



# TURBOVAC i Turbomolecular Pumps

90 l/s - 450 l/s



# A giant leap in vacuum performance!

**It has never been so easy to improve your processes until now. TURBOVAC 90-450 i will allow you to optimize pump down times and consistently hit your target in terms of pressures and gas flows. Designed to offer the best performance/size ratio in the ISO 63, 100 and 160 size range, this product family features a cutting edge rotor and drag stage design resulting in high performance and unparalleled pumping speed, especially for light gases.**

Not only does the flexibility of the rotor and drag stage design offer benchmark performance, it also ensures that the performance of your pump is perfectly adapted to your specific application. In addition, you can also choose between different electronic control options, various housing and flange

configurations as well as a wide range of accessories. The unique oil free hybrid bearing system with lifetime-lubricated ball bearings will boost your productivity and reduce cost of ownership.

The result: a vacuum system operation which is more efficient than ever!

## Advantages at a glance

- **Price & Performance:** Best performance for your investment
- **Flexible & Fast:** High level of product flexibility – a perfect match for your application requirements
- **Plug & Play:** Simple and easy installation, operation and control thanks to flexible product design, integrated electronics and wide range of communication interfaces
- **Fit & Forget:** Superior reliability due to an innovative pump design and the unique oil-free hybrid bearing concept with lifetime-lubricated ball bearings available in the market today

# Typical applications



## Analytical technologies/ Research & Development

- Mass spectrometry
- Electron microscopy
- Surface analysis
- X-ray analysis
- Particle accelerators and synchrotrons
- Laboratory coating systems
- MBE (Molecular Beam Epitaxy)
- UHV systems

## Life Sciences

- Proton therapy
- Gamma sterilization
- Production of high quality implants

## Industrial and coating applications

- PVD (Physical Vapour Deposition)
  - Optical coatings
  - CD/DVD/Blu-Ray disc production
  - Thin film technologies, photovoltaics
- Load locks, transfer chambers, handling systems
- Electron beam welders
- Insulation vacuum and leak detection



### Performance you can rely on

Thanks to its variable rotor and drag stage design, the modern TURBOVAC i line provides the right performance for different processes: For UHV applications and compact pump system solutions, TURBOVAC 90 i, 250 i, 350 i and 450 i are the products of choice. With a light gas pumping speed of up to 60% above current reference products and compression values around 100 times higher than previous generation products, they are especially suitable for operation with small backing pumps.

Your benefits: a considerably smaller vacuum system, lower initial and operating costs and a more compact footprint.

When it comes to demanding process and high gas throughput applications, TURBOVAC T models deliver unequalled efficiency with faster run up times, higher tolerance for particles and increased gas throughput.

### Superior reliability

The unique oil free hybrid bearing system is characterized by its extreme reliability and durability.

This is achieved by an integrated lifetime lubrication system that never needs an oil change.

The simply-supported shaft system results in a low vibration pump design which reduces noise, mechanical stress and negative impact on vibration sensitive applications. Optimized cooling of the bearings is ensured through thermal isolation and a highly efficient motor. The pump is also equipped with a purge port to protect the bearings from critical gases and particles. As a result, the up-time and lifespan of the pump as well as your productivity are increased considerably. In combination with low costs of ownership, your vacuum system will be more efficient than ever.





## Countless options

The TURBOVAC i family offers numerous options to meet all of your application's requirements. All versions of the TURBOVAC i family are available with an additional interstage port that will allow you to pump down a second chamber. In order to reach the highest possible level of comfort during installation, operation and control, TURBOVAC i offers features such as a rotatable fore-vacuum flange connection, an integrated electronic drive with 24/48V DC supply and an operator interface with USB, RS485 and digital I/O connections. Additional interface options are available on demand.

A flexible and broad accessory program completes the new product range. It includes cost-efficient power supplies for 100-240V mains supply, adjustable air or water cooling units, heaters, venting and purge accessories as well as installation and mounting kits to simplify pump installation. Discover infinite possibilities with the flexibility of TURBOVAC i.

