VACUUM SOLUTIONS

COBRA

Dry Screw Vacuum Pumps
NF 0750 A, NF 0950 A
Water-Cooled Version (WCV)

Instruction Manual

Get technical data, instruction manuals, service kits

VACUUM APP

0870232965 | -0003_en-US | Original instructions

11/24/2022

Table of Contents

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* [➔ 6]. 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.

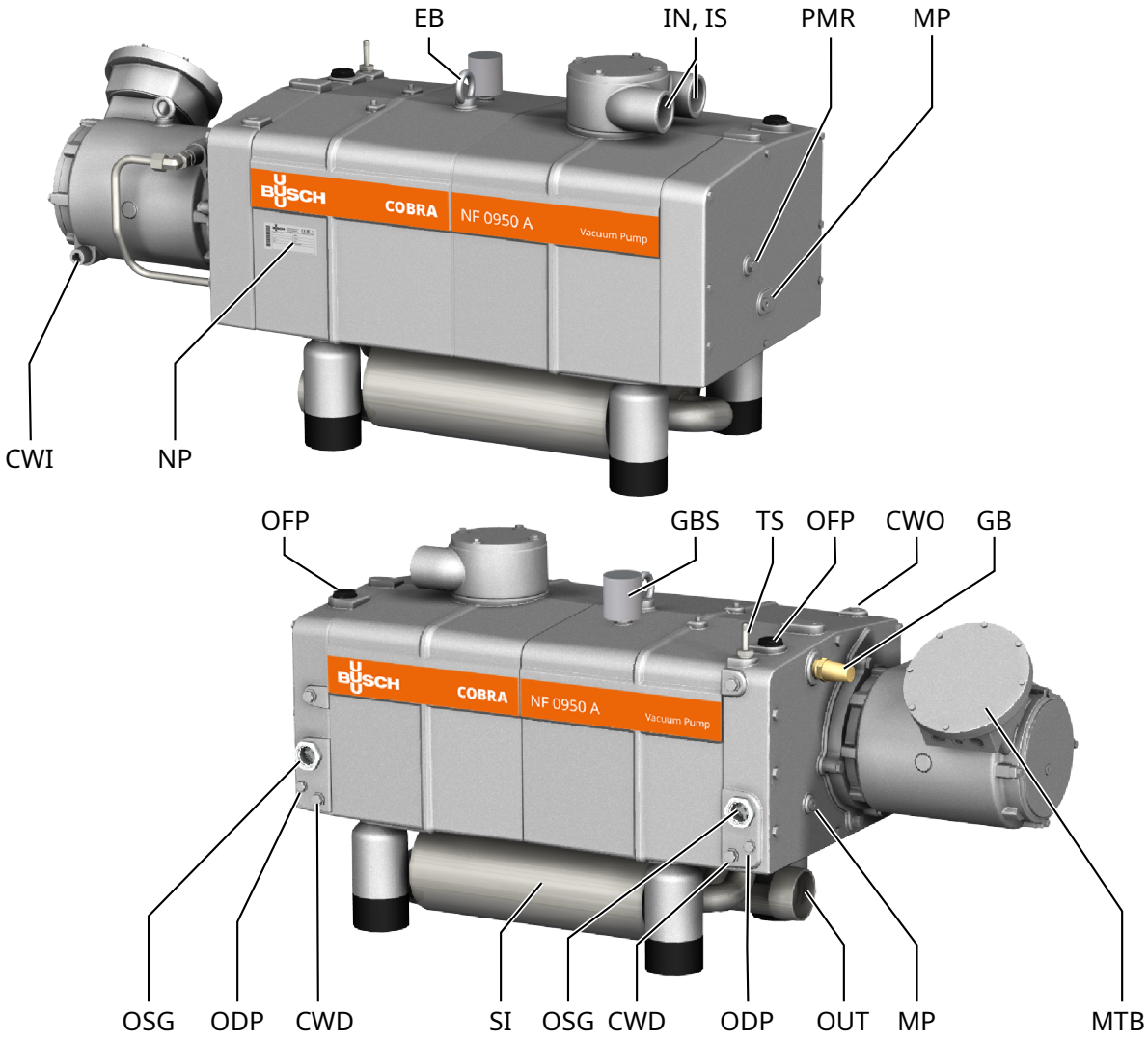
NOTE

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

WARNING

... indicates a potentially dangerous situation related to the presence of an oxygen level of more than 21%.

2 Product Description



Description			
IN	Suction connection (Inlet)	OUT	Discharge connection (Outlet)
CWD	Cooling water drain plug	CWI	Cooling water inlet
CWO	Cooling water outlet	EB	Eye bolt
GB	Gas ballast valve	GBS	Gas ballast silencer
IS	Inlet screen	MP	Magnetic plug
MTB	Motor terminal box	NP	Nameplate
ODP	Oil drain plug	OFP	Oil fill plug
OSG	Oil sight glass	PMR	Plug for manual rotation of rotors
SI	Silencer	TS	Temperature switch

NOTE

Technical term.

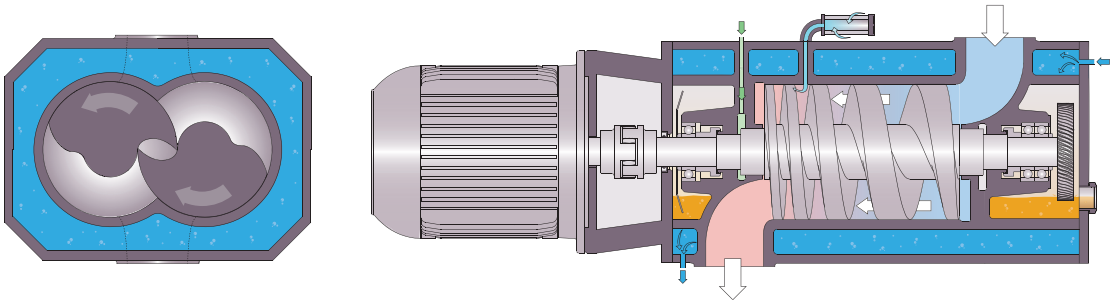
In this instruction manual, we consider that the term ‘machine’ refers to the ‘vacuum pump’.

NOTE

Illustrations

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

2.1 Operating Principle



The machine works on the one-stage, twin-screw pump principle.

Two screw rotors rotate inside the cylinder. The pumped medium is trapped between the cylinder and screw chambers, compressed, and transported to the gas outlet. During the compression process, the two screw rotors do not come into contact with each other or with the cylinder. There is no need for a lubrication or an operating fluid in the compression chamber.

2.2 Intended Use

WARNING

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

Risk of injuries!

Risk of damages to the machine!

Risk of damages to the environment!

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

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

Conveying of other media leads to an increased thermal and/or mechanical load on the machine and is permissible only after a consultation with Busch.

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

The machine is capable of maintaining ultimate pressure, see Technical Data.

The machine is suitable for continuous operation.

Permitted environmental conditions, see Technical Data.

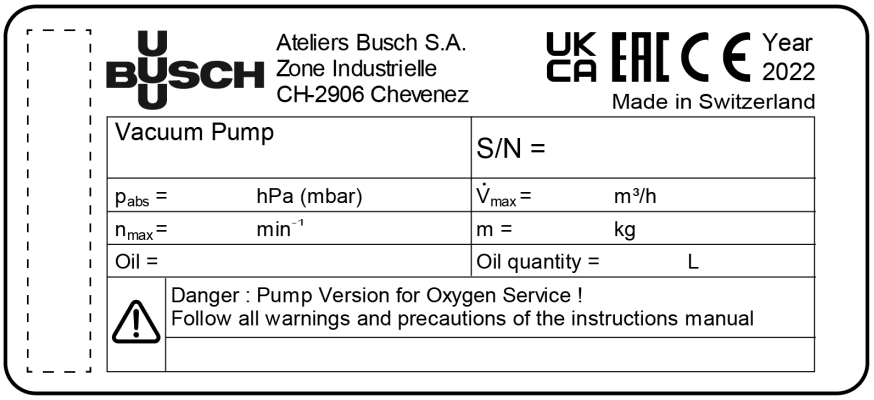
WARNING

A specific Oxygen version (see nameplate) can convey process gas with > 21% vol. oxygen.

The following warning and precautions additionally apply for the Oxygen version if process gas with > 21% vol. is drawn:

- The barrier gas system is mandatory, see *Sealing Systems* [➔ 8] and *Barrier Gas System* [➔ 8].
- Installation conditions: the installation area must be ventilated in such a way to prevent unacceptable levels of oxygen, see *Installation Conditions* [➔ 12].
- Use only a type of oil approved and recommended by Busch for oxygen applications, see *Filling Oil* [➔ 16] and *Oil* [➔ 41].
- Follow the additional commissioning instructions, see *Commissioning* [➔ 22].
- Follow the additional maintenance instructions, see *Maintenance* [➔ 26] and *Oil Change* [➔ 32].
- Use only Busch genuine spare parts, see *Spare Parts* [➔ 37].

Nameplate of the oxygen version of the machine



NOTICE

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

Risk of corrosion inside the compression chamber which can reduce performance and its lifetime!

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

2.3 Start Controls

The machine comes without start controls. The control of the machine is to be provided in the course of installation.

The NF 0950 A must be equipped with a variable speed drive* for 72Hz operation.

The NF 0750 A must be operated at 60Hz with a variable speed drive* or on a grid with 60Hz supply frequency.

