VACUUM SOLUTIONS

Part of the BUSCH GROUP

MINK

Claw Vacuum Pumps
MW 0332 B
MW 0330 B ECOTORQUE

Instruction Manual



SERVICE AND SPARE PARTS, INSTRUCTION MANUALS ... WWW.BUSCHVACUUM.COM/SERVICE-CONTACT

VACUUM APP

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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* [➔ 7].

This instruction manual highlights potential hazards where appropriate. Safety notes and warning messages are tagged with one of the keywords DANGER, WARNING, CAUTION, NOTICE and NOTE as follows:



DANGER

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



WARNING

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



CAUTION

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



NOTICE

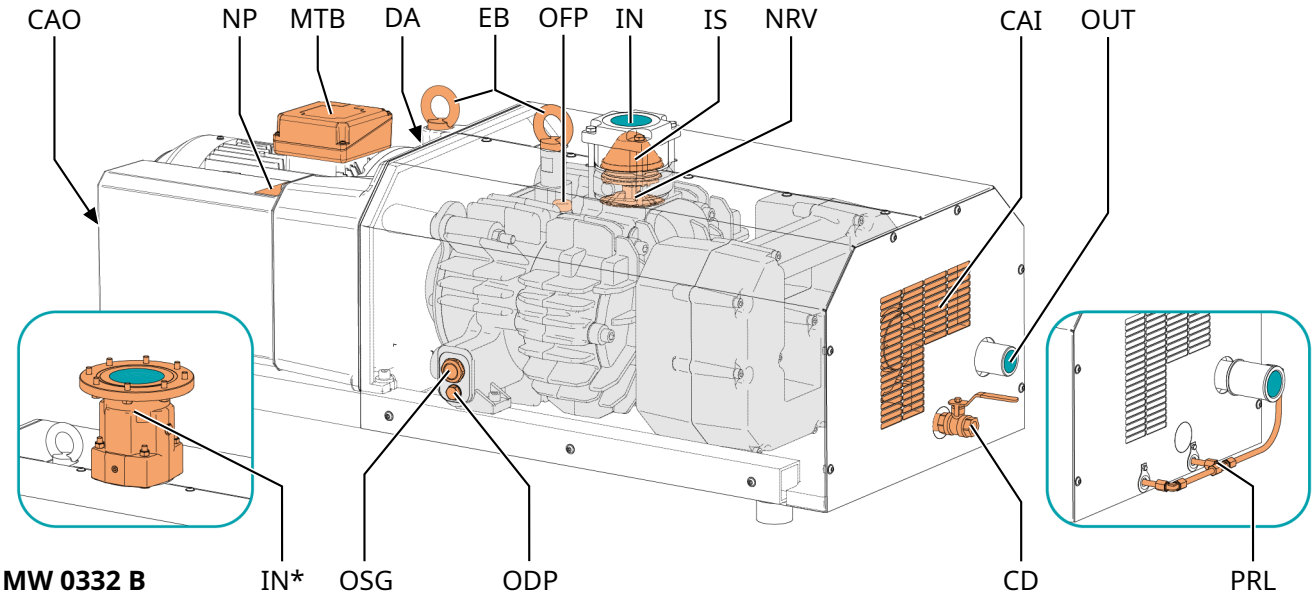
... indicates a potentially dangerous situation that could result in damage to property.



NOTE

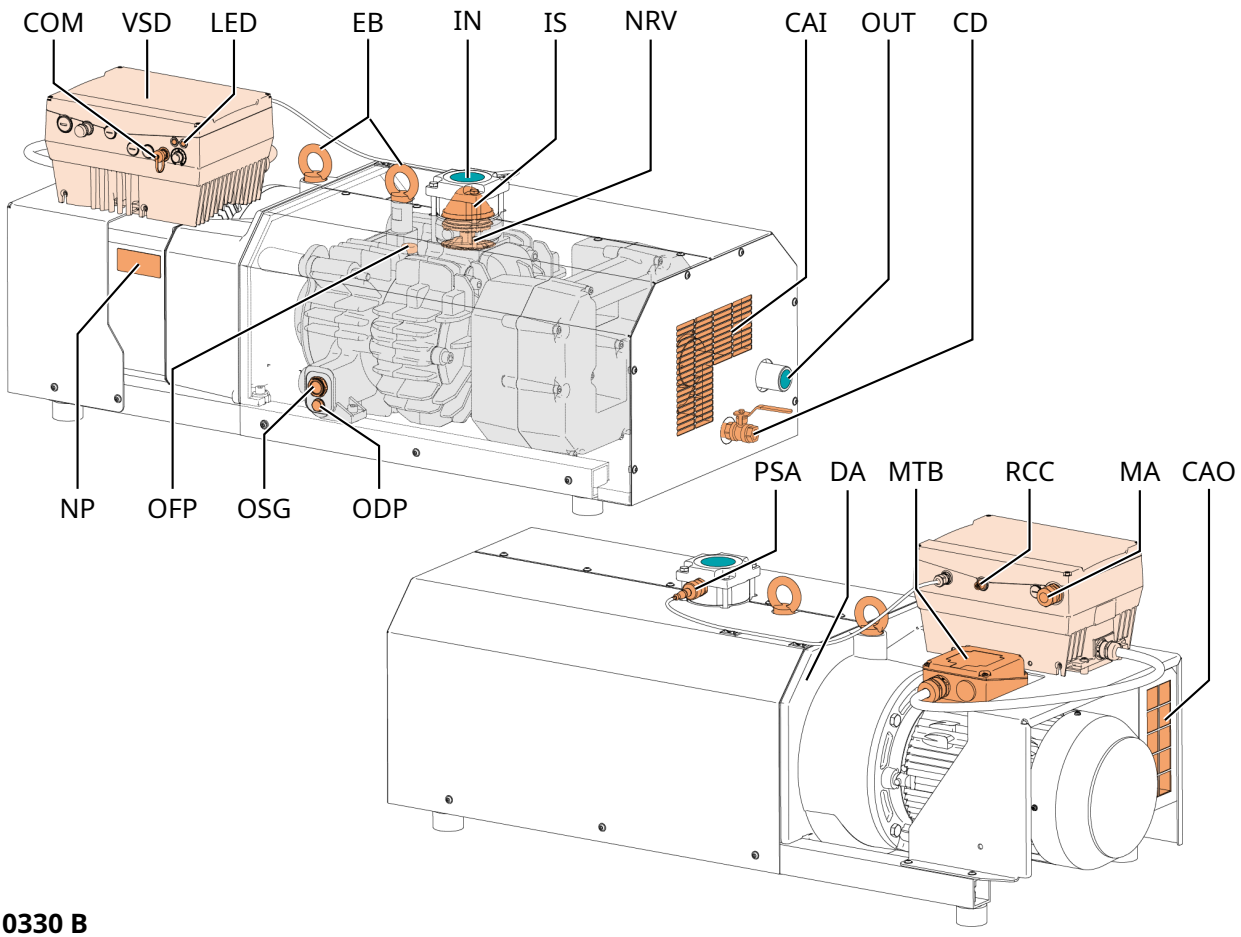
... indicates helpful tips and recommendations, as well as information for efficient and trouble-free operation.

2 Product Description



MW 0332 B

Description			
IN	Inlet connection	OUT	Exhaust connection
OFP	Oil fill plug/venting valve (below the cover)	ODP	Oil drain plug
CAI	Cooling air inlet	CAO	Cooling air outlet
IS	Inlet screen	NRV	Non-return valve (integrated)
OSG	Oil sight glass	EB	Eye bolt
MTB	Motor terminal box	DA	Directional arrow
NP	Nameplate	IN* (optional)	Booster ready version: DIN100 ISO-F IS and NRV integrated
CD (optional)	Condensate drain (aqua version)	PRL (optional)	Pressure relief line (gastight version)



MW 0330 B

Description			
IN	Inlet connection	OUT	Exhaust connection
OFP	Oil fill plug/venting valve (below the cover)	ODP	Oil drain plug
IS	Inlet screen	NRV	Non-return valve (integrated)
CAI	Cooling air inlet	CAO	Cooling air outlet
EB	Eye bolt	DA	Directional arrow
OSG	Oil sight glass	CD	Condensate drain (aqua version)
MTB	Motor terminal box	VSD	Variable speed drive
MA	Directional arrow	LED	Function indicator
PSA	Pressure transmitter	NP	Nameplate
COM	Communication I/O port (M12, 4-pole, A-coded)	RCC (optional)	Remote control connection (M12, 12-pole, A-coded)

NOTE

Technical term.

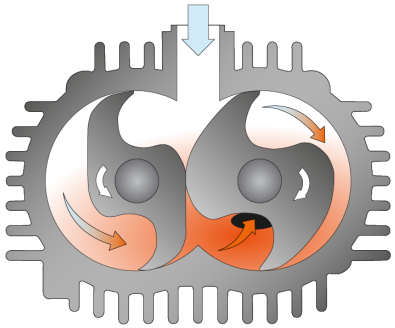
In this instruction manual, we consider that the term ‘machine’ refers to the ‘vacuum pump’.

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 claw principle.

