



# Turbopumps

For perfect vacuum solutions to challenging applications

# Turbopumps

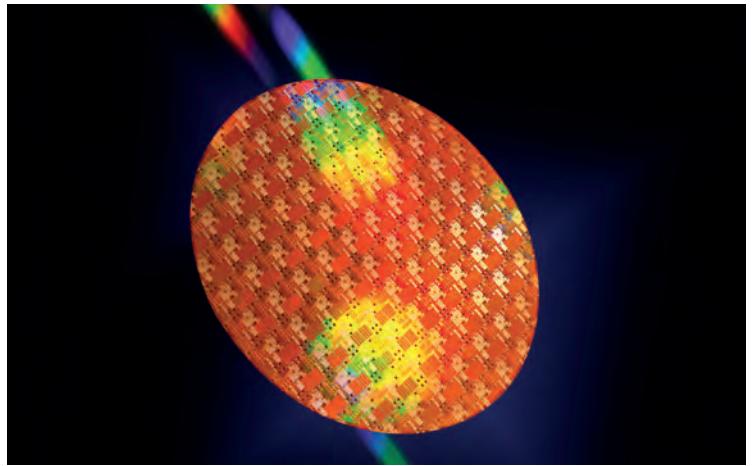
The complete range



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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 2,700 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:

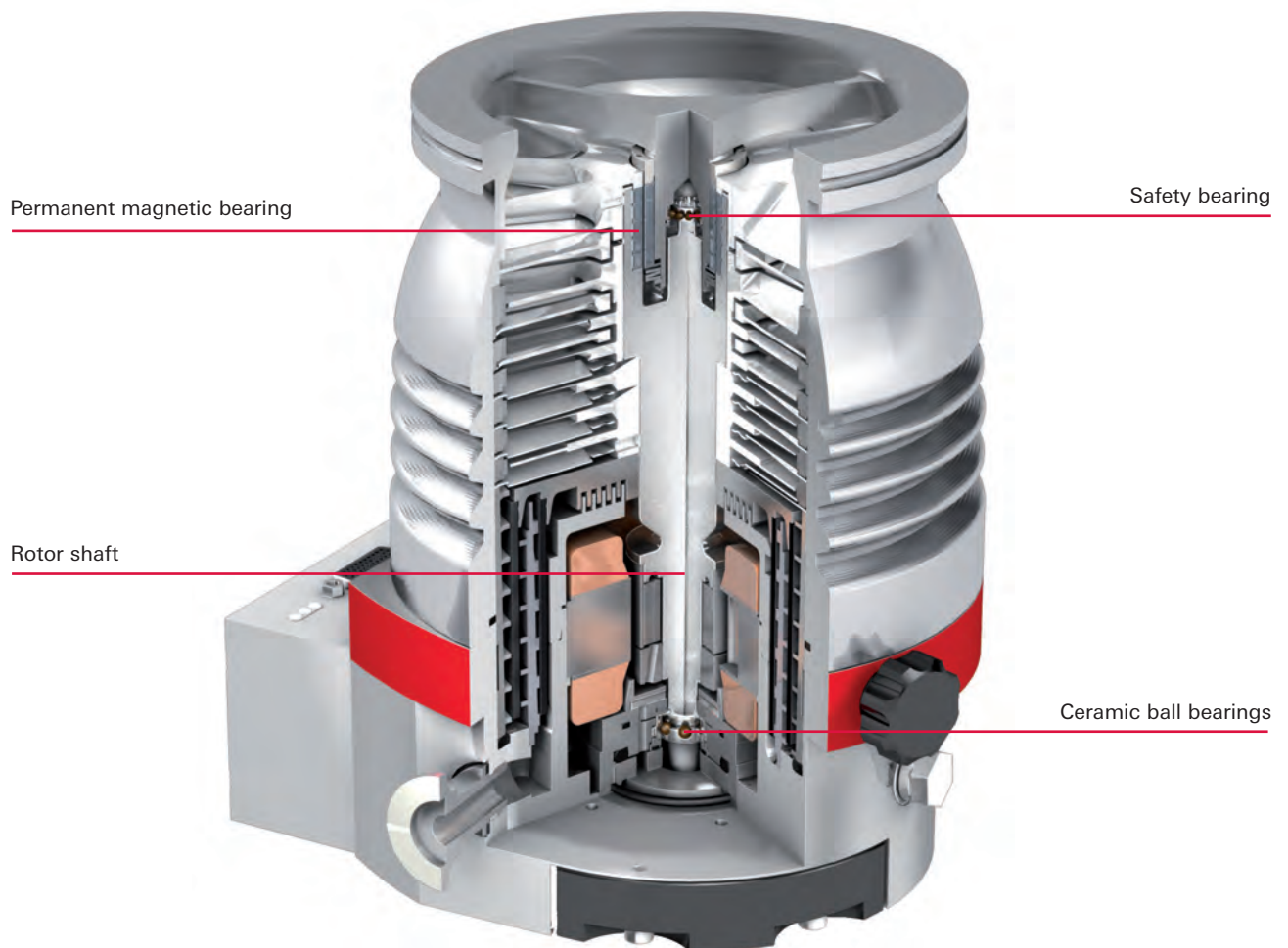
Compact, magnetically levitated turbopumps in the pumping speed class from 1,300 to 2,700 l/s. High backing pump compatibility. Very high gas throughput. Outstanding long-term stability.



## Bearing technologies

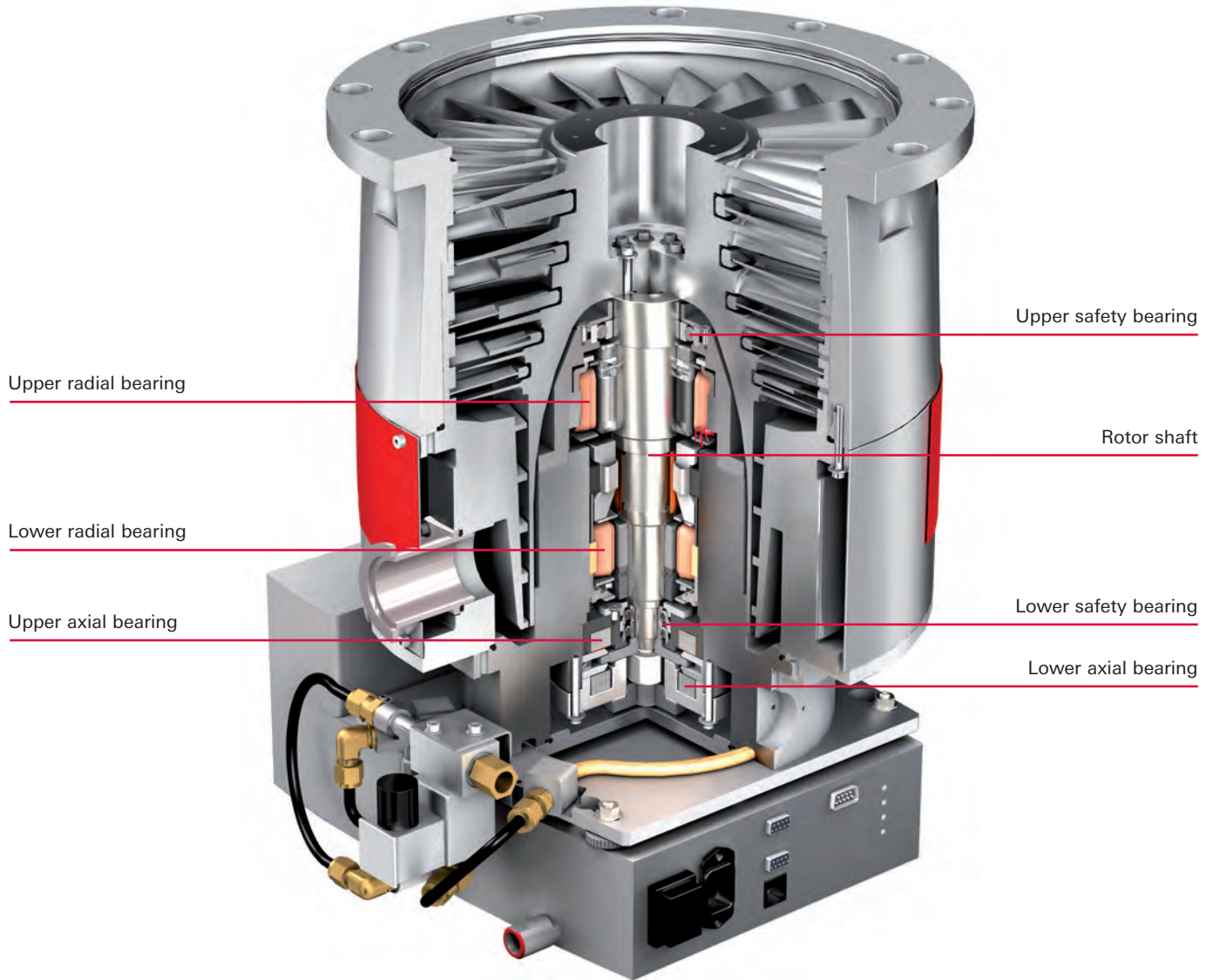
### Hybrid bearing

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.