* not included in the scope of supply

2.4 Standard Features

2.4.1 Water Cooling

The machine is cooled by a cooling water circuit in the cylinder cover, cylinder and in the motor.

2.4.2 Temperature Switch

The temperature switch monitors the cooling water temperature of the machine.

The temperature switch has one switch point:

Switch point T = 70°C	Trip, the machine must be stopped, pin 1+2 (see *Electrical Connection of the Monitoring Devices* [➔ 21]).

2.4.3 Sealing Systems

The machine is equipped with labyrinth seals on the motor side and suction side.

Sealing systems prevent the process gas going to the bearings chambers.

Depending on the application, the sealing systems efficiency can be improved with a barrier gas system, see *Barrier Gas System* [➔ 8].

WARNING

The barrier gas system is mandatory for the suction of process gas with a volume of oxygen higher than 21% (>21%).

2.5 Optional Accessories

2.5.1 Gas Ballast Valve

The gas ballast valve mixes the process gas with a limited quantity of ambient air to counteract the condensation of vapor inside the machine.

The gas ballast valve has an influence on the ultimate pressure of the machine, see Technical Data.

2.5.2 Silencer

A silencer at the discharge connection (OUT) can be provided to reduce the exhaust gas noise.

2.5.3 Barrier Gas System

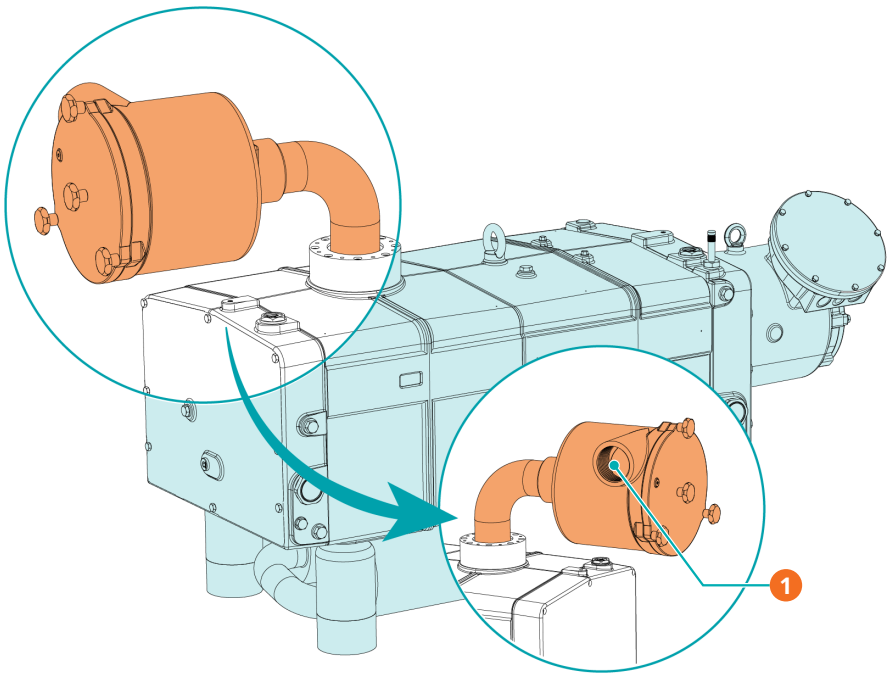
WARNING

The barrier gas system is mandatory for the suction of process gas with a volume of oxygen higher than 21% (>21%).

The barrier gas system allows the supply of compressed air or nitrogen into the motor side shaft seals to improve the sealing efficiency.

2.5.4 Inlet Filter

The inlet filter protects the machine against dust and other solids in the process gas. The inlet filter is available with a paper or polyester cartridge.



Description			
1	Connection size: G3'		

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.

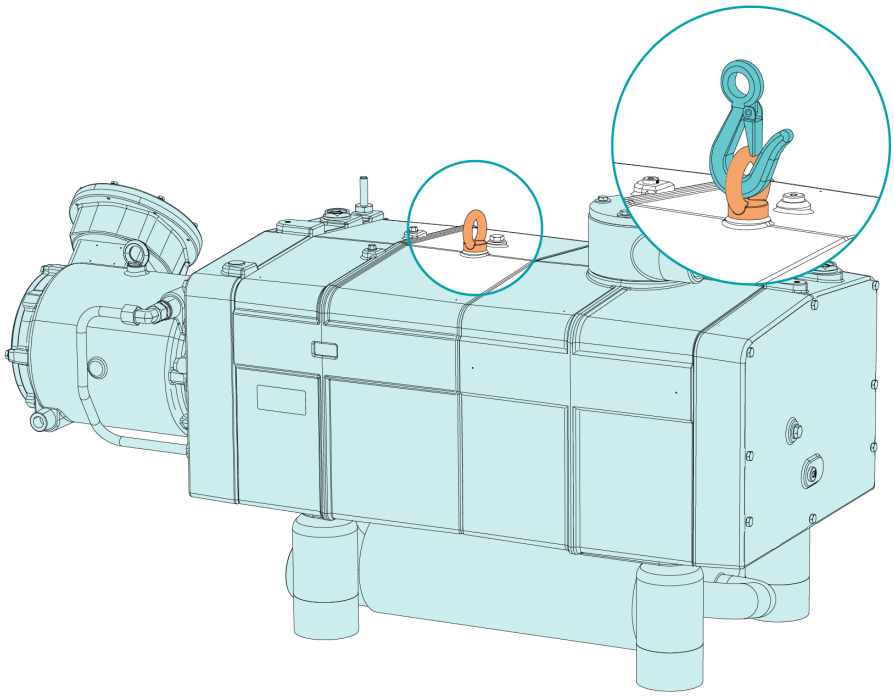
NOTICE

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 cylinder.

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

- To find out the weight of the machine, refer to the chapter Technical Data or the nameplate (NP).
- Make sure that the eye bolt(s) (EB) is/are in faultless condition, fully screwed in and tightened by hand.



- Check the machine for transport damage.

If the machine is secured to a base plate:

- Remove the machine from the base plate.

4 Storage

NOTICE

Long storage time.

Risk of damage to the machine!

- 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, dry, dust free and if possible in original packaging preferably at temperatures between 5 ... 55 °C.

5 Installation

WARNING

Lack of oxygen regulation knowledge.

Risk of fire!

- Installation, commissioning, and maintenance must only be carried out by qualified personnel who are informed about the applicable safety regulations and trained in the handling of oxygen.
- Accident prevention regulations or methods must imperatively be complied with.
  Seek further information:
  - European Industrial Gases Association “EIGA” www.eiga.eu (EIGA SAG NL 79/04).
  - Berufsgenossenschaft Rohstoffe und chemische Industrie "BG RCI” *www.bgrci.de* (Merkblatt M 034 Sauerstoff).

5.1 Installation Conditions

WARNING

The machine is not absolutely gas tight!

Risk of fire!

- The installation area must be aired in such a way to prevent unacceptable levels of oxygen.

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.
- Make sure that the environmental conditions comply with the protection class of the motor and the electrical elements.
- Make sure that the oil sight glass (OSG) remains easily visible.
- Make sure that enough space remains for maintenance work.
- Make sure that the machine is placed or mounted horizontally, a maximum deviation of 1° in any direction is acceptable.
- Check the oil level, see *Oil Level Inspection* [➔ 28].
- Make sure that the cooling water complies with the requirements, see *Cooling Water Connection* [➔ 14].

5.2 Connecting Lines / Pipes

- Remove all protective covers before installation.
- Make sure that the connection lines cause no stress on the connection of the machine; if necessary use flexible joints.
- 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.

5.2.1 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.

Several executions are available and typically include a mesh screen.

Connection size(s):

– G3, vertical or horizontal

– 2 x G2, horizontal

– ISO DN100, DIN 28404, vertical

5.2.2 Discharge Connection

NOTICE

Discharge gas flow obstructed.

Risk of damage to the machine!

- Make sure that the discharged gas will flow without obstruction. Do not shut off or throttle the discharge line or use it as a pressurized air source.

