



**VACUUM SOLUTIONS**

# Instruction Manual

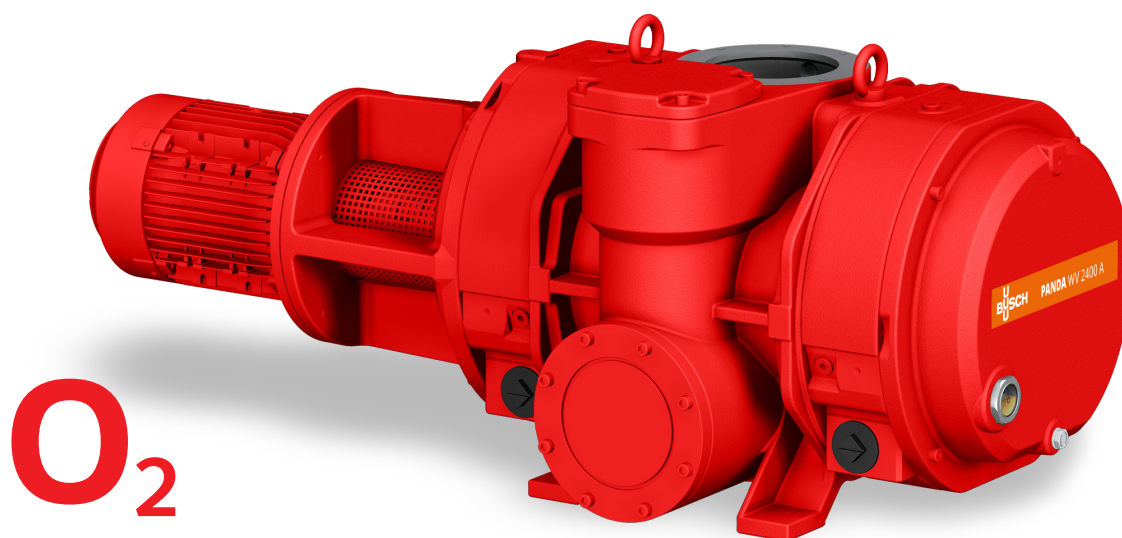
## PANDA / PUMA

Vacuum Boosters with Operating Fluid YLC 250 B

PANDA WV 0250-2400 C/A Oxygen

PUMA WP 0250-1250 D Oxygen

PUMA WP 2000 D Oxygen



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**VACUUM APP**

# Table of Contents

<b>Introduction.</b>	<b>2</b>
<b>Product description</b>	<b>3</b>
Use	3
Principle of operation	3
Cooling	4
On/ Off switch	4
<b>Safety</b>	<b>4</b>
Intended use	4
Safety notes	4
Noise Emissions	4
<b>Transport</b>	<b>4</b>
Transport in Packaging	4
Transport without packaging	4
<b>Storage</b>	<b>5</b>
Short-term Storage	5
Conservation	5
Commissioning after conservation	5
<b>Installation and Commissioning</b>	<b>5</b>
Installation prerequisites	5
Mounting Position and space	5
Suction Connection	6
Discharge connection	6
Electrical connection/ Controls	6
Installation	7
Fitting	7
Connecting electrically	7
Connection diagram three-phase motor	7
Connecting Lines/ Pipes	7
Checking the operating fluid level	7
Recording the Operating Parameters	8
Recommendations on operation	8
Application	8
<b>Maintenance</b>	<b>9</b>
Maintenance Schedule	9
Monthly:	9
Every 3 Months:	9
Every 6 Months:	9
Every 16000 Operating hours, latest after 4 years	9
Checking the operating fluid	9
Checking the operating fluid level at the sprockets and bearing housings	9
Checking the operating fluid level in the seal housing	9
Topping up with operating fluid	9
Checking the colour of the operating fluid	10
Operating fluid Change	10
Draining used operating fluid from the sprockets and the bearings	10
Draining used operating fluid from the seal housing	10
Filling in fresh operating fluid for the sprockets and the bearings	10
Filling in fresh operating fluid for the seal housing	11
Motor cover	11
<b>Overhaul</b>	<b>11</b>
<b>Removal from Service</b>	<b>11</b>
Temporary Removal from Service	11
Recommissioning	11
Dismantling and Disposal of the vacuum pump	12
<b>Troubleshooting</b>	<b>13</b>
<b>Spare parts</b>	<b>17</b>
Wearing parts kit	17
Accessories	17
<b>Operating fluid</b>	<b>19</b>
<b>Quantity of operating fluid</b>	<b>20</b>
Standard sealing	20
<b>Technical Data</b>	<b>21</b>
<b>EU-Declaration of Conformity</b>	<b>22</b>
<b>UK-Declaration of Conformity</b>	<b>23</b>

## Introduction

Congratulations on your purchase of your Busch vacuum pump. With careful observation of the field's requirements, innovation and continuous development, Busch provides modern vacuum and pressure solutions worldwide.

These operating instructions contain information on

- product description,
- security,
- transport,
- storage,
- installation and commissioning
- maintenance,
- overhaul,
- troubleshooting

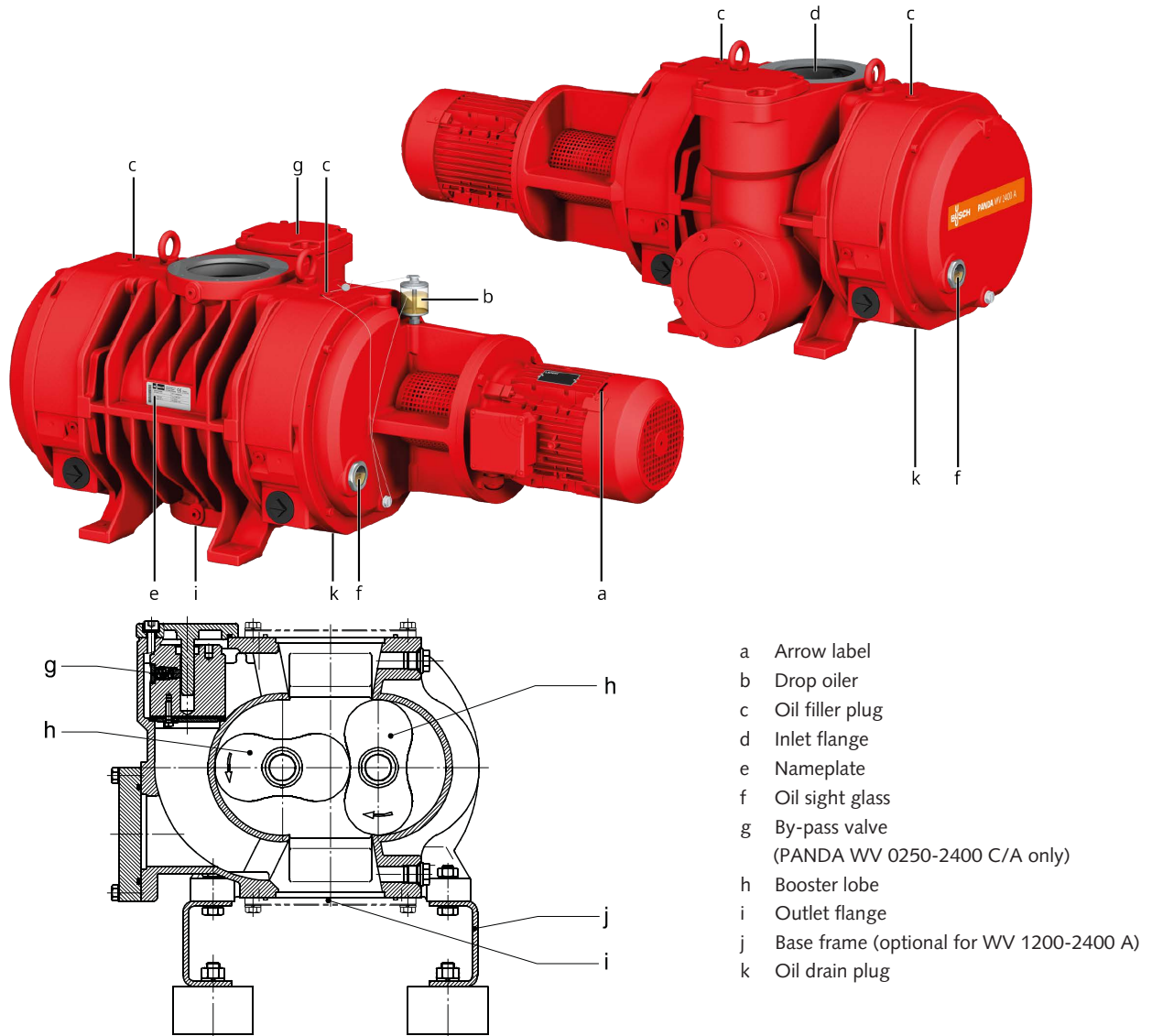
of the vacuum pump.

