

HUCKEPACK

Once-Through Oil-Lubricated Rotary Vane Vacuum Pumps
HO 0429 F, HO 0433 F, HO 0437 F, HO 0441 F

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 Busch representative.

Read this manual carefully before use and keep for future reference.

This instruction manual remains valid as long as the customer does not change anything on the product.

The machine is intended for industrial use. It must be handled only by technically trained personnel.

Always wear appropriate personal protective equipment in accordance with the local regulations.

The machine has been designed and manufactured 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.

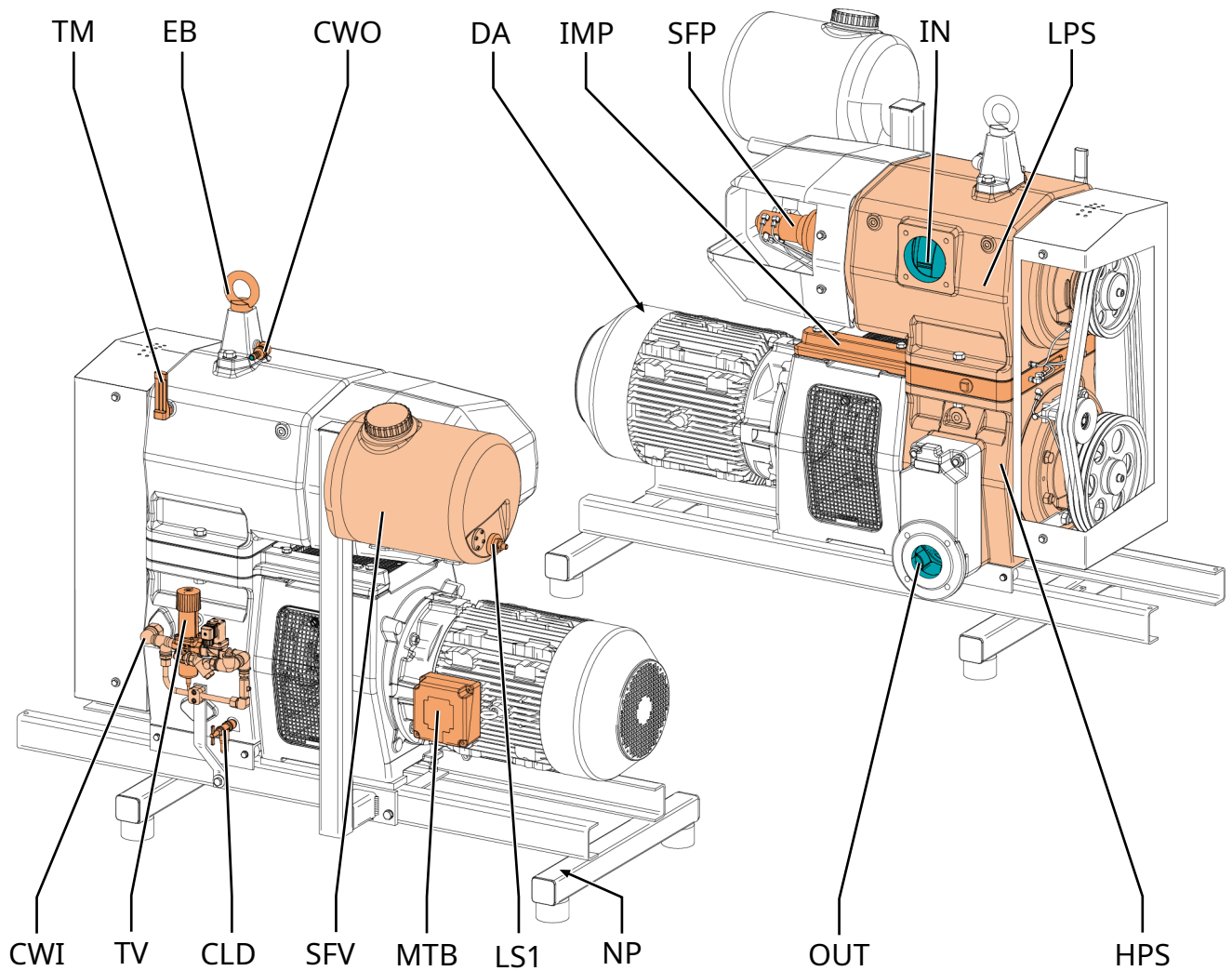


NOTE

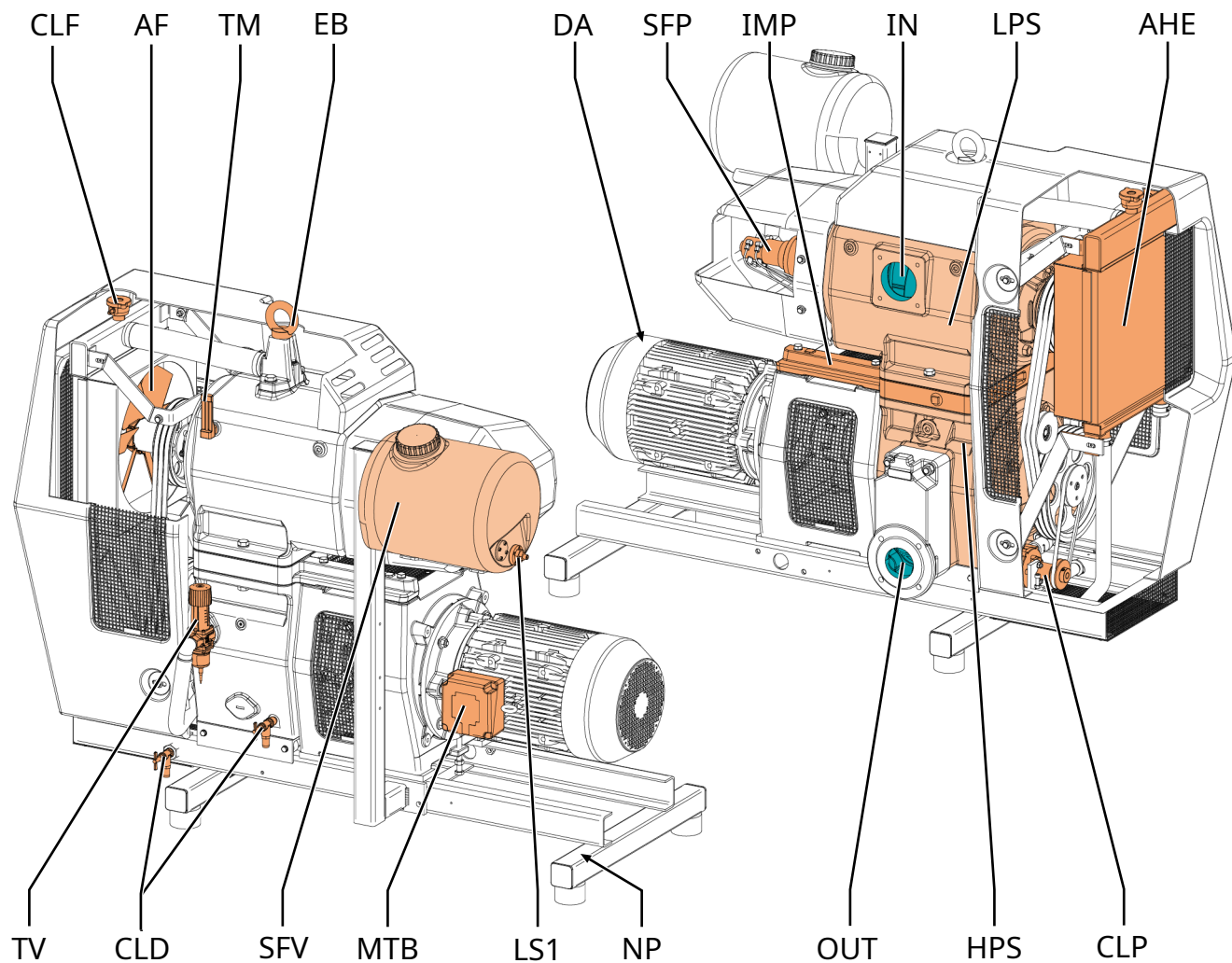
... indicates helpful tips and recommendations, as well as information for efficient and trouble-free operation.

2 Product Description

Direct cooling-version:



Description			
IN	Inlet connection	OUT	Discharge connection
CLD	Cooling liquid drain valve	CWI	Cooling water inlet
CWO	Cooling water outlet	DA	Directional arrow
EB	Eye bolt	HPS	High pressure stage
IMP	Intermediate plate	LPS	Low pressure stage
LS1	Level switch	MTB	Motor terminal box
NP	Nameplate	SFP	Seal fluid pump
SFV	Seal fluid vessel	TM	Thermometer
TV	Thermostatic valve		

Radiator cooling-version:**Description**

IN	Inlet connection	OUT	Discharge connection
AF	Axial fan	AHE	Air-water heat exchanger
CLD	Cooling liquid drain valve	CLF	Cooling liquid fill plug
CLP	Cooling liquid pump	DA	Directional arrow
EB	Eye bolt	HPS	High pressure stage
IMP	Intermediate plate	LPS	Low pressure stage
LS1	Level switch	MTB	Motor terminal box
NP	Nameplate	SFP	Seal fluid pump
SFV	Seal fluid vessel	TM	Thermometer
TV	Thermostatic valve		

**NOTE**

Technical term.

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

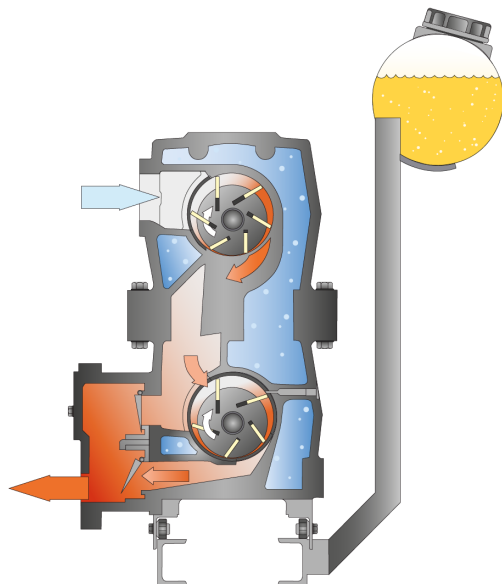


NOTE

Illustrations.

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

2.1 Operating Principle



The machine works on the rotary vane principle.

The once-through oil seals the gaps, lubricates the vanes and takes away compression heat.

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, aggressive, toxic and non-explosive gases.