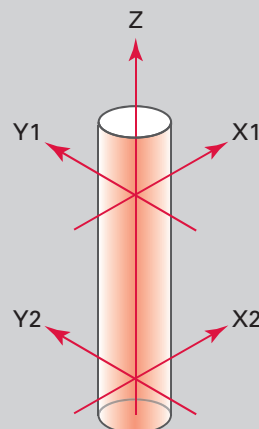
## Magnetic levitation

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.



## 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 speeds 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

### Advantages at a glance

- 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 orientation<sup>1)</sup>
- 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

<sup>1)</sup> HiPace 300 C, 0° to 90°



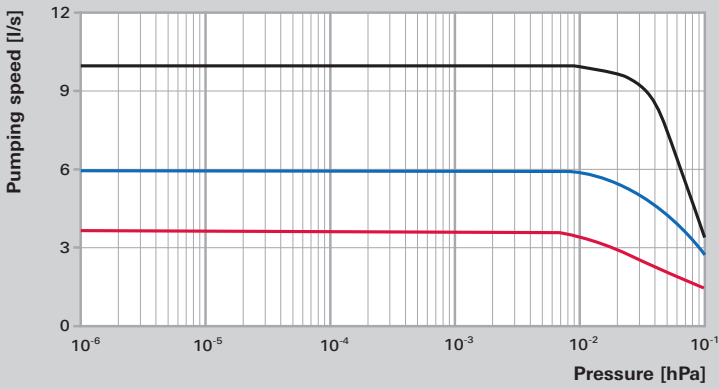


## Pumping speeds and dimensions

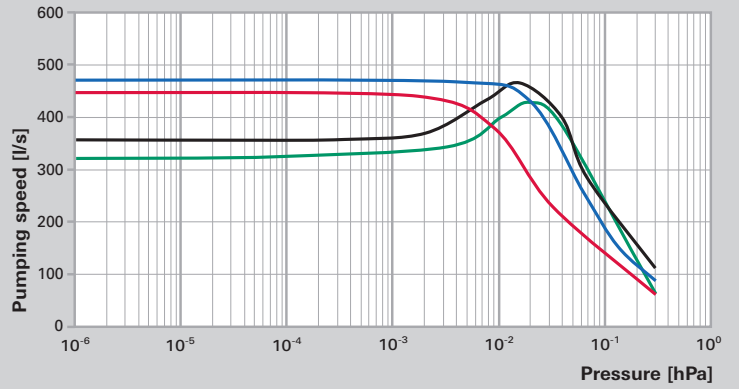
### Pumping speed

N<sub>2</sub> —  
 He —  
 H<sub>2</sub> —  
 Ar —

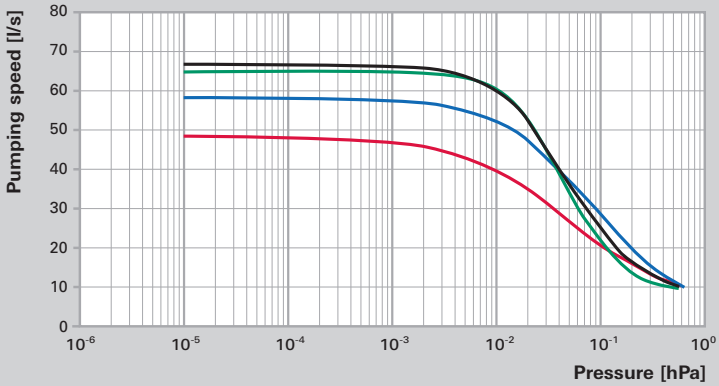
HiPace<sup>®</sup> 10, DN 25



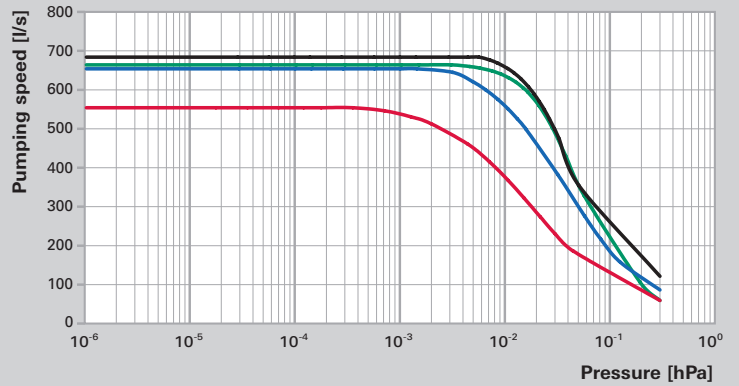
HiPace<sup>®</sup> 400, DN 100



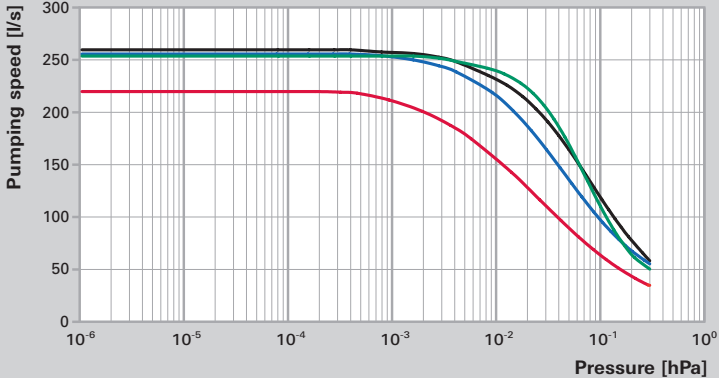
HiPace<sup>®</sup> 80, DN 63



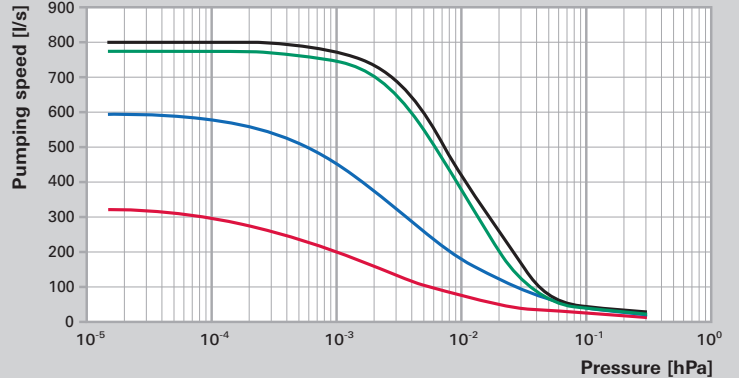
HiPace<sup>®</sup> 700, DN 160



HiPace<sup>®</sup> 300, DN 100

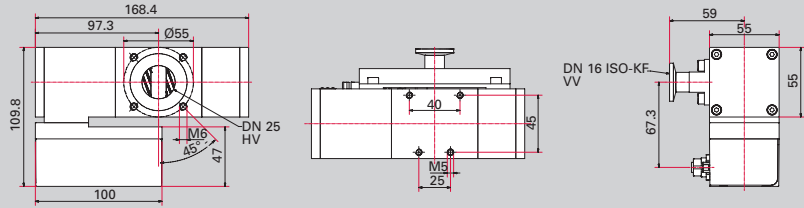


HiPace<sup>®</sup> 800, DN 200

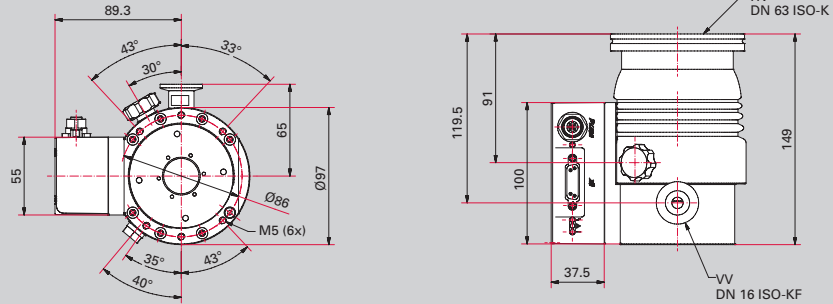


## Dimensions

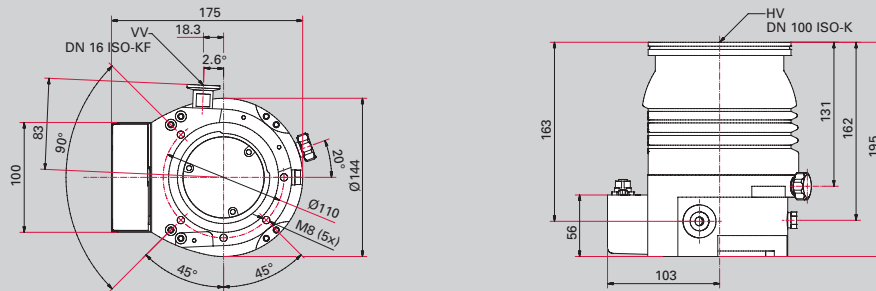
HiPace® 10,  
DN 25 with TC 110



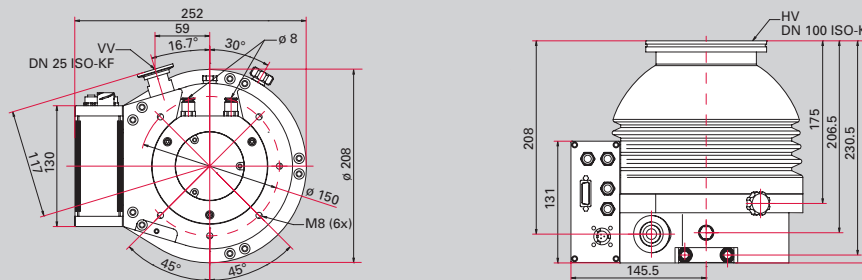
HiPace® 80,  
DN 63 ISO-K with TC 110



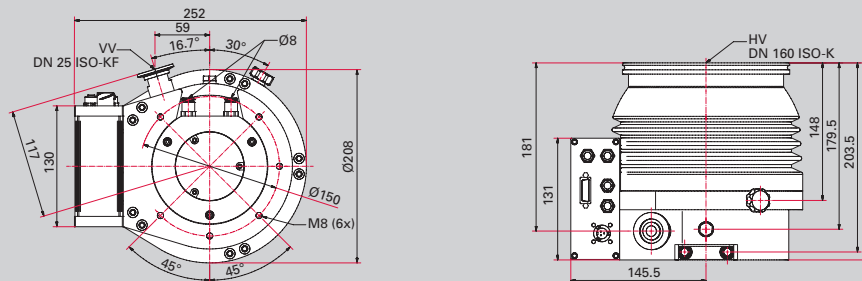
HiPace® 300,  
DN 100 ISO-K with TC 110



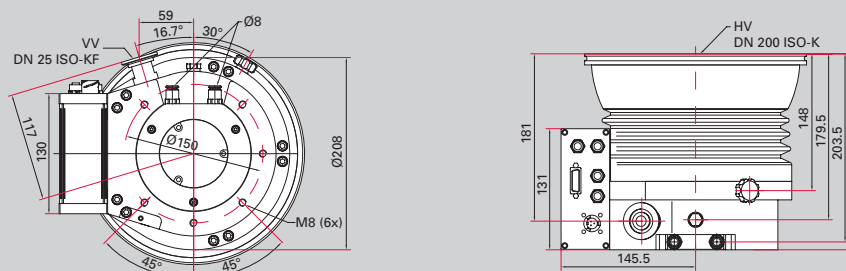
HiPace® 400,  
DN 100 ISO-K with TC 400



HiPace® 700,  
DN 160 ISO-K with TC 400



HiPace® 800,  
DN 200 ISO-K with TC 400



## Technical data and order numbers

### Technical data

Pump type	Unit	HiPace® 10	HiPace® 80	HiPace® 300 <sup>1)</sup>	HiPace® 300 <sup>2)</sup>
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 <sub>2</sub> )	l/s	10	67	260	260
Helium (He)	l/s	6	58	255	255
Hydrogen (H <sub>2</sub> )	l/s	3.7	48	220	220
Argon (Ar)	l/s	11.5	66	255	255
Compression ratio for:					
Nitrogen (N <sub>2</sub> )		$3 \cdot 10^6$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Helium (He)		$3 \cdot 10^3$	$1.3 \cdot 10^7$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Hydrogen (H <sub>2</sub> )		$3 \cdot 10^2$	$1.4 \cdot 10^5$	$9 \cdot 10^5$	$9 \cdot 10^5$
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 <sub>2</sub> )	hPa	25	22	15	20