# More in it for you ...

## Performance

- Industry-leading pumping speed especially for light gases (up to 60% higher than existing products)
- Optimized rotor diameter for ISO 63, 100 and 160 flanges to provide maximum pumping performance

## Flexibility

- Vacuum port design flexibility
  - Rotatable fore-vacuum port
  - Interstage port options
- Variable rotor and drag stage configurations for perfect match to application requirements

## Installation, operation and control

- Integrated 24/48V DC drive electronics to avoid expensive cabling
- Widest range of communication interfaces: USB, RS485 and remote 15 pin digital I/O as standard options, other interfaces on request
- Highly efficient motor
- Thermal isolation by design for optimized cooling of bearing and improved pump lifetime
- Simply-supported shaft reduces vibration
- Maintenance free upper passive magnetic bearing
- Oil free, lifetime lubricated lower mechanical ceramic ball bearing, field-replaceable



## ... get more out of it



### Best performance for your investment

- Flexible performance adaptation – tailor-made to perfectly meet your requirements
- Outstanding performance for all applications thanks to innovative technology

### Easy installation, operation and control

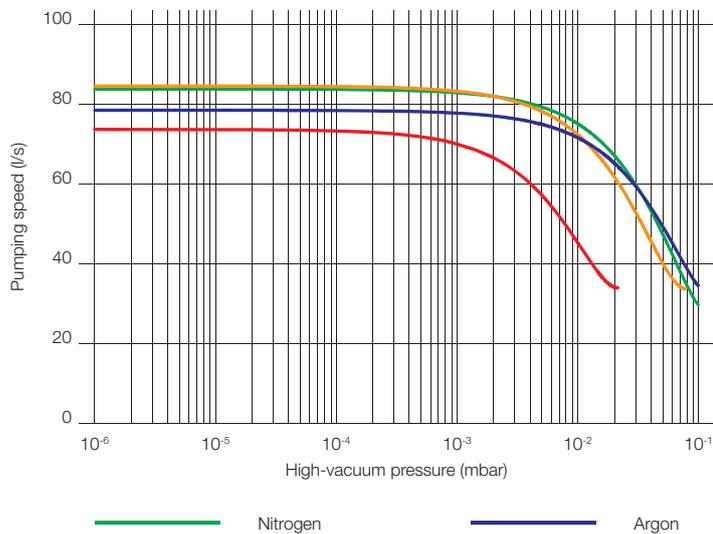
- Plug & Play: integrated electronics, communication options and flexible accessories
- Installation in any orientation

### Increased productivity and system uptime at lowest cost

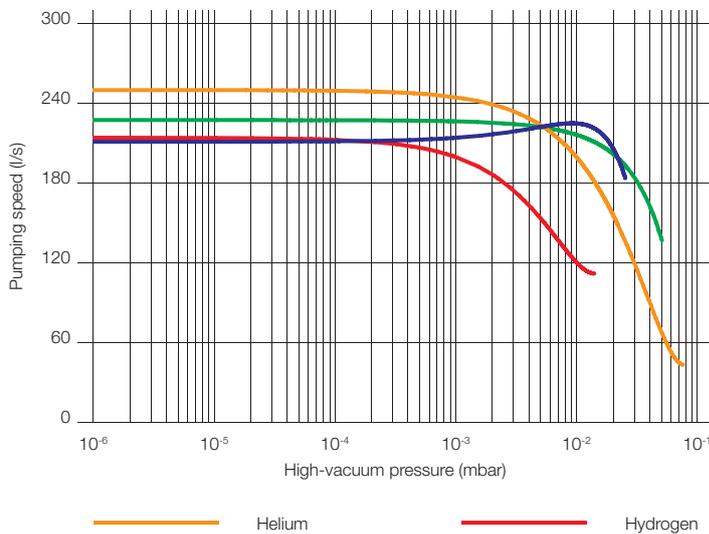
- Superior reliability thanks to innovative pump and bearing design
- Fit & Forget: first and only mechanical turbomolecular pump with oil-free bearing concept and maintenance-free ball bearings – no need for oil changes
- Possibility of on-site bearing replacement reduces cost of ownership and downtime

