

# SECO

Dry-running Rotary Vane Vacuum Pumps  
SV 1003 D, SV 1005 D

## 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 according to state-of-the-art methods. Nevertheless, residual risks may remain, as described in the following chapters and in accordance with the chapter *Intended Use* [→ 5]. This instruction manual highlights potential hazards where appropriate. Safety notes and warning messages are tagged with one of the keywords DANGER, WARNING, CAUTION, NOTICE and NOTE as follows:



## DANGER

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



## WARNING

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



## CAUTION

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



## NOTICE

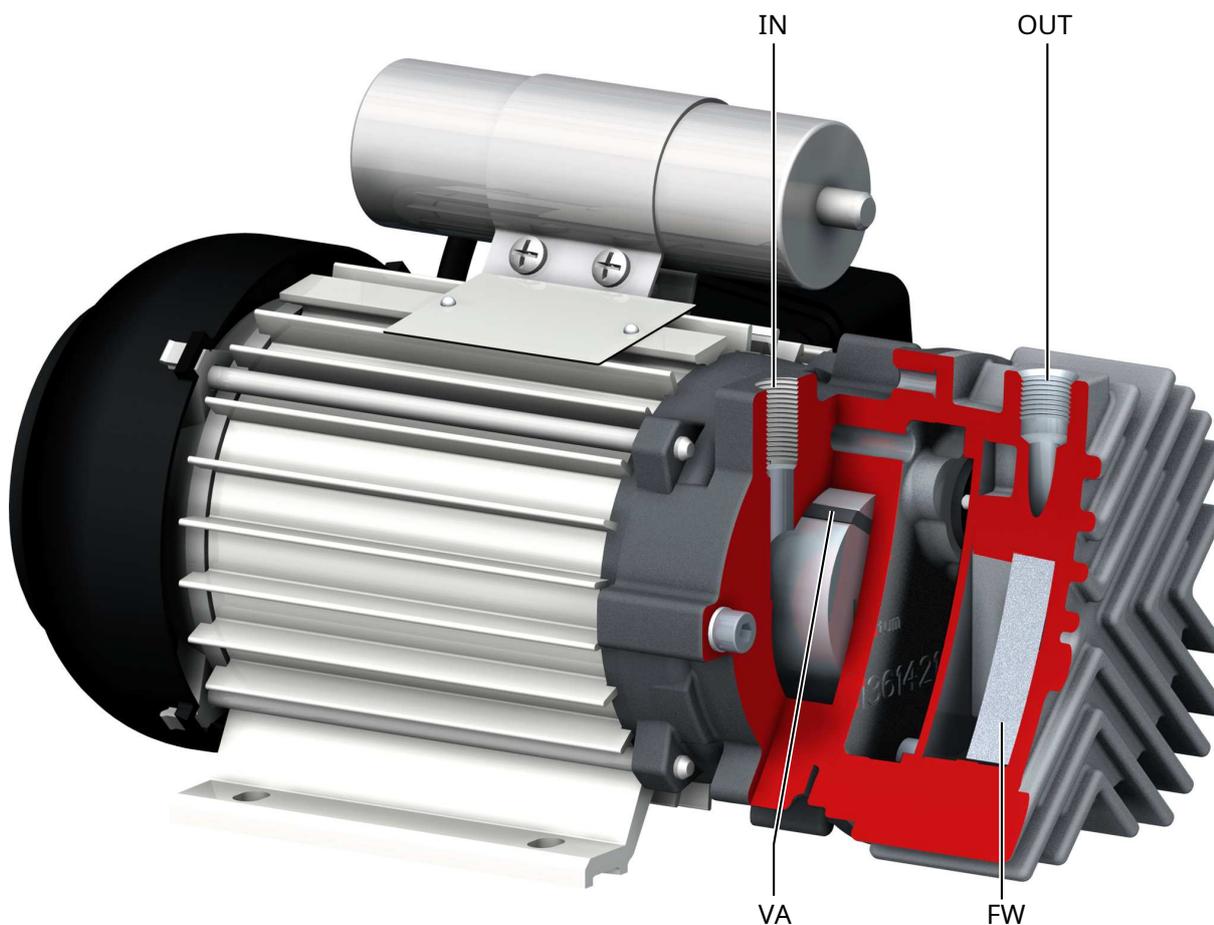
... indicates a potentially dangerous situation that could result in damage to property.



## NOTE

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

## 2 Product Description



### Description

IN	Suction connection	OUT	Discharge connection
VA	Vane	FW	Felt washer



### NOTE

Technical term.

