



## TurboDrag Pump

HiPace 80

# HiPACE

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# 1 About this manual

## 1.1 Validity

This operating manual is for customers of Pfeiffer Vacuum. It describes the functioning of the designated product and provides the most important information for safe use of the unit. The description follows applicable EU guidelines. All information provided in this operating manual refer to the current state of the product's development. The documentation remains valid as long as the customer does not make any changes to the product.

Up-to-date operating instructions can also be downloaded from [www.pfeiffer-vacuum.net](http://www.pfeiffer-vacuum.net).

### Applicable documents

HiPace 80	Operating instructions
Safety information for vacuum pumps "Safety Guide"	PT 0300 BN*
Operating instructions "Electronic drive unit TC 110"	PT 0203 BN*
Manufacturer's declaration	Part of this document
Operating instructions for accessories	see section "Accessories"*

\*also available via [www.pfeiffer-vacuum.net](http://www.pfeiffer-vacuum.net)

For information about other certifications, if applicable, please see the signet on the pump or:

- [www.tuvdotcom.com](http://www.tuvdotcom.com)
- TUVdotCOM-ID 0000021320

## 1.2 Conventions

### Safety instructions

The safety instructions in Pfeiffer Vacuum operating manuals are the result of risk evaluations and hazard analyses and are oriented on international certification standards as specified by UL, CSA, ANSI Z-535, Semi-S1, ISO 3864 and DIN 4844. In this document, the following hazard levels and information are considered:

<b>DANGER</b>
<b>Immediate danger</b> Death or very severe injuries occur.
<b>WARNING</b>
<b>Possible danger</b> Death or injuries may occur.
<b>CAUTION</b>
<b>Possible danger</b> Medium to slight injuries may occur.
<b>NOTE</b>
<b>Command or note</b> Command to perform an action or information about properties, the disregarding of which may result in damage to the product.

## Piktograph definitions



Prohibition of an action or activity in connection with a source of danger, the disregarding of which may result in serious accidents.



Warning of a displayed source of danger in connection with operation of the unit or equipment.



Command to perform an action or task associated with a source of danger, the disregarding of which may result in serious accidents.

## Instructions in the text

→ Work instruction: here you have to do something.

## Abbreviations used

**DCU:** Display and operating unit  
**HPU:** Handheld programming unit  
**TC:** Electronic drive unit for turbopump  
**TPS:** Mains pack

## Symbols used

The following symbols are used consistently throughout the diagrams:

- Ⓜ High vacuum flange
- Ⓦ Fore-vacuum flange
- ⚡ Electric connection
- ⊗ Cooling water connection
- ⓕ Venting connection
- Ⓢ Sealing gas connection

## 2 Safety

### 2.1 Safety precautions



#### NOTE

##### Duty to inform

Each person involved in the installation, operation or maintenance of the vacuum pump must read and observe the safety-related parts of these operating instructions.

- Absolute observe the safety information for vacuum pumps (PT 0300 BN) !
- The operator is obligated to make operating personnel aware of dangers originating from the vacuum pump, the pumped medium and the entire system.



#### NOTE

##### Installation and operation of accessories

Pfeiffer Vacuum pumps can be equipped with a series of adapted accessories. The installation, operation and maintenance of connected devices are described in detail in the operating instructions of the individual components.

- For information on the operating instructions of components, see "Accessories".
- Use original accessory parts only.

- Do not loosen any plug connection during operations.
- Wait for the rotor to reach standstill before performing work on the high vacuum flange.
- Keep leads and cables well away from hot surfaces (> 70 °C).
- A safe connection to the protective earthing conductor (PE) is recommended (protection class III).
- Never fill or operate turbopump with cleaning agent.

### 2.2 Proper use



#### NOTE

##### CE conformity

The manufacturer's declaration becomes invalid if the operator modifies the original product or installs additional components!

- Following installation into a plant and before commissioning, the operator must check the entire system for compliance with the valid EU directives and reassess it accordingly.

- Only operate the turbopump with an approved backing pump.
- Only operate the turbopump with electronic drive unit by a specified Pfeiffer Vacuum power supply. The use of other power units than the intended, is only permitted after consultation with Pfeiffer Vacuum.

### 2.3 Improper use

Improper use will cause all claims for liability and guarantees to be forfeited. Improper use is deemed to be all use for purposes deviating from those mentioned above, especially:

- Pumping of corrosive or explosive media.
- Pumping of condensing vapors.
- Operation with improper high levels of gas loads.
- Operation with improper high fore-vacuum pressures.

- Operation with improper gas mode.
- Operation with improper high levels of insulated heat input.
- Venting with improper high venting rates.
- The operation of the devices in potentially radioactive areas.
- Installation in systems where the turbopumps are subjected to impact-like stress and vibrations or the effect of periodically occurring forces.
- The connection to a power supply with earthing of a direct voltage pole.
- The use of accessories, which are not named in this manual or not authorised by Pfeiffer Vacuum.



#### NOTE

##### Warranty seal

The pump housing is sealed ex factory. Damaging or breakage of the seal leads to the loss of liability and warranty entitlements.

- Do not open the pump within its warranty period!
- For process-related shorter maintenance intervals please contact the Pfeiffer Vacuum Service.

## 3 Transport and storage

### 3.1 Transport

- Reuse the transport container. Vacuum pumps should be transported or shipped in the original packing only.
- Only remove the protective covers from the high vacuum and the fore-vacuum side immediately before connection.
- Keep the original protective covers.
- Always transport the turbopump in an upright position.

### 3.2 Storage

- Close the flange openings by using the original protective covers.
- Close further connection ports by using the corresponding protective covers.
- Store the pump only indoors with an ambient temperature between -25 °C and +55 °C.
- In rooms with moist or aggressive atmospheres, the turbopump must be air-proof shrink-wrapped in a plastic bag together with a bag of dessicant.

## 4 Product description

### 4.1 Product identification

#### Pump features

Characteristics	HiPace 80		
HV flange	DN 63 ISO-K	DN 63 CF	DN 40 ISO-KF
Flange material	Aluminium	Stainless steel	Aluminium

To correctly identify the product when communicating with Pfeiffer Vacuum, always have the information from the rating plate available.



Fig. 1: Example for a rating plate

#### Scope of delivery

- HiPace 80 with TC 110 and 24 VDC  $\pm$  5 %
- Protective cover for the high vacuum and the fore-vacuum flange
- Operating instructions

### 4.2 Function

The turbopump HiPace 80 forms a complete unit together with the electronic drive unit TC 110. For the voltage supply only Pfeiffer Vacuum power supplies may be used (e.g. TPS or DCU). The use of other power units than the proper intended is only permitted after consultation with Pfeiffer Vacuum (specification of the power supplies on request).

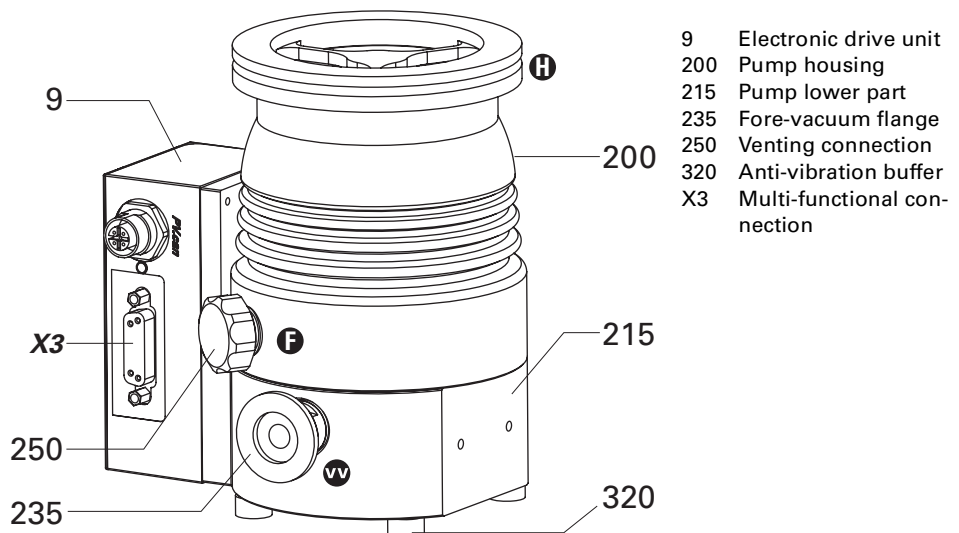


Fig. 2: View of HiPace 80 with TC 110

#### Cooling

- Air cooling
- Water cooling (optional)

In the case of excess temperature the electronic drive unit reduces the drive power automatically. Depending on the application and the HiPace different cooling variants are selectable.

**Rotor bearing**

Hybrid bearing TurboDrag pump

- High vacuum side: maintenance-free permanent magnetic bearing.
- Fore-vacuum side: ceramic ball bearing.

**Drive**

Electronic drive unit TC 110

**4.3 Range of application**

The pump HiPace 80 must be installed and operated in the following ambient conditions.