For the purpose of these instructions, "handling" the vacuum system means the transport, storage, installation, commissioning, influence on operating conditions, maintenance, troubleshooting and overhaul of the vacuum system.

**Prior to handling the vacuum system, these operating instructions must be read and understood. If anything remains to be clarified please contact your Busch representative !**

**Keep these operating instructions and, if applicable, other relevant operating instructions available on site.**

Illustration shows Booster PANDA WV 2400 A. The various elements are similar on all the range Booster Oxygen.  
CAUTION: In this instruction manual the illustrations may differ from the machine appearance.



## Product description

### Use

The vacuum pump is intended for

- the suction of
- air and other dry, non-aggressive, non-toxic and non-explosive gases with increased oxygen content (volume content greater than 21%)

Conveying media with a higher density than air leads to an increased thermal and mechanical load on the vacuum pump and is permissible only after prior consultation with Busch.

Max. allowed temperature of the inlet gas: 40 °C

The vacuum pump is intended for use in a potentially non-explosive environment.

Max. permissible number of startings per hour: 6.

The vacuum pump is thermally suitable for continuous operation.

The vacuum pump is ultimate pressure proof.

## Principle of operation



**WARNING**

**Organic matter and oxygen form potentially explosive mixtures.**

**Constant risk of fire!**

**Only special operating fluids (no mineral or synthetic oils or greases) are allowed for lubrication of the vacuum pump !**

**If there is a suspicion that the operating fluid is contaminated with organic material, it must be changed.**

**If there is a suspicion that the vacuum pump is contaminated with organic material, the vacuum pump must be removed from service and cleaned by specialists (Busch Service).**

The Roots vacuum pumps work in accordance with the approved principle of the Roots type machine. Operation is both simple and effective. Two rotors with identical profiles rotate in opposite directions in a cylinder. As they rotate, gas is drawn into the space between each rotor and the cylinder where it is trapped and, pushed out of the discharge by the rotation of the lobes.. This action is repeated twice for each revolution of each rotor and therefore four times for each revolution of the drive shaft. There is no mechanical contact between the rotors and cylinder, therefore no oil lubrication of the lobes is required.

The Roots vacuum pumps WV Oxygen are equipped with an automatic by-pass valve that limits the differential pressure between inlet and outlet.

## Cooling

WV 0250-2400 C/A and WP 0250-1250 D versions are air-cooled.

The WP 2000 D 2 is water cooled.

Caution! The cooling water supply must imperatively be connected up at first start up.

The WP 2000 D2 has a cooling system in each of the two covers (cooling coils). These cooling systems are separated from each other.

The cooling water must be neutral and clean.

Water temperature : 10-15°C at the water inlet

Quantity of cooling water : > 2 l/min. per cooling coil

Cooling water connection

The cooling water connection can be done with flexible hoses or water pipes.

Connection : 1/4"

Initial fill-up with cooling water

- Remove the safety caps from the connections
- Connect up the two hoses at the water inlet
- Fill in water until water comes out at the outlet
- Connect up the two hoses at the water outlet

## On/ Off switch

The vacuum pump comes without on/off switch. The monitoring of the vacuum pump must be provided in the course of the installation.

## Safety

### Intended use

**DEFINITION:** For the purpose of these instructions, "handling" the vacuum pump means the transport, storage, installation, commissioning, influence on operating conditions, maintenance, troubleshooting and overhaul of the vacuum pump.

The vacuum pump is intended for industrial use. It must only be handled by qualified personnel.

**The different applications for use and operational limits of the vacuum pump as laid out in the "Product Description" and the "Installation Prerequisites" of the vacuum pump must be observed both by the manufacturer of the machinery into which the vacuum pump is to be incorporated and by the end user.**

The maintenance instructions must be observed.

**Prior to handling the vacuum pump, these operating instructions must be read and understood. If anything remains to be clarified please contact your Busch representative!**

### Safety notes

The vacuum pump has been designed and manufactured in accordance with the latest technical and safety standards. Nevertheless, residual risks may remain. These operating instructions and the pump itself inform about potential hazards where appropriate. Safety instructions can be detected through the keywords, DANGER, WARNING and CAUTION as follows:



#### DANGER

Disregard of this safety instruction will always lead to accidents with fatal or serious injuries.



#### WARNING

Disregard of this safety instruction may lead to accidents with fatal or serious injuries.



#### CAUTION

Disregard of this safety instruction may lead to accidents with minor injuries or property damage.

## Noise Emissions

Refer to the table "Technical Properties" for the permissible sound levels in free field conditions according to EN ISO 2151.



#### CAUTION

The vacuum pump emits noise of high intensity.

Risk of damage to hearing.

Persons staying in the vicinity of a non noise insulated vacuum pump over extended periods shall wear ear protection.

## Transport

Roots vacuum pumps undergo a rigorous operating test at the factory and are packed carefully to avoid transport damage.

The inlet and outlet flange are sealed with plugs to avoid foreign matter entering the pump during transport. These covers must be removed before connecting up the pump.

Please check packaging for transport damage on delivery.

The pump can be lifted from the packaging with suitable lifting gear using the lifting brackets on the pump, or using appropriate belts.

The packaging materials must be disposed of in accordance with applicable environmental protection regulations, or re-used.

These operating instructions are part of the pump delivery.

### Transport in Packaging

Packed on a pallet, the vacuum pump can be transported with a forklift.

### Transport without packaging

**NOTE:** The vacuum pump is delivered with operating fluid already filled in. When lifting the vacuum pump keep it as horizontal as possible in order to minimise the ingress of operating fluid into the cylinder.

In case the vacuum pump is bolted to a pallet or a base plate:

- ◆ Remove the bolts between the vacuum pump and the pallet/base plate



#### CAUTION

Do not walk, work or stand under suspended loads.

**NOTE:** The position of the eyebolt fits to the centre of gravity of the vacuum pump incl. drive motor.

If a vacuum pump without drive motor is to be lifted, attach another belt/rope at a suitable point. If other components are fitted to the pump, attach another belt/rope at a suitable point (eyebolt, motor flange etc.).

- Attach lifting gear securely to the eyebolt on the cylinder.
- Attach lifting gear to a crane hook with safety latch.
- Lift the vacuum pump

In case the vacuum pump was bolted to a pallet:

- ◆ Remove the stud bolts from the rubber feet.



#### CAUTION

Tilting a vacuum pump that is already filled with operating fluid can cause large quantities of operating fluid to get into the cylinder.

Starting the vacuum pump with excessive quantities of operating fluid in the cylinder will immediately break the vanes and ruin the vacuum pump.

# Storage

## Short-term Storage

- Make sure that the suction connection/gas inlet and the discharge connection /gas outlet are closed (fit the provided plugs)
- Store the vacuum pump
  - if possible in its original packaging,
  - indoors,
  - dry,
  - dust free
  - vibration free

## Conservation

In case of adverse ambient conditions (e.g. aggressive atmosphere, frequent temperature changes) conserve the vacuum pump immediately. In case of favourable ambient conditions conserve the vacuum pump if a storage of more than 3 months is anticipated.

- Make sure that all openings are firmly closed; seal all openings that are not closed with PTFE-tape, gaskets or o-rings, with adhesive tape.
- Wrap the vacuum pump in VCI film

**NOTE:** VCI stands for "Volatile Corrosion Inhibitor". VCI-products (film, paper, cardboard, foam) evaporate a substance that condenses in molecular thickness on the packed good and by its electrochemical properties effectively suppresses corrosion on metallic surfaces. However, VCI-products may attack the surfaces of plastics and elastomers. Seek advice from your local packaging dealer! VCI packaging ensures good protection against corrosion for a few years, even in the most extreme of conditions such as sea transport and prolonged storage.

- Store the vacuum pump
  - if possible in its original packaging,
  - indoors,
  - dry,
  - dust free and
  - vibration free

Repeat the conservation process after 12 months of shut-down.



### CAUTION

Prior to a new conservation process or re-installation of the vacuum pump, make sure to remove the gasket, plug or adhesive tape from the discharge connection.

