

## OnTool™ Booster 150



**for operation with  
electronic drive unit TCP 3000**

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**Please note:**

Current operating instructions are also available via [www.pfeiffer-vacuum.net](http://www.pfeiffer-vacuum.net).

# 1. Safety Instructions

- ☞ Read and follow all instructions in this manual.
- ☞ Inform yourself regarding:
  - Hazards which can be caused by the pump;
  - Hazards which can be caused by your system;
  - Hazards which can be caused by the media being pumped.
- ☞ Avoid exposing any part of the body to vacuum.
- ☞ Observe the safety and accident prevention regulations.
- ☞ Regularly check that all accident prevention measures are being complied with.
- ☞ Operate the pump with only in conjunction with the TCP 3000.
- ☞ Do not operate the pump with open vacuum flange.
- ☞ Do not carry out any unauthorised conversions or alterations to the pump and the TCP 3000.
- ☞ Operate the pump only when the lubricant reservoirs are filled
- ☞ Operate the pump only with water cooling
- ☞ When returning the pump observe the shipping instructions.
- ☞ The pump must be anchored in accordance with the installation instructions.
- ☞ Do not disconnect any plug between the pump and the TCP 3000 during operations.
- ☞ When the vacuum flange is open disconnect the voltage supply to the TCP 3000.
- ☞ When working on the pump, the vacuum flange should only be opened once the rotor is at rest.
- ☞ During operations temperatures of up to 65 °C can arise of the pump. Take care to avoid burns !
- ☞ The unit has been accredited protection class IP 51. When the unit is operated in environments which require other protection classes, the necessary measures must be taken.
- ☞ The mains connection must be subject to a safe connection to the PE (protection class 1).

## 1.1. For Your Orientation

### Instructions in the text

➔ Operating instructions: Here, you have to do something.

### Symbols Used

The following symbols are used throughout in the illustrations:

- Ⓥ Vacuum flange
- Ⓛ Exhaust flange
- Ⓜ Cooling water connection
- Ⓣ Mains connection
- Ⓜ Gas ballast connection
- Ⓢ Sealing gas connection

### Abbreviations Used

TCP 3000 = Electronic Drive and Control Unit  
[P:XXX] = Parameter XXX, e.g.: P:[028]  
f<sub>end</sub> = Final pump rotation speed

### Position Numbers

Identical pump and accessory parts have the same position numbers in all illustrations.

## 1.2. Pictogram Definitions



Danger of injury from rotating parts.



Danger of burns from touching hot parts.



Danger of an electric shock.



Danger of poisoning.



Excessive noise!  
Wear suitable ear protection!



Danger of personal injury.



Danger of damage to the pump or system.

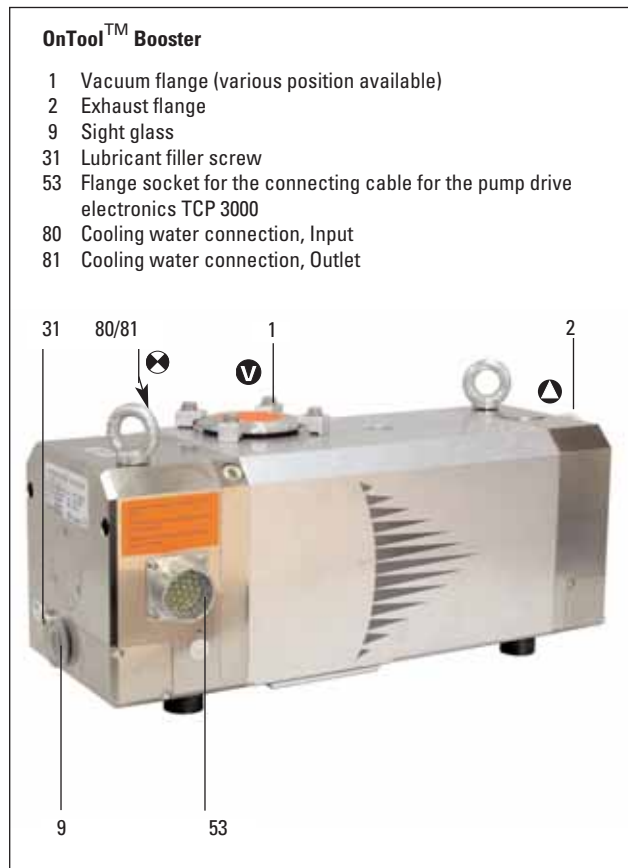


Important note.

## 2. Understanding The Pump

### 2.1. Main Features

The Pump OnTool™ Booster is driven and controlled by the Electronic Drive Unit TCP 3000 (not depicted in the illustration). The power pack is integrated in the Electronic Drive Unit TCP 3000.



#### Operating Method

The OnTool™ Booster is a multistage side channel blower combined with drag stages.

For pump operation there are two kinds of operating media required:

- Water cooling for the drive components and the suction chambers inside the pump,
- Lubricant to oil the ball bearings on both ends of the rotor.

#### Proper Use

- The pump may only be used for the purpose of generating vacuum - primarily for pumping out chambers.
- The pump may only be operated with the Electronic Drive and Control Unit TCP 3000.
- The pump may only be used with both lubricant reservoirs filled.
- The pump may only be operated with water cooling.
- Only use the pump for clean processes and where the incidence of particles is not involved.
- Only use gas ballast when pumping condensating vapours.
- Do not pump explosive gases (special operation conditions should be checked with Pfeiffer Vacuum).
- Installation, start-up, operating and maintenance instructions must be observed.
- Accessories other than those named in this manual may not be used without the agreement of Pfeiffer Vacuum.
- Max. permissible intake pressure for continuous operation: 1000 mbar --> for N<sub>2</sub> and air.

#### Improper Use

The following are regarded as improper:

- The pumping of liquids.
- The pumping of corrosive and explosive gases.
- The pumping of other gases than air or nitrogen without the express agreement of Pfeiffer Vacuum.
- Do not operate the pump in locations where there is an explosion hazard.
- The pump may not be used for the purpose of generating pressure.
- Operation in the sphere of magnetic fields (only after consulting the manufacturer).
- Installation in systems where the pump is subjected to impact-like stress and vibrations or the effect of periodically occurring forces.
- Uses not covered above, and, in particular:
  - Connection to pumps and units which is not permitted according to their operating instructions.
  - Operating the pump in environments which require a protection class superior to IP 51.
  - The use of other power pack units or accessories which are not named in this manual or which have not been agreed by the manufacturer.

Improper use will cause any rights regarding liability and guarantees to be forfeited.

## 2.2. Delivery Content

- Lubricant F3 included with the delivery (50 ml), initial oil filling for each lubricant reservoir is 24 ml.
- Cable socket (counter-piece to the mains connection plug).
- Hose nozzles for the cooling water monitor and the cooling water connection (input / output) including sealing rings.
- Reducing nipple for the cooling water monitor
- Cooling water monitor
- Blank flange DN 50 ISO-KF (intake side), mounted with 4 claw grips, centering ring and screws.
- Blank flange DN 25 ISO-KF for exhaust flange, mounted with centering ring and clamping ring.
- Operating Instructions, PU 0021 BN).

# 3. Installation

## 3.1. Preparations For Installation



Do not carry out any unauthorised conversions or alterations to the pump.

