



VACUUM SOLUTIONS

Part of the **BUSCH** GROUP

PUMA

Vacuum Boosters
WY 3600 A

Instruction Manual

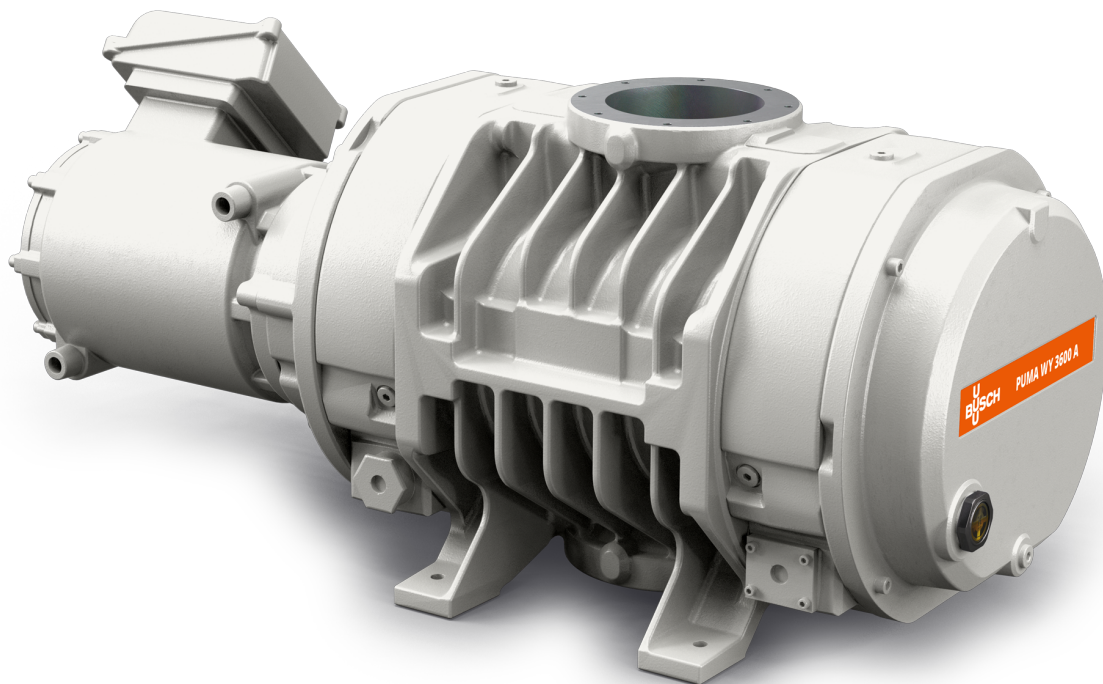


Table of Contents

1	Safety	3
2	Product Description	4
2.1	Operating Principle	5
2.2	Intended Use	5
2.3	Standard Features.....	6
2.3.1	Water Cooling	6
2.3.2	Temperature Switch	6
3	Transport and Handling	7
4	Storage.....	9
5	Installation.....	10
5.1	Installation Conditions	10
5.2	Connecting Lines / Pipes	10
5.2.1	Inlet Connection	11
5.2.2	Exhaust Connection	11
5.2.3	Cooling Water Connection	12
5.3	Filling Oil.....	13
6	Electrical Connection	15
6.1	Machine delivered without Control Box or Variable Speed Drive (VSD)	15
6.2	Wiring Diagram Three-Phase Motor.....	16
6.3	Electrical Connection of the Monitoring Devices	18
6.3.1	Wiring Diagram Temperature Switch	18
7	Commissioning	19
7.1	Pump Down Cycle	20
7.2	Compression Chamber Flushing.....	20
8	Maintenance	22
8.1	Maintenance Schedule	23
8.2	Oil Level Inspection.....	23
8.3	Oil Color Inspection	24
8.4	Oil Change.....	24
9	Overhaul.....	28
10	Decommissioning	29
10.1	Dismantling and Disposal	29
11	Spare Parts	30
12	Troubleshooting	31
13	Technical Data	33
14	Maximum Permissible Differential Pressures	34
15	Oil	35
16	EU Declaration of Conformity	36
17	UK Declaration of Conformity.....	37

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* [→ 5].