## Commissioning after conservation

- Make sure that all gaskets, plugs or adhesive tape are removed from the openings
- Make sure that the oil level at the sprockets and bearings is between the MIN and MAX markings of the oil sight glasses
- Make sure that the drop oiler (b) is at least two thirds full
- Commission the vacuum pump as described in the chapter "Installation and Commissioning"

# Installation and Commissioning



### WARNING

Installation and commissioning must only be carried out by qualified personnel who are informed about the applicable safety regulations and trained in the handling of oxygen.

Accident prevention regulations or methods must imperatively be complied with. Seek further information:

- European Industrial Gases Association "EIGA" [www.eiga.eu](http://www.eiga.eu) (EIGA SAG NL 79/04).
- Berufsgenossenschaft Rohstoffe und chemische Industrie "BG RCI" [www.bgrci.de](http://www.bgrci.de) (Merkblatt M 034 Sauerstoff).

## Installation prerequisites



### CAUTION

In case of non-compliance with the installation prerequisites, particularly in case of insufficient cooling:

Risk of damage or destruction of the vacuum pump and adjoining plant components!

Risk of injury!

The installation prerequisites must be complied with.

- Make sure that the integration of the vacuum pump is compliant with the essential safety requirements of the Machine Directive 2006/42/EC (in the responsibility of the designer of the machinery into which the vacuum pump is to be incorporated; see also the note in the EC-Declaration of Conformity)

## Mounting Position and space

- Make sure that the environment of the vacuum pump is not potentially explosive
- Make sure that the following ambient conditions are adhered to :
  - Ambient temperature : 5 ... 40 °C
  - Ambient pressure : atmospheric
- Make sure that the environmental conditions comply with the protection class of the drive motor (according to the nameplate)
- Make sure that the vacuum pump is placed on or fastened to a horizontal surface
- Make sure that the vacuum pump is level and even
- Make sure that the vacuum pump cannot inadvertently or intentionally be stepped on and cannot be used as a support for heavy objects
- Make sure that the vacuum pump cannot be hit by falling objects
- Make sure that the vacuum pump is at least 0,5 m away from any wall to ensure sufficient cooling
- Make sure that no temperature- sensitive parts (plastics, wood, cardboard, paper, electronics) come into direct contact with the hot surface of the vacuum pump



### CAUTION

The vacuum pump is not absolutely gas tight.

Risk of fire!

The installation site must be aired in such a way so as to prevent unacceptable levels of oxygen.

- Make sure that the installation site or assembly area is ventilated in such a way that adequate cooling of the vacuum pump is guaranteed





#### CAUTION

During operation the surface of the vacuum pump may exceed temperatures of 85°C.

Risk of burns!

- Make sure that the vacuum pump cannot be touched inadvertently during operation, provide a guard if appropriate
- Make sure that the sight glass will remain easily accessible

If the oil change is meant to be performed on site:

- ◆ Make sure that the oil drain plugs (k) and the oil filler plugs (c) remain easily accessible

The pumps WV 0250-0500 C can be installed in two different ways:

- ◆ vertical gas flow
- ◆ vertical gas flow with outlet at the side

The WV 1200-2400 A can be installed in two different positions:

- ◆ vertical gas flow
- ◆ vertical gas flow with outlet at the side

Vertical gas flow has the advantage of self-cleaning of the cylinder during operation.

The Roots pump can be installed directly or using the threaded holes at the rubber feet

The pump WP 0250-2000 D can be installed in two different ways:

- ◆ vertical gas flow
- ◆ horizontal gas flow

Vertical gas flow has the advantage of self-cleaning of the cylinder during operation.

Operation with the motor drive-shaft at the bottom is not possible.

## Suction Connection



#### WARNING

**Any contamination of the vacuum pump with foreign material, particularly with organic material will lead to an imminent risk of fire.**

**By using suitable filters, make sure that no foreign material, particularly organic material, can find its way into the vacuum pump.**



#### CAUTION

Drawing solid particles or liquids can destroy the vacuum pump.

In case the inlet gases can contain dust or other foreign solid particles:

- ◆ Make sure that a suitable filter (5 micron or less) is installed upstream of the vacuum pump
- ◆ Make sure that the filter is approved for oxygen applications
- Make sure that the suction line fits the suction connection (d) of the vacuum pump
- Make sure that the gas will be drawn through a vacuum-tight flexible hose or a pipe

When using a pipe:

- ◆ Make sure that the pipe will cause no stress on the vacuum pump's connection, use bellows if necessary
- Make sure that the nominal diameter of the suction line matches that of the suction connection/ gas inlet (d) of the vacuum pump in its entire length

When using very long suction lines (> 2 m), it is advisable to use larger diameters in order to avoid a loss in efficiency. For advice please contact your Busch representative!

If two or more vacuum pumps work on the same suction line, if the volume of the vacuum system is large enough to draw back oil after having been switched off, or if the vacuum must be maintained after switching off the vacuum pump:

- ◆ Provide a manual or automatically operated valve (= non-return valve) in the suction line

(the non-return valve that is installed inside the suction connection is not intended for this purpose!)

If the vacuum pump is intended to be used for the suction of gas that contains limited quantities of condensable vapour

- ◆ Provide a shut-off valve, a drain line and a drain valve in the suction line, so that condensates can be drained from the suction line
- Make sure that the suction line does not contain foreign objects, such as welding slag.

## Discharge connection

**Discharge gases must circulate freely. An interruption or blockage of the discharge line or using the discharged gases as a source of compressed air is not authorised.**

The following guidelines for the discharge line do not apply, if the drawn air is discharged into the environment away from the vacuum pump.



#### CAUTION

The discharged air contains small quantities of vacuum oil.

Spending time in air contaminated with vacuum operating fluid is hazardous to health.

If air is discharged into rooms where people are staying, sufficient ventilation must be provided for.

- Make sure that the discharge line fits the gas discharge connection (i) of the vacuum pump

When using a pipe:

- ◆ Make sure that the pipe will cause no stress on the discharge connection, if necessary use bellows
- Make sure that the nominal diameter of the discharge line matches that of the gas discharge connection (b) of the vacuum pump in its entire length

When using very long discharge lines (> 2 m) it is advisable to use larger diameters in order to avoid a loss of efficiency and an overload of the vacuum pump. Seek advice from your Busch representative

- Make sure that the discharge line either slopes away from the vacuum pump or provide a liquid separator or a drain line with a drain cock so that no liquids can re-enter the vacuum pump



#### WARNING

**Discharge lines made from non-conducting material can build up static charge.**

**Static discharge can cause fire of potentially existing operating fluid mist.**

**The discharge line must be made of conducting material or precautions must be made against static discharge**

## Electrical connection/ Controls

- Make sure that the stipulations acc. to the EMC-Directive 2014/30/EU as well as the EN-standards, electrical and occupational safety directives and the local or national regulations respectively, are complied with (this is in the responsibility of the designer of the machinery into which the vacuum pump is to be incorporated; see also the note in the EC-Declaration of Conformity).
- Make sure that the power supply is compatible with the data on the nameplate of the drive motor

- Make sure that an overload protection in accordance with EN 60204-1 is provided for the drive motor
- Make sure that the drive of the vacuum pump will not be affected by electric or electromagnetic disturbance originating from the power supply; if necessary seek advice from the Busch service

In case of mobile installation:

- ◆ Provide the electrical connection with grommets that will serve as strain-relief

## Installation

### Fitting

- Make sure that the "Installation Prerequisites" are complied with
- Set down or install the vacuum pump at its final location

### Connecting electrically



**WARNING**

Risk of electrical shock, risk of damage to equipment.

**Electrical installation work must only be executed by qualified personnel that knows and observes local or national regulations.**



**CAUTION**

The connection diagrams given below are typical. Specific orders or for certain markets may require deviating connection diagrams.

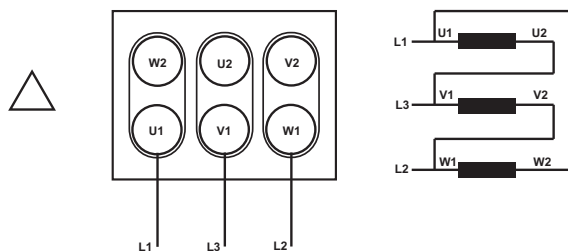
Risk of damage to the drive motor !

Check the inside of the terminal box for drive motor connection instructions/diagrams.

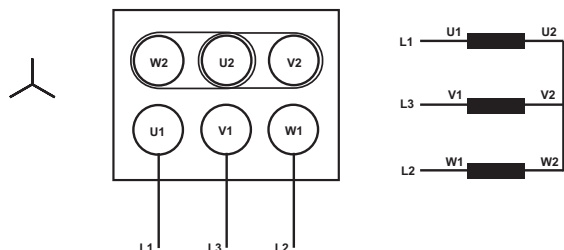
- Electrically connect the drive motor
- Connect the earth line

### Connection diagram three-phase motor

Delta connection (Low voltage):



Star connection (High voltage):



**CAUTION**

Operation in the wrong direction of rotation can destroy the vacuum pump within short time.