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

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

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

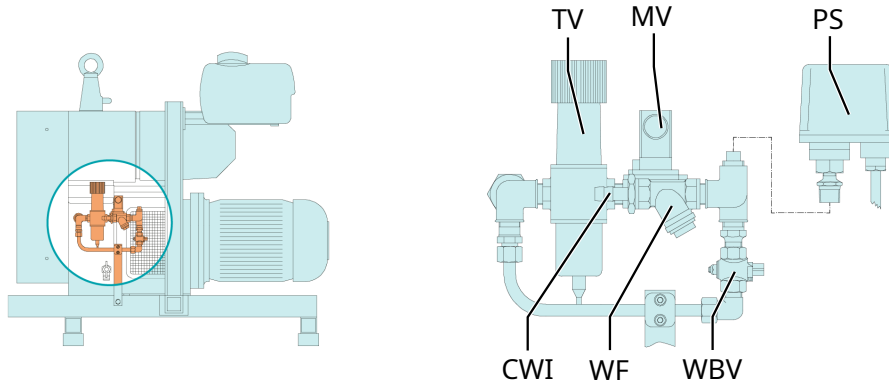
The machine is capable of maintaining ultimate pressure, see *Technical Data* [→ 45].

The machine is suitable for continuous operation under certain conditions, see *Continuous Operation* [→ 31]

Permitted environmental conditions, see *Technical Data* [→ 45].

The machine is capable of conveying gases which contain a certain percentage of water vapor if the gas ballast valve (accessory) is installed and open. See chapters *Conveying Condensable Vapors* [→ 31] and *Technical Data* [→ 45].

2.3 Direct Cooling-Version



Description			
CWI	Cooling water inlet	MV	Solenoid valve
PS	Pressure switch (optional)	TV	Thermostatic valve (optional)
WBV	Water bypass valve	WF	Water filter

The Huckepack machines with direct cooling-system are equipped with a water inlet unit with a solenoid valve (MV), a thermostatic valve (TV) and a pressure control switch (PS) (optional).

The solenoid valve (MV) is used to stop the cooling water circulation when the machine is switched off.

The thermostatic valve (TV) is used to control the water flow in order to keep a stable machine temperature.

The pressure switch (PS) is used to monitor the water pressure at the cooling system of the machine and to stop the machine if the water pressure is too low.

The water bypass valve (WBV) is used at the first machine start-up.

2.4 Radiator Cooling-Version

The Huckepack machines with radiator cooling-system are independent of the cooling water net see *Product Description* [→ 5].

The cooling liquid is circulated through the radiator (AHE) by a cooling liquid pump (CLP). A cooling fan (AF) cools the radiator (AHE).

The thermostatic valve (TV) is used to control the water flow in order to keep a stable machine temperature.

2.5 Start Controls

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

The machine can be equipped with a soft-starter.

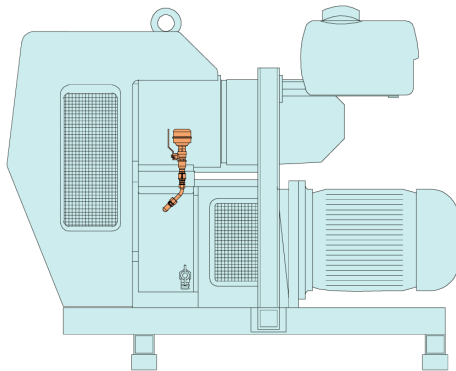
2.6 Optional Accessories

2.6.1 Gas Ballast Valve

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

Mixing with inert gas is also possible.

The gas ballast valve has an influence on the ultimate pressure of the machine, see *Technical Data* [→ 45].



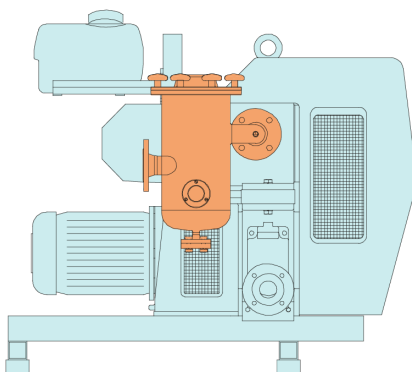
2.6.2 Inlet Filter

The inlet filter (IF) protects the machine against dust and other solids on the process gas. The inlet filter is available with a paper cartridge (other cartridge material on request).

2.6.3 'Duosec' Separator

The 'Duosec' separator protects the machine against corrosive gases, vapors, sticky media or dust particles in the process gas.

When the liquid has reached the sight glass, it must be drawn off through the drain plug with the vacuum pump switched off.



2.6.4 Inlet Flange

The inlet flange has a female thread and is made of ductile cast.

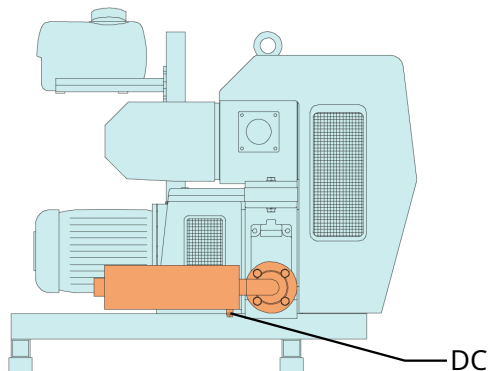
Available connection size(s):

- G2 for HO 429 F; HO 433 F
- G3 for HO 437 F; HO 441 F

2.6.5 Discharge Silencer

The discharge silencer (SI) reduces the sound pressure level at the gas discharge (OUT) of the machine.

A drain connection (DC) is provided to drain the collected seal fluid.



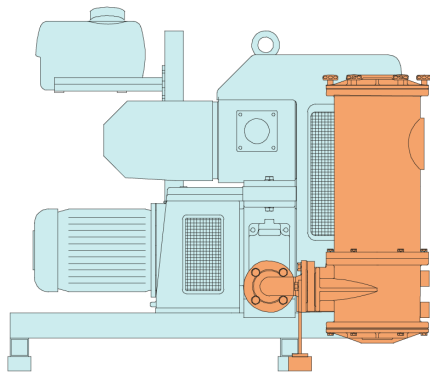
2.6.6 Seal Fluid Separator

The seal fluid separator reduces the sound pressure level at the gas discharge (OUT) of the machine and separates the seal fluid from the discharged gas.

The seal fluid separator is available with fleece inserts or aerolith filter elements.

The change intervals of the filter elements in the separator depend on the pumped medium or saturation.

A pressure switch (option) is to switch off the machine if the filter resistance is too high.



2.6.7 Pressure Switch "Direct Cooling"

The pressure control switch monitors the static water pressure.

The machine must be switched off when the water pressure is too low.

2.6.8 Additional Level Switch of Seal Fluid Vessel

In addition to level switch LS1 (mandatory) to stop the machine if the oil level in the seal fluid vessel (SFV) is too low, an upper level switch (LS2) is available, to monitor low seal fluid level in the seal fluid vessel (SFV).

2.6.9 Liquid Flushing Device

The liquid flushing device is to flush the machine with the appropriate liquid according to the process type.

The flushing device makes it possible to clean the pump stages (LPS and HPS) from residues, polymerizing, subliming or corrosive tailings.

Manual or automatical flushing devices are available, see *Liquid Flushing Procedure* [→ 32].

Two level switches monitor the flushing liquid quantity in the flushing liquid vessel (FLV):

Lower level switch (LS3 ▶ L _{alarm})
--

Trip, the mashine must be stopped

Optional:

Upper level switch (LS4 ▶ L _{warning})
--

Early warning, refill the flushing liquid vessel
--

3 Transport



WARNING

Suspended load.

Risk of severe injury!

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



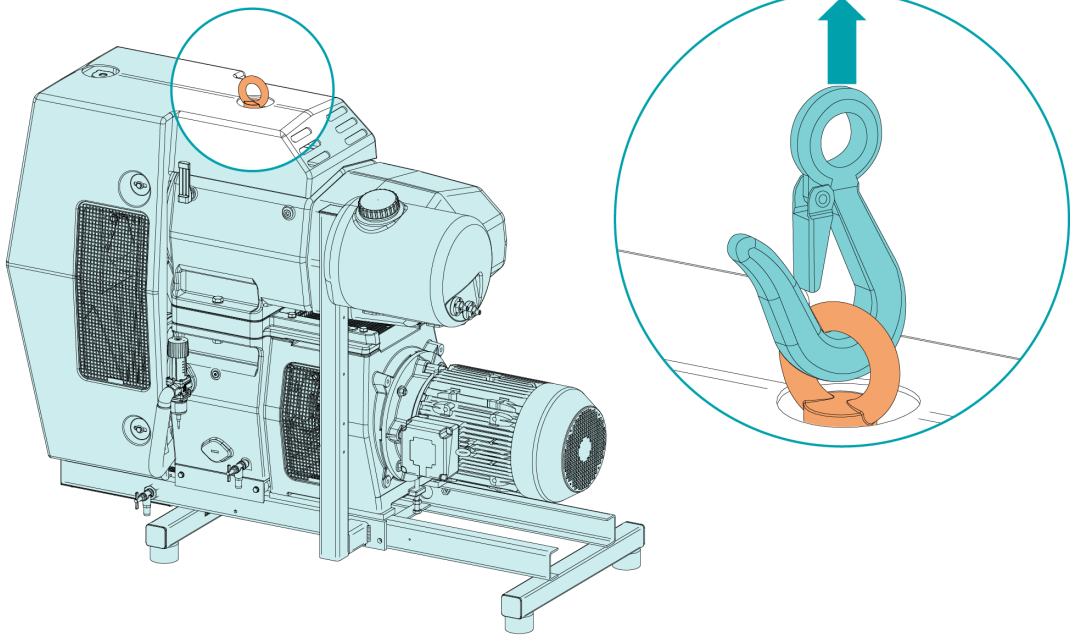
WARNING

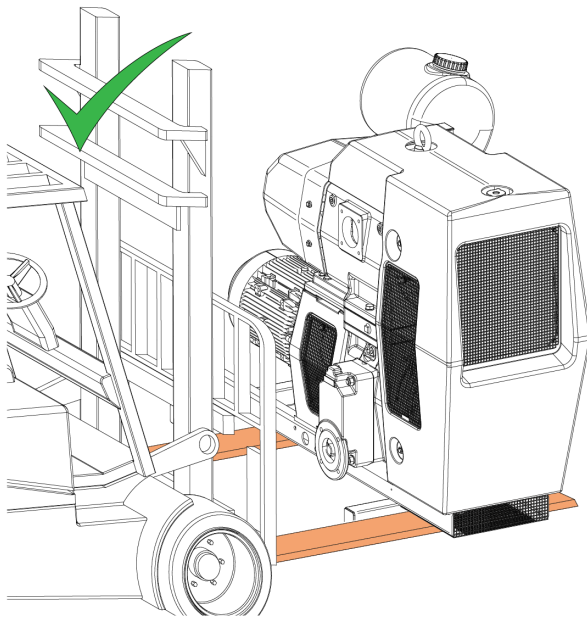
Lifting the machine using the motor eye bolt.

