

oerlikon
leybold vacuum

TURBOVAC and MAG

Turbomolecular Pumps

35 - 3 200 l x s⁻¹

175.01.02

Excerpt from the Oerlikon Leybold Vacuum Full Line Catalog

Product Section C09

Edition 2010

Contents

General

General	C09.03
Applications	C09.10
Accessories	C09.11

Products

Turbomolecular Pumps with Mechanical Rotor Suspension

without Compound-Stage	C09.12
with integrated Frequency Converter and Power Supply	C09.36
with Compound Stage	
with Frequency Converter for Attaching or Separate	C09.40
with integrated Frequency Converter	C09.52
without integrated Frequency Converter	C09.56
with integrated Frequency Converter and Power Supply	C09.64
Special Turbomolecular Pumps	C09.72

Turbomolecular Pumps with Magnetic Rotor Suspension

with integrated Frequency Converter	
with Compound Stage	C09.74
with separate Frequency Converter	
without Compound-Stage	C09.82
with Compound Stage	C09.86

Accessories

Electronic Frequency Converters

for Turbomolecular Pumps with Mechanical Rotor Suspension	C09.114
for Turbomolecular Pumps with Magnetic Rotor Suspension	C09.124

(Miscellaneous) Accessories

Vibration Absorber	C09.130
Air Cooling Unit	
für TURBOVAC ClassicLine-Pumpen	C09.130
für TURBOVAC SL-Pumpen	C09.131
Flange Heater for CF High Vacuum Flanges	C09.131
Fine Filter	C09.132
Securing Collar for Octal Socket Plugs	C09.132
Solenoid Venting Valve	C09.132
Power Failure Venting Valve	C09.132
Power Failure Venting Valve, electromagnetically actuated	C09.133
Purge Gas and Venting Valve	C09.133
for ClassicLine and SL Pumps	C09.134
Adapter Set for Seal Gas and Venting Valve for the SL pumps	C09.134
Gas Filter to G 1/4" for Purge Gas and Venting Valve for the SL pumps	C09.134
Accessories for Serial Interfaces RS 232 C and RS 485 C	C09.135

Miscellaneous

Service	C09.136
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General

The turbomolecular pumps from Oerlikon Leybold Vacuum generate a clean high and ultra-high vacuum, are easy to operate and are exceptionally reliable. In connection with a well rated backing pump, pressures below 10^{-10} mbar (0.75×10^{-10} Torr) can be attained.

Oerlikon Leybold Vacuum offers two product lines:

1. TURBOVAC line

Turbomolecular pumps with mechanical rotor suspension

2. TURBOVAC MAG line

Turbomolecular pumps with magnetic rotor suspension

Each of the two product lines contains “classic” turbomolecular pumps as well as turbomolecular pumps with a compound stage.

Oerlikon Leybold Vacuum is one of the world’s leading manufacturer of turbomolecular pumps. Consequently, the TURBOVAC and the TURBOVAC MAG pumps are successfully used in many applications. A list of the most important ones is given in the table “Applications” in the section “General”.

Principle of Operation

The turbomolecular pump is a turbine with blades. By the momentum transfer from the rapidly rotating rotor blades to the gas molecules their initially non-directed thermal motion is changed to a directed motion.



TURBOVAC SL 80 turbomolecular pump with frequency converter for attaching or separate and compound stage



TURBOVAC TW 361 turbomolecular pump with mechanical rotor suspension



TURBOVAC MAG W 1500 CT turbomolecular pump with magnetic rotor suspension and compound stage

Hence, the pumping process in a turbomolecular pump results from the directed motion of the gas molecules from the inlet flange to the fore-vacuum port.

In the **molecular flow range** - i.e. at pressures below 10^{-3} mbar (0.75×10^{-3} Torr) - the mean free path of the gas molecules is larger than the spacing between rotor and stator blades (typically some tenths of a millimeter). Consequently, the molecules collide primarily with the rotor blades with the result that the pumping process is highly efficient.

In the **range of laminar flow**, i.e. at pressures over 10^{-1} mbar (0.75×10^{-1} Torr) the situation is completely different. The effect of the rotor is impaired by the frequent collisions between the molecules. Therefore, a turbomolecular pump is not capable of pumping gases at atmospheric pressure thus necessitating the use of a suitably rated forevacuum pump.

To create the directed motion of the gas molecules, the tips of the rotor blades have to move at high speeds. Hence, a high rotational speed of the rotor is required. In the case of Oerlikon Leybold Vacuum turbomolecular pumps the rotor speeds vary from about 36,000 rpm for the larger rotor diameters (e.g. TURBOVAC 1000 about 20 cm (7.87 in.)) to 72,000 rpm. for small rotor diameters (e.g. TURBOVAC 50 about 6 cm (2.36 in.))

Characteristic Quantities

Pumping speed (volume flow rate), S, [l x s⁻¹]

The pumping speed for a given type of gas depends on the diameter of the rotor and the high vacuum flange, the rotor/stator design, the rotor speed and the molecular weight of the gas. The pumping speed S is a non-linear function of the inlet pressure p₁:

$$S = S(p_1).$$

Gas throughput, Q, [mbar x l x s⁻¹]

Gas throughput Q is linked to the pumping speed S and the inlet pressure p₁ through the relationship

$$Q = Q(p_1) = p_1 \times S(p_1).$$

The maximum permissible gas throughput Q_{max} is attained at the maximum permissible inlet pressure p_{1, max}:

$$Q_{\max} = Q(p_{1, \max}).$$

Compression, K

For a given type of gas, compression K is defined as the ratio between forevacuum pressure p_{VV} (= pressure on the forevacuum side of the turbomolecular pump) and the highvacuum pressure p_{HV} (= pressure on the highvacuum side of the turbomolecular pump):

$$k = k(p_{VV}) = p_{VV} / p_{HV} \\ = p_{VV} / p_{HV}(p_{VV}).$$

Compression depends very much on the gas throughput: at a given forevacuum pressure, compression increases when the gas throughput is reduced.

Idle compression, K₀

Idle compression K₀ of a turbomolecular pump is defined as the amount of compression of this pump at "Zero" gas throughput. What is problematic about this definition is the fact that the demanded "Zero" throughput can never be implemented in practice (finite leak rate, degassing of sealing components, desorption from wall surfaces). Data on idle compression need therefore to be gained from measurements run at extremely low throughputs.

Idle compression of a pump equipped with metal seals is significantly higher compared to the same pump sealed with O-rings.

Ultimate pressure (base pressure), p_{ult}, [mbar]

The ultimate pressure of a turbomolecular pump is defined as that pressure which is attained in the test chamber 48 hours after a 24 hour degassing period of the measurement system. The ultimate pressure will chiefly depend on the foreline pump used and the type of seal used at the highvacuum flange.

TURBOVAC Product Line

The TURBOVAC pumps are turbo-molecular pumps with mechanical rotor suspension which are used in the pressure range from 10⁻¹ mbar (0.75 x 10⁻¹ Torr) to 10⁻¹⁰ mbar (0.75 x 10⁻¹⁰ Torr). Pumping speeds for air vary from 35 l x s⁻¹ (inlet flange diameter = 40 mm (1.57 in.)) to 1,600 l x s⁻¹ (inlet flange diameter = 250 mm (9.84 in.)).

Through the compact design, the most reliable ceramics ball bearings and the simplicity of operation, this line of pumps is used in all high-vacuum and ultrahigh vacuum areas of application.

In particular the TURBOVAC pumps are very successfully operated in mass spectroscopy applications, gas and liquid chromatographic analysis, CD, DVD and hard disk production, manufacturing of large-surface optical layers, and non-corrosive semiconductor fabrication processes.

The most important advantages of the TURBOVAC product line are:

- Oil-free pumps for the generation of clean high and ultra-high vacuum conditions
- Highly performance in any orientation
- Highly degree of operating reliability
- Easy to operate
- Compact design

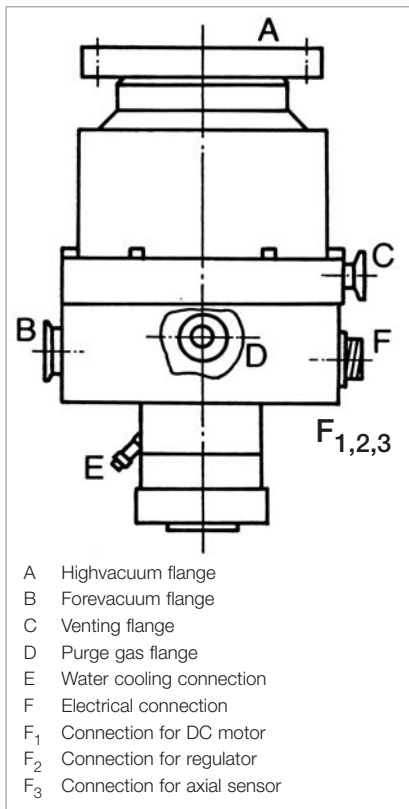
Ceramic Ball Bearings Technology

All TURBOVAC pumps are fitted with **ceramic ball bearings**, i.e. **ceramic balls** are running in steel races. The bearings are **lubricated for life by grease**.

Ceramic balls are lighter, harder and smoother than balls made of steel. Therefore, with ceramic balls the wear on the races is significantly reduced. Consequently, the lifetime of the bearings, and hence the lifetime of the pump, is increased.

The **TURBOVAC pumps** fitted with grease-lubricated ceramic ball bearings **can be mounted in any orientation**.

As the ball bearing is encapsulated, the grease can not enter the highvacuum space, even if the pump is mounted up-side-down.



Flange designations used in this product section

Components supplied with the Turbomolecular Pumps

Highvacuum Flange

KF, ISO-K and ISO-F models

- Accessories need to be ordered separately

ANSI Models

- O-ring included in the delivery

CF Models

- Without gaskets ¹⁾, but with screws ²⁾

Forevacuum Port

- Centering rings, O-rings and clamps for all KF type forevacuum flanges are included.

Purge / vent ports are blanked-off

¹⁾ For CF gaskets, see Product Section C13

²⁾ Only for MAG pumps

TURBOVAC MAG Product Line

The **TURBOVAC MAG pumps** are **turbomolecular pumps with magnetic rotor suspension** which are used in the **pressure range from 10⁻¹ mbar (0.75 x 10⁻¹ Torr) to 10⁻¹⁰ mbar (0.75 x 10⁻¹⁰ Torr)**.

Pumping speeds for air vary from 300 l x s⁻¹ (inlet flange diameter = 100 mm (3.94 in.)) **to 3,200 l x s⁻¹** (inlet flange diameter = 320 mm (12.6 in.)).

The TURBOVAC MAG pumps are mostly installed on semiconductor processing lines like etching, CVD, PVD and ion implantation, i.e. in applications where corrosive gases need to be pumped. Also electron beam microscopy is an important area of application for these pumps.

The **most important advantages of the TURBOVAC MAG product line** are:

- Hydrocarbon-free pumps for the generation of clean high and ultra-high vacuum conditions
- High performance in any orientation
- High degree of operating reliability
- Extremely low vibration
- Designed for pumping of corrosive gases
- Almost maintenance-free

Use of Turbomolecular Pumps in Analytical Instruments

All modern analytical methods for gas, liquid and plasma analysis – like for example GC-MS, LC-MS and ICP-MS – rely on mass spectrometers and for this reason require adequate highvacuum conditions. Also in electron microscopes and many surface analysis instruments the production of a highvacuum is essential.

In over 90% of all highvacuum applications, the turbomolecular pump has been found to be ideal. Thanks to the hydrocarbon-free vacuum, most simple operation, compact design and almost maintenance-free operation it has in most cases displaced above all the diffusion pump.

On the basis of decades of experience and in cooperation with research facilities and the manufacturers of analytical instruments,

Oerlikon Leybold Vacuum has continually optimized its products.

Through the TURBOVAC wide range series, a further improvement has been attained, making available to users in the area of analytical engineering highly flexible and reliable products.

Owing to the modular concept the user may

- adapt his vacuum system precisely to his requirements
- perfectly integrate the components within his system and
- find the most cost-effective system configuration for his needs.

Moreover, in response to special customer requirements, though Oerlikon Leybold Vacuum has, through the introduction of the TURBOVAC multi inlet series, achieved a major step ahead for analytical instruments.

Up to three analysis chambers can be pumped down simultaneously by a single multi inlet pump. These pumps are fine tuned with regard to pumping speed and gas throughput so as to attain higher detection sensitivities for analytical systems, a smaller footprint and an increased sample throughput.

The benefits for the customers are the extreme compactness of the vacuum systems without sacrificing performance density, simple installation, stable vacuum connections and, compared to the use of discrete individual pumps, significantly lower investment costs for the entire system. The cartridge solution, moreover, allows for an innovative and cost-effective design of the customer's system and during servicing a simple replacement of the active unit without involved assembly work and leak searching.

Cartridge benefits, which convince

- Higher effective pumping speed
- No losses in conductance
- Compact vacuum system
- Easy pump replacement without having to disassemble the highly sensitive mass spectrometer chambers

The benefits for the customers using Oerlikon Leybold Vacuum products are reflected by the efficiency of the analytical instruments:

- Increase in detection sensitivity
- Smaller analytical systems
- Increase in sample throughput
- Reduction of system costs
- Lower maintenance costs

In combination with backing pumps like the TRIVAC or Scroll pump, Oerlikon Leybold Vacuum is able to offer the best vacuum system optimized for all major applications in the area of analytical instrumentation.



TURBOVAC multi Inlet TW 220/150/15 fitted in an analytical instrument
(by courtesy of Thermo Fisher Scientific)

Use of Turbomolecular Pumps in the Area of Semiconductor Processes

In the semiconductor industry turbomolecular pumps are used on the following processes, among others:

- Etching
- Sputtering
- Ion implantation
- CVD
- Lithography.

In these applications pumping of aggressive gases is often required.

This may necessitate the use of pumps equipped with a purge gas facility or a magnetic suspension in order to avoid damaged bearings. Especially during metal etching, deposits may occur in the fore-vacuum space of the turbomolecular pump. In order to prevent this the pumps must be heated to a certain temperature. Such temperature controlled variants are optionally available for the MAG 1500 C, MAG 2000 C, MAG 2800 and MAG 3200. In contrast to turbomolecular pumps with mechanical bearings, magnetically levitated pumps provide the advantage that they prevent overheating of the bearings at high gas flows and effectively exclude any damage to the magnetic bearings by aggressive media.

In electron microscopes and in lithographic equipment, low vibration levels are exceptionally important. For this reason magnetically levitated turbomolecular pumps should be used here.

The recommended backing pumps are either dry compressing ECODRY pumps or rotary vane pumps from the TRIVAC range, possibly fitted with the BCS system.

Use of Turbomolecular Pumps in the Area of Coating Systems

Coating of optical and magnetic storage media, optical components as well as architectural glass requires highvacuum conditions. This is the only way to ensure that the formed layers will be uniform and adhere to the substrate.

The way in which the vacuum is generated has a significant impact on the quality of the coating. By pumping the vacuum chamber down to pressures in the range of 10^{-6} mbar (0.75×10^{-6} Torr), interfering gas and water molecules are removed from the processing chamber. In the case of sputtering the coating process is run in the pressure range between 10^{-3} and 10^{-2} mbar (0.75×10^{-3} and 0.75×10^{-2} Torr), and in the case of evaporation coating, pressures below 10^{-4} mbar (0.75×10^{-4} Torr) are utilized.

The turbomolecular pump meets all requirements of the customers as to a hydrocarbon-free vacuum, very simple operation, compact design and almost maintenance-free operation in an almost ideal manner. The range of pumps from Oerlikon Leybold Vacuum includes pumps with flange diameters ranging from 40 mm to 250 mm (1.57 in. to 9.84 in.) nominal width. Thus the right pump is available for each application, be it coating of data memories (CD, DVD, hard discs), coating of tools and coating of precision lenses in the area of optical components, displays or architectural glass.

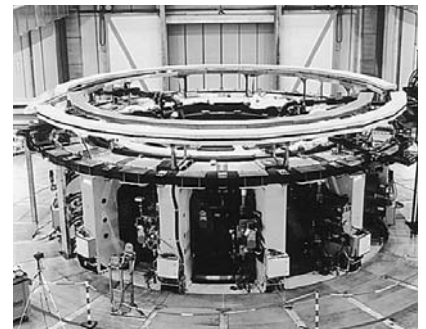


Entire high vacuum equipment of a CD/DVD coating system with TURBOVAC TW 250 S pumps

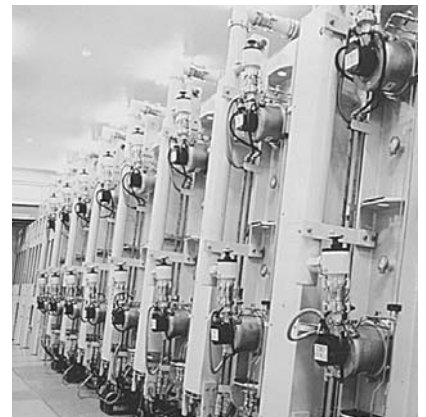
Research and Development

In the area of research, all types of turbomolecular pumps from Oerlikon Leybold Vacuum are being used.

In the case of particularly stringent requirements such as low vibration levels, a TURBOVAC with magnetic bearings should be selected; the same applies to those applications in which entirely hydrocarbon-free pump systems are required.



Nuclear fusion technology



High performance glass coating plant



TURBOVAC MAG W 1300 C turbomolecular pump with magnetic rotor suspension and compound stage

Magnetic Bearings Technology

The world-wide success of the TURBOVAC MAG product line results from more than **30 years of experience** of Oerlikon Leybold Vacuum in the development and manufacturing of turbomolecular pumps with magnetically levitated rotors.

In 1976 Oerlikon Leybold Vacuum started the market introduction of the famous TURBOVAC 560 M. This was the first magnetically levitated turbomolecular pump which became commercially available. Today, Oerlikon Leybold Vacuum is employing the well-proven and reliable 5 axes active suspension design principle.

Five axes with active bearings

The rotor position is actively controlled by electromagnets in all 5 degrees of freedom. The TURBOVAC MAG 300/400, MAG 600/700, MAG 830/1300, MAG 1500, MAG 2000, MAG 2200 and MAG 2800/3200 are equipped with such a bearing system.

Applications

Pumps	50	151, 361 (C)	600 C	1000 C	1100 C	T 1600	SL 80	SL 300	SL 700	TW 250 S	TW 501	TW 1600	TW 2401	MAG 1500 CT	MAG W 300/400/600/700 IP/IP	MAG W 830/1300 C	MAG W 1500 CT	MAG W 2200 C	MAG W 2000 C/CT	MAG W 2800/3200 C/CT
Applications																				
Analytical Instruments																				
Leak detectors	■	■					■	■						■	■					
Mass spectrometers	■	■					■	■	■					■	■					
Gas chromatography (GC-MS)	■	■					■	■		■				■	■					
Liquid chromatography (LC-MS)	■	■					■	■		■	■			■	■					
Quadrupol time of flight (Q-TOF)								■	■					■	■					
Matrix assisted laser desorption time of flight (MALDI-TOF)	■							■	■					■	■					
Inductively coupled plasma mass spectrometry (ICP-MS)	■							■	■	■				■	■					
Electron beam microscopy	■						■				■			■	■					
Coating																				
Data storage / optical		■						■				■		■	■		■	■	■	■
Data storage / magnetic			■	■	■	■			■	■	■	■	■	■	■		■	■	■	■
Flat panel displays			■	■	■	■			■	■	■	■	■	■	■		■	■	■	■
Optical coating		■	■	■	■	■		■		■	■	■	■	■	■		■	■	■	■
Large area coating				■	■	■						■		■		■	■	■	■	■
Decorative coating				■	■	■				■	■			■		■	■	■	■	■
Metallization				■	■	■				■	■			■		■	■	■	■	■
Wear protection			■	■	■	■				■	■			■		■	■	■	■	■
Metallurgy				■	■	■				■	■			■		■	■	■	■	■
TV tube manufacturing	■						■		■											
R & D (Research and Development)																				
Surface analysis				■			■						■	■	■	■	■	■	■	■
UHV / XHV systems		■	■	■	■		■	■	■		■	■	■	■	■		■			■
Particle accelerators		■		■	■	■		■	■		■		■	■	■		■	■	■	■
Fusion experiments			■	■	■	■				■	■	■	■	■	■		■	■	■	■
Space simulation			■	■	■					■	■	■	■	■	■		■	■	■	■
Semiconductor Processes																				
Load locks and Transfer chambers	■	■	■	■	■		■	■	■	■		■		■	■					
Etch																■		■	■	
PECVD														■	■	■	■	■	■	■
PVD										■		■		■	■	■	■	■	■	■
Ion implantation														■	■	■	■	■	■	■

Accessories

Pumps																					
	50	151, 361	600 C	1000 C	1100 C	T 1600	SL 80	SL 300	SL 700	TW 250 S	TW 501	TW 1600	TW 2401	MAG 1500 CT	MAG W 300/400/600/700 IP/P	MAG W 800/1300 C	MAG W 1500 CT	MAG W 2200 C	MAG W 2000 C/CT	MAG W 2800/3200 C/CT	
Accessories	Page																				
Frequency Converters																					
TURBO.DRIVE TD 20 <i>classic</i>	C09.114	■	■	■	■																
NT 10	C09.116	■																			
TURBO.DRIVE TD 400	C09.117					■	■		■												
TURBO.DRIVE TD 700	C09.118							■													
Power supply TURBO.POWER 300	C09.120					■	■		■												
Power supply TURBO.CONTROL 300	C09.120					■	■		■												
Power supply TURBO.CONTROL 700	C09.120								■				■								
TURBO.DRIVE TD 35	C09.122									■											
TURBO.DRIVE TD 240	C09.123											■									
MAG.DRIVE S	C09.124												■								
MAG.DRIVE digital	C09.126												■	■	■	■	■	■	■	■	■
Power supply TURBO.POWER 500	C09.128											■									
Vibration absorber	C09.130	■	■	■	■	■	■	■	■	■		■	■		■						
Air cooling unit	C09.130	■	■	■	■							■		■							
Air cooling unit for SL pumps	C09.131						■	■	■												
Flange heaters for CF flanges	C09.131	■	■	■	■		■	■	■	■		■		■							
Fine filter	C09.132	■	■																		
Securing Collar for Octal Socket Plugs	C09.132		■	■	■	■															
Venting valve	C09.133	■	■	■	■	■		■	■	■		■		■	■		■				
Power failure venting valve	C09.132		■	■	■	■	■			■		■	■		■	■	■	■	■	■	■
Purge gas and venting valve	C09.133		■	■	■	■				■				■		■					
Purge gas and venting valve for ClassicLine and SL Pumps	C09.134		■	■	■	■		■	■	■											
Adapter Set	C09.134						■	■	■												
Gas filter G 1/4"	C09.134		■	■	■	■		■	■	■											
Water cooling kit		■					■	■	■	■		■		■							
Accessories for serial interfaces RS 232 C and RS 485 C	C09.135		■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

Products and Accessories

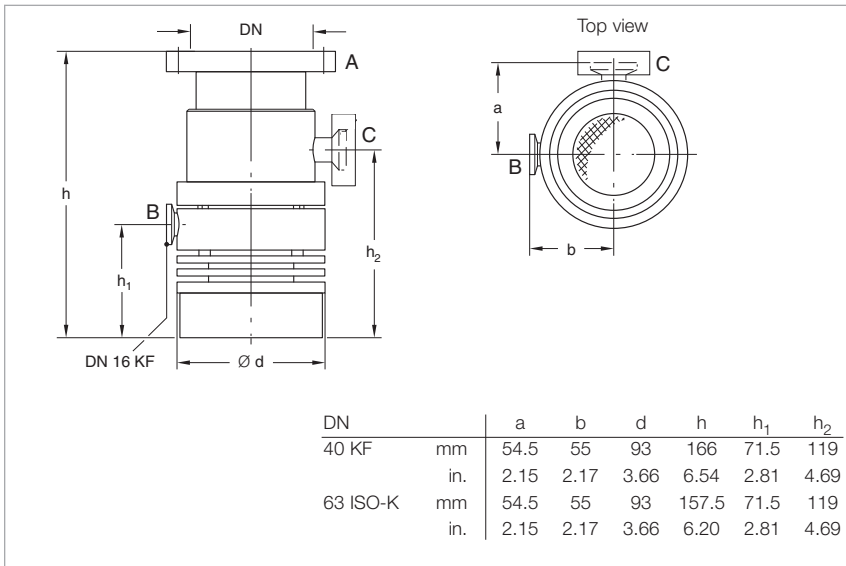
Mechanical Rotor Suspension without Compound-Stage

TURBOVAC 50



Typical Applications

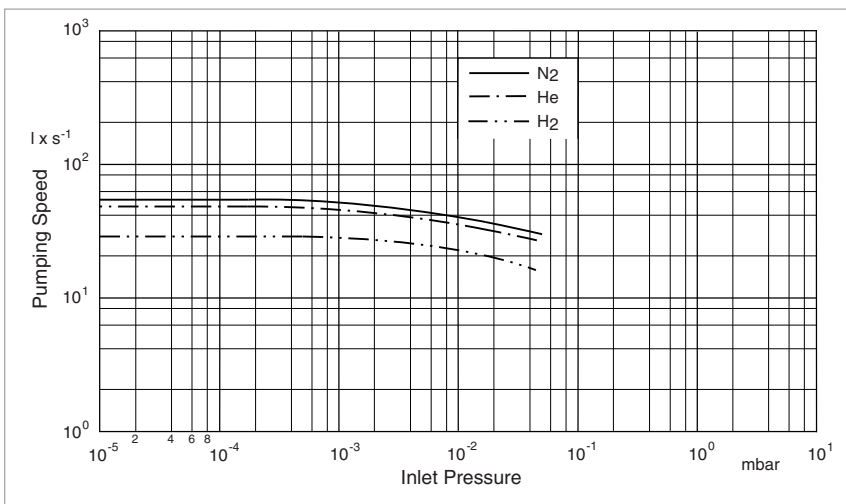
- Leak detectors
- Mass spectrometers
- Electron beam microscopy
- TV tube manufacturing
- Load locks and transfer chambers
- High vacuum chambers



Dimensional drawing for the TURBOVAC 50

Technical Features

- Small footprint
- Installation in any orientation
- Cooling by convection is sufficient for most applications
- Air and water cooling can be added easily
- Oil-free pump for generating clean high and ultrahigh vacuum conditions



Pumping speed as a function of the inlet pressure (TURBOVAC 50 with flange DN 63 ISO-K)

Advantages to the User

- Space-saving
- Easy to integrate into complex vacuum systems
- Low operating costs
- Highly reliable operation also in processes loaded with particles

Technical Data

TURBOVAC 50

Inlet flange	DN	O-ring sealed 40 KF	O-ring sealed 63 ISO-K
Pump housing		Aluminum	Aluminum
Pumping speed at 10^{-3} mbar (0.75×10^{-3} Torr)			
N ₂	$l \times s^{-1}$	33	55
He	$l \times s^{-1}$	36	48
H ₂	$l \times s^{-1}$	28	30
Max. gas throughput ¹⁾ at 10^{-2} mbar (0.75×10^{-2} Torr)			
N ₂	$mbar \times l \times s^{-1}$	0.30	0.40
He	$mbar \times l \times s^{-1}$	0.25	0.35
H ₂	$mbar \times l \times s^{-1}$	0.20	0.25
Max. compression when idle			
N ₂		2×10^6	2×10^6
Ultimate pressure	mbar (Torr)	$< 5 \times 10^{-8}$ ($< 3.75 \times 10^{-8}$)	$< 5 \times 10^{-8}$ ($< 3.75 \times 10^{-8}$)
Max. foreline pressure for N ₂	mbar (Torr)	1×10^{-1} ($< 0.75 \times 10^{-1}$)	1×10^{-1} ($< 0.75 \times 10^{-1}$)
Recommended forevacuum pump		TRIVAC D 2,5 E	TRIVAC D 2,5 E
Run-up time to 95% of nominal speed	min	2	2
Weight, approx.	kg (lbs)	2 (4.4)	(4.4)
Max. power consumption	VA	45	45

¹⁾ For continuous operation when water-cooled



Technical Data

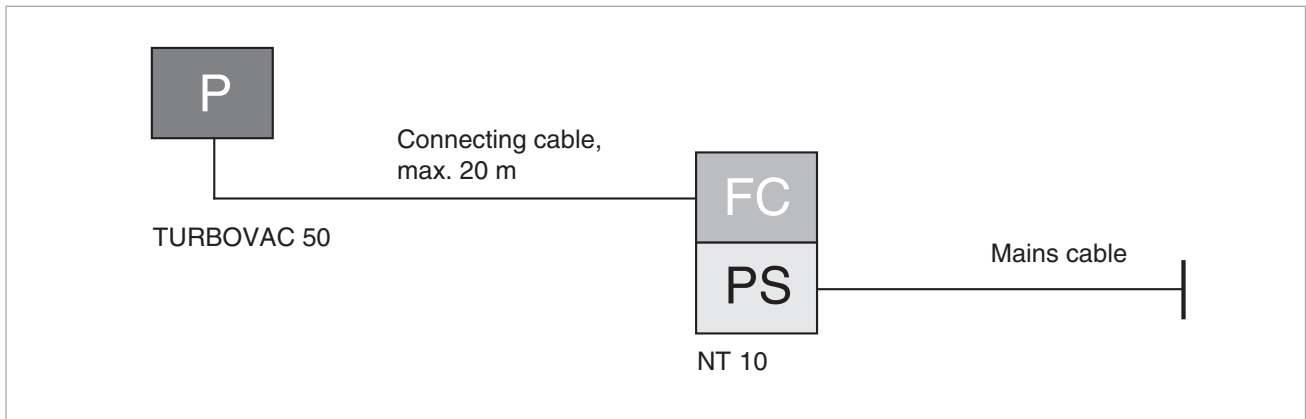
TURBOTRONIK NT 10

Mains connection, 50 - 60 Hz	V	100-120/200-240
Max. output voltage	V	3 x 150
Overload current limit	A	0,22
Permissible ambient temperature	°C (°F)	0 to +40 (+32 to +104)
Dimensions (W x H x D)	mm (in.)	106 x 128 x 233 (4.17 x 5.04 x 9.17)
Weight, approx.	kg (lbs)	1.5 (3.3)

Ordering Information

TURBOVAC 50

TURBOVAC 50 without Compound Stage	P	Part No.	
DN 40 KF, convection DN 63 ISO-K, convection		854 00 854 01	
Mandatory Accessories		FC	PS
Electronic frequency converter NT 10 with EURO plug, 180-240 V with US plug, 90-140 V		859 00 859 01	
Connecting cable converter – TURBOVAC 1.0 m (3.5 ft) 3.0 m (10.5 ft) 5.0 m (17.5 ft) 10.0 m (35.0 ft) 20.0 m (70.0 ft)		200 11 609 121 08 121 09 161 10 800150V2000	
Forevacuum pump TRIVAC D 2,5 E 220-240 V, 50 Hz; 230 V, 60 Hz; earthed plug, EURO version 110-120 V, 200-240 V50/60 Hz; without plug, world version 110-120 V, 50/60 Hz; NEMA plug, US version 100 V, 50/60 Hz; NEMA plug, Japan version For further types, see our Full Line Catalog		140 000 140 001 140 002 140 003	



Ordering Information

TURBOVAC 50

Accessories, optional	Part No.
Air cooling unit 230 V AC 115 V AC 100 V AC	854 05 854 06 800152V0015
Water cooling kit (hose nozzles \varnothing 10 mm (0.4 in.))	800135V0003
Vibration absorber DN 63 ISO-K	800131V0063
Solenoid venting valve, normally closed 24 V DC, DN 16 KF	800120V0011
Power failure venting valve, normally open 24 V DC, DN 16 KF	800120V0021
Included in the Delivery of the Pump P	
Inlet screen, centering ring with FPM sealing ring, outer ring	ISO-K
Inlet screen, centering ring with FPM O-ring, Spannring	KF
Centering ring with O-ring, Clamping ring	Foreline Flange
Included in the Delivery of the Frequency Converter FC PS	
Mains cable	

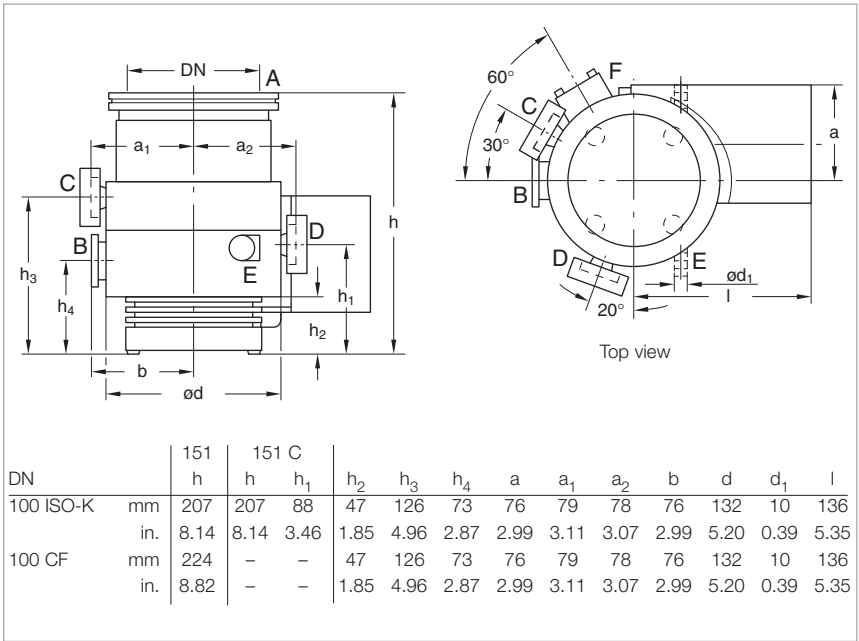
Mechanical Rotor Suspension without Compound-Stage

TURBOVAC 151, 151 C ClassicLine

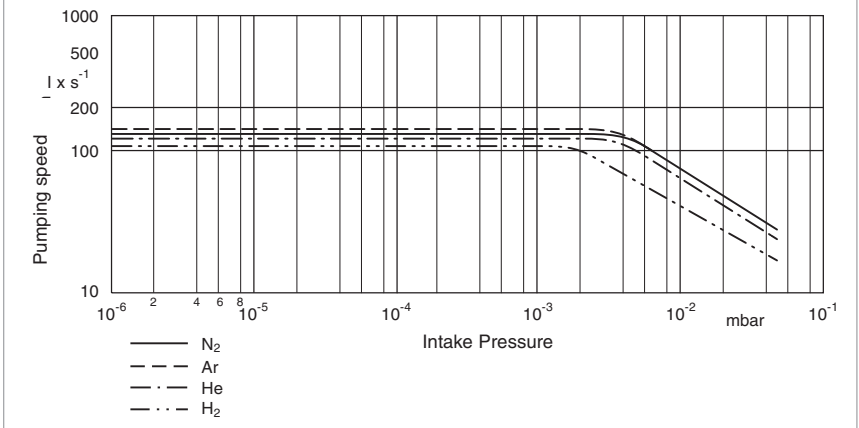


Turbomolecular pumps without a purge gas facility are only suited for pumping of air or inert gases. They are not suited for pumping of aggressive or reactive gases.

TURBOVAC pumps with a "C" in the type designation are equipped with a purge gas facility. The purge gas protects only the bearing area and the motor of the TURBOVAC.



Dimensional drawing for the TURBOVAC 151 and 151 C



Pumping speed as a function of the inlet pressure (TURBOVAC 151 with flange DN 100)

Typical Applications

- Leak detectors
- Mass spectrometers
- Optical coating
- R & D
- UHV systems
- Particle accelerators
- Load locks and transfer chambers

Technical Features

- Small footprint
- Operation in any orientation
- Oil-free pump for generating clean high and ultrahigh vacuum conditions
- Bearing temperature measurement through the TURBO.DRIVE TD 20 classic

Advantages to the User

- Space-saving
- Easy to integrate into complex vacuum systems
- Low operating costs
- Highly reliable operation also in processes loaded with particles

Technical Data

TURBOVAC 151 (C)

Inlet flange	DN	100 ISO-K	100 CF
Pumping speed			
N ₂	l x s ⁻¹	145	145
Ar	l x s ⁻¹	150	150
He	l x s ⁻¹	135	135
H ₂	l x s ⁻¹	115	115
Max. gas throughput			
N ₂	mbar x l x s ⁻¹	1.5	1.5
Ar	mbar x l x s ⁻¹	1.3	1.3
H ₂	mbar x l x s ⁻¹	1.0	1.0
Compression ratio			
N ₂		1 x 10 ⁹	1 x 10 ⁹
He		2 x 10 ⁴	2 x 10 ⁴
H ₂		8 x 10 ²	8 x 10 ²
Ultimate pressure	mbar (Torr)	< 1 x 10 ⁻¹⁰ (< 0.75 x 10 ⁻¹⁰)	< 1 x 10 ⁻¹⁰ (< 0.75 x 10 ⁻¹⁰)
Max. continuous inlet pressure ¹⁾	mbar (Torr)	5 x 10 ⁻² (4 x 10 ⁻²)	5 x 10 ⁻² (4 x 10 ⁻²)
Max. foreline pressure for N ₂	mbar (Torr)	5 x 10 ⁻¹ (4 x 10 ⁻¹)	5 x 10 ⁻¹ (4 x 10 ⁻¹)
Recommended forevacuum pump		from TRIVAC D 4 B to D 16 B	from TRIVAC D 4 B to D 16 B
Run-up time at 95% of nominal speed	min	≈ 2	≈ 2
Purge / vent port	DN	10 KF	10 KF
Cooling water connection (hose nozzles)	mm (in.)	10 (0.39)	10 (0.39)
Weight, approx.	kg (lbs)	8 (17)	8 (17)
Max. power consumption / Ultimate pressure	VA	680	680
	VA	480	480

¹⁾ Water-cooled



Technical Data

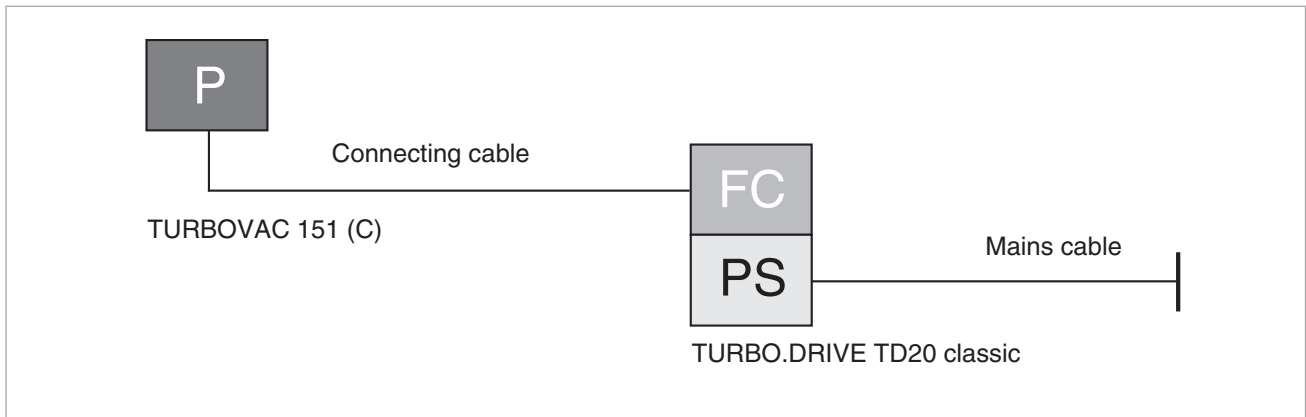
TURBO.DRIVE TD 20 *classic*

Mains connection, 50 - 60 Hz; selectable	V	100 to 240 (-15 % / +10 %)
Max. output voltage	V	3 x 47
Overload current limit	A	5
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Protection class	IP	20
Dimensions (W x H x D)	mm (in.)	213 x 128 x 315 (1/2 19", 3 HU) 8.39 x 5.04 x 12.40 (1/2 19", 3 HU)
Weight, approx.	kg (lbs)	4 (8.8)

Ordering Information

TURBOVAC 151 (C)

TURBOVAC 151 (C) without Compound Stage	P	Part No.	
DN 100 ISO-K, water-cooled DN 100 ISO-K, water-cooled (C version) DN 100 CF, water-cooled DN 100 CF, water-cooled (C version)		856 31 856 35 856 32 103 41	
Mandatory Accessories			
TURBO.DRIVE TD 20 <i>classic</i> without interface with RS 232 C interface with RS 485 C interface with Profibus with 25 pol I/O	FC	PS	
Connecting cable TURBOVAC - frequency converter 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft) 50 m (175.0 ft) 60 m (210.0 ft) 80 m (280.0 ft) 140 m (490.0 ft)		857 65 857 66 857 67 857 68 800152V0008 800152V0007 800152V0080 800152V0140	
Mains cable 3 m (10.5 ft) EURO plug UK plug US plug 5-15 P (220 V AC) 2 m (7.5 ft) US plug 115 V AC		800102V0002 800102V0003 800102V1002 992 76 513	
Forevacuum pump TRIVAC D 4 B 1 phase motor; 230 V, 50 Hz		112 45	
TRIVAC D 8 B 1 phase motor; 230 V, 50 Hz		112 55	
TRIVAC D 16 B 1 phase motor; 230 V, 50 Hz 1 phase motor; 230 V, 50/60 Hz 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz		112 65 113 25 112 66	
SCROLLVAC SC 30 D 1 phase motor; 200-230 V, 50/60 Hz 1 phase motor; 100-115 V, 50/60 Hz 3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V 60 Hz		133 002 133 102 133 004	
For further types, see our Full Line Catalog			



Ordering Information

TURBOVAC 151 (C)

Accessories, optional	Part No.
Air cooling unit 230 V AC 115 V AC 100 V AC	855 31 894 08 800152V0016
Flange heater DN 100 CF, 230 V, 50 Hz DN 100 CF, 115 V, 60 Hz	854 27 854 28
Vibration absorber DN 100 ISO-K DN 100 CF	800131V0100 500 071
Solenoid venting valve, with gas admission filter, normally closed 24 V DC, DN 16 KF	800120V0011
Power failure venting valve, with gas admission filter, normally open 24 V DC, DN 16 KF	800120V0021
Purge gas and venting valve Gas flow at 1 bar 0.4 mbar x l x s ⁻¹ (24 sccm), Pump connection DN 10 KF / gas connection G 1/4" 230 V AC 100 - 115 V AC 24 V DC	800152V0014 800152V0041 800152V0013
Gas filter to G 1/4-in. for purge gas and venting valve	800110V0012
Replacement filter (for gas filter to G 1/4-in. for purge gas and venting valve)	200 18 515
Included in the Delivery of the Pump	P
Inlet screen, centering ring with FPM sealing ring, outer ring	ISO-K
Inlet screen	CF
Centering ring with O-ring, clamping ring	Foreline Flange
Pivoted threaded fittings to replace the included hose nipples	Water Cooling

Mechanical Rotor Suspension without Compound-Stage

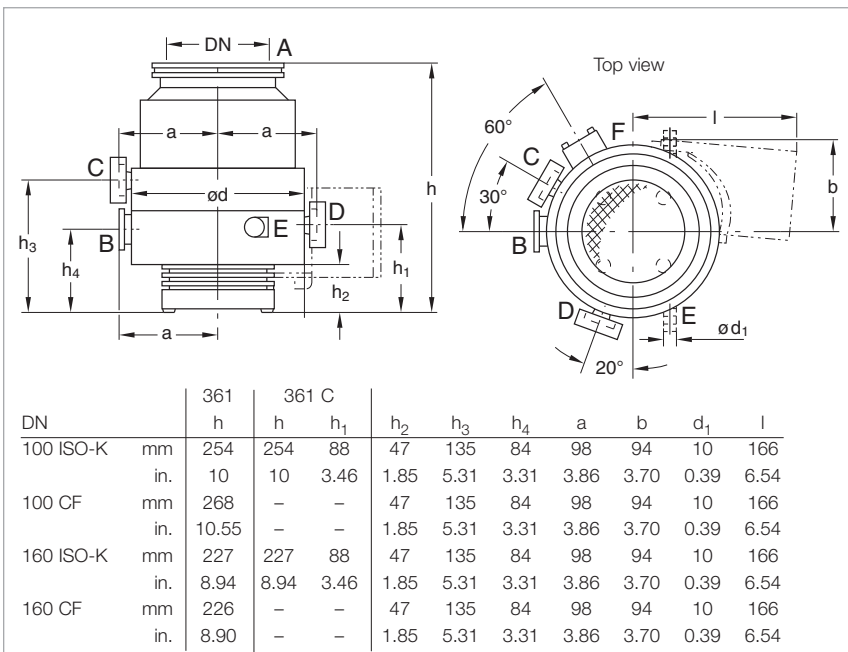
TURBOVAC 361, 361 C ClassicLine



Turbomolecular pumps without a purge gas facility are only suited for pumping of air or inert gases. They are not suited for pumping of aggressive or reactive gases.

