VACUUM SOLUTIONS

Part of the BUSCH GROUP

COBRA

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

Instruction Manual

SERVICE
AND SPARE PARTS, INSTRUCTION MANUALS ...
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VACUUM APP

CE UK CA

0870232965 | A0_en-US | Original instructions

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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, contact your manufacturer representative.

Read this instruction 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 in accordance with the 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.

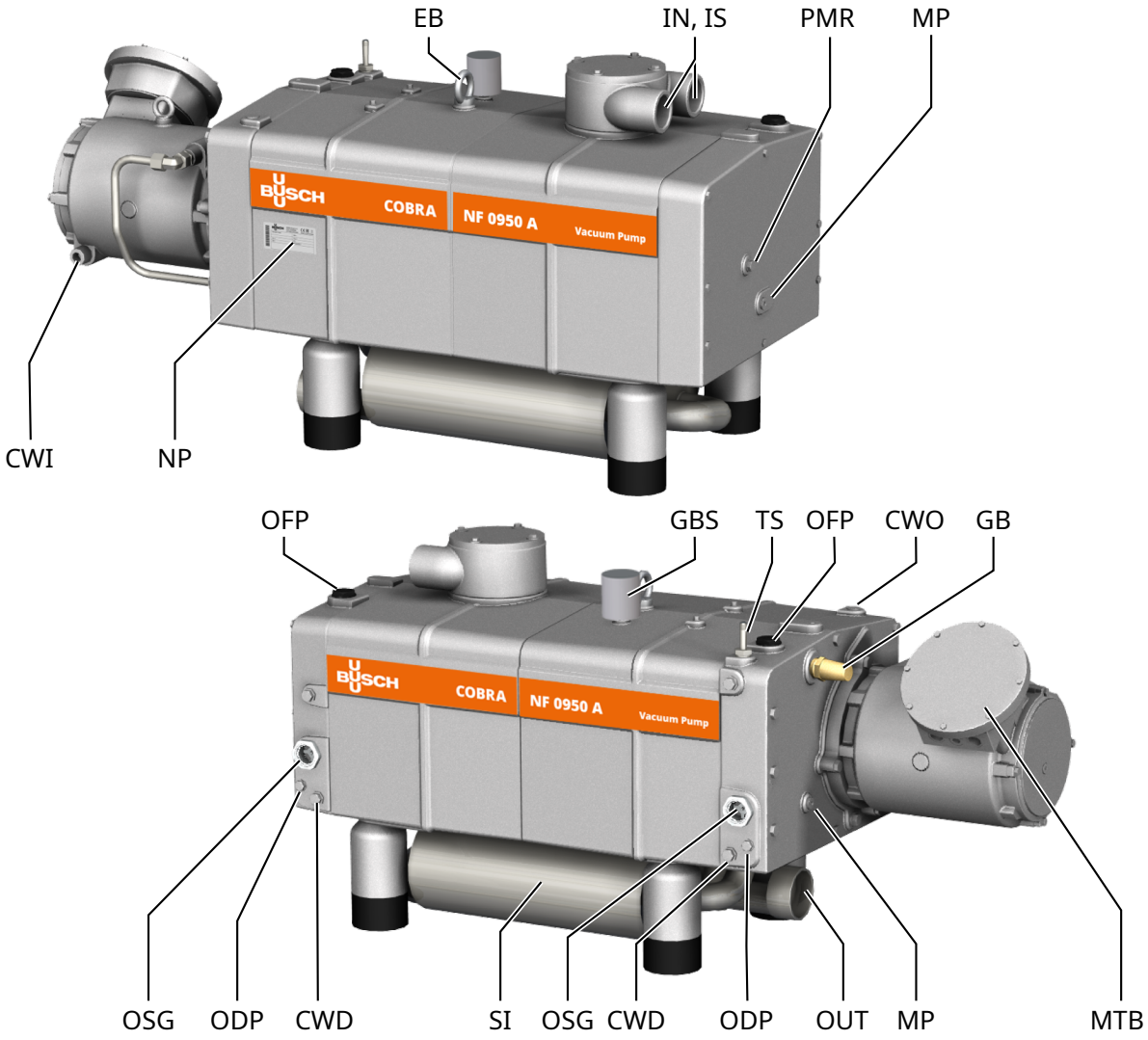
NOTE

... 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	Inlet connection	OUT	Exhaust connection
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	Name plate
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.

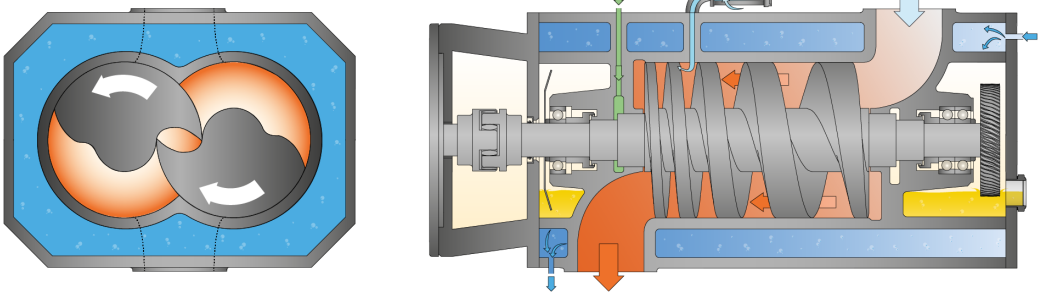
In this instruction manual, we consider that the term 'machine' refers to the 'vacuum pump'.

NOTE

Illustrations.

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

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 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 the suction of air and other dry, non-aggressive, non-toxic, non-ignitable 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 the manufacturer.

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

The machine is capable of maintaining ultimate pressure, see *Technical Data* [➔ 41].

The machine is suitable for continuous operation.

Permitted environmental conditions, see *Technical Data* [➔ 41].

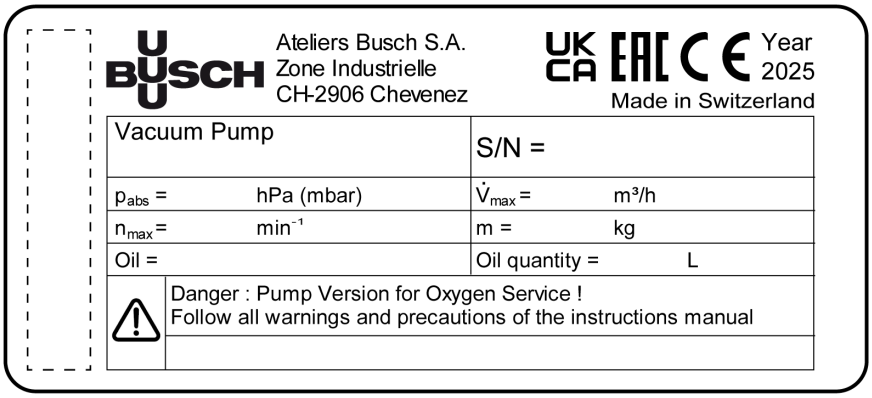
WARNING

A specific Oxygen version (see name plate) 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 to avoid unacceptable oxygen levels, see *Installation Conditions* [➔ 12].
- Use only a type of oil approved and recommended by Busch for oxygen applications, see *Filling Oil* [➔ 17] and Oil.
- Follow the additional commissioning instructions, see *Commissioning* [➔ 24].
- Follow the additional maintenance instructions, see *Maintenance* [➔ 28] and *Oil Change* [➔ 33].
- Use only Busch genuine spare parts, see *Spare Parts* [➔ 38].

Name plate 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 life-time!

- Check if the process gases are compatible with those following materials:
  - Cast iron
  - Steel
  - Stainless Steel
  - Aluminum
  - Fluor elastomer (FKM/FPM)
- Contact your Busch representative for further advice and information.

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 delivery.

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* [➔ 23]).

2.4.3 Sealing Systems

The machine is equipped with labyrinth seals on the motor side and inlet 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 gases with an oxygen volume greater 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* [➔ 41].