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

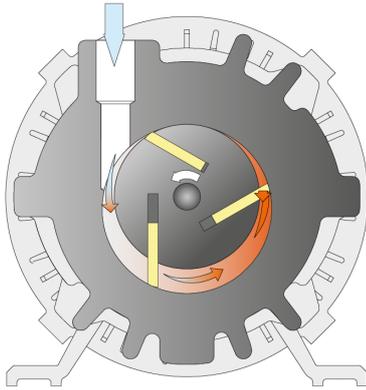


### NOTE

Illustrations

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

## 2.1 Operating Principle



The machine works on the rotary vane principle.

The compression is made without the use of any lubrication whatsoever.



### NOTICE

**Lubricating a dry running machine (compression chamber).**

**Risk of damage to the machine!**

- Do not lubricate the compression chamber of the machine with oil or grease.

## 2.2 Intended Use



### WARNING

**In case of foreseeable misuse outside the intended use of the machine.**

**Risk of injuries!**

**Risk of damages to the machine!**

**Risk of damages to the environment!**

- Make sure to follow all instructions described in this manual.

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 capable of maintaining ultimate pressure, see *Technical Data* [→ 24].

The machine is suitable for continuous operation.

Permitted environmental conditions, see *Technical Data* [→ 24].

## 2.3 Standard Features

### 2.3.1 Motor Thermal Protection

Single-phase motors are equipped with a thermal protection switch to protect the machine against overload. Three-phase motors are not equipped with a thermal protection switch.

## **2.4 Optional Accessories**

### **2.4.1 Inlet Filter**

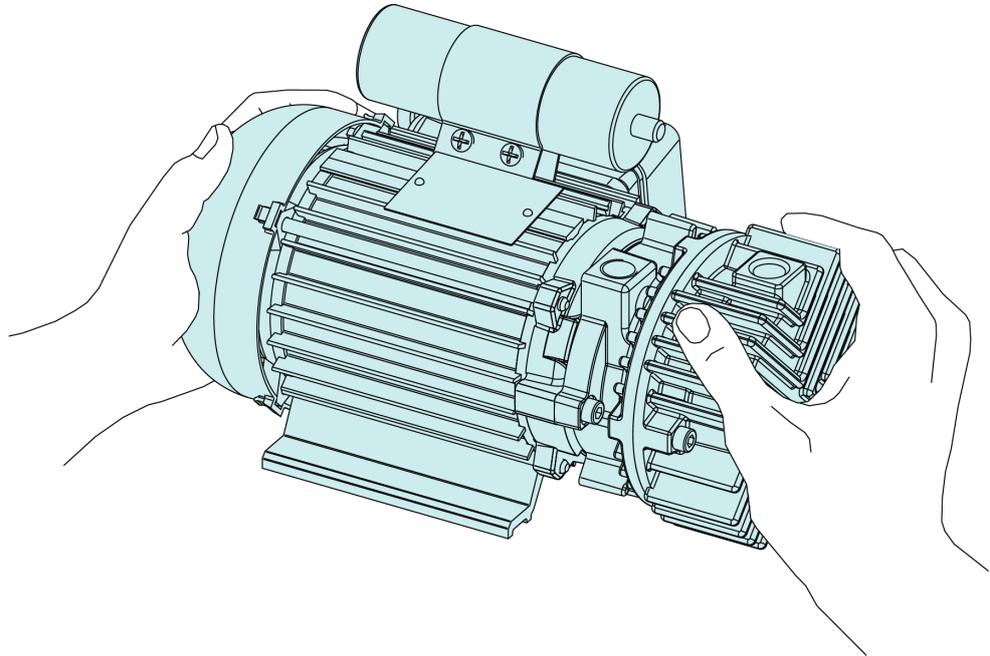
The inlet filter protects the machine against dust and other solids in the process gas. The inlet filter is available with a paper or polyester cartridge.

### **2.4.2 Hose Nipple**

A hose nipple, depending on the version, could be fitted to the inlet and/or the discharge line. It allows an easy connection to the machine with a flexible hose.

### 3 Transport

- To find out the weight of the machine, refer to the chapter *Technical Data* [→ 24] or the nameplate (NP).



- Check the machine for transport damage.
- If the machine is secured to a base plate:
- Remove the machine from the base plate.

## 4 Storage

- Seal all apertures with adhesive tape or reuse provided caps.

If the machine is to be stored for more than 3 months:

- Wrap the machine in a corrosion inhibiting film.
- Store the machine indoors, dry, dust free and if possible in original packaging preferably at temperatures between 0 ... 40 °C.

