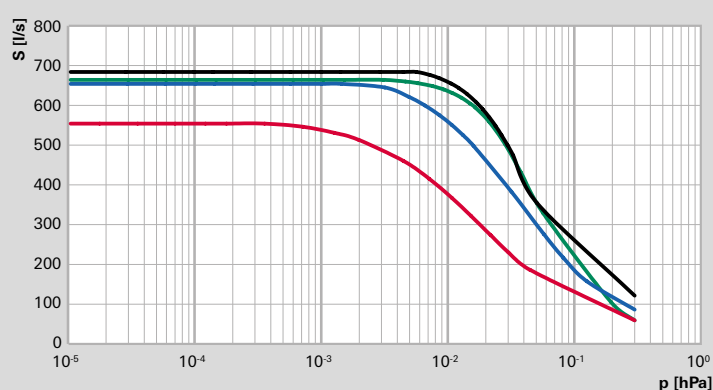
HiPace® 400, DN 100



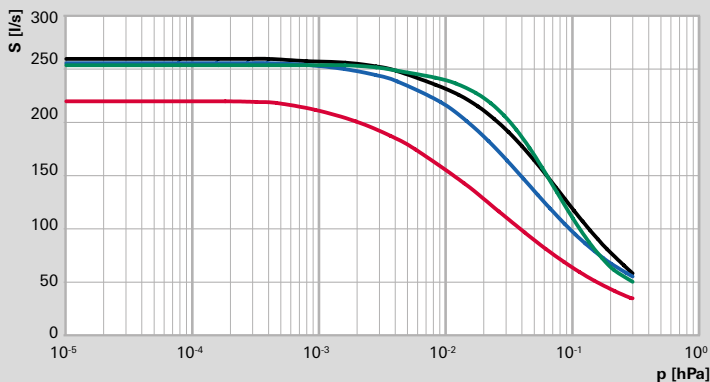
HiPace® 80, DN 63



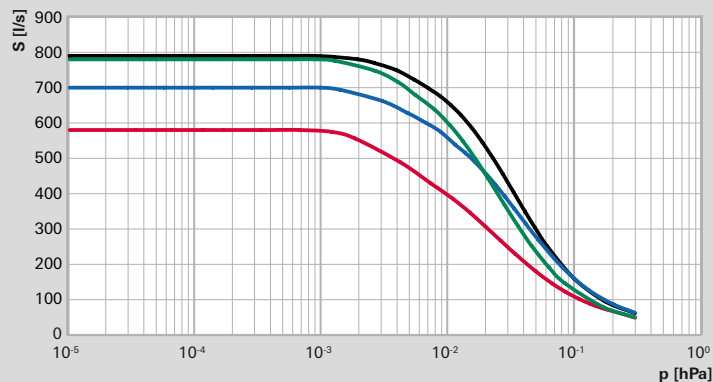
HiPace® 700, DN 160



HiPace® 300, DN 100

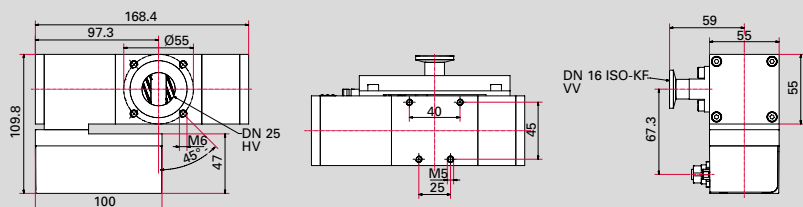


HiPace® 800, DN 200

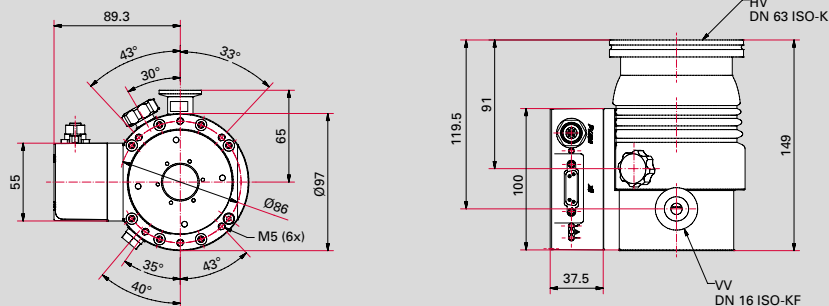


Dimensions

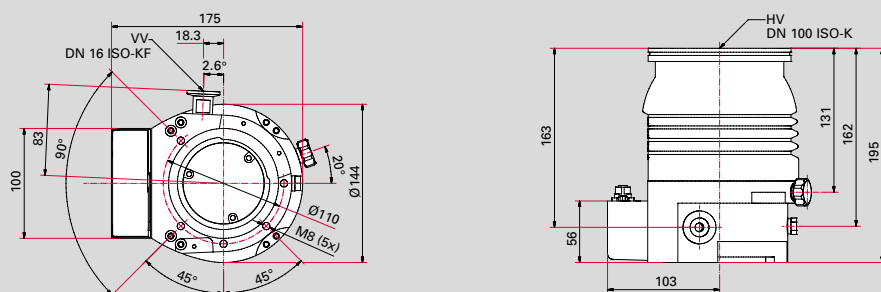
HiPace® 10,
DN 25 with TC 110



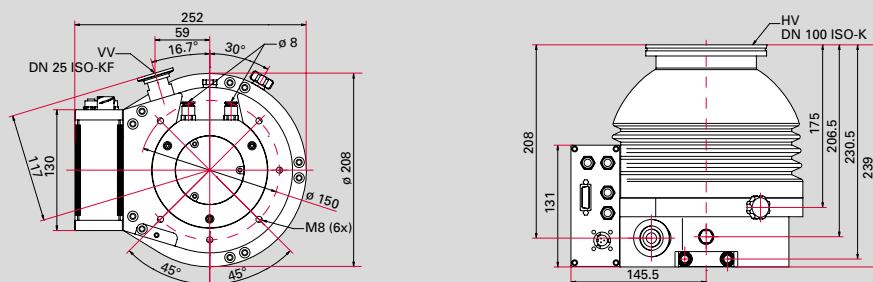
HiPace® 80,
DN 63 ISO-K with TC 110



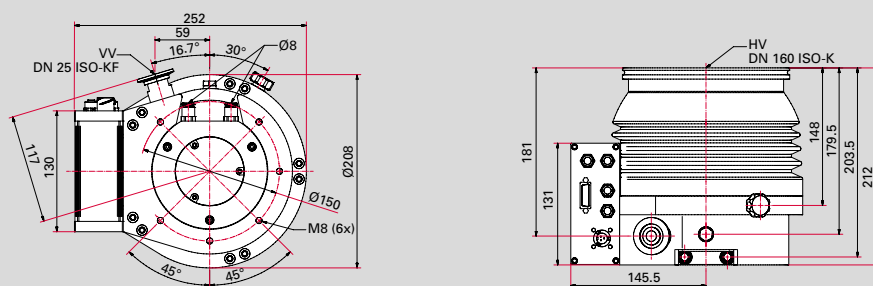
HiPace® 300,
DN 100 ISO-K with TC 110



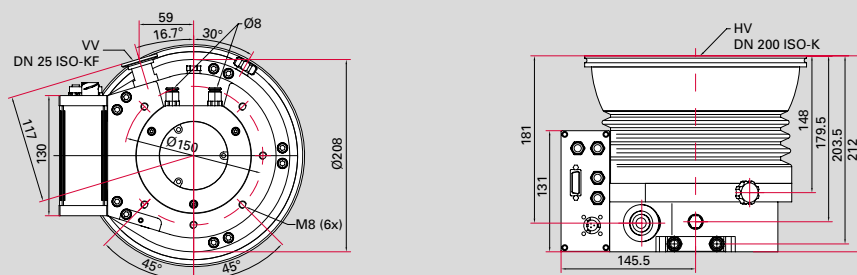
HiPace® 400,
DN 100 ISO-K with TC 400



HiPace® 700,
DN 160 ISO-K with TC 400



HiPace® 800,
DN 200 ISO-K with TC 400



HIPACE® 10–800

Technical data and order numbers

Technical data

Pump type	Unit	HiPace® 10	HiPace® 80	HiPace® 300 ¹⁾	HiPace® 300 ²⁾
Connection nominal diameter					
Flange (in)		DN 25	DN 63	DN 100	DN 100
Flange (out)	ISO-KF	DN 16	DN 16	DN 16	DN 16
Venting connection		–	G 1/8"	G 1/8"	G 1/8"
Pumping speed for:					
Nitrogen (N ₂)	l/s	10	67	260	260
Helium (He)	l/s	6	58	255	255
Hydrogen (H ₂)	l/s	3.7	48	220	220
Argon (Ar)	l/s	11.5	66	255	255
Compression ratio for:					
Nitrogen (N ₂)		$3 \cdot 10^6$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Helium (He)		$3 \cdot 10^3$	$1.3 \cdot 10^7$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Hydrogen (H ₂)		$3 \cdot 10^2$	$1.4 \cdot 10^5$	$9 \cdot 10^5$	$9 \cdot 10^5$
Argon (Ar)		$2.5 \cdot 10^7$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Max. fore-vacuum pressure for					
Nitrogen (N ₂)	hPa	25	22	15	20
Max. gas throughput at full rotational speed for					
Nitrogen (N ₂)	hPa l/s	0.37	1.3	5	14
Ultimate pressure	hPa	$< 5 \cdot 10^{-5}$	$< 1 \cdot 10^{-7}$	$< 1 \cdot 10^{-7}$	$< 1 \cdot 10^{-7}$
Rotation speed	RPM	90,000	90,000	60,000	60,000
Run-up time	min	0.9	1.75	3.5	1.8
Cooling type, Standard		Convection	Convection	Air	Water
Cooling water consumption	l/min	–	–	–	0.83
Cooling water temperature	°C	–	–	–	15–35
Operating voltage ³⁾	V DC	24 ± 5%	24 ± 5%	24 ± 5%	24 ± 5%
Max. power consumption	W	28.8	110	180	300
Weight	kg	1.8	2.4	5.8 – 8.2	6.7 – 8.7

¹⁾with drive electronics TC 110

²⁾with drive electronics TC 400

³⁾with drive electronics

You can find additional technical data and accessories on the Internet at: www.pfeiffer-vacuum.com

Order numbers

Pump type	HiPace® 10	HiPace® 80			HiPace® 300		
Drive \ flange	DN 25	DN 40 ISO-KF	DN 63 ISO-K	DN 63 CF-F	DN 100 ISO-K	DN 100 ISO-F	DN 100 CF-F
TC 110	PM P03 960	PM P03 942	PM P03 940	PM P03 941	PM P03 990	PM P03 992	PM P03 991
TC 400	–	–	–	–	PM P03 900	PM P03 902	PM P03 901
TCP 350	–	PM P03 945	PM P03 943	PM P03 944	PM P03 993	PM P03 995	PM P03 994

Technical data

Pump type	Unit	HiPace® 400	HiPace® 700	HiPace® 800
Connection nominal diameter				
Flange (in)		DN 100	DN 160	DN 200
Flange (out)	ISO-KF	DN 25	DN 25	DN 25
Venting connection		G 1/8"	G 1/8"	G 1/8"
Pumping speed for:				
Nitrogen (N ₂)	l/s	355	685	790
Helium (He)	l/s	470	655	700
Hydrogen (H ₂)	l/s	445	555	580
Argon (Ar)	l/s	320	665	780
Compression ratio for:				
Nitrogen (N ₂)		$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Helium (He)		$3 \cdot 10^7$	$3 \cdot 10^7$	$3 \cdot 10^7$
Hydrogen (H ₂)		$4 \cdot 10^5$	$4 \cdot 10^5$	$4 \cdot 10^5$
Argon (Ar)		$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Max. fore-vacuum pressure for				
Nitrogen (N ₂)	hPa	11	11	11
Max. gas throughput at full rotational speed for				
Nitrogen (N ₂)	hPa l/s	6.5	6.5	6.5
Ultimate pressure	hPa	$< 1 \cdot 10^{-7}$	$< 1 \cdot 10^{-7}$	$< 1 \cdot 10^{-7}$
Rotation speed	RPM	49,200	49,200	49,200
Run-up time	min	2	2	2
Cooling type, Standard		Water	Water	Water
Cooling water consumption	l/min	1.6	1.6	1.6
Cooling water temperature	°C	15–35	15–35	15–35