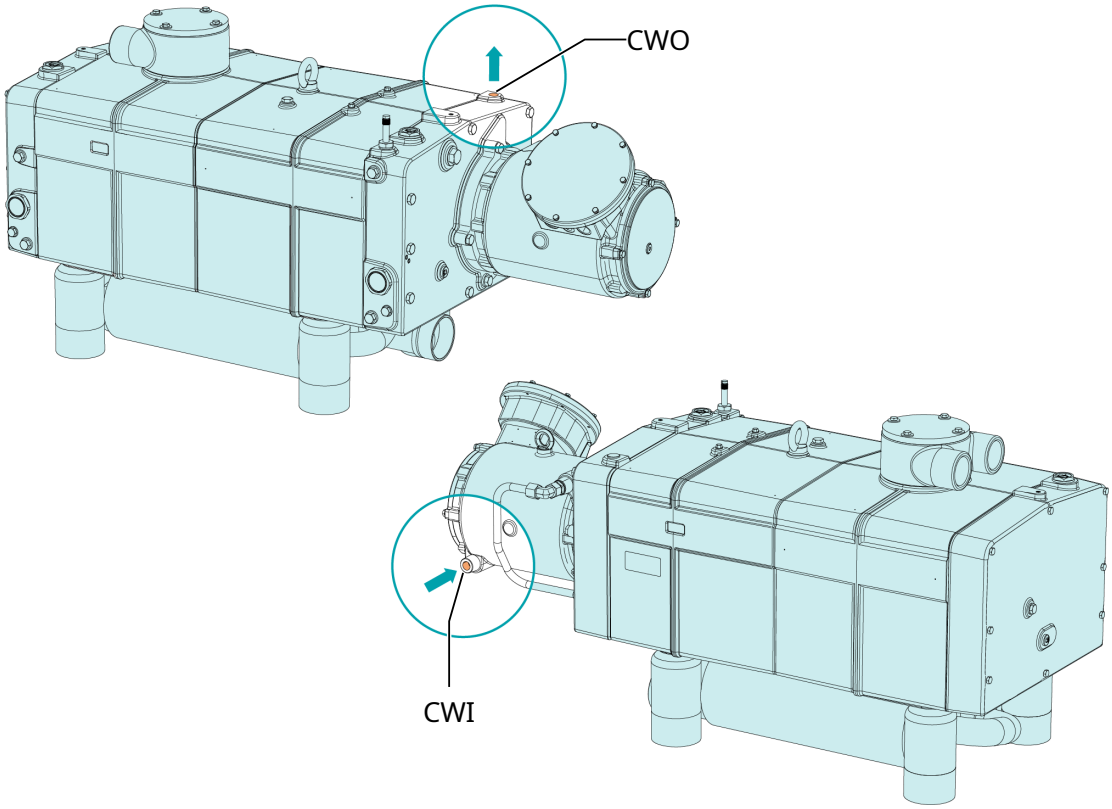
Connection size(s):

At the silencer (SI) discharge connection

– G3, horizontal

- Make sure that the counter pressure (also termed back pressure) at the discharge connection (OUT) does not exceed the maximum allowable discharge pressure, see Technical Data.

5.2.3 Cooling Water Connection



Description			
CWI	Cooling water inlet	CWO	Cooling water outlet

- Connect the cooling water connections (CWI / CWO) to the water supply.

Connection size:

– G1/2, ISO 228-1 (CWI / CWO)

- Make sure that the cooling water complies with the following requirements:

Supply capacity	l/min	8 ... 16
Water pressure	bar	1 ... 6
Supply temperature	°C	+5 ... +30
Required pressure differential across supply and return	bar	≥ 1

- To reduce the maintenance effort and ensure a long product lifetime we recommend the following cooling water quality:

Hardness	mg/l (ppm)	< 90
Properties	Clean & clear	
PH value		7 ... 8
Particle size	µm	< 200
Chloride	mg/l	< 100
Electrical conductivity	µS/cm	≤ 100
Free chloride	mg/l	< 0.3
Materials in contact with the cooling water	Stainless steel and cast iron	

NOTE

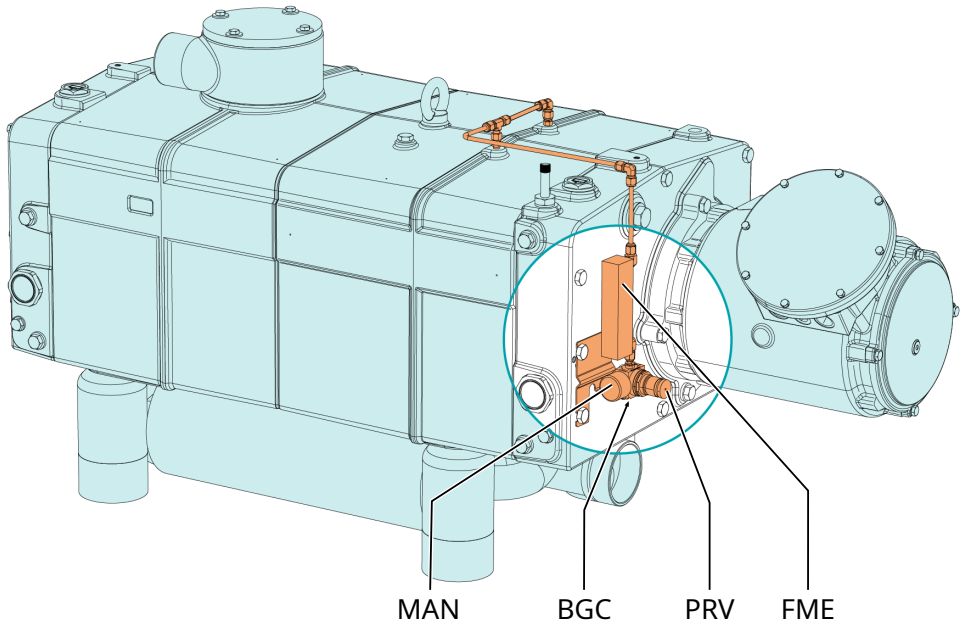
Water hardness unit conversion.

1 mg/l (ppm) = 0.056 °dh (german degree) = 0.07 °e (english degree) = 0.1 °fH (french degree)

5.2.4 Barrier Gas System Connection (Optional)

WARNING

The barrier gas system is mandatory for the suction of process gas with a volume of oxygen higher than 21% (>21%).



Description			
BGC	Barrier gas connection	FME	Flow meter
MAN	Manometer	PRV	Pressure regulating valve

- Connect the barrier gas connection (BGC) to the gas supply.

Connection size:

– G1/4, ISO 228-1

- Make sure that the gas complies with the following requirements:

Gas type	Dry nitrogen or air	
Gas temperature	°C	0 ... 60
Maximum gas pressure	bar	13
Recommended pressure setting at the pressure regulating valve (PRV)	bar(a)	3
Filtration	µm	5
Recommended flow rate	SLM (standard liter per minute)	15 ... 20

5.3 Filling Oil

WARNING

Process gas with > 21% vol. oxygen and use of an inappropriate oil.

Risk of fire!

- Use only a type of oil approved and recommended by Busch for oxygen applications.

NOTICE

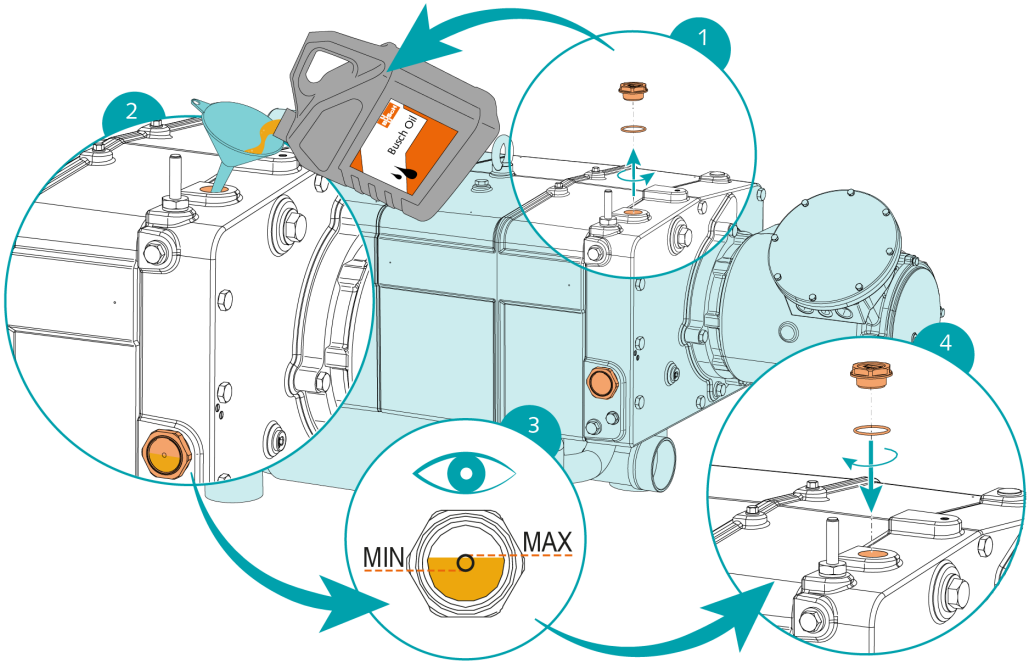
Use of an inappropriate oil.

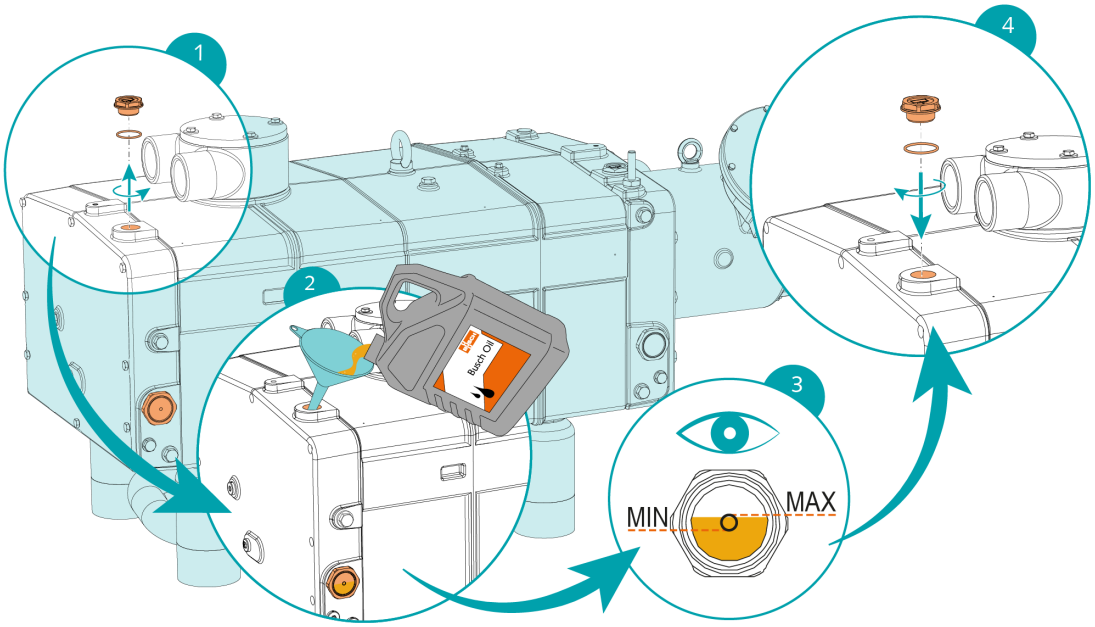
Risk of premature failure!