Risk of destruction of the vacuum pump!

Prior to starting-up, make sure that the vacuum pump is connected up correctly.

- Determine the intended direction of rotation with the arrow on the fan cover of the motor
- Switch on the drive motor for a fraction of a second only
- Watch the fan of the drive motor and determine the direction of rotation just before the fan stops

If the direction of rotation of the fan must be changed:

- ◆ Switch around any two of the drive motor wires in the terminal box

### Connecting Lines/ Pipes

In case the suction line is equipped with a shut-off valve:

- ◆ Connect the suction line
- Connect the discharge line
- Make sure that cooling air inlets and outlets are not covered or obstructed and that the cooling air flow is not obstructed in any other way

### Checking the operating fluid level



**WARNING**

The operating fluid is inert and should not be contaminated.

Any contamination with organic matter leads to an imminent risk of fire.

In order to prevent wrong material from being filled in, the vacuum pump is equipped with one or more tamper-proof lead seals.

Removal or placement of lead seals or work that requires the removal of lead seals must only be carried out by specially authorised and trained personnel.

**NOTE:** Starting the vacuum pump with cold operating fluid is made easier when the suction line is left open or left uncovered (no rubber mat) when starting the pump.

- Switch on the vacuum pump

In case the suction line is equipped with a shut-off valve:

- ◆ Close the shut-off valve

In case the suction line is not equipped with a shut-off valve:

- ◆ Cover the suction connection with a rubber mat (d)
- Let the vacuum pump run for a few minutes
- Switch off the vacuum pump and wait for a few minutes
- Make sure that the oil level is between the MIN and the MAX-markings of the oil sight glass (f)

In case the level has fallen below the MIN-marking of the oil sight glass:



#### WARNING

The vacuum pump must only be operated with the operating fluid that has been approved by the German Federal Institute for Materials Research and Testing (Bundesanstalt für Materialforschung und -prüfung (BAM)) and released for service with this vacuum pump.

Use of other operating fluids cancels the vacuum pump's approval for service.

- ◆ Top-up with operating fluid (see "Topping up with operating fluid")

In case the suction line is equipped with a shut-off valve:

- ◆ Open the shut-off valve

In case the suction line is not equipped with a shut-off valve:

- ◆ Remove the rubber mat from the suction connection
- Make sure that the lead seals (t) have been fitted

## Recording the Operating Parameters

As soon as the vacuum pump is working under normal operating conditions:

- Measure the working current of the drive motor and keep it as a reference for all future maintenance and repair work

## Recommendations on operation

### Application



#### WARNING

The vacuum pump is designed for operation under the conditions described below.

**In case of disrespect of the above, risk of damage or destruction of the vacuum pump and its components !**

**Risk of Injury !**

**The vacuum pump must only be operated under the conditions described below.**

The vacuum pump is designed for

- the suction
- of
- air and other dry, non-aggressive, non-toxic and non-explosive gases with increased oxygen content (volume content greater than 21 percent)

Conveying media with a higher density than air leads to an increased thermal and mechanical load on the vacuum pump and is permissible only after prior consultation with Busch

Max. allowed temperature of the inlet gas: 40 °C

The vacuum pump is intended for the use in a potentially non-explosive environment.

Max. permissible number of startings per hour: 6.

The vacuum pump is thermally suitable for continuous operation.

The vacuum pump is ultimate pressure proof.



#### WARNING

Contaminated machine with organic material can burn.

Risk of fire!

**Only special operating fluids, no mineral or synthetic oils or greases are allowed for lubrication of the vacuum pump !**

**If there is a suspicion that the operating fluid is contaminated with organic material, it must be changed.**

**If there is a suspicion that the vacuum pump is contaminated with organic material, the vacuum pump must be removed from service and cleaned by specialists (Busch Service).**

Only special operating fluids are allowed for the lubrication of the vacuum pump, **no** mineral or synthetic oils must be used!

In order to prevent wrong material from being filled in, the vacuum pump is equipped with one or more tamper-proof lead seals.

Lead seals must only be removed and affixed by specially authorised and trained personnel.



#### CAUTION

During operation the surface of the vacuum pump may exceed temperatures of 85°C.

Risk of burns!

The vacuum pump must be protected against accidental contact during operation, it must cool down prior to a required contact or heat protection gloves must be worn.



#### CAUTION

The discharged air contains small quantities of vacuum oil.

Spending time in air contaminated with vacuum operating fluid is hazardous to health.

If air is discharged into rooms where people are staying, sufficient ventilation must be provided for.



#### CAUTION

The noise level of the vacuum pump is quite high.

Risk of ear damage.

People spending a longer period of time in the vicinity of a non-insulated vacuum pump must wear ear protection.

- Make sure that all provided covers, guards, hoods etc. are fitted
- Make sure that protective devices will not be disabled.
- Make sure that cooling air inlets and outlets are not covered or obstructed and that the cooling air flow is not obstructed in any other way
- Make sure that the "Installation Prerequisites" (see "Installation Prerequisites and Commissioning") are complied with and will remain complied with, particularly that sufficient cooling will be ensured.



# Maintenance



## WARNING

The vacuum pump's authorisation for the drawing of gases with a higher oxygen content remains valid only under condition that the vacuum pump is maintained according to the service instructions below, that only original spare parts are used and that only Busch-approved materials for oxygen applications are used.

Maintenance work must only be executed by qualified personnel that is trained in the handling of oxygen, informed about the relevant safety regulations and instructed in the handling of oxygen vacuum pumps by Busch.

Accident prevention regulations or methods must imperatively be complied with. Seek further information:

- European Industrial Gases Association "EIGA" [www.eiga.eu](http://www.eiga.eu) (EIGA SAG NL 79/04).
- Berufsgenossenschaft Rohstoffe und chemische Industrie "BG RCI" [www.bgrci.de](http://www.bgrci.de) (Merkblatt M 034 Sauerstoff).



## WARNING

The operating fluid is inert and must not be contaminated with organic matter.

Any contamination with organic matter leads to an imminent risk of fire.

In order to prevent wrong material from being filled in, the vacuum pump is equipped with one or more tamper-proof lead seals.

Removal or placement of lead seals or work that require the removal of lead seals must only be carried out by specially authorised and trained personnel.



## CAUTION

During operation the surface of the vacuum pump may exceed temperatures of 85°C.

Risk of burns!

- Prior to work, that requires touching the vacuum pump, the pump must be left to cool down. Prior to changing the operating fluid, let the vacuum pump cool down for no more than 20 minutes
- Prior to disconnecting connections make sure that the connected pipes/lines are vented to atmospheric pressure

## Maintenance Schedule

**NOTE:** The maintenance intervals depend very much on the individual operating conditions. The intervals given below must be considered as upper limits that should not be exceeded. Particularly heavy duty operation, e.g. high dust loads in the environment or in the process gases, other contaminations or ingress of process material, can make it necessary to shorten the maintenance intervals significantly.

### Monthly:

- Check the temperature of the vacuum pump
  - ◆ In a room with moderate temperatures around 20°C the maximum temperature of the vacuum pump must be 90°C
  - ◆ Measure the temperature near the sight glass (f)
- Check the vacuum pump for operating fluid leaks - in case of leaks have the vacuum pump repaired (Busch service)

In case of operation in a dusty environment:

- ◆ Clean if necessary (see "Every 6 Months")

### Every 3 Months:

- Make sure that the vacuum pump and the primary pump have been switched off and cannot accidentally be switched on again
- Check the level and the colour of the operating fluid (see "Checking the Operating Fluid")
- Make sure that the operating fluid level at the sprockets and bearings is between the Min and MAX markings of the sight glasses

### Every 6 Months:

- Make sure that the vacuum pump and the primary pump have been switched off and cannot accidentally be switched on again
- If necessary, clean the motor fan, motor hood and cooling fins of the pump

### Every 16 000 Operating hours, latest after 4 years

- Drain the operating fluid in the sprockets and the bearing housings (see "Operating fluid change")
- Drain the operating fluid of the seal housing (see "Operating fluid change")

## Checking the operating fluid

### Checking the operating fluid level at the sprockets and bearing housings

- Make sure that the vacuum pump and the primary pump are switched off and cannot accidentally be switched on again
- Read the level on the sight glasses (f)

In case the level has dropped below the MIN-marking:

- ◆ Top up with operating fluid (see "Topping up with operating fluid")

In case the level is above the MAX-marking:

- ◆ Change the operating fluid (see "Change the operating fluid")

Dispose of the used operating fluid in compliance with applicable environmental protection regulations.