Operating voltage ¹⁾	V DC	48 ± 5%	48 ± 5%	48 ± 5%
Max. power consumption	W	420	400	420
Weight	kg	11.6 – 17.5	11.5 – 17.4	12.8 – 19.1

¹⁾with drive electronics

You can find additional technical data and accessories on the Internet at: www.pfeiffer-vacuum.com

Order numbers

Pump type	HiPace® 400			HiPace® 700		
Drive \ flange	DN 100 ISO-K	DN 100 ISO-F	DN 100 CF-F	DN 160 ISO-K	DN 160 ISO-F	DN 160 CF-F
TC 110	–	–	–	–	–	–
TC 400	PM P04 023	PM P04 025	PM P04 024	PM P03 933	PM P03 935	PM P03 934
TCP 350	PM P04 026	PM P04 028	PM P04 027	PM P04 080	PM P04 082	PM P04 081

Pump type	HiPace® 800		
Drive \ flange	DN 200 ISO-K	DN 200 ISO-F	DN 200 CF-F
TC 110	–	–	–
TC 400	PM P04 300	PM P04 302	PM P04 301
TCP 350	–	–	–

HIPACE® 1200 – 2300

Compact, hybrid bearing turbopumps in the pumping speed class of 1,000 to 2,000 l/s

Intelligent sensors

The HiPace 1200 to 2300 turbopumps can be mounted upside down. The proven bearing system guarantees unrivaled reliability. Thanks to the mature rotor design, very high values are achieved for the pumping speed, backing pump compatibility and gas throughput as well as compression for light gases. Combined with a reliable sensor system, the HiPace series achieves the highest level of safety 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, which 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

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 und TÜV certification
- Suitable for industrial use thanks to protection class IP 54
- Highest process capability, resistant to particles

Integrated electronics

The integrated drive electronics prevent costly cabling. In addition, they are available with various interface versions with the same structural volume. 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 evaluate 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 set standards in efficiency with the well-thought-out design of the HiPace. This is evidenced not only by its functional housing, which makes the pumps extremely light and extends the spectrum of applications. The innovative rotor geometry for low vibration operation sets standards too. And the integrated cooling system ensures that turbopumps can become more powerful without „overpacing“ them.

Overview of series and applications

	Analytics						Semiconductor						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	Flat Panel Display (FPD)	LED / OLED	Hard disk coating	Photovoltaics	Glass coating (PVD)	CD / DVD / Blu-ray production (PVD)	Optical coating (PVD)	Wear protection (PVD, CVD)	Web coating	Medical technology	Industrial leak detection	Electron beam welding	Isolation vacuums	Lamp and tube manufacturing	Heat treatment	Vacuum drying	Vacuum furnaces	Nuclear research	Fusion technology	Plasma research	Particle accelerators	Space simulation	Cryogenic research	Elementary particle physics	Nanotechnology	Biotechnology			
■ recommended																																													
HiPace® 1200							■					■						■	■	■	■	■	■	■	■	■		■	■				■	■	■								■		
HiPace® 1200 C								■	■	■	■	■			■					■	■	■	■	■	■	■							■	■	■		■								■
HiPace® 1200 T												■						■																											
HiPace® 1500							■	■				■					■	■			■	■	■	■	■	■	■	■	■	■			■	■	■									■	
HiPace® 1500 C							■	■	■	■	■	■			■					■	■	■	■	■	■	■						■	■	■		■								■	
HiPace® 1500 T								■	■	■	■	■						■																											
HiPace® 1800							■	■	■			■								■	■		■	■	■	■						■	■	■											
HiPace® 1800 C							■	■	■	■	■	■			■					■	■		■	■	■	■						■	■	■		■									
HiPace® 1800 T								■	■	■	■	■																																	
HiPace® 2300							■	■				■					■		■	■	■		■	■	■	■	■	■	■			■	■	■						■					
HiPace® 2300 C							■	■	■	■	■	■			■					■	■		■	■	■	■						■	■	■											
HiPace® 2300 T									■	■	■								■																										