TURBOVAC pumps with a "C" in the type designation are equipped with a purge gas facility.

The purge gas protects only the bearing area and the motor of the TURBOVAC.



Dimensional drawing for the TURBOVAC 361 and 361 C

Typical Applications

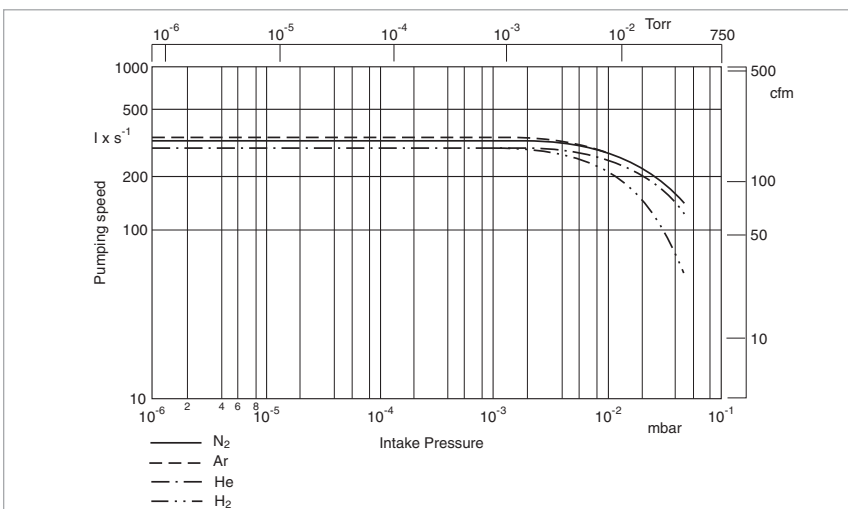
- Leak detectors
- Mass spectrometers
- Data storage
- Optical coating
- R & D
- UHV systems
- Particle accelerators
- Load locks and transfer chambers

Technical Features

- Small footprint
- Installation in any orientation
- Oil-free pump for generating clean high and ultrahigh vacuum conditions
- Bearing temperature measurement through the TURBO.DRIVE TD 20 classic

Advantages to the User

- Space-saving
- Easy to integrate into complex vacuum systems
- Low operating costs
- Highly reliable operation also in processes loaded with particles



Pumping speed as a function of the inlet pressure (TURBOVAC 361 with flange DN 100)

Technical Data

TURBOVAC 361 (C)

Inlet flange	DN	100 ISO-K • 100 CF	160 ISO-K • 160 CF
Pumping speed			
N ₂	l x s ⁻¹	345	400
Ar	l x s ⁻¹	350	-
He	l x s ⁻¹	340	380
H ₂	l x s ⁻¹	340	370
Max. gas throughput			
N ₂	mbar x l x s ⁻¹	3.0	3.0
Ar	mbar x l x s ⁻¹	2.5	2.5
Compression ratio			
N ₂		1 x 10 ⁹	1 x 10 ⁹
He		6 x 10 ⁴	6 x 10 ⁴
H ₂		3 x 10 ³	3 x 10 ³
Ultimate pressure	mbar (Torr)	< 1 x 10 ⁻¹⁰ (< 0.75 x 10 ⁻¹⁰)	< 1 x 10 ⁻¹⁰ (< 0.75 x 10 ⁻¹⁰)
Max. continuous inlet pressure ¹⁾	mbar (Torr)	5 x 10 ⁻² (4 x 10 ⁻²)	5 x 10 ⁻² (4 x 10 ⁻²)
Max. foreline pressure for N ₂	mbar (Torr)	5 x 10 ⁻¹ (4 x 10 ⁻¹)	5 x 10 ⁻¹ (4 x 10 ⁻¹)
Recommended forevacuum pump		from TRIVAC D 16 B to D 25 B	from TRIVAC D 16 B to D 25 B
Run-up time at 95% speed	min	≈ 2	≈ 2
Purge / vent port	DN	10 KF	10 KF
Cooling water connection (hose nozzles)	mm (in.)	10 (0.39)	10 (0.39)
Weight, approx.	kg (lbs)	12 (26)	12 (26)
Max. power consumption / Ultimate pressure	VA	680	680
	VA	480	480

¹⁾ Water-cooled



Technical Data

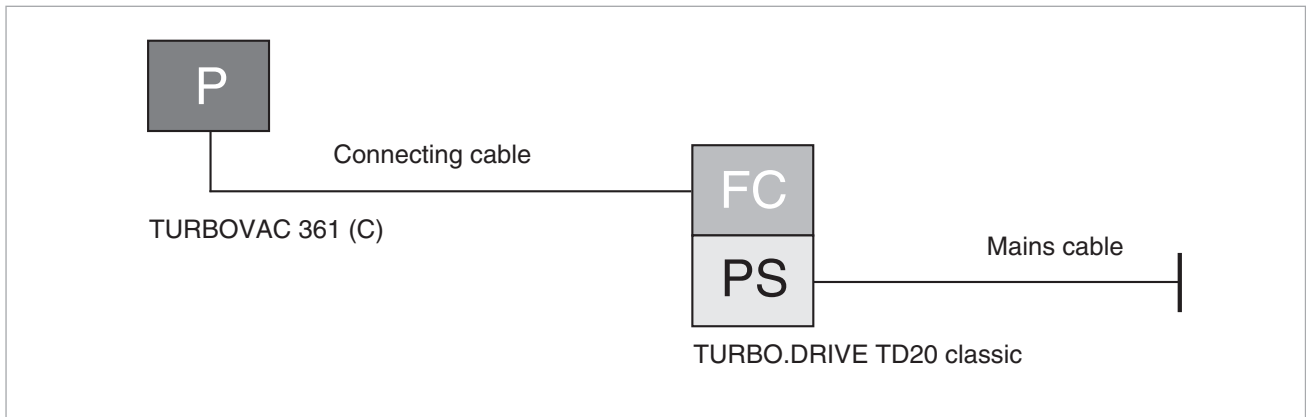
TURBO.DRIVE TD 20 classic

Mains connection, 50 - 60 Hz; selectable	V	100 to 240 (-15 % / +10 %)
Max. output voltage	V	3 x 47
Overload current limit	A	5
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Protection class	IP	20
Dimensions (W x H x D)	mm (in.)	213 x 128 x 315 (1/2 19", 3 HU) 8.39 x 5.04 x 12.40 (1/2 19", 3 HU)
Weight, approx.	kg (lbs)	4 (8.8)

Ordering Information

TURBOVAC 361 (C)

TURBOVAC 361 (C) without Compound Stage	P	Part No.		
DN 100 ISO-K, water-cooled DN 100 ISO-K, water-cooled (C version) DN 100 CF, water-cooled DN 160 ISO-K, water-cooled DN 160 ISO-K, water-cooled (C version) DN 160 CF, water-cooled		856 70 856 75 856 71 856 72 856 77 856 73		
Mandatory Accessories		FC	PS	
TURBO.DRIVE TD 20 <i>classic</i> without interface with RS 232 C interface with RS 485 C interface with Profibus with 25 pol I/O		800075V0001 800075V0002 800075V0004 800075V0003 800075V0005		
Connecting cable TURBOVAC - frequency converter 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft) 50 m (175.0 ft) 60 m (210.0 ft) 80 m (280.0 ft) 140 m (490.0 ft)		857 65 857 66 857 67 857 68 800152V0008 800152V0007 800152V0080 800152V0140		
Mains cable 3 m (10.5 ft) EURO plug UK plug US plug 5-15 P (220 V AC) 2 m (7.5 ft) US plug 115 V AC		800102V0002 800102V0003 800102V1002 992 76 513		
Forevacuum pump TRIVAC D 16 B 1 phase motor; 230 V, 50 Hz 1 phase motor; 230 V, 50/60 Hz 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz		112 65 113 25 112 66		
TRIVAC D 25 B 1 phase motor; 230 V, 50 Hz 1 phase motor; 230 V, 50/60 Hz 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz		112 75 113 35 112 76		
SCROLLVAC SC 30 D 1 phase motor; 200-230 V, 50/60 Hz 1 phase motor; 100-115 V, 50/60 Hz 3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 002 133 102 133 004		
For further types, see our Full Line Catalog				



Ordering Information

TURBOVAC 361 (C)

Accessories, optional	Part No.
Air cooling unit	
230 V AC	855 31
115 V AC	894 08
100 V AC	800152V0016
Flange heater	
DN 100 CF, 230 V, 50 Hz	854 27
DN 100 CF, 115 V, 60 Hz	854 28
DN 160 CF, 230 V, 50 Hz	854 37
DN 100 CF, 115 V, 60 Hz	854 38
Vibration absorber	
DN 100 ISO-K	800131V0100
DN 100 CF	500 071
DN 160 ISO-K	500 073
DN 160 CF	500 072
Solenoid venting valve, with gas admission filter, normally closed	
24 V DC, DN 16 KF	800120V0011
Power failure venting valve, with gas admission filter, normally open	
24 V DC, DN 16 KF	800120V0021
Purge gas and venting valve	
Gas flow at 1 bar 0.4 mbar x l x s ⁻¹ (24 sccm),	
Pump connection DN 10 KF / gas connection G 1/4"	
230 V AC	800152V0014
100 - 115 V AC	800152V0042
24 V DC	800152V0013
Gas filter to G 1/4-in. for purge gas and venting valve	800110V0012
Replacement filter	200 18 515
Included in the Delivery of the Pump	P
Inlet screen, centering ring with FPM sealing ring, outer ring	ISO-K
Inlet screen	CF
Centering ring with O-ring, clamping ring	Foreline Flange
Pivoted threaded fittings to replace the included hose nipples	Water Cooling

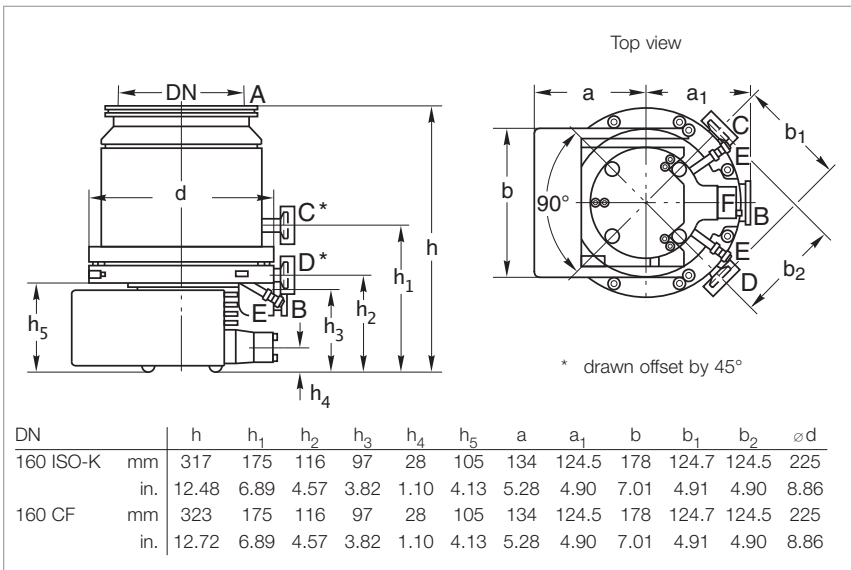
Mechanical Rotor Suspension without Compound-Stage

TURBOVAC 600 C ClassicLine



Typical Applications

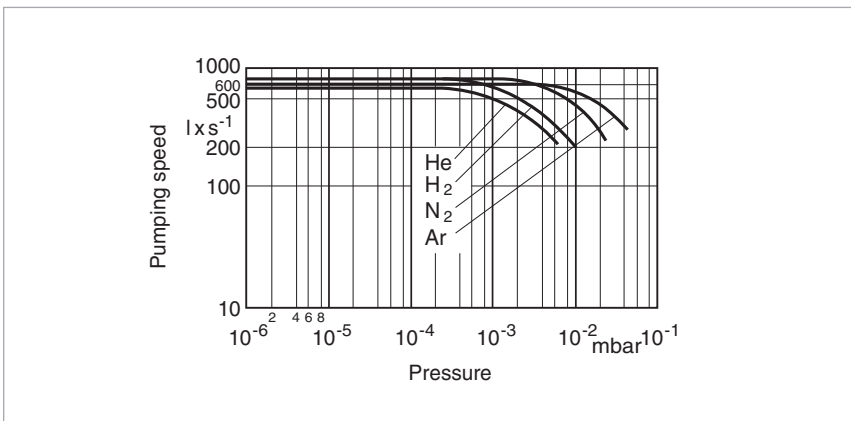
- Load locks and transfer chambers
- Optical coating
- Flat panel displays
- R & D



Dimensional drawing for the TURBOVAC 600 C

Technical Features

- Small footprint
- Installation in any orientation
- Oil-free pump for generating clean high and ultrahigh vacuum conditions
- Bearing temperature measurement through the TURBO.DRIVE TD 20 classic
- Seal gas connection
- Venting connection



Pumping speed for different gases as a function of intake pressure
(TURBOVAC 600 C with flange DN 160 ISO-K)

Advantages to the User

- Installation in any orientation
- Highly reliable due to hybrid ceramic ball bearings

Technical Data

TURBOVAC 600 C

Inlet flange	DN	160 ISO-K • 160 CF
Pumping speed		
N ₂	l x s ⁻¹	560
He	l x s ⁻¹	600
H ₂	l x s ⁻¹	570
Max. gas throughput		
N ₂	mbar x l x s ⁻¹	< 4
Ar	mbar x l x s ⁻¹	< 4
Compression ratio		
N ₂		> 10 ⁹
He		2 x 10 ⁴
H ₂		1.1 x 10 ³
Ultimate pressure	mbar (Torr)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)
Operating speed	min ⁻¹	36 000
Run-up time (frequency converter), approx.	min	4
Max. continuous inlet pressure ¹⁾	mbar (Torr)	1 x 10 ⁻² (0.75 x 10 ⁻²)
Max. foreline pressure for N ₂	mbar (Torr)	1 x 10 ⁻¹ (< 0.75 x 10 ⁻¹)
Recommended forevacuum pump for standard operation for purge gas operation		TRIVAC D 25 B / 40 B TRIVAC D 40 B
Run-up time at 95% of nominal speed	min	3
Purge / vent port	DN	10 KF
Cooling water connection (hose nozzles)	mm (in.)	10 (0.39)
Weight, approx.	kg (lbs)	17 (37.5)
Max. power consumption	VA	680
at ultimate pressure	VA	480

¹⁾ Water-cooled



Technical Data

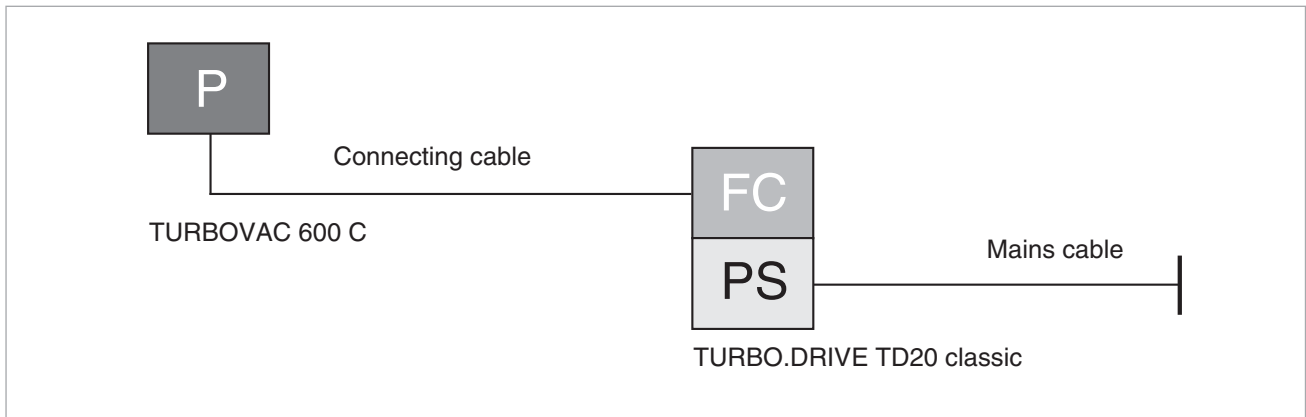
TURBO.DRIVE TD 20 *classic*

Mains connection, 50 - 60 Hz; selectable	V	100 to 240 (-15 % / +10 %)
Max. output voltage	V	3 x 47
Overload current limit	A	5
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Protection class	IP	20
Dimensions (W x H x D)	mm (in.)	213 x 128 x 315 (1/2 19", 3 HU) 8.39 x 5.04 x 12.40 (1/2 19", 3 HU)
Weight, approx.	kg (lbs)	4 (8.8)

Ordering Information

TURBOVAC 600 C

TURBOVAC 600 C without Compound Stage	P	Part No.	
DN 160 ISO-K, water-cooled DN 160 CF, water-cooled		800150V0015 800150V0017	
Mandatory Accessories		FC	PS
TURBO.DRIVE TD 20 <i>classic</i> without interface with RS 232 C interface with RS 485 C interface with Profibus with 25 pol I/O		800075V0001 800075V0002 800075V0004 800075V0003 800075V0005	
Connecting cable TURBOVAC - frequency converter 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft) 50 m (175.0 ft) 60 m (210.0 ft) 80 m (280.0 ft) 140 m (490.0 ft)		857 65 857 66 857 67 857 68 800152V0008 800152V0007 800152V0080 800152V0140	
Mains cable 3 m (10.5 ft) EURO plug UK plug US plug 5-15 P (220 V AC) 2 m (7.5 ft) US plug 115 V AC		800102V0002 800102V0003 800102V1002 992 76 513	
Forevacuum pump TRIVAC D 25 B 1 phase motor; 230 V, 50 Hz 1 phase motor; 230 V, 50/60 Hz 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz;		112 75 113 35 112 76	
TRIVAC D 40 B 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz 3 phase motor; 200/346 V, 50 Hz / 208/360 V, 60 Hz		112 86 113 47	
SCROLLVAC SC 30 D 1 phase motor; 200-230 V, 50/60 Hz 1 phase motor; 100-115 V, 50/60 Hz 3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 002 133 102 133 004	
For further types, see our Full Line Catalog			



Ordering Information

TURBOVAC 600 C

Accessories, optional	Part No.
Air cooling unit 230 V AC 115 V AC 100 V AC	855 41 170 016 800152V0017
Flange heater DN 160 CF, 230 V, 50 Hz DN 100 CF, 115 V, 60 Hz	854 37 854 38
Vibration absorber DN 160 ISO-K DN 160 CF	500 073 500 072
Solenoid venting valve, with gas admission filter, normally closed 24 V DC, DN 16 KF	800120V0011
Power failure venting valve, with gas admission filter, normally open 24 V DC, DN 16 KF	800120V0021
Purge gas and venting valve Gas flow at 1 bar 0.6 mbar x l x s ⁻¹ (36 sccm), Pump connection DN 10 KF / gas connection G 1/4" 230 V AC 100 - 115 V AC 24 V DC	800152V0040 800152V0043 800152V0012
Gas filter to G 1/4-in. for purge gas and venting valve	800110V0012
Replacement filter	200 18 515
Included in the Delivery of the Pump	P
Inlet screen, centering ring with FPM sealing ring, outer ring	ISO-K
Inlet screen	CF
Centering ring with O-ring, clamping ring	Foreline Flange
Pivoted threaded fittings to replace the included hose nipples	Water Cooling

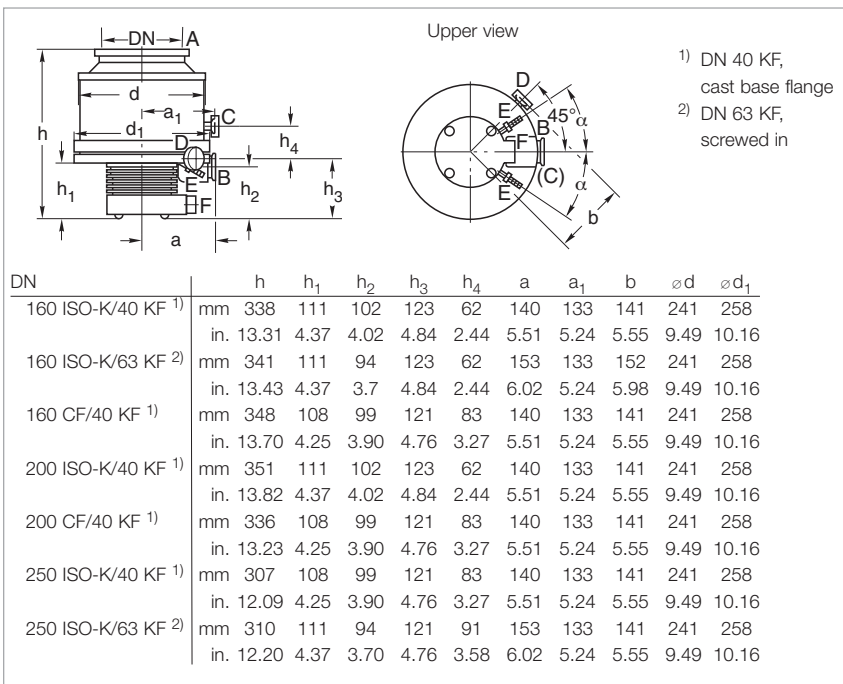
Mechanical Rotor Suspension without Compound-Stage

TURBOVAC 1000 C ClassicLine



Typical Applications

- Research systems



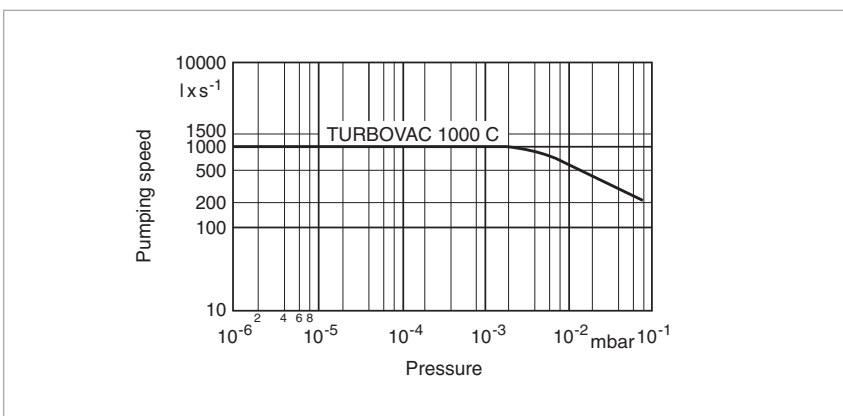
Dimensional drawing for the TURBOVAC 1000 C

Technical Features

- Robust rotor design
- Installation in any orientation
- Highest pumping speed and highest throughput
- Bearing temperature measurement through the TURBO.DRIVE TD 20 classic
- Seal gas connection
- Venting connection

Advantages to the User

- Installation in any orientation
- Highly reliable due to hybrid ceramic ball bearings
- Standard model: water cooling
- Purge gas facility



Pumping speed for air as a function of intake pressure (TURBOVAC 1000 C with DN 250 flange)

Technical Data

TURBOVAC 1000 C

Inlet flange	DN	160 ISO-K • 160 CF	200 ISO-K • 200 CF	250 ISO-K
Pumping speed				
N ₂	l x s ⁻¹	850	1100	1150
He	l x s ⁻¹	880	975	1000
H ₂	l x s ⁻¹	900	970	1000
Max. gas throughput				
N ₂	mbar x l x s ⁻¹	6.5	6.5	6.5
Compression ratio				
N ₂		> 10 ⁹	> 10 ⁹	> 10 ⁹
He		5 x 10 ⁴	5 x 10 ⁴	5 x 10 ⁴
H ₂		2 x 10 ³	2 x 10 ³	2 x 10 ³
Ultimate pressure				
	mbar (Torr)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)
Operating speed				
	min ⁻¹	36 000	36 000	36 000
Run-up time				
at 95% of nominal speed, approx.	min	9	9	9
Max. continuous inlet pressure ¹⁾ mbar (Torr)				
		1 x 10 ⁻² (0.75 x 10 ⁻²)	1 x 10 ⁻² (0.75 x 10 ⁻²)	1 x 10 ⁻² (0.75 x 10 ⁻²)
Installation orientation				
		any	any	any
Cooling				
		Water (air)	Water (air)	Water (air)
Weight, approx.				
	kg (lbs)	25 (55.1)	25 (55.1)	25 (55.1)
Recommended forevacuum pump				
for standard operation	TRIVAC	D 25 B / D 40 B	D 25 B / D 40 B	D 25 B / D 40 B
for purge gas operation	TRIVAC	D 40 B / D 65 B	D 40 B / D 65 B	D 40 B / D 65 B

¹⁾ Water-cooled



Technical Data

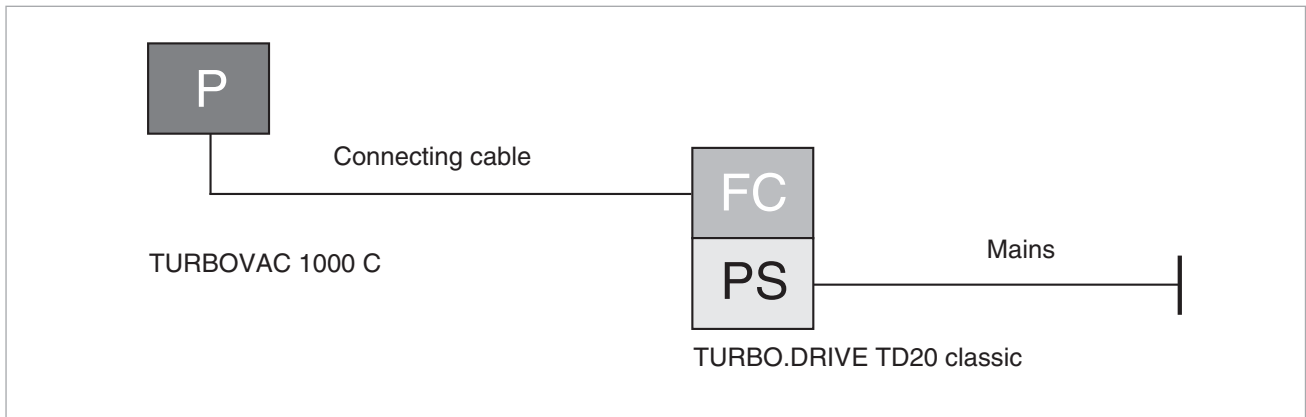
TURBO.DRIVE TD 20 *classic*

Mains connection, 50 - 60 Hz; selectable	V	100 to 240 (-15 % / +10 %)
Max. output voltage	V	3 x 47
Overload current limit	A	5
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Protection class	IP	20
Dimensions (W x H x D)	mm (in.)	213 x 128 x 315 (1/2 19", 3 HU) 8.39 x 5.04 x 12.40 (1/2 19", 3 HU)
Weight, approx.	kg (lbs)	4 (8.8)

Ordering Information

TURBOVAC 1000 C

TURBOVAC 1000 C without Compound Stage	P	Part No.	
DN 160 ISO-K / DN 40 KF, water-cooled DN 160 ISO-K / DN 63 ISO-K, water-cooled DN 160 CF / DN 40 KF, water-cooled DN 200 ISO-K / DN 40 KF, water-cooled DN 200 CF / DN 40 KF, water-cooled DN 250 ISO-K / DN 40 KF, water-cooled DN 250 ISO-K / DN 63 ISO-K, water-cooled		855 35 855 38 854 91 153 00 117 64 855 36 855 39	
Mandatory Accessories	FC	PS	
TURBO.DRIVE TD 20 <i>classic</i> without interface with RS 232 C interface with RS 485 C interface with Profibus with 25 pol I/O		800075V0001 800075V0002 800075V0004 800075V0003 800075V0005	
Connecting cable TURBOVAC - frequency converter 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft) 50 m (175.0 ft) 60 m (210.0 ft) 80 m (280.0 ft) 140 m (490.0 ft)		857 65 857 66 857 67 857 68 800152V0008 800152V0007 800152V0080 800152V0140	
Mains cable 3 m (10.5 ft) EURO plug UK plug US plug 5-15 P (220 V AC) 2 m (7.5 ft) US plug 115 V AC		800102V0002 800102V0003 800102V1002 992 76 513	
Forevacuum pump TRIVAC D 25 B 1 phase motor; 230 V, 50 Hz 1 phase motor; 230 V, 50/60 Hz 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz		112 75 113 35 112 76	
TRIVAC D 40 B 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz 3 phase motor; 200/346 V, 50 Hz / 208/360 V, 60 Hz		112 86 113 47	
TRIVAC D 65 B 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz 3 phase motor; 230/346 V, 50 Hz / 208/360 V, 60 Hz		112 96 113 57	
SCROLLVAC SC 30 D 1 phase motor; 200-230 V, 50/60 Hz 1 phase motor; 100-115 V, 50/60 Hz 3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 002 133 102 133 004	
For further types, see our Full Line Catalog			



Ordering Information

TURBOVAC 1000 C

Accessories, optional	Part No.
Air cooling unit 230 V AC 115 V AC 100 V AC	855 41 170 016 800152V0017
Flange heater DN 160 CF, 230 V, 50 Hz DN 100 CF, 115 V, 60 Hz	854 37 854 38
Vibration absorber DN 160 ISO-K DN 160 CF	500 073 500 072
Solenoid venting valve, with gas admission filter, normally closed 24 V DC, DN 16 KF	800120V0011
Power failure venting valve, with gas admission filter, normally open 24 V DC, DN 16 KF	800120V0021
Purge gas and venting valve Gas flow at 1 bar 0.6 mbar x l x s ⁻¹ (36 sccm), Pump connection DN 10 KF / gas connection G 1/4" 230 V AC 100-115 V AC 24 V DC	800152V0040 800152V0043 800152V0012
Gas filter to G 1/4-in. for purge gas and venting valve	800110V0012
Replacement filter	200 18 515
Included in the Delivery of the Pump	P
Inlet screen, centering ring with FPM sealing ring, outer ring	ISO-K
Inlet screen	CF
Centering ring with O-ring, clamping ring	Foreline Flange
Pivoted threaded fittings to replace the included hose nipples	Water Cooling

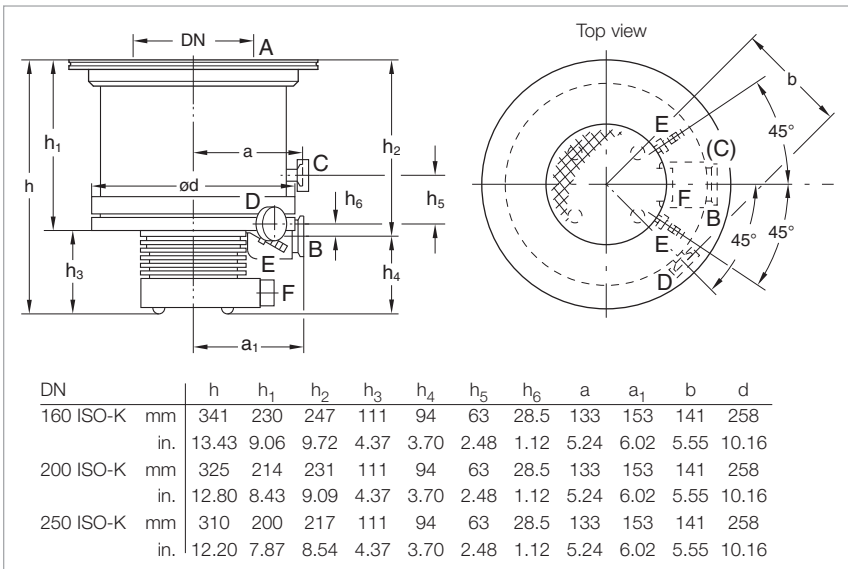
Mechanical Rotor Suspension without Compound-Stage

TURBOVAC 1100 C ClassicLine



Typical Applications

- Data storage
- Flat panel displays
- Optical coating
- Large area coating
- Load locks and transfer chambers



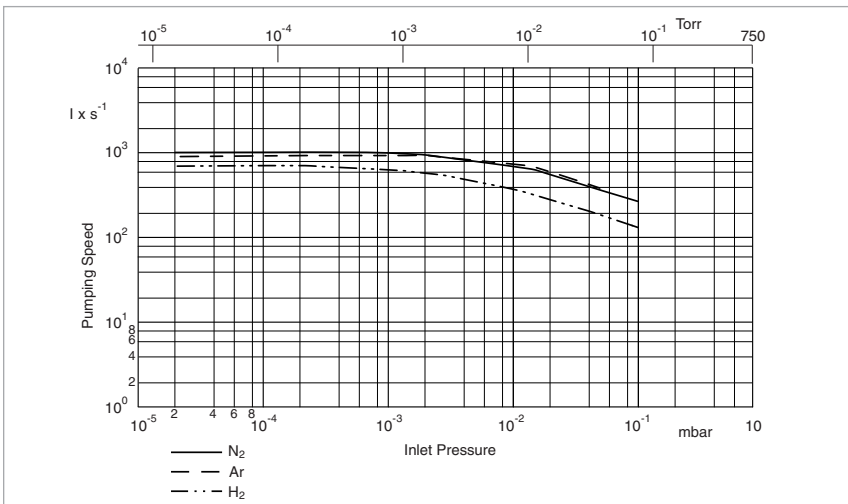
Dimensional drawing for the TURBOVAC 1100 C

Technical Features

- Robust rotor design
- Installation in any orientation
- Highest pumping speed and highest throughput
- Bearing temperature measurement through the TURBO.DRIVE TD 20 classic
- Oil-free pump for generating clean high and ultrahigh vacuum conditions
- Seal gas connection
- Venting connection

Advantages to the User

- Space-saving
- Easy to integrate into complex vacuum systems
- High productivity
- Low operating costs
- Highly reliable operation also in processes loaded with particles



Pumping speed as a function of the inlet pressure (TURBOVAC 1100 C with flange DN 250)

Technical Data

TURBOVAC 1100 C

Inlet flange	DN	160 ISO-K	200 ISO-K	250 ISO-K
Pumping speed				
N ₂	l x s ⁻¹	710	830	1050
Ar	l x s ⁻¹	-	760	980
He	l x s ⁻¹	-	750	850
H ₂	l x s ⁻¹	-	600	630
Max. gas throughput				
N ₂	mbar x l x s ⁻¹	6.5	6.5	6.5
Ar	mbar x l x s ⁻¹	6.5	6.5	6.5
Compression ratio				
N ₂		1 x 10 ⁵	1 x 10 ⁵	1 x 10 ⁵
Ar		1 x 10 ⁵	1 x 10 ⁵	1 x 10 ⁵
H ₂		1 x 10 ⁴	1 x 10 ⁴	1 x 10 ⁴
Ultimate pressure				
	mbar (Torr)	< 3 x 10 ⁻¹⁰ (< 2.2 x 10 ⁻¹⁰)	< 3 x 10 ⁻¹⁰ (< 2.2 x 10 ⁻¹⁰)	< 3 x 10 ⁻¹⁰ (< 2.2 x 10 ⁻¹⁰)
Max. foreline pressure for N₂				
	mbar (Torr)	0.1 (0.075)	0.1 (0.075)	0.1 (0.075)
Recommended forevacuum pump				
		TRIVAC D 65 B / SCROLLVAC SC 15/30 D	TRIVAC D 65 B / SCROLLVAC SC 15/30 D	TRIVAC D 65 B / SCROLLVAC SC 15/30 D
Run-up time				
at 95% of nominal speed	min	9	9	9
Purge / vent port				
	DN	10 KF	10 KF	10 KF
Cooling water connection				
(hose nozzles)	mm (in.)	10 (0.39)	10 (0.39)	10 (0.39)
Weight, approx.				
	kg (lbs)	22 (48)	22 (48)	22 (48)
Supply voltage				
	V AC	42	42	42
Max. power consumption				
	VA	400	400	400

Technical Data

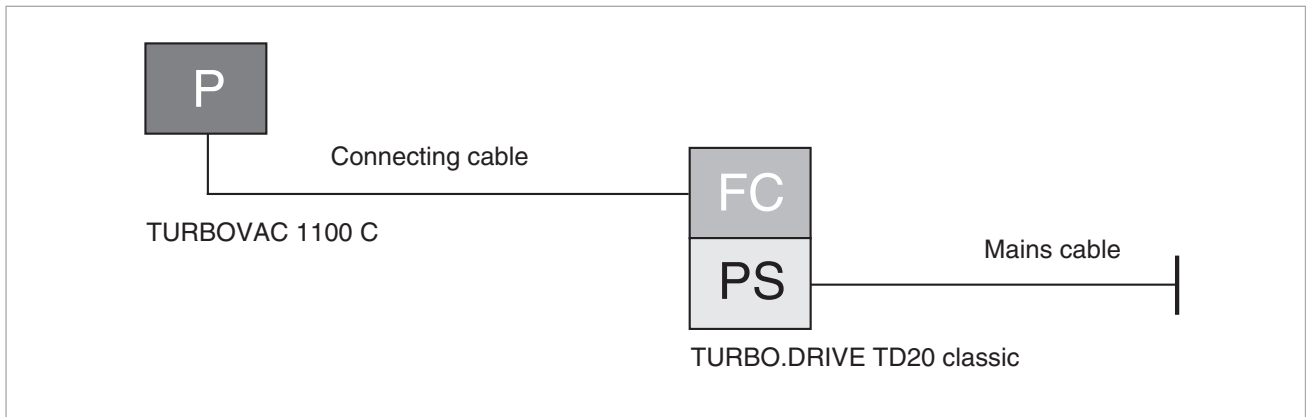
TURBO.DRIVE TD 20 *classic*

Mains connection, 50 - 60 Hz; selectable	V	100 to 240 (-15 % / +10 %)
Max. output voltage	V	3 x 47
Overload current limit	A	5
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Protection class	IP	20
Dimensions (W x H x D)	mm (in.)	213 x 128 x 315 (1/2 19", 3 HU) 8.39 x 5.04 x 12.40 (1/2 19", 3 HU)
Weight, approx.	kg (lbs)	4 (8.8)

Ordering Information

TURBOVAC 1100 C

TURBOVAC 1100 C without Compound Stage	P	Part No.		
DN 160 ISO-K / DN 63 ISO-K, water-cooled DN 200 ISO-K / DN 63 ISO-K, water-cooled DN 250 ISO-K / DN 63 ISO-K, water-cooled		800150V0030 800150V0031 800150V0032		
Mandatory Accessories		FC	PS	
TURBO.DRIVE TD 20 <i>classic</i> without interface with RS 232 C interface with RS 485 C interface with Profibus with 25 pol I/O		800075V0001 800075V0002 800075V0004 800075V0003 800075V0005		
Connecting cable TURBOVAC - frequency converter 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft) 50 m (175.0 ft) 60 m (210.0 ft) 80 m (280.0 ft) 140 m (490.0 ft)		857 65 857 66 857 67 857 68 800152V0008 800152V0007 800152V0080 800152V0140		
Mains cable 3 m (10.5 ft) EURO plug UK plug US plug 5-15 P (220 V AC) 2 m (7.5 ft) US plug 115 V AC		800102V0002 800102V0003 800102V1002 992 76 513		
Forevacuum pump TRIVAC D 65 B 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz 3 phase motor; 230/346 V, 50 Hz / 208/360 V, 60 Hz		112 96 113 57		
SCROLLVAC SC 30 D 1 phase motor; 200-230 V, 50/60 Hz 1 phase motor; 100-115 V, 50/60 Hz 3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 002 133 102 133 004		
For further types, see our Full Line Catalog				



Ordering Information

TURBOVAC 1100 C

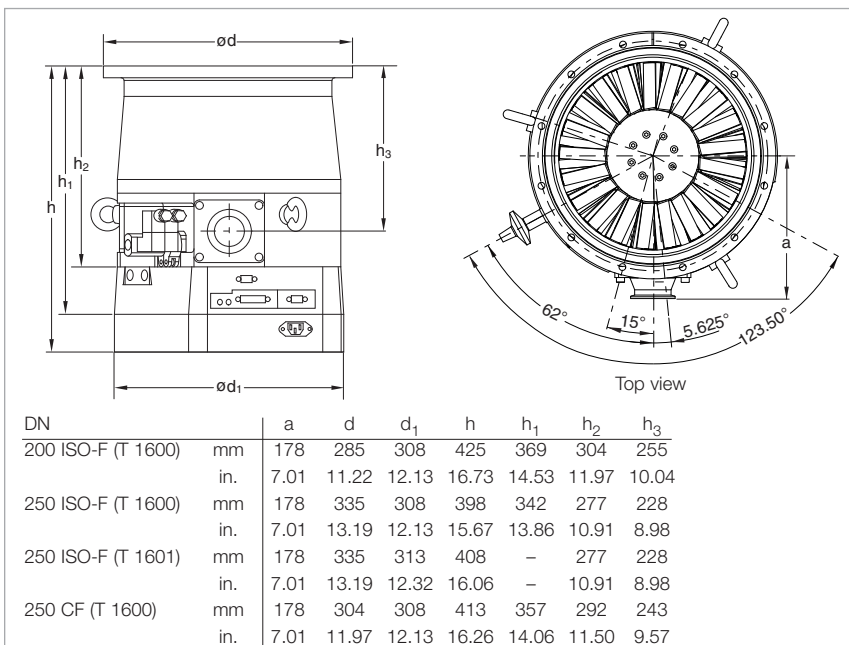
Accessories, optional	Part No.
Vibration absorber DN 160 ISO-K	500 073
Solenoid venting valve, with gas admission filter, normally closed 24 V DC, DN 16 KF	800120V0011
Power failure venting valve, with gas admission filter, normally open 24 V DC, DN 16 KF	800120V0021
Purge gas and venting valve Gas flow at 1 bar $0.6 \text{ mbar} \times l \times s^{-1}$ (36 sccm), Pump connection DN 10 KF / gas connection G 1/4" 230 V AC 100-115 V AC 24 V DC	800152V0040 800152V0043 800152V0012
Gas filter to G 1/4-in. for purge gas and venting valve	800110V0012
Replacement filter	200 18 515
Included in the Delivery of the Pump	P
Inlet screen, centering ring with FPM sealing ring, outer ring	ISO-K
Inlet screen	CF
Centering ring with O-ring, clamping ring	Foreline Flange
Pivoted threaded fittings to replace the included hose nipples	Water Cooling

Mechanical Rotor Suspension with integrated Frequency Converter and Power Supply, without Compound-Stage TURBOVAC T 1600 / T 1601



Typical Applications

- Data storage
- Flat panel displays
- Optical coating
- Large area coating
- R & D
 - Thermonuclear fusion experiments
 - Space simulation



