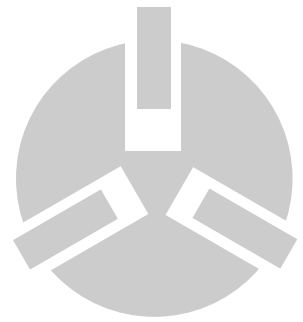


Instruction Manual

Seco

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



CE

Busch Vyroba CZ s.r.o.
Svárovská 620, CZ 460 01, Liberec 11
Czech Republic

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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.

The machine has been designed and manufactured according to state-of-the-art methods. Nevertheless, residual risks may remain. 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.

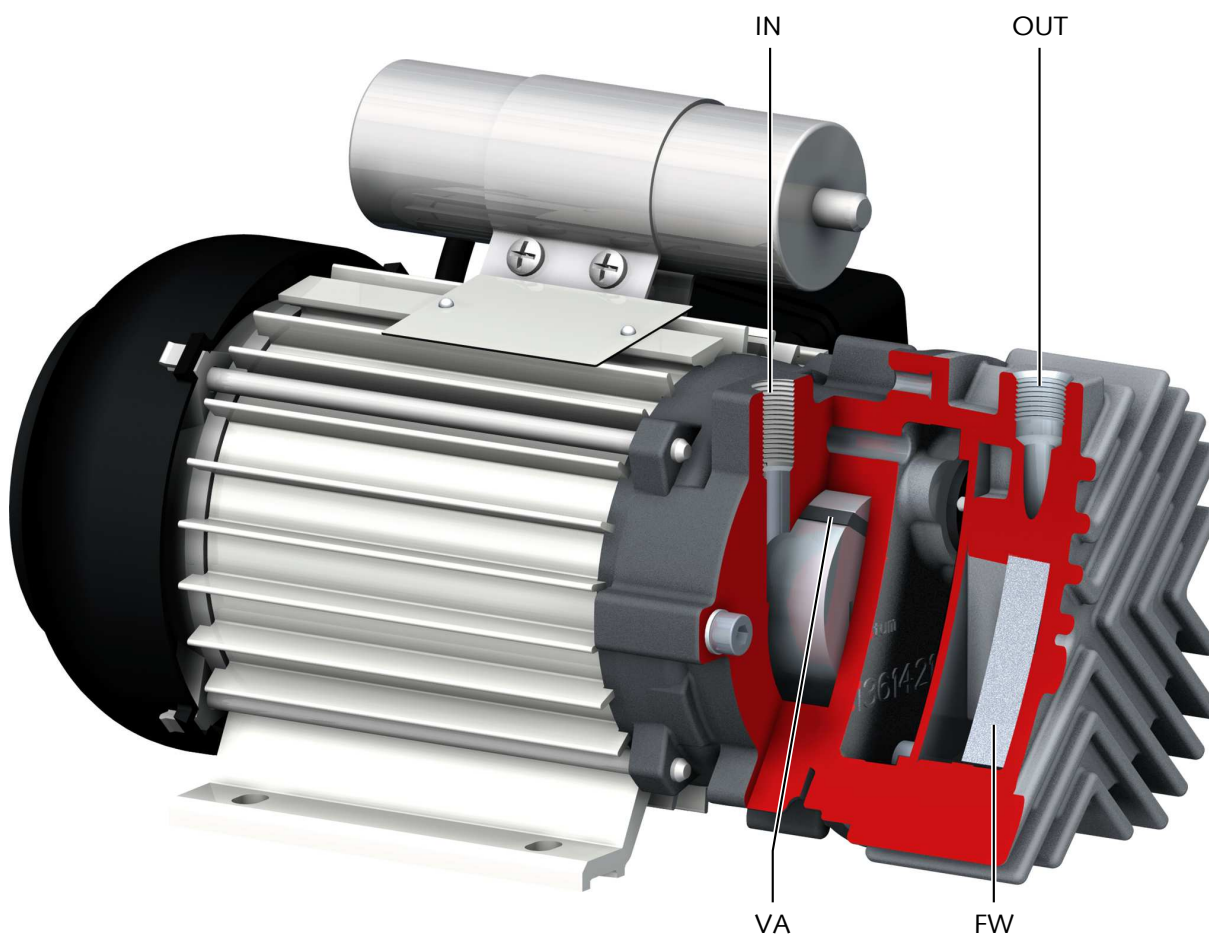
NOTICE

... 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



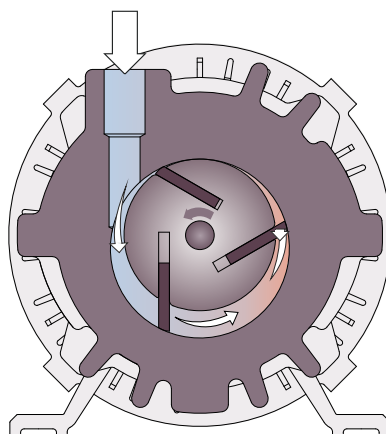
- IN Suction connection
- OUT Discharge connection
- VA Vane
- FW Felt washer

NOTE

Technical term.

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