# Technical specifications

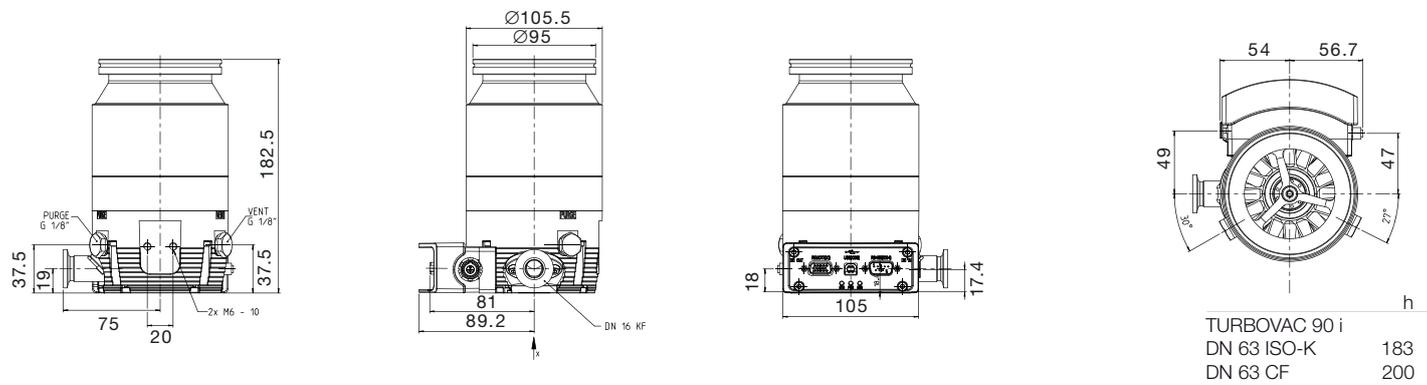
## TURBOVAC 90 i



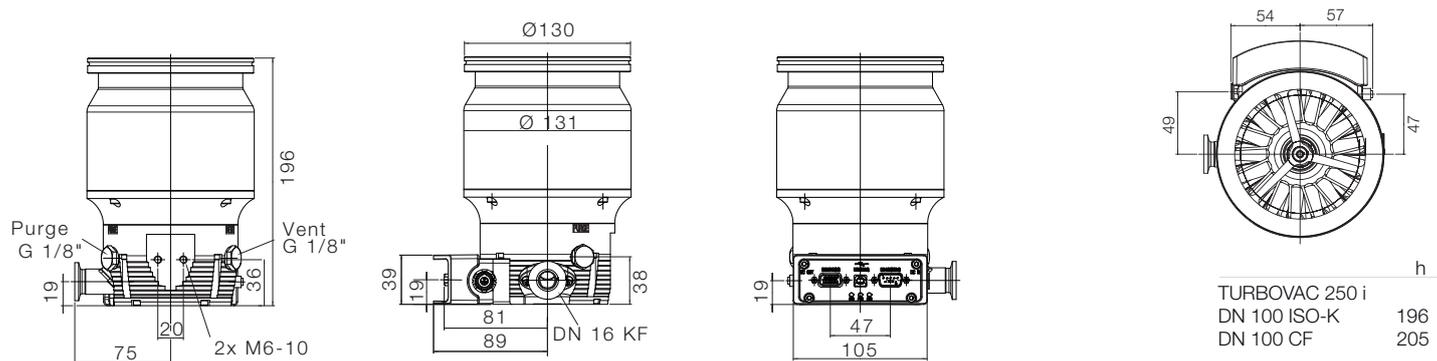
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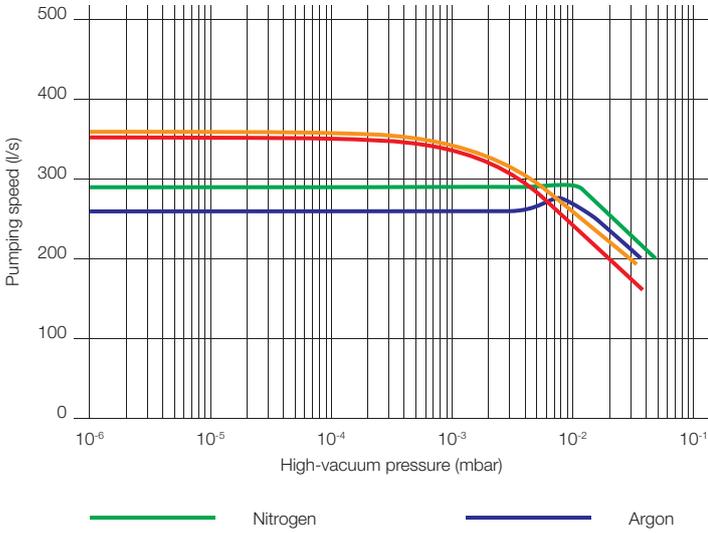
## TURBOVAC 90 i