Risk of severe injury!

- Do not lift the machine using the eye bolt fitted to the motor. Only lift the machine as shown.
- To find out the weight of the machine, refer to the chapter *Technical Data* [-> 45] or the nameplate (NP).
- Make sure that the eye bolt(s) (EB) is/are in faultless condition, fully screwed in and tightened by hand.

Transport with a lifting hook:



Transport with a forklift:

- 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 0 ... 40°C.

If the machine is to be stored for more than 60 days:

- Drain the seal fluid vessel and refill with 3 liters of conservation oil, BUSCH part no. 0831 570 966 (5-liter packaging).
- Let the machine run for one hour or until it reaches full operating temperature, with suction connection 90-95% closed.
- Make sure there is still some conservation oil in the bottom of the seal fluid vessel.
- Switch the machine off with the inlet closed.

Direct cooling version:

- Disconnect the water supply line to the machine.
- Drain the cooling water from the cooling jackets by opening the cooling liquid drain valve (CLD).

Radiator cooling version:

- Check the level of water/glycol cooling liquid, refill if necessary.

If a seal fluid separator or discharge silencer (SI) being installed:

- Seal hermetically all apertures with the caps provided with the machine, or with adhesive tape if the caps are no longer available.

If no seal fluid separator or discharge silencer (SI) being installed:

- Seal hermetically the discharge connection (OUT) with a blind flange and o-ring and all other apertures with the caps provided with the machine, or with adhesive tape if the caps are no longer available.

Applicable for all above:

- Wrap the machine in a VCI film (Vapor Corrosion Inhibitor).
- 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.
- Every 6 months of storage, remove the protective cover of the transmission belts and turn the transmission pulley of the high pressure stage (HPS) a quarter turn in the direction indicated by the arrow on the motor, to ensure that the static load of the rotors does not remain constantly applied to the same location on the bearings and shaft sleeves.
- Repeat the procedure of conservation after 12 months of immobilization.

When putting the machine back into service after storage:

- Make sure that all remains of adhesive tape are removed from the ports.
- Make sure that the blind flange at the discharge connection (OUT) is removed.

Direct cooling version:

- Reconnect the water supply line to the machine.

Radiator cooling version:

- Check the level of water/glycol cooling liquid, refill if necessary.

5 Installation

5.1 Installation Conditions

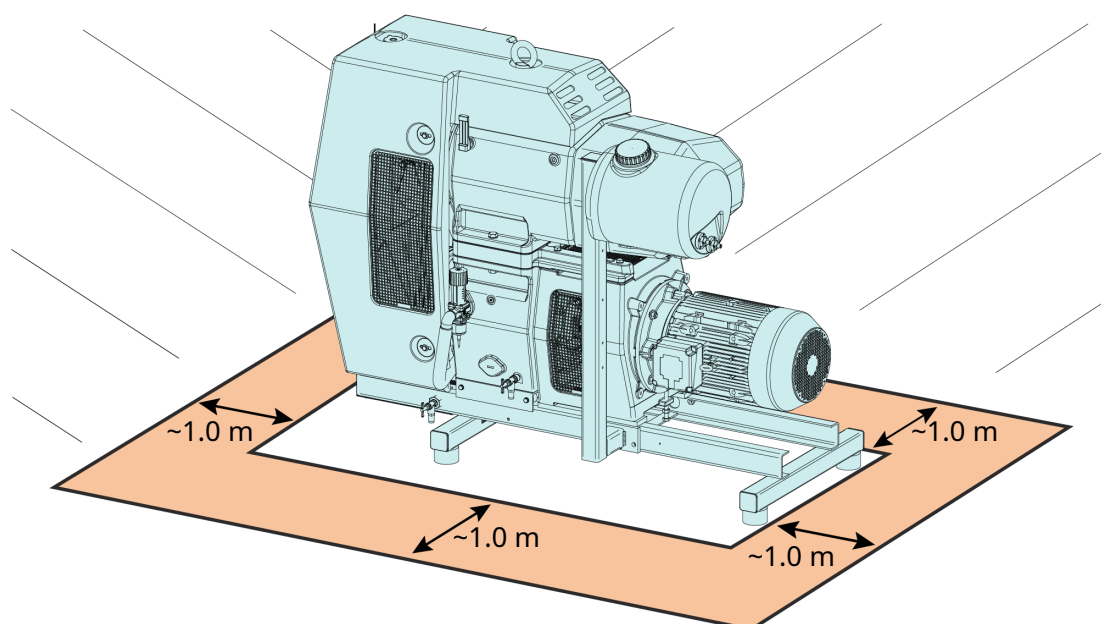
NOTICE

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* [→ 45].
- 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 cooling air inlets and outlets of the motor fan are not covered or obstructed and that the cooling air flow is not affected adversely in any other way.
- 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 all provided covers, guards, hoods, etc. are mounted.

In case of a machine delivery without motor:

- Make sure that the coupling is correctly aligned, see *Fitting the Coupling* [→ 21].
- Make sure that the cooling water complies with the requirements, see *Cooling System (direct cooling version)* [→ 18].

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

- Contact your Busch representative, the motor should be derated or the ambient temperature limited.

If the machine is equipped with monitoring devices or sensors:

- Make sure that the monitoring devices are correctly connected and integrated into a control system such that operation of the machine will be inhibited if the safety limit values are exceeded, see *Electrical Connection of the Monitoring Devices* [→ 27].

5.2 Connecting Lines / Pipes



WARNING

Unprotected connection.

Risk of severe injury!

- Do not put hand or fingers in the connection.
-
- 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 suction 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, it is recommended to use larger diameters to avoid a loss of efficiency. In this case, please contact your Busch representative.

- Make sure that the connection flanges are fitted with the appropriate gaskets.

5.2.1 Suction Connection



WARNING

Unprotected connection.

Risk of severe injury!

- Do not put hand or fingers in the connection.
-



NOTICE

Ingress of foreign objects or liquids.

Risk of damage to the machine !

If the inlet gas contains dust or other foreign solid particles:

- Install a suitable filter (5 micron or less) upstream from the machine.
-

Connection size(s):

DN 80 PN 6

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

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

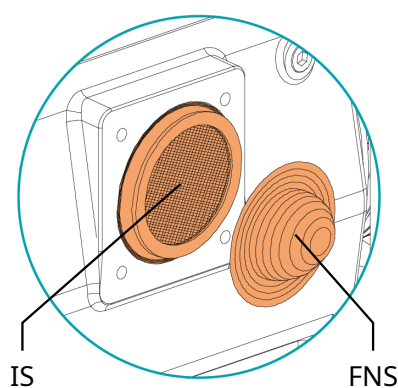
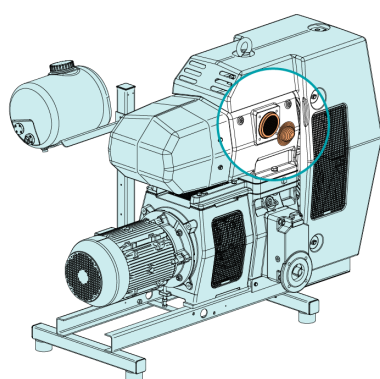
- Busch recommends the installation of an isolation valve in order to prevent the machine from turning backwards.
- Busch recommends the installation of an isolation valve in order to prevent the oil from flowing back to the vacuum system.
- Busch recommends the installation of an isolation valve in order to prevent the process gases and debris flowing back to the vacuum system.
- Make sure that the connection lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible lines on the suction and discharge connections.

Huckepack vacuum pumps are supplied with a loose-packed inlet screen (IS) and a fine screen (FNS)

- Assemble both screens on the inlet connection (IN), to prevent foreign particles from entering into the machine.

If the machine is supplied with an inlet flange, both screens are already assembled in the flange.

- Remove the fine screen (FNS) after about 20 working hours (the inlet screen (IS) remains in place).



Description

FNS	Fine screen	IS	Inlet screen
-----	-------------	----	--------------

5.2.2 Discharge Connection



WARNING

Unprotected connection.

Risk of severe injury!

- Do not put hand or fingers in the 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):

- DN 50 PN 16 for HO 0429 F and HO 0433 F
- DN 80 PN 6 for HO 0437 F and HO 0441 F

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

- Make sure that the discharge line either slopes away from the machine or provide a liquid separator or a siphon with a drain cock, so that no liquids can flow back into the machine.
- Make sure that the connection lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible lines on the suction and discharge connections.

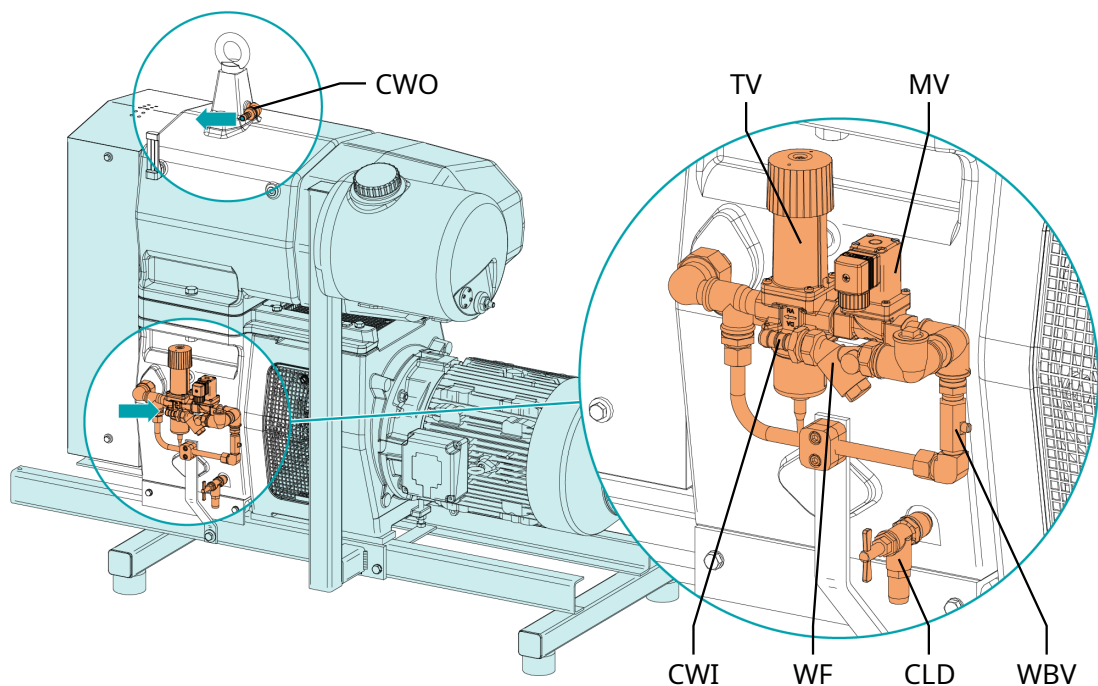
The seal fluid resulting at the exhaust side must be disposed according to environmental laws.