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 (process chamber).

Risk of damage to the machine!

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

2.2 Application

The machine is intended for the suction of air and other dry, non-aggressive, non-toxic and non-explosive gases.

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

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

The machine is capable of maintaining ultimate pressure.

The machine is suitable for continuous operation.

Permitted environmental conditions see Technical Data [► 18].

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

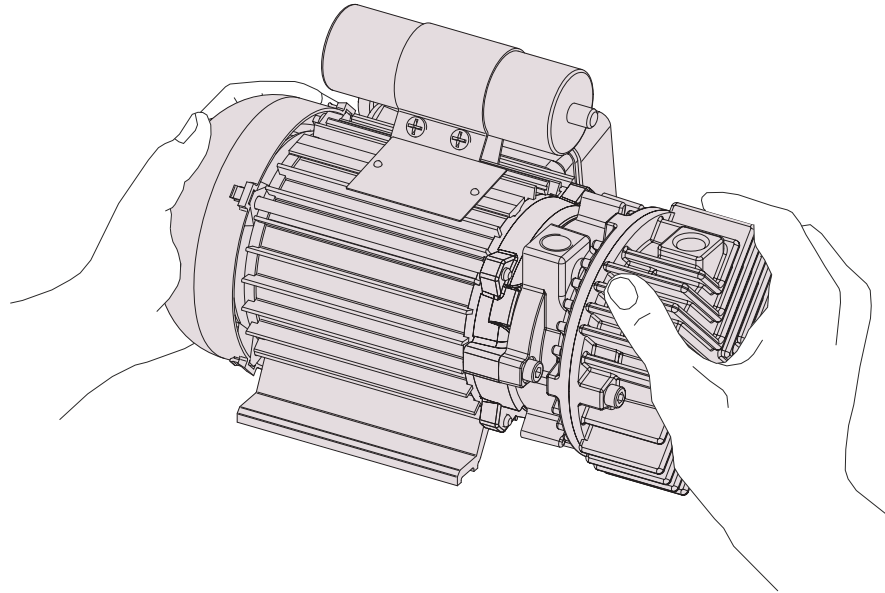
2.4.1 Inlet Filter

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



- Check the machine for transport damage.

In case of the machine being secured to a base plate:

- Remove the fixations.