## 5 Installation

### 5.1 Installation Conditions

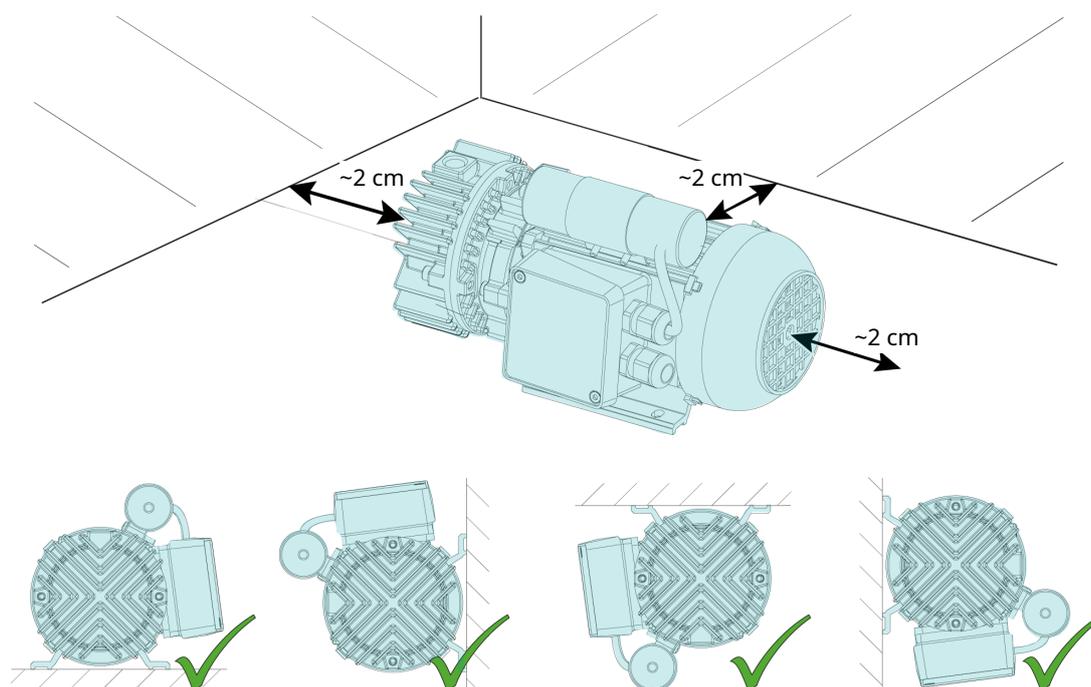
#### NOTICE

Use of the machine outside of the permitted installation conditions.

**Risk of premature failure!**

**Loss of efficiency!**

- Take care that the installation conditions are fully complied with.



- Make sure that the environment of the machine is not potentially explosive.
- Make sure that the ambient conditions comply with the *Technical Data* [→ 24].
- 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 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.

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.

## 5.2 Connecting Lines / Pipes

- Remove all protective covers before installation.
- Make sure that the connection lines cause no stress on the connection of the machine; if necessary use flexible joints.
- Make sure that the line size 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 advisable to use larger line sizes in order to avoid a loss of efficiency. Seek advice from your Busch representative.

### 5.2.1 Suction 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):

- G1/4

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

### 5.2.2 Discharge Connection



#### NOTICE

**Discharge gas flow obstructed.**

**Risk of damage to the machine!**

- Make sure that the discharged gas will flow without obstruction. Do not shut off or throttle the discharge line or use it as a pressurized air source.

Connection size(s):

- G3/8

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

## 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 according to EN 60204-1 must be insured by the customer on its installation.
- 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* [→ 25] or *UK Declaration of Conformity* [→ 26]).

### 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 isolation default.
  - 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.
- Connect the protective earth conductor.
- Electrically connect the motor.

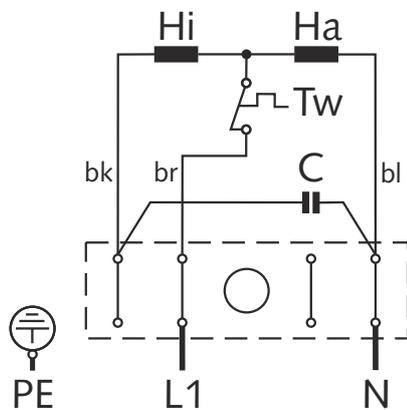
## NOTICE

**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 Single-Phase Motor



Ha = Main phase  
 Hi = Auxiliary phase  
 Tw = Thermal protector  
 C = Permanent capacitor  
 bk = Black  
 bn = Brown  
 bu = Blue

## 6.3 Wiring Diagram Three-Phase Motor

## NOTICE

**Incorrect direction of rotation.**

**Risk of damage to the machine!**

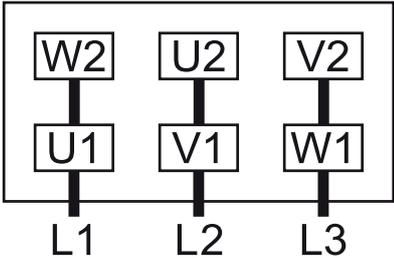
- Operation in the wrong direction of rotation can destroy the machine in a short time! Prior to start-up, ensure that the machine is operated in the right direction.