2.5.2 Silencer

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

2.5.3 Barrier Gas System

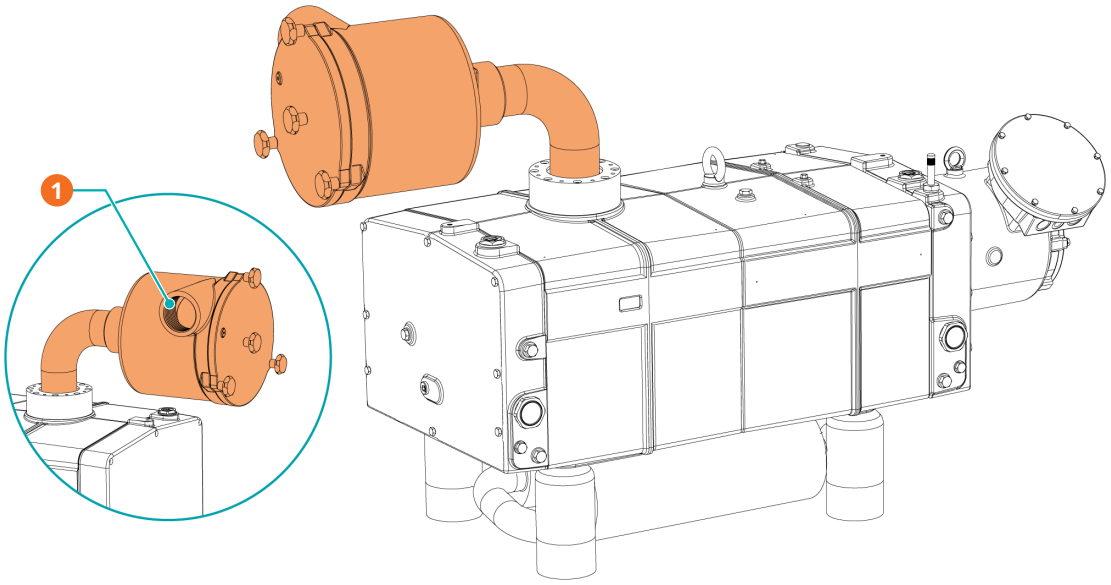
WARNING

The barrier gas system is mandatory for the suction of process gases with an oxygen volume greater 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 and Handling

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.

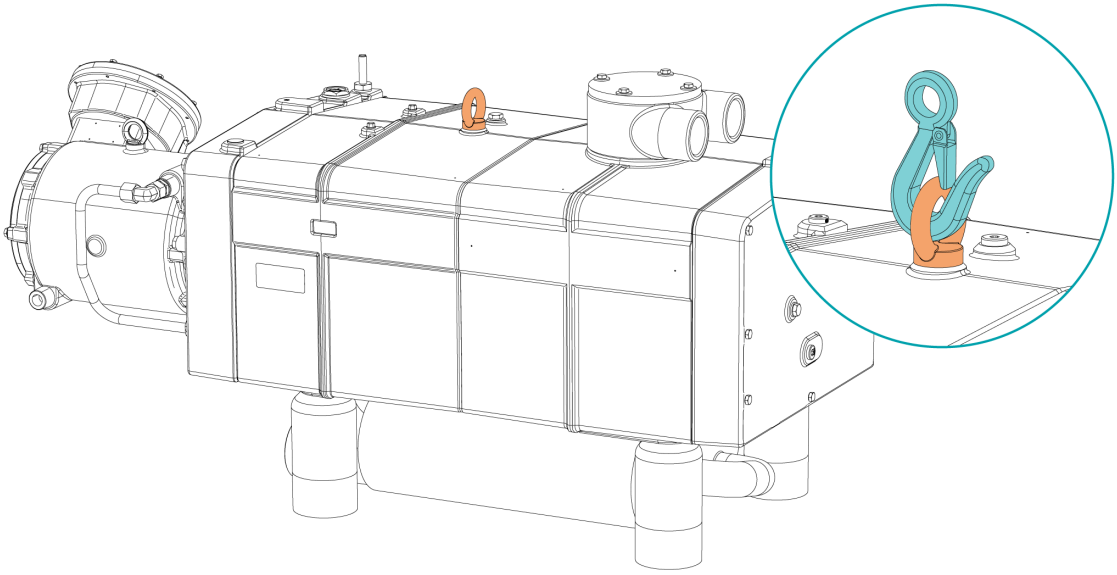
NOTICE

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* [➔ 41] or the name plate (NP).
- Make sure that the eye bolt(s) (EB) is/are in faultless condition, fully screwed in and tightened by hand.



- Check that the machine has not been damaged during transport.

If the machine is mounted and secured on a transport support (pallet):

- Remove the machine from the transport support before installation.

4 Storage

NOTICE

Long storage time.

Risk of damage to the machine!

- Seal hermetically all apertures with the caps provided with the machine, or with adhesive tape if the caps are no longer available.
- Store the machine indoors, in a dry place, away from dust and vibrations and if possible, in original packaging, preferably at temperatures between 5 ... 55 °C.

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

- Seal hermetically all apertures with the caps provided with the machine, or with adhesive tape if the caps are no longer available.
- Wrap the machine in a corrosion inhibitor film.
- Store the machine indoors, in a dry place, away from dust and vibrations and if possible, in original packaging, preferably at temperatures between 5 ... 55 °C.

5 Installation

WARNING

Lack of knowledge about oxygen regulation.

Risk of fire!

- Installation, commissioning and maintenance must only be carried out by qualified personnel who have been informed of the applicable safety regulations and trained in the handling of oxygen
- Accident prevention rules and methods must be observed. For more 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 completely gas-tight!

Risk of fire!

- The installation area must be ventilated to avoid unacceptable oxygen levels.

NOTICE

Use of the machine outside of the permitted installation conditions.

Risk of premature failure!

Loss of efficiency!

- Make sure that the installation conditions are fully respected.

- Make sure that the environment of the machine is not potentially explosive.
- Make sure that the ambient conditions comply with the *Technical Data* [➔ 41].
- 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* [➔ 30].
- 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 connecting lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible lines at the inlet and exhaust connections.
- Make sure that the diameter of the connecting lines over the entire length is at least as large as the connections of the machine.

In case of long connecting lines:

- Use larger diameters to avoid a loss of efficiency.
- Contact your manufacturer representative for more information.

5.2.1 Inlet Connection

WARNING

Unprotected inlet connection.

Risk of severe injury!

- Do not put hand or fingers in the inlet 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) at the inlet of 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

If the machine is used as part of a vacuum system:

- Busch recommends the installation and use of an isolation valve to prevent the machine from running backwards.
- Busch also recommends not opening the isolation valve until at least the minimum machine speed has been reached.

- Make sure that the connecting lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible lines at the inlet and exhaust connections.

5.2.2 Exhaust Connection

NOTICE

Exhaust gas flow obstructed.

Risk of damage to the machine !

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

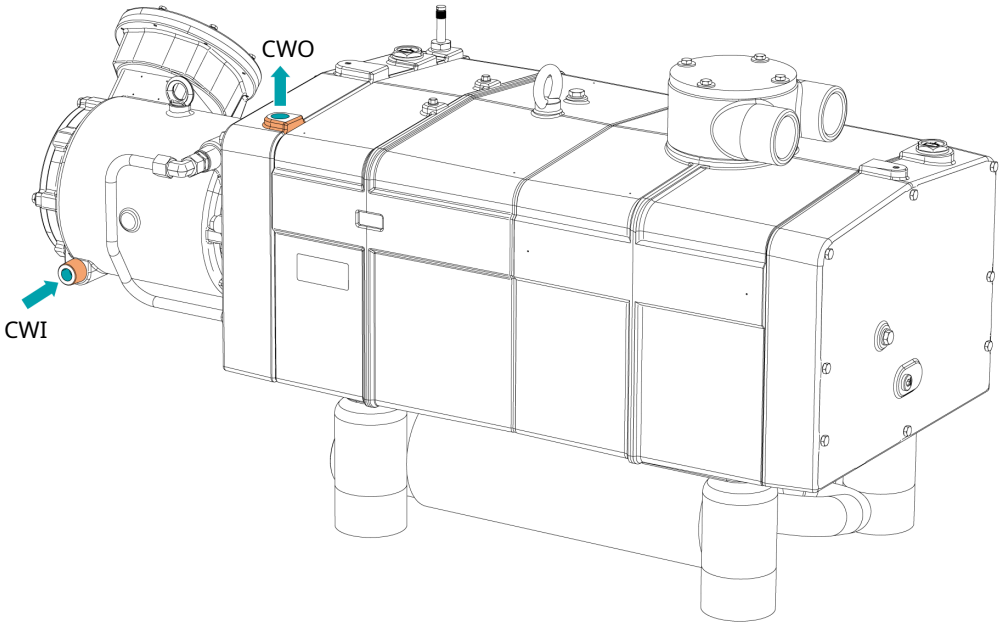
Connection size(s):

At the silencer (SI) exhaust connection

- G3”, horizontal

- Make sure that the connecting lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible lines at the inlet and exhaust connections.
- Make sure that the counter pressure (also called “back pressure”) at the exhaust connection (OUT) does not exceed the maximum allowable exhaust pressure, see *Technical Data* [➔ 41].