Installation location	weather protected (indoors)
Temperature	+5 °C to +40 °C (up to +35 °C with air cooling)
Protection category	IP 54
Protection class	III
Relative humidity	max. 80 %, at T ≤ 31 °C, up to max. 50% at T ≤ 40 °C
Atmospheric pressure:	77 kPa - 106 kPa
Installation altitude	2000 m max.
Degree of pollution	2
Permissible surrounding magnetic field	≤ 3 mT
Overvoltage category	II
Connection voltage TC	24 VDC ±5%

**5 Installation**



<b>WARNING</b>	
<b>Danger of the turbopump being ripped off.</b>	<p>If the rotor is suddenly blocked, torques of up to 620 Nm can occur; if the turbopump is not properly fastened, it can be ripped off.</p> <p>→ Precisely follow installation instructions.</p> <p>→ Only use original components for the installation.</p>



<b>NOTE</b>	
<b>Installation and operation of accessories</b>	<p>Pfeiffer Vacuum pumps can be equipped with a series of adapted accessories. The installation, operation and maintenance of connected devices are described in detail in the operating instructions of the individual components.</p> <p>→ For information on the operating instructions of components, see "Accessories".</p> <p>→ Use original accessory parts only.</p>

**5.1 Set-up**

When installing the pump, observe the following conditions:

- The ambient conditions named for the area of use.
- When using a casing heating and a water cooling unit the temperature of the connected flange of the vacuum chamber must not exceed 120 °C.
- The pump may be fastened to the floor only after consultation with Pfeiffer Vacuum.



- The pumps must not be installed in systems in which sporadic loads and vibrations or periodic forces have an effect on the pump.

## 5.2 Preparatory work

- Ensure sufficient cooling for the turbopump.
- Where magnetic fields > 3 mT are involved, a suitable shielding must be used. Check installation location and consult Pfeiffer Vacuum if needed!
- The maximum permissible rotor temperature for the turbopump is 90 °C. If high temperatures arise for process reasons, the radiated heat input must not exceed 3 W. Install suitable screening sheets, if necessary (design information on request).

## 5.3 Assembly

- Ensure the greatest possible cleanliness when installing any high vacuum parts. Unclean components prolong the pump-down time.
- All flange components must be grease-free, dust-free and dry at installation.
- The operating fluid reservoir is already installed and filled for the turbopumps HiPace 80.

### Use of a splinter shield or protection screen

The installation of a Pfeiffer Vacuum centering ring with splinter shield or protection screen in the high vacuum flange protects the turbopump against foreign bodies coming from the recipient. The volume flow rate is reduced as followed.

	Reduced volume flow rate in %			
	H <sub>2</sub>	He	N <sub>2</sub>	Ar
Splinter shield DN 40	6	9	17	18
Splinter shield DN 63	3	6	15	16
Protection screen DN 63	1	1	4	4

### Vibration damper



#### CAUTION

##### Danger of the pump being ripped off

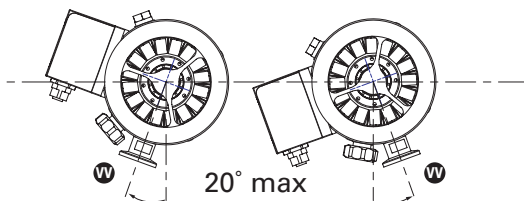
When a Pfeiffer Vacuum vibration damper is used, suitable safety measures must be taken to compensate for the torques in case of sudden blocking.

- Definitely consult with Pfeiffer Vacuum.
- Do not exceed the maximum permitted temperature at the vibration compensator (100°C).

### Mounting orientation

Pfeiffer Vacuum HiPace pumps are designed for installation with the high vacuum connection in any orientation.

- To avoid contamination via the fore-vacuum line, the fore-vacuum flange should always point vertically downward ( $\pm 20^\circ$ ).
- Support pipes in front of the pump or remove them. No force from the pipe system may be exerted on the fixed turbopump.



**Fig. 3: Recommended orientation of the fore-vacuum flange**

The maximum axial loading capacity of the high vacuum flange is 200 N (equals 20 kg). A one-sided load on the high vacuum flange is not permitted.

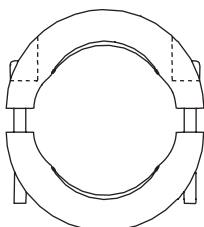
**Installing the high vacuum flange**

In the case the rotor is suddenly blocked, the torques arising from the system and the high vacuum flange must be absorbed. Only the components listed in the following can be used to fasten the turbo pumps to the high vacuum flange. The components for installing the turbo pumps are special designs of Pfeiffer Vacuum. Observe the minimum strength of 170 N/mm<sup>2</sup> for the flange material.



NOTE
<p><b>Mounting of ISO flanges</b></p> <p>If the rotor suddenly blocks the connection of high vacuum flanges of types ISO-KF or ISO-K can lead to twisting despite proper installation.</p> <ul style="list-style-type: none"> <li>• The tightness of the high vacuum flange is not endangered thereby.</li> </ul>

**Installation of ISO-KF flange with ISO-KF flange**

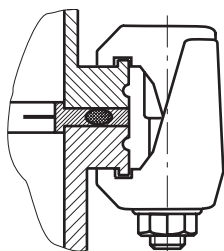


For the installation of the flange connections the following components are available:

- The valid mounting kit of the Pfeiffer Vacuum accessories programme
- A protective screen or splinter shield can optionally be used

- Mind that the sealing surfaces are not damaged.
- Flange the turbopump with the clamping ring.
- Tightening torque: 3,7 Nm

**Installation of ISO-K flange with ISO-K flange**

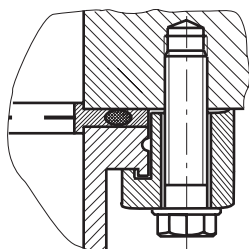


For the installation of the flange connections the following components are available:

- The valid mounting kit of the Pfeiffer Vacuum accessories programme
- A protective screen or splinter shield can optionally be used

- Mind that the sealing surfaces are not damaged.
- Connect the flanges according to the drawing and with the component parts of the mounting kit.
- Use the required number of **4** claw clamps.
- Tighten the claw clamps crosswise in three steps.
- Tightening torque: 5, 15, 25 ±2 Nm

## Installation of ISO-K flange with ISO-F flange



For the installation of the flange connections the following components are available:

- The valid mounting kit of the Pfeiffer Vacuum accessories programme
  - A protective screen or splinter shield can optionally be used
- Mind that the sealing surfaces are not damaged.
- Connect the flanges according to the drawing and with the component parts of the mounting kit.
- Use the required number of **4** claw grips.
- Tighten the claw grips crosswise in three steps.
- Tightening torque: 3, 10, 16 ±1 Nm.

## Installation of CF-flanges



### NOTE

#### Preservation of sealing capacity

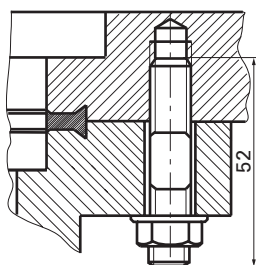
Observe the following to preserve sealing capacity:

- Touch seals only with gloves.
- Make sure sealing lips are undamaged.

The connection types for installation of CF to CF flange are "stud screw and blind hole" as well as "hex screw and through hole". The following elements are required:

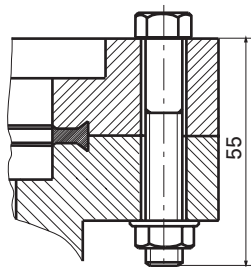
- The valid mounting kit of the Pfeiffer Vacuum accessories programme
- A copper seal
- A protective screen or splinter shield can optionally be used

#### Stud screw and blind hole



- If used: Insert protective screen or splinter shield with the clamping lugs downward into the high vacuum flange.
- Place the seal exactly in the hollow.
- Connect the flange using **8** stud screws (M8) with washers and nuts and tighten circularly with a torque of 22 ±2 Nm. After this, check the torque, since flowing of the sealing material may make it necessary to tighten the screws.

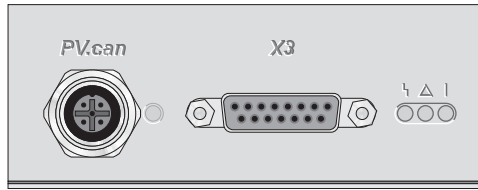
#### Hexagon screw and through hole



- If used: Insert protective screen or splinter shield with the clamping lugs downward into the high vacuum flange.
- Place the seal exactly in the hollow.
- Connect the flange using **8** hex screws (M8) with washers and nuts and tighten circularly with a torque of 22 ±2 Nm. After this, check the torque, since flowing of the sealing material may make it necessary to tighten the screws.

## 5.4 Connections to the turbopump

**Electronic drive unit** • TC 110 SD in standard version



X3 Multi-function connection  
PV.can Service interface

**Fig. 4: Connection panels for the electronic drive unit TC 110**

Detailed description for function, configuration and operation with the respective connection panel are given in the specific operating instructions for the electronic drive unit.

### Connecting the power supply

For voltage supply, use only Pfeiffer Vacuum power supplies (e.g. TPS 110 or DCU 110). Use other power supplies only after consultation with Pfeiffer Vacuum and comparison with valid specifications (specifications of the power supplies on request). Connecting cables are available from the Pfeiffer Vacuum accessory programme.

