

PANDA

Vacuum Booster
WV 1200 A, WV 1800 A, WV 2400 A

Instruction Manual

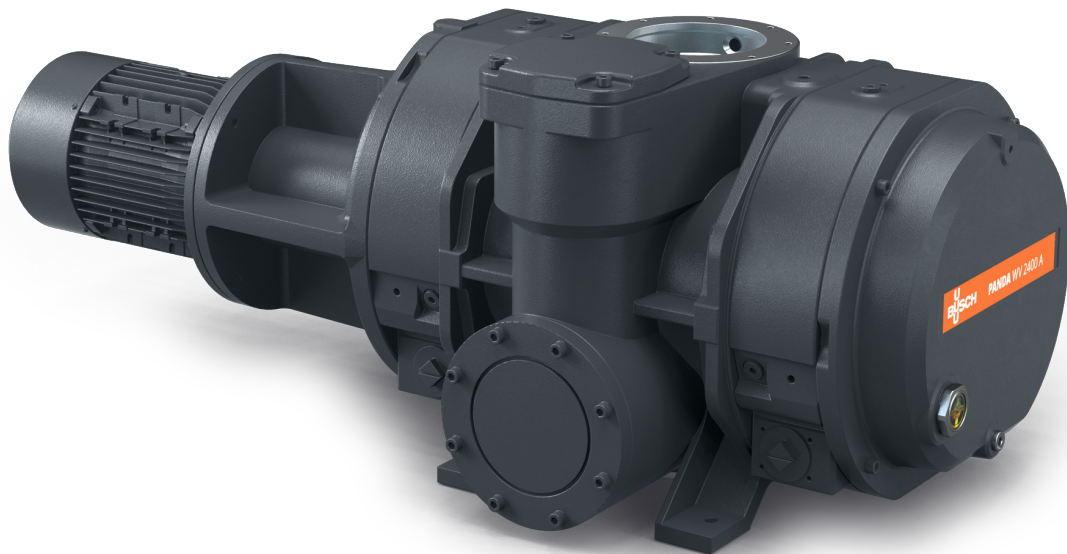


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1 Safety

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

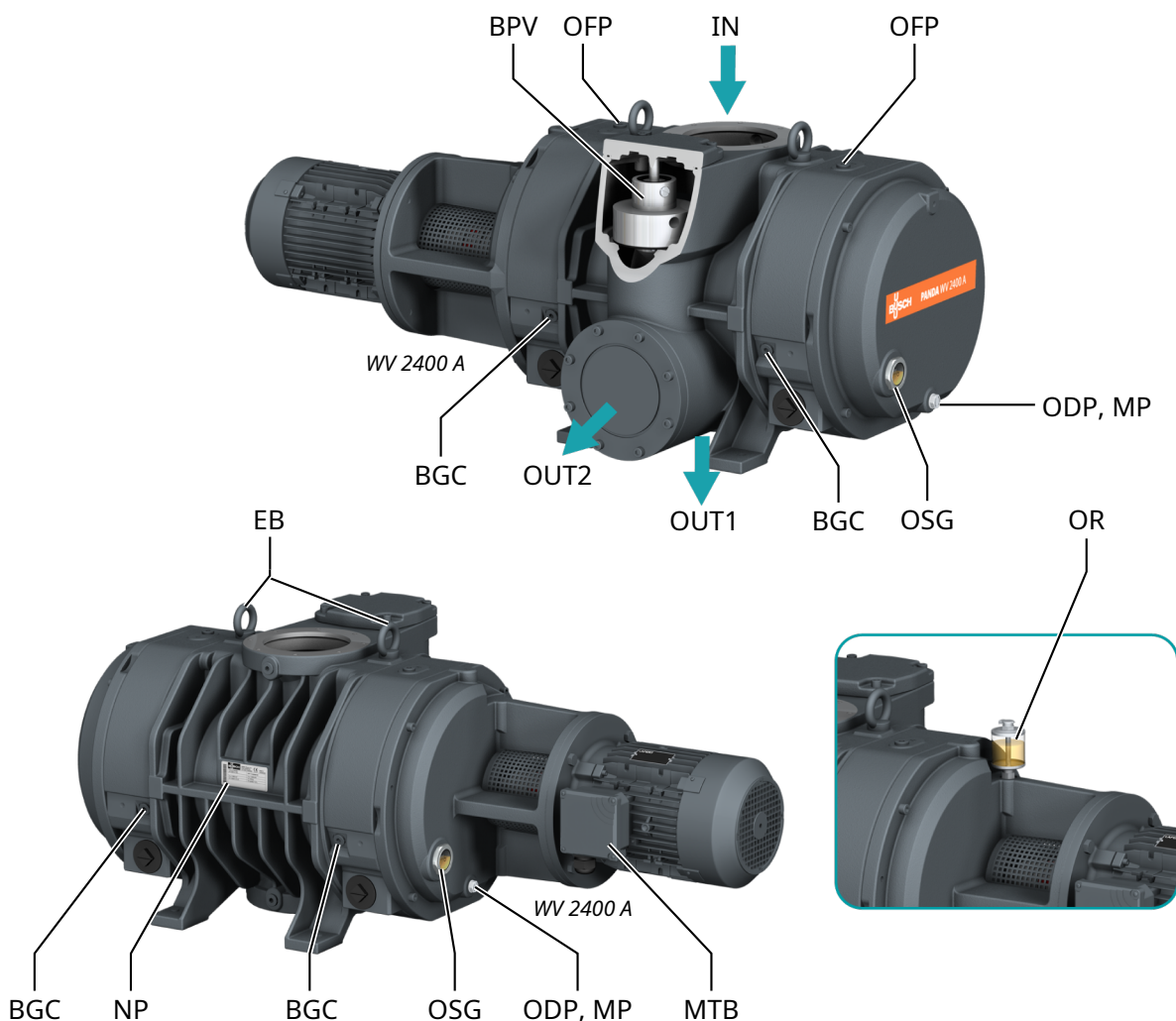
... indicates a potentially dangerous situation that could result in damage to property.