- 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.

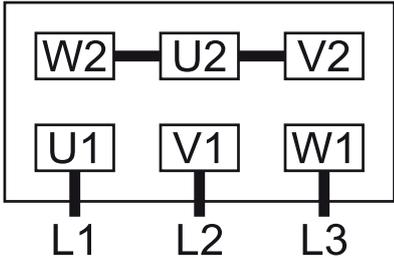
If the rotation of the motor must be changed:

- Switch any two of the motor phase wires.

Delta connection (low voltage):



Star connection (high voltage):



# 7 Commissioning

## NOTICE

**Lubricating a dry running machine (compression chamber).**

**Risk of damage to the machine!**

- Do not lubricate the compression chamber of the machine with oil or grease.



## CAUTION

**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 persons are present in the vicinity of a non noise insulated machine over extended periods:

- Make sure to wear hearing protection.
- Make sure that the *Installation Conditions* [→ 9] are met.
- Start the machine.
- Make sure that the maximum permissible number of starts does not exceed 12 starts per hour. Those starts should be spread within the hour.
- Make sure that the operating conditions comply with the *Technical Data* [→ 24].

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

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

## 8 Maintenance



### DANGER

**Live wires.**

**Risk of electrical shock.**

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



### 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.



### CAUTION

**Hot surface.**

**Risk of burns!**

- Prior to any action requiring touching the machine, let the machine cool down first.



### CAUTION

**Failing to properly maintain the machine.**

**Risk of injuries!**

**Risk of premature failure and loss of efficiency!**

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



### NOTICE

**Using inappropriate cleaners.**

**Risk of removing safety stickers and protective paint!**

- Do not use incompatible solvents to clean the machine.

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

If necessary:

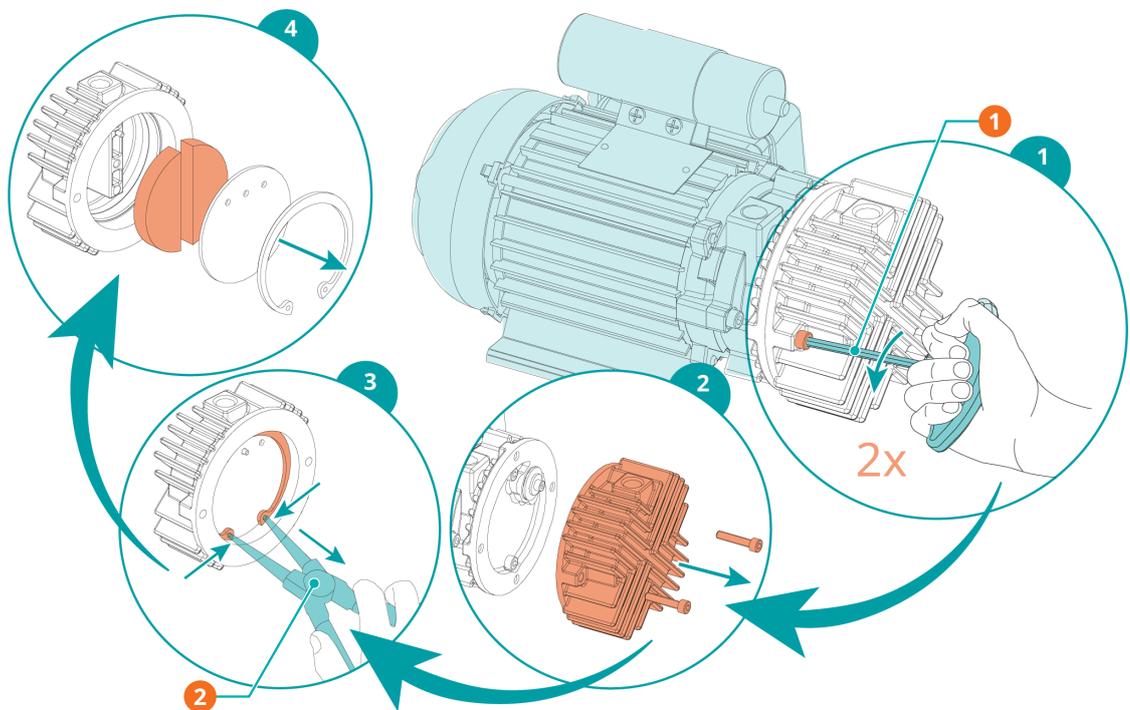
- Disconnect all connections.