The MINK is fully air-cooled thanks to an integrated fan in the drive unit.

In order to avoid solids from entering, the machine is equipped with an inlet screen (IS).

Inlet screen (IS):

- See *Cleaning from Dust and Dirt* [➔ 35]
- See *Troubleshooting* [➔ 40]

In order to avoid reverse rotation after switching off, the machine is equipped with a non-return valve (NRV).

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.
- Make sure to operate the machine only when all provided covers, guards, hoods, etc. are mounted.
- Entanglement prevention: Do not wear loose clothing and long hair must be tied back securely before operating the machine.

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 designed for indoor installations. For outdoor installations, consult your Busch representative for special precautions.

The machine is capable of maintaining ultimate pressure, see *Technical Data* [➔ 47].

The machine is suitable for continuous operation up to a certain inlet pressure indicated below:

Machine type	Inlet pressure limitation for continuous operation
MINK MW 0330 B; MINK MW 0332 B	Within a range of 0.8 - 300 hPa (mbar) abs.

Note: The non-return valve (NRV) shouldn't be used as a non-return valve or isolation valve for the system. The non-return valve is only to protect the machine.

If the machine needs to be maintained after shutdown:

- Provide an additional manual or automatic operated non-return valve in the suction line.

Permitted environmental conditions, see *Technical Data* [➔ 47].

2.3 Design Options

The design options described in the following chapters might be combined.

Please refer to the nameplate (NP) to identify the corresponding design option of your machine.

Design option	Codification	Example
Standard (no design option)	0	MW 0332 B 0**0**
Aqua version	A	MW 0332 B 0**A**
Gas tight version	G	MW 0332 B 0**G**
Booster ready version	NF	MW 0332 B 0** ****NF**

2.3.1 Aqua Version

The Aqua version is a design option for conveying condensable vapors (water).

This machine is specifically equipped with:

– corrosion protection coating.

– optional condensate drain (CD) in the internal silencer.

2.3.2 Gas Tight Version

(MW 0332 B Only)





WARNING



Media potentially dangerous.

Risk of poisoning!

Risk of infection!

- Wear appropriate personal protective equipment in case of high concentration of the medium in the ambient atmosphere of the machine.

The gas tight version is a design option for applications where the process gas remains in the machine and does not escape to the environment.

It is a very important feature for applications where gases potentially dangerous to human health are not allowed and the concentration of the process gas must not exceed the admissible values of the ambient atmosphere of the machine.

This machine is specifically equipped with:

- pressure relief lines
- collecting lines
- shaft seal rings

Requirements for a proper functioning:

Description	
Ambient pressure	The gas tight machine requires an ambient pressure at the gas exhaust connection (OUT) during the whole operation range of +/- 200 hPa (mbar), unless otherwise specified on the nameplate.
Leakage rate	The machine is not absolutely gas tight. The leakage rate of the machine described in this manual is of 0.1 hPa l/s (mbar l/s) at an inlet pressure of 250 mbar. It can considerably increase up to prohibited pressure values at the gas inlet/exhaust connection due to used shaft seal rings or clogged pressure relief lines.

Description	
Ambient environment	Closed air cooling systems are not suitable and therefore prohibited. • Make sure that the machine is sufficiently vented (see *Installation Conditions* [➔ 18]).

2.3.3 Booster Ready Version

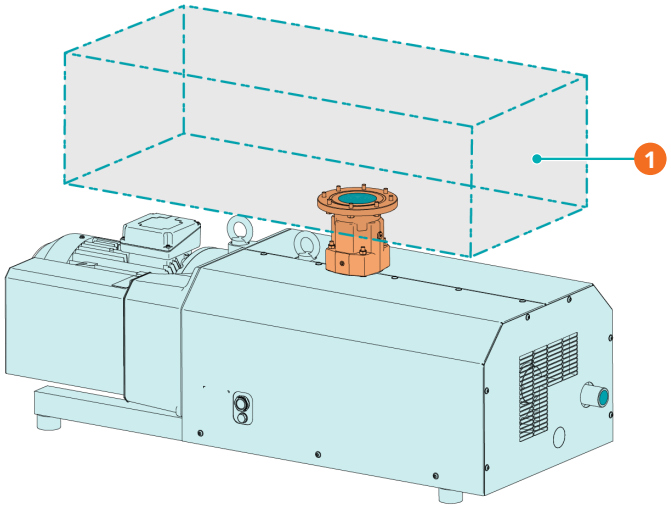
(MW 0332 B Only)

The booster ready version is a design option which allows to mount a vacuum booster directly on the MINK MW 0332 B.

The MINK MW 0332 B booster ready version is equipped with:

– inlet connection with adapter flange DN100 ISO-F

– PT100 sensor in silencer for process temperature monitoring



Description			
1	Busch vacuum booster		

The following Busch vacuum boosters are tested and can be used with this design option:

– PANDA WV 0500 after combining, the resulting unit is a COMBI BWV 0500 C 0332 B A

– PANDA WV 1200 after combining, the resulting unit is a COMBI BWV 1200 A 0332 B A

– PANDA WV 1800 after combining, the resulting unit is a COMBI BWV 1800 A 0332 B A

– PANDA WV 2200 after combining, the resulting unit is a COMBI BWV 2200 A 0332 B A

The PT100 must be connected to the PLC of the customer. To prevent overheating the vacuum pump, the maximum permitted temperature is 200 °C. A delay time must be set to 10 s. The alarm threshold must be set to 190 °C with a delay time of 10 s.

The maximum permissible inlet temperature at the booster inlet depends on the operating pressure:

– Inlet pressure > 40 hPa (mbar) abs.: max. 40 °C

– Inlet pressure 10 to 40 hPa (mbar) abs.: max. 100 °C

– Inlet pressure < 10 hPa (mbar) abs.: max. 200 °C

Continuous operation with a booster is only possible at an inlet pressure < 100 hPa (mbar) abs.

2.4 Start Controls

(MW 0332 B Only)

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

2.5 Standard Features

2.5.1 ECOTORQUE Variable Speed Drive

(MW 0330 B Only)

The machine is equipped with an ECOTORQUE Variable Speed Drive (VSD) and a pressure sensor, assembled at the inlet flange.

The ECOTORQUE Variable Speed Drive (VSD) regulates the pumping speed of the machine and saves energy. For more information contact your Busch representative.

The machine is delivered in auto start mode with an automatic start function and a preset speed of 60 Hz. The pressure transmitter (PSA) continuously monitors the inlet pressure. When pressure control is activated, the variable speed drive (VSD) adjusts the pumping speed based on the measured pressure and maintains the target pressure.

NOTICE

ECOTORQUE Variable Speed Drive (VSD) should primarily be controlled using Busch Vacuum Manager software, available at *www.buschvacuum.com* (free of charge).

Any changes to parameters outside of those done by Busch or certified representatives, particularly if made using methods other than the Busch Vacuum Manager software, which result in damage or malfunction of the ECOTORQUE Variable Speed Drive (VSD) or the machine, are not covered under the product warranty or liability.

The following parameters of ECOTORQUE VSD can be controlled:

1. Speed- / Pressure control
2. Auto / Manual START/STOP
3. Preset speed
4. Inlet pressure target setpoint
5. Ecomode

2.6 Optional Accessories

2.6.1 Communication Cable

(MW 0330 B Only)

In order to select between speed- or pressure control, using the **Busch Vacuum Manager** software, an M12 - USB communication cable is required for connection to a computer.

– Art. no. 0987 208 730 : M12 - USB Communicable cable

2.6.2 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.

2.6.3 Condensate Drain

The condensate drain (CD) is used to drain the accumulated fluids.

2.6.4 Enhanced Silencer

The enhanced silencer reduces the sound pressure level with an unpiped exhaust up to 5 dB(A) under the following operating conditions:

– Inlet pressure > 400 mbar (abs.) at 50 Hz

– Inlet pressure > 100 mbar (abs.) at 60 Hz

2.6.5 Remote Control Package

(MW 0330 B Only)

Remote control package (RCC) with an M12 female connector on the machine for customer-sided digital START/STOP-signal.

A 5 m customer cable with M12 male connector is within the delivery scope.

2.6.6 I/O and Communication Port

(MW 0330 B Only)

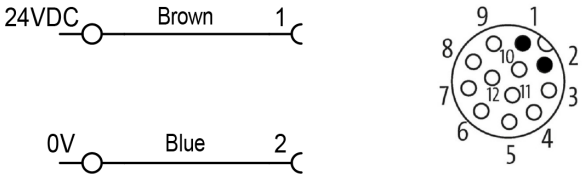
If the “Remote control package” option is selected:

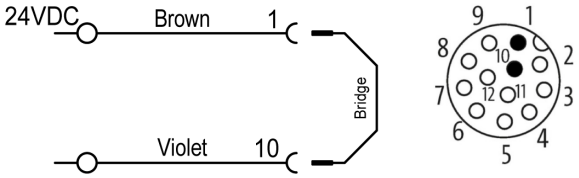
Setup I/O port

Connector type: M12 12p female A coded (connection cable included in the scope of supply).

