

# TYR

Rotary Lobe Blowers + Vacuum pumps

WT 0100 CV, WT 0150 CV,

WT 0280 CV, WT 0390 CV,

WT 0600 CV, WT 0730 CV,

WT 0100 CP, WT 0150 CP,

WT 0280 CP, WT 0390 CP,

WT 0600 CP, WT 0730 CP

## Instruction Manual



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# 1 Safety

Prior to handling the machine, this instruction manual should be read and understood. If anything needs to be clarified, please contact your Busch representative.

Read this manual carefully before use and keep for future reference.

This instruction manual remains valid as long as the customer does not change anything on the product.

The machine is intended for industrial use. It must be handled only by technically trained personnel.

Always wear appropriate personal protective equipment in accordance with the local regulations.

The machine has been designed and manufactured according to state-of-the-art methods. Nevertheless, residual risks may remain, as described in the following chapters and in accordance with the chapter *Intended Use* [→ 7]. This instruction manual highlights potential hazards where appropriate. Safety notes and warning messages are tagged with one of the keywords DANGER, WARNING, CAUTION, NOTICE and NOTE as follows:



## DANGER

... indicates an imminent dangerous situation that will result in death or serious injuries if not prevented.



## WARNING

... indicates a potentially dangerous situation that could result in death or serious injuries.



## CAUTION

... indicates a potentially dangerous situation that could result in minor injuries.



## NOTICE

... indicates a potentially dangerous situation that could result in damage to property.

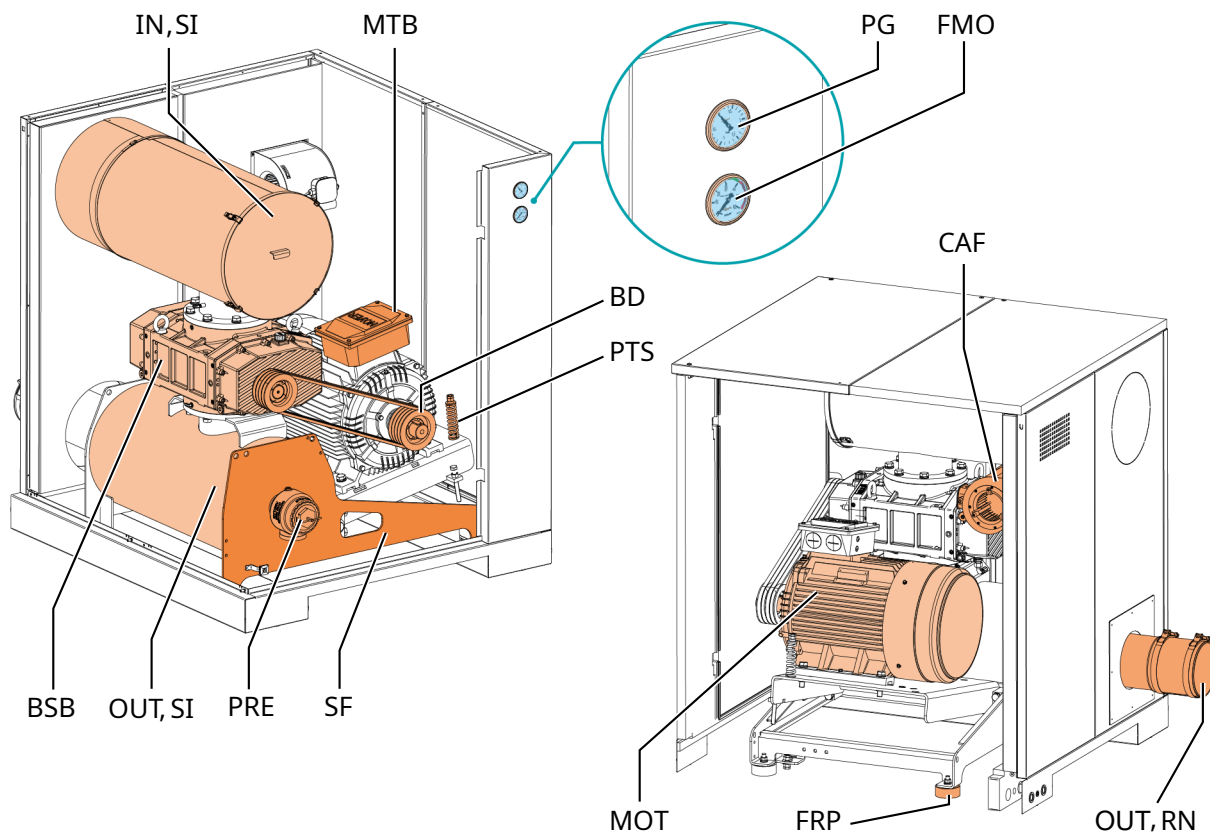


## NOTE

... indicates helpful tips and recommendations, as well as information for efficient and trouble-free operation.

