

HiPace™ MC Turbopumps



The HiPace™ MC Innovation.

Magnetically Levitated Turbopumps
with Integrated Drive Electronics.

PFEIFFER VACUUM



HiPace™ MC Turbopumps

The HiPace™ MC innovation

Pfeiffer Vacuum continues to be committed to innovation. It was in this spirit that we extended the HiPace series of dependable, magnetically levitated turbopumps for your applications in coating, semiconductor industry and research & development.

What is HiPace MC?

HiPace MC is a line of magnetically levitated turbopumps with integrated drive electronics that set a milestone. This not only applies with respect to their especially high pumping speeds, high compression and high gas throughput. Their magnetically levitated bearings, which assure extremely low vibration and maintenance-free operation, are the embodiment of top class technology.

Where are the advantages?

The innovative principle of integrated drive electronics finally avoids cumbersome and costly cabling. Moreover, the HiPace MC turbopumps are extremely robust and suitable for industrial applications. Another positive feature that should be mentioned is their integrated water cooling, which assures optimum heat dissipation for the pump and electronics.

Top performance in any number of fields



Film coating¹⁾



Ion beam etching²⁾



Solar technology³⁾

Are there additional advantages?

There definitely are, for example in the form of the integrated venting valve, whose patented control concept enables HiPace MC turbopumps to be vented very quickly and automatically. This combined venting/sealing gas valve, which is operated by the drive electronics, eliminates the need for separate control lines, thus making a real contribution to cost reductions. In addition, permanent monitoring of the rotor assures stable and reliable operation.

And last but not least!

The modern design of these pumps offers impressive visual appearance and functionality. To no small degree, their coated rotors and integrated sealing gas valves make the HiPace MC pumps suitable for use with corrosive gases. Their innovative rotor design, without a Holweck or Gaede stage, offers an optimum performance envelope for both light and heavy gases. This affords trouble-free employment in processes that generate particulates.

HiPace MC: Quality and reliability from the inventor of the turbopump!

Advantages at a glance

- ▶ Integrated drive electronics eliminate the need for cumbersome and costly cabling
- ▶ Suitable for most applications thanks to high pumping speed and high gas throughput
- ▶ Extremely low vibration and noise for sensitive applications
- ▶ Highly reliable thanks to permanent rotor monitoring
- ▶ Suitable for industrial applications thanks to Protection Class IP 54
- ▶ Robust, long-life safety bearing concept
- ▶ Water cooling affords long service life of electronic components
- ▶ Reliable operation with cooling water compatibility of up to 35 °C
- ▶ Additional cost savings thanks to integrated power supply in HiPace 2400 MC
- ▶ Patented centering ring with anti-slip coating to enhance system reliability
- ▶ 5-axis active magnetic bearing
- ▶ Any desired installation orientation
- ▶ Profibus or DeviceNet interfaces (optional)
- ▶ Semi S2, F47 and E74 certification



*HiPace™ 2400 MC
with integrated power supply*



HiPace™ 3400 MC

Applications

Semiconductor Industry

- ▶ EUV lithography
- ▶ Chemical vapor deposition (CVD)
- ▶ Physical vapor deposition (PVD)
- ▶ Ion beam etching
- ▶ Ion implantation