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

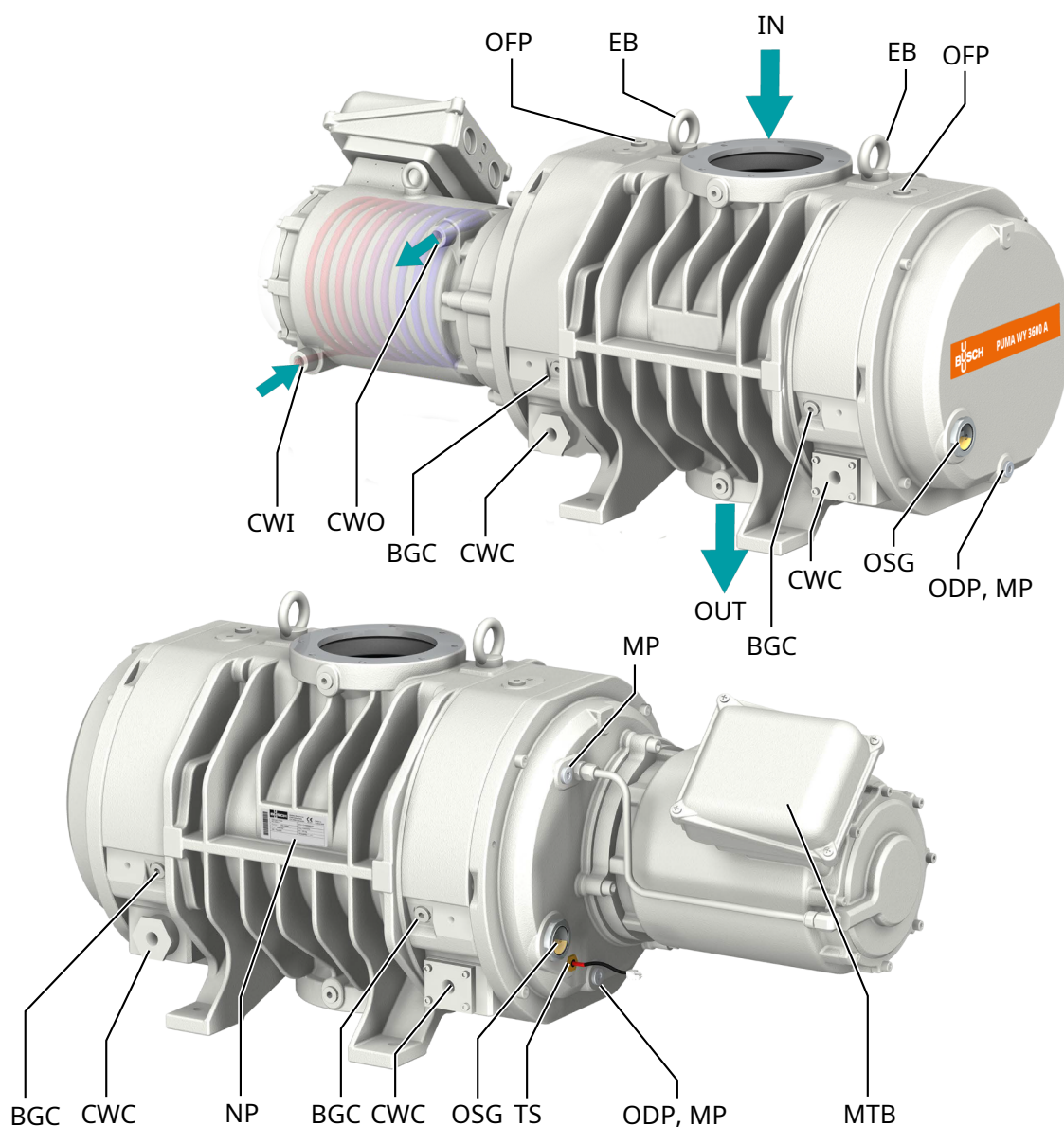
... indicates a potentially dangerous situation that could result in damage to property.



NOTE

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

2 Product Description



Description

IN	Inlet connection (Inlet)	OUT	Exhaust connection (Outlet)
BGC	Barrier gas connection	CWO	Cooling water outlet
CWI	Cooling water inlet	EB	Eyebolt
CWC	Cooling water connection	MP	Magnetic plug
NP	Name plate	MTB	Motor terminal box
OFP	Oil fill plug	ODP	Oil drain plug
OSG	Oil sight glass	TS	Temperature switch



NOTE

Technical term.

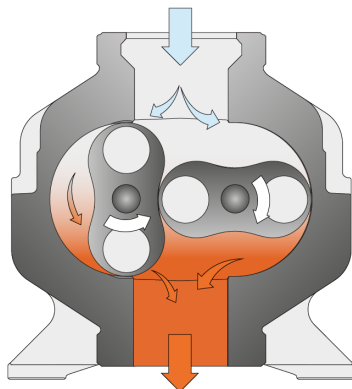
In this instruction manual, we consider that the term 'machine' refers to the 'vacuum booster'.

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 Booster blower principle.

The two oil housings (on each side) allow the lubrication of the gears and bearings.

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 used in combination with a backing pump in vacuum system.

Permitted environmental conditions, see *Technical Data* [→ 33].



NOTICE

Start the backing pump first up to the allowed inlet pressure of the vacuum booster, see *Maximum Permissible Differential Pressures* [→ 34] or call Busch representative.

Risk of damage to 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
 - Aluminum
 - Epoxy resin
 - Fluor elastomer (FKM/FPM)
 - Contact your Busch representative for further advice and information.
-

2.3 Standard Features

2.3.1 Water Cooling

The machine is driven by a water-cooled motor.

When operated with Variable Speed Drive (VSD), pump water cooling is mandatory, see *Cooling Water Connection* [→ 12].

2.3.2 Temperature Switch

The temperature switch monitors the oil temperature of the machine.

The machine must be stopped when the temperature switch trips (140 °C).

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.

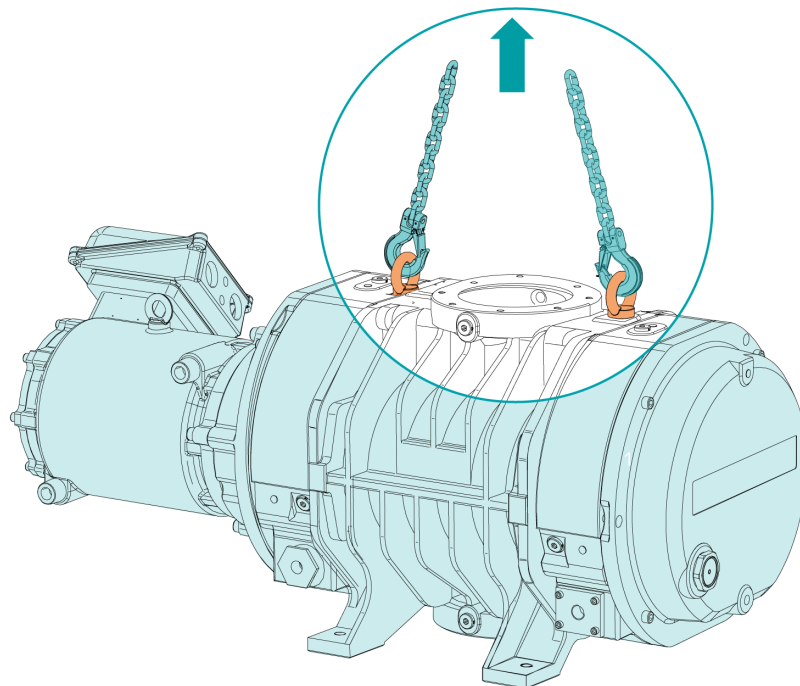


NOTICE

If the machine is already filled with oil.