## 2 Product Description

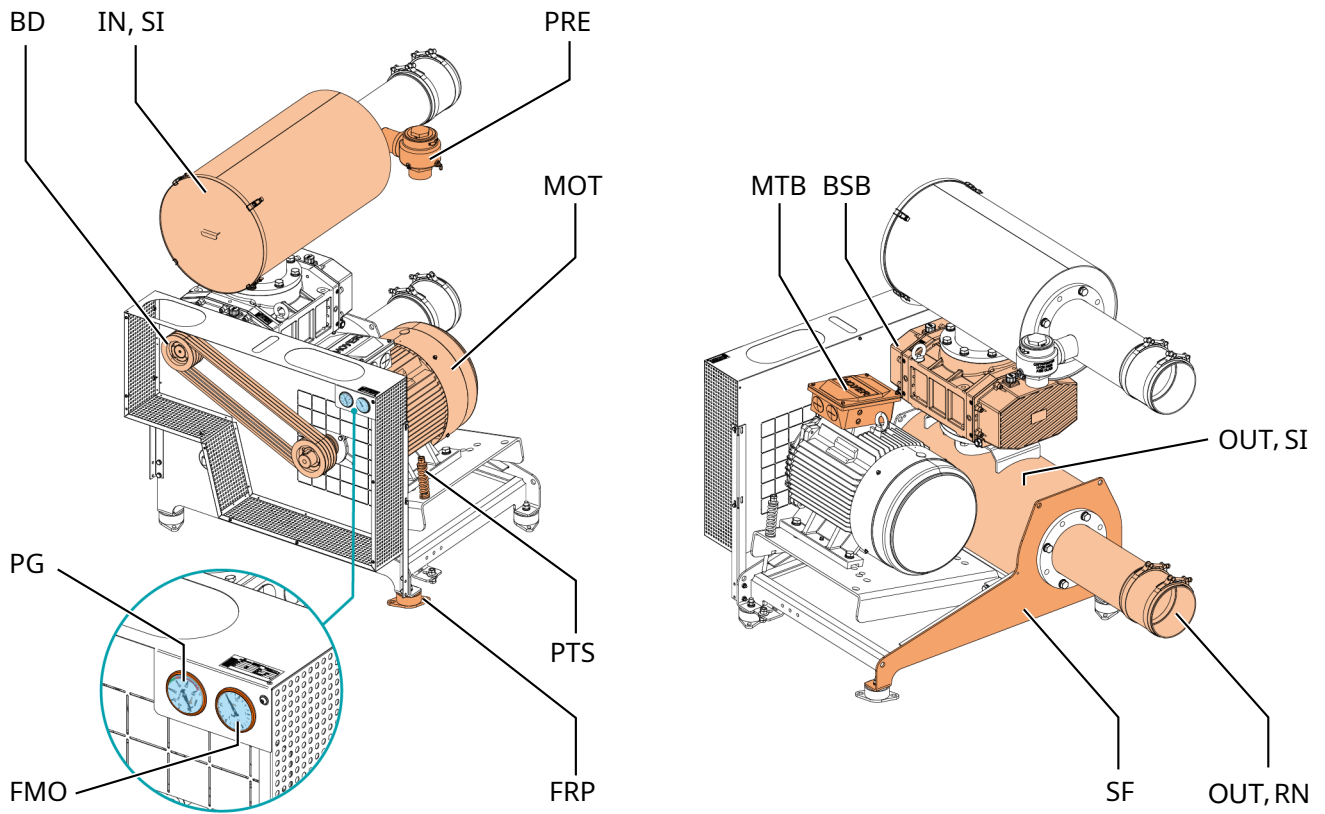
Blower package with cabinet



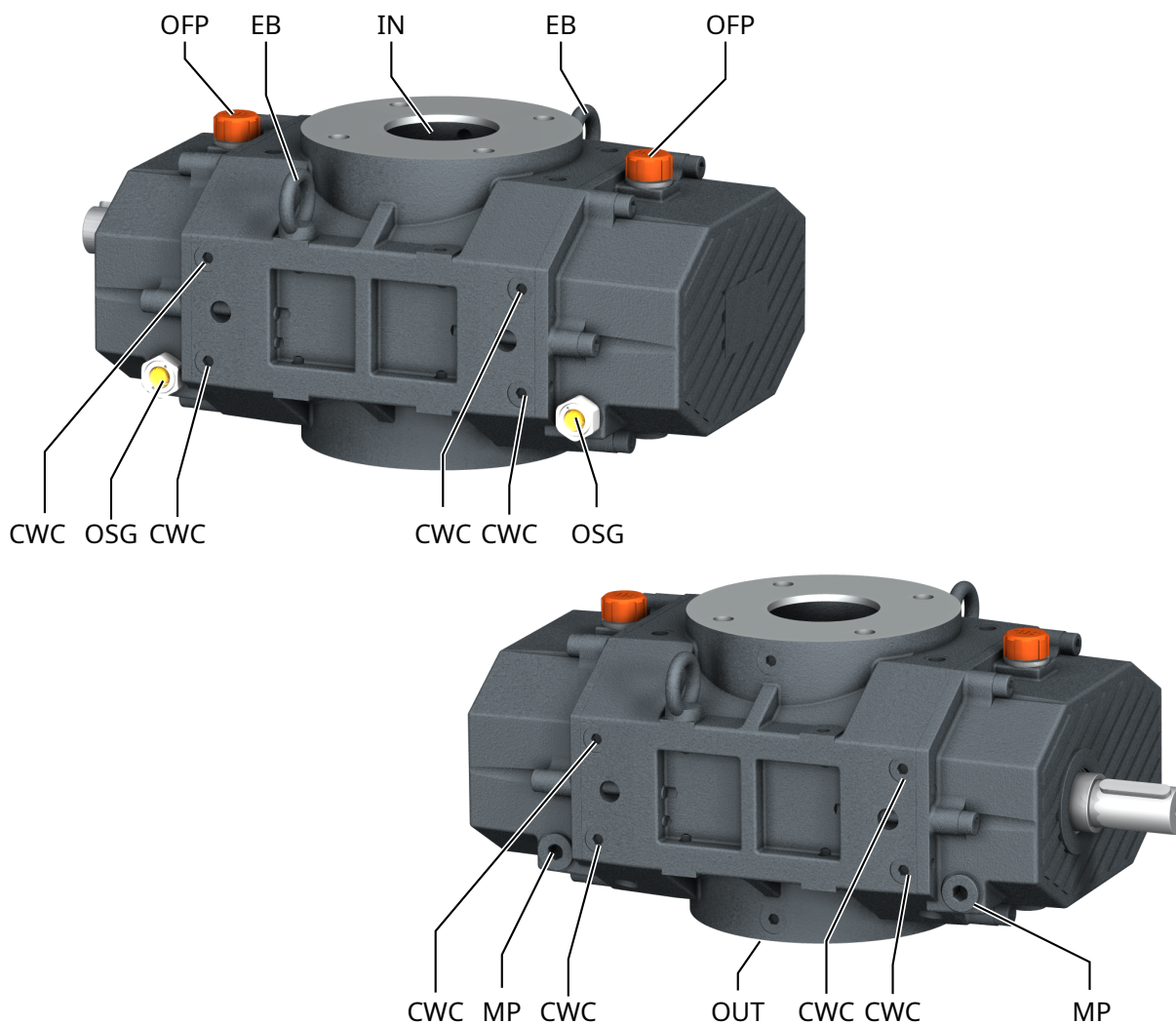
### Description

IN	Blower inlet	MTB	Motor terminal box
PG	Pressure gauge	FMO	Filter monitoring
BD	Belt drive	PTS	Pre-tensioning system
BSB	Bare shaft blower	OUT	Blower outlet
SI	Silencer	PRE	Pressure relief valve
SF	Supporting frame	CAF	Cabinet fan
MOT	Motor	FRP	Feet with rubber pads
RN	Rubber hose		

Vacuum pump without cabinet



Description			
BD	Belt drive	IN	Blower inlet
SI	Silencer	PRE	Pressure relief valve
MOT	Motor	PG	Pressure gauge
FMO	Filter monitoring	PTS	Pre-tensioning system
FRP	Feet with rubber pads	MTB	Motor terminal box
BSB	Bare shaft blower	SF	Supporting frame
OUT	Blower outlet	RN	Rubber hose



**Description**

EB	Eyebolt	IN	Blower inlet
MP	Magnetic plug	OFF	Oil fill plug
OSG	Oil sight glass	OUT	Blower outlet
CWC	Cooling water connection		

**i NOTE**

**Technical term.**

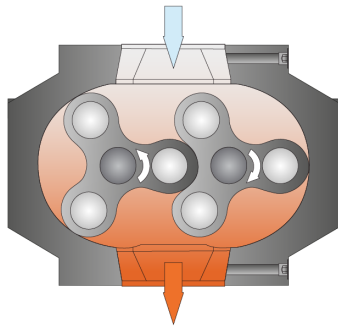
In this instruction manual, we consider that the term 'machine' refers to the 'rotary lobe blower package for overpressure or vacuum operation'.

**i NOTE**

**Illustrations**

In this instruction manual, the illustrations may differ from the machine appearance.

## 2.1 Operating Principle



The machine with tri-lobe rotors works on the principle of oil-free gas transport.

Two identical lobes rotate in opposite direction in the casing, transporting fixed volume of air with each turn. There is no contact between the rotors and also between rotor and casing, therefore process does not require oil in the working area. The machine transports the gas without increasing the pressure.

Gas is compressed in the machine outlet by the gas that has been already transported (blowers with external compression).

## 2.2 Intended Use



### WARNING

**In case of foreseeable misuse outside the intended use of the machine.**

**Risk of injuries!**

**Risk of damage to the machine!**

**Risk of damage to the environment!**

- Make sure to follow all instructions described in this manual.

The machine is intended for transport of air and other dry, non-aggressive, non-toxic and non-explosive gases.

The machine is intended for the placement in a non-potentially explosive environment.

The machine is suitable for continuous as well as intermittent operation.

Permitted environmental conditions, see *Technical Data* [→ 36].



### NOTICE

**Chemical compatibility of the process gases with the machine component materials.**

**Risk of corrosion inside the blower working area which can reduce performance and its lifetime!**

- Check if the process gases are compatible with those following materials:
  - Cast iron
  - Steel
  - Aluminum
  - Fluor elastomer (FKM/FPM)
- In doubt, please contact your Busch representative.

## 3 Transport



### WARNING

**Suspended load.**

**Risk of severe injury!**

- Do not walk, stand or work under suspended loads.



### WARNING

**Lifting the machine using the motor eye bolt.**

**Risk of severe injury!**

- Do not lift the machine using the eye bolt fitted to the motor. Only lift the machine as shown.



### NOTICE

**In case the machine is already filled with oil.**

**Tilting a machine that is already filled with oil can cause large quantities of oil to ingress into the casing.**

- Drain the oil prior to every transport or always horizontally transport the machine.

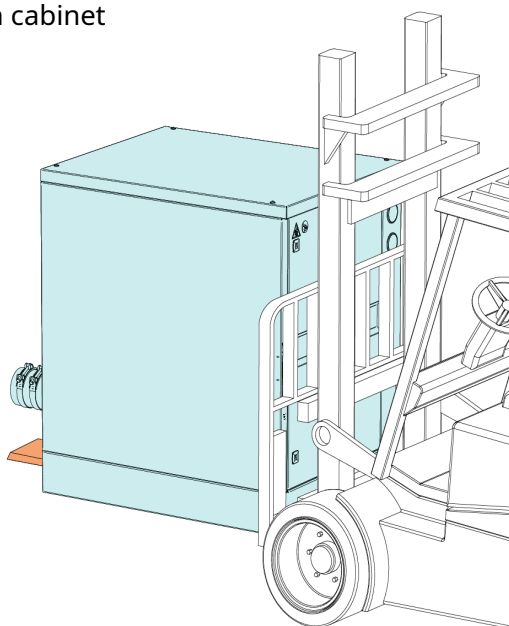
- Check the machine for transport damage.

If the machine is secured to a base plate:

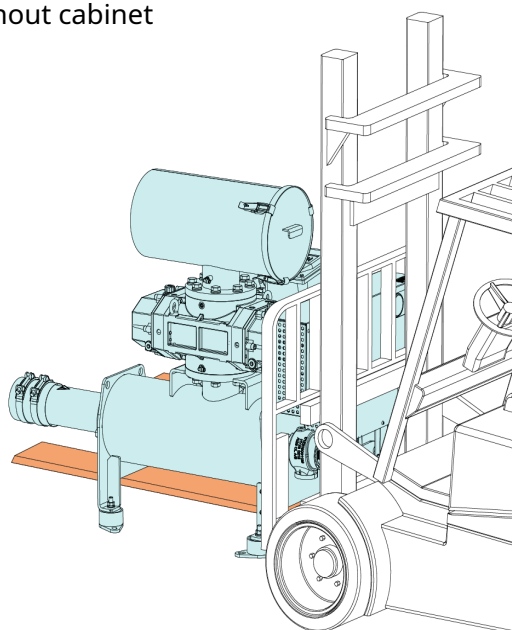
- Remove the machine from the base plate.



Blower package with cabinet



Blower package without cabinet



## 4 Storage

- Seal all apertures with adhesive tape or reuse provided caps.

If the machine is to be stored for more than 3 months:

- Wrap the machine in a corrosion inhibiting film.
- Store the machine indoors, in a dry and dust free environment and if possible, in original packaging, preferably at temperatures between 0 ... 20 °C.



### NOTICE

**Long storage time (over 6 months).**

**The blower shaft should be rotated by hand periodically, at least once every 3 months, in order to renew the grease on the bearing races and keep a periodical record. Failure to carry out this procedure could invalidate the product warranty.**

- Very important is to rotate the blower shaft by hand at least during the installation, just before starting up the machine.



### NOTICE

**Long storage time (more than 6 months).**

**For long storage time or storage in a warehouse with substantial fluctuations in temperature and/or an aggressive atmosphere, the rotary lobe blower must be prepared in a special procedure from Busch Vyroba CZ s.r.o. (according to customer information during order preparation).**

**All specific preparations and procedures must be preserved during a storing all the time. The rotary lobe blower must be wrapped in a special VCI foil all the time during storing.**

## 5 Installation

### 5.1 Installation Conditions



#### NOTICE

**Use of the machine outside of the permitted installation conditions.**

**Risk of premature failure!**

**Loss of efficiency!**

- Take care that the installation conditions are fully complied with.
- Make sure that the environment of the machine is not potentially explosive.
- Make sure that the ambient conditions comply with the *Technical Data* [→ 36].
- Make sure that the environmental conditions comply with the protection class of the motor and the electrical elements.
- Make sure that the installation space or location is protected from weather and lightning.
- Make sure that the installation space or location is vented such that sufficient cooling of the machine is provided.
- Make sure that cooling air inlets and outlets are not covered or obstructed and that the cooling air flow is not affected adversely in any other way.
- Check the oil level, see *Oil Level Inspection* [→ 25].
- Make sure that all provided covers, guards, hoods, etc. are mounted.
- Make sure that the machine is secured against movement.

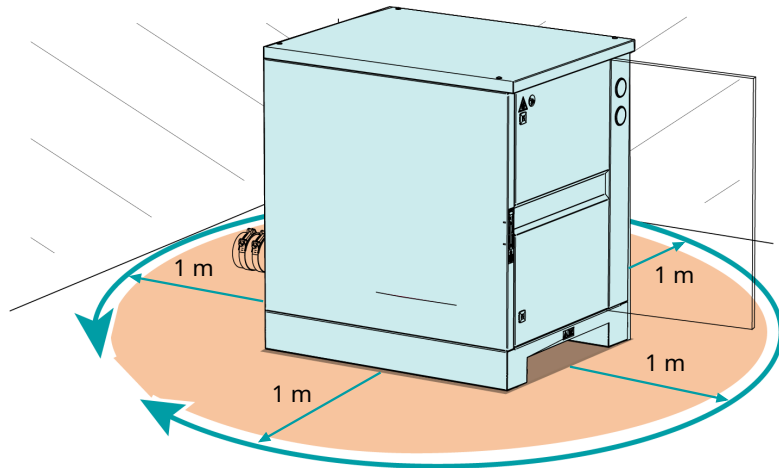
### 5.2 Blower Unit Installation

The machine must be set up horizontally on a flat surface.

