

CompactTurbo™ 10–500 l/s Class



World class Turbopumps!

**Dependable Operation. Low Cost of Ownership.
Wide Variety of Applications.**

PFEIFFER  **VACUUM**

CompactTurbo™ 10–500 l/s Class

Maximum quality and reliability

Looking for a compact, powerful turbopump for your application? The trend is toward ever-smaller and more integrated products. We have developed a number of high-quality turbos that offer pumping speeds of 10 to 500 liters per second.

What makes these turbopumps so impressive is the fact that they are so highly cost-effective and flexible. Their proven bearing system and rugged design offer you optimum reliability.

They are especially suitable for employment in the analytical applications, in research & development, as well as in the semiconductor and coating industries.

Benefit from the know-how enjoyed by the inventor of the turbopump. Take advantage of our experience, stemming from over 250,000 turbopumps delivered!

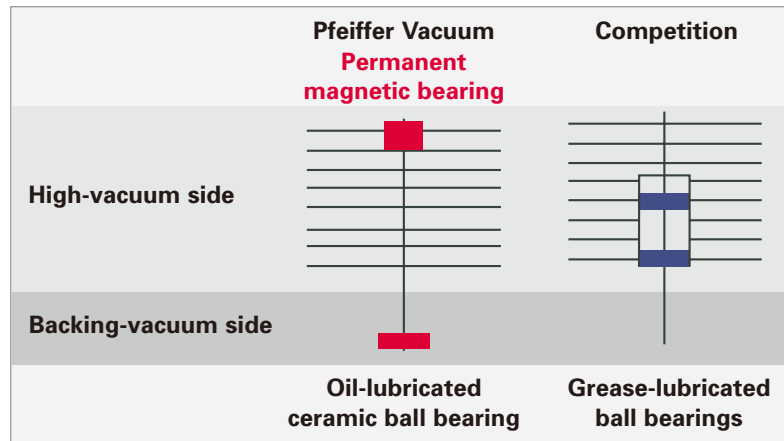


TPD 011 – The world's smallest turbopump

Advantages at a glance

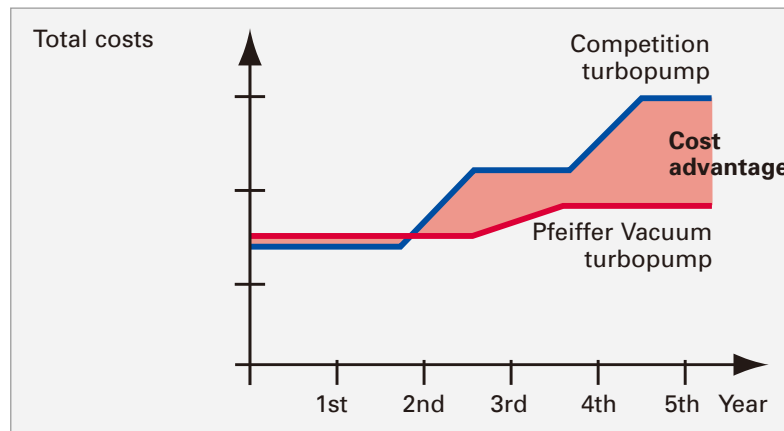
- ▶ Complete series offering pumping speeds of 10–500 l/s
- ▶ Rugged design and proven bearing system offer maximum reliability
- ▶ Compact design makes for a minimum footprint
- ▶ Modular design makes for minimum configuration (subsequent expansion poses no problems)
- ▶ Standard interfaces: RS-485 and Remote Profibus and DeviceNet (optional)
- ▶ Maximum flexibility utilizing either an integrated drive system or external drive electronics
- ▶ Simple Plug & Play operation
- ▶ Integral power supply and corrosive gas version available
- ▶ On-site service worldwide

Dependable operation



- Highly reliable:**
- ▶ Robust bearing system
 - ▶ Extremely low vibration
 - ▶ Minimum wear
 - ▶ Mean time to failure > 200,000 hours

Cost of Ownership



- Minimum operating costs:**
- ▶ Simple maintenance offers highest uptime
 - ▶ Long service intervals
 - ▶ On-site bearing change capability
 - ▶ Flexible service concepts

CompactTurbo™ 10–500 I/s Class

Wide variety of applications

	Analytical Industry					Electronics and Semiconductor Technology					Research & Development Industrial Applications					Other												
	Electron microscopy	Leak detection	Mass spectrometry	Surface analysis	Plasma monitoring	Residual gas analysis	Defect analysis/repair	Ion implantation	Molecular beam epitaxy	Plasma etching	PVD/Sputtering	CVD	Film coating	Surface refinement	UHV/XHV systems	Gas flow control systems	Nuclear research	Plasma physics	X-ray tubes	Space applications	Storage rings	Particle accelerators	Leak detection systems	Differential pumping systems	Insulation vacuum	Lamp/tube manufacturing	Transfer chambers/Load-locks	Handling systems
TPD 011	●	●	●		●	●									●					●			●	●	●	●		
TMH/U 071	●	●	●	●	●	●	●								●	●			●	●	●	●	●	●	●	●	●	●
TMH/U 261/262	●	●	●	●	●	●	●	●			●			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
TPH/U 261 for corrosive gases							▲	●	●	●	▲	●		▲			▲	●										
TMH/U 521	●		●	●		●	●	●			●		●	●	●		●	●	●		●	●	●	●	●	●	●	●
TPH/U 521 for corrosive gases							▲	●	●	●	▲	●		▲			▲	●										

