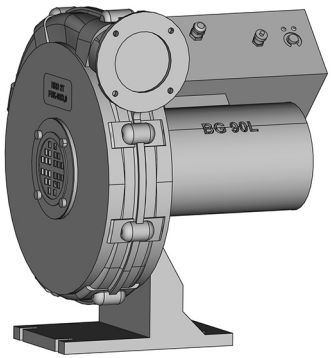
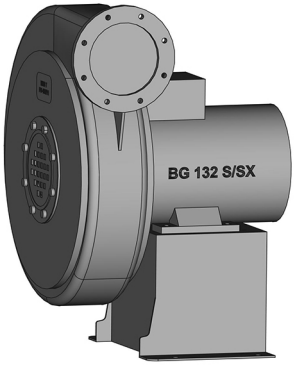
Elektror airsystems gmbh

TCF TWIN CITY FAN





TXR

Aluminum Extreme Pressure Blowers

Operating and Assembly Instructions

TXR 1009-105, TXR 1015-105, TXR 1112-105, TXR 1112-115, TXR 1407-95, TXR 1508-105, TXR 1512-100, TXR 1814-105

For proper and safe use, follow this guide.
Store for later look-up.

IM-826
Version: June 2021

Table of Contents

Purpose of the Operating Instructions

Before operating the fan for the first time or when you are contracted with other work on the fan, you must read the operating instructions.

The use and handling of the fan described below as well as its handling are not self-evident and are explained in detail by the accompanying technical documentation.

Pay particular attention to Chapter 2 Security.

Operating Instructions

The operating instructions help you to use the fan as intended, appropriately, effectively, and safely. Therefore, read the following chapters carefully. If necessary, keep referring to this document.

This manual applies to the standard version of our fans.

Residual Risks

The operating manual informs and warns the user of residual risks that are not fully covered removed through design and protective measures.

Orientation in the Operating Instructions

Presentation of general information symbols

This operating manual contains the following general information symbols, which guide you as a reader through the operating instructions and gives you important information.

Pictogram	Meaning
	**Caution of possible material damage** This pictogram indicates that damage to the fan may occur if the action specifications are not correctly complied with and carried out.
	**Important Information** This pictogram displays an important additional information that includes a warning of a danger.
	**Personnel Qualification** This pictogram indicates which personnel (target group) are approved for the actions in the respective chapter.

Pictogram	Meaning
	**Documentation Information** This pictogram indicates that parts of the documentation must be given special or additional attention, such as supplier instructions, etc.

Tab. 1 General Pictograms and Their Meanings

Presentation of Warnings

When operating the product, actions must always be carried out as if problems may occur. Actions bearing these risks are preceded by warnings, which must be observed. The warnings always consist of a pictogram and an introductory signal word, which expresses the extent of the hazard.

Important information about the warnings in the operating instructions

Observe all warnings on the product and in the documentation and be extra careful in these cases. Also, share all warnings with other users.

Warnings (as well as commandments and prohibitions) are for your personal protection!

Design of Warnings in the Operating Instructions

⚠ DANGER!	
	**Indicates an imminent threat that leads to serious bodily injury or death.**

⚠ WARNING!	
	**Indicates a danger that could result in serious bodily injury or death.**

⚠ CAUTION!	
	**Indicates a danger that could lead to minor bodily injury.**

NOTE	
	**Indicates a situation that could lead to possible damage to the product.**

Symbols Used

Warning symbols warn of danger points, risks and obstacles.

Pictogram	Meaning
	Warning of danger
	Warning of dangerous electrical voltage

Pictogram	Meaning
	Warning of rotating parts
	Warning of suspended load
	Warning of danger of being drawn in
	Warning of the cuts from sharp edges or corners
	Warning of hot surfaces
	Do not reach into the fan

Mandatory symbols used to prevent accidents in the workplace.

Pictogram	Meaning
	General attention symbol
	Wear safety shoes
	Wear protective gloves
	Wear protective goggles
	Wearing a hairnet

Pictogram	Meaning
	Wear appropriate work clothes

1 IDENTIFICATION

1.1 Product Identification

Aluminum Extreme Pressure Blowers

Product Model: TXR

Model Designation: TXR 1009-105, TXR 1015-105, TXR 1112-105, TXR 1112-115, TXR 1407-95, TXR 1508-105, TXR 1512-100, TXR 1814-105

1.2 Contact Information

	Twin City Fan & Blower
	5959 Trenton Lane
	Minneapolis, MN 55328
Phone:	763.551.7600
Fax:	763.551.7601
E-Mail:	tcf_sales@tcf.com
Internet:	www.tcf.com

Tab. 2: Manufacturer's Details

1.3 Copyright

This document is copyrighted and intended solely for use in your business by authorized personnel. Infringements result in legal consequences. If in doubt, contact the manufacturer.

The illustrations and visualizations in this document are for general illustrative purposes. Therefore, representations

and functional options may differ from the delivered product. Twin City Fan & Blower reserves the right to change this documentation and the descriptions and technical data contained therein without prior notice.

1.4 Related Documents

Important information about the relevant documents

If other documents or instructions are included in the scope of delivery, these must also be read and observed.

The following documents must be observed:

- OSHA 1910
- AMCA Bulletin 410
- *Local building codes, or in the absence of local codes, the National Electric Code ANSI/NFPA 70 - Latest Edition.*
- *In Canada, wiring must comply with CSA C22.1, Part 1, Electrical Code.*
- Kostal Quick Start Guide
- UL Notes Kostal
- Omron Quick Start Guide
- For special versions: Observe additional documents

1.5 Nameplate

The fan is clearly marked by signs. It has a motor nameplate and a fan nameplate. Use the information there for connection, maintenance and ordering of spare parts.

The motor nameplate is located on the fan's motor.

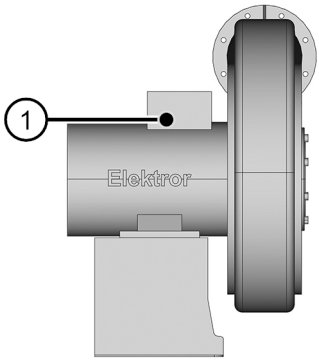


Fig. 1: Position of Motor Nameplate on Fan

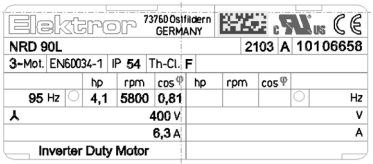


Fig. 2: Motor Nameplate

The fan nameplate is located on the fan's housing.

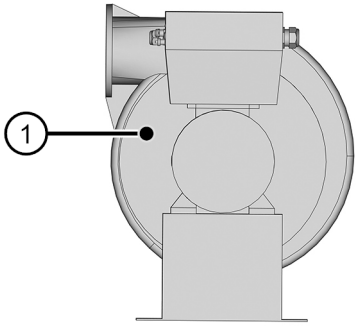


Fig. 3: Position of the Fan Nameplate

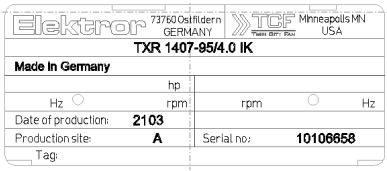


Fig. 4: *Fan Nameplate*

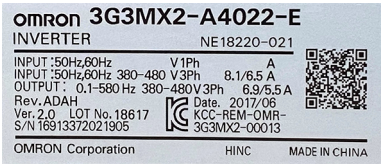


Fig. 6: Performance Nameplate on Frequency Inverter Omron

Nameplate of the frequency inverter

The frequency inverter is clearly marked via the inverter nameplate. The information there must be complied with. The power nameplate is located on the frequency inverter.