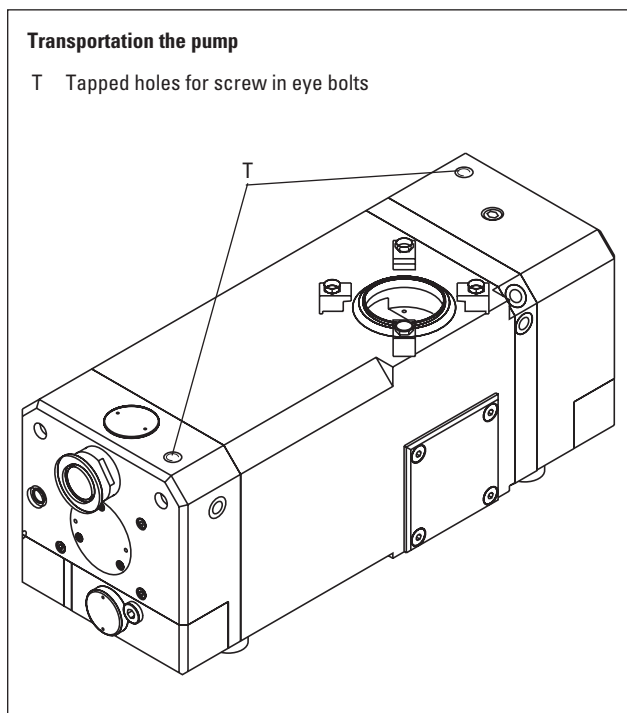
- ➔ Fill up both lubricant reservoirs (see Section 3.4. Filling And Checking The Lubricant).
- ➔ Install cooling water monitor and connect inlet and outlet line of the water cooling connection.
- ➔ Ensure free air flow for the ventilator in the electronic drive unit.
  - Only remove the blank flange from the vacuum flange and exhaust flange immediately before connection.
  - Max. permissible ambient temperature for the pump is 40 °C.

## 3.2. Transportation Of The Pump

- ➔ Only lift and move the pump while maintaining it horizontally (see figures below).
  - For this use suitable transport straps or screw an eye bolt into the transport bores T and lift the pump with lifting bar.



Ensure even distribution of weight when lifting. --> **Danger of tilting!**



## 3.3. Setting Up The Pump And Mounting On A Standing Surface

- ➔ Unscrew the rubber feet on the underside (standing surface)
- ➔ Screw pump using M6 screws tightly onto a holder (torque 8 Nm).



No forces from the piping system must be allowed to act on the pump. Suspend or support all pipes to the pump.

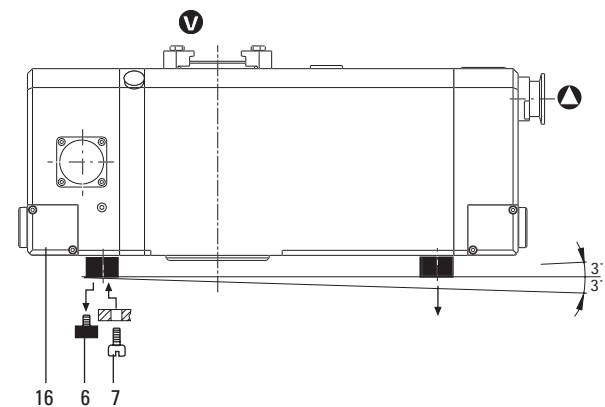
### Permissible Installation Positions For The Pump



The pump may only be operated in the horizontal position, with the lubricant reservoirs 16 face down (see figure below). The maximum deviation from the horizontal is  $\pm 3^\circ$ .

#### Anchoring points on the underside of the pump

- 6 Rubber feet (4x)
- 7 Screw M6 (4x)
- 16 Lubricant reservoirs



### 3.4. Filling In And Checking The Lubricant



Before first-time starting ensure that both lubricant reservoirs have been filled with each **24 ml** of Lubricant F3.

The delivery consignment for the standard pump contains sufficient lubricant (50 ml) for one filling.



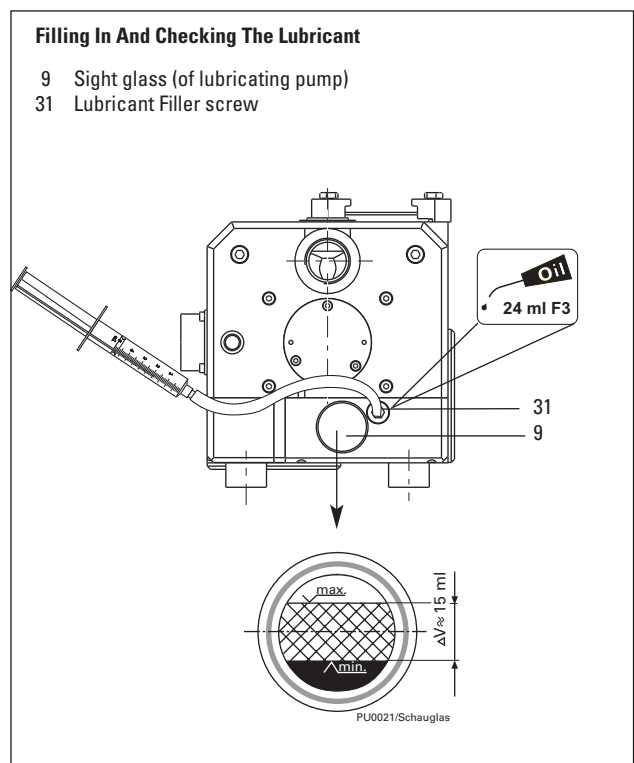
If "F3" is heated above 300°C, toxic vapours which can harm the respiratory tract are emitted. Do not allow "F3" to come into contact with tobacco products (danger of poisoning when ignited). The precautions necessary in the handling of chemicals must be observed.

#### Filling In The Lubricant



Fill only when the pump is in the horizontal position. Do not fill when the pump is running and not in evacuated condition.

- ➔ Unscrew both lubricant filler screws 31, taking care with the sealing.
- ➔ Slowly fill in 24 ml of the accompanying lubricant into each lubricant reservoir.
- ➔ Screw back in lubricant filler screws 31 with the sealing.
- ➔ During operations or at pump still stand check the lubricant level on both sight glasses; the permissible level is shown in the illustration.
- ➔ Switch off pump if lubricant is to be replenished.
- ➔ In non-stop operations check the lubricant monthly, on both sight glasses 9 after each switch-on.



### 3.5. Connecting The Vacuum Side

As standard, the pump is equipped with an inlet opening pointing vertically up for fitting a vacuum flange (DN 50 ISO-KF) or a corrugated hose. Upon delivery, this opening has been blanked off with a blank flange including a centering ring, for the purpose of the protecting the inside of the pump.



The vacuum side of the pump must not be flanged directly to the vacuum chamber; it must be flanged via a bellows.

Never suspend the pump on the vacuum flange, always set up on the standing surface or screw down.

- ➔ Loosen the screws from the claws and disassemble the blank flange.
- ➔ Fit the desired component part directly to the inlet opening using claws; note the centering ring.

#### Shifting the inlet opening

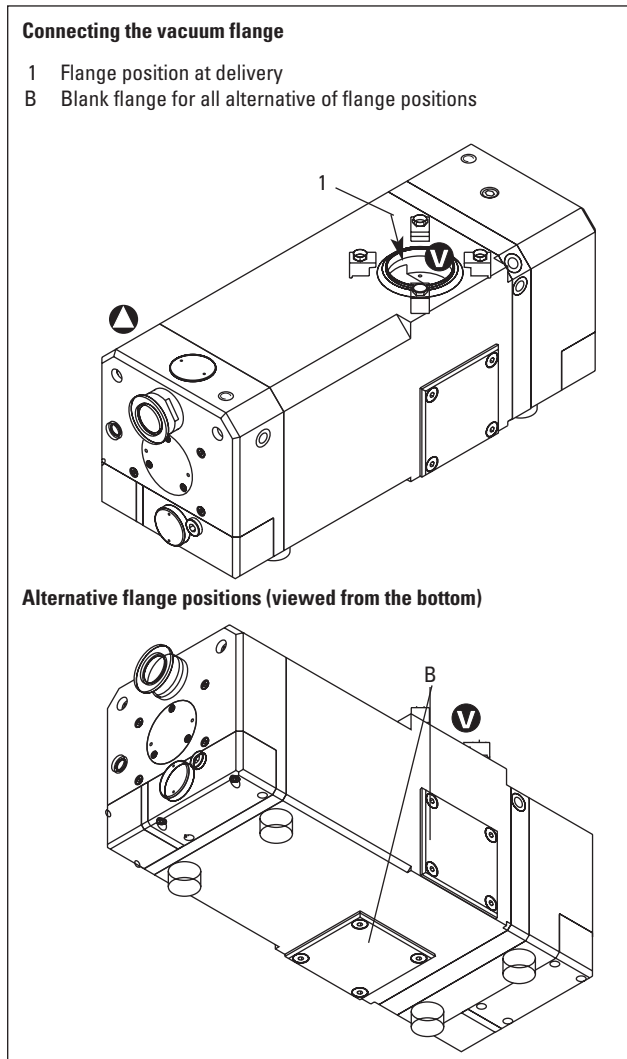
Depending on the installation situation, the inlet opening may be shifted to the side or the bottom.