Power Supply

- 24V DC power supply - Max 100 mA





NOTE

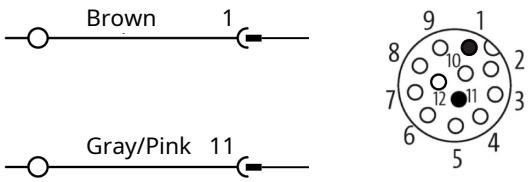
In case of a remote-control start, the machine must be integrated in the user's safety chain (signal warning the user to stop the machine in case of problem or emergency stop).

NOTE

According to the standard factory setting, there is a bridge inside the variable speed drive (VSD).

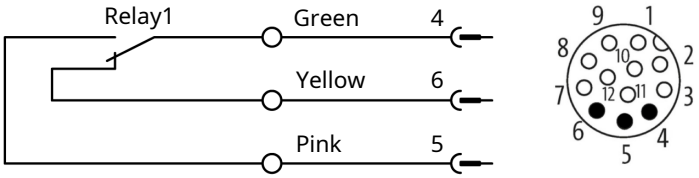
- Remove the bridge and connect to “Remote pump start” according to the wiring diagram delivered with the machine.

Reset Fault



It allows resetting remotely faults from the ECOTORQUE Variable Speed Drive (VSD) in case of alarm. Using a toggle switch is recommended to reset the ECOTORQUE Variable Speed Drive (VSD). Rising edge on the input will reset the fault..

Alarm Output



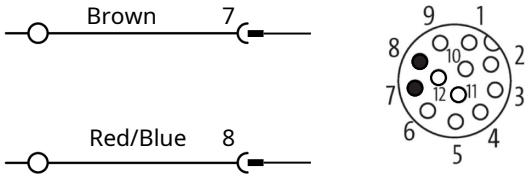
Operation Output

- M12 connector max. 30V DC 2 A



Customer Emergency OFF (EMO)

- A lockable disconnect switch or an emergency stop switch can be provided so the machine is completely secured in case of an emergency situation.



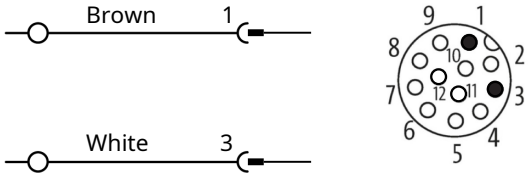
It allows to add an external safety element (dry contact).

Speed- / Pressure Control Selection

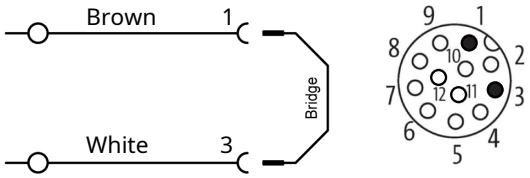
NOTE

The factory setting of the ECOTORQUE Variable Speed Drive (VSD) is Speed Control mode.

Speed Control (default factory setting)



Pressure Control



2.6.7 OTTO IoT Box



The machine can be equipped with the OTTO IoT Box. This allows the vacuum pump to connect to the Busch Cloud and collect real-time measurement data during operation.

For the activation and setup of this optional function, contact your Busch representative.

For more information, consult the specific instruction manual for the "OTTO IoT Box" (article number 0870236702) or contact your Busch representative.

3 Transport and Handling



WARNING

Suspended load.

Risk of severe injury!

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



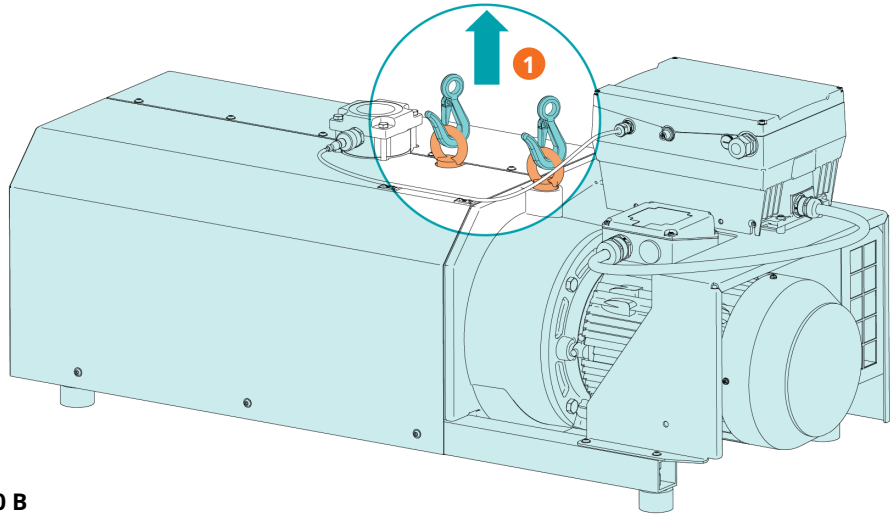
WARNING

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.

- To find out the weight of the machine, refer to the chapter *Technical Data* [➔ 47] 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.



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Description			
1	Use both eye bolts to lift the machine		

- 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.

Transport and Handling of Booster Ready Versions with Mounted Vacuum Boosters



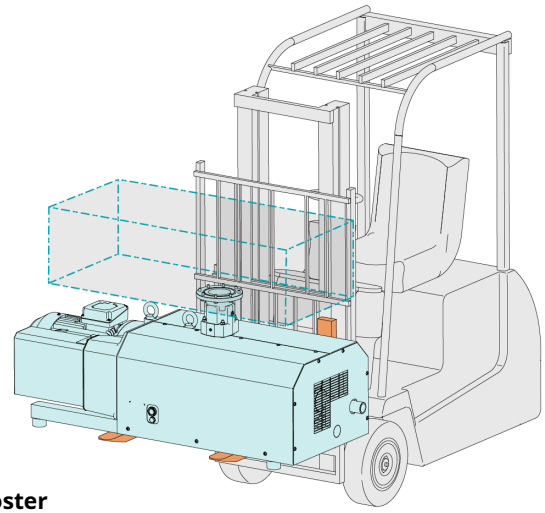
WARNING

Improper lifting.

Risk of severe injury!

- Do not lift the pump and booster combination with a lifting hook.
- Only lift the pump and booster combination as shown.

- Handle the pump and booster combination with care. Use either a forklift truck or a pallet jack. Access the base frame from underneath only.



MM 0332 B + Vacuum Booster

- Do not lift the entire pump and booster combination with a lifting hook.
- Disassemble the pump and booster combination and lift each machine separately.
- Comply with the lifting method described in the respective instruction manual of each machine.

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 0 ... 40 °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 0 ... 40 °C.

5 Installation

5.1 Installation Conditions

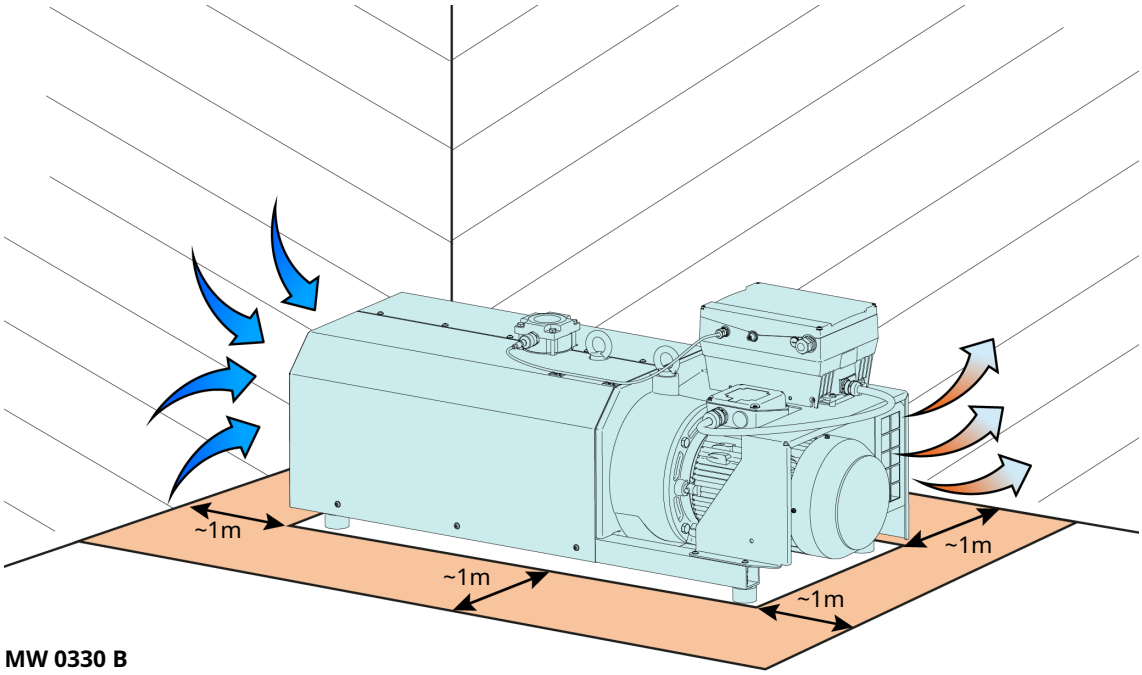
NOTICE

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.