4 Storage

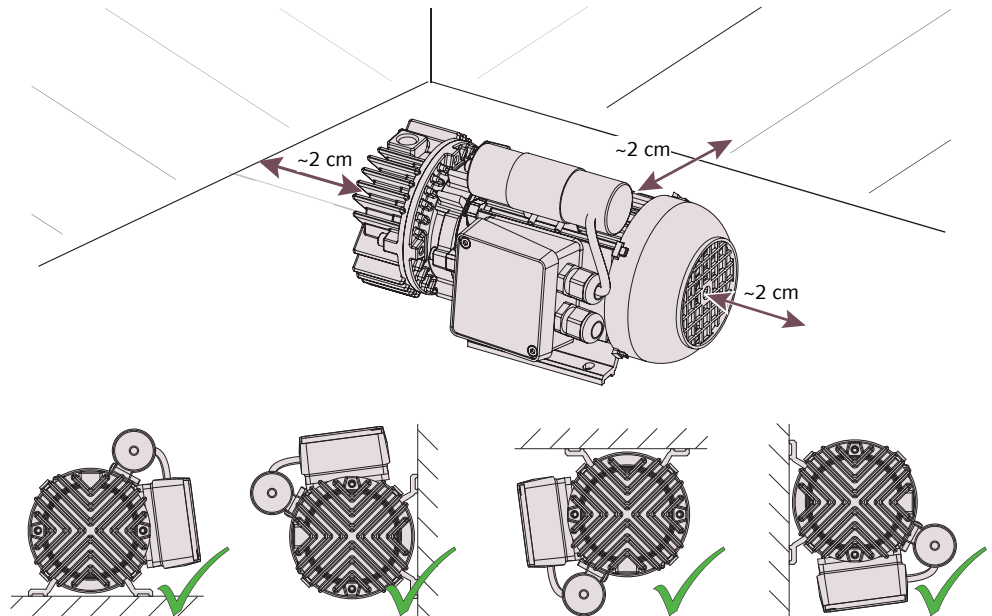
- Seal all apertures with adhesive tape or reuse provided caps.

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



- Make sure that the environment of the machine is not potentially explosive.
- Make sure that the ambient conditions comply with the Technical Data [► 18].
- Make sure that the environmental conditions comply with the protection class of the motor.
- 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 of 1° in any direction.
- Make sure that all provided covers, guards, hoods, etc. are mounted.

5.2 Connecting Lines / Pipes

- Make sure that the connection lines cause no stress on the machine's connection; 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 very 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

Intruding 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:

- G1/4

Depending on the specific order, other connection dimensions may apply.

5.2.2 Discharge Connection

Connection size:

- G3/8

Depending on the specific order, other connection dimensions may apply.

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

5.3 Electrical Connection

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.
- Provide overload protection according to EN 60204-1 for the motor.
- Connect the protective earth conductor.
- Electrically connect the motor.

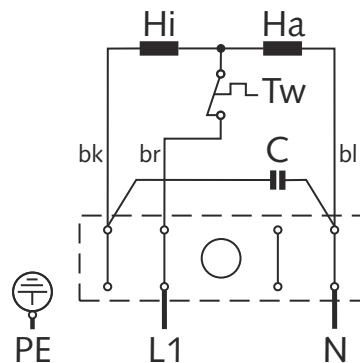
NOTICE

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.

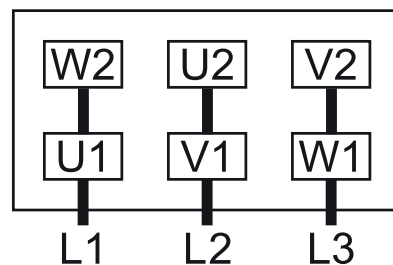
5.3.1 Wiring Diagram Single-Phase Motor



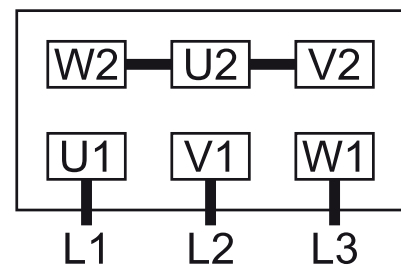
Ha = Main phase
 Hi = Auxiliary phase
 Tw = Thermal protector
 C = Permanent capacitor
 bk = Black
 bn = Brown
 bu = Blue

5.3.2 Wiring Diagram Three-Phase Motor

Delta connection (low voltage):



Star connection (high voltage):



! 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 must be changed:

- Switch any two of the motor phase wires.

6 Commissioning

! NOTICE

Lubricating a dry running machine (process chamber).

Risk of damage to the machine!

- Do not lubricate the process 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 that ear protection is being used.
-
- Make sure that the installation conditions (see Installation Conditions [▶ 7]) are complied with.
 - Switch on the machine.
 - Make sure that the maximum permissible number of starts does not exceed 12 starts per hour.