Loss of efficiency!

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

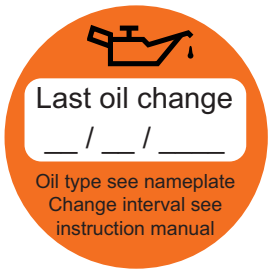
For oil type and oil capacity see Technical Data and *Oil* [➔ 41].





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 according to EN 60204-1 must be insured by the customer on its installation.
- 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* [➔ 42] or *UK Declaration of Conformity* [➔ 43]).

6.1 Machine delivered without Variable Speed Drive

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 isolation default.
  - 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

The motor frequency is below 20 Hz.

Risk of damage to the machine!

- The motor nominal speed must always be higher than 1200 min^{-1} (20 Hz).

NOTICE

The admissible motor nominal speed exceeds the recommendation.

Risk of damage to the machine!

- Check the admissible motor nominal speed (n_{max}) on the nameplate of the machine (NP).
- Make sure to comply with it.
- Consult the Technical Data to get more information.

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 Three-Phase Motor (Pump Drive)

- Make sure that you select the proper speed drive according to the motor specifications.
- Connect the motor to your external speed drive according to the operating instructions of your external speed drive.
- Connect the motor cables as shown in the below wiring diagram.

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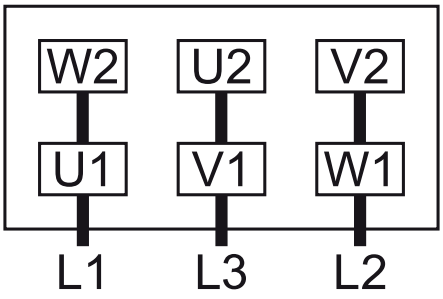
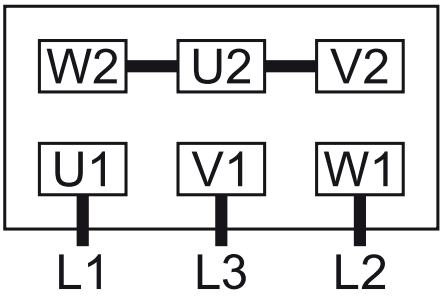
Delta connection (low voltage):

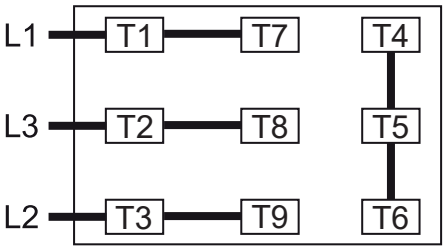


Star connection (high voltage):

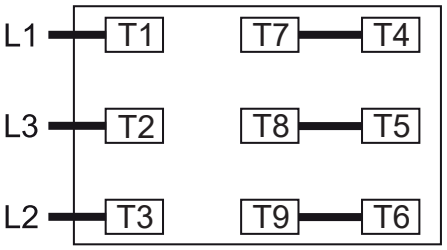


NF 0750 A

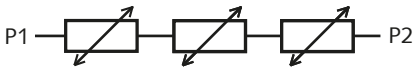
Double star connection (low voltage):



Star connection (high voltage):



Connection of motor thermistors (3xPTC) (recommended):



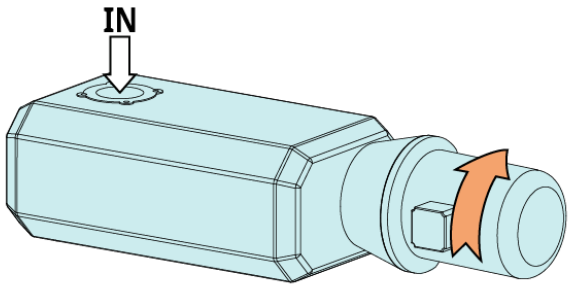
NOTICE

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 illustration below:



- Jog the motor briefly.
- With a phase rotation tester, check if the wiring corresponds to the correct direction of rotation.

If the rotation of the motor must be changed:

- Switch any two of the motor phase wires.
- Connect the motor temperature protection (Thermistors PTC. 3 x 155°C).
- Motor terminal box cable entries:
  - 2 x M25 x 1.5
  - 1 x M16 x 1.5

6.3 Electrical Connection of the Monitoring Devices

NOTE

In order to prevent potential nuisance alarms, Busch recommends that the control system is configured with a time delay of at least 20 seconds.

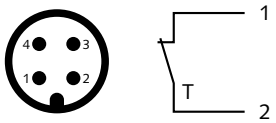
6.3.1 Wiring Diagram Temperature Switch

Part no.: 0651 563 762

Connector: M12x1, 4-pin

U = ≤ 250 V AC/DC (50/60 Hz) ; I = ≤ 1 A

Switch point:
T_{trip} = 70° C ► pin 1 + 2



1 = Brown ; 2 = White ;
3 = Blue ; 4 = Black

7 Commissioning

WARNING

Lack of oxygen regulation knowledge.

Risk of fire!

- Installation, commissioning, and maintenance must only be carried out by qualified personnel who are informed about the applicable safety regulations and trained in the handling of oxygen.
- Accident prevention regulations or methods must imperatively be complied with.
  Seek further information:
  - European Industrial Gases Association “EIGA” www.eiga.eu (EIGA SAG NL 79/04).
  - Berufsgenossenschaft Rohstoffe und chemische Industrie "BG RCI” *www.bgrci.de* (Merkblatt M 034 Sauerstoff).

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 persons are present in the vicinity of a non noise insulated machine over extended periods:

- Make sure that ear protection is being used.

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* [➔ 16].

NOTICE

The machine can be shipped without cooling liquid.

Operation without cooling liquid will ruin the machine in short time!

- Prior to commissioning, the machine must be filled with cooling liquid, see Filling Cooling Liquid.

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.

- Make sure that the installation conditions (see Installation Conditions) are met.
- Turn on the water supply.

If the machine is equipped with a barrier gas system:

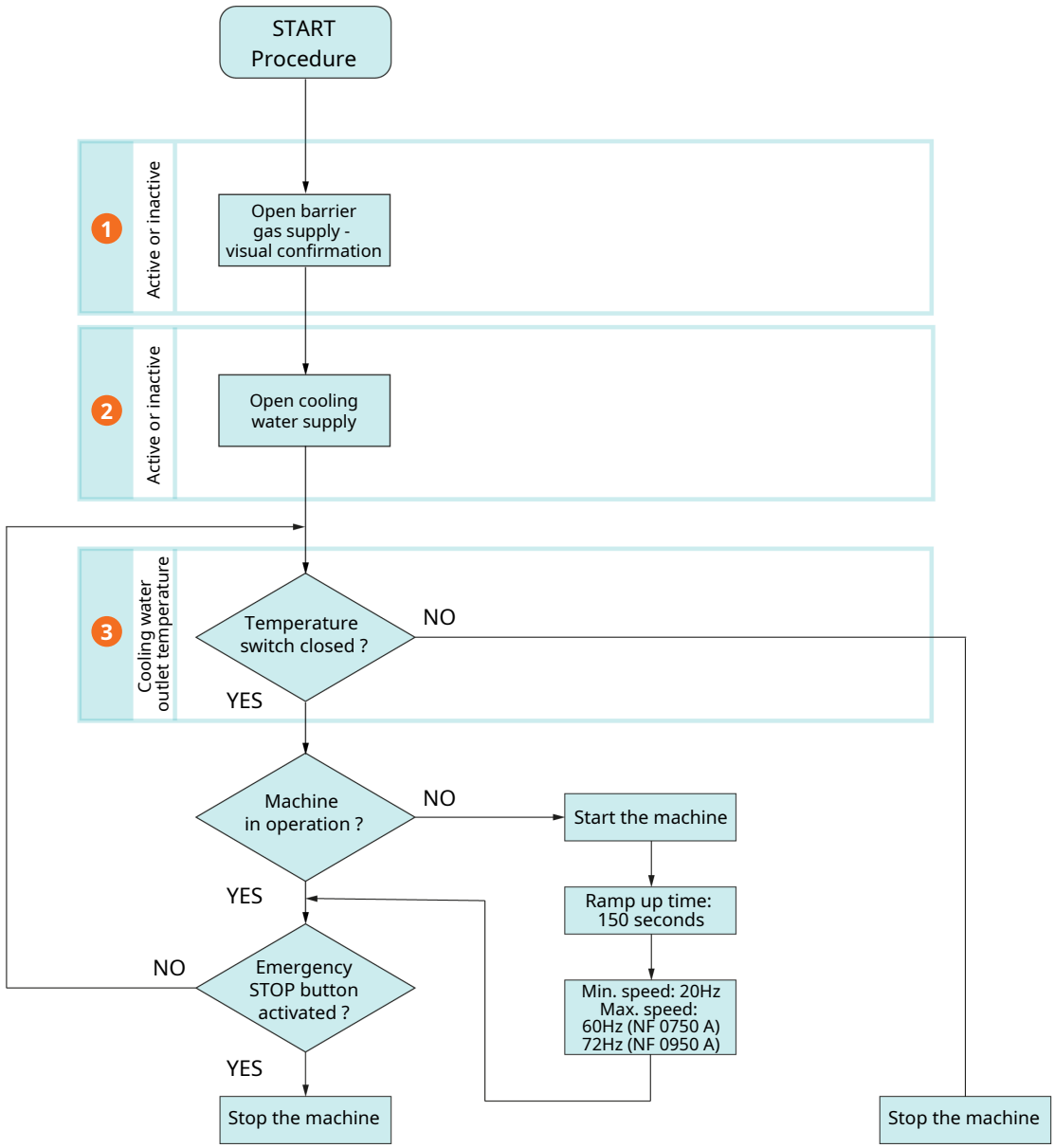
- Turn on the barrier gas supply.
- Adjust the barrier gas pressure.