Max. gas throughput at full rotational speed for					
Nitrogen (N <sub>2</sub> )	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 <sup>3)</sup>	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

<sup>1)</sup>with drive electronics TC 110

<sup>2)</sup>with drive electronics TC 400

<sup>3)</sup>with drive electronics

You can find additional technical data and accessories on the Internet at: [www.pfeiffer-vacuum.com](http://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 <sub>2</sub> )	l/s	355	685	790
Helium (He)	l/s	470	655	700
Hydrogen (H <sub>2</sub> )	l/s	445	555	580
Argon (Ar)	l/s	320	665	780
Compression ratio for:				
Nitrogen (N <sub>2</sub> )		$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Helium (He)		$3 \cdot 10^7$	$3 \cdot 10^7$	$3 \cdot 10^7$
Hydrogen (H <sub>2</sub> )		$4 \cdot 10^5$	$4 \cdot 10^5$	$4 \cdot 10^5$
Argon (Ar)		$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Max. fore-vacuum pressure for				
Nitrogen (N <sub>2</sub> )	hPa	11	11	11
Max. gas throughput at full rotational speed for				
Nitrogen (N <sub>2</sub> )	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 <sup>1)</sup>	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

<sup>1)</sup>with drive electronics

You can find additional technical data and accessories on the Internet at: [www.pfeiffer-vacuum.com](http://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

## **Advantages at a glance**

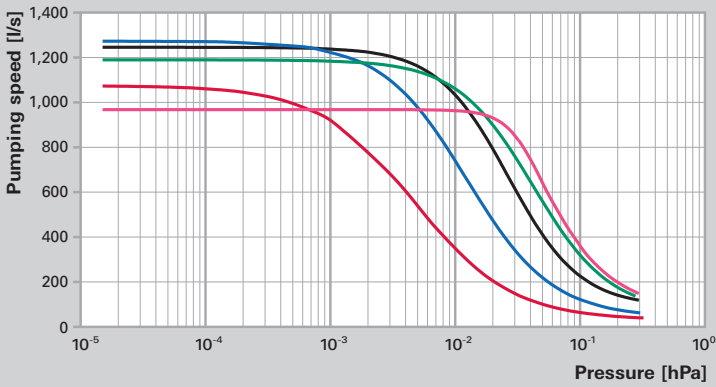
- Four sizes with pumping speeds from 1,000 to 2,000 l/s
- High pumping speed for light gases (H<sub>2</sub>, He) and heavy gases (Ar, CF<sub>4</sub>)
- High gas throughput, even for heavy gases (Ar, CF<sub>4</sub>)
- Installation position 0° to 90° and 90° to 180° available
- Corrosive gas version (C-types) 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



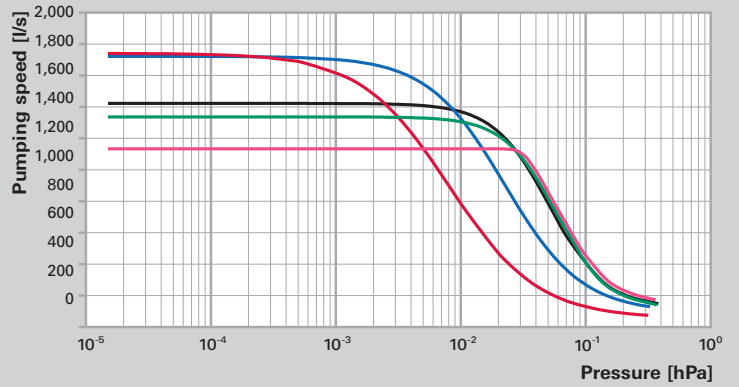
## Pumping speed and dimensions

### Pumping speed

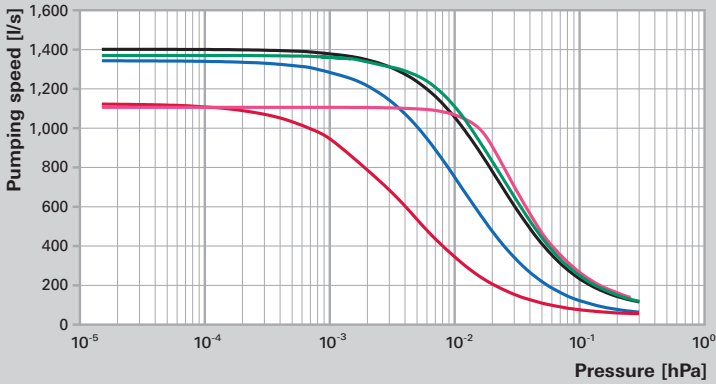
HiPace<sup>®</sup> 1200, DN 200



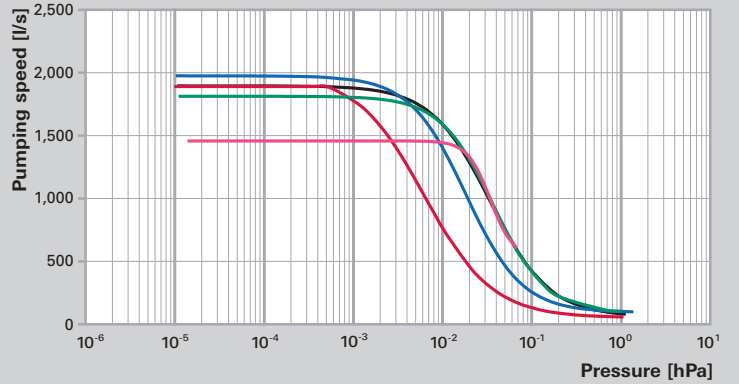
HiPace<sup>®</sup> 1800, DN 200



HiPace<sup>®</sup> 1500, DN 250



HiPace<sup>®</sup> 2300, DN 250

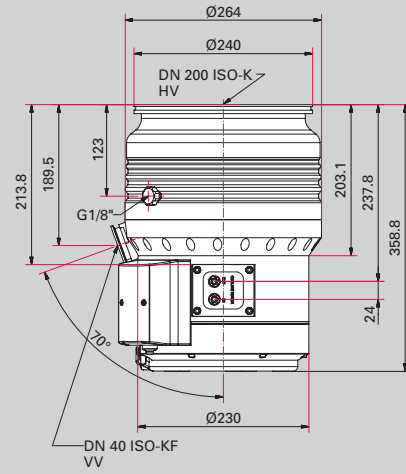
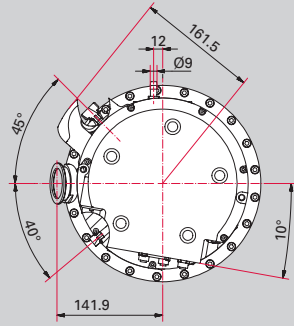