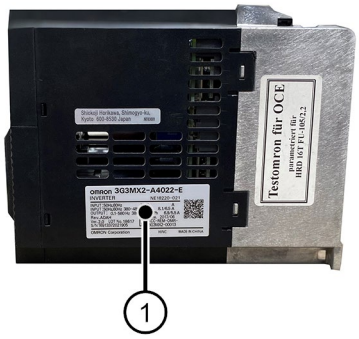


Fig. 5: Position of the Nameplate on the Frequency Inverter Omron

Fig. 7: Position of the Performance Nameplate on the Frequency Inverter Kostal

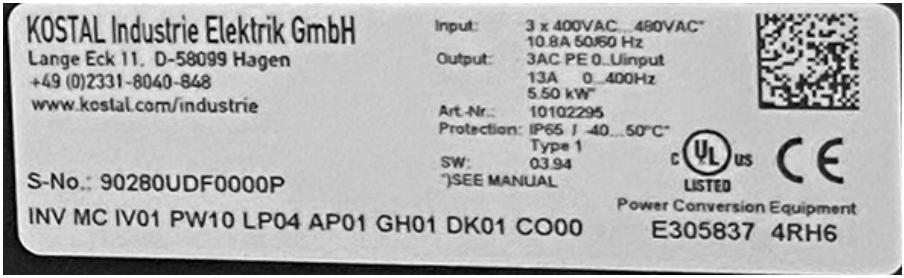


Fig. 8: Performance Nameplate on Frequency Inverter Kostal

2 SAFETY

2.1 Operator's Duty of Care

Important information

Due to the commercial use of the product, the operator is bound by occupational safety obligations. In addition to the safety instructions in this operating manual, it must therefore also comply with safety, accident prevention and environmental regulations applicable to the field of application.

In particular, AMCA Bulletin 410, OSHA 1910 and local building codes or ANSI/NFPA 70 (CSA C22.1, Part 1 for Canada) must be complied with.

Important information

The operator must ensure that the operating instructions are read and understood by its personnel.

The safety instructions and information of the supplier instructions (purchased parts) must also be observed.

The operator must familiarize himself about the applicable health and safety regulations and, in a risk assessment, also identify hazards arising from the special working conditions at the place of use of the product. He must implement these in the form of operating instructions for the operation of the product.

The operator must check during the entire operating period of the product whether the operating instructions issued comply with the current state of the regulations and, if necessary, adapt them.

Technical Condition of the Product

The following requirements are made for the technical condition of the product and must be ensured by the operator:

- The product may only be used as intended
- The product must always be checked for its perfect technical condition before switching on
- Safety devices must be regularly checked for their functionality
- The safety and warning signs affixed to the product must not be removed and must be regularly checked for their legibility and replaced if necessary
- No unauthorized modifications, manipulations and modifications may be made to the product
- The product must be serviced at the prescribed intervals
- The operating instructions must always be freely available in legible condition and completely at the place of use of the product. This also applies to other documents or instructions included in the scope of delivery

2.2 Personnel Requirements

2.2.1 Personnel Qualifications

Important information on personnel qualification

All activities on the product may only be carried out by trained and qualified persons

Specialist

Specialist is a person who has successfully completed vocational training. The professional must continue to have knowledge of the relevant standards and regulations. It must be able to assess transferred work and, on the basis of its professional training and work experience, be able to identify and avoid possible hazards independently.

A specialist within the meaning of this manual also has experience and knowledge with the installation, commissioning and maintenance of air-moving equipment.

Electrician

The qualified electrician is a person with special knowledge in the field of electrical engineering (training in a recognized occupation such as a journeyman/skilled worker, master craftsman, master craftsman, state-certified technician, graduate engineer).

Instructed Person

An instructed person is a specialist. The instructed person has also received instruction from the operator on the tasks assigned to him and possible dangers in the event of improper behavior.

Only persons who are expected to carry out their work reliably are authorized as staff. Persons whose responsiveness is affected, e.g. by drugs, alcohol or medication, are not approved.

When selecting personnel, observe the age and occupational regulations applicable at the place of employment.

2.2.2 Unauthorized Person

In addition to qualified personnel, third parties and/or insufficiently qualified persons may be near the product or its surroundings. These groups of persons are referred to as "unauthorized" within the meaning of this manual and must be kept away from the product.

⚠ WARNING!

Danger from unauthorized persons

Unauthorized persons cannot detect the dangers of the product and thereby endanger themselves and other persons. There is a risk of serious injury and significant damage to property if unauthorized persons are in the danger zone of the product or carry out work on the product.

- Unauthorized persons must be kept away from the danger zone
- Stop work as long as unauthorized persons are in the danger zone
- In case of doubt, contact authorities and expel unauthorized people from the work area

2.3 Personal Protective Equipment

Personnel are obliged to wear appropriate personal protective equipment (PPE) in compliance with the applicable guidelines and regulations. The required PPE shall be provided by the operator.

Proper use by the staff shall be ensured by the operator.

Important information about personal protective equipment

When performing work on the fan, the personnel must wear the appropriate PPE.

Please refer to the following list and the chapter-related list as well as the attached notes in the working area for personal protective equipment.

Personal Protective Equipment (PPE)

The level of protective equipment must be assessed and determined on a case-by-case basis.

The following is a list of recommended PPEs:

Wear safety shoes

The safety shoes protect the feet from heavy falling or falling parts and from slipping on slippery surfaces.

Wear appropriate work clothes

Appropriate work clothes are tight-fitting clothing without wide sleeves or protruding parts. It is used to protect against being caught by moving (e.g. also rotating) parts.

Also, do not wear rings, necklaces, ties or other jewelry that could be pulled in.

Wear protective goggles

The goggles are used to protect the eyes from flying parts.

Wear head protection/hair protection

Head protection/hair protection is a hairnet, a hat, a hairband or other means of covering or tying up long, loose hair. It is used to protect against long hair being caught or drawn in by moving (e.g. also rotating) parts.

Wear protective gloves

The protective gloves are used to protect the hands from friction, abrasions, punctures or deeper injuries as well as from contact with hot surfaces

Use only the approved gloves provided by the operator of the fan.

Wear hearing protection

Hearing protection is used to protect against noise while working on the product.

2.4 Appropriate Use

The product is to be used exclusively for the intended use described herein.

The fans are only suitable for conveying gaseous media without solids. Solids or impurities contained in the conveying medium must be filtered out before entering the fan.

The intended use also includes:

- The temperature of the conveying medium must be between -4.0°F (-20°C) and +176.0°F (+80°C) in the standard version.
- The temperature of the conveying medium must be between -4.0°F (-

20°C) and +356.0°F (+180°C) for special versions with heat shield.