MW 0330 B

- Make sure that the environment of the machine is not potentially explosive.
- Make sure that the ambient conditions comply with the *Technical Data* [➔ 47].
- 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 (CAI) and outlets (CAO) 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 installed or mounted horizontally, a maximum deviation of 1° in any direction is acceptable.
- Check the oil level, see *Oil Level Inspection* [➔ 34].
- Make sure that all provided covers, guards, hoods, etc. are mounted.
- Make sure that suitable protection against reverse rotation of the machine is provided.

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.

Installation Conditions for Booster Ready Versions

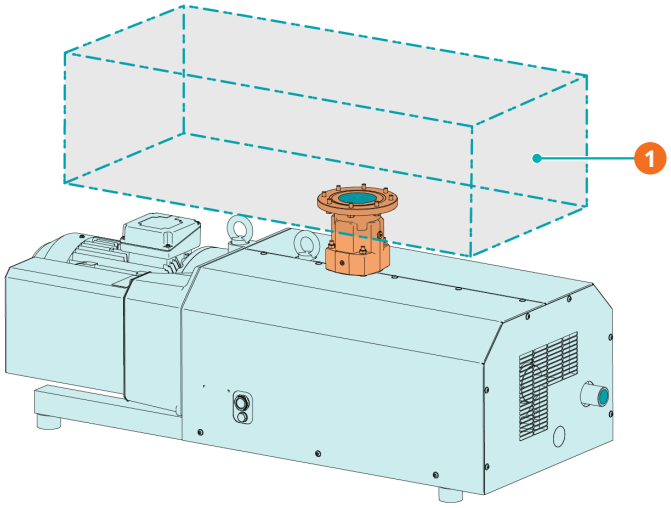
- Make sure that the weight of the vacuum booster does not exceed the maximum permissible value that is specified in the following table.

Backing pump	Maximum vacuum booster weight
MINK MW 0332 B	350 kg

- Comply with the installation conditions of the vacuum booster and the backing pump. Refer to the respective instruction manuals.

5.2 Mounting a Vacuum Booster

(MW 0332 B Only)



Description			
1	Busch vacuum booster		

For pump and booster combinations that are not delivered in an assembled state:

- Mount the vacuum booster on the top of the backing pump.
- Align the connecting flange with the vacuum booster flange.
- Make sure that the O-ring is installed correctly.
- Observe the permissible tightening torque of the screws. Refer to the instruction manual of the vacuum booster.

5.3 Connecting Lines / Pipes



WARNING

Rotating Parts.

Risk of severe injury!

- Do not operate the machine without inlet and exhaust connections installed.

- 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.

NOTICE

Potential condensate flows from the piping to the machine.

Risk of damage to the machine!

- Make sure that the inlet and outlet connecting pipes of the machine are installed in such a way as to prevent any possible condensate from flowing from the piping into the machine.
- Busch recommends the use of the optional horizontal inlet filter and exhaust condensate drain (or drip leg), to collect condensate and prevent it from flowing into the machine.

5.3.1 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):

- G2” – without inlet filter (IF)
- G2 ½” - with inlet filter (IF)

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.

5.3.2 Exhaust Connection

NOTICE

The exhaust gas flow is 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):

– R1 ¼"

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.

5.4 Filling Oil

NOTICE

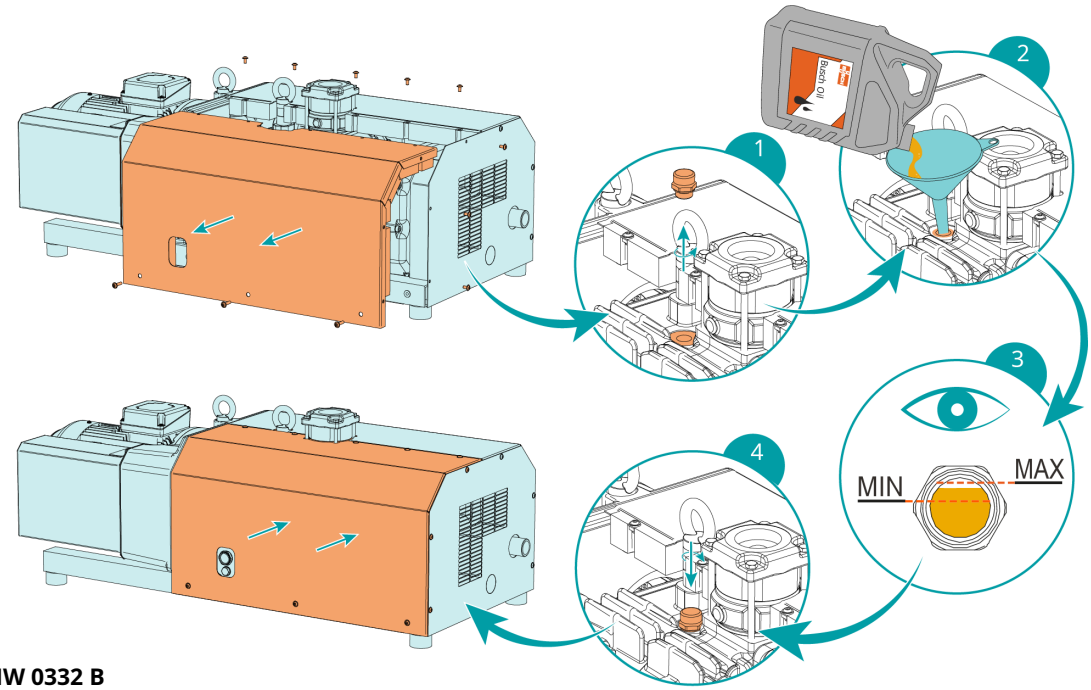
Use of inappropriate oil.

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* [➔ 47] and *Oil* [➔ 47] chapters.



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The oil level should stay constant over the lifetime of the oil. If the level does fall, this indicates a leak and the machine requires repair.

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* [➔ 48] or *UK Declaration of Conformity* [➔ 49]).

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

(MW 0332 B Only)





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

6.2 Machine delivered with an ECOTORQUE VSD

(MW 0330 B Only)



DANGER

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

Risk of electrical shock!

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

- Make sure that the power supply for the drive is compatible with the data on the name plate of the variable speed drive.
- 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.
- If the variable speed drive (VSD) is not equipped with a lockable disconnect switch, provide it on the power line so that the machine is completely secured during maintenance tasks.
- 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 an overload protection according to EN 60204-1.
- Connect the protective earth conductor.

6.3 Start / Stop Connection



NOTICE

Risk of phase loss or voltage imbalance.

Risk of damage to the machine!

If a phase loss or significant voltage imbalance occurs, the ECOTORQUE VSD may experience:

- **Reduced Output Power:** The ECOTORQUE VSD may not be able to deliver the full rated power to the connected machine.
- **Increased Heat Generation:** Operating under unbalanced conditions can lead to higher thermal stress on the ECOTORQUE VSD components.
- **Potential Fault Triggers:** The ECOTORQUE VSD might enter a fault state to protect itself from damage.

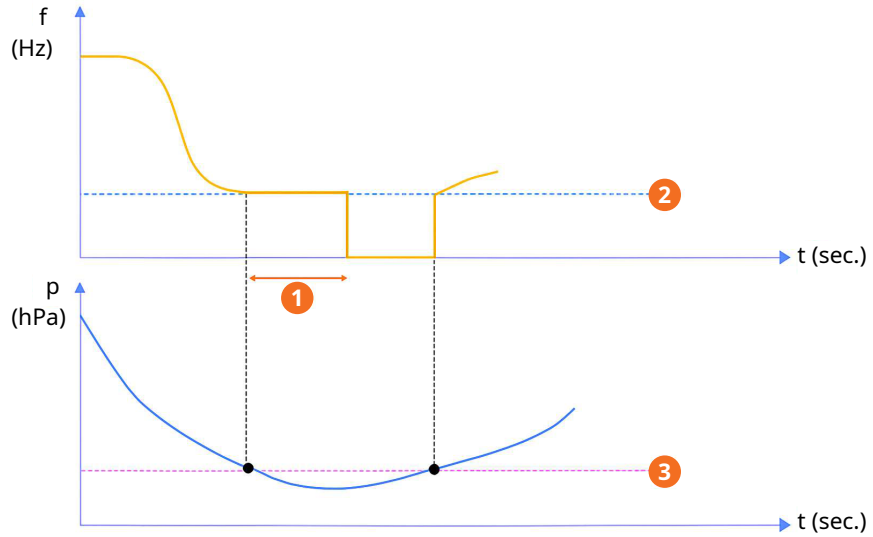
The following applies to machines equipped with an on-board variable speed drive (VSD).

- The ECOTORQUE Variable Speed Drive (VSD) is delivered with preset factory parameters. Please refer to the specific wiring diagram 11000036503.
- Contact your local Busch agency or your Busch representative to check if your machine is a custom or a standard one.

