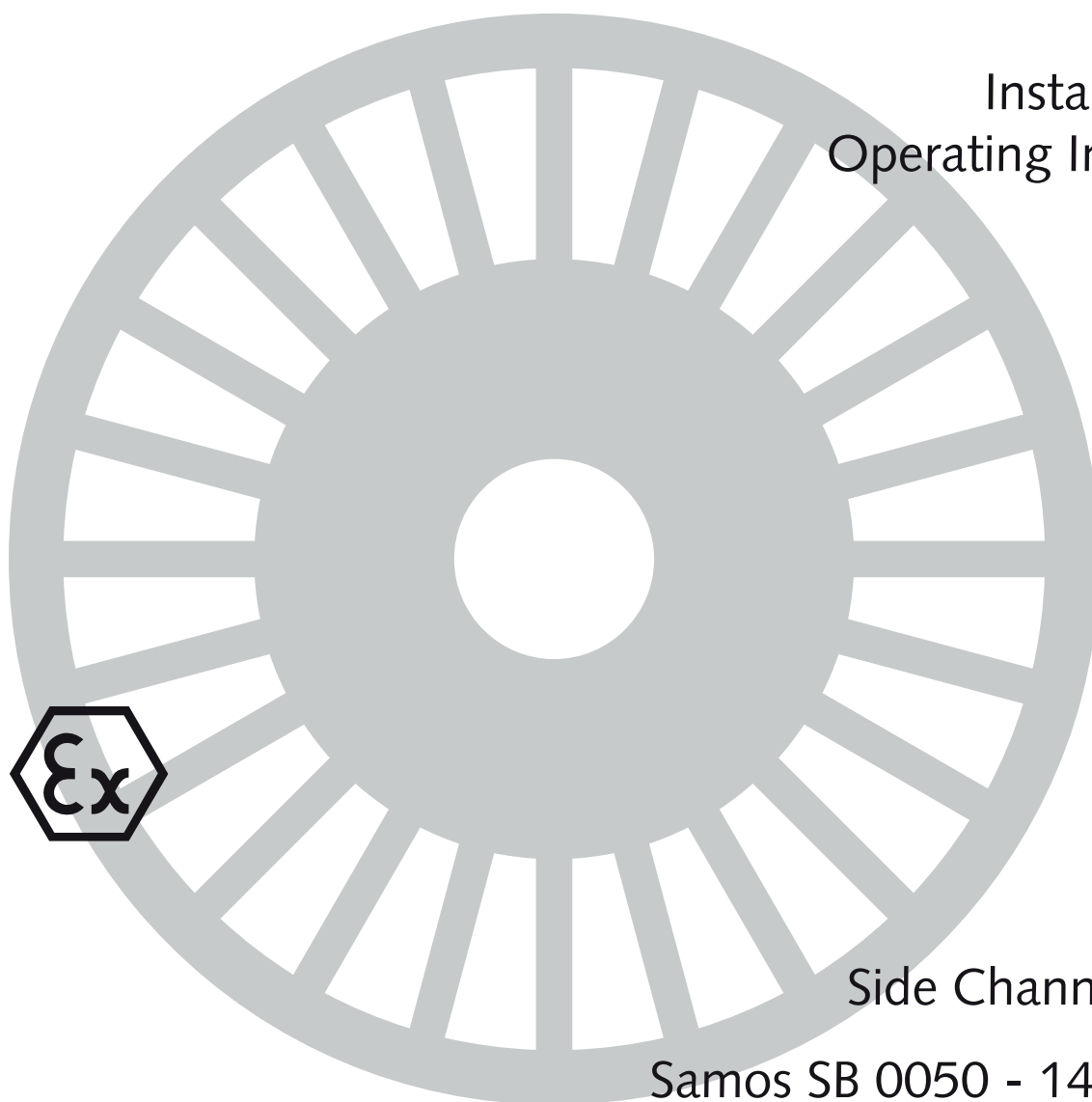




Installation and Operating Instructions



Side Channel Blowers

Samos SB 0050 - 1400 D0/D2

ATEX-Version



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Preface

Congratulations on your purchase of the Busch side channel blower. With watchful observation of the field's requirements, innovation and steady development Busch delivers modern vacuum and pressure solutions worldwide.

These operating instructions contain information for

- product description,
- safety,
- transport,
- storage,
- installation and commissioning,
- maintenance,
- overhaul,
- troubleshooting and
- spare parts

of the side channel blower.

The ATEX-drive motor is subject to a separate instruction manual.