## 8.1 Maintenance Schedule

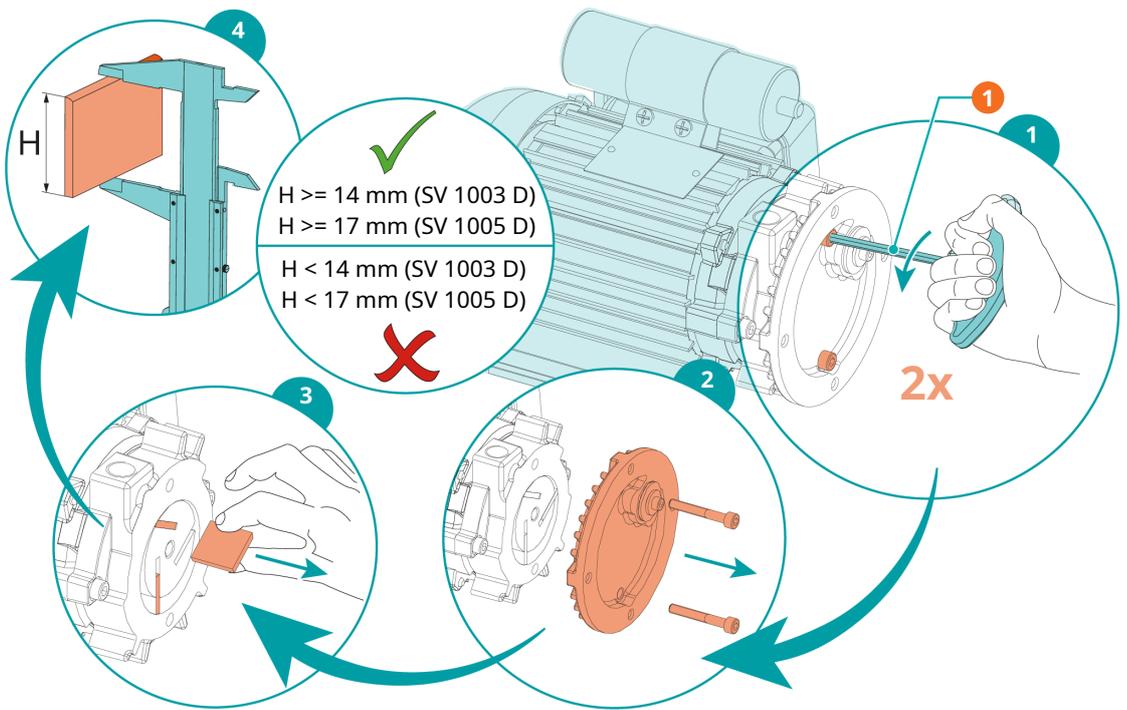
The maintenance intervals depend very much on the individual operating conditions. The intervals given below are considered as starting values which should be shortened or extended as appropriate. Particularly harsh applications or heavy duty operation, such as high dust loads in the environment or in the process gas, other contamination or ingress of process material, can make it necessary to shorten the maintenance intervals significantly.

Every 3000 hours	<ul style="list-style-type: none"> <li>• Check the vanes (VA) and change them if necessary.</li> <li>• Change the felt washers (FW)</li> </ul>
Every 6 months	<ul style="list-style-type: none"> <li>• Clean the machine from dust and dirt.</li> </ul> <p>In case of an inlet filter being installed:</p> <ul style="list-style-type: none"> <li>• Check the inlet filter cartridge, replace if necessary.</li> </ul>