Maximum permissible unevenness of the base / inclination of the machine can be expressed as follows:

- View from left to right and the front to back : max. 0.5°

We recommend to keep 1 meter space around the machine for the maintenance work.



- Make sure that the machine is fixed to the concrete base with anchors, see Possible Fixing below.

### 5.2.1 Possible fixing



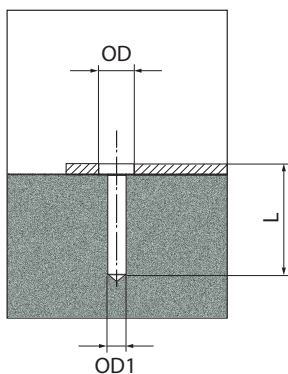
## WARNING

After being set in its position, the machine must be anchored to the floor.  
Otherwise, it could move spontaneously and thus be damaged.

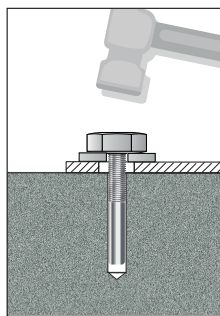
Working procedure for anchoring machine and noise-damping hoods.

- Drill a hole and clean it (A)
- Stick the anchor into the hole (B); and
- Tighten the nut (C)

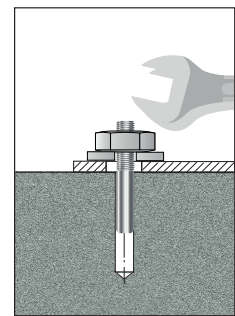
A)



B)



C)



## 5.3 Connecting Lines / Pipes

- Remove all protective covers before installation.
- Make sure that the connection lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible joints on the suction and discharge connections.
- Make sure that the line size of the connection lines over the entire length is at least as large as the connections of the machine.

In case of long connection lines, it is advisable to use larger line sizes in order to avoid a loss of efficiency. Seek advice from your Busch representative.



### WARNING

**The pipe installation must be made from conducting material in order to avoid build up of static electricity.**

**Pipe installation on the exhaust side must be made from heat resistant material.**

**Risk of severe injury!**

**Risk of damage to the machine!**

### 5.3.1 Suction Connection



### WARNING

**Unprotected suction connection.**

**Risk of severe injury!**

- Do not put hand or fingers in the suction connection.



### NOTICE

**Ingress of foreign objects or liquids.**

**Risk of damage to the machine!**

If the inlet gas contains dust or other foreign solid particles:

- Install a suitable filter (5 micron or less) upstream from the machine.

Connection size(s):

- Ø 114 mm for WT 0100 CV/CP and WT 0150 CV/CP
- Ø 159 mm for WT 0280 CV/CP and WT 0390 CV/CP
- Ø 219 mm for WT 0600 CV/CP and WT 0730 CV/CP

Depending on the specific configuration ordered, other connection dimensions may apply.

- Make sure that the connection lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible joints on the suction and discharge connections.

## 5.3.2 Discharge Connection

### ! NOTICE

**Discharge gas flow obstructed.**

**Risk of damage to the machine!**

- Make sure that the discharged gas will flow without obstruction.

Connection size(s):

- Ø 114 mm for WT 0100 CV/CP and WT 0150 CV/CP
- Ø 159 mm for WT 0280 CV/CP and WT 0390 CV/CP
- Ø 219 mm for WT 0600 CV/CP and WT 0730 CV/CP

Depending on the specific configuration ordered, other connection dimensions may apply.

- Make sure that the connection lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible joints on the suction and discharge connections.

## 5.4 Filling Oil

### ! NOTICE

**Use of an inappropriate oil.**

**Risk of premature failure!**

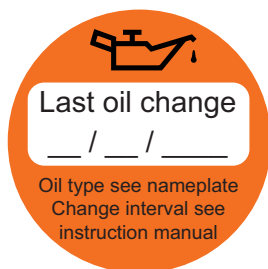
**Loss of efficiency!**

- Only use an oil type which has previously been approved and recommended by Busch.

For oil type and oil capacity see *Technical Data* [→ 36] and *Oil* [→ 38].

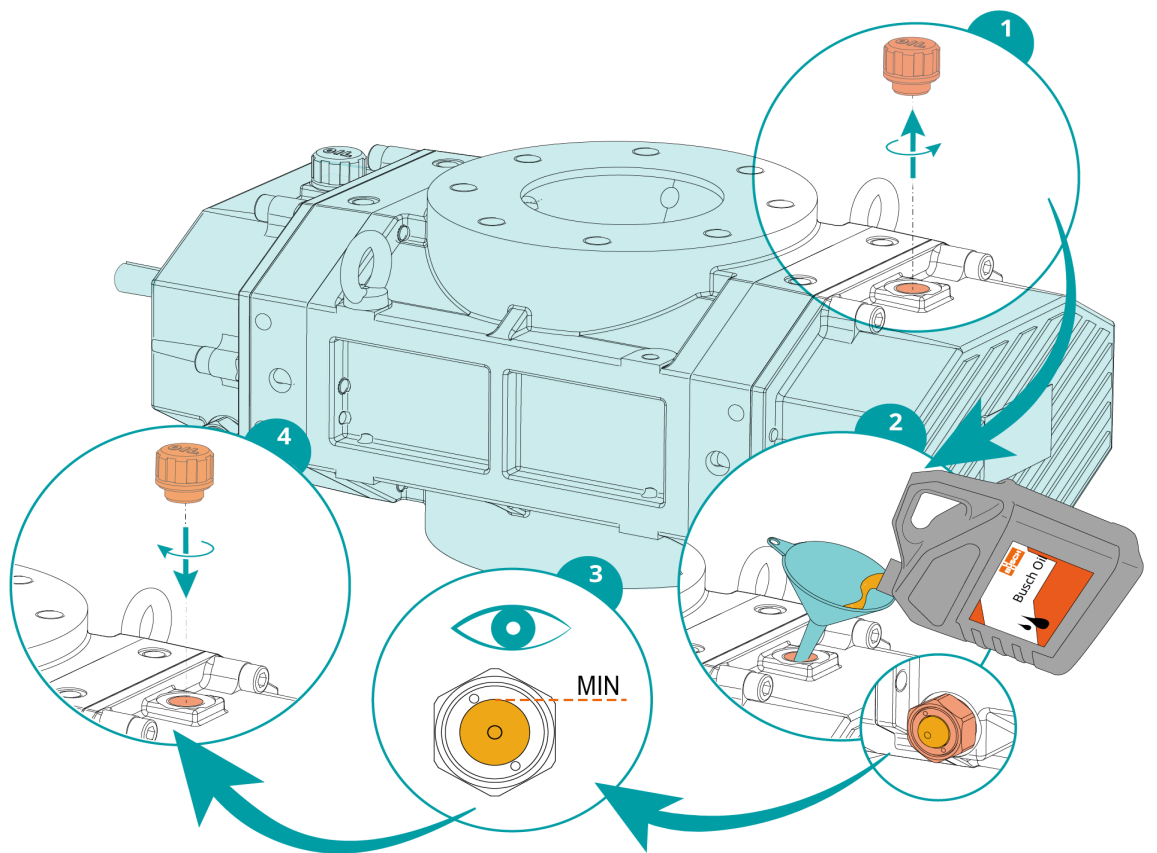
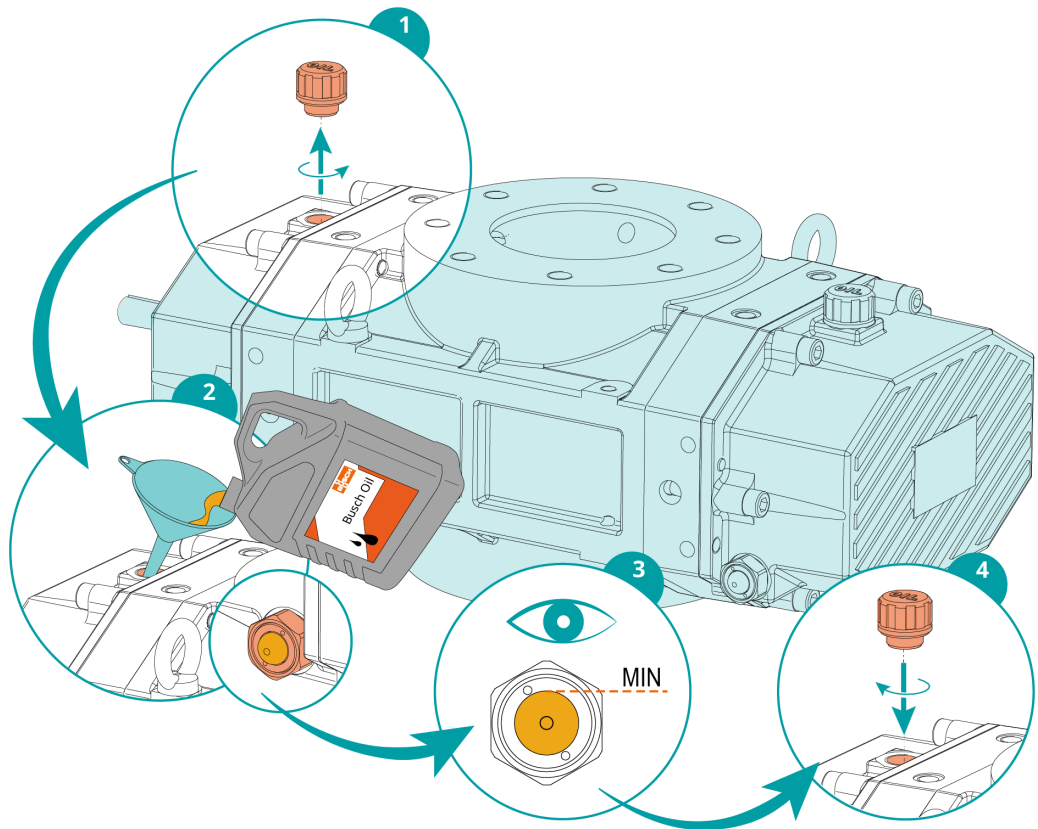
When the oil filling is achieved:

- Write down the oil change date on the sticker.



If there is no sticker (part no. 0565 568 959) on the machine:

- Order it from your Busch representative.



## 6 Electrical Connection



### DANGER

Live wires.

Risk of electrical shock.

- Electrical installation work must only be executed by qualified personnel.

#### CURRENT PROTECTION OF THE CUSTOMER INSTALLATION:



### DANGER

Missing current protection.

Risk of electrical shock.