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

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

7 Maintenance



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

If necessary:

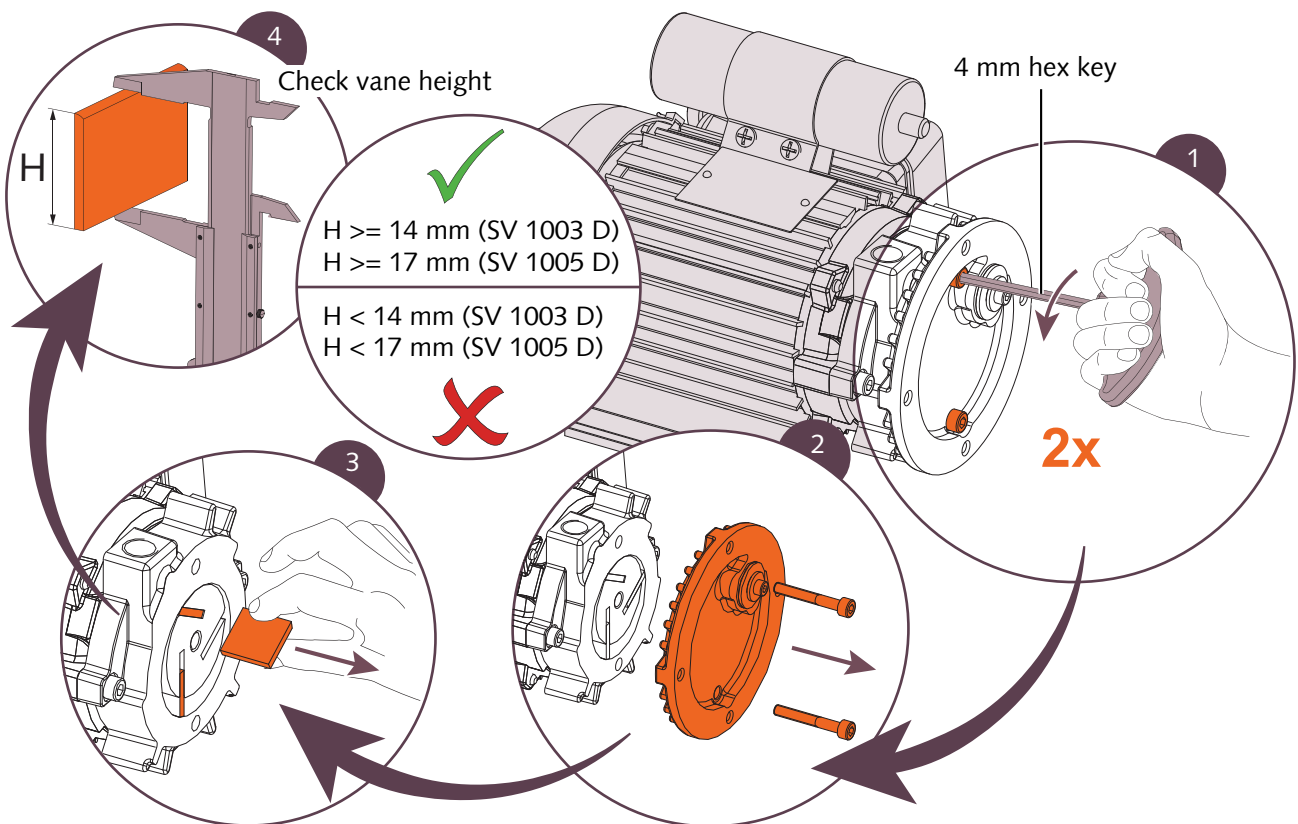
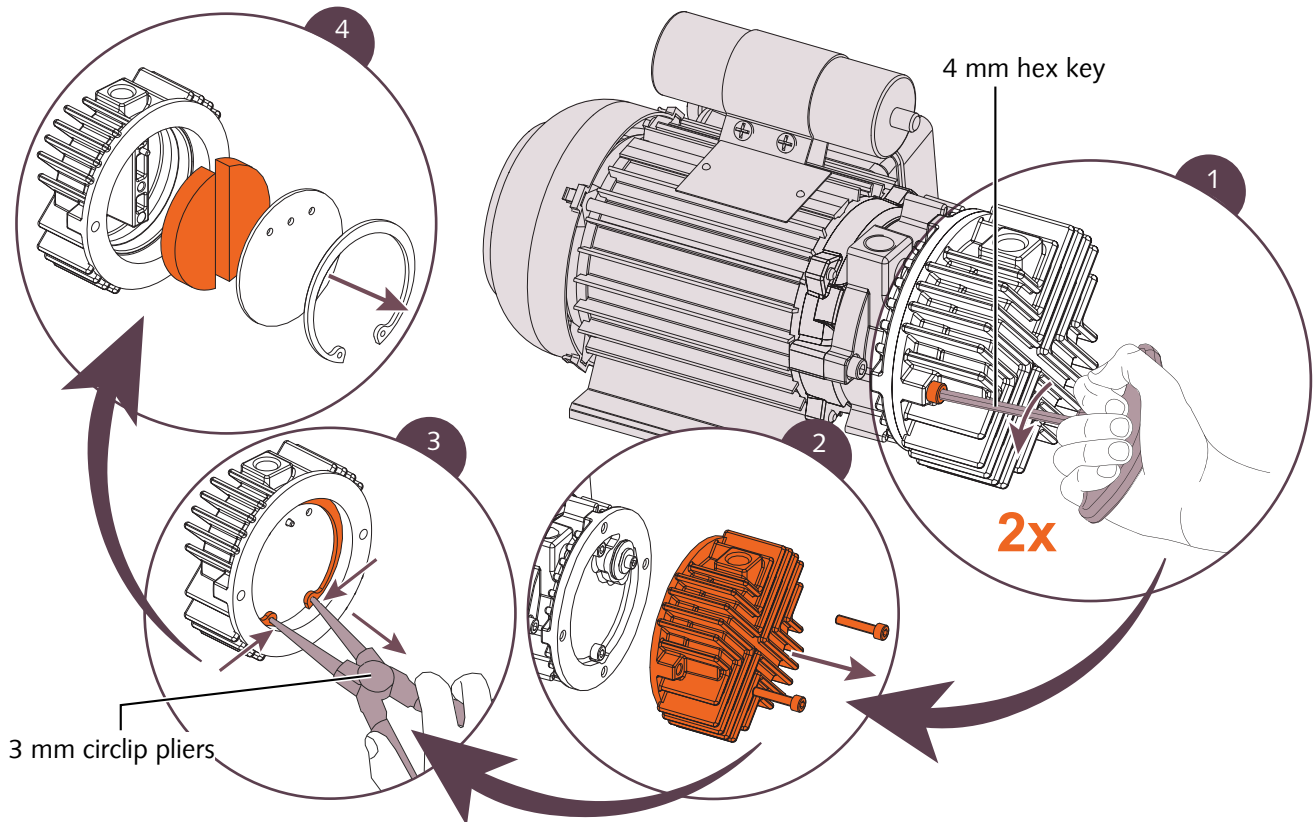
- Disconnect all connections.