Tilting a machine already filled with oil can cause a large amount of oil to ingress into the cylinder.

- Drain the oil before each transport or always transport the machine horizontally.
- To find out the weight of the machine, refer to the chapter *Technical Data* [→ 33] or the name plate (NP).



- 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

- 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 -20 ... 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 -20 ... 55 °C.
- Make sure that the cooling water has been completely removed, see *Decommissioning* [→ 29].

5 Installation

5.1 Installation Conditions



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* [→ 33].
 - Make sure to use a suitable backing pump, if necessary seek advice from your Busch representative
 - 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 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.
 - Make sure that the machine is secured either from the four feet or from the exhaust flange.
 - Check the oil level, see *Oil Level Inspection* [→ 23].
 - Make sure that all provided covers, guards, hoods, etc. are mounted.
 - Make sure that the cooling water complies with the requirements, see *Cooling Water Connection* [→ 12].

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.

Connection size(s):

- DN160, DIN 28404

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

- 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



WARNING

Unprotected exhaust connection.

Risk of severe injury!

- Do not put hand or fingers in the 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):

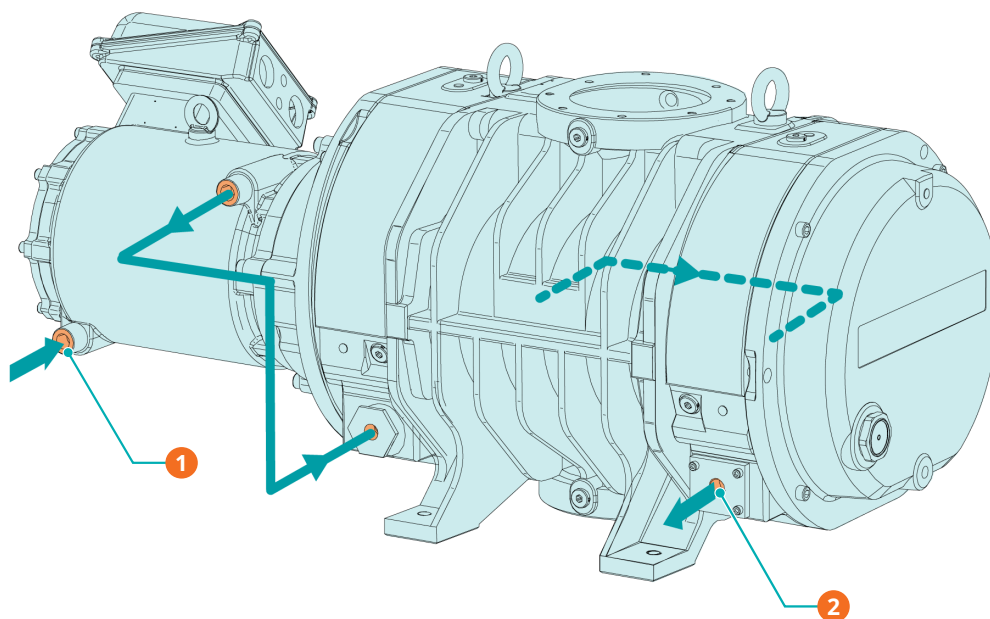
- DN160, DIN 28404

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

- 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.

5.2.3 Cooling Water Connection

Motor + Booster cooling (Mandatory for operation with Variable Speed Drive (VSD))



Description

1	CWI: Cooling water inlet	2	CWO: Cooling water outlet
---	--------------------------	---	---------------------------

The cooling connection type depends on the application. Seek advice from your Busch representative.

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

Connection size(s):

- G ½" for the cooling water inlet and outlet on the motor (CWI / CWO)
- G ½" for the cooling water connections on the covers (CWC)
- Make sure that the cooling water complies with the following requirements:

Minimum supply capacity	l/min	4
Water pressure	bar (g)	2 ... 5
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, copper 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)