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(s):

- G ½”, 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 (g)	1 ... 6
Supply temperature	°C	+5 ... +30
Required pressure differential across supply and return	bar (g)	≥ 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

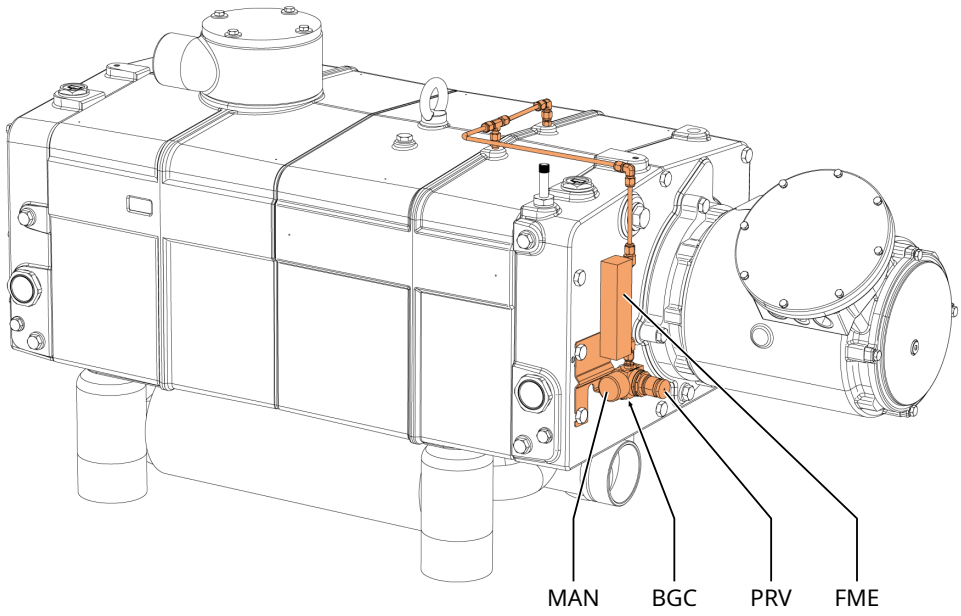
Water hardness unit conversion.

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 gases with an oxygen volume greater 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 (g)	13
Recommended pressure setting at the pressure regulating valve (PRV)	bar (g)	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 inappropriate oil.

Risk of fire!

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

NOTICE

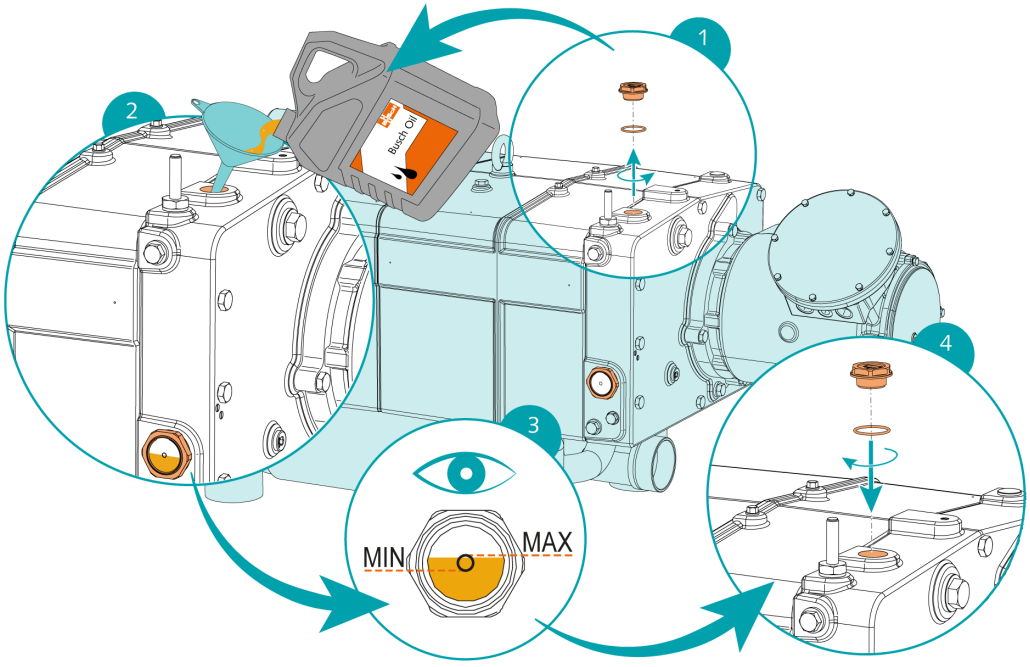
Use of inappropriate oil.

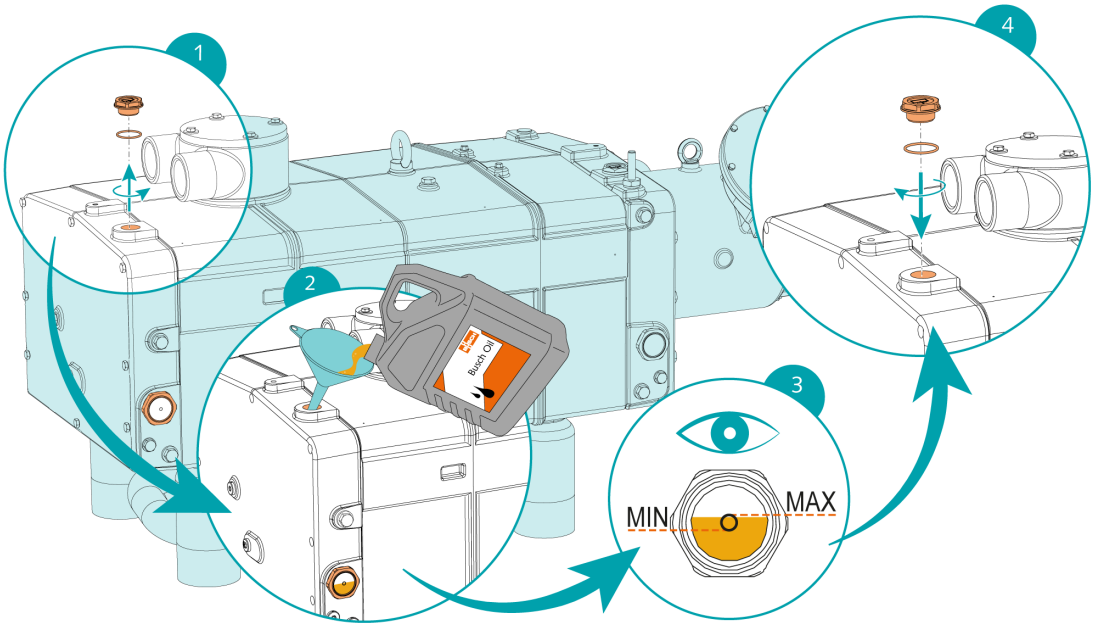
Risk of premature failure!

Loss of efficiency!

- Use only a type of oil previously approved and recommended by the manufacturer.

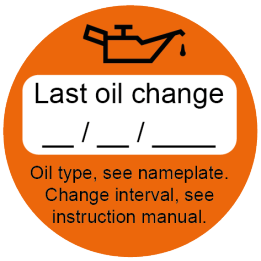
- For information on oil type and filling capacities, see the *Technical Data* [➔ 41] and Oil chapters.