- Switch on the machine (see *Start Procedure* [➔ 24] and *Shutdown Procedure* [➔ 25]).
- Make sure that the operating conditions comply with the Technical Data.
- After a few minutes of operation, perform an *Oil Level Inspection* [➔ 28].

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

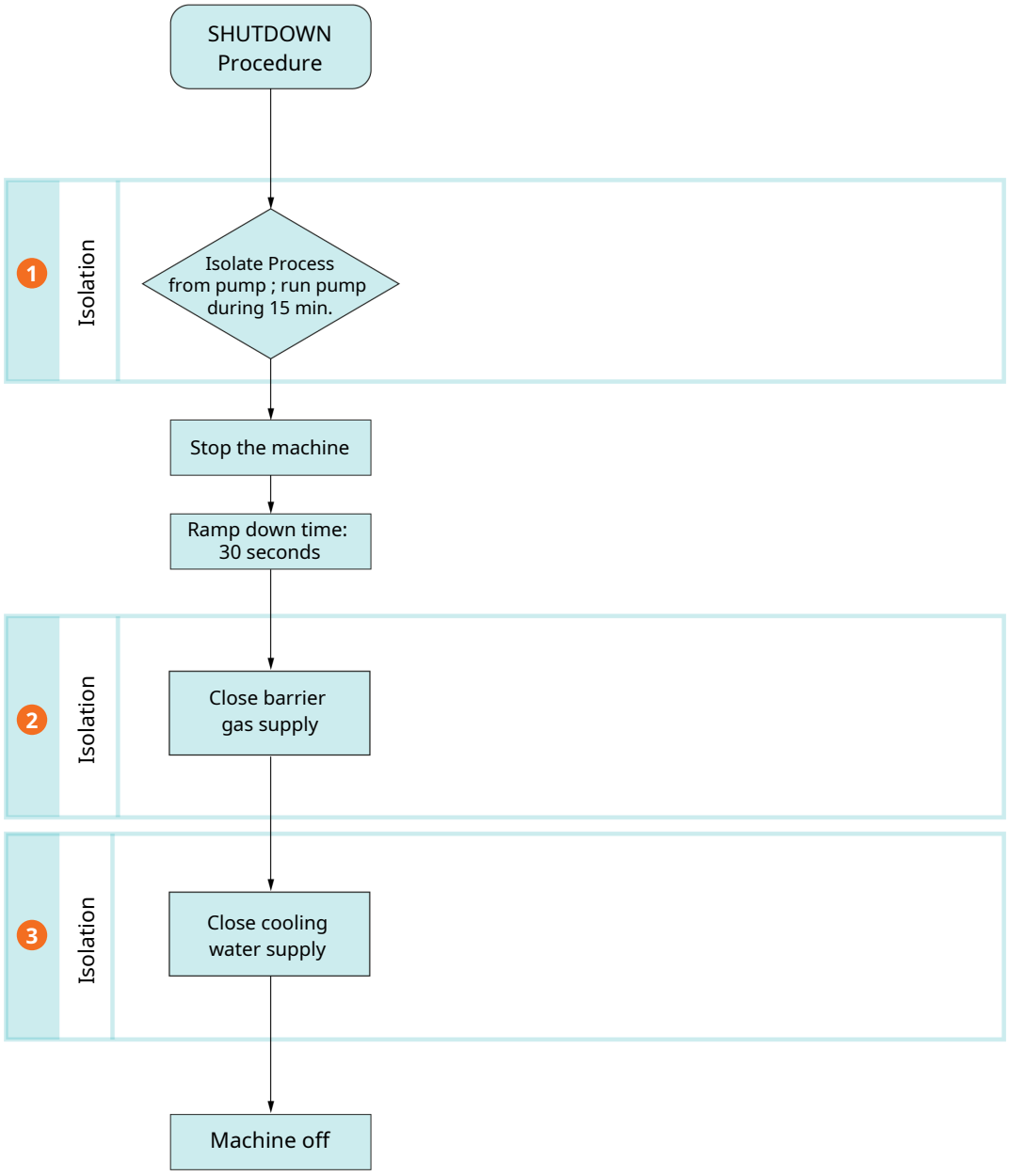
- Measure the motor current and record it as reference for future maintenance and trouble-shooting work.

7.1 Start Procedure



Description			
1	Barrier gas flow: 15-20 SLM (Option)	2	Cooling water supply: 8-16 l/min., 1-6 bar, 5-30°C
3	Temperature switch 70°C		

7.2 Shutdown Procedure



Description			
1	Pump inlet	2	Barrier gas flow (Option)
3	Cooling water supply		

8 Maintenance

DANGER

Live wires.

Risk of electrical shock.

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

DANGER

Live wires. Carry out any work on the variable speed drive and motor.

Risk of electrical shock!

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

WARNING

Lack of oxygen regulation knowledge.

Risk of fire!

- Installation, commissioning, and maintenance must only be carried out by qualified personnel who are informed about the applicable safety regulations and trained in the handling of oxygen.
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WARNING

Machine contaminated with organic material.

Risk of fire!

If there is a suspicion that the machine and/or the oil are/is contaminated with organic material:

- The machine must be removed from service and cleaned by specialists (contact your Busch representative).

WARNING

Use of non-Busch genuine spare parts.

Risk of fire!

- Use only Busch genuine spare parts approved by Busch and suitable for oxygen applications.


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.
- Turn off the water supply.

If the machine is equipped with a barrier gas system:

- Close the barrier gas supply.

- Vent the connected lines to atmospheric pressure.

If necessary:

- Drain the cooling water from the two cooling water drain plugs (CWD).
- Disconnect all connections.

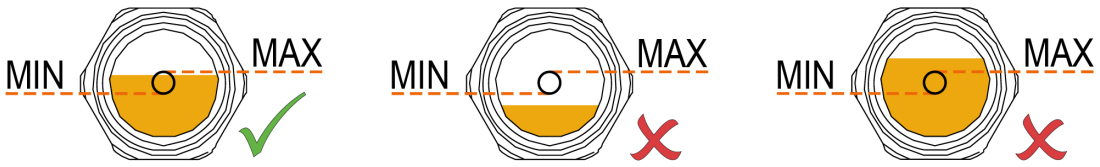
8.1 Maintenance Schedule

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.

Interval	Maintenance work
Monthly	• Check the oil level, see *Oil Level Inspection* [➔ 28]. • Check the machine for oil leaks - in case of leaks have the machine repaired (contact Busch).
Yearly	• Carry out a visual inspection and clean the machine from dust and dirt. • Check the electrical connections and the monitoring devices. • Clean the inlet screen, see *Cleaning the Inlet Screen* [➔ 29].
Yearly If one or more of these accessories are installed.	• Check the filter of the gas ballast valve (GB) and clean it if necessary, see *Cleaning the Gas Ballast Filter (Optional)* [➔ 32]. • Check the silencer (SI) and clean it if necessary. • Check the inlet filter, replace the filter cartridge if necessary.
Every 8500 hours or after 1 year	• Change the oil of the gear and bearing housings (both sides), see *Oil Change* [➔ 32]. • Clean the magnetic plugs (MP).
Every 25000 hours or after 4 years	• Have a major overhaul on the machine (contact Busch).