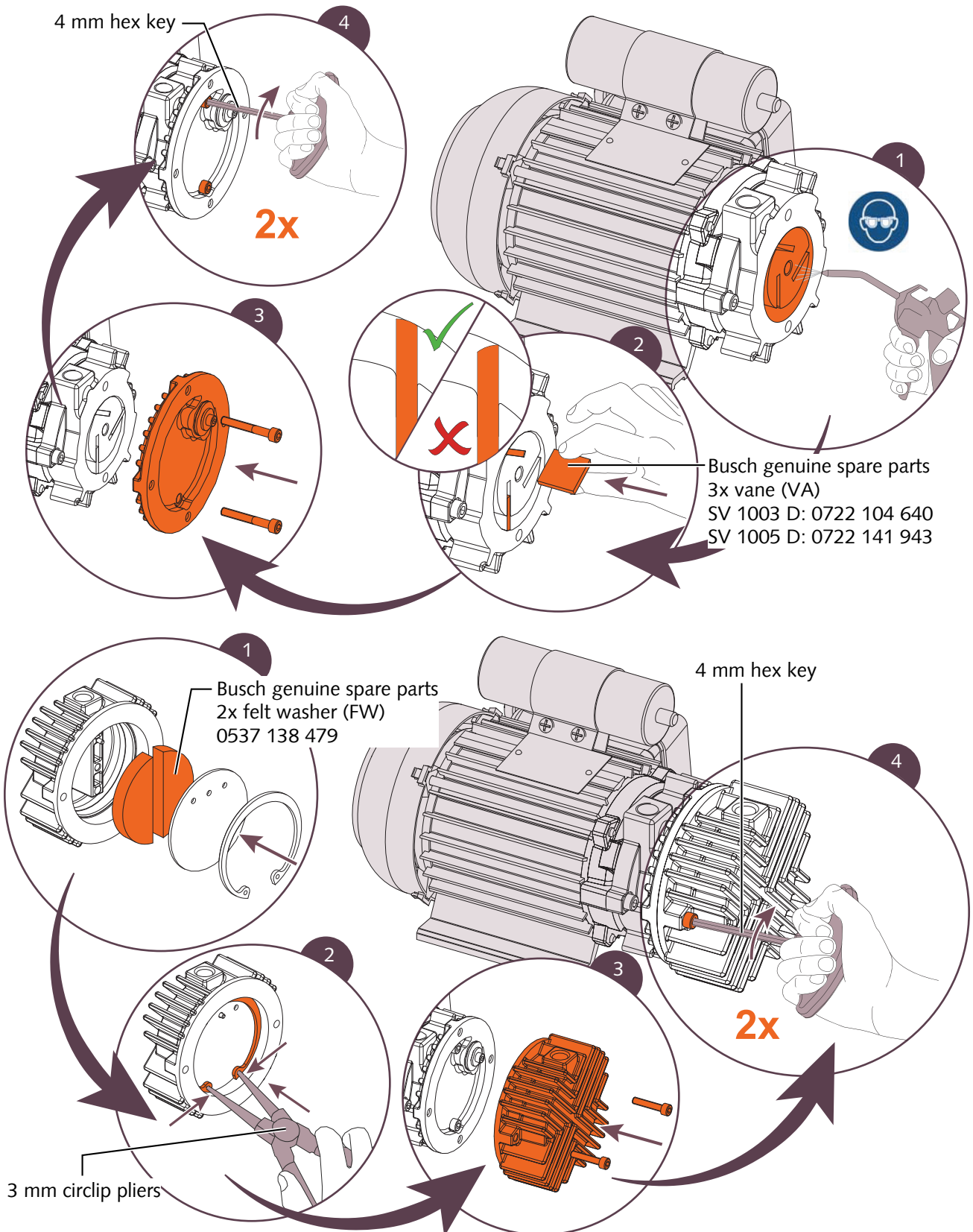
7.1 Maintenance Schedule

The maintenance intervals depend very much on the individual operating conditions. The intervals given below are desired to be considered as starting values which should be shortened or extended as appropriate. Particularly 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"> • Check the vanes (VA) and change them if necessary. • Change the felt washers (FW)
Every 6 months	<ul style="list-style-type: none"> • Clean the machine from dust and dirt. <p>In case of an inlet filter being installed:</p> <ul style="list-style-type: none"> • Check the inlet filter cartridge, replace if necessary.

7.2 Change Vanes and Internal Filters





8 Overhaul

NOTICE

Improper assembly.

Risk of premature failure!

Loss of efficiency!

- It is highly recommended that any dismantling of the machine that goes beyond anything that is described in this manual should be done through Busch.



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.

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

- Decontaminate the machine as well 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)

9 Decommissioning

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

If the machine is going to be stored:

- See Storage [▶ 6].

9.1 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.

10 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 proper function of the machine and for granting of warranty.

Spare part	Description	Part no.
Vane (VA)	3x required for SV 1003 D	0722 104 640
Vane (VA)	3x required for SV 1005 D	0722 141 943
Felt washer (FW)	2x required	0537 138 479

If other parts are required:

- Contact your Busch representative for the detailed spare parts list.

11 Troubleshooting

⚡ DANGER

Live wires.

Risk of electrical shock.