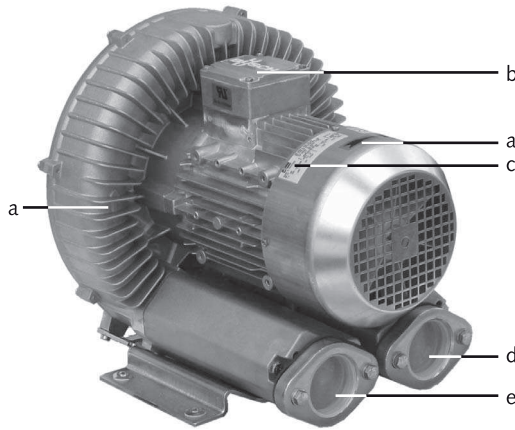
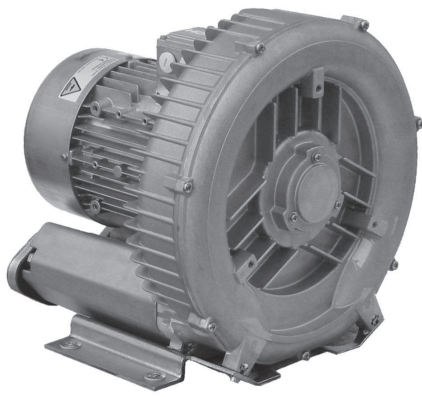
For the purpose of these instructions, "handling" the side channel blower means the transport, storage, installation, commissioning, influence on operating conditions, maintenance, troubleshooting and overhaul of the side channel blower.

Prior to handling the side channel blower these operating instructions shall be read and understood. If anything remains to be clarified please contact your Busch representative!

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

Technical Data

ATEX-classification, motor connection parameters, nominal speeds and allowed differential pressures are given on the nameplate of the side channel blower. More technical data, available sizes, versions and accessories are given in the current sales programme. In case of further questions please contact your Busch representative.



- a Directional arrows
- b Terminal box
- c Nameplate
- d Gas discharge/ pressure connection
- e Inlet

Product Description

Use

The side channel blower is intended for

- the suction
 - the compression
- of
- mixtures of dry non-aggressive and non-toxic gases and/or dust according to the identification on the nameplate of the side channel blower (explanation see below)

Conveying media with a lower or higher density than air leads to an increased thermal and/or mechanical load on the side channel blower and is permissible only after prior consultation with Busch.

According to the directive 2014/34/EU (“ATEX 2014”) the side channel blower is made for the intended use in potentially explosive areas according to the data given on the nameplate of the side channel blower and on the data given on the nameplate of the drive motor.

The classification on the side channel blower is to be read as follows (interpretations of equipment categories and zones for information only; the relevant laws, directives and standards are literally binding; for temperature classes and explosion groups see E. Brandes, W. Möller “Sicherheitstechnische Kenngrößen, Band 1: Brennbare Flüssigkeiten und Gase”, ISBN 3-89701-745-8 (or equivalent source)):

If the classifications with regard to the conveyed gas/air or dust/air mixture on the one side and the environment of the side channel blower on the other side vary, the nameplate of the side channel blower reads the classification with regard to the conveyed gas/air or dust/air mixture first and next, after a slash, the classification with regard to the environment (example “3/2”).

⊕ II 3/2G c T3

Group II, for non-mining applications, explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas in the process gas not likely to occur in normal operation but, if it does occur, will persist for a short period only (equipment category 3, for zone 2), in the environment explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist likely to occur in normal operation occasionally (equipment category 2, for zone 1),

type of protection constructional safety, for gases temperature class T3 in the process gas and in the environment.

Not for potentially explosive dust/air atmospheres.

⊕ II 3/2D c T 125°C

Group II, for non-mining applications, in the process gas explosive atmosphere in the form of a cloud of combustible dust in air not likely to occur in normal operation but, if it does occur, will persist for a short period only (equipment category 3, for zone 22), in the environment explosive atmosphere in the form of a cloud of combustible dust in air likely to occur in normal operation occasionally (equipment category 2, for zone 21),

type of protection constructional safety, maximum permissible surface temperature for the dust/air mixtures in the process gas and in the environment greater equal 125 °C (acc. to EN 50281-2-1 or IEC 61241-2-1 resp.).

Not for potentially explosive gas atmospheres.

⊕ II 3G T3

Group II, for non-mining applications, in the process gas and in the environment explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas (in the environment also vapour or mist) not likely to occur in normal operation but, if it does occur, will persist for a short period only (equipment category 3, for zone 2), for gases temperature class T3 in the process gas and in the environment.

Not for potentially explosive dust/air atmospheres.

⊕ II 3D T 125°C

Group II, for non-mining applications, in the process gas and in the environment explosive atmosphere in the form of a cloud of combustible dust in air not likely to occur in normal operation but, if it does occur, will persist for a short period only (equipment category 3, for zone 22), maximum permissible surface temperature for the dust/air mixtures in the process gas and in the environment greater equal 125 °C (acc. to EN 50281-2-1 or IEC 61241-2-1 resp.).