8.2 Oil Level Inspection

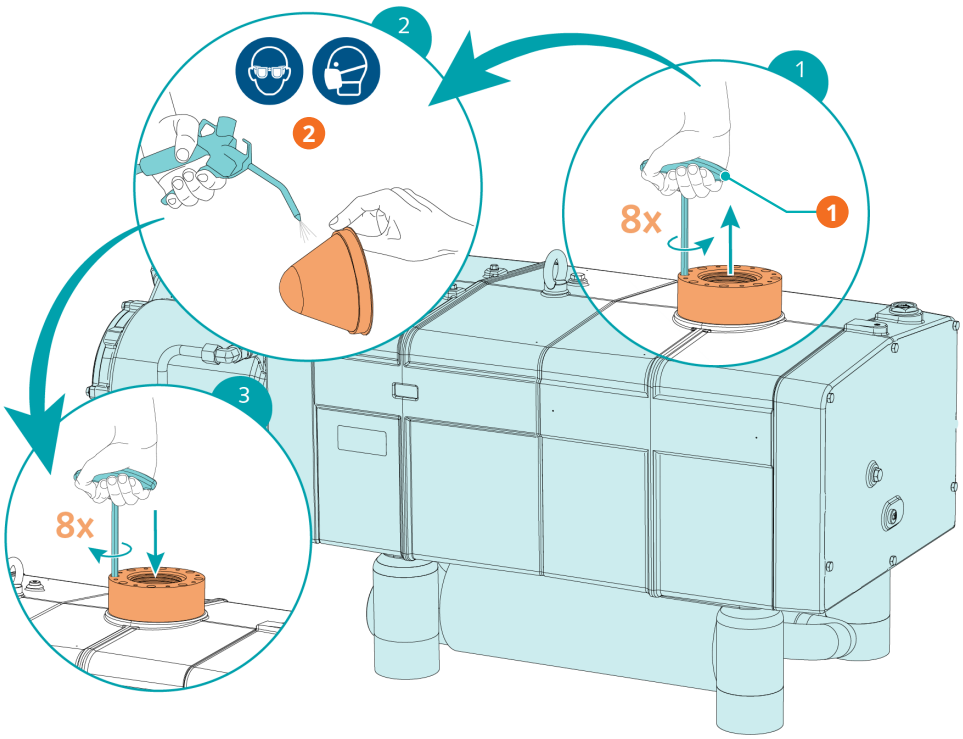
- Shut down the machine.
- When the machine is stopped, wait 1 minute before checking the oil level.



- Fill up if necessary, see *Oil Filling* [➔ 16].

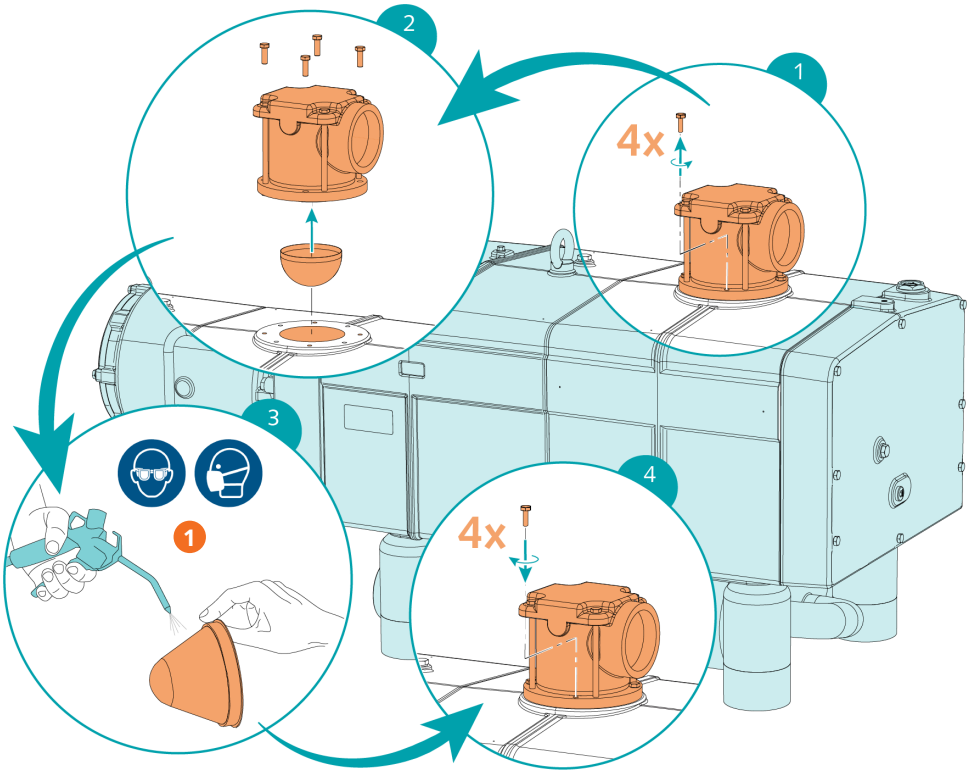
8.3 Cleaning the Inlet Screen

8.3.1 Cleaning the Inlet Screen with Vertical Flange G3 or DN100



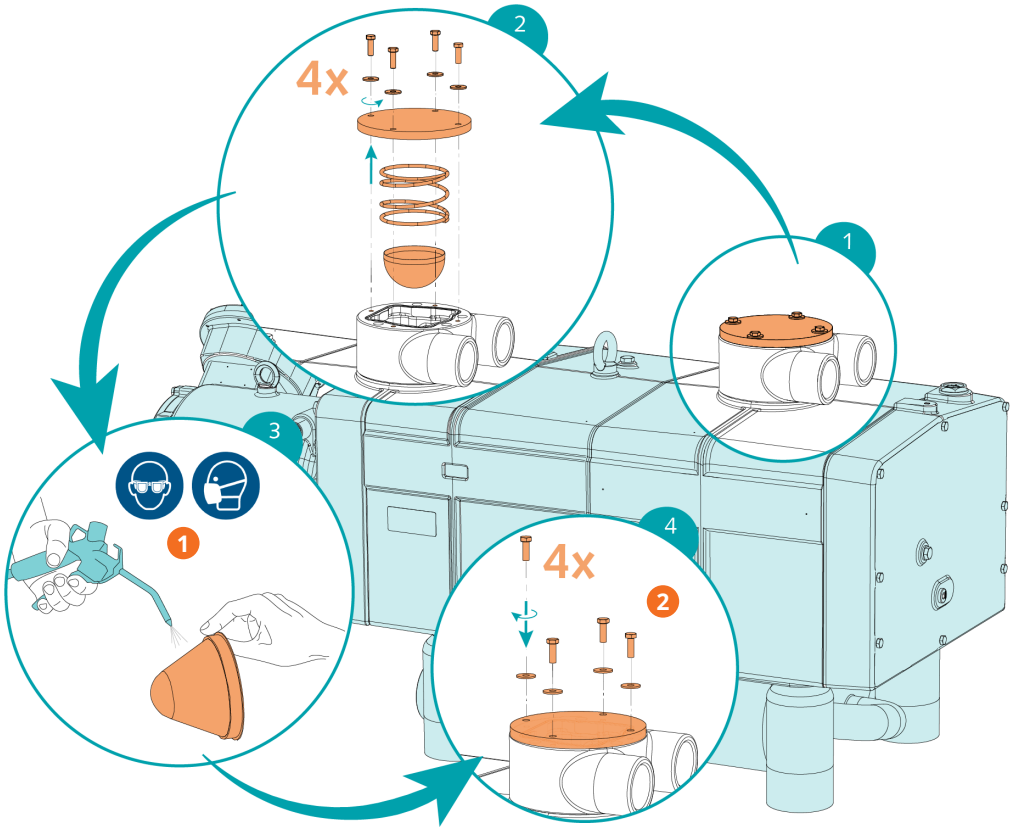
Description			
1	Use a hexagonal key	2	Use compressed air and wear protective eyewear and mask

8.3.2 Cleaning the Inlet Screen with Horizontal Flange G3



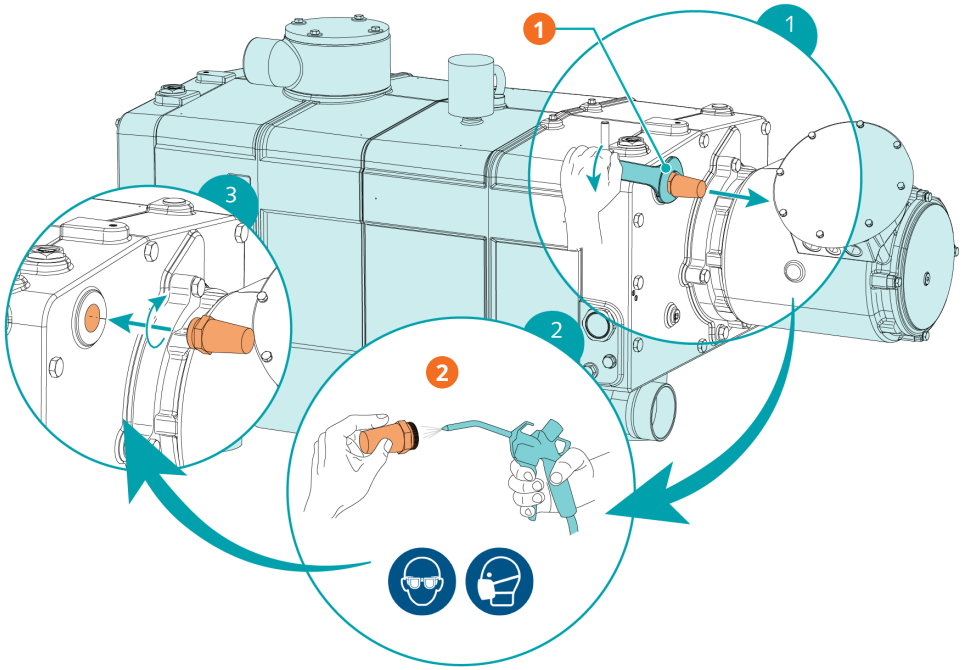
Description			
1	Use compressed air and wear protective eyewear and mask		

8.3.3 Cleaning the Inlet Screen with Double Flange G2



Description			
1	Use compressed air and wear protective eyewear and mask	2	Max. admissible torque: 12Nm

8.4 Cleaning the Gas Ballast Filter (Optional)



Description			
1	Use a 36 mm wrench	2	Use compressed air and wear protective eyewear and mask

8.5 Oil Change

WARNING

Process gas with > 21% vol. oxygen and use of an inappropriate oil.