5.3 Filling Oil



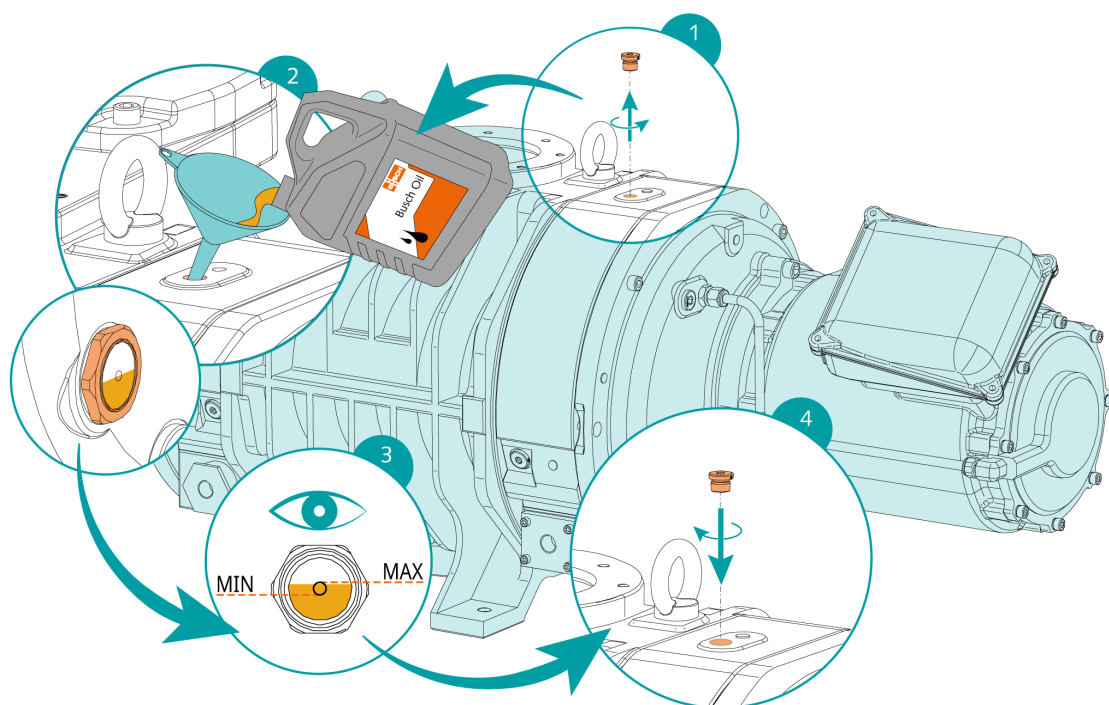
NOTICE

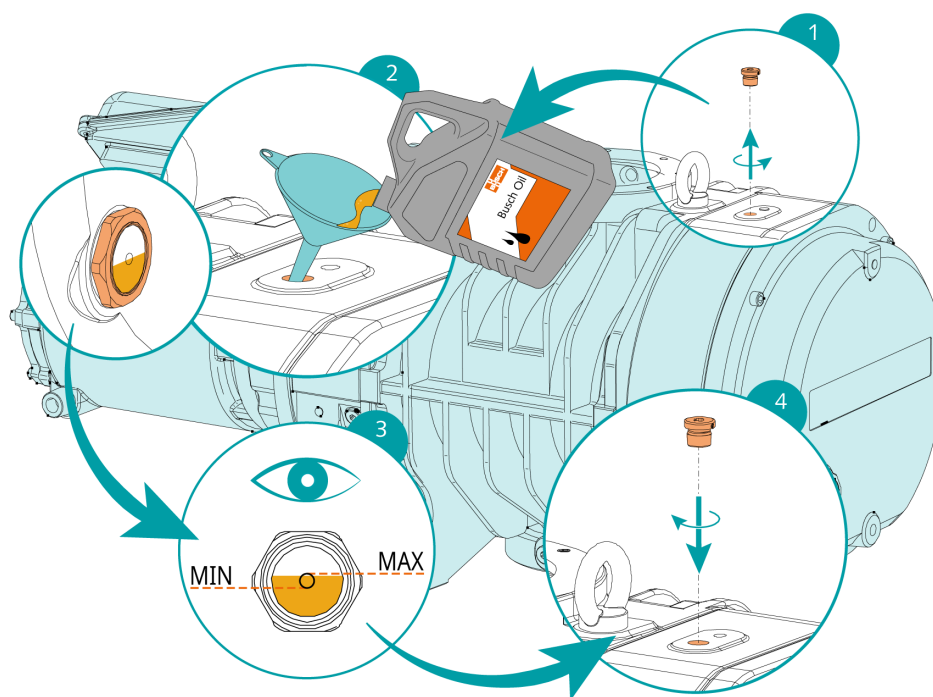
Use of inappropriate oil.

Risk of premature failure!

Loss of efficiency!

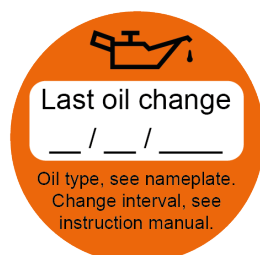
- Use only a type of oil previously approved and recommended by the manufacturer.
- For information on oil type and filling capacities, see the *Technical Data* [→ 33] and Oil chapters.





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* [→ 36] or *UK Declaration of Conformity* [→ 37]).

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.



NOTE

The operation with variable speed, i.e. with a variable speed drive or a soft starter unit, is allowed as long as the motor is capable and the permitted motor speed range is respected (see *Technical Data* [→ 33]).

Contact your Busch representative for further advice and information.

- 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.
 - Busch recommends installing a D-curve circuit breaker.
- Connect the protective earth conductor.
- Electrically connect the motor.



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* [→ 33].



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



NOTICE

The tightening torque does not comply with the recommendation.

Risk of damage the connector threads!

- When connecting up the wires into the terminal box, make sure the tightening torque of 3 Nm is applied and checked with a calibrated torque wrench.



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.

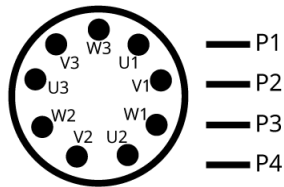
The intended rotation direction of the motor is defined by the specific instruction label stuck on the machine.

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

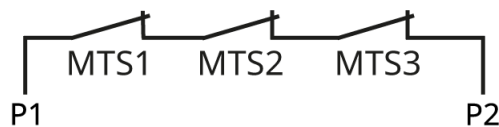
If the rotation of the motor must be changed:

- Switch any two of the motor phase wires.

Motor connectors:



Connection of motor temperature switches (recommended):

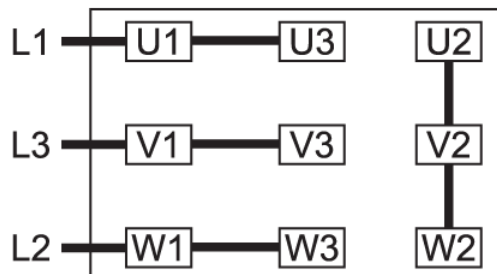


Control voltage: $\leq 250\text{ V}$

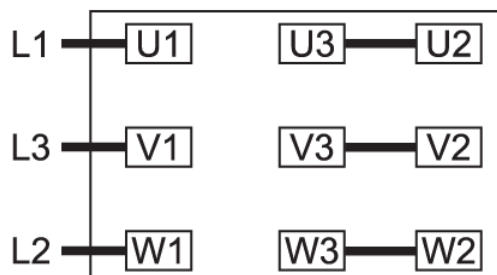
Max current: 1.6 A

MTS = Motor temperature switch (in motor coil)

Double star connection (low voltage):



Star connection (high voltage):



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

AC ($\cos\varphi=1$): $U = 250\text{ V}$; $I = 2.5\text{ A}$

AC ($\cos\varphi=0.6$): $U = 250\text{ V}$; 1.6 A

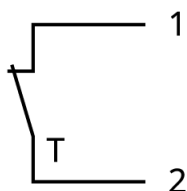
DC: $U = 24\text{ V}$; $I = 1.6\text{ A}$

DC: $U = 48\text{ V}$; $I = 1.25\text{ A}$

Connector: WAGO CAGE CLAMP®

Contact: Normally closed

Switch point (T): pin 1 + 2 = $140\text{ }^{\circ}\text{C}$



7 Commissioning



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* [→ 13].