Not for potentially explosive gas atmospheres.

The gas shall be free from vapours that would condensate under the temperature and pressure conditions inside the side channel blower.

The nominal value (=reference value for performance data) for the temperature of the process gas is 15 °C. The max. allowed temperature of the inlet gas is 40 °C.

The nominal value for the ambient temperature is 25 °C. The min. allowed ambient temperature is -30 °C. The max. allowed ambient temperature is 40 °C.

Binding data with regard to the allowed differential pressure are to be read from the nameplate (value with negative sign (“-”) for vacuum operation, value without sign for pressure operation). The data is valid for ambient temperatures up to 25 °C and location altitudes up to 1000 m above sea level. Higher ambient temperatures reduce the allowed differential pressures by up to 10 percent at 40 °C. In case of placement in altitudes beyond 1000 m above sea level the allowed differential pressure shall be agreed upon with Busch.

The side channel blower is intended for continuous operation. Frequent switching on and off increase the coil temperature. In this case the operating conditions shall be agreed upon with Busch.

Only use variable-frequency drive in accordance with accompanying inspection document for inverter-fed explosion-proof motors.

The above mentioned limits must be strictly complied with. In particular the allowed differential pressures must not be violated by means of throttling on the suction side or pressure side. Violation of the limits results in increased temperatures and thus puts the explosion safety of the side channel blower at risk.

The maximum allowed pressure on the pressure connection (d) is 2 bar abs (the nameplate of the side channel blower indicates the valid pressure). By means of process control it must be made sure that the maximum allowed pressure will not be exceeded.

Principle of Operation

The side channel blower works on the impulse principle, i.e. kinetic energy is transferred from the rotor to the conveyed medium and then is converted into pressure.

For the two stage version:

2 stages, both working on the principle described above, are installed in line in order to achieve a better ultimate/differential pressure.

The side channel blower compresses the inlet gas absolutely oil-free. A lubrication of the pump chamber is neither necessary nor allowed.

Cooling

The side channel blower is cooled by

- radiation of heat from the surface of the side channel blower
- the air flow from the fan wheel of the drive motor
- the process gas

Start Controls

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

Safety

Intended Use

Definition: For the purpose of these instructions, "handling" the side channel blower means the transport, storage, installation, commissioning, influence on operating conditions, maintenance, troubleshooting and overhaul of the side channel blower.

The side channel blower is intended for industrial use. It shall be handled only by qualified personnel.

The allowed media and operational limits (→ page 3: Product Description) and the installation prerequisites (→ page 5: Installation Prerequisites) of the side channel blower shall be observed both by the manufacturer of the machinery into which the side channel blower is to be incorporated and by the operator.

In particular the intended use in potentially explosive areas, i.e. either inside the side channel blower or in its adjacency potentially explosive atmosphere can occur, requires that the side channel blower is equipped accordingly and carries the Ex-mark and that the associated documentation acc. to the directive 2014/34/EU is available.

The maintenance instructions shall be observed.

Prior to handling the side channel blower these installation and operating instructions shall be read and understood. If anything remains to be clarified please contact your Busch representative!

Safety Notes

The side channel blower has been designed and manufactured according to state-of-the-art methods. Nevertheless, residual risks may remain. These operating instructions highlight potential hazards where appropriate. Safety notes are tagged with one of the keywords DANGER, WARNING and CAUTION as follows:



DANGER

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



WARNING

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



CAUTION

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

Noise Emission



CAUTION

Depending on the construction size the side channel blower can emit noise of high intensity.

Depending on the operating state the side channel blower can emit noise in a narrow band.

Risk of damage to the hearing.

Persons staying in the vicinity of a non noise insulated side channel blower over extended periods shall wear ear protection.

Transport

Transport in Packaging

Side channel blowers individually packed in cardboard boxes can be carried by hand.

Packed on a pallet the side channel blower is to be transported with a forklift.

Transport without Packaging

In case the side channel blower is packed in a cardboard box with inflated cushions:

- ◆ Remove the inflated cushions from the box

In case the side channel blower is in a cardboard box cushioned with rolled corrugated cardboard:

- ◆ Remove the corrugated cardboard from the box

In case the side channel blower is laid in foam:

- ◆ Remove the foam

In case the side channel blower is bolted to a pallet or a base plate:

- ◆ Remove the bolting between the side channel blower and the pallet/base plate

In case the side channel blower is fastened to the pallet by means of tightening straps:

- ◆ Remove the tightening straps

In case the side channel blower weighs less than 20 kg and comes without eyebolts for the attachment of lifting gear:

Version without handle:

- ◆ Grasp the side channel blower with both hands

Version with handle:

- ◆ Carry the side channel blower using the handle

In case the side channel blower comes with one or more eyebolts for the attachment of lifting gear:



CAUTION

Do not walk, stand or work under suspended loads.