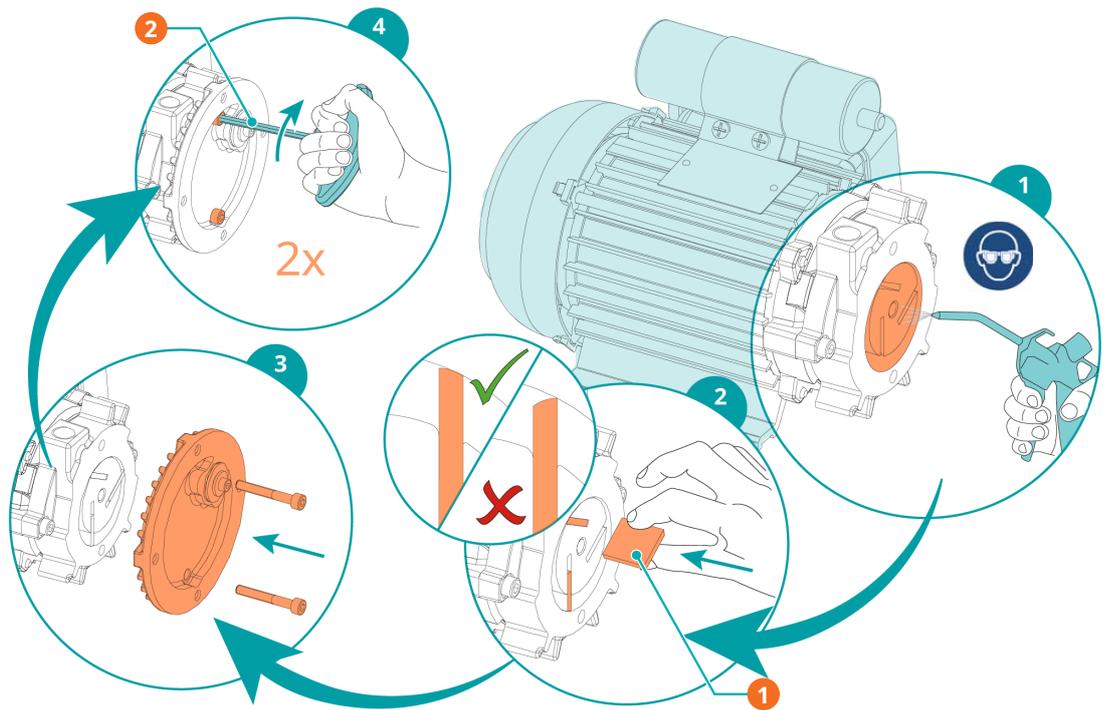
## 8.2 Change Vanes and Internal Filters



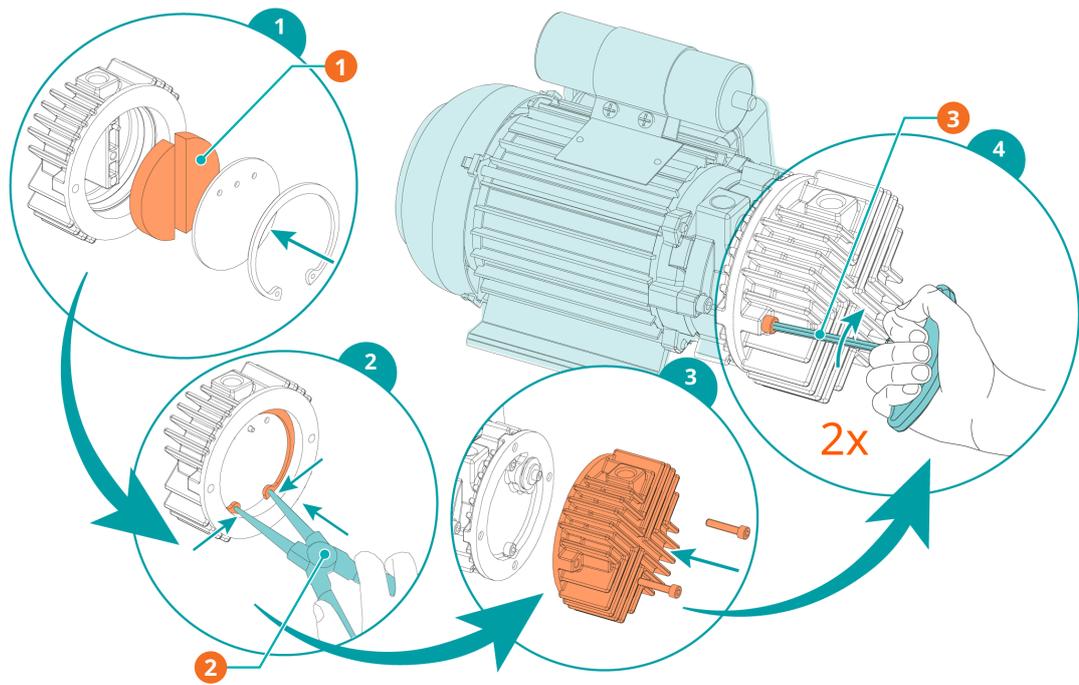
Description			
1	4 mm hex key	2	3 mm circlip pliers



Description		
1	4 mm hex key	



Description			
1	Busch genuine spare parts: 3x vane (VA) SV 1003 D: 0722 104 640 SV 1005 D: 0722 141 943	2	
		2	4 mm hex key


**Description**

1	Busch genuine spare parts 2x felt washer (FW) 0537 138 479	2	3 mm circlip pliers
3	4 mm hex key		

## 9 Overhaul



### 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.



### 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.

In case of the machine having conveyed gas that was contaminated with foreign materials which are dangerous to health:

- Decontaminate the machine as much as possible and state the contamination status in a 'Declaration of Contamination'.

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

## 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!**

- Prior to any action requiring touching the machine, let the machine cool down first.

- Shut down the machine and lock against inadvertent start up.
- Disconnect the power supply.
- Vent the connected lines to atmospheric pressure.
- Disconnect all connections.