C = Corrosive gas version

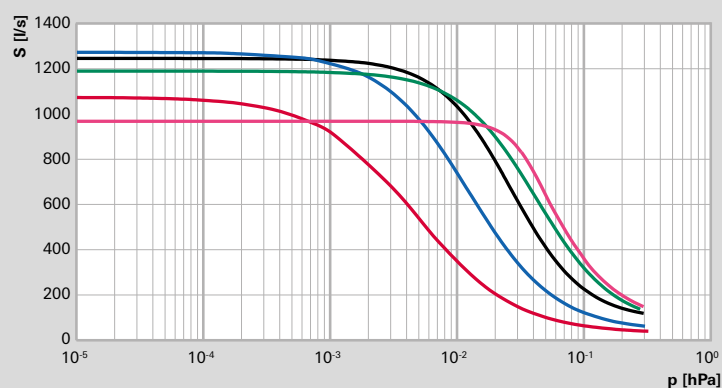
T = with temperature management

HIPACE® 1200 – 2300

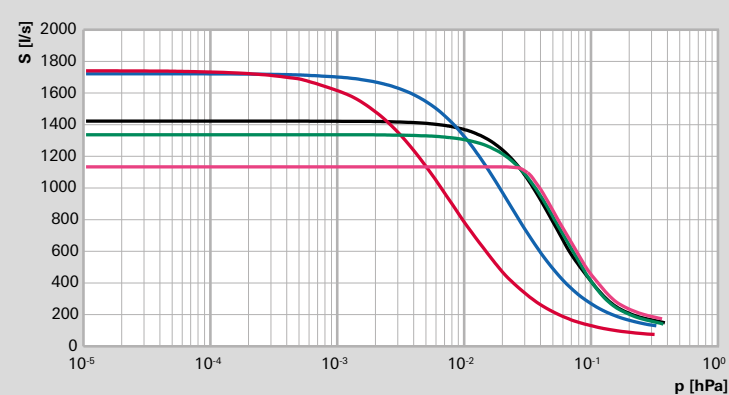
Pumping speed and dimensions

Pumping speed

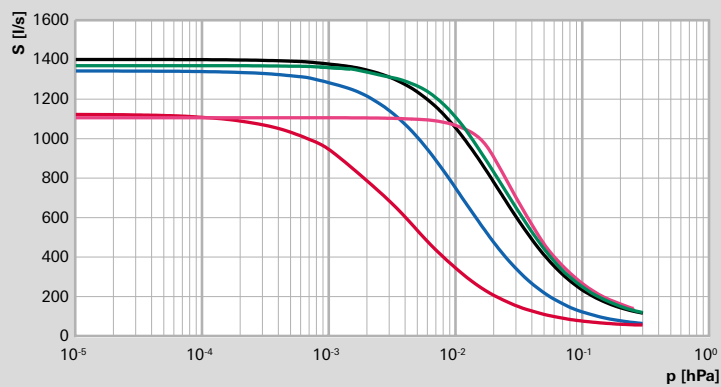
HiPace® 1200, DN 200



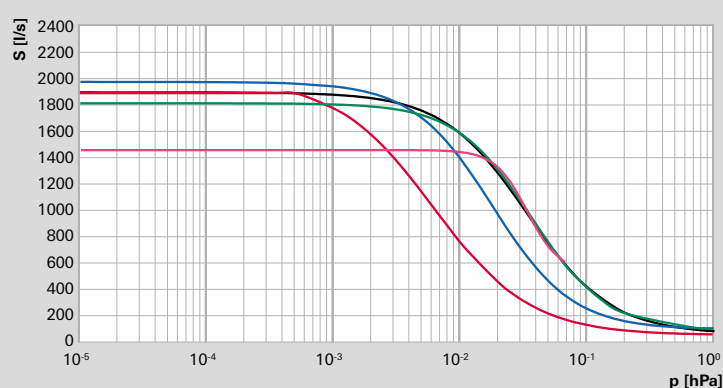
HiPace® 1800, DN 200



HiPace® 1500, DN 250



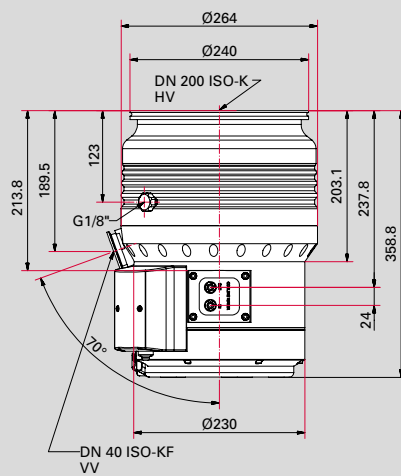
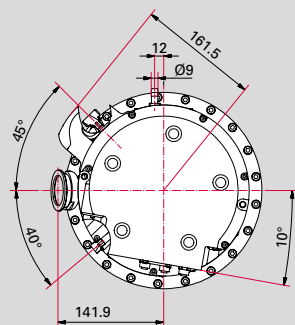
HiPace® 2300, DN 250



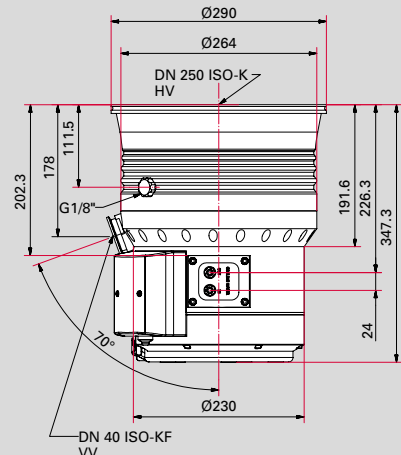
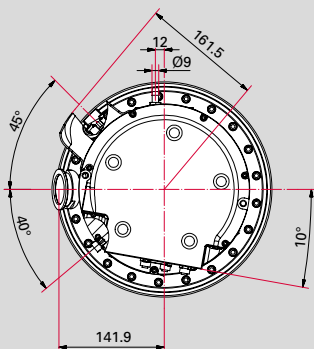
N_2 —
 He —
 H_2 —
 Ar —
 CF_4 —

Dimensions

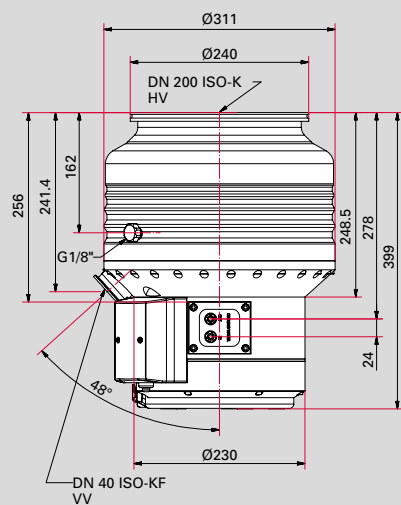
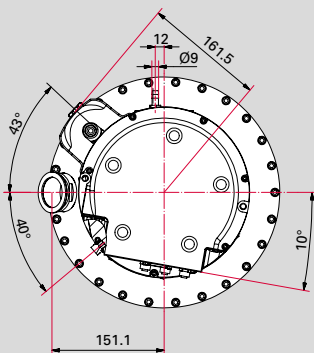
HiPace® 1200,
DN 200 ISO-K



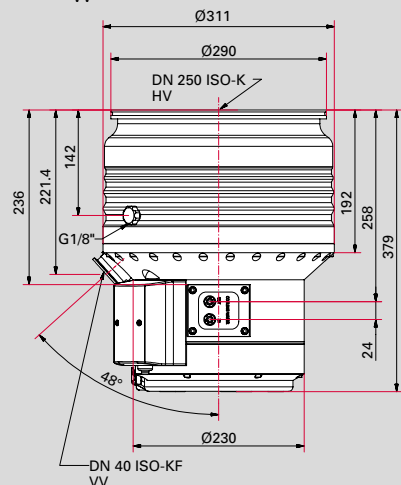
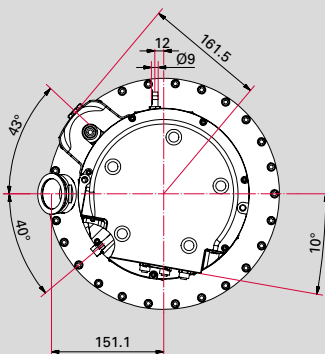
HiPace® 1500,
DN 250 ISO-K