During assembly of component parts do not lay the pump on the side or the back

- ➔ Disassemble the blank flange (flange cover) at the desired inlet opening.

- ➔ Cover and bolt down with a blank flange the inlet opening pointing vertically up; note the sealing ring.
- ➔ Fit the desired component part to the inlet opening using claws; note the centering ring.



The utmost cleanliness must be observed when fitting all high vacuum parts. Unclean components prolong the pumping time.

- ➔ Fit a vacuum safety valve (Accessory) in the vacuum line. This prevents the vacuum chamber being ventilated via the backing pump.

### 3.6. Connecting The Exhaust Flange

Use usual small flange components (DN 25 ISO-KF) or screwed hose connections for connecting the exhaust line.

- ➔ Provide the flange connection with clamping ring and centering ring at the exhaust flange (DN 25 ISO-KF).
- ➔ With rigid pipe connections fit a bellows in the connecting line to reduce vibration.
- ➔ Vacuum chambers with a volume of > 2 litres must have a non-return valve on the exhaust side to prevent their venting via the exhaust flange after switching off the pump.



Be sure to conduct away the exhaust gases from the pump. Do not reduce the free cross section of the exhaust flange with following components. The exhausted process gases and vapours can represent a health hazard and can also be environmentally damaging.



Use an exhaust silencer or connect the exhaust flange to an exhaust line if requested.

### 3.7. Connecting The Cooling Unit

The pump housing must be water cooled.  
The TCP 3000 electronic drive and control unit is fan-cooled.

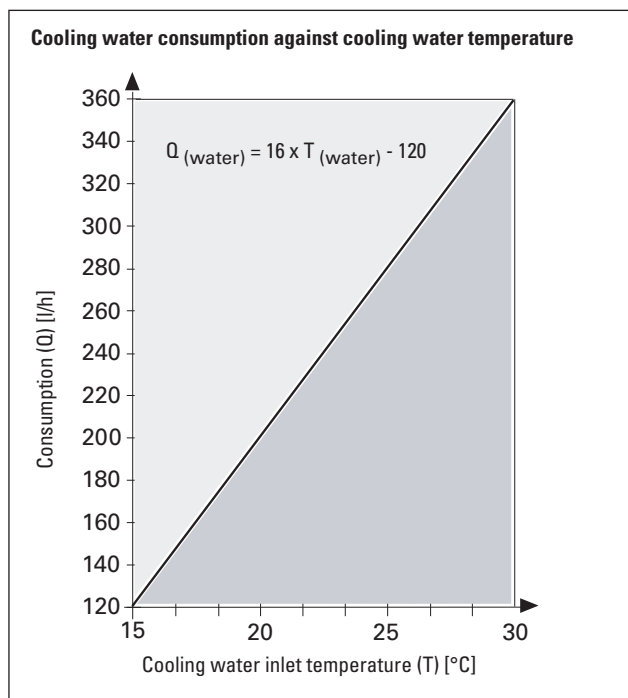
- The cooling water can be drawn either
- From the cooling water mains, or
  - From Recycled Water Cooling Unit TZK (> 2 kW cooling capacity) in closed circuit.

#### Cooling from the cooling water mains

To prevent deposits collecting in the pump the cooling water must be filtered.

Minimum cooling water requirements:  
Mechanically clean, optically clear, no turbidity, no sediment, chemically neutral.

Oxygen content:	max. 4 mg/kg
Chloride content:	max. 100 mg/kg
Carbonate hardness:	max. 10° dH
Consumption of potassium permanganate:	max. 10 mg/kg
Carbon dioxide:	Undetectable
Ammonia:	Undetectable
pH-value:	7-9
Fore-line over pressure:	max. 6 bar
Minimum flow rate at gas load max.:	120 l/h at 15 °C



#### Connection to the cooling water mains

- ➔ Fit the dirt trap (Accessory) in the supply line.
- ➔ Connect the supply line with hose clips onto the cooling water connection 80.
- ➔ Fit reducing nipple and hose nozzles at the cooling water monitor.
- ➔ Fit the cooling water monitor in the return line 42.



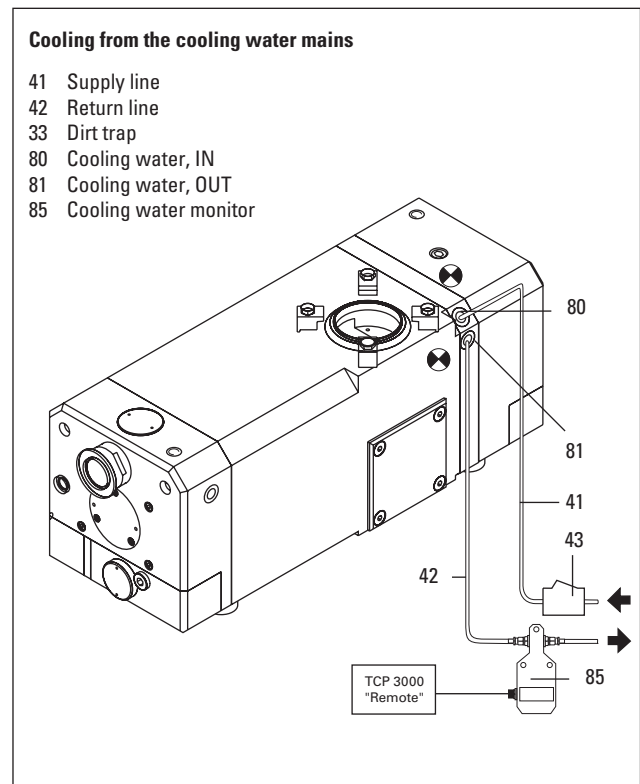
The operation without cooling water monitor is not permissible.

The actual flow rate will be indicated by a LED line at the cooling water monitor housing and controlled at the electronic drive unit.

#### Cooling water monitor states

- Rot: Flow rate is below switching point
- Gelb: Flow rate reached switching point (preset at works)
- Grün: Flow rate is higher than switching point (the requested flow rate is reached)

- ➔ Use the provided cable to connect the cooling water monitor with the "REMOTE" connector of Electronic Drive Unit TCP 3000.
- ➔ Connect the return line to the cooling water connection 81.
- ➔ Tighten all hose clips and check for firm seating of the hoses.

