

FOSSA

Scroll Vacuum Pumps
FO 0015 A, FO 0035 B

Instruction Manual



Table of Contents

1	Safety	4
2	Product Description	5
2.1	Operating Principle	6
2.2	Intended Use	6
2.3	Standard Features.....	7
2.3.1	Non-return Valve	7
2.3.2	Inlet Screen	7
2.3.3	Operating Hours Counter.....	7
2.3.4	Variable Speed Drive (Single-phase Version Only)	7
2.3.5	I/O and Communication Port (Single-phase Version Only).....	7
2.4	Optional Accessories.....	7
2.4.1	Inlet Filter	7
2.4.2	Exhaust Filter.....	7
2.4.3	Gas Ballast Valve.....	7
2.4.4	Purge Gas Adapter	7
2.4.5	Wheels.....	7
2.5	Optional Variants	8
2.5.1	ATEX (Optional)	8
2.5.2	Oxygen (Optional)	8
3	Transport	9
4	Storage	10
5	Installation	11
5.1	Installation Conditions	11
5.2	Connecting Lines / Pipes.....	12
5.2.1	Suction Connection	12
5.2.2	Discharge Connection.....	13
5.3	Gas ballast Valve Installation (Optional).....	13
6	Electrical Connection	14
6.1	Machine delivered with a Variable Speed Drive.....	14
6.2	Single-Phase Version	15
6.2.1	I/O and Communication Port Schematic (Single-phase Version Only).....	15
6.3	Three-Phase Version.....	16
6.3.1	Wiring Diagram Three-Phase Motor	16
7	Commissioning	18
7.1	Conveying Condensable Vapors.....	19
7.1.1	Gas Ballast Valve Adjustment	20
8	Maintenance	21
8.1	Maintenance Schedule	22
8.2	Tip Seal Replacement.....	23
8.3	Non-Return Valve Change.....	31
9	Overhaul	33
10	Decommissioning	34
10.1	Dismantling and Disposal	34
11	Spare Parts Kits	35
11.1	Overview.....	35
11.2	Available Kits.....	35
12	Accessories	36

13	Troubleshooting	37
14	Technical Data	38
15	EU Declaration of Conformity	39
16	UK Declaration of Conformity.....	40

1 Safety

Prior to handling the machine, this instruction manual should be read and understood. If anything needs to be clarified, please contact your Busch representative.

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

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

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

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

The machine has been designed and manufactured in accordance with the state-of-the-art methods. Nevertheless, residual risks may remain, as described in the following chapters and in accordance with the chapter *Intended Use* [→ 6].

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

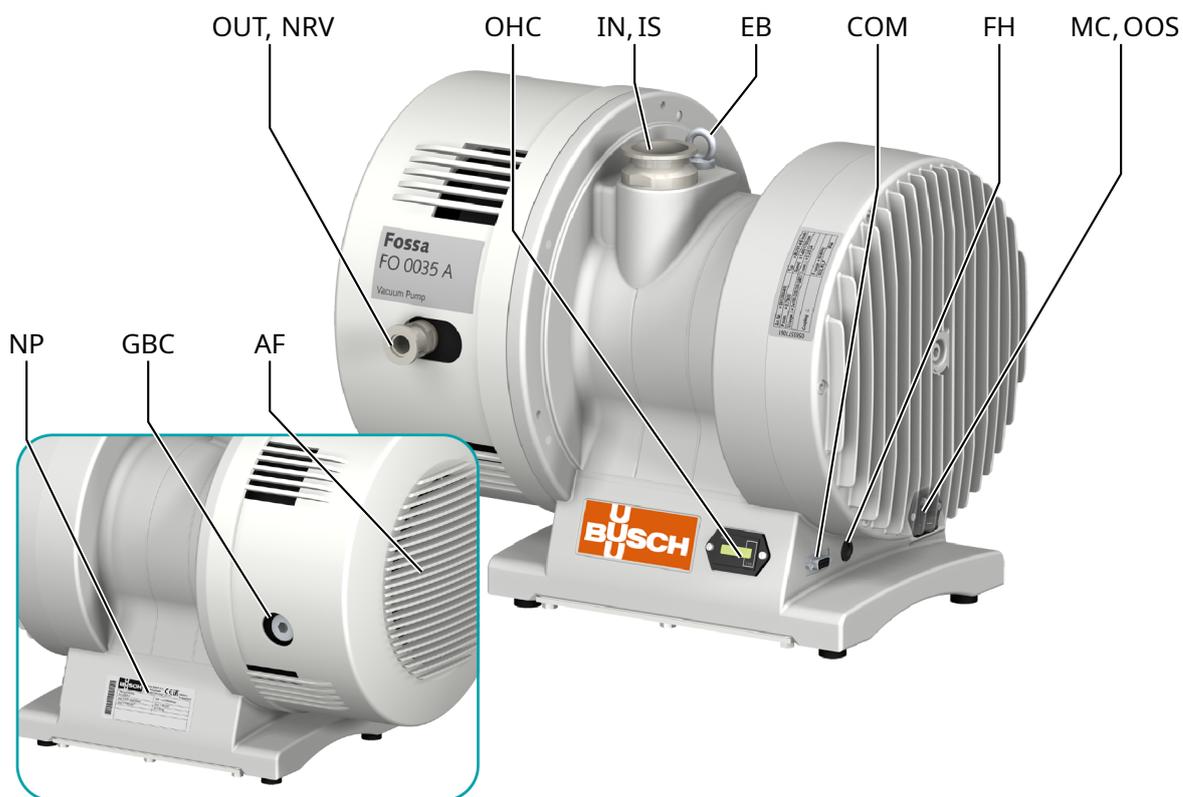
... indicates a potentially dangerous situation that could result in damage to property.



NOTE

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

2 Product Description



Description			
AF	Axial fan	COM	I/O and communication port (single-phase version only)
EB	Eye bolt	FH	Fuse holder
GBC	Gas ballast valve connection	IN	Suction connection
IS	Inlet screen	MC	Mains connection
NP	Nameplate	NRV	Non-return valve
OHC	Operating hours counter	OOS	On/off-switch (single-phase version only)
OUT	Discharge connection		

i NOTE

Technical term.

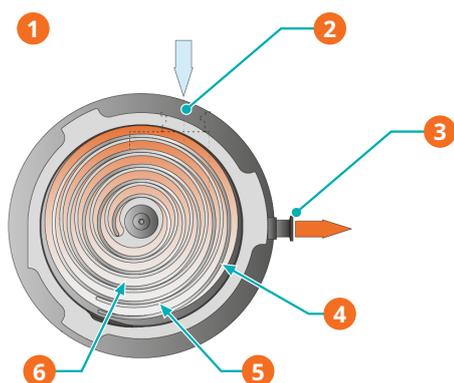
In this instruction manual, we consider that the term 'machine' refers to the 'vacuum pump'.

i NOTE

Illustrations

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

2.1 Operating Principle



Description			
1	Compression cycle	2	Gas inlet (IN)
3	Gas outlet (OUT)	4	Fixed scroll
5	Orbiting scroll	6	Gas process pocket

Scroll vacuum pumps consist of both a fixed and an orbiting scroll. As the orbiting scroll moves, voids are created at the inlet of the pump, drawing in the gas. As the rotor further moves, the gas is steadily compressed until it is discharged to atmosphere at the pump exhaust.

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 damage to the machine!

Risk of damage to the environment!

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

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

Depending on the optional variant, the machine may be used for ATEX or oxygen applications, see *Optional Variants* [→ 8].

The machine is gas tight when a gas ballast valve is not installed.

The machine is suitable for continuous operation.

The continuous operation of FO 0035 B is limited to a suction pressure of 100 hPa (mbar) abs..

Permitted environmental conditions, see *Technical Data* [→ 38].

The machine is capable of conveying gases which contain a certain percentage of water vapor if the gas ballast valve (accessory) is installed and open. See chapters *Conveying Condensable Vapors* [→ 19] and *Technical Data* [→ 38].

2.3 Standard Features

2.3.1 Non-return Valve

The non-return valve (NRV), integrated to the discharge connection (OUT), protects the process against suckback.

2.3.2 Inlet Screen

The inlet screen (IS), integrated to the suction connection (IN), prevents large solid particles from entering into the machine.

2.3.3 Operating Hours Counter

The operating hours counter allows the reading of the total operating time that the machine has run.

2.3.4 Variable Speed Drive (Single-phase Version Only)

The machine is equipped in standard with a variable speed drive.

2.3.5 I/O and Communication Port (Single-phase Version Only)

The D-Sub 9 supports maintained dry contact remote control and monitoring of the machine.