HiPace® 1800,
DN 200 ISO-K



HiPace® 2300,
DN 250 ISO-K



HIPACE® 1200 – 2300

Technical data and order numbers

Technical data

Pump type	Unit	HiPace® 1200	HiPace® 1500	HiPace® 1800	HiPace® 2300
Connection nominal diameter					
Flange (in)		DN 200	DN 250	DN 200	DN 250
Flange (out)	ISO-KF	DN 40	DN 40	DN 40	DN 40
Venting connection		G 1/8"	G 1/8"	G 1/8"	G 1/8"
Pumping speed for					
Nitrogen (N ₂)	l/s	1,250	1,400	1,450	1,900
Helium (He)	l/s	1,300	1,350	1,650	2,000
Hydrogen (H ₂)	l/s	1,100	1,150	1,700	1,850
Argon (Ar)	l/s	1,200	1,350	1,370	1,800
Tetrafluoromethane (CF ₄)	l/s	950	1,100	1,050	1,450
Compression ratio for					
Nitrogen (N ₂)		$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Helium (He)		$2 \cdot 10^5$	$2 \cdot 10^5$	$3 \cdot 10^5$	$3 \cdot 10^5$
Hydrogen (H ₂)		$6 \cdot 10^3$	$6 \cdot 10^3$	$2 \cdot 10^4$	$2 \cdot 10^4$
Argon (Ar)		$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Tetrafluoromethane (CF ₄)		$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Max. fore-vacuum pressure for					
Nitrogen (N ₂)	hPa	2	2	1.8	1.8
Max. gas throughput at full rotational speed for					
Nitrogen (N ₂)	hPa l/s	20	20	20	20
Helium (He)	hPa l/s	> 30	> 30	20	20
Hydrogen (H ₂)	hPa l/s	> 30	> 30	> 30	> 30
Argon (Ar)	hPa l/s	11	11	16	16
Tetrafluoromethane (CF ₄)	hPa l/s	12	12	14	14
Ultimate pressure ¹⁾	hPa	$< 1 \cdot 10^{-7}$	$< 1 \cdot 10^{-7}$	$< 1 \cdot 10^{-7}$	$< 1 \cdot 10^{-7}$
Rotation speed	RPM	37,800	37,800	31,500	31,500
Run-up time	min	2.5	2.5	4	4
Cooling type, Standard		Water	Water	Water	Water
Cooling water consumption ²⁾	l/h	100	100	100	100
Cooling water temperature	°C	15 – 35	15 – 35	15 – 35	15 – 35
Power connection: voltage	V AC	100–120/ 200–240	100–120/ 200–240	100–120/ 200–240	100–120/ 200–240
Max. power consumption	W	1,350	1,350	1,350	1,350
Weight	kg	27 – 40	29 – 41	33 – 34	34 – 47

¹⁾Measured with oil-free backing pump purged with inert gas, not tempered, elastomer sealed

²⁾At maximum gas throughput and cooling water temperature of 25 °C

You can find additional technical data and accessories on the Internet at: www.pfeiffer-vacuum.com

Order numbers

Flange Orientation of the HV flange	ISO-K up (0° – 90°)	ISO-F	CF-F	ISO-K upside down (90° – 180°)	ISO-F	CF-F
Pump type	HiPace® 1200, DN 200, TC 1200					
Standard version	PM P03 910	PM P03 911	PM P03 912	PM P03 913	PM P03 914	PM P03 915
Corrosive gas version	PM P03 916	PM P03 917	PM P04 190	PM P03 918	PM P03 919	PM P04 191
Pump type	HiPace® 1500, DN 250, TC 1200					
Standard version	PM P04 060	PM P04 061	PM P04 062	PM P04 063	PM P04 064	PM P04 065
Corrosive gas version	PM P04 066	PM P04 067	PM P04 192	PM P04 068	PM P04 069	PM P04 193
Pump type	HiPace® 1800, DN 200, TC 1200					
Standard version	PM P06 200	PM P06 201	–	PM P06 210	PM P06 211	–
Corrosive gas version	PM P04 076	PM P04 077	–	PM P04 078	PM P04 079	–
Pump type	HiPace® 2300, DN 250, TC 1200					
Standard version	PM P06 300	PM P06 301	PM P06 302	PM P06 310	PM P06 311	PM P06 312
Corrosive gas version	PM P03 926	PM P03 927	PM P04 194	PM P03 928	PM P03 929	PM P04 195

HIPACE® 300 – 800 M, ATH 500 M

Compact, magnetically levitated turbopumps in the pumping speed class of 300 to 800 l/s

Technically perfect

The HiPace M and ATH 500 M have an active 5-axis magnetic bearing. Using just this bearing technology, the rotor position is controlled in real-time. During operation, automatic out-of-balance compensation occurs, which allows minimal vibrations or 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. You have the choice.



HiPace® 300 M



ATH 500 M



HiPace® 700 M



HiPace® 800 M

Customer benefits

- Very easy installation
- Any mounting position
- Integrated drive electronics
- Clean vacuum thanks 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

Leading

Highest pumping speed, 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 sector.

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.

Overview of series and applications

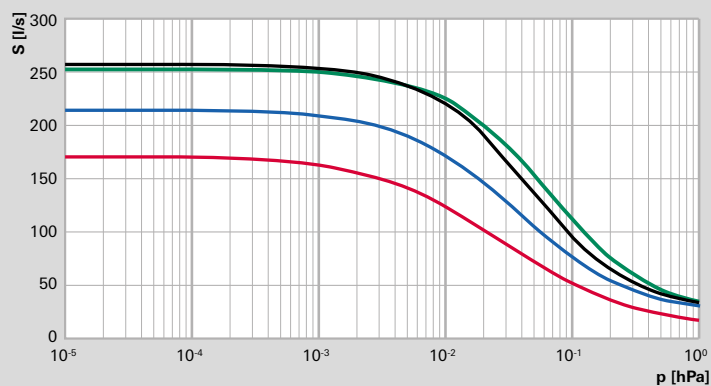
	Analytics						Semiconductor						Coating						Industry				R&D																									
	Electron microscopy	Leak detection	Mass spectrometry	Surface analysis	Plasma monitoring	Residual gas analysis	Lithography	PVD (Physical Vapor Deposition)	CVD (Chemical Vapor Deposition)	Plasma etching	Implantation – Source	Implantation – Beamline	Inspection	Bonding	MBE (Molecular Beam Epitaxy)	Load-locks, transfer chambers, handling systems	Flat Panel Display (FPD)	LED / OLED	Hard disk coating	Photovoltaics	Glass coating (PVD)	CD / DVD / Blu-ray production (PVD)	Optical coating (PVD)	Wear protection (PVD, CVD)	Web coating	Medical technology	Industrial leak detection	Electron beam welding	Isolation vacuums	Lamp and tube manufacturing	Heat treatment	Vacuum drying	Vacuum furnaces	Nuclear research	Fusion technology	Plasma research	Particle accelerators	Space simulation	Cryogenic research	Elementary particle physics	Nanotechnology	Biotechnology						
■ recommended																																																
HiPace® 300 M	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■		
ATH 500 M		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	
ATH 500 MT										■	■							■		■																												
HiPace® 700 M	■		■	■		■	■	■				■	■			■		■	■	■	■	■	■				■							■	■			■	■		■		■	■	■	■	■	
HiPace® 800 M	■		■			■	■	■				■	■			■		■	■	■	■	■	■				■							■	■			■	■		■		■	■	■	■	■	■