Research & Development

- ▶ Physical equipment
- ▶ Space simulation

Coating

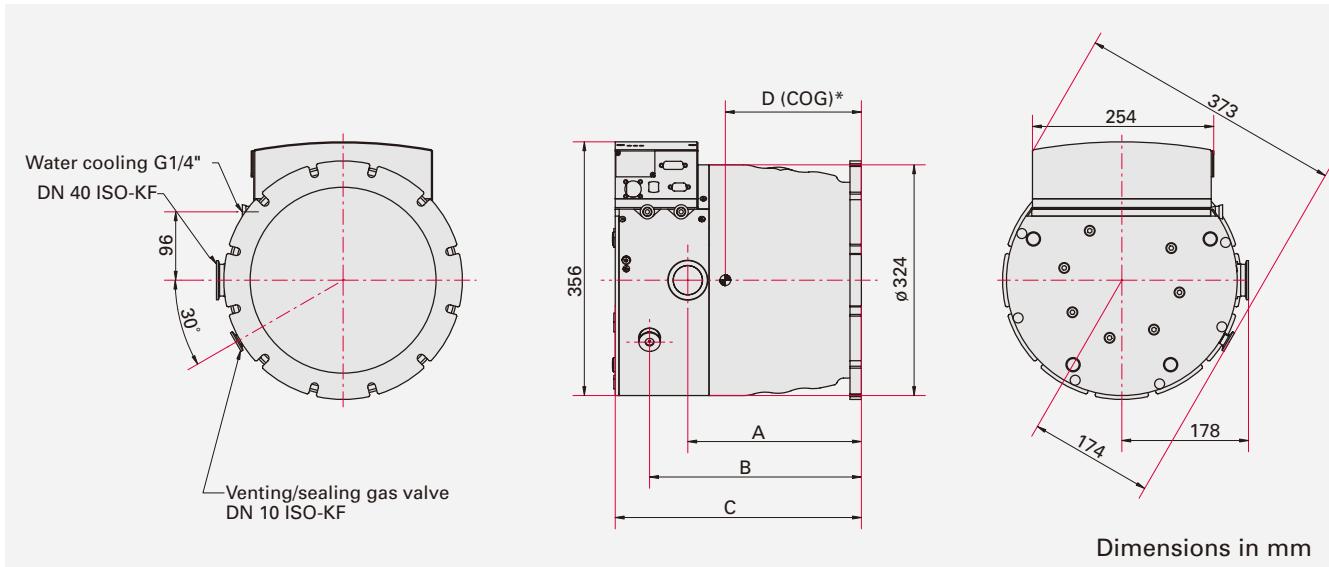
- ▶ Glass coating
- ▶ Thin films
- ▶ Ophthalmics
- ▶ Solar cell coating