- The fan is designed for S1 operation (continuous operation) and S9 operation (uninterrupted operation with non-periodic load/speed change) (according to IEC 60034-1). To prevent damage, a maximum of 27 cycles per hour are permitted.
- In the case of damp media, a condensation drain plug can be ordered. This is introduced into the housing by the manufacturer.

The product may only be used if:

- This is in technically perfect condition
- The staff has the necessary safety and danger awareness.
- The instructions in the operating instructions are followed.

2.5 Predictable Misuse

For a purpose other than the intended use listed here, the fan should not be used.

In principle, any use other than the intended use is considered to be improper. This means that safe operation is no longer guaranteed. The operator and not the manufacturer is responsible for all personal injury and property damage resulting from the improper use.

Predictable misuse also includes:

- The promotion of:
  - Aggressive media
  - Abrasive media
  - Adhesive media
  - Toxic media
  - Explosive media
  - very humid (with droplet formation) media
- Installation in an explosive atmosphere
- Series or parallel connection of several fans
- Outdoor installation without special measures
- Conversion and modification of the fan

2.6 Modifications and Changes

Modifications to the fan are not permitted for safety reasons.

The use of non-original spare parts may void warranty and remove liability for the resulting consequences. Therefore, always use only the original spare parts, this applies especially to safety-relevant components (impeller, motor, ball bearings, runners, etc.).

2.7 Residual Risks

Fans are built according to the industrial standard and are characterized by a high level of operational reliability. Since the fans are very powerful machines, the following safety instructions must be strictly observed in order to avoid injury, damage to property and the machine itself.

Overview of Danger Points

The residual hazards of the fan are divided into the following four areas:

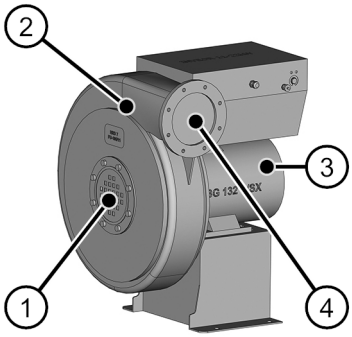


Fig. 9: Overview of Danger Points

1 Inlet flange

2 Fan housing, impeller inside

3 Motor with terminal box, frequency inverter and electrical connection

4 Outlet opening

Danger zone	Description
Inlet flange	Dangers from sucking in Danger from unexpected start-up of the fan Danger from rotating parts
Outlet opening	Danger from ejected parts Danger from breakage Danger from rotating parts
Fan housing, impeller inside	Exposure to sharp edges, corners and tips Thermal hazards Danger from rotating parts
Motor with terminal box, frequency inverter and electrical connection	Exposure to electrical energy Thermal hazards
Fan in general	Exposure to noise Danger from environment Danger due to speed and resonances Danger due to weight and safe standing

Table 3: Assignment of Residual Hazards

For more information, see the following chapters.

2.7.1 **Hazards from Fans**

Many residual hazards come from the fan itself and are due to its intended use. During operation, the impeller rotates inside the fan and this can lead to risks. As a protective measure against these risks, the fan has a housing and a protective grille on the suction side that prevents the contact of the dangerous areas. In the case of free-blowing fans, a protective grille must be added on the pressure side (available as an accessory). Furthermore, pictograms inform about potential danger points.

Dangers from moving in

During the operation of the fan, the impeller rotates at high speed. The air is sucked in via the inlet opening. People and objects in the vicinity can also be sucked in.

⚠ WARNING!

Danger from being drawing in at the inlet opening

During operation, air is sucked in through the inlet opening. Loose clothing, personal jewelry, scarves or long hair can be sucked in. The consequences are mild to severe physical injuries, such as shortness of breath due to strangulation, abrasions, skin injuries, etc.

- Wear tight fitting clothing
- Wear a hairnet
- Take off personal jewelry such as necklaces or bracelets before working on the fan.
- Do not wear ties or scarves
- Keep away from the inlet opening during operation
- Check the condition of the protective grille regularly

Wear head protection, such as hairnet, beanie, hairband

For long hair, wear a hairnet, a beanie or a hairband so that it is not possible to suck the hair into the fan.

Danger from unexpected start-up of the fan

The fan and its housing must be opened during cleaning, maintenance and repair work. In these situations, unexpected start-up of the fan carries a great risk. Therefore, the product must be disconnected from the power supply before this work and secured against being switched on again. Then wait for all moving parts to stop. Only then can work on the product be carried out.

Unexpected start-up can cause hazards due to being drawn in. If the fan starts unexpectedly, hair, clothing or jewelry can be sucked in and cause injury.

Disconnect the product from the power supply even in the event of an unexpected failure or interruption of the power supply. This prevents the product from coming out unexpectedly and endangering people nearby.

Danger from ejected parts

⚠ WARNING!

Risk of injury due to ejected parts

When contaminants or objects enter the interior of the product, they are ejected from the exhaust outlet at high speed during operation. People affected by this suffer serious injuries.

- Use only clean media without solids
- Do not stay in the danger zone
- Adhere to maintenance and repair information
- Wear protective goggles

The fan is designed to convey clean air. The protective grille at the inlet opening prevents access to the inside of the fan and also prevents larger foreign bodies from being drawn in. Smaller foreign bodies and particles in the sucked-in air can still enter the inside of the product and are deposited there as impurities or are immediately ejected again. Deposits can damage the fan or be ejected from the exhaust outlet at high speed during operation. People who are hit by ejected parts can suffer serious injuries.

Danger from rotating parts

⚠ WARNING!

Risk of injury due to rotating parts

The fan impeller rotates at high speed during operation. If people reach into the rotating impeller fingers or limbs can be severed.

- Do not reach into the inside of the fan during operation
- Check regularly whether the necessary protective grilles are present at the openings and are intact
- Replace missing or damaged protective grilles immediately
- Wait until the impeller stops before removing protective grilles for maintenance
- After completion of maintenance work, install all protective grilles again. Access to the inside of the fan must be prevented.

The impeller inside the fan rotates at a high-speed during operation. If objects or limbs are put into the rotating impeller, serious personal injuries are at risk. In addition, these may be further pulled into the impeller.

This residual hazard is an important part of the function of the product. Without a rotating impeller, media cannot be conveyed by the fan. For the protection of

persons, the protective grilles are an important safety element. They prevent interference with the inside of the fan.

However, during maintenance and repair work, the impeller must be accessible to detect and repair damage to the fan. For this work, the protective grilles must be able to be removed.

To avoid dangerous situations and injuries, it is therefore necessary to check regularly during maintenance and repair whether all protective grilles are present and installed. Missing protective grilles must be replaced immediately.

The fan is equipped as standard with a protective grille on the inlet. The protective grille on the pressure side is optional accessory. If the pressure side is accessible and is not connected to any ductwork, a protective grille must also be installed here.

Danger from exceeding the maximum switching cycles

⚠ WARNING!

Risk of injury due to component failure

Exceeding the maximum permissible speed can lead to breakdown of the impeller. Fragments are thrown out of the fan and can injure people.

- ➢ Adhere to the switching cycles specified in chapter 2.4, page 11

The impeller of the fan is designed for high loads. Nevertheless, it can be damaged by repeated, impermissible, rapid starting and stopping. This breaks the impeller and parts of it are thrown out of the discharge side. People hit with fragments suffer serious injuries. Adhere to the maximum number of switching operations (see chapter 2.4, page 11) per hour and the information on maintenance and repair.