Connecting cable	Function
TC 110 - TPS/DCU 110/180 with bridges, RS 485	<ul style="list-style-type: none"> <li>• Voltage supply via power supply pack</li> <li>• Automatic start by bridges on pins 2, 5, 7</li> <li>• Connection to a display and control unit via RS 485</li> </ul>
TC 110 - TPS/DCU 110/180 with accessory ports, RS 485	<ul style="list-style-type: none"> <li>• Voltage supply via power supply pack</li> <li>• Accessory connection via M8 plugs</li> <li>• Connection to a display and control unit via RS 485</li> </ul>
TC 110 - TPS 110/180 with bridges	<ul style="list-style-type: none"> <li>• Voltage supply via power supply pack</li> <li>• Automatic start by bridges on pins 2, 5, 7</li> </ul>
TC 110 - TPS 110/180 with bridges, with accessory ports	<ul style="list-style-type: none"> <li>• Voltage supply via power supply pack</li> <li>• Automatic start by bridges on pins 2, 5, 7</li> <li>• Accessory connection via M8 plugs</li> </ul>



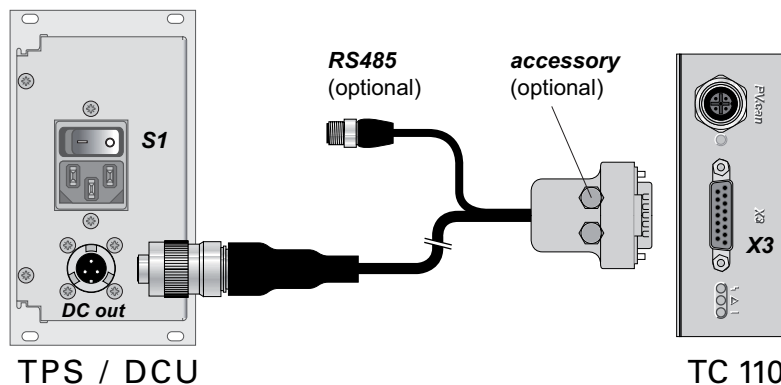
### WARNING

#### Danger of electric shock

In case of defect, the parts connected to the power supply are under voltage.

→ Always keep the mains connection freely accessible so you can disconnect it at any time.

→ Make sure that the turbopump has the correct supply voltage.



**Fig. 5: Connecting the TC 110 to a power supply using a Pfeiffer Vacuum connecting cable**

→ Switch off switch *S1* on the mains pack (position "0").

- Place and fix the connecting cable with the 15-pole mating plug into the connection "X3" on the TC 110.
- Insert the connection cable with the plug in the connection "DC out" on the power supply and close the bayonet lock.

When using a Pfeiffer Vacuum display and control unit:

- Connect the display and control unit to the plug "RS485" of the connecting cable "TC110-TPS/DCU".

## Accessory connection



### NOTE

#### Accessory connection on the TC 110

The connection of at most two Pfeiffer Vacuum accessory units to the electronic drive unit TC 110 is only possible by using the respective connecting cable .

- Configure the preferred accessory output via RS485 using a Pfeiffer Vacuum display and control unit or a PC.
- Consider the operating instructions "Electronic Drive Unit TC 110"

## Connecting the fore-vacuum side



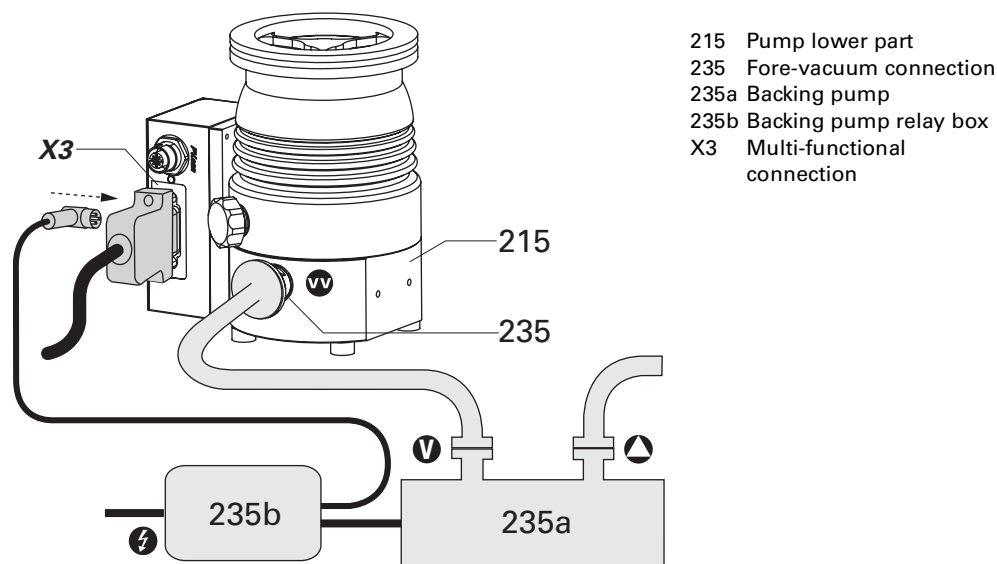
**Recommendation:** As backing pump, use a dry-compressing diaphragm pump or rotary vane pumps from the Pfeiffer Vacuum programme. The backing pump must generate a vacuum pressure of  $\leq 5$  mbar.

### WARNING

#### Damage to health due to poisonous gases

Process gases can damage health and contaminate the environment.

- Safely lead away the gas emission from the backing pump!
- Observe all safety recommendations of the gas producer.



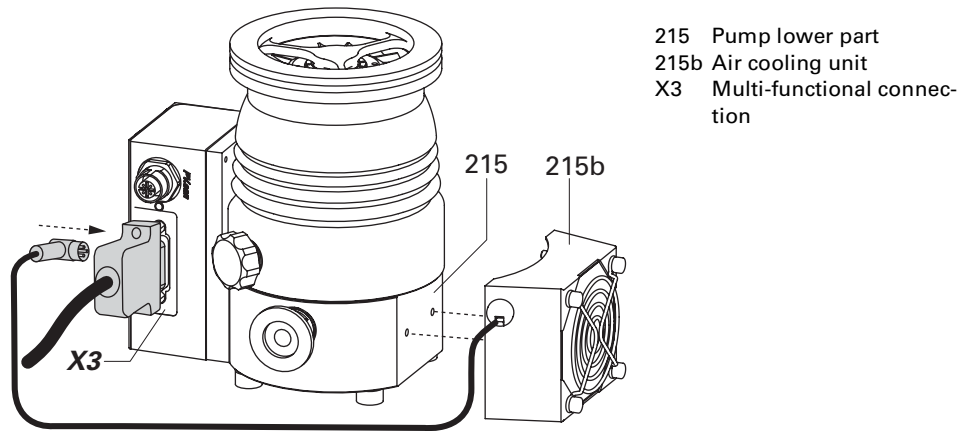
**Fig. 6: Connecting the backing pump**

- With rigid pipe connections: Install bellows for attenuation of vibrations in the connection line.
- Connect the fore-vacuum line with small-flange components or threaded hose couplings. Do not narrow the free cross section of the fore-vacuum flange!
- The backing pump is connected electrically via a relay box.
- Plug in and fix the accessory's control lead to a free accessory connection port on the connecting cable.

→ Make the settings and control via the interfaces of the TC 110.

### Air cooling

Turbopumps with the electronic drive unit TC 110 (24 VDC) may be operated with air cooling up to an ambient temperature of +35 °C.



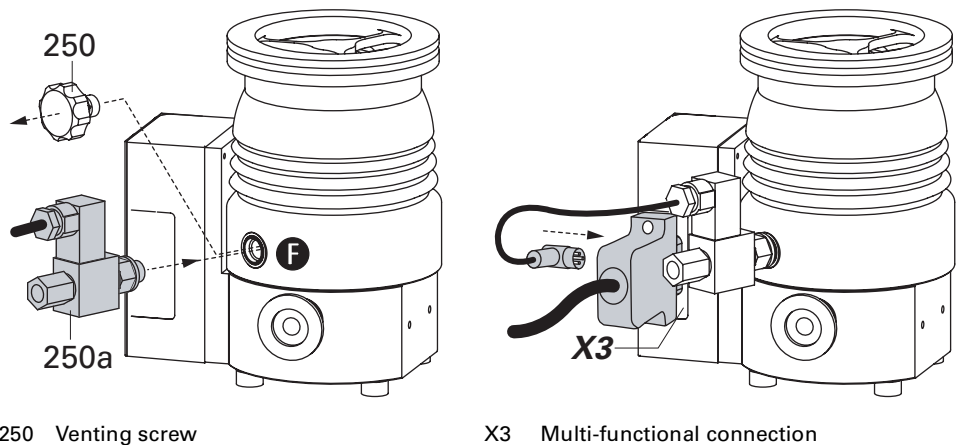
**Fig. 7: Connecting the air cooling unit**

- Fix the Pfeiffer Vacuum air cooling unit to the holes of the turbopump using two Allen head screws.
- Plug in and fix the accessory's control lead to a free accessory connection port on the connecting cable.
- Make the settings and control via the interfaces of the TC 110.

### Venting valve

The Pfeiffer Vacuum Venting valve is used for automatic venting in case of shut-down or power failure.

The permissible connection pressure is max. 3 bar absolute.



**Fig. 8: Connecting the venting valve**

- Unscrew the venting screw from the venting connection of the turbopump.
- Screw in the venting valve with seal ring.
- Plug in and fix the accessory's control lead to a free accessory connection port on the connecting cable.
- Make the settings and control via the interfaces of the TC 110.
- If necessary install a venting gas supply (e.g. inert gas) to the intake (G 1/8") of the solenoid valve.

## Casing heating unit

The turbopump and vacuum chamber can be heated to reach the final pressure more quickly. Use of a casing heating unit makes sense only for pumps with the high vacuum flange in stainless steel design. The heating duration depends on the degree of contamination as well as the final pressure to be reached and should be at least 4 hours.



### CAUTION

#### Dangerous excess temperatures

Process-related high temperatures can result in impermissible excess temperatures and thus damage to the turbopump.

→ Always use water cooling when a casing heating unit is used or when the pump is connected to a heated vacuum chamber.



### WARNING

#### Danger of burns

High temperatures arise when the turbopump or vacuum chamber are baked out. As a result, there is a danger of burns from touching hot parts, even after the housing heater is switched off!

→ Thermally insulate heating sleeve, pump housing and vacuum chamber, if possible during installation.