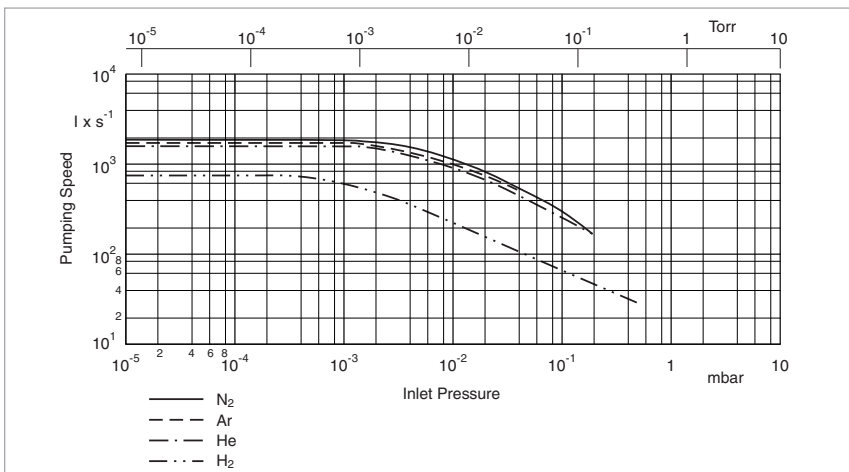
Dimensional drawing for the TURBOVAC T 1600

Technical Features

- Frequency converter and power supply integrated
- Robust rotor design
- Operation in any orientation
- Highest pumping speed and highest throughput
- Oil-free pump for generating clean high and ultrahigh vacuum conditions
- Purge gas and venting valve integrated
- For special outside influences
 - tropical proof moisture resistant (only T 1601)

Advantages to the User

- Space-saving
- Easy to integrate into complex vacuum systems
- High productivity
- Low operating costs
- Highly reliable operation also in processes loaded with particles



Pumping speed as a function of the inlet pressure (TURBOVAC T 1600 with flange DN 250)


Technical Data

TURBOVAC T 1600 / T 1601

Inlet flange	DN	200 ISO-F	250 ISO-F • 250 CF
Pumping speed			
N ₂	l x s ⁻¹	1100	1550
Ar	l x s ⁻¹	960	1410
He	l x s ⁻¹	1150	1300
H ₂	l x s ⁻¹	690	720
Max. gas throughput			
N ₂	mbar x l x s ⁻¹	30	30
Ar	mbar x l x s ⁻¹	20	20
He	mbar x l x s ⁻¹	30	30
H ₂	mbar x l x s ⁻¹	20	20
Compression ratio			
N ₂		5 x 10 ⁵	5 x 10 ⁵
Ar		1 x 10 ⁶	1 x 10 ⁶
He		1 x 10 ⁴	1 x 10 ⁴
H ₂		2 x 10 ²	2 x 10 ²
Ultimate pressure	mbar (Torr)	< 3 x 10 ⁻¹⁰ (< 2.2 x 10 ⁻¹⁰)	< 3 x 10 ⁻¹⁰ (< 2.2 x 10 ⁻¹⁰)
Max. foreline pressure for N₂	mbar (Torr)	0.5 (0.375)	0.5 (0.375)
Recommended forevacuum pump (alternatively)		TRIVAC D 65 B + RUVAC WA 501 TRIVAC D 65 B SCROLLVAC SC 15/30 D	TRIVAC D 65 B + RUVAC WA 501 TRIVAC D 65 B SCROLLVAC SC 15/30 D
Run-up time at 95% of nominal speed	min	< 10	< 10
Purge / vent port	DN	G 1/4"	G 1/4"
Cooling water connection		G 3/8"	G 3/8"
Weight, approx.	kg (lbs)	40 (88)	40 (88)
Supply voltage	V	100 - 240	100 - 240
Max. power consumption	VA	700	700

Ordering Information

TURBOVAC T 1600 / T 1601

TURBOVAC T 1600 / 1601 without Compound Stage	P FC PS	Part No.	
DN 200 ISO-F / DN 40 KF, water-cooled DN 200 ISO-F / DN 40 KF, water-cooled, Profibus DN 200 ISO-F / DN 63 ISO-K, water-cooled, Profibus DN 250 ISO-F / DN 40 KF, water-cooled DN 250 ISO-F / DN 40 KF, water-cooled, Profibus DN 250 ISO-F / DN 40 KF, water-cooled, Profibus (T 1601) DN 250 ISO-F / DN 63 ISO-K, water-cooled DN 250 ISO-F / DN 63 ISO-K, water-cooled, Profibus DN 250 CF / DN 40 KF, water-cooled DN 250 CF / DN 40 KF, water-cooled, Profibus	P FC PS	800040V1144 800040V2144 800040V1244 800040V1444 800040V2444 800040V4444 800040V1544 800040V2546 800040V1844 800040V2844	
Mandatory Accessories		P FC PS	
Forevacuum pump			
TRIVAC D 65 B 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz 3 phase motor; 230/346 V, 50 Hz / 208/360 V, 60 Hz	P FC PS	112 96 113 57	
RUVAC WA 501 IEC motor NEMA motor, US version	P FC PS	117 30 917 30	
SCROLLVAC SC 15 D 1 phase motor; 200-230 V, 50/60 Hz 1 phase motor; 100-115 V, 50/60 Hz 3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz	P FC PS	133 001 133 101 133 003	
SCROLLVAC SC 30 D 1 phase motor; 200-230 V, 50/60 Hz 1 phase motor; 100-115 V, 50/60 Hz 3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz	P FC PS	133 002 133 102 133 004	
For further types, see our Full Line Catalog			



Ordering Information

TURBOVAC T 1600 / T 1601

Accessories, optional	Part No.
Adapter RS 232 C / RS 485 C; 220 V, 50 Hz, EURO plug	800110V0101
Purge filter	200 18 515
Power failure venting valve, normally open 24 V DC, DN 16 KF	800120V0021
PC software "TURBO.DRIVE"	800110V0102
Included in the Delivery of the Pump	P FC PS
Inlet screen, centering ring, support ring and O-ring	ISO-F
Centering ring, clamping ring and DN 40 KF O-ring	KF Foreline Flange
Centering ring	ISO-K Foreline Flange
Gas filter with an adaptor for screwing in is included	Seal Gas Connection
2 adaptors G 3/8" - hose nipple LW 13 and 2 gaskets	Water Cooling
Mains cord with EURO plug	

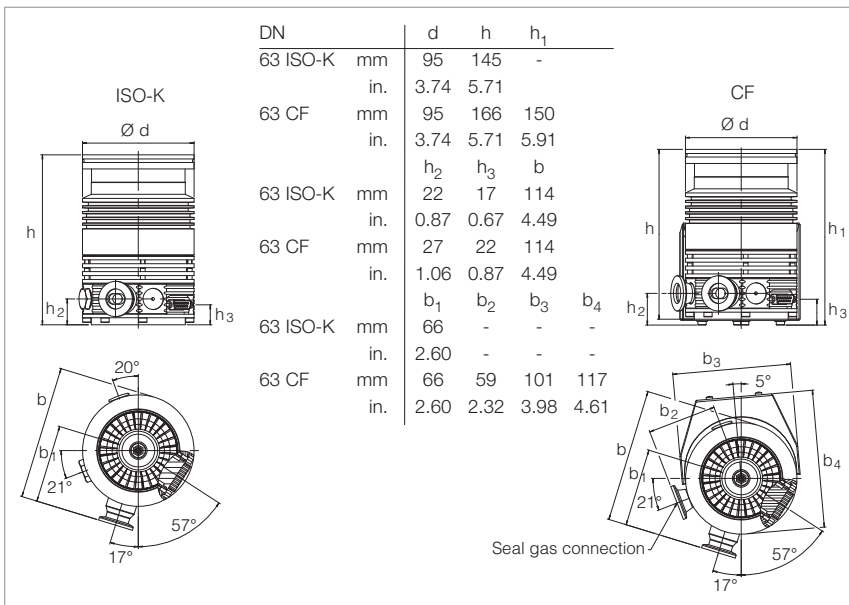
Mechanical Rotor Suspension with Frequency Converter for Attaching or Separate with Compound Stage

TURBOVAC SL 80



Typical Applications

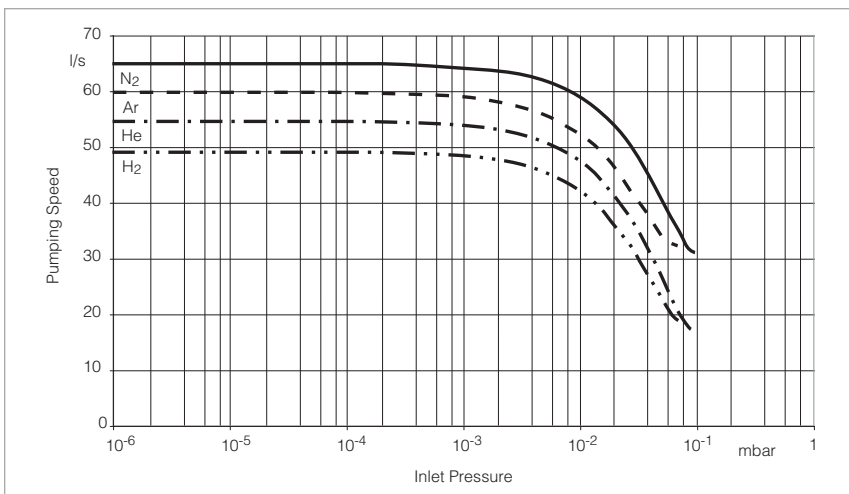
- Helium leak detectors
- Mass spectrometers (gas chromatography GC-MS), liquid chromatography (LC-MS), residual gas analysis, mobile analytical systems, etc.)
- Electron beam microscopy
- XHV-/UHV systems
- Transfer chambers



Dimensional drawing for the TURBOVAC SL 80: Attachment examples

Technical Features

- Oil free pump
- High pressure foreline tolerance
- Excellent resistance to vibration due to proven mechanical bearings
- Efficient convection cooling due to a large number of cooling fins
- Purge gas/venting connection
- Installation in any orientation
- Flexible attachment of the frequency converter to the pump
- Small footprint
- Delayed venting through the frequency converter TURBO.DRIVE TD 400 (optional)
- Selection of interfaces, RS 232 C, RS 485 C, Profibus



Pumping speed as a function of the inlet pressure

Advantages to the User

- Easy to integrate into complex vacuum systems
- Space-saving
- Prepared for pumping of slightly corrosive gases owing to the seal gas connection
- High reliability, MTTF over 200,000 hours
- Matching accessories (fan, water cooling, seal gas/venting valves, power failure venting valves, flange heaters, different cable lengths etc.)
- High reliability due to self-monitoring

Technical Data

TURBOVAC SL 80

		O-ring sealed	Metal sealed
Inlet flange	DN	63 ISO-K • 63 CF	
Foreline flange	DN	DN 16 KF	
Purge and vent port		M 8	
Pump housing		Aluminum	Stainless steel
Pumping speed (without inlet screen)			
N ₂	l x s ⁻¹	65	
Ar	l x s ⁻¹	60	
H ₂	l x s ⁻¹	49	
He	l x s ⁻¹	55	
Max. gas throughput with water cooling			
N ₂	mbar x l x s ⁻¹	2.0	
Ar	mbar x l x s ⁻¹	1.6	
H ₂	mbar x l x s ⁻¹	0.5	
He	mbar x l x s ⁻¹	1.2	
Ultimate pressure for CF version with two-stage oil-sealed rotary vane vacuum pump	mbar (Torr)	< 2 x 10 ⁻¹⁰ (< 1.5 x 10 ⁻¹⁰)	
Max. recommended foreline pressure for N ₂ water-cooled	mbar (Torr)	20 (15)	
Recommended forevacuum pump two-stage oil-sealed rotary vane vacuum pump with scroll vacuum pump diaphragm pump		TRIVAC D 2,5 E / TRIVAC NT 5 SCROLLVAC SC 5 D / 15 D DIVAC 0.8 T	
Operating speed	min ⁻¹	72.000	
Run-up time	min	1.5	
Power consumption at run-up	W	120	
at ultimate pressure	W	17	
Protection class	IP	20	
Noise level	dB(A)	< 46	
Ambient temperature during operation	°C (°F)	+15 to +45 (+50 to +113)	
during storage	°C (°F)	-15 to +70 (-5 to +158)	
Weight, approx.			
Pump	kg (lbs)	1.9 (4.19)	3.1 (6.84)
Pump with TURBO.DRIVE	kg (lbs)	2.5 (5.52)	3.7 (8.17)
Pump with TURBO.DRIVE and air-cooling	kg (lbs)	2.8 (6.18)	4.0 (8.83)
and water-cooling	kg (lbs)	3.1 (6.84)	4.3 (9.49)
Max. rel. atmospheric humidity, approx.	%	95 (non-condensing)	





Technical Data

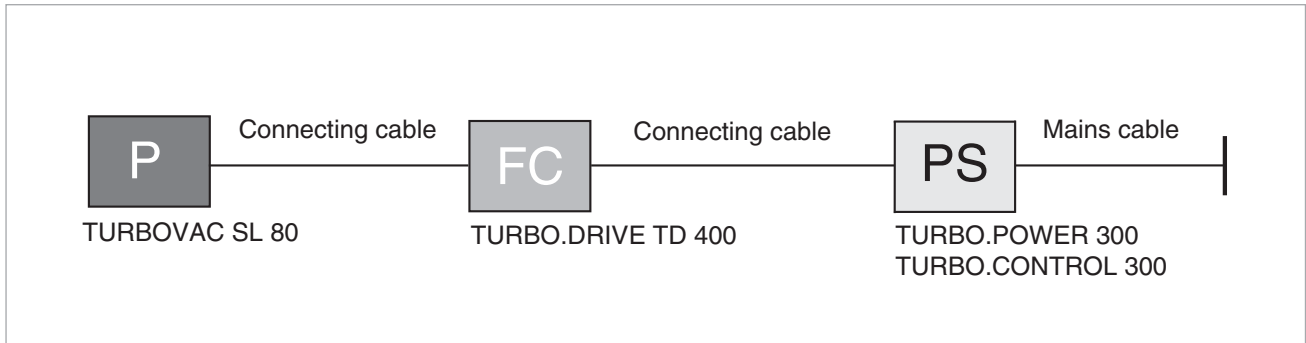
TURBO.DRIVE TD 400

Power supply	V DC	24 ±10 %
Ripple	%	< 3
Output		
Voltage, 3 phase	V DC	0 to 24
Power	W	160
Frequency	Hz	0 to 1500
Ambient temperature during operation	°C (°F)	+5 to +45 (+41 to +113)
during storage	°C (°F)	-15 to +70 (-5 to +158)
Weight, approx.	kg (lbs)	0.7 (1.55)
Serial interface		RS 232 C, RS 485 C or Profibus

Ordering Information

TURBOVAC SL 80

TURBOVAC SL 80 with Compound Stage	P	Part No.	
DN 63 ISO-K / DN 16 KF DN 63 CF / DN 16 KF		800002V3001 800002V3002	
Mandatory Accessories			
Electronic frequency converter TURBO.DRIVE TD 400 with RS 232 C interface with RS 485 C interface with Profibus	P FC PS	800073V0002 800073V0003 800073V0004	
Connecting cable pump - frequency converter 0.2 m (0.7 ft) 0.3 m (1.1 ft) 0.4 m (1.4 ft) 0.5 m (1.75 ft) 1.0 m (3.5 ft) 2.5 m (8.7.5 ft) 3.0 m (10.5 ft) 5,0 m (17.5 ft)		800152V0021 800152V0023 800152V0022 800152V0050 152 47 864 49 864 40 864 50	
Power supply and control unit TURBO.CONTROL 300		800100V0001	
24 V connecting cable power supply - TURBO.CONTROL 300 1 m (3.5 ft) 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft)		800091V0100 800091V0300 800091V0500 800091V1000 800091V2000	
Power supply TURBO.POWER 300		800100V0002	
24 V connecting cable power supply - TURBO.POWER 300 1 m (3.5 ft) 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft)		800094V0100 800094V0300 800094V0500 800094V1000 800094V2000	
Mains cable 3 m (10.5 ft) - TURBO.CONTROL 300 / TURBO.POWER 300 with EURO plug with UK plug with US plug 5-15 P with US plug 115 V		800102V0002 800102V0003 800102V1002 992 76 513	
START/STOP switch for manual operation of the turbomolecular pump		152 48	
Forevacuum pump			
TRIVAC D 2,5 E			
220-240 V, 50 Hz; 230 V, 60 Hz; earthed plug, EURO version		140 000	
110-120 V / 220-240 V, 50/60 Hz, without plug, (world version)		140 001	
110-120 V, 50/60 Hz; NEMA plug, US version		140 002	
100 V, 50/60 Hz; NEMA plug, Japan version		140 003	
TRIVAC NT 5			
1 phase EURO motor; 220-240 / 230 V, 50/60 Hz		140 214	
1 phase Japan motor; 100 V, 50/60 Hz		140 216	
DIVAC 0,8 T			
1 phase motor; 198-264 V, 50/60 Hz		127 80	
1 phase motor; 90-127 V, 50/60 Hz		127 81	
SCROLLVAC SC 5 D			
1 phase motor; 200-230 V, 50/60 Hz		133 000	
1 phase motor; 100-115 V, 50/60 Hz		133 100	
SCROLLVAC SC 15 D			
1 phase motor; 200-230 V, 50/60 Hz		133 001	
1 phase motor; 100-115 V, 50/60 Hz		133 101	
3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 003	
For further types, see our Full Line Catalog			



Ordering Information

TURBOVAC SL 80

Accessories, optional	P	FC	PS	Part No.
Mounting kit TD 400 for SL 80, incl. 0.2 m (0.7 ft.) long connecting cable pump - frequency converter for installing the frequency converter beside the pump for installing the frequency converter beneath the pump (not for 800073V0007)				800110V0005
				800110V0008
Water cooling unit with 2x G 1/8-in. connections, including 2 hose nozzles G 1/8-in. 8 mm (0.3 in.) OD, 2 gaskets (copper) 10 x 14 x 1 mm (0.4 x 0.6 x 0.04 in.) and hose clamps				800135V0001
Air cooling unit				800136V0001
Flange heater DN 63 CF, 230 V, 50 Hz DN 63 CF, 115 V, 60 Hz				854 04
				854 07
Inlet screen DN 63 ISO-K (coarse) DN 63 CF (coarse) DN 63 CF (fine)				200 17 170
				200 17 171
				887 20
Vibration absorber DN 63 ISO-K DN 63 CF				800131V0063
				500 070
Pump connection adapter DN 10 KF / pump connection M 8 (incl. O-ring, filter and clamping ring)				800110V0011
Purge gas and venting valve Gas flow at 1 bar 0.4 mbar x l x s ⁻¹ (24 sccm), Pump connection DN 10 KF / gas connection G 1/4" 230 V AC 100 - 115 V AC 24 V DC				800152V0014
				800152V0042
				800152V0013
				800152V0013
Gas filter to G 1/4" for purge gas and venting valve				800110V0012
Replacement filter				200 18 515
Power failure venting valve, normally open 24 V DC, DN 16 KF				800120V0021
Power failure venting valve, normally open 24 V DC, DN 10 KF 230 V AC / 50/60 Hz, DN 10 KF				174 46
				174 26
Hat rail adaptor as mounting aid				800110V0003
Fin type cooler				800110V0001

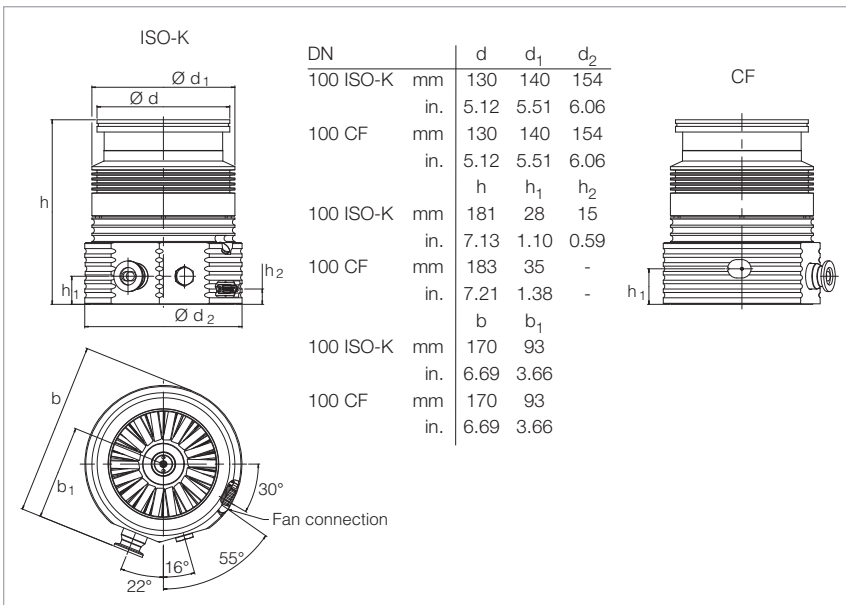
Mechanical Rotor Suspension with Frequency Converter for Attaching or Separate with Compound Stage

TURBOVAC SL 300



Typical Applications

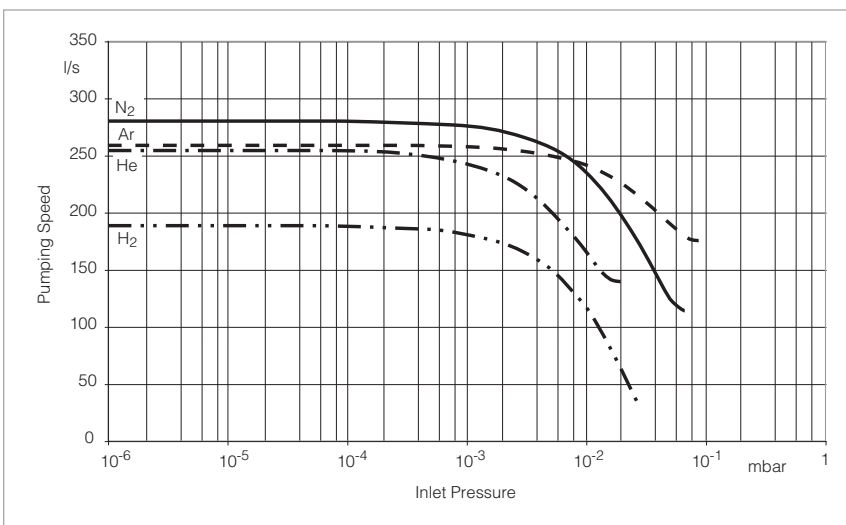
- Particle accelerators
- Mass spectrometers (gas chromatography GC-MS), liquid chromatography (LC-MS), time of flight (TOF-MS), residual gas analysis, etc.)
- Electron beam microscopy
- Coating technology
- XHV-/UHV systems
- Transfer chambers



Dimensional drawing for the TURBOVAC SL 300

Technical Features

- Oil free pump
- High pressure foreline tolerance
- Excellent resistance to vibration due to proven mechanical bearings
- Efficient convection cooling due to a large number of cooling fins
- Purge gas/venting connection
- Installation in any orientation
- Flexible attachment of the frequency converter to the pump
- Small footprint
- Delayed venting through the frequency converter TURBO.DRIVE TD 400 (optional)
- Selection of interfaces, RS 232 C, RS 485 C, Profibus



Pumping speed as a function of the inlet pressure

Advantages to the User

- Easy to integrate into complex vacuum systems
- Space-saving
- Prepared for pumping of slightly corrosive gases owing to the seal gas connection
- High reliability, MTTF over 200,000 hours
- Matching accessories (fan, water cooling, seal gas/venting valves, power failure venting valves, flange heaters, different cable lengths etc.)
- High reliability due to self-monitoring

Technical Data

TURBOVAC SL 300

		O-ring sealed	Metal sealed
Inlet flange	DN	100 ISO-K • 100 CF	
Foreline flange	DN	DN 16 KF	
Purge and vent port		M 8	
Pump housing		Aluminum	Stainless steel
Pumping speed (without inlet screen)			
N ₂	l x s ⁻¹	270	
Ar	l x s ⁻¹	260	
H ₂	l x s ⁻¹	190	
He	l x s ⁻¹	255	
Max. gas throughput with water cooling			
N ₂	mbar x l x s ⁻¹	2.9	
Ar	mbar x l x s ⁻¹	2.0	
H ₂	mbar x l x s ⁻¹	0.9	
He	mbar x l x s ⁻¹	1.9	
Ultimate pressure for CF version with two-stage oil-sealed rotary vane vacuum pump	mbar (Torr)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)	
Max. recommended foreline pressure for N ₂ water-cooled	mbar (Torr)	< 8 (< 6)	
Recommended forevacuum pump rotary vane vacuum pump with scroll vacuum pump diaphragm pump		TRIVAC D 2,5 E / TRIVAC NT 5 SCROLLVAC SC 5 /15 D DIVAC 2.5 VT	
Operating speed	min ⁻¹	60.000	
Run-up time, approx.	min	4	
Power consumption at run-up	W	115	
at ultimate pressure	W	18	
Protection class	IP	20	
Noise level	dB(A)	< 49	
Ambient temperature during operation (water-cooled pump)	°C (°F)	+15 to +45 (+50 to +113)	
during storage	°C (°F)	-15 to +70 (-5 to +158)	
Weight, approx.			
Pump	kg (lbs)	5.2 (11.48)	7.4 (16.34)
Pump with TURBO.DRIVE	kg (lbs)	5.8 (12.80)	8.0 (17.66)
Pump with TURBO.DRIVE and air-cooling	kg (lbs)	6.3 (13.91)	8.5 (18.76)
and water-cooling	kg (lbs)	6.1 (13.47)	8.3 (18.32)
Max. rel. atmospheric humidity, approx.	%	95 (non-condensing)	





Technical Data

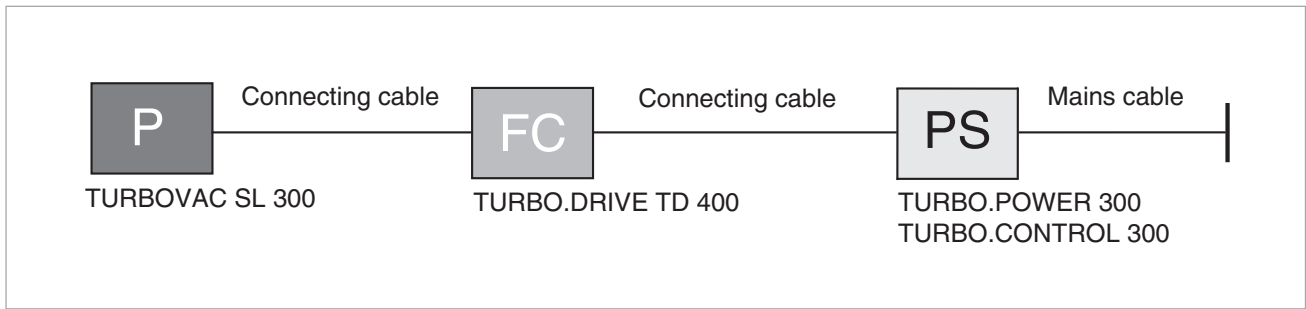
TURBO.DRIVE TD 400

Power supply	V DC	24 ±10 %
Ripple	%	< 3
Output		
Voltage, 3 phase	V DC	0 to 24
Power	W	160
Frequency	Hz	0 to 1500
Ambient temperature during operation	°C (°F)	+5 to +45 (+41 to +113)
during storage	°C (°F)	-15 to +70 (-5 to +158)
Weight, approx.	kg (lbs)	0.7 (1.55)
Serial interface		RS 232 C, RS 485 C or Profibus

Ordering Information

TURBOVAC SL 300

TURBOVAC SL 300 with Compound Stage	P	Part No.			
DN 100 ISO-K / DN 16 KF DN 100 CF / DN 16 KF		800170V3005 800170V3006			
Mandatory Accessories		P	FC	PS	
Electronic frequency converter TURBO.DRIVE TD 400 with RS 232 C interface with RS 485 C interface with Profibus		800073V0002 800073V0003 800073V0004			
Connecting cable pump - frequency converter 0.2 m (0.7 ft) 0.3 m (1.1 ft) 0.4 m (1.4 ft) 0.5 m (1.75 ft) 1.0 m (3.5 ft) 2.5 m (8.7.5 ft) 3.0 m (10.5 ft) 5.0 m (17.5 ft)		800152V0021 800152V0023 800152V0022 800152V0050 152 47 864 49 864 40 864 50			
Power supply and control unit TURBO.CONTROL 300		800100V0001			
24 V connecting cable power supply - TURBO.CONTROL 300 1 m (3.5 ft) 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft)		800091V0100 800091V0300 800091V0500 800091V1000 800091V2000			
Power supply TURBO.POWER 300		800100V0002			
24 V connecting cable power supply - TURBO.POWER 300 1 m (3.5 ft) 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft)		800094V0100 800094V0300 800094V0500 800094V1000 800094V2000			
Mains cable 3 m (10.5 ft) - TURBO.CONTROL 300 / TURBO.POWER 300 with EURO plug with UK plug with US plug 5-15 P with US plug 115 V		800102V0002 800102V0003 800102V1002 992 76 513			
START/STOP switch for manual operation of the turbomolecular pump		152 48			
Forevacuum pump					
TRIVAC D 2,5 E					
220-240 V, 50 Hz; 230 V, 60 Hz; earthed plug, EURO version		140 000			
110-120 V / 220-240 V, 50/60 Hz, without plug, (world version)		140 001			
110-120 V, 50/60 Hz; NEMA plug, US version		140 002			
100 V, 50/60 Hz; NEMA plug, Japan version		140 003			
TRIVAC NT 5					
1 phase EURO motor; 220-240 / 230 V, 50/60 Hz		140 214			
1 phase Japan motor; 100 V, 50/60 Hz		140 216			
SCROLLVAC SC 5 D					
1 phase motor; 200-230 V, 50/60 Hz		133 000			
1 phase motor; 100-115 V, 50/60 Hz		133 100			
SCROLLVAC SC 15 D					
1 phase motor; 200-230 V, 50/60 Hz		133 001			
1 phase motor; 100-115 V, 50/60 Hz		133 101			
3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 003			
For further types, see our Full Line Catalog					



Ordering Information

TURBOVAC SL 300

Accessories, optional	P	FC	PS	Part No.
Mounting kit TD 400 for SL 300, incl. 0.2 m (0.7 ft.) long connecting cable pump - frequency converter for installing the frequency converter beside the pump for installing the frequency converter beneath the pump (not for 800073V0007)				800110V0006 800110V0009
Water cooling unit with 2x G 1/8-in. connections, including 2 hose nozzles G 1/8-in. 8 mm (0.3 in.) OD, 2 gaskets (copper) 10 x 14 x 1 mm (0.4 x 0.6 x 0.04 in.) and hose clamps				800135V0002
Air cooling unit				800136V0002
Flange heater DN 100 CF, 230 V, 50 Hz DN 100 CF, 115 V, 60 Hz				854 27 854 28
Inlet screen DN 100 ISO-K/CF (coarse) DN 100 ISO-K/CF (fine)				800132V0101 800132V0102
Vibration absorber DN 100 ISO-K DN 100 CF				800131V0100 500 071
Pump connection adapter DN 10 KF / pump connection M 8 (incl. O-ring, filter and clamping ring)				800110V0011
Purge gas and venting valve Gas flow at 1 bar 0.2 mbar x l x s ⁻¹ (12 sccm), Pump connection DN 10 KF / gas connection G 1/4" 230 V AC 100 - 115 V AC 24 V DC				800152V0019 800152V0041 113 50
Gas filter to G 1/4" for purge gas and venting valve				800110V0012
Replacement filter				200 18 515
Power failure venting valve, normally open 24 V DC, DN 16 KF				800120V0021
Power failure venting valve, normally open 24 V DC, DN 10 KF 230 V AC / 50/60 Hz, DN 10 KF				174 46 174 26
Hat rail adaptor as mounting aid				800110V0003
Fin type cooler				800110V0001

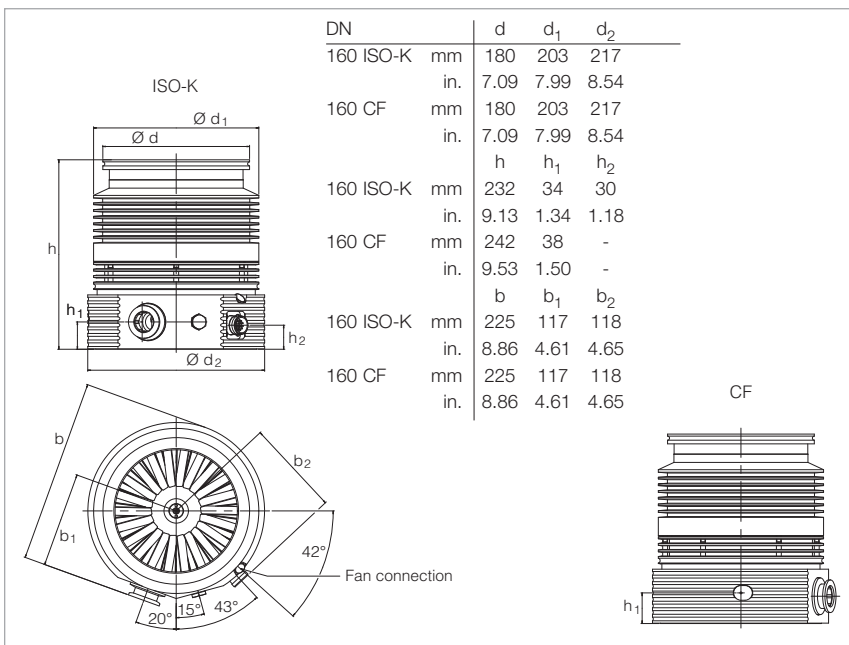
Mechanical Rotor Suspension with Frequency Converter for Attaching or Separate with Compound Stage

TURBOVAC SL 700



Typical Applications

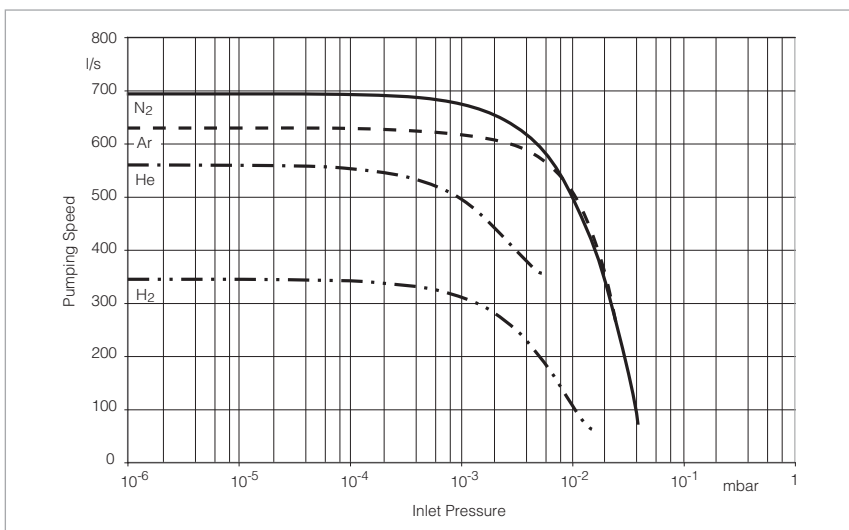
- Mass spectrometers (gas chromatography GC-MS), liquid chromatography (LC-MS), etc.
- Coating technology
- UHV systems
- Transfer chambers



Dimensional drawing for the TURBOVAC SL 700

Technical Features

- Highest pumping speed in the DN 160 flange category
- Oil free pump
- Excellent resistance to vibration due to proven mechanical bearings
- Efficient convection cooling due to a large number of cooling fins
- Purge gas/venting connection
- Installation in any orientation
- Flexible attachment of the frequency converter to the pump
- Small footprint
- Selection of interfaces, RS 232 C, RS 485 C, Profibus



Pumping speed as a function of the inlet pressure

Advantages to the User

- Easy to integrate into complex vacuum systems
- Space-saving
- Prepared for pumping of slightly corrosive gases owing to the seal gas connection
- High reliability, MTTF over 200,000 hours
- Matching accessories (fan, water cooling, seal gas/venting valves, power failure venting valves, flange heaters, different cable lengths etc.)
- High reliability due to self-monitoring

Technical Data

TURBOVAC SL 700

		O-ring sealed	Metal sealed
Inlet flange	DN	160 ISO-K • 160 CF	
Foreline flange	DN	DN 25 KF	
Purge and vent port		M 8	
Pump housing		Aluminum	Stainless steel
Pumping speed (without inlet screen)			
N ₂	l x s ⁻¹	690	
Ar	l x s ⁻¹	630	
He	l x s ⁻¹	580	
H ₂	l x s ⁻¹	360	
Max. gas throughput with water cooling			
N ₂	mbar x l x s ⁻¹	5.6	Upon request
Ar	mbar x l x s ⁻¹	4.6	Upon request
He	mbar x l x s ⁻¹	2.0	Upon request
H ₂	mbar x l x s ⁻¹	0.9	Upon request
Ultimate pressure for CF version with two-stage oil-sealed rotary vane vacuum pump	mbar (Torr)	< 10 ⁻⁹ (< 10 ⁻⁹)	
Max. recommended foreline pressure for N ₂ water-cooled	mbar (Torr)	15 (11.3)	
Recommended forevacuum pump		TRIVAC NT 10 / 16 SCROLLVAC SC 15 / 30 D	
Operating speed	min ⁻¹	48.000	
Run-up time, approx.	min	5	
Power consumption			
at run-up	W	270	
at ultimate pressure	W	60	
Protection class	IP	20	
Noise level	dB(A)	< 47	
Ambient temperature			
during operation	°C (°F)	+10 to +45 (+50 to +113)	
at standstill	°C (°F)	-15 to +60 (-5 to +140)	
Weight, approx.			
Pump	kg (lbs)	-15 to +60 (-5 to +140)	17.3 (38.19)
Pump with TURBO.DRIVE	kg (lbs)	14.8 (32.67)	18.1 (39.96)
Pump with TURBO.DRIVE and air-cooling	kg (lbs)	16.0 (35.32)	19.3 (42.60)
and water-cooling	kg (lbs)	15.1 (33.33)	18.4 (40.62)
Max. rel. atmospheric humidity, approx.	%	5 to 85 (non-condensing)	




Technical Data

TURBO.DRIVE TD 700

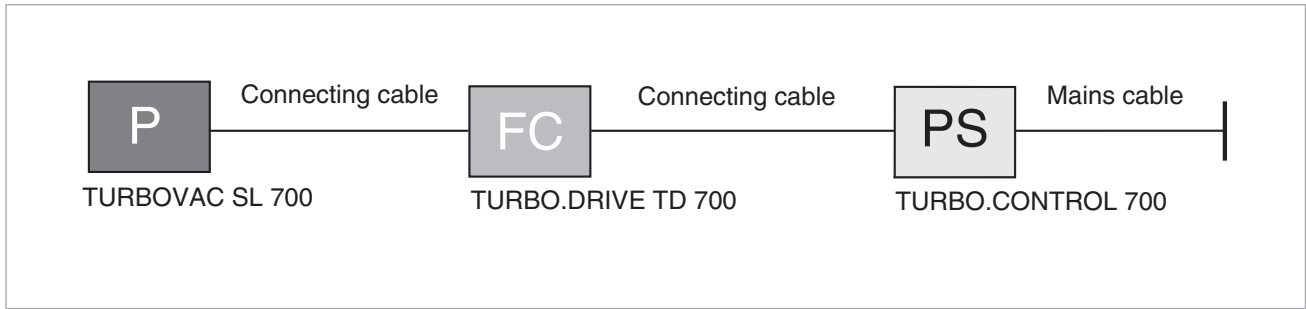
Power supply	V DC	24 ±10 %
Ripple	%	< 3
Output		
Voltage, 3 phase	V DC	0 to 24
Power	W	160
Frequency	Hz	0 to 1500
Ambient temperature		
during operation	°C (°F)	+10 to +45 (+50 to +113)
during storage	°C (°F)	-15 to +60 (-5 to +140)
Weight, approx.	kg (lbs)	0.7 (1.55)
Serial interface		RS 232 C, RS 485 C or Profibus

Ordering Information

TURBOVAC SL 700

TURBOVAC SL 700 with Compound Stage	P	Part No.	
DN 160 ISO-K / DN 25 KF DN 160 CF / DN 25 KF		800051V3001 800051V3002	
Mandatory Accessories			
Electronic frequency converter TURBO.DRIVE TD 700 with RS 232 C interface with RS 485 C interface with Profibus	P FC PS	800074V0001 800074V0003 800074V0004	
Connecting cable pump - frequency converter 0.4 m (1.4 ft) 1.0 m (3.5 ft) 2.5 m (8.75 ft) 3.0 m (10.5 ft) 5.0 m (17.5 ft) 10.0 m (35.0 ft)		800080V0040 800084V0100 800080V0042 800084V0300 800084V0500 800084V1000	
Power supply and control unit TURBO.CONTROL 700		800101V0001	
Connecting cable TURBO.DRIVE TD 700 - TURBO.CONTROL 700 1 m (3.5 ft) 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft)		800093V0100 800093V0300 800093V0500 800093V1000 800093V2000	
Mains cable 3 m (10.5 ft) - TURBO.CONTROL 300 / TURBO.POWER 300 with EURO plug with UK plug with US plug 5-15 P (220 V AC) 2 m (7.5 ft) US plug 115 V AC		800102V0002 800102V0003 800102V1002 992 76 513	
Air cooling unit or Water cooling unit with 2 cooling coils includes 4x G 1/8-in. connections, including 4 hose nozzles G 1/8-in. 8 mm (0.3 in.) OD, 4 gaskets (copper) 10 x 14 x 1 mm (0.4 x 0.6 x 0.04 in.) and hose clamps		800136V0003 800135V0004	
START/STOP switch for manual operation of the turbomolecular pump		152 48	
Forevacuum pump			
TRIVAC NT 10			
1 phase EURO motor; 220-240 / 230 V, 50/60 Hz		140 314	
1 phase Japan motor; 100 V, 50/60 Hz		140 316	
TRIVAC NT 16			
1 phase EURO motor		140 231	
1 phase US/Japan motor		140 241	
Power supply cable for TRIVAC NT 16			
100-120 V, 50/60 Hz; NEMA plug		140 304	
200-240 V, 50/60 Hz; earthed plug		140 306	
SCROLLVAC SC 15 D			
1 phase motor; 200-230 V, 50/60 Hz		133 001	
1 phase motor; 100-115 V, 50/60 Hz		133 101	
3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 003	
SCROLLVAC SC 30 D			
1 phase motor; 200-230 V, 50/60 Hz		133 002	
1 phase motor; 100-115 V, 50/60 Hz		133 102	
3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 004	

For further types, see our Full Line Catalog



Ordering Information

TURBOVAC SL 700

Accessories, optional	P	FC	PS	Part No.
Mounting kit TD 700 for SL 700, incl. 0.2 m (0.7 ft.) long connecting cable pump - frequency converter for installing the frequency converter beside the pump for installing the frequency converter beneath the pump				800110V0007
				800110V0010
Flange heater DN 160 CF, 230 V, 50 Hz DN 100 CF, 115 V, 60 Hz				854 37
				854 38
Inlet screen DN 160 ISO-K DN 160 CF				200 00 307
				200 17 247
Vibration absorber DN 160 ISO-K DN 160 CF				500 073
				500 072
Pump connection adapter DN 10 KF / pump connection M 8 (incl. O-ring, filter and clamping ring)				800110V0011
Purge gas and venting valve Gas flow at 1 bar $0.6 \text{ mbar} \times l \times s^{-1}$ (36 sccm), Pump connection DN 10 KF / gas connection G 1/4" 230 V AC 100 - 115 V AC 24 V DC				800152V0040
				800152V0043
				800152V0012
Gas filter to G 1/4" for purge gas and venting valve				800110V0012
Replacement filter				200 18 515
Power failure venting valve, normally open 24 V DC, DN 16 KF				800120V0021
Power failure venting valve, normally open 24 V DC, DN 10 KF 230 V AC / 50/60 Hz, DN 10 KF				174 46
				174 26
Solenoid venting valve, normally closed 24 V DC, DN 16 KF				800120V0011