Danger from rotational speed

⚠ WARNING!

Risk of injury due to component failure

Exceeding the maximum permissible rotational speed can lead to breakdown of the impeller. Fragments are thrown out of the fan and can injure people.

- ➢ Keep within the maximum number of rotational speed or maximum frequency indicated on the nameplate

The impeller of the fan is designed for high loads and rotational speeds. If the maximum permissible rotational speeds are exceeded, the material can weaken and break. This will destroy the fan and seriously injure nearby people. Adhere to the maximum speeds or maximum frequencies and the information in the maintenance and repair manual**.**

Model	Max. Frequency	Min. Frequency
TXR 1009-105	105 Hz	20 Hz
TXR 1015-105	105 Hz	20 Hz
TXR 1112-105	105 Hz	20 Hz
TXR 1112-115	115 Hz	20 Hz
TXR 1407-95	95 Hz	20 Hz
TXR 1508-105	105 Hz	20 Hz
TXR 1512-100	100 Hz	20 Hz
TXR 1814-105	105 Hz	20 Hz
Device with heat shield	see device type	35 Hz

Tab. 4: Permissible Frequencies

Hazards from sharp edges, corners and tips

⚠ CAUTION!

Risk of cutting due to sharp edges, corners and tips

Touching these areas can lead to minor cuts.

- Wear protective gloves

The impeller inside the fan has sharp edges, corners and tips. Touching these areas can lead to minor cuts. To avoid these, the parts were deburred as far as possible. In addition, the protective grille on the suction opening prevents the intervention in the housing and warning signs on the fan warn of the danger. Check the condition of these protective measures regularly and replace them in the event of damage.

Hazards due to the weight of the fans

During transport or installation of the fan, there is a risk of the fan tipping over or falling. In these situations, the fan is not yet firmly screwed and its own weight can injure people. Secure the fan with suitable fasteners during transport or installation and follow the instructions in this manual.

2.7.2 Hazards from Electrical Energy

The electrical connection of the product to the power supply network as well as work on the electrical equipment may only be carried out by qualified electricians, considering the relevant standards and regulations.

The electrical components of the product must be checked at regular intervals. Defects, such as loose connections, damaged cables, must be rectified immediately.

Keep moisture away from voltage-carrying parts. Moisture can cause short circuits.

⚠ DANGER!

Danger when working on voltage-carrying parts on the fan.

When performing work on the fan, you may encounter parts that cause dangerous voltages during operation. Touching voltage-carrying parts can lead to death.

- Work on electrical installations/equipment may only be carried out by electrical professionals or electrically instructed persons under the guidance and supervision of an electrical specialist in accordance with the electrotechnical rules
- The workspace must be locked with a red-and-white safety chain and warning signs
- The safety rules for carrying out work on electrical installations and equipment must be followed

Security policy

Observe the following safety rules for carrying out work on electrical installations/equipment:

1. Disconnect the power supply
2. Secure against re-connection
3. Detect voltage leaks
4. Proper grounding and prevent short-circuit
5. Cover or build barriers to adjacent, voltage-carrying parts

2.7.3 **Exposure to Noise**

The fan causes noise during operation. This residual hazard cannot be eliminated as it is the result of the function of the fan. Increased noise exposure can lead to hearing damage or other health damage. Therefore, always wear hearing protection and stay in the vicinity of the fan only when necessary.

⚠ WARNING!

Hearing damage due to noise

Staying without hearing protection in the vicinity of the running fan can lead to hearing damage.

- Wear a hearing protection from a daily exposure level of 80 dB(A) and/or a peak sound pressure level of 135 dB(C).

The noise emitted by the fan is not constant over the entire power range. The radiated noise levels can be found in the technical data.

The operator must perform a measurement on the fan. If the statutory maximum values at workplaces are exceeded, the operator must carry out sound insulation.

Sound insulation of any kind shall not result in an undue increase in the ambient temperature above +104°F (+40°C) on the drive motor.

2.7.4 **Hazards from the Environment**

Accessibility and location of the fan are important safety factors. Therefore, when installing and installing the fan, ask yourself the following questions:

- How easy is it for outsiders to get access to the facility?
- Does the fan pose a danger to the environment?
- Has the system been tuned for the application?
- Are additional safety precautions, such as protective fences, necessary?
- Can service or maintenance personnel easily shut down the fan via accessible switches and secure it against re-switching on?

All these issues are relevant to safety. Only with respect for these aspects can the fan be operated properly and safely.

2.7.5 **Thermal Hazards**

Hot surfaces on the fan housing

The fan housing assumes the temperature of the conveying medium during operation. If this is above +122°F (+50°C), the fan must be protected by the operator from direct contact. Touching hot surfaces can lead to burns.

When conveying from the inlet side to the outlet side, the temperature in the conveyed medium can be increased. Depending on the operating conditions, this temperature difference can be in a range of up to +176°F (+80°C) depending on the type.

⚠ WARNING!

Risk of burning due to hot surfaces

Surfaces of the fan can heat up. Prolonged contact (>1 sec) with these surfaces can cause burns.

- ➢ Avoid touching the hot surfaces
- ➢ Turn off the fan and wait until the surfaces have cooled down

Hot surfaces on the motor

The motor housing heats up during operation. If the temperature rises above +122°F (+50°C), the fan must be protected by the operator from direct contact. Touching hot surfaces can lead to burns.

⚠ WARNING!

Risk of burning due to hot surfaces

Surfaces of the fan can heat up. Prolonged contact (>1 sec) with these surfaces can cause burns.

- ➢ Avoid touching the hot surfaces
- ➢ Turn off the fan and wait until the surfaces have cooled down

2.7.6 Hazards Due to Resonances and Vibrations

⚠ WARNING!

Risk of injury due to component failure

Operation with resonances and vibrations can damage the fan and cause the impeller to break. Fragments are thrown out of the fan and can injure bystanders.

- When commissioning, measure the vibrations
- Do not operate the fan in resonance mode
- Follow the instructions for transport, storage and installation described in the instructions
- Prevent impacts on the fan
- Skip or block areas with increased vibration values
- We recommend the use of permanent vibration monitoring for speed-controlled fans

Risk from Vibrations

Typical damage to fans is caused by impermissible vibrations. If the fan is operated with impermissible vibrations for a long time, this will affect the service life of the entire product. Vibrations can loosen screw connections and damage ball bearings. In the worst case, parts break and are thrown out of the fan outlet. If people are hit by these parts, this can lead to serious injuries or death.

Risk from Resonances

Every component on the fan has its own natural frequencies. These can be excited by certain speeds of the fan, which leads to a possible resonance operation.

The resonance operation can lead to mechanical destruction of the fan and the associated personal injury. The risk can be life-threatening. The fan must not be operated in resonance mode. The fans are designated in such a way that resonances usually do not occur.

If the speed changes during operation, an excitation can occur under certain circumstances. These circumstances are also influenced by the customer-specific installation situation or the ventilation ductwork connection.

If operating frequencies of the fan lead to resonance operation, these must be excluded by appropriate parameterization of the frequency converter.

The fan should be installed and commissioned by specialists with experience in handling fans. Adhere to the information in the operating instructions to prevent damage.