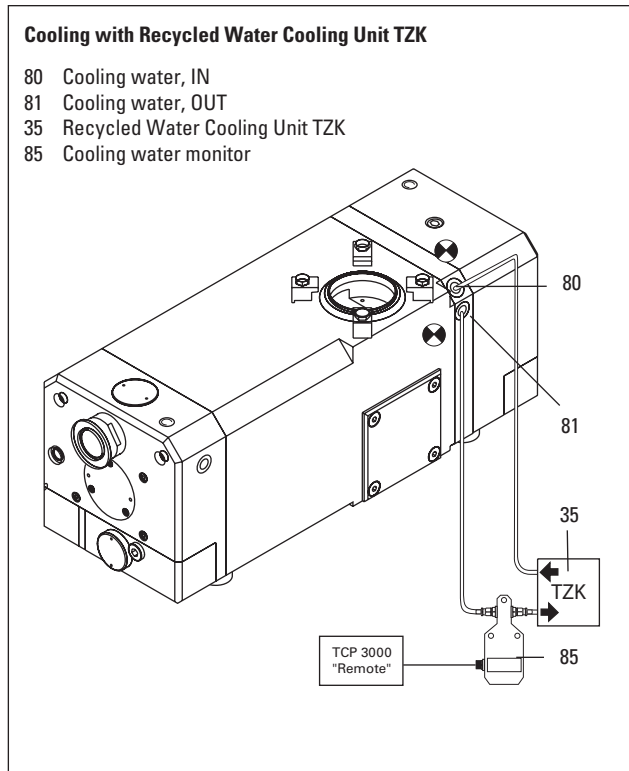


### Connection for Cooling with the Recycled Water Cooling Unit TZK (Accessory)



The cooling capacity of the TZK should be greater or equal to 2 kW.  
Dirt traps may not be fitted in the lines.

- ➔ Carry out all other steps as for connecting to the cooling water mains.



### 3.8. Connecting The Pump To The Electronic Drive Unit TCP 3000



Electrical connections must be carried out in accordance with local regulations. Voltage and frequency values on the TCP 3000 rating plate must concur with mains voltage and mains frequency values.

- ➔ Plug connecting cable 52 (accessory) with X2 into the Electronic Drive Unit TCP 3000 and with X7 into the pump.
  - After plugging in, interlock bayonet lock (X2/X7) and secure with the screw M4.



When the operating voltage is provided and the main switch switched "ON" the pump runs a self test so as to check the supply voltage.

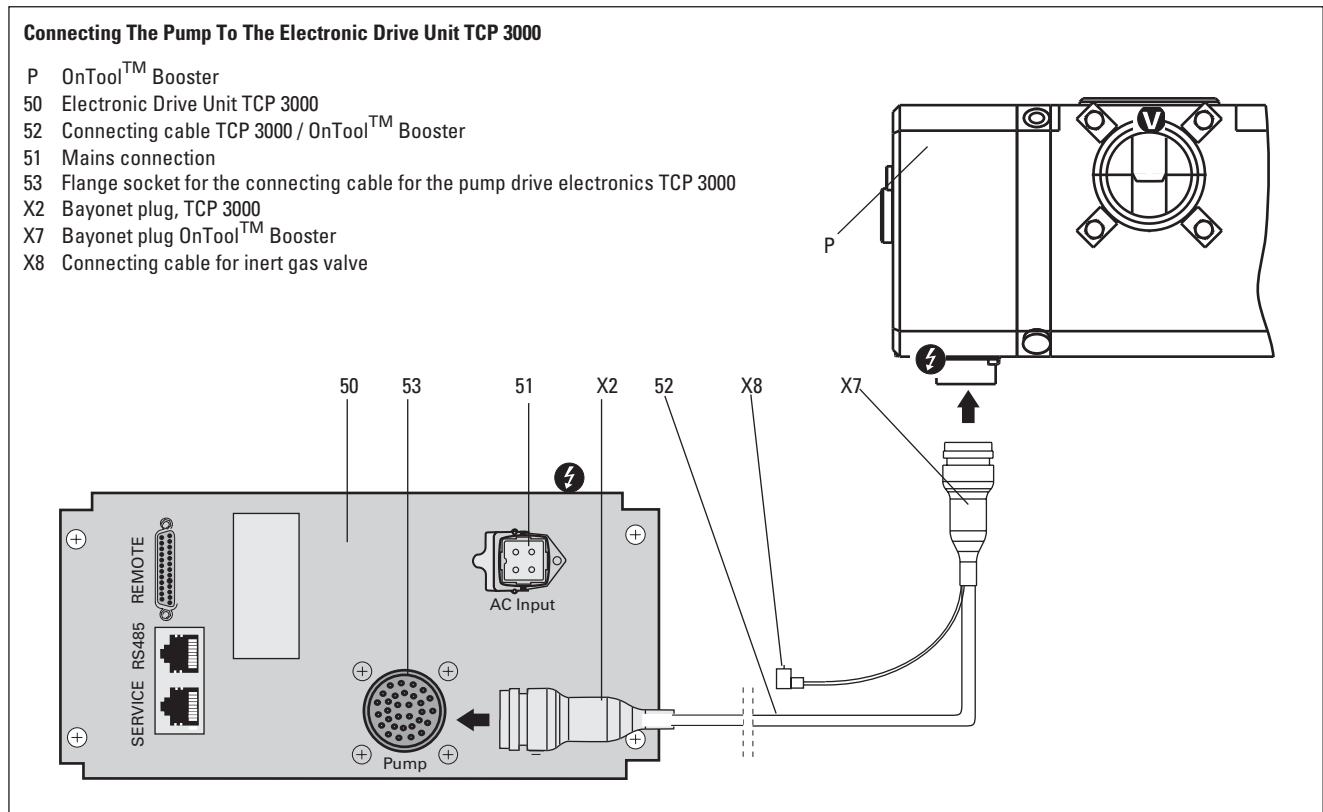


Only unplug the connector to the electronic drive unit when the pump is completely at rest and the electronic drive unit has been disconnected from the mains.

Voltages of more than 130 V<sub>eff</sub> can occur on a running down pump on the open electric connection.

There is a danger of an electric shock from touching the contacts.

For further details please refer to Operating Instructions PT 0087 BN for the Electronic Drive Unit TCP 3000.



#### Controlling the direction of rotation

The correct direction of rotation for the pump has been checked during works acceptance tests.



Interchange of two phases during installation, at the power supply input of the TCP 3000, does not commutate the direction of rotation.

### 3.9 Pumping of Vapors

If condensable vapors are to be pumped, the pump needs to be operated with the gas ballast on the exhaust side 8.2. This effects an increase in the gas temperature and a dilution in the concentration of the process gases.

#### Controlling the gas ballast inlet via magnetic valve:

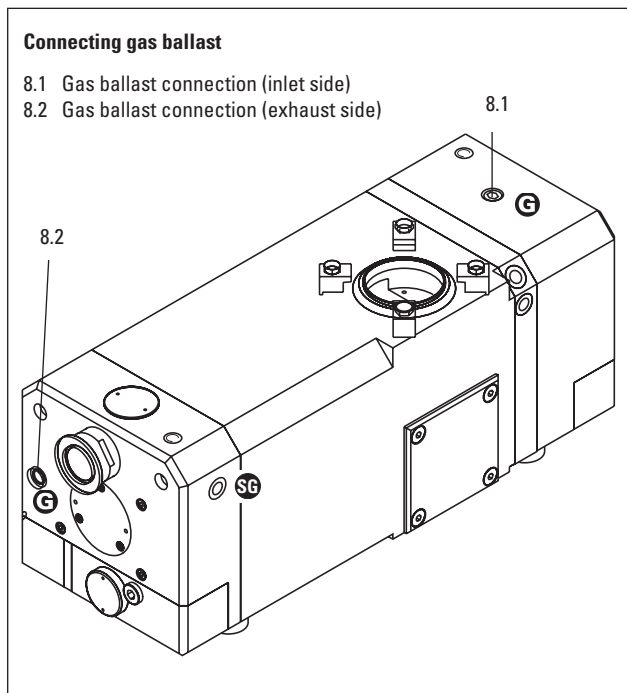
- via serial interface RS 485 at the TCP 3000 or
- at the control panel of the TCP 3000 with the parameter [P:052].



The magnetic valve opens when a pump rotation speed exceeds 15 % of the nominal value (approximately 150 Hz).