- Make sure that the eyebolt is in faultless condition (replace a damaged, e.g. bent eyebolt with a new one)
- Make sure that the eyebolt is fully screwed in and tightened by hand
- Attach lifting gear securely to the eyebolt on the cylinder
- Attach the lifting gear to a crane hook with safety latch

- Lift the side channel blower with a crane

In case the side channel blower was bolted to a pallet or a base plate:

- ◆ Remove the stud bolts from the rubber feet

Storage

Short-term Storage

- Make sure that the suction connection/gas inlet and the gas discharge/pressure connection are closed (leave the provided plugs in)
- Store the side channel blower
 - if possible in original packaging,
 - indoors,
 - dry,
 - dust free and
 - vibration free

Conservation

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

- Make sure that all ports are firmly closed; seal all ports that are not sealed with PTFE-tape, gaskets or o-rings with adhesive tape

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 electro-chemical 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! Busch uses CORTEC VCI 126 R film for the overseas packaging of large equipment.

- Wrap the side channel blower in VCI film
- Store the side channel blower
 - if possible in original packing,
 - indoors,
 - dry,
 - dust free and
 - vibration free.

For commissioning after conservation:

- Make sure that all remains of adhesive tape are removed from the ports
- Commission the side channel blower as described in the chapter Installation and Commissioning (→ page 5)

Installation and Commissioning

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 side channel blower and adjoining plant components!

Risk of injury!

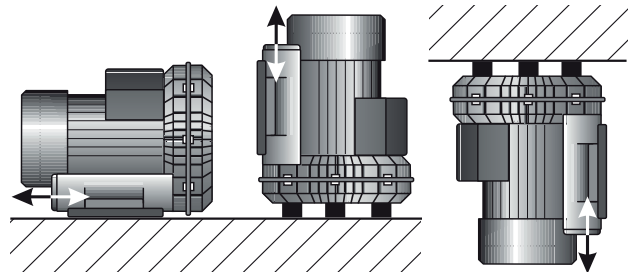
The installation prerequisites must be complied with.

- Make sure that the integration of the side channel blower is carried out such that the essential safety requirements of the Machine Directive 2006/42/EC are complied with (in the responsibility of the designer of the machinery into which the side channel blower is to be incorporated; → page 12: note in the EC-Declaration of Conformity)

Mounting Position and Space

- Make sure that the following ambient conditions will be complied with:
 - ambient temperature: $-30 \dots +40 \text{ }^\circ\text{C}$
 - ambient pressure: atmospheric
 - altitude of location: up to 1000 m above sea level (at higher altitudes reduction of allowed differential pressure; to be agreed upon with Busch)
- Make sure that the environmental conditions comply with the protection class of the drive motor (according to the nameplate)
- Make sure that the side channel blower can neither inadvertently nor intentionally be stepped on and cannot be used as a support for heavy objects
- Make sure that the side channel blower cannot be hit by falling objects

The side channel blower can be operated with horizontal or vertical gas flow



- Make sure that the mounting base is even
- Make sure that there will be a clearance of minimum 3.5 cm (up to construction size 140) or 5.5 cm (as of constructions size 200) between the fan hood and nearby walls/ceiling
- Make sure that there will be a clearance of minimum 2 cm (up to construction size 200), 3 cm (for construction size 310) or 4 cm (as of constructions size 530), respectively, between the cover and nearby walls/floor

In case of mounting with the drive motor in the uppermost position:

- ◆ Make sure that no objects can fall into the motor fan (cooling must not be impeded, though)
- ◆ Provide vibration insulating rubber feet to fasten the side channel blower to the floor
- Make sure that no heat sensitive parts (plastics, wood, cardboard, paper, electronics) will touch the surface of the side channel blower
- Make sure that the installation space or location is vented such that a sufficient cooling of the side channel blower is warranted



CAUTION

During operation the surface of the side channel blower may reach temperatures of more than $70 \text{ }^\circ\text{C}$.

Risk of burns!

- Make sure that the side channel blower will not be touched inadvertently during operation, provide a guard if appropriate

Suction Connection/Gas Inlet



CAUTION

Intruding foreign objects or liquids can destroy the side channel blower.

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

- ◆ Make sure that a suitable filter (5 micron or less) is installed upstream the side channel blower
- ◆ Make sure that the filter is sufficiently ATEX-qualified (electrically conductive, with equipotential bonding etc.; also for non-combustible dusts!)
- Make sure that the suction line fits to the suction connection/gas inlet (e) of the side channel blower
- Make sure that the pipe will cause no stress on the side channel blower's connection, if necessary use an expansion joint
- Make sure that the line size of the suction line over the entire length is at least as large as the suction connection/gas inlet (e) of the side channel blower

In case the length of the suction line exceeds 2 m it is prudent to use larger line sizes in order to avoid a loss of efficiency and an overload of the side channel blower. Seek advice from your Busch representative!