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 cartridge.

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

2.4.2 Exhaust Filter

The exhaust filter reduces the exhaust noise and retains the tip seal dust when the machine cannot be connected to a house exhaust system.

2.4.3 Gas Ballast Valve

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

2.4.4 Purge Gas Adapter

The purge gas adapter can be fitted in place of the gas ballast valve. It allows you to connect a controlled supply of inert gas to the pump.

2.4.5 Wheels

Four wheels can easily be fitted to the bottom of the machine to facilitate transportation and installation.

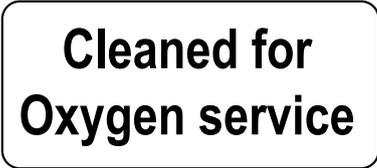
2.5 Optional Variants

2.5.1 ATEX (Optional)

According to ATEX classification, refer to the nameplate (NP), explosive gases and vapor mixtures (zone 2) can be drawn in according to the scope of the Directive ATEX 2014/34/EU.

2.5.2 Oxygen (Optional)

The machine is designed for conveying gases with an increased oxygen content (volume content greater than 21% and up to 100%) if the following label is stuck on the machine body:



**Cleaned for
Oxygen service**

3 Transport

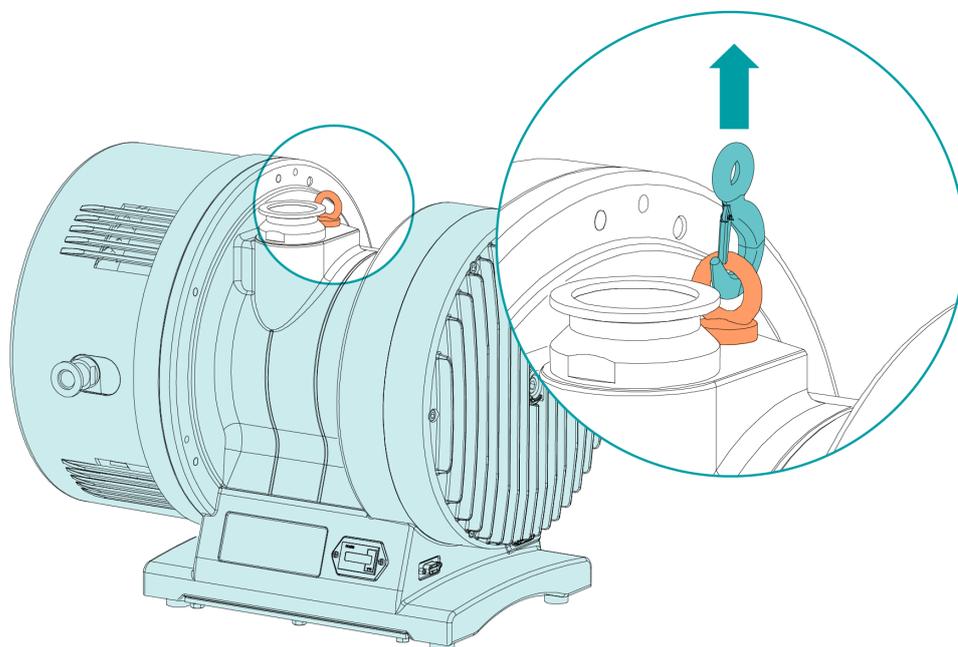


WARNING

Suspended load.

Risk of severe injury!

- Do not walk, stand, or work under suspended loads.
- To find out the weight of the machine, refer to the chapter *Technical Data* [→ 38] or the name-plate (NP).
- Make sure that the eye bolt(s) (EB) is/are in faultless condition, fully screwed in and tightened by hand.



- Check the machine for transport damage.

If the machine is secured to a base plate:

- Remove the machine from the base plate.

4 Storage

- Seal hermetically all apertures with the caps provided with the machine, or with adhesive tape if the caps are no longer available.
- Store the machine indoors, in a dry place, away from dust and vibrations and if possible, in original packaging, preferably at temperatures between -20 ... 60 °C.

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

- Seal hermetically all apertures with the caps provided with the machine, or with adhesive tape if the caps are no longer available.
- Wrap the machine in a corrosion inhibitor film.
- Store the machine indoors, in a dry place, away from dust and vibrations and if possible, in original packaging, preferably at temperatures between -20 ... 60 °C.



NOTICE

Long storage time.

Risk of damage to the machine!

- Due to a long storage time the capacitors of the variable speed drive can lose efficiency because of electrochemical processes. In the worst case, it can lead to a short-circuit and therefore to a damage to the variable speed drive of the machine.
 - Connect the machine every 18 months for 30 minutes to the mains.
-

5 Installation

5.1 Installation Conditions



WARNING

The installation conditions are not respected in an ATEX environment.

Risk of severe injury!

Risk of explosion!

- Take care that the installation conditions are met.



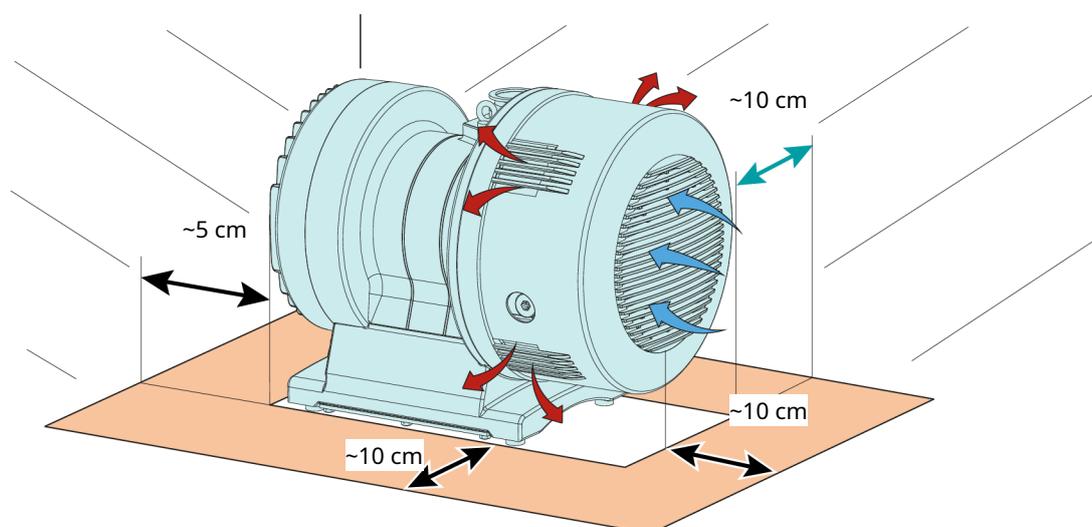
NOTICE

Use of the machine outside of the permitted installation conditions.

Risk of premature failure!

Loss of efficiency!

- Make sure that the installation conditions are fully respected.



- Make sure that the ambient conditions comply with the *Technical Data* [→ 38].
- 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 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.

If additional electrical components not included in the scope of supply are to be added:

- Make sure they have an ATEX classification better than or equal to that of the machine, see the ATEX marking on the nameplate (NP).

5.2 Connecting Lines / Pipes



WARNING

Connection lines can accumulate an electrostatic charge.

Risk of severe injury!

Risk of explosion!

- Connection lines must be made of conductive material, or measures must be taken to prevent electrostatic charging.

- Remove all protective covers before installation.
- Make sure that the connection lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible lines on the suction and discharge connections.
- Make sure that the diameter of the connection lines over the entire length is at least as large as the connections of the machine.

In case of long connection lines, it is recommended to use larger diameters to avoid a loss of efficiency. In this case, please contact your Busch representative.

5.2.1 Suction Connection



WARNING

Unprotected suction connection.

Risk of severe injury!

- Keep long hair, loose articles of clothing, etc. away from 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.



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 ATEX inlet filter (5 micron or less) upstream from the machine.