Industrial

- ▶ Metallurgy
- ▶ Electron beam welding

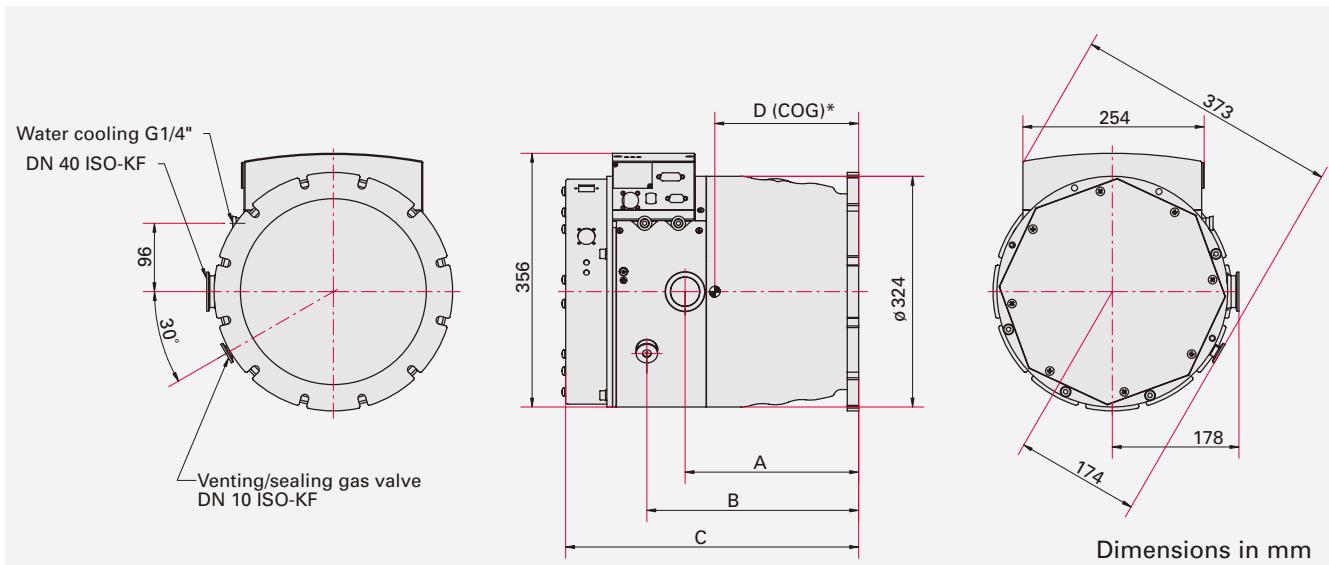
HiPace™ MC Turbopumps

Dimensions



HiPace™ 2400 MC

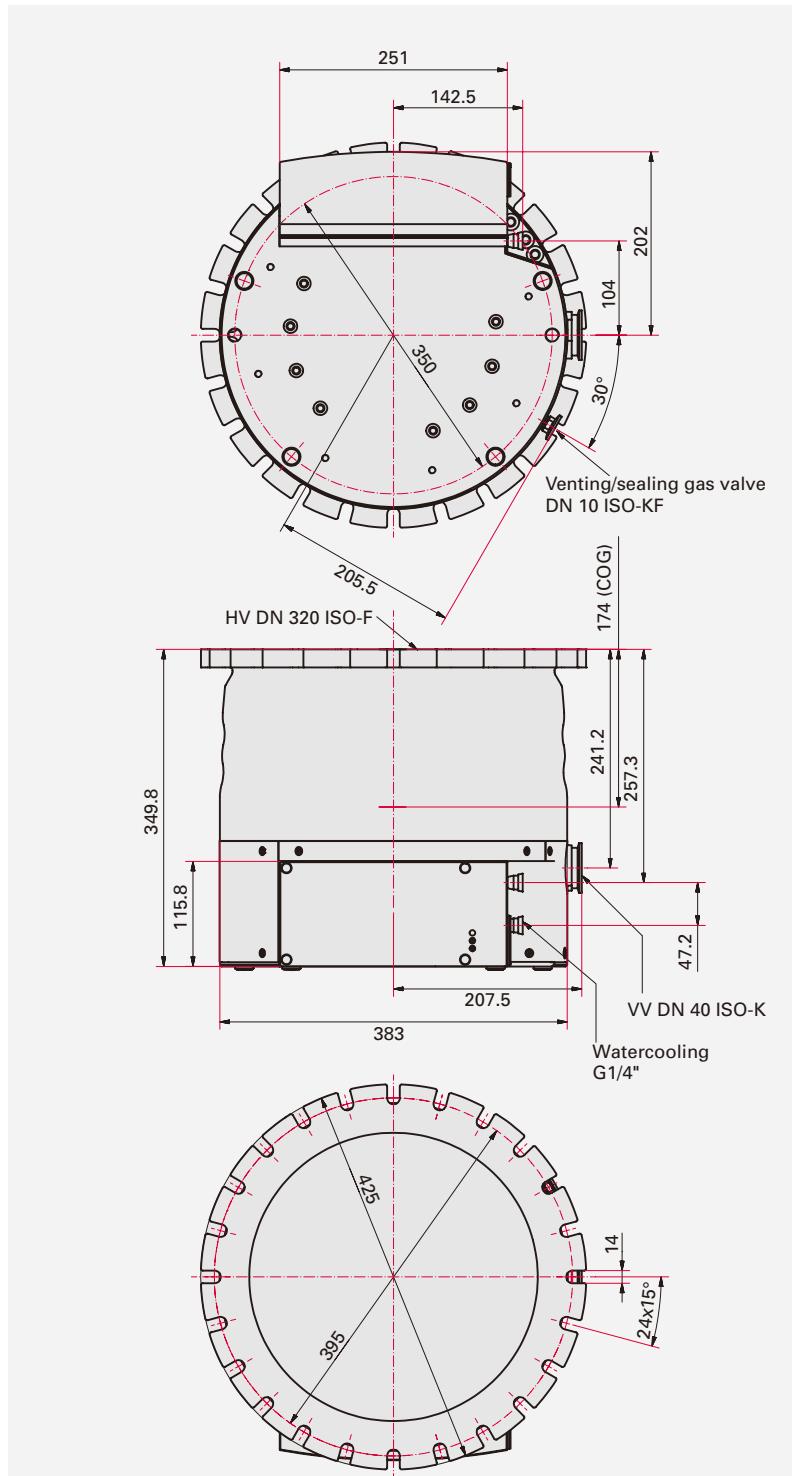
Flange	A	B	C	D
DN 250 ISO-K	244	297	346	199
DN 250 ISO-F	244	297	346	191
DN 250 CF-F	268	322	370	194