- Current protection in accordance with EN 60204-1 must be provided by the customers on their installation(s).
- The electrical installation must comply with the applicable national and international standards.



### NOTICE

Electromagnetic compatibility.

- Make sure that the motor of the machine will not be affected by electric or electromagnetic disturbance from the mains, if necessary seek advice from Busch.
- Make sure that the EMC of the machine is compliant with the requirements of your supply network system, if necessary provide further interference suppression (EMC of the machine, see *EU Declaration of Conformity* [→ 39] or *UK Declaration of Conformity* [→ 40]).



### NOTICE

The motor frequency is below 20 Hz.

Risk of damage to the machine!

### 6.1 Machine delivered without Control Box or Variable Speed Drive (VSD)



### DANGER

Live wires.

Risk of electrical shock.

- Electrical installation work must only be executed by qualified personnel.



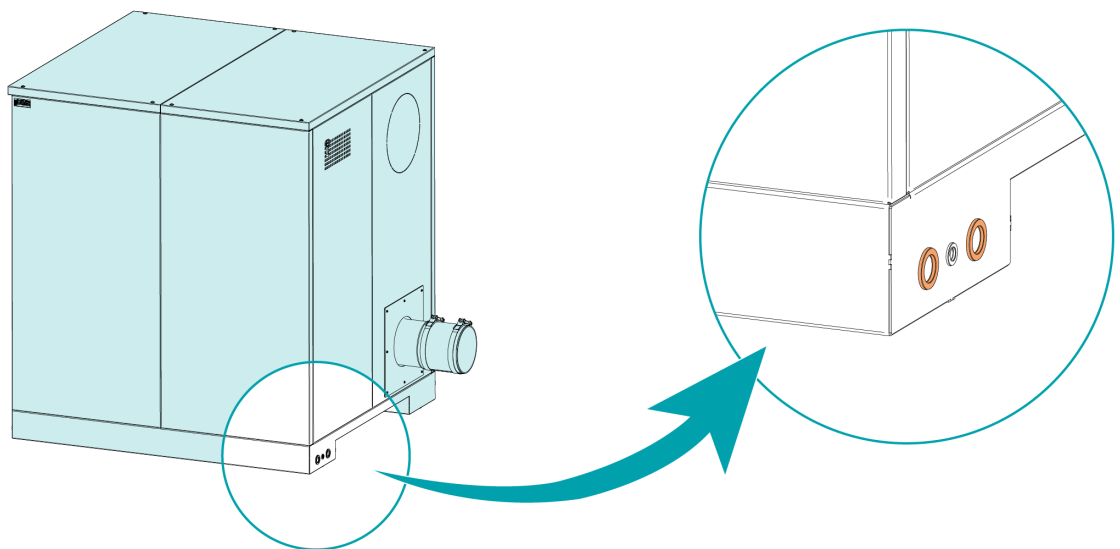
- Make sure that the power supply for the motor is compatible with the data on the nameplate of the motor.
- If the machine is equipped with a power connector, install a residual current protective device to protect persons in case of a defective insulation.
  - Busch recommends installing a type B residual protective device suitable for the electrical installation.
- Provide a lockable disconnect switch or an emergency stop switch on the power line so that the machine is completely secured in case of an emergency situation.
- Provide a lockable disconnect switch on the power line so that the machine is completely secured during maintenance tasks.
- Provide an overload protection according to EN 60204-1 for the motor.
- Connect the protective earth conductor.
- Electrically connect the motor.

## NOTICE

### Electrical connections of the cabinet fan and the main motor.

The cables must be led through the cable entries located at the bottom of the rear side of the supporting frame (see above picture).

- Cut through the rubber membrane then lead the cables into the cabinet.



## NOTICE

### Incorrect connection.

#### Risk of damage to the motor!

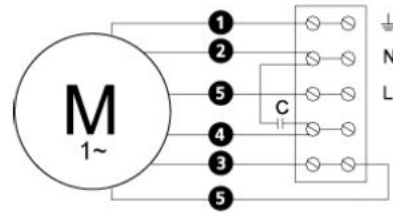
- The wiring diagrams given below are typical. Check the inside of the terminal box for motor connection instructions/diagrams.

## 6.2 Wiring Diagram Single-Phase Motor

For optional cabinet fans with different voltages the electrical connection may vary.

**Electrical data:**

- U = 230 VDC
- P = 290 W
- C = 1.3 A
- R.p.m. = 1950
- F = 50 Hz
- Cap. = 10  $\mu$ F



C = Permanent capacitor  
 M<sub>1~</sub> = Standard single-phase motor

## 6.3 Wiring Diagram Three-Phase Motor

### ! NOTICE

**Incorrect direction of rotation.**

**Risk of damage to the machine!**

- Operation in the wrong direction of rotation can destroy the machine in a short time! Prior to start-up, ensure that the machine is operated in the right direction.

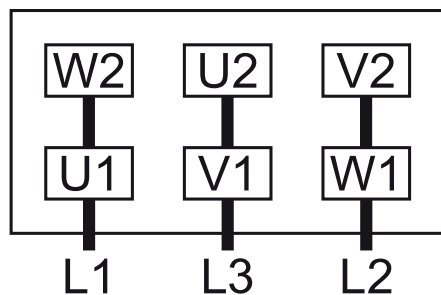
The intended rotation direction of the motor is defined by the specific instruction label stuck on the machine.

- Jog the motor briefly.
- Watch the fan wheel of the motor and determine the direction of rotation just before the fan wheel stops.

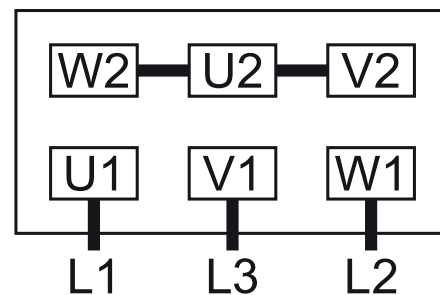
If the rotation of the motor must be changed:

- Switch any two of the motor phase wires.

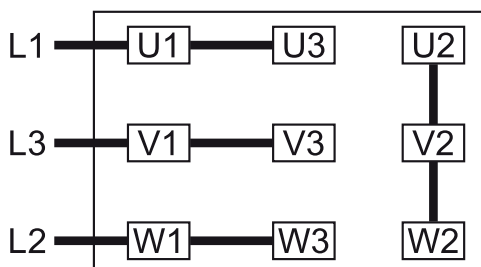
Delta connection (low voltage):



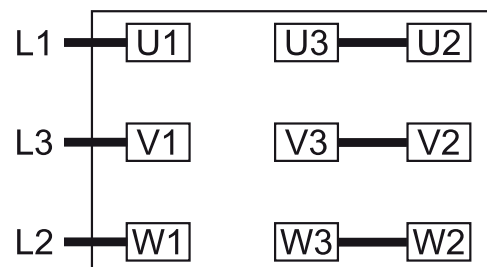
Star connection (high voltage):



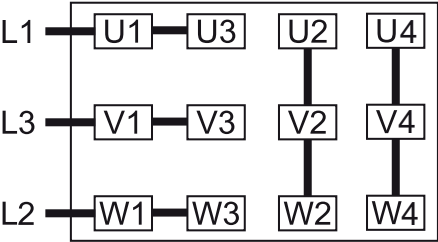
Double star connection, multi-voltage motor with 9 pins (low voltage):



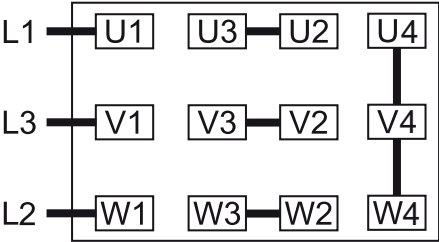
Star connection, multi-voltage motor with 9 pins (high voltage):



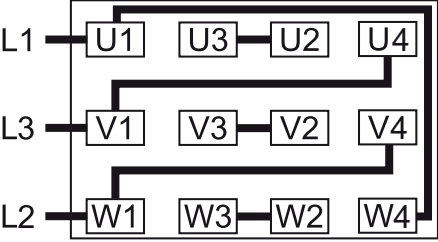
Double star connection, multi-voltage motor with 12 pins (low voltage):



Star connection, multi-voltage motor with 12 pins (high voltage):



Delta connection, multi-voltage motor with 12 pins (middle voltage):



## 7 Commissioning



### CAUTION

During operation the surface of the machine may reach temperatures of more than 70°C.

**Risk of burns!**

- Avoid contact with the machine during and directly after operation.



### CAUTION



**Noise of running machine.**

**Risk of damage to hearing!**

If people are present in the vicinity of a machine that is not insulated from noise for extended periods of time:

- Make sure to wear hearing protection.
- Make sure that the *Installation Conditions* [→ 11] are met.
- Start the machine.
- Make sure that the maximum permissible number of starts does not exceed the following recommendations:

From 3 kW to 11 kW	12 starts per hour
From 15 kW to 90 kW	6 starts per hour

- Make sure that the operating conditions comply with the *Technical Data* [→ 36].
- After a few minutes of operation, perform an *Oil Level Inspection* [→ 25].

As soon as the machine is operated under normal operating conditions:

- Measure the motor current and record it as reference for future maintenance and troubleshooting work.



### NOTICE

**The machine can be shipped without oil.**

**Operation without oil will ruin the machine in short time!**

- Prior to commissioning, the machine must be filled with oil, see *Filling Oil* [→ 14].



### NOTICE

**Lubricating a dry running machine (compression chamber).**

**Risk of damage to the machine!**

- Do not lubricate the compression chamber of the machine with oil or grease.

## 8 Maintenance



### DANGER

**Live wires.**

**Risk of electrical shock.**

- Electrical installation work must only be executed by qualified personnel.



### WARNING



**Machines contaminated with hazardous material.**

**Risk of poisoning!**

**Risk of infection!**

If the machine is contaminated with hazardous material:

- Wear appropriate personal protective equipment.



### CAUTION

**Hot surface.**

**Risk of burns!**

- Prior to any action requiring touching the machine, let the machine cool down first.



### CAUTION

**Failing to properly maintain the machine.**

**Risk of injuries!**

**Risk of premature failure and loss of efficiency!**

- Maintenance work must only be executed by qualified personnel.
- Respect the maintenance intervals or ask your Busch representative for service.



### NOTICE

**Using inappropriate cleaners.**

**Risk of removing safety stickers and protective paint!**

- Do not use incompatible solvents to clean the machine.

- Shut down the machine and lock against inadvertent start up.
- Vent the connected lines to atmospheric pressure.

If necessary:

- Disconnect all connections.