NOTE

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

2 Product Description



Description

BGC	Barrier gas connection	BPV	Bypass valve
EB	Eye bolt	IN	Inlet connection
MP	Magnetic plug	MTB	Motor terminal box
NP	Nameplate	ODP	Oil drain plug
OFF	Oil fill plug	OSG	Oil sight glass
OUT1	Discharge connection	OUT2	Lateral discharge connection (Optional)
OR	Oiler for lip seals variant (Optional)		



NOTE

Technical term.

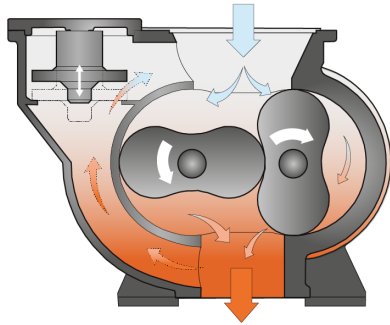
In this instruction manual, we consider that the term 'machine' refers to the 'vacuum booster'.

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, bearings and in certain versions the oil lubricated mechanical seals.

A bypass valve (BPV) limits automatically the differential pressure between inlet and outlet.

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 the placement in a non-potentially explosive environment.

The machine is used in combination with a backing pump in vacuum system.

The machine is suitable for continuous operation.

Permitted environmental conditions, see Technical Data.



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
 - Aluminum
 - Fluor elastomer (FKM/FPM)
 - Contact your manufacturer representative for further advice and information.
-

2.3 Shaft Sealing Variants

2.3.1 Mechanical Seal

The shaft sealing consists, in standard execution, of a mechanical seal.

2.3.2 Lip Seals (Optional)

Optionally, the shaft sealing may consist of three lip seals. This variant requires an oiler (OR) in order to continuously lubricate the sealing system.

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.

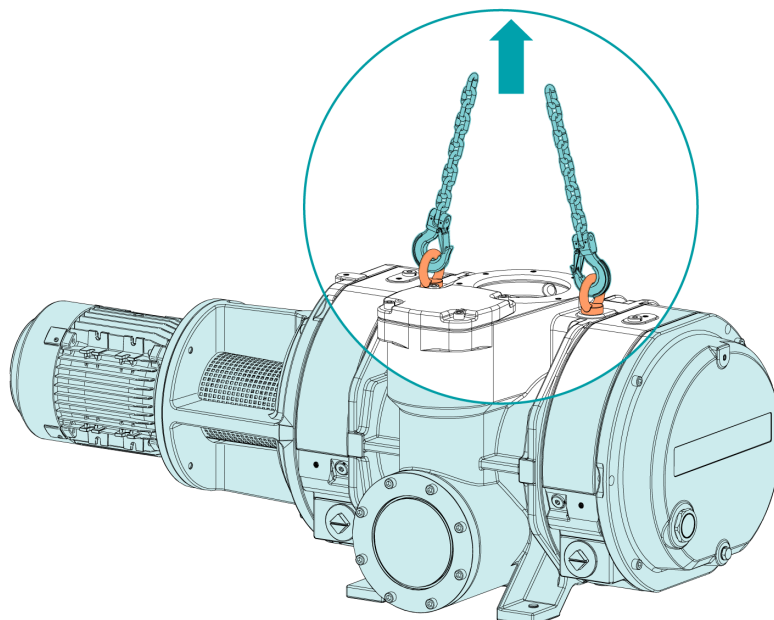


NOTICE

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).



- Check the machine for transport damage.

If the machine is secured to a base plate:

- Remove the machine from the base plate.

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.

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.
 - 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 cooling air inlets and outlets are not covered or obstructed and that the cooling air flow is not affected adversely in any other way.
 - 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 discharge flange.
 - Check the oil level, see *Oil Level Inspection* [→ 24].
 - Make sure that all provided covers, guards, hoods, etc. are mounted.

If the machine is installed at an altitude greater than 1000 meters above sea level:

- Contact your manufacturer representative, the motor must be derated or the ambient temperature limited.

5.2 Connecting Lines / Pipes

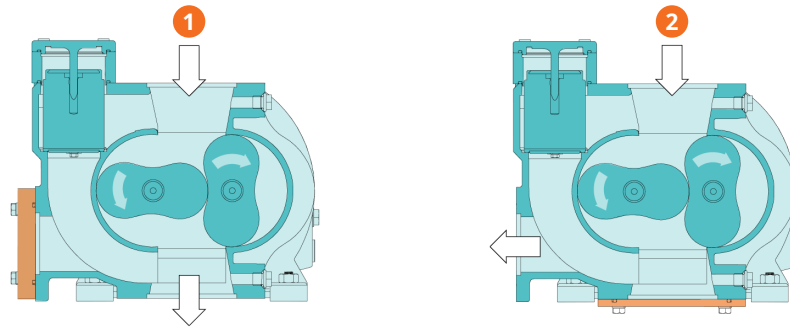
- Remove all protective covers before installation.
- Make sure that the connection lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible lines on the inlet and discharge connections.
- Make sure that the diameter of the connection lines over the entire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

In case of long connection lines:

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

5.2.1 Gas Flow Variants

The machine can be installed in different ways:



Description	
1	Vertical gas flow
2	Lateral discharge (Optional)

In some specific cases, other gas flow variants may apply.