If the machine is going to be stored:

- See *Storage* [→ 8].

### 10.1 Dismantling and Disposal

- 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.

Spare part kit	Description	Part no.
Service kit	Includes all the necessary parts for maintenance.	0993 529 770

If other parts are required:

- Contact your Busch representative.

# 12 Troubleshooting



## DANGER

Live wires.

Risk of electrical shock.

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

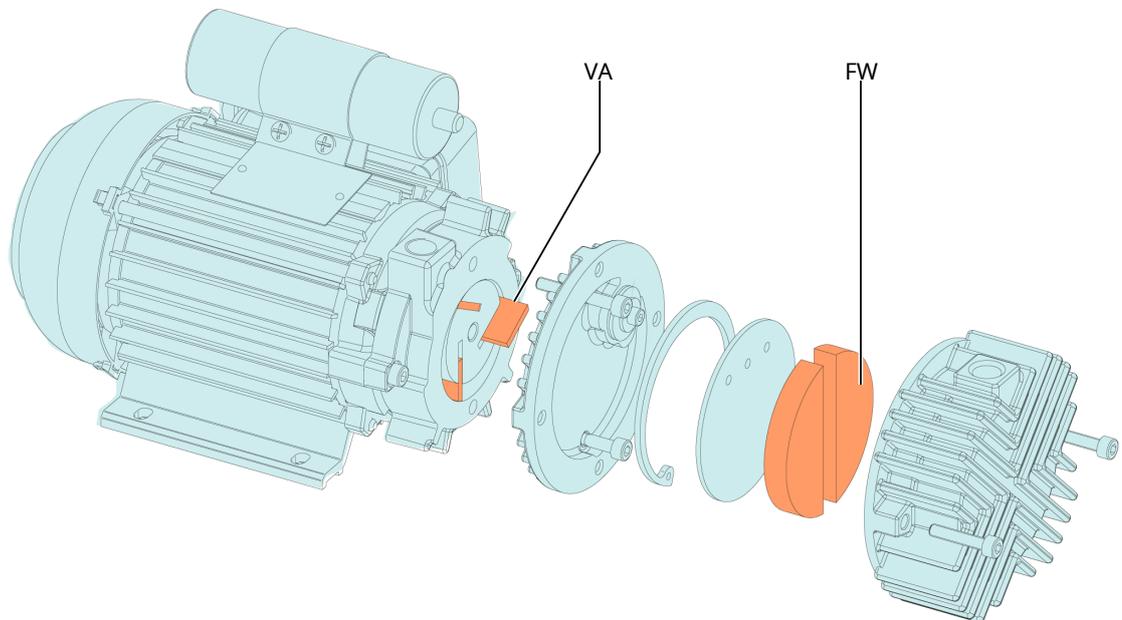


## CAUTION

Hot surface.

Risk of burns!

- Prior to any action requiring touching the machine, let the machine cool down first.



Problem	Possible Cause	Remedy
The machine does not start.	The motor is not supplied with the correct voltage.	<ul style="list-style-type: none"> <li>• Check the power supply.</li> </ul>
	The motor is defective.	<ul style="list-style-type: none"> <li>• Repair the machine (contact Busch).</li> </ul>
The machine does not reach the usual pressure on the suction connection.	The felt washers (FW) are partially clogged.	<ul style="list-style-type: none"> <li>• Replace the felt washers.</li> </ul>
	The inlet filter cartridge (optional) is partially clogged.	<ul style="list-style-type: none"> <li>• Replace the inlet filter cartridge.</li> </ul>
	Stuck vanes.	<ul style="list-style-type: none"> <li>• Free the vanes or replace them.</li> </ul>
	The vanes (VA) are worn	<ul style="list-style-type: none"> <li>• Replace the vanes.</li> </ul>

<b>Problem</b>	<b>Possible Cause</b>	<b>Remedy</b>
The machine runs very noisily.	The machine runs in the wrong direction	<ul style="list-style-type: none"> <li>• Check the direction of rotation.</li> </ul>
	Defective bearings.	<ul style="list-style-type: none"> <li>• Repair the machine (contact Busch).</li> </ul>
The machine runs too hot.	Insufficient cooling.	<ul style="list-style-type: none"> <li>• Remove dust and dirt from the machine.</li> </ul>
	Ambient temperature too high.	<ul style="list-style-type: none"> <li>• Observe the permitted ambient temperature.</li> </ul>
	The felt washers (FW) are partially clogged.	<ul style="list-style-type: none"> <li>• Replace the felt washers.</li> </ul>
	The inlet filter (optional) is partially clogged.	<ul style="list-style-type: none"> <li>• Replace the filter cartridge.</li> </ul>