N<sub>2</sub> ———  
 He ———  
 H<sub>2</sub> ———  
 Ar ———  
 CF<sub>4</sub> ———

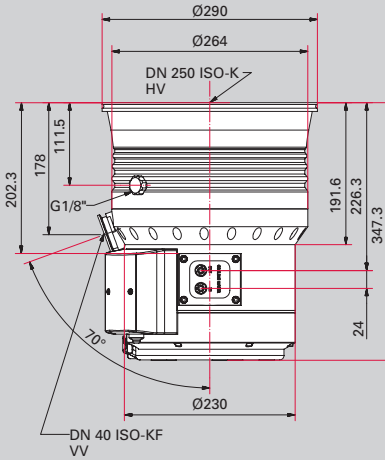
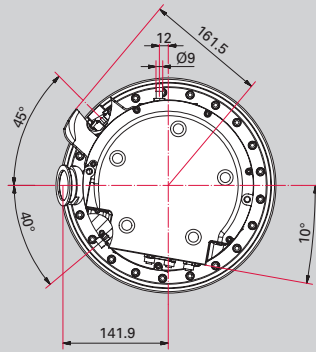


## Dimensions

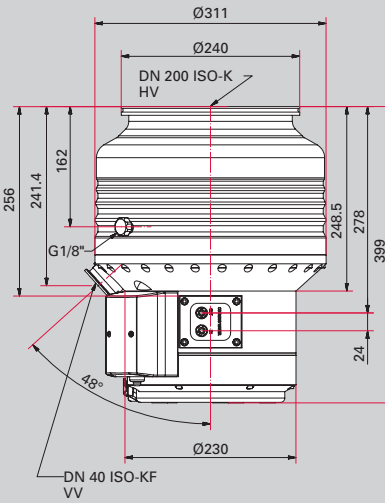
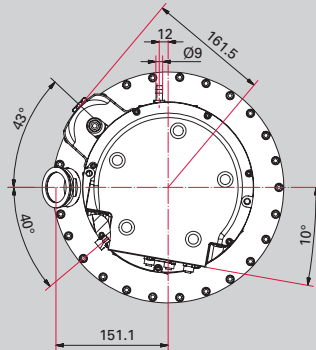
HiPace® 1200,  
DN 200 ISO-K



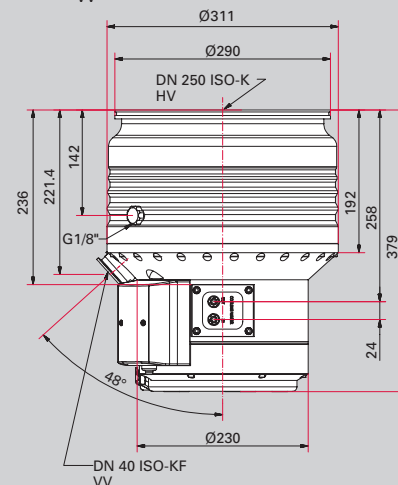
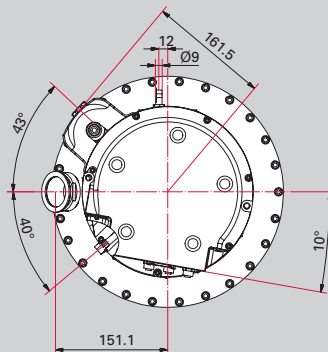
HiPace® 1500,  
DN 250 ISO-K



HiPace® 1800,  
DN 200 ISO-K



HiPace® 2300,  
DN 250 ISO-K



## 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 <sub>2</sub> )	l/s	1,250	1,450	1,450	1,900
Helium (He)	l/s	1,300	1,350	1,650	2,050
Hydrogen (H <sub>2</sub> )	l/s	1,100	1,150	1,700	1,850
Argon (Ar)	l/s	1,200	1,400	1,370	1,850
Tetrafluoromethane (CF <sub>4</sub> )	l/s	950	1,100	1,050	1,450
Compression ratio for					
Nitrogen (N <sub>2</sub> )		$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Helium (He)		$2 \cdot 10^5$	$2 \cdot 10^5$	$3 \cdot 10^5$	$3 \cdot 10^5$
Hydrogen (H <sub>2</sub> )		$6 \cdot 10^3$	$6 \cdot 10^3$	$2 \cdot 10^4$	$2 \cdot 10^4$
Argon (Ar)		$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Tetrafluoromethane (CF <sub>4</sub> )		$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Max. fore-vacuum pressure for					
Nitrogen (N <sub>2</sub> )	hPa	2	2	1.8	1.8
Max. gas throughput at full rotational speed for					
Nitrogen (N <sub>2</sub> )	hPa l/s	20	20	20	20
Helium (He)	hPa l/s	> 30	> 30	20	20
Hydrogen (H <sub>2</sub> )	hPa l/s	> 30	> 30	> 30	> 30
Argon (Ar)	hPa l/s	11	11	16	16
Tetrafluoromethane (CF <sub>4</sub> )	hPa l/s	12	12	14	14
Ultimate pressure <sup>1)</sup>	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 <sup>2)</sup>	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

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

<sup>2)</sup>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](http://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
<b>Pump type</b>	<b>HiPace® 1200, DN 200, TC 1200</b>					
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
<b>Pump type</b>	<b>HiPace® 1500, DN 250, TC 1200</b>					
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
<b>Pump type</b>	<b>HiPace® 1800, DN 200, TC 1200</b>					
Standard version	PM P04 070	PM P04 071	–	PM P04 073	PM P04 074	–
Corrosive gas version	PM P04 076	PM P04 077	–	PM P04 078	PM P04 079	–
<b>Pump type</b>	<b>HiPace® 2300, DN 250, TC 1200</b>					
Standard version	PM P03 920	PM P03 921	PM P03 922	PM P03 923	PM P03 924	PM P03 925
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