Connection size(s):

- ISO-KF 40

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

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

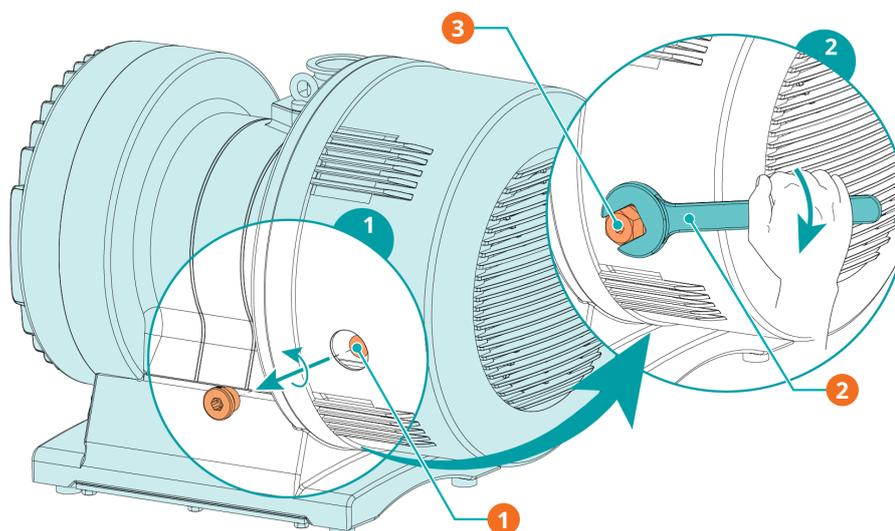
5.2.2 Discharge Connection

Connection size(s):

- ISO-KF 16
- Without connection if an exhaust filter is installed.

- Make sure that the connection lines cause no stress on the connections of the machine. Therefore, we recommend installing flexible lines on the suction and discharge connections.

5.3 Gas ballast Valve Installation (Optional)



Description			
1	Gas ballast connection (GBC)	2	25 mm wrench
3	Gas ballast valve (GB) (accessory) part no.: 0540 559 847		

6 Electrical Connection



DANGER

Live wires.

Risk of electrical shock!

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

CURRENT PROTECTION OF THE CUSTOMER INSTALLATION:



DANGER

Missing current protection.

Risk of electrical shock!

- Current protection in accordance with EN 60204-1 must be provided by the customers on their installation(s).
- The electrical installation must comply with the applicable national and international standards.



NOTICE

Electromagnetic compatibility.

- Make sure that the motor of the machine will not be affected by electric or electromagnetic disturbance from the mains, if necessary, seek advice from Busch.
- Make sure that the EMC of the machine is compliant with the requirements of your supply network system, if necessary, provide further interference suppression (EMC of the machine, see EU Declaration of Conformity or UK Declaration of Conformity).

6.1 Machine delivered with a Variable Speed Drive



NOTICE

Incorrect connection.

Risk of damage to the variable speed drive!

- The wiring diagrams given below are typical. Check the connection instructions/diagrams.
- Make sure that the power supply corresponds to the specification on the wiring diagram supplied with the machine.
- If the machine is equipped with a power connector, install a residual current protective device to protect persons in case of a defective insulation.
 - Busch recommends installing a type B residual protective device suitable for the electrical installation.
- If the variable speed drive is not equipped with a lockable disconnect switch, provide it on the power line so that the machine is completely secured during maintenance tasks.
- Provide a lockable disconnect switch or an emergency stop switch on the power line so that the machine is completely secured in case of an emergency situation.

- Provide an overload protection according to EN 60204-1.
 - Busch recommends installing a C-curve circuit breaker.
- Connect the protective earth conductor.

6.2 Single-Phase Version

- Electrically connect the machine directly to the mains connection (MC).

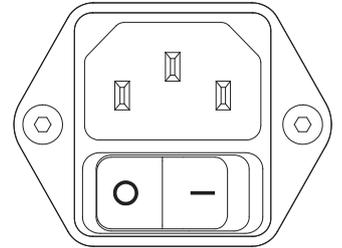
Connector: EN 60320-C14

On/off-switch (OOS):

O ► OFF = Variable Speed Drive (VSD) not powered

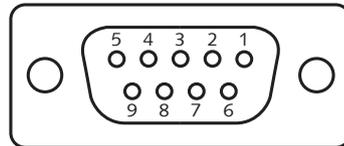
I ► ON = Variable Speed Drive (VSD) powered

Fuse holder (FH): 12.5 A, type F (F12.5)



6.2.1 I/O and Communication Port Schematic (Single-phase Version Only)

Connector: D-Sub9, 9-pin, female



Pin Nr.	Description	Signal
1	24 V Out	Power supply (max. 100 mA)
2	0 V / Ground	Ground
3	Digital Input 1	Open: Stop Closed: Start
4	Digital Input 2*	Preset speed DI2 / DI3 0 / 0 ► Standard speed 1 / 0 ► Boost speed
5	Digital Input 3*	0 / 1 ► Idle speed 1 / 1 ► Boost speed
6	RS485, D+	For reading status values (current, voltage, operating hours, etc...) or parameters.
7	RS485, D-	
8	Fault relay IN	Contact NC (normally closed)
9	Fault relay OUT	U _{max} = 100 VDC / I _{max} = 5 A

* "Logic 0" : input voltage = 0 ... 4 VDC
"Logic 1" : input voltage = 8 ... 30 VDC

Communication port via Modbus (RS485):

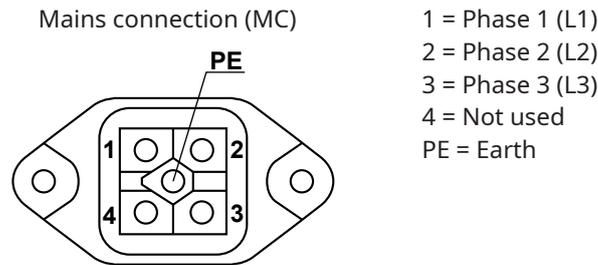
Ask your Busch representative for more information.

6.3 Three-Phase Version

- Provide a lockable disconnect switch on the power line so that the machine is completely secured during maintenance tasks.
- Provide an overload protection according to EN 60204-1 for the motor.
 - Busch recommends installing a D-curve circuit breaker.
- Electrically connect the machine, see Wiring Diagram Three-Phase Motor.

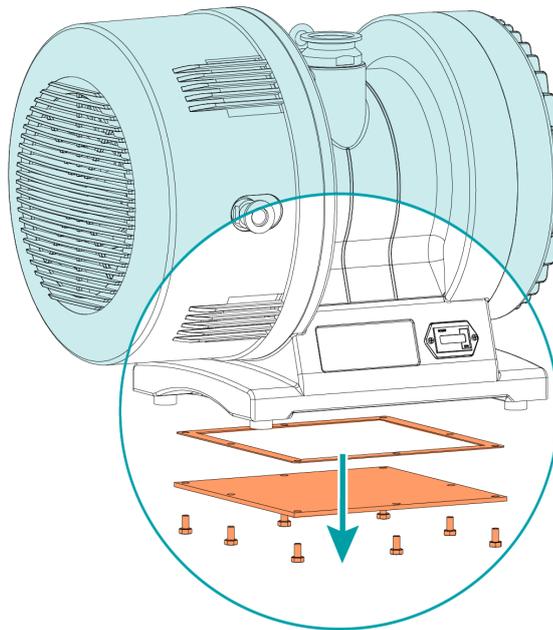
6.3.1 Wiring Diagram Three-Phase Motor

- Wire the mating connector (delivered loose) in accordance with the scheme below:

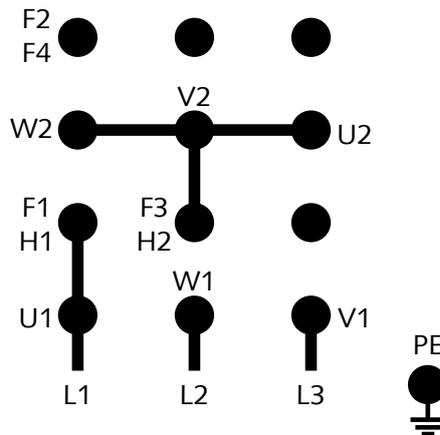


- If necessary, change the connection type from star (factory default setting) to delta.

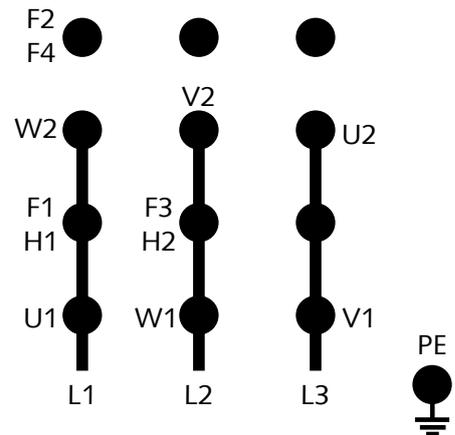
Accessing terminals:



Star connection (high voltage):
380-415 V (50 Hz), 380-480 V (60 Hz)
Factory default setting



Delta connection (low voltage):
190-220 V (50 Hz), 200-240 V (60 Hz)



- F1 ▶ motor fan wire 1 = White
- F2 ▶ motor fan wire 2 = Brown
- F3 ▶ motor fan wire 3 = Green
- F4 ▶ motor fan wire 4 = Yellow
- H1 ▶ counter wire 1
- H2 ▶ counter wire 2



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.