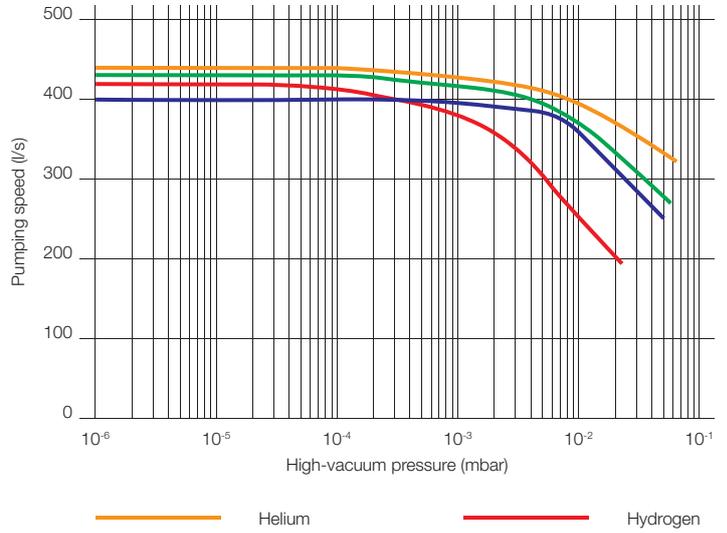
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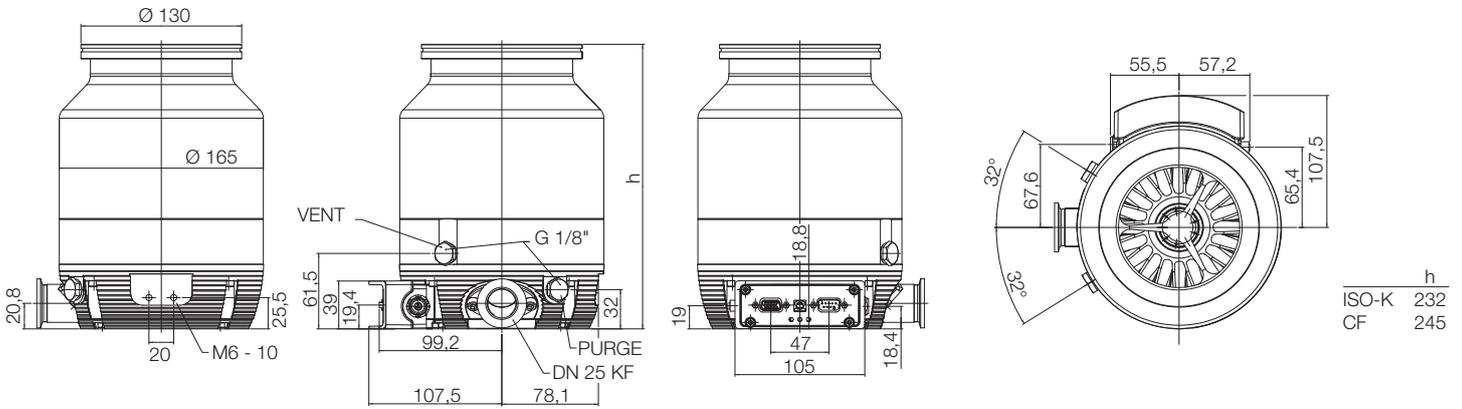
### TURBOVAC 350 i