### Checking the operating fluid level in the seal housing

- Make sure that the vacuum pump and the primary pump are switched off and cannot accidentally be switched on again
- Check the operating fluid level of the drop oiler (b)

If either an excessive rise or a drop in the operating fluid level of the drop oiler is noticed, please check for possible causes in chapter "Troubleshooting".

Dispose of the used operating fluid in compliance with applicable regulations.

## Topping up with operating fluid

**NOTE:** Under normal conditions there should be no need to top up with operating fluid. A significant level drop indicates a malfunction (see "Troubleshooting").



## CAUTION

Filling in operating fluid through the suction connection (d) will result in breakage and destruction of the vacuum pump.

Operating fluid may only be filled through the filler holes.

- Make sure that the vacuum pump and the primary pump are switched off and cannot accidentally be switched on again
- Remove filler plugs (c)



#### WARNING

The vacuum pump must only be operated with the operating fluid that has been approved by the German Federal Institute for Materials Research and Testing (Bundesanstalt für Materialforschung und -prüfung (BAM)) and released for service with this vacuum pump.

Use of other operating fluids cancels the vacuum pump's approval for service.

- Top up with operating fluid until the level reaches the middle of the sight glass
- Make sure that the level at the sprockets and bearings is between the MIN and MAX markings of the sight glasses
- Make sure that the drop oiler (b) is at least two thirds full
- Make sure that the seals of the filler plugs (c) have been fitted and are undamaged, replace if necessary
- Refit the filler plugs (c) together with their seals
- Make sure that the filler plugs have been fitted correctly after filling in the operating fluid, so that no air can enter the pump. Too high an operating fluid level must also be avoided as this could lead to overheating of the sprockets.
- Refit the tamper-proof lead seals (t)

### Checking the colour of the operating fluid

**NOTE:** The oil must be clear and transparent. A permanent milky colour is an indication for contamination by foreign bodies. A dark colour is an indication for oil that has been chemically altered or contaminated by foreign bodies.



#### WARNING

Dark colored oil may indicate a hazardous pump condition which could cause personal injury.



If dark oil similar to the example shown is observed, you have to contact the Busch Customer Service without delay.

### Operating fluid Change



#### WARNING

The vacuum pump must only be operated with the operating fluid that has been approved by the German Federal Institute for Materials Research and Testing (Bundesanstalt für Materialforschung und -prüfung (BAM)) and released for service with this vacuum pump.

Use of other operating fluids, cancels the vacuum pump's approval for service.

### Draining used operating fluid from the sprockets and the bearings

**NOTE:** After switching off the vacuum pump at normal operating temperature, wait no more than 20 minutes before draining the operating fluid.

- Make sure that the vacuum pump and the primary pump are switched off and cannot accidentally be switched on again
- Make sure that the vacuum pump is vented to atmospheric pressure
- Put a drain tray underneath the drain plugs (k)
- Remove the drain plugs (k)
- Drain the operating fluid

When the operating fluid flow has stopped:

Make sure that all the used operating fluid has been fully drained

- Make sure that the seal of the drain plug is not damaged and fits correctly. Replace seal if damaged
- Refit the drain plugs (k)
- Switch on the vacuum pump for a few seconds
- Make sure that the vacuum pump and the primary pump are switched off and cannot accidentally be switched on again
- Remove the drain plug again and drain the rest of the operating fluid
- Make sure that the seal of seat on the drain plug is undamaged, if necessary replace the drain plug
- Refit the drain plugs (k)
- Dispose of the used operating fluid in compliance with applicable regulations

### Draining used operating fluid from the seal housing

**NOTE:** After switching off the vacuum pump at normal operating temperature, wait no more than 20 minutes before draining the operating fluid.

- Make sure that the vacuum pump and the primary pump are switched off and cannot accidentally be switched on again
- Check the level of the drop oiler (b)
- Put a drain tray underneath the drain plug (k)
- Remove the drain plug (k)
- Drain the operating fluid

When the operating fluid flow has stopped:

Make sure that all the used operating fluid is drained

- Refit the drain plug (k)
- Switch the vacuum pump on for a few seconds
- Make sure that the vacuum pump and the primary pump are switched off and cannot accidentally be switched on again
- Remove the drain plug again and drain the rest of the operating fluid
- Make sure that the seal of the oil drain plug is undamaged and fits properly, if necessary replace the oil drain plug
- Refit the drain plug (k)
- Dispose of the used operating fluid in compliance with applicable regulations

### Filling in fresh operating fluid for the sprockets and the bearings



#### WARNING

The vacuum pump must only be operated with the operating fluid that has been approved by the German Federal Institute for Materials Research and Testing (Bundesanstalt für Materialforschung und -prüfung (BAM)) and released for service with this vacuum pump.

Use of other operating fluids, cancels the vacuum pump's approval for service.

- Prepare the quantity of operating fluid needed (see table "Quantity of operating fluid")



#### WARNING

The use of chemically contaminated or polluted oil can lead to hazardous pump conditions which could cause personal injury.

**NOTE:** The quantity given in these operating instructions is of informative nature only. Check the operating fluid level with the help of the sight glasses (f) on the vacuum pump.

- Make sure that oil drain plugs (k) have been fitted correctly and do not leak



#### CAUTION

Filling operating fluid through the suction connection (d) will lead to breakage and destruction of the vacuum pump.

Operating fluid must only be filled in through the filler holes.

- Remove the filler plugs (c)
- Fill in operating fluid
- Make sure that the level is between the MIN and the MAX-markings of the sight glass
- Make sure that the seals are undamaged and inserted into the filler plugs (c), replace them if necessary
- Refit the filler plugs (c) together with the seals
- Refit the tamper-proof lead seals (t)

### Filling in fresh operating fluid for the seal housing



#### WARNING

The vacuum pump must only be operated with the operating fluid that has been approved by the German Federal Institute for Materials Research and Testing (Bundesanstalt für Materialforschung und -prüfung (BAM)) and released for service with this vacuum pump.

Use of other operating fluids cancels the vacuum pump's approval for service.

- Prepare the quantity of operating fluid needed (see table "Quantity of operating fluid")



#### WARNING

The use of chemically contaminated or polluted oil can lead to hazardous pump conditions which could cause personal injury.

**NOTE:** The quantity given in these operating instructions is of informative nature only. Check the operating fluid level with the help of the oil sight glasses (f) on the vacuum pump.

- Make sure that drain plugs (k) have been fitted correctly and do not leak
- Remove the drop oiler (b)
- Fill operating fluid into the seal housing right up to the beginning of the threading of the drop oiler



#### CAUTION

Operating fluid must be filled in through the filler hole only.

- Refit the drop oiler (b)
- Lift the lid of the drop oiler. Fill the drop oiler (b) reservoir up to 2/3.

## Motor cover

Check the motor cover regularly. Poor maintenance of the motor cover will affect the cooling and may lead to overheating of the vacuum pump.

## Overhaul



#### CAUTION

In order to achieve best efficiency and a long service life the vacuum pump was assembled and adjusted with specifically defined tolerances.

This adjustment will be lost during dismantling of the vacuum pump.

It is therefore strictly recommended that any dismantling of the vacuum pump that is beyond of what is described in this manual must be done by the Busch service.



#### WARNING

Improper maintenance work on the vacuum pump will put the operating safety at risk.

Risk of fire!

Approval for operation will be cancelled !

Any dismantling of the vacuum pump that is beyond of what is described in this manual must be done by specially trained Busch service personnel only.



#### DANGER

In case the vacuum pump conveyed gas that was contaminated with foreign materials which are dangerous to health, harmful material can reside in operating fluid and condensates.

Harmful material can reside in pores, gaps and internal spaces of the vacuum pump.

Danger to health during dismantling of the vacuum pump.

Danger to the environment.

Prior to shipping the vacuum pump shall be decontaminated as good as possible and the contamination status shall be stated in a "Declaration of Contamination" (form downloadable from [www.buschvacuum.com](http://www.buschvacuum.com)).

Busch service will only accept vacuum pumps that come with a completely filled in and legally binding signed "Declaration of Contamination" (form downloadable from [www.buschvacuum.com](http://www.buschvacuum.com)).

## Removal from Service

### Temporary Removal from Service

- Prior to disconnecting pipes/lines make sure that all pipes/lines are vented to atmospheric pressure

### Recommissioning



#### CAUTION

Lobes can stick after a long shutdown period.