When oil filling is complete:

- Note the date of the oil change on the sticker.



If there is no sticker on the machine:

- Order it from your Busch representative (article number 0565 568 959).

6 Electrical Connection

DANGER

Live wires.

Risk of electrical shock!

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

INSTALLATION(S) CURRENT PROTECTION:

DANGER

Missing current protection.

Risk of electrical shock!

- Provide current protection in accordance with EN 60204-1 on your 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, contact your Busch representative for more information.
- 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 name plate 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

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 name plate of the machine (NP).
- Make sure to comply with it.
- For more information, consult the chapter *Technical Data* [➔ 41].

NOTICE

Incorrect connection.

Risk of damage to the motor!

- The wiring diagrams below are examples only. See inside the terminal box for motor connection instructions and diagrams.

6.2 Wiring Diagram Three-Phase Motor (Pump Drive)

- Make sure that you select the correct speed drive according to the motor specifications.
- Connect the motor to your external variable speed drive according to the manufacturer's operating instructions.
- Connect the motor cables as shown in the following wiring diagram.

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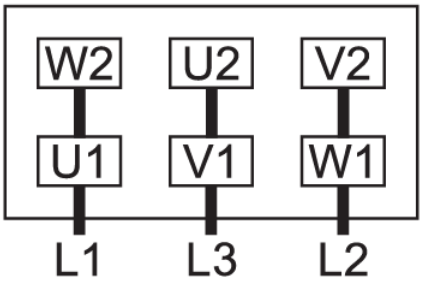
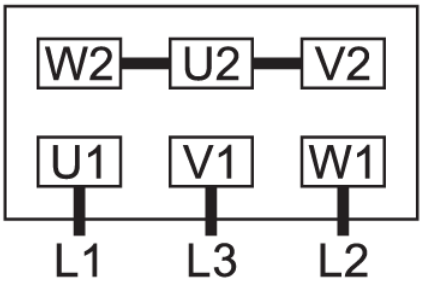
Delta connection (low voltage):

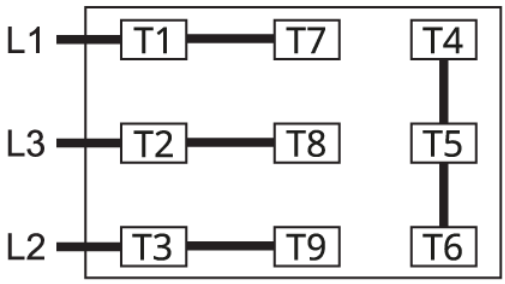


Star connection (high voltage):

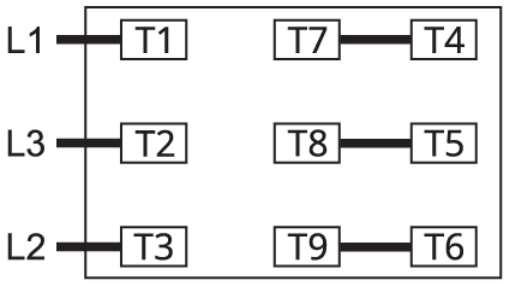


NF 0750 A

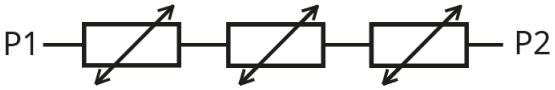
Double star connection (low voltage):



Star connection (high voltage):



Connection of motor thermistors 3xPTC (recommended):



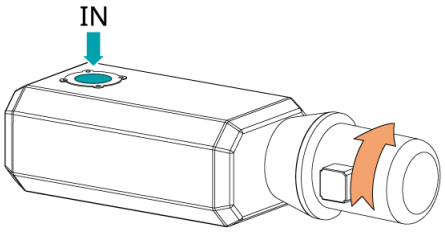
NOTICE

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

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

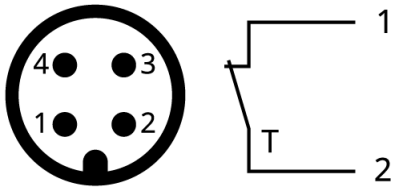
6.3.1 Wiring Diagram Temperature Switch

Article number: 0651 563 762

Connector: M12x1, 4-pin

Electrical data: 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 knowledge about oxygen regulation.

Risk of fire!

- Installation, commissioning and maintenance must only be carried out by qualified personnel who have been informed of the applicable safety regulations and trained in the handling of oxygen
- Accident prevention rules and methods must be observed. For more 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

In operation, the surface of the machine may reach temperatures over 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.

NOTICE

The machine is normally shipped without oil.

Operation without oil will ruin the machine in short time!

- Before commissioning, the machine must be filled with oil, see *Filling Oil* [➔ 17].

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 are met.
- Open the water supply.

If the machine is equipped with a barrier gas system:

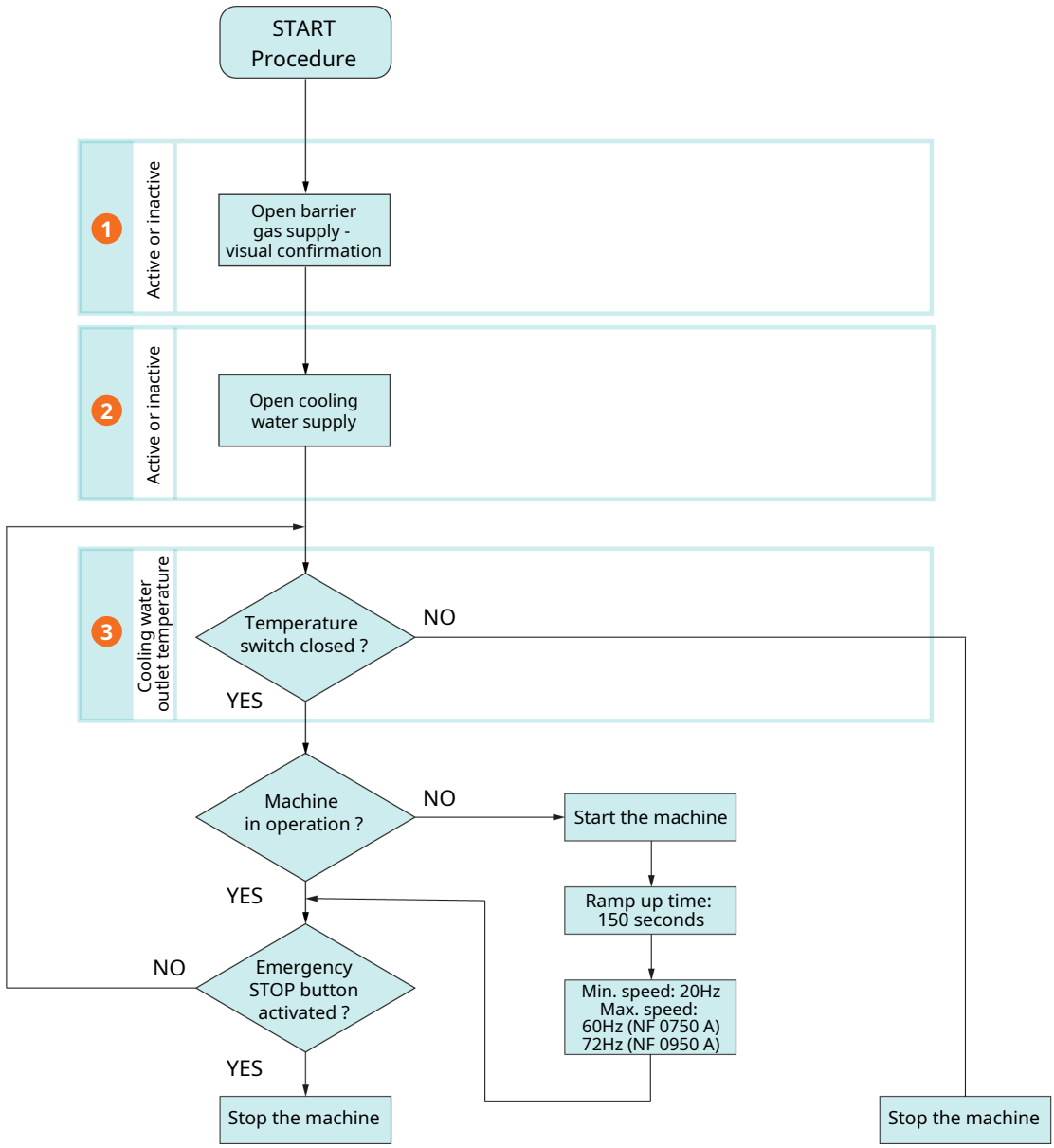
- Open the barrier gas supply.
- Adjust the barrier gas pressure.