● Recommended ▲ Possible



TPD 011
Portable time-of-flight mass spectrometer (TOF-MS)¹⁾



TMH 262, TPD 011
Scanning electron microscope



SplitFlow™ TMH 071
Portable gas chromatography mass spectrometer (GC-MS)²⁾



SplitFlow™ TMH 261
High-resolution time-of-flight mass spectrometer (TOF-MS)

¹⁾ Developed by Johns Hopkins University Applied Physics Laboratory

²⁾ Courtesy of INFICON



TMH 071
Helium leak detection system for fuel tanks



TMU 261, TMU 071
Mass spectrometer leak detection system³⁾



TMH 071, TMH 261
High-performance liquid chromatography mass spectrometer (LC-MS)



TMH 261
Coating system for optical storage media⁴⁾



TMH 521, TMH 261, TMH 071
Combination electrospray ionization (ESI) and matrix-supported laser desorption ionization (MALDI) in an integral, computer-selectable ion source (MS/FT-MS)⁵⁾



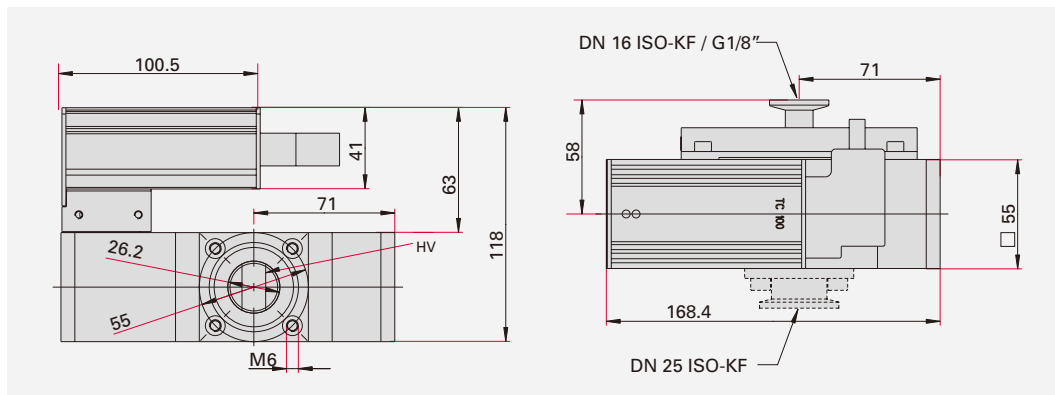
TMH 521, TMH 071
Surface analysis⁶⁾

³⁾ Courtesy of Nolek AB
⁴⁾ Courtesy of STEAG Hama Tech AG
⁵⁾ Courtesy of Bruker Daltonics
⁶⁾ Courtesy of BESTEC GmbH