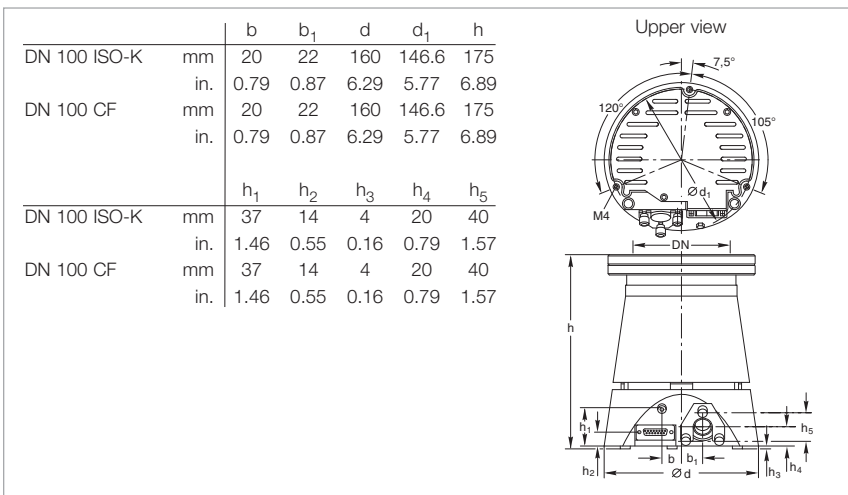
Mechanical Rotor Suspension with integrated Frequency Converter with Compound Stage

TURBOVAC TW 250 S



Typical Applications

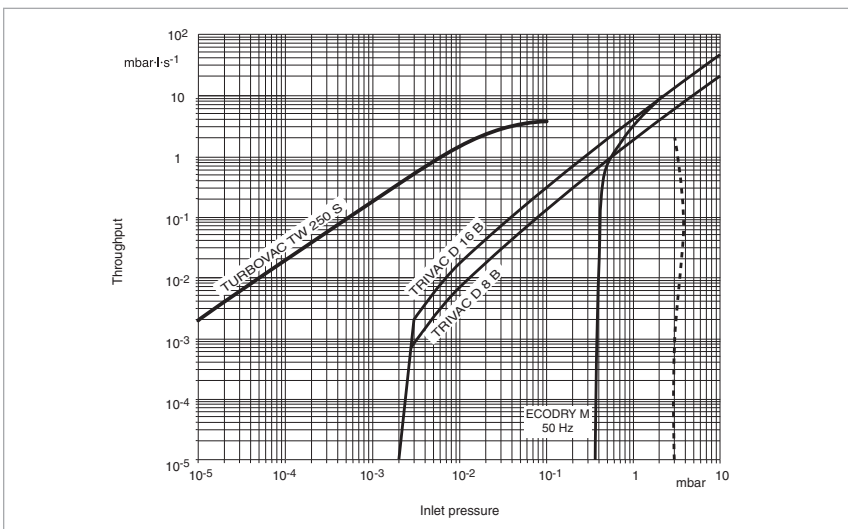
- Analytical Instruments
- Coating
- R & D
- Transfer chambers



Technical Features

- High gas throughput
- Oil free pump
- Insensitive to impact and movement due to the mechanical bearing concept
- Installation in any orientation
- Small footprint
- Integrated fan
- Purge gas/venting connection

Dimensional drawing for the TURBOVAC TW 250 S without frequency converter



Operation diagram for nitrogen for TURBOVAC TW 250 S

Advantages to the User

- Highest throughput for N₂ and Ar
- Highest reliability in operation
- Space-saving
- High reliability due to self-monitoring
- Easy to integrate into complex vacuum systems

Technical Data

TURBOVAC TW 250 S

Inlet flange	DN	100 ISO-K / 100 CF
Pumping speed at 10^{-5} mbar (10^{-5} Torr)		
N ₂	l x s ⁻¹	230
Ar	l x s ⁻¹	210
H ₂	l x s ⁻¹	80
He	l x s ⁻¹	150
Max. gas throughput		
N ₂		3.7 mbar x l x s ⁻¹ at 10^{-1} mbar
Ar		1.6 mbar x l x s ⁻¹ at 10^{-2} mbar
H ₂		1.1 mbar x l x s ⁻¹ at 10^{-1} mbar
He		2.4 mbar x l x s ⁻¹ at 10^{-1} mbar
Ultimate pressure with two-stage oil-sealed rotary vane pump	mbar (Torr)	$< 2 \times 10^{-8}$ ($< 1.5 \times 10^{-2}$)
Max. permissible backing pressure for N ₂	mbar (Torr)	3 (2.3)
Operating speed	min ⁻¹	51 600
Run-up time, approx.	min	3
Foreline flange		DN 16 KF
Venting connection		Thread M 5
Weight		
without frequency converter	kg (lbs)	5.0 (11.0)
with frequency converter	kg (lbs)	5.8 (12.80)
Recommended forevacuum pump		
TRIVAC		D 2.5 E
diaphragm pump with an ultimate pressure < 3 mbar (< 2.25 Torr) and a pumping speed at 3 mbar (2.25 Torr)		upon request
TRIVAC (at purge gas operation)		D 8 B




Technical Data

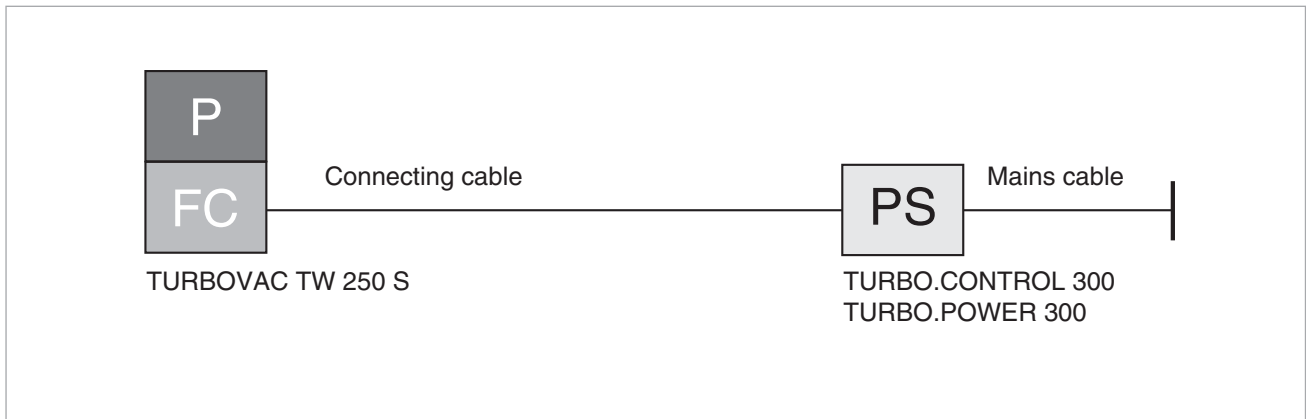
TURBO.DRIVE TD 400

Power supply	V DC	24 ±10 %
Ripple	%	< 3
Output		
Voltage, 3 phase	V DC	0 to 24
Power	W	160
Frequency	Hz	0 to 1500
Ambient temperature		
during operation	°C (°F)	+5 to +45 (+41 to +113)
during storage	°C (°F)	-15 to +70 (-5 to +158)
Weight, approx.	kg (lbs)	0.7 (1.55)
Serial interface		RS 232 C, RS 485 C or Profibus

Ordering Information

TURBOVAC TW 250 S

TURBOVAC TW 250 S with Compound Stage	P	Part No.		
DN 100 ISO-K / DN 16 KF, air-cooled, RS 485 C interface with attached venting valve		114 42		
DN 100 ISO-K / DN 16 KF, water-cooled, Profibus		114 37		
DN 100 ISO-K / DN 16 KF, water-cooled, Profibus, inlet screen coarse		800150V0016		
DN 100 ISO-K / DN 16 KF, air-cooled, Profibus, inlet screen coarse		800150V0009		
DN 100 ISO-K / DN 16 KF, air-cooled, RS 232 C interface		800150V0011		
DN 100 ISO-K / DN 16 KF, air-cooled, RS 485 C interface		800150V0013		
DN 100 CF / DN 16 KF, air-cooled, RS 232 C interface		800150V0012		
DN 100 CF / DN 16 KF, air-cooled, RS 485 C interface		800150V0014		
Mandatory Accessories	P	FC	PS	
Power supply and control unit TURBO.CONTROL 300				
24 V connection line frequency converter TD 400 - TURBO.CONTROL 300				
1 m (3.5 ft)				
3 m (10.5 ft)				
5 m (17.5 ft)				
10 m (35.0 ft)				
20 m (70.0 ft)				
Power supply TURBO.POWER 300				
24 V connection line frequency converter TD 400 - TURBO.POWER 300				
1 m (3.5 ft)				
3 m (10.5 ft)				
5 m (17.5 ft)				
10 m (35.0 ft)				
20 m (70.0 ft)				
Mains cable 3 m (10.5 ft) - TURBO.CONTROL 300 / TURBO.POWER 300				
with EURO plug				
with UK plug				
with US plug 5-15 P (220 V AC)				
2 m (7.5 ft) US plug 115 V AC				
START/STOP switch for manual operation of the turbomolecular pump				
Forevacuum pump				
TRIVAC D 16 B				
1 phase motor; 230 V, 50 Hz				
1 phase motor; 230 V, 50/60 Hz				
3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz				
For further types, see our Full Line Catalog				



Ordering Information

TURBOVAC TW 250 S

Accessories, optional	P FC PS	Part No.
Flange heater DN 100 CF, 230 V, 50 Hz DN 100 CF, 115 V, 60 Hz		854 27 854 28
Inlet screen DN 100 ISO-K (coarse) DN 100 ISO-K (fine)		800132V0101 800132V0102
Vibration absorber DN 100 ISO-K DN 100 CF		800131V0100 500 071
Power failure venting valve, normally open 24 V DC (venting kit Part No. 863 20 is required)		280 85
Included in the Delivery of the Pump	P	
Centering ring with FPM sealing ring, clamping shoe with gasket		Foreline Flange
Sealing screw and a gasket ring		Vent Port
High vacuum connection elements are not part of the supplied equipment		

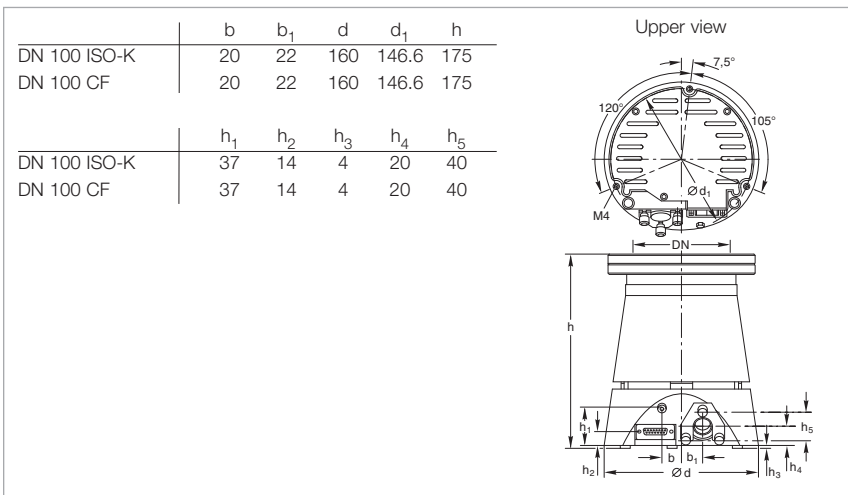
Mechanical Rotor Suspension without integrated Frequency Converter with Compound Stage

TURBOVAC TW 250 S



Typical Applications

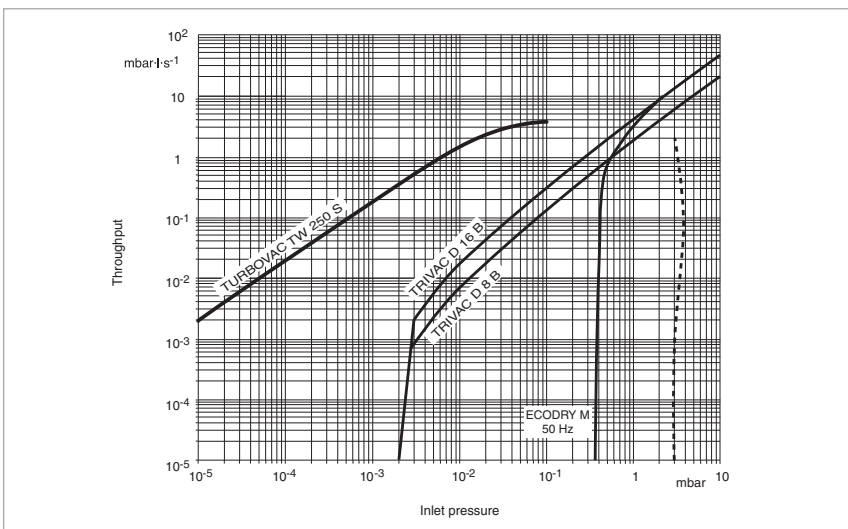
- Analytical Instruments
- Coating
- R & D
- Transfer chambers



Dimensional drawing for the TURBOVAC TW 250 S without frequency converter

Technical Features

- High gas throughput
- Oil free pump
- Insensitive to impact and movement due to the mechanical bearing concept- Installation in any orientation
- Small footprint
- Integrated fan
- Purge gas/venting connection



Operation diagram for nitrogen for TURBOVAC TW 250 S

Advantages to the User

- Highest throughput for N₂ and Ar
- Highest reliability in operation
- Space-saving
- High reliability due to self-monitoring
- Easy to integrate into complex vacuum systems





Technical Data

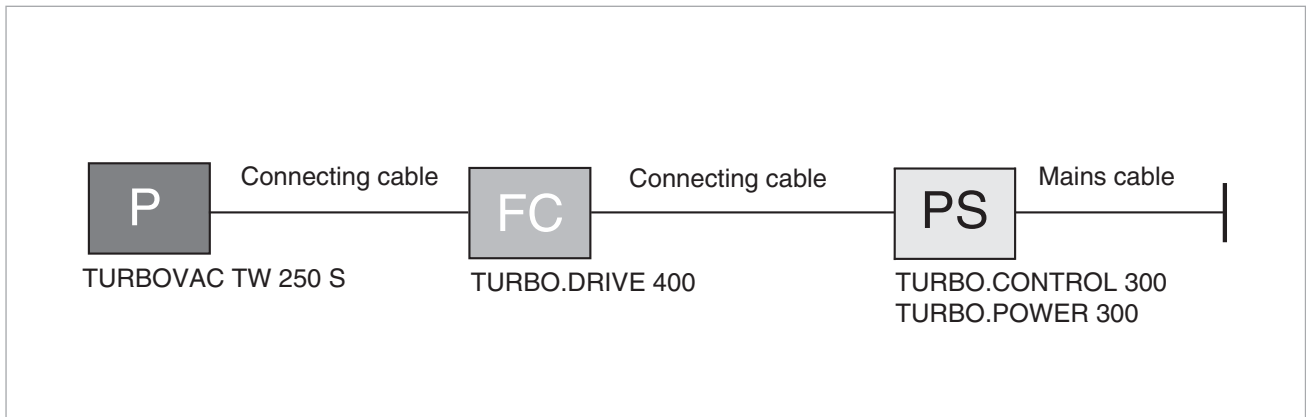
TURBOVAC TW 250 S

Inlet flange	DN	100 ISO-K / 100 CF
Pumping speed at 10^{-5} mbar (0.75×10^{-5} Torr)		
N ₂	l x s ⁻¹	230
Ar	l x s ⁻¹	210
H ₂	l x s ⁻¹	80
He	l x s ⁻¹	150
Max. gas throughput		
N ₂		3.7 mbar x l x s ⁻¹ at 10 ⁻¹ mbar
Ar		1.6 mbar x l x s ⁻¹ at 10 ⁻² mbar
H ₂		1.1 mbar x l x s ⁻¹ at 10 ⁻¹ mbar
He		2.4 mbar x l x s ⁻¹ at 10 ⁻¹ mbar
Ultimate pressure with two-stage oil-sealed rotary vane pump	mbar (Torr)	$< 2 \times 10^{-8}$ ($< 1.5 \times 10^{-2}$)
Max. permissible backing pressure für N ₂	mbar (Torr)	3 (2.3)
Operating speed	min ⁻¹	51 600
Run-up time, approx.	min	3
Foreline flange		DN 16 KF
Venting connection		Thread M 5
Weight		
without frequency converter	kg (lbs)	5.0 (11.0)
with frequency converter	kg (lbs)	5.8 (12.80)
Recommended forevacuum pump		
TRIVAC		D 2.5 E
diaphragm pump		
with an ultimate pressure		
< 3 mbar (< 2.3 Torr)		
and a pumping speed		
at 3 mbar (2.3 Torr)		upon request
TRIVAC (at purge gas operation)		D 8 B

Ordering Information

TURBOVAC TW 250 S

TURBOVAC TW 250 S with Compound Stage	P	Part No.				
DN 100 ISO-K / DN 16 KF, air-cooled, inlet screen coarse DN 100 ISO-K / DN 16 KF, air-cooled, inlet screen coarse (with vibration absorber)		113 52 800150V0007				
Mandatory Accessories		P	FC	PS		
Electronic frequency converter TURBO.DRIVE TD 400 RS 485 C interface RS 232 C interface		800073V0003 800073V0002				
Connecting cable pump - TURBO.DRIVE TD 400 1 m (3.5 ft) 3 m (10.5 ft) 5 m (17.5 ft)		152 47 864 40 864 50				
Power supply and control unit TURBO.CONTROL 300		800100V0001				
24 V connecting cable TURBO.DRIVE TD 400 - TURBO.CONTROL 300 1 m (3.5 ft) 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft)		800091V0100 800091V0300 800091V0500 800091V1000 800091V2000				
Power supply TURBO.POWER 300		800100V0002				
24 V connecting cable TURBO.DRIVE TD 400 - TURBO.POWER 300 1 m (3.5 ft) 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft)		800094V0100 800094V0300 800094V0500 800094V1000 800094V2000				
Mains cable 3 m (10.5 ft) - TURBO.CONTROL 300 / TURBO.POWER 300 with EURO plug with UK plug with US plug 5-15 P (220 V AC) 2 m (7.5 ft) US plug 115 V AC		800102V0002 800102V0003 800102V1002 992 76 513				
Forevacuum pump TRIVAC D 16 B 1 phase motor; 230 V, 50 Hz 1 phase motor; 230 V, 50/60 Hz 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz		112 65 113 25 112 66				
For further types, see our Full Line Catalog						



Ordering Information

TURBOVAC TW 250 S

Accessories, optional	P	FC	PS	Part No.
Inlet screen				
DN 100 ISO-K (coarse)				800132V0101
DN 100 ISO-K (fine)				800132V0102
DN 160 ISO-K				200 00 307
DN 160 CF				200 17 247
Vibration absorber				
DN 100 ISO-K				800131V0100
DN 100 ISO-K				500 071
DN 160 ISO-K				500 073
Venting valve				
24 V DC (venting kit Part No. 863 20 is required)				280 74
Power failure venting valve, normally open				
24 V DC (venting kit Part No. 863 20 is required)				280 85
Mounting kit for venting valve or Power failure venting valve				863 20
Included in the Delivery of the Pump	P			
Centering ring with FPM sealing ring, blank flange with clamping shoe				Foreline Flange
Sealing screw and a gasket ring				Vent Port
DC coupling for the power supply is included				

Mechanical Rotor Suspension with Compound Stage

TURBOVAC TW 501

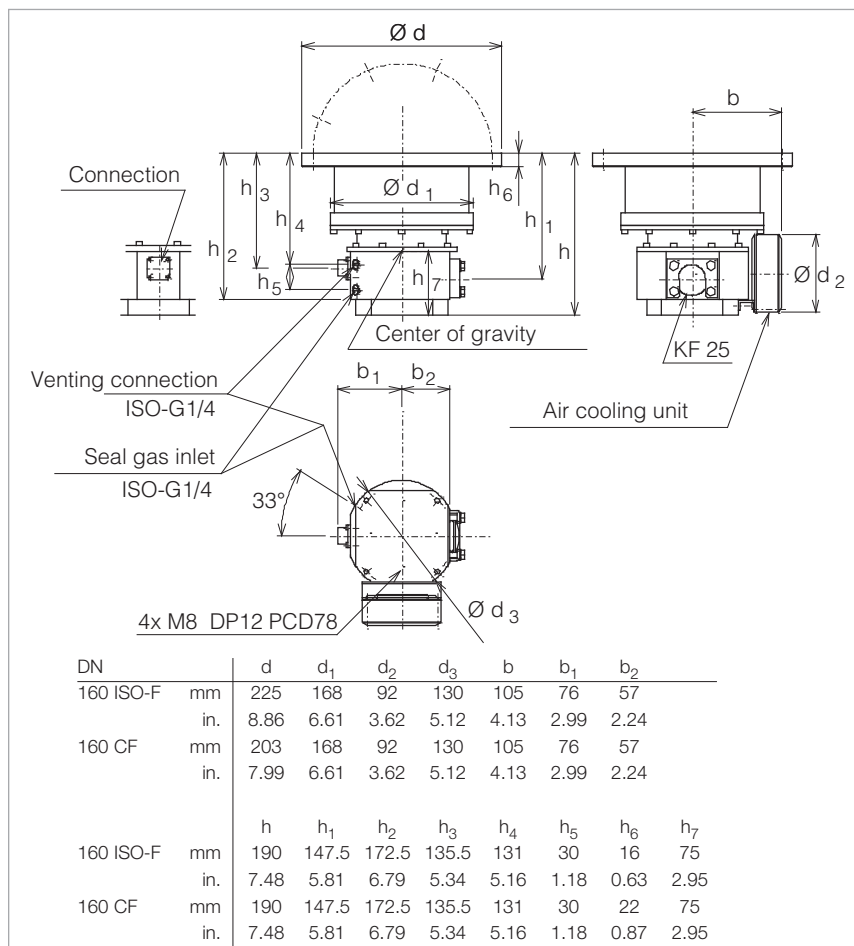


Typical Applications

- R & D
- Thermonuclear fusion
- Space simulation
- Data memories
- Coating

Technical Features

- Robust rotor design
- High pressure foreline tolerance
- Oil-free pump for generating clean high vacuum conditions
- Installation in any orientation
- Seal gas/venting connection (purge/vent)
- Water and air cooling
- CE and NRTL compliant
- RS 232 C interface
- Electronic frequency converter TD 35 with integrated power supply and display for controlling and monitoring the pump



Dimensional drawing for the TURBOVAC TW 501

Advantages to the User

- Compact, space saving design
- High gas throughput
- Extremely rugged and maintenance-free

Technical Data

TURBOVAC TW 501

Inlet flange	DN	160 ISO-F	160 CF
Pumping speed			
N ₂	l x s ⁻¹	450	450
Ar	l x s ⁻¹	-	-
He	l x s ⁻¹	-	-
H ₂	l x s ⁻¹	240	240
Max. gas throughput			
N ₂	mbar x l x s ⁻¹	9.2	9.2
Ar	mbar x l x s ⁻¹	4.6	4.6
Compression ratio			
N ₂		1 x 10 ⁸	1 x 10 ⁸
He		-	-
H ₂		2 x 10 ³	2 x 10 ³
Ultimate pressure	mbar (Torr)	< 1 x 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 1 x 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)
Max. foreline pressure for N ₂	mbar (Torr)	2.5 (1.9)	2.5 (1.9)
Recommended forevacuum pump		from TRIVAC D 4 B to D 4 B	from TRIVAC D 4 B to D 4 B
Run-up time at 95% of nominal speed	min	< 2.5	< 2.5
Purge / vent port	ISO	G 1/4"	G 1/4"
Cooling water connection	ISO	Rc 1/4"	Rc 1/4"
Weight, approx.			
ISO-F	kg (lbs)	7 (15.5)	7 (15.5)
CF	kg (lbs)	10 (22)	10 (22)
Max. power consumption	VA	610	610
Ultimate pressure	VA	92	92



Technical Data

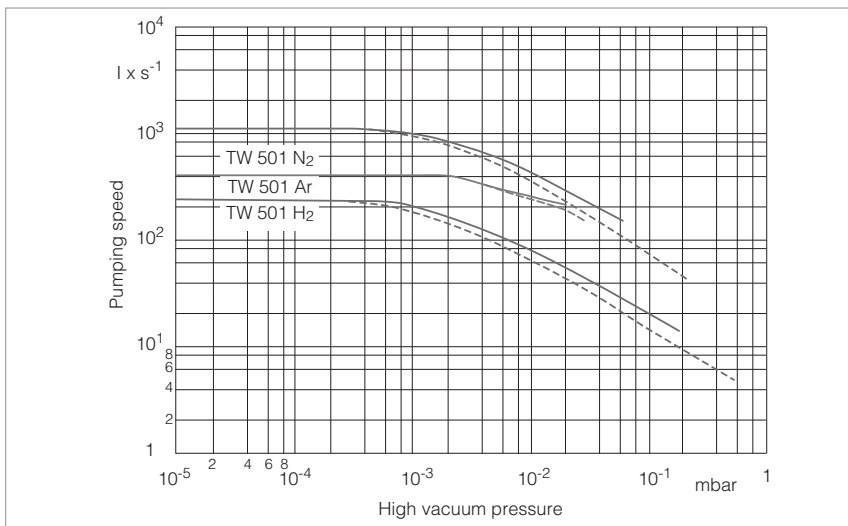
TURBO.DRIVE TD 35

Mains connection, 50 - 60 Hz; selectable	V AC	90 to 110 / 180 to 253
Max. output voltage	V	3 x 60
Permissible ambient temperature	°C (°F)	-5 to +40 (+23 to +104)
Protection class	IP	20
Dimensions (W x H x D)	mm (in.)	104.5 x 149 x 250 (4.1 x 5.9 x 9.8)
Weight, approx.	kg (lbs)	4 (8.8)

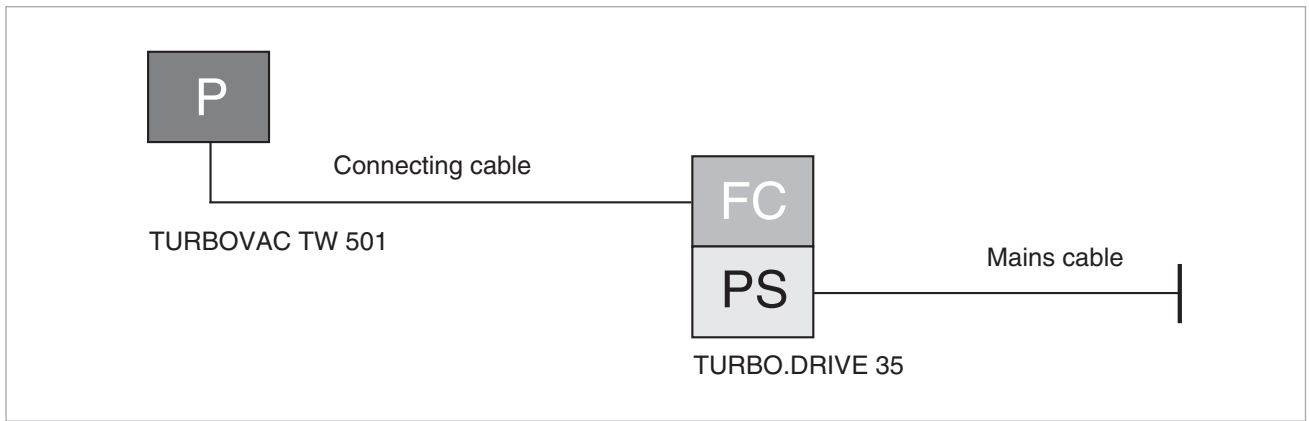
Ordering Information

TURBOVAC TW 501

TURBOVAC TW 501	P	Part No.		
DN 160 ISO-F, water-cooled DN 160 ISO-F, air-cooled DN 160 CF, water-cooled DN 160 CF, air-cooled		800150V0104 800150V0106 800150V0105 800150V0107		
Mandatory Accessories		P	FC	PS
Electronic frequency converter TURBO.DRIVE TD 35 RS 232 C interface		800150V0111		
Connecting cable TURBOVAC - frequency converter 3 m (10.5 ft)		800150V0113		
Cable for air cooler 3 m (10.5 ft)		800150V0115		
Mains cable 3 m (10.5 ft) EURO plug UK plug US plug 5-15 P		800102V0002 800102V0003 800102V1002		
Forevacuum pump TRIVAC D 4 B 1 phase motor; 230 V, 50 Hz		112 45		
TRIVAC D 8 B 1 phase motor; 230 V, 50 Hz		112 55		
SCROLLVAC SC 15 D 1 phase motor; 200-230 V, 50/60 Hz 3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 001 133 003		
For further types, see our Full Line Catalog				



Pumping speed for nitrogen for the TURBOVAC TW 501



Ordering Information

TURBOVAC TW 501

Accessories, optional	Part No.
Flange heater DN 160 CF, 230 V, 50 Hz DN 100 CF, 115 V, 60 Hz	854 37 854 38
Vibration absorber DN 160 CF	500 072
Included in the Delivery of the Pump	P
Inlet screen, centering ring with FPM sealing ring, outer ring	ISO-F
Inlet screen	CF

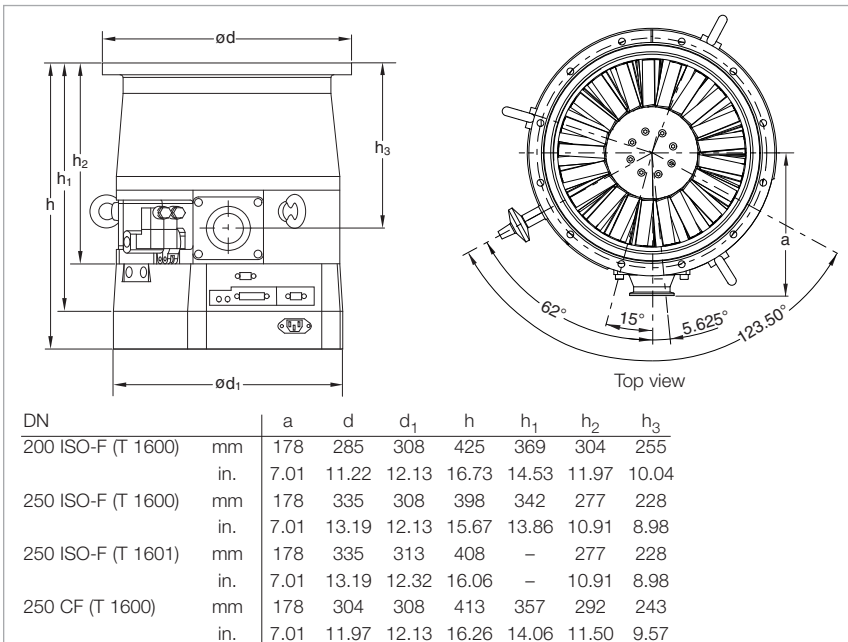
Mechanical Rotor Suspension with integrated Frequency Converter und Netzteil with Compound Stage

TURBOVAC TW 1600



Typical Applications

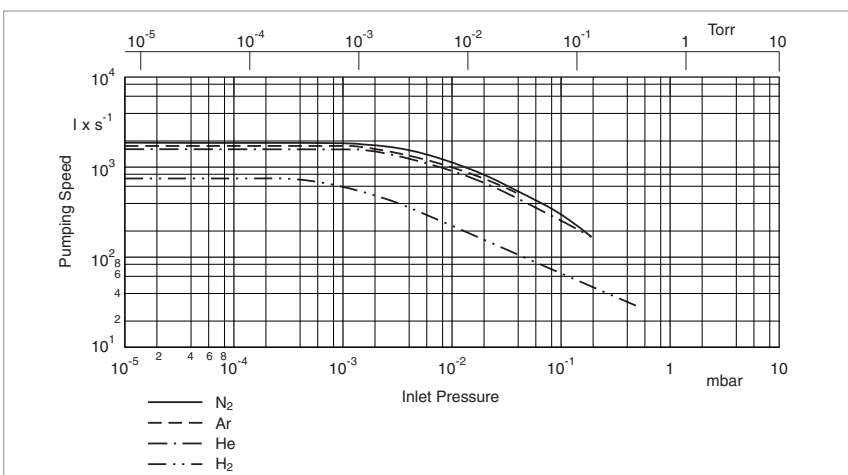
- Data storage
- Flat panel displays
- Optical coating
- Glas-Beschichtung
- R & D
 - Fusion experiments
 - Space simulation
 - UHV applications



Dimensional drawing for the TURBOVAC T 1600

Technical Features

- Frequency converter and power supply integrated
- Robust rotor design
- Operation in any orientation
- Highest pumping speed and high throughput
- Oil-free pump for generating clean high and ultrahigh vacuum conditions
- Integrated seal gas and venting valve
- High pressure foreline tolerance



Pumping speed as a function of the inlet pressure (TURBOVAC T 1600 with flange DN 250)

Advantages to the User

- Space-saving
- Easy to integrate into complex vacuum systems
- High productivity
- Low operating costs
- Operation with dry compressing backing pumps


Technical Data

TURBOVAC TW 1600

Inlet flange	DN	200 ISO-F	250 ISO-F • 250 CF
Pumping speed			
N ₂	l x s ⁻¹	1000	1420
Ar	l x s ⁻¹	820	1200
Max. gas throughput			
N ₂	mbar x l x s ⁻¹	7.4	7.4
Ar	mbar x l x s ⁻¹	6.8	6.8
Compression ratio k ₀ for O-Ring sealed pumps			
N ₂		1 x 10 ⁷	1 x 10 ⁷
Ar		3 x 10 ⁸	3 x 10 ⁸
Ultimate pressure	mbar (Torr)	< 3 x 10 ⁻¹⁰ (< 2.2 x 10 ⁻¹⁰)	< 3 x 10 ⁻¹⁰ (< 2.2 x 10 ⁻¹⁰)
Max. foreline pressure for N ₂	mbar (Torr)	8 (6)	8 (6)
Recommended forevacuum pump (alternatively)		TRIVAC D 65 B + RUVAC WA 501 DIVAC 4.8 VT SOGEVAC SV 25 SCROLLVAC SC 30 D	TRIVAC D 65 B + RUVAC WA 501 DIVAC 4.8 VT SOGEVAC SV 25 SCROLLVAC SC 30 D
Run-up time at 95% of nominal speed	min	< 10	< 10
Purge / vent port	DN	G 1/4"	G 1/4"
Cooling water connection		G 3/8"	G 3/8"
Weight, approx.	kg (lbs)	40 (88)	40 (88)
Supply voltage	V AC	100 - 240	100 - 240
Max. power consumption	W	700	700

Ordering Information

TURBOVAC TW 1600

TURBOVAC TW 1600 with Compound Stage	P FC PS	Part No.	
DN 200 ISO-F / DN 40 KF, water-cooled, Profibus DN 250 ISO-F / DN 40 KF, water-cooled, Profibus DN 250 CF / DN 40 KF, water-cooled, Profibus		800041V2144 800041V2444 800041V2844	
Mandatory Accessories		P FC PS	
Forevacuum pump			
TRIVAC D 65 B			
3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz		112 86	
3 phase motor; 115 V, 60 Hz		113 57	
TRIVAC D 65 B + RUVAC WA 501 + Adapter		-	
DIVAC 4,8 T			
1 phase motor; 230 V, 50 Hz		127 89	
1 phase motor; 115 V, 60 Hz		127 90	
SCROLLVAC SC 15 D			
1 phase motor; 200-230 V, 50/60 Hz		133 001	
1 phase motor; 100-115 V, 50/60 Hz		133 101	
3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 003	
SCROLLVAC SC 30 D			
1 phase motor; 200-230 V, 50/60 Hz		133 002	
1 phase motor; 100-115 V, 50/60 Hz		133 102	
3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 004	
SOGEVAC SV 25			
see Catalog Section C02 "SOGEVAC"		-	
For further types, see our Full Line Catalog			



Ordering Information

TURBOVAC TW 1600

Accessories, optional	P FC PS	Part No.
Power failure venting valve, normally open 24 V DC, DN 16 KF		800120V0021
Solenoid venting valve, normally closed 24 V DC, DN 16 KF		800120V0011
Purge filter		200 18 515
Accessories for RS 232 C and RS 485 C interfaces		See Section "Turbomolecular pumps", para "Accessories"
Included in the Delivery of the Pump	P FC PS	
Integrated seal gas and venting valve		-
Inlet screen, centering ring, support ring and O-ring		ISO-F
Centering ring, clamping ring and a DN 40 KF O-ring		KF Foreline Flange
ISO-K foreline flange, centering ring		ISO-K Foreline Flange
Gas filter with adapter fitting		Vent Port
2 adaptors G 3/8 in. - hose nipple LW 13, 2 gaskets		Water Cooling
Mains cord with EURO plug		

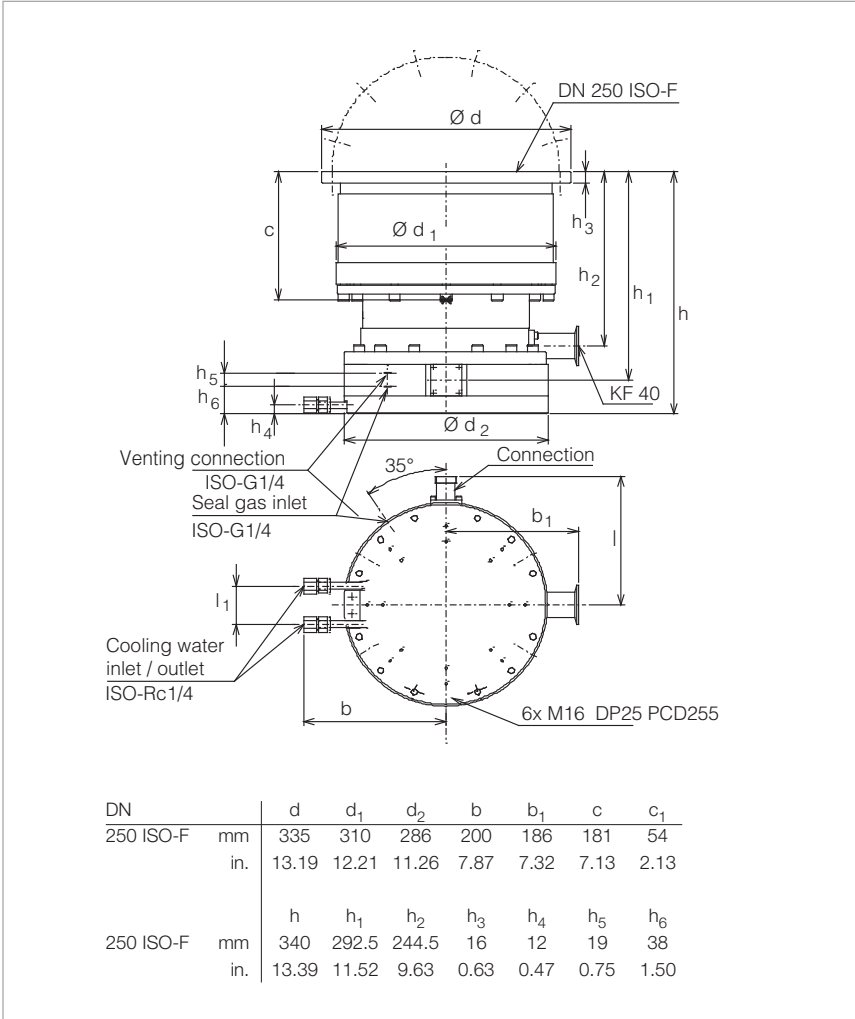
Mechanical Rotor Suspension with Compound Stage

TURBOVAC TW 2401



Typical Applications

- R & D
- Thermonuclear fusion
- Space simulation
- Data memories
- Coating



Dimensional drawing for the TURBOVAC TW 2401 with air cooling

Technical Features

- Robust rotor design
- High pressure foreline tolerance
- Oil-free pump for generating clean high vacuum conditions
- Installation in any orientation
- Seal gas/venting connection (purge/vent)
- Water and air cooling
- CE and NRTL compliant
- RS 232 C interface
- Electronic frequency converter TD 240 with integrated power supply and display for controlling and monitoring the pump

Advantages to the User

- Compact, space saving design
- High gas throughput
- Extremely rugged and maintenance-free

Technical Data**TURBOVAC TW 2401**



Inlet flange	DN	250 ISO-F
Pumping speed		
N ₂	l x s ⁻¹	2400
Ar	l x s ⁻¹	-
He	l x s ⁻¹	-
H ₂	l x s ⁻¹	1100
Max. gas throughput		
N ₂	mbar x l x s ⁻¹	16.6
Ar	mbar x l x s ⁻¹	13.8
Compression ratio		
N ₂		1 x 10 ⁸
He		-
H ₂		1400
Ultimate pressure	mbar (Torr)	< 1 x 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)
Max. foreline pressure for N ₂	mbar (Torr)	2 (1.5)
Recommended forevacuum pump		from TRIVAC D 25 B to D 65 B
Run-up time at 95% of nominal speed	min	< 18
Purge / vent port	ISO	G 1/4"
Cooling water connection	ISO	Rc 1/4"
Weight, approx.	kg (lbs)	12 (26)
Max. power consumption	VA	1200
Ultimate pressure	VA	140

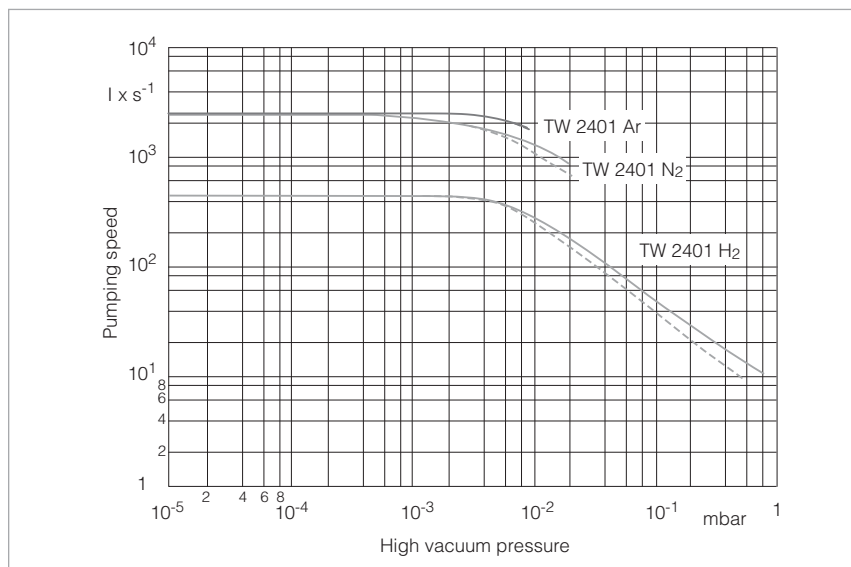
Technical Data**TURBO.DRIVE TD 240**

Mains connection, 50 - 60 Hz; selectable	V AC	180 to 253
Max. output voltage	V	3 x 110
Permissible ambient temperature	°C (°F)	-5 to +40 (+23 to +104)
Protection class	IP	20
Dimensions (W x H x D)	mm (in.)	209 x 149 x 400 (8.2 x 5.7 x 15.7)
Weight, approx.	kg (lbs)	8.2 (18.1)