- Start the machine (see *Start Procedure* [➔ 26] and *Shutdown Procedure* [➔ 27]).
- Make sure that the operating conditions comply with the *Technical Data* [➔ 41].
- After a few minutes of operation, perform an *Oil Level Inspection* [➔ 30].

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

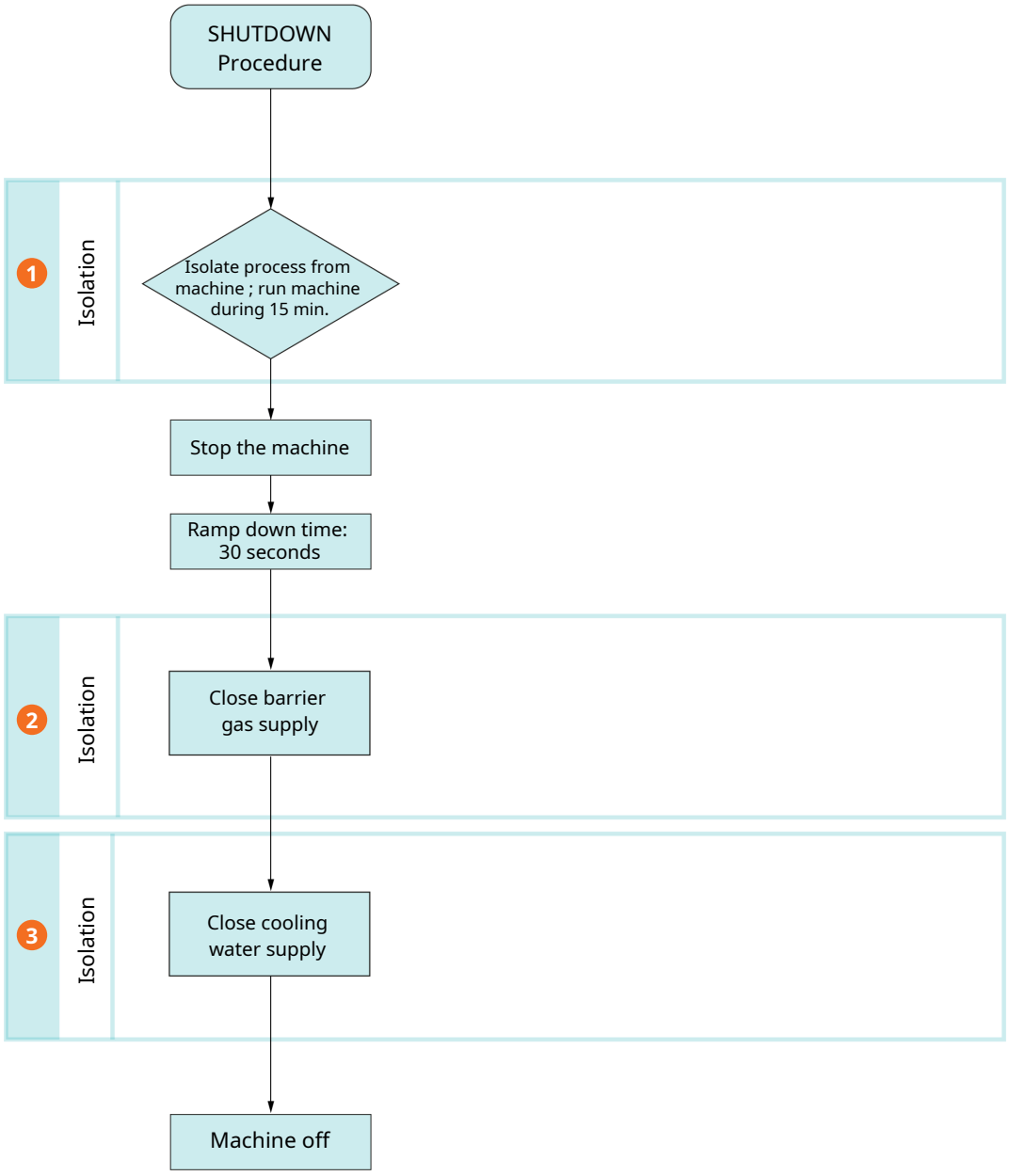
- Measure the motor current and record it as reference for future maintenance and trouble-shooting work.

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	Machine 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.

WARNING

Lack of knowledge about oxygen regulation.

Risk of fire!

- Installation, commissioning and maintenance must only be carried out by qualified personnel who have been informed of the applicable safety regulations and trained in the handling of oxygen
- Accident prevention rules and methods must be observed. For more 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).

WARNING

The machine is contaminated with organic matter.

Risk of fire!

If it is suspected that the machine and/or oil are contaminated with organic matter:

- The machine must be taken out of service and cleaned by specialists (contact your Busch representative).

WARNING

Use of non-Busch genuine spare parts.

Risk of fire!

- Only use genuine spare parts approved by Busch and suitable for oxygen application.

WARNING

The machine is 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!

- Before doing anything that requires touching the machine, let it cool down first.

CAUTION

Hot liquids.

Risk of burns!

- Before draining liquids, 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.

- Stop the machine and lock it to prevent accidental start-up.
- Close 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 through cooling water drain plugs (CWD).
- Disconnect all connections.

8.1 Maintenance Schedule

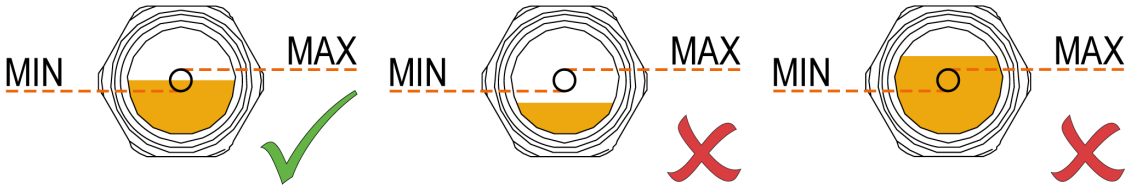
The maintenance intervals depend very much on the individual operating conditions. The intervals given below are considered as starting values which should be individually shortened or extended as appropriate.

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* [➔ 30]. • 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* [➔ 31].
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)* [➔ 33]. • 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* [➔ 33]. • 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

- Stop the machine.
- Wait 1 minute.
- Check the oil level.