#### Connecting the gas ballast 8.2 :

- ➔ Unscrew the plug G 1/8" from the pump housing and replace it by a screw-in small flange.
  - If required install a throttle.
  - Alternatively use a solenoid valve.
- ➔ Connect the inert gas line to the gas ballast connection 8.2.
  - Generally use dry air or pure nitrogen.
- ➔ Set up the gas ballast throughput to a max. of 1200 NI/h at the inert gas inlet.



### 3.10 Pumping of Light or Heavy Gases

When pumping light or heavy gases it is recommended to operate the pump at the intake side 8.1 with gas ballast:

- In the case of heavy process gases the gas ballast effects cooling and a dilution in concentration.
- In the case of lighter gases the gas ballast operates as a carrier gas which promotes pumping of the process medium.



If gases other than air or nitrogen are used for the gas ballast, please discuss such plans with Pfeiffer Vacuum first.



The gas ballast reduces the volume flow rate and increase the final pressure correspondingly to the admitted quantity of gas ballast.

#### Connecting the gas ballast 8.1 :

- ➔ Unscrew the plug G 1/8" from the pump housing and replace it by a screw-in small flange.
  - If required install a throttle and use a solenoid valve.
- ➔ Connect the inert gas line to the gas ballast connection 8.1.
  - Generally use dry air or pure nitrogen (other gases on request).
- ➔ Set up the gas ballast throughput to a max. of 1000 sccm at the gas ballast inlet.

### 3.11 Using Sealing Gas

For all applications the pump should be operated with sealing gas at the shaft feedthrough between the suction chamber and the bearing chamber on the exhaust side.

This effects the following:

- protection of the lubricant against contamination,
- protection of the bearing when pumping vapors and contaminated gases and
- reduction in the amount of oil ejected during cyclic pumping processes (loadlock applications).



The type of sealing gas is dependent on the process (normally N<sub>2</sub>).

#### Controlling the sealing gas inlet via magnetic valve:

- via serial interface RS 485 at the TCP 3000 or
- at the control panel of the TCP 3000 with the parameter [P:052].

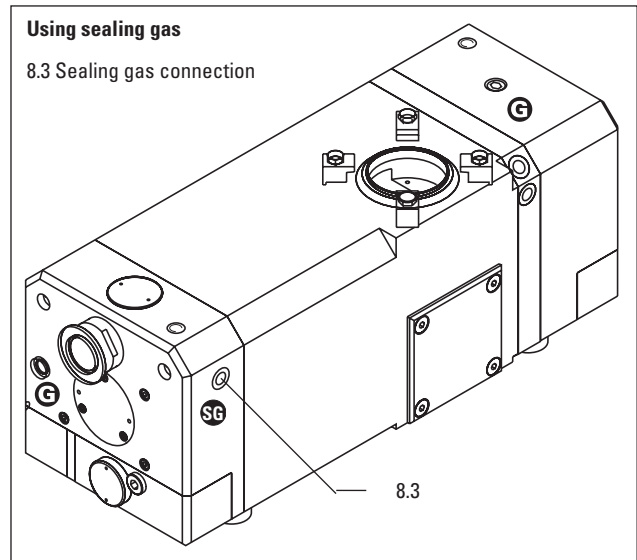
➔ Use [P:054] for changing over the operating mode for controlling the magnetic valve.



The magnetic valve opens when a pump rotation speed exceeds 15 % of the nominal value (approximately 150 Hz).  
In cases of malfunctions the valve closes automatically.

#### Connecting the sealing gas 8.3 :

- ➔ Unscrew the plug G 1/8" from the pump housing and replace it by a screw-in small flange.
  - If required install a sinter filter or a throttle.
  - Alternatively use a solenoid valve and connect it to the control cable X8 (see Section 3.8. Connecting The Pump To The Electronic Drive Unit TCP 3000).
- ➔ Connect the inert gas line to the sealing gas connection 8.3.
  - Generally use dry air or pure nitrogen.
- ➔ Set up the sealing gas throughput to a max. of 800 ... 1200 NI/h at the inlet.



## 4. Operations

### 4.1. Before Switching On The Pump

- ➔ Check the lubricant level before starting the pump.
- ➔ Before switching on the pump check that all lines have been correctly connected.



Shut-off valves in the exhaust line should be activated so that they open either before or simultaneously with the start of the pumps.



Pump rotors rotate at high speed. When the high vacuum flange is open there is a danger of injury and of damage to the pump caused by objects falling into the pump. Therefore never operate the pump with open high vacuum flange!



Take care when pumping hazardous gases and observe the safety precautions of the gas manufacturer!

- ➔ With gas ballast valve: open the gas ballast supply.
- ➔ Open the cooling water supply and adjust the flow until at least one green LED at the cooling water monitor lights up.

### 4.2. Switching The Pump ON

Details regarding the switching on of the pump are contained in Operating Instructions PT 0087 BN for the Electronic Drive Unit TCP 3000.

- ➔ Bring pump to operating temperature before process start (approx. 10 min) to prevent condensation.



When switching on for the first time or after a change of lubricant, the contacts for monitoring the lubricating pump can open as a result of degassification. In such cases, as for other malfunctions, the electronic drive unit switches off the pump.

- ➔ In remote mode and if a malfunction has occurred, a malfunction acknowledgment is carried out automatically after pump OFF/ON (pin 2 on the remote plug).
- ➔ For operations via the front panel of the TCP 3000, the malfunction or warning signal is reset via the malfunction acknowledgment key.



Malfunction acknowledgment following a lubricant malfunction can occur up to five times. If this malfunction occurs again, the TCP 3000 should be disconnected from the mains for a short time.

If after applying the mains voltage the error message E777 is displayed, then proceed as follows:

- ➔ In the case of the DCU 001 or HPU 001 select «**777: PumpRot Max**».
- ➔ Enter the nominal speed for the connected pump once (see Chapter 11. Technical Data).

The error message E777 is erased, the pump is ready for operation.



This procedure is part of a redundant safety system for avoiding excessively high speeds.

### 4.2.1 Motor temperature monitoring

An automatic temperature control controls the following units:

#### Control electronics

Exceeding of the max. permissible temperature results in switching off the pump.

#### Motor temperature

For motor temperature monitoring there are two limiting values:

- At motor temperature > 80°C --> warning.
- At motor temperature > 85°C --> error.

#### Built in protection means against overtemperatures:

The drive electronics TCP 3000 will slow down the rotor speed

### 4.3. Gas Type Dependent Operations

Where high level gas loads and rotation speeds are involved, the resulting friction subjects the rotor to the effect of great heat. To avoid over-heating, a power rotation speed characteristic line is implemented in the TCP 3000; this ensures that where maximum gas loads are involved, the pump will operate at any rotation speed without the danger of damage arising. The maximum power is dependent on the type of gas and consider only nitrogen, respectively air and lighter gases.

#### Max. permissible gas loads:

- Molecular mass < 40 (e.g. Argon) ≤ 1000 sccm
- Molecular mass > 40 in exceptional cases with gas ballast.



Pumping gases with molecular mass ≥ 40 can cause damage to the pump. Before pumping such gas types please contact the manufacturer.

## 4.4. Switching The Pump OFF

Details regarding the switching off of the pump are contained in Operating Instructions PT 0087 BN for the Electronic Drive Unit TCP 3000.



When switching off the pump or in case of malfunctions shut off the suction line immediately to prevent the vacuum chamber being ventilated via the backing pump.

- ➔ In remote mode the pump is switched off with “pump OFF” (pin 2 on the remote plug).
- ➔ For operations via the front panel of the TCP 3000 the pump is switched off via the key ON/OFF.
- ➔ Close the fore-vacuum safety valve (if fitted).
- ➔ Disconnect the Electronic Drive Unit TCP 3000 from the mains not until the pump rotor is at rest and only then disconnect the connecting cable pump/TCP.