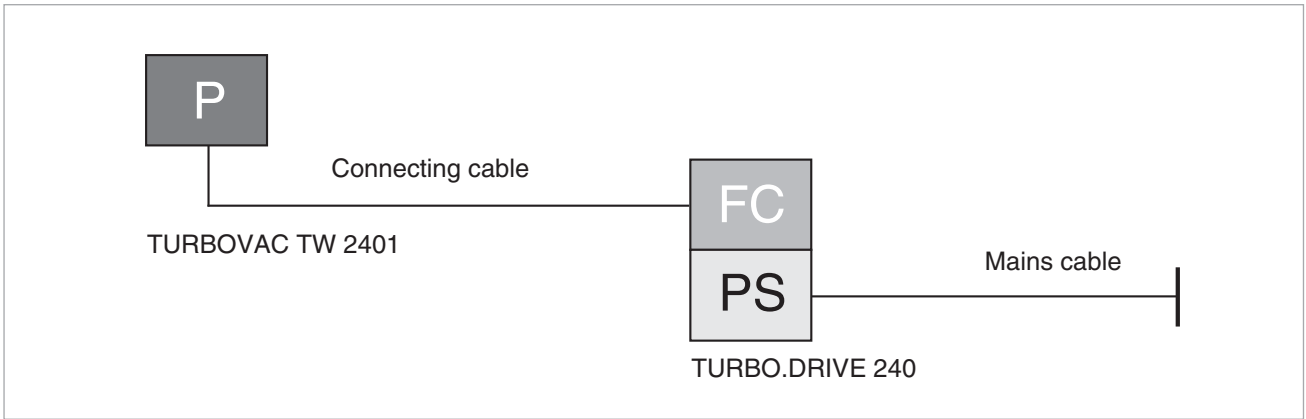
Ordering Information

TURBOVAC TW 2401

TURBOVAC TW 2401	P	Part No.	
DN 250 ISO-F, water-cooled		800150V0108	
Mandatory Accessories			
Frequency converter TURBO.DRIVE TD 240 RS 232 C interface	P FC PS	800150V0112	
Connecting cable TURBOVAC - frequency converter 3 m (10.5 ft)		800150V0114	
Mains cable 3 m (10.5 ft) EURO plug UK plug US plug 5-15 P		800102V0002 800102V0003 800102V1002	
Forevacuum pump TRIVAC D 25 B 1 phase motor; 230 V, 50 Hz 1 phase motor; 230 V, 50/60 Hz 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz		112 75 113 35 112 76	
SCROLLVAC SC 30 D 1 phase motor; 200-230 V, 50/60 Hz 1 phase motor; 100-115 V, 50/60 Hz 3 phase motor; 380-415 V, 50 Hz / 200-230 V, 460 V, 60 Hz		133 002 133 102 133 004	
For further types, see our Full Line Catalog			



Pumping speed for nitrogen for the TURBOVAC TW 2401

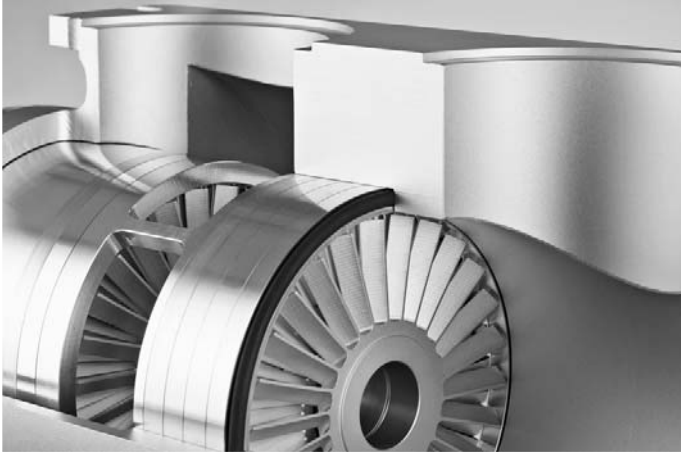


Ordering Information

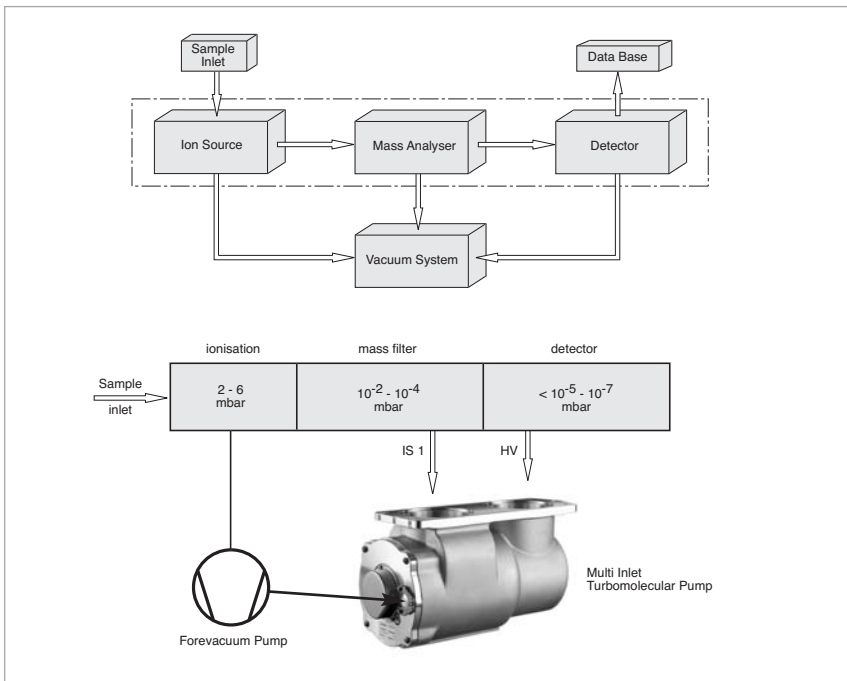
TURBOVAC TW 2401

Included in the Delivery of the Pump	P
Inlet screen, centering ring with FPM sealing ring, outer ring	ISO-F

Special Turbomolecular Pumps



TURBOVAC Multi Inlet



Application example: GC-MS



Multi inlet product examples
Left: cartridge, right: dual inlet

Advantages to the User

- Reduction of system costs
- Smaller size of the analysis system
- Reduction in the number of individual vacuum components
- Choice between cartridge or customised pump housing

Typical Applications

For example

- LC-MS (linking of a liquid chromatograph to a mass spectrometer)
- GC/MS (linking of a gas chromatograph to a mass spectrometer)
- TOF-MS (time-of-flight mass spectrometer)
- ICP-MS (inductively coupled plasma mass spectrometry)
- Helium leak detectors

Technical Features

- Dual Inlet (pumping down of two analysis chambers)
- Triple inlet (pumping down of three analysis chambers)
- High effective pumping speed

HV stage S = 60 to 400 l/s

Interstage IS1 S = 30 to 300 l/s

Interstage IS2 S = 5 to 30 l/s

- Cartridge solutions (without pump housing) are available
- Compact vacuum system

Customised versions are available upon request

Magnetic Rotor Suspension with integrated Frequency Converter, with Compound Stage

TURBOVAC MAG W 300/400 iP

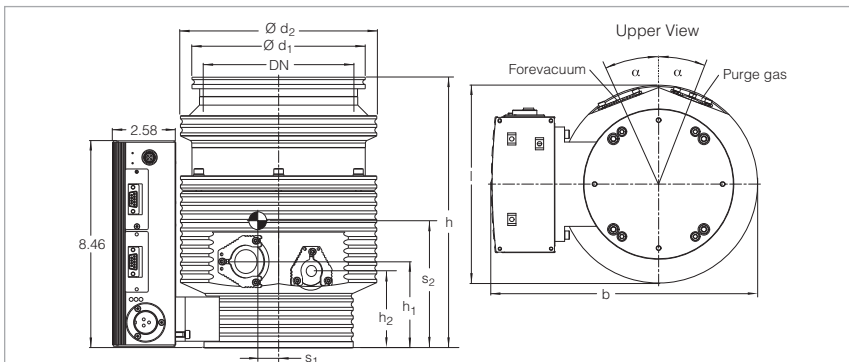


Typical Applications

- Gas analysis systems
- Particle accelerators
- Electron microscopes
- Research
- Coating systems

Technical Features

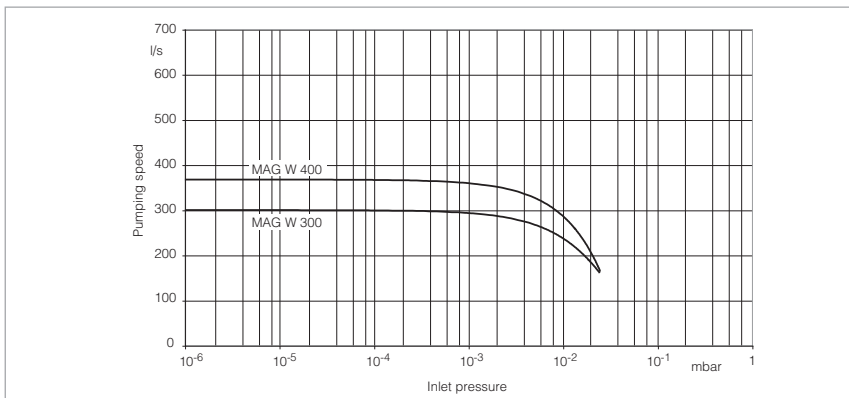
- Installation in any orientation
- DN 100 or 160 ISO-K and/or CF high vacuum connection
- DN 16 KF with clamped forevacuum connection
- Purge gas/venting connection DN 16 KF with clamped connection (purge/vent)
- Water or air cooling optional
- CE and RoHS compliant; fulfilment of UL requirements
- 2 slots for industrial communications modules
- Standard 9 pin 24 V SPS PLC-IO in Control Slot
- RS 232 C in Service Slot
- further interfaces can be fitted: Ethernet, Profibus, DeviceNet, RS 485 C



	DN	$\varnothing d_1$	$\varnothing d_2$	h	h_1	h_2	l	b	b^*	α	s_1	s_2	
MAG W 300 iP	mm	100 ISO-K	130.0	155.0	250.0	77.7	70.0	156.0	250.0	233.0	16°	19.0	103.0
	in.		5.12	6.10	9.84	3.06	2.76	6.14	9.84	9.17	16°	0.75	4.06
	mm	100 CF	151.5	155.0	264.3	77.7	70.0	156.0	250.0	233.0	16°	15.0	129.0
	in.		5.96	6.10	10.41	3.06	2.76	6.14	9.84	9.17	16°	0.59	5.08
MAG W 400 iP	mm	160 ISO-K	180.0	155.0	241.0	77.7	70.0	168.5	262.5	245.5	16°	19.0	106.0
	in.		7.09	6.10	9.49	3.06	2.76	6.63	10.33	9.67	16°	0.75	4.17
	mm	160 CF	202.5	155.0	234.7	77.7	70.0	181.2	273.7	256.7	16°	14.0	129.0
	in.		7.97	6.10	9.24	3.06	2.76	9.13	10.78	10.11	16°	0.55	5.08

b^* = width with plug of the DRIVE/BEARING cable connected instead of MAG.DRIVE iS

Dimensional drawing for the TURBOVAC MAG W 300/400 iP



Pumping speed for N_2 of the TURBOVAC MAG W 300/400 iP as a function of the inlet pressure

Advantages to the User

- Highest pumping speed from the smallest possible size
- New standard regarding maintenance free systems
- Suitability for vibration sensitive applications in the area of analytical engineering, thin-film technology, electron microscopes, research, development among others
- Flexibility due to the modular concept; the converter is optionally also available by way of a bench top unit

TURBOVAC MAG

Technical Data

W 300 iP

W 400 iP

Inlet flange	DN	100 ISO-K	100 CF	160 ISO-K	160 CF
Pumping speed					
N ₂	l x s ⁻¹	300	300	365	365
Ar	l x s ⁻¹	260	260	330	330
He	l x s ⁻¹	260	260	280	280
H ₂	l x s ⁻¹	190	190	200	200
Operating speed	min ⁻¹	58 800	58 800	58 800	58 800
Compression ratio					
N ₂		1.0 x 10 ¹⁰	1.0 x 10 ¹⁰	1.0 x 10 ¹⁰	1.0 x 10 ¹⁰
H ₂		3.2 x 10 ³	3.2 x 10 ³	3.2 x 10 ³	3.2 x 10 ³
He		9.2 x 10 ⁴	9.2 x 10 ⁴	9.2 x 10 ⁴	9.2 x 10 ⁴
Ultimate pressure	mbar (Torr)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)
Max. degassing temperature	°C (°F)	–	80 (176)	–	80 (176)
Max. foreline pressure for N ₂	mbar (Torr)	8 (6)	8 (6)	8 (6)	8 (6)
Recommended backing pump		TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B
Run-up time	min	< 5	< 5	< 5	< 5
Foreline flange (clamped)	DN	16 KF	16 KF	16 KF	16 KF
Purge / vent port (clamped)	DN	16 KF	16 KF	16 KF	16 KF
Water cooling connection (optional)	G	1/8"	1/8"	1/8"	1/8"
Weight, approx.	kg (lbs)	12 (26)	12 (26)	12 (26)	12 (26)



Technical Data

Integrated Frequency Converter TURBO.DRIVE iS

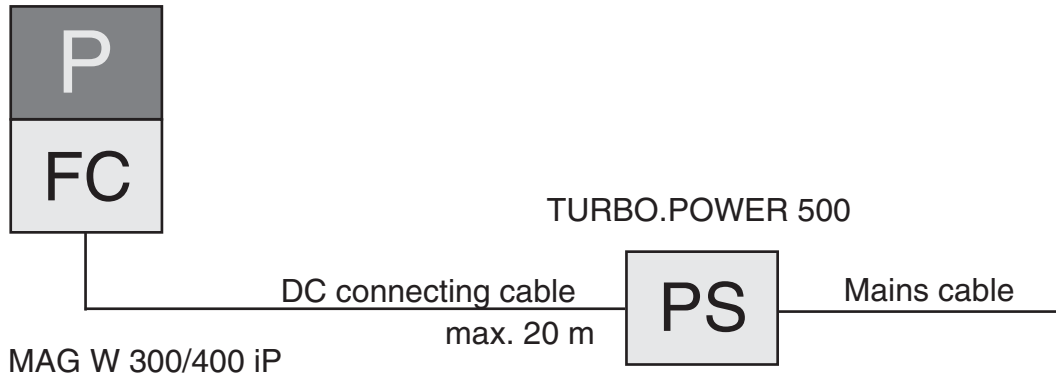
Power supply	V	48	48	48	48
Ripple	%	< 2	< 2	< 2	< 2
Power consumption					
Maximum	W	400	400	400	400
at ultimate pressure	W	259	259	259	259
DC current consumption, max.	A	7.5 to 9.3	7.5 to 9.3	7.5 to 9.3	7.5 to 9.3
DC power supply voltage range	V	43 to 53	43 to 53	43 to 53	43 to 53
Length of the DC connection cable, max.					
at 3 x 1.5 mm ²	m (ft)	5 (17.5)	5 (17.5)	5 (17.5)	5 (17.5)
at 3 x 2.5 mm ²	m (ft)	20 (70.0)	20 (70.0)	20 (70.0)	20 (70.0)
Contact rating for the relays, max.		32 V; 0,5 A	32 V; 0,5 A	32 V; 0,5 A	32 V; 0,5 A
Permissible ambient temperature					
during operation	°C	+10 to +40	+10 to +40	+10 to +40	+10 to +40
	(°F)	(+50 to +104)	(+50 to +104)	(+50 to +104)	(+50 to +104)
during storage	°C	0 to +60	0 to +60	0 to +60	0 to +60
	(°F)	(0 to +140)	(0 to +140)	(0 to +140)	(0 to +140)
Relative humidity of the air, non-condensing	%	5 to 85	5 to 85	5 to 85	5 to 85
Protection class	IP	30	30	30	30
Overvoltage category		II	II	II	II
Pollution category		2	2	2	2

Ordering Information

TURBOVAC MAG W 300/400 iP

TURBOVAC MAG W 300 iP with Integrated Frequency Converter and Seal Gas Connection	P FC	Part No.	
DN 100 ISO-K DN 100 CF		410300V0505 410300V0506	
TURBOVAC MAG W 400 iP with Integrated Frequency Converter and Seal Gas Connection	P FC		
DN 160 ISO-K DN 160 CF		410400V0505 410400V0506	
Mandatory Accessories		P FC	
Power supply TURBO.POWER 500		410300V0221	
DC cable frequency converter - power supply 1 m (3.5 ft) 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft)		410300V2001 410300V2003 410300V2005 410300V2010 410300V2020	
Mains cable, 3 m (10.5 ft) with EURO plug with US plug 5-15 P		800102V0002 800102V1002	
Forevacuum pump TRIVAC D 2,5 E 220-240 V, 50 Hz; 230 V, 60 Hz; earthed plug, EURO version 110-120 V, 50/60 Hz; NEMA plug, US version		140 000 140 002	
TRIVAC D 8 B 1 phase motor; 230 V, 50/60 Hz 3 phase motor; 230/400 V, 50 Hz; 250/440 V, 60 Hz		112 55 112 56	

With integrated Frequency Converter



Ordering Information

TURBOVAC MAG W 300/400 iP

Accessories, optional	P	Part No.
Inlet screen		
DN 100 ISO-K		
coarse (3.2 x 3.2 mm (0.13 x 0.13 in.))		800132V0101
fine (1.6 x 1.6 mm (0.06 x 0.06 in.))		800132V0102
DN 100 CF		
coarse (3.2 x 3.2 mm (0.13 x 0.13 in.))		200 91 514
fine (1.6 x 1.6 mm (0.06 x 0.06 in.))		E 200 17 195
DN 160 ISO-K		E 200 00 307
DN 160 CF		200 17 247
Flange heater		
100 CF, 230 V, 50 Hz		854 27
100 CF, 115 V, 60 Hz		854 28
160 CF, 230 V, 50 Hz		854 37
160 CF, 115 V, 60 Hz		854 38
Water cooling unit		410300V0101
Air cooling unit		410300V0102
START/STOP switch for manual operation of the turbomolecular pump		152 48
DC plug		800 001 694
Solenoid venting valve, normally closed		
24 V DC, DN 16 KF		800120V0011
Power failure venting valve, normally open		800120V0021
Included in the Delivery of the Pump	P	
Flanges for forevacuum, venting and purge gas are blank-flanged		
Centering ring with FPM sealing ring and a clamping yoke		

Magnetic Rotor Suspension with integrated Frequency Converter, with Compound Stage

TURBOVAC MAG W 600/700 iP

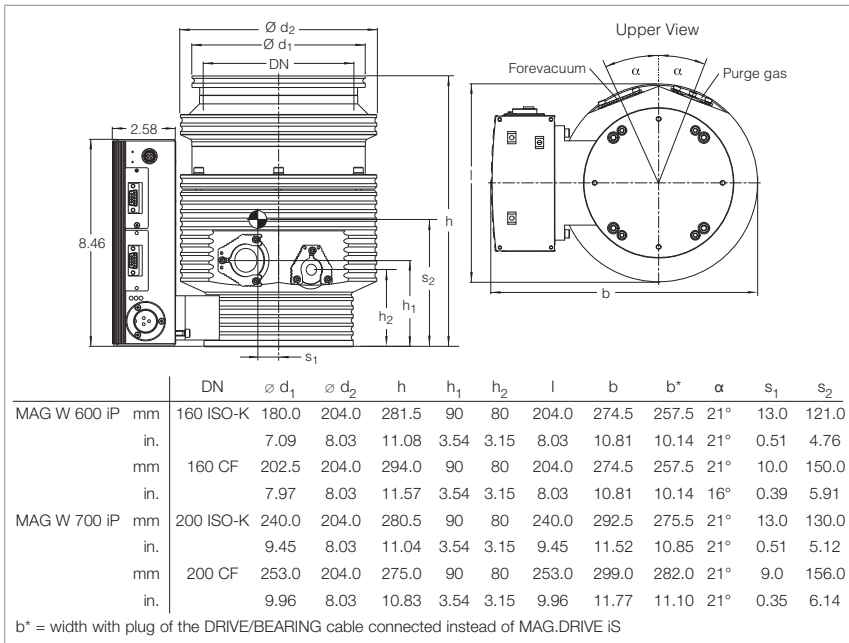


Typical Applications

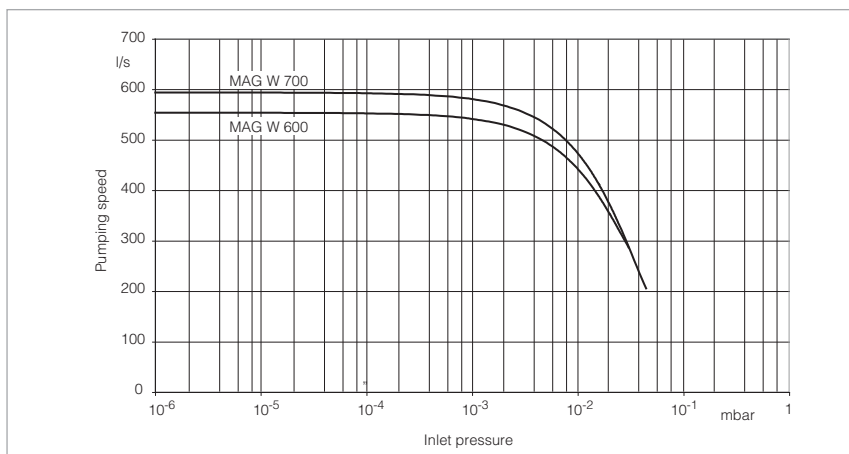
- Gas analysis systems
- Particle accelerators
- Electron microscopes
- Research
- Coating systems

Technical Features

- Installation in any orientation
- DN 160 or 200 ISO-K and/or CF high vacuum connection
- DN 25 KF with clamped forevacuum connection
- Purge gas/venting connection DN 16 KF with clamped connection (purge/vent)
- Water or air cooling optional
- CE and RoHS compliant; fulfilment of UL requirements
- 2 slots for industrial communications modules
 - Standard 9 pin 24 V SPS PLC-IO in Control Slot
 - RS 232 C in Service Slot
 - further interfaces can be fitted: Ethernet, Profibus, DeviceNet, RS 485 C



Dimensional drawing for the TURBOVAC MAG W 600/700 iP



Pumping speed for N₂ of the TURBOVAC MAG W 600/700 iP as a function of the inlet pressure

Advantages to the User

- Highest pumping speed from the smallest possible size
- New standard regarding maintenance free systems
- Suitability for vibration sensitive applications in the area of analytical engineering, thin-film technology, electron microscopes, research, development among others
- Flexibility due to the modular concept; the converter is optionally also available by way of a bench top unit

TURBOVAC MAG

Technical Data

W 600 iP

W 700 iP

Inlet flange	DN	160 ISO-K	160 CF	200 ISO-K	200 CF
Pumping speed					
N ₂	l x s ⁻¹	550	550	590	590
Ar	l x s ⁻¹	520	520	540	540
He	l x s ⁻¹	570	570	600	600
H ₂	l x s ⁻¹	410	410	430	430
Operating speed	min ⁻¹	48 000	48 000	48 000	48 000
Compression ratio					
N ₂		1.6 x 10 ¹⁰	1.6 x 10 ¹⁰	1.6 x 10 ¹⁰	1.6 x 10 ¹⁰
H ₂		3.4 x 10 ⁴	3.4 x 10 ⁴	3.4 x 10 ⁴	3.4 x 10 ⁴
He		1.7 x 10 ⁶	1.7 x 10 ⁶	1.7 x 10 ⁶	1.7 x 10 ⁶
Ultimate pressure	mbar (Torr)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)
Max. degassing temperature	°C (°F)	–	80 (176)	–	80 (176)
Max. foreline pressure for N ₂	mbar (Torr)	6.0 (4.5)	6.0 (4.5)	6.0 (4.5)	6.0 (4.5)
Recommended backing pump		TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B
Run-up time	min	< 6	< 6	< 6	< 6
Foreline flange (clamped)	DN	25 KF	25 KF	25 KF	25 KF
Purge / vent port (clamped)	DN	16 KF	16 KF	16 KF	16 KF
Water cooling connection (optional)	G	1/8"	1/8"	1/8"	1/8"
Weight, approx.	kg (lbs)	17 (37.5)	17 (37.5)	17 (37.5)	17 (37.5)



Integrated Frequency Converter TURBO.DRIVE iS

Technical Data

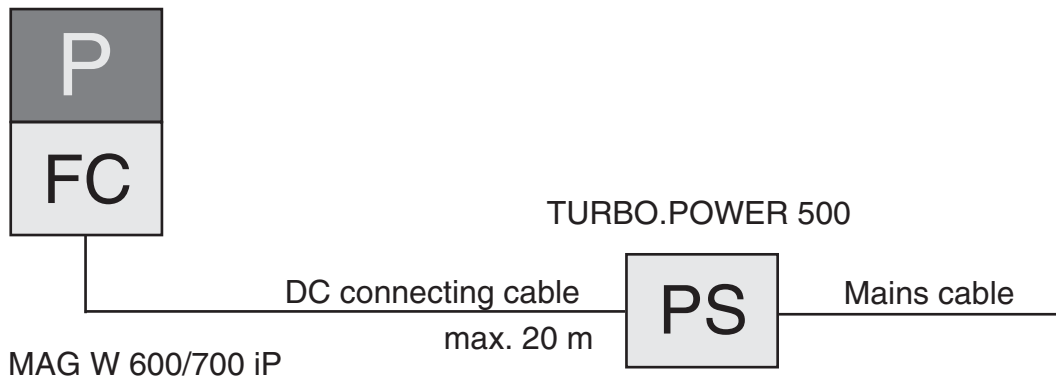
Power supply	V	48	48	48	48
Ripple	%	< 2	< 2	< 2	< 2
Power consumption					
Maximum	W	400	400	400	400
at ultimate pressure	W	259	259	259	259
DC current consumption, max.	A	7.5 to 9.3	7.5 to 9.3	7.5 to 9.3	7.5 to 9.3
DC power supply voltage range	V	43 to 53	43 to 53	43 to 53	43 to 53
Length of the DC connection cable, max.					
at 3 x 1.5 mm ²	m (ft)	5 (17.5)	5 (17.5)	5 (17.5)	5 (17.5)
at 3 x 2.5 mm ²	m (ft)	20 (70.0)	20 (70.0)	20 (70.0)	20 (70.0)
Contact rating for the relays, max.		32 V; 0,5 A	32 V; 0,5 A	32 V; 0,5 A	32 V; 0,5 A
Permissible ambient temperature during operation	°C	+10 to +40	+10 to +40	+10 to +40	+10 to +40
	(°F)	(+50 to +104)	(+50 to +104)	(+50 to +104)	(+50 to +104)
during storage	°C	0 to +60	0 to +60	0 to +60	0 to +60
	(°F)	(0 to +140)	(0 to +140)	(0 to +140)	(0 to +140)
Relative humidity of the air, non-condensing	%	5 to 85	5 to 85	5 to 85	5 to 85
Protection class	IP	30	30	30	30
Overvoltage category		II	II	II	II
Pollution category		2	2	2	2

Ordering Information

TURBOVAC MAG W 600/700 iP

TURBOVAC MAG W 600 iP with Integrated Frequency Converter and Seal Gas Connection	P FC	Part No.	
DN 160 ISO-K DN 160 CF		410600V0505 410600V0506	
TURBOVAC MAG W 700 iP with Integrated Frequency Converter and Seal Gas Connection	P FC		
DN 200 ISO-K DN 200 CF		410700V0505 410700V0506	
Mandatory Accessories		P FC	
Power supply TURBO.POWER 500		410300V0221	
DC cable frequency converter - power supply 1 m (3.5 ft) 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft)		410300V2001 410300V2003 410300V2005 410300V2010 410300V2020	
Mains cable, 3 m (10.5 ft) with EURO plug with US plug 5-15 P		800102V0002 800102V1002	
Forevacuum pump TRIVAC D 2,5 E 220-240 V, 50 Hz; 230 V, 60 Hz; earthed plug, EURO version 110-120 V, 50/60 Hz; NEMA plug, US version		140 000 140 002	
TRIVAC D 8 B 1 phase motor; 230 V, 50/60 Hz 3 phase motor; 230/400 V, 50 Hz; 250/440 V, 60 Hz		112 55 112 56	

With integrated Frequency Converter



Ordering Information

TURBOVAC MAG W 600/700 iP

Accessories, optional	P	Part No.
Inlet screen		
DN 160 ISO-K		E 200 00 307
DN 160 CF		200 17 247
DN 200 ISO-K		200 91 639
DN 200 CF		400 001 515
Flange heater		
160 CF, 230 V, 50 Hz		854 37
160 CF, 115 V, 60 Hz		854 38
Water cooling unit		410600V0101
Air cooling unit		410600V0102
START/STOP switch for manual operation of the turbomolecular pump		152 48
DC plug		800 001 694
Solenoid venting valve, normally closed		
24 V DC, DN 16 KF		800120V0011
Power failure venting valve, normally open		800120V0021
Included in the Delivery of the Pump	P	
Flanges for forevacuum, venting and purge gas are blank-flanged		
Centering ring with FPM sealing ring and a clamping yoke		

Magnetic Rotor Suspension with separate Frequency Converter, without Compound-Stage

TURBOVAC MAG 1500 CT

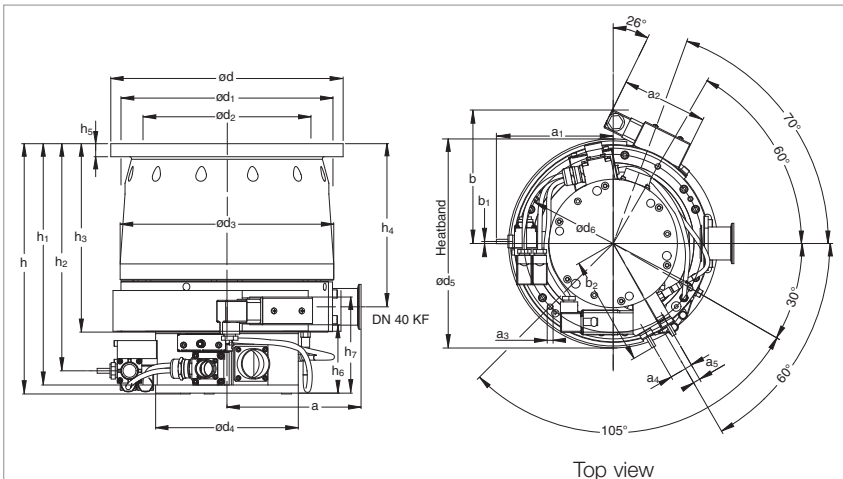


Typical Applications

- All major semiconductor processes such as Etch, CVD, PVD and Ion Implantation
- Load lock and transfer chambers

Technical Features

- Active 5-axis magnetic bearing system
- Patented KEPLA-COAT® for rotor and stator to prevent corrosion
- Low noise and vibration levels
- Installation in any orientation
- Advanced rotor design for high throughput
- Integrated purge gas system
- Integrated temperature management system (TMS)
- Bearing and temperature system are controlled digitally
- Intelligent power control system



Top view

		a	a ₁	a ₂	a ₃	a ₄	a ₅	b	b ₁	b ₂	d	d ₁	d ₂
200 ISO-F	mm	164.5	159	116.5	M8 x 15	32	9	182	3	150	285	260	213
	in.	6.48	6.26	4.59	M8 x 0.6	1.26	0.35	7.17	0.12	5.91	11.22	10.24	8.39
250 ISO-F	mm	164.5	159	116.5	M8 x 15	32	9	182	3	150	335	310	213
	in.	6.48	6.26	4.59	M8 x 0.6	1.26	0.35	7.17	0.12	5.91	11.22	12.20	10.28
		d ₃	d ₄	d ₅	d ₆	h	h ₁	h ₂	h ₃	h ₄	h ₅	h ₆	h ₇
200 ISO-F	mm	262	175	285	243	307	296	279	231	200	16	84	16
	in.	10.31	6.89	11.22	9.57	12.09	11.65	10.98	9.09	7.87	0.63	3.31	0.63
250 ISO-F	mm	262	175	285	243	307	296	279	231	200	16	84	16
	in.	10.31	6.89	11.22	9.57	12.09	11.65	10.98	9.09	7.87	0.63	3.31	0.63

Dimensional drawing for the TURBOVAC MAG 1500 CT

Advantages to the User

- Maintenance-free
- High throughput for all process gases
- High pumping speed at low pressure
- High foreline pressure tolerance: up to 1.7 mbar (1.3 Torr)
- High resistance against corrosive gases
- Robust against particles and deposits
- Temperature control up to 90 °C (194 °F) to avoid condensation
- Lowest weight and size in its class
- Application specific design

Technical Data

TURBOVAC MAG 1500 CT

Inlet flange	DN	200 ISO-F	250 ISO-F
Pumping speed according to PNEUROP			
N ₂	l x s ⁻¹	1100	1220
Ar	l x s ⁻¹	1150	1180
He	l x s ⁻¹	1050	1250
H ₂	l x s ⁻¹	980	1080
Operating speed	min ⁻¹	36 000	36 000
Compression ratio			
N ₂		> 10 ⁸	> 10 ⁸
Ultimate pressure according to DIN 28 400			
	mbar (Torr)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)
Max. foreline pressure for N ₂	mbar (Torr)	1.7 (1.3)	1.7 (1.3)
Recommended backing pump			
Rotary vane pump or dry compressing pump offering a pumping speed of 100 m ³ /h		TRIVAC D 65 BCS	TRIVAC D 65 BCS
Run-up time	min	< 6	< 6
Foreline flange	DN	40 KF	40 KF
Purge / vent port	VCR	1/4"	1/4"
Cooling water connection			
(OD of tube)	mm (in.)	6.4 (0.25)	6.4 (0.25)
Weight, approx.	kg (lbs)	32 (70.6)	32 (70.6)



Technical Data

MAG.DRIVE digital

Mains connection, 50/60 Hz	V	200 - 240, +10 %/-15 %
Current for connected consumers max.	A	20
Max. motor voltage	V	60
Nominal frequency	Hz	50/60
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Dimensions (W x H x D)	mm (in.)	483 x 213 x 1/2 19" (19.02 x 8.39 x 1/2 19")
Weight, approx.	kg (lbs)	10 (22)

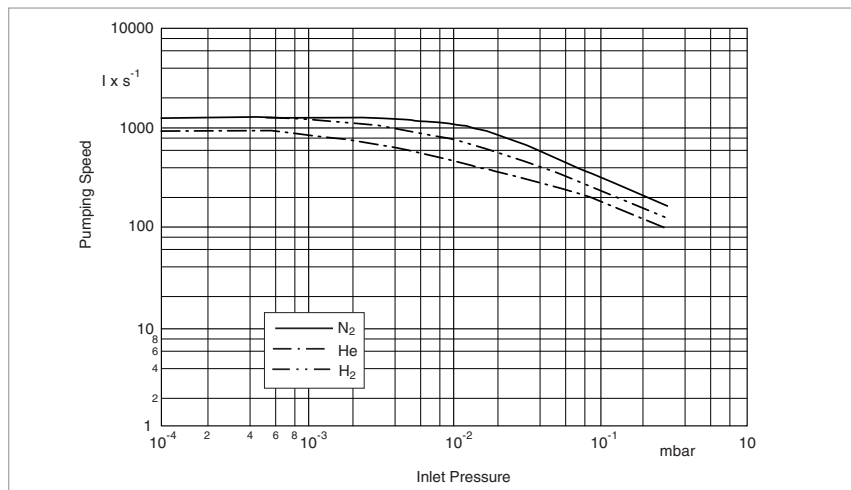
Ordering Information

TURBOVAC MAG 1500 CT

TURBOVAC MAG 1500 CT with separate Frequency Converter without Compound Stage	<div style="border: 1px solid black; padding: 2px; display: inline-block;">P</div>	Part No.	
DN 200 ISO-F DN 250 ISO-F		400020V0002 400021V0002	
Mandatory Accessories		<div style="border: 1px solid black; padding: 2px; display: inline-block;">P FC</div>	
Electronic frequency converter ¹⁾ MAG.DRIVE digital MAG.DRIVE digital, Profibus MAG.DRIVE digital, RS 232 C interface		400035V0011 400035V0013 400035V0014	
Connecting cable converter – pump ²⁾ 1.5 m (5.25 ft) DRIVE/BEARING 1.5 m (5.25 ft) TMS 3.0 m (10.5 ft) DRIVE/BEARING 3.0 m (10.5 ft) TMS 5.0 m (17.5 ft) DRIVE/BEARING 5.0 m (17.5 ft) TMS 10.0 m (35.0 ft) DRIVE/BEARING 10.0 m (35.0 ft) TMS 20.0 m (70.0 ft) DRIVE/BEARING 20.0 m (70.0 ft) TMS		400036V0001 400037V0001 400036V0008 400037V0008 400036V0004 400037V0004 400036V0002 400037V0002 400036V0003 400037V0003	
Plug-in control		121 36	
Forevacuum pump TRIVAC D 65 B 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz 3 phase motor; 208-23/460 V, 60 Hz / 200-220/380 V, 60 Hz		113 98 913 98-2	
For further types, see our Full Line Catalog			

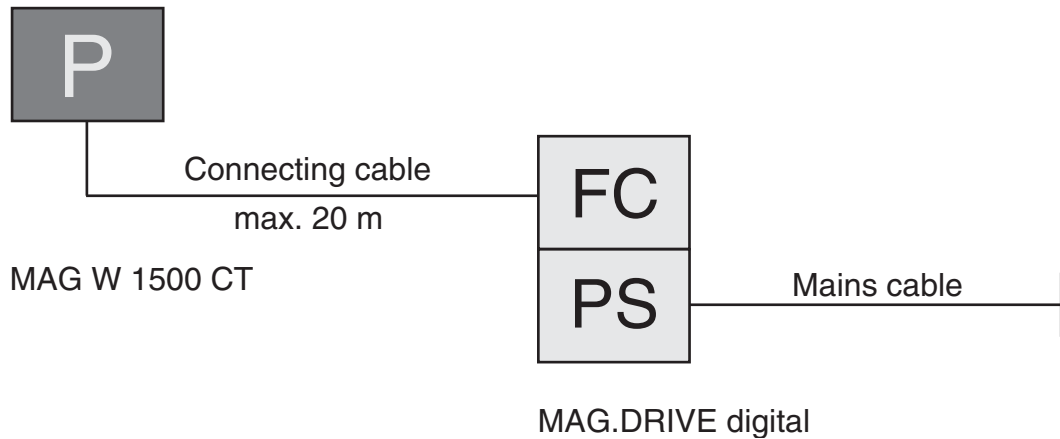
¹⁾ Included are 2 mains cords. One with EURO plug and one with US plug (220 V AC). Replacement mains cord are Part Numbers 180 097 or 180 096 respectively

²⁾ Further connecting cables can be found under MAG.DRIVE digital in the section "Turbomolecular Pumps with Magnetic Rotor Suspension", para. "Electronic Frequency Converters"



Pumping speed of the TURBOVAC MAG 1500 C/CT as a function of the inlet pressure

With separate Frequency Converter



Ordering Information

TURBOVAC MAG 1500 CT

Accessories, optional	P	Part No.
Seal kit DN 250 metal		200 07 901
Included in the Delivery of the Pump	P	
Inlet screen DN 200 ISO-F DN 250 ISO-F		200 07 470 E 200 07 471
Integrated purge gas system VRC nut 1/4"		
Integrated temperature management system		
Intelligent power control system		
Cooling water connection Swagelock 1/4" tube		
Included in the Delivery of the Frequency Converter	FC	
Mains cord, 3 m (10.5 ft.) long, approx. with EURO or US plug		

Magnetic Rotor Suspension with separate Frequency Converter, with Compound Stage

TURBOVAC MAG W 300/400 P

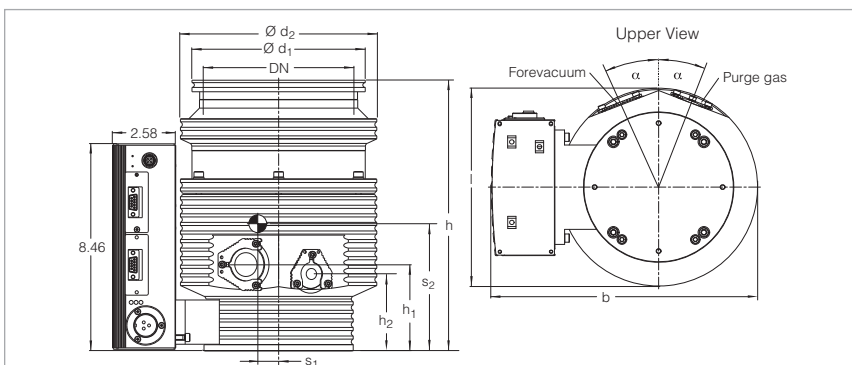


Typical Applications

- Gas analysis systems
- Particle accelerators
- Electron microscopes
- Research
- Coating systems

Technical Features

- Installation in any orientation
- DN 100 or 160 ISO-K and/or CF high vacuum connection
- DN 16 KF with clamped forevacuum connection
- Purge gas/venting connection DN 16 KF with clamped connection (purge/vent)
- Water or air cooling optional
- CE and RoHS compliant; fulfilment of UL requirements



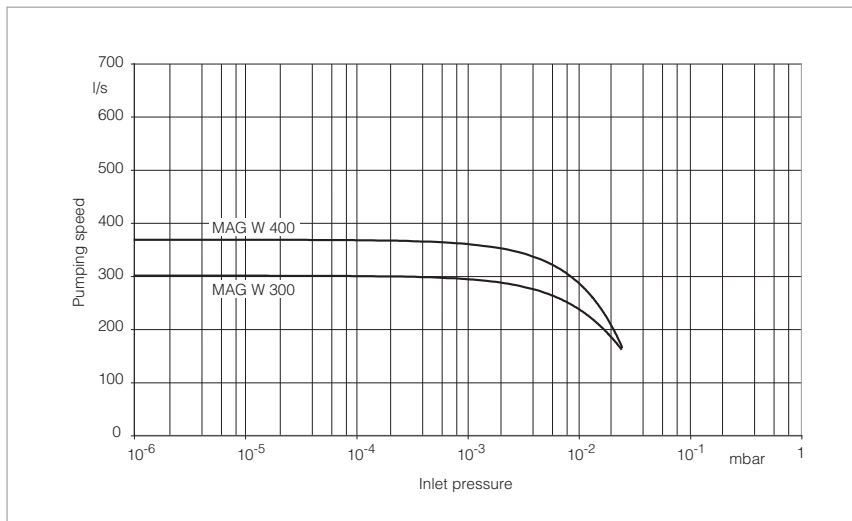
	DN	$\varnothing d_1$	$\varnothing d_2$	h	h_1	h_2	l	b	b^*	α	s_1	s_2
MAG W 300 P	100 ISO-K	130,0	155,0	250,0	77,7	70,0	156,0	250,0	233,0	16°	19,0	103,0
	100 CF	151,5	155,0	264,3	77,7	70,0	156,0	250,0	233,0	16°	15,0	129,0
MAG W 400 P	160 ISO-K	180,0	155,0	241,0	77,7	70,0	168,5	262,5	245,5	16°	19,0	106,0
	160 CF	202,5	155,0	234,7	77,7	70,0	181,2	273,7	256,7	16°	14,0	129,0

b^* = width with plug of the DRIVE/BEARING cable connected instead of MAG.DRIVE iS

Dimensional drawing for the TURBOVAC MAG W 300/400 P

Advantages to the User

- Highest pumping speed from the smallest possible size
- New standard regarding maintenance free systems
- Suitability for vibration sensitive applications in the area of analytical engineering, thin-film technology, electron microscopes, research, development among others
- Flexibility due to the modular concept; alternatively the pump is available also with an integrated frequency converter