## 8.1 Maintenance Schedule

The maintenance intervals depend very much on the individual operating conditions. The intervals given below are considered as starting values which should be shortened or extended as appropriate. Particularly harsh applications or heavy duty operation, such as high dust loads in the environment or in the process gas, other contamination or ingress of process material, can make it necessary to shorten the maintenance intervals significantly.



### NOTE

**The machine must be turned off at the service breaker and secured against wrongful re-activation during all service work.**

Interval	Maintenance work
Every 6 months	<ul style="list-style-type: none"> <li>Carry out a visual inspection and clean the machine from dust and dirt.</li> <li>Check the electrical connections and the monitoring devices.</li> </ul>
Every 32000 hours	<ul style="list-style-type: none"> <li>Bare shaft blower overhaul or replacement is recommended.</li> </ul>
According to the motor manual	<ul style="list-style-type: none"> <li>Check the motor. Lubricate the motor if necessary. (In accordance with the motor manual).</li> </ul>

## 8.2 Maintenance Inlet Filter

The inlet filter must be cleaned regularly. The frequency depends on the application, but the filter must be cleaned at least once every six months.

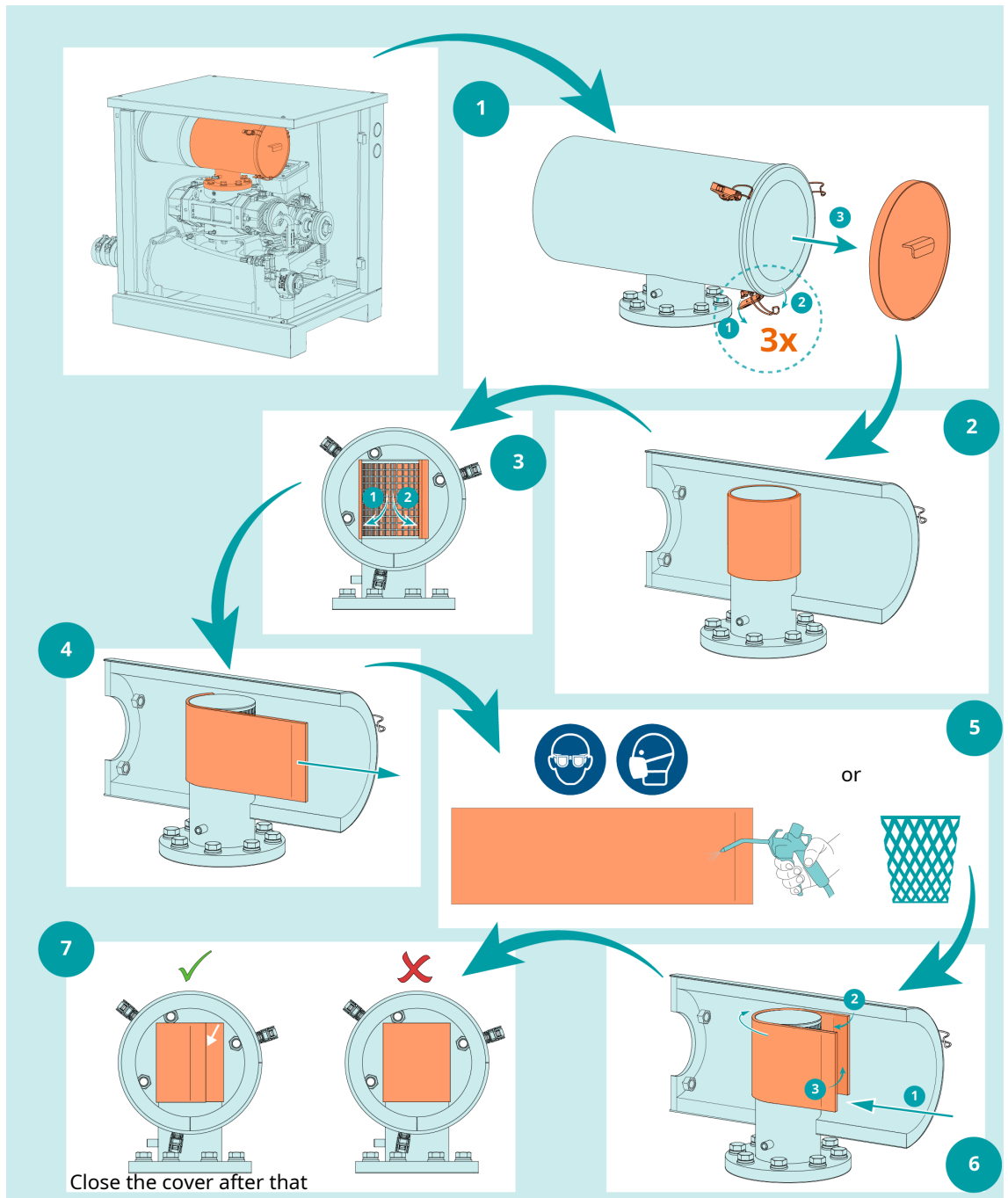
The filter must not be washed.

The filter's dirt level is monitored by the supplied filter gauge that is built into the belt cover or the cabinet front.

Cleaning with compressed air does not ensure a 100% clean wrap filter, it is therefore recommended to replace it with a new one.

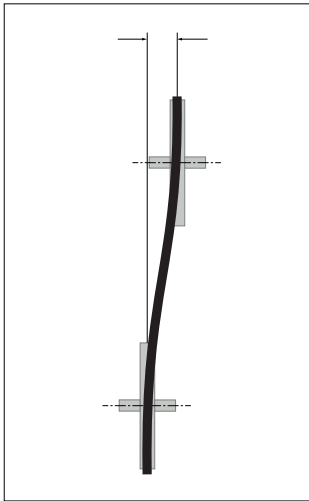
Interval	Maintenance work
After 10-20 operating hours	<ul style="list-style-type: none"> <li>Check the inlet filter and clean if necessary. (See clean or change inlet filter, point 5)</li> </ul>
Monthly (or more often depending on application).	<ul style="list-style-type: none"> <li>Check the inlet filter and clean if necessary. (See clean or change inlet filter, point 5)</li> </ul>
Half - yearly	<ul style="list-style-type: none"> <li>Change the inlet filter (or more often depending on application). (See clean or change inlet filter, point 5)</li> </ul>
Yearly	<ul style="list-style-type: none"> <li>Change the inlet filter (or more often depending on application). (See clean or change inlet filter, point 5)</li> </ul>

### Clean or Change the Inlet Filter



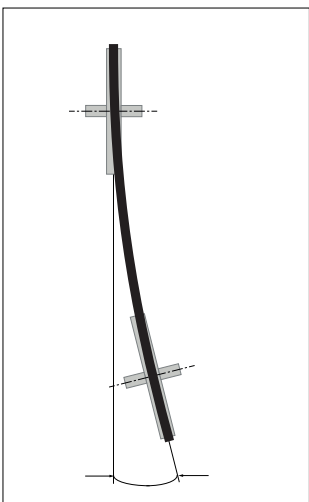
## 8.3 Maintenance Belt and Pulley Alignment

Interval	Maintenance work
After 10-20 operating hours	<ul style="list-style-type: none"> <li>• Check the belt tension.</li> <li>• Check the pulley alignments.</li> </ul>
Half - yearly (or more often depending on application).	<ul style="list-style-type: none"> <li>• Check the belt tension.</li> <li>• Check the pulley alignments.</li> </ul>
Once a year	<ul style="list-style-type: none"> <li>• Change the belts.</li> <li>• Belt change intervals for higher loads and ambient temperatures (more than +40°C) range from 4000 to max. 8000 hours.</li> </ul>



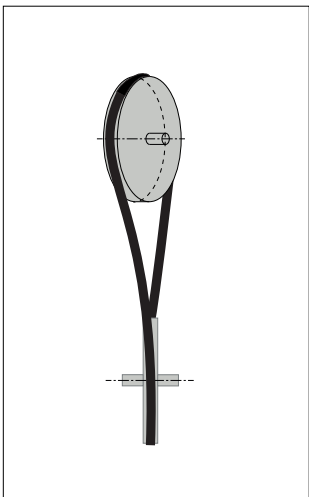
**1. Parallel offset:** max. 1% of center distance for belts

Product	Permissible parallel offset of two pulleys
Belts & multiple ribbed belts	10 mm per 1000 mm of strand length



**2. Angular offset of two pulleys:** max. 0.5° for belts

Product	Permissible angular offset of two pulleys
Belts & multiple ribbed belts	0.5°



**3. Axial twist of pulleys:** max. 0.25° for belts

Product	Permissible axial twist of pulleys
Belts & multiple ribbed belts	0.25°



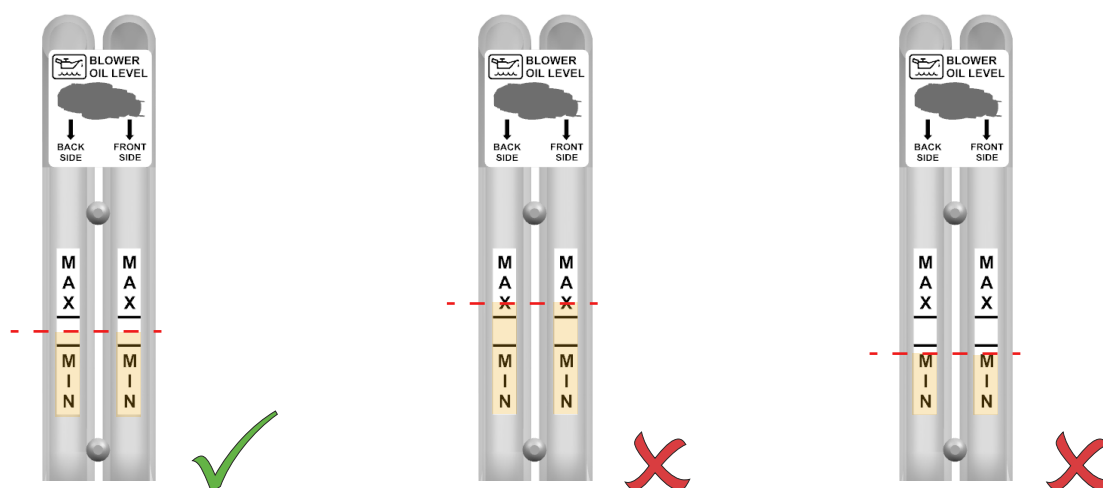
## 8.4 Maintenance Oil

Interval	Maintenance work
After 10-20 operating hours	<ul style="list-style-type: none"> <li>Check the oil level, see <i>Oil Level Inspection</i> [→ 25].</li> </ul>
Weekly	<ul style="list-style-type: none"> <li>Check the oil level, see <i>Oil Level Inspection</i> [→ 25].</li> </ul>
After 500 operating hours	<ul style="list-style-type: none"> <li>Change for newly operated blower.</li> </ul>
Every 8000 hours	<ul style="list-style-type: none"> <li>Change the oil (min. once a year).</li> </ul>

## 8.5 Oil Level Inspection

- Shut down the machine.
- When the machine is stopped, wait 1 minute before checking the oil level.