2.7.7 Hazards for Devices With a Heat Shield

⚠ WARNING!

Risk of injury due to shearing/retraction

Limbs, loose hair or clothing can be detected and retracted at the temperature barrel. There is a risk of minor to severe bodily injuries, such as shortness of breath due to strangulation, abrasions, skin injuries, etc.

- Wear tight-fitting clothing
- Wear a hairnet.
- Remove personal jewelry, such as necklaces or arm chains, before working on the product.
- Do not wear ties and scarves

For special versions with heat shield, the motor is structurally detached from the fan housing to prevent heat transfer. Through this opening, however, limb, loose hair or clothing can be retracted and lead to injuries. Therefore, at all stages of life, wear personal protective equipment, tight-fitting clothing and a hairnet. Before working on the fan, put down personal items such as jewelry.

2.7.8 Hazards when Operating Multiple Fans

If the fan is operated in combination with other fans in a system, additional residual hazards are created. Therefore, when working on systems with multiple fans, always switch off all fans that can cause a hazardous situation.

The following situations may occur when working in multi-ventilator systems:

- The impeller of the fan does not stand still despite the separation of the electrical energy. It is further driven by the airflow of the other fans. There is a risk of injury due to rotating parts!
- Small particles or dirt dissolve during work on the fan and become projectiles due to the remaining air flow. You can injure other fans, plant parts, or people at the outlet opening.

Therefore, when working on systems with multiple fans, turn off all fans. If this is not possible, disconnect the affected fan from the system by blocking the suction and/or pressure side before performing any work. After completion of the work, thoroughly check the fan and remove any loose objects and dirt before removing the blockages and re-entering the fan into plant operation.

2.8 Safety and Surveillance Equipment

2.8.1 General

The safety devices on the product are designed to protect personnel from hazards caused by the product, which has been built in accordance with applicable legal regulations and is safe to operate. Dangerous hazards that cannot be ruled out are provided with protective devices and, if necessary, are marked with warning signs on the product and instructions for occupational safety in the operating instructions.

The product may only be operated if all safety and safety-related equipment is in place and functional.

⚠ DANGER!

Danger from disassembly or manipulation of safety devices

Dismantling or manipulating safety devices can result in serious irreversible or even life-threatening injuries, fatalities, serious adverse effects on health or significant damage to property.

- Do not dismantle safety devices
- Do not tamper with safety devices
- Check all existing safety devices at regular intervals

⚠ WARNING!

Risk of accident due to missing or defective safety devices

Injury can occur if arbitrary changes are made to the safety devices.

- Check the functions of protective devices before operation and replace defective safety devices
- Do not change safety devices

2.8.2 Existing Safety Devices

Safety	Function
Fan Housing	Prevents internal interference, prevents contact between people and dangerous spots
Protective grille on the suction nozzle	Prevents intervention in the fan (included).
Silencer on the fan	Reduce noise emissions during operation
Direction of rotation arrows on the housing	Marking of pressure and suction side. Direction of rotation also indicates the direction of rotation at which the fan reaches the specified pressure and volume flow.
Warning signs and pictograms	Warning signs are placed at dangerous areas that cannot be ruled out in the constructive way, warning staff of dangers
Motor circuit breakers	Protects the electric motor from overload (overload protection function is usually part of the frequency converter)
Fan Motor Cover	Access protection for cooling fan blades on motor

Safety	Function
Protective grille Heat shield	Protects against contact with the rotating motor shaft and cooling impeller
Console/Bracket IK	Without the console and bracket, the fan would be unstable due to the weight of the motor. It could fall over, injure people or be damaged itself.
Protective grille on the pressure side (for the open outlet)	Prevents intervention in the fan (available as an accessory).

Table 5: Safety Devices

2.8.3 **Safety Instructions on the Fan**

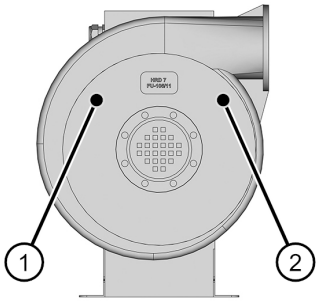
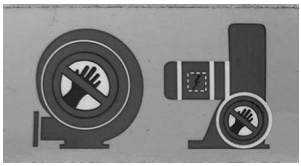


Fig. 10: Safety Instructions on the Housing

1

2



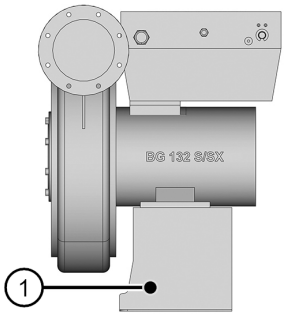
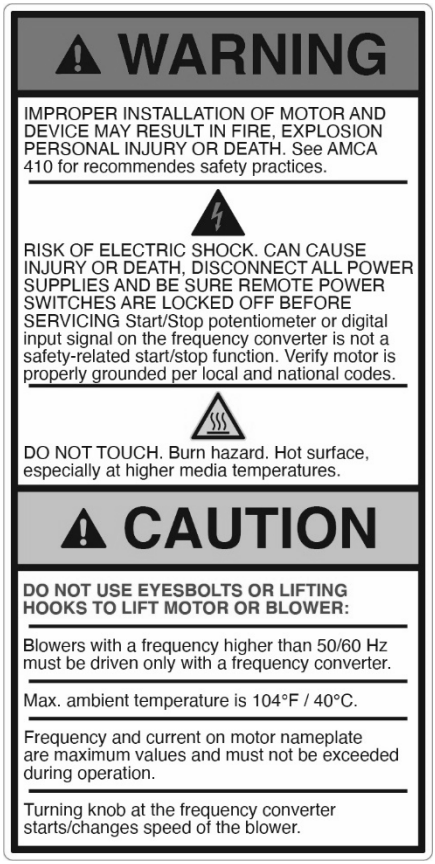


Fig. 11: Safety Instr. on the Device Base



2.9 Emergency Information

Behavior in an emergency

In the event of an emergency on the fan, it must be decommissioned as soon as possible. Also disconnect the power supply and secure it against re-connecting. It is necessary to check whether there are any injuries.

To shut down the fan in an emergency, proceed as follows:

- Stop the fan immediately and disconnect the power supply. Secure against re-energizing.
- Inform the responsible person at the scene.
- Alert emergency services.
- Rescue people from the danger zone.
- Initiate first aid measures.
- Keep access routes clear for emergency services.

After the rescue measures, carry out the following activities:

- In the event of particularly serious cases, please inform the authorities
- Assign appropriate personnel to the troubleshooting task
- ⚠ **warning!** Risk of injury due to premature re-energizing. Before switching back on, make sure that no one is in the danger zone.
- Check the fan before recommissioning. Make sure that all security devices are installed and functional.
- Shutdown in case of emergency is complete.

3 PRODUCT DESCRIPTION, STRUCTURE AND FUNCTION

3.1 Specifications

The technical data can be found in the appendix.

3.2 Equipment and Accessories

The equipment and accessories of the fan correspond to the wording of the order confirmation.

Other accessories (additional protective grilles, nozzles, flexible connectors, etc.) can be obtained from the dealer or manufacturer.

3.3 Construction

3.3.1 General Overview

The fan is delivered in 4 different versions. All 4 versions are described in this manual.