HiPace™ 2400 MC
with integrated power supply

Flange	A	B	C	D
DN 250 ISO-K	244	297	411	210
DN 250 ISO-F	244	297	411	202
DN 250 CF-F	268	322	436	205

* COG = Center of gravity



Dimensions in mm

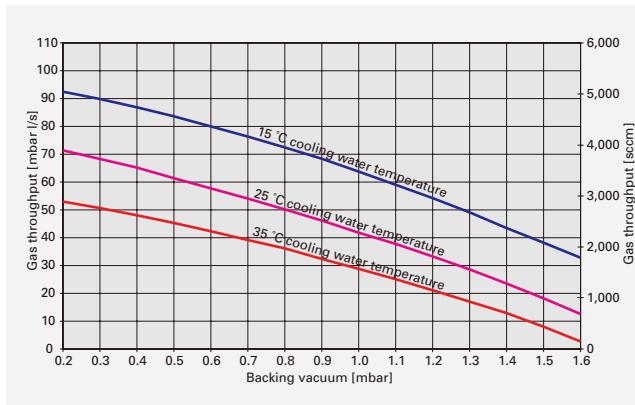
HiPace™ 3400 MC, DN 320 ISO-F

HiPace™ MC Turbopumps

Gas throughput

Gases with molecular mass of < 40

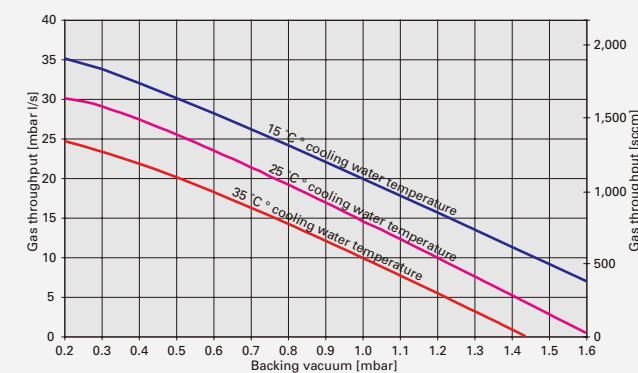
at nominal speed, cooling water throughput 100 l/h