With cabinet



- Fill up if necessary, see *Oil Filling* [→ 14].



## WARNING

**Too much oil filling.**

**Risk of damage to the machine!**

- It will lead to increased operating temperature and increased absorbed power.

## 8.6 Oil Change



## NOTICE

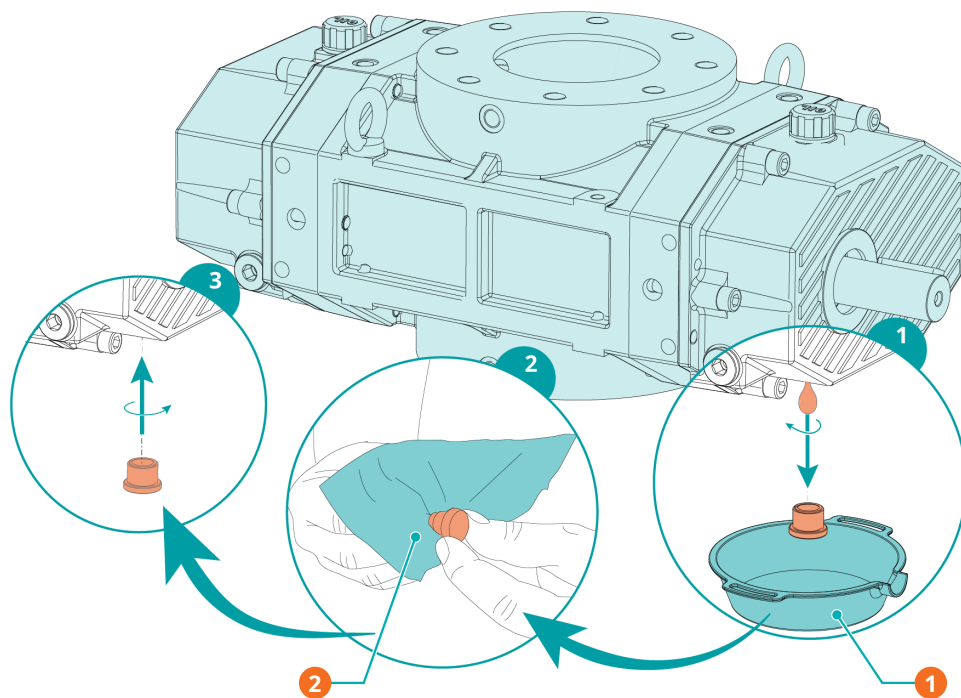
**Use of an inappropriate oil.**

**Risk of premature failure!**

**Loss of efficiency!**

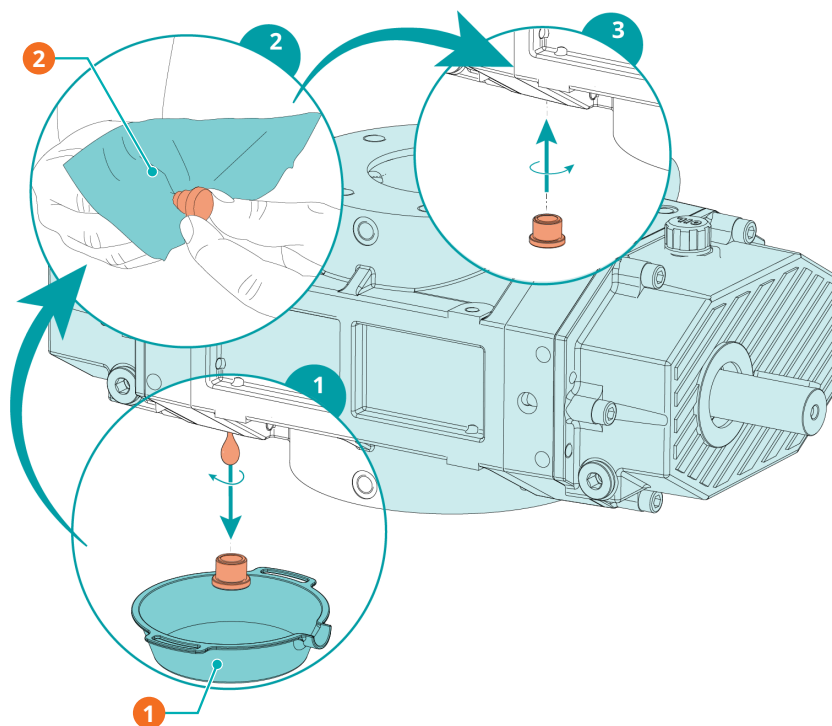
- Only use an oil type which has previously been approved and recommended by Busch.

- See chapter *Oil* [→ 38]



### Description

1	Drain pan	2	Cleaning cloth
---	-----------	---	----------------



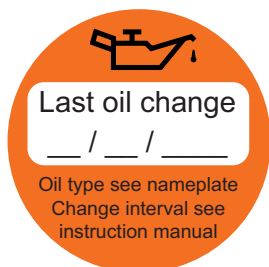
### Description

1	Drain pan	2	Cleaning cloth
---	-----------	---	----------------

For oil type and oil capacity see *Technical Data* [→ 36] and *Oil* [→ 38].

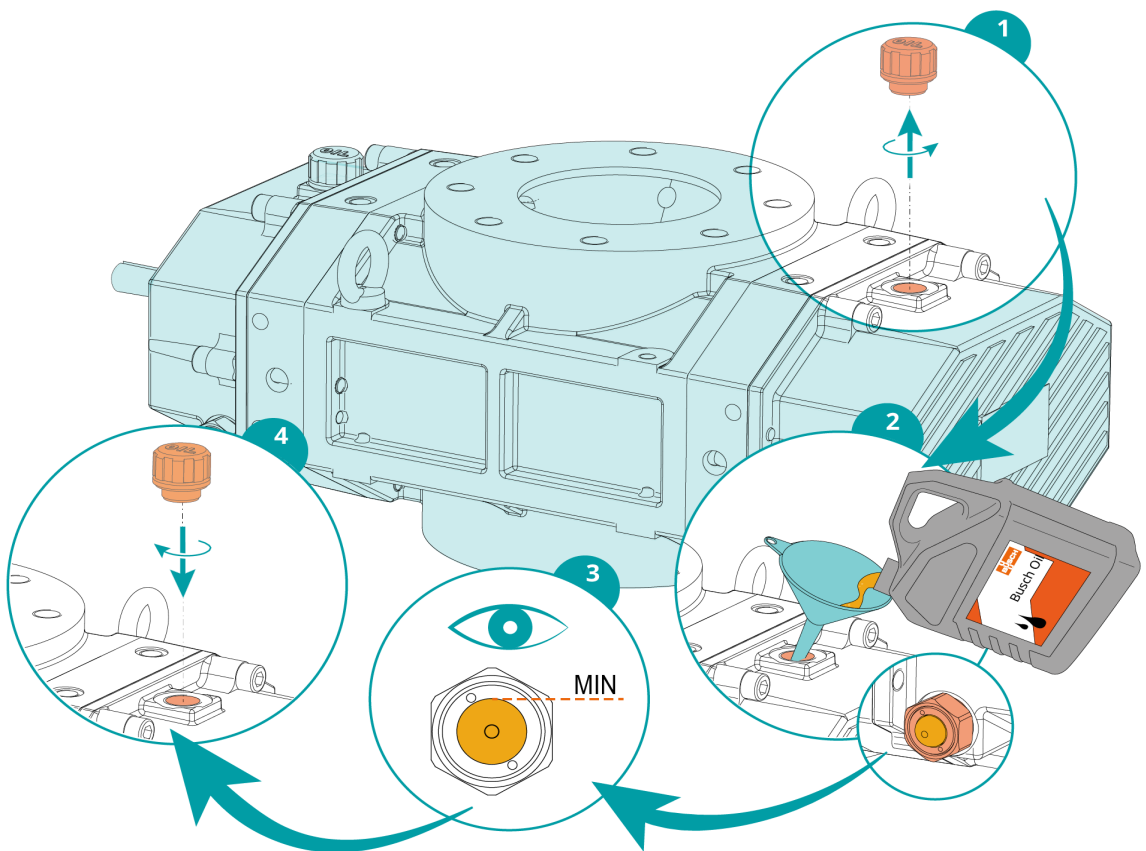
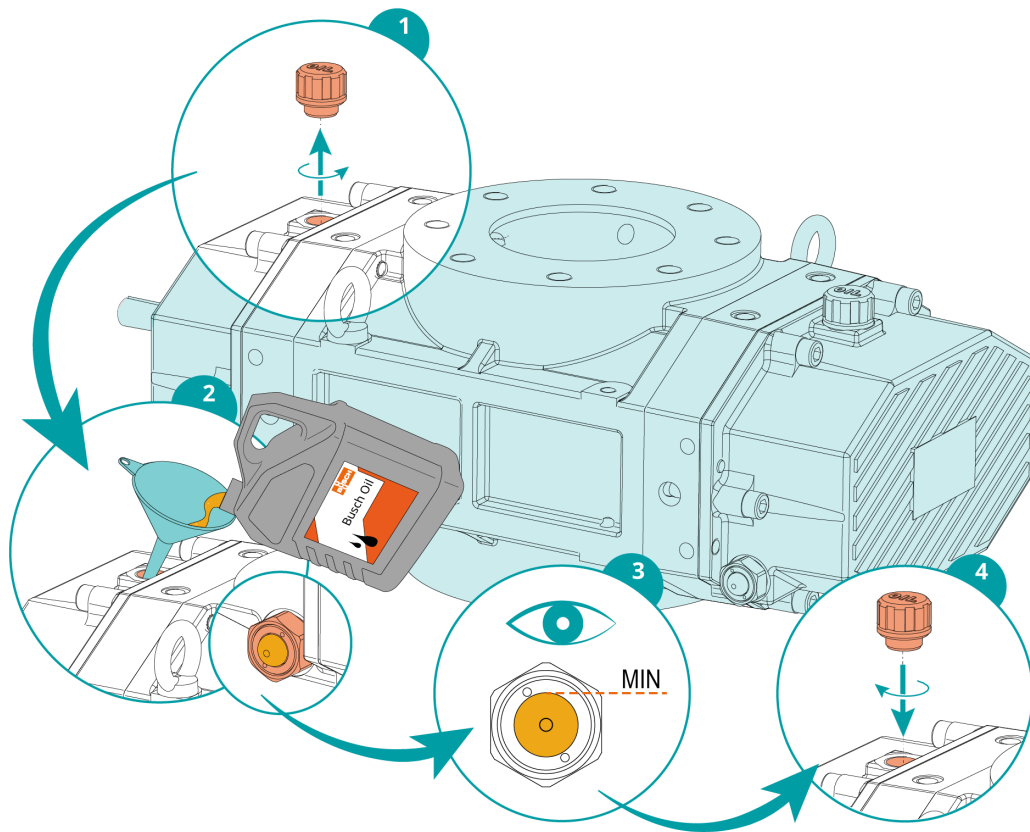
When the oil filling is achieved:

- Write down the oil change date on the sticker.