In case the vacuum shall be maintained after shutdown of the side channel blower:

- ◆ Provide a manual or automatic operated valve (= non-return valve) in the suction line
- Make sure that the suction line does not contain foreign objects, e.g. welding scales

Gas Discharge

In case of vacuum operation:

The discharged gas must flow without obstruction. It is not permitted to shut off or throttle the discharge line or to use it as a pressurised air source.

- Make sure that the discharge line fits to the gas discharge (d) of the side channel blower
- Make sure that the pipe will cause no stress on the side channel blower's connection, if necessary use an expansion joint
- Make sure that the line size of the discharge line over the entire length is at least as large as the gas discharge (d) of the side channel blower

In case the length of the discharge line exceeds 2 m it is prudent to use larger line sizes in order to avoid a loss of efficiency and an overload of the side channel blower. Seek advice from your Busch representative!

- Make sure that the discharge line either slopes away from the side channel blower or provide a liquid separator or a drip leg with a drain cock, so that no liquids can back up into the side channel blower

Pressure Connection

- Make sure that the pressure line fits to the pressure connection (d) of the side channel blower
- Make sure that the pipe will cause no stress on the side channel blower's connection, if necessary use an expansion joint
- Make sure that the line size of the pressure line over the entire length is at least as large as the pressure connection (d) of the side channel blower

In case the length of the pressure line exceeds 2 m it is prudent to use larger line sizes in order to avoid a loss of efficiency and an overload of the side channel blower. Seek advice from your Busch representative!

- Make sure that the pressure line either slopes away from the side channel blower or provide a liquid separator or a drip leg with a drain cock, so that no liquids can back up into the side channel blower

Electrical Connection / Controls

- Make sure that installation instructions for the ATEX-drive motor (separate leaflet) are available
- Observe the instructions given in the installation instructions manual for the ATEX-drive motor
- Make sure that the stipulations acc. to the EMC-Directive 2004/108/EC and Low-Voltage-Directive 2006/95/EC as well as the EN-standards, electrical and occupational safety directives and the local or national regulations, respectively, are complied with (this is the responsibility of the designer of the machinery into which the side channel blower is to be incorporated; → page 12: note in the EC-Declaration of Conformity).
- Make sure that the power supply for the drive motor is compatible with the data on the nameplate of the drive motor
- Make sure that an overload protection according to EN 60204-1 is provided for the drive motor
- Make sure that the drive of the side channel blower will not be affected by electric or electromagnetic disturbance from the mains; if necessary seek advice from the Busch service

In case of mobile installation:

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

Electrical circuits in zone 1 (outside) shall be executed intrinsically safe in protection class *ib* acc. to EN 50020:2002.

Installation

Mounting

- Make sure that the Installation Prerequisites (→ page 5) are complied with
- Fasten the side channel blower at its 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 the following regulations:

- IEC 364 or CENELEC HD 384 or DIN VDE 0100, respectively,
- IEC-Report 664 or DIN VDE 0110,
- BGV A2 (VBG 4) or corresponding national accident prevention regulation.

- Connect the drive motor according to the installation instructions for the drive motor (separate leaflet)
- Electrically connect the drive motor
- Connect the protective earth conductor
- Provide an overload protection according to EN 60204-1 for the motor.
- The electrical installation must comply with applicable national and international standards.



CAUTION

Operation in the wrong direction of rotation can destroy the side channel blower in short time.


Risk of explosion!

Prior to starting-up it must be made sure that the side channel blower is operated in the proper direction.

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

If the rotation must be changed:

- ◆ Switch any two of the drive motor wires



WARNING

Operating with variable-frequency drive.

Risk of injury!

Risk of damage to the machine!

Only use variable-frequency drive in accordance with accompanying inspection document for inverter-fed explosion-proof motors.

When using machines with variable-frequency drives, the maximum rotation speed written on the nameplate must be adhered to.

Connecting Lines/Pipes

- Connect the suction line

Installation without suction line:

- ◆ Make sure that the gas inlet (e) is open

- Connect the discharge line

or

- Connect the pressure line

Installation without discharge line:

- ◆ Make sure that the gas discharge (d) is open

- Make sure that all provided covers, guards, hoods etc. are mounted
- 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

In case the side channel blower comes with an eyebolt for the attachment of lifting gear:

- ◆ Make sure that the eyebolt is firmly tightened



Recording of Operational Parameters

As soon as the side channel blower is operated under normal operating conditions:

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

Operation Notes

Use

WARNING



The side channel blower is designed for operation under the conditions described below.