HiPace™ 2400 MC¹⁾

Gases with molecular mass of ≥ 40

at nominal speed, sealing gas 20 sccm,
cooling water throughput 100 l/h

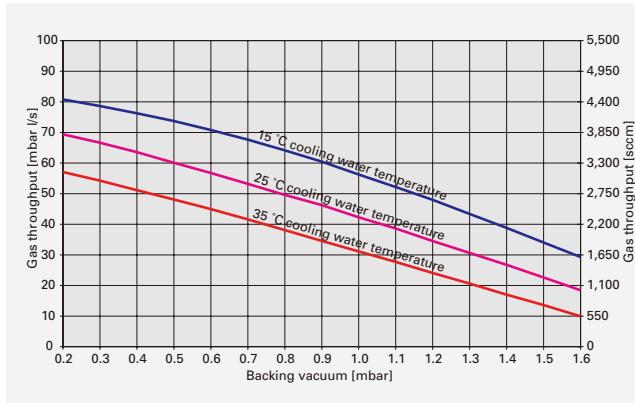


Gases with molecular mass of < 40

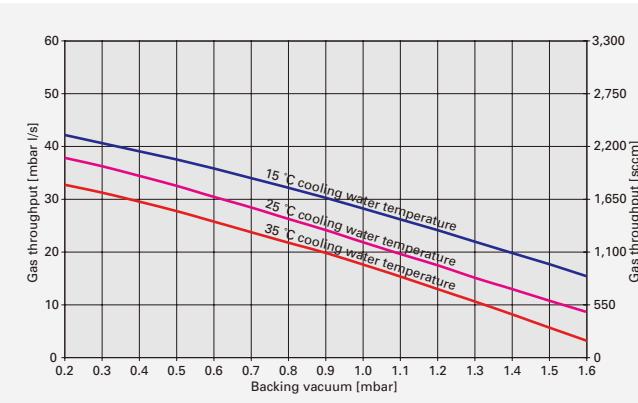
at nominal speed, cooling water throughput 100 l/h