The following versions are available:

- Fan suitable for frequency converters, with customer-supplied frequency converter (IV)
- Fan with frequency converter Omron (IV & Omron)
- Fan with a Kostal (IK) frequency converter mounted on the motor
- Fan with frequency converter Kostal, with adapter plate for wall mounting (IV & Kostal)

Version IV / IV & Omron / IV & Kostal

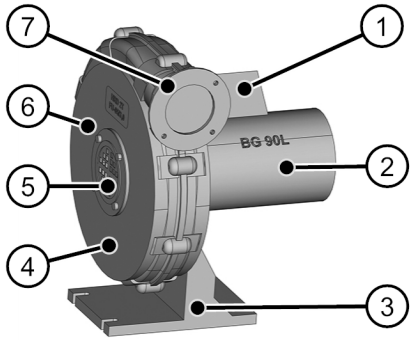


Fig. 12: Structure of the Fan with Foot (Without Converter)

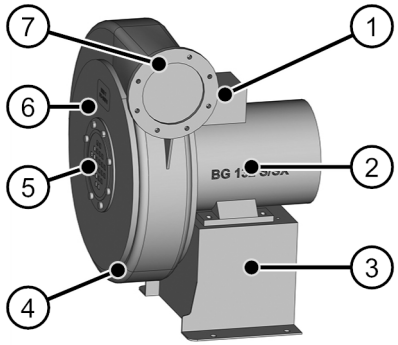


Fig. 13: Structure of the Fan with Console (without Converter)

1 Terminal box

2 Motor

3 Foot / console

4 Fan housing

5 Protective grille on the suction inlet

6 Fan impeller

7 Outlet opening of fans

Information on execution

This information also applies to the following design variants (not shown):

- IV Omron for installation in the control cabinet
- IV Kostal for installation with adapter plate on a wall

Information on the frequency converter

The frequency inverters are described in the operating instructions of the respective manufacturer. Therefore, please pay attention to the related documents.

Version IK

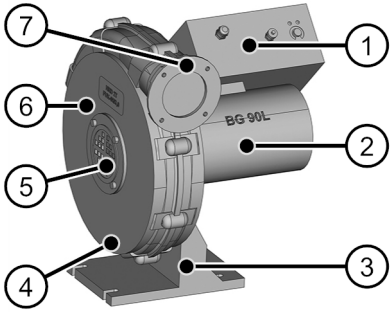


Fig. 14: Structure of the Fan with Foot (with Frequency Converter)

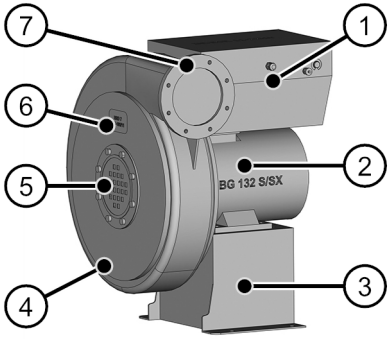


Fig. 15: Structure of the Fan with Console (with Frequency Converter)

1 Frequency Converter
2 Motor
3 Foot / Console
4 Fan Housing
5 Protective grille on the suction inlet
6 Fan impeller
7 Outlet opening of fans

3.3.2 Power Supply

The fan is supplied with power via the terminal box or the frequency converter. The electrical connection of the IV version (terminal box) and the IK version (frequency converter Kostal) are described in this manual. For the connection of the Omron frequency converter, refer to the operating instructions from Omron.

3.3.3 Frequency Converter

The frequency converter changes the frequency and supply voltage to the frequency and voltage required by the

motor. The requirement for the conversion of the voltage is that the supply voltage must be higher or equal to the voltage required by the motor.

3.3.4 **Heat Shield**

Some fans are equipped with a heat shield. This is located on the fan housing.

The heat shield constructively separates the motor from the fan housing.

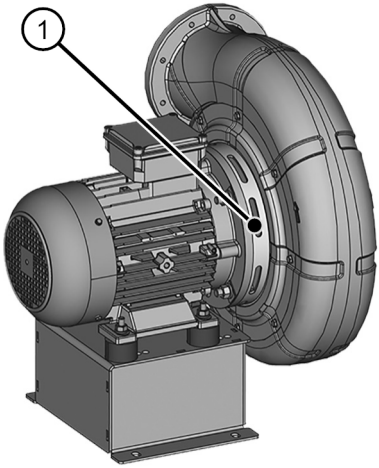


Fig. 16: Heat Shield

1 Heat shield

3.4 Description

The electric motor drives the impeller inside the fan. Through the rotating impeller, the fan sucks in the conveying medium (e.g. air) via the inlet opening and transports it to the outlet via the fan housing.

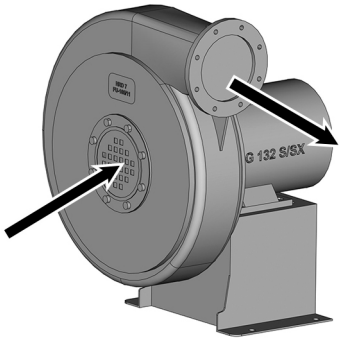


Fig. 17: Functional Description

The fan itself has no controls. It is either delivered with a frequency inverter or connected to a separate frequency inverter via the terminal box.

3.5 Interfaces

The fan has the following connection elements:

- Suction Inlet Flange
- Discharge Flange
- Foot / console

3.6 Modes

General Information

The aerodynamic performance of the fan can be adapted to the system and application requirements during operation via the speed control. The maximum rotational speed / frequency indicated on the nameplate must not be exceeded.

3.6.1 **Continuous Operation S1**

The fans are designed for continuous operation (operating mode S1 according to IEC 60034-1).

3.6.2 Speed-Controlled Operation S9

Operation with non-periodic load and speed changes. The rotational speed of the fan is controlled by a control element or manually via the frequency inverter.

3.7 Natural Frequencies

Measures for natural frequencies

Mechanical components have natural frequencies. Excitation frequencies or a stimulation to unacceptably high vibrations can lead to component failure. This can cause damage to housings, impellers, attachments, bearings or shafts.

4 TRANSPORT AND STORAGE

4.1 Introductory Notes on Safety

Personnel qualification

The following personnel are approved for "transport and storage":

- Transport companies with appropriate expertise
- Manufacturer's staff
- Trained Personnel

Important information about your safety

You are responsible!

In any case, the safety instructions in *Chapter 2: Safety* and the local safety regulations must be observed and complied with.

Wear the following protective equipment:

- Safety shoes
- Work clothes
- Gloves

4.2 Delivery

4.2.1 Scope of Delivery

Immediately check the fan for completeness upon receipt.

4.2.2 Checking for Transport Damage

Check the fan for transport damage immediately after delivery at the installation site. If transport damage is present, these must be reported to the manufacturer immediately. We recommend documenting the transport damage with photos.

Damage to the fan can pose an increased safety risk. Damaged fans should therefore not be put into operation.

4.3 Packaging

The individual packages are packed according to the expected transport conditions. The packaging protects the individual components from transport damage, corrosion and other damage until assembly. Do not damage the packaging and remove it just before assembly.

Fig. 18: Possible Transport Packaging

Dispose of packaging materials in an environmentally friendly manner.