At the exhaust side, there must not be any stagnation of seal fluid or condensate.

When conveying poisonous agents, the environmental regulations must be observed.

In case a discharge silencer (SI) (optional) being installed, the seal fluid must be drained continuously through the drain connection (DC) or collected in a vessel.

5.3 Cooling System (direct cooling version)



Description			
CLD	Cooling liquid drain valve	CWI	Cooling water inlet
CWO	Cooling water outlet	MV	Solenoid valve
TV	Thermostatic valve (optional)	WBV	Water bypass valve
WF	Water filter		

The thermostatic valve (TV) is to be adjusted with the rotary button starting with 0 (max. quantity flow) to 5 (min. quantity flow) so that the temperature at the water thermometer is the same as of the machine.

The control value is 55 - 90°C.

The factory default adjustment of the thermostatic valve (TV) is set in position 3 (approx. 80°C water temperature).

When the pressure switch detects a pressure lower than 0.6 bar, the machine must be stopped.

The water bypass valve (WBV) is used at the first machine start-up. At that moment it should be open (approx. 90 seconds) to prime the cooling circuit, afterwards it should be closed.

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

Connection size:

- 13 mm hose (CWI/CWO)
- Electrically connect the pressure switch (PS):
 - See *Wiring Diagramm Pressure Control Switch of Water Inlet (Optional)* [→ 28]
- Electrically connect the solenoid valve (MV).
- Make sure that the cooling water complies with the following requirements:

		HO 0429 F	HO 0433 F	HO 0437 F	HO 0441 F
Min. supply capacity	l/min	2.5	2.5	5	5
Water pressure	bar (g)	2 ... 6	2 ... 6	2 ... 6	2 ... 6
Supply temperature	°C	+5 ... +35	+5 ... +35	+5 ... +35	+5 ... +35
Required pressure differential across supply and return	bar	≥ 1	≥ 1	≥ 1	≥ 1

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

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



NOTE

Water hardness unit conversion.

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

5.3.1 First Filling with Cooling Water

At first start-up or start-up after having drained the cooling water, the machine must be filled as follows:

- Remove the hose at the water outlet (CWO).
- Open the solenoid valve (MV) or the water by-pass valve (WBV).
- Open the water supply and fill with water until water overflows.
- Connect the hose at the water outlet (CWO).

5.4 Cooling System (radiator cooling version)

The thermostatic valve (TV) is to be adjusted with the rotary button starting with 0 (max. quantity flow) to 5 (min. quantity flow) so that the temperature at the water thermometer is the same as of the machine.

The control value is 55 - 90°C.

The factory default adjustment of the thermostatic valve (TV) is set in position 3 (approx. 80°C cooling liquid temperature).

A mixture of 60% of water and 40% of glycol must be used as cooling liquid. The mixture must be mixed before it is charged. For cooling liquid quantity, see *Technical Data* [→ 45].

5.4.1 First Filling with Cooling Liquid

At first start-up or start-up after having drained the cooling liquid, the machine must be filled as follows:

- Open the cooling liquid fill plug (CLF).
- Fill with cooling liquid.
- Switch on the machine for a short time so that the air bubbles come up in the feed pipe.
- Close the cooling liquid fill plug (CLF).

Note: Version without thermostat for water circulation are not delivered with cooling liquid fill plug (CLF).

5.5 Filling Seal Fluid and Flushing Liquid

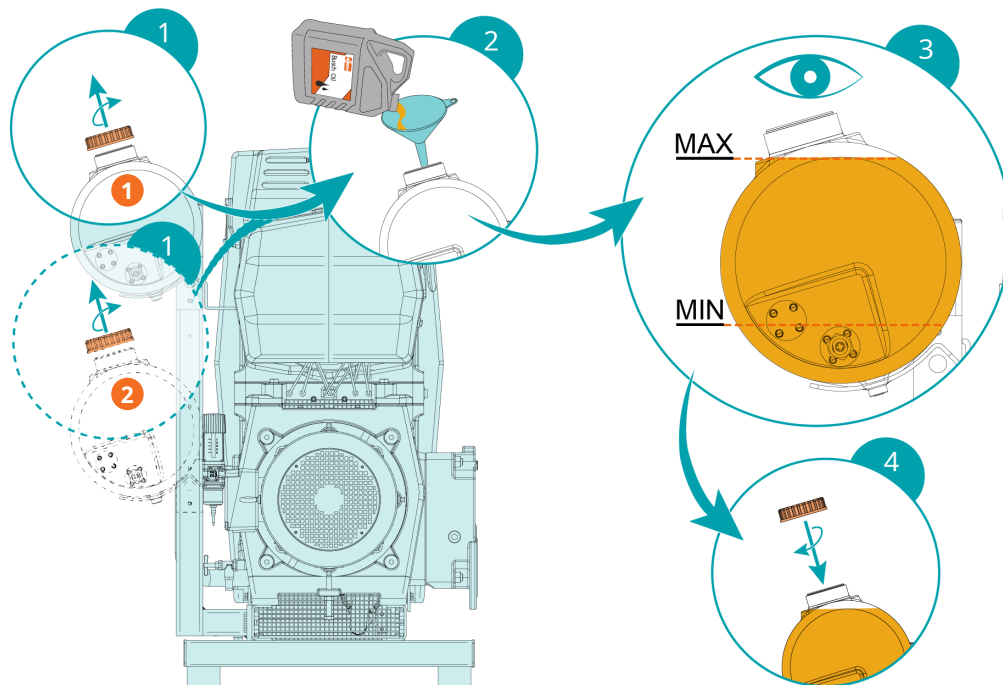
NOTICE

Use of an inappropriate seal fluid.

Risk of premature failure!

Loss of efficiency!

- Only use a seal fluid type which has previously been approved and recommended by Busch.



Description	
1	Seal fluid vessel
2	Flushing liquid vessel (optional)

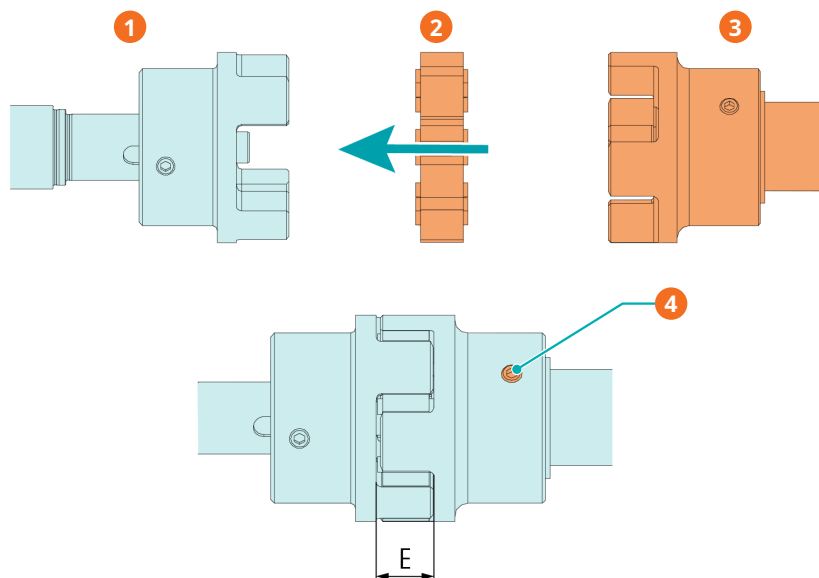
5.6 Fitting the Coupling



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

Machine type	Coupling size	Value "E" (mm)
HO 0429 F	ROTEX® 42	26
HO 0433 F		
HO 0437 F	ROTEX® 55	30
HO 0441 F		

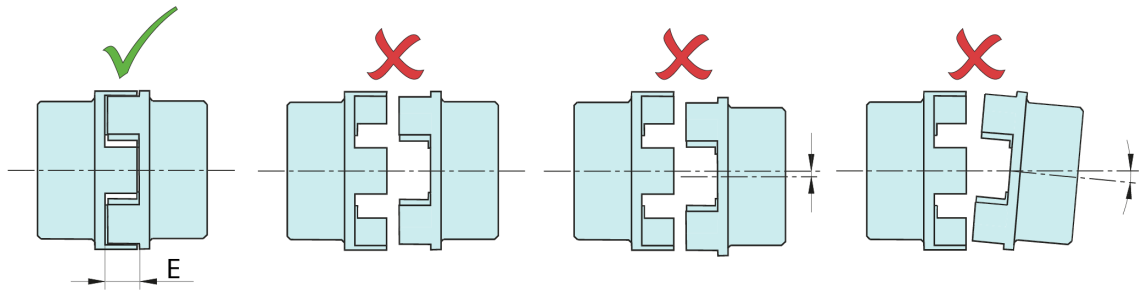
In case of a machine delivery without motor:

- 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 ROTEX® coupling.

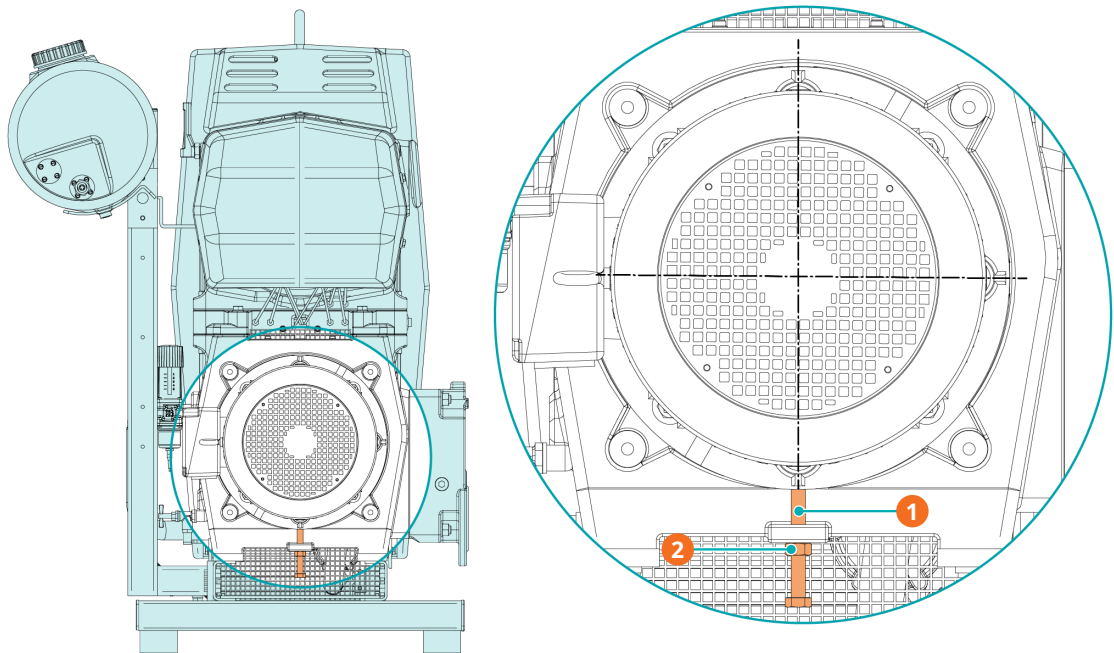
English	German	French
		
<p><i>Instruction Manual - English</i></p>	<p><i>Instruction Manual - German</i></p>	<p><i>Instruction Manual - French</i></p>