HIPACE® 300 – 800 M, ATH 500 M

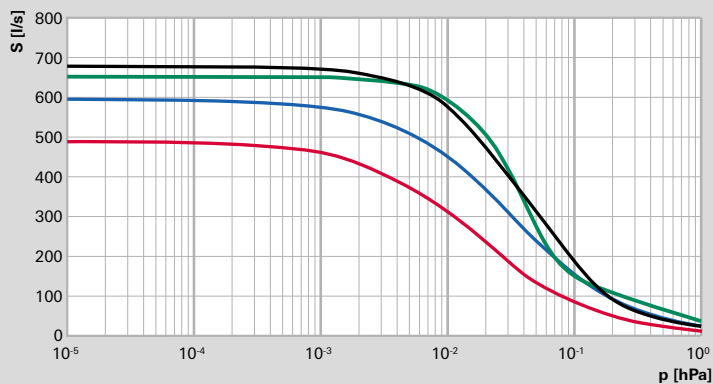
Pumping speed and dimensions

Pumping speed

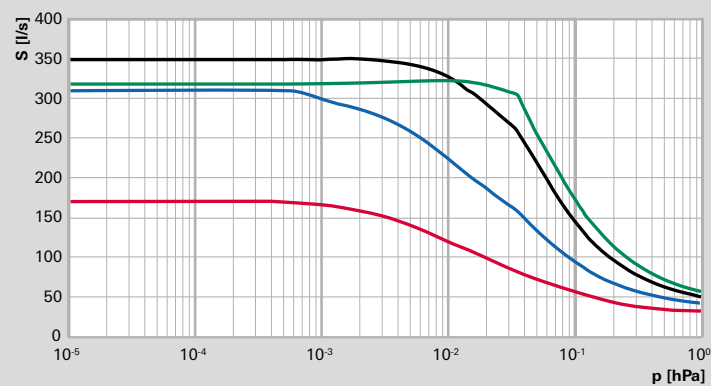
HiPace® 300 M, DN 100



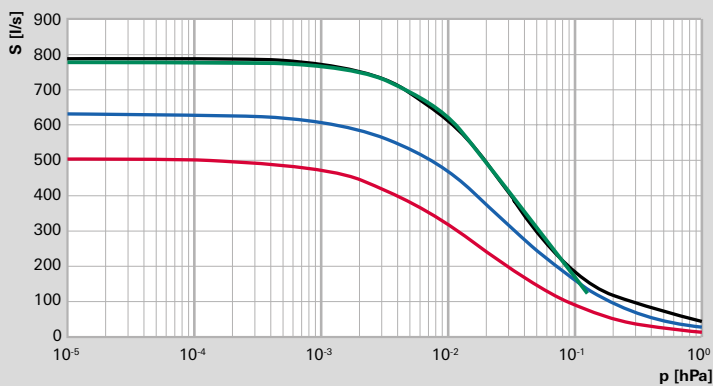
HiPace® 700 M, DN 160



ATH 500 M, DN 160



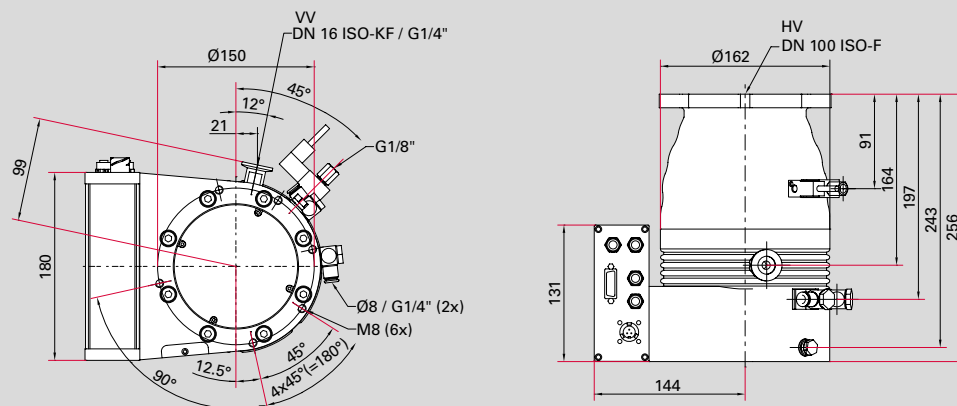
HiPace® 800 M, DN 200



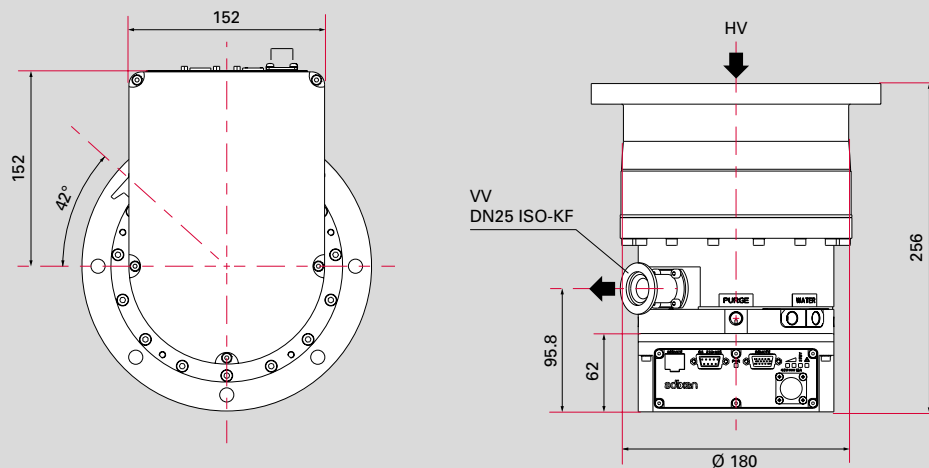
N_2 —
 He —
 H_2 —
 Ar —

Dimensions

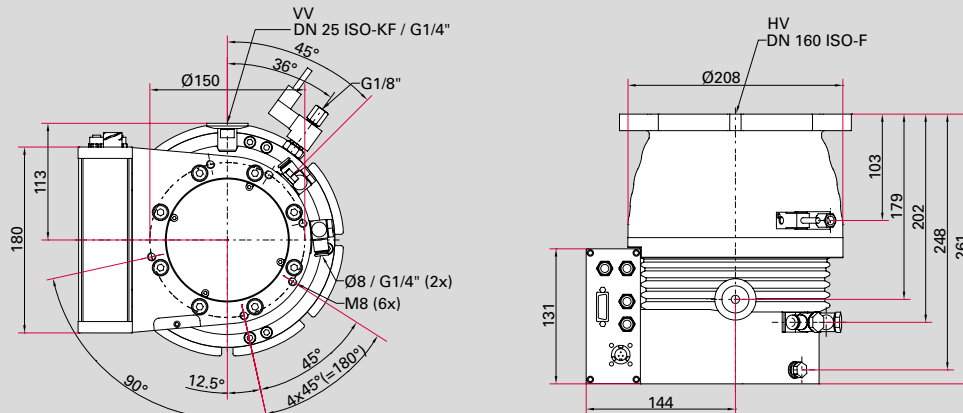
HiPace® 300 M,
DN 100 ISO-F



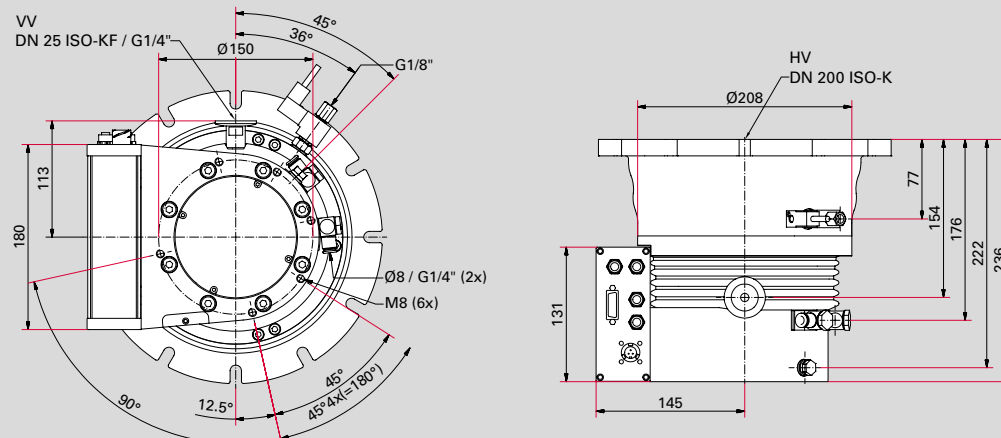
ATH 500 M,
DN 160 ISO-F



HiPace® 700 M,
DN 160 ISO-F



HiPace® 800 M,
DN 200 ISO-F



HIPACE® 300 – 800 M, ATH 500 M

Technical data and order numbers

Technical data

Pump type	Unit	HiPace® 300 M	ATH 500 M	HiPace® 700 M	HiPace® 800 M
Connection nominal diameter					
Flange (in)		DN 100	DN 160	DN 160	DN 200
Flange (out)	ISO-KF	DN 16	DN 25	DN 25	DN 25
Venting connection		G 1/8"	G 1/8"	G 1/8"	G 1/8"
Pumping speed for					
Nitrogen (N ₂)	l/s	255	550	685	790
Helium (He)	l/s	215	390	600	625
Hydrogen (H ₂)	l/s	170	190	480	500
Argon (Ar)	l/s	250	530	660	775
Compression ratio for					
Nitrogen (N ₂)		$> 1 \cdot 10^{11}$	$> 2 \cdot 10^7$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Helium (He)		$> 1 \cdot 10^8$	$> 1 \cdot 10^4$	$> 1 \cdot 10^7$	$> 1 \cdot 10^7$
Hydrogen (H ₂)		$5 \cdot 10^5$	$> 2 \cdot 10^2$	$2 \cdot 10^5$	$2 \cdot 10^5$
Argon (Ar)		$> 1 \cdot 10^{11}$	$> 8 \cdot 10^6$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Max. fore-vacuum pressure for					
Nitrogen (N ₂)	hPa	20	2.6	8	8
Max. gas throughput at full rotational speed for					
Nitrogen (N ₂)	hPa l/s	28	67	13	13
Argon (Ar)	hPa l/s	13	42	8	8
Ultimate pressure	hPa	$< 1 \cdot 10^{-7}$	$< 1 \cdot 10^{-8}$	$< 1 \cdot 10^{-7}$	$< 1 \cdot 10^{-7}$
Rotation speed	RPM	60,000	50,000	49,200	49,200
Run-up time	min	< 2	< 2	4	4
Cooling type, Standard		Water	Water	Water	Water
Cooling water consumption	l/min	1.3	1.0	1.3	1.3
Cooling water temperature	°C	15 – 35	15 – 25	15 – 35	15 – 35
Operating voltage ¹⁾	V DC	48 ± 5%	48 ± 5%	48 ± 5%	48 ± 5%
Max. power consumption	W	300	550	300	300
Weight	kg	13.1 – 17.2	17 – 18	15.7 – 20.8	17.1 – 21.5

¹⁾with drive electronics

You can find additional technical data and accessories on the Internet at: www.pfeiffer-vacuum.com

Order numbers

Pump type	HiPace® 300 M		
Interface \ flange	DN 100 ISO-K	DN 100 ISO-F	DN 100 CF-F
RS-485	PM P03 950	PM P03 951	PM P03 952
Profibus	PM P03 953	PM P03 954	PM P03 955
DeviceNet	PM P03 956	PM P03 957	PM P03 958

Pump type	ATH 500 M			ATH 500 M		
Interface, cooling \ flange	DN 100 ISO-F	DN 100 ISO-K	DN 100 CF-F	DN 160 ISO-F	DN 160 ISO-K	DN 160 CF-F
Profibus, water cooling	VY362100	VY312100	VY322100	VY462100	VY412100	VY422100
Remote, water cooling	V2362100	V2312100	V2322100	V2462100	V2412100	V2422100
Profibus, air cooling	VY361100	VY311100	VY321100	VY461100	VY411100	VY421100
Remote, air cooling	V2361100	V2311100	V2321100	V2461100	V2411100	V2421100

Pump type	ATH 500 MT			ATH 500 MT		
Interface, cooling \ flange	DN 100 ISO-F	DN 100 ISO-K	DN 100 CF-F	DN 160 ISO-F	DN 160 ISO-K	DN 160 CF-F
Remote, water cooling	VR362103	VR312103	VR322103	VR462103	VR412103	VR422103

Pump type	HiPace® 700 M		
Interface \ flange	DN 100 ISO-K	DN 160 ISO-F	DN 160 CF-F
RS-485	PM P04 450	PM P04 451	PM P04 452
Profibus	PM P04 453	PM P04 454	PM P04 455
DeviceNet	PM P04 456	PM P04 457	PM P04 458

Pump type	HiPace® 800 M		
Interface \ flange	DN 200 ISO-K	DN 200 ISO-F	DN 200 CF-F
RS-485	PM P04 460	PM P04 461	PM P04 462
Profibus	PM P04 463	PM P04 464	PM P04 465
DeviceNet	PM P04 466	PM P04 467	PM P04 468

ATH 500 MT = with temperature management

ATH 1600 – 3200 M, ATP 2300 M

**Compact, magnetically levitated turbopumps
in the pumping speed class of 1,400 to 2,800 l/s**

Reliable