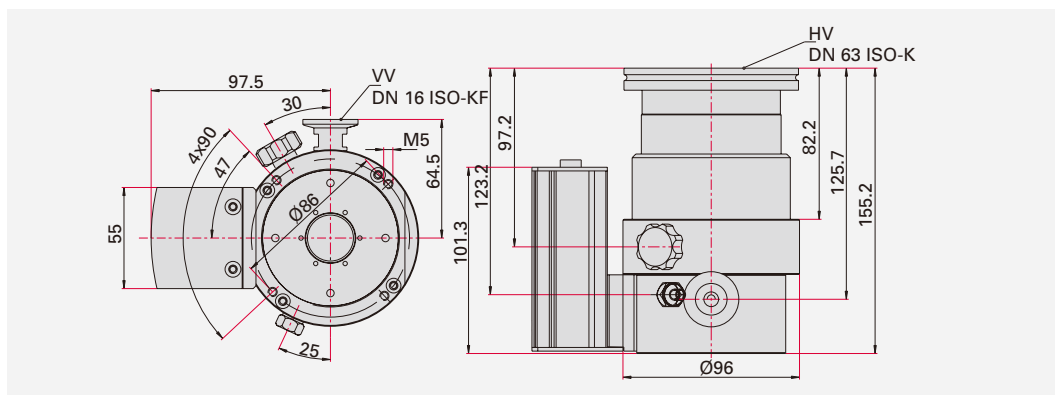
CompactTurbo™ 10–500 I/s Class

Dimensions

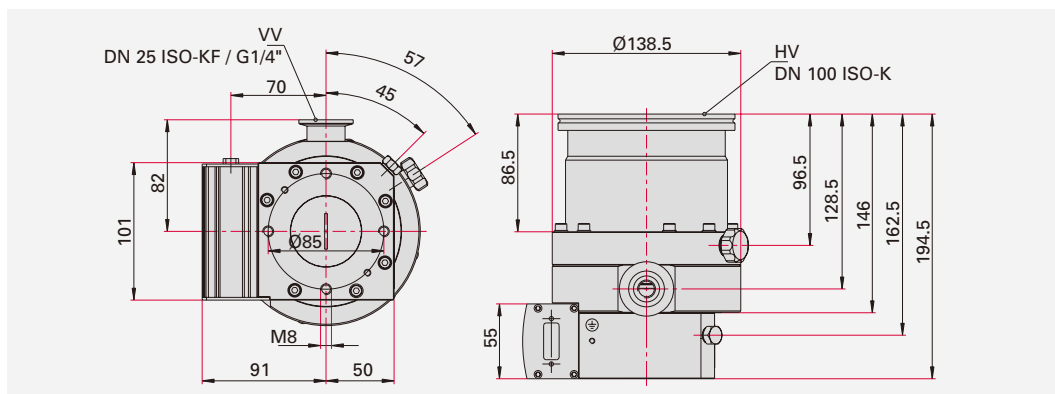
**TPD 011,
DN 25 ISO-KF**



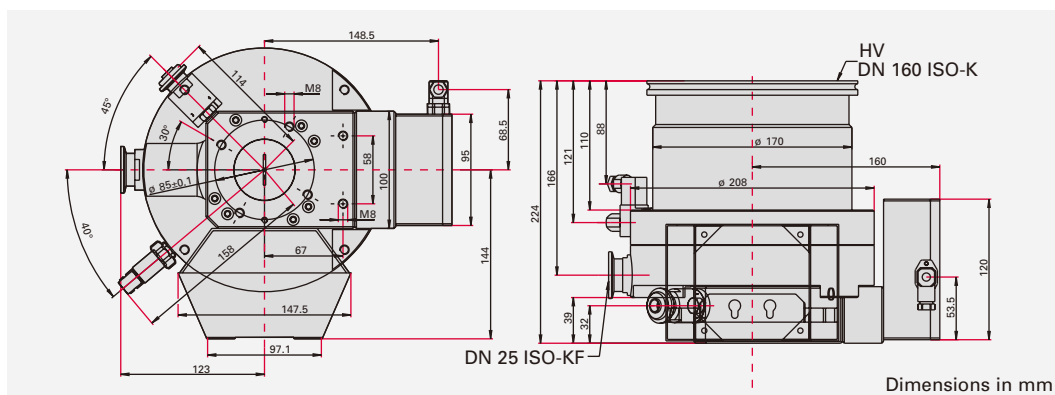
**TMH 071,
DN 63 ISO-K**



**TMH 262 P,
DN 100 ISO-K**



**TMH 521 P,
DN 160 ISO-K**

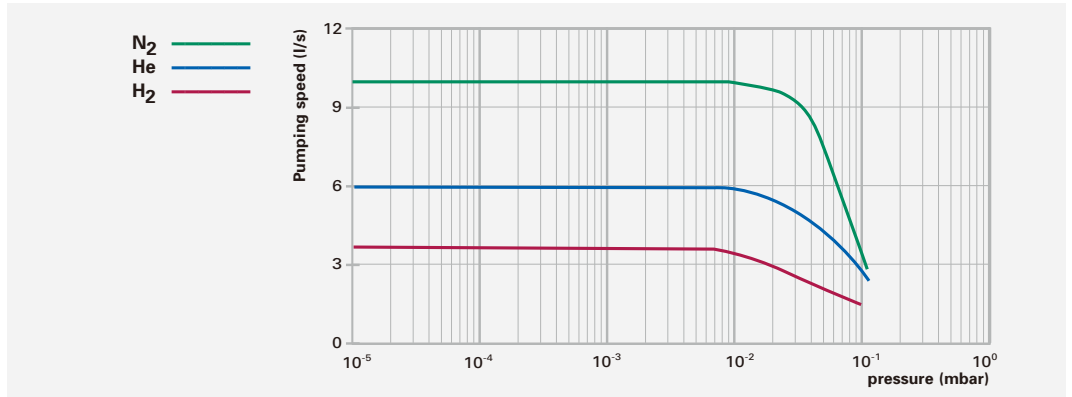


Dimensions in mm

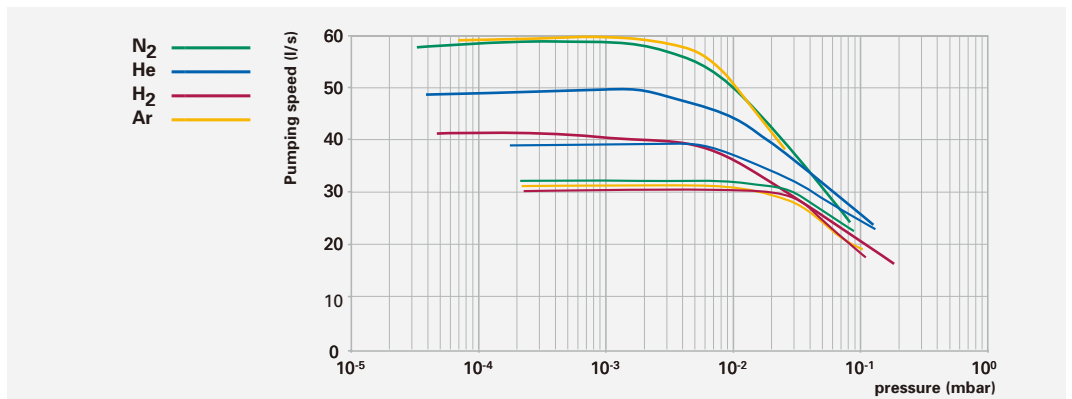
Further versions are available in our Online Catalog: www.pfeiffer-vacuum.net