6.3.1 Ecomode in Pressure Control

This function can provide additional energy savings in pressure control mode, by stopping the machine when the target pressure is reached for a defined time (Ecomode stand-by time to be set in **Busch Vacuum Manager** software), instead of running at minimum speed (see *Technical Data* [➔ 47])

Once the pressure value (**p**) is higher than the target value (**3**), the machine will start again.



Description			
1	Ecomode stand-by time	2	Minimum speed (20 Hz / 1200 min^{-1})
3	Target pressure		

In **Busch Vacuum Manager** software, the Ecomode can be activated by clicking on the toggle switch. Toggle turned orange means that the Ecomode is activated.

If the drive controller runs for this set time at its minimum speed, the machine is stopped (0 Hz) to save energy.

Ecomode stand-by time value	Description
0	Ecomode disabled (default)
> 0	Waiting time [sec.] until stand-by function is enabled. (maximum 10000 sec), to be adapted at customer process.

6.4 Wiring Diagram Three-Phase Motor

(MW 0332 B Only)

NOTICE

Incorrect rotation direction.

Risk of damage to the machine!

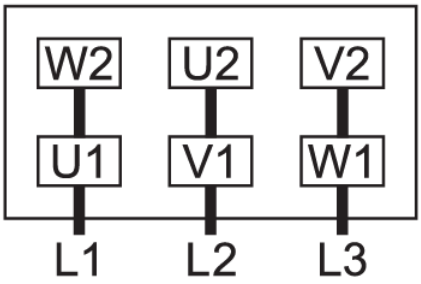
- Operating the machine in the wrong direction of rotation can destroy it very quickly! Before starting, make sure that the motor of the machine is rotating in the correct direction.

- Determine the intended direction of rotation with the arrow (stuck on or cast).
- Jog the motor briefly.

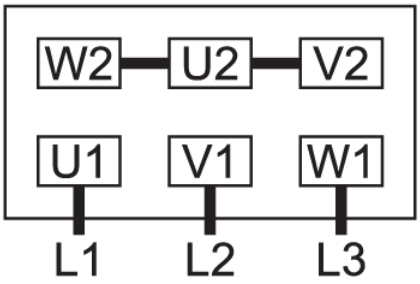
If the rotation of the motor must be changed:

- Switch any two of the motor phase wires.

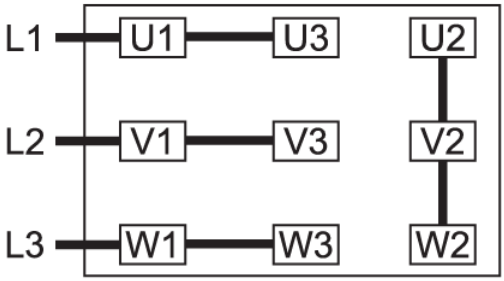
Delta connection (low voltage):



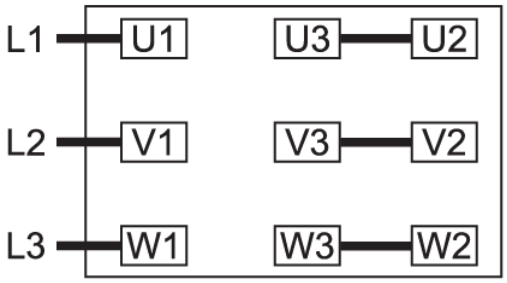
Star connection (high voltage):



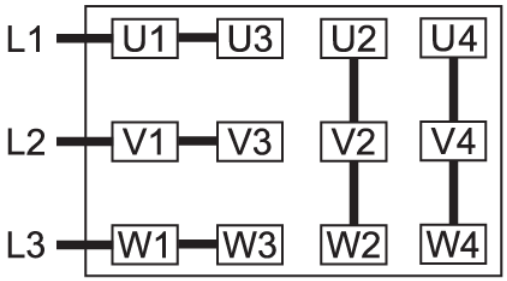
Double star connection, multi-voltage motor with 9 pins (low voltage):



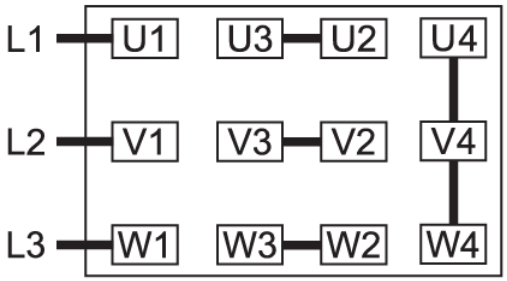
Star connection, multi-voltage motor with 9 pins (high voltage):



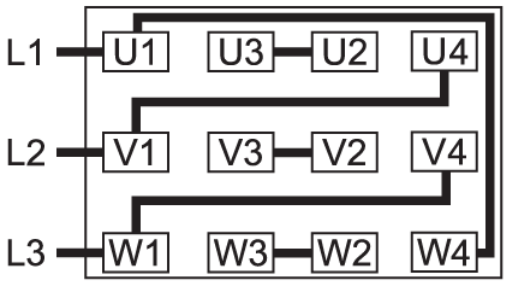
Double star connection, multi-voltage motor with 12 pins (low voltage):



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



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



6.5 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.

7 Commissioning

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.



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

While operating and/or venting the machine, the discharged gases and/or liquids may reach temperatures above 70°C.

Risk of burns!

- Avoid direct contact with the outlet connection (OUT) and installed lines or pipes.
- Avoid direct contact with the gas and/or liquid stream, in case the gas discharge (OUT) has no connections (lines or pipes) installed.

- Make sure that the *Installation Conditions* [➔ 18] are met.
- Start the machine.
- Make sure that the maximum permissible number of starts does not exceed 12 starts per hour. Those starts should be spread within the hour.
- Make sure that the operating conditions comply with the *Technical Data* [➔ 47].

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

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

7.1 Conveying Condensable Vapors



CAUTION

In operation, the surface of the inlet and exhaust connections may reach temperatures over 70°C.

Risk of burns!

- Avoid contact with these surfaces during and directly after operation.



CAUTION

Venting the machine.

The discharged gases and/or liquids may reach temperatures above 70°C!

Risk of burns!

- Avoid direct contact with the flow of gases and/or liquids.

CAUTION



Noise while draining the condensate.

Risk of damage to hearing!

While the machine is running, opening the condensate drain valve will lead to a significant increase of the noise level.

- Make sure to wear hearing protection.

The Aqua version is a design option for conveying condensable vapors (water).

Water vapor within the gas flow is tolerated within certain limits. The conveyance of other vapors shall be agreed upon with the manufacturer.

If condensable vapors are to be conveyed:

- Regularly drain condensate from the silencer with the drain cock.

7.2 Operating a Vacuum Booster without Bypass

(MW 0332 B Only)

For operation of a vacuum booster without bypass (PUMA WP or WY), observe the following recommendations:

- Always switch on the backing pump first.
- Switch on the vacuum booster as soon as the operating pressure is ≤ 50 mbar (abs.).
- During continuous operation, do not exceed the maximum permissible differential pressure of the vacuum booster. Refer to the instruction manual of the respective vacuum booster.

8 Maintenance



DANGER

Live wires.

Risk of electrical shock!

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



DANGER

Maintenance work without switching off the power supply to the control unit.

Risk of electrical shock!

- Switch off the power supply to the control unit with a lockable disconnect switch before attempting any work on it. High voltages are present at the terminals and within the variable speed drive for up to 10 minutes after disconnecting the electrical supply.
- Always ensure, by using a suitable two-pole voltage tester, that no voltage is present on any drive power terminals before starting any work.



DANGER

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

Risk of electrical shock!

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





WARNING



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

Venting the machine.

The discharged gases and/or liquids may reach temperatures above 70°C!

Risk of burns!

- Avoid direct contact with the flow of gases and/or liquids.

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

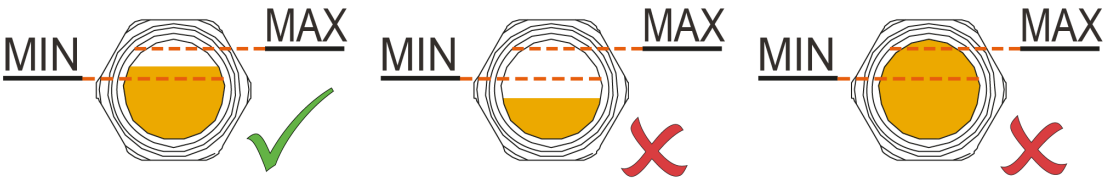
The maintenance intervals depend very much on the individual operating conditions. The intervals given below are considered as starting values which should be individually shortened or extended as appropriate.

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
Monthly	• Check the inlet screen (IS), clean if necessary. In case of an inlet filter (IF) being installed: • Check the inlet filter cartridge, replace if necessary.
Every 3 months	• Check the oil level, see *Oil Level Inspection* [➔ 34].
Every 6 months	• Clean the machine from dust and dirt. In case of a coupling (CPL) being installed: • Check the coupling (CPL) for backlash and wear.
Every 20000 hours	• Change the oil. The change interval of 20000 operating hours is valid for Busch approved oils only. The change interval depends very much on the operating conditions. Borderline operation may reduce the change interval down to approximately 5000 operating hours. Other oils may reduce the change interval.
Every 40000 hours or after 6 years	• Have a major overhaul on the machine (contact Busch).