5.6.1 Coupling Alignment



Motor Adjustment:

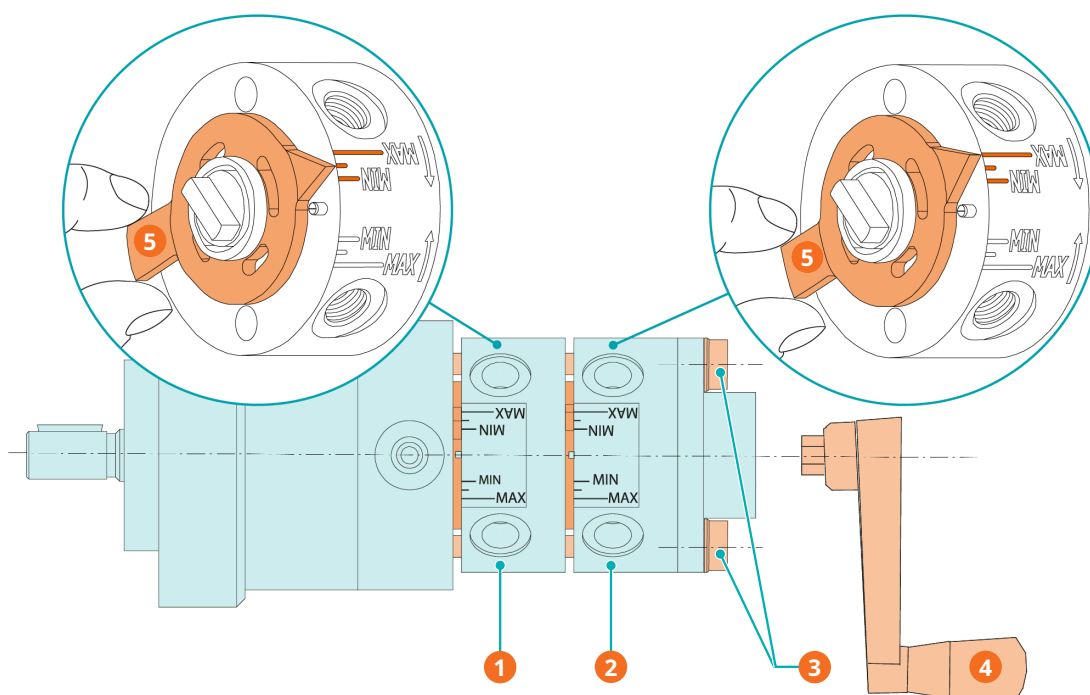
The motor elevation can be adjusted by an adjusting screw.



Description			
1	Adjusting screw	2	Fixing nut

5.7 Lubrication System

The seal fluid pump is used to supply the different lubrication spots with seal fluid.
 The measuring of the seal fluid can be varied directly by the seal fluid pump.



Description			
1	Adjustment for slide ring lubrication Ring 1	2	Adjustment for vane lubrication Ring 2
3	Tightening screws	4	Crank
5	Adjustment disc		

Note: The values below are standard values for chemical use. The quantity of seal fluid depends on the conditions of the process.

When pumping inert gas without corrosive components the seal fluid rate can be reduced down to ½ (control value of scale).

Original calibration of the seal fluid pump:

		HO 0429 F	HO 0433 F	HO 0437 F	HO 0441 F
Internal gear ratio		75 : 1	75 : 1	25 : 1	25 : 1
Slide ring lubrication Ring 1		½	½	½	½
Vane lubrication Ring 2		MAX	MAX	½	½
Seal fluid requirement (50 / 60 Hz)	cm ³ /h	250 / 310	250 / 310	536 / 597	536 / 597

The seal fluid consumption indicated in the table is the maximum consumption.

The real consumption may vary, based on the operating conditions of the machine.

In addition, a variation of seal fluid consumption of about +/- 8% must be considered as acceptable, based on measured results.

Different adjustment of the oil pump can be done depending on customer process conditions after validation by Busch.



NOTICE

Adjustment of the seal fluid pump.

- Only adjust the seal fluid pump with the machine switched off and locked against inadvertent start up.

Adjustment of the seal fluid pump

- Loose the two tightening screws slightly (approximately 1 turn).
Do not remove them.
- Adjust the adjustment disc to the required seal fluid lift.
- Tighten the two tightening screws very slightly (1 turn).
- Tighten the two tightening screws alternately in the following increments up to the torque of 8 Nm:
 - a. 2 Nm
 - b. 4 Nm
 - c. 6 Nm
 - d. 7 Nm
 - e. 8 Nm
- Re-prime the seal fluid pump.

Priming of the seal fluid pump

- Turn the crank of the seal fluid pump anticlockwise until the seal fluid reaches the several lubrication spots through the pipes.
- Remove the crank.

6 Electrical Connection



DANGER

Live wires.

Risk of electrical shock!

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

CURRENT PROTECTION OF THE CUSTOMER INSTALLATION:



DANGER

Missing current protection.

Risk of electrical shock!

- Current protection in accordance with EN 60204-1 must be provided by the customers on their 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, seek advice from Busch.
- Make sure that the EMC of the machine is compliant with the requirements of your supply network system, if necessary, provide further interference suppression (EMC of the machine, see *EU Declaration of Conformity* [→ 48] or *UK Declaration of Conformity* [→ 49]).

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.
- 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!

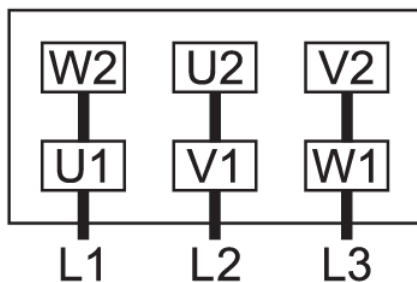
- Operation in the wrong direction of rotation can destroy the machine in a short time! Prior to start-up, ensure that the machine is operated in the right direction.

- Determine the intended direction of rotation with the arrow (stuck on or cast).
- Jog the motor briefly.
- Watch the fan wheel of the motor and determine the direction of rotation just before the fan wheel stops.

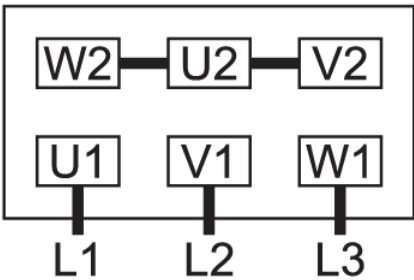
If the rotation of the motor must be changed:

- Switch any two of the motor phase wires.

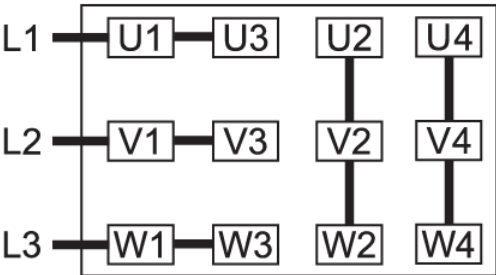
Delta connection (low voltage):



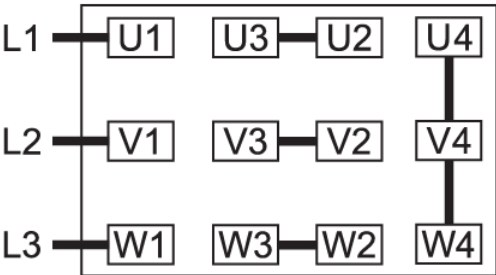
Star connection (high voltage):



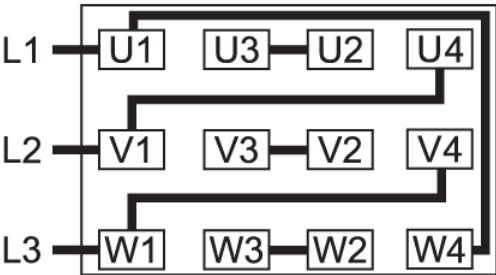
Double star connection, multi-voltage motor with 12 pins (low voltage):



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



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



6.3 Electrical Connection of the Monitoring Devices

i NOTE

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

6.3.1 Wiring Diagram Exhaust Pressure Transmitter (Optional)

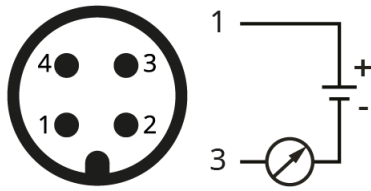
Part no.: 0653 567 425

Connector: M12x1, 4-pin

Electrical data: U = 10 ... 35 VDC; 4 ... 20 mA ► 0 ... 1.6 bar (abs.)

Warning signal: P_{warning} = 0.4 bar (overpressure)

Trip signal: P_{trip} = 0.6 bar (overpressure)



1 = Brown; 3 = Blue

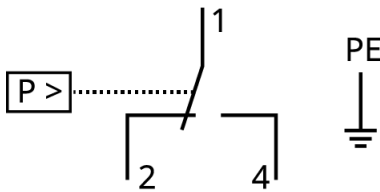
6.3.2 Wiring Diagramm Pressure Control Switch of Water Inlet (Optional)

Part no.: 0653 000 002

Electrical data: U = 230 VAC; I = 1 A; U = 24 ... 100 VDC; I = 0.5 ... 2 A

Contact: Normally open

Switch point: P_{trip} = 0.6 bar (relative) ► min. permitted pressure



6.3.3 Wiring Diagramm Level Switch

Part no.: 0652 570 687

Connector: M12x1, 4-pin

Switch function: N/C (SPST)

U_{max} = 230 VAC; I_{max} = < 500 mA

U_{max} = 100 VDC; I_{max} = < 500 mA

Contact: Normally closed

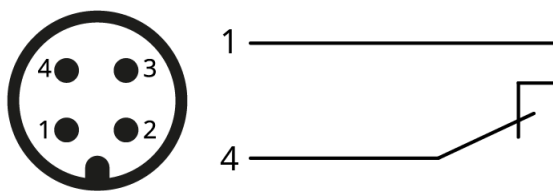
Switch point:

LS1: L_{trip} ► pin 1 + 4 ► Alarm level seal fluid "Stop the machine"

LS2: L_{trip} ► pin 1 + 4 ► Warning level seal fluid "Refill seal fluid"

LS3: L_{trip} ► pin 1 + 4 ► Alarm level flushing liquid "Stop the machine"

LS4: L_{trip} ► pin 1 + 4 ► Warning level flushing liquid "Refill flushing liquid"



1 = Brown; 4 = Black

6.3.4 Wiring Diagramm Temperature Switch of LPS

Part no.: 0651 555 983

Switch point: $T_{\text{trip}} = 85^{\circ}\text{C}$

Part no.: 0651 555 984

Switch point: $T_{\text{trip}} = 95^{\circ}\text{C}$

Part no.: 0651 555 985

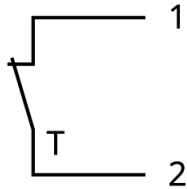
Switch point: $T_{\text{trip}} = 106^{\circ}\text{C}$

Part no.: 0651 555 986

Switch point: $T_{\text{trip}} = 112^{\circ}\text{C}$

$U = 6 \dots 30 \text{ VDC} ; I = 10 \dots 100 \text{ mA}$

Contact : Normally closed



1 = White ; 2 = Brown

7 Commissioning



CAUTION

During operation the surface of the machine may reach temperatures of more than 70°C.