Pumping speed for N_2 of the TURBOVAC MAG W 300/400 P as a function of the inlet pressure

TURBOVAC MAG

Technical Data

W 300 P

W 400 P

Inlet flange	DN	100 ISO-K	100 CF	160 ISO-K	160 CF
Pumping speed					
N ₂	l x s ⁻¹	300	300	365	365
Ar	l x s ⁻¹	260	260	330	330
He	l x s ⁻¹	260	260	280	280
H ₂	l x s ⁻¹	190	190	200	200
Operating speed	min ⁻¹	58 800	58 800	58 800	58 800
Compression ratio					
N ₂		1.0 x 10 ¹⁰	1.0 x 10 ¹⁰	1.0 x 10 ¹⁰	1.0 x 10 ¹⁰
H ₂		3.2 x 10 ³	3.2 x 10 ³	3.2 x 10 ³	3.2 x 10 ³
He		9.2 x 10 ⁴	9.2 x 10 ⁴	9.2 x 10 ⁴	9.2 x 10 ⁴
Ultimate pressure	mbar (Torr)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)
Max. degassing temperature	°C (°F)	–	80 (176)	–	80 (176)
Max. foreline pressure for N ₂	mbar (Torr)	8 (6)	8 (6)	8 (6)	8 (6)
Recommended backing pump		TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B
Run-up time	min	< 5	< 5	< 5	< 5
Foreline flange (clamped)	DN	16 KF	16 KF	16 KF	16 KF
Purge / vent port (clamped)	DN	16 KF	16 KF	16 KF	16 KF
Water cooling connection (optional)	G	1/8"	1/8"	1/8"	1/8"
Weight, approx.	kg (lbs)	12 (26)	12 (26)	12 (26)	12 (26)



Technical Data

MAG.DRIVE S

Voltage range	V	100 - 240, ±10 %
Nominal frequency	Hz	50 / 60
Power consumption		
Stand-by	W	100
Maximum	W	400
Max. motor voltage	V	48
Max. pump current	A	6
Fuses F1, F2 5 x 20 mm		10 A fast blow high breaking capacity 250 V
System fuse		L or G characteristic
Max. Frequency	Hz	0 to 2000
Load capability, relay output X1	V / A	32 / 0,5
Temperature		
during operation	°C (°F)	0 to +45 (+32 to +113)
during storage	°C (°F)	-10 to +60 (+14 to +140)
Relative humidity of the air	%	95 (non-condensing)

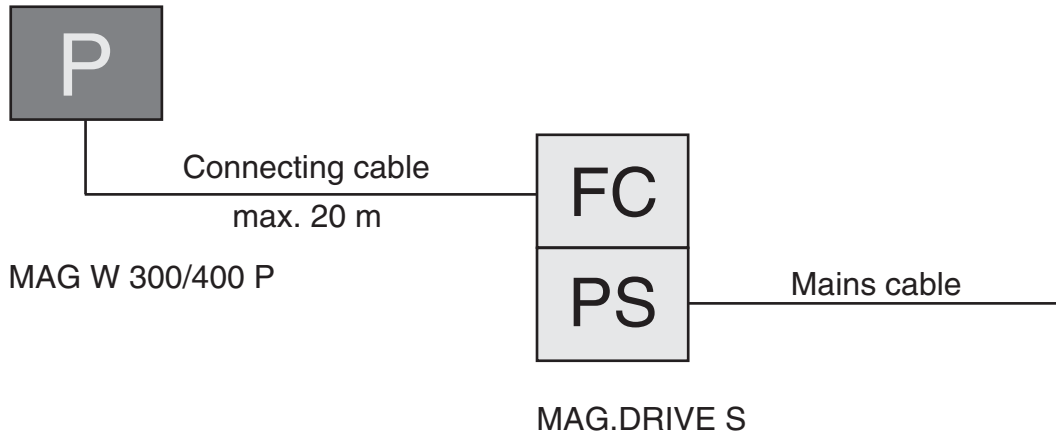
Ordering Information

TURBOVAC MAG W 300/400 P

TURBOVAC MAG W 300 P with separate Frequency Converter and Compound Stage	P	Part No.		
DN 100 ISO-K DN 100 CF		410300V0005 410300V0006		
TURBOVAC MAG W 400 P with separate Frequency Converter and Compound Stage	P			
DN 160 ISO-K DN 160 CF		410400V0005 410400V0006		
Mandatory Accessories		P	FC	
Electronic frequency converter MAG.DRIVE S MAG.DRIVE S with display		410300V0202 410300V0212		
Connecting cable DRIVE/BEARING (connection between pump and MAG.DRIVE S) 3.0 m (10.5 ft) 5.0 m (17.5 ft) 10.0 m (35.0 ft) 20.0 m (70.0 ft) ¹⁾		410300V4003 410300V4005 410300V4010 410300V4020		
Mains cable 3.0 m (10.5 ft) EURO plug US plug (220 V AC) 2.0 m (7.5 ft) US plug 115 V AC		800102V0002 800102V1002 992 76 513		
Forevacuum pump TRIVAC D 2,5 E 220-240 V, 50 Hz; 230 V, 60 Hz; earthed plug, EURO version 110-120 V, 50/60 Hz; NEMA plug, US version		140 000 140 002		
TRIVAC D 8 B 1 phase motor; 230 V, 50/60 Hz 3 phase motor; 230/400 V, 50 Hz; 250/440 V, 60 Hz		112 55 112 56		

¹⁾ Suited for operating the MAG W 300/400 only

With separate Frequency Converter



Ordering Information

TURBOVAC MAG W 300/400 P

Accessories, optional	P	Part No.
Inlet screen		
DN 100 ISO-K		
coarse (3.2 x 3.2 mm (0.13 x 0.13 in.))		800132V0101
fine (1.6 x 1.6 mm (0.06 x 0.06 in.))		800132V0102
DN 100 CF		
coarse (3.2 x 3.2 mm (0.13 x 0.13 in.))		200 91 514
fine (1.6 x 1.6 mm (0.06 x 0.06 in.))		E 200 17 195
DN 160 ISO-K		E 200 00 307
DN 160 CF		200 17 247
Flange heater		
100 CF, 230 V, 50 Hz		854 27
100 CF, 115 V, 60 Hz		854 28
160 CF, 230 V, 50 Hz		854 37
160 CF, 115 V, 60 Hz		854 38
Water cooling unit		410300V0101
Air cooling unit		410300V0102
Solenoid venting valve, normally closed		
24 V DC, DN 16 KF		800120V0011
Power failure venting valve, normally open		800120V0021
Included in the Delivery of the Pump	P	
Flanges for forevacuum, venting and purge gas are blank-flanged		
Centering ring with FPM sealing ring and a clamping yoke		

Magnetic Rotor Suspension with separate Frequency Converter, with Compound Stage

TURBOVAC MAG W 600/700 P

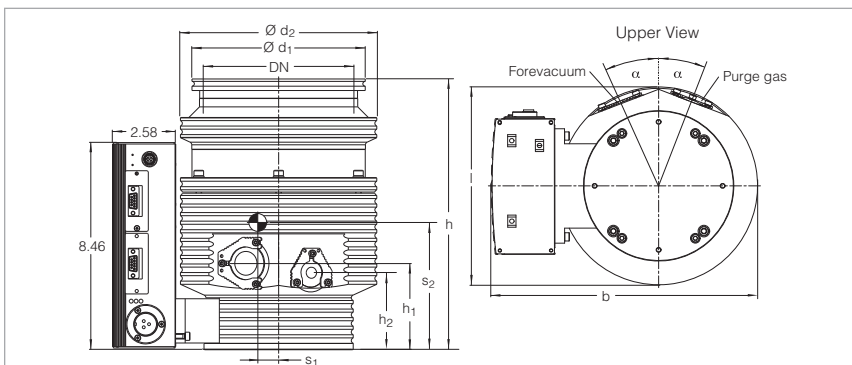


Typical Applications

- Gas analysis systems
- Particle accelerators
- Electron microscopes
- Research
- Coating systems

Technical Features

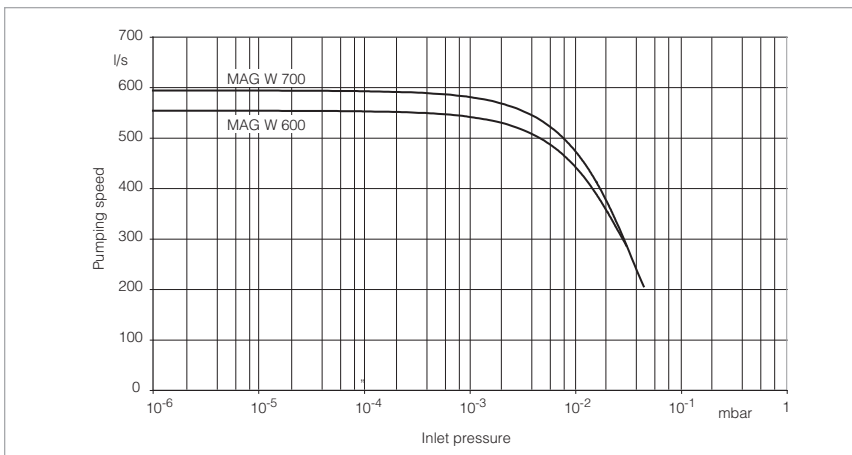
- Installation in any orientation
- DN 160 or 200 ISO-K and/or CF high vacuum connection
- DN 25 KF with clamped forevacuum connection
- Purge gas/venting connection DN 16 KF with clamped connection (purge/vent)
- Water or air cooling optional
- CE and RoHS compliant; fulfilment of UL requirements



		DN	ø d ₁	ø d ₂	h	h ₁	h ₂	l	b	b*	α	s ₁	s ₂
MAG W 600 P	mm	160 ISO-K	180.0	204.0	281.5	90	80	204.0	274.5	257.5	21°	13.0	121.0
			7.09	8.03	11.08	3.54	3.15	8.03	10.81	10.14	21°	0.51	4.76
	in.	160 CF	202.5	204.0	294.0	90	80	204.0	274.5	257.5	21°	10.0	150.0
			7.97	8.03	11.57	3.54	3.15	8.03	10.81	10.14	16°	0.39	5.91
MAG W 700 P	mm	200 ISO-K	240.0	204.0	280.5	90	80	240.0	292.5	275.5	21°	13.0	130.0
			9.45	8.03	11.04	3.54	3.15	9.45	11.52	10.85	21°	0.51	5.12
	mm	200 CF	253.0	204.0	275.0	90	80	253.0	299.0	282.0	21°	9.0	156.0
			9.96	8.03	10.83	3.54	3.15	9.96	11.77	11.10	21°	0.35	6.14

b* = width with plug of the DRIVE/BEARING cable connected instead of MAG.DRIVE IS

Dimensional drawing for the TURBOVAC MAG W 600/700 P



Pumping speed for N₂ of the TURBOVAC MAG W 600/700 P as a function of the inlet pressure

Advantages to the User

- Highest pumping speed from the smallest possible size
- New standard regarding maintenance free systems
- Suitability for vibration sensitive applications in the area of analytical engineering, thin-film technology, electron microscopes, research, development among others
- Flexibility due to the modular concept; alternatively the pump is available also with an integrated frequency converter

TURBOVAC MAG

Technical Data

W 600 P

W 700 P

Inlet flange	DN	160 ISO-K	160 CF	200 ISO-K	200 CF
Pumping speed					
N ₂	l x s ⁻¹	550	550	590	590
Ar	l x s ⁻¹	520	520	540	540
He	l x s ⁻¹	570	570	600	600
H ₂	l x s ⁻¹	410	410	430	430
Operating speed	min⁻¹	48 000	48 000	48 000	48 000
Compression ratio					
N ₂		1.6 x 10 ¹⁰	1.6 x 10 ¹⁰	1.6 x 10 ¹⁰	1.6 x 10 ¹⁰
H ₂		3.4 x 10 ⁴	3.4 x 10 ⁴	3.4 x 10 ⁴	3.4 x 10 ⁴
He		1.7 x 10 ⁶	1.7 x 10 ⁶	1.7 x 10 ⁶	1.7 x 10 ⁶
Ultimate pressure	mbar (Torr)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)
Max. degassing temperature	°C (°F)	–	80 (176)	–	80 (176)
Max. foreline pressure for N₂	mbar (Torr)	6.0 (4.5)	6.0 (4.5)	6.0 (4.5)	6.0 (4.5)
Recommended backing pump		TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B	TRIVAC D 2,5 E TRIVAC D 8 B
Run-up time	min	< 6	< 6	< 6	< 6
Foreline flange (clamped)	DN	25 KF	25 KF	25 KF	25 KF
Purge / vent port (clamped)	DN	16 KF	16 KF	16 KF	16 KF
Water cooling connection (optional)	G	1/8"	1/8"	1/8"	1/8"
Weight, approx.	kg (lbs)	17 (37.5)	17 (37.5)	17 (37.5)	17 (37.5)



Technical Data

MAG.DRIVE S

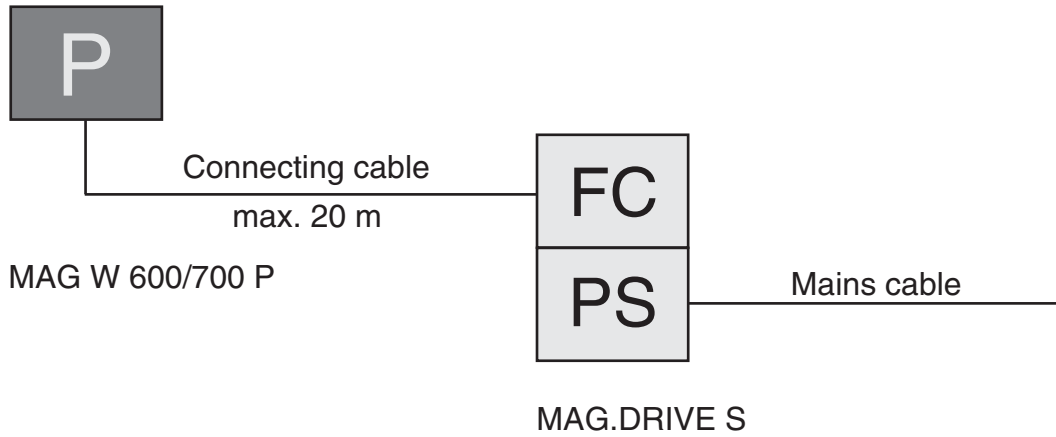
Voltage range	V	100 - 240, ±10 %
Nominal frequency	Hz	50 / 60
Power consumption		
Stand-by	W	100
Maximum	W	400
Max. motor voltage	V	48
Max. pump current	A	6
Fuses F1, F2 5 x 20 mm		10 A fast blow high breaking capacity 250 V
System fuse		L or G characteristic
Max. Frequency	Hz	0 to 2000
Load capability, relay output X1	V / A	32 / 0,5
Temperature		
during operation	°C (°F)	0 to +45 (+32 to +113)
during storage	°C (°F)	-10 to +60 (+14 to +140)
Relative humidity of the air	%	95 (non-condensing)

Ordering Information

TURBOVAC MAG W 600/700 P

TURBOVAC MAG W 600 P with separate Frequency Converter and Compound Stage	P	Part No.	
DN 160 ISO-K DN 160 CF		410600V0005 410600V0006	
TURBOVAC MAG W 700 P with separate Frequency Converter and Compound Stage	P		
DN 200 ISO-K DN 200 CF		410700V0005 410700V0006	
Mandatory Accessories		P	FC
Electronic frequency converter MAG.DRIVE S MAG.DRIVE S with display		410300V0202 410300V0212	
Connecting cable DRIVE/BEARING (connection between pump and MAG.DRIVE S) 3.0 m (10.5 ft) 5.0 m (17.5 ft) 10.0 m (35.0 ft)		410300V4003 410300V4005 410300V4010	
Mains cable 3.0 m (10.5 ft) EURO plug US plug (220 V AC) 2.0 m (7.5 ft) US plug 115 V AC		800102V0002 800102V1002 992 76 513	
Forevacuum pump TRIVAC D 2,5 E 220-240 V, 50 Hz; 230 V, 60 Hz; earthed plug, EURO version 110-120 V, 50/60 Hz; NEMA plug, US version		140 000 140 002	
TRIVAC D 8 B 1 phase motor; 230 V, 50/60 Hz 3 phase motor; 230/400 V, 50 Hz; 250/440 V, 60 Hz		112 55 112 56	

With separate Frequency Converter



Ordering Information

TURBOVAC MAG W 600/700 P

Accessories, optional	P	Part No.
Inlet screen		
DN 160 ISO-K		E 200 00 307
DN 160 CF		200 17 247
DN 200 ISO-K		200 91 639
DN 200 CF		400 001 515
Flange heater		
160 CF, 230 V, 50 Hz		854 37
160 CF, 115 V, 60 Hz		854 38
Water cooling unit		410600V0101
Air cooling unit		410600V0102
Solenoid venting valve, normally closed		
24 V DC, DN 16 KF		800120V0011
Power failure venting valve, normally open		800120V0021
Included in the Delivery of the Pump	P	
Flanges for forevacuum, venting and purge gas are blank-flanged		
Centering ring with FPM sealing ring and a clamping yoke		

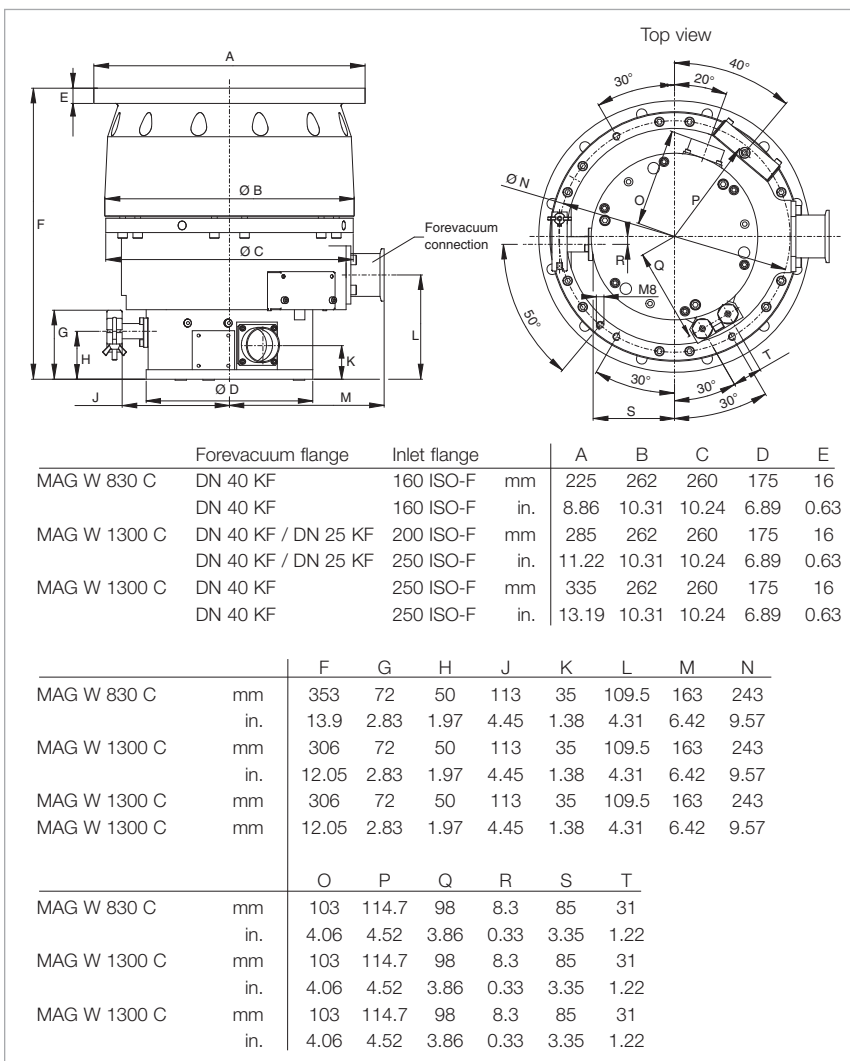
Magnetic Rotor Suspension with separate Frequency Converter, with Compound Stage

TURBOVAC MAG W 830/1300 C



Typical Applications

- Semiconductor processes, like PVD and ion implantation
- Transfer chambers
- Particle accelerators
- Research
- Coating systems



Dimensional drawing for the TURBOVAC MAG W 830/1300 C

Technical Features

- Active 5-axis magnetic bearing system
- Digital monitoring of the bearing system
- Low noise and vibration levels
- Installation in any orientation
- Advanced rotor design for high throughput
- Purge gas connection
- Intelligent power control system

Advantages to the User

- Maintenance-free
- High throughput for all process gases
- High pumping speed at low pressure
- High foreline pressure tolerance: up to 2 mbar (1.5 Torr)
- Lowest weight and size in its class
- Application specific design

Technical Data

TURBOVAC MAG

		W 830	W 830 C	W 1300	W 1300 C	
Inlet flange	DN	160 CF	160 ISO-F	200 CF	200 ISO-F	250 ISO-F
Pumping speed according to PNEUROP						
N ₂	l x s ⁻¹	900	700	1170	1100	1220
Ar	l x s ⁻¹	750	650	1100	1050	1180
He	l x s ⁻¹	900	500	1150	1100	1200
H ₂	l x s ⁻¹	740	350	920	920	1020
Operating speed	min ⁻¹	36000	24000	36000	36000	36000
Compression ratio						
N ₂		1.5 x 10 ⁸	> 5 x 10 ⁷	1.5 x 10 ⁸	> 10 ⁸	> 10 ⁸
Ultimate pressure according to DIN 28 400						
mbar		< 1 x 10 ⁻¹⁰	< 10 ⁻⁸	< 1 x 10 ⁻¹⁰	< 10 ⁻⁸	< 10 ⁻⁸
(Torr)		(< 0.75 x 10 ⁻¹⁰)	(< 0.75 x 10 ⁻⁸)	(< 0.75 x 10 ⁻¹⁰)	(< 0.75 x 10 ⁻⁸)	(< 0.75 x 10 ⁻⁸)
Max. foreline pressure for N ₂						
with convection cooling	mbar (Torr)	0.2 (0.15)	–	0.2 (0.15)	–	–
with water cooling	mbar (Torr)	2.0 (1.5)	2.0 (1.5)	2.0 (1.5)	2.0 (1.5)	2.0 (1.5)
Recommended backing pump						
Rotary vane pump		TRIVAC D 65 BCS	TRIVAC D 65 BCS	TRIVAC D 65 BCS	TRIVAC D 65 BCS	TRIVAC D 65 BCS
or dry compressing pump						
offering a pumping speed of 100 m ³ /h						
Run-up time	min	< 6	< 4	< 6	< 6	< 6
Foreline flange	DN	40 KF	40 KF	40 KF	40 KF	40 KF
Purge and vent port	DN	10 KF / 16 KF	10 KF / 16 KF	10 KF / 16 KF	10 KF / 16 KF	10 KF / 16 KF
Cooling water connection						
(OD of tube)	mm (in.)	1/4"	1/4"	1/4"	6	6
Weight, approx.	kg (lbs)	35 (77.3)	32 (70.6)	35 (77.3)	32 (70.6)	32 (70.6)



Technical Data

MAG.DRIVE digital

Mains connection, 50/60 Hz	V	200 - 240, +10 %/-15 %
Current for connected consumers		
max.	A	20
Max. motor voltage	V	60
Nominal frequency	Hz	50/60
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Dimensions (W x H x D)	mm (in.)	483 x 213 x 1/2 19" (19.02 x 8.39 x 1/2 19")
Weight, approx.	kg (lbs)	10 (22)

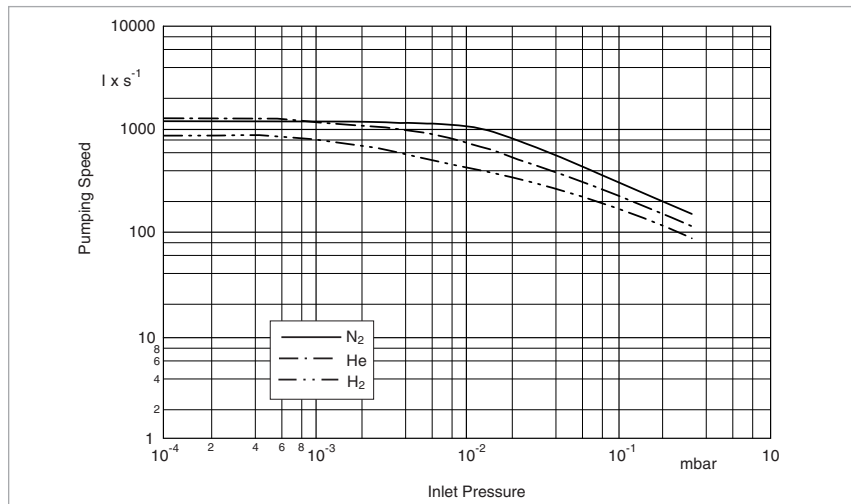
Ordering Information

TURBOVAC MAG W 830 (C) / W 1300 (C)

TURBOVAC MAG W 830 (C) with separate Frequency Converter and Compound Stage	P	Part No.	
DN 160 CF (MAG W 830) DN 160 ISO-F (MAG W 830 C)		400100V0041 400100V0005	
TURBOVAC MAG W 1300 (C) with separate Frequency Converter and Compound Stage	P		
DN 200 CF (MAG W 1300) DN 200 ISO-F (MAG W 1300 C) DN 250 ISO-F (MAG W 1300 C)		400110V0051 400110V0011 400110V0021	
Mandatory Accessories	P FC		
Electronic frequency converter ¹⁾ MAG.DRIVE digital MAG.DRIVE digital, Profibus MAG.DRIVE digital, RS 232 C interface		400035V0011 400035V0013 400035V0014	
Plug-in control		121 36	
Connecting cable converter – pump ²⁾ 1.5 m (5.25 ft) DRIVE/BEARING 3.0 m (10.5 ft) DRIVE/BEARING 5.0 m (17.5 ft) DRIVE/BEARING 10.0 m (35.0 ft) DRIVE/BEARING 20.0 m (70.0 ft) DRIVE/BEARING		400036V0001 400036V0008 400036V0004 400036V0002 400036V0003	
Forevacuum pump TRIVAC D 65 B 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz 3 phase motor; 208-23/460 V, 60 Hz / 200-220/380 V, 60 Hz		113 98 913 98-2	
For further types, see our Full Line Catalog			

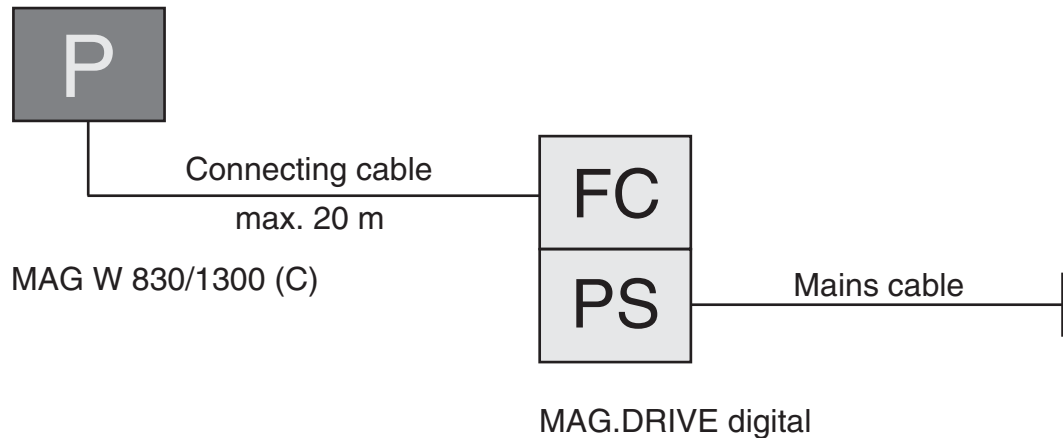
¹⁾ Included are 2 mains cords. One with EURO plug and one with US plug (220 V AC).
Replacement mains cord are Part Numbers 180 097 or 180 096 respectively

²⁾ Further connecting cables can be found under MAG.DRIVE digital in the section
"Turbomolecular Pumps with Magnetic Rotor Suspension",
para. "Electronic Frequency Converters"



Pumping speed of the TURBOVAC MAG W 1300 C (DN 250) as a function of the inlet pressure

With separate Frequency Converter



Ordering Information

TURBOVAC MAG W 830 (C) / W 1300 (C)

Accessories, optional	P	Part No.
Purge gas and venting valve		121 33
Connecting cable for optional purge gas valve (pump/converter)		
1.5 m (5.25 ft)		400038V0007
3.0 m (10.5 ft)		400038V0006
10.0 m (35.0 ft)		400038V0002
20.0 m (70.0 ft)		400038V0009
Included in the Delivery of the Pump	P	
Inlet screen		
DN 160 ISO-F		E 200 00 307
DN 160 CF		200 17 247
DN 200 ISO-F		200 91 470
DN 200 CF		E 200 17 248
DN 250 ISO-F		E 200 91 471

Magnetic Rotor Suspension with separate Frequency Converter, with Compound Stage

TURBOVAC MAG W 1500 CT

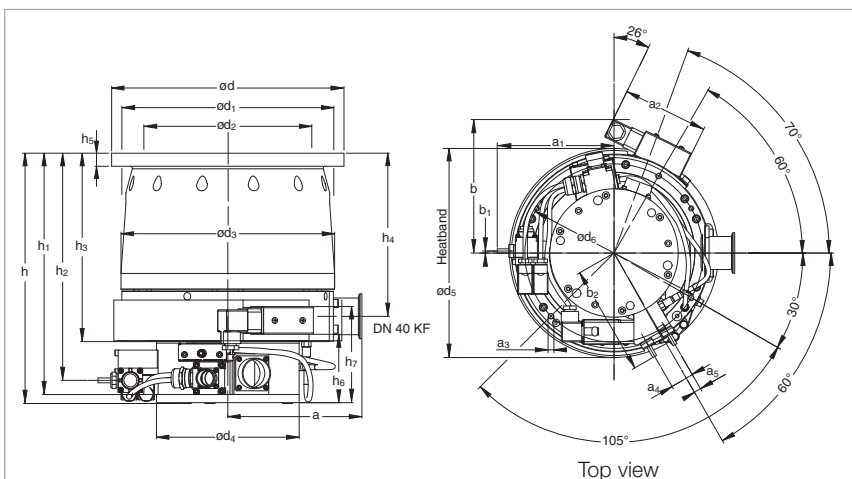


Typical Applications

- All major semiconductor processes such as Etch, CVD, PVD and Ion Implantation

Technical Features

- Active 5-axis magnetic bearing system
- Bearing and temperature system are controlled digitally
- Corrosion resistant
- Low noise and vibration levels
- Installation in any orientation
- Advanced rotor design for high pump speeds and forevacuum pressures
- Integrated purge gas system
- Integrated temperature management system (TMS)
- Intelligent power control system



		a	a ₁	a ₂	a ₃	a ₄	a ₅	b	b ₁	b ₂	d	d ₁	d ₂
200 ISO-F	mm	164.5	159	116.5	M8 x 15	32	9	182	3	150	285	260	213
	in.	6.48	6.26	4.59	M8 x 0.6	1.26	0.35	7.17	0.12	5.91	11.22	10.24	8.39
250 ISO-F	mm	164.5	159	116.5	M8 x 15	32	9	182	3	150	335	310	261
	in.	6.48	6.26	4.59	M8 x 0.6	1.26	0.35	7.17	0.12	5.91	11.22	12.20	10.28

		d ₃	d ₄	d ₅	d ₆	h	h ₁	h ₂	h ₃	h ₄	h ₅	h ₆	h ₇
200 ISO-F	mm	262	175	285	243	307	296	279	231	200	16	84	118
	in.	10.31	6.89	11.22	9.57	12.09	11.65	10.98	9.09	7.87	0.63	3.31	4.65
250 ISO-F	mm	262	175	285	243	307	296	279	231	200	16	84	118
	in.	10.31	6.89	11.22	9.57	12.09	11.65	10.98	9.09	7.87	0.63	3.31	4.65

Dimensional drawing for the TURBOVAC MAG W 1500 CT

Advantages to the User

- Maintenance-free
- High throughput for all process gases
- High pumping speed at low pressure
- High foreline pressure tolerance: up to 2.6 mbar (1.95 Torr)
- High resistance against corrosive gases
- Robust against particles and deposits
- Temperature control up to 90 °C (194 °F) to avoid condensation
- Lowest weight and size in its class
- Application specific design

Technical Data

TURBOVAC MAG W 1500 CT

Inlet flange	DN	200 ISO-F	250 ISO-F	200 CF
Pumping speed according to PNEUROP				
N ₂	l x s ⁻¹	1100	1220	1100
Ar	l x s ⁻¹	1050	1180	1050
He	l x s ⁻¹	1100	1200	1100
H ₂	l x s ⁻¹	920	1020	920
Operating speed	min ⁻¹	36 000	36 000	36 000
Compression ratio				
N ₂		> 10 ⁸	> 10 ⁸	> 10 ⁸
Ultimate pressure according to DIN 28 400				
	mbar (Torr)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻¹⁰ (< 10 ⁻¹⁰)
Max. foreline pressure for N ₂	mbar (Torr)	2.6 (1.95)	2.6 (1.95)	2.6 (1.95)
Recommended backing pump				
Rotary vane pump or dry compressing pump offering a pumping speed of 100 m ³ /h		TRIVAC D 65 BCS	TRIVAC D 65 BCS	TRIVAC D 65 BCS
Run-up time				
at 95% of nominal speed	min	< 6	< 6	< 6
Foreline flange	DN	40 KF	40 KF	40 KF
Purge and vent port	VCR	1/4"	1/4"	1/4"
Cooling water connection				
(OD of tube)	mm (in.)	6.4 (0.25)	6.4 (0.25)	6.4 (0.25)
Weight, approx.	kg (lbs)	32 (70.6)	32 (70.6)	32 (70.6)



Technical Data

MAG.DRIVE S

Voltage range	V	100 - 240, ±10 %
Nominal frequency	Hz	50 / 60
Power consumption		
Stand-by	W	100
Maximum	W	400
Max. motor voltage	V	48
Max. pump current	A	6
Fuses F1, F2 5 x 20 mm		10 A fast blow high breaking capacity 250 V
System fuse		L or G characteristic
Max. Frequency	Hz	0 to 2000
Load capability, relay output X1	V / A	32 / 0,5
Temperature		
during operation	°C (°F)	0 to +45 (+32 to +113)
during storage	°C (°F)	-10 to +60 (+14 to +140)
Relative humidity of the air	%	95 (non-condensing)

Ordering Information

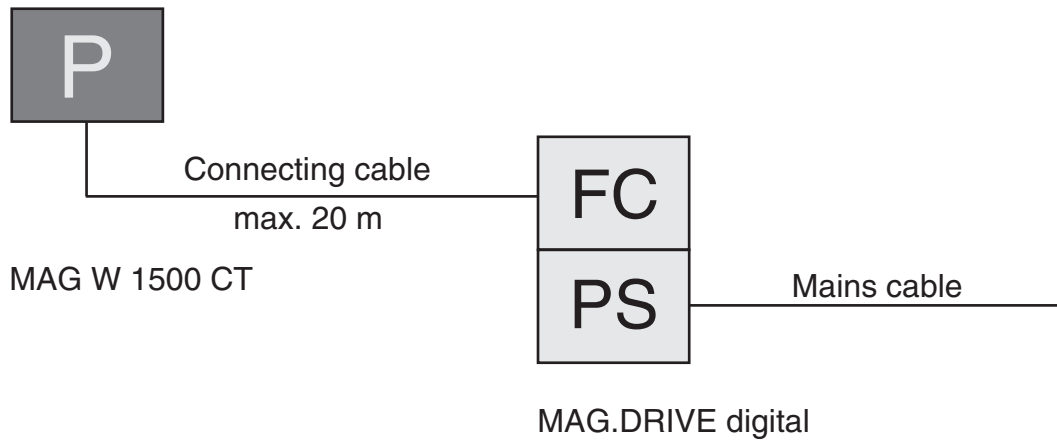
TURBOVAC MAG W 1500 CT

TURBOVAC MAG W 1500 CT with separate Frequency Converter and Compound Stage	P	Part No.	
DN 200 ISO-F DN 250 ISO-F DN 250 CF		400026V0002 400027V0002 400030V0002	
Mandatory Accessories		P	FC
Electronic frequency converter ¹⁾ MAG.DRIVE digital MAG.DRIVE digital, Profibus MAG.DRIVE digital, RS 232 C interface		400035V0011 400035V0013 400035V0014	
Connecting cable converter – pump ²⁾ 1.5 m (5.25 ft) DRIVE/BEARING 1.5 m (5.25 ft) TMS 3.0 m (10.5 ft) DRIVE/BEARING 3.0 m (10.5 ft) TMS 5.0 m (17.5 ft) DRIVE/BEARING 5.0 m (17.5 ft) TMS 10.0 m (35.0 ft) DRIVE/BEARING 10.0 m (35.0 ft) TMS 20.0 m (70.0 ft) DRIVE/BEARING 20.0 m (70.0 ft) TMS		400036V0001 400037V0001 400036V0008 400037V0008 400036V0004 400037V0004 400036V0002 400037V0002 400036V0003 400037V0003	
Plug-in control		121 36	
Forevacuum pump TRIVAC D 65 B 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz 3 phase motor; 208-23/460 V, 60 Hz / 200-220/380 V, 60 Hz		113 98 913 98-2	
For further types, see our Full Line Catalog			

¹⁾ Included are 2 mains cords. One with EURO plug and one with US plug (220 V AC).
 Replacement mains cord are Part Numbers 180 097 or 180 096 respectively

²⁾ Further connecting cables can be found under MAG.DRIVE digital in the section
 "Turbomolecular Pumps with Magnetic Rotor Suspension",
 para. "Electronic Frequency Converters"

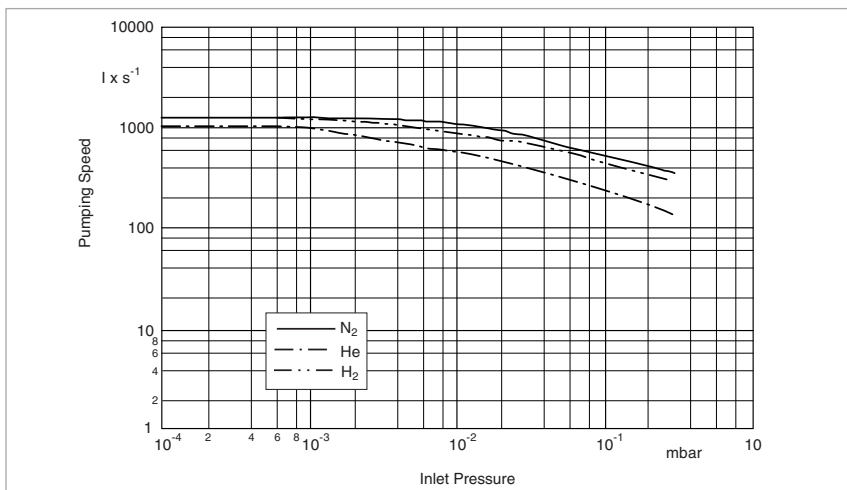
With separate Frequency Converter



Ordering Information

TURBOVAC MAG W 1500 CT

Accessories, optional	P	Part No.
Seal kit DN 250 metal		200 07 901
Included in the Delivery of the Pump	P	
Inlet screen DN 200 ISO-F DN 250 ISO-F DN 250 CF		200 91 470 E200 91 471 200 91 638
Integrated purge gas system VRC nut 1/4"		
Integrated temperature management system		
Cooling water connection Swagelock 1/4" tube		
Included in the Delivery of the Frequency Converter	FC	
Mains cord, 3 m (10.5 ft.) long, approx. with EURO or US plug		



Pumping speed of the TURBOVAC MAG W 1500 CT (DN 250) as a function of the inlet pressure

Magnetic Rotor Suspension with separate Frequency Converter with Compound Stage

TURBOVAC MAG W 2000 C/CT

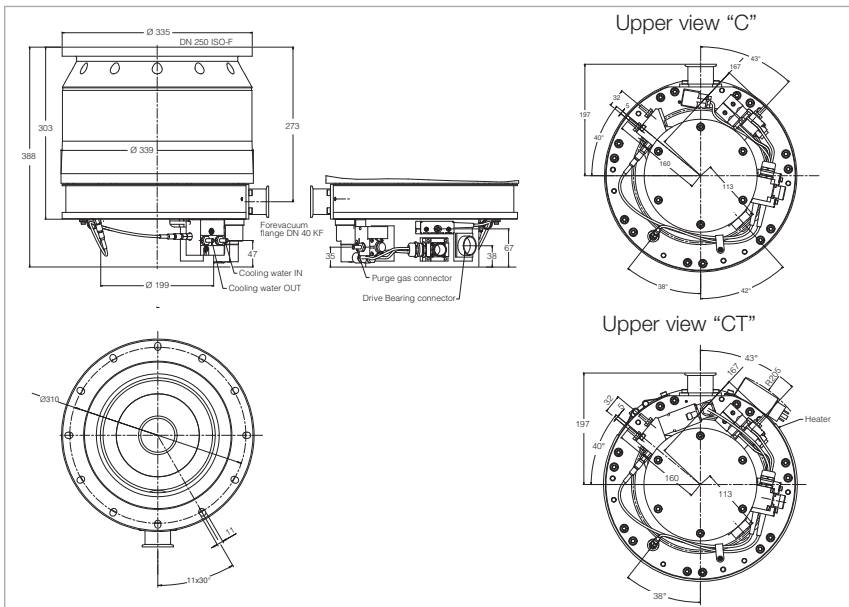


Typical Applications

- All major semiconductor processes such as Etch, CVD, PVD and Ion Implantation

Technical Features

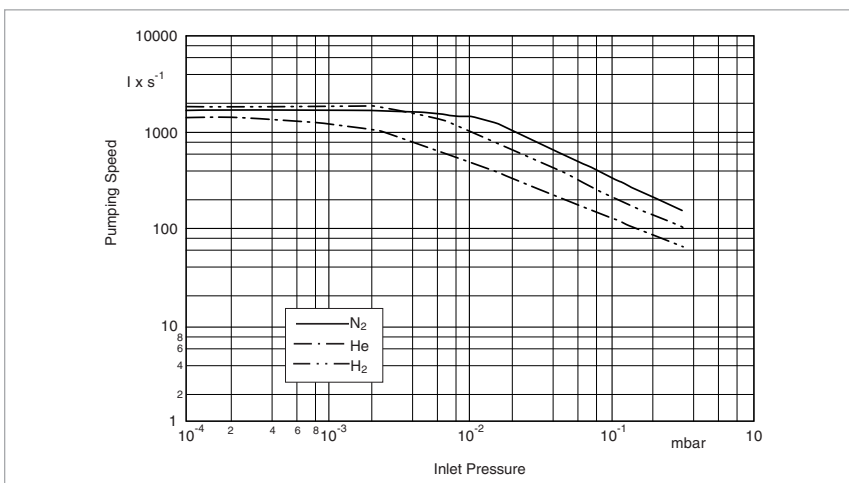
- Active 5-axis magnetic bearing system
- Patented KEPLA-COAT® for rotor and stator to prevent corrosion
- Low noise and vibration levels
- Installation in any orientation
- Advanced rotor design for high pump speeds and forevacuum pressures
- Integrated purge gas system
- CT versions: Integrated temperature management system (TMS)



Dimensional drawing for the TURBOVAC MAG W 2000 C/CT

Advantages to the User

- Maintenance-free
- High throughput for all etch gases
- High pumping speed at low pressure
- High foreline pressure tolerance: up to 5.3 mbar (4 Torr)
- High resistance against corrosive gases
- Robust against particles and deposits
- Temperature management system (TMS) to avoid condensation
- Application specific design