Our turbopumps in the ATH M and ATP¹⁾ M series are not 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 orientation of the high vacuum pumps make our ATH M and ATP M series a benchmark for high-performance turbopumps in semiconductor production, coating and dry-etching plasma processes as well as in many industrial and R&D applications.

¹⁾ATP = no Holweck stage



ATH 1603 M,
with drive electronics OBC V4



ATH 2303 M,
with drive electronics OBC V4



ATH 2800 M



ATH 3200 M

Customer benefits

- Clean vacuum thanks to lubricant-free magnetic bearings
- Very high gas throughput for all process gases
- Outstanding long-term stability and reliability
- High backing pump compatibility
- High air ingress stability
- Low lifetime costs due to maintenance-free 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
- Continuous control of the rotor position thanks to magnetic bearing technology

High performance

Our magnetically levitated turbopumps are optimized for vacuum production processes with high gas throughput at a high operating pressure. In R&D applications, the pumps are distinguished by their minimal vibration even at a low final pressure. A freely selectable RPM makes optimized process adjustment possible or the direct replacement of old high-vacuum pumps through adaptation to their pumping speed.

Safe

In the event of a power cut, the rotor acts as a generator and supplies power to the battery-free controller. The rotor is gradually slowed down and smoothly goes into mechanical emergency bearing mode. In the event of an extreme ingress of air or a break in the connection 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 brake the rotor quickly and effectively in the event of a massive ingress of air or mechanical shock and in this way so prevent damage to the pump.

MT models in the ATH M series have a temperature management feature through an integrated heater. The process-oriented regulation of the heating cable and the cooling water keeps the pump at a constant temperature (up to 75°C) in order to minimize the condensation of process chemicals or by-products in the pump.

Overview of series and applications

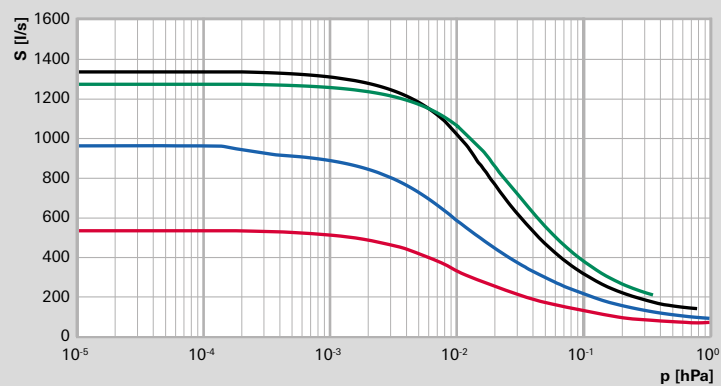
	Analytics						Semiconductor						Coating						Industry				R&D																									
	Electron microscopy	Leak detection	Mass spectrometry	Surface analysis	Plasma monitoring	Residual gas analysis	Lithography	PVD (Physical Vapor Deposition)	CVD (Chemical Vapor Deposition)	Plasma etching	Implantation – Source	Implantation – Beamline	Inspection	Bonding	MBE (Molecular Beam Epitaxy)	Load-locks, transfer chambers, handling systems	Flat Panel Display (FPD)	LED / OLED	Hard disk coating	Photovoltaics	Glass coating (PVD)	CD / DVD / Blu-ray production (PVD)	Optical coating (PVD)	Wear protection (PVD, CVD)	Web coating	Medical technology	Industrial leak detection	Electron beam welding	Isolation vacuums	Lamp and tube manufacturing	Heat treatment	Vacuum drying	Vacuum furnaces	Nuclear research	Fusion technology	Plasma research	Particle accelerators	Space simulation	Cryogenic research	Elementary particle physics	Nanotechnology	Biotechnology						
■ recommended																																																
ATH 1603 M		■	■	■	■	■											■	■	■														■			■												
ATH 1600 MT																																																
ATH 2303 M								■	■								■	■	■	■	■	■	■	■	■	■	■	■																				
ATH 2300 MT																																																
ATH 2800 M								■	■			■				■			■	■	■	■	■	■	■	■	■	■	■			■		■		■	■	■	■	■	■	■	■	■	■	■	■	■
ATH 2800 MT																																																
ATH 3200 M								■	■			■				■		■	■	■	■	■	■	■	■	■	■	■	■			■		■		■	■	■	■	■	■	■	■	■	■	■	■	■
ATH 3200 MT										■									■	■																												
ATP 2300 M			■	■	■	■	■				■	■			■		■	■	■					■	■	■	■	■	■				■		■		■	■	■	■	■	■	■	■	■	■	■	■