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.



NOTICE

The machine is running at 90 Hz when starting a pump down cycle.

Risk of damage to the machine!

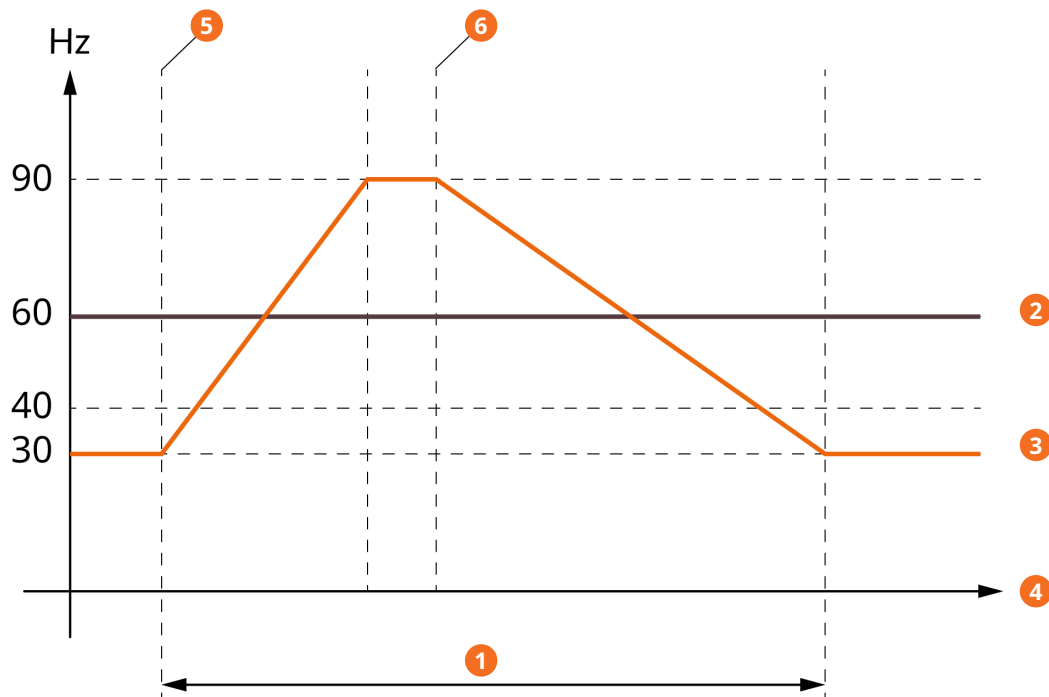
- Ensure no sudden ambient pressure while pump is running at 90 Hz.
- Ensure progressive transition to ambient pressure.
- Make sure that the *Installation Conditions* [→ 10] are met.
 - Open the water supply.
- Start the machine.
- Make sure that the maximum permissible number of starts does not exceed 6 starts per hour. Those starts should be spread within the hour.
- Make sure that the operating conditions comply with the *Technical Data* [→ 33].
- After a few minutes of operation, perform an *Oil Level Inspection* [→ 23].

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 Pump Down Cycle

Below the graph and the procedure to operate the machine for a pump down cycle.



Description			
1	Cycle	2	Backing pump
3	Booster	4	Time
5	Open isolation valve	6	Close isolation valve

- The machine must operate at a motor frequency of 30 Hz when opening the isolation valve.
- Gradually increase the motor frequency up to 90 Hz.
- As soon as the target pressure is reached, close the isolation and decrease the motor frequency to 30 Hz.

7.2 Compression Chamber Flushing

Depending on the process type (very demanding application), flushing through the compression chamber (cylinder + lobes) might need to be performed. Seek advice from your Busch representative.



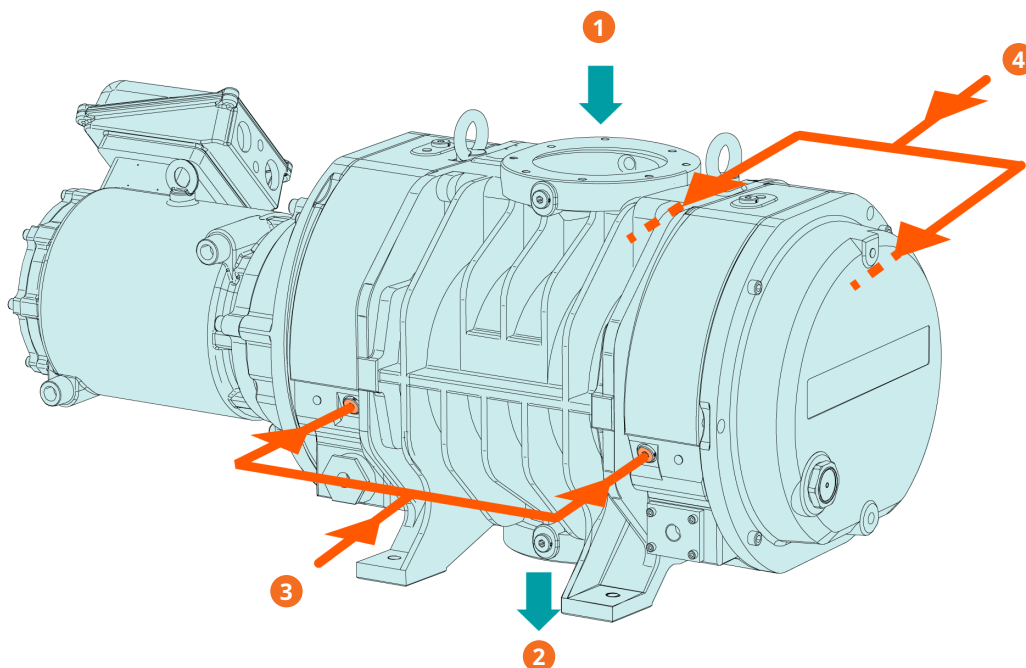
NOTICE

Flushing without barrier gas.