Risk of burns!

- Avoid contact with the machine during and directly after operation.



CAUTION



Noise of running machine.

Risk of damage to hearing!

If 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

Operation without seal fluid will ruin the machine in short time!

- Prior to commissioning, the machine must be filled with seal fluid, see *Filling Seal Fluid and Flushing Liquid* [→ 20].

- Make sure that the *Installation Conditions* [→ 15] are met.

Radiator cooling:

- Open the cooling liquid fill plug (CLF) and check the cooling liquid level.
- Make sure that the cooling system is in operation (axial fan(AF) and cooling liquid pump (CLP)), see *Cooling System (radiator cooling version)* [→ 19].

Direct cooling:

- Turn on the water supply.
- If the cooling water inlet is equipped with a water bypass valve (WBV), open it for approx. 90 seconds before the first machine start-up.
- Make sure that cooling water requirements are fully complied with, see *Cooling System (direct cooling version)* [→ 18].
- Adjust the thermostatic valve position according to the process requirements.
- 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.
- Depending on the medium to be conveyed, warm up the machine first.
- Make sure that the operating conditions comply with the *Technical Data* [→ 45].

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.

After processing, it may be that the machine must be kept running for a certain time or flushing is required.

7.1 Continuous Operation

The normal operating pressure of the vacuum pump Huckepack is 0.5 ... 150 hPa(mbar).

For continuous operation with higher operating pressures a bypass valve is fitted in order to be able to operate at higher pressures.

In case of higher intake pressures:

- The drive power of the motor must be checked.
- If necessary, the motor must be replaced by a motor with a higher drive power.

The machine is suitable for continuous operation with a closed valve on the suction side.

When starting up an entire or a large volume system:

- Throttle the suction valve to max. 200 hpa (mbar) inlet pressure.

When the inlet pressure is < 200 hpa (mbar), the inlet valve may be fully opened.

7.2 Conveying Condensable Vapors



CAUTION

During operation, the surface of the suction and exhaust connections may reach temperatures above 70°C.

Risk of burns!

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



CAUTION

Draining the condensate 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 flow of gases and/or liquids.



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.

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

If condensable vapors are to be conveyed:

START

- Close the isolation valve* and open the gas ballast valve** (GB)
- Warm up the machine for 30 minutes
- Open the isolation valve* and perform the process
- Close the isolation valve*
- Wait 30 minutes
- Close the gas ballast valve** (GB)

END

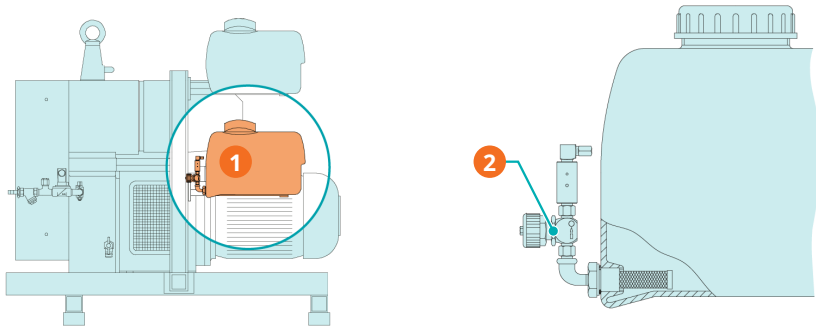
* Not included in the scope of delivery.

** Optional

- Continuously drain the condensate from the silencer (SI) (Optional) through the drain connection (DC).

7.3 Liquid Flushing Procedure

7.3.1 Manual Flushing Device (Optional)



Description			
1	Flushing liquid vessel	2	Shut-off valve

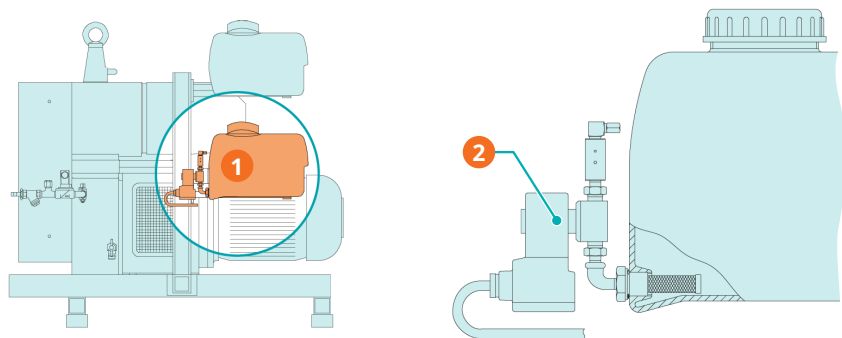
If after the application process a liquid flushing is required:

START

- Open the liquid flushing device (shut-off valve)
- Adapt the flushing liquid flow according to the application requirements
 - The flushing duration depends on the application, but should last for at least 10 minutes
- Close the liquid flushing device (shut-off valve)
- Keep the machine running for 5 minutes

END

7.3.2 Automatical Flushing Device (Optional)



Description

1	Flushing liquid vessel	2	Solenoid valve
---	------------------------	---	----------------

If after the application process a liquid flushing is required:

START

- Open the liquid flushing device (solenoid valve) by pressing “Flushing” at the control cabinet
 - A special timing relay stops the flushing automatically
 - In case of automatic shut down flushing is made automatically

END

7.4 Flushing Liquids

The flushing liquids depend on the process.

Oils, synthetic oils, oil/diesel or oil/petroleum mixtures can be used.

For more information, contact your Busch representative.

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

Failing to properly maintain the machine.

Risk of injuries!

Risk of premature failure and loss of efficiency!

- Maintenance work must only be executed by qualified personnel.
- Respect the maintenance intervals or ask your Busch representative for service.



NOTICE

Using inappropriate cleaners.

Risk of removing safety stickers and protective paint!

- Do not use incompatible solvents to clean the machine.

- Shut down the machine and lock against inadvertent start up.
- Vent the connected lines to atmospheric pressure.
 - Turn off the water supply.

If necessary:

- Disconnect all connections.

8.1 Maintenance Schedule

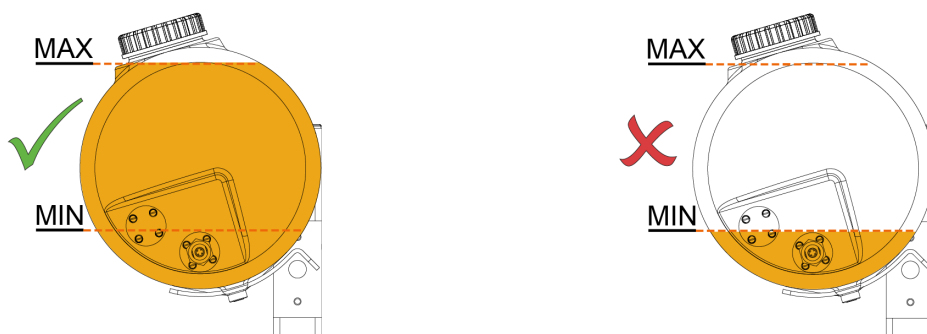
The maintenance intervals depend very much on the individual operating conditions. The intervals given below are considered as starting values which should be individually shortened or extended as appropriate.

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.