- Jog the motor briefly.
- With a phase rotation tester, check if the wiring corresponds to the correct direction of rotation.

If the rotation of the motor must be changed:

- Switch any two of the motor phase wires.

7 Commissioning



WARNING

FO 0035 B operates at 100 hPa (mbar) in continuous operation.

Risk of damage to the machine!

ATEX ► Risk of explosion and injuries!

- Make sure to comply with the maximum continuous suction pressure, see *Technical Data* [→ 38].



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.



NOTE

A small amount of tip seal dust may collect in the exhaust duct of the machine. The dust may be blown out when the machine is vented.

- Make sure that the *Installation Conditions* [→ 11] are met.
- Start the machine.
- Make sure that the maximum permissible number of starts does not exceed 6 starts per hour. Those starts should be spread within the hour.



NOTE

For the single phase version, take into account a delay of 5 seconds between power-up and the machine start up.

- Make sure that the operating conditions comply with the *Technical Data* [→ 38].

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.

7.1 Conveying Condensable Vapors



WARNING

Draining condensate in an explosive atmosphere.

Risk of explosion!

- Drain and dispose of condensate only in a non-explosive atmosphere.



WARNING

Creation of an explosive atmosphere in the discharge area.

Risk of explosion!

- Make sure that any potentially explosive gases/gas mixtures being conveyed are discharged to an area where no explosive gas mixtures can accumulate.



WARNING

Electrostatic charge creates an ignition spark.

Risk of explosion!

- Make sure that connections and lines are made of conductive material or take precautions against electrostatic charging.



CAUTION

Draining the condensate while operating and/or venting the machine.

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

Risk of burns!

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



NOTE

The use of a gas ballast can decrease the interval between the change of the tip seal, depending on duration and frequency. Contact Busch service for further information.

START

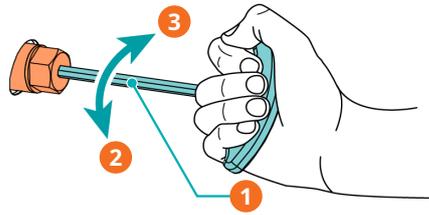
- Close the isolation valve* and open the gas ballast valve** (GB)
- Warm up the machine for 30 minutes
- Open the isolation valve* and perform the process
- Close the isolation valve*
- Wait 30 minutes
- Close the gas ballast valve** (GB)

END

* Not included in the scope of delivery.

** Can be considered as optional on some products

7.1.1 Gas Ballast Valve Adjustment



Description			
1	8 mm hex key	2	Open
3	Close		



NOTE

Risk of back-flow when the gas ballast is open.

8 Maintenance



DANGER

Live wires.

Risk of electrical shock!

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



WARNING



The machine is contaminated with hazardous material.

Risk of poisoning!

Risk of infection!

If the machine is contaminated with hazardous material:

- Wear appropriate personal protective equipment.



WARNING

Version intended for oxygen application.

Risk of fire!

- Do not perform maintenance task before being informed about oxygen requirements.
- Ask your Busch representative for more information.



CAUTION

Hot surface.

Risk of burns!

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

8.1 Maintenance Schedule

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

Particularly harsh applications or heavy duty operation, such as high dust loads in the environment or in the process gas, other contamination or ingress of process material, can make it necessary to shorten the maintenance intervals significantly.

Interval	Maintenance work
Every 6 months or as required	<ul style="list-style-type: none"> • Clean the machine from dust and dirt. • Check the inlet screen (IS), clean if necessary. • Flush the machine by running it at atmospheric pressure for about 1 minute. <p>In case of an inlet filter being installed:</p> <ul style="list-style-type: none"> • Check the inlet filter cartridge, clean if necessary. <p>In case of a gas ballast valve being installed:</p> <ul style="list-style-type: none"> • Clean the filter of the gas ballast valve.
Annually or as required	<ul style="list-style-type: none"> • Replace the tip seal and the non-return valve (NRV), see Tip Seal and Non-return Valve Replacement.
Every 4 years or after 20000 hours	<ul style="list-style-type: none"> • Have a major overhaul on the machine (contact Busch).

8.2 Tip Seal Replacement

NOTICE

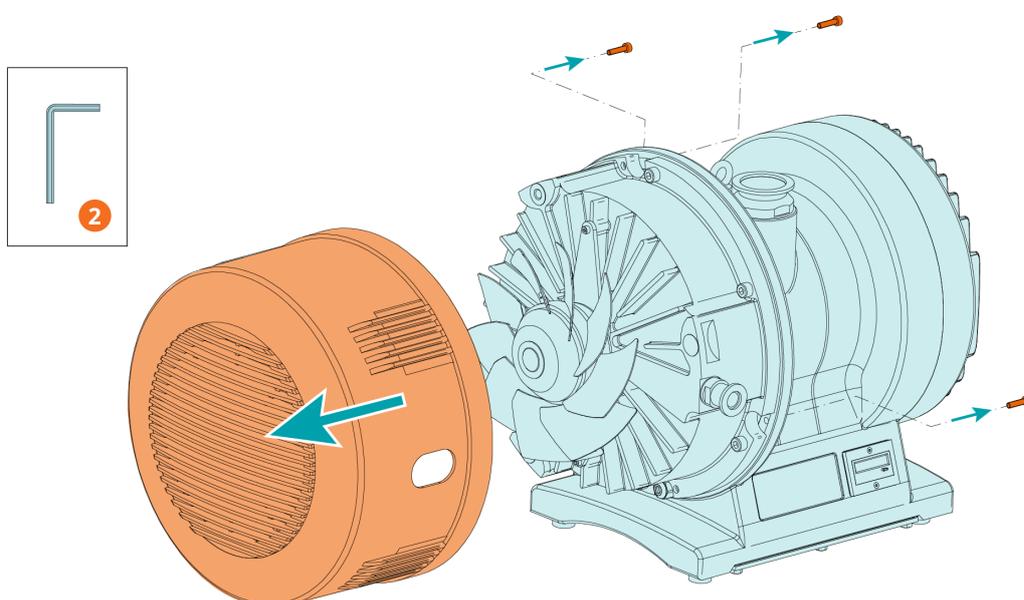
Changing the tip seals without training.

Loss of Busch liability!

Loss of efficiency!

- Ask your Busch representative before performing this maintenance task.
 - Order the Busch genuine service kit.
-
- Unscrew the three screws of the protection cover and take it off.

1



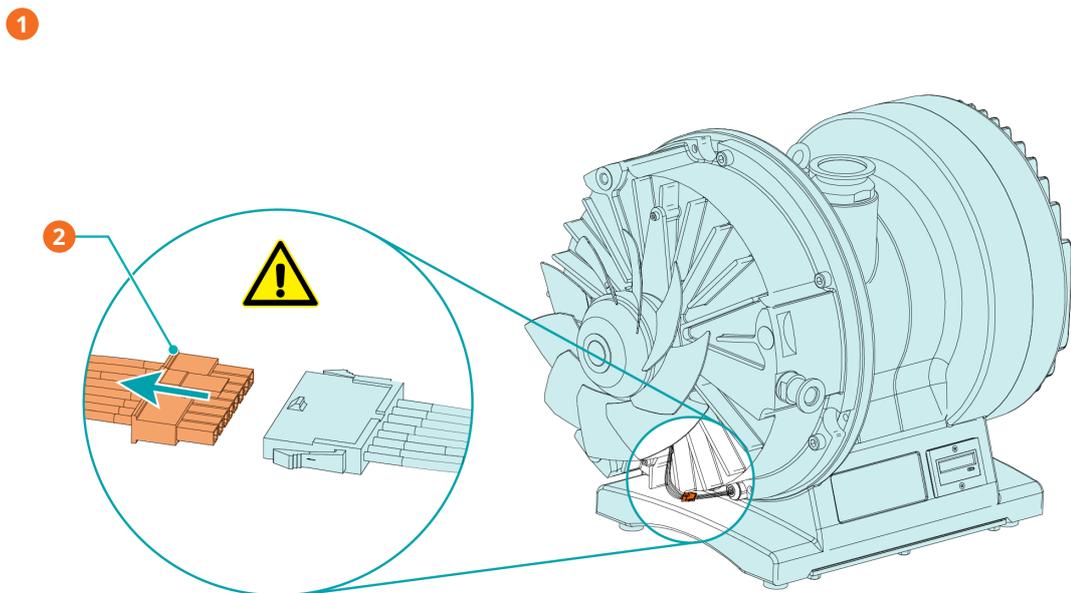
Description

1	Illustrations 1 & 10: Remove cover	2	4 mm hex key
---	------------------------------------	---	--------------

- Unplug the connector of the fan by pressing the small grip.