8.2 Oil Level Inspection

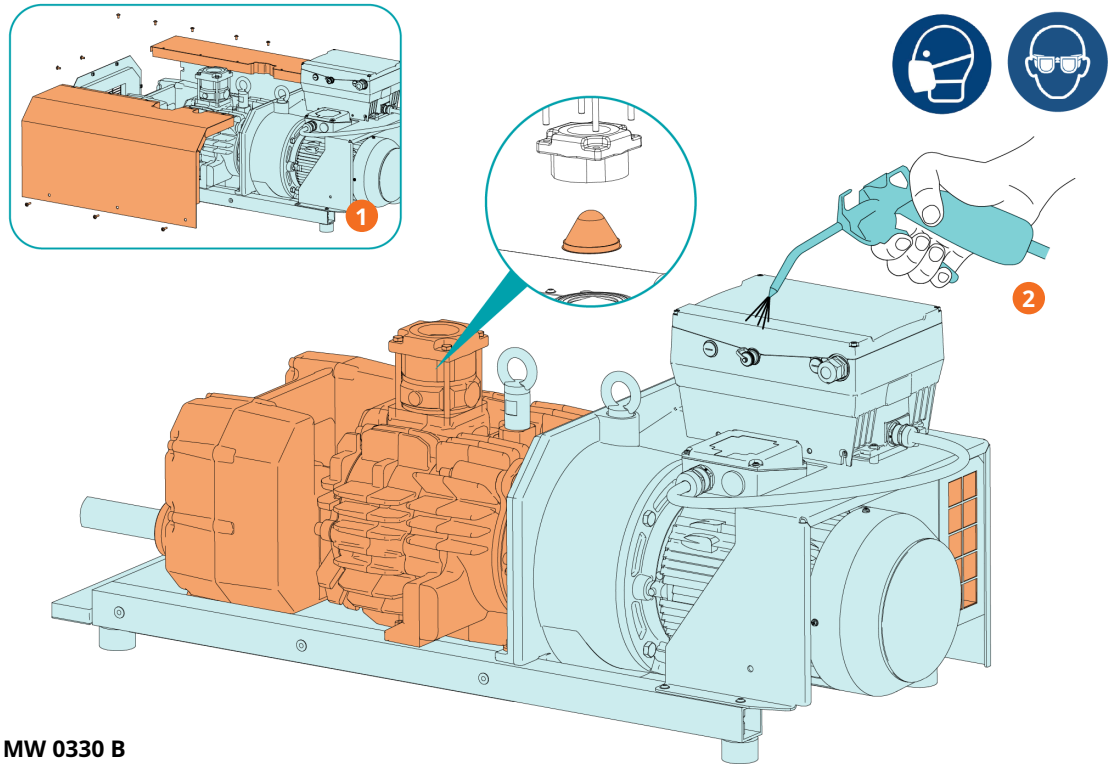
- Stop the machine.
- Wait 1 minute.
- Check the oil level.



The oil level should stay constant over the lifetime of the oil. If the level does fall, this indicates a leak and the machine requires repair.

- Fill up if necessary, see *Filling Oil* [➔ 22].

8.3 Cleaning from Dust and Dirt



MW 0330 B

Description			
1	Remove the covers	2	Clean the ventilation grilles, inlet screen and cooling fins with an industrial vacuum cleaner

8.4 Oil Change

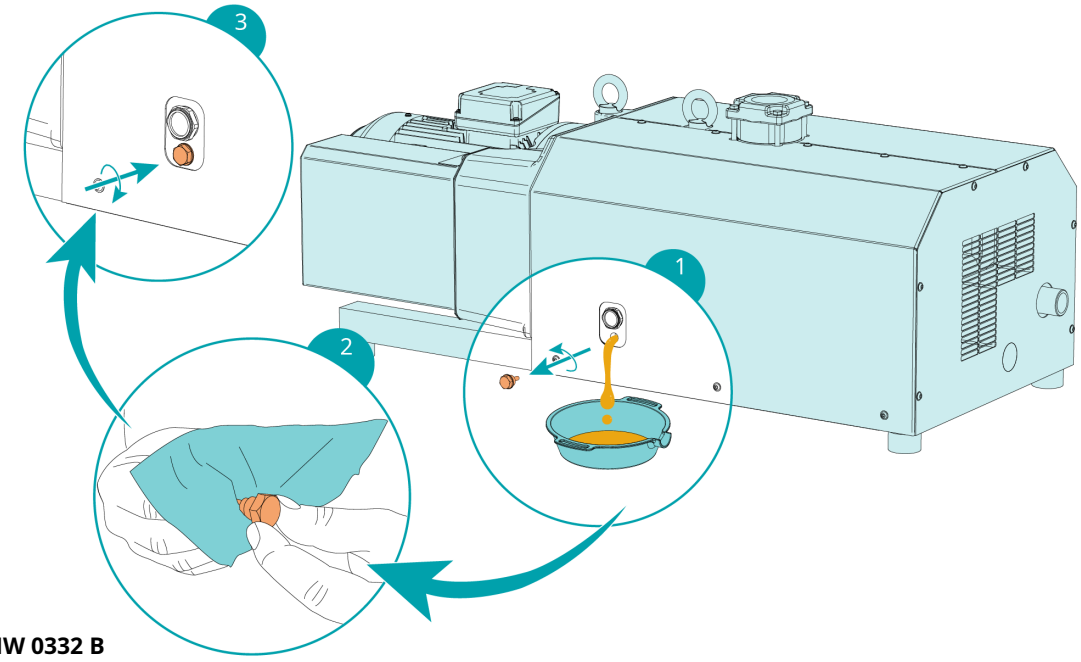
NOTICE

Use of inappropriate oil.

Risk of premature failure!

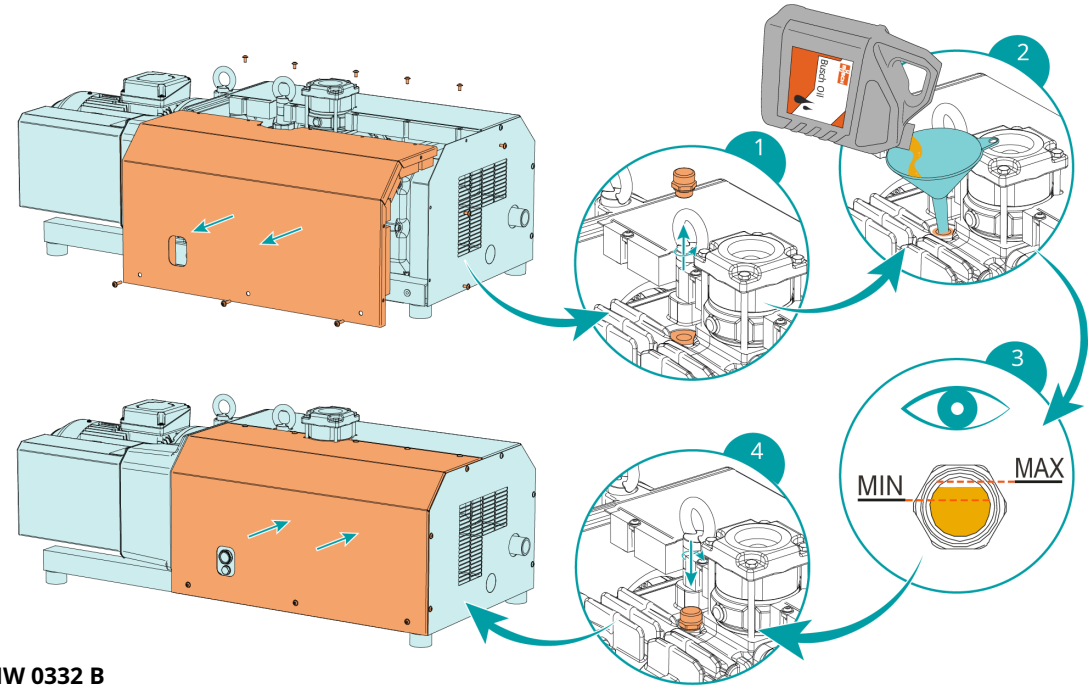
Loss of efficiency!

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



MW 0332 B

- For information on oil type and filling capacities, see the *Technical Data* [➔ 47] and *Oil* [➔ 47] chapters.



MW 0332 B

The oil level should stay constant over the lifetime of the oil. If the level does fall, this indicates a leak and the machine requires repair.

8.5 Pressure Relief Lines Maintenance

(Gas Tight Version Only)



WARNING



Media potentially dangerous.

Risk of poisoning!

Risk of infection!

- Wear appropriate personal protective equipment in case of high concentration of the medium in the ambient atmosphere of the machine.

- Check that pressure relief lines (PRL) are not clogged as described in the following illustrations.