→ Do not touch heating sleeve, pump casing and vacuum chamber during bake out.

- When using a casing heating and a water cooling unit the temperature of the connected flange of the vacuum chamber must not exceed 120 °C.
  - The maximum permissible rotor temperature for the turbopump is 90 °C. If high temperatures arise for process reasons, the radiated heat input must not exceed 3 W. Install suitable screening sheets, if necessary (design information on request).
- Connect the casing heating for the corresponding pump type in accordance with the accessory's operating manual.
- Plug in and fix the accessory's control lead to a free accessory connection port on the connecting cable.
- Make the settings and control via the interfaces of the TC 110.

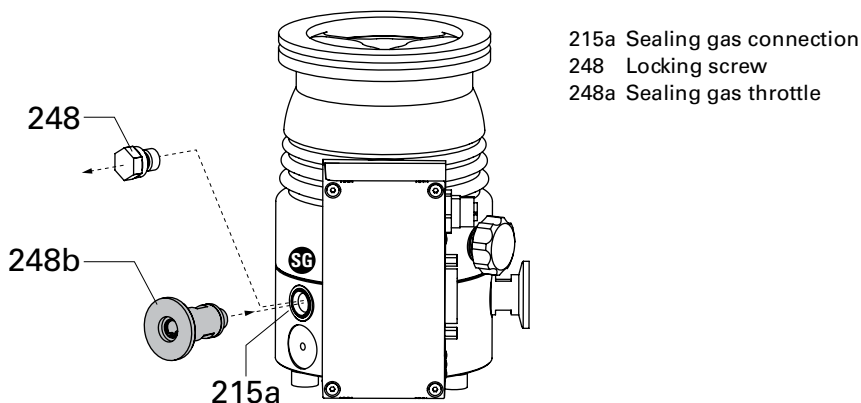
## Sealing gas connection

The turbopump must be operated with sealing gas to protect it, such as in the case of unclean processes or high gas loads. The supply is made via a sealing gas throttle without control or alternatively via a control valve. The activation of the control valve for the sealing gas connection is not pre-installed in the electronic drive unit and has to be configured via their interfaces.

The permissible connection pressure is max. 3 bar absolute.

- When operating the pump with more than 50 % of the maximum gas load, sealing gas must be used to ensure rotor cooling.
- As control valve serves the TVF 005 from the Pfeiffer Vacuum assortment.
- The sealing gas flow rate depends on the pump and is 7.5 - 9.5 sccm for the Hi-Pace 80.

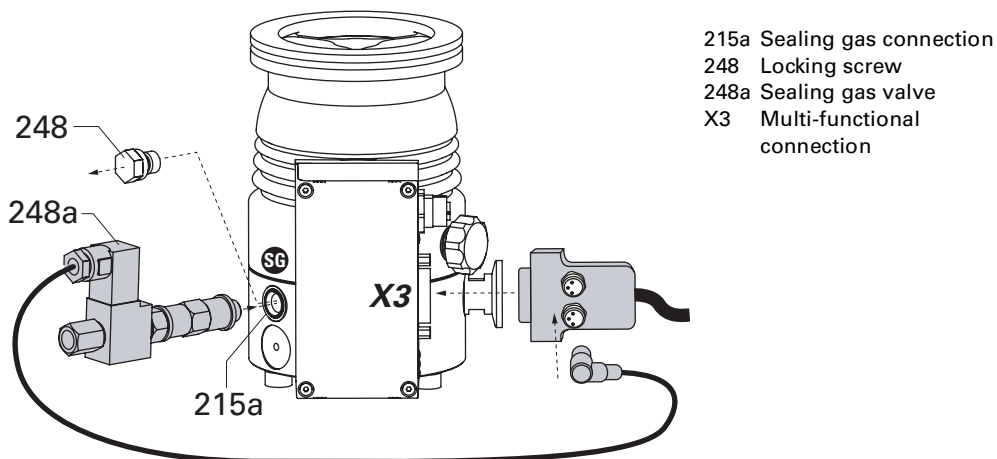
### Sealing gas supply without control valve



**Fig. 9: Connecting the sealing gas throttle**

- Unscrew the screw plug with sealing ring out of the sealing gas connection of the turbopump.
- Screw the sealing gas throttle with sealing ring into the sealing gas connection.

### Sealing gas supply with control valve



**Fig. 10: Connecting the sealing gas valve**

- Unscrew the screw plug with sealing ring out of the sealing gas connection of the turbopump.
- Screw the sealing gas valve with seal ring into the purge gas connection.
- Plug in and fix the accessory's control lead to a free accessory connection port on the connecting cable.
- Make the settings and control via the interfaces of the TC 110.
- Install the sealing gas supply (e.g. inert gas) via a connection adapter or on the inlet side (G 1/8") of the control valve.

### Water cooling

As an option turbopumps HiPace 80 with TC 110 can be equipped with water cooling.

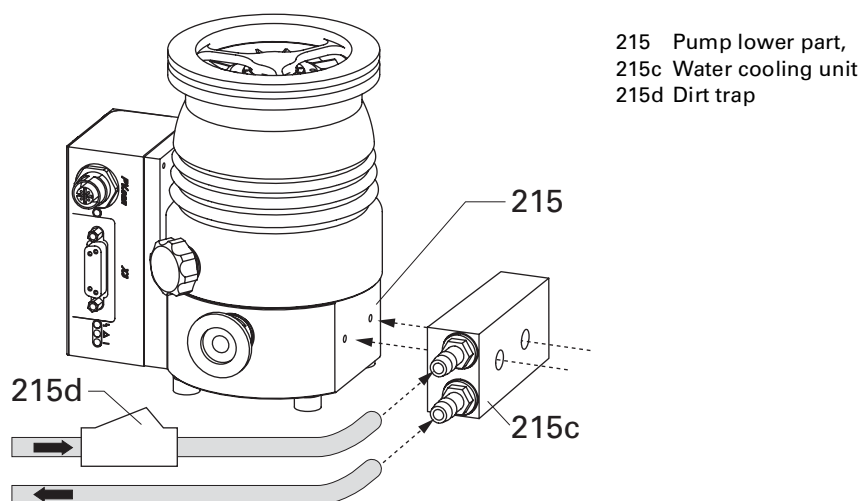
- In case of increased backing pressure (> 0.1 mbar) and/or operation with gas loads, either air or water cooling may be used.
- Generally use water cooling if the ambient temperature is > +35 °C.



### Cooling water requirements

Cooling water connection	Swiveling screw-fitting with plug and socket connection
Hose lines	External diameter 8 mm Internal diameter 6 mm
Cooling water quality	filtrated, mechanically clean, optically clear, no turbidity, no sediments, chemically neutral
Oxygen content max.	4 mg/kg
Chloride content max.	100 mg/kg
Water hardness max.	10 °dH 12.53 °e 17.8 °fH 178 ppm CaCO <sub>3</sub>
Consumption of potassium per manganate max.	10 mg/kg
Carbon dioxide content max.	undetectable
Ammonia content max.	undetectable
pH-value	7 - 9
Fore-line overpressure max.	6 bar
Cooling water temperature	> dew point, max. 25 °C
Cooling water consumption at max. gas load	75 l/h

### Connecting to a cooling water system



**Fig. 11: Connecting the cooling water**

- Fix the water cooling unit sideways on the pump lower part.
- Insert hoses for the water cooling fore-line and return-line as far as they will go in one cooling water connection each.
- Install dirt trap (accessory) in the fore-line.
- Torque of the banjo fitting: 0.25 Nm.

## 6 Operation

### 6.1 Commissioning

The following important settings are programmed in the electronic drive unit ex factory.

- Control max. run-up time: 8 min
- Gas mode: 0 = heavy gases
- Rotation speed switchpoint: 80% of the nominal rotation speed
- Venting rotation speed at delayed venting: 50% of the nominal rotation speed
- Venting time: 3600 s

→ When water cooling is used: Open cooling water supply and check the flow.

→ When sealing gas is used: Open the sealing gas supply and check the flow.

→ Establish the mains for the power supply.



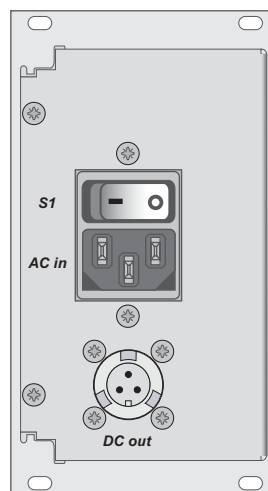
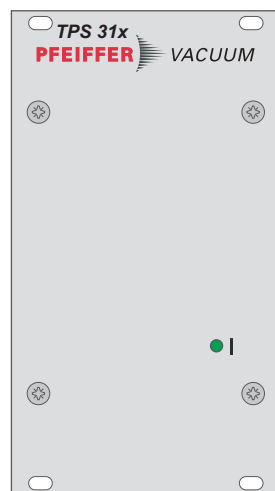
#### CAUTION

##### **Danger of the pump being destroyed**

Pumping of gases with the molecular mass  $\geq 40$  in the wrong gas mode can lead to destruction of the pump.

→ Ensure the gas mode is correctly set.

→ Contact Pfeiffer Vacuum before using gases with a greater molecular mass.



S1 Switch ON/OFF  
 ACin Mains connection  
 DCout Connection TC 110

**Fig. 12: Front and rear view of a TPS mains pack**

### 6.2 Operation modes

The following operation modes are available:

- Operation without operating panel
- Operation via "X3" connection
- Operation via RS485 and Pfeiffer Vacuum display and control units or PC
- Operation via field bus (Profibus or DeviceNet)

## 6.3 Function description



### WARNING

#### Danger due to open high vacuum flange

The rotor of the turbopump turns at high speed. If the high vacuum flange is open, there is a danger of cut injuries and that the pump can be destroyed by objects falling into it.