5.2.2 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 connection lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible lines on the inlet and discharge connections.

5.2.3 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):

- DN100, DIN 28404 for WV 1200/1800 A
- DN160, DIN 28404 for WV 2400 A

Same connection size for lateral discharge (OUT2)

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

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

5.3 Filling Oil

NOTICE

Use of an inappropriate oil.

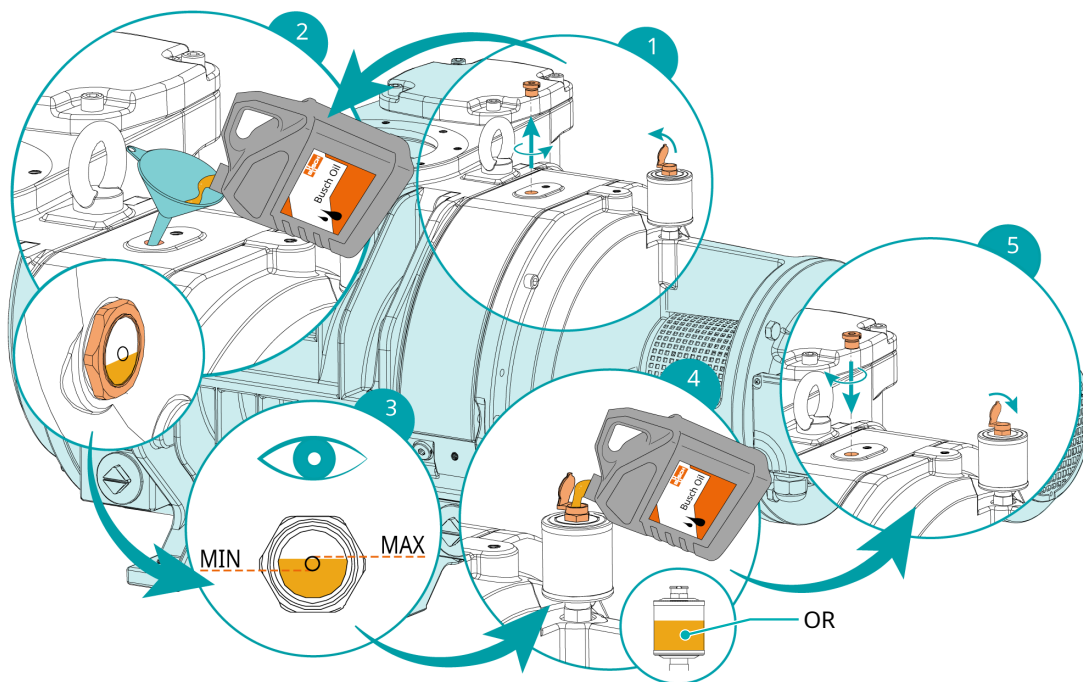
Risk of premature failure!

Loss of efficiency!

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

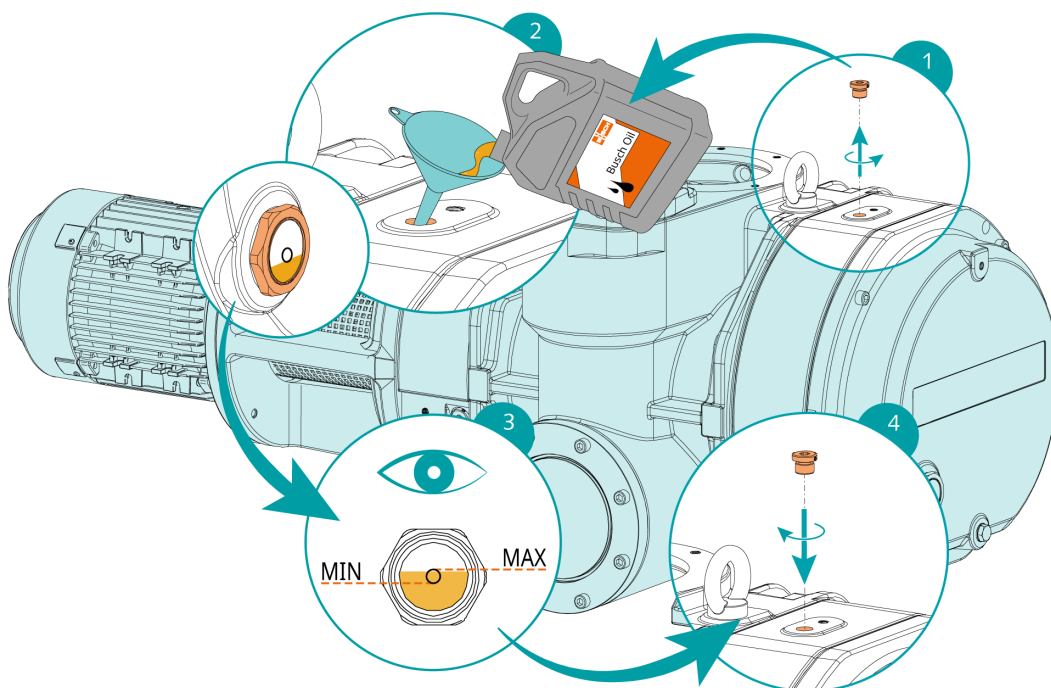
For oil type and oil capacity see Technical Data and *Oil* [→ 36].

- Fill up until the oiler (OR) is at least two thirds full (with lip seals only).



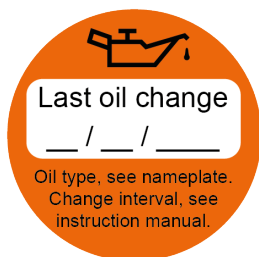
Description

OR	Oiler		
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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.