After longer shutdown periods the vacuum pump must be turned by hand.

After longer shutdown periods:

- ◆ Make sure that the vacuum pump and the primary pump are switched off and cannot accidentally be switched on again
  - ◆ Remove the fan cover of the drive motor
  - ◆ Slowly rotate the fan by hand several revolutions in the intended direction of rotation (see arrow sticker or cast arrow on the fan cover)
  - ◆ Refit the fan cover of the drive motor.
- Follow the instructions in chapter "Installation and Commissioning"

## Dismantling and Disposal of the vacuum pump



**DANGER**

In case the vacuum pump conveyed gases that were contaminated with harmful foreign material the operating fluid and the exhaust filter(s) will be contaminated with harmful material.

Harmful material can reside in pores, gaps and other internal spaces of the vacuum pump.

**Danger to health during dismantling of the vacuum pump.**

**Danger to the environment.**

**During dismantling of the vacuum pump wear protective equipment.**

**The vacuum pump must be decontaminated prior to disposal.**

**Operating fluid and exhaust filters must be disposed of separately in compliance with applicable regulations.**



**CAUTION**

Used operating fluid is special waste and must be disposed of in compliance with applicable regulations.

- Drain the operating fluid
- Make sure that materials and components that are special waste have been separated from the vacuum pump
- Make sure that the vacuum pump is not contaminated with harmful foreign material

According to the state of information at the time of print of this manual the materials used for the manufacture of the vacuum pump involve no risk.

- Dispose of the used operating fluid in compliance with applicable regulations
- Dispose of special waste in compliance with applicable regulations
- Dispose of the vacuum pump as scrap metal

# Troubleshooting



## WARNING

Risk of electrical shock, risk of damage to equipment.

Electrical installation work must only be carried out by qualified personnel that knows and observes the local or national regulations.



## ATTENTION

During operation, the surface of the vacuum pump may exceed temperatures of 85°C.

Risk of burns!

Do not touch the hot surfaces of the vacuum pump or wear heat protection gloves.

**Please contact your local Busch representative if you have any doubts or questions**

Problem	Possible Cause	Remedy
<p>The vacuum pump does not reach the usual working pressure</p> <p>The current consumption of the motor is too high (compared with the initial value after commissioning)</p> <p>Reaching operational pressure takes too long</p>	The vacuum system or suction line are not leak-tight	Check piping, hoses or pipe connections for possible leaks
	Jammed lobes	Inspection of the lobes
	Defective bearings	Have the vacuum pump repaired (Busch service)
	In case an inlet filter is installed on the suction side : The filter on the suction flange is partially clogged	Clean or change the filter
	Partial clogging or blockage in suction or discharge lines	Remove foreign particles
	Suction or discharge lines too long, or too small (diameter)	Use larger diameter lines
	Internal parts worn or damaged	Have the vacuum pump repaired (Busch service)
The vacuum pump does not start	The vacuum pump turns in the wrong direction	Check the direction of rotation of the driving motor. See "Installation and Commissioning", change if necessary
	The drive motor is not supplied with the correct voltage or is overloaded	Supply the drive motor with the correct voltage
	The drive motor trip switch protection is too weak or trip level is too low	<p>Compare the technical data of drive motor trip switch with the data on the nameplate of the motor.</p> <p>Correct if necessary</p> <p>In case of high ambient temperature:</p> <p>Set the trip level of the drive motor trip switch 5% above the nominal drive motor current</p>
	One of the fuses has blown	Check the fuses
	The connection cable is too long or too small causing a voltage drop at the vacuum pump	Use adequately dimensioned cable



	The vacuum pump or the drive motor is jammed or seized	<p>Make sure that the drive motor is disconnected from the power supply</p> <p>Remove the fan cover</p> <p>Try to turn the fan by hand</p> <p>If the unit vacuum pump / drive motor is still jammed:</p> <p>Remove the drive motor and check the drive motor and the vacuum pump separately</p> <p>If the vacuum pump is jammed:</p> <p>Have the vacuum pump repaired (Busch service)</p>
	The drive motor is defective	Change the drive motor (Busch service)
The vacuum pump is jammed or seized	Solid foreign particles have entered the vacuum pump	<p>Have the vacuum pump repaired (Busch service)</p> <p>Make sure the suction line is equipped with a mesh screen</p> <p>If necessary fit a mesh screen at the inlet</p>
	Corrosion in the vacuum pump from remaining condensates	<p>Have the vacuum pump repaired (Busch service)</p> <p>Check the process</p> <p>Follow the instructions in chapter "Installation and Commissioning, Operating Notes"</p>
<p>The vacuum pump starts, but labours or runs noisily or rattles</p> <p>The drive motor draws too high a current (compare with initial value after commissioning)</p>	<p>Connection(s) in the drive motor terminal box are defective</p> <p>The motor winding is defective</p> <p>The drive motor operates on two phases only</p>	<p>Check the proper connection of the wires against the wiring diagram</p> <p>Tighten or change the connections</p>
	Wrong operating fluid quantity, unsuitable operating fluid type	<p>Use one of the recommended operating fluids in the correct quantity</p> <p>(see "Operating fluid", Operating fluid change see "Maintenance")</p>
	Foreign particles in the vacuum pump Seized bearings	Have the vacuum pump repaired (Busch service)
The vacuum pump is very noisy	Defective bearings	Have the vacuum pump repaired (Busch service)
	Worn coupling element	Replace the coupling elements
	Defective gears	Have the vacuum pump repaired (Busch service)
Noise at the seals	Insufficient lubrication	Check operating fluid levels and top up with operating fluid
	Worn sealing (wear parts)	Change sealing
The vacuum pump is very hot (the temperature of the drained operating fluid must not exceed 90°C)	Cooling water flow is too low (only WP2000)	Check the cooling water circuit and adjust the flow if necessary
	Ambient temperature too high	Keep within the permitted ambient temperature range
	Temperature of the gases at inlet too high	Keep within the permitted temperature range for the gases at inlet
	Mains frequency or voltage outside tolerance range	Provide a more stable power supply

The operating fluid is black	Operating fluid change intervals are too long The operating fluid has overheated	Drain the operating fluid Fill in new operating fluid (see "Maintenance") In case the operating fluid life is too short : use operating fluid with better heat resistance (see "Operating fluid") or fit additional cooling
The rotors do not turn, and cannot be turned either way by hand:	Failure of the motor	Repair or change motor
The rotors do not turn, and cannot be turned by hand either way:	Rotors are jammed, stuck or seized	Free the rotors  Check for signs of overheating (discolouration) and contact Busch Service for a service/dismantling for repair
	Foreign substances in the pump	Dismantle pump to clean and repair
Abnormal sounds or vibrations: STOP BLOWER IMMEDIATELY !!	Excessive wear of bearings	Change bearings
	Too little gear oil in the pump, or oil in the pump is worn	Top up with operating fluid/Change operating fluid
	Resonance of piping	Provide support for the piping or use flexible connections
	**Abnormal increase of discharge pressure	Refer to cause marked with **
	Leakage	Find and stop leaks
	Synchronising the rotors	Have the vacuum pump repaired (Busch service)
	Foreign particles in the gear housing	Have the vacuum pump repaired (Busch service)
	Failure of non-return valve	Change non-return valve
Abnormal heat	Abnormal increase of discharge pressure	Refer to causes marked with **
	Rotational speed of blower and/or motor too low (when using a frequency converter)	Check the minimal admissible rotational speed and correct
	Too much operating fluid in the housing	Fill in operating fluid only to the middle of the sight glass, while the blower is switched off
	Ambient temperature too high	Increase ventilation of the machine room/increase rotational speed (ventilation) of motor
	Blockage of the suction inlet or filter	Clean suction inlet, and clean or change filter
	Excessive wear of rotors and consequently increase of rotor tolerances	Install filter and dismantle blower for repair  Have the vacuum pump repaired (Busch service)
**Abnormal increase of discharge pressure	Blockage of discharge pipe	Clean discharge pipe
	Blockage of system piping	Clean system piping
	Primary pump failure	Have the vacuum pump repaired (Busch service)
Operating fluid leaks	Too much operating fluid in the pump	Fill up operating fluid only to the middle of the oil sight glass, while the blower is switched off
	Worn sealing	Change sealing
	Ambient conditions and vacuum combined with pressure operation and high dP	Fit an operating fluid separator, ensure adequate ventilation
	Pump has been tilted or is not level	Install the pump on a horizontal surface

Operating fluid level in the seal housing fluctuates abnormally (drop oiler)	Worn sealing	Change sealing
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## Spare parts

**NOTE:** When ordering spare parts or accessories acc. to the table below please always quote the type and the serial no. of the vacuum pump (on the name plate of the pump). This will allow Busch service technicians to check if the vacuum pump is compatible with a modified or improved part.