## Advantages at a glance

- 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

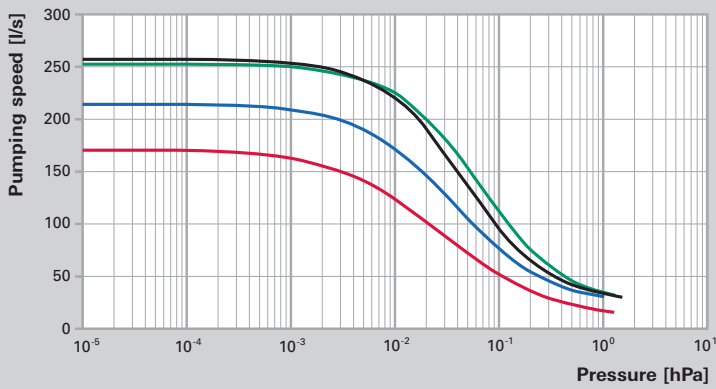




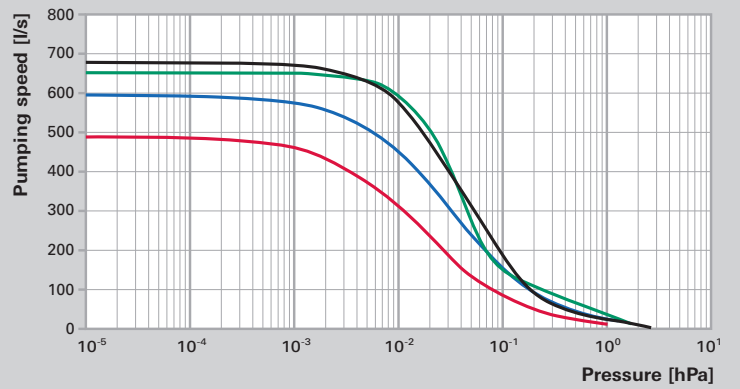
## Pumping speed and dimensions

### Pumping speed

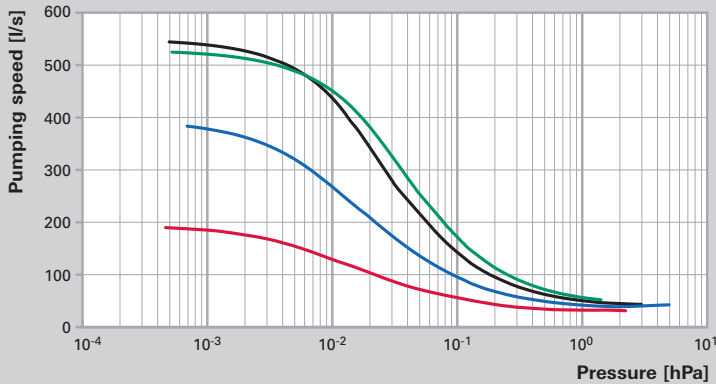
HiPace® 300 M, DN 100



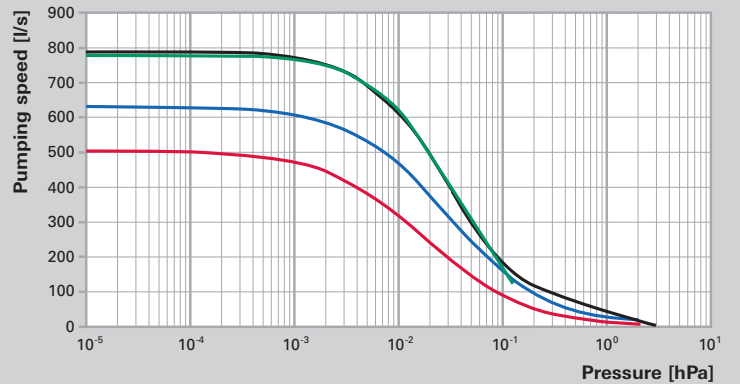
HiPace® 700 M, DN 160



ATH 500 M, DN 160



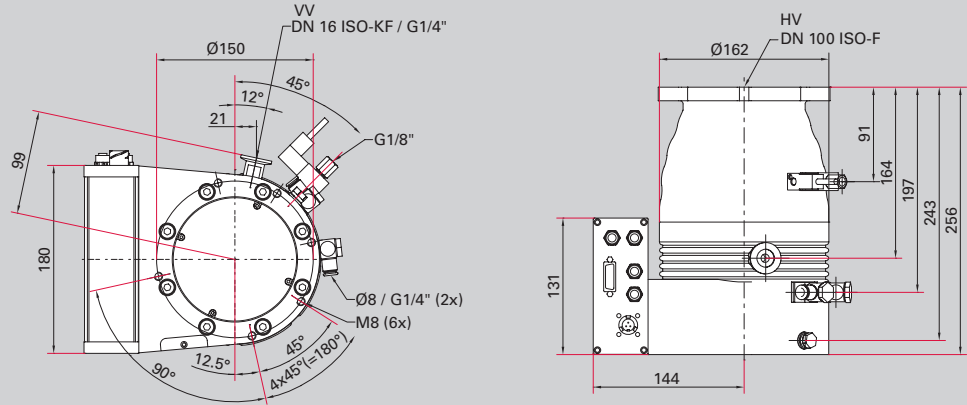
HiPace® 800 M, DN 200



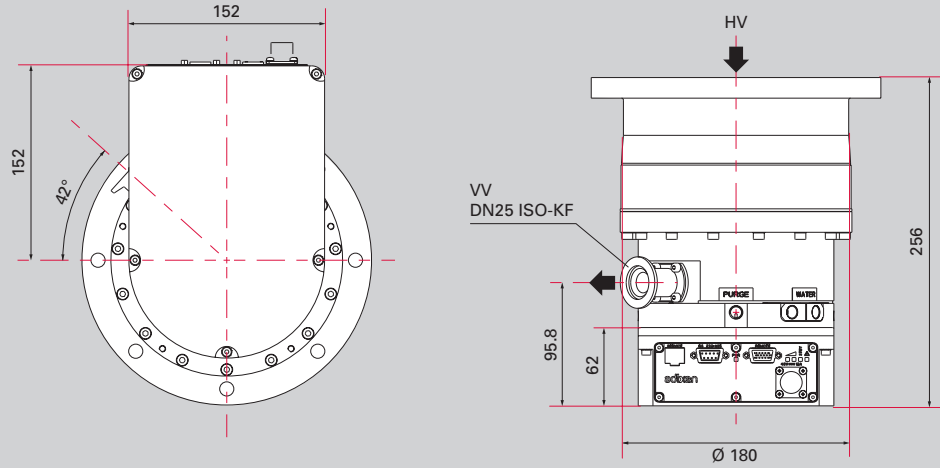
N<sub>2</sub> ———  
 He ———  
 H<sub>2</sub> ———  
 Ar ———

## Dimensions

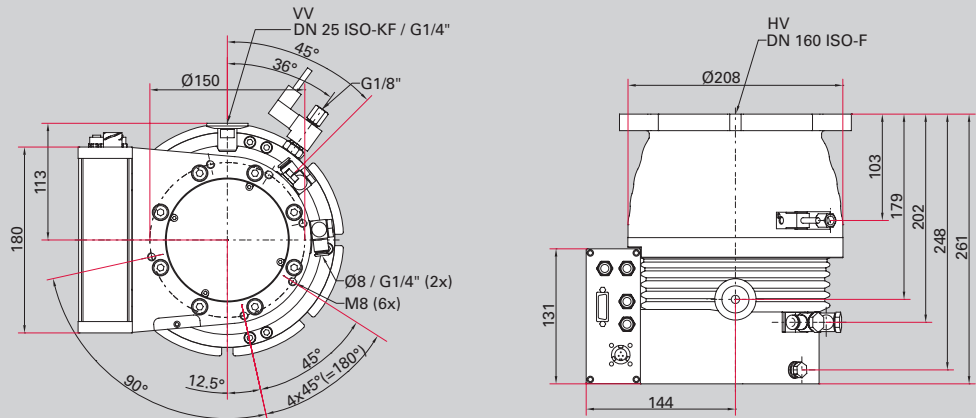
HiPace® 300 M,  
DN 100 ISO-F



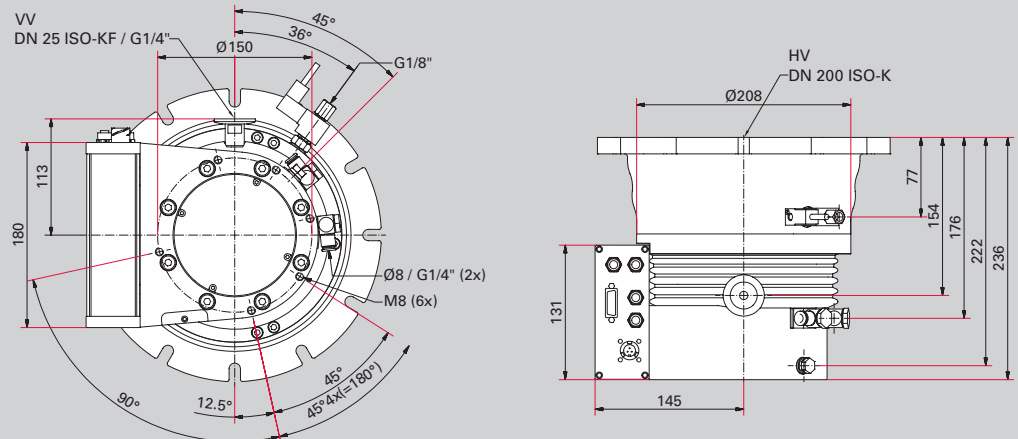
ATH 500 M,  
DN 160 ISO-F



HiPace® 700 M,  
DN 160 ISO-F



HiPace® 800 M,  
DN 200 ISO-F



## Technical data and order numbers

### Technical data

Pump type	Unit	HiPace <sup>®</sup> 300 M	ATH 500 M	HiPace <sup>®</sup> 700 M	HiPace <sup>®</sup> 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 <sub>2</sub> )	l/s	255	520	685	790
Helium (He)	l/s	215	350	600	625
Hydrogen (H <sub>2</sub> )	l/s	170	190	480	500
Argon (Ar)	l/s	250	500	660	775
Compression ratio for					
Nitrogen (N <sub>2</sub> )		$> 1 \cdot 10^{11}$	$> 2 \cdot 10^7$	$> 1 \cdot 10^{11}$	$> 1 \cdot 10^{11}$
Helium (He)		$> 1 \cdot 10^8$	$> 1 \cdot 10^4$	$> 1 \cdot 10^7$	$> 1 \cdot 10^7$
Hydrogen (H <sub>2</sub> )		$5 \cdot 10^5$	$> 2 \cdot 10^2$	$2 \cdot 10^5$	$2 \cdot 10^5$
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 <sub>2</sub> )	hPa	20	2.6	8	8
Max. gas throughput at full rotational speed for					
Nitrogen (N <sub>2</sub> )	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 <sup>1)</sup>	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

<sup>1)</sup>with drive electronics

You can find additional technical data and accessories on the Internet at: [www.pfeiffer-vacuum.com](http://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, air 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 1600–3200 M, ATP 2300 M

**Compact, magnetically levitated turbopumps  
in the pumping speed class of 1,300 to 2,700 l/s**

## Reliable

Our turbopumps in the ATH M and ATP<sup>1)</sup> 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.