Gases with molecular mass of ≥ 40

at nominal speed, sealing gas 20 sccm,
cooling water throughput 100 l/h



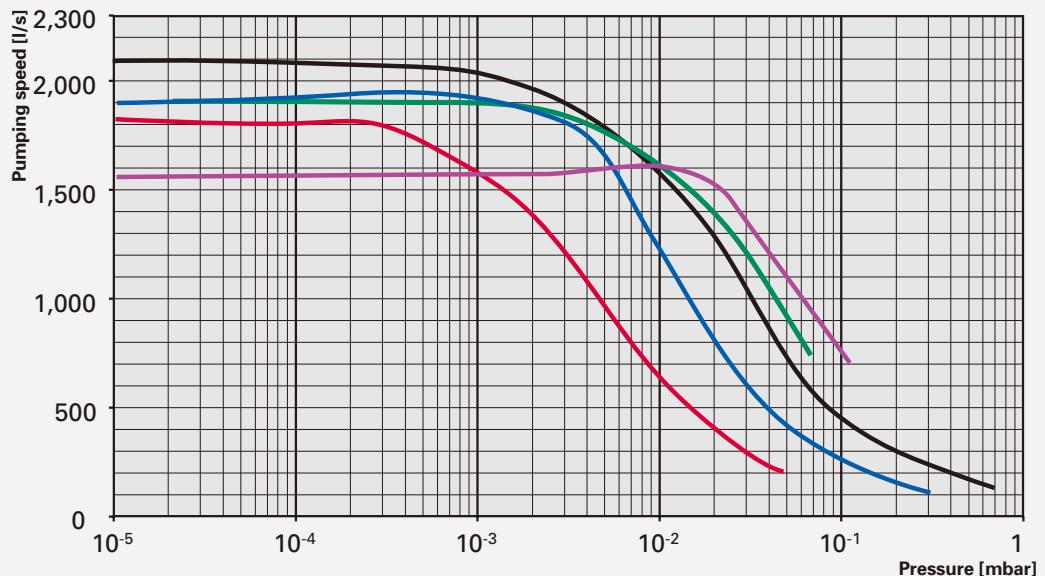
HiPace™ 3400 MC, DN 320 ISO-F¹⁾



¹⁾ Gas throughput relative to backing vacuum and kind of gas

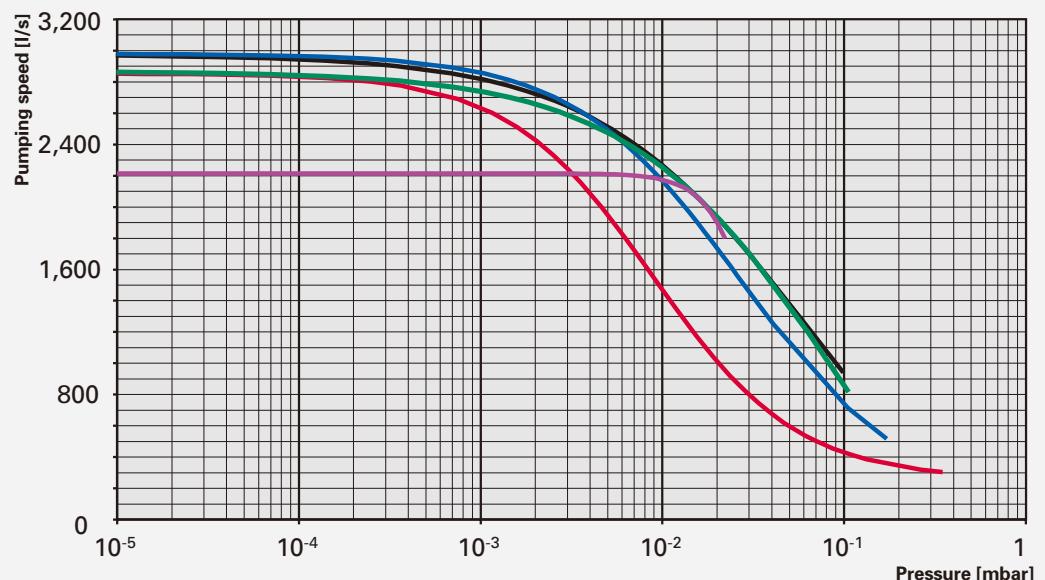
Pumping speed

N₂ ——————
He ——————
H₂ ——————
Ar ——————
CF₄ ——————



HiPace™ 2400 MC, DN 250 ISO-K

N₂ ——————
He ——————
H₂ ——————
Ar ——————
CF₄ ——————



HiPace™ 3400 MC, DN 320 ISO-F

HiPace™ MC Turbopumps

Technical data

	Unit	HiPace™ 2400 MC
Nominal connection diameter, inlet		DN 250 ISO-K
Nominal connection diameter, outlet		DN 40 ISO-KF
Venting/sealing gas connection		DN 10 ISO-KF
Nominal speed	1/min / Hz	29,400 / 490
Standby speed	1/min / Hz	19,600 / 327
Run-up time without/with integrated power supply (backing vacuum 0.1 mbar)	min	6 / 7
Braking time with/without venting	min	1.5 / 10
Connection pressure, venting/sealing gas valve	bar [psia]	1–3 [15–45] (absolute)
Max. noise level ¹⁾	dB (A)	45
Integral leakage rate (He) ²⁾	mbar l/s [Torr l/s]	< 2 · 10 ⁻⁸ [< 1.5 · 10 ⁻⁸]
Pumping speed for:		
Ar	l/s	1,900
N ₂	l/s	2,100
He	l/s	1,900
H ₂	l/s	1,800
CF ₄	l/s	1,600
Compression ratio for:		
Ar		> 1 · 10 ⁹
N ₂		> 1 · 10 ⁹
He		2 · 10 ⁵
H ₂		1 · 10 ⁴
CF ₄		> 1 · 10 ⁹
Maximum backing vacuum without/with integrated power supply:		
Ar	mbar [Torr]	3 / 1.5 [2.2 / 1.1]
N ₂	mbar [Torr]	3 / 1.5 [2.2 / 1.1]
He	mbar [Torr]	2 / 2 [1.5 / 1.5]
H ₂	mbar [Torr]	0.5 / 0.5 [0.37 / 0.37]
CF ₄	mbar [Torr]	1.5 / 1.5 [1.1 / 1.1]
Ultimate pressure ³⁾ with OnTool DryPump™	mbar [Torr]	< 1 · 10 ⁻⁹ [< 7.5 · 10 ⁻¹⁰]
Cooling water consumption ⁴⁾	l/h [USGM]	100 [0.44]
Cooling water temperature	°C [°F]	15–35 [59–95]
Weight without/with integrated power supply	kg [lbs]	71 / 77 [157 / 170]
Permissible magnetic field	mT	10
Max. power consumption, without/with integrated power supply	VA	1,600 / 1,100
Interface		RS-485
Protection Class		IP 54

¹⁾ Distance from pump 1 m

²⁾ Measured with 20 % He concentration, measurement time 10 sec.