If there is no sticker (part no. 0565 568 959) on the machine:

- Order it from your Busch representative.



## 9 Overhaul



### WARNING



**Machines contaminated with hazardous material.**

**Risk of poisoning!**

**Risk of infection!**

If the machine is contaminated with hazardous material:

- Wear appropriate personal protective equipment.



### NOTICE

**Improper assembly.**

**Risk of premature failure!**

**Loss of efficiency!**

- Any dismantling of the machine that goes beyond anything that is described in this manual should be done by Busch authorized technicians.

In case of the machine having conveyed gas that was contaminated with foreign materials which are dangerous to health:

- Decontaminate the machine as much as possible and state the contamination status in a 'Declaration of Contamination'.

Busch will only accept machines that come with a completely filled in and legally binding signed 'Declaration of Contamination' (form downloadable from [www.buschvacuum.com](http://www.buschvacuum.com)).

## 10 Decommissioning



### DANGER

**Live wires.**

**Risk of electrical shock.**

- Electrical installation work must only be executed by qualified personnel.



### CAUTION

**Hot surface.**

**Risk of burns!**

- Prior to any action requiring touching the machine, let the machine cool down first.

- Shut down the machine and lock against inadvertent start up.
- Disconnect the power supply.
- Vent the connected lines to atmospheric pressure.
- Disconnect all connections.

If the machine is going to be stored:

- See *Storage* [→ 10].

### 10.1 Dismantling and Disposal

- Drain and collect the oil.
- Make sure that no oil drips onto the floor.
- Separate special waste from the machine.
- Dispose of special waste in compliance with applicable regulations.
- Dispose of the machine as scrap metal.

# 11 Spare Parts



## NOTICE

**Use of non-Busch genuine spare parts.**

**Risk of premature failure!**

**Loss of efficiency!**

- The exclusive use of Busch genuine spare parts and consumables is recommended for the correct functioning of the machine and to validate the warranty.

To order parts for basic maintenance, please contact your Busch representative and inform him about the serial number of your machine.

# 12 Troubleshooting



## DANGER

**Live wires.**

**Risk of electrical shock.**

- Electrical installation work must only be executed by qualified personnel.



## CAUTION

**During operation the surface of the machine may reach temperatures of more than 70°C.**

**Risk of burns!**

- Let the machine cool down prior to required contact or wear heat protection gloves.

Problem	Possible Cause	Remedy
The blower is not running, and the blower shaft can be turned in both directions.	Broken belts	<ul style="list-style-type: none"> <li>• Fit new belts.</li> </ul>
	Motor failure	<ul style="list-style-type: none"> <li>• Repair and replace the motor. (contact Busch).</li> </ul>
The blower is not running, and the blower shaft cannot be turned manually.	The lobes touch the cylinder or the end covers.	<ul style="list-style-type: none"> <li>• Check the blower for signs of overheating / overloading and begin necessary repairs.</li> <li>• Check the lobes for signs of corrosion and dissolve with oil.</li> </ul>
	There are foreign bodies in the cylinder.	<ul style="list-style-type: none"> <li>• Begin necessary repairs.</li> </ul>



Problem	Possible Cause	Remedy
Abnormal sounds or vibrations. STOP THE MACHINE IMMEDIATELY!	The pulleys are placed incorrectly. Either parallel-displaced or angle-displaced.	<ul style="list-style-type: none"> <li>Place the pulleys correctly.</li> </ul>
	Damaged bearings.	<ul style="list-style-type: none"> <li>Begin repair with bearing replacement.</li> </ul>
	Shortage of oil or dazed oil.	<ul style="list-style-type: none"> <li>Top up or change oil.</li> </ul>
	Too much oil in oil box.	<ul style="list-style-type: none"> <li>Drain the oil and regulate the oil level.</li> </ul>
	Too unstable foundation.	<ul style="list-style-type: none"> <li>Ensure stable foundation.</li> </ul>
	Resonance in pipe system.	<ul style="list-style-type: none"> <li>Pipe system must be connected to blower with flexible connections and supported if necessary.</li> </ul>
	Too high differential pressure.	<ul style="list-style-type: none"> <li>Look for causes of increased differential pressure, e.g. blockage or damage. Check also for control system-based causes. Repair.</li> </ul>
	Air leakage.	<ul style="list-style-type: none"> <li>Find the leakage spots and repair.</li> </ul>
	The lobes touch the cylinder or the end covers.	<ul style="list-style-type: none"> <li>Begin repair in workshop.</li> </ul>
	There are foreign bodies in the cylinder.	<ul style="list-style-type: none"> <li>Begin repair in workshop.</li> </ul>
Damaged check valve	<ul style="list-style-type: none"> <li>Replace check valve.</li> </ul>	

Problem	Possible Cause	Remedy
<p>Abnormal heat development.</p> <p><b>STOP THE MACHINE IMMEDIATELY !!</b></p>	Abnormal increase in exhaust temperature.	<ul style="list-style-type: none"> <li>• See causes marked with.</li> </ul>
	Too low rpm on blower (and/or motor with frequency regulation)	<ul style="list-style-type: none"> <li>• Check the minimum allowed rpm. And correct the setting.</li> </ul>
	Too high oil level.	<ul style="list-style-type: none"> <li>• The oil level must be at the top of the level indicator when the blower is not running.</li> </ul>
	Under pressure in the machine room.	<ul style="list-style-type: none"> <li>• Check the ventilation system and correct the ventilation amount or air lock sizes so there is not under pressure in the room.</li> </ul>
	Too high differential pressure.	<ul style="list-style-type: none"> <li>• Check, clean and replace the inlet filter. Check pipes and process system on both sides of the blower for blockages, obstructions, both mechanical and control system related.</li> <li>• and begin repairs of the blower.</li> </ul>
	Abnormal wear on the lobes after strain from solid media (e.g. dust from operation without inlet filter, CIP cleaning of the blower during operation with aggressive cleaning fluids or stress from aggressive gases).	<ul style="list-style-type: none"> <li>• Install inlet filter to protect the blower</li> </ul>
Oil leakage.	Too high oil level (above max on level indicator in cabinet)	<ul style="list-style-type: none"> <li>• The oil level must be between MIN and MAX on level indicator on cabinet front.</li> </ul>
	Leaking or damaged shaft seals.	<ul style="list-style-type: none"> <li>• Begin repair in workshop.</li> </ul>
	Blower has been tilted or is not mounted horizontally.	<ul style="list-style-type: none"> <li>• Place on horizontal foundation.</li> </ul>
	Too high differential pressure.	<ul style="list-style-type: none"> <li>• Check, clean and replace the inlet filter. Check pipes and process system on both sides of the pump for blockages, obstructions, both mechanical and control system based.</li> </ul>

<b>Problem</b>	<b>Possible Cause</b>	<b>Remedy</b>
Loss of capacity.	Leak in the system.	<ul style="list-style-type: none"> <li>Find the leaks and stop them.</li> </ul>
	Activated safety valve.	<ul style="list-style-type: none"> <li>Check differential pressure and see causes marked with *.</li> <li>Possibly set the safety valve's opening pressure.</li> </ul>
	Dirty inlet filter or blocked pipes.	<ul style="list-style-type: none"> <li>Clean and possibly replace filters and pipes.</li> </ul>
	Loose belts.	<ul style="list-style-type: none"> <li>Replace belts.</li> </ul>
	Too high differential pressure*.	<ul style="list-style-type: none"> <li>See symptoms and causes marked with *.</li> </ul>
Continuously activated safety valve.	Too high rpm and thereby too high amount of air (concerns frequency-controlled blowers).	<ul style="list-style-type: none"> <li>Lower the rpm.</li> </ul>
	Too high differential pressure*	<ul style="list-style-type: none"> <li>Find the cause of the increased differential pressure and repair it.</li> </ul>
	The valve setting is below the actual operating point.	<ul style="list-style-type: none"> <li>Adjust the max limits of the valve within the blower. Monitor the absorbed power and ensure that the setting does not allow overloading of the pump.</li> </ul>
Abnormally high differential pressure* STOP THE MACHINE IMMEDIATELY !	Safety valves do not open despite too high differential pressure.	<ul style="list-style-type: none"> <li>Dismantle and clean valve and possibly readjust.</li> </ul>
	Blockages on inlet side or outlet side of the blower.	<ul style="list-style-type: none"> <li>Clean the pipe system and look for mechanical or control system related blockages or obstructions that can lead to increased loss of pressure.</li> </ul>
	Fault on check valve.	<ul style="list-style-type: none"> <li>Replace check valve.</li> </ul>
The motor is running the wrong way.	Wrong power supply.	Switch two phases to reverse the direction of revolutions.
Abnormal motor temperature.	Motor fault or fault in motor bearings.	<ul style="list-style-type: none"> <li>Repair and replace the motor.</li> </ul>
	The motor is incorrectly electrically wired.	<ul style="list-style-type: none"> <li>Check and reconnect.</li> </ul>
	Overloading.	<ul style="list-style-type: none"> <li>Look for causes of increased differential pressure in the system and repair.</li> </ul>
	Wrong power supply.	<ul style="list-style-type: none"> <li>The power supply must be consistent with data on motor's type sign.</li> </ul>
	Too high ambient temperature (+40°C).	<ul style="list-style-type: none"> <li>Improve ventilation in the machine room.</li> </ul>
	Fault on motor fan.	<ul style="list-style-type: none"> <li>Repair and replace the motor fan.</li> </ul>