4.4 Transport

4.4.1 Permissible Means of Transport

The fan must be transported with suitable means of transport.

Transport can be carried out by the following means of transport and means of transport:

- Transport with min. 2 people (for fans up to 40 kg (88.18 lbs.)
- Transport with lifting device (such as forklift)
- Transport with load crane

4.4.2 Transport Information

⚠ DANGER!

Danger to life due to suspended loads!

Falling loads can lead to serious injuries and even death.

- ➢ Never step under suspended loads
- ➢ Use only the intended lifting points (see 4.4.5 Transport of the unpacked fan)
- ➢ Before lifting, check that the lifting gear is securely in place
- ➢ Use only tested and approved lifting gear with sufficient load-bearing capacity
- ➢ Dispose of damaged, torn or scrubbed ropes and straps
- ➢ Never leave suspended loads unattended.

⚠ CAUTION!

Danger from sudden movement during lifting

There is a risk of injury due to sudden movements during the lifting process.

- ➢ Always pay attention to the system during the lifting process
- ➢ Make sure there are no people in the danger zone

Information on transport:

- The operator must be qualified to carry the hoist used to transport the fan
- Before lifting the fan, all persons must move out of the working area of the hoist
- Secure the transport routes

4.4.3 Transport of Pallets by Crane

Packed fans on the pallet can be transported by crane.

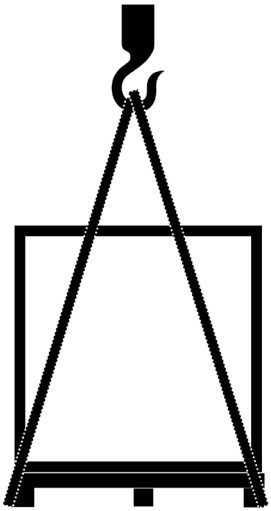


Fig. 19: Transport of the Pallet by Crane

To transport the packages by crane, proceed as follows:

1. Attach ropes, straps or multi-point hangings to the pallet.
2. Check whether the packages are damaged by the lifting gear. The lifting gear must not damage the packages or the packaging.
3. Before lifting, check that the packages are securely in place. Loose packages or parts must not be transported while suspended. There is a risk of injury due to falling parts.
4. Transport the packages to their destination.
   ✓ The transport is complete.

4.4.4 Transport of Pallets by Lifting Vehicle

Packed fans on the pallet can be transported by lifting vehicles.

Fig. 20: Transport of the Pallet by Lifting Vehicle

To transport the packages by lifting vehicle, proceed as follows:

1. Drive the lifting vehicle with the forks between the tie bars of the pallet.
   - ➢ The forks must be inserted until they protrude on the other side.
2. Check the center of gravity of the pallet and package. The package must not tip over when lifting.
3. Transport the packages to their destination.
   - ✓ The transport is complete.

4.4.5 Transporting the Unpacked Fan

If the fan is to be lifted and/or transported while suspended, the load-carrying device can be positioned between the motor and fan flange.

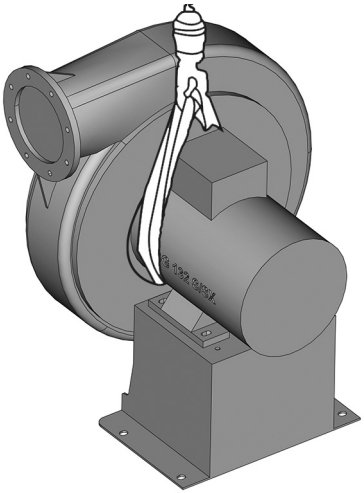


Fig. 21: Load-Carrying Equipment Between the Motor and the Fan Flange

4.4.6 Incorrect Transport

NOTE

Property damage due to incorrect transport

If the fan is lifted via the eye bolt on the motor, it can tear out. The fan then falls and is badly damaged.

- ➢ Do not use the eye bolt on the motor for transport. This is only intended for the assembly and disassembly of the motor.

Damage to the frequency inverter (only for IK devices)

NOTE

Material damage due to incorrect handling

The frequency inverter can be quickly damaged if the fan is handled incorrectly.

- ➢ Do not use the frequency inverter as a climbing aid or foot step
- ➢ Do not install load-carrying equipment on the frequency inverter

4.5 Storage

The following points must be considered so that the fan, which is not used for an extended period, remains functional:

- Store the fan
  - if possible, in original packaging
  - in a closed room,

  - in a dry, dust-free and vibration-free environment
- Both suction and pressure connection must be closed
- Storage temperature range from -20°C (-4°F) to +60°C (+140°F)
- After a storage period of 12 months or more, the motor bearings must be checked before the fan installation
- When starting up, let the fan run with 50% of the frequency for 2 minutes, so that the ball bearing grease can mix after a long standstill or storage time under low load.
- Devices may be stored for a maximum of 2 years

5 CONNECTION, INSTALLATION AND COMMISSIONING

5.1 Introductory Notes on Safety

Personnel qualification

The following personnel are approved for "connection, assembly and commissioning":

- Manufacturer's staff
- Trained personnel
- All electrical work may only be carried out by trained and authorized electricians

Important information about your safety

You are responsible!

In any case, the safety instructions in *Chapter 2: Safety* and the local safety regulations must be observed and complied with.

Wear the following protective equipment:

- Hearing protectors
- Safety shoes
- Gloves
- Work clothes
- Goggles
- Hairnet

⚠ WARNING!

Risk of injury due to improper installation and initial commissioning

Improper installation and initial commissioning can result in serious personal injury or property damage.

- ➢ Follow the instructions in this chapter.
- ➢ If in doubt, contact the manufacturer.
- ➢ Make sure you have enough space, cleanliness, and order before starting work.
- ➢ Install components professionally and keep pre-defined tightening torques.
- ➢ Secure components against falling or tipping over.

5.2 Installation

Important information about the weather

If the fan is installed outdoors, it must be protected from the elements.

Observe the following information during installation and maintenance:

- Screw the fan down tightly at the place of operation, with the foot / console on a level, solid and sufficiently stable surface without vibration transmission/load.
- The foot / console is designed only for the respective weight of the fan. A greater load can cause damage to the fan.
- When installed in systems subject to vibration, we recommend the use of isolators and flexible connectors.
- Ensure adequate motor ventilation. The permissible ambient temperatures are -20°C (-4°F) to +40°C (104°F)
- The cooling system of the motor must not be affected by the installation situation. Make sure there is enough space around the motor.
- IK devices may cause severe contamination of the cooling fins under special environmental conditions. If the cooling capacity on the cooling fins is not sufficient, the frequency inverter switches off. Regular cleaning is required for devices in these environments. In this situation, adjust the maintenance intervals for cleaning accordingly.
- Use of the fan in wet, steamy environments is not permitted.
- Depending on the application, additional standards or regulations may have to be observed.

5.3 Permissible Installation Positions of Blower

Note!

Damage to the fan due to incorrect connection

In the mounting type "without foot", the fan is only connected to the system via the inlet and / or pressure side; the foot of the fan is not screwed. Due to the associated loads, fixed connections are necessary on the inlet and / or pressure side. These must be able to carry the weight of the fan. Failure to do so can damage the fan.

➢ Adhere to the specifications for installation and mounting positions.

Note!