**The exclusive use of genuine spare parts and consumables is a prerequisite for the proper function of the vacuum pump and for the granting of warranty, guarantee or goodwill.**

This parts list applies to a typical and standard configuration of the vacuum pump. Specific pump configuration parts lists can be supplied upon request.

## Wearing parts kit

Wearing parts kit		Part no.
Gasket kit	WV 0250-0500 C	0990 000 502
	WV 1200-1800 A	0990 209 267
	WV 2400 A	0990 211 434
	WP 0250-1250 D	0990 512 237
	WP 2000 D	0990 508 702
Overhaul kit	WV 0250-0500 C	0994 000 102
	WV 1200-1800 A	0994 209 265
	WV 2400 A	0994 212 181
	WP 0250-1250 D	0994 512 235
	WP 2000 D	0994 508 703

## Accessories

Accessories	WV 0250 C WV 0500 C
Flange with female thread G 2	0947 501 471
Flange with female thread G 2 (horizontal discharge)	0947 505 111
Flange with female thread G 2 1/2	0947 510 202
Flange with female thread G 3	0947 505 215
Flange with female thread G 2 and mesh screen	0947 501 588
Flange with female thread G 3 and mesh screen	0947 505 967
Flange with hose nipple, G 2, ø 60 mm	0947 501 288
Flange with hose nipple, G 2, ø 60 mm (horizontal discharge)	0947 501 737
Flange with hose nipple, G 2 1/2, ø 60 mm	0947 504 124
Flange with hose nipple, G 3, ø 90 mm	0947 504 900
Flange with hose nipple and mesh screen, G 2, ø 60 mm	0947 503 827
Flange with hose nipple and mesh screen, G 3, ø 90 mm	0947 504 283
Flange with 90° -elbow and hose nipple, G 2, ø 60 mm	0947 501 289
Flange with 90° -elbow and hose nipple, G 2, ø 60 mm (horizontal discharge)	0947 505 139
Flange with 90° -elbow and hose nipple, G 2 1/2, ø 60 mm	0947 502 726
Flange with 90° -elbow and hose nipple, G 3, ø 90 mm	0947 501 521
Flange with 90° -elbow, hose nipple and mesh screen, G 2, ø 60 mm	0947 504 450
Flange with 90° -elbow, hose nipple and mesh screen, G 2 1/2, ø 90 mm	0947 503 002
Flange with 90° -elbow, hose nipple and mesh screen, G 3, ø 90 mm	0947 505 966
Blind flange	0947 500 750

Blind flange with mesh screen	0947 000 756
Cover plate	0947 501 586

Accessories	WV 1200 A outlet	WV 1200 A inlet
Flange with female thread G 2	0947 501 471	0947 516 317
Flange with female thread G 2 1/2	0947 510 202	-
Flange with female thread G 3	0947 505 215	0947 501 748
Flange with female thread G 2 and mesh screen	0947 501 588	0947 500 749
Flange with female thread G 3 and mesh screen	0947 505 967	0947 505 965
Flange with hose nipple, G 2, ø 60 mm	0947 501 288	0947 501 522
Flange with hose nipple, G 2 1/2, ø 60 mm	0947 504 124	-
Flange with hose nipple, G 3, ø 90 mm	0947 504 900	0947 504 376
Flange with hose nipple and mesh screen, G 2, ø 60 mm	0947 503 827	0947 506 827
Flange with hose nipple and mesh screen, G 3, ø 90 mm	0947 504 283	0947 501 520
Flange with 90° -elbow and hose nipple, G 2, ø 60 mm	0947 501 289	0947 503 099
Flange with 90° -elbow and hose nipple, G 2 1/2, ø 60 mm	0947 502 726	0947 503 004
Flange with 90° -elbow and hose nipple, G 3, ø 60 mm	0947 501 521	0947 502 975
Flange with 90° -elbow, hose nipple and mesh screen, G 2, ø 60 mm	0947 504 450	0947 501 544
Flange with 90° -elbow, hose nipple and mesh screen, G 2 1/2, ø 90 mm	0947 503 002	0947 503 003
Flange with 90° -elbow, hose nipple and mesh screen, G 3, ø 90 mm	0947 505 966	0947 505 964
Blind flange	0947 500 750	0947 505 971
Blind flange with mesh screen	0947 000 756	0947 505 972
Cover plate	0947 501 586	0947 501 587

Accessories	WV 1800 A outlet	WV 1800 A inlet
Flange with female thread G 2	0947 501 471	0947 516 317
Flange with female thread G 2 1/2	0947 510 202	-
Flange with female thread G 3	0947 505 215	0947 501 748
Flange with female thread G 2 and mesh screen	0947 501 588	0947 500 749
Flange with female thread G 3 and mesh screen	0947 505 967	0947 505 965
Flange with hose nipple, G 2, ø 60 mm	0947 501 288	0947 501 522
Flange with hose nipple, G 2 1/2, ø 60 mm	0947 504 124	-
Flange with hose nipple, G 3, ø 90 mm	0947 504 900	0947 504 376
Flange with hose nipple and mesh screen, G 2, ø 60 mm	0947 503 827	0947 506 827
Flange with hose nipple and mesh screen, G 3, ø 90 mm	0947 504 283	0947 501 520
Flange with 90° -elbow and hose nipple, G 2, ø 60 mm	0947 501 289	0947 503 099
Flange with 90° -elbow and hose nipple, G 2 1/2, ø 60 mm	0947 502 726	0947 503 004

Flange with 90° -elbow and hose nipple, G 3, ø 60 mm	0947 501 521	0947 502 975
Flange with 90° -elbow, hose nipple and mesh screen, G 2, ø 60 mm	0947 504 450	0947 501 544
Flange with 90° -elbow, hose nipple and mesh screen, G 2 1/2, ø 90 mm	0947 503 002	0947 503 003
Flange with 90° -elbow, hose nipple and mesh screen, G 3, ø 90 mm	0947 505 966	0947 505 964
Blind flange	0947 500 750	0947 505 971
Blind flange with mesh screen	0947 000 756	0947 505 972
Cover plate	0947 501 586	0947 501 587

Accessories	WP 2400 A
Flange with female thread G 2	0947 516 317
Flange with female thread G 3	0947 501 748
Flange with female thread G 2 and mesh screen	0947 500 749
Flange with female thread G 3 and mesh screen	0947 505 965
Flange with hose nipple, G 2, ø 60 mm	0947 501 522
Flange with hose nipple, G 3, ø 90 mm	0947 504 376
Flange with hose nipple and mesh screen , G 2, ø 60 mm	0947 506 827
Flange with hose nipple and mesh screen , G 3, ø 90 mm	0947 501 520
Flange with 90° -elbow and hose nipple, G 2, ø 60 mm	0947 503 099
Flange with 90° -elbow and hose nipple, G 2 1/2, ø 60 mm	0947 503 004
Flange with 90° -elbow and hose nipple, G 3, ø 60 mm	0947 502 975
Flange with 90° -elbow, hose nipple and mesh screen, G 2, ø 60 mm	0947 501 544
Flange with 90° -elbow, hose nipple and mesh screen, G 2 1/2, ø 90 mm	0947 503 003
Flange with 90° -elbow, hose nipple and mesh screen, G 3, ø 90 mm	0947 505 964
Blind flange	0947 505 971
Blind flange with mesh screen	0947 505 972
Cover plate	0947 501 587

Accessories	WP 0250 D 4 WP 0500 D 2	WP 0700 D 2
Flange with female thread G 2	0947 505 111	0947 501 471
Flange with female thread G 2 1/2	-	0947 510 202
Flange with female thread G 3	-	0947 505 215
Flange with female thread G 2 and Mesh screen	0947 504 950	0947 511 201
Flange with female thread G 3 and Mesh screen	-	0947 511 202
Flange with hose nipple, G 2, ø 60 mm	0947 501 737	0947 501 288
Flange with hose nipple, G 2 1/2, ø 60 mm	-	0947 504 124
Flange with hose nipple, G 3, ø 90 mm	-	0947 504 900
Flange with hose nipple and mesh screen , G 2, ø 60 mm	0947 506 346	0947 511 203
Flange with hose nipple and mesh screen , G 3, ø 90 mm	-	0947 511 204
Flange with 90° -elbow and hose nipple, G 2, ø 60 mm	0947 505 139	0947 501 289