→ Never operate the pump with an open high vacuum flange.

### Operation without operating unit



### CAUTION

#### Automatic start

After bridging the contacts Pin 1, 2, 5, 7 on the connection "X3" or using a connecting cable "with bridges" **and** setting up the supply voltage, the turbopump will run up immediately.

→ Switch on the mains supply on the turbo pump immediately before operation.

→ For operation without the control unit, the respective connecting cable "with bridges" must be in the "X3" connection on the TC 110.

→ Switch on the supply voltage with switch S1 on the power supply.

After operating voltage is applied, the TC 110 performs a self-test to check the supply voltage. Once the self test has been successfully completed on the TC 110 (approx. 10 seconds), the turbopump and the backing pump - if connected - begin to operate.

### Operation via "X3" connection

Remote control options are provided via the 15-pole D-Sub connector with the designation "X3" on the electronic drive unit.

→ Consider the following manuals for the operation via remote control:

- Operating instructions "Electronic drive unit TC 110"

### Operation with DCU or HPU

→ Consider the following manuals for the operation via Pfeiffer Vacuum display and control units:

- Operating instructions "DCU"
- Operating instructions "HPU"
- Operating instructions "Electronic drive unit TC 110"

→ Connect the display and control unit to the plug "RS485" of the connecting cable "TC110-TPS/DCU".

→ Switch on the supply voltage with switch S1 on the power supply or on the DCU 110.

→ Settings are possible via the RS485 by using DCU, HPU or PC.

### Operation via field bus

Integrating and operating Pfeiffer Vacuum turbopumps in the customer's field bus system is possible for electronic drive units with a corresponding field bus panel.




→ Consider the following manuals for the operation via remote control:

- Operating instructions "Electronic drive unit TC 110"

## 6.4 Monitoring of the operation conditions

### Operating mode display via LED

LEDs in the front panel of the electronic drive unit show basic operating conditions of the turbopump. A differentiated malfunction and warning display is possible only for operation with DCU or HPU.

LED	Symbol	Steady OFF	Flashing (1/12 s active)	Blinking (1/2 s active)	Steady ON
Green		insufficient power supply	Pumping station "OFF" Rotation speed ≤ 1Hz	Pumping station "OFF" Rotation speed > 1 Hz	Pumping station "ON"
Yellow		no warning			Warning
Red		no malfunction			Malfunction

### Temperature monitoring

The drive power is reduced in case of impermissible motor temperature or impermissibly high housing temperature. This can cause the motor to fall below the set rotation speed switchpoint and so result in switching off of the turbomolecular pump.

## 6.5 Switching off and venting

### Switching off

After the turbopump is switched off, it must be vented to avoid contamination due to particles streaming back from the fore-vacuum area.

- Close the fore-vacuum line. Switch off the backing pump or close a fore-vacuum valve.
- Switch off the turbopump on the control unit or via remote control.
- Venting (possibilities, see below)
- For water cooling: Shut off the water supply.

### Venting

#### Manually Venting

- Open the venting screw (included) in the venting connection of the pump about one turn.

#### Venting with Pfeiffer Vacuum Venting Valve

- Enable venting via the functions of the electronic drive unit.
- Settings are possible via the RS485 by using DCU, HPU or PC.

Venting rotation speed	Switch off the pumping station	Mains power failure <sup>1)</sup>
50% of the nominal rotation speed	Venting valve opens for 3600 s (1 h, works setting)	Venting valve opens for 3600 s (1 h, works setting)

<sup>1)</sup>When mains power is restored the venting procedure is aborted.

#### Basic information for the rapid venting

Venting of the vacuum chamber in two steps. Ask for details on individual solutions from Pfeiffer Vacuum.

- Vent for 20 seconds at a rate of pressure rise of max. 15 mbar/s.
  - The valve cross section for the venting rate of 15 mbar/s must be adapted to the size of the vacuum chamber.
  - For small vacuum chambers, use the Pfeiffer Vacuum TVF 005 venting valve.
- Then vent with an additional venting valve of any desired size.

## 7 Maintenance / replacement



### WARNING

#### Contamination of parts and operating fluid by pumped media is possible.

Poisoning hazard through contact with materials that damage health.

- In the case of contamination, carry out appropriate safety precautions in order to prevent danger to health through dangerous substances.
- Decontaminate affected parts before carrying out maintenance work.



### NOTE

#### Disclaimer of liability

Pfeiffer Vacuum accepts no liability for personal injury or material damage, losses or operating malfunctions due to improperly performed maintenance. The liability and warranty entitlement expires.

### 7.1 Maintenance intervals and responsibilities

- Clean the turbopump externally with a lint-free cloth and little industrial alcohol.
- You can replace the operating fluid reservoir and electronic drive unit yourself.
- Change the operating fluid reservoir at least every 4 years.
- Change the turbopump bearing at least every 4 years.
  - Contact Pfeiffer Vacuum Service.
- Clarify shorter change intervals for extreme loads or impure processes with Pfeiffer Vacuum Service.
- For all other cleaning, maintenance or repair work, please contact your Pfeiffer Vacuum service location.

### 7.2 Replacing the operating fluid reservoir



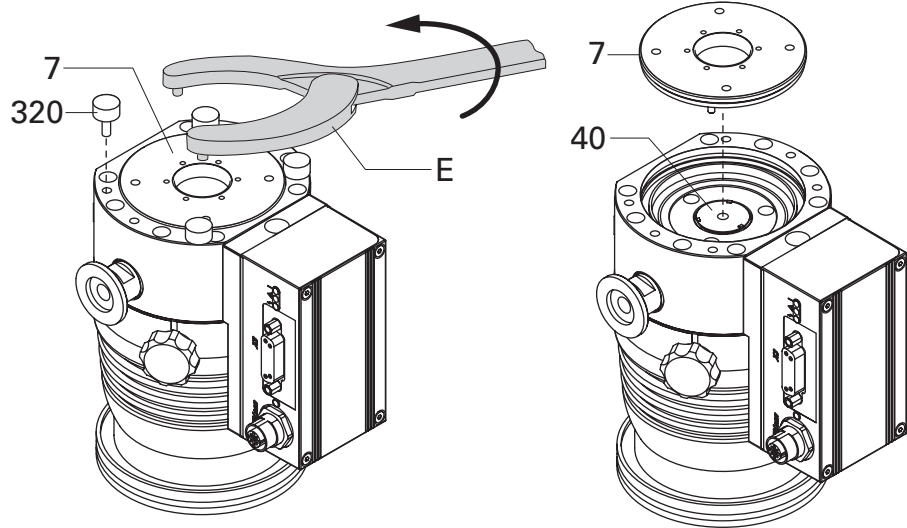
### WARNING

#### Poisoning hazard through contact with materials that damage health.

The operating fluid reservoir and parts of the pump may contain toxic substances from the pumped media.

- Dispose of operating fluid reservoir in accordance with the applicable regulations. Safety data sheet on request or under [www.pfeiffer-vacuum.net](http://www.pfeiffer-vacuum.net)
- Prevent health hazards or environmental damage due to contamination by means of appropriate safety precautions.
- Decontaminate affected parts before carrying out maintenance work.

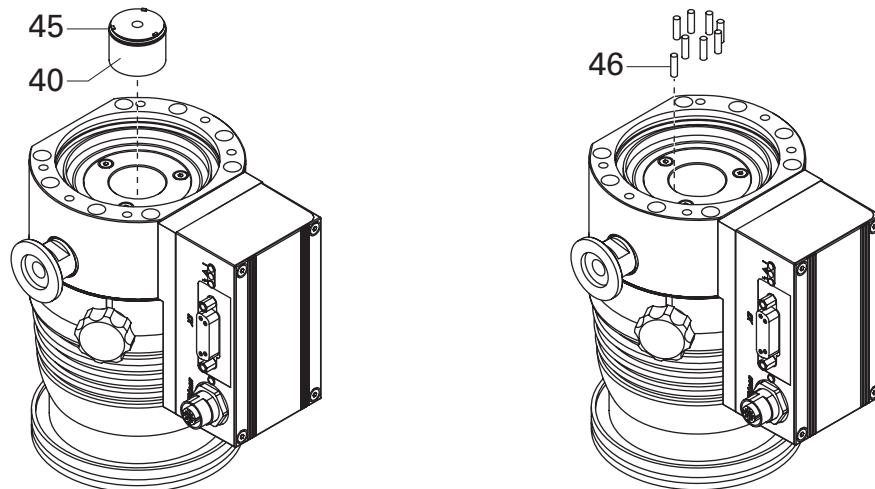
- Turn off the vacuum pump, vent to atmospheric pressure and allow to cool, if necessary.
- Remove the vacuum pump from the system, if necessary.
- Close the flange openings by using the original protective covers.
- Turn the turbopump over onto the closed high vacuum flange.



7 End cover  
320 Anti-vibration buffer  
E Face spanner (N 5709 103)

40 Operating fluid reservoir

- Unscrew the anti-vibration buffers from the pump bottom part.
- Screw out the end cover on the bottom of the turbopump with special tool E. Pay attention to O-ring.
- Remove the end cover. Pay attention to O-ring.