³⁾ Under DIN 28 428, ultimate pressure is defined as the pressure reached in a plug gauge 48 hours after heating

⁴⁾ At maximum gas throughput

HiPace™ 2400 MC	HiPace™ 2400 MC	HiPace™ 3400 MC
DN 250 ISO-F	DN 250 CF-F	DN 320 ISO-F
DN 40 ISO-KF	DN 40 ISO-KF	DN 40 ISO-KF
DN 10 ISO-KF	DN 10 ISO-KF	DN 10 ISO-KF
29,400 / 490	29,400 / 490	24,000 / 400
19,600 / 327	19,600 / 327	16,000 / 267
6 / 7	6 / 7	11 / –
1.5 / 10	1.5 / 10	2 / 15
1–3 [15–45] (absolute)	1–3 [15–45] (absolute)	3 [45] (absolute)
45	45	45
< 2 · 10 ⁸ [< 1.5 · 10 ⁸]	< 2 · 10 ⁸ [< 1.5 · 10 ⁸]	< 2 · 10 ⁸ [< 1.5 · 10 ⁸]
1,900	1,900	2,850
2,100	2,100	2,950
1,900	1,900	2,950
1,800	1,800	2,850
1,600	1,600	2,200
> 1 · 10 ⁹	> 1 · 10 ⁹	> 1 · 10 ⁹
> 1 · 10 ⁹	> 1 · 10 ⁹	> 1 · 10 ⁹
2 · 10 ⁵	2 · 10 ⁵	4 · 10 ⁵
1 · 10 ⁴	1 · 10 ⁴	4 · 10 ⁴
> 1 · 10 ⁹	> 1 · 10 ⁹	> 1 · 10 ⁹
3 / 1.5 [2.2 / 1.1]	3 / 1.5 [2.2 / 1.1]	3 [2.2]
3 / 1.5 [2.2 / 1.1]	3 / 1.5 [2.2 / 1.1]	2 [1.5]
2 / 2 [1.5 / 1.5]	2 / 2 [1.5 / 1.5]	1 [1.5]
0.5 / 0.5 [0.37 / 0.37]	0.5 / 0.5 [0.37 / 0.37]	0.4 [0.3]
1.5 / 1.5 [1.1 / 1.1]	1.5 / 1.5 [1.1 / 1.1]	4.5 [3.4]
< 1 · 10 ⁹ [< 7.5 · 10 ⁻¹⁰]	< 1 · 10 ⁹ [< 7.5 · 10 ⁻¹⁰]	< 1 · 10 ⁹ [< 7.5 · 10 ⁻¹⁰]
100 [0.44]	100 [0.44]	100 [0.44]
15–35 [59–95]	15–35 [59–95]	15–35 [59–95]
75 / 81 [166 / 180]	75 / 81 [166 / 180]	94 / – [208 / –]
10	10	10
1,600 / 1,100	1,600 / 1,100	1,600 / –
RS-485	RS-485	RS-485
IP 54	IP 54	IP 54

HiPace™ MC Turbopumps

Order numbers – Pumps

Turbopump	DN 250 ISO-K
With integrated TM 3000 drive electronics	PM P03 490
With integrated TM 3000 drive electronics and power supply	PM P03 710
With integrated TM 3000 drive electronics and Profibus ¹⁾	PM P03 493
With integrated TM 3000 drive electronics and power supply as well as Profibus ¹⁾	PM P03 713