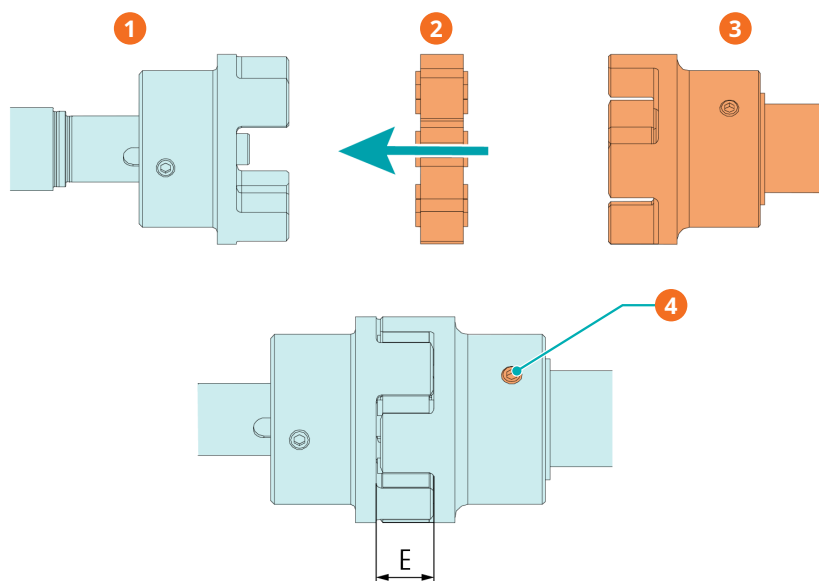
5.4 Fitting the Coupling



i NOTE

Radial screw.

For trouble-free operation, use thread locking glue to secure the radial screw.



Description			
1	Coupling hub (machine side)	2	Coupling spider
3	Coupling hub (motor side)	4	Radial screw / max. admissible torque: 10Nm

Machine type	Coupling size	Value "E" (mm)
WV 1200 A	ROTEX® 24	18
WV 1800 A		
WV 2400 A	ROTEX® 38	24

In case of a machine delivery without motor:

- Fit the second coupling hub on the motor shaft (separately delivered).
- Axially adjust the hub in such a way until value "E" is reached.
- When the coupling adjustment is done, lock the coupling hub by tightening the radial screw.
- Mount the motor on the machine by including the coupling spider.

For further coupling information, go to www.ktr.com and download the instruction manual of the RO-TEX® coupling.

English	German	French
		
<i>Instruction Manual - English</i>	<i>Instruction Manual - German</i>	<i>Instruction Manual - French</i>

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* [→ 37] or *UK Declaration of Conformity* [→ 38]).

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).

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

! 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

! NOTICE

Incorrect direction of rotation.

Risk of damage to the machine!

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

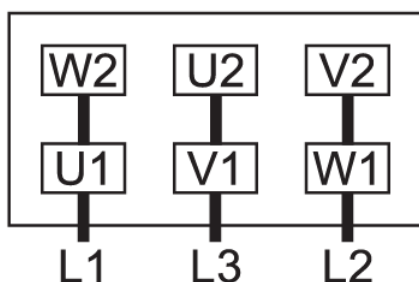
The intended rotation direction of the motor is defined by the specific instruction label stuck on the machine.

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

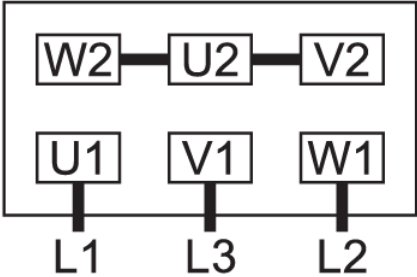
If the rotation of the motor must be changed:

- Switch any two of the motor phase wires.

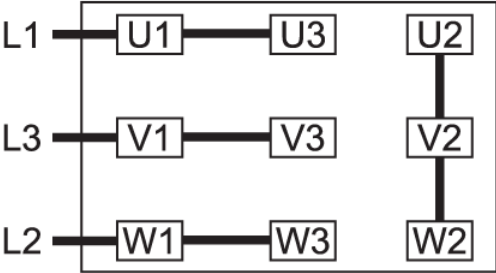
Delta connection (low voltage):



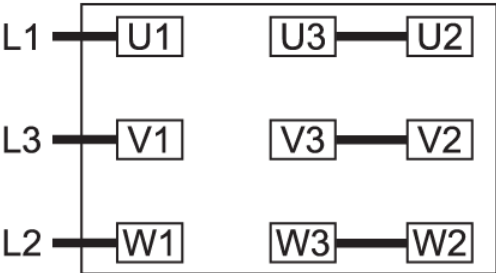
Star connection (high voltage):



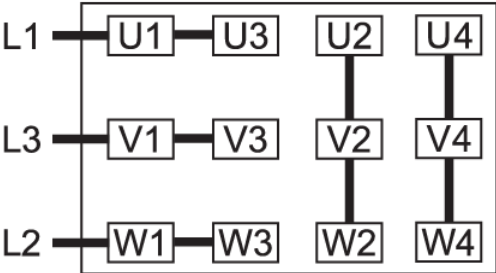
Double star connection, multi-voltage motor with 9 pins (low voltage):



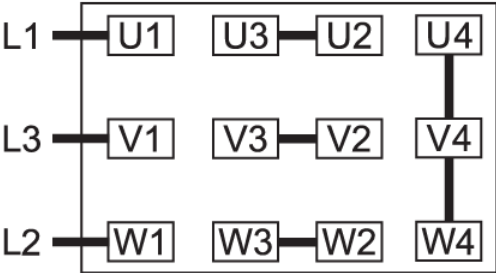
Star connection, multi-voltage motor with 9 pins (high voltage):