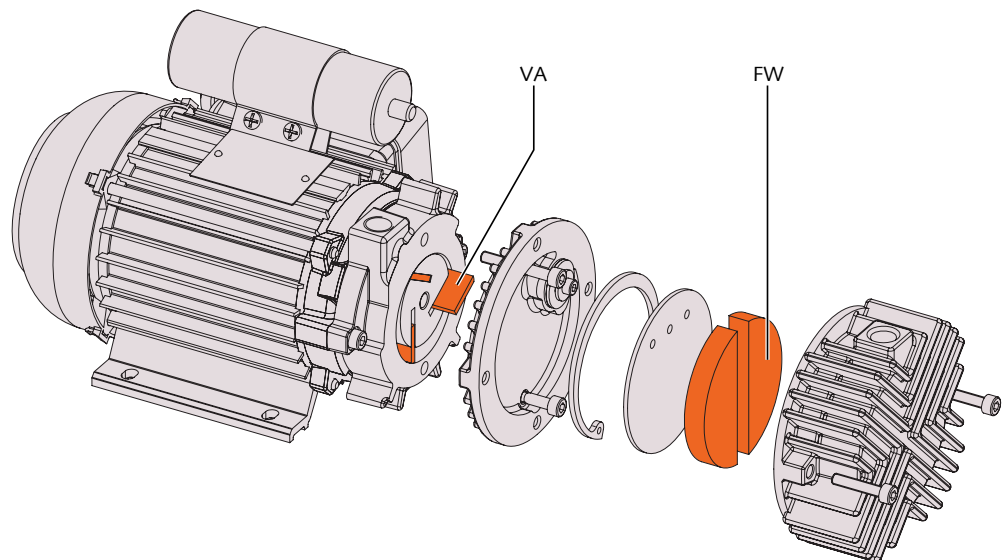
- Electrical installation work must only be executed by qualified personnel.

⚠ 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.	• Check the power supply.
	The motor is defective.	• Repair the machine (contact Busch).
The machine does not reach the usual pressure on the suction connection.	The felt washers (FW) are partially clogged.	• Replace the felt washers.
	The inlet filter cartridge (optional) is partially clogged.	• Replace the inlet filter cartridge.
	Stuck vanes.	• Free the vanes or replace them.
	The vanes (VA) are worn	• Replace the vanes.
The machine runs very noisily.	The machine runs in the wrong direction	• Check the direction of rotation.
	Defective bearings.	• Repair the machine (contact Busch).

The machine runs too hot.	Insufficient cooling.	<ul style="list-style-type: none"> Remove dust and dirt from the machine.
	Ambient temperature too high.	<ul style="list-style-type: none"> Observe the permitted ambient temperature.
	The felt washers (FW) are partially clogged.	<ul style="list-style-type: none"> Replace the felt washers.
	The inlet filter (optional) is partially clogged.	<ul style="list-style-type: none"> Replace the filter cartridge.

For the solution of problems not mentioned in the troubleshooting chart contact your Busch representative.

12 Technical Data

		SV 1003 D	SV 1005 D
Nominal pumping speed (50Hz / 60Hz)	m ³ /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 ⁻¹	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

13 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

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



declare that the machine(s): **Seco SV 1003 D; SV 1005 D**

with a serial number from **V1701...** to **V1852...**

has (have) been manufactured in accordance with the 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

and following the standards.

Standard	Title of the Standard
EN ISO 12100:2010	Safety of machinery - Basic concepts, general principles of design
EN ISO 13857:2008	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 60204-1:2006	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN 61000-6-2:2005	Electromagnetic compatibility (EMC) - Generic standards. Immunity for industrial environments
EN 61000-6-4:2007 + A1:2011	Electromagnetic compatibility (EMC) - Generic standards. Emission standard for industrial environments
EN ISO 13849-1:2015 ⁽¹⁾	Safety of machinery - Safety-related parts of control systems - Part 1: General principles for design

Person authorised to compile the technical file:

Gerd Rohweder
 Busch Dienste GmbH
 Schauinslandstr. 1
 DE-79689 Maulburg

Liberec, 08.01.2017

Michael Dostalek, General director

⁽¹⁾ In case control systems are integrated.

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