# 13 Technical Data

		WT 0100 CP/CV	WT 0150 CP/CV	WT 0280 CP/CV
Inlet flow (50Hz)	m <sup>3</sup> /min	2.5 – 10.0	3.7 – 15.0	5.1 – 28.0
Nominal motor rating (50Hz)	kW	1.5 – 22.0	3.0 – 37.0	3.0 - 55.0
Max. differential pressure Pressure operation	hPa (mbar) abs.	1000	1000	1000
Max. differential pressure Vacuum operation	hPa (mbar) abs.	500	500	500
Nominal motor speed (50Hz)	min <sup>-1</sup>	1150 - 4700	1150 - 4700	850 – 4100
Ambient temperature range	°C	-15 ... 45		
Max. gas inlet temperature	°C	60		
Relative humidity	at 30°C	90%		
Weight pump stage approx.	kg	75	92	167
Weight unit without cabinet	kg	180	197	346
Weight unit with cabinet	kg	295	312	535

		WT 0390 CP/CV	WT 0600 CP/CV	WT 0730 CP/CV
Inlet flow (50Hz)	m <sup>3</sup> /min	7.1 – 39.0	12.0 – 64.0	15.4 – 73.0
Nominal motor rating (50Hz)	kW	3.0 - 55.0	11.0 – 90.0	11.0 – 90.0
Max. differential pressure Pressure operation	hPa (mbar) abs.	1000	1000	1000
Max. differential pressure Vacuum operation	hPa (mbar) abs.	500	500	500
Nominal motor speed (50Hz)	min <sup>-1</sup>	850 - 4100	750 - 3500	750 – 3500
Ambient temperature range	°C	-15 ... 45		
Max. gas inlet temperature	°C	60		
Relative humidity	at 30°C	90%		
Weight pump stage approx.	kg	193	336	375
Weight unit without cabinet	kg	372	711	750
Weight unit with cabinet	kg	561	1014	1053

# 14      **Specific Technical Data**

**Page reserved for configuration sticker**

# 15 Oil

		WT 0100 CP/CV	WT 0150 CP/CV	WT 0280 CP/CV
Oil capacity (Motor side, with cabinet)	l	0.4	0.4	0.7
Oil capacity (Motor side, without cabinet)	l	0.3	0.3	0.6
Oil capacity (Gear side, with cabinet)	l	0.4	0.4	0.7
Oil capacity (Gear side, without cabinet)	l	0.3	0.3	0.6

		WT 0390 CP/CV	WT 0600 CP/CV	WT 0730 CP/CV
Oil capacity (Motor side, with cabinet)	l	0.7	1.1	1.1
Oil capacity (Motor side, without cabinet)	l	0.6	1.0	1.0
Oil capacity (Gear side, with cabinet)	l	0.7	1.1	1.1
Oil capacity (Gear side, without cabinet)	l	0.6	1.0	1.0

		Anderol 6220
ISO-VG		220
Part number 1 L packaging		0831 300 009
Part number 5 L packaging		0831 300 011
Part number 20 L packaging		0831 300 012
Remark		Food grade gear oil

		VS 220
ISO-VG		220
Oil Type		Synthetic
Part number 1 L packaging		0831 217 852
Part number 5 L packaging		0831 217 853
Part number 20 L packaging		0831 217 855

To know which oil has been filled in the machine, please refer to the nameplate (NP).

## Oil suitability

- **Oil VS 220:** Suitable for standard applications.

# 16 EU Declaration of Conformity

This Declaration of Conformity and the CE-markings affixed to the nameplate are valid for the machine within the Busch scope of delivery. This Declaration of Conformity is issued under the sole responsibility of the manufacturer.

When this machine is integrated into a superordinate machinery the manufacturer of the superordinate machinery (this can be the operating company, too) must conduct the conformity assessment process for the superordinate machine or plant, issue the Declaration of Conformity for it and affix the CE-marking.

The manufacturer

**Busch Výroba CZ s.r.o.**  
**Svárovská 620**  
**CZ 460 01, Liberec 11**

declares that the machine: TYR WT 0100 C; TYR WT 0150 C; TYR WT 0280 C; TYR WT 0390 C; TYR WT 0600 C; TYR WT 0730 C

fulfill(s) all the relevant provisions from EU directives:

- 'Machinery' 2006/42/EC
- 'Electromagnetic Compatibility' (EMC) 2014/30/EU
- 'RoHS' 2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment (incl. all related applicable amendments)

and comply(-ies) with the following harmonized standards that have been used to fulfill those provisions:

Standards	Title of the Standard
EN ISO 12100 : 2010	Safety of machinery - Basic concepts, general principles of design
EN ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN 1012-2 : 1996 + A1 : 2009	Vacuum pumps - Safety requirements - Part 2
EN ISO 2151 : 2008	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
EN 60204-1 : 2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN IEC 61000-6-2 : 2019	Electromagnetic compatibility (EMC) - Generic standards. Immunity for industrial environments
EN IEC 61000-6-4 : 2019	Electromagnetic compatibility (EMC) - Generic standards. Emission standard for industrial environments

Legal person authorized to compile the technical file and authorized representative in the EU (if the manufacturer is not located in the EU):

Busch Dienste GmbH  
 Schauinslandstr. 1  
 DE-79689 Maulburg

Liberec, 16.04.2021



**Michael Dostalek**  
**General Manager**

# 17 UK Declaration of Conformity

This Declaration of Conformity and the UKCA-markings affixed to the nameplate are valid for the machine within the Busch scope of delivery. This Declaration of Conformity is issued under the sole responsibility of the manufacturer.

When this machine is integrated into a superordinate machinery the manufacturer of the superordinate machinery (this can be the operating company, too) must conduct the conformity assessment process for the superordinate machine or plant, issue the Declaration of Conformity for it and affix the UKCA-marking.

The manufacturer

**Busch Výroba CZ s.r.o.**  
**Svárovská 620**  
**CZ 460 01, Liberec 11**

declares that the machine: TYR WT 0100 C; TYR WT 0150 C; TYR WT 0280 C; TYR WT 0390 C; TYR WT 0600 C; TYR WT 0730 C

fulfill(s) all the relevant provisions from UK legislations:

- Supply of Machinery (Safety) Regulations 2008
- Electromagnetic Compatibility Regulations 2016
- Restriction of the use of certain hazardous substances in Electrical and Electronic Equipment Regulations 2021

and comply(-ies) with the following designated standards that have been used to fulfill those provisions:

Standards	Title of the Standard
EN ISO 12100 : 2010	Safety of machinery - Basic concepts, general principles of design
EN ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN 1012-2 : 1996 + A1 : 2009	Vacuum pumps - Safety requirements - Part 2
EN ISO 2151 : 2008	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
EN 60204-1 : 2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN IEC 61000-6-2 : 2019	Electromagnetic compatibility (EMC) - Generic standards. Immunity for industrial environments
EN IEC 61000-6-4 : 2019	Electromagnetic compatibility (EMC) - Generic standards. Emission standard for industrial environments

Legal person authorized to compile the technical file  
 and importer in the UK  
 (if the manufacturer is not located in the UK):

Busch (UK) Ltd  
 30 Hortonwood  
 Telford - UK

Liberec, 16.04.2021



**Michael Dostalek**  
**General Manager**



# Notes

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A large grid of small dots, arranged in approximately 30 columns and 40 rows, covering the majority of the page. This grid is intended for users to take handwritten notes.

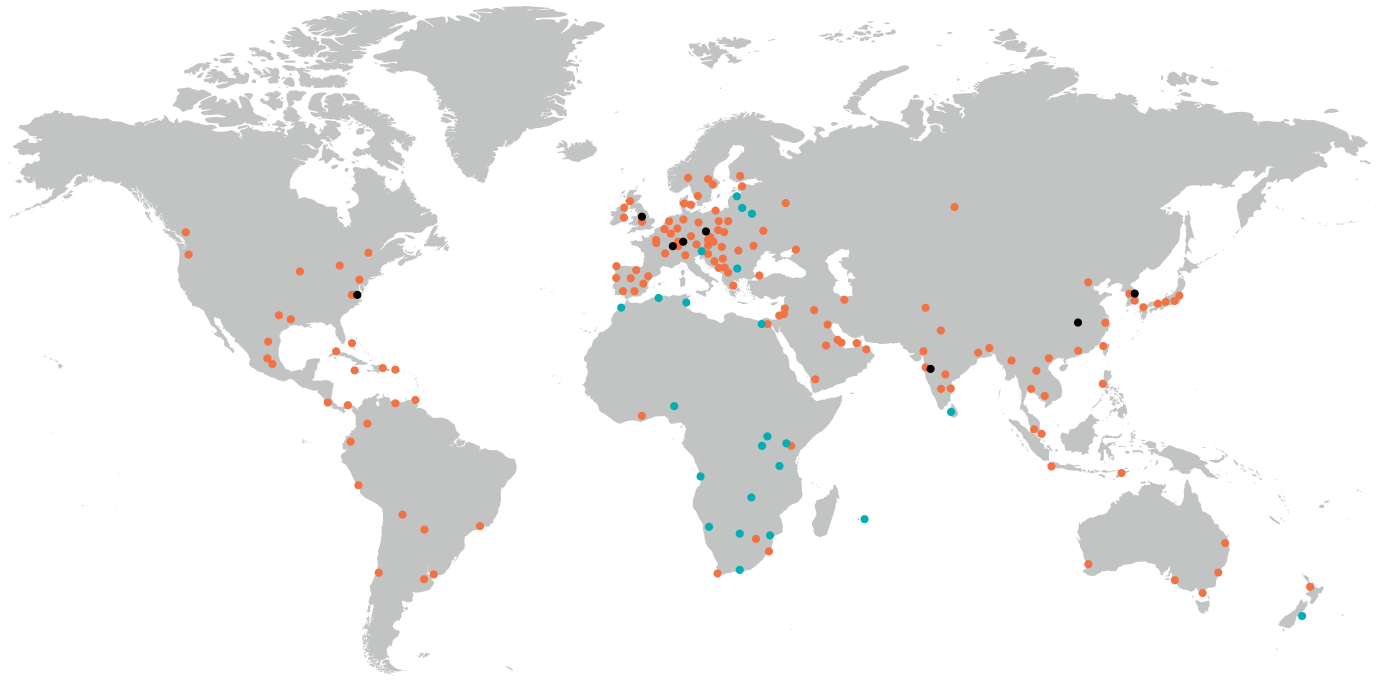
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# Busch

## Vacuum Solutions

With a network of over 60 companies in more than 40 countries and agencies worldwide, Busch has a global presence. In every country, highly competent local personnel delivers custom-tailored support backed by a global network of expertise. Wherever you are. Whatever your business. We are there for you.



● Busch companies and Busch employees   ● Local representatives and distributors   ● Busch production site

[www.buschvacuum.com](http://www.buschvacuum.com)