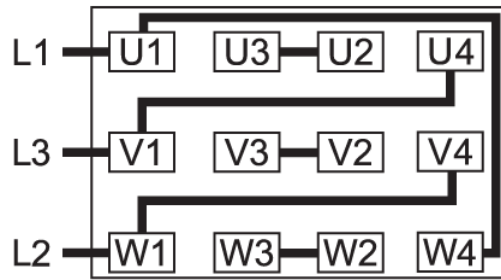
Double star connection, multi-voltage motor with 12 pins (low voltage):



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



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



7 Commissioning



CAUTION

During operation the surface of the machine can 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!

- Prior to commissioning, the machine must be filled with oil, see *Filling Oil* [→ 11].

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* [→ 9] are met.
- 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.
- After a few minutes of operation, perform an *Oil Level Inspection* [→ 24].

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

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

7.1 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.

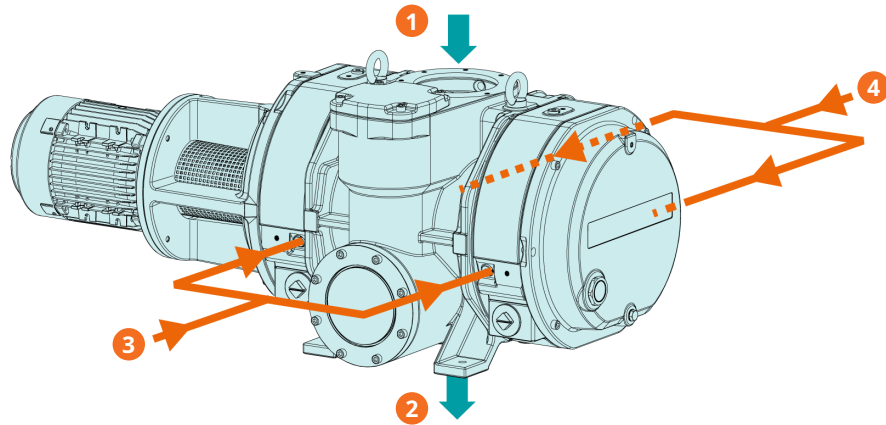
NOTICE

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 2 x (BGC)	4	Barrier gas connections 2 x (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 suction capacity.

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.
- Vent the connected lines to atmospheric pressure.

If necessary:

- Disconnect all connections.

8.1 Maintenance Schedule

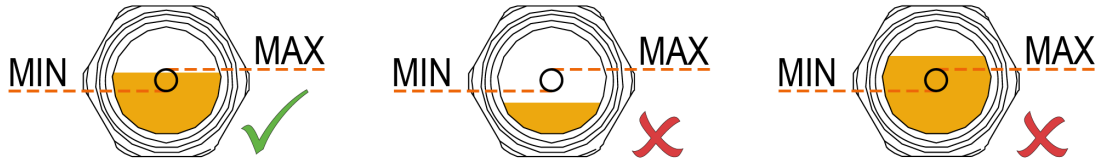
The maintenance intervals depend very much on the individual operating conditions. The intervals given below are considered as starting values which should be individually shortened or extended as appropriate.

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
Weekly	<ul style="list-style-type: none"> • For Lip seal versions only: check the oiler volume for the first three months, then monthly.
Monthly	<ul style="list-style-type: none"> • Check the oil level, see <i>Oil Level Inspection</i> [→ 24]. • Check the machine for oil leaks. In case of leaks, have the machine repaired (contact Busch). • For mechanical seal versions only: one month after installation and one month after each major overhaul: empty the oil retention volume. • For Lip seal versions only: check the oiler level.
Every 6 months	<ul style="list-style-type: none"> • Perform an oil inspection; change it if the oil has changed its initial color, see <i>Oil Color Inspection</i> [→ 24].
Every 5000 hours or after 1 year	<ul style="list-style-type: none"> • Change the oil of the gear and bearing housings (both sides) • Clean the magnetic plugs (MP)
Yearly	<ul style="list-style-type: none"> • Carry out a visual inspection and clean the machine from dust and dirt. • Check the electrical connections and the monitoring devices.
Every 16000 hours or after 4 years	<ul style="list-style-type: none"> • Carry out a major overhaul on the machine (Contact Busch).

8.2 Oil Level Inspection

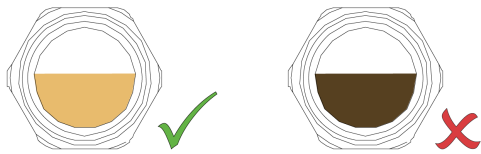
- Stop the machine.
- Wait 1 minute.
- Check the oil level.



- Fill up if necessary, see *Filling Oil* [→ 11].

8.3 Oil Color Inspection

- 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* [→ 25].