Risk of damage to the machine!

- The flushing process can pass over into the bearings and the oil chambers!
Do not perform flushing without using the barrier gas.

Beforehand, a barrier gas must be connected according to the following illustration and recommendations:



Description			
1	Process flow inlet (IN)	2	Process flow outlet (OUT)
3	Barrier gas connections (BGC)	4	Barrier gas connections (BGC)

Connection size:

- 4 x G3/8" (BGC)

Barrier gas requirements:

Gas type	Dry nitrogen, air or other suitable gas	
Gas temperature	°C	0 ... 60
Filtration	µm	≤ 5
Gas pressure	bar	≥ Pressure of flushing fluid + 1 bar
Recommended flow rate	SLM*	30

* standard liter per minute

- Stop the machine.
- Open the gas supply.
- Flush the machine.

When the flushing is finished:

- Close the gas supply.
- Dry the machine of flushing fluid.

Do not operate the machine in normal operating conditions with the barrier gas opened. It might affect the ultimate pressure and the pumping speed.

8 Maintenance



DANGER

Live wires.

Risk of electrical shock!

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



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.
- Vent the connected lines to atmospheric pressure.

If necessary:

- Disconnect all connections.

8.1 Maintenance Schedule

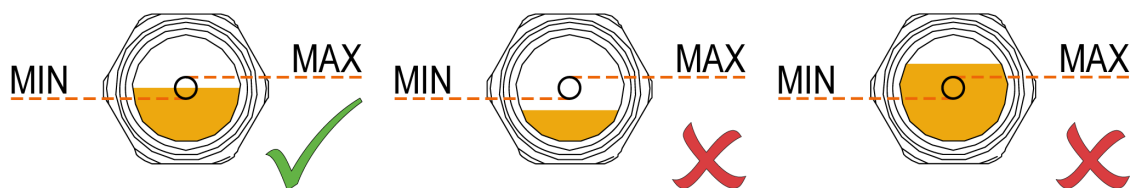
The maintenance intervals depend very much on the individual operating conditions. The intervals given below are considered as starting values which should be individually shortened or extended as appropriate.

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 <i>Oil Level Inspection</i> [→ 23]. • Check the machine for oil leaks. In case of leaks, have the machine repaired (contact Busch).
Yearly	• Perform an oil inspection; change it if the oil has changed its initial color, see <i>Oil Color Inspection</i> [→ 24].
Every 16000 hours or after 4 years	• Change the oil of the gear and bearing housings (both sides) • Clean the magnetic plugs (MP) • 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* [→ 13].

8.3 Oil Color Inspection



WARNING

"YLC 250 B" oil chemically contaminated or contaminated by foreign matter.

Risk of explosion!

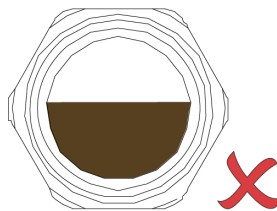
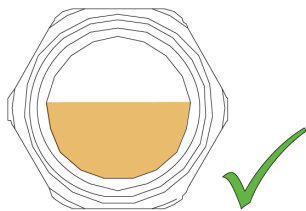
If the oil becomes dark:

- Contact your manufacturer's representative immediately.

- Make sure that the oil is either light or transparent.

If the oil becomes dark or looks different from the initial color:

- Change the oil immediately, see *Oil Change* [→ 24].



- Contact your representative to find out why the color of the oil has changed.

8.4 Oil Change



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.