NOTICE

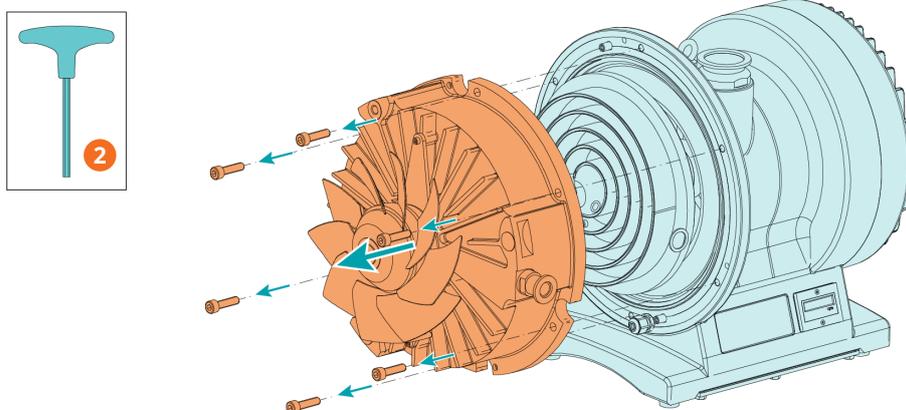
By disconnecting, be careful not to tear the wires.

**Description**

1	Illustration 2: Disconnect fan	2	Disconnect fan
---	--------------------------------	---	----------------

- Unscrew the six screws of the fixed scroll and slowly remove with care the fixed scroll.

1

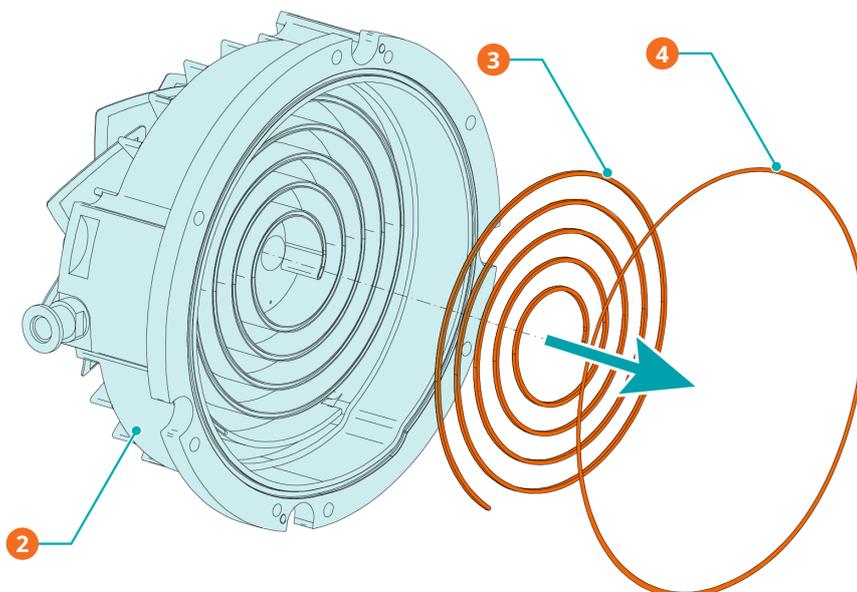


Description

1	Illustration 3: Remove fixed scroll	2	6 mm hex key (ideally T-handle)
---	-------------------------------------	---	---------------------------------

- Remove the used tip seals (pos. 8) from its groove by the help of a small, pointed tool and the O-ring (pos. 26).

1

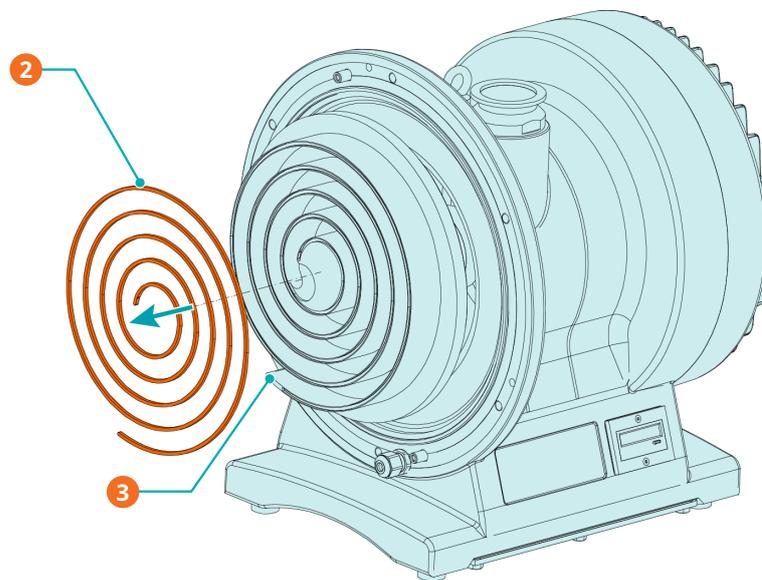


Description

1	Illustration 4: Remove used tip seal (fixed scroll)	2	Fixed scroll
---	---	---	--------------

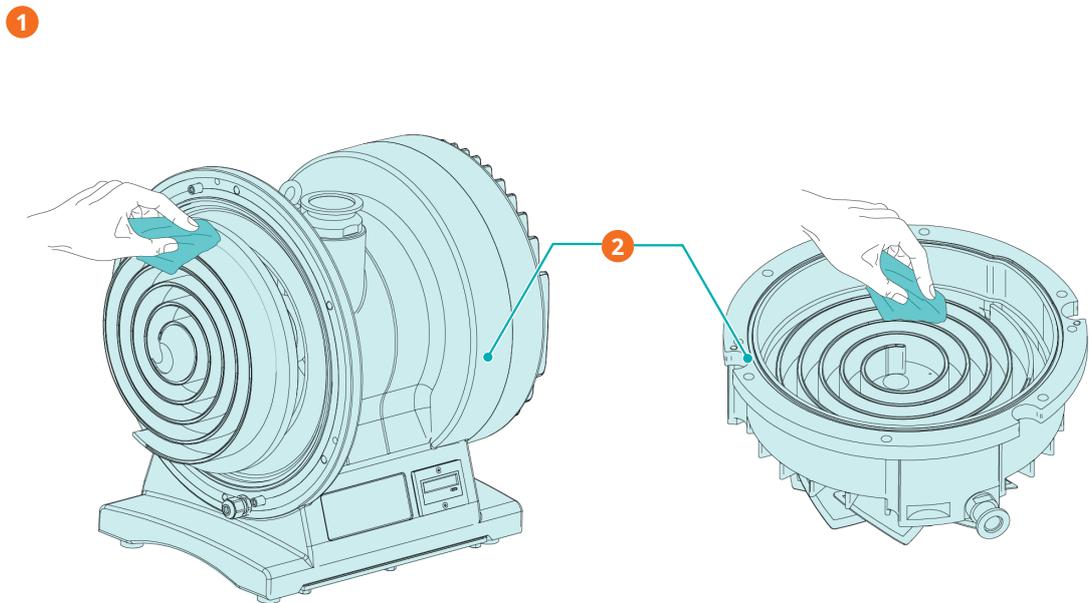
Description			
3	Tip seal, pos. 8	4	O-ring, pos. 26

1



Description			
1	Illustration 5: Remove used tip seal (moving scroll)	2	Tip seal, pos. 8
3	Moving scroll		