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

8.4 Oil Change

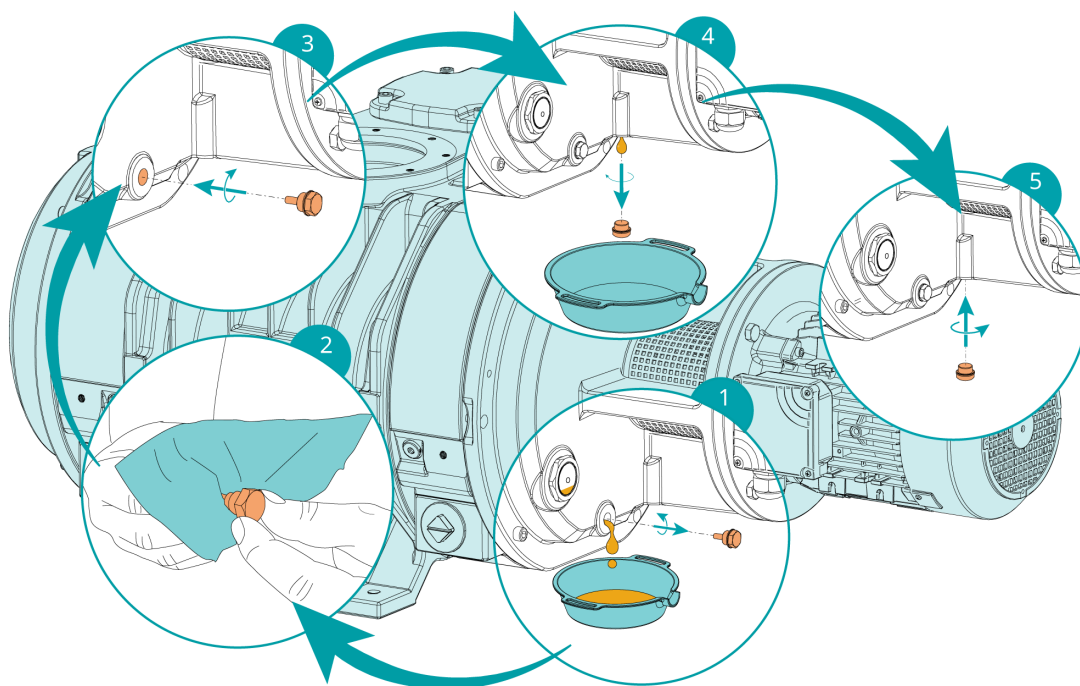
! NOTICE

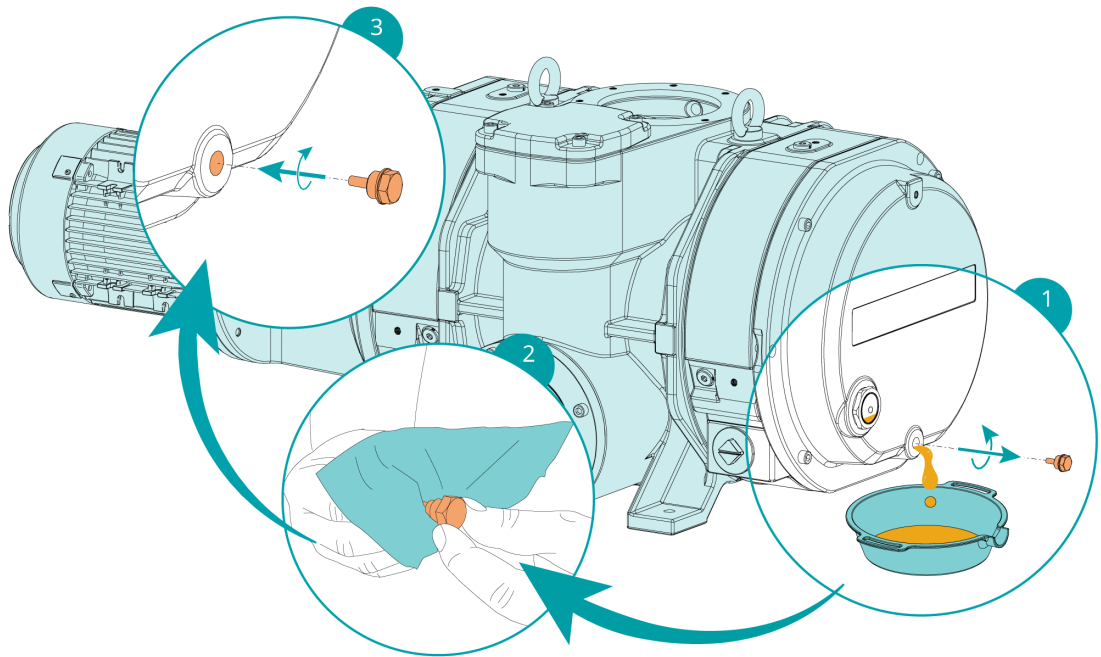
Use of an inappropriate oil.

Risk of premature failure!

Loss of efficiency!