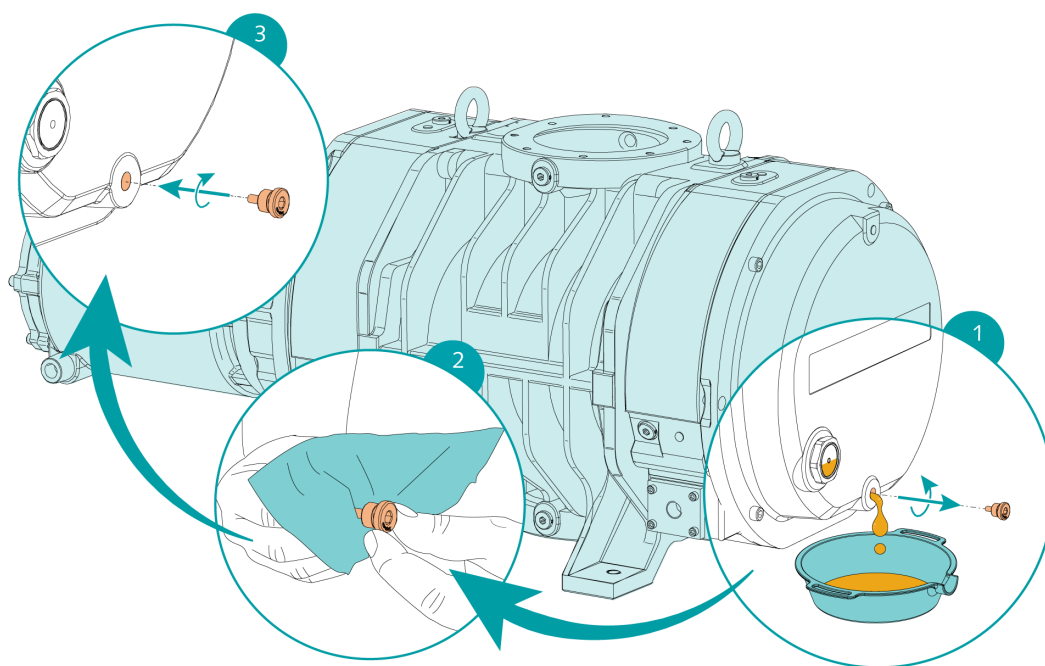
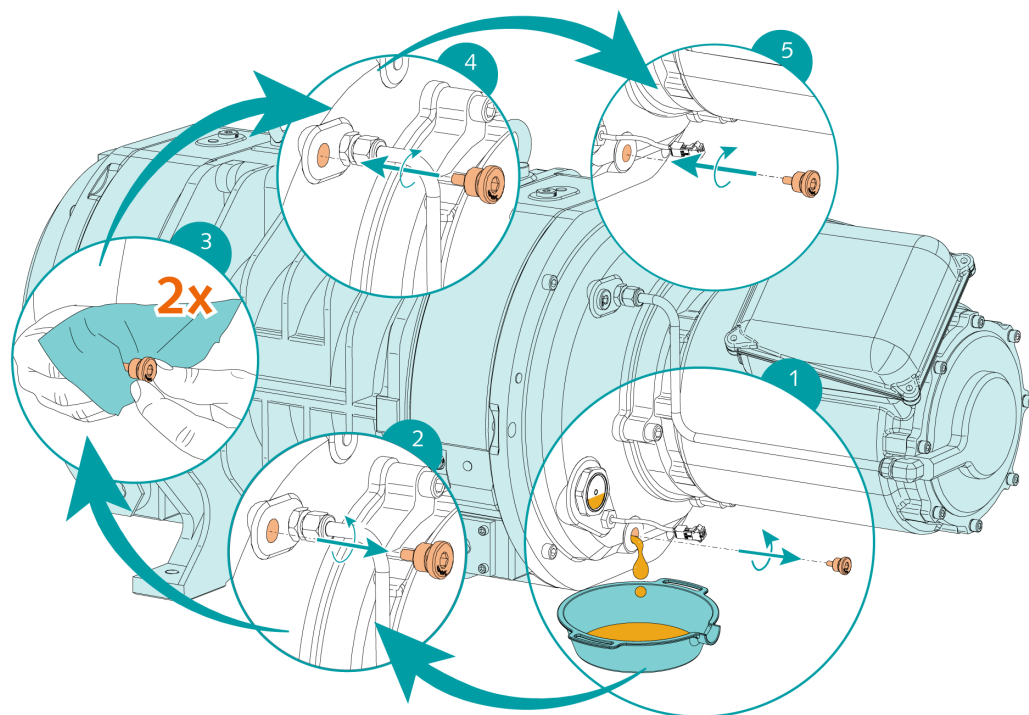


NOTICE

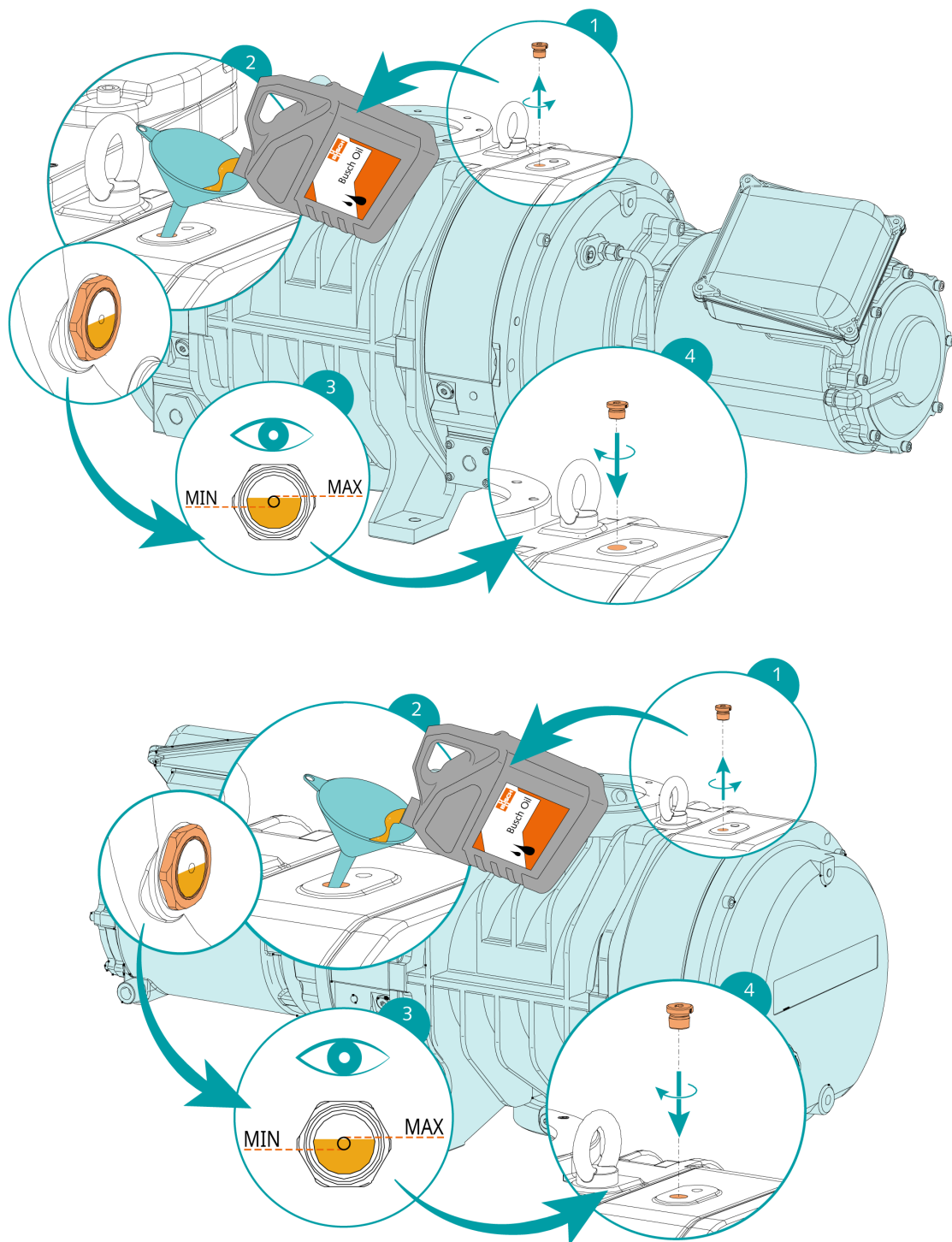
Replace the magnetic plug.