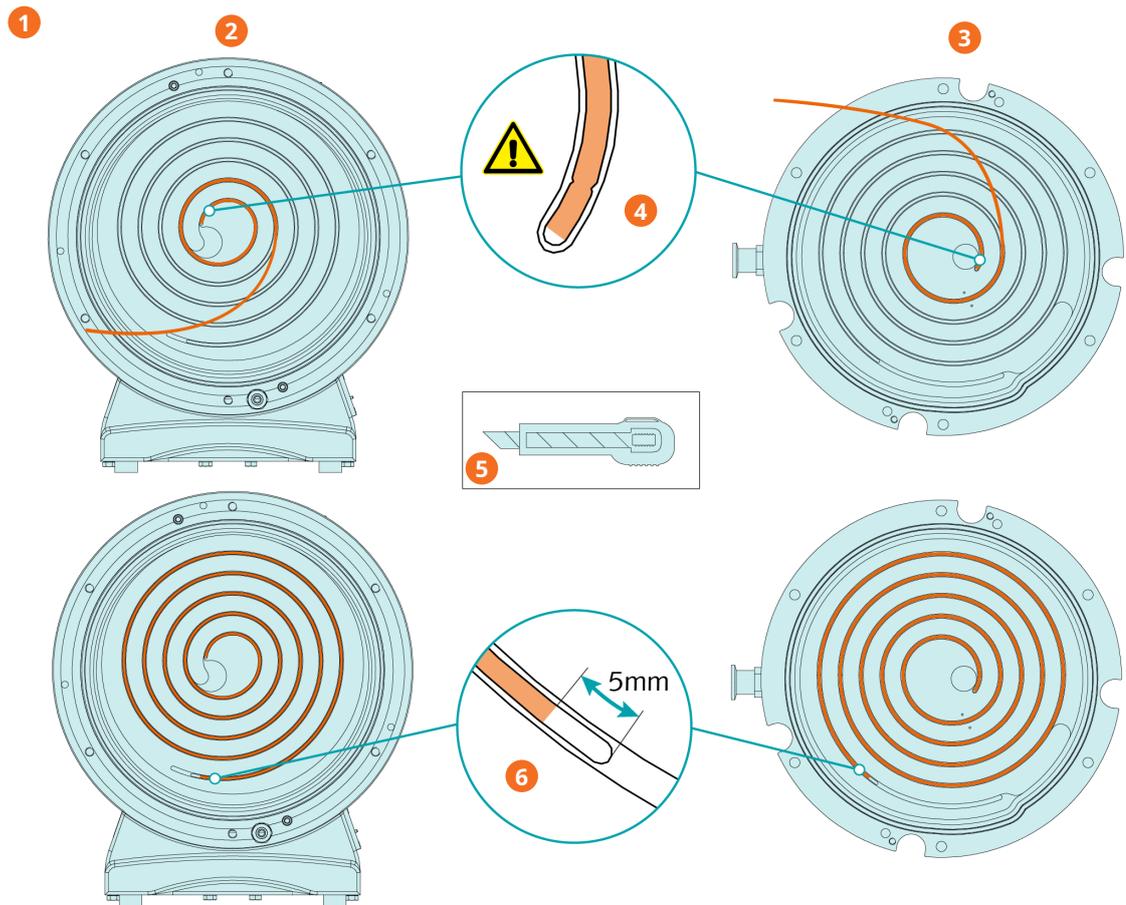
- Wipe all spirals with a soft, lint-free cloth, impregnated with alcohol, including the tip seal grooves.
- Make sure that there is no remaining debris in the scroll parts.

**Description**

1	Illustration 6: Clean-up spirals	2	Clean-up spirals
---	----------------------------------	---	------------------

Set and adjust the new tip seals in the groove by starting from the center. Make sure that the tip seals are correctly assembly in the holding claws. Use a cutter knife to adjust the tip seal length. Make sure that the tip seals are fully pushed in the groove with the fingers.

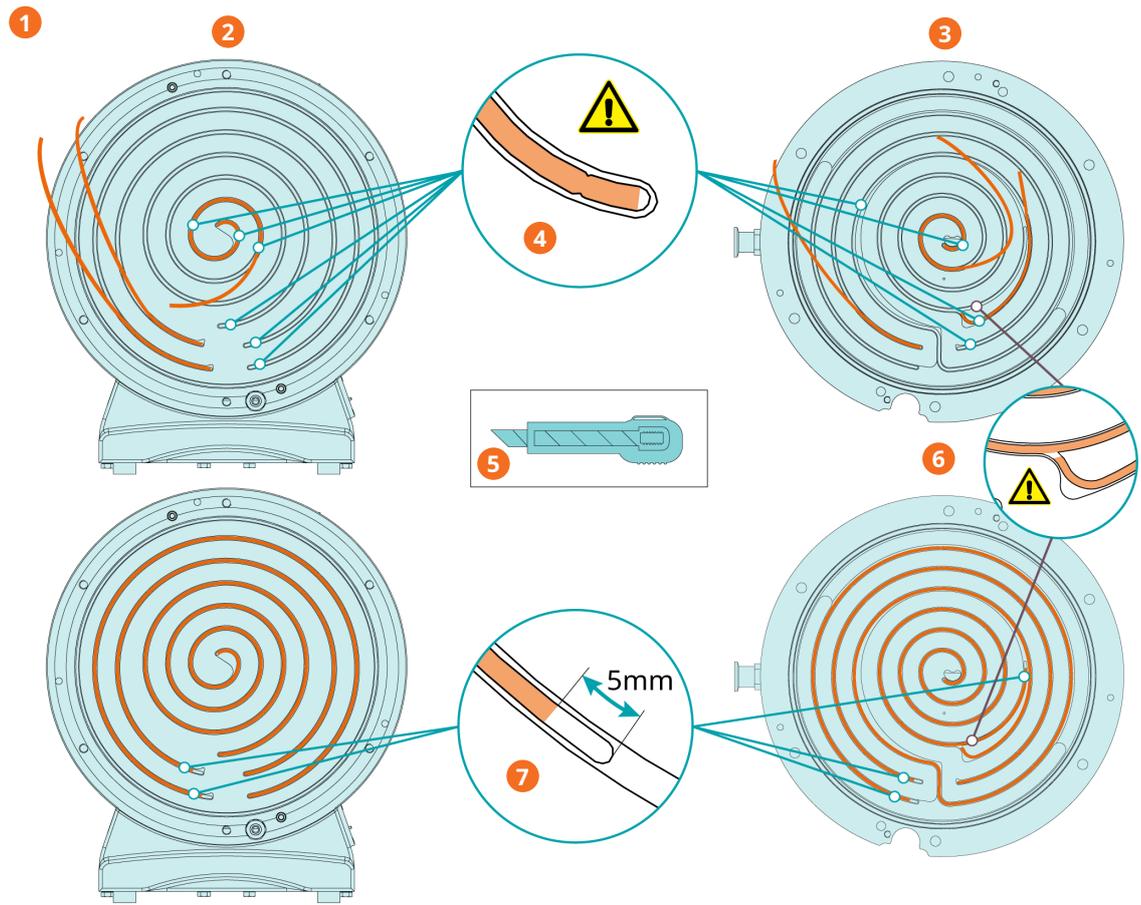
Insert tip seal FOSSA FO 0015 A:



Description

1	Illustration 7: Insert tip seal FOSSA FO 0015 A	2	Moving scroll
3	Fixed scroll	4	Starting points holding claws
5	Cutter knife	6	End points

Insert tip seal FOSSA FO 0035 B:

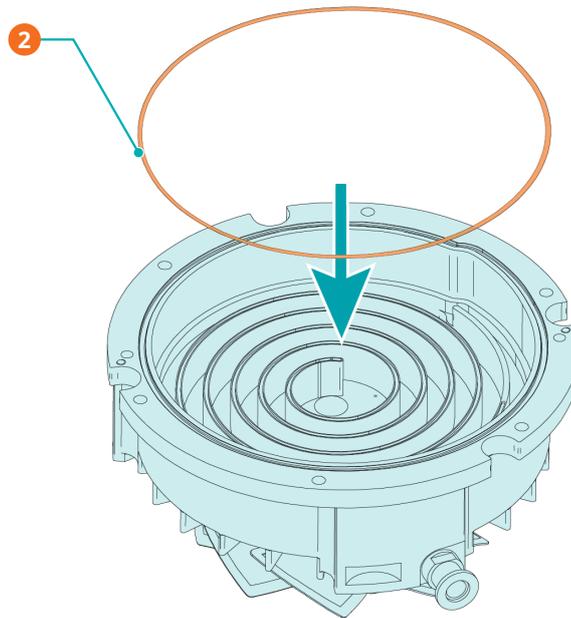


Description

1	Illustration 8: Insert tip seal	2	Moving scroll
3	Fixed scroll	4	Starting points holding claws
5	Cutter knife	6	Adjust extra part of tip seal
7	End points		

- Replace the o-ring (pos. 26) by a new one.