Risk of fire!

- Use only a type of oil approved and recommended by Busch for oxygen applications.

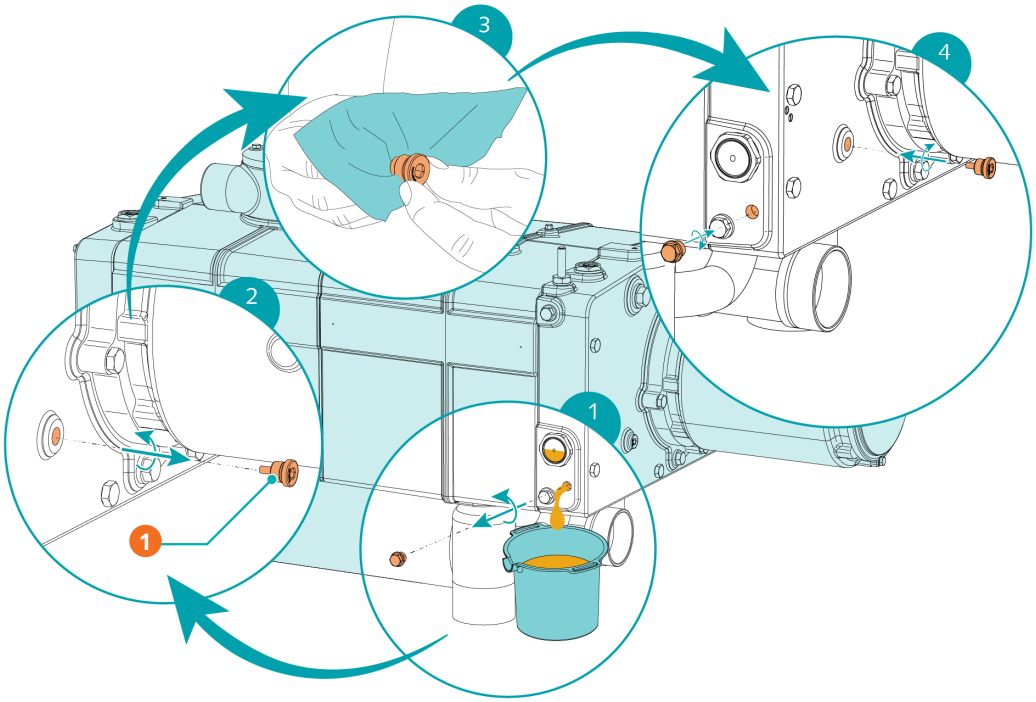
NOTICE

Use of an inappropriate oil.

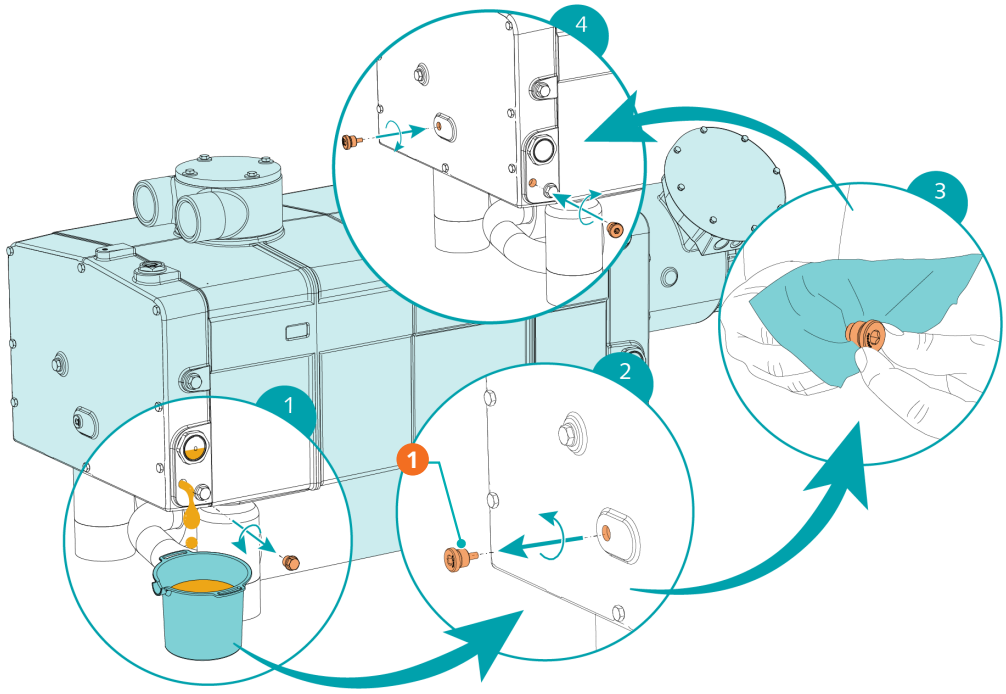
Risk of premature failure!

Loss of efficiency!

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

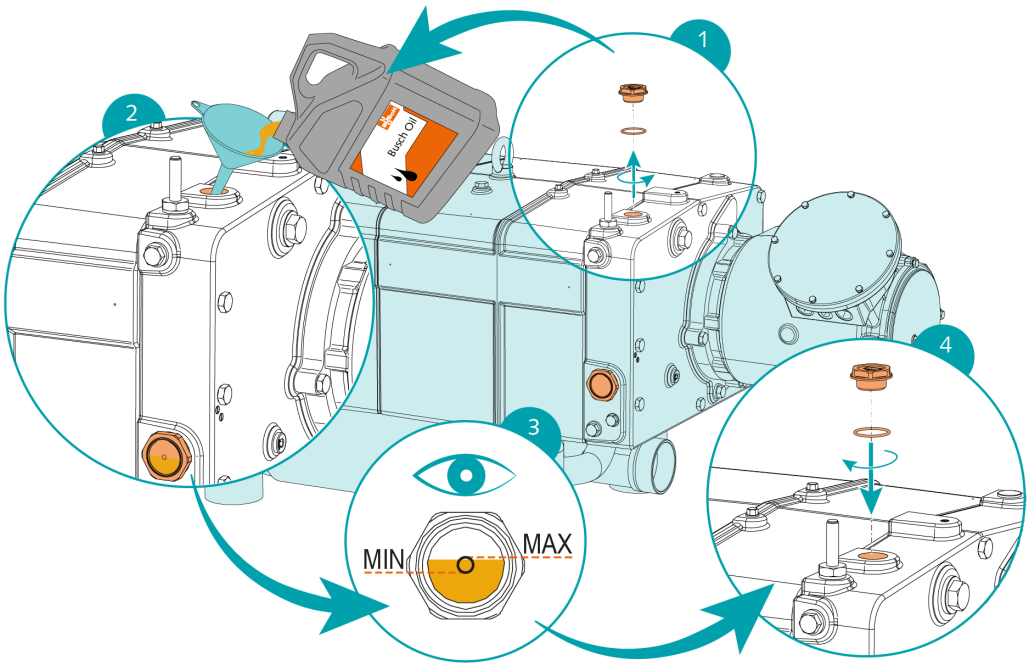


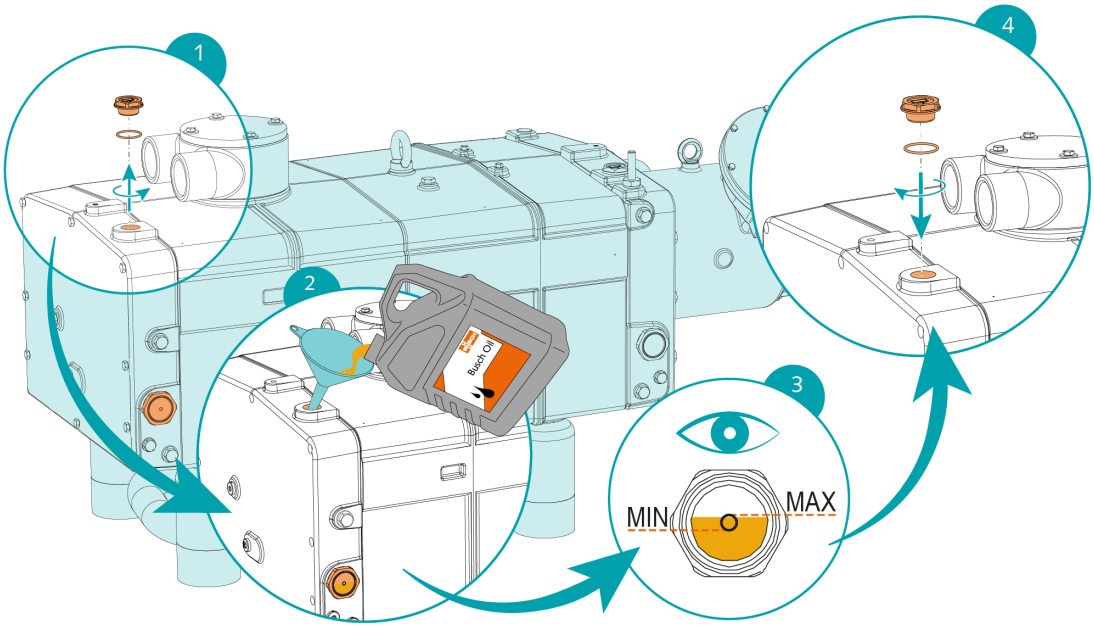
Description			
1	Magnetic plug		



Description			
1	Magnetic plug		

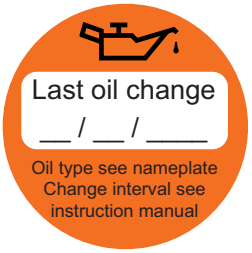
For oil type and oil capacity see Technical Data and *Oil* [➔ 41].