40 Operating fluid reservoir  
45 O-ring

46 Porex rod

- Lift out the operating fluid reservoir using two screwdrivers.
- Using tweezers, pull out Porex rods (9 pieces).
- Remove impurities from the turbopump and the end cover with a clean, lint-free cloth. **Do not use any cleaning fluids!**
- Using tweezers, insert new Porex rods (9 pieces).
- Push the new operating fluid reservoir into the turbopump up to the O-ring.
- Screw in the end cover with O-ring. The operating fluid reservoir is brought into the correct axial position by the end cover.
- Screw rubber-metal buffer into the pump bottom part.

## 7.3 Replacing the electronic drive unit

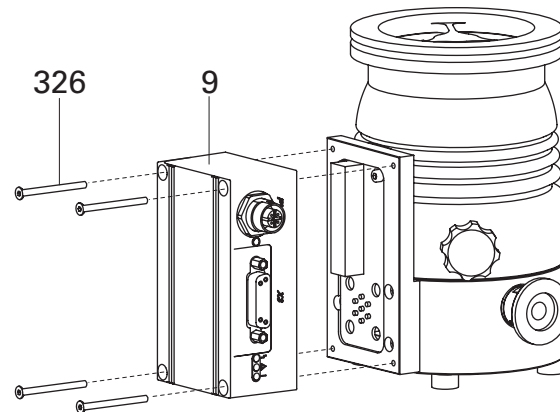


### NOTE

#### Operating parameters of the electronic drive unit

The factory operating parameters are always preset with replacement shipments.

- The use of a HPU enables the storing and the reuse of an existing parameter record.
- Reset any individually changed application parameters.
- Refer to the manual "Pumping operations".



9 Electronic drive unit  
326a Allen head screw

**Fig. 13: Assembly / disassembly of the TC 110**

- Do not exercise any mechanical load on the electronic drive unit.
- Turn off the vacuum pump, vent to atmospheric pressure and allow to cool, if necessary.
- Only separate the pump and the electronic drive unit from each other after disconnecting the supply voltage and the complete standstill of the pump.
- Remove the vacuum pump from the system, if necessary.
- Unscrew Allen head screws (4 x) from the electronic drive unit.
- Pull the electronic drive unit off the pump.
- Screw on and connect new electronic drive unit to the turbopump.

### Rotation speed set value

The typical nominal rotation speed of a turbopump is factory-set in the electronic drive unit. If the electronic drive unit is replaced or a different pump type is used, the reference set value of the nominal rotation speed must be confirmed.

HiPace	Nominal rotation speed confirmation [P:777]
10 / 80	1500 Hz
300	1000 Hz

- Adjust the parameter **[P:777]** according to the pump type.

Once the nominal rotation speed is attained, the pump will run idle unless additional gas loads are entered. Depending on process or application requirements, the nominal rotation speed can be reduced in rotation speed setting mode or standby mode.

## 8 Decommissioning

### 8.1 Shutting down for longer periods



#### WARNING

##### Contamination of parts and operating fluid by pumped media is possible.

Poisoning hazard through contact with materials that damage health.

- In the case of contamination, carry out appropriate safety precautions in order to prevent danger to health through dangerous substances.
- Decontaminate affected parts before carrying out maintenance work.

If the turbopump should be shut down for longer than a year:

- Remove the vacuum pump from the system, if necessary.
- Change the operating fluid reservoir.
- Close the high vacuum flange of the turbopump.
- Evacuate turbopump via the fore-vacuum flange.
- Vent turbopump via the venting connection with dry air or inert gas.
- Close the flange openings by using the original protective covers.
- Close further connection ports by using the corresponding protective covers.
- Place pump upright on rubber feet.
- Store the pump only indoors with an ambient temperature between -25 °C and +55 °C.
- In rooms with moist or aggressive atmospheres, the turbopump must be air-proof shrink-wrapped in a plastic bag together with a bag of desiccant.

### 8.2 Re-starting



#### CAUTION

##### Re-starting

The serviceability of the operating fluid without operation is a maximum of 4 years. Before restarting after a shut-down of **4 years or longer**, carry out the following work.

- Replace the operating fluid reservoir.
- Replace bearings.
- Follow the maintenance instructions and inform Pfeiffer Vacuum.
- Check turbopump for contamination and moisture.
- Clean the turbopump externally with a lint-free cloth and little industrial alcohol.
- If necessary, have Pfeiffer Vacuum Service clean the turbopump completely.
- If necessary, have the bearings replaced. Take into account the total running time.
- Change the operating fluid reservoir.
- Installation and commissioning in accordance with the operating instructions (see p. 8, chap. 5).

### 8.3 Disposal

Products or parts thereof (mechanical and electrical components, operating fluids, etc.) may cause environmental burden.

- Safely dispose of the materials according to the locally applicable regulations.



## 9 Malfunctions

If malfunctions on the pump occur, you will find possible causes and instructions for repair in the following table.

### 9.1 Rectifying malfunctions

Problem	Possible causes	Remedy
Pump will not start; non of the built-in LEDs on the TC 110 lights up	• Electrical supply interrupted	⇒ Check plug contacts on the power supply ⇒ Check supply lines on the power supply ⇒ Check the output voltage (24 VDC) on the connection "DC out" of the power supply ⇒ Check the plug contacts on the TC
	• Operating voltage incorrect	⇒ Apply correct operating voltage ⇒ Observe the rating plate
	• No operating voltage applied	⇒ Apply operating voltage
	• TC 110 defective	⇒ Exchange the TC 110 ⇒ Contact the Pfeiffer Vacuum Service
Pump will not start; green LED on the TC 110 is flashing	• At operation without control panel: Pins 1-2, 1-5 or 1-7 are not connected on the "X3" connection	⇒ Connect the pins 1-2, 1-5 or 1-7 on the "X3" connection ⇒ Install the mating plug (scope of delivery) to the "remote" connection.
	• At operation via RS485: Bridge at Pin 1-2 prevents control commands	⇒ Remove the bridge between pins 1 and 2 from the "X3" connection ⇒ If necessary exchange the connecting cable.
	• Voltage drop in the cable too high	⇒ Use a suitable cable
Pump does not attain the final rotational speed within the specified run-up time	• Fore-vacuum pressure too high	⇒ Ensure function and suitability of the backing pump
	• Leak	⇒ Perform leak detection ⇒ Check sealings and flange fastenings ⇒ Eliminate leaks
	• Gas load too high	⇒ Prozessgaszufuhr reduzieren
	• Rotor runs hard, bearing defective	⇒ Check the bearing for noises ⇒ Contact the Pfeiffer Vacuum Service
	• Setpoint for run-up time too low	⇒ Extend the run-up time via DCU, HPU or PC
	• Thermal overload: – Lack of air ventilation – Water flow too low – Fore-vacuum pressure too high – Ambient temperature too high	⇒ Reduce thermal loads – Ensure adequate cooling – Ensure the cooling water flow – Lower the fore-vacuum pressure – Adjust ambient conditions
Pump does not attain the ultimate pressure	• Pump is dirty	⇒ Bake out the pump ⇒ Cleaning in case of heavy contamination – Contact the Pfeiffer Vacuum Service
	• Vacuum chamber, pipes or pump are leaky	⇒ Leak detection starting from the vacuum chamber ⇒ Eliminate leaks
Unusual noises during operation	• Bearing damage	⇒ Contact the Pfeiffer Vacuum Service
	• Rotor damage	⇒ Contact the Pfeiffer Vacuum Service
	• Splinter shield or protective screen are loose	⇒ Correct the seat of the splinter shield or the protective screen ⇒ Observe the installation notes
Red LED on the TC 110 is on	• Collective fault	⇒ Reset by switching the mains OFF/ON ⇒ Reset via pin 6 on the "X3" connection ⇒ Differentiated malfunction display is possible via DCU or HPU <sup>1)</sup> ⇒ Contact the Pfeiffer Vacuum Service

<sup>1)</sup>If no display and control unit is available, please contact the Pfeiffer Vacuum Service.

## 10 Service

### Pfeiffer Vacuum offers first-class service!

- Operating fluid and bearing change on the spot by Pfeiffer Vacuum FieldService
- Maintenance / repair in the nearby ServiceCenter or ServicePoint
- Fast replacement with exchange products in mint condition
- Advice on the most cost-efficient and quickest solution

Detailed information, addresses and forms at: **[www.pfeiffer-vacuum.net](http://www.pfeiffer-vacuum.net)** (**Service**).

### Maintenance and repair in the Pfeiffer Vacuum ServiceCenter

The following steps are necessary to ensure a fast, smooth servicing process:

- Download the forms "Service Request" and "Declaration on Contamination".<sup>1)</sup>
- Fill in the "Service Request" form and send it by fax or e-mail to your service address.
- Include the confirmation on the service request from Pfeiffer Vacuum with your shipment.
- Fill in the declaration on contamination and include it in the shipment (required!).
- Dismantle all accessories.
- Drain the operating fluid (applies for turbopumps in corrosive gas version or with suction performance > 700 l/s)
- Leave electronic drive on the pump.
- Close the flange openings by using the original protective covers.
- If possible, send pump in the original packaging.

### Sending of contaminated pumps or devices

No units will be accepted if they are contaminated with micro-biological, explosive or radioactive substances. "Hazardous substances" are substances and compounds in accordance with the hazardous goods directive (current version). If pumps are contaminated or the declaration on contamination is missing, Pfeiffer Vacuum performs decontamination at the shipper's expense.

- Neutralise the pump by flushing it with nitrogen or dry air.
- Close all openings airtight.
- Seal the pump or unit in suitable protective film.
- Return the pump/unit only in a suitable and sturdy transport container and send it in while following applicable transport conditions.

### Exchange unit

The factory operating parameters are always preset with exchange units. If you use changed parameters for your application, you have to set these again.