Pumping speed

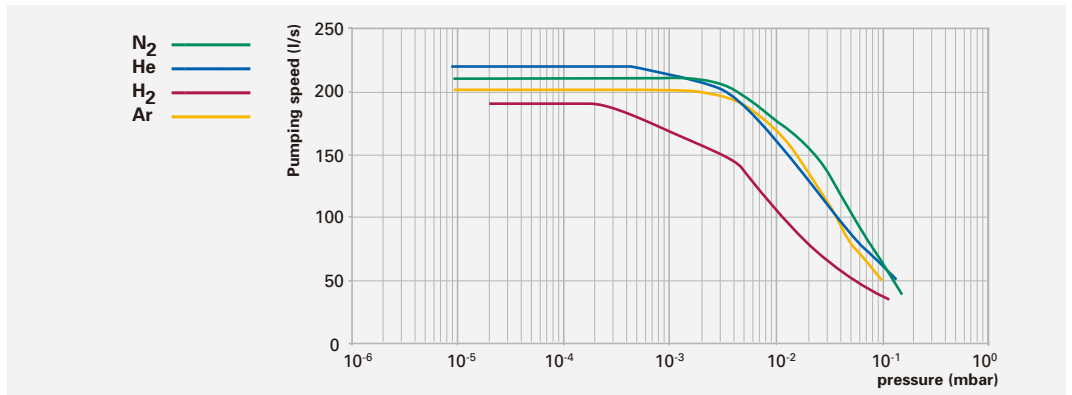
TPD 011,
DN 25



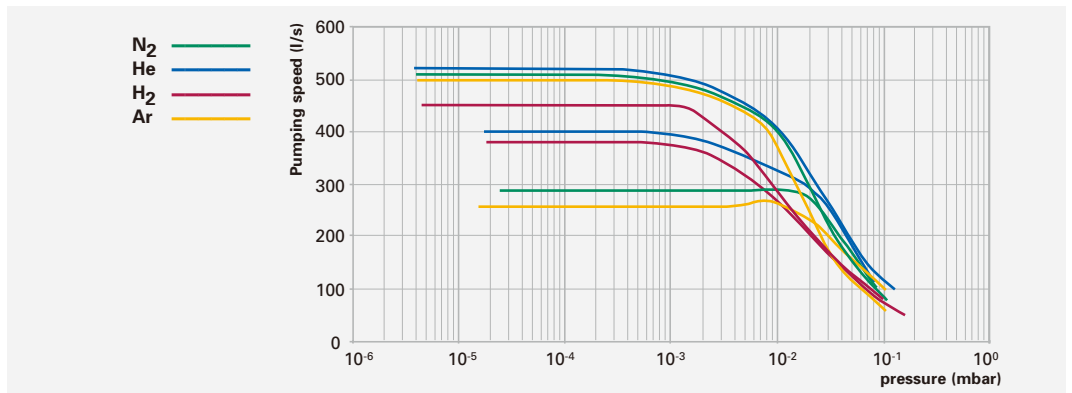
TMH/U 071,
DN 40,
DN 63



TMH/U 261/262,
DN 100



TMH/U 521,
DN 100,
DN 160



CompactTurbo™ 10–500 l/s Class

Technical data

Pump model	TPD 011/ TPD 011 N	TMH 071 P/YP	TMH 071 YPN	TMH/U 071 P/YP	TMH/U 071 YPN
	DN 25	DN 40 KF	DN 40 KF	DN 63 ISO-K/CF-F	DN 63 ISO-K/CF-F
Connection nominal diameter					
Flange (in)	DN 25	DN 40	DN 40	DN 63	DN 63
Flange (out)	DN 16 ISO-KF / G 1/8"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"	DN 16 ISO-KF / G 1/4"
Venting connection	–	G 1/8"	G 1/8"	G 1/8"	G 1/8"
Pumping speed [l/s]					
Hydrogen (H ₂)	3.7	32	32	42	40
Helium (He)	6	39	39	50	48
Nitrogen (N ₂)	10	33	33	59	56
Argon (Ar)	11.5	31	31	60	56
Compression ratio [mbar]					
Hydrogen (H ₂)	3 · 10 ²	> 10 ⁵	> 10 ⁵	> 1 · 10 ⁵	> 1 · 10 ⁵
Helium (He)	3 · 10 ³	6 · 10 ⁶	6 · 10 ⁶	6 · 10 ⁶	6,10 ⁶
Nitrogen (N ₂)	3 · 10 ⁶	> 10 ¹¹	> 10 ¹¹	> 10 ¹¹	> 10 ¹¹
Argon (Ar)	3 · 10 ⁷	> 10 ¹¹	> 10 ¹¹	> 10 ¹¹	> 10 ¹¹
Max. backing vacuum pressure for N ₂ [mbar]	25	18	16	18	16
Max. gas throughput at HV-pressure 0.1 mbar [mbar l/s]					
Hydrogen (H ₂)	0.15	2	2	2	2
Helium (He)	0.3	3	3	3	3
Nitrogen (N ₂)	0.65	2	2	2	2
Argon (Ar)	0.78	2	2	2	2
Max. gas throughput at full speed [mbar l/s]					
Pumping speed of used backing pump (m ³ /h)	2.5	2.5	2.5	2.5	2.5
Hydrogen (H ₂)	0.15	7.3	4.5	7.3	4.5
Helium (He)	0.15	2.5	1.8	2.5	1.8
Nitrogen (N ₂)	0.15	1.2	0.6	1.2	0.6
Argon (Ar)	0.15	0.5	0.3	0.5	0.3
Ultimate pressure [mbar]	< 5 · 10 ⁻⁵	< 1 · 10 ⁻⁷	< 1 · 10 ⁻⁷	< 5 · 10 ⁻¹⁰	< 1 · 10 ⁻⁸
Rotational speed [1/min]	90,000	90,000	90,000	90,000	90,000
Run-up time [min]	0.9	2	2.5	2	2.5
Cooling, standard	Convection	Air	Air	Air	Air
Cooling water consumption[l/h]	–	100	–	100	–
Max. cooling water temperature [°C]	–	25	–	25	–
Weight [kg]	1.9	2.4	2.8	3.8	4.2