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*).

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.
- Turn off the water supply.

If the machine is equipped with a barrier gas system:

- Close the barrier gas supply.

- Vent the connected lines to atmospheric pressure.
- Drain the cooling water from the two cooling water drain plugs (CWD).
- Disconnect all connections.

If the machine is going to be stored:

- See *Storage* [➔ 11].

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

WARNING

Use of non-Busch genuine spare parts.

Risk of fire!

- Use only Busch genuine spare parts approved by Busch and suitable for oxygen applications.

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.

There are no standard spare parts kits available for this product.

If you require Busch genuine parts:

- Contact your Busch representative.

Spare parts available

Spare part	Description	Part no.
Inlet filter cartridge	Inlet filter cartridge, **paper**	0532 000 006
Inlet filter cartridge	Inlet filter cartridge, **polyester**	0532 121 865
Inlet screen	Inlet screen	0534 565 893
Transparent inlet cover	Cover for inlet flange	0710 222 659

Spare parts available for Oxygen version

Spare part	Description	Part no.
Inlet filter cartridge for oxygen > 21% vol.	Inlet filter cartridge, **polyester**	0532 121 865

12 Troubleshooting

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.

Problem	Possible Cause	Remedy
The machine does not start.	The motor is not supplied with the correct voltage.	• Check the power supply.
	The rotors are jammed or seized.	• Rotors inspection or repair the machine (contact Busch).
	Solid foreign matter has entered the machine.	• Remove the solid foreign matter or repair the machine (contact Busch). • Check the inlet screen (IS) at the suction connection.
	The temperature switch (TS) reached the switch point.	• Let the machine cool down. • See problem “The machine runs too hot”.
	The motor is defective.	• Replace the motor.
The machine does not reach the usual pressure on the suction connection.	Suction or discharge lines too long or section diameter too small.	• Use larger diameter or shorter lines. • Seek advice from your local Busch representative.
	The inlet screen (IS) is partially clogged.	• Clean the inlet screen (IS), see *Cleaning the Inlet Screen* [➔ 29].
	The machine runs in the wrong direction.	• Check the direction of rotation, see Wiring Diagram Three-Phase Motor.
	Internal parts are worn or damaged.	• Repair the machine (contact Busch).
The machine runs very noisily.	Wrong oil quantity or unsuitable oil type.	• Use one of the recommended oils in the correct quantity, see *Oil* [➔ 41].
	Defective gears, bearings or coupling element.	• Repair machine (contact Busch).

Problem	Possible Cause	Remedy
The machine runs too hot.	Insufficient cooling.	• Make sure to comply with the cooling water requirements, see *Cooling Water Connection* [➔ 14].
	Ambient temperature too high.	• Observe the permitted ambient temperature, see Technical Data.
	Temperature of the process gases at the inlet too high.	• Observe the permitted gas inlet temperature, see Technical Data.
	Oil level too low.	• Top up oil.
The oil is black.	Oil change intervals are too long.	• Drain the oil and fill in new oil, see *Oil Change* [➔ 32].
	The machine runs too hot.	• See problem "The machine runs too hot".

For resolution of problems not listed in the troubleshooting table, please contact your Busch representative.

13 Technical Data

		NF 0750 A	NF 0950 A
Pumping speed (with inlet G3 or ISO DN100) *	m^3/h	750	950
	ACFM	441	560
Ultimate pressure (without gas ballast)	hPa (mbar) abs.	≤0.05	≤0.01
	TORR	≤0.0375	≤0.0075
Ultimate pressure (with gas ballast)	hPa (mbar) abs.	≤0.10	≤0.05
	TORR	≤0.075	≤0.0375
Nominal motor rating	kW	15	18.5
	HP	20	25
Nominal motor speed	min^{-1}	3600 (60Hz)	4320 (72Hz)
	RPM		
Noise level (ISO 2151)	dB(A)	≤66	≤69
Ambient temperature range	°C	5 ... 40	
	°F	41 ... 104	
Max. allowable counter pressure at the discharge	hPa (mbar) rel.	200	
	TORR	150	
Max. allowable gas inlet temperature according to the inlet pressure	°C	≤50 hPa (mbar) abs. ► 200	
		>50 hPa (mbar) abs. ► 70	
	°F	≤37.5 TORR ► 392	
		>37.5 TORR ► 158	
Relative humidity	at 30 °C at 86 °F	90%	
Cooling water requirements		See *Cooling Water Connection* [➔ 14]	
Oil capacity - motor side	L	1	
	qts.	1.05	
Oil capacity - suction side	L	1	
	qts.	1.05	
Weight approx.	Kg	900	
	Lbs.	1765	

* Performance could be reduced by using 2 x G2 inlet flange or inlet filter.

14 Oil

Oil for the version of the machine for Oxygen service (Oxygen > 21% vol.)

	YLC 250 B
Part number 0.5 L packaging (~1 kg)	0831 131 400
Part number 1.0 L packaging (~2 kg)	0831 108 878
Part number 5.0 L packaging (~10 kg)	0831 108 879

Oil for standard service (Oxygen ≤ 21% vol.)

	VSL 100
ISO-VG	100
Part number 1 L packaging	0831 122 573
Part number 5 L packaging	0831 122 572

15 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

Ateliers Busch S.A.
Zone Industrielle
CH-2906 Chevenez

declares that the machine: COBRA NF 0750 A, COBRA NF 0950 A

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 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 authorized representative in the EU
(if the manufacturer is not located in the EU):

Busch Dienste GmbH
Schauinslandstr. 1
DE-79689 Maulburg

Chevenez, 25.01.2022

Christian Hoffmann, General Director

16 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

Ateliers Busch S.A.
Zone Industrielle
CH-2906 Chevenez

declares that the machine: COBRA NF 0750 A, COBRA NF 0950 A

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):

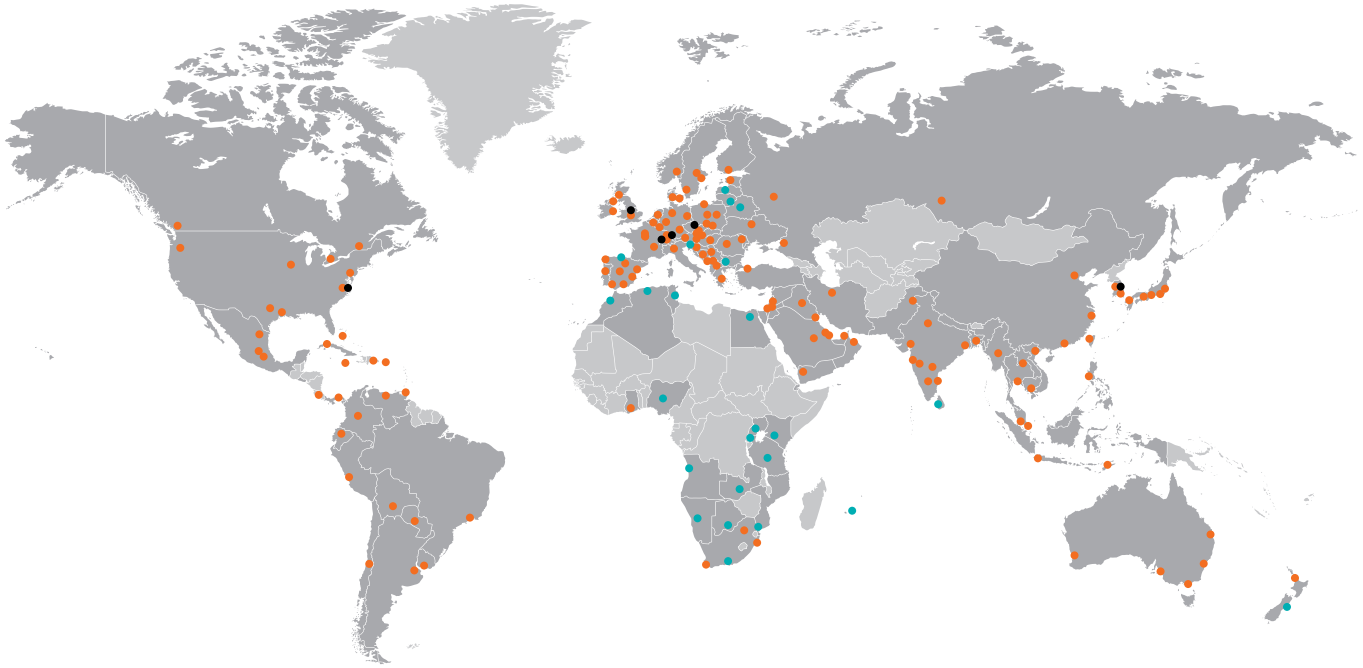
Busch (UK) Ltd
30 Hortonwood
Telford - UK

Chevenez, 25.01.2022

Christian Hoffmann, General Director

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

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