In case of disregard risk of explosion!

The side channel blower must only be operated under the conditions described below.

The side channel blower is intended for

- the suction
 - the compression
- of
- mixtures of dry non-aggressive and non-toxic gases and/or dust according to the identification on the nameplate of the side channel blower (explanation see below)

WARNING

Operating a faulty side channel blower puts the explosion safety at risk.

Risk of explosion!

The side channel blower must only be operated in faultless condition. A faulty side channel blower must immediately be removed from service.

Conveying media with a lower or higher density than air leads to an increased thermal and/or mechanical load on the side channel blower and is permissible only after prior consultation with Busch.

According to the directive 2014/34/EU ("ATEX 2014") the side channel blower is made for the intended use in potentially explosive areas according to the data given on the nameplate of the side channel blower and on the data given on the nameplate of the drive motor.

The classification on the side channel blower is to be read as follows (interpretations of equipment categories and zones for information only; the relevant laws, directives and standards are literally binding; for temperature classes and explosion groups see E. Brandes, W. Möller "Sicherheitstechnische Kenngrößen, Band 1: Brennbare Flüssigkeiten und Gase", ISBN 3-89701-745-8 (or equivalent source)):

If the classifications with regard to the conveyed gas/air or dust/air mixture on the one side and the environment of the side channel blower on the other side vary, the nameplate of the side channel blower reads the classification with regard to the conveyed gas/air or dust/air mixture first and next, after a slash, the classification with regard to the environment (example "3/2").

II 3/2G c T3

Group II, for non-mining applications, explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas in the process gas not likely to occur in normal operation but, if it does occur, will persist for a short period only (equipment category 3, for zone 2), in the environment explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas, vapour or mist likely to occur in normal operation occasionally (equipment category 2, for zone 1),

type of protection constructional safety, for gases temperature class T3 in the process gas and in the environment.

Not for potentially explosive dust/air atmospheres.

II 3/2D c T 125°C

Group II, for non-mining applications, in the process gas explosive atmosphere in the form of a cloud of combustible dust in air not likely to occur in normal operation but, if it does occur, will persist for a short period only (equipment category 3, for zone 22),

in the environment explosive atmosphere in the form of a cloud of combustible dust in air likely to occur in normal operation occasionally (equipment category 2, for zone 21),

type of protection constructional safety, maximum permissible surface temperature for the dust/air mixtures in the process gas and in the environment greater equal 125 °C (acc. to EN 50281-2-1 or IEC 61241-2-1 resp.).

Not for potentially explosive gas atmospheres.

II 3G T3

Group II, for non-mining applications, in the process gas and in the environment explosive atmosphere consisting of a mixture with air of flammable substances in the form of gas (in the environment also vapour or mist) not likely to occur in normal operation but, if it does occur, will persist for a short period only (equipment category 3, for zone 2),

for gases temperature class T3 in the process gas and in the environment.

Not for potentially explosive dust/air atmospheres.

II 3D T 125°C

Group II, for non-mining applications, in the process gas and in the environment explosive atmosphere in the form of a cloud of combustible dust in air not likely to occur in normal operation but, if it does occur, will persist for a short period only (equipment category 3, for zone 22), maximum permissible surface temperature for the dust/air mixtures in the process gas and in the environment greater equal 125 °C (acc. to EN 50281-2-1 or IEC 61241-2-1 resp.).
Not for potentially explosive gas atmospheres.

The gas shall be free from vapours that would condensate under the temperature and pressure conditions inside the side channel blower.

The nominal value (=reference value for performance data) for the temperature of the process gas is 15 °C. The max. allowed temperature of the inlet gas is 40 °C.

The nominal value for the ambient temperature is 25 °C. The min. allowed ambient temperature is -30 °C. The max. allowed ambient temperature is 40 °C.

Binding data with regard to the allowed differential pressure are to be read from the nameplate (value with negative sign ("-") for vacuum operation, value without sign for pressure operation). The data is valid for ambient temperatures up to 25 °C and location altitudes up to 1000 m above sea level. Higher ambient temperatures reduce the allowed differential pressures by up to 10 percent at 40 °C. In case of placement in altitudes beyond 1000 m above sea level the allowed differential pressure shall be agreed upon with Busch.

The side channel blower is intended for continuous operation. Frequent switching on and off increase the coil temperature. In this case the operating conditions shall be agreed upon with Busch.

Only use variable-frequency drive in accordance with accompanying inspection document for inverter-fed explosion-proof motors.

The above mentioned limits must be strictly complied with. In particular the allowed differential pressures must not be violated by means of throttling on the suction side or pressure side. Violation of the limits results in increased temperatures and thus puts the explosion safety of the side channel blower at risk.