Type designations

The product designation consists of a family designation (1), the size which is oriented on the pumping speed of the turbopump (2) and on the properties (3) of the pump:

Example: ¹TMH ²262 ³YPN

1. Family designation

T = Turbopump
P = Turbopump without Holweck stage
M = Turbopump with Holweck stage
D = "Drag" pump for the medium vacuum range

TMH/U 261 P/YP	TMH/U 262 P/YP	TMH/U 262 PN/YPN	TMH/U 521 P/YP	TMH/U 521 PN/YPN	TMH/U 521 P/YP	TMH/U 521 PN/YPN
DN 100 ISO-K/CF-F	DN 100 ISO-K/CF-F	DN 100 ISO-K/CF-F	DN 100 ISO-K/ ISO-F/CF-F	DN 100 ISO-K/ ISO-F/CF-F	DN 160 ISO-K/ ISO-F/CF-F	DN 160 ISO-K/ ISO-F/CF-F
DN 100	DN 100	DN 100	DN 100	DN 100	DN 160	DN 160
DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"	DN 25 ISO-KF / G 1/4"
G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"	G 1/8"
175	175	175	380	380	450	450
220	220	220	400	400	520	520
210	210	210	290	290	510	510
200	200	200	260	260	500	500
$1.4 \cdot 10^4$	$1.4 \cdot 10^4$	$1.4 \cdot 10^4$	$6.5 \cdot 10^5$	$6.5 \cdot 10^5$	$6.5 \cdot 10^5$	$6.5 \cdot 10^5$
$3 \cdot 10^5$	$3 \cdot 10^5$	$3 \cdot 10^5$	$5 \cdot 10^7$	$5 \cdot 10^7$	$5 \cdot 10^7$	$5 \cdot 10^7$
$> 1 \cdot 10^9$	$> 1 \cdot 10^9$	$> 1 \cdot 10^9$	$> 1 \cdot 10^{12}$	$> 1 \cdot 10^{12}$	$> 1 \cdot 10^{12}$	$> 1 \cdot 10^{12}$
$> 1 \cdot 10^9$	$> 1 \cdot 10^9$	$> 1 \cdot 10^9$	$> 1 \cdot 10^{12}$	$> 1 \cdot 10^{12}$	$> 1 \cdot 10^{12}$	$> 1 \cdot 10^{12}$
10	8.5	8.5	13	8	13	8
3.5	3	3.5	8	6	8	6
6	5	4	12	6	12	6
7	6	3	12	6	12	6
7	3	3	12	7	12	7
10	10	10	10	10	10	10
43	18	3	9.5	5	9.5	5
9	5.1	2	8	3	8	3
7	3.2	1.5	4	1.5	4	1.5
4	2	1	2	1	2	1
$< 5 \cdot 10^{-10}$	$< 5 \cdot 10^{-10}$	$< 1 \cdot 10^{-8}$	$< 5 \cdot 10^{-10}$	$< 1 \cdot 10^{-8}$	$< 5 \cdot 10^{-10}$	$< 1 \cdot 10^{-8}$
60,000	60,000	60,000	50,000	50,000	50,000	50,000
1.6	3	3.5	4	7	4	7
Water, Air	Water, Air	Air	Water, Air	Air	Water, Air	Air
100	100	–	100	–	100	–
25	25	–	25	–	25	–
7.4	7	7.8	17.5	18.5	17	18

2. Model designation

262 = Model designation of the pump related to its pumping speed class

3. Properties

Y = Installation in any orientation
P = Purge sealing gas system
N = Integrated power supply

U = CF-F flange, metal seal for ultra-high vacuum applications
H = Flange variants ISO-K, ISO-KF or ISO-F for high vacuum applications

CompactTurbo™ 10–500 I/s Class

Drive concepts

The drive electronics monitor and control the entire turbopump. Depending upon the model, the drive electronics are either an integral component or a separate unit.