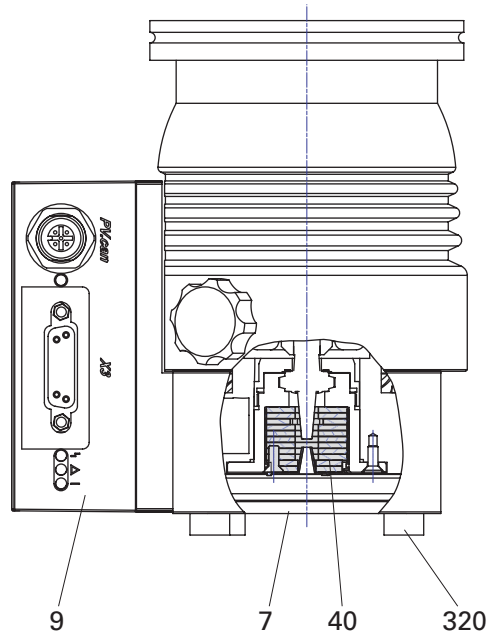
### Service orders

All service orders are carried out exclusively according to our repair conditions for vacuum units and components.

<sup>1)</sup> Forms under [www.pfeiffer-vacuum.net](http://www.pfeiffer-vacuum.net)

## 11 Spare parts HiPace 80

Item	Designation	Size	Order number	Notes	Pieces	Order qty
7	End cover	M75 x 1	PM 083 021 -X		1	
9	Operating fluid reservoir		PM 133 737 -U	incl. Porex rods	1	
40	Electronic drive unit TC 110		PM C01 790		1	
320	Rubber foot	d = 12 mm	P 3695 700 ZD		4	



Please also specify model number of the the rating plate when ordering accessories or spare parts.

## 12 Accessories

Designation	HiPace 80 with TC 110 DN 63 ISO-K	HiPace 80 with TC 110 DN 63 CF-F	HiPace 80 with TC 110 DN 40 ISO-KF	Order quantity
<b>Power supplies and control units</b>				
TPS 110, mains pack for wall/standard rail fitting	PM 061 340-T	PM 061 340-T	PM 061 340-T	
TPS 111, mains pack 19" rack module 3 RU	PM 061 344-T	PM 061 344-T	PM 061 344-T	
DCU 110, Display control unit incl. power supply	PM C01 820	PM C01 820	PM C01 820	
DCU 002, Display control unit	PM 061 348-T	PM 061 348-T	PM 061 348-T	
HPU 001, handheld programming unit	PM 051 510-T	PM 051 510-T	PM 051 510-T	
Accessories package for HPU - Power supply, software and PC cable	PM 061 005-T	PM 061 005-T	PM 061 005-T	
<b>Cables</b>				
230 V AC mains cable with Euro-style safety plug, 3 m	P 4564 309 ZA	P 4564 309 ZA	P 4564 309 ZA	
115 V AC mains cable with UL plug, 3 m	P 4564 309 ZE	P 4564 309 ZE	P 4564 309 ZE	
208 V AC mains cable with UL plug	P 4564 309 ZF	P 4564 309 ZF	P 4564 309 ZF	
Connection cable for linking HiPace with TC 110 to power supply TPS/DCU 110/111/180/181	PM 061 350-T	PM 061 350-T	PM 061 350-T	
Connection cable for linking HiPace with TC 110 to power supply TPS/DCU 110/111/180/181	PM 061 351-T	PM 061 351-T	PM 061 351-T	
<b>Accessories for venting</b>				
24 V DC venting valve, G 1/8", for connection to TCP 110	PM Z01 290	PM Z01 290	PM Z01 290	
TTV 001, air drier for venting turbopumps	PM Z00 121	PM Z00 121	PM Z00 121	
<b>Accessories for cooling</b>				
Air cooling for HiPace 80 with TC 110	PM Z01 300	PM Z01 300	PM Z01 300	
Water cooling for HiPace 80, TC 110	PM 016 623-T	PM 016 623-T	PM 016 623-T	
<b>Accessories for heating</b>				
Heating jacket for HiPace 80 with TC 110/TCP 350, 230 V AC, Euro-style safety plug		PM 061 360-T		
Heating jacket for HiPace 80 with TC 110/TCP 350, 208 V AC, UL plug		PM 061 361-T		
Heating jacket for HiPace 80 with TC 110/TCP 350, 115 V AC, UL plug		PM 061 362-T		
<b>Backing pump control</b>				
Backing pump relay box, single phase 5 A, for TC 110/TCP 350	PM 061 372-T	PM 061 372-T	PM 061 372-T	
Backing pump relay box, single phase 20 A, for TC 110/TCP 350	PM 061 373-T	PM 061 373-T	PM 061 373-T	
TVV 001 backing vacuum safety valve, 230 V AC	PM Z01 205	PM Z01 205	PM Z01 205	
TVV 001 backing vacuum safety valve, 115 V AC	PM Z01 206	PM Z01 206	PM Z01 206	
<b>Mounting kits</b>				
Mounting kit for HiPace 80, DN 63 ISO-K, including coated centering ring, bracket screws	PM 016 360-T			
Mounting kit for HiPace 80, DN 63 ISO-K, including coated centering ring, protection screen, clamping screws	PM 016 362-T			
Mounting kit for HiPace 80, DN 63 ISO-K, including coated centering ring, splinter shield, bracket screws	PM 016 361-T			

Designation	HiPace 80 with TC 110 DN 63 ISO-K	HiPace 80 with TC 110 DN 63 CF-F	HiPace 80 with TC 110 DN 40 ISO-KF	Order quantity
Mounting kit for HiPace 80, DN 63 ISO-K to DN 63 ISO-F, including coated centering ring, claws	PM 016 510-T			
Mounting kit for HiPace 80, DN 63 ISO-K to DN 63 ISO-F, including coating centering ring, protection screen, claws	PM 016 512-T			
Mounting kit for HiPace 80, from DN 63 ISO-K to DN 63 ISO-F, including coated centering ring, splinter and claws	PM 016 511-T			
Set of hexagonal screws, 8 count, M8, DN 63 CF		PM 016 683-T		
Set of stud screws, 8 count, M8, DN 63 CF		PM 016 684-T		
Clamping ring with centering ring, DN 40 KF			PM 016 625-T	
Clamping ring, including centering ring and splinter shield, DN 40 KF			PM 016 626-T	

#### Miscellaneous accessories

Sealing gas valve for HiPace 80	PM Z01 310	PM Z01 310	PM Z01 310	
Sealing gas throttle for HiPace 80	PM Z01 316	PM Z01 316	PM Z01 316	
Centering ring, with multifunction coating, DN 63 ISO-K/-F pumps	PM 016 206-U			
Centering ring, with multifunction coating and integrated protective screen, DN 63 ISO-K/-F	PM 016 208-U			
Centering ring, with multifunction coating and integrated splinter shield, DN 63 ISO-K/-F	PM 016 207-U			
Protection screen, DN 63 CF-F		PM 016 333		
Splinter screen, DN 63 CF-F		PM 016 312		
Centering ring, FPM/aluminium, DN 40 ISO-KF			PF 110 140-T	
Centering ring, with integrated mesh screen, DN 40 ISO-KF			PF 113 240-T	
Centering ring, with integrated splinter shield, DN 40 ISO-KF			PM 006 375-X	
Vibration damper, DN 63 ISO-K	PM 006 800-X			
Vibration damper, DN 63 CF-F		PM 006 801-X		
Vibration damper, DN 40 ISO-KF			PM 006 799-X	
USB Converter to RS 485 interface	PM 061 207-T	PM 061 207-T	PM 061 207-T	
Interface cable, 3 m, M 12	PM 061 283-T	PM 061 283-T	PM 061 283-T	
Y-connector, M12, for RS 485	P 4723 010	P 4723 010	P 4723 010	

## 13 Technical data and dimensions

### 13.1 General

Basic principles for the Technical Data of Pfeiffer Vacuum Turbopumps:

- Recommendations of PNEUROP committee PN5
- ISO 21360; 2007: "Vacuum technology - Standard methods for measuring vacuum-pump performance - General description"
- ISO 5302; 2003: "Vacuum technology - Turbomolecular pumps - Measurement of performance characteristics"
- Ultimate pressure: using a test dome and a 48 hrs. period of baking out
- Gas throughput: with water cooling; backing pump = rotary vane pump (10 m<sup>3</sup>/h)
- Cooling water consumption: at max. gas throughput, cooling water temp. 25 °C

- Integral leak rate: using a Helium concentration of 100 %, period 10 s
- Acoustic pressure: Distance 1 m to the pump