<sup>1)</sup>ATP = no Holweck stage



ATH 1603 M,  
with drive electronics



ATH 2303 M,  
with drive electronics



ATH 2800 M



ATH 3200 M

## Advantages at a glance

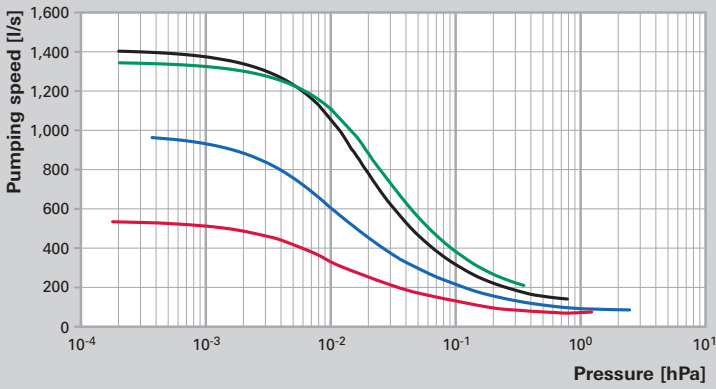
- Clean vacuum thanks to lubricant-free magnetic bearings
- Very high gas throughput for all process gases
- Outstanding long-term stability and reliability
- High backing pump compatibility
- High air ingress stability
- Low lifetime costs due to maintenance-free technology
- Freely selectable rotation 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



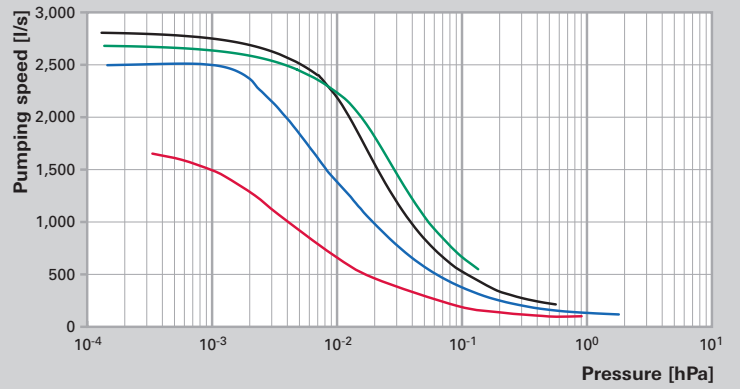
## Pumping speed and dimensions

### Pumping speed

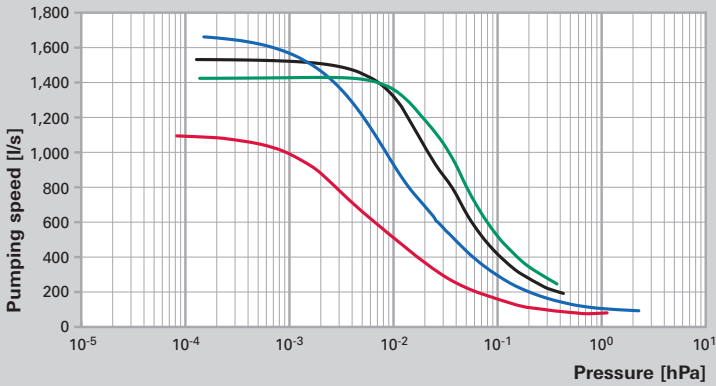
ATH 1603 M, DN 250



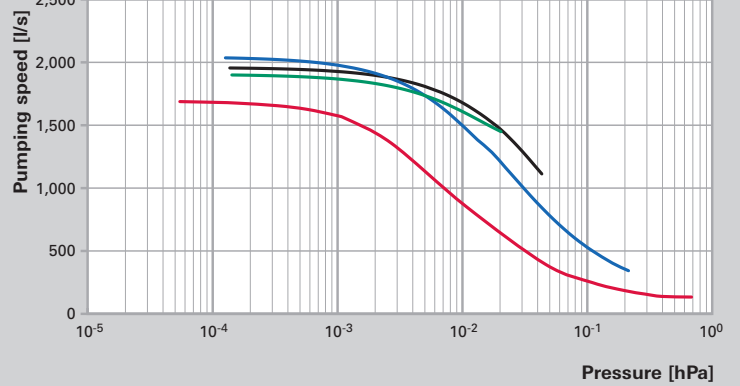
ATH 3200 M, DN 320



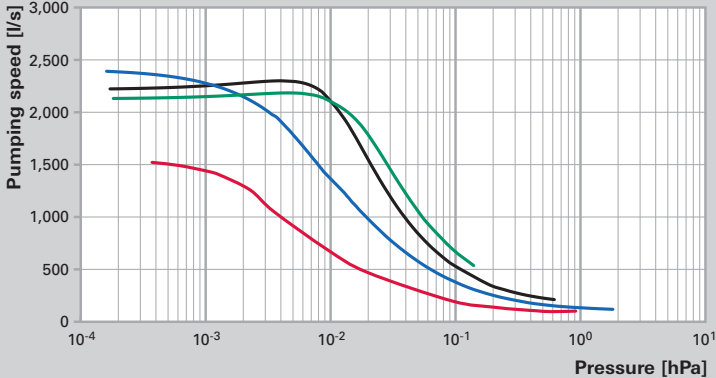
ATH 2303 M, DN 250



ATP 2300 M, DN 250



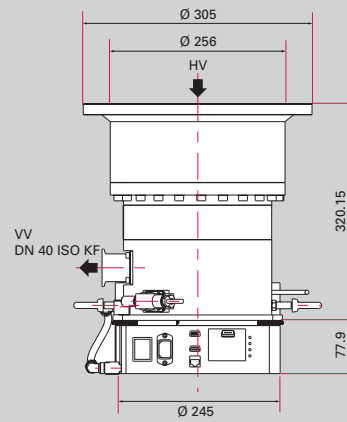
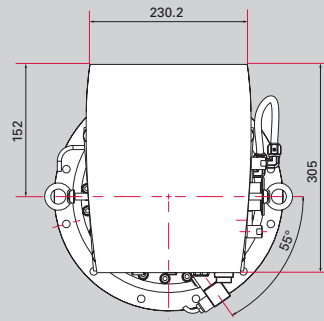
ATH 2800 M, DN 250



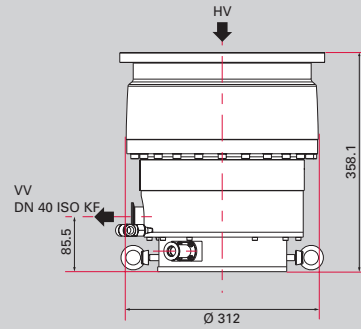
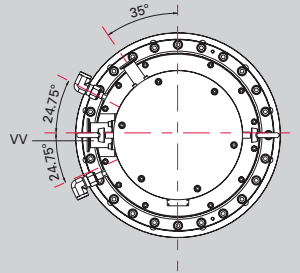
N<sub>2</sub> —  
 He —  
 H<sub>2</sub> —  
 Ar —

## Dimensions

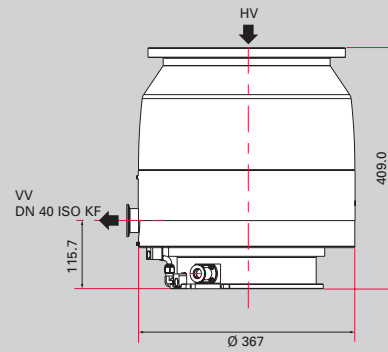
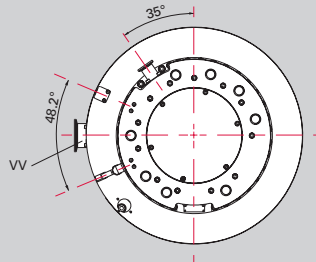
ATH 1603 M,  
DN 250 ISO-F,  
with integrated  
drive electronics



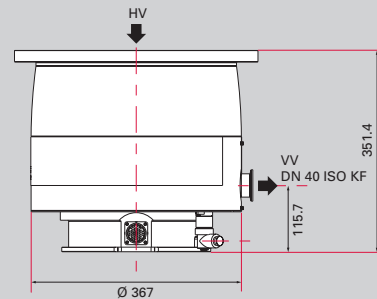
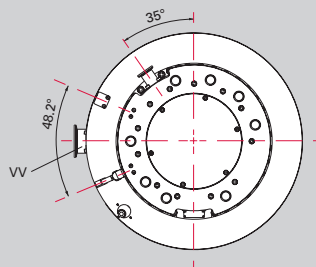
ATH 2303 M,  
DN 250 ISO-F



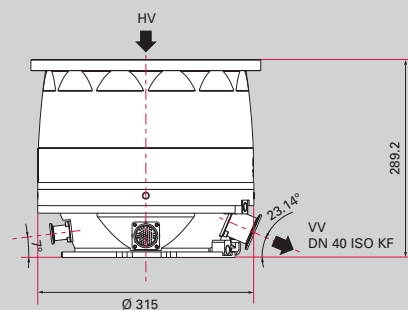
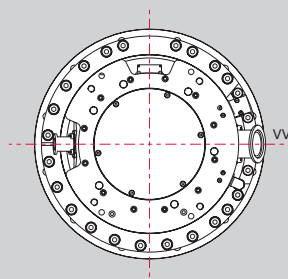
ATH 2800 M,  
DN 250 ISO-F