To avoid condensation in the pump, vapours should only be pumped off when the pump is warm and with gas ballast valve **G** open. When the process has been completed, allow the pump to continue running for about 30 minutes with open gas ballast valve for operating fluid regeneration purposes.

## 4.5. Preparation For Transport And Shutting Down The Pump For Longer Periods



Empty cooling water circuit before transporting and stocking the pump to avoid frost damage.  
Storage temperature range: - 25 °C ... + 55 °C  
Transport temperature range: - 25 °C ... + 70 °C

- ➔ Switch off the pump via remote mode or via the key ON/OFF at the front panel of the TCP 3000; do not disconnect the Electronic Drive Unit TCP 3000 from the mains until attainment of 0 Hz rotation speed.
- ➔ Unplug cooling water and empty water chambers; for this admit compressed air (2 ... 5 bar) at the water inlet line 80. Make sure the hose of the outlet line 81 is open and unaligned.
- ➔ Drain off the lubricant or dismantle both lubricant reservoirs from the pump housing and empty any residual lubricant into a suitable vessel; (see Section 6.2.).



The Shelf-life of lubricant F5 is 4 years when storing in dry areas and closed original packaging.

It is recommended to flush the pump with an inert gas (e.g. Nitrogen) before shutting down the pump for longer periods.

- ➔ Vent pump via the vacuum flange with nitrogen or dry air.
- ➔ Block off the pump on the intake side and at the exhaust flange by using a blank flanges.



If the pump has been shut down for **3 years**, the bearing must be changed (please contact Pfeiffer Vacuum Service).

## 5. What To Do In Case Of Breakdowns?

Problem	Possible Cause	Elimination
The pump does not start; Neither LED's glow on the TCP 3000 <sup>1)</sup>	<ul style="list-style-type: none"> <li>• Current supply interrupted</li> <li>• Incorrect operations voltage supplied</li> <li>• Line safety switch defective</li> <li>• Run-up time exceeded</li> <li>• Run-up time monitor switched off</li> </ul>	<ul style="list-style-type: none"> <li>• Check the mains connections and the feeder lines</li> <li>• Supply correct operations voltage</li> <li>• Let the pump cool if already in operation; inform Pfeiffer Vacuum Service</li> <li>• Check parameter for run-up time and switching threshold P[700] and [701] at the TCP 3000; for example, the speed of the pump drops below the switching threshold P[701] after it has attained its nominal speed.</li> <li>• Switch on the run-up time monitor P[004].</li> </ul>
The pump does not attain the nominal rotation speed The pump switches off during operations	<ul style="list-style-type: none"> <li>• High gas load</li> <li>• Exhaust closed</li> <li>• Rotor sluggish caused by dirty pump stages or defective bearings</li> <li>• Thermal overload from insufficient water flow</li> <li>• Ventilator on the electronic drive unit defect.</li> <li>• Cooling water monitor defective or not connected</li> </ul>	<ul style="list-style-type: none"> <li>• Check the exhaust line</li> <li>• Check the bearing for noises. For replacement please inform Pfeiffer Vacuum Service</li> <li>• Check water flow</li> <li>• Check ventilator function: replace ventilator if necessary or clean the ventilator grill.</li> <li>• Check cooling water monitor</li> </ul>
The pump does not attain the final pressure	<ul style="list-style-type: none"> <li>• Leak in System</li> <li>• Dirty pump</li> <li>• Leak in the system</li> </ul>	<ul style="list-style-type: none"> <li>• Repair leak</li> <li>• In serious cases inform Pfeiffer Vacuum Service of the need for cleaning the pump</li> <li>• Seek leak, starting with the vacuum chamber and repair</li> </ul>
Unusual operating noises	<ul style="list-style-type: none"> <li>• Damage to the pump stages</li> <li>• Damage to the bearing</li> <li>• Damage to the rotor</li> </ul>	<ul style="list-style-type: none"> <li>• Inform Pfeiffer Vacuum Service of the need for repairs</li> <li>• Inform Pfeiffer Vacuum Service of the need for repairs</li> <li>• Inform Pfeiffer Vacuum Service of the need for repairs</li> </ul>
Red LED on the TCP 3000 glows	<ul style="list-style-type: none"> <li>• Collective malfunction</li> </ul>	<ul style="list-style-type: none"> <li>• Differentiated malfunction display via the front display on the TCP 3000, parameter 303 possible.</li> <li>• Where control is via remote ([P:028]=0), confirm via pump ON/OFF. Where control is via the front panel, depress malfunction confirmation key. Where control is via SIO, transmit a malfunction reset command.</li> </ul>
Red LED on the TCP 3000 blinks	<ul style="list-style-type: none"> <li>• Warning mains power failure:</li> </ul>	<ul style="list-style-type: none"> <li>• Differentiated warning display via the front display on the TCP 3000, parameter 303 possible.</li> <li>• Check mains supply/mains voltage.</li> </ul>

1) Please take into account to information in the Operating Instructions for the TCP 3000, PT 0087 BN.

## 6. Maintenance

### 6.1. Precautionary Measures During Maintenance Work



Maintenance work may only be carried out by qualified Pfeiffer Vacuum personnel.

#### Usual intervals for lubricant replacements:

1... 2 years depending on the operating conditions.

- ➔ When working on the pump, always secure pump against being switched on.
- ➔ When working with synthetic lubricants or with substances which are toxic or are contaminated with corrosive gases, the relevant precautions must be observed.
- ➔ Clean pump parts only with alcohols. Do not use other solvents.



Do not allow any liquids to enter into the inside chamber of the pump.  
This can damage the rotor blades!

### 6.2. Replacing The Lubricant

The intervals for lubricant replacement are governed by the operating conditions. Influential factors are operating temperature and the type of process medium.



During maintenance and repair work, process related toxic gases and vapours can escape from the lubricant which may become contaminated with harmful substances (radioactive, chemical etc.).



Please request safety instruction data sheets for lubricants from Pfeiffer Vacuum.

#### Changing the lubricant

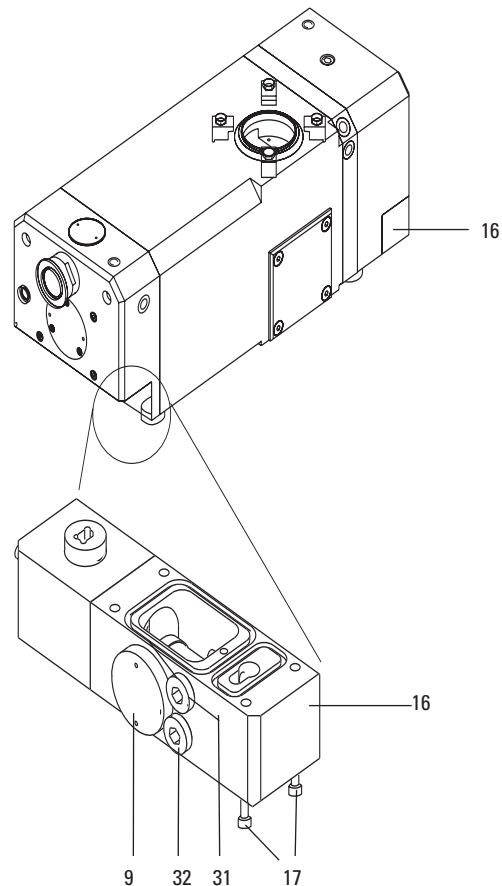
- ➔ Allow the pump to cool to a safe temperature.
- ➔ Switch off and vent pump if lubricant is to be replenished.
- ➔ Unscrew lubricant drain screws 32 on both sides (valid for pumps with revision index "E") and drain lubricant; otherwise dismantle lubricant reservoirs and pour out lubricant.
- ➔ Screw in lubricant drain screws 32.