Pumping speed of the TURBOVAC MAG W 2000 CT (DN 250) as a function of the inlet pressure

TURBOVAC MAG

Technical Data

		W 2000 C	W 2000 CT
Inlet flange	DN	250 ISO-F	250 ISO-F
Pumping speed according to PNEUROP			
N ₂	l x s ⁻¹	1760	1760
Ar	l x s ⁻¹	1650	1650
He	l x s ⁻¹	1800	1800
H ₂	l x s ⁻¹	1500	1500
Operating speed	min ⁻¹	28 800	28 800
Compression ratio			
N ₂		> 10 ⁸	> 10 ⁸
Ultimate pressure according to DIN 28 400			
	mbar (Torr)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)
Max. foreline pressure for N ₂	mbar (Torr)	3.5 (2.63)	3.5 (2.63)
Recommended backing pump			
Rotary vane pump or dry compressing pump offering a pumping speed of 100 m ³ /h		TRIVAC D 65 BCS	TRIVAC D 65 BCS
Run-up time	min	< 8	< 8
Foreline flange	DN	40 KF	40 KF
Purge and vent port	VCR	1/4"	1/4"
Cooling water connection			
(OD of tube)	mm (in.)	6.4 (0.25)	6.4 (0.25)
Weight, approx.	kg (lbs)	68 (150)	68 (150)



Technical Data

MAG.DRIVE digital

Mains connection, 50/60 Hz	V	200 - 240, +10 %/-15 %
Current for connected consumers max.	A	20
Max. motor voltage	V	60
Nominal frequency	Hz	50/60
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Dimensions (W x H x D)	mm (in.)	483 x 213 x 1/2 19" (19.02 x 8.39 x 1/2 19")
Weight, approx.	kg (lbs)	10 (22)

Ordering Information

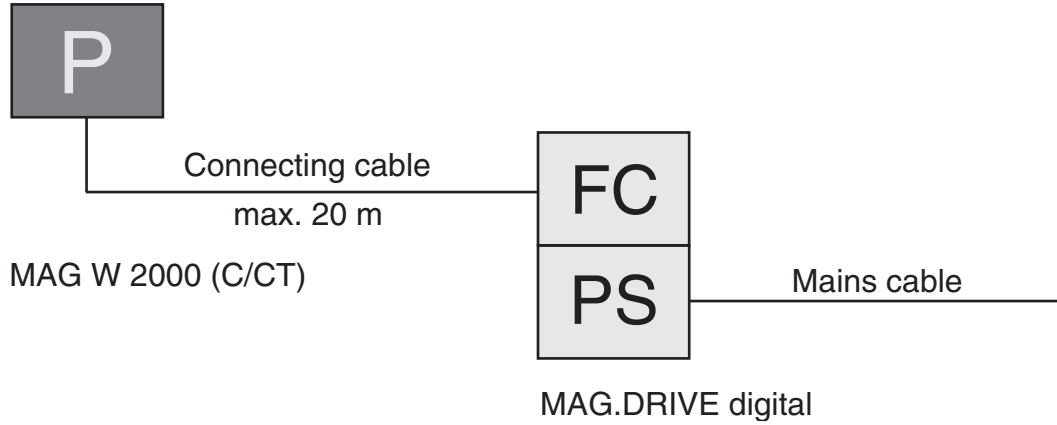
TURBOVAC MAG W 2000 C/CT

TURBOVAC MAG W 2000 C/CT with separate Frequency Converter and Compound Stage	P	Part No.	
DN 250 ISO-F (MAG W 2000 C) DN 250 ISO-F (MAG W 2000 CT)		400047V0001 400047V0002	
Mandatory Accessories		P FC	
Electronic frequency converter ¹⁾ MAG.DRIVE digital MAG.DRIVE digital, Profibus MAG.DRIVE digital, RS 232 C interface		400035V0011 400035V0013 400035V0014	
Connecting cable converter – pump ²⁾ 1.5 m (5.25 ft) DRIVE/BEARING 1.5 m (5.25 ft) TMS 3.0 m (10.5 ft) DRIVE/BEARING 3.0 m (10.5 ft) TMS 5.0 m (17.5 ft) DRIVE/BEARING 5.0 m (17.5 ft) TMS 10.0 m (35.0 ft) DRIVE/BEARING 10.0 m (35.0 ft) TMS 20.0 m (70.0 ft) DRIVE/BEARING 20.0 m (70.0 ft) TMS		400036V0001 400037V0001 400036V0008 400037V0008 400036V0004 400037V0004 400036V0002 400037V0002 400036V0003 400037V0003	
Plug-in control		121 36	
Forevacuum pump TRIVAC D 65 B 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz 3 phase motor; 208-23/460 V, 60 Hz / 200-220/380 V, 60 Hz		113 98 913 98-2	
For further types, see our Full Line Catalog			

¹⁾ Included are 2 mains cords. One with EURO plug and one with US plug (220 V AC).
 Replacement mains cord are Part Numbers 180 097 or 180 096 respectively

²⁾ Further connecting cables can be found under MAG.DRIVE digital in the section
 "Turbomolecular Pumps with Magnetic Rotor Suspension",
 para. "Electronic Frequency Converters"

With separate Frequency Converter



Ordering Information

TURBOVAC MAG W 2000 C/CT

Included in the Delivery of the Pump	P	Part No.
Inlet screen DN 250 ISO-F		E 200 91 471
Integrated purge gas system VRC nut 1/4"		
Integrated temperature management system (only CT version)		
Cooling water connection Swagelock 1/4" tube		
Included in the Delivery of the Frequency Converter	FC	
Mains cord, 3 m (10.5 ft.) long, approx. with EURO or US plug		

Magnetic Rotor Suspension with separate Frequency Converter, with Compound Stage

TURBOVAC MAG W 2200 C



Typical Applications

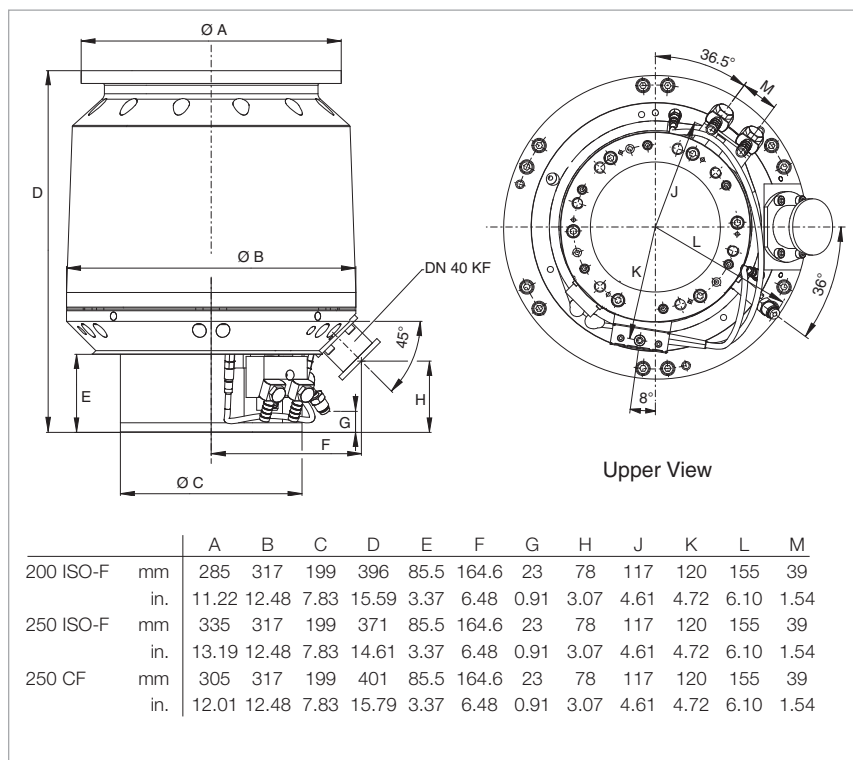
- All major semiconductor processes such as Etch, CVD, PVD and Ion Implantation
- Coating systems

Versions with CF highvacuum connection

- Particle accelerators
- Research

Technical Features

- Active 5-axis magnetic bearing system
- Digital monitoring of the bearing system
- Low noise and vibration levels
- Installation in any orientation
- Advanced rotor design for high pump speeds and forevacuum pressures
- Purge gas connection (only "C" version)
- Integrated purge gas system (only "CT" version)
- Intelligent power control system
- Integrated temperature management System (TMS) ("CT" version only)



Dimensional drawing for the TURBOVAC MAG W 2200 C

Advantages to the User

- Maintenance-free
- High throughput for all process gases
- High pumping speed at low pressure
- High foreline pressure tolerance: up to 2 mbar (1.5 Torr)
- Lowest weight and size in its class
- Application specific design

TURBOVAC MAG

Technical Data

W 2200 C/CT

W 2200

Inlet flange	DN	200 ISO-F	250 ISO-F	250 CF
Pumping speed according to PNEUROP				
N ₂	l x s ⁻¹	1600	2000	1800
Ar	l x s ⁻¹	1450	1900	1700
He	l x s ⁻¹	1780	1980	1980
H ₂	l x s ⁻¹	1720	1930	1930
Operating speed	min ⁻¹	29 400	29 400	29 400
Compression ratio				
N ₂		> 1 x 10 ⁸	> 1 x 10 ⁸	1 x 10 ⁸
Ultimate pressure according to DIN 28 400				
	mbar (Torr)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 1 x 10 ⁻¹⁰ (< 0.75 x 10 ⁻¹⁰)
Max. foreline pressure for N₂				
with convection cooling	mbar (Torr)	–	–	0.1 (0.075)
with water cooling	mbar (Torr)	2 (1.5)	2 (1.5)	1 (0.75)
Recommended backing pump				
Rotary vane pump or dry compressing pump offering a pumping speed of 100 m ³ /h		TRIVAC D 65 BCS	TRIVAC D 65 BCS	TRIVAC D 65 BCS
Run-up time				
at 95% of nominal speed	min	< 8	< 8	< 8
Foreline flange	DN	40 KF	40 KF	40 KF
Purge and vent port		1/4" VCR	1/4" VCR	DN 10/16
Cooling water connection				
(OD of tube)		1/2"	1/2"	Swagelok tube 1/4"
Weight, approx.	kg (lbs)	48 (106)	48 (106)	60 (132.45)



Technical Data

MAG.DRIVE digital

Mains connection, 50/60 Hz	V	200 - 240, +10 %/-15 %
Current for connected consumers max.	A	20
Max. motor voltage	V	60
Nominal frequency	Hz	50/60
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Dimensions (W x H x D)	mm (in.)	483 x 213 x 1/2 19" (19.02 x 8.39 x 1/2 19")
Weight, approx.	kg (lbs)	10 (22)

Ordering Information

TURBOVAC MAG W 2200 C/CT

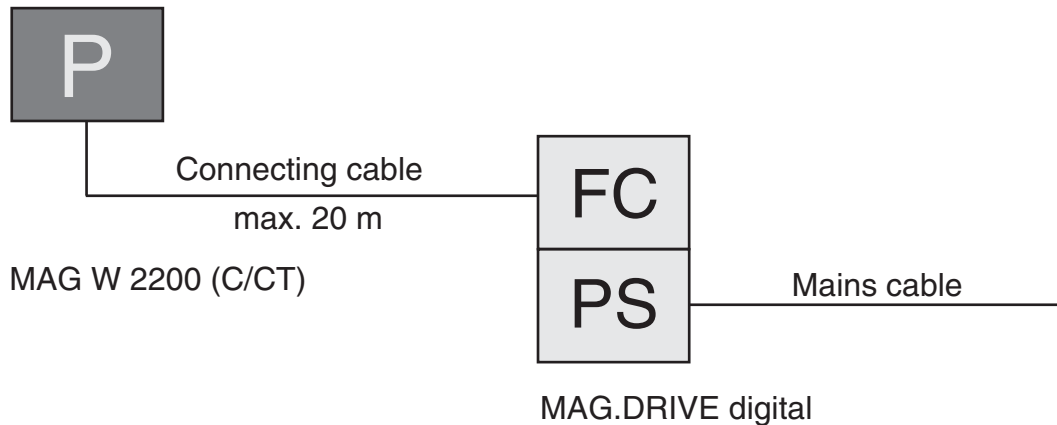
TURBOVAC MAG W 2200 C/CT with separate Frequency Converter and Compound Stage	P	Part No.	
DN 200 ISO-F (MAG W 2200 C) DN 250 ISO-F (MAG W 2200 C) DN 250 CF (MAG W 2200) DN 200 ISO-F (MAG W 2200 CT) DN 250 ISO-F (MAG W 2200 CT)		400081V0011 400081V0021 400081V0061 400081V0013 400081V0023	
Mandatory Accessories		P FC	
Electronic frequency converter ¹⁾ MAG.DRIVE digital MAG.DRIVE digital, Profibus MAG.DRIVE digital, RS 232 C interface		400035V0011 400035V0013 400035V0014	
Connecting cable converter – pump ²⁾ 1.5 m (5.25 ft) DRIVE/BEARING 1.5 m (5.25 ft) TMS ³⁾ 3.0 m (10.5 ft) DRIVE/BEARING 3.0 m (10.5 ft) TMS ³⁾ 5.0 m (17.5 ft) DRIVE/BEARING 5.0 m (17.5 ft) TMS ³⁾ 10.0 m (35.0 ft) DRIVE/BEARING 10.0 m (35.0 ft) TMS ³⁾ 20.0 m (70.0 ft) DRIVE/BEARING 20.0 m (70.0 ft) TMS ³⁾		400036V0001 400037V0001 400036V0008 400037V0008 400036V0004 400037V0004 400036V0002 400037V0002 400036V0003 400037V0003	
Plug-in control		121 36	
Forevacuum pump TRIVAC D 65 B 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz 3 phase motor; 208-23/460 V, 60 Hz / 200-220/380 V, 60 Hz		113 98 913 98-2	
For further types, see our Full Line Catalog			

¹⁾ Included are 2 mains cords. One with EURO plug and one with US plug (220 V AC).
 Replacement mains cord are Part Numbers 180 097 or 180 096 respectively

²⁾ Further connecting cables can be found under MAG.DRIVE digital in the section
 “Turbomolecular Pumps with Magnetic Rotor Suspension”,
 para. “Electronic Frequency Converters”

³⁾ TMS connecting cables are only needed for the “CT” version of the TURBOVAC MAG W 2200

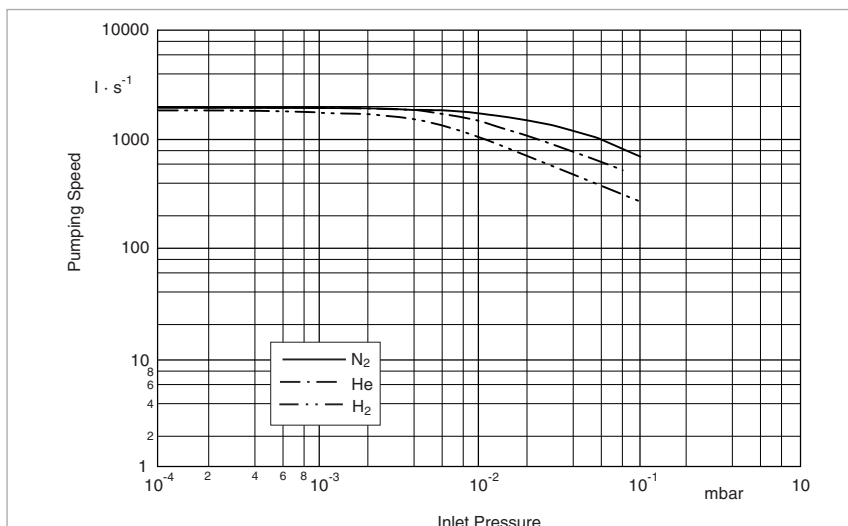
With separate Frequency Converter



Ordering Information

TURBOVAC MAG W 2200 C/CT

Accessories, optional	P	Part No.
Purge gas and venting valve		121 33
Connection cable for optional seal gas valve (pump/converter)		
1.5 m (5.25 ft)		400038V0007
3.0 m (10.5 ft)		400038V0006
10.0 m (35.0 ft)		400038V0002
20.0 m (70.0 ft)		400038V0009
Seal kit		
DN 250 metal		200 07 901
Included in the Delivery of the Pump	P	
Inlet screen		
DN 200 ISO-F		E 400 000 096
DN 250 ISO-F		E 400 000 100
DN 250 CF		200 15 157
Included in the Delivery of the Frequency Converter	FC	
Mains cord, 3 m (10.5 ft.) long, approx. with EURO or US plug		



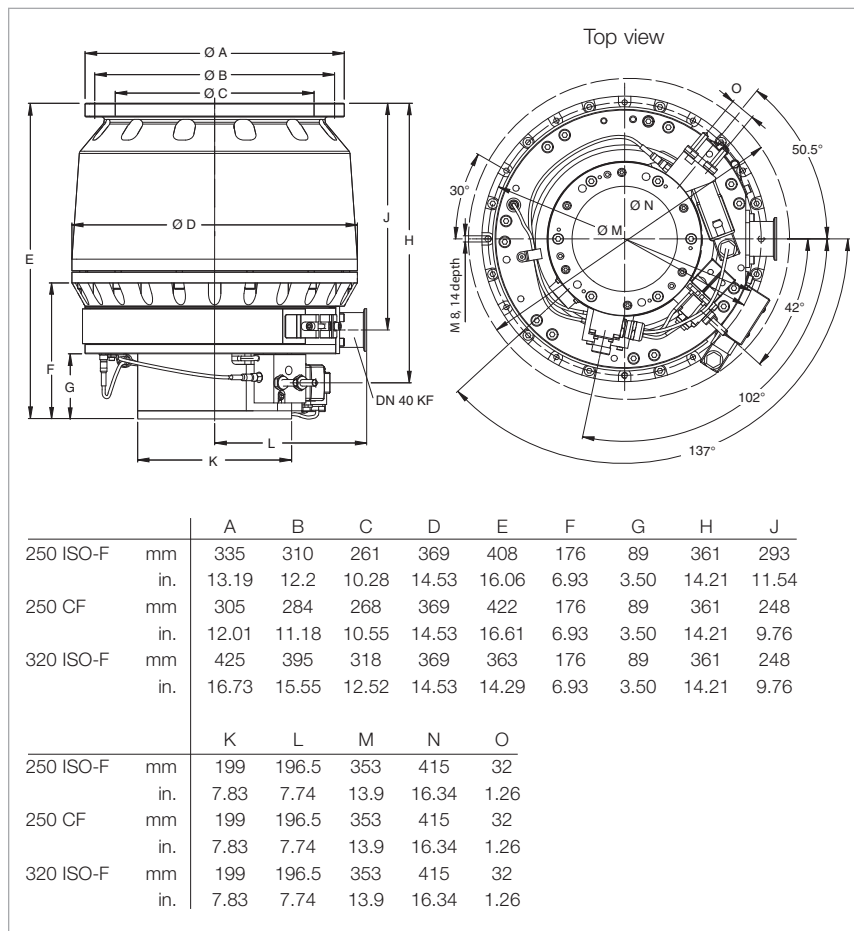
Pumping speed of the TURBOVAC MAG W 2200 C (DN 250) as a function of the inlet pressure

Magnetic Rotor Suspension with separate Frequency Converter, with Compound Stage

TURBOVAC MAG W 2800/3200 C/CT



TURBOVAC MAG W 2800 CT (left) and TURBOVAC MAG W 3200 CT (right)



Dimensional drawing for the TURBOVAC MAG W 2800/3200 C/CT

Typical Applications

- All major semiconductor processes such as Etch, CVD, PVD and Ion Implantation

Versions with CF highvacuum connection

- Particle accelerators
- Research

Technical Features

- Active 5-axis magnetic bearing system
- Bearing and temperature system are controlled digitally
- Corrosion resistant
- Low noise and vibration levels
- Installation in any orientation
- Advanced rotor design for high pump speeds and forevacuum pressures
- Integrated purge gas system
- CT versions: Integrated temperature management system (TMS)
- Intelligent power control system

Advantages to the User

- Maintenance-free
- High throughput for all process gases
- High pumping speed at low pressure
- High foreline pressure tolerance: up to 2 mbar (1.5 Torr)
- High resistance against corrosive gases
- Robust against particles and deposits
- Temperature control up to 90 °C (194 °F) to avoid condensation
- Lowest weight and size in its class
- Application specific design

Technical Data

TURBOVAC MAG

		W 2800 C	W 2800 CT	W 2800	W 3200 CT
Inlet flange	DN	250 ISO-F	250 ISO-F	250 CF	320 ISO-F
Pumping speed according to PNEUROP					
N ₂	l x s ⁻¹	2650	2650	2650	3200
Ar	l x s ⁻¹	2450	2450	2450	3000
He	l x s ⁻¹	2650	2650	2650	3000
H ₂	l x s ⁻¹	2100	2100	2100	2250
Operating speed	min ⁻¹	28800	28800	28800	28800
Compression ratio					
N ₂		1 x 10 ⁸	1 x 10 ⁸	1 x 10 ⁹	1 x 10 ⁸
Ultimate pressure according to DIN 28 400					
	mbar (Torr)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)	< 1 x 10 ⁻¹⁰ (< 0.75 x 10 ⁻¹⁰)	< 10 ⁻⁸ (< 0.75 x 10 ⁻⁸)
Max. foreline pressure for N ₂					
with convection cooling	mbar (Torr)	–	–	0.3 (0.23)	–
with water cooling	mbar (Torr)	2 (1.5)	2 (1.5)	3 (2.3)	2 (1.5)
Recommended backing pump					
Rotary vane pump or dry compressing pump offering a pumping speed of 100 m ³ /h		TRIVAC D 65 BCS	TRIVAC D 65 BCS	TRIVAC D 65 BCS	TRIVAC D 65 BCS
Run-up time	min	< 10	< 10	< 10	< 10
Foreline flange	DN	40 KF	40 KF	40 KF	40 KF
Purge / vent port		1/4" VCR	1/4" VCR	DN 10/16	1/4" VCR
Cooling water connection	Swagelok tube	1/4"	1/4"	1/4"	1/4"
Weight, approx.	kg (lbs)	64 (141.3)	64 (141.3)	75 (165.6)	65 (143.5)




Technical Data

MAG.DRIVE digital

Mains connection, 50/60 Hz	V	200 - 240, +10 %/-15 %
Current for connected consumers, max.	A	20
Max. motor voltage	V	60
Nominal frequency	Hz	50/60
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Dimensions (W x H x D)	mm (in.)	483 x 213 x 1/2 19" (19.02 x 8.39 x 1/2 19")
Weight, approx.	kg (lbs)	10 (22)

Ordering Information

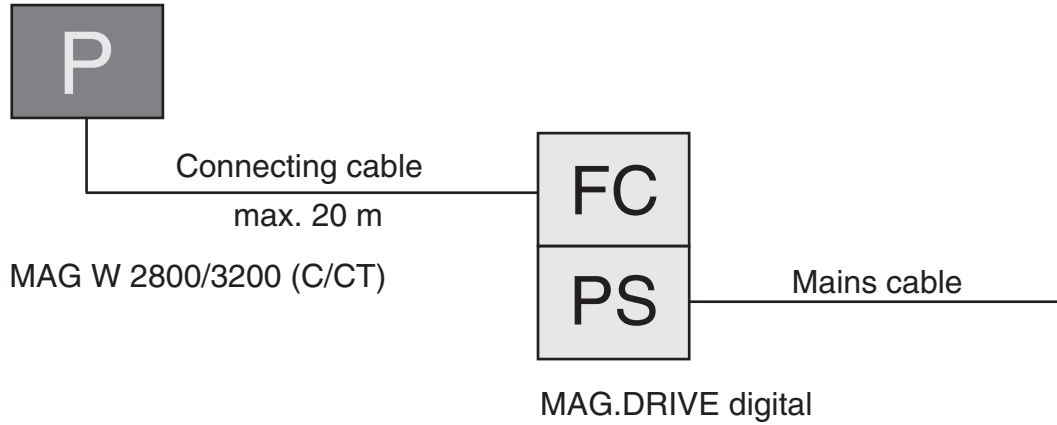
TURBOVAC MAG W 2800 C/CT / 3200 CT

TURBOVAC MAG W 2800 (C/CT) with separate Frequency Converter and Compound Stage	P	Part No.	
DN 250 CF (MAG W 2800) DN 250 ISO-F (MAG W 2800 C) DN 250 ISO-F (MAG W 2800 CT)		400006V0071 400000V0001 400000V0002	
TURBOVAC MAG W 3200 CT with separate Frequency Converter and Compound Stage	P		
DN 320 ISO-F		400003V0002	
Mandatory Accessories	P	FC	
Electronic frequency converter ¹⁾ MAG.DRIVE digital MAG.DRIVE digital, Profibus MAG.DRIVE digital, RS 232 C interface		400035V0011 400035V0013 400035V0014	
Plug-in control		121 36	
Connecting cable converter – pump ²⁾ 1.5 m (5.25 ft) DRIVE/BEARING 1.5 m (5.25 ft) TMS 3.0 m (10.5 ft) DRIVE/BEARING 3.0 m (10.5 ft) TMS 5.0 m (17.5 ft) DRIVE/BEARING 5.0 m (17.5 ft) TMS 10.0 m (35.0 ft) DRIVE/BEARING 10.0 m (35.0 ft) TMS 20.0 m (70.0 ft) DRIVE/BEARING 20.0 m (70.0 ft) TMS		400036V0001 400037V0001 400036V0008 400037V0008 400036V0004 400037V0004 400036V0002 400037V0002 400036V0003 400037V0003	
Forevacuum pump TRIVAC D 65 B 3 phase motor; 230/400 V, 50 Hz / 250/440 V, 60 Hz 3 phase motor; 208-23/460 V, 60 Hz / 200-220/380 V, 60 Hz		112 96 912 96-2	
For further types, see our Full Line Catalog			

¹⁾ Included are 2 mains cords. One with EURO plug and one with US plug (220 V AC).
Replacement mains cord are Part Numbers 180 097 or 180 096 respectively

²⁾ Further connecting cables can be found under MAG.DRIVE digital in the section
"Turbomolecular Pumps with Magnetic Rotor Suspension",
para. "Electronic Frequency Converters"

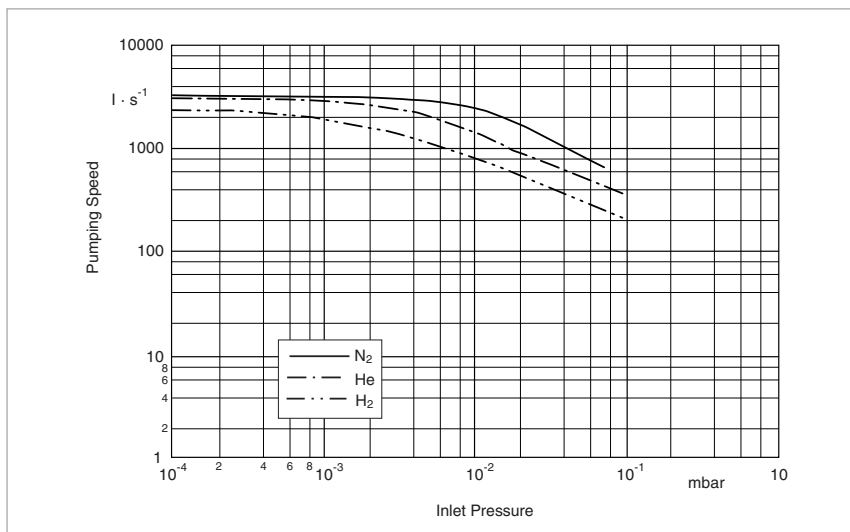
With separate Frequency Converter



Ordering Information

TURBOVAC MAG W 2800 C/CT / 3200 CT

Accessories, optional	P	Part No.
Purge gas and venting valve		121 33
Seal kit DN 250 metal		200 07 901
Included in the Delivery of the Pump	P	
Inlet screen DN 250 ISO-F		E 400 000 100
DN 250 CF		200 15 157
DN 320 ISO-F		E 400 000 134
Included in the Delivery of the Frequency Converter	FC	
Mains cord, 3 m (10.5 ft.) long, approx. with EURO or US plug		



Pumping speed of the TURBOVAC MAG W 3200 C (DN 320) as a function of the inlet pressure

Accessories

Electronic Frequency Converters for Pumps with Mechanical Rotor Suspension

TURBO.DRIVE TD 20 *classic*

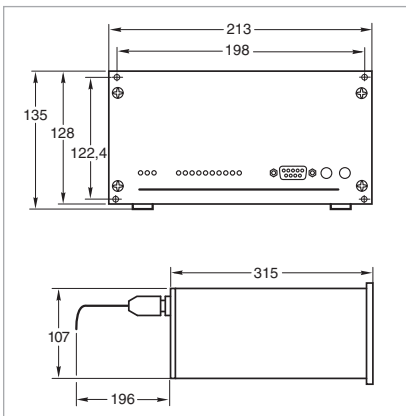


Technical Features

- For operating the TURBOVAC 151 (C), 361 (C), 600 C, 1000 C and 1100 C turbomolecular pump
- Front panel with LED
 - Status, Power, Error, pump run-up, pumping power
- Wide voltage range mains input
- Current interfaces like Profibus, DeviceNet, Ethernet/IP, RS 232 C, RS 485 C and 25-way terminal strip, available as options

Advantages to the User

- Easy integration within a vacuum system owing to the large variety of different modern interfaces as well as for modernising older systems
- Start/stop function through keys on the front panel
- Remote control and process control through analog and PLC compatible inputs and outputs
- Compatible to frequency converter NT 20, NT 151/361 and NT 361



Dimensional drawing for the electronic frequency converter TURBO.DRIVE TD 20 *classic*

Technical Data

TURBO.DRIVE TD 20 *classic*

Mains connection, 50 - 60 Hz; selectable	V	100 to 240 (-15% / +10%)
Max. output voltage	V	3 x 47
Overload current limit	A	5
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Protection class	IP	20
Dimensions (W x H x D)	mm (in.)	213 x 128 x 315 (1/2 19", 3 HU) 8.39 x 5.04 x 12.40 (1/2 19", 3 HU)
Weight, approx.	kg (lbs)	4 (8.8)

Ordering Information

TURBO.DRIVE TD 20 *classic*

TURBO.DRIVE TD 20 <i>classic</i> without interface with RS 232 C interface with RS 485 C interface with Profibus with 25 pol I/O		Part No. 800075V0001 Part No. 800075V0002 Part No. 800075V0004 Part No. 800075V0003 Part No. 800075V0005
Mains cable 3 m (10.5 ft) EURO plug UK plug US plug 5-15 P (220 V AC) 2 m (7.5 ft) US plug 115 V AC		Part No. 800102V0002 Part No. 800102V0003 Part No. 800102V1002 992 76 513
Connecting cable TURBOVAC - frequency converter 3 m (10.5 ft) 5 m (17.5 ft) 10 m (35.0 ft) 20 m (70.0 ft) 50 m (175.0 ft) 60 m (210.0 ft) 80 m (280.0 ft) 140 m (490.0 ft)		857 65 857 66 857 67 857 68 800152V0008 800152V0007 800152V0080 800152V0140
19 in. rack mounting frame 3 HU		Part No. 161 00
Pump adapter cable		Part No. 800 000 006
Adapter cable, 0.2 m (0.7 ft) long 25-way PLC interface to 2x Phoenix plugs (required when a NT 20 with connected PLC interface needs to be replaced)		Part No. 800152V0020
PC software TURBO.DRIVE Server ¹⁾		Part No. 800110V0102 (see Section "Accessories" at the end of the chapter)

¹⁾ Software supports only RS 232 C, RS 485 C and Profibus

TURBOTRONIK NT 10



Technical Features

- For operating the TURBOVAC 50 turbomolecular pump
- Bench top unit
- Also for rack mounting (1/4 19", 3 HU)
- Controls and indicators on the front panel
- Inputs for remote control and process controller
- Freely assignable relays (e.g. to control the backing pumps)

Technical Data

TURBOTRONIK NT 10

Mains connection, 50 - 60 Hz	V	100-120/200-240
Max. output voltage	V	3 x 150
Overload current limit	A	0.22
Permissible ambient temperature	°C (°F)	0 to +40 (+32 to +104)
Dimensions (W x H x D)	mm (in.)	106 x 128 x 233 (4.17 x 5.04 x 9.17)
Weight, approx.	kg (lbs)	1.5 (3.3)

Ordering Information

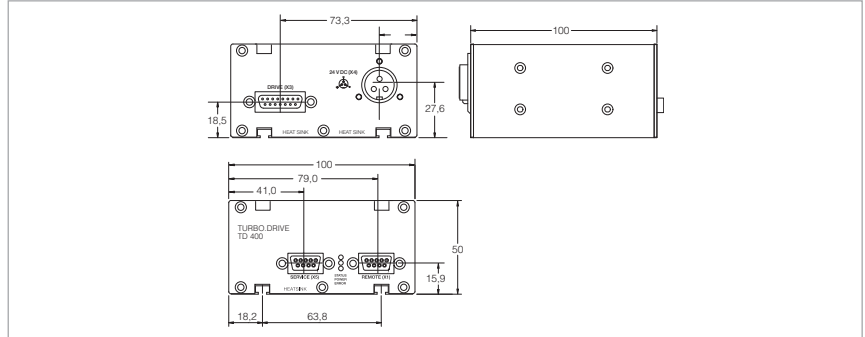
TURBOTRONIK NT 10

100 - 120 V (with US plug)	Part No. 859 01
200 - 240 V (with EURO plug)	Part No. 859 00
Connecting cable pump - converter	
1 m (3.5 ft)	Part No. 200 11 609
3 m (10.5 ft)	Part No. 121 08
5 m (17.5 ft)	Part No. 121 09
10 m (35.0 ft)	Part No. 161 10
15 m (52.5 ft)	Part No. 119 90
20 m (70.0 ft)	Part No. 800150V2000

TURBO.DRIVE TD 400 (TD 400) for TURBOVAC SL 80 and SL 300



TURBO.DRIVE TD 400 (Front side)



Dimensional drawing for the TURBO.DRIVE TD 400 (Rear side)

Technical Features

- Small footprint
- RS 232 C, RS 485 C, Profibus or Ethernet/IP interface
- Configurations:
 - as a separate frequency converter
 - integrated within the turbomolecular pump
- Remote control via remote interface
- Flexible mounting options
- Cost-effective supply of 24 V DC

Technical Data

TURBO.DRIVE TD 400

Input		
Voltage	V DC	24 ± 5%
Max. Dauerstrom	A	7
Max. Dauerleistungs-Aufnahme	W	170
Ambient temperature	°C (°F)	+5 to +45 (+41 to +113)
Dimensions (W x H x D)	mm (in.) (100 x 90 x 100 (3.9 x 3.5 x 3.9)
Weight	kg (lbs)	0.7 (1.55)
Serial interface		RS 232 C, RS 485 C, Profibus or Ethernet/IP

Ordering Information

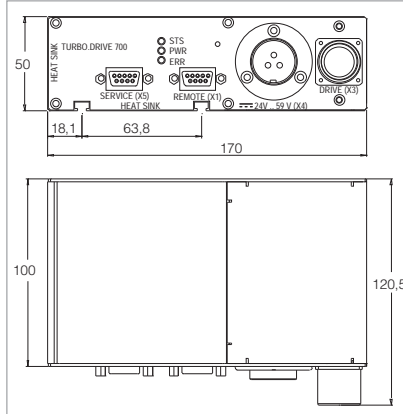
TURBO.DRIVE TD 400

TURBO.DRIVE TD 400 with RS 232 C interface with RS 485 C interface with Profibus	Part No. 800073V0002 Part No. 800073V0003 Part No. 800073V0004
Connecting cable TD 400 - Pump 0.2 m (0.70 ft) 0.3 m (1.15 ft) 0.4 m (1.40 ft) 0.5 m (1.75 ft) 1.0 m (3.50 ft) 2.5 m (8.75 ft) 3.0 m (10.5 ft) 5.0 m (17.5 ft)	Part No. 800152V0021 Part No. 800152V0023 Part No. 800152V0022 Part No. 800152V0050 Part No. 152 47 Part No. 864 49 Part No. 864 40 Part No. 864 50
START/STOP switch (for manual operation)	Part No. 152 48
Hat rail adaptor as mounting aid	Part No. 800110V0003
Accessories for RS 232 C and RS 485 C interfaces	see para. "(Miscellaneous) Accessories"

TURBO.DRIVE TD 700 (TD 700) for TURBOVAC SL 700



TURBO.DRIVE TD 700 (front side)



Dimensional drawing for the TURBO.DRIVE TD 700 (rear side)

Technical Features

- Small footprint
- RS 232 C, RS 485 C or Profibus interface
- Configurations:
 - as a separate frequency converter
 - integrated within the turbomolecular pump
- Remote control via remote interface
- Flexible mounting options

Technical Data

TURBO.DRIVE TD 700

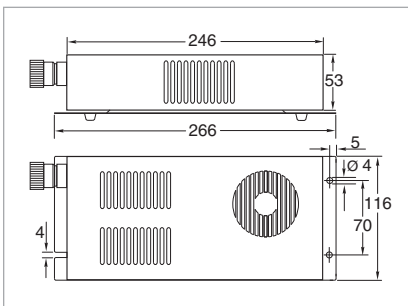
Input		
Voltage	V DC	59
Ripple	%	< 2
Ambient temperature		
during operation	°C (°F)	+10 to +45 (+50 to +113)
during storage	°C (°F)	-15 to +60 (-5 to +140)
Dimensions (W x H x D)	mm (in.)	170 x 50 x 120.5 (6.69 x 1.97 x 4.74)
Max. continuous current	A	8
Max. Power consumption	W	480
Weight	kg (lbs)	0.7 (1.55)
Serial interface		RS 232 C, RS 485 C or Profibus

Ordering Information

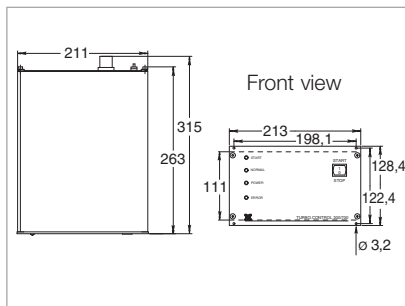
TURBO.DRIVE TD 700

TURBO.DRIVE TD 700 with RS 232 C interface with RS 485 C interface with Profibus	Part No. 800074V0001 Part No. 800074V0003 Part No. 800074V0004
Connecting cable TD 700 - Pump 0.2 m (0.70 ft) 1.0 m (3.50 ft) 3.0 m (10.5 ft) 10.0 m (35.0 ft)	Part No. 800080V0020 Part No. 800084V0100 Part No. 800084V0300 Part No. 800084V1000
START/STOP switch (for manual operation)	Part No. 152 48
Hat rail adaptor as mounting aid	Part No. 800110V0003
Accessories for RS 232 C and RS 485 C interfaces	see para. "(Miscellaneous) Accessories"

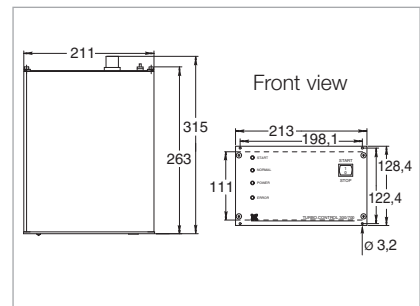
Power Supply Units for TURBO.DRIVE TD 400 und TURBO.DRIVE TD 700



Dimensional drawing for the power supply
TURBO.POWER 300



Dimensional drawing for the power supply
TURBO.CONTROL 300



Dimensional drawing for the power supply
TURBO.CONTROL 700

Technical Features

- Cost-effective supply of 24 V DC power for SL 80, SL 300, TW 250 S and TURBO.DRIVE TD 400
- Plug & play
- Bench top unit or for cabinet mounting

Technical Features

- Cost-effective supply of 24 V DC power for SL 80, SL 300, TW 250 S and TURBO.DRIVE TD 400
- Plug & play
- Bench top unit or for cabinet mounting
- Mains switch
- START/STOP switch for the turbo-molecular pump
- Remote control via remote interface
- Status indicating LEDs and status relays

Technical Features

- Cost-effective supply of 59 V DC power for SL 700
- Plug & play
- Bench top unit or for cabinet mounting
- Mains switch
- START/STOP switch for the turbo-molecular pump
- Remote control via remote interface
- Status indicating LEDs and status relays

Technical Data

Power Supply

		TURBO.POWER 300	TURBO.CONTROL 300	TURBO.CONTROL 700
Input				
Mains voltage		85-264 V / 50/60 Hz	85-264 V / 50/60 Hz	85-264 V / 50/60 Hz
Max. power consumption	V A	300	300	805
Output				
Voltage, nominal	V DC	24	24	59
Max. continuous current	A	8.4	8.4	8.5
Ambient temperature	°C (°F)	0 to +40 (+32 to +104)	0 to +40 (+32 to +104)	0 to +40 (+32 to +104)
Dimensions (W x H x D)	mm (in.)	116 x 53 x 260 (4.57 x 2.09 x 10.24)	213 x 129 x 320 (8.39 x 5.08 x 12.60)	213 x 129 x 320 (8.39 x 5.08 x 12.60)
Weight	kg (lbs)	1.5 (3.3)	1.5 (3.3)	2.5 (5.52)

Ordering Information

Power Supply

	TURBO.POWER 300	TURBO.CONTROL 300	TURBO.CONTROL 700
Power supply			
TURBO.POWER 300	Part No. 800100V0002	-	-
TURBO.CONTROL 300	-	Part No. 800100V0001	-
TURBO.CONTROL 700	-	-	Part No. 800101V0001
DC cable	24 V DC power cable	24 V DC control cable	59 V DC control cable
frequency converter - power supply			
1 m (3.5 ft)	Part No. 800094V0100	Part No. 800091V0100	Part No. 800093V0100
3 m (10.5 ft)	Part No. 800094V0300	Part No. 800091V0300	Part No. 800093V0300
5 m (17.5 ft)	Part No. 800094V0500	Part No. 800091V0500	Part No. 800093V0500
10 m (35.0 ft)	Part No. 800094V1000	Part No. 800091V1000	Part No. 800093V1000
20 m (70.0 ft)	Part No. 800094V2000	Part No. 800091V2000	Part No. 800093V2000
Mains cable			
3 m (10.5 ft)			
with EURO plug	Part No. 800102V0002	Part No. 800102V0002	Part No. 800102V0002
with UK plug	Part No. 800102V0003	Part No. 800102V0003	Part No. 800102V0003
with US plug 5-15 P (220 V AC)	Part No. 800102V1002	Part No. 800102V1002	Part No. 800102V1002
2 m (7.5 ft)			
US plug 115 V AC	Part No. 992 76 513	Part No. 992 76 513	Part No. 992 76 513
Hat rail adaptor as mounting aid	Part No. 800110V0003	-	-

TURBO.DRIVE TD 35



Technical Features

- Operation of the turbomolecular pump TURBOVAC TW 501
- Benchtop unit
- Display of operating status
- Control pushbuttons and display on the front panel
- Inputs for remote control and process control (RS 232 C)

Technical Data

TURBO.DRIVE TD 35

Mains connection, 50 - 60 Hz	V	90-110/180-253
Max. output voltage	V	3 x 60
Permissible ambient temperature	°C (°F)	-5 to +40 (+23 to +104)
Dimensions (W x H x D)	mm (in.)	104.5 x 149 x 250 (4.11 x 5.87 x 9.84)
Weight, approx.	kg (lbs)	2.7 (5.96)

Ordering Information

TURBO.DRIVE TD 35

TURBO.DRIVE TD 35	Part No. 800150V0111
Connecting cable pump - converter 3 m (10.5 ft)	Part No. 800150V0113
Connection line air cooler 3 m (10.5 ft)	Part No. 800150V0115