1

**Description**

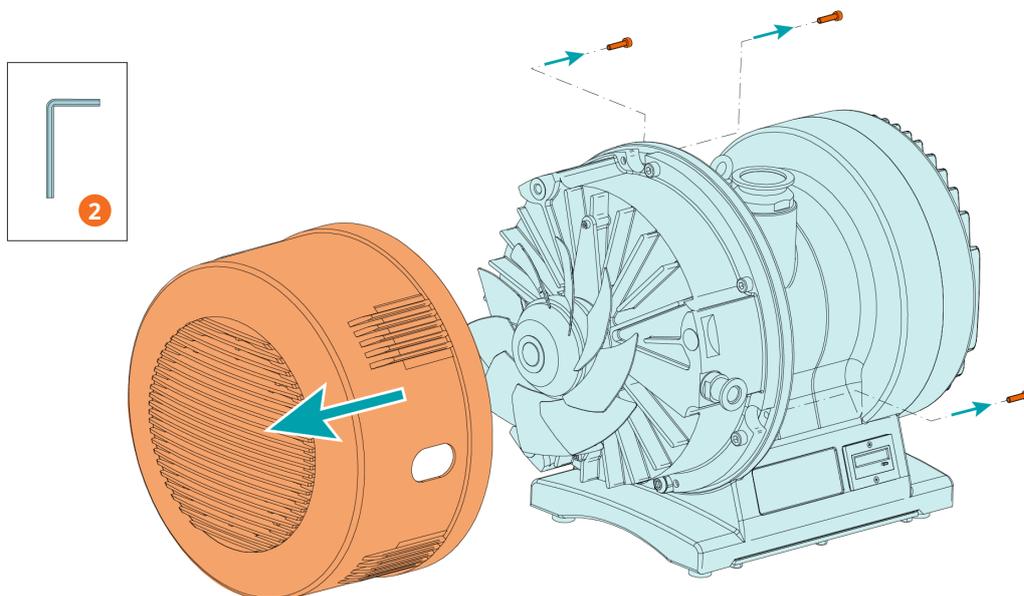
1	Illustration 9: New o-ring	2	New o-ring
---	----------------------------	---	------------

- Reassemble the fixed scroll like it is shown in illustration 3.
- Plug the connector of the fan like it is shown in illustration 2.
- Reassemble the protection cover like it is shown in illustration 1.

8.3 Non-Return Valve Change

- Unscrew the three screws of the protection cover and take it off.

1

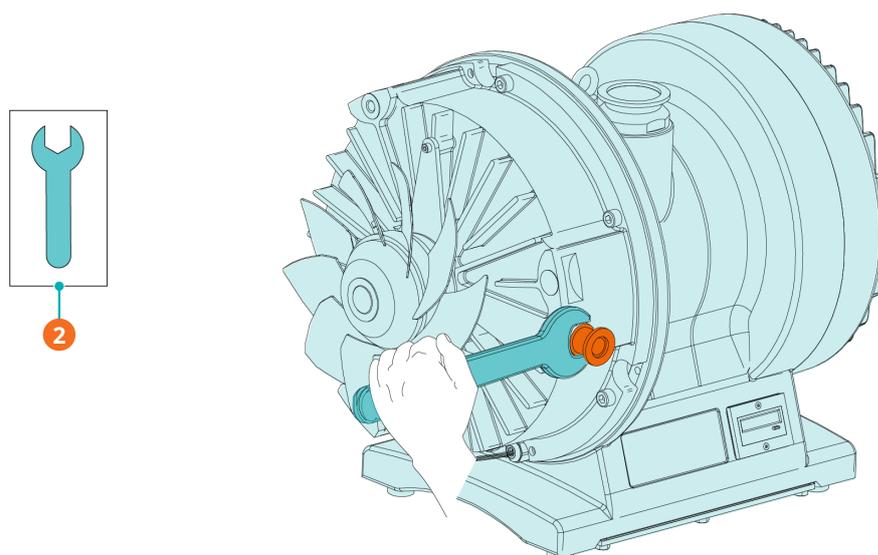


Description

1	Illustrations 1 & 10: Remove cover	2	4 mm hex key
---	------------------------------------	---	--------------

- Unscrew the exhaust flange using a 21 mm wrench.

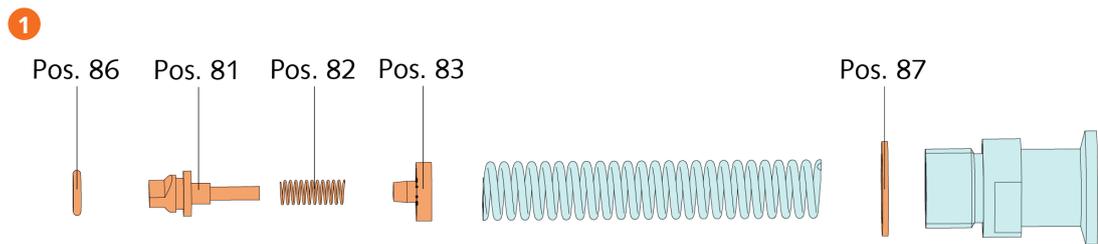
1



Description

1	Illustration 11: Remove exhaust flange	2	21 mm wrench
---	--	---	--------------

- Replace the different parts of the non-return valve (pos. 81/82/83/86) including the ring seal of the exhaust (pos. 87).



Description

1	Illustration 12: Exploded view of the non-return valve		
---	--	--	--

- Reassemble the non-return valve and refit the exhaust flange like it is shown on the illustration 10.
- Reassemble the protection cover like it is shown on the illustration 11.

9 Overhaul



WARNING



The machine is contaminated with hazardous material.

Risk of poisoning!

Risk of infection!

If the machine is contaminated with hazardous material:

- Wear appropriate personal protective equipment.



NOTICE

Improper assembly.

Risk of premature failure!

Loss of efficiency!

- Any dismantling of the machine that goes beyond anything that is described in this manual should be done by Busch authorized technicians.

If the machine has conveyed gas contaminated with foreign materials which are hazardous to health:

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

Busch will only accept machine accompanied by a signed, fully completed and legally binding "declaration of contamination", downloadable from the following link: buschvacuum.com/declaration-of-contamination.

10 Decommissioning



DANGER

Live wires.

Risk of electrical shock!

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



CAUTION

Hot surface.

Risk of burns!

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

- 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 to be stored:

- See *Storage* [→ 10].

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.

12 Accessories

Accessory	Part No.
Inlet filter	0530 566 434
Exhaust Filter	0562 566 435
Gas ballast adapter	0916 566 457
Gas ballast valve	0540 559 847
Kit of wheels	0999 569 268

If other parts are required:

- Contact your Busch representative.

13 Troubleshooting

Problem	Possible Cause	Remedy
The machine does not start.	The motor is not supplied with the correct voltage.	<ul style="list-style-type: none"> • Check the power supply.
	Internal parts are worn or damaged	<ul style="list-style-type: none"> • Repair the machine (contact Busch).
	The fuse has blown.	<ul style="list-style-type: none"> • Check the electrical installation. • Replace the fuse.
	The motor is defective.	<ul style="list-style-type: none"> • Repair the machine (contact Busch).
The machine does not reach the usual pressure on the suction connection.	The inlet screen is partially clogged.	<ul style="list-style-type: none"> • Clean the inlet screen.
	The inlet filter cartridge (optional) is partially clogged.	<ul style="list-style-type: none"> • Replace the inlet filter cartridge.
	Measurement method or reading is false.	<ul style="list-style-type: none"> • Check gauge, check final pressure without installation connected.
	Leak in the system.	<ul style="list-style-type: none"> • Repair leak.
	Worn tip seal.	<ul style="list-style-type: none"> • Replace tip seal, see Tip Seal and Non-return Valve Replacement.
	Internal parts are worn or damaged.	<ul style="list-style-type: none"> • Repair the machine (contact Busch).
The machine runs very noisily.	The machine runs too hot.	<ul style="list-style-type: none"> • See problem "The machine runs too hot".
	Internal parts are worn or damaged.	<ul style="list-style-type: none"> • Repair the machine (contact Busch).
The machine runs too hot.	Insufficient cooling.	<ul style="list-style-type: none"> • Check the ventilation.
	Ambient temperature too high.	<ul style="list-style-type: none"> • Observe the permitted ambient temperature.
	The machine is contaminated by process residuals.	<ul style="list-style-type: none"> • Repair the machine (contact Busch).
	Discharge pipe obstructed.	<ul style="list-style-type: none"> • Check the discharge line.
	The motor is defective.	<ul style="list-style-type: none"> • Repair the machine (contact Busch).