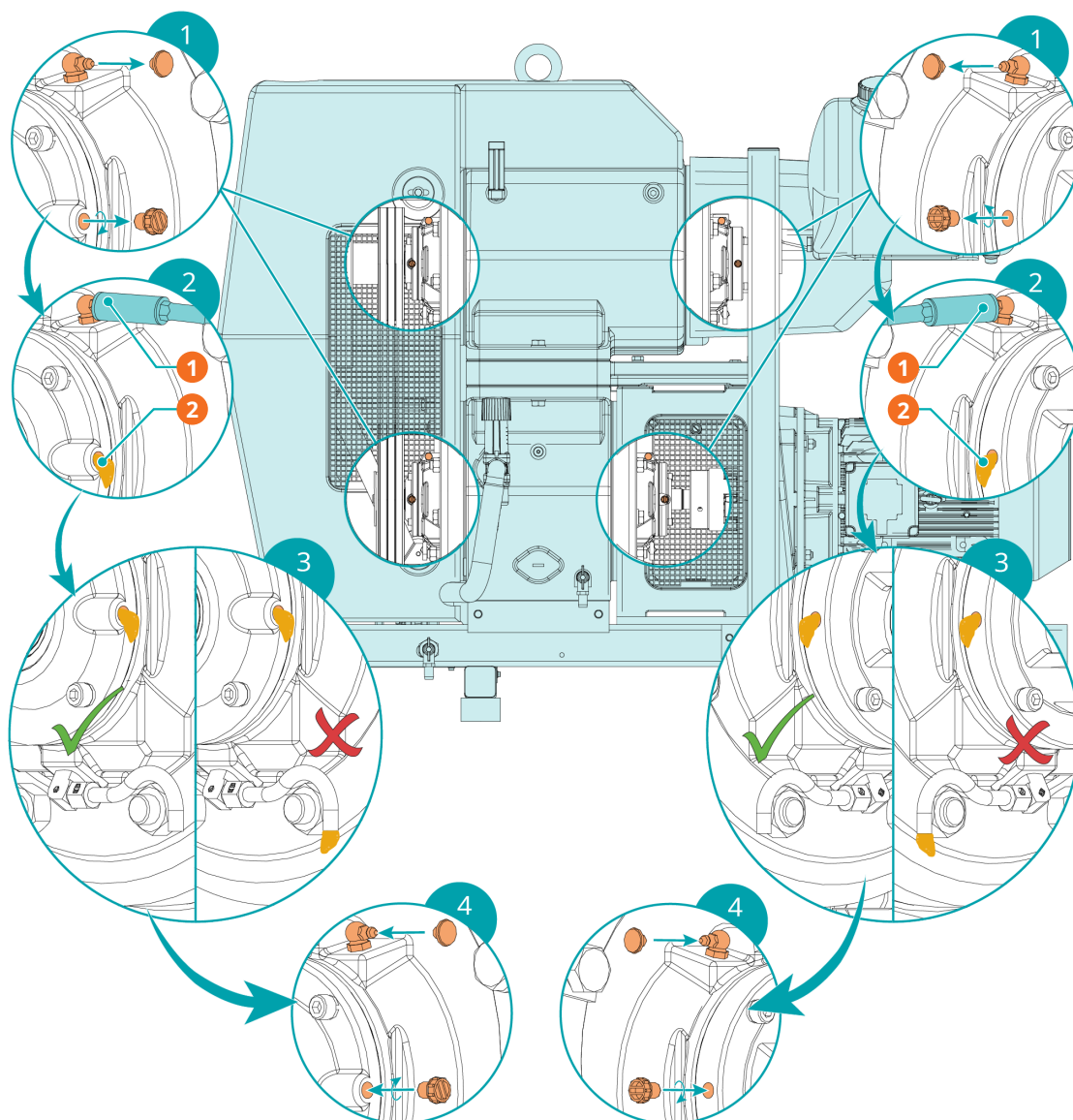
Interval	Maintenance work
Daily	<ul style="list-style-type: none"> ● Check the level of the seal fluid, see <i>Seal Fluid and Flushing Liquid Level Inspection</i> [→ 36]. <p>In case of a seal fluid separator being installed:</p> <ul style="list-style-type: none"> ● Check the seal fluid level and drain if necessary. <p>In case of a 'Duosec' Separator being installed:</p> <ul style="list-style-type: none"> ● Check the liquid level on the sight glass and drain if necessary.
Monthly	<ul style="list-style-type: none"> ● Check the function and settings of the seal fluid pump, see <i>Lubrication System</i> [→ 22]. ● Clean the screen of the seal fluid vessel. ● Check the function of the safety devices. <p>In case of a radiator cooling system being installed:</p> <ul style="list-style-type: none"> ● Check the cooling liquid level. ● Clean the radiator and the grid of the fan hood. <p>In case of a direct cooling system being installed:</p> <ul style="list-style-type: none"> ● Check the water pressure. <p>In case of a seal fluid separator being installed:</p> <ul style="list-style-type: none"> ● Check the filter elements and replace if necessary. <p>In case of an inlet filter (IF) being installed:</p> <ul style="list-style-type: none"> ● Check the inlet filter cartridge, replace if necessary.
Every 6 months	<ul style="list-style-type: none"> ● Check the inlet screen (IS), clean if necessary. ● Check the tightening torque of the tightening screws of the seal fluid pump and adjust if necessary, see <i>Lubrication System</i> [→ 22]. <p>In case of a direct cooling system being installed:</p> <ul style="list-style-type: none"> ● Check the water filter (WF) of the water inlet unit, clean or replace if necessary. <p>In case of a 'Duosec' separator being installed:</p> <ul style="list-style-type: none"> ● Change the filter elements

Interval	Maintenance work
Yearly	<ul style="list-style-type: none"> • Check and grease the bearings, see <i>Bearing Lubrication</i> [→ 37]. • Check the V-belts and adjust if necessary, see <i>Belt Tension Inspection</i> [→ 38] and <i>Belt Tension Adjustment</i> [→ 38].
Every 8000 hours	<ul style="list-style-type: none"> • Check the vanes, replace if necessary. • Check the seals, replace if necessary. • Check the suction and discharge lines, clean and replace if necessary.
Every 16000 hours, at the latest after 4 years	<ul style="list-style-type: none"> • Contact Busch for an inspection

8.2 Seal Fluid and Flushing Liquid Level Inspection

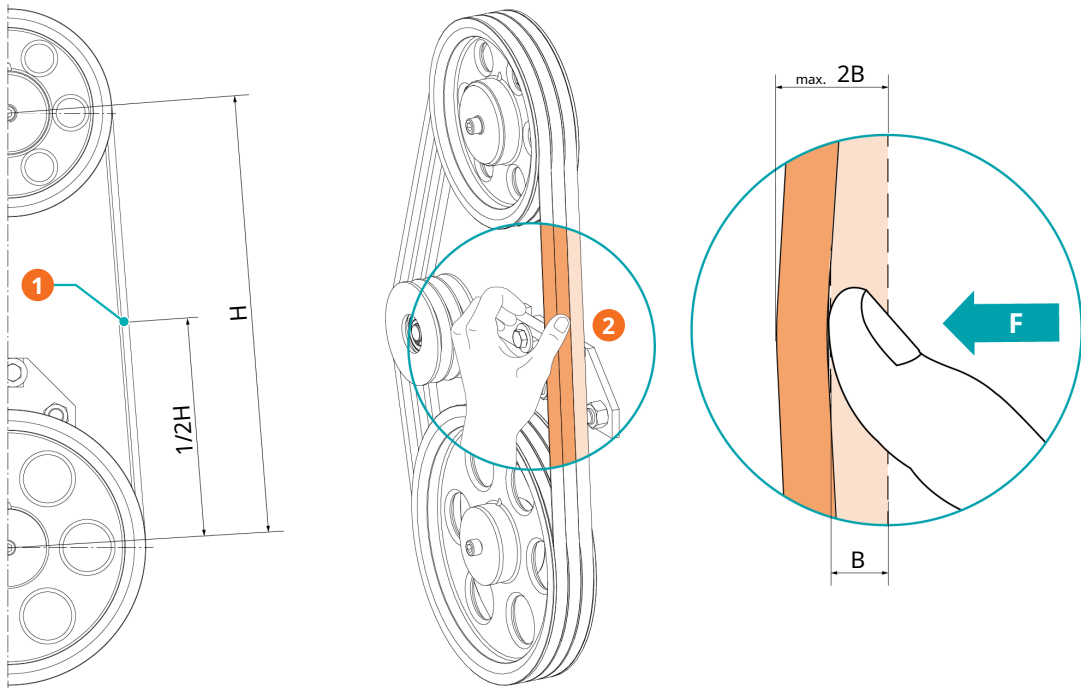


8.3 Bearing Lubrication



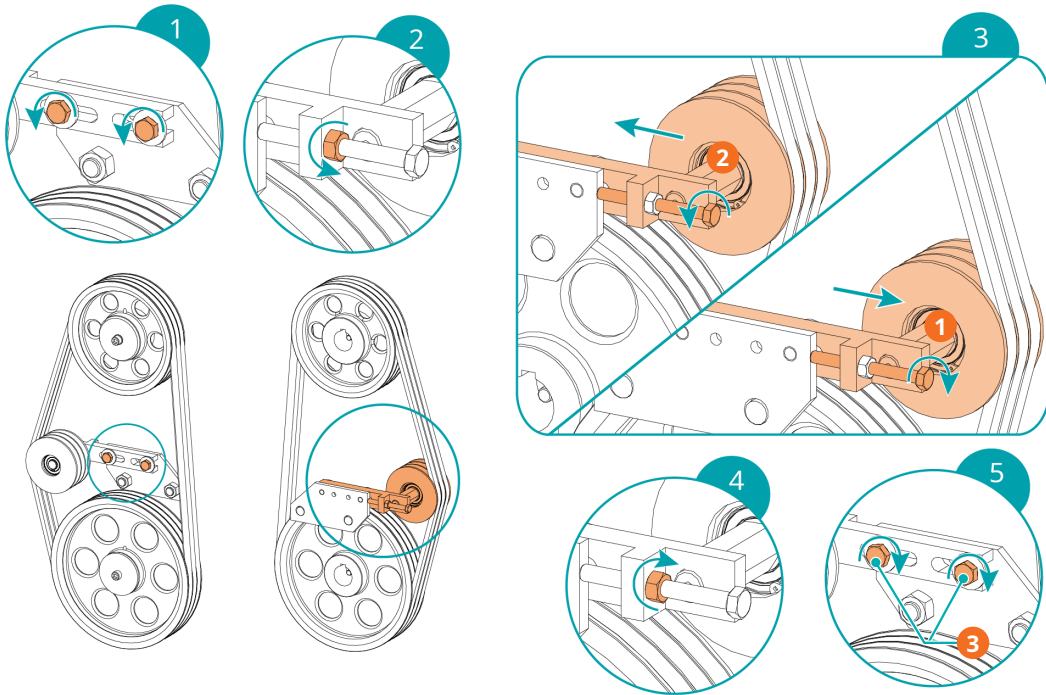
Description			
1	Use grease with a high melting point up to 150°C and the consistence: SKF LGHP-2/1 lithium grease.	2	Charge with grease until grease comes out of the opening

8.4 Belt Tension Inspection



Description			
1	Belt tension check point	2	Push two of the three belts

8.5 Belt Tension Adjustment



Description			
1	Increasing the belt tension	2	Decreasing the belt tension
3	Tighten with 50 Nm		

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 Busch 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'.

Busch 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.

If the machine is to be stored:

- See *Storage* [→ 14].
- Shut down the machine and lock against inadvertent start up.
- Disconnect the power supply.
- Vent the connected lines to atmospheric pressure.
- Drain the cooling water from the water drain valve (CWD).

Version with direct cooling system:

- Turn off the water supply.
- Disconnect the water supply.
- Open the water bypass valve (WBV).
- Blow through the water cooling inlet with compressed air.
- Disconnect all connections.

10.1 Dismantling and Disposal



WARNING



Machines contaminated with hazardous material.

Risk of poisoning!

Risk of infection!

If the machine is contaminated with hazardous material:

- Wear appropriate personal protective equipment.
- Drain and collect the seal fluid.
- Make sure that no seal fluid drips onto the floor.
- Remove the exhaust filters.
- 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!

- The exclusive use of Busch genuine spare parts and consumables is recommended for the correct functioning of the machine and to validate the warranty.

-
- 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.

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 motor is defective.	<ul style="list-style-type: none"> • Replace the motor.
	The coupling (CPL) is defective.	<ul style="list-style-type: none"> • Replace the coupling (CPL).
The machine does not reach the usual pressure on the suction connection.	Seal fluid level too low.	<ul style="list-style-type: none"> • Top up seal fluid.
	Seal fluid does not get to the lubrication spots.	<ul style="list-style-type: none"> • Check that seal fluid flows through the supply lines downstream of the seal fluid pump. Prime the seal fluid pump if this is not the case. • Tighten the lubrication connections. Check the connections and the lines. • Replace the seal fluid pump if faulty.
	The inlet screen (IS) is partially clogged.	<ul style="list-style-type: none"> • Clean the inlet screen (IS).
	The inlet filter cartridge (optional) is partially clogged.	<ul style="list-style-type: none"> • Replace the inlet filter cartridge.
	Internal parts are worn or damaged.	<ul style="list-style-type: none"> • Repair the machine (contact Busch).
The machine runs very noisily.	Worn coupling (CPL).	<ul style="list-style-type: none"> • Replace the coupling (CPL).
	Stuck vanes.	<ul style="list-style-type: none"> • Repair the machine (contact Busch).
	Defective bearings.	<ul style="list-style-type: none"> • Repair the machine (contact Busch).
	The machine runs in the wrong direction.	<ul style="list-style-type: none"> • Check the direction of rotation of the motor.
	Improper seal fluid quantity, unsuitable seal fluid type.	<ul style="list-style-type: none"> • Use the proper type and quantity of seal fluid, see <i>Seal Fluid</i> [→ 47].