TC 100 and TC 600 integrated drive electronics are available for the various sizes and versions of the turbopumps.



TPD 011 turbopump with TC 100 drive electronics and integrated power supply



TMU 071 turbopump with TC 100 drive electronics



TMH 071 turbopump with TC 600 drive electronics



TMU 261 turbopump with TC 600 drive electronics



TMU 262 turbopump with TC 100 drive electronics



TMH 521 turbopump with TC 600 drive electronics and integrated power supply

Our CompactTurbo™ – Now also with integrated power supply:

- ▶ Plug & Play
- ▶ Modular design
- ▶ Minimum footprint thanks to compact design
- ▶ No additional costs

Options

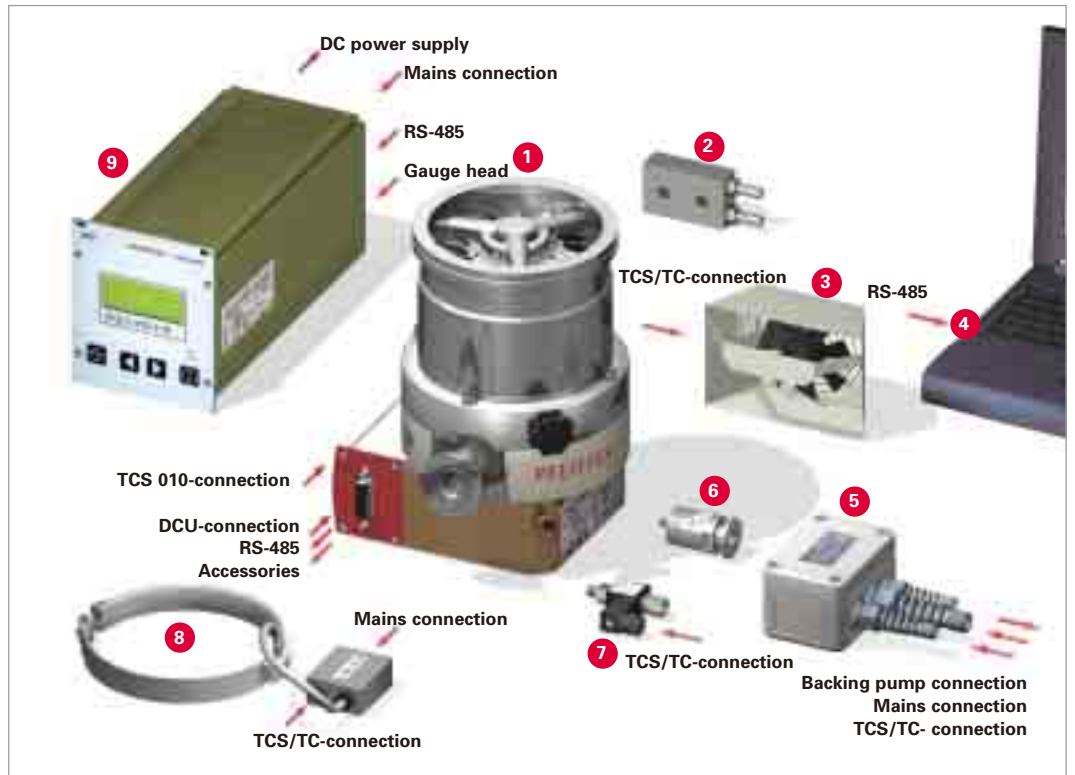
The separate TCP 350 turbo controller offers the greatest flexibility for size 071–521 CompactTurbo™ pumps. This turbo controller is ideally suited for applications in the field of research & development, for example, where turbopumps are subjected to high levels of radiation intensity or the system does not

offer sufficient space for an integrated controller. It combines the wide range of functions offered by the drive electronics as well as the power supply in one compact housing. Cable lengths of up to 100 m are possible between turbopump and TCP 350.



TMH 521 with external TCP 350 turbo controller

- 1 Pump and integrated controller
- 2 Water cooling
- 3 Air cooling
- 4 PC
- 5 Relay box for backing pump
- 6 Sealing gas valve
- 7 Venting valve
- 8 Heater
- 9 Display Control Unit DCU with integrated power supply