NOTICE

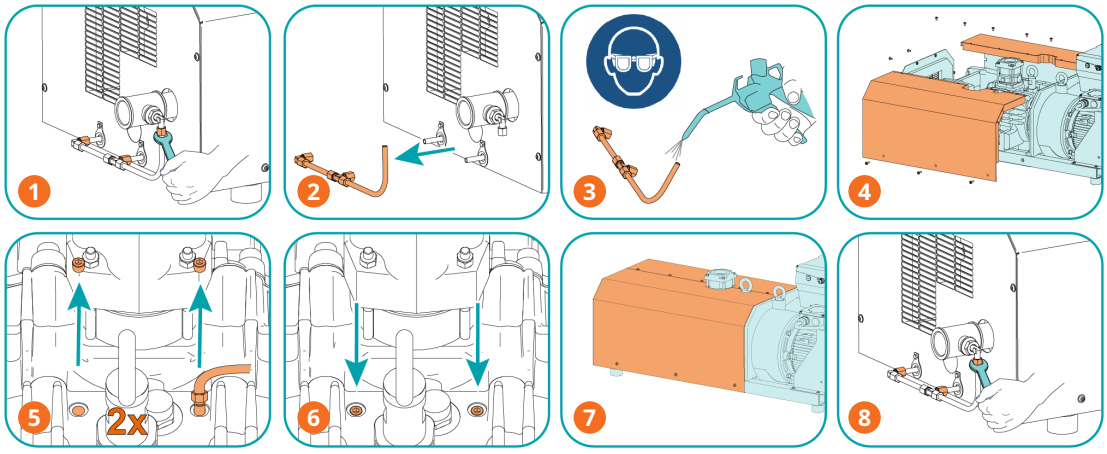
Pressurized air systems supply too high pressure.

Risk of damage to the machine!

- Adjust the pressurized air to 0.2 bar(g) by means of a pressure regulator.

In case of clogged pressure relief lines (PRL):

- Remove the clogging or have the machine repaired (contact Busch).



Description			
1	Loosen the nuts	2	Remove the pressure relief line
3	Clean the pressure relief line	4	Remove the covers
5	Remove both plugs and connect pressurize air (max. 0.5 bar (g)) to the pressure relief system.	6	After flushing, reinstall both plugs
7	Reinstall the covers	8	Reinstall the pressure relief line and tighten the nuts

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.



DANGER

Maintenance work without switching off the power supply to the control unit.

Risk of electrical shock!

- Switch off the power supply to the control unit with a lockable disconnect switch before attempting any work on it. High voltages are present at the terminals and within the variable speed drive for up to 10 minutes after disconnecting the electrical supply.
- Always ensure, by using a suitable two-pole voltage tester, that no voltage is present on any drive power terminals before starting any work.



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* [➔ 17].

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.

Spare part	Description	Article number
Service kit	Includes all parts to perform maintenance work	2000 268 575
Inlet screen (IS)		0534 000 041

If other parts are required:

- Contact your Busch representative.

12 Troubleshooting



DANGER

Live wires.

Risk of electrical shock!

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



DANGER

Maintenance work without switching off the power supply to the control unit.

Risk of electrical shock!

- Switch off the power supply to the control unit with a lockable disconnect switch before attempting any work on it. High voltages are present at the terminals and within the variable speed drive for up to 10 minutes after disconnecting the electrical supply.
- Always ensure, by using a suitable two-pole voltage tester, that no voltage is present on any drive power terminals before starting any work.



CAUTION

Hot surface.

Risk of burns!

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

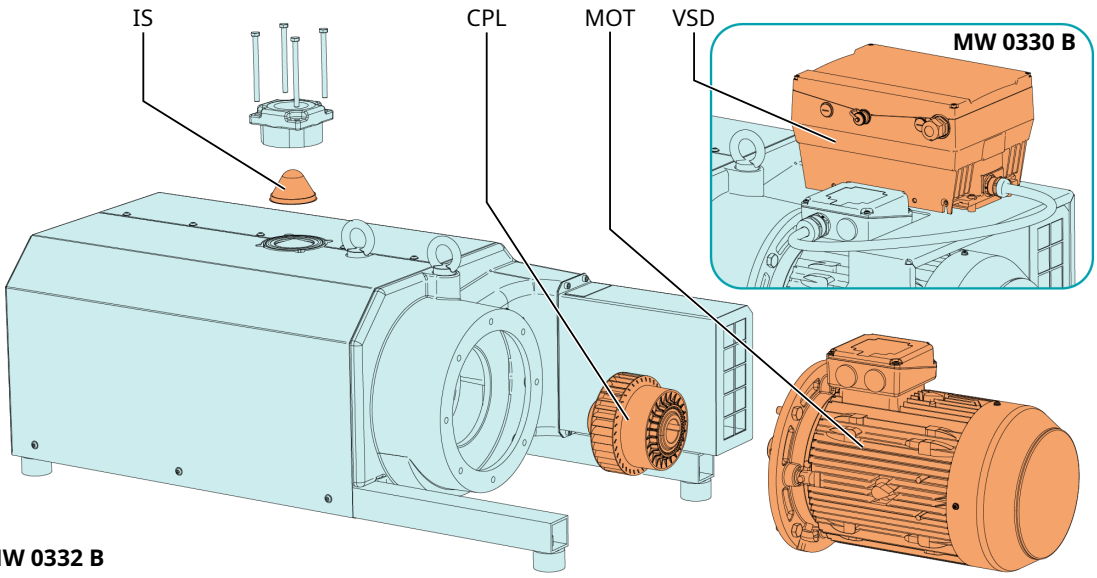


CAUTION

Hot liquids.

Risk of burns!

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



MW 0332 B

Description			
IS	Inlet screen	CPL	Coupling
MOT	Motor	VSD	Variable speed drive

The machine does not start.	
Possible Cause	**Remedy**
The motor is not supplied with the correct voltage.	• Check the power supply.
The ECOTORQUE variable speed drive (VSD) is not supplied with the correct voltage.	• Check the power supply.
The motor is defective.	• Replace the motor (contact Busch).
The ECOTORQUE variable speed drive (VSD) is defective.	• Replace the ECOTORQUE variable speed drive (VSD).
The coupling (CPL) is defective.	• Replace the coupling (CPL) (contact Busch).

The machine does not reach the usual pressure at the inlet connection.	
Possible Cause	**Remedy**
The inlet screen (IS) is partially clogged.	• Clean the inlet screen (IS).
The inlet filter cartridge (optional) is partially clogged.	• Replace the inlet filter cartridge.
Leakage in the return line of the bypass or blocked bypass valve.	• Tighten the leakage, replace defective parts.
Internal parts are worn or damaged.	• Repair the machine (contact Busch).

The machine runs very noisily.	
Possible Cause	**Remedy**
Worn coupling (CPL).	• Replace the coupling (CPL) (contact Busch)
Oil level too low.	• Check the machine for leakage. • Top up oil.
Defective bearings.	• Repair the machine (contact Busch).

The machine runs too hot. Possible Cause	Remedy
Insufficient cooling.	• Remove dust and dirt from the machine.
Ambient temperature is too high.	• Observe the permitted ambient temperature, see *Technical Data* [➔ 47].
Temperature of the process gases at the inlet too high.	• Observe the permitted gas inlet temperature, see *Technical Data* [➔ 47].
Oil level too low.	• Check the machine for leakage. • Top up oil.

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

12.1 Troubleshooting ECOTORQUE Variable Speed Drive (VSD)

DANGER

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

Risk of electrical shock!

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

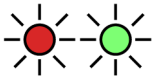
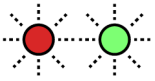
12.1.1 LED Flash Codes

When an error occurs, the LEDs on the variable speed drive display a flashing code that allows the errors to be diagnosed.

The following table contains an overview:

Red LED	Green LED	State
		Boot loader active (flashing in turn)
		Ready for operation (activate En_HW for operation)
		Operation / ready
		Warning
		Error
		Identification of motor data
		Initialisation
		Firmware update

Red LED	Green LED	State
		Bus error operation
		Bus error ready for operation

Key			
	LED off		LED on
	LED flashing		LED flashing quickly

12.1.2 List of Errors

The variable speed drive shuts down if an error occurs. Consult the flash code table / PC tool for the corresponding error numbers.

NOTE

Error messages can only be acknowledged once the error has been remedied.

Error messages can be acknowledged as follows:

- Digital input 2, see wiring diagram delivered with the machine
- switch device off and on again
- Busch Vacuum Manager Software

The following section contains a list of possible error messages.

Contact your Busch representative if you encounter errors that are not listed here.