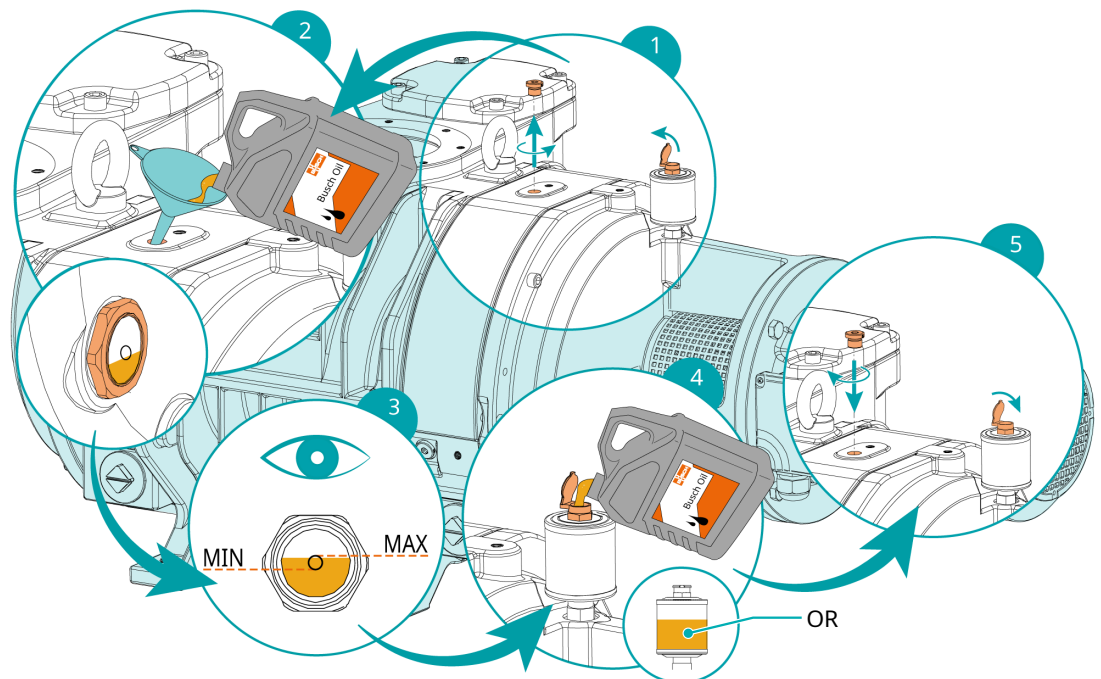
- Only use an oil type which has previously been approved and recommended by the manufacturer.



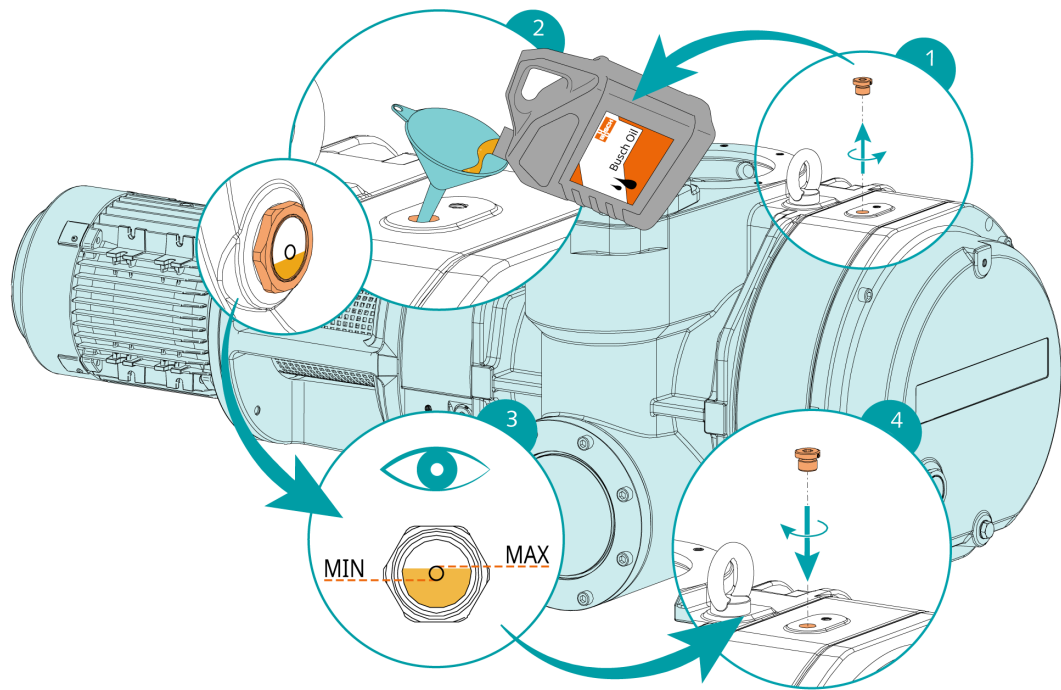


For oil type and oil capacity see Technical Data and *Oil* [→ 36].

- Fill up until the oiler (OR) is at least two thirds full (with lip seals only).

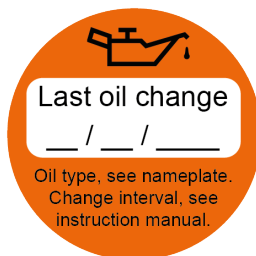


Description	
OR	Oiler



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



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

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 manufacturer authorized technicians.

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.
- Vent the connected lines to atmospheric pressure.
- Disconnect all connections.

If the machine is to be stored:

- See *Storage* [→ 8].

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 original Busch 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.	<ul style="list-style-type: none"> • Check the power supply.
	The lobes are jammed or seized.	<ul style="list-style-type: none"> • Lobes inspection or repair the machine (contact Busch).
	Solid foreign matter has entered the machine.	<ul style="list-style-type: none"> • Remove the solid foreign matter or repair the machine (contact Busch). • Equip the machine with a mesh screen at the inlet connection.
	The motor is defective.	<ul style="list-style-type: none"> • Replace the motor.
The machine does not reach the usual pressure.	Suction or discharge lines too long or section diameter too small.	<ul style="list-style-type: none"> • Use larger diameter or shorter lines. • Seek advice from your local Busch representative.
	The backing pump is not correctly defined.	<ul style="list-style-type: none"> • Contact Busch.
	The machine runs in the wrong direction.	<ul style="list-style-type: none"> • Check the direction of rotation, see <i>Wiring Diagram Three-Phase Motor</i> [→ 16].
	Internal parts are worn or damaged.	<ul style="list-style-type: none"> • Repair the machine (contact Busch).