TURBO.DRIVE TD 240



Technical Features

- Operation of the turbomolecular pump TURBOVAC TW 2401
- Benchtop unit
- Display of operating status
- Control pushbuttons and display on the front panel
- Inputs for remote control and process control (RS 232 C)

Technical Data

TURBO.DRIVE TD 240

Mains connection, 50 - 60 Hz	V	180-253
Max. output voltage	V	3 x 110
Permissible ambient temperature	°C (°F)	-5 to +40 (+23 to +104)
Dimensions (W x H x D)	mm (in.)	209 x 149 x 400 (8.2 x 5.7 x 15.7)
Weight, approx.	kg (lbs)	8.2 (18.1)

Ordering Information

TURBO.DRIVE TD 240

TURBO.DRIVE TD 240	Part No. 800150V0112
Connecting cable pump - converter 3 m (10.5 ft)	Part No. 800150V0114
Connection line air cooler 3 m (10.5 ft)	Part No. 800150V0116

Electronic Frequency Converters for Pumps with Magnetic Rotor Suspension MAG.DRIVE S



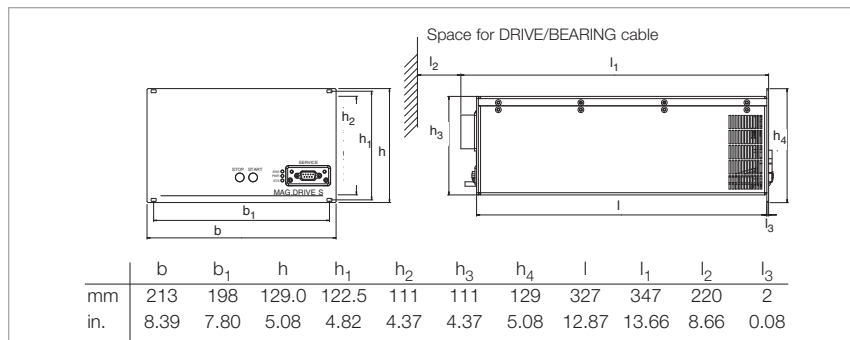
MAG.DRIVE S without display



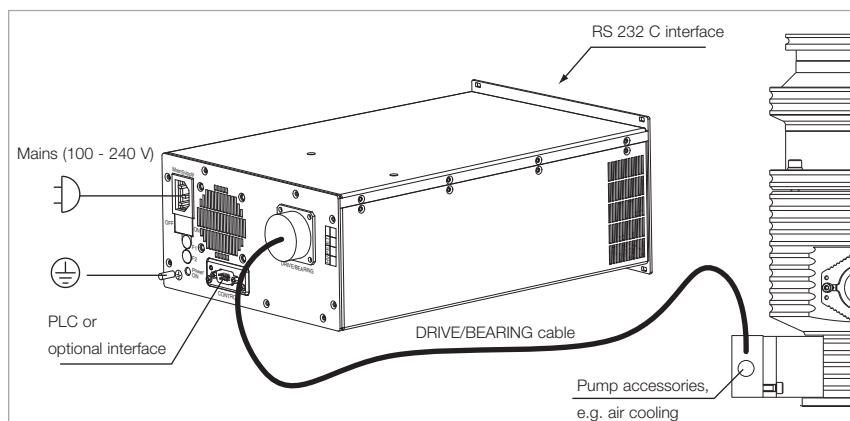
MAG.DRIVE S with display

Advantages to the User

- Operation of turbomolecular pumps with magnetically levitated rotors:
 - MAG W 300/400 P and
 - MAG W 600/700 P
- Easy operation through the controls
- Communication to host computer of the customer via serial interface and conventional interface possible
- Setting of speed and other functions
- Warning in case the pump is running out of specification
- Storing of all parameters in the pump's memory
- Small size and low weight
- Integrated fan
- 2 slots for industrial communications modules
 - rear side:
 - Standard 9 pin 24 V SPS
 - PLC-IO in Control Slot
 - front side:
 - RS 232 C in Service Slot
 - further interfaces can be fitted:
 - Ethernet, Profibus, DeviceNet,
 - RS 485 C



Dimensional drawing for the MAG.DRIVE S



Overview connection lines

Technical Data**MAG.DRIVE S**

Voltage range	V	100 - 240, ± 10%
Nominal frequency	Hz	50 / 60
Power consumption		
Stand-by	W	100
Maximum	W	400
Max. motor voltage	V	48
Max. pump current	A	6
Fuses F1, F2 5 x 20 mm		10 A fast blow high breaking capacity 250 V
System fuse		L or G characteristic
Max. frequency	Hz	0 to 2000
Load capability, relay output X1	V / A	32 / 0,5
Temperature		
during operation	°C (°F)	0 to +45 (+32 to +113)
during storage	°C (°F)	-10 to +60 (+14 to +140)
Relative humidity of the air	%	95 (non-condensing)

Ordering Information**MAG.DRIVE S**

Electronic frequency converter MAG.DRIVE S MAG.DRIVE S with display	Part No. 410300V0202 Part No. 410300V0212
Connecting cable DRIVE/BEARING (connection between pump and MAG.DRIVE S) 3.0 m (10.5 ft) 5.0 m (17.5 ft) 10.0 m (35.0 ft) ¹⁾ 20.0 m (70.0 ft) ¹⁾	Part No. 410300V4003 Part No. 410300V4005 Part No. 410300V4010 Part No. 410300V4020
Mains cable 3.0 m (10.5 ft) EURO plug US plug (220 V AC) 2.0 m (7.5 ft) US plug 115 V AC	Part No. 800102V0002 Part No. 800102V1002 Part No. 992 76 513

¹⁾ Suited for operating the MAG W 300/400 only

MAG.DRIVE digital



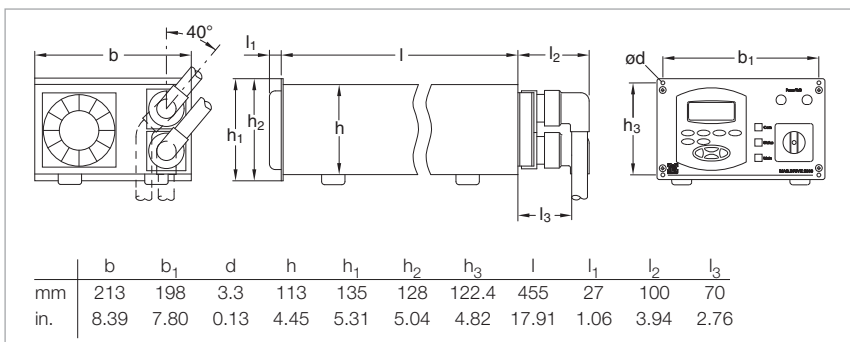
MAG.DRIVE digital without plug-in control



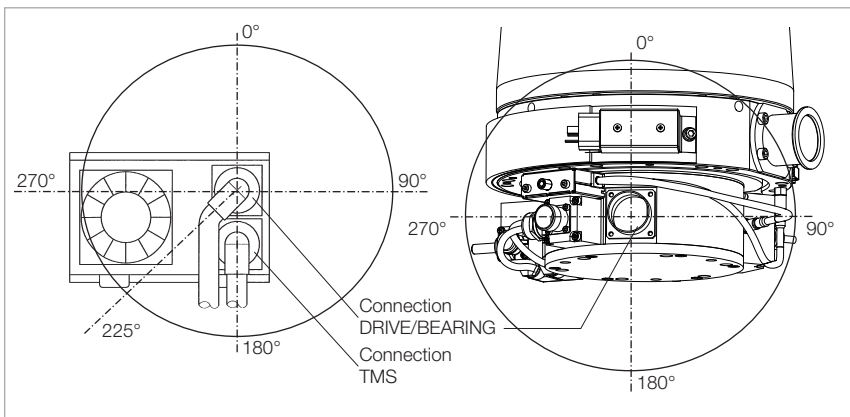
MAG.DRIVE digital with plug-in control

Advantages to the User

- Operation of turbomolecular pumps with magnetically levitated rotors:
MAG W 830/1300 C,
MAG (W) 1500 CT,
MAG W 2000 C/CT,
MAG W 2200 C/CT und
MAG W 2800/3200 C/CT
- Easy operation through the controls or the use of plug-in control unit
- Communication to host computer of the customer via serial interface and conventional interface possible
- Setting of speed, temperature of the basic flange and other functions
- Warning in case the pump is running out of specification
- Storing of all parameters in the pump's memory
- Plug-in control
- Small size and low weight
- Integrated fan
- Integrated temperature management system (TMS)



Dimensional drawing for the MAG.DRIVE digital



Overview connection lines

Technical Data

MAG.DRIVE digital

Mains connection, 50/60 Hz	V	200 - 240, +10%/-15%
Current for connected consumers, max.	A	20
Max. motor voltage	V	60
Nominal frequency	Hz	50/60
Permissible ambient temperature	°C (°F)	0 to +45 (+32 to +113)
Dimensions (W x H x D)	mm (in.)	483 x 213 x 1/2 19" (19.02 x 8.39 x 1/2 19")
Weight, approx.	kg (lbs)	10 (22)

Ordering Information

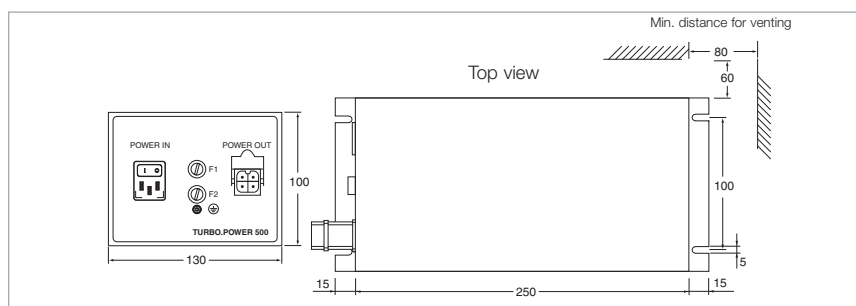
MAG.DRIVE digital

Electronic frequency converter ¹⁾ MAG.DRIVE digital with Profibus interface with RS 232 C interface				Part No. 400035V0011 Part No. 400035V0013 Part No. 400035V0014
Plug-in control				Part No. 121 36
Connection line leading to the DRIVE/BEARING of the TURBOVAC MAG ... C/CT				
	Cable outlet frequency converter	Cable outlet pump		
	DRIVE/BEARING	DRIVE/BEARING	PK	
1.5 m (5.25 ft)	bended 225°	straight	straight	Part No. 400036V0001
1.5 m (5.25 ft)	bended 40°	bended 180°	straight	Part No. 400036V0025
3.0 m (10.5 ft)	straight	bended 180°	straight	Part No. 400036V0006
3.0 m (10.5 ft)	bended 225°	straight	straight	Part No. 400036V0008
3.0 m (10.5 ft)	straight	bended 270°	straight	Part No. 400036V0009
5.0 m (17.5 ft)	bended 225°	straight	straight	Part No. 400036V0004
5.0 m (17.5 ft)	straight	straight	straight	Part No. 400036V0010
8.0 m (28.0 ft)	bended 225°	straight	straight	Part No. 400036V0005
10.0 m (35.0 ft)	bended 225°	straight	straight	Part No. 400036V0002
20.0 m (70.0 ft)	bended 225°	straight	straight	Part No. 400036V0003
23.0 m (80.5 ft)	bended 225°	straight	straight	Part No. 400036V0012
30.0 m (105 ft)	bended 225°	straight	straight	Part No. 400036V0011
TMS (only for CT versions)				
	Cable outlet frequency converter	Cable outlet pump		
	TMS	TMS	Heater	
1.5 m (5.25 ft)	bended 225°	straight	bended 180°	Part No. 400037V0001
1.5 m (5.25 ft)	bended 40°	straight	bended 180°	Part No. 400037V0025
3.0 m (10.5 ft)	bended 225°	straight	bended 180°	Part No. 400037V0008
5.0 m (17.5 ft)	bended 225°	straight	bended 180°	Part No. 400037V0004
8.0 m (28.0 ft)	bended 225°	straight	bended 180°	Part No. 400037V0005
10.0 m (35.0 ft)	bended 225°	straight	bended 180°	Part No. 400037V0002
20.0 m (70.0 ft)	bended 225°	straight	bended 180°	Part No. 400037V0003
Purge / Vent (only for optional purge vent valve Part No. 121 33)				
	Cable outlet frequency converter	Cable outlet pump		
	TMS	Purge	Vent	
1.5 m (5.25 ft)	straight	bended	bended	Part No. 400038V0007
3.0 m (10.5 ft)	bended 225°	bended	bended	Part No. 400038V0006
10.0 m (35.0 ft)	bended 225°	bended	bended	Part No. 400038V0002
20.0 m (70.0 ft)	straight	bended	bended	Part No. 400038V0009
Connector for hardware interface				upon request
19" installation frame				Part No. 161 00

¹⁾ Included are 2 mains cords. One with EURO plug and one with US plug (220 V AC).
Replacement mains cord are Part Numbers 180 097 or 180 096 respectively

Power Supply TURBO.POWER 500

for TURBOVAC MAG W 300/400/600/700 iP



Dimensional drawing for the power supply TURBO.POWER 500

Technical Features

- For supplying 48 V DC power to the MAG W 300/400/600/700 iP
- Bench top unit or for cabinet mounting

Technical Data

Power Supply TURBO.POWER 500

Power supply (POWER IN)	V	100 - 240, ± 10%
Nominal frequency	Hz	50 / 60
Power consumption		
Maximum	VA	650
at ultimate pressure operation		
of the pump	VA	450
DC voltage range		
POWER OUT	V DC	48
max.	A	10
Length of the DC connection cable, max.		
at 3 x 1.5 mm ²	m (ft)	5 (17.5)
at 3 x 2.5 mm ²	m (ft)	20 (70.0)
Ambient temperature		
during operation	°C (°F)	+10 to +40 (+50 to +104)
during storage	°C (°F)	-10 to -70 (+14 to -94)
Relative humidity of the air	%	5 to 85 (non-condensing)
Protection class	IP	30
Overvoltage category		II
Pollution category		2
Weight, approx.	kg (lbs)	4.0 (8.8)

Ordering Information

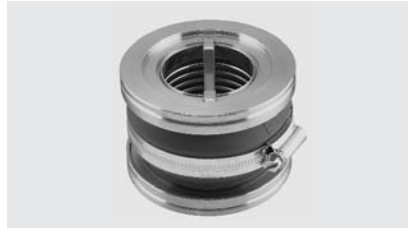
Power Supply TURBO.POWER 500

Power supply TURBO.POWER 500	Part No. 410300V0221
DC cable (connection between TURBO.POWER 500 and MAG.DRIVE iS)	
1.0 m (3.5 ft)	Part No. 410300V2001
3.0 m (10.5 ft)	Part No. 410300V2003
5.0 m (17.5 ft)	Part No. 410300V2005
10.0 m (35.0 ft)	Part No. 410300V2010
20.0 m (70.0 ft)	Part No. 410300V2020
Mains cable	
3.0 m (10.5 ft)	
EURO plug	Part No. 800102V0002
US plug (220 V AC)	Part No. 800102V1002
2.0 m (7.5 ft)	
US plug 115 V AC	Part No. 992 76 513

(Miscellaneous) Accessories

Vibration Absorber

Vibration absorbers are used to inhibit the propagation of vibrations from the turbomolecular pump to highly sensitive instruments like electron beam microscopes, micro-balances or analytical instruments.



Ordering Information

Vibration Absorber

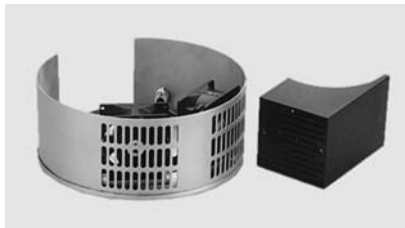
Vibration absorber

DN 63 ISO-K	66 mm (2.60 in.) long
DN 63 CF	81 mm (3.19 in.) long
DN 100 ISO-K	84 mm (3.31 in.) long
DN 100 CF	100 mm (4.09 in.) long
DN 160 ISO-K	84 mm (3.31 in.) long
DN 160 CF	104 mm (4.09 in.) long

Part No. 800131V0063
Part No. 500 070
Part No. 800131V0100
Part No. 500 071
Part No. 500 073
Part No. 500 072

Air Cooling Unit for TURBOVAC ClassicLine Pumps

For the purpose of retrofitting the TURBOVAC 50, 151, 361 and 600 pumps for air cooling, an air cooling unit is available by way of a retrofit kit. This kit can be easily fitted to the respective pump using the fitting components included with the accessories.



Technical Data

Air Cooling Unit

Rated power consumption of

the air cooling unit when connected to

TURBOVAC 50, 151 (C)/361 (C)	W
TURBOVAC 600 C, 1000 C	W

10.5
21.0

Ordering Information

Air Cooling Unit

Air cooling unit for

TURBOVAC 50
TURBOVAC 151 (C)/361 (C)
TURBOVAC 600 C, 1000 C

230 V
Part No. 854 05
Part No. 855 31
Part No. 855 41

115 V
Part No. 854 06
Part No. 894 08
upon request

100 V
Part No. 800152V0015
Part No. 800152V0016
Part No. 800152V0017

Air Cooling Unit for TURBOVAC SL Pumps

For fitting to the turbomolecular pumps SL 80, SL 300 and SL 700



Air cooling units for the SL-pumps, from left to right for: SL 80, SL 300 and SL 700

Technical Data

Air Cooling Unit

		SL 80	SL 300	SL 700
Power supply voltage	V DC	24	24	24
Current rating	mA	39	260	245
Power	W	0.9	6,2	6,0
Operating temperature	°C (°F)	+10 to +40 (+50 to +104)	+10 to +40 (+50 to +104)	+10 to +40 (+50 to +104)
Protection class	IP	20	20	20
Weight, approx.	g (lbs)	230 (0.51)	480 (1.1)	1100 (2.43)
Volume flow	m ³ /h	20	80	160

Ordering Information

Air Cooling Unit

	SL 80	SL 300	SL 700
Air cooling unit for TURBOVAC SL 80	Part No. 800136V0001	-	-
TURBOVAC SL 300	-	Part No. 800136V0002	-
TURBOVAC SL 700	-	-	Part No. 800136V0003

Flange Heater for CF High Vacuum Flanges

Most TURBOVAC pumps can be baked out in order to improve the ultimate pressure attained in the UHV range. Degassing of the turbomolecular pump will only be useful when simultaneously baking out the vacuum chamber.



Technical Data

Flange Heater

Rated power consumption of the flange heater		
DN 63 CF, DN 100 CF	W	100
DN 160 CF	W	150

Ordering Information

Flange Heater

	230 V	115 V
Flange heater		
DN 63 CF	Part No. 854 04	Part No. 854 07
DN 100 CF	Part No. 854 27	Part No. 854 28
DN 160 CF	Part No. 854 37	Part No. 854 38

Fine Filter

A fine filter integrated in the centering ring protects the pump against particles and dust on the highvacuum side.

Ordering Information

Connection flange of the fine filter
 DN 40 KF
 DN 63 ISO-K
 DN 100 ISO-K

Fine Filter

Part No. 883 98
Part No. 887 20
Part No. 887 21

Securing Collar for Octal Socket Plugs

for ClassicLine Pumps TURBOVAC 151 (C), 361 (C), 600 C, 1000 C and 1100 C

The securing collar serves the purpose of securing the plug on the ClassicLine pumps TURBOVAC 151 (C), 361 (C), 600 C, 1000 C and 1100 C against being disconnected inadvertently.



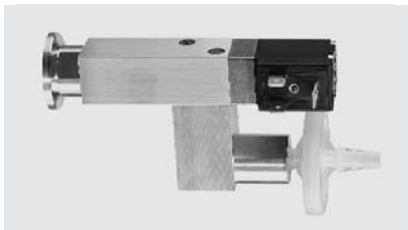
Ordering Information

Securing collar for octal socket plugs

Securing Collar for Octal Socket Plugs

Part No. 800001830

Solenoid Venting Valve



Technical Data

Technical Data		Venting Valve
Drive voltage	V DC	24
Power consumption	W	4
Connecting flange	DN	16 KF
Weight, approx.	kg (lbs)	0.3 (0.66)

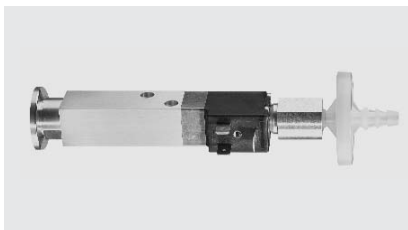
Ordering Information

Solenoid venting valve,
normally closed

Venting Valve

Part No. 800120V0011

Power Failure Venting Valve



Technical Data

Technical Data		Power Failure Venting Valve
Drive voltage	V DC	24
Power consumption	W	4
Connecting flange	DN	16 KF
Weight, approx.	kg (lbs)	0.3 (0.66)

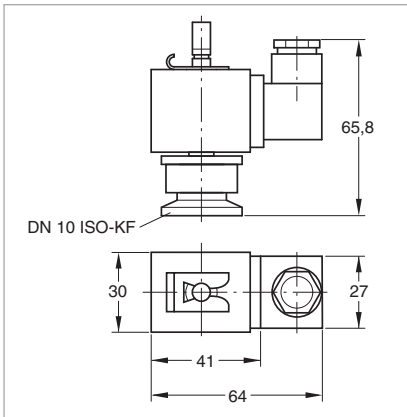
Ordering Information

Power failure venting valve, normally open

Power Failure Venting Valve

Part No. 800120V0021

Power Failure Venting Valve, Electromagnetically Actuated



Technical Data

Technical data

Power Failure Venting Valve

See Catalog Section C14 "Valves", para. "Special Valves"

Ordering Information

Power failure venting valve DN 10 KF,
electromagnetically actuated
24 V DC
230 V AC / 50/60 Hz

Power Failure Venting Valve

Part No. 174 46
Part No. 174 26

Purge Gas and Venting Valve



Technical Data

Connecting flange DN
Weight, approx. kg (lbs)

Purge Gas and Venting Valve

10 KF
0.7 (1.55)

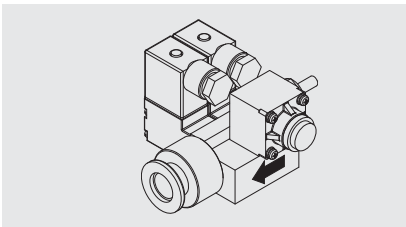
Ordering Information

Purge gas and venting valve, 230 V
0.2 mbar x l x s⁻¹ (12 sccm)
0.4 mbar x l x s⁻¹ (24 sccm)

Purge Gas and Venting Valve

Part No. 855 19
Part No. 855 29

Purge Gas and Venting Valve



Technical Data

Connecting flange
Inlet
Outlet
Purge gas pressure, abs. bar
Weight, approx. kg (lbs)

Purge Gas and Venting Valve

1/4" tube
pump specific or DN 16 KF

1.5 to 6,0
0.5 (1.1)

Ordering Information

Purge gas and venting valve
24 V DC; 0.6 mbar x l x s⁻¹

Purge Gas and Venting Valve

Part No. 121 33

Further 0.6 mbar x l x s⁻¹ valves upon request

Purge Gas and Venting Valve for ClassicLine and SL Pumps



Technical Data

Connecting flange		
Pump side	DN	10 KF
Gas connection	G	1/4"
Seal gas pressure, abs.	bar	1
Weight, approx.	kg (lbs)	0.3 (0.66)

Purge Gas and Venting Valve

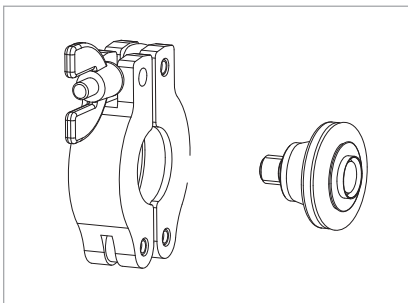
Ordering Information

Purge gas and venting valve at 1 bar
 0.2 mbar x l x s⁻¹ (12 sccm), 24 V DC
 0.2 mbar x l x s⁻¹ (12 sccm), 110 - 115 V DC
 0.2 mbar x l x s⁻¹ (12 sccm), 230 V DC
 0.4 mbar x l x s⁻¹ (24 sccm), 24 V DC
 0.4 mbar x l x s⁻¹ (24 sccm), 110 - 115 V DC
 0.4 mbar x l x s⁻¹ (24 sccm), 230 V DC
 0.6 mbar x l x s⁻¹ (36 sccm), 24 V DC
 0.6 mbar x l x s⁻¹ (36 sccm), 110 - 115 V DC
 0.6 mbar x l x s⁻¹ (36 sccm), 230 V DC

Purge Gas and Venting Valve

Part No. 113 50
Part No. 800152V0041
Part No. 800152V0019
Part No. 800152V0013
Part No. 800152V0042
Part No. 800152V0014
Part No. 800152V0012
Part No. 800152V0043
Part No. 800152V0040

Adapter Set for Seal Gas and Venting Valve for the SL pumps



Technical Data

Pump flange adapter M8/DN 10 KF including adapter centering ring DN 10/DN 16 KF with sinter filter insert and clamping ring

Adapter Set

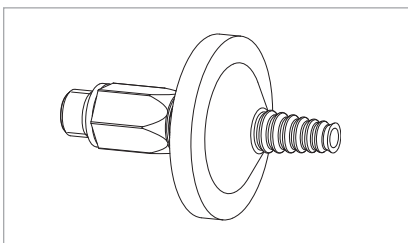
Ordering Information

Adapter set for purge gas and venting valve

Adapter Set

Part No. 800110V0011

Gas Filter to G 1/4" for Purge Gas and Venting Valve



Technical Data

Gasfilter including fitting G 1/4-in. and 2 gaskets

Gas Filter

Ordering Information

Gas filter to G 1/4-in. for seal gas and venting valve

Gas Filter

Part No. 800110V0012

Replacement filter for gas filter to G 1/4-in. for seal gas and venting valve

Part No. 200 18 515

The following accessories are also available:

Delayed venting unit
 Part No. 500 441
 (see Product Section C10)

Accessories for Serial Interfaces RS 232 C and RS 485 C

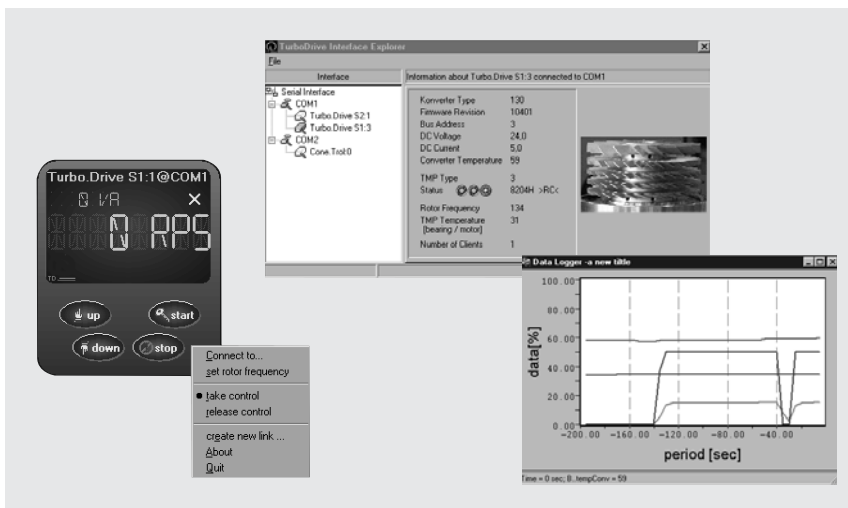
Through these accessories many control, monitoring and information capabilities can be implemented in connection with the electronic frequency converters and turbomolecular pumps.

The following turbomolecular pumps or electronic frequency converters are supported:

TW 70 H / TURBO.DRIVE S
SL 80, SL 300 /
TURBO.DRIVE TD 400
SL 700 / TURBO.DRIVE TD 700

TW 250 S / TURBO.DRIVE S /
TURBO.DRIVE TD 300
TW 300, TW 300 H / TURBO.DRIVE S /
TURBO.DRIVE TD 300
TW 501
TW 701
T 1600, TW 1600
TW 2401

PC Software



PC software for Windows 95 or higher

Technical Features

- Convenient graphical user interface
- Several turbomolecular pumps can be operated in parallel
- Display, modify, save and compare the parameter lists of the turbomolecular pumps
- Integration of customer's software
- Recording parameter data over time (for example, temperatures, rotor frequency)

Ordering Information

PC software
"TURBO.DRIVE Server", CD-Rom ¹⁾

PC Software

Part No. 800110V0102 ¹⁾

¹⁾ The PC software can be downloaded from "www.oerlikon.com"
Software supports only RS 232 C, RS 485 C and Profibus

Adaptor RS 232 C/RS 485 C for Frequency Converter with RS 485 C Interface

Ordering Information

Adaptor RS 232 C/RS 485 C
Mains connection 220 V, 50 Hz, EURO plug

Adaptor RS 232 C/RS 485 C

Part No. 800110V0101

Services for Mechanically Suspended Turbomolecular Pumps

Complete Refurbishing at the Service Centre

Complete refurbishing at the service centre includes the following:

Complete disassembly, cleaning, replacement of all wearing parts, mounting, electrical safety test, final test including vibration measurement

Complete Refurbishing with Decontamination at the Service Centre

Complete refurbishing with decontamination at the service centre includes the following:

Complete disassembly, cleaning and decontamination, replacement of all wearing parts, mounting, electrical safety test, final test including vibration measurement

Ordering Information	Complete Refurbishing at the Service Centre	Complete Refurbishing with Decontamination at the Service Centre
For pump		
TURBOVAC 35 / 50D	Part No. AS 2165	Part No. AS 2165 D
TURBOVAC 50	Part No. AS 2133	Part No. AS 2133 D
TURBOVAC SL 80	Part No. LAS 2368	Part No. LAS 2368 D
TURBOVAC TW 70 H	Part No. AS 2368	Part No. AS 2368 D
TURBOVAC 151	Part No. AS 2134	Part No. AS 2134 D
TURBOVAC TW 250 S	Part No. AS 2168	Part No. AS 2168 D
TURBOVAC SL 300	Part No. LAS 2369	Part No. LAS 2369 D
TURBOVAC TW 300	Part No. AS 2369	Part No. AS 2369 D
TURBOVAC 361	Part No. AS 2135	Part No. AS 2135 D
TURBOVAC 600 / 1000	Part No. AS 2136	Part No. AS 2136 D
TURBOVAC SL 700	Part No. LAS 2330	Part No. LAS 2330 D
TURBOVAC TW 701 / 690	Part No. AS 2330	Part No. AS 2330 D
TURBOVAC 1100	Part No. AS 2137	Part No. AS 2137 D
TURBOVAC T (W) 1600	Part No. AS 2329	Part No. AS 2329 D

Services for Magnetically Levitated Turbomolecular Pumps

Complete Refurbishing at the Service Centre

Complete refurbishing at the service centre includes the following:

Complete disassembly, cleaning, replacement of all wearing parts, mounting, electrical safety test, final test including vibration measurement

Complete Refurbishing with Decontamination at the Service Centre

Complete refurbishing with decontamination at the service centre includes the following:

Complete disassembly, cleaning and decontamination, replacement of all wearing parts, mounting, electrical safety test, final test including vibration measurement

Ordering Information	Complete Refurbishing at the Service Centre	Complete Refurbishing with Decontamination at the Service Centre
For pump TURBOVAC 340 M	Part No. AS 2141	Part No. AS 2141 D
TURBOVAC 340 MC/MCT	Part No. AS 2142 ¹⁾	Part No. AS 2142 D ¹⁾
TURBOVAC MAG 400 C/CT	Part No. AS 2143 ¹⁾	Part No. AS 2143 D ¹⁾
MAG (W) 1600 / 2000	Part No. AS 2164 ¹⁾	Part No. AS 2164 D ¹⁾
MAG (W) 830 / 1300 / 1500	Part No. AS 2370 ¹⁾	Part No. AS 2370 D ¹⁾
MAG 900 / 1000 / 1200	Part No. AS 2160 ¹⁾	Part No. AS 2160 D ¹⁾
MAG 2200	Part No. AS 2200 ¹⁾	Part No. AS 2200 D ¹⁾
MAG 2800 / 3200	Part No. AS 2800 ¹⁾	Part No. AS 2800 D ¹⁾

Notes

The listed services include the costs for material and working hours for standard pumps. Services for pump variants upon request.

If additional spare parts are needed for repairs, then these are invoiced separately according to a cost estimate.

¹⁾ Including rotor replacement

Sales and Service

Germany

Oerlikon
Leybold Vacuum GmbH
Bonner Strasse 498
D-50968 Cologne
Phone: +49-(0)221-347 1234
Fax: +49-(0)221-347 1245
sales.vacuum@oerlikon.com
www.oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Sales Area North/Northeast
Branch Office Berlin
Industriestrasse 10b
D-12099 Berlin
Phone: +49-(0)30-435 609 0
Fax: +49-(0)30-435 609 10
sales.vacuum.bn@oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Sales Area South/Southwest
Branch Office Munich
Karl-Hammerschmidt-Strasse 34
D-85609 Aschheim-Dornach
Phone: +49-(0)89-357 33 9-10
Fax: +49-(0)89-357 33 9-33
sales.vacuum.mn@oerlikon.com
service.vacuum.mn@oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Sales Area West & Benelux
Branch Office Cologne
Bonner Strasse 498
D-50968 Cologne
Phone: +49-(0)221-347 1270
Fax: +49-(0)221-347 1291
sales.vacuum.kn@oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Service Competence Center
Emil-Hoffmann-Strasse 43
D-50996 Cologne-Suerth
Phone: +49-(0)221-347 1439
Fax: +49-(0)221-347 1945
service.vacuum.kn@oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Mobil Customer Service
Emil-Hoffmann-Strasse 43
D-50996 Cologne-Suerth
Phone: +49-(0)221-347 1765
Fax: +49-(0)221-347 1944
service.vacuum.kn@oerlikon.com

Oerlikon
Leybold Vacuum
Dresden GmbH
Service Competence Center
Zur Wetterwarte 50, Haus 304
D-01109 Dresden
Service:
Phone: +49-(0)351-88 55 00
Fax: +49-(0)351-88 55 041
info.vacuum.dr@oerlikon.com

Europe

Belgium
Oerlikon
Leybold Vacuum Nederland B.V.
Belgisch bijkantoor
Leuvensesteenweg 542-9A
B-1930 Zaventem
Sales:
Phone: +32-2-711 00 83
Fax: +32-2-720 83 38
sales.vacuum.zv@oerlikon.com
Service:
Phone: +32-2-711 00 82
Fax: +32-2-720 83 38
service.vacuum.zv@oerlikon.com

France
Oerlikon
Leybold Vacuum France S.A.
7, Avenue du Québec
Z.A. de Courtaboeuf 1 - B.P. 42
F-91942 Courtaboeuf Cedex
Sales and Service:
Phone: +33-1-69 82 48 00
Fax: +33-1-69 07 57 38
info.vacuum.ctb@oerlikon.com
sales.vacuum.ctb@oerlikon.com

Oerlikon
Leybold Vacuum France S.A.
Valence Factory
640, Rue A. Bergès
B.P. 107 640
F-26501 Bourg-lès-Valence Cedex
Service:
Phone: +33-4-75 82 33 00
Fax: +33-4-75 82 92 69
marketing.vacuum.vc@oerlikon.com

Great Britain
Oerlikon
Leybold Vacuum UK LTD.
Silverglade Business Park
Leatherhead Road Unit 2
KT9 2QL Chessington, Surrey
(London)
Sales:
Phone: +44-13-7273 7300
Fax: +44-13-7273 7301
sales.vacuum.ln@oerlikon.com
Service:
Phone: +44-20-8971 7030
Fax: +44-20-8971 7003
service.vacuum.ln@oerlikon.com

Italy
Oerlikon
Leybold Vacuum Italia S.r.l.
Via Trasimeno 8
I-20128 Milano
Sales:
Phone: +39-02-27 22 31
Fax: +39-02-27 20 96 41
sales.vacuum.mi@oerlikon.com
Service:
Phone: +39-02-27 22 31
Fax: +39-02-27 22 32 17
service.vacuum.mi@oerlikon.com

Netherlands
Oerlikon
Leybold Vacuum Nederland B.V.
Proostwetering 24N
NL-3543 AE Utrecht
Sales and Service:
Phone: +31-(30) 242 6330
Fax: +31-(30) 242 6331
sales.vacuum.ut@oerlikon.com
service.vacuum.ut@oerlikon.com

Spain
Oerlikon
Leybold Vacuum Spain, S.A.
C/ Huelva 7
E-08940 Cornellà de Llobregat
(Barcelona)
Sales:
Phone: +34-93-666 43 11
Fax: +34-93-666 43 70
sales.vacuum.ba@oerlikon.com
Service:
Phone: +34-93-666 46 16
Fax: +34-93-685 43 70
service.vacuum.ba@oerlikon.com

Sweden
Oerlikon
Leybold Vacuum Scandinavia AB
Box 9084
SE-40092 Göteborg
Sales and Service:
Phone: +46-31-68 84 70
Fax: +46-31-68 39 39
info.vacuum.gt@oerlikon.com
sales.vacuum.gt@oerlikon.com
Visiting/delivery address:
Datavägen 57B
SE-43632 Askim

Switzerland
Oerlikon
Leybold Vacuum Schweiz AG
Leutschenbachstrasse 55
CH-8050 Zürich
Sales:
Phone: +41-44-308 40 50
Fax: +41-44-302 43 73
sales.vacuum.zh@oerlikon.com
Service:
Phone: +41-44-308 40 62
Fax: +41-44-308 40 60
service.vacuum.zh@oerlikon.com

America

USA
Oerlikon
Leybold Vacuum USA Inc.
5700 Mellon Road
USA-Export, PA 15632
Phone: +1-724-327-5700
Fax: +1-724-325-3577
info.vacuum.ex@oerlikon.com
Sales:
Eastern & Central time zones
Phone: +1-724-327-5700
Fax: +1-724-333-1217
Pacific, Mountain, Alaskan &
Hawaiian time zones
Phone: +1-408-436-2828
Fax: +1-408-436-2849
Service:
Phone: +1-724-327-5700
Fax: +1-724-325-3577

Latin America
Oerlikon
Leybold Vacuum USA Inc.
Brazilian Office
Av. Dória 360 cj. 12 Campo Belo
04635-070 São Paulo SP BRAZIL
Sales:
Phone: +55 11-3554 3117
Fax: +55 11-3554 3117
nelson.batistucci@oerlikon.com

Oerlikon
Leybold Vacuum GmbH
Bonner Strasse 498
D-50968 Cologne
Phone: +49-(0)221-347 0
Fax: +49-(0)221-347 1250
info.vacuum@oerlikon.com

Asia

P.R. China
Oerlikon
Leybold Vacuum (Tianjin)
International Trade Co. Ltd.
Beichen Economic
Development Area (BEDA),
No.8 Western Shuangchen Road
Tianjin 300400
China
Sales and Service:
Phone: +86-22-2697 0808
Fax: +86-22-2697 4061
Fax: +86-22-2697 2017
info.vacuum.tj@oerlikon.com
sales.vacuum.tj@oerlikon.com
service.vacuum.tj@oerlikon.com

Oerlikon
Leybold Vacuum
(Tianjin) Co. Ltd.
Beichen Economic
Development Area (BEDA),
No.8 Western Shuangchen Road
Tianjin 300400
China
Sales and Service:
Phone: +86-22-2697 0808
Fax: +86-22-2697 4061
info.vacuum.tj@oerlikon.com
sales.vacuum.tj@oerlikon.com
service.vacuum.tj@oerlikon.com

Oerlikon
Leybold Vacuum (Tianjin)
International Trade Co. Ltd.
Shanghai Branch:
No.33
76 Fu Te Dong San Road
Waigaoqiao Free Trade Zone
Shanghai 200131
China
Sales and Service:
Phone: +86-21-5064-4666
Fax: +86-21-5064-4668
info.vacuum.sh@oerlikon.com
sales.vacuum.sh@oerlikon.com
service.vacuum.sh@oerlikon.com

Oerlikon
Leybold Vacuum (Tianjin)
International Trade Co. Ltd.
Guangzhou Office and
Service Center
1st F, Main Building
Science City Plaza,
No.111 Science Revenue,
Guangzhou Science City
(GZSC) 510663, Guangzhou,
China
Sales:
Phone: +86-20-223 23 980
Fax: +86-20-223 23 990
info.vacuum.gz@oerlikon.com
sales.vacuum.gz@oerlikon.com
service.vacuum.gz@oerlikon.com

Oerlikon
Leybold Vacuum (Tianjin)
International Trade Co. Ltd.
Beijing Branch:
1-908, Beijing Landmark Towers
8 North Dongsanhuan Road
Beijing 100004
China
Sales:
Phone: +86-10-6590-7622
Fax: +86-10-6590-7607
sales.vacuum.bj@oerlikon.com
service.vacuum.bj@oerlikon.com

India
Oerlikon
Leybold Vacuum India Pvt Ltd.
EL 22, J-Block
MIDC Bhosari
Pune 411026
India
Sales and Service:
Phone: +91-20-3061 6000
Fax: +91-20-2712 1571
sales.vacuum.pu@oerlikon.com
service.vacuum.pu@oerlikon.com

Japan
Oerlikon
Leybold Vacuum
Japan Co., Ltd.
Headquarter
23-3, Shin-Yokohama
3-chome
Tobu A.K. Bldg. 4th Floor
Kohoku-ku
Yokohama-shi 222-0033
Sales:
Phone: +81-45-471-3330
Fax: +81-45-471-3323
info.vacuum.yh@oerlikon.com
sales.vacuum.yh@oerlikon.com

Oerlikon
Leybold Vacuum
Japan Co., Ltd.
Osaka Sales Office
3F, Shin-Osaka Terasaki
No.3 Bldg.
1-5-28 Nishi-Miyahara
Yodogawa-ku, Osaka-shi
Osaka 532-0004
Phone: +81-6-6399-6271
Fax: +81-6-6399-6273
info.vacuum.os@oerlikon.com
sales.vacuum.os@oerlikon.com

Oerlikon
Leybold Vacuum
Japan Co., Ltd.
Tsukuba Technical Service Center
Kogyo Danchi
21, Kasuminosato,
Ami-machi, Inashiki-gun
Ibaraki-ken, 300-0315
Service:
Phone: +81-298 89 2841
Fax: +81-298 89 2838
info.vacuum.iik@oerlikon.com
sales.vacuum.iik@oerlikon.com

South Korea
Oerlikon
Leybold Vacuum Korea Ltd.
3F, Jellzone 2 Tower
Jeongja-dong 159-4
Bundang-gu Sungnam-si
Gyeonggi-do
Bundang 463-384, Korea
Sales:
Phone: +82-31 785 1367
Fax: +82-31 785 1359
sales.vacuum.bd@oerlikon.com

Service:
623-7, Upsung-Dong
Cheonan-Si
Chungcheongnam-Do
Korea 330-290
Phone: +82-41 589 3035
Fax: +82-41 588 0166
service.vacuum.cn@oerlikon.com

Singapore
Oerlikon
Leybold Vacuum
Singapore Pte Ltd.
1 Science Park Road
Singapore Science Park 2
#02-12, Capricorn Building
Singapore 117528
Sales and Service:
Phone: +65-6303 7000
Fax: +65-6773 0039
sales.vacuum.sg@oerlikon.com
service.vacuum.sg@oerlikon.com

Taiwan
Oerlikon
Leybold Vacuum Taiwan Ltd.
No 416-1, Sec. 3
Chungshin Road., Chutung
Hsinchu County 310
Taiwan, R.O.C.
Sales and Service:
Phone: +886-3-500 1688
Fax: +886-3-583 3999
sales.vacuum.hc@oerlikon.com
service.vacuum.hc@oerlikon.com

oerlikon
leybold vacuum
www.oerlikon.com/leyboldvacuum