Flange with 90° -elbow and hose nipple, G 2 1/2, ø 60 mm	-	0947 502 726
Flange with 90° -elbow and hose nipple, G 3, ø 90 mm	-	0947 501 521
Flange with 90° -elbow, hose nipple and mesh screen, G 2, ø 60 mm	0947 506 340	0947 511 205
Flange with 90° -elbow, hose nipple and mesh screen, G 3, ø 90 mm	-	0947 511 206
Blind flange	0947 506 329	0947 500 750
Blind flange with Mesh screen	0947 000 755	0947 511 207
Cover plate	0947 501 736	0947 501 586

Accessories	WP 1000 D 2 WP 1250 D 2
Flange with female thread G 2	0947 516 317
Flange with female thread G 3	0947 501 748
Flange with female thread G 3 and mesh screen	0947 504 924
Flange with hose nipple, G 2, ø 60 mm	0947 501 522
Flange with hose nipple, G 3, ø 90 mm	0947 504 376
Flange with hose nipple and mesh screen , G 3, ø 90 mm	0947 505 690
Flange with 90° -elbow and hose nipple, G 2, ø 60 mm	0947 503 099
Flange with 90° -elbow and hose nipple, G 2 1/2, ø 60 mm	0947 503 004
Flange with 90° -elbow and hose nipple, G 3, ø 90 mm	0947 502 975
Flange with 90° -elbow, hose nipple and mesh screen, G 3, ø 90 mm	0947 505 691
Blind flange	0947 505 971
Blind flange with mesh screen	0947 000 757
Cover plate	0947 501 587

Accessories	WP 2000 D 2
Flange with female thread G 2	0947 516 317
Flange with female thread G 3	0947 501 748
Flange with female thread G 3 and mesh screen	0947 504 924
Flange with hose nipple, G 2, ø 60 mm	0947 501 522
Flange with hose nipple, G 3, ø 90 mm	0947 504 376
Flange with hose nipple and mesh screen , G 3, ø 90 mm	0947 505 690
Flange with 90° -elbow and hose nipple, G 2, ø 60 mm	0947 503 099
Flange with 90° -elbow and hose nipple, G 2 1/2, ø 60 mm	0947 503 004
Flange with 90° -elbow and hose nipple, G 3, ø 90 mm	0947 502 975
Flange with 90° -elbow, hose nipple and mesh screen, G 3, ø 90 mm	0947 505 691
Blind flange	0947 505 971
Blind flange with mesh screen	0947 000 757
Cover plate	0947 501 587



# Operating fluid



## WARNING

The use of chemically contaminated or polluted oil can lead to hazardous pump conditions which could cause personal injury.

Description	Busch YLC 250 B
Base	PFPE
Density (20°C) [g/cm³]	1,90
Ambient temperature range [°C]	5 ... 40
Kinematic viscosity at 20°C [mm²/s]	270
Viscosity index (20°C)	113
Specific operating fluid consumption [cm³/h]	0,7
Pourpoint [°C]	- 35
Part no. 0,5 l (~1 kg) packaging Part no. 2,5 l (~5 kg) packaging	0831 131 400 0831 514 524
Note	Specials applications "Oxygen"
Filling quantity approx. [l]	See "Technical data"

# Quantity of operating fluid

## Standard sealing

Quantity of operating fluid [l]	Motor side	Gear side	Seal housing
WV 0250 C	0,4	0,5	0,35
WV 0500 C	0,4	0,5	0,35

Quantity of operating fluid [l]	Motor side	Gear side	Seal housing
WV 1200 A	1,6	1,9	0,1
WV 1800 A	1,6	1,9	0,1
WV 2400 A	1,7	2,2	0,1

Quantity of operating fluid [l]	Vertical gas flow		Horizontal gas flow		Seal housing
	Motor side	Gear side	Motor side	Gear side	
WP 0250 D 4 - WP 1250 D 2	0,6	0,8	0,4	0,5	0,1

Quantity of operating fluid [l]	Vertical gas flow		Horizontal gas flow		Seal housing
	Motor side	Gear side	Motor side	Gear side	
WP 2000 D 2	1,2	1,5	0,8	0,9	0,1

# Technical Data

Technical Properties			WV 0250 C	WV 0500 C	WV 1200 A	WV 1800 A	WV 2400 A
Nominal displacement	50 (60) Hz	m³/h	250 (300)	500 (600)	1050 (1260)	1600 (1920)	2120 (2540)
Max. differential pressure		hPa (mbar)	53	53	53	53	53
Nominal motor rating	50 (60) Hz	kW	0,75 (1,1)	1,5 (2,2)	3,5 (4,8)	4,3 (5,2)	6,0 (7,6)
Nominal motor speed	50 (60) Hz	min <sup>-1</sup>	1500 (1800)	3000 (3600)	3000 (3600)	3000 (3600)	3000 (3600)
Weight approx.		kg	136	143	290	300	520

Technical Properties			WP 0250 D 4	WP 0500 D 2	WP 0500 D 4	WP 0700 D 2	WP 1000 D 2	WP 1250 D 2
Nominal displacement	50 (60) Hz	m³/h	250 (300)	500 (600)	500 (600)	700 (840)	1000 (1200)	1250 (1500)
Max. differential pressure		hPa (mbar)	80	50	80	50	50	50
Nominal motor rating	50 (60) Hz	kW	1,1 (1,5)	2,2 (3)	1,5 (2,2)	3 (4)	3 (4)	4 (5,5)
Nominal motor speed	50 (60) Hz	min <sup>-1</sup>	1500 (1800)	3000 (3600)	1500 (1800)	3000 (3600)	3000 (3600)	3000 (3600)
Weight approx.		kg	133	144	178	159	191	220

Technical Properties			WP 2000 D 2
Nominal displacement	50 (60) Hz	m³/h	2000 (2400)
Max. differential pressure		hPa (mbar)	50
Nominal motor rating	50 (60) Hz	kW	5,5 (7,5)
Nominal motor speed	50 (60) Hz	min <sup>-1</sup>	3000 (3600)
Weight approx.		kg	330

# EU Declaration of Conformity

This Declaration of Conformity and the CE-mark 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-mark.

The manufacturer

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

declares that the machine(s) **WV 0250-2400 C/A Oxygen, WP 0250-1250 D Oxygen  
and WP 2000 D Oxygen with operating fluid YLC 250 B**

fulfil(s) all the relevant provisions from European directives:

- 'Machinery' 2006/42/EC
- 'Electromagnetic Compatibility' 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 designated standards that have been used to fulfil those provisions:

Standard	Title of the Standard
EN ISO 12100 : 2010	Safety of machinery - Basic concepts, general principles of design
EN ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN 1012-1 : 2010 EN 1012-2 : 1996 + A1 : 2009	Compressors and vacuum pumps - Safety requirements - Part 1 and Part 2
EN ISO 2151 : 2008	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
EN 60204-1 : 2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
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 ISO 13849-1 : 2015 <sup>(1)</sup>	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design

<sup>(1)</sup> In case control systems are integrated.

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, 14.05.2021



**Christian Hoffmann, General Director**

# UK Declaration of Conformity

This Declaration of Conformity and the UKCA-mark 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-mark.

The manufacturer

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

declares that the machine(s) **WV 0250-2400 C/A Oxygen, WP 0250-1250 D Oxygen  
and WP 2000 D Oxygen with operating fluid YLC 250 B**

fulfil(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 fulfil those provisions:

Standard	Title of the Standard
BS EN ISO 12100 : 2010	Safety of machinery. Basic concepts, general principles of design. Risk assessment and risk reduction.
BS EN ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs.
BS EN 1012-1 : 2010 BS EN 1012-2 : 1996 + A1 : 2009	Compressors and vacuum pumps. Safety requirements. Air compressors and vacuum pumps.
BS EN ISO 2151 : 2008	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
BS EN 60204-1 : 2018	Safety of machinery. Electrical equipment of machines. General requirements.
BS EN IEC 61000-6-2 : 2019	Electromagnetic compatibility (EMC) - Generic standards. Immunity standard for industrial environments.
BS EN IEC 61000-6-4 : 2019	Electromagnetic compatibility (EMC) - Generic standards. Emission standard for industrial environments.
BS EN ISO 13849-1 : 2015 <sup>(1)</sup>	Safety of machinery. Safety-related parts of control systems. General principles for design.

<sup>(1)</sup> In case control systems are integrated.

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, 14.05.2021



**Christian Hoffmann, General Director**



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