The maximum allowed pressure on the pressure connection (d) is 2 bar abs (the nameplate of the side channel blower indicates the valid pressure). By means of process control it must be made sure that the maximum allowed pressure will not be exceeded.



During operation the surface of the side channel blower may reach temperatures of more than 70 °C.

Risk of burns!

The side channel blower shall be protected against contact during operation, it shall cool down prior to a required contact or heat protection gloves shall be worn.



Depending on the construction size the side channel blower may emit noise of high intensity.

Depending on the operating state the side channel blower may emit noise in a narrow band.

Risk of damage to the hearing.

Persons staying in the vicinity of a non noise insulated side channel blower over extended periods shall wear ear protection.

- Make sure that all provided covers, guards, hoods etc. remain mounted
- Make sure that protective devices will not be disabled
- Make sure that cooling air inlets and outlets will not be covered or obstructed and that the cooling air flow will not be affected adversely in any other way
- Make sure that the installation prerequisites (→ page 5: Installation Prerequisites) are complied with and will remain complied with, particularly that a sufficient cooling will be ensured

Maintenance



The approval of the side channel blower for use in potentially explosive areas remains valid only if the maintenance is conducted regularly according to the maintenance schedule below and genuine spare parts and consumables, approved for use in potentially explosive areas by Busch, are used exclusively.

Maintenance work must be executed by qualified personnel, specially instructed in the maintenance of this type of side channel blower by Busch.



In case the side channel blower conveyed gas that was contaminated with foreign materials which are dangerous to health, harmful material can reside in filters.

Danger to health during inspection, cleaning or replacement of filters.

Danger to the environment.

Personal protective equipment must be worn during the handling of contaminated filters.

Contaminated filters are special waste and must be disposed of separately in compliance with applicable regulations.



During operation the surface of the side channel blower may reach temperatures of more than 70 °C.

Risk of burns!

- 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 are upper limits that must not be exceeded.

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

Monthly:

- Make sure that the side channel blower is shut down and locked against inadvertent start up

In case an inlet air filter is installed:

- ◆ Check the inlet air filter, if necessary replace

In case of operation in a dusty environment:

- ◆ Clean as described under → page 8: Every 6 Months:

Every 6 Months:

- Make sure that the housing is free from dust and dirt, clean if necessary
- Make sure that the side channel blower is shut down and locked against inadvertent start up

Note: Any kind of deposit on the side channel blower compromises the explosion safety of the side channel blower.

- Clean the fan cowling, the fan wheel, the ventilation grille and the cooling fins
- Check the electrical connection

Every Year:

- Make sure that the side channel blower is shut down and locked against inadvertent start up

In case an inlet air filter is installed:

- ◆ Replace the inlet air filter

In case an inlet screen is installed:

- ◆ Check the inlet screen, clean if necessary

Every 2 Years:

- Have the bearings replaced by the Busch service

Overhaul



Improper work on the side channel blower puts the operating safety at risk.

Risk of explosion!

Approval for operation will be void!

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



In case the side channel blower conveyed gas that was contaminated with foreign materials which are dangerous to health, harmful material can reside in pores, gaps and internal spaces of the side channel blower.

Danger to health during dismantling of the side channel blower.

Danger to the environment.

Prior to shipping the side channel blower 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).

Busch service will only accept side channel blowers that come with a completely filled in and legally binding signed "Declaration of Contamination" (form downloadable from 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

- Observe the chapter Installation and Commissioning (→ page 5)

Dismantling and Disposal



In case the side channel blower conveyed gas that was contaminated with foreign materials which are dangerous to health, harmful material can reside in pores, gaps and internal spaces of the side channel blower.

Danger to health during dismantling of the side channel blower.

Danger to the environment.

During dismantling of the side channel blower personal protective equipment must be worn.

The side channel blower must be decontaminated prior to disposal.

- Make sure that materials and components to be treated as special waste have been separated from the side channel blower
- Make sure that the side channel blower is not contaminated with harmful foreign material

According to the best knowledge at the time of printing of this manual the materials used for the manufacture of the side channel blower involve no risk.

- Dispose of the side channel blower as scrap metal

Spare Parts

The side channel blower contains no user changeable parts. Overhauls/repairs must be done by specially trained Busch service personnel only.

Troubleshooting



WARNING

Vacuum pump/ Compressor/ Vacuum and pressure pump/ Blower for use in potentially explosive atmospheres.

The side channel blower must only be operated in faultless condition.

Risk of explosion in case of operation of faulty equipment!

A faulty side channel blower must immediately be removed from service.

In case of faults the cause of which cannot be determined the Busch service must be contacted.



WARNING

Risk of electrical shock, risk of damage to equipment.

Electrical installation work must only be executed by qualified personnel that knows and observes the following regulations:

- IEC 364 or CENELEC HD 384 or DIN VDE 0100, respectively,
- IEC-Report 664 or DIN VDE 0110,
- BGV A2 (VBG 4) or equivalent national accident prevention regulation.