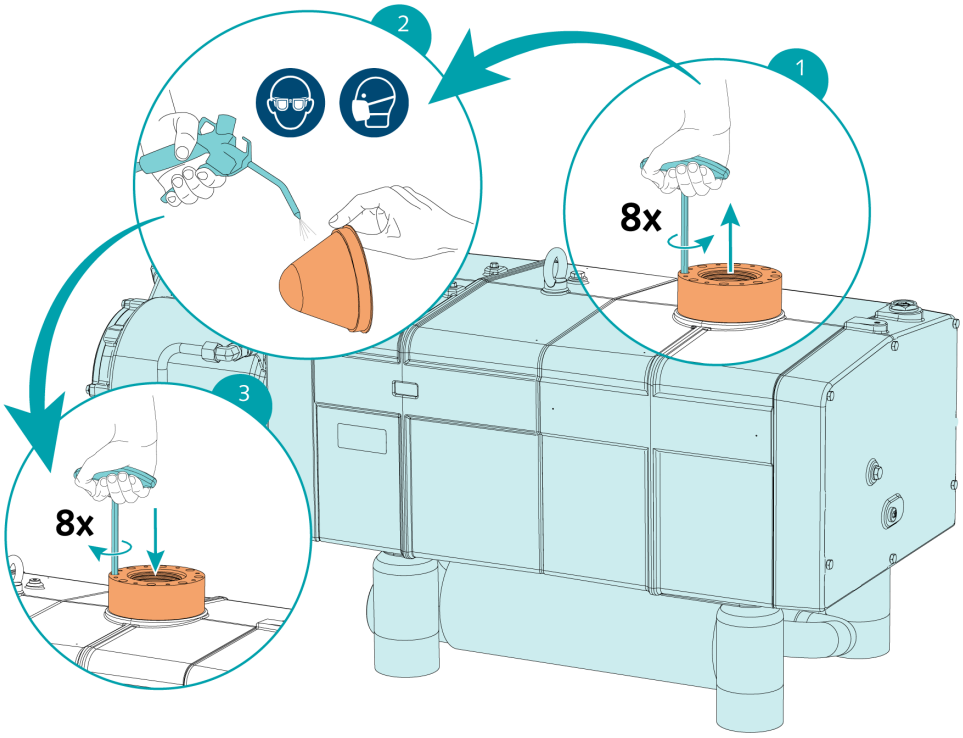


- Fill up if necessary, see *Filling Oil* [➔ 17].

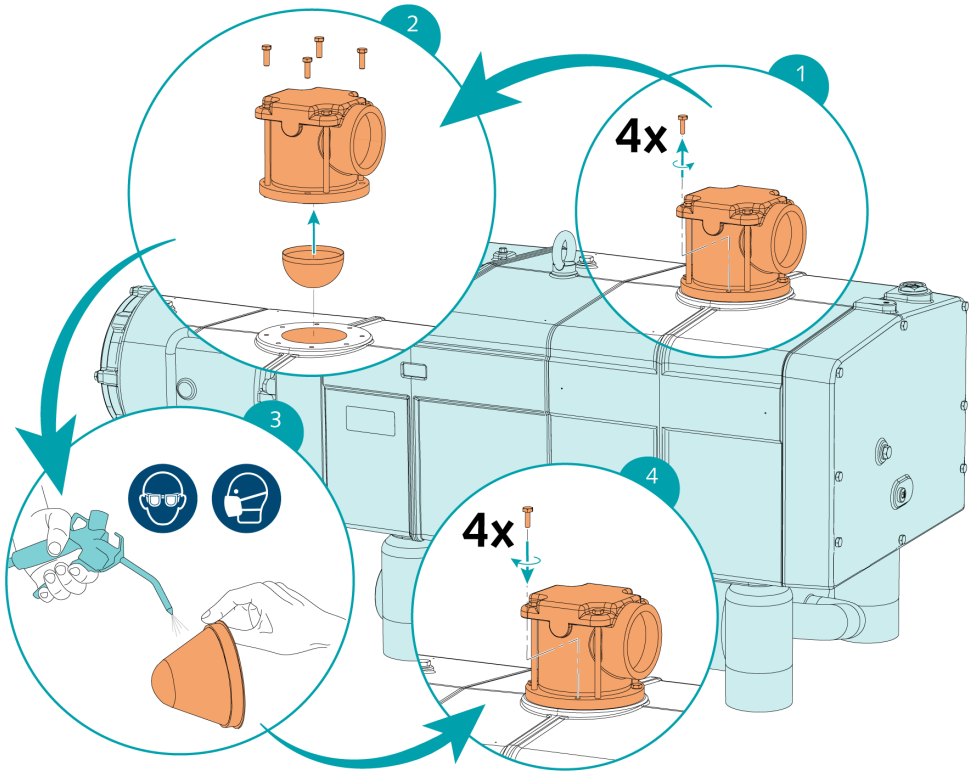
8.3 Cleaning the Inlet Screen

- Use compressed air and wear protective eyewear and mask.

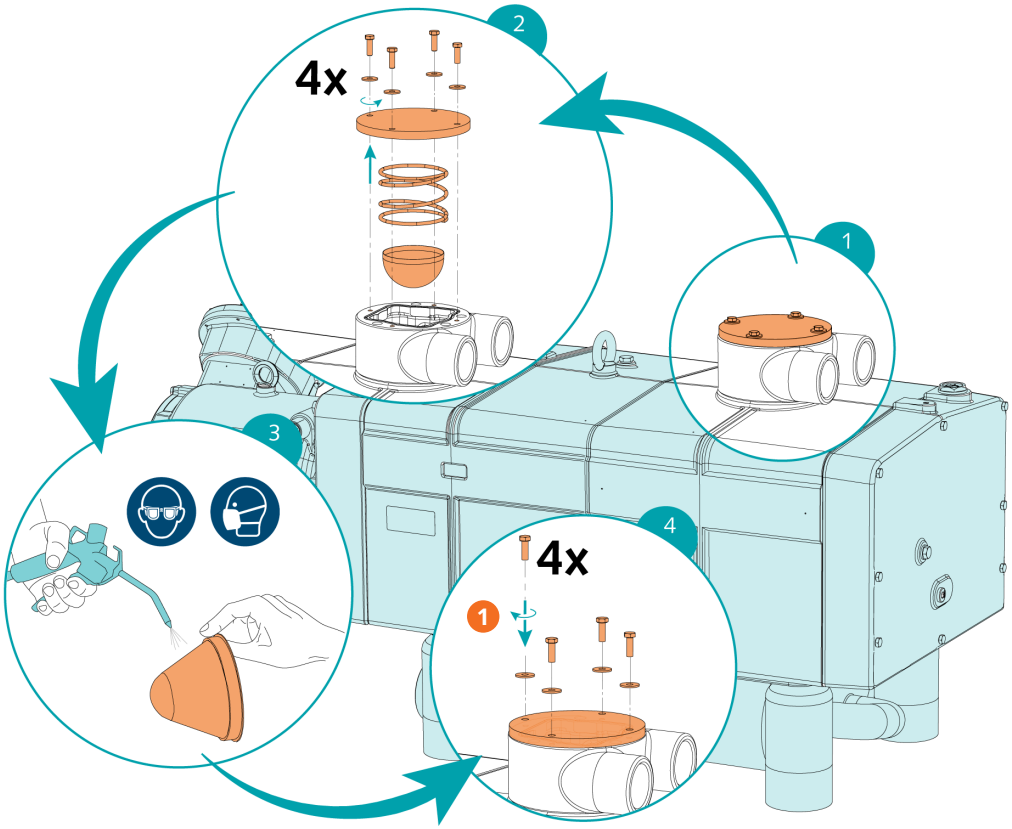
With Vertical Inlet Flange G3” or DN100



With Horizontal Inlet Flange G3”

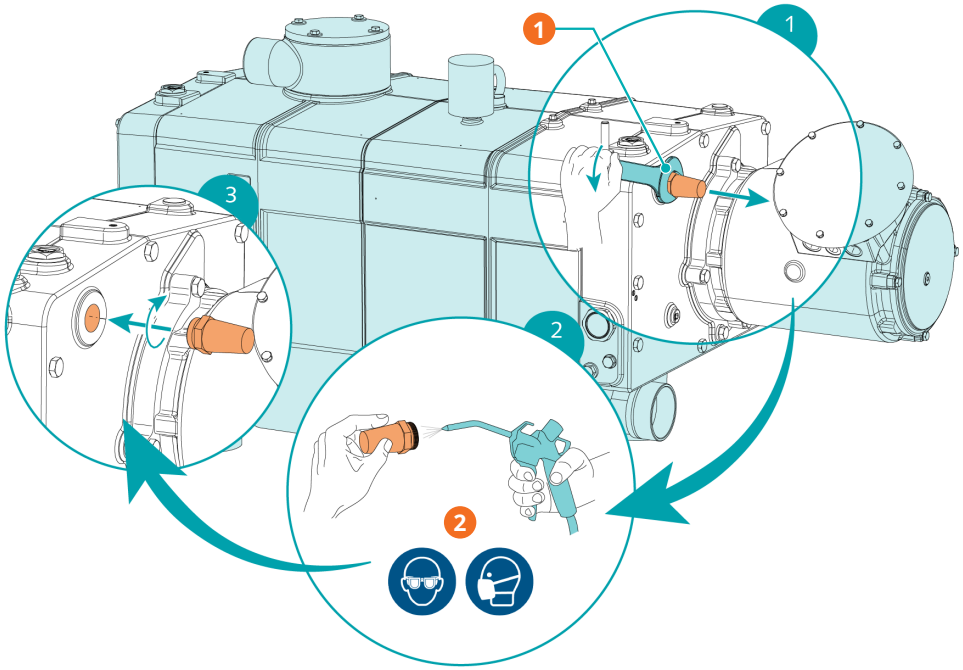


With Double Inlet Flange G2”



Description			
1	Tightening torque: 12 Nm		

8.4 Cleaning the Gas-Ballast Filter (Optional)



Description			
1	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 inappropriate oil.