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

# 13 Technical Data

		SV 1003 D	SV 1005 D
Nominal pumping speed (50Hz / 60Hz)	m <sup>3</sup> /h	3.0 / 3.6	5.0 / 5.6
Ultimate pressure	hPa (mbar) abs.	150	
Nominal motor rating (50Hz / 60Hz)	kW	0.1 / 0.12	0.14 / 0.16
Nominal motor speed (50Hz / 60Hz)	min <sup>-1</sup>	3000 / 3600	
Noise level (EN ISO 2151) (50Hz / 60Hz)	dB(A)	59 / 63	68 / 72
Ambient temperature range	°C	0 ... 40	
Ambient pressure		Atmospheric pressure	
Weight approx.	kg	5.2	6.0

# 14 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

**Busch Výroba CZ s.r.o.**  
Svárovská 620  
CZ 460 01, Liberec 11

declares that the machine: SECO SV 1003 D; SECO SV 1005 D

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 ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN 1012-2 : 1996 + A1 : 2009	Vacuum pumps - Safety requirements - 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

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

Liberec, 16.04.2021



**Michael Dostalek**  
General Manager

# 15 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

**Busch Výroba CZ s.r.o.**  
**Svárovská 620**  
**CZ 460 01, Liberec 11**

declares that the machine: SECO SV 1003 D; SECO SV 1005 D

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 2021

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 ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
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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

Liberec, 16.04.2021

**Michael Dostalek**  
**General Manager**

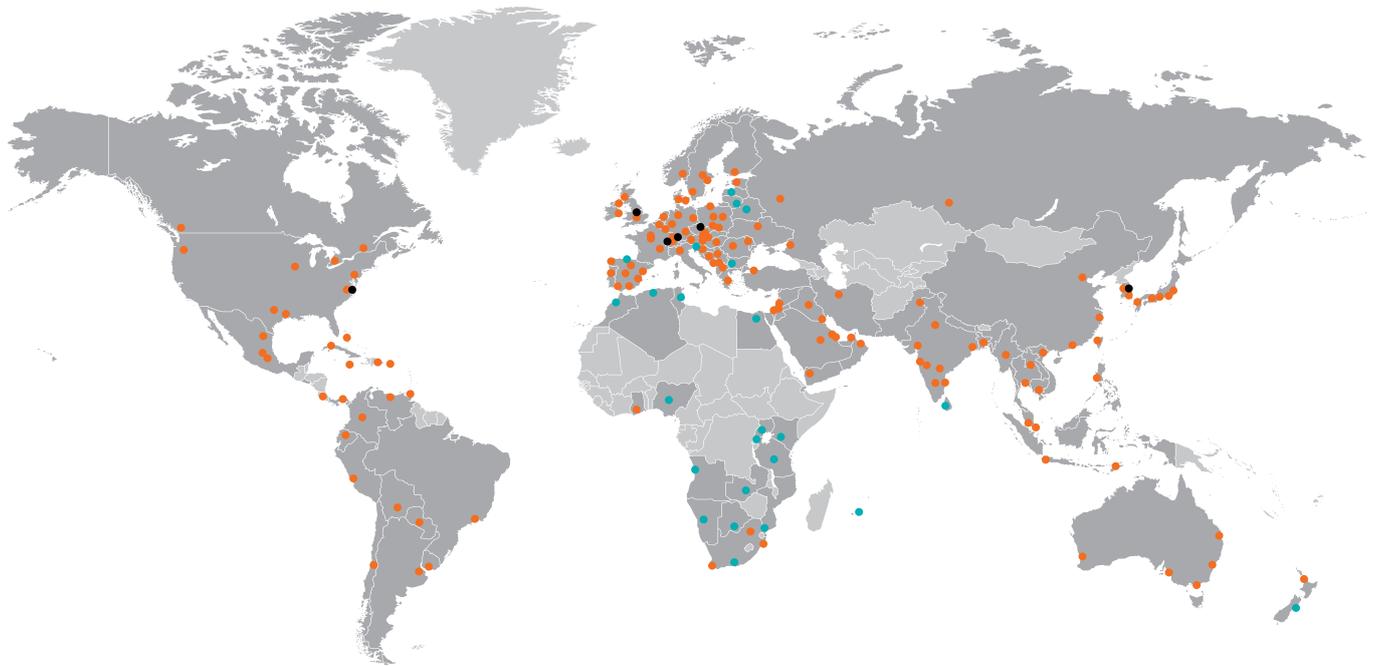
# Notes

A large grid of small dots for taking notes, consisting of approximately 30 columns and 40 rows.

# 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.



● Busch companies and Busch employees    ● Local representatives and distributors    ● Busch production site

[www.buschvacuum.com](http://www.buschvacuum.com)