TC drive concept with accessories

CompactTurbo™ 10–500 I/s Class

Order numbers – Pumps

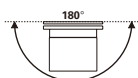
Flange orientation	Type of flange	Integrated drive	Integrated power supply	External drive (TCP 350)	Any orientation	TPD 011 DN 25	TMH 071 DN 40	TMH/U 071 DN 63
○	DN 25	✓	-	-	✓	PM P02 607	-	-
○	DN 25	✓	✓	-	✓	PM P03 640	-	-
◐	ISO-KF	✓	-	-	-	-	PM P02 982/PM P02 802 ¹⁾	-
◑	ISO-KF	-	-	✓	-	-	PM P03 442	-
○	ISO-KF	✓	-	-	✓	-	PM P03 525/PM P03 522 ¹⁾	-
○	ISO-KF	-	-	✓	✓	-	PM P03 528	-
○	ISO-KF	✓	✓	-	✓	-	PM P03 657	-
◐	ISO-K	✓	-	-	-	-	-	PM P02 980/PM P02 800 ¹⁾
◑	ISO-K	-	-	✓	-	-	-	PM P03 440
◐	ISO-K	✓	✓	-	-	-	-	-
○	ISO-K	✓	-	-	✓	-	-	PM P03 523/PM P03 520 ¹⁾
○	ISO-K	-	-	✓	✓	-	-	PM P03 526
○	ISO-K	✓	✓	-	✓	-	-	PM P03 655
◐	ISO-F	✓	-	-	-	-	-	-
◑	ISO-F	-	-	✓	-	-	-	-
◐	ISO-F	✓	✓	-	-	-	-	-
○	ISO-F	✓	-	-	✓	-	-	-
○	ISO-F	-	-	✓	✓	-	-	-
○	ISO-F	✓	✓	-	✓	-	-	-
◐	CF-F	✓	-	-	-	-	-	PM P02 981/PM P02 801 ¹⁾
◑	CF-F	-	-	✓	-	-	-	PM P03 441
◐	CF-F	✓	✓	-	-	-	-	-
○	CF-F	✓	-	-	✓	-	-	PM P03 524/PM P03 521 ¹⁾
○	CF-F	-	-	✓	✓	-	-	PM P03 527
○	CF-F	✓	✓	-	✓	-	-	PM P03 656

¹⁾With TC 600 drive electronics

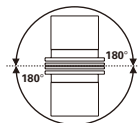
Corrosive gas versions TPH 261 and TPH 521 are available; please refer to our Product Catalog for further information

✓ = yes
- = no

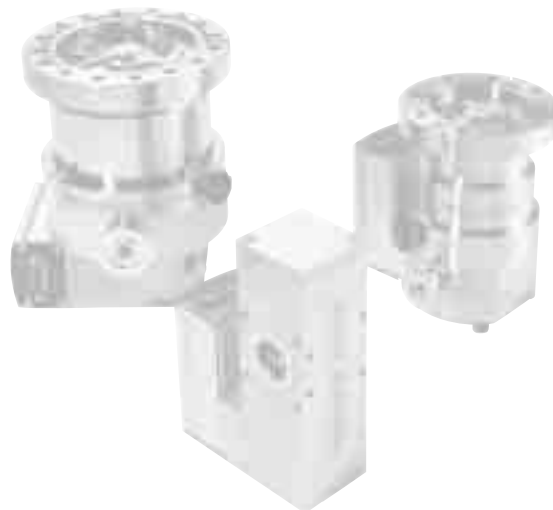
◐ = Standard orientation



○ = Any orientation



	TMH/U 261 DN 100	TMH/U 262 DN 100	TMH/U 521 DN 100	TMH/U 521 DN 160	Pump model
-	-	-	-	-	TPD ...
-	-	-	-	-	TPD ... N
-	-	-	-	-	TMH ... P
-	-	-	-	-	TMH ... P
-	-	-	-	-	TMH ... YP
-	-	-	-	-	TMH ... YP
-	-	-	-	-	TMH ... YPN
PM P02 821	PM P02 991	PM P02 851	PM P02 850		TMH ... P
PM P03 450	-	PM P03 461	PM P03 460		TMH ... P
-	PM P03 660	PM P03 671	PM P03 670		TMH ... PN
PM P03 530	PM P03 540	PM P03 551	PM P03 550		TMH ... YP
PM P03 531	-	PM P03 731	PM P03 730		TMH ... YP
-	PM P03 665	PM P03 741	PM P03 740		TMH ... YPN
-	-	PM P03 721	PM P03 720		TMH ... P
-	-	PM P03 463	PM P03 462		TMH ... P
-	-	PM P03 673	PM P03 672		TMH ... PN
-	-	PM P03 558	PM P03 557		TMH ... YP
-	-	PM P03 733	PM P03 732		TMH ... YP
-	-	PM P03 743	PM P03 742		TMH ... YPN
PM P02 826	PM P02 996	PM P02 856	PM P02 855		TMU ... P
PM P03 455	-	PM P03 466	PM P03 465		TMU ... P
-	PM P03 661	PM P03 676	PM P03 675		TMU ... PN
PM P03 535	PM P03 545	PM P03 556	PM P03 555		TMU ... YP
PM P03 536	-	PM P03 736	PM P03 735		TMU ... YP
-	PM P03 666	PM P03 746	PM P03 745		TMU ... YPN