Risk of fire!

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

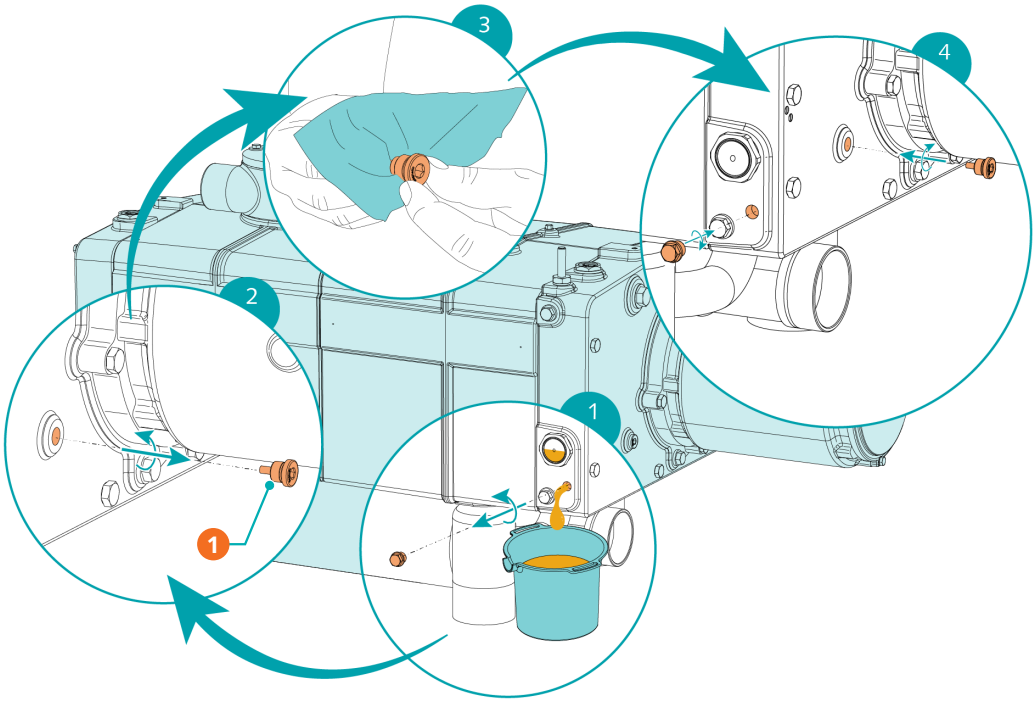
NOTICE

Use of inappropriate oil.

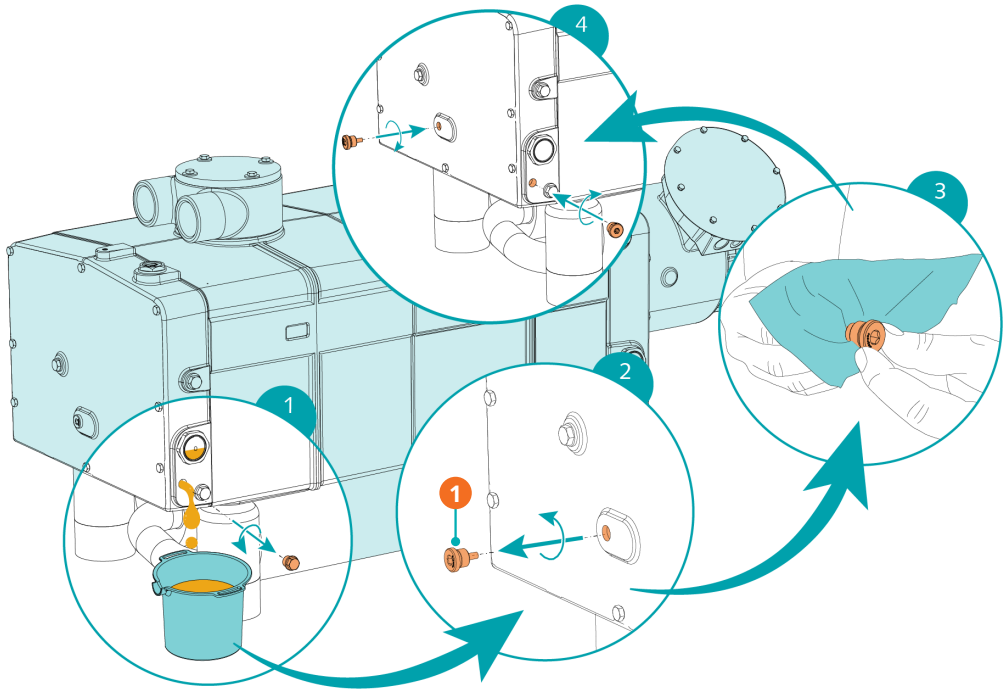
Risk of premature failure!

Loss of efficiency!

- Use only a type of oil previously approved and recommended by the manufacturer.