¹⁾ Also available with DeviceNet

Order numbers – Accessories

Turbopump	DN 250 ISO-K
Installation mounting kits	
Coated centering ring, bracket screws	PM 016 420 -T
Coated centering ring, protection screen, bracket screws	PM 016 422 -T
Coated centering ring, splinter shield, bracket screws	PM 016 421 -T
Coated centering ring, hexagon screws	-
Coated centering ring, protection screen, hexagon screws	-
Coated centering ring, splinter shield, hexagon screws	-
Coated centering ring, stud screws	-
Coated centering ring, protection screen, stud screws	-
Coated centering ring, splinter shield, stud screws	-
Set of hexagon screws for CF flanges	-
Set of stud screws for CF flanges	-
Additional accessories	
TPS 1400 power supply, wall or standard-rail mounting ²⁾	
TPS 1401 power supply, as a 19" rack mounting unit ²⁾	
TPS 1400/1401 power cable, Euro-style safety plug, 230 V; 3 m	
TPS 1400/1401 power cable, UL plug, 208 V; 3 m	
TM 3000 – TPS 1400/1401 connection cable; 3 m (available in lengths of up to 50 m)	
DCU 002 display control unit	
HPU 001 handheld programming unit	
Accessories package for HPU 001	
Interface cable RJ 45 on M 12 for using TIC 001	
Backing pump relay box, single-phase, 20 A	
Connection cable backing pump relay box TM 3000, 2 m	
TIC 001, RS-485 – RS-232 serial interface converter	
USB converter to RS-485 interface	
TVV 001 backing vacuum safety valve; 115 V	
TVV 001 backing vacuum safety valve; 230 V	
Heating jacket 230 V AC, Euro-style safety plug	
Heating jacket 208 V AC, UL plug plug	

²⁾ Not necessary for pumps with integrated power supply

HiPace™ 2400 MC		HiPace™ 3400 MC
DN 250 ISO-F	DN 250 CF-F	DN 320 ISO-F
PM P03 491	PM P03 492	PM P03 501
PM P03 711	PM P03 712	-
PM P03 494	PM P03 495	PM P03 504
PM P03 714	PM P03 715	-

HiPace™ 2400 MC		HiPace™ 3400 MC
DN 250 ISO-F	DN 250 CF-F	DN 320 ISO-F
-	-	-
-	-	-
-	-	-
PM 016 480 -T	-	PM 016 490 -T
PM 016 482 -T	-	PM 016 492 -T
PM 016 481 -T	-	PM 016 491 -T
PM 016 485 -T	-	PM 016 495 -T
PM 016 487 -T	-	PM 016 497 -T
PM 016 486 -T	-	PM 016 496 -T
-	PM 016 694 -T	-
-	PM 016 695 -T	-
 PM C01 760		PM C01 760
PM C01 761		PM C01 761
P 4564 309 HA		P 4564 309 HA
P 4564 309 HB		P 4564 309 HB
 PM 051 983 -T		PM 051 983 -T
PM 061 348 -T		PM 061 348 -T
PM 051 510 -T		PM 051 510 -T
PM 061 005 -T		PM 061 005 -T
PM 051 726 -T		PM 051 726 -T
PM 061 375 -T		PM 061 375 -T
PM 061 630 -X		PM 061 630 -X
PM 051 054 -T		PM 051 054 -T
PM 061 207 -T		PM 061 207 -T
PM Z01 206		PM Z01 206
PM Z01 205		PM Z01 205
PM 061 154 -T		-
PM 061 155 -T		-

Leading innovations. Too fast to be copied.

Pfeiffer Vacuum – A name that stands for reliable high-tech products and innovative solutions that support our customers in their applications and pave the way to their success.

Our vacuum technology developments always keep us a step ahead!



All data subject to change without prior notice. PT017PE (November 2008/15)

Sales, service and consulting

- ▶ Worldwide on-site service
- ▶ Comprehensive in-factory and on-site training programs
- ▶ Modular service concept ranging from spare parts to maintenance contracts



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