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 <sub>2</sub> )	l/s	1,370	1,950	2,150	2,700	1,850
Helium (He)	l/s	1,100	1,500	2,200	2,400	1,800
Hydrogen (H <sub>2</sub> )	l/s	550	1,200	1,750	1,800	1,700
Argon (Ar)	l/s	1,300	1,850	2,100	2,500	1,750
Compression ratio for						
Nitrogen (N <sub>2</sub> )		$> 6 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Helium (He)		$> 4 \cdot 10^4$	$> 3 \cdot 10^4$	$> 3 \cdot 10^4$	$> 3 \cdot 10^4$	$> 1 \cdot 10^5$
Hydrogen (H <sub>2</sub> )		$> 5 \cdot 10^2$	$> 1 \cdot 10^3$	$> 2 \cdot 10^3$	$> 2 \cdot 10^3$	$> 7 \cdot 10^3$
Argon (Ar)		$> 1,7 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$	$> 1 \cdot 10^8$
Max. fore-vacuum pressure for						
Nitrogen (N <sub>2</sub> )	hPa	1.7	2.9	2.1	2.1	2.1
Gas throughput for						
Nitrogen (N <sub>2</sub> )	hPa l/s	67	67	84	84	37
Helium (He)	hPa l/s	$> 67$	$> 67$	$> 84$	$> 84$	$> 50$
Hydrogen (H <sub>2</sub> )	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 <sup>1)</sup>	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
Profibus	YY56210A	YY52210A	YY66210A	YY62210A	XY66210A	XY62210A
DeviceNet	YV56210A	YV52210A	YV66210A	YV62210A	XV66210A	XV62210A
Remote	YS56210A	YS52210A	YS66210A	YS62210A	XS66210A	XS62210A

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
Profibus					TY66210A	TY62210A
DeviceNet					TV66210A	TV62210A
Remote					TS66210A	TS62210A

## 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 <sub>2</sub> )	l/s	1,370	1,950	2,150	2,700
Helium (He)	l/s	1,100	1,500	2,200	2,400
Hydrogen (H <sub>2</sub> )	l/s	550	1,200	1,750	1,800
Argon (Ar)	l/s	1,300	1,850	2,100	2,500
Compression ratio for					
Nitrogen (N <sub>2</sub> )		> 5 · 10 <sup>8</sup>	> 1 · 10 <sup>8</sup>	> 1 · 10 <sup>8</sup>	> 1 · 10 <sup>8</sup>
Helium (He)		> 4 · 10 <sup>4</sup>	> 3 · 10 <sup>4</sup>	> 3 · 10 <sup>4</sup>	> 3 · 10 <sup>4</sup>
Hydrogen (H <sub>2</sub> )		> 5 · 10 <sup>2</sup>	> 2 · 10 <sup>3</sup>	> 2 · 10 <sup>3</sup>	> 2 · 10 <sup>3</sup>
Argon (Ar)		> 2 · 10 <sup>8</sup>	> 1 · 10 <sup>8</sup>	> 1 · 10 <sup>8</sup>	> 1 · 10 <sup>8</sup>
Max. fore-vacuum pressure for					
Nitrogen (N <sub>2</sub> )	hPa	2.2	2.8	2.1	2.1
Gas throughput for					
Nitrogen (N <sub>2</sub> )	hPa l/s	67	67	84	84
Helium (He)	hPa l/s	> 67	> 67	> 84	> 84
Hydrogen (H <sub>2</sub> )	hPa l/s	> 67	> 67	> 84	> 84
Argon (Ar)	hPa l/s	20	25	> 37	> 37
Ultimate pressure	hPa	< 6 · 10 <sup>-9</sup>	< 6 · 10 <sup>-9</sup>	< 6 · 10 <sup>-9</sup>	< 6 · 10 <sup>-9</sup>
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 <sup>1)</sup>	kg	42	68	93	93

<sup>1)</sup>Weight including drive electronics 8 kg

You can find additional technical data and accessories on the Internet at: [www.pfeiffer-vacuum.com](http://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
Profibus	PY56210A	PY52210A	PY66210A	PY62210A	QY56210A	QY66210A	QY62210A
Remote	PS56210A	PS52210A	PS66210A		QS56210A	QS66210A	QS62210A

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	U6A62100	U6C62100	U6DA2100

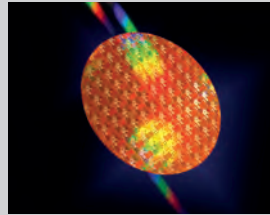
# Vacuum Solutions from a single Source

## Market segments and applications

### The Vacuum solution

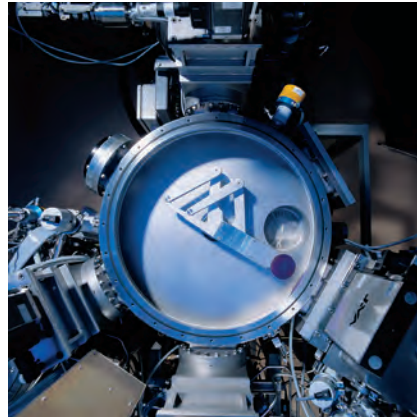
Providing solutions means understanding the customer. One vacuum is not just like another vacuum, the key lies in the specific requirements. Which process should be used with which materials to produce the right results? Under which environmental conditions? Our customers demand sophisticated and intelligent results – and rightly so. Their vacuums have to deliver stability and low-maintenance pumps as well as reduced energy and resource consumption.

A complete vacuum solution covers all processes and steps involved in creating perfect vacuum conditions including consultation, products, accessories, application training programs and service. Our customers' requirements usually involve a high level of complexity. They not only include the precise vacuum requirements but also specific needs covering the entire system, the materials and products to be used and processed as well as process conditions. This is why we develop customized vacuum solutions handinhand with our customers.



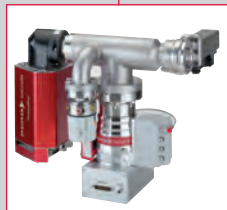
### Semiconductor

Sputter system



### Customer benefits

- Extra long service intervals
- Low energy consumption of the vacuum pumps
- On-site service for all product lines from a single source

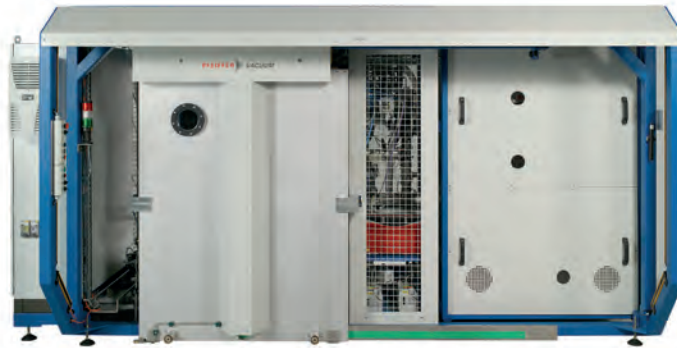


# Vacuum Solutions from a single Source

## Market segments and applications

### Industry

Leak detection



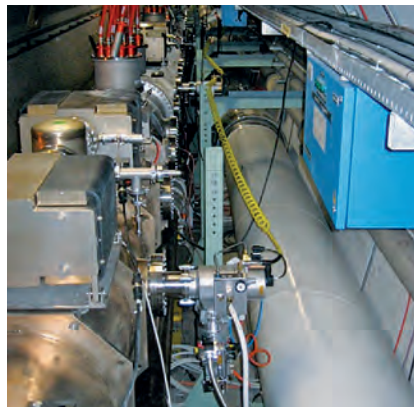
### Customer benefits

- Detection of smallest leakages
- High reproducibility
- High throughput and fast cycle times
- Maximum environmental benefit
- On-site service for all product lines from a single source



### Research & Development

Accelerator



### Customer benefits

- High reliability
- Special solution for accelerator applications
- Resistant to radioactive radiation
- Easy maintenance
- Highest quality and availability
- On-site service for all product lines from a single source





# Vacuum Solutions from a single Source

## Market segments and applications

### Coating

Glass coating



#### Customer benefits

- Unmatched Cost of ownership thanks to optimum pump design
- High availability due to robust design
- Largest product range in vacuum technology
- On-site service for all product lines from a single source