CompactTurbo™ 10–500 I/s Class

Order numbers – Accessories

Accessories		Order number
Power supply¹⁾	DCU 100, Power supply with Display Control Unit	PM C01 694
	DCU 150, Power supply with Display Control Unit	PM C01 698
	DCU 200, Power supply with Display Control Unit	PM C01 695
	DCU 300, Power supply with Display Control Unit	PM C01 696
	TPS 100, Power supply for wall/standard rail fitting	PM 041 827-T
	TPS 101, Power supply 19" rack module 3 HE	PM 041 828-T
	TPS 150, Power supply 19" rack module 3 HE	PM 051 461-T
	TPS 200, Power supply for wall/standard rail fitting	PM 041 813-T
	TPS 201, Power supply 19" rack module 3 HE	PM 041 819-T
	TPS 300, Power supply for wall/standard rail fitting	PM 041 814-T
	TPS 301, Power supply 19" rack module 3 HE	PM 041 820-T
Turbo controller	TCP 350	PM C01 740
	TCP 350, with Profibus interface	PM C01 741
	TCP 350, with DeviceNet	PM C01 742
Operator devices	DCU 001, Display Control Unit	PM 041 816-T
	HPU 001, Handheld Programming Unit	PM 051 510-T
	Accessories for HPU (Power supply, software and PC cable)	PM 061 005-T
Mains cable, length 3 m (DCU/TPS/TCP/Integrated power supply)	with safety plug (230 V)	P 4564 309 ZA
	with US plug (115 V)	P 4564 309 ZE
	with US plug (208 V)	P 4564 309 ZF
Mains cable length 1.5 m (only TPD 011 with integrated power supply)	with safety plug (230 V)	P 4564 309 OA
	with US plug (115 V)	P 4564 309 OB
Connection cable, length 3 m²⁾ between	TC 100 – TPS 100/150 with bridge "Pumping station on" ¹⁾	PM 051 421-T
	TC 100/TCS 010 – TPS/DCU 100/150/200 ¹⁾	PM 051 541-T
	TC 100 – TPS/DCU 100/150/200 with connection RS-485 ¹⁾	PM 051 431-T
	TC 600 – TPS/DCU 100/200/300 ¹⁾	PM 051 103-T
	TCP 350 – Turbo 071/261/521	PM 051 803-T
	TCS 010 – connection box for accessories and RS-485	PM 051 460-U
Activation backing pump	Relay box 5 A, 1-phase (Diaphragm pump)	PM 041 937-T
	Relay box 20 A, 1-phase (Rotary vane pump)	PM 041 938-T
	Connection cable Relay box-TCP 350	PM 061 144-X
	TVV 001, backing vacuum safety valve, DN 16 ISO-KF, 230 V	PM Z01 205
	TVV 001, backing vacuum safety valve, DN 16 ISO-KF, 115 V	PM Z01 206
General accessories	Sealing gas valve	PM Z01 142
	Serial interface converter RS-232-485	PM 051 054-T
	Profibus-Gateway TIC 250	PM 051 257-T
	Connection adapter DN 25 ISO-KF (TPD 011)	PM 093 315-T
	Cover plate for the TC 600 attainable protection class IP 54	PM 051 327-U
	PWM adapter box, pre-switching unit for rotation speed control	PM 051 028-U
	Splinter shield	see catalog
	Vibration compensators	see catalog

¹⁾ Not for pumps with integrated power supply (N-models)

²⁾ Additional length upon request

Accessories		Order number
Venting accessories	TVF 005, venting valve	PM Z01 135
	TTV 001, air drier for venting	PM Z01 121
Cooling accessories	Heat sink	see catalog
	Air cooling	see catalog
	Water cooling ¹⁾	see catalog
Heating accessories¹⁾	Heating jacket 230 V AC, safety plug	see catalog
	Heating jacket 208 V AC, US plug	see catalog
	Heating jacket 115 V AC, US plug	see catalog
Fastening accessories	An extensive line of fastening accessories is available, featuring either splinter shield or protection screen.	see catalog

¹⁾ Not for pumps with integrated power supply (N-models)

Ordering numbers for accessories are shown in our Online or Print Catalog.

In the Online Catalog, please enter the order number for the pump in the search function and click on "Accessories." In the Print Catalog, the corresponding accessories are contained on the following pages:

Pump	Catalog page
TPD 011	155
TMH/U 071	160–163
TMH/U 261/262	168–171
TMH/U 521	176–181

Safety matters

Our turbopumps are characterized by a high level of safety. This safety is based upon theoretical and empirical crash behavior studies and the high margins of safety that are engineered into the pumps. We also place these same high demands on the

interface between pump and customer system. We therefore offer a complete line of installation materials to assure a safe interface connection; they are shown in the accessories for the respective pump.

Vacuum is nothing, but everything to us!

Pfeiffer Vacuum has been setting technological milestones for creating, measuring and analyzing vacuum for over 100 years. Our comprehensive product range covers individual components to complex vacuum systems.

Quality and service worldwide from the inventor of the turbopump: Pfeiffer is the international market leader with more than 250,000 turbopumps sold to date.

We manufacture special turbo pumping stations for your application:

- ▶ TurboCube: The ideal solution for high vacuum applications
- ▶ Economy pumping stations: Optimal for applications in both the analytical industry as well as research & development

Do you have questions about your application? Please ask us.



All data subject to change without prior notice. PT 0102 PE (November 2005)



Sales, consulting and service

- ▶ Worldwide on-site service
- ▶ Comprehensive training programs including at customer sites
- ▶ Modular service system ranging from spare parts to maintenance contracts



Pfeiffer Vacuum · Headquarters/Germany

Phone +49 (0) 6441-802-0 · Fax +49 (0) 6441-802-202 · info@pfeiffer-vacuum.de · www.pfeiffer-vacuum.net