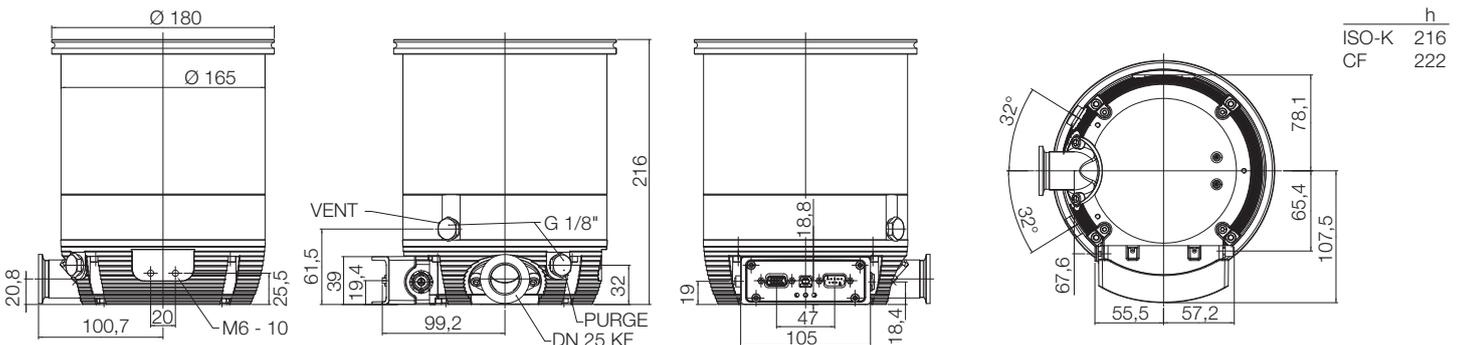
### TURBOVAC 450 i



### TURBOVAC (T) 350 i



### TURBOVAC (T) 450 i



# Technical specifications

Technal data			
TURBOVAC		90 i	250 i
High-vacuum connection	DN	63 ISO-K 63 CF	100 ISO-K 100 CF
Fore-vacuum connection	DN	16 KF	16 KF
Pumping speed for	$l \cdot s^{-1}$		
N <sub>2</sub>		90	225
Ar		83	210
He		90	250
H <sub>2</sub>		78	210
Gas throughput	$mbar \cdot l \cdot s^{-1}$		
N <sub>2</sub>		10	6
Ar		3	3
He		11	6
H <sub>2</sub>		11	> 10
Compression ratio			
N <sub>2</sub>		$1 \cdot 10^{11}$	$1 \cdot 10^{11}$
Ar		$1 \cdot 10^{11}$	$1 \cdot 10^{11}$
He		$1 \cdot 10^8$	$1 \cdot 10^8$
H <sub>2</sub>		$5 \cdot 10^7$	$2 \cdot 10^7$
Ultimate pressure ISO-K/CF with 2-stage oil-sealed rotary vane pump	mbar	$\leq 8 \cdot 10^{-8} / \leq 5 \cdot 10^{-10}$	
Max. permissible fore-vacuum pressure for N <sub>2</sub>	mbar	14	14
Operating speed	rpm	72 000	
Cooling standard		Convection	
Cooling optional		Air or water	
Weight ISO-K/CF	kg	3.1 / 4.8	4.0 / 6.6
Recommended fore-vacuum pumps	TRIVAC SCROLLVAC DIVAC	D 2,5 E / D 4 B SC 5 D 1.4 HV3	D 2,5 E / D 4 B SC 5 D / SC 15 D 3.8 HV3
Supply voltage		24/48V DC $\pm 10\%$	
Max. current consumption		10 A at 24 V DC	
Max. power consumption	W	240	
Interfaces		RS 485, USB, 15-pin digital I/O (additional on request)	

## Technical data

TURBOVAC		350 i	450 i	T 350 i	T 450 i
High-vacuum connection	DN	100 ISO-K 100 CF	160 ISO-K 160 CF	100 ISO-K 100 CF	160 ISO-K 160 CF
Fore-vacuum connection	DN	25 KF	25 KF	25 KF	25 KF
Pumping speed for	$l \cdot s^{-1}$				
N <sub>2</sub>		290	430	290	430
Ar		260	400	260	400
He		360	440	360	440
H <sub>2</sub>		350	420	320	400
Gas throughput	$mbar \cdot l \cdot s^{-1}$				
N <sub>2</sub>		4.5	4.5	11.5	11.5
Ar		2.0	2.0	6.0	6.0
He		8.0	8.0	20.0	20.0
H <sub>2</sub>		8.0	8.0	20.0	20.0
Compression ratio					
N <sub>2</sub>		$1 \cdot 10^{11}$	$1 \cdot 10^{11}$	$1 \cdot 10^{10}$	$1 \cdot 10^{10}$
Ar		$1 \cdot 10^{11}$	$1 \cdot 10^{11}$	$1 \cdot 10^{11}$	$1 \cdot 10^{11}$
He		$1 \cdot 10^8$	$1 \cdot 10^8$	$1 \cdot 10^6$	$1 \cdot 10^6$
H <sub>2</sub>		$1 \cdot 10^6$	$1 \cdot 10^6$	$1 \cdot 10^4$	$1 \cdot 10^4$
Ultimate pressure ISO-K/CF with 2-stage oil-sealed rotary vane pump	mbar	$\leq 8 \cdot 10^{-8} / \leq 5 \cdot 10^{-10}$			
Max. permissible fore-vacuum pressure for N <sub>2</sub>	mbar	10	10	0.5	0.5
Operating speed	rpm	60 000			
Cooling standard		Convection			
Cooling optional		Air or water			
Weight ISO-K/CF	kg	7.5 / 11.5	7.7 / 12.5	7.0 / 11.0	7.2 / 12.0
Recommended fore-vacuum pumps	TRIVAC	D 4 B	D 4 B	D 16 B	D 16 B
	SCROLLVAC	SC 5 D	SC 5 D	SC 15 D	SC 15 D
		SC 15 D	SC 15 D	SC 30 D	SC 30 D
	DIVAC	3.8 HV3	3.8 HV3	–	–
Supply voltage		24/48 V DC $\pm$ 10 %			
Max. current consumption		10 A at 24 V DC			
Max. power consumption	W	240			
Interfaces		RS 485, USB, 15-pin digital I/O (additional on request)			