Risk of damage to the motor bearing!

- At every oil change, it is necessary to replace the magnetic plug, due to wear and tear of the seal.

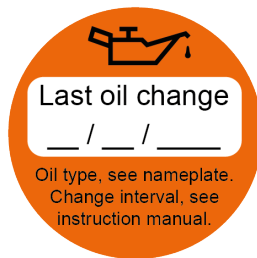


- For information on oil type and filling capacities, see the *Technical Data* [→ 33] and Oil chapters.



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.
- Vent the connected lines to atmospheric pressure.
- Blow through the water cooling inlet with compressed air.
- Disconnect all connections.

If the machine is to be stored:

- See *Storage* [→ 9].

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!

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

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 lobes are jammed or seized.	• Lobes 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). • Equip the machine with a mesh screen at the inlet 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.	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 backing pump is not correctly defined.	• Contact Busch.
	The machine runs in the wrong direction.	• Check the direction of rotation, see <i>Wiring Diagram Three-Phase Motor</i> [→ 16].
	Internal parts are worn or damaged.	• Repair the machine (contact Busch).

Problem	Possible Cause	Remedy
The machine runs very noisily.	Wrong oil quantity or unsuitable oil type.	Use one of the recommended oils in the correct quantity, see <i>Oil</i> [→ 35].
	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 <i>Cooling Water Connection</i> [→ 12].
	Ambient temperature too high.	Observe the permitted ambient temperature, see <i>Technical Data</i> [→ 33].
	Temperature of the process gases at the inlet too high.	Observe the permitted gas inlet temperature, see <i>Technical Data</i> [→ 33].
	Oil level too low.	Top up oil.
	The backing pump is not correctly defined.	Contact Busch.
The oil is black.	Oil change intervals are too long.	Drain the oil and fill in new oil, see <i>Oil Change</i> [→ 24].
	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

WY 3600 A (90Hz) * *		
Nominal pumping speed	m ³ /h	3600
Nominal motor rating	kW	15
Nominal motor speed	min ⁻¹	5400
Nominal motor current (double star connection)	A	38 (200 V)
Nominal motor current (star connection)	A	18.9 (400 V)
Sound pressure level (ISO 2151), KpA = 3 dB *	dB(A)	65
Ambient temperature	°C	5 ... 50
Maximum allowable gas inlet temperature	°C	200 (P < 10 hPa, staging ratio of 4)
Relative humidity	at 30°C	90 %
Leak rate	mbar·L /s	< 1 · 10 ⁻⁶
Oil capacity - Motor side	l	1.3
Oil capacity - Gear side	l	2.2
Weight approx.	kg	500

* Operation under ultimate pressure. Pressure level above 10 mbar may result in higher noise levels.

** With variable speed drive, max. 90 Hz.

14 Maximum Permissible Differential Pressures

WY 3600 A (90Hz) *				
Blower nominal pumping speed	m ³ /h	3600		
Backing pump nominal pumping speed	m ³ /h	≥ 720	≥ 360	≤ 360
Delta P max. in continuous operation	hPa	30 **	15 **	On request
Delta P max. in 50% duty	hPa	30 **	15 **	On request
Volume max. for pump down cycles	l	1000 (every 2 min.)	1000 (every 2 min.)	On request

* With variable speed drive, max. 90 Hz.

** Require cooling water connected to the covers (CWC).

15 Oil

YLC 250 B	
ISO-VG	250
Oil Type	Synthetic
Article number 0.5 L packaging	0831 131 400
Article number 1 L packaging	0831 108 878
Article number 5 L packaging	0831 108 879

To find out which oil needs to be filled into the machine, refer to the name plate (NP).

Oil suitability

- **Oil YLC 250 B:** Mandatory oil for specific applications.

16 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 is determined by the serial number:

Serial number starts with **CHM1...**

Ateliers Busch S.A.
Zone industrielle
2906 Chevenez
Switzerland

Serial number starts with **CNM1...**

Busch Manufacturing China Co., Ltd.
No. 73, Zhulin 4th Road, Daji Street,
Caidian District, Wuhan City,
P.R.China

declares that the machine: vacuum booster PUMA WY 3600 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 XXX127029999 (until January 19, 2027).
- 'Machinery Regulation' (EU) 2023/1230, if the serial number is greater than or equal to XXX127030000 (from January 20, 2027).
The conformity assessment has been carried out according to internal production control procedure (Module A), in accordance with the requirements of the 'Machinery Regulation'.
- '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, 2026.06.17



Christian Hoffmann
General Manager
Ateliers Busch S.A.

Wuhan, 2026.06.17



Philip Wu
General Manager
Busch Manufacturing China Co., Ltd.

17 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 is determined by the serial number:

Serial number starts with **CHM1...**

Ateliers Busch S.A.
Zone industrielle
2906 Chevenez
Switzerland

Serial number starts with **CNM1...**

Busch Manufacturing China Co., Ltd.
No. 73, Zhulin 4th Road, Daji Street,
Caidian District, Wuhan City,
P.R.China

declares that the machine: vacuum booster PUMA WY 3600 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, 2026.06.17



Christian Hoffmann
General Manager
Ateliers Busch S.A.

Wuhan, 2026.06.17



Philip Wu
General Manager
Busch Manufacturing China Co., Ltd.

Notes

Grid of dots for notes.

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.



● Busch Group companies

▲ Busch Group production sites

● Busch Group service centers

■ Busch Group local representatives

www.buschvacuum.com

www.pfeiffer-vacuum.com