14 Technical Data

		FO 0015 A	FO 0035 B
Nominal pumping speed	m ³ /h	15 / 18	35 / 42
Single-phase version: (normal / boost) ^{***}	l/min cfm	250 / 300 8.8 / 10.6	583 / 700 20.6 / 24.7
Three-phase version: (50Hz / 60Hz)			
Ultimate pressure (gas ballast closed)	hPa (mbar) abs. Torr	0.025 0.018	0.02 0.015
Ultimate pressure (gas ballast open)	hPa (mbar) abs. Torr	0.09 0.067	
Max. continuous suction pressure	hPa (mbar) abs. Torr	1000 1125	100 75
Max. allowable gas inlet temperature	°C	70 (non-ATEX) 40 (ATEX T4)	
Max. allowable discharge pressure	hPa (mbar) rel. PSIG	500 7.3	200 2.9
Water vapor capacity	g/h	300	400
Leak rate (helium)	mbar·L·s ⁻¹ (sccs)	≤1 x 10 ⁻⁶	
Nominal motor rating	W HP	400 0.5	750 1
Operating voltages (single-phase version) ^{***}	V (50/60Hz)	100-240	
Operating voltages (three-phase version)	V (50Hz) V (60Hz)	190-220 / 380-415 200-240 / 380-480	
Nominal motor speed	min ⁻¹	1480 / 1780	
Noise level (EN ISO 2151) (idle speed) ^{***}	dB(A)	42	43
Max. noise level (EN ISO 2151)	dB(A)	59	60
Vibration level at inlet (EN ISO 10816-1)	mm s ⁻¹	Class 1B, < 1.5 mm/sec	
Ambient temperature range	°C	5 ... 40*	
Gas inlet temperature range	°C	5 ... 40*	
Dimensions (L x W x H)	mm	450 x 338 x 369	462 x 338 x 369
Weight approx.	kg	48**	50**

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

** The weight can vary depending on the order.

*** With integrated variable speed drive

15 EU Declaration of Conformity

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

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

The manufacturer

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

declares that the machine: FOSSA FO 0015 A; FOSSA FO 0035 B

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

- 'Machinery' 2006/42/EC
- 'ATEX Directive' 2014/34/EU, for use in potentially explosive areas according to classification written on the machine nameplate
- 'Electromagnetic Compatibility' (EMC) 2014/30/EU
- 'RoHS' 2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment (incl. all related applicable amendments)

and comply(-ies) with the following harmonized standards that have been used to fulfill those provisions:

Standards	Title of the Standard
EN ISO 12100 : 2010	Safety of machinery - Basic concepts, general principles of design
EN 1012-2 : 1996 + A1 : 2009	Vacuum pumps - Safety requirements - Part 2
EN 60204-1 : 2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN ISO 2151 : 2008	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
CFR 47 FCC Part 15; Class A (industry)	The FCC 47 CFR Part 15 from the Federal Communications Commission: rules and regulations for EMC.
ICES-001	Industrial scientific and medical (ism) radio frequency generators
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 61326-1 : 2013 Table 2	Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements
EN 61000-3-2 : 2019 Class A (industry)	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
EN 61000-3-3 : 2013 + A1 : 2019	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.
EN 61010-1 : 2010 + A1 : 2019 + A1 : 2019 / AC : 2019	Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements
EN ISO 80079-36 : 2016	Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements
EN ISO 80079-37 : 2016	Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non electrical type of protection constructional safety 'c', control of ignition source 'b', liquid immersion 'k'
EN 1127-1 : 2019	Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology

Legal person authorized to compile the technical file and authorized representative in the EU (if the manufacturer is not located in the EU):

Busch Dienste GmbH
Schauinslandstr. 1
DE-79689 Maulburg

Chevenez, 01.03.2023



Christian Hoffmann, General Manager

16 UK Declaration of Conformity

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

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

The manufacturer

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

declares that the machine: FOSSA FO 0015 A; FOSSA FO 0035 B

fulfill(s) all the relevant provisions from UK legislations:

- Supply of Machinery (Safety) Regulations 2008
- The Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016
- Electromagnetic Compatibility Regulations 2016
- Restriction of the use of certain hazardous substances in Electrical and Electronic Equipment Regulations 2012

and comply(-ies) with the following designated standards that have been used to fulfill those provisions:

Standards	Title of the Standard
EN ISO 12100 : 2010	Safety of machinery - Basic concepts, general principles of design
EN 1012-2 : 1996 + A1 : 2009	Vacuum pumps - Safety requirements - Part 2
EN 60204-1 : 2018	Safety of machinery - Electrical equipment of machines - Part 1: General requirements
EN ISO 13857 : 2019	Safety of machinery - Safety distances to prevent hazard zones being reached by the upper and lower limbs
EN ISO 2151 : 2008	Acoustics - Noise test code for compressors and vacuum pumps - Engineering method (grade 2)
CFR 47 FCC Part 15; Class A (industry)	The FCC 47 CFR Part 15 from the Federal Communications Commission: rules and regulations for EMC.
ICES-001	Industrial scientific and medical (ism) radio frequency generators
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 61326-1 : 2013 Table 2	Electrical equipment for measurement, control and laboratory use. EMC requirements. General requirements
EN 61000-3-2 : 2019 Class A (industry)	Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)
EN 61000-3-3 : 2013 + A1 : 2019	Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.
EN 61010-1 : 2010 + A1 : 2019 + A1 : 2019 / AC : 2019	Safety requirements for electrical equipment for measurement, control, and laboratory use. General requirements
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EN ISO 80079-37 : 2016	Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - Non electrical type of protection constructional safety 'c', control of ignition source 'b', liquid immersion 'k'
EN 1127-1 : 2019	Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology

Legal person authorized to compile the technical file and importer in the UK (if the manufacturer is not located in the UK):

**Busch (UK) Ltd
30 Hortonwood
Telford - UK**

Chevenez, 01.03.2023



Christian Hoffmann, General Manager

Notes

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

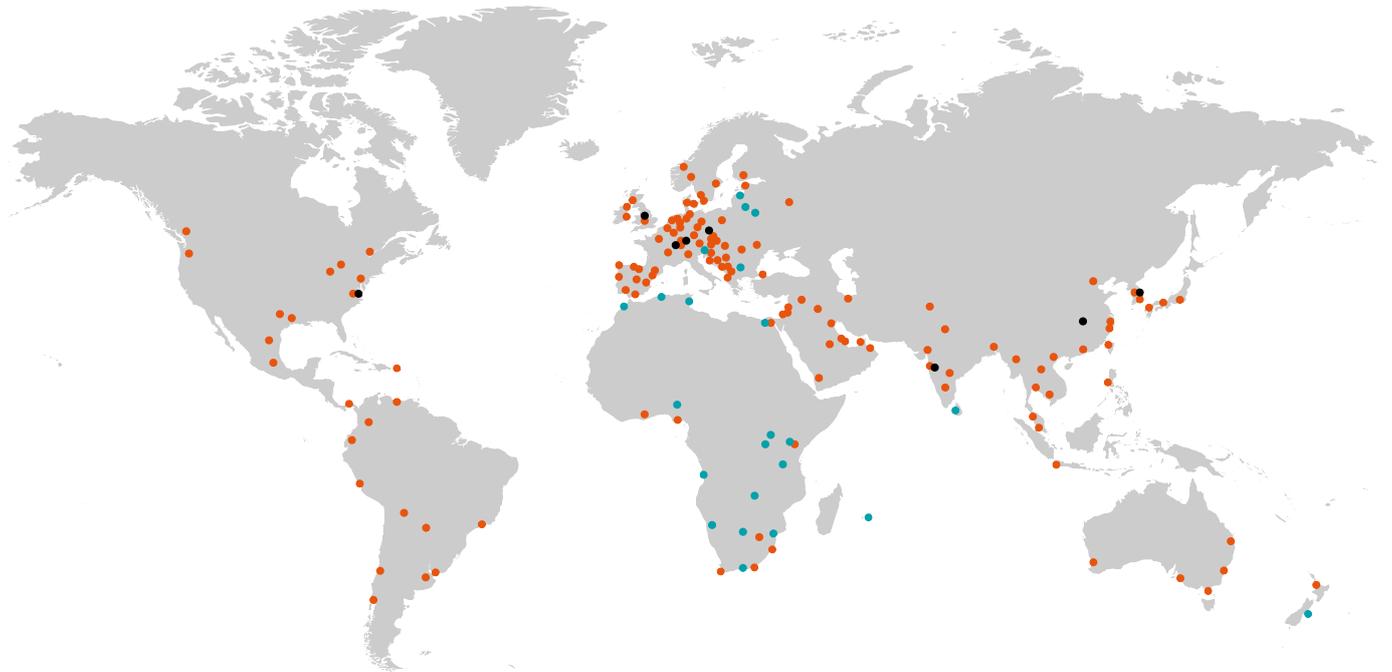
A large grid of small dots, intended for taking notes. The grid consists of 20 columns and 30 rows of dots, providing a structured space for writing.

A large grid of small dots for taking notes, covering the majority of the page. The dots are arranged in a regular, repeating pattern.

Busch

Vacuum Solutions

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



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