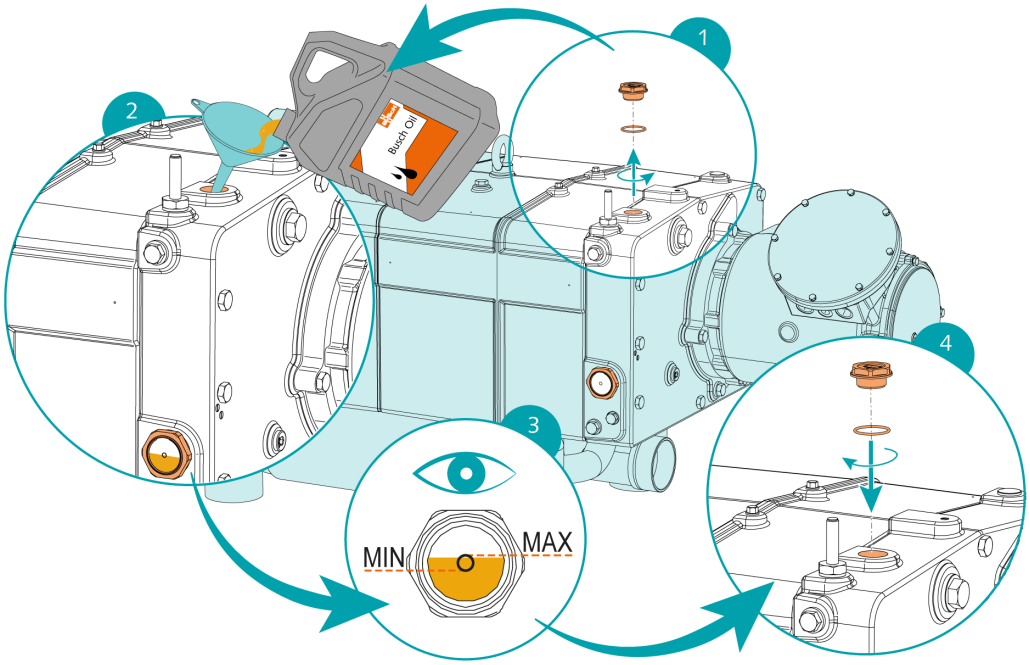


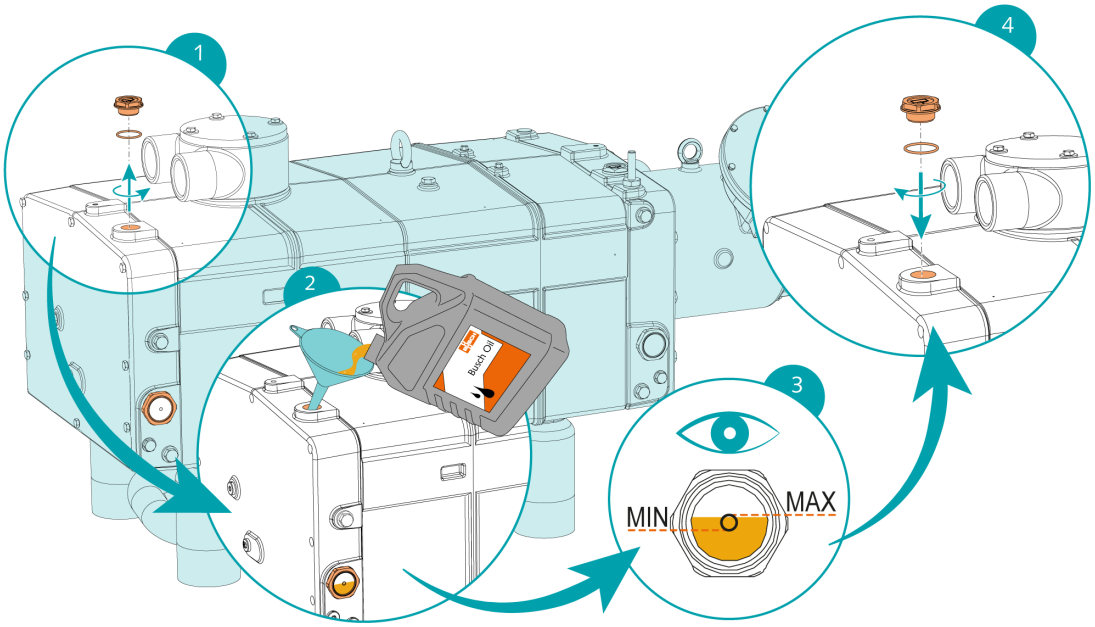
Description			
1	Magnetic plug		



Description			
1	Magnetic plug		

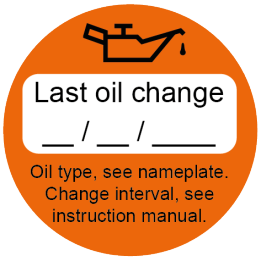
- For information on oil type and filling capacities, see the *Technical Data* [➔ 41] and Oil chapters.





When oil filling is complete:

- Note the date of the oil change on the sticker.



If there is no sticker on the machine:

- Order it from your Busch representative (article number 0565 568 959).

9 Overhaul

WARNING

The machine is contaminated with hazardous material.

Risk of poisoning!

Risk of infection!

If the machine is contaminated with hazardous material:

- Wear appropriate personal protective equipment.

NOTICE

Incorrect assembly.

Risk of premature failure!

Loss of efficiency!

- Any disassembly of the machine beyond that described in this manual must be carried out by technicians approved by Busch.

If the machine has conveyed gas contaminated with foreign materials which are hazardous to health:

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

The manufacturer will only accept machine accompanied by a signed, fully completed and legally binding "declaration of contamination", downloadable from the following link: *buschvacuum.com/declaration-of-contamination*.

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!

- Before doing anything that requires touching the machine, let it cool down first.

CAUTION

Hot liquids.

Risk of burns!

- Before draining liquids, let the machine cool down first.

- Stop the machine and lock it to prevent accidental start-up.
- Disconnect the power supply.
- Close 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 cooling water through cooling water drain plugs (CWD).
- Disconnect all connections.

If the machine is 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!

- Only use genuine spare parts approved by Busch and suitable for oxygen application.

NOTICE

Use of non-Busch genuine spare parts.

Risk of premature failure!

Loss of efficiency!

- Use only Busch genuine spare parts, consumables and supplies to ensure correct operation of the machine and to validate the warranty.

Spare part	Description	Article number
Inlet screen (IS)	Inlet screen	0534 565 893
Inlet filter cartridge	Paper	0532 000 006
Inlet filter cartridge	Polyester	0532 121 865
Transparent cover	Inlet flange cover	0710 222 659

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

For Busch genuine spare parts:

- Contact your Busch representative.

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!

- Before doing anything that requires touching the machine, let it cool down first.

CAUTION

Hot liquids.

Risk of burns!

- Before draining liquids, 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 inlet connection (IN).
	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.

Problem	Possible Cause	Remedy
The machine does not reach the usual pressure at the inlet connection.	Suction or exhaust 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* [➔ 31].
	The machine runs in the wrong direction.	• Check the direction of rotation, see *Wiring Diagram Three-Phase Motor (Pump Drive)* [➔ 21].
	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.
	Defective gears, bearings or coupling element.	• Repair machine (contact Busch).
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* [➔ 41].
	Temperature of the process gases at the inlet too high.	• Observe the permitted gas inlet temperature, see *Technical Data* [➔ 41].
	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* [➔ 33].
	The machine runs too hot.	• See problem "The machine runs too hot".

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

13 Technical Data

		NF 0750 A	NF 0950 A
Pumping speed *	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 (60 Hz)	4320 (72 Hz)
	rpm		
Sound pressure level (ISO 2151) KpA = 3 dB	dB(A)	≤ 66	≤ 69
Ambient temperature	°C	5 ... 40	
	°F	41 ... 104	
Maximum allowable counter pressure at exhaust connection	hPa (mbar) rel.	200	
	Torr	150	
Maximum 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	90 %	
	at 86°F		
Cooling water requirements		See *Cooling Water Connection* [➔ 14]	
Oil capacity - Inlet side	l	1.0	
	qts.	1.05	
Oil capacity - Motor side	l	1.0	
	qts.	1.05	
Weight approx.	kg	900	
	lbs.	1984	

* With inlet G3" or ISO DN100. Performance could be reduced by using a 2 x G2" inlet flange or an inlet filter.

14 Oil

Use with an oxygen volume less than or equal to 21%

Name	ISO-VG	Oil type	1 L packing	5 L packing	10 L packing	20 L packing
VSL 100	100	Synthetic	0831 122 573	0831 122 572	-	-

Use with an oxygen volume greater than 21%

Name	ISO-VG	Oil type	0.1 L packing	0.5 L packing	1 L packing	5 L packing
YLC 250 B	250	Synthetic	-	0831 131 400	0831 108 878	0831 108 879

15 EU Declaration of Conformity

This Declaration of Conformity and the CE-markings affixed to the name plate 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: vacuum pump COBRA NF 0750 A; COBRA NF 0950 A

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

- 'Machinery Directive' 2006/42/EC, if the serial number is less than or equal to CHM126999999
- 'Machinery Regulation' (EU) 2023/1230, if the serial number is greater than or equal to CHM127000000
- '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:

Standard	Title of the Standard
EN ISO 12100 : 2010	Safety of machinery - Basic concepts, general principles of design
EN 1012-2 : 1996 + A1 : 2009	Vacuum pumps - Safety requirements - Part 2
EN 60204-1 : 2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN ISO 2151 : 2008	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
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, 2025.12.01

Christian Hoffmann, General Manager

Ateliers Busch S.A.

16 UK Declaration of Conformity

This Declaration of Conformity and the UKCA-markings affixed to the name plate 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: vacuum pump 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 2012

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

Standard	Title of the Standard
EN ISO 12100 : 2010	Safety of machinery - Basic concepts, general principles of design
EN 1012-2 : 1996 + A1 : 2009	Vacuum pumps - Safety requirements - Part 2
EN 60204-1 : 2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN ISO 2151 : 2008	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
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, 2025.12.01

Christian Hoffmann, General Manager

Ateliers Busch S.A.

BUSCH GROUP

The Busch Group is one of the world's largest manufacturers of vacuum pumps, vacuum systems, blowers, compressors and gas abatement systems. Under its umbrella, the group houses two well-known brands: Busch Vacuum Solutions and Pfeiffer Vacuum+Fab Solutions. Together, they offer solutions to a wide range of industries. A global network of highly competent local teams in 44 countries ensures that expert, tailor-made support is always available near you. Wherever you are. Whatever your business.

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