# Ordering Information

For the operation of a TURBOVAC i, a suitable backing pump, a power supply and DC/mains cable are mandatory. Further accessories might be required depending on the application and operating conditions.

## Pumps

TURBOVAC	90 i	250 i	350 i	450 i	T 350 i	T 450 i
High-vacuum flange	63 ISO-K	100 ISO-K	100 ISO-K	160 ISO-K	100 ISO-K	160 ISO-K
<b>Part Number *)</b>	810031V1000	820051V1000	830051V1000	830071V1000	830050V1000	830070V1000
High-vacuum flange	63 CF	100 CF	100 CF	160 CF	100 CF	160 CF
<b>Part Number *)</b>	810041V1000	820061V1000	830061V1000	830081V1000	830060V1000	830080V1000

\*) all part numbers with RS485, USB+, 15 pin digital I/O; other interfaces upon request

## Accessories

### Power supply, cables and accessories

- 800100V0003 – **TURBO.POWER integra incl. cable 0.3 m**
- 800096V0100 – Cable TURBOVAC i – TURBO.POWER integra, 1 m
- 800096V0300 – Cable TURBOVAC i – TURBO.POWER integra, 3 m
- 800096V0500 – Cable TURBOVAC i – TURBO.POWER integra, 5 m
- 800102V0002 – Mains cable for power supplies, 3 m, EC plug
- 800102V0003 – Mains cable for power supplies, 3 m, UK plug
- 800102V1002 – Mains cable for power supplies, 3 m, US plug
- 800110V0016 – Accessory cable TURBOVAC i, M8-M8, 2m
- 800110V0020 – Y cable TURBOVAC i, M8
- 800110V0021 – Start stop switch for TURBOVAC i
- 800110V0108 – USB cable 2.0 Type A/B, 1.8 m
- 230439V01 – **LEYASSIST software for turbomolecular pumps**
- 800110V0030 – **Relay box for forevacuum pump, 1-phase, 10A**  
incl. 2 m M8-M8 cable

### Cooling

- 800136V0007 – Air cooling radial TURBOVAC 90 i(X)
- 800136V0009 – Air cooling radial TURBOVAC 250 i(X)
- 800136V0005 – Air cooling radial TURBOVAC 350-450 i(X)
- 800136V0008 – Air cooling axial TURBOVAC 90 i(X) und 250 i(X)
- 800136V0006 – Air cooling axial TURBOVAC 350-450 i(X)
- 800135V0005 – Water cooling TURBOVAC i(X), G 1/8"
- 800135V0006 – Water cooling TURBOVAC i(X), G 1/4"

### Heating

- 800137V0003 – Flange heating DN 63 CF, 230 V
- 800137V0004 – Flange heating DN 63 CF, 115 V
- 800137V0005 – Flange heating DN 100 CF, 230V
- 800137V0006 – Flange heating DN 100 CF, 115V
- 800137V0007 – Flange heating DN 160 CF, 230V
- 800137V0008 – Flange heating DN 160 CF, 115V

### Venting and Purge

- 800120V0012 – Venting valve, 24 V DC, G 1/8"
- 800120V0013 – Purge gas valve, 24V DC, 24 sccm, G 1/8"
- 800120V0014 – Purge gas throttle, 24 sccm, G 1/8"
- 800120V0022 – Power failure venting valve, 24V DC, G 1/8"
- 800110V0022 – Air filter, G 1/8"



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