#### Cleaning the lubricant reservoir

- ➔ Dismantle both lubricant reservoirs 16 by unscrewing each four screws 17 on the underside of the pump.
- ➔ Detach lubricant reservoir 16 horizontally from the pump casing and drain off any residual lubricant into a suitable vessel.
- ➔ If necessary remove the strainers from the lubricant reservoir and clean.
- ➔ After cleaning, refit the strainers and screw on lubricant reservoirs.
- ➔ During strong contamination of the lubricant, exchange lubricant reservoir completely.

#### Dismantling The Lubricant Reservoir And Changing The Lubricant

- 9 Sight glass
- 16 Lubricant reservoir
- 17 Screw
- 31 Lubricant filler screw
- 32 Lubricant drain screw (valid for pumps with revision index "E")





Remove drops of lubricant in the working environment immediately using either a rag or some suitable cleaning agent.



Disposal of used lubricant is subject to the relevant local regulations.



If "F3" is heated above 300°C, toxic vapours which can harm the respiratory tract are emitted. Do not allow "F3" to come into contact with tobacco products (danger of poisoning when ignited). The precautions necessary in the handling of chemicals must be observed.

### Filling in the lubricant

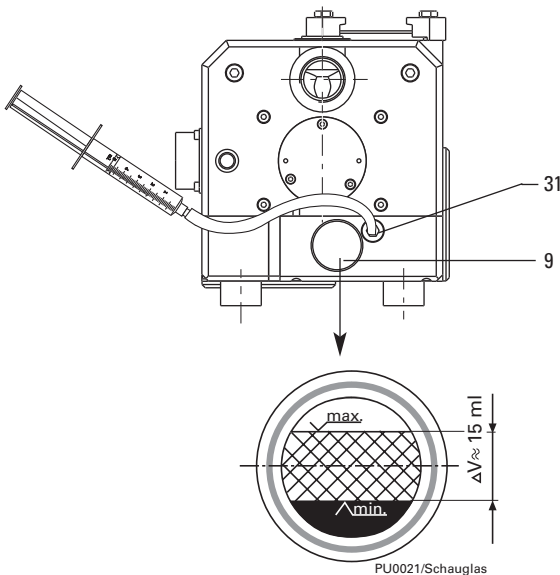


Only fill the lubricant reservoirs of the pump in the horizontal position. Do not fill when the pump is running and not in evacuated condition.

- ➔ Unscrew both lubricant filler screws 31, taking care with the sealing.
- ➔ Slowly fill in 24 ml of the accompanying lubricant into each lubricant reservoir.
- ➔ Screw back in lubricant filler screws 31 with the sealing.
- ➔ During operations or at pump still stand check the lubricant level on both sight glasses; the permissible level is shown in the illustration.
- ➔ In non-stop operations check the lubricant monthly, on both sight glasses 9 after each switch-on.

#### Filling In And Checking The Lubricant

- 9 Sight glass
- 31 Lubricant filler screw



Before first-time starting and after a lubricant change, the amount of lubricant is approximately 24ml.

The filling level range shown in the illustration ("min./max.") should never be exceeded nor undershot.

## 7. Service

### Do Make Use Of Our Service Facilities

In the event that repairs are necessary to your pumping station, a number of options are available to you to ensure any system down time is kept to a minimum:

- Have the pump repaired on the spot by our Pfeiffer Vacuum Service Engineers;
- Return the individual components to the manufacturer for repairs;
- Replace individual components with a new value exchange units.

Local Pfeiffer Vacuum representatives can provide full details.

### Before Returning:

- ➔ When returning the pump please use original factory packing.
- ➔ Dismantle all accessories.
- ➔ Drain lubricant (see Section 6.2.).
- ➔ Empty water chambers (see Section 4.4.).
- ➔ If the pump free of harmful substances, please attach a clearly visible notice: "Free of contamination" (to the unit being returned, the delivery note and accompanying paperwork).

Harmful substances" are substances and preparations as defined in current legislation. Pfeiffer Vacuum will carry out the decontamination and invoice this work to you if you have not attached this note. This also applies where the operator does not have the facilities to carry out the decontamination work. Units which are contaminated microbiologically, explosively or radioactively cannot be accepted as a matter of principle.

### Fill Out The Contamination Declaration

- ➔ In every case the "Contamination Declaration" must be completed diligently and truthfully.
- ➔ A copy of the completed declaration must accompany the unit; any additional copies must be sent to your local Pfeiffer Vacuum-Service Center.

Please get in touch with your local Pfeiffer Vacuum representatives if there are any questions regarding contamination.



Decontaminate units before returning or possible disposal. Do not return any units which are microbiologically, explosively or radioactively contaminated.

### Returning Contaminated Units

If contaminated units have to be returned for maintenance/repair, the following instructions concerning shipping must be followed without fail:

- ➔ Neutralise the pump by flushing with nitrogen or dry air.
- ➔ Seal all openings to the air.
- ➔ Seal pump or unit in suitable protective foil.
- ➔ Ship units only in the original factory packing or in appropriate transport containers.



Repair orders are carried out according to our general conditions of sale and supply.

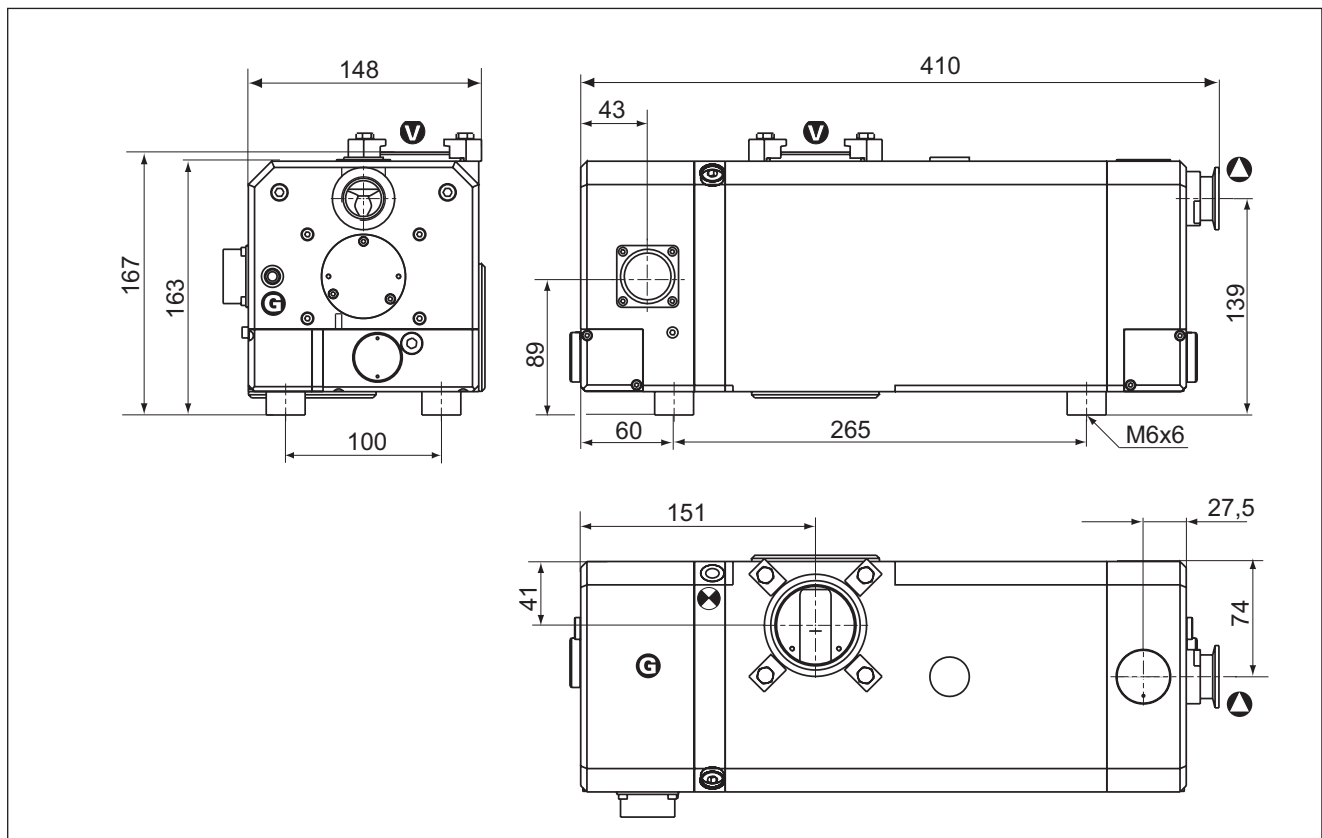
- ➔ If repairs are necessary, please send the unit together with a short damage description to your nearest Pfeiffer Vacuum Service Center.