CAUTION

During operation the surface of the side channel blower may reach temperatures of more than 70 °C.

Risk of burns!

Let the side channel blower cool down prior to a required contact or wear heat protection gloves.

Problem	Possible Cause	Remedy
The side channel blower does not reach the usual pressure The drive motor draws a too high current (compare with initial value after commissioning) Vacuum operation: Evacuation of the system takes too long Pressure operation: Filling the system takes too long Building up pressure in the system takes too long	Vacuum operation: The vacuum system or suction line is not leak-tight Pressure operation: The pressure system or pressure line is not leak-tight	Check the hose or pipe connections for possible leak
	In case a screen is installed in the suction connection/gas inlet (e): The screen in the suction connection/gas inlet (e) is partially clogged	Clean the screen If cleaning is required too frequently install a filter upstream
	In case a filter is installed on the suction connection/gas inlet (e): The filter on the suction connection/gas inlet (e) is partially clogged	Clean or replace the inlet air filter, respectively
	Partial clogging in the suction, discharge or pressure line	Remove the clogging
	Long suction, discharge or pressure line with too small diameter	Use larger diameter
	Internal parts are worn or damaged	Repair the side channel blower (Busch service)
The gas conveyed by the side channel blower smells displeasing	Process components evaporating under vacuum	Check the process, if applicable
The side channel blower does not start	The drive motor is not supplied with the correct voltage or is overloaded	Supply the drive motor with the correct voltage

	The drive motor starter overload protection is too small or trip level is too low	Compare the trip level of the drive motor starter overload protection with the data on the nameplate, correct if necessary
	One of the fuses has blown	Check the fuses
	The connection cable is too small or too long causing a voltage drop at the side channel blower	Use sufficiently dimensioned cable
	The side channel blower or the drive motor is blocked	Make sure the drive motor is disconnected from the power supply Remove the fan cover Try to turn the drive motor with the side channel blower by hand If the side channel blower is blocked: Repair the side channel blower (Busch service)
	The drive motor is defective	Replace the drive motor (Busch service)
The side channel blower is blocked	Solid foreign matter has entered the side channel blower	Repair the side channel blower (Busch service) Make sure the suction line is equipped with a screen If necessary additionally provide a filter
	Corrosion in the side channel blower from remaining condensate	Repair the side channel blower (Busch service) Check the process
	The side channel blower was run in the wrong direction	Repair the side channel blower (Busch service) When connecting the side channel blower make sure the side channel blower will run in the correct direction (→ page 6: Installation)
The side channel blower starts, but labours or runs noisily or rattles The drive motor draws a too high current (compare with initial value after commissioning)	Loose connection(s) in the drive motor terminal box Not all drive motor coils are properly connected The drive motor operates on two phases only	Check the proper connection of the wires against the connection diagram Tighten or replace loose connections
	The side channel blower runs in the wrong direction	Verification and rectification → page 5: Installation and Commissioning
	Foreign objects in the side channel blower Stuck bearings	Repair the side channel blower (Busch service)
The side channel blower runs very noisily	Defective bearings	Repair the side channel blower (Busch service)
The side channel blower runs very hot	Insufficient air ventilation	Make sure that the cooling of the side channel blower is not impeded by dust/dirt Clean the fan cowling, the fan wheel, the ventilation grille and the cooling fins Install the side channel blower in a narrow space only if sufficient ventilation is ensured
	Ambient temperature too high	Observe the permitted ambient temperatures
	Temperature of the inlet gas too high	Observe the permitted temperatures for the inlet gas
	Insufficient gas transfer	Check the process conditions
	Mains frequency or voltage outside tolerance range	Provide a more stable power supply
	Partial clogging of filters or screens Partial clogging in the suction, discharge or pressure line	Remove the clogging
	Long suction, discharge or pressure line with too small diameter	Use larger diameter

EC-Declaration of Conformity

Note: 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.

We

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Declare that the vacuum pumps **SB 0050 - 1400 D0/D2 ATEX-Version**

with a serial number **BN10...**


Documentation No.: T611145612

Audit: CE0637

has (have) been manufactured in accordance with the European 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' 2014/30/EU
- 'RoHS 2' 2011/65/EU, 2017/2102, 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 for design –Risk assessment and risk reduction
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 immunity standards. Immunity for industrial environments
EN 61000-6-4: 2007 + A1: 2011	Electromagnetic compatibility (EMC) - Generic immunity 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
EN ISO 13463-1: 2009	Non-electrical equipment for potentially explosive atmospheres - Part 1: Basic methodology and requirements
EN ISO 1127-1: 2011	Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology
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Maulburg, 01.03.2018

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