ATH 1600 – 3200 M, ATP 2300 M

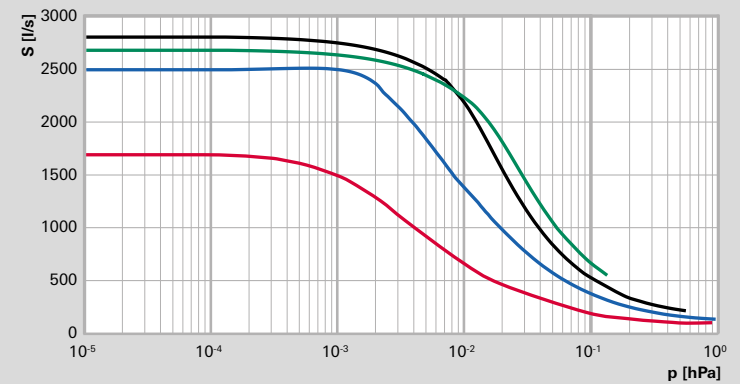
Pumping speed and dimensions

Pumping speed

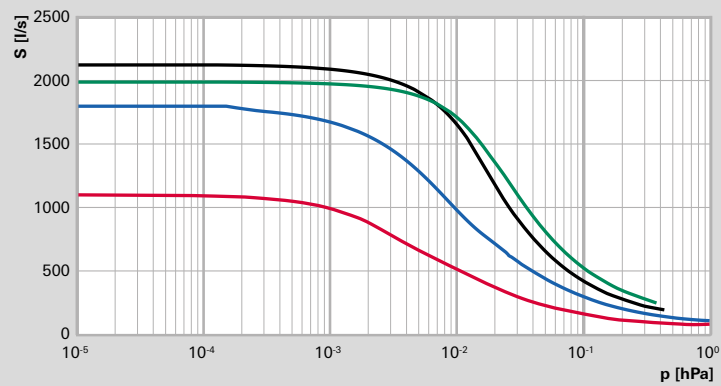
ATH 1603 M, DN 250



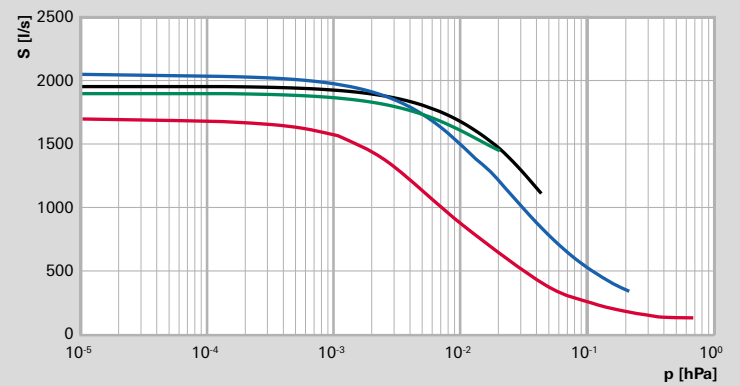
ATH 3200 M, DN 320



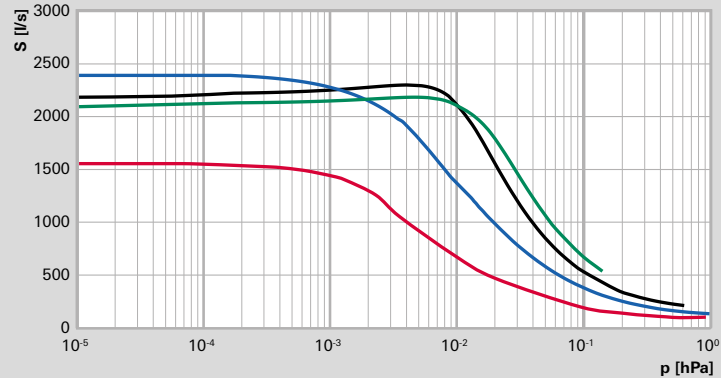
ATH 2303 M, DN 250



ATP 2300 M, DN 250



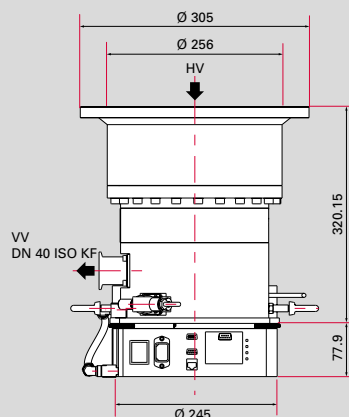
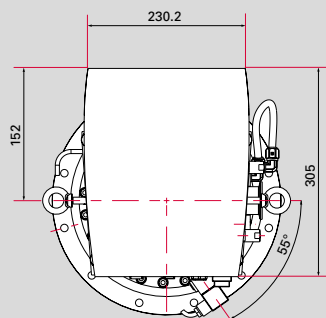
ATH 2800 M, DN 250



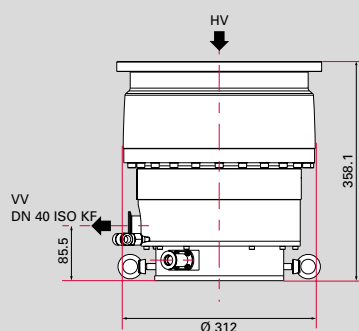
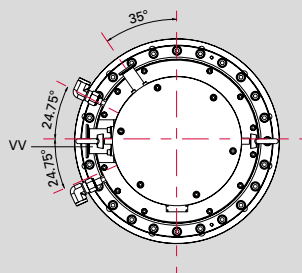
N_2 —
 He —
 H_2 —
 Ar —

Dimensions

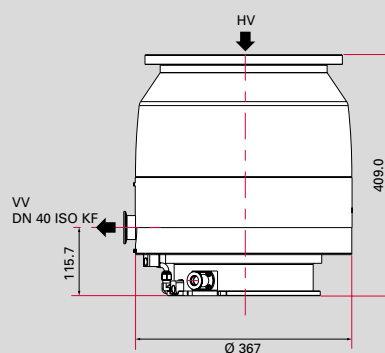
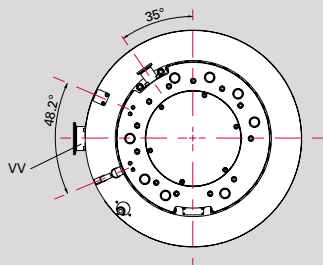
ATH 1603 M,
DN 250 ISO-F,
with integrated
drive electronics OBC V4



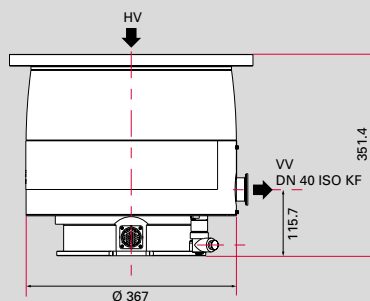
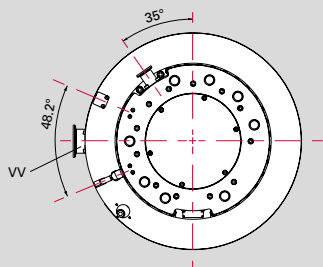
ATH 2303 M,
DN 250 ISO-F