## 13.2 Technical data

Parameter	HiPace 80	HiPace 80	HiPace 80
Flange (in)	DN 63 ISO-K	DN 63 CF-F	DN 40 ISO-KF
Flange (out)	DN 16 ISO-KF	DN 16 ISO-KF	DN 16 ISO-KF
Venting connection	G 1/8"	G 1/8"	G 1/8"
Rotation speed $\pm 2\%$	90000 rpm	90000 rpm	90000 rpm
Rotational speed: variable	20 - 100 %	20 - 100	20 - 100 %
Run-up time	1.7 min	1.7 min	1.7 min
Pumping speed for N <sub>2</sub>	67 l/s	67 l/s	35 l/s
Pumping speed for He	58 l/s	58 l/s	41 l/s
Pumping speed for H <sub>2</sub>	48 l/s	48 l/s	38 l/s
Pumping speed for Ar	66 l/s	66 l/s	30 l/s
Gas throughput at full rotational speed for N <sub>2</sub>	1.3 mbar l/s	1.3 mbar l/s	1.3 mbar l/s
Gas throughput at full rotational speed for He	2.7 mbar l/s	2.7	2.7 mbar l/s
Gas throughput at full rotational speed for H <sub>2</sub>	15.3 mbar l/s	15.3	15.3 mbar l/s
Gas throughput at full rotational speed for Ar	0.54 mbar l/s	0.54	0.54 mbar l/s
Compression ratio for N <sub>2</sub>	$>10^{11}$	$>1 \cdot 10^{11}$	$>1 \cdot 10^{11}$
Compression ratio for He	$1.3 \cdot 10^7$	$1.3 \cdot 10^7$	$1.3 \cdot 10^7$
Compression ratio for H <sub>2</sub>	$1.4 \cdot 10^5$	$1.4 \cdot 10^5$	$1.4 \cdot 10^5$
Compression ratio for Ar	$>10^{11}$	$>1 \cdot 10^{11}$	$>1 \cdot 10^{11}$
Compression ratio for CF <sub>4</sub>	$>1 \cdot 10^{11}$	$>1 \cdot 10^{11}$	$>1 \cdot 10^{11}$
Fore Vacuum max. for N <sub>2</sub>	22 mbar	22 mbar	22 mbar
Fore Vacuum max. for He	22 mbar	22	22 mbar
Fore Vacuum max. for H <sub>2</sub>	14 mbar	14	14 mbar
Fore Vacuum max. for Ar	23 mbar	23	23 mbar
Fore Vacuum max. for CF <sub>4</sub>	20 mbar	20	20 mbar
Ultimate pressure with OnTool DryPump™	$<1 \cdot 10^{-7}$ mbar	$<5 \cdot 10^{-10}$	$<1 \cdot 10^{-7}$ mbar
Cooling method, standard	Air	Air	Air
Cooling method, optional	Water	Water	Water
Cooling water temperature	5-25 °C	5-25 °C	5-25 °C
Cooling water consumption	75 l/h	75 l/h	75 l/h
Connection pressure max. for venting valve/ sealing gas valve	3 bar	3 bar	3 bar
Integral leak rate	$<1 \cdot 10^{-7}$ mbar l/s	$<1 \cdot 10^{-7}$ mbar l/s	$<1 \cdot 10^{-7}$ mbar l/s
Operating voltage	24 $\pm 5\%$ V DC	24 $\pm 5\%$ V DC	24 $\pm 5\%$ V DC
Operating voltage power supply	90-265 V AC	90-265 V AC	90-265 V AC
Current consumption max	4.6 A	4.6 A	4.6 A
Power consumption max.	110 W	110 W	110 W
Sound pressure level	<48 dB (A)	<48 dB (A)	<48 dB (A)
Interface	RS 485, Remote	RS 485, Remote	RS 485, Remote
Protection category	IP 54	IP 54	IP 54
Permissible magnetic field max.	3.3 mT	3.3 mT	3.3 mT
Relative humidity of air	5-85 non condensing %	5-85 non condensing %	5-85 non condensing %
Weight	2.4 kg	3.8 kg	2.4 kg

13.3 Dimensions

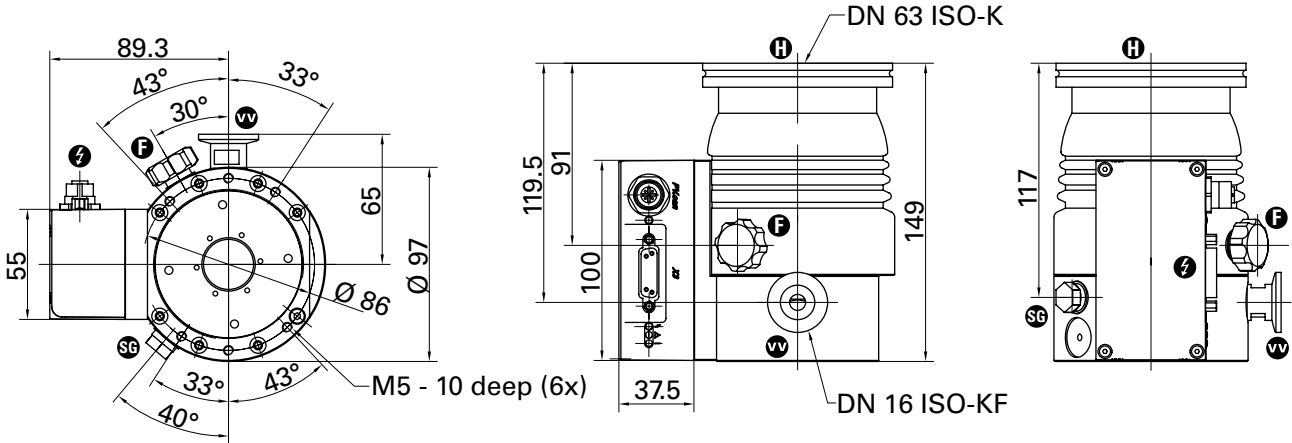


Fig. 14: HiPace 80, DN 63 ISO-K

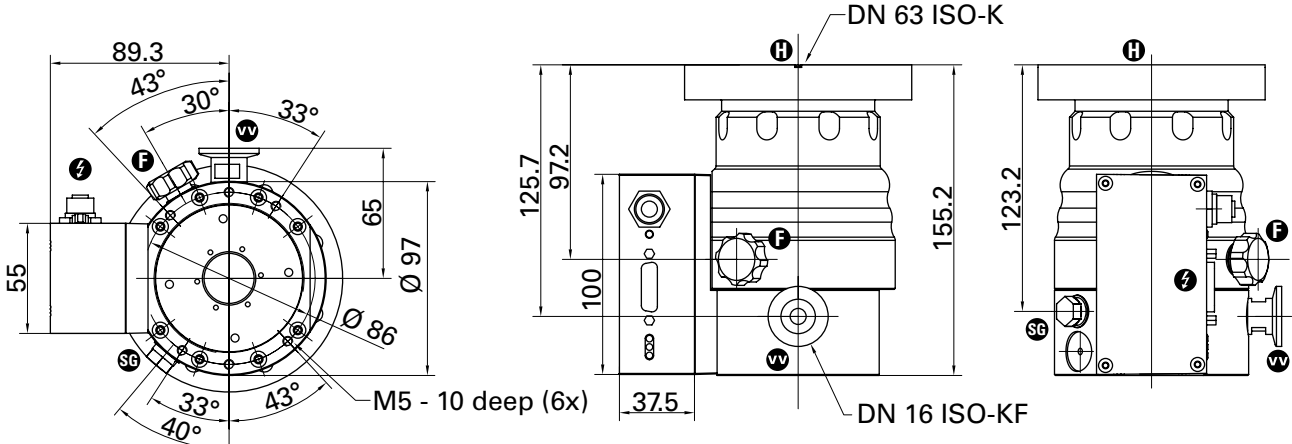


Fig. 15: HiPace 80, DN 63 CF-F

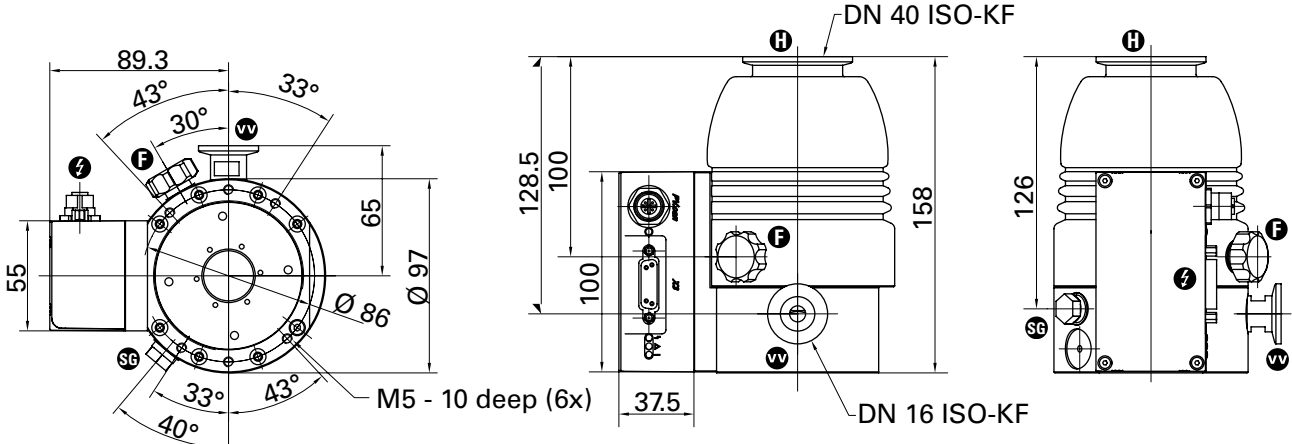


Fig. 16: HiPace 80, DN 40 ISO-KF



# Manufacturer's Declaration

pursuant to the following EU directives:

- **Machinery 98/37/EEC (Annex II B)**
- **Electromagnetic Compatibility 89/336/EEC**
- **Low Voltage 2006/95/EEC**

We hereby certify that the product specified below is intended for installation in a machine which is forbidden to be put into operation until such time as it has been determined that the end product is in accordance with the provision of EU Directive 98/37/EEC.

The product specified below is in correspondence to the EU directives Machinery **98/37/EEC**, Electromagnetic Compatibility **89/336/EEC** and Low Voltage **2006/95/EEC**.

## HiPace 80

Guidelines, harmonised standards and national standards in languages and specifications which have been applied:

EN 294

EN 1012-2

EN 12100-1

EN 12100-2

EN 61010

Signatures:

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CE/2007



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**Service**

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