### Analytics

Mass spectrometry



#### Customer benefits

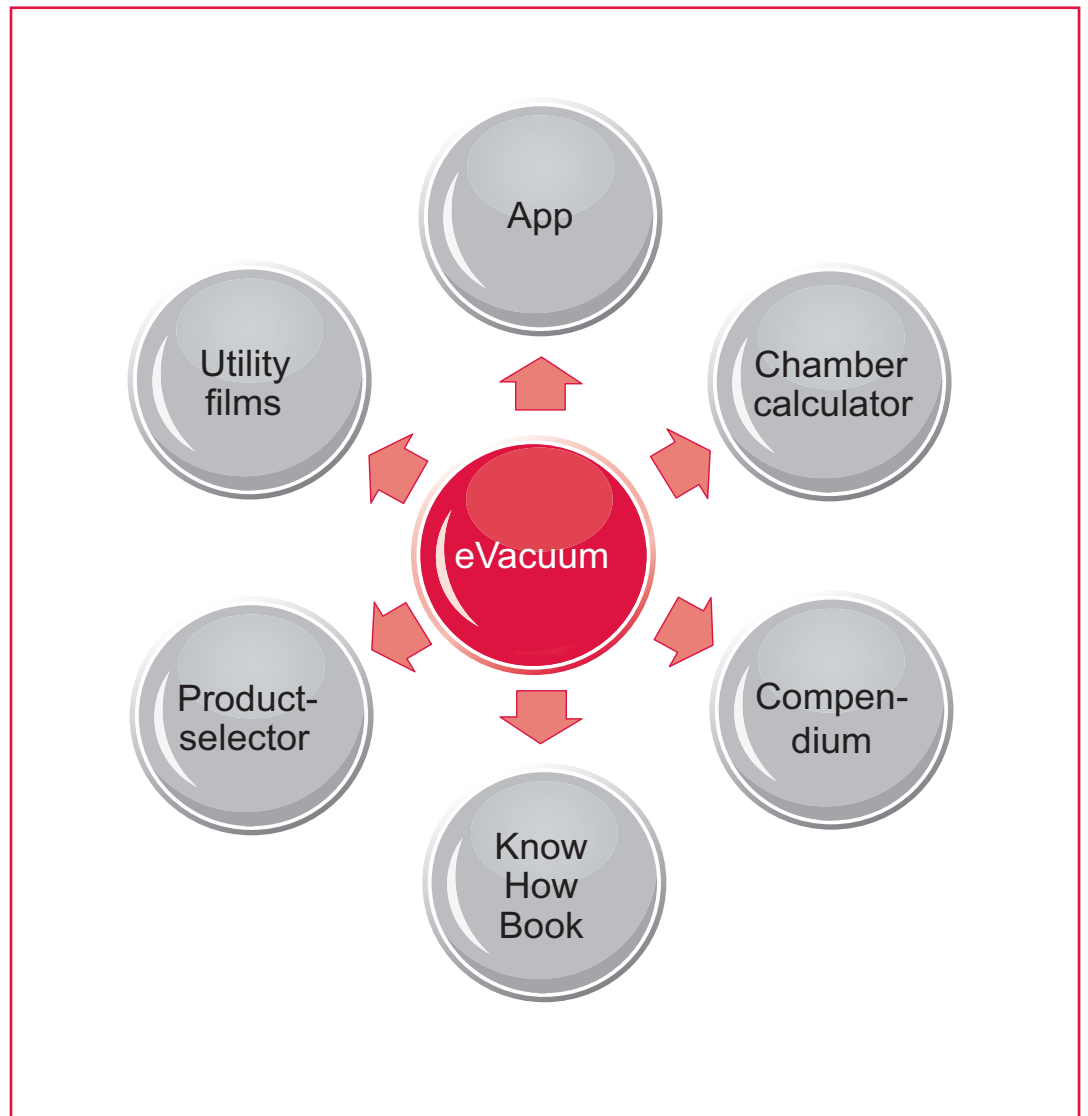
- Specially coordinated component selection
- Common interfaces and easy control
- Synchronization of vacuum generation and -measuring
- On-site service for all product lines from a single source



# Vacuum Solutions from a single Source

## Market segments and applications

### eVacuum



#### Customer benefits

- Central point of contact for questions concerning vacuum technology for customers and employees
- Simple, comprehensive and interactive knowledge





# Vacuum Solutions from a single Source

## Product overview









# Vacuum Solutions from a single Source




## Product overview

## Vacuum generation

### Rotary vane pumps

Single-stage			Two-stage		
					
<b>UnoLine Plus</b> Pumping speed 250 up to 500 m <sup>3</sup> /h	<b>HenaLine</b> Pumping speed 25 up to 1,000 m <sup>3</sup> /h	<b>Pascal</b> Pumping speed 5.4 up to 15 m <sup>3</sup> /h	<b>PentaLine</b> Pumping speed 22 up to 34 m <sup>3</sup> /h	<b>DuoLine</b> Pumping speed 1.25 up to 250 m <sup>3</sup> /h	<b>Pascal</b> Pumping speed 5.4 up to 60 m <sup>3</sup> /h

### Turbopumps

Hybrid bearing	Magnetically levitated	Multi-stage
		
<b>HiPace</b> Pumping speed 10 up to 2,000 l/s	<b>ATH M/HiPace M</b> Pumping speed 255 up to 2,600 l/s	<b>SplitFlow</b> Pumping speed according to requirement

### Dia-phragm pumps



**MVP**  
Pumping speed  
0.25 up to 9.6 m<sup>3</sup>/h

### Piston pumps





**XtraDry**  
Pumping speed  
7.5 up to 13 m<sup>3</sup>/h

### Screw pumps







**HeptaDry**  
Pumping speed  
110 up to 525 m<sup>3</sup>/h

### Roots pumps

Air cooled	Gas cooled
	
<b>OktaLine</b> Pumping speed 250 up to 25,000 m <sup>3</sup> /h	<b>OktaLine G</b> Pumping speed 250 up to 12,000 m <sup>3</sup> /h

### Roots pumping stations

With single-stage backing pump	With two-stage backing pump	With dry backing pump	Compact pumping station
			
<b>CombiLine WU</b> Ultimate pressure up to 2 · 10 <sup>-3</sup> hPa	<b>CombiLine WD</b> Ultimate pressure up to 5 · 10 <sup>-4</sup> hPa	<b>CombiLine WH</b> Ultimate pressure up to 2 · 10 <sup>-3</sup> hPa	<b>LRS</b> Pumping speed 150 up to 1,000 m <sup>3</sup> /h

### Side channel pumps




**OnTool Booster**  
Pumping speed  
130 m<sup>3</sup>/h

### Multistage Roots pumps

Light duty				Medium duty	Harsh duty
					
<b>ACP 15-40</b> Dry and compact	<b>A100L</b> Integrated load lock pump	<b>ACP 120/ACG 600</b> Dry, for industrial application	<b>A3P Serie</b> Energy efficient process pump	<b>A3H Serie</b> Harsh processes for semiconductor industry	

### Turbo pumping stations

Compact	Standard	High performance
		
<b>HiCube Eco</b> Pumping speed 35 up to 67 l/s	<b>HiCube Classic</b> Pumping speed 35 up to 685 l/s	<b>HiCube Pro</b> Pumping speed 35 up to 685 l/s, short pump-down time

# Vacuum Solutions from a single Source

## Product overview

### Vacuum measurement    Vacuum analysis

#### Measurement equipment

**Analog**    **Digital**    **Modular**



ActiveLine  
Total pressure  
measurement



DigiLine  
Total pressure  
measurement



ModulLine  
Total pressure  
measurement for R&D

#### Analysis equipment

**Residual gas analysis**    **Gas analysis**    **Plasma analysis**



PrismaPlus  
Mass spectrometer  
Mass range  
1-300 amu



HiQuad  
Mass spectrometer  
Mass range  
1-2048 amu



OmniStar  
Compact benchtop  
analysis system



HPA  
High Pressure Analyzer  
Pressure range  
up to 50 hPa



SPM  
Sputter Process Monitor  
Pressure range  
up to 10 hPa



PPM  
Plasma Process  
Monitor 1-1024 amu

### Leak detection and leak testing

#### Leak detectors

**Portable**    **Compact**    **High performance**



MiniTest  
Mobile, even for  
harsh environments



ASM 310  
Mobile service use



ASM 142  
High performance  
all-rounder



ASM 142 D  
Dry all-rounder



ASM 380  
Dry and mobile



ASM 182 T  
Robust industry  
standard



ASM 192 T  
Flexible console  
devices

#### Leak detectors

**Workstation**    **Modular**    **Sniffing leak detection**



ASM 1002  
Ergonomical  
test station



ASI 30  
Industrial leak  
detection systems



ASM 102 S  
Dry and portable



ASM 142 S  
Stationary sniffing  
test station

# Vacuum Solutions from a single Source

## Product overview

## Vacuum components

### Chambers

**Standard**



TrinosLine  
Cubical, horizontal/  
vertical, modular

**Customized**



TrinosLine  
Customized for specific  
customer applications

### Components, valves, manipulators

**Components**



ISO-KF, ISO-K,  
ISO-F, CF, COF

**Hoses and flex  
connectors**



ISO-KF, ISO-K, CF

**Glass  
elements**



ISO-KF, ISO-K,  
ISO-F, CF

**Customized  
elements**



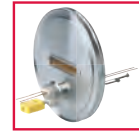
Customized for specific  
customer applications

**Valves**



Shut-off valves,  
gas dosing valves

**Feedthroughs**



Current/voltage,  
fluids, insulators,  
combinations

**Manipulators**



X-, Y-, Z-motion,  
rotation, tilting

## System technology

### Plant construction

**Contamination  
Management Solutions**



APA  
Monitoring  
of contamination

**Multi-stage  
vacuum  
process**



Vacu2  
For die casting  
processes

**Coating**



Classic  
Coating systems

**Helium leak  
detection  
systems**



Complete systems

### Service solutions

**Worldwide quality**



Representatives  
worldwide



Genuine parts



Training courses



Maintenance

## Consulting competence

**Applications**



Know-how

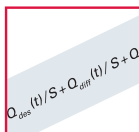


Experience

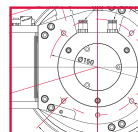


Customer  
intimacy

**Products**



Dimensioning



Engineering

**eVacuum**



Website



App

**Vacuum solutions  
from a single source**

Pfeiffer Vacuum stands for innovative and custom vacuum solutions worldwide, technological perfection, competent advice and reliable service.

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of products**

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**Pfeiffer Vacuum GmbH**  
Headquarters · Germany  
T +49 6441 802-0  
info@pfeiffer-vacuum.de  
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