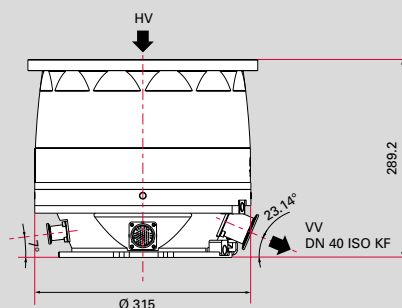
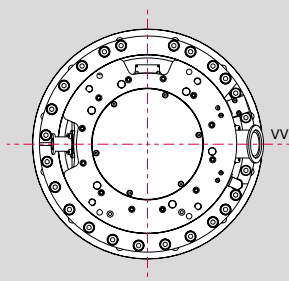
ATH 2800 M,
DN 250 ISO-F



ATH 3200 M,
DN 320 ISO-F



ATP 2300 M,
DN 250 ISO-F



ATH 1600 – 3200 M, ATP 2300 M

Technical data and order numbers

Technical data

Pump type	Unit	ATH 1603 M	ATH 2303 M	ATH 2800 M	ATH 3200 M	ATP 2300 M
Connection nominal diameter						
Flange (in)		DN 250	DN 250	DN 250	DN 320	DN 250
Flange (out)	ISO-KF	DN 40	DN 40	DN 40	DN 40	DN 40
Pumping speed for						
Nitrogen (N ₂)	l/s	1,400	2,150	2,200	2,800	1,950
Helium (He)	l/s	970	1,800	2,400	2,500	2,050
Hydrogen (H ₂)	l/s	540	1,100	1,550	1,700	1,700
Argon (Ar)	l/s	1,350	2,000	2,100	2,700	1,900
Compression ratio for						
Nitrogen (N ₂)		$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Helium (He)		$> 4 \cdot 10^4$	$> 3 \cdot 10^4$	$> 3 \cdot 10^4$	$> 3 \cdot 10^4$	$> 1 \cdot 10^5$
Hydrogen (H ₂)		$> 5 \cdot 10^2$	$> 1 \cdot 10^3$	$> 2 \cdot 10^3$	$> 2 \cdot 10^3$	$> 7 \cdot 10^3$
Argon (Ar)		$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Max. fore-vacuum pressure for						
Nitrogen (N ₂)	hPa	1.7	2.9	2.1	2.1	2.1
Gas throughput for						
Nitrogen (N ₂)	hPa l/s	67	67	84	84	37
Helium (He)	hPa l/s	> 67	> 67	> 84	> 84	> 50
Hydrogen (H ₂)	hPa l/s	> 67	> 67	> 84	> 84	> 50
Argon (Ar)	hPa l/s	20	25	> 37	> 37	15
Final pressure	hPa	$< 6 \cdot 10^{-9}$	$< 6 \cdot 10^{-9}$	$< 6 \cdot 10^{-9}$	$< 6 \cdot 10^{-9}$	$< 4 \cdot 10^{-9}$
RPM	RPM	39,000	31,000	25,000	25,000	31,000
Run-up time	min	< 6	< 8	< 10	< 10	< 8
Cooling type, Standard		Water	Water	Water	Water	Water
Cooling water consumption	l/min	1.0	1.0	1.0	1.0	1.0
Cooling water temperature	°C	15 – 25	15 – 25	15 – 25	15 – 25	15 – 25
Power connection: voltage	V AC	200 – 240	200 – 240	200 – 240	200 – 240	200 – 240
Max. power consumption	W	650	1,000	1,000	1,000	1,000
Weight ¹⁾	kg	42	68	93	93	60

Order numbers

Pump type	ATH 1603 M				ATH 2303 M	
Interface \ flange	DN 200 ISO-F	DN 200 CF-F	DN 250 ISO-F	DN 250 CF-F	DN 250 ISO-F	DN 250 CF-F
External drive electronics	Y2562100	Y2522100	Y2662100	Y2622100	X2662100	X2622100
OBC V4 Profibus	YN56215A	YN52215A	YN66215A	YN62215A	XN66215A	XN62215A
OBC V4 DeviceNet	YL56215A	YL52215A	YL66215A	YL62215A	XL66215A	XL62215A
OBC V4 Remote	YJ56215A	YJ52215A	YJ66215A	YJ62215A	XJ66215A	XJ62215A

Pump type	ATH 2800 M		ATH 3200 M		ATP 2300 M	
Interface \ flange	DN 250 ISO-F	VG 250	DN 320	VG 350	DN 250 ISO-F	DN 250 CF-F
External drive electronics	U2662100	U26A2100	U2C62100	U2DA2100	T2662100	T2622100
OBC V4 Profibus					TN66215A	TN62215A
OBC V4 DeviceNet					TL66215A	TL62215A
OBC V4 Remote					TJ66215A	TJ62215A

Technical data

Pump type	Unit	ATH 1600 MT	ATH 2300 MT	ATH 2800 MT	ATH 3200 MT
Connection nominal diameter					
Flange (in)		DN 250	DN 250	DN 250	DN 320
Flange (out)	ISO-KF	DN 40	DN 40	DN 40	DN 40
Pumping speed for					
Nitrogen (N ₂)	l/s	1,360	2,150	2,200	2,800
Helium (He)	l/s	940	1,800	2,400	2,500
Hydrogen (H ₂)	l/s	540	1,100	1,550	1,700
Argon (Ar)	l/s	1,280	2,000	2,100	2,700
Compression ratio for					
Nitrogen (N ₂)		$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Helium (He)		$> 4 \cdot 10^3$	$> 3 \cdot 10^4$	$> 3 \cdot 10^4$	$> 3 \cdot 10^4$
Hydrogen (H ₂)		$> 5 \cdot 10^2$	$> 2 \cdot 10^3$	$> 2 \cdot 10^3$	$> 2 \cdot 10^3$
Argon (Ar)		$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Max. fore-vacuum pressure for					
Nitrogen (N ₂)	hPa	2.2	2.8	2.1	2.1
Gas throughput for					
Nitrogen (N ₂)	hPa l/s	67	67	84	84
Helium (He)	hPa l/s	> 67	> 67	> 84	> 84
Hydrogen (H ₂)	hPa l/s	> 67	> 67	> 84	> 84
Argon (Ar)	hPa l/s	20	25	> 37	> 37
Ultimate pressure	hPa	$< 6 \cdot 10^{-9}$	$< 6 \cdot 10^{-9}$	$< 6 \cdot 10^{-9}$	$< 6 \cdot 10^{-9}$
Rotation speed	RPM	39,000	31,000	25,000	25,000
Run-up time	min	< 6	< 8	< 10	< 10
Cooling type, Standard		Water	Water	Water	Water
Cooling water consumption	l/min	1.0	1.0	1.0	1.0
Cooling water temperature	°C	15 – 25	15 – 25	15 – 25	15 – 25
Power connection: voltage	V AC	200 – 240	200 – 240	200 – 240	200 – 240
Max. power consumption	W	650	1,000	1,000	1,000
Weight ¹⁾	kg	42	68	93	93

¹⁾Weight including drive electronics 8 kg

You can find additional technical data and accessories on the Internet at: www.pfeiffer-vacuum.com

Order numbers

Pump type	ATH 1600 MT				ATH 2300 MT		
Interface \ flange	DN 200 ISO-F	DN 200 CF-F	DN 250 ISO-F	DN 250 CF-F	DN 200 ISO-F	DN 250 ISO-F	DN 250 CF-F
External drive electronics	P6562100	P6522100	P6662100	P6622100	Q6562100	Q6662100	Q6622100
OBC V4 Profibus	PM56215A	PM52215A	PM66215A	PM62215A	QM56215A	QM66215A	QM62215A
OBC V4 Remote	PI56215A	PI52215A	PI66215A	PI62215A	QI56215A	QI66215A	QI62215A

Pump type	ATH 2800 MT		ATH 3200 MT	
Interface \ flange	DN 250 ISO-F	VG 250	DN 320 ISO-F	VG 350
External drive electronics	U6662100	U66A2100	U6C62100	U6DA2100

Further configurations on request.

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