## 8. Technical Data

Feature	Unit	OnTool™ Booster
Connection nominal diameter Inlet Outlet		DN 50 ISO-KF DN 25 ISO-KF
Nominal rotation speed	1/min	60 000
Run-up time (with vacuum flange blanked off)	s	25
Noise level	dB (A)	< 64
<sup>1)</sup> Final pressure for Nitrogen N <sub>2</sub>	mbar	< 1 • 10 <sup>-5</sup>
Maximum volume flow rate for Nitrogen N <sub>2</sub> at 0,1 mbar Atmosphere pressure	m <sup>3</sup> /h m <sup>3</sup> /h	130 18
Max. Gas load for Argon other gases on request	sccm	1000
Type of lubricant		F3
Amount of lubricant for the lubricant reservoirs	ml (each)	24
Cooling water consumption with water at 15 °C	l/min	2
Cooling water temperature	°C	15 ... 30
Permissible ambient temperature	°C	12 - 40
Weight, approx.	kg	35
Connection voltage at the TCP 3000	V	208 ... 240 V ± 10% / 60 Hz 230 ... 240 V ± 10% / 50 Hz
Max. power	W	2000
Protection class of the pump		IP 51

<sup>1)</sup> The final pressure is dependent on the type of pumped media. Pump off light gases with a suitable carrier gas (gas ballast connection 8.1)

### 8.1. Dimensions Diagram



## 9. Accessories

Description	Size	Number	Comments/ Operating Instructions	Order Quantity
Dirt trap	R 3/8"	P 4161 300 2R		
Recycled Water Cooling Unit TZK 2000	230 V, 50 Hz	PM Z01 240	PM 800 369 BN	
Vacuum flange	DN 50 ISO-KF	PF 121 250	Stainless Steel	
Centering ring	DN 50 ISO-KF	PF 110 250 -T	Stainless Steel/Elastomere	
Vibration compensator	DN 50 ISO-KF	PF 130 250 -X		
Non-return flap	DN 25 ISO-KF	PK 004 521 -U		
Sealing ring	DN 25 ISO-KF	PF 110 025 -T	Al/Neopren	
Sealing ring	DN 25 ISO-KF	PF 110 125 -T	Al/Elastomer	
Screw-in flange		PM 006 702	for inert gas inlet	
Pipe union	G 1/8"	P 4169 200 MN	hose nozzle for water inlet	
Sealing ring		P 3529 133 -A		
Filter for sealing gas inlet	G 1/8 "	P 0998 442	sintered metal	
Sealing ring		P 3529 133 A	USIT	
Magnetic valve TVF 005 for sealing gas and gas ballast inlet	G 1/8"	PM Z01 135 G	24 V/DC	
Electronic drive and control unit TCP 3000		PM C01 731 A		
Electronic drive and control unit TCP 3000		PM C01 732 A	with Profibus	
Electronic drive and control unit TCP 3000		PM C01 733 A	with DeviceNet	
Connection cable TCP 3000 / OnTool™ Booster	3 m	PM 051 863 AT	other length on request	
Connection cable cooling water monitor	3 m	PK 003 443 AT		
Level Converter	RS 232/RS 485	PM 051 054 -X	PM 800 549 BN	

When ordering accessories please be sure to state the full part number. Please use this list as an order form (by taking a copy).

## Declaration of Contamination of Vacuum Equipment and Components

The repair and/or service of vacuum components will only be carried out if a correctly completed declaration has been submitted. Non-completion will result in delay.

The manufacturer could refuse to accept any equipment without a declaration.

This declaration can only be completed and signed by authorised and qualified staff:

1. Description of component:

- Equipment type/model: \_\_\_\_\_
- Code No.: \_\_\_\_\_
- Serial No.: \_\_\_\_\_
- Invoice No.: \_\_\_\_\_
- Delivery Date: \_\_\_\_\_

2. Reason for return:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

3. Equipment condition

- Has the equipment been used?  
yes  no
- What type of pump oil was used?  
\_\_\_\_\_
- Is the equipment free from potentially harmful substances?  
yes  (go to section 5)  
no  (go to section 4)

4. Process related contamination of equipment

- toxic yes  no
- corrosive yes  no
- microbiological hazard\*) yes  no
- explosive\*) yes  no
- radioactive\*) yes  no
- other harmful substances yes  no

\*) We will not accept delivery of any equipment that has been radioactively or microbiologically contaminated without written evidence of decontamination!

Please list all substances, gases and by-products which may have come into contact with the equipment:

Tradename Product name Manufacturer	Chemical name (or Symbol)	Danger class	Precautions associated with substance	Action if spillage or human contact
1.				
2.				
3.				
4.				
5.				

### 5. Legally Binding Declaration

I hereby declare that the information supplied on this form is complete and accurate. The despatch of equipment will be in accordance with the appropriate regulations covering Packaging, Transportation and Labelling of Dangerous Substances.

Name of Organisation: \_\_\_\_\_

Address: \_\_\_\_\_ Post code: \_\_\_\_\_

Tel.: \_\_\_\_\_

Fax: \_\_\_\_\_ Telex: \_\_\_\_\_

Name: \_\_\_\_\_

Job title: \_\_\_\_\_

Date: \_\_\_\_\_ Company stamp: \_\_\_\_\_

Legally binding signature: \_\_\_\_\_

## **Herstellererklärung Manufacturer's Declaration**

im Sinne folgender EU-Richtlinien:  
*pursuant to the following EU directives:*

- **Maschinen/Machinery 98/37/EWG (Anhang/Annex II B)**
- **Elektromagnetische Verträglichkeit/Electromagnetic Compatibility 89/336/EWG**
- **Niederspannung/Low Voltage 73/23/EWG**

Hiermit erklären wir, daß das unten aufgeführte Produkt zum Einbau in eine Maschine bestimmt ist und daß deren Inbetriebnahme so lange untersagt ist, bis festgestellt wurde, daß das Endprodukt den Bestimmungen der EU-Richtlinie 98/37/EWG entspricht.

Das unten aufgeführte Produkt entspricht den Anforderungen der EU-Richtlinien **Maschinen 98/37/EWG, Elektromagnetische Verträglichkeit 89/336/EWG** und **Niederspannung 73/23/EWG**.

*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 **EU Low Voltage 73/23/EEC**.*

**Produkt/Product:**

**OnTool™ Booster 150**

Angewendete Richtlinien, harmonisierte Normen und angewendete nationale Normen:

*Guidelines, harmonised standards, national standards in which have been applied:*

**EN 12100-1, EN 12100-2, EN 294, EN 1012-2**  
**EN 50 081-1, EN 50 082-1**  
**EN 60 204-1, EN 61 010**  
**EN 1050**

Unterschrift/Signature:



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(W. Dondorf)  
Geschäftsführer  
Managing Director

Herst.I./2003



**Vacuum is nothing, but everything to us!**



**Turbopumps**



**Rotary vane pumps**



**Roots pumps**



**Dry compressing pumps**



**Leak detectors**



**Valves**



**Components and feedthroughs**



**Vacuum measurement**



**Gas analysis**



**System engineering**



**Service**

**PFEIFFER**  **VACUUM**

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