No.	Error name	Description of error	Possible causes / remedy
1	Undervoltage 24 V application	Supply voltage for the application is less than 15 V.	24 V supply overload.
2	Overvoltage 24 V application	Supply voltage for the application is greater than 31 V.	Internal 24 V supply is not OK, or external supply is not OK.
4	Warning: Customer PLC runtime environment	Customer PLC is not running.	The customer PLC is being downloaded / The customer PLC has a programming error, e.g. division by 0.
6	Customer PLC version error	The version of the customer PLC doesn't match the device firmware.	Check the version numbers of the customer PLC and device firmware.
8	Communication application<>power	Internal communication between the application plate and the power-conducting plate is not OK.	EMC interference.
9	Warning: Warning: multi-pump error	A fault has occurred in the multi-pump system: One participant has a fault. The CAN open connection is disturbed/interrupted.	Check that all participants are available, and the status LED is green. Check CAN open connection.
10	Parameter distributor.	The internal distribution of parameters during initialization failed.	Parameter set is incomplete.
11	Time-out power	The power part does not respond.	Operation with 24 V without mains feed-in.
13	Cable break at analog in 1 (4–20 mA / 2–10 V)	Current or voltage is less than the lower limit of analog input 1.	Cable break, faulty external sensor.
14	Cable break at analog in 2 (4–40 mA / 2–10 V)	Current or voltage is less than the lower limit of analog input 2.	Cable break, faulty external sensor.
15	Blocking detection	The drive shaft of the motor is stalled.	Remove the blockage.
16	PID dry run	No PID actual value despite maximum speed.	PID actual value sensor defective Extend dry run time parameter.
17	Start-up error	Motor not starting up or starting up incorrectly.	Check motor connections / check motor and controller parameters.

No.	Error name	Description of error	Possible causes / remedy
18	Excess temperature for frequency converter application	Inner temperature too high.	Insufficient cooling, low motor speed and high torque, switching frequency too high.
19	Firmware update error	A firmware update could not be completed.	Connection aborted during a FW update. Repeat the FW update. The variable speed drive is supplied externally with 24 V. **Note:** During a firmware update, 24 V must not be connected externally.
21	Bus time-out	No response from bus sharing unit or remote control/PC.	Check bus wiring.
22	Acknowledgement error	The number of maximum automatic acknowledgements was exceeded.	Check error history and remedy error.
23	External fault 1	The parameterized fault input is active.	Correct the external error.
24	External fault 2	The parameterized fault input is active.	Correct the external error.
25	Motor detection	Motor identification error.	Check variable speed drive/motor and PC / remote control / variable speed drive connections / restart motor identification.
26	STO inputs plausibility	The statuses of the two STO inputs have not been identical for more than 2 sec.	Incorrect activation of the STO inputs. Check corresponding external wiring / Indoor temperature too high.
27	Bus address invalid	CAN open fieldbus address invalid.	The ID must be > 0 and < 127.
28	Limit frequency exceeded / not met	The parameterized minimum / maximum frequency has not been met / has been exceeded.	Motor blocked / Brake not opened / Motor overloaded.
32	Trip IGBT	Protection of the IGBT module against overcurrent has been triggered.	Short circuit in the motor or motor feed line / controller settings.
33	Overvoltage of intermediate circuit	The maximum intermediate circuit voltage has been exceeded.	Feedback by motor in generator mode / supply voltage too high / incorrect setting of speed controller / brake resistor not connected or defective / ramp times too short / operation on transformer / operation with mains choke.
34	Undervoltage of intermediate circuit	The minimum intermediate circuit voltage has not been reached.	Mains voltage too low, mains connection defective / check wiring.
35	Excess motor temperature	Motor PTC has been triggered.	Overload of the motor (e.g. high torque at low motor speed) / ambient temperature too high.
36	Power failure	The grid voltage has dropped briefly.	Grid fluctuation / grid voltage interrupted.
38	Excess IGBT module temperature	Excess IGBT module temperature.	Insufficient cooling, low motor speed and high torque, switching frequency too high.

No.	Error name	Description of error	Possible causes / remedy
39	Overcurrent	Maximum output current of variable speed drive exceeded.	Motor stalled / check motor connection / incorrect speed controller setting / check motor parameters / ramp times too short / brake not open.
40	Excess frequency converter temperature	Inner temperature too high.	Insufficient cooling / low motor speed and high torque / switching frequency too high permanent overload / reduce ambient temperature / check fan.
42	I2t motor protection shutoff	The internal I2t motor protection (can be parameterized) has been triggered.	Permanent overload.
43	Ground leak	Ground leak during a motor phase.	Insulation fault.
45	Motor connection disrupted	No motor current despite control through frequency converter.	No motor connected or not completely connected. Check phases or motor connections and connect correctly when necessary.
46	Motor parameters	Plausibility check for motor parameters failed.	Parameter set not OK.
47	Variable speed drive parameters	Plausibility check for variable speed drive parameters failed.	Parameter sets are not OK, motor type and control method are not plausible.
48	Type plate data	No motor data entered.	Please enter the motor data according to the motor nameplate.
49	Power class restriction	Max. overload of the variable speed drive exceeded more than 60 sec.	Check application / reduce load / use larger variable speed drive.
53	Motor tipped	Only for synchronous motors, field orientation lost.	Load too high Optimize controller parameters.
56	Grid overvoltage	The mains input voltage is above 528 V AC.	Check the mains supply.
57	**Warning:** Switching frequency reduction active	The switching frequency was reduced due to the ambient temperature.	Insufficient cooling / low speed and high torque / permanent overload/reduce ambient temperature/check fan.
58	IGBT module overheating	The IGBT module overheating at high starting current and high clocking frequency.	Reduce clocking frequency. Reduce load in the lower speed range.
-	Pressure / Speed target not reached	Speed limitation to avoid overloading the motor.	Control possible overload due to excessive exhaust back pressure: pressure drops in the exhaust line downstream of the machine, clogged exhaust filters. In cold ambient conditions, pre-heat the machine for 5 minutes at start-up.

13 Technical Data

		MW 0332 B	MW 0330 B
Nominal pumping speed (50 / 60 Hz)	m^3/h	280 / 330	- / 330
	ACFM	– / 194	
Ultimate pressure	hPa (mbar) abs.	0.8	
	Torr abs.	0.6	
Nominal motor rating (50 / 60 Hz)	kW	7.5 / 9.5	
	hp	– / 12.1	
Power consumption at ultimate pressure (50 / 60 Hz)	kW	3.7 / 4.7	- / 4.3
	hp	– / 5.4	
Nominal motor speed (50 / 60 Hz)	min^{-1}	3000 / 3600	- / 3600
	rpm	3000 / 3600	- / 3600
Permitted motor speed	min^{-1}	1200 ... 3600 automatic speed reduction at max. motor current limit (> 300mbar – 1000mbar)	
	rpm	1200 ... 3600 at ≥ 0.6 Torr abs.	
Sound pressure level (ISO 2151) at ultimate pressure (50 / 60 Hz)	dB(A)	70 / 73	- / 73
Ambient temperature	°C	0 ... 40 *	
	°F	32 ... 104 *	
Inlet gas temperature	°C	0 ... 40 *	
	°F	32 ... 104 *	
Ambient pressure		Atmospheric pressure	
Oil capacity	l	1.2	
	qts.	1.05	
Weight approx.	kg	325 **	350 **
	Lbs.	716 **	

* In case of higher or lower temperatures, consult your Busch representative.

** The weight can vary depending on the order.

14 Oil

Name	ISO-VG	Oil type	0.1 L packing	0.5 L packing	1 L packing	5 L packing
VS 150	150	Synthetic	-	0831 168 695	0831 164 883	0831 164 884

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

Oil suitability

- **Oil VS 150**: Suitable for standard applications.

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

Busch Produktions GmbH
Schauinslandstr. 1
DE-79689 Maulburg

declares that the machine: vacuum pump MINK MW 0330 B; MINK MW 0332 B

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

- 'Machinery Directive' 2006/42/EC, if the serial number is less than or equal to DEM127029999 (until January 19, 2027).
- 'Machinery Regulation' (EU) 2023/1230, if the serial number is greater than or equal to DEM127030000 (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)
- 'Cyber Resilience Act' [1)], Regulation (EU) 2024/2847, if the serial number is greater than or equal to DEM127480000 (from December 11, 2027). The conformity assessment has been carried out according to internal production control procedure (Module A), in accordance with the requirements of the 'Cyber Resilience Act'.

and comply(-ies) with the following harmonized standards, common specifications or other technical specifications:

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 3744 : 2010	Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane
EN IEC 63000 : 2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
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
EN IEC 62443-3-3 : 2019	Industrial communication networks - Network and system security - Part 3-3: System security requirements and security levels

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

Maulburg, 2026.10.01



Dr. Martin Gutmann, General Manager

Busch Produktions GmbH

[1)] The **'Cyber Resilience Act'** regulation is applicable if the machine is delivered ex-factory with digital elements containing programmable or digital functions, such as a control box, a VSD (Variable Speed Drive), an OTTO IoT Box, a Busch PLC (Programmable Logic Controller) ...

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

Busch Produktions GmbH
Schauinslandstr. 1
DE-79689 Maulburg

declares that the machine: vacuum pump MINK MW 0330 B; MINK MW 0332 B

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, common specifications or other technical specifications:

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 3744 : 2010	Acoustics - Determination of sound power levels and sound energy levels of noise sources using sound pressure - Engineering methods for an essentially free field over a reflecting plane
EN IEC 63000 : 2018	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances
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
EN IEC 62443-3-3 : 2019	Industrial communication networks - Network and system security - Part 3-3: System security requirements and security levels

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

Maulburg, 2026.10.01



Dr. Martin Gutmann, General Manager

Busch Produktions GmbH

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
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www.buschvacuum.com

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