Problem	Possible Cause	Remedy
The machine runs very noisily.	Wrong oil quantity or unsuitable oil type.	<ul style="list-style-type: none"> Use one of the recommended oils in the correct quantity, see <i>Oil</i> [→ 36].
	Defective gears, bearings or coupling element.	<ul style="list-style-type: none"> Repair machine (contact Busch).
The machine runs too hot.	Ambient temperature too high.	<ul style="list-style-type: none"> Observe the permitted ambient temperature, see Technical Data.
	Temperature of the process gases at the inlet too high.	<ul style="list-style-type: none"> Observe the permitted gas inlet temperature, see Technical Data.
	Oil level too low.	<ul style="list-style-type: none"> Top up oil.
	The backing pump is not correctly defined.	<ul style="list-style-type: none"> Contact Busch.
The oil is black.	Oil change intervals are too long.	<ul style="list-style-type: none"> Drain the oil and fill in new oil, see <i>Oil Change</i> [→ 25].
	The machine runs too hot.	<ul style="list-style-type: none"> See problem "The machine runs too hot".

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

13 Technical Data

		WV 1200 A	WV 1800 A	WV 2400 A
Nominal pumping speed (50 / 60 Hz)	m ³ /h	1050 / 1260	1600 / 1920	2120 / 2540
Nominal motor rating (50 / 60 Hz)	kW	3.5 / 4.8	4.3 / 5.2	5.5 / 7.0
Nominal motor speed (50 / 60 Hz)	min ⁻¹	3000 / 3600	3000 / 3600	3000 / 3600
Sound pressure level (ISO 2151), KpA = 3 dB * (50 / 60 Hz)	dB(A)	59 / 63	60 / 64	67 / 71
Ambient temperature range	°C	5 ... 40		
Maximum allowable gas inlet temperature	°C	200 (P < 10 hPa, staging ratio of 4)		
Relative humidity	at 30°C	90%		
Oil capacity - Motor side	l	1.6	1.6	1.7
Oil capacity - Gear side	l	1.9	1.9	2.2
Oil capacity - Oiler	l	0.10	0.10	0.10
Weight approx.	kg	290	300	520

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

14 Maximum Permissible Differential Pressures

WV 1200 A							
		50 Hz			50 Hz		
Blower nominal suction capacity	m ³ /h	1050			1260		
Backing pump nominal suction capacity	m ³ /h	≥ 200	From 100 to 200	≤ 100	≥ 240	From 120 to 240	≤ 120
Delta P max. in continuous operation	hPa	53 *	On request	On request	53 *	On request	On request
Delta P max. in 50% duty **	hPa	53	53	On request	53	53	On request
Volume max. (every 2 minutes) Standard bypass	l	No restriction	On request	On request	No restriction	No restriction	On request
Volume max. (every 2 minutes) Rapid pump down bypass (optional)	l	On request	On request	On request	On request	On request	On request

* 3 h max. at delta P max. in continuous operation

** Delta P max in 50% duty: 20 min at delta P max. – 20 min at ultimate vacuum

WV 1800 A							
		50 Hz			60 Hz		
Blower nominal suction capacity	m ³ /h	1600			1920		
Backing pump nominal suction capacity	m ³ /h	≥ 300	From 150 to 300	≤ 150	≥ 360	From 180 to 360	≤ 180
Delta P max. in continuous operation	hPa	53 *	On request	On request	53 *	On request	On request
Delta P max. in 50% duty **	hPa	53	On request	On request	53	On request	On request
Volume max. (every 2 minutes) Standard bypass	l	No restriction	On request	On request	No restriction	On request	On request
Volume max. (every 2 minutes) Rapid pump down bypass (optional)	l	On request	On request	On request	On request	On request	On request

* 3 h max. at delta P max. in continuous operation

** Delta P max in 50% duty: 20 min at delta P max. – 20 min at ultimate vacuum

WV 2400 A							
		50 Hz			60 Hz		
Blower nominal suction capacity	m ³ /h	2120			2540		
Backing pump nominal suction capacity	m ³ /h	≥ 400	≥ 200	≤ 200	≥ 480	≥ 240	≤ 240
Delta P max. in continuous operation	hPa	53 *	On request	On request	53 *	On request	On request
Delta P max. in 50% duty **	hPa	53	53	On request	53	53	On request
Volume max. (every 2 minutes) Standard bypass	l	No restriction	1000	On request	No restriction	1000	On request
Volume max. (every 2 minutes) Rapid pump down bypass (optional)	l	2000	On request	On request	2000	On request	On request

* 3 h max. at delta P max. in continuous operation

** Delta P max in 50% duty: 20 min at delta P max. – 20 min at ultimate vacuum

15 Oil

	VSC 100	VSL 100
ISO-VG	100	100
Ambient temperature range [°C]	0 ... 40	0 ... 40
Part number 1 L packaging	0831 168 356	0831 122 573
Part number 5 L packaging	0831 168 357	0831 122 572
Remark	-	Food applications (H1)

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

Oil suitability

- **Oil VSC 100:** Suitable for standard applications.
- **Oil VSL 100:** Suitable for food applications (H1).

16 EU Declaration of Conformity

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

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

The manufacturer

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

declares that the machine: PANDA WV 1200 A; PANDA WV 1800 A; PANDA WV 2400 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 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, 01.03.2023



Christian Hoffmann, General Manager

17 UK Declaration of Conformity

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

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

The manufacturer

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

declares that the machine: PANDA WV 1200 A; PANDA WV 1800 A; PANDA WV 2400 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, 01.03.2023



Christian Hoffmann, General Manager

Notes

A large grid of small dots, arranged in approximately 30 rows and 60 columns, intended for taking notes. The dots are evenly spaced and cover most of the page area below the title.

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 three well-known brands: Busch Vacuum Solutions, Pfeiffer Vacuum and centrotherm clean 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

www.centrotherm.com