Problem	Possible Cause	Remedy
The machine runs too hot.	Insufficient cooling.	<ul style="list-style-type: none"> Remove dust and dirt from the machine. Check the cooling water supply (direct cooling version). Check the cooling fan and the cooling liquid level (radiator cooling version).
	Ambient temperature too high.	<ul style="list-style-type: none"> Observe the permitted ambient temperature.
	Seal fluid level too low.	<ul style="list-style-type: none"> Top up seal fluid.
	The exhaust filters (EF) in the seal fluid separator (optional) are partially clogged.	<ul style="list-style-type: none"> Replace the exhaust filters (EF).
The machine fumes or expels oil droplets through the seal fluid separator (optional).	The exhaust filters (EF) are partially clogged.	<ul style="list-style-type: none"> Replace the exhaust filters (EF).
	An exhaust filter (EF) with o-ring is not fitted properly.	<ul style="list-style-type: none"> Ensure the correct position of the exhaust filters (EF) and the o-rings.
The seal fluid is black.	The inlet filter (optional) is defective.	<ul style="list-style-type: none"> Replace the inlet filter.
	The machine runs too hot.	<ul style="list-style-type: none"> See problem "The machine runs too hot".
The seal fluid is resinous and/or sticky	Improper seal fluid quantity, unsuitable seal fluid type	<ul style="list-style-type: none"> Use the proper type and quantity of the seal fluid for the application (contact Busch).
The seal fluid is emulsified.	The machine sucked in liquids or significant amounts of vapor.	<ul style="list-style-type: none"> Flush the machine (contact Busch). Clean the filter of the gas ballast valve (GB). Modify the operational mode (see <i>Conveying Condensable Vapors</i> [→ 31]).

Problem	Possible Cause	Remedy
<p>The machine is blocked.</p>	<p>Solid foreign matter has entered the machine.</p>	<ul style="list-style-type: none"> • Repair the machine (contact Busch). • Make sure the suction line is equipped with proper filtration.
	<p>Corrosion in the machine from remaining condensate</p>	<ul style="list-style-type: none"> • Repair the machine (contact Busch). • Check the process. • Observe the <i>Conveying Condensable Vapors</i> [→ 31].
	<p>After switching off the machine, the vacuum system can create vacuum inside the pump chamber. This can suck seal fluid from the separator back into the pump chamber.</p> <p>When the machine was restarted too much seal fluid was enclosed between the vanes. Seal fluid could not be compressed and thus broke a vane</p>	<ul style="list-style-type: none"> • Repair the machine (contact Busch). • Make sure the vacuum system cannot create vacuum inside the pump chamber when it is switched off. • If necessary provide an additional shut-off valve or non-return valve.
	<p>The machine was run in the wrong direction</p>	<ul style="list-style-type: none"> • Repair the machine (contact Busch). • Change the wiring of the motor and make sure the machine will run in the correct direction (see <i>Installation</i> [→ 15]).
<p>The power consumption of the machine has increased.</p>	<p>The exhaust filters (EF) in the seal fluid separator (optional) are partially clogged.</p>	<ul style="list-style-type: none"> • Replace the exhaust filters (EF).

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

13 Technical Data

		HO 0429 F	HO 0433 F
Nominal pumping speed (50 / 60 Hz)	m ³ /h	160 / 190	250 / 300
Ultimate pressure (50 / 60 Hz)	hPa (mbar)	0.5	0.5
Operating pressure	hPa(mbar)	0.5 ... 150	0.5 ... 150
Nominal motor rating (50 / 60 Hz)	kW	5.5 / 9.2	7.5 / 9.2
Nominal motor speed (50 / 60 Hz)	min ⁻¹	1500 / 1800	1500 / 1800
Sound pressure level (ISO 2151) KpA = 3 dB (50 / 60 Hz)	dB(A)	72	73
Weight approx.	kg	385	440
Dimensions (L x W x H)	mm	1320 x 740 x 1160	1320 x 740 x 1160
Gas inlet / outlet		DN 80 PN 6 / DN 50 PN 16	DN 80 PN 6 / DN 50 PN 16
Operating temperature	°C	65 ... 95	65 ... 95
Ambient temperature range	°C	8 ... 40	8 ... 40
Ambient pressure		Atmospheric pressure	
Cooling liquid capacity approx. (radiator cooling) (50 Hz / 60 Hz)	l	15	16
Max. back pressure	mbar(g)	200	200
Max. gas inlet temperature >100 mbar	°C	70	70
Max. gas inlet temperature at 10 mbar	°C	90	90

		HO 0437 F	HO 0441 F
Nominal pumping speed (50 / 60 Hz)	m ³ /h	400 / 480	630 / 760
Ultimate pressure (50 / 60 Hz)	hPa (mbar)	0.5	0.5
Operating pressure	hPa(mbar)	0.5 ... 150	0.5 ... 150
Nominal motor rating (50 / 60 Hz)	kW	11.0 / 15.0	15.0 / 18.5
Nominal motor speed (50 / 60 Hz)	min ⁻¹	1000 / 1200	1000 / 1200
Sound pressure level (ISO 2151) KpA = 3 dB (50 / 60 Hz)	dB(A)	73	74
Weight approx.	kg	930	1000
Dimensions (L x W x H)	mm	1640 x 950 x 1240	1640 x 950 x 1240
Gas inlet / outlet		DN 80 PN 6 / DN 80 PN 6	DN 80 PN 6 / DN 80 PN 6
Operating temperature	°C	65 ... 95	65 ... 95
Ambient temperature range	°C	8 ... 40	8 ... 40
Ambient pressure		Atmospheric pressure	
Cooling liquid capacity approx. (radiator cooling) (50 Hz / 60 Hz)	l	37	43
Max. back pressure	mbar(g)	200	200
Max. gas inlet temperature >100 mbar	°C	70	70
Max. gas inlet temperature at 10 mbar	°C	90	90

14 Seal Fluid

		HO 0429 F	HO 0433 F	HO 0437 F	HO 0441 F
Seal fluid requirement (50 / 60 Hz)	cm ³ /h	250 / 310	250 / 310	536 / 597	536 / 597
Seal fluid vessel capacity	l	12 or 25	12 or 25	25	25
Seal fluid type		VM 150			

15 EU Declaration of Conformity

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

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

The manufacturer

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

declares that the machine: HUCKEPACK HO 0429 F; HUCKEPACK HO 0433 F; HUCKEPACK HO 0437 F; HUCKEPACK HO 0441 F

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:

Standards	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

16 UK Declaration of Conformity

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

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

The manufacturer

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

declares that the machine: HUCKEPACK HO 0429 F; HUCKEPACK HO 0433 F; HUCKEPACK HO 0437 F; HUCKEPACK HO 0441 F

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:

Standards	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

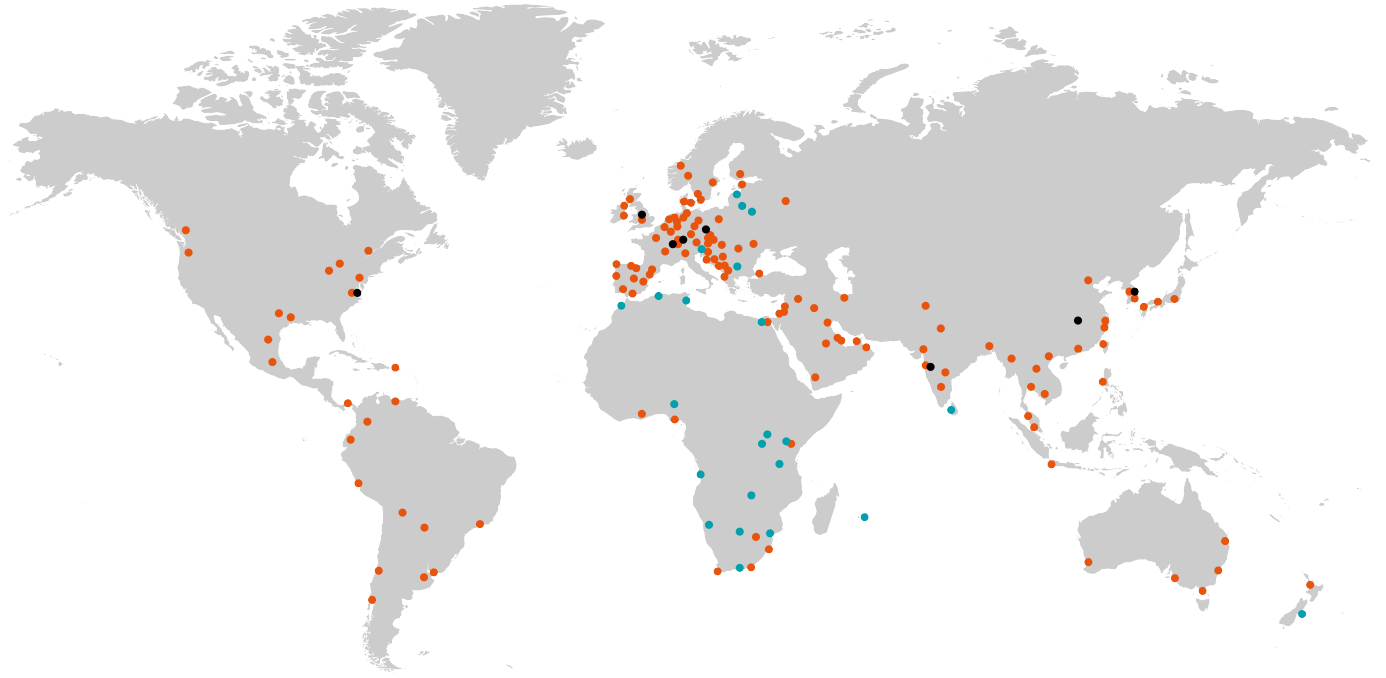
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Busch

Vacuum Solutions

With a network of over 60 companies in more than 40 countries and agencies worldwide, Busch has a global presence. In every country, highly competent local personnel delivers custom-tailored support backed by a global network of expertise. Wherever you are. Whatever your business. We are there for you.



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