Halved service life of the ball bearings

For mounting positions with vertical drive shaft, the service life is halved.

➢ See chapter "7.6 Ball Bearings" on page 51**Error! Bookmark not defined.**

The fan may only be placed in approved positions and installation positions. Other positions and mounting positions are not permitted. A presentation with all approved positions and mounting positions can be found in chapter 10.2, page 58.

5.4 Assembly

Preconditions:

- Voltage must match the information on the nameplate on the frequency inverter
- Compliance with local safety regulations, particularly AMCA 410
- Wearing protective equipment (protective gloves, work clothes, safety shoes, safety helmet)
- Fan is unpacked and set up

To mount the fan, proceed as follows:

1. Check the clearance around the motor's cooling system. The minimum distances must be maintained.

Power	Minimum distance to the fan cover
≤ 2 HP (1.5 kW)	1.34 in. (34 mm)
> 2 HP (1.5 kW)	2.09 in. (53 mm)

Table 6: Clearances to Fan Cover

2. Check the clearance to walls or surrounding systems on the suction side (suction inlet) of the fan.
   ➢ Ensure an optimal suction effect of the medium on the suction side for sufficient space to walls or surrounding systems. As a rule of thumb, we recommend a minimum distance of 0.5 x suction inlet diameter.
   ➢ Calculation example: Diameter inlet nozzles 6.49 in. (165 mm)

x 0.5 = 3.25 in. (82.5 mm) Minimum distance to other objects

3. Attach the fan to the base via the 4 mounting holes on the console.

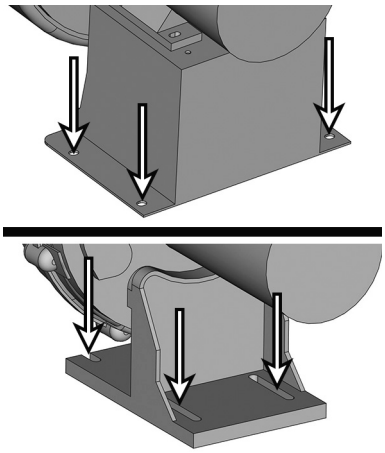


Fig. 22: Attach the Fan to the Foundation

4. Connect the fan to the system (suction and/or pressure side).
5. Install protective grilles on existing openings. This prevents the intervention into the fan and the associated risks of injury.

✓ The installation of the fan is complete.

5.5 Electrical Connection

⚠ DANGER!

Danger to life due to electric current

Touching voltage-carrying parts results in an electric shock. Damage to components or insulation material can be life-threatening.

- ➢ Work on electrical installations/equipment may only be carried out by electrical professionals
- ➢ If the insulation material is damaged, switch off the power supply immediately and secure the fan against re-engagement. Have the damage rectified immediately.
- ➢ Keep moisture away from voltage-carrying parts. This is how you prevent short circuit.

⚠ WARNING!

Risk of fire and electric shock due to loose or incorrectly tightened connections

Incorrectly tightened or loose connections can cause electric shocks, fires, property damage and personal damage.

- Check the connections for looseness and tighten them according to the tightening torques of the following table.

Threaded Bolt	Tightening Torque
M4	0.88 ft.-lb. (1.2 Nm)
M5	1.48 ft.-lb. (2.0 Nm)
M6	2.21 ft.-lb. (3.0 Nm)
M8	4.43 ft.-lb. (6.0 Nm)

Table 7: Tightening Torques for Threads in the Motor Terminal Box (IV / IV & Omron /IV & Kostal)

Design of the electrical systems (dimensioning considering the environmental conditions, protection against overload and short circuit, cabling, execution of professional installation, commissioning, etc.) is the responsibility of the customer.

The power supply to the frequency converter must be protected with a lockable fuse or circuit breaker disconnect switch. The field-supplied disconnect switch must have adequate ampacity and must be installed in accordance with Article 430 of the National Electric Code, ANSI/NFPA 70. Please refer to the unit nameplate for voltage and ampacity requirements

Protection by fault current circuit breakers (circuit breaker):

The current IGBT frequency inverters cause surge (stray currents) >=3.5 mA. These discharge currents can lead to false triggers in systems that are protected by a 30 mA circuit breaker.

In the event of an error, fault currents can also flow as DC via the protective conductor. If protection by circuit breakers on the supply side is required, it is essential to use an all-current sensitive (ACDC) circuit breaker.

⚠ WARNING!

Danger to life due to electric current

If an unsuitable circuit breaker is used, parts of the fan can be put under voltage in the event of a fault. Touching voltage-carrying parts can result in serious injury or death.

- Use only all-current sensitive (ACDC) circuit breakers

In order to comply with the EN 61800-5-1 standard, the protective conductor connection must be implemented twice, using separate terminals or a protective conductor cross-section of at least 10 mm^2 Cu.

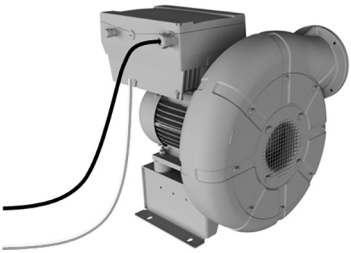


Fig. 23: Protective Connection for Kostal

5.5.1 Connection IK Fans

Preconditions:

- Supply voltage must be consistent with the information on the nameplate of the frequency inverter. The frequency inverter converts the supply voltage to the required motor voltage of 400V.
- Frequency inverters can be operated at 50 and 60Hz input frequency
- Use suitable circuit breakers with the specified rated current between the mains and the frequency inverter.
- Installation of wiring must conform with local building codes, or in the absence of local codes, with the National Electric Code ANSI/NFPA 70 - Latest Edition70. Unit must be electrically grounded in conformance to this code. In Canada, wiring must comply with CSA C22.1, Part 1, Electrical Code.
- Wearing protective equipment (work clothes, safety shoes)
- Fan is securely installed

To perform the electrical connection for fans with frequency inverters directly on the motor, proceed as follows:

1. Connect the power supply cables and the protective conductors at 400V as shown in the figure. For more information, see the separate Kostal guidelines.

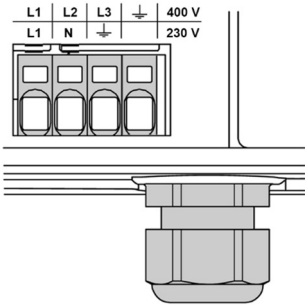


Fig. 24: Size A - C

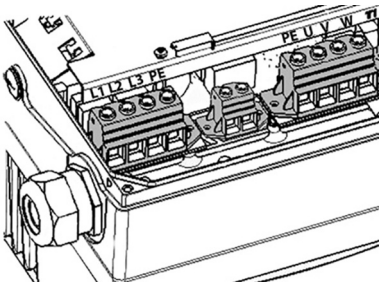


Fig. 25: Size D

Designation	Occupancy
L1	Line phase 1
L2	Line phase 2
L3	Line phase 3
N	Neutral

Designation	Occupancy
ON	Protective ⏚

2. When connecting the protective conductor, note the information in the section *Protection by* fault current circuit breakers (circuit breaker), see page **Error! Bookmark not defined.**.

3. ⚠**WARNING! If the second protective conductor is** omitted, a cable break in the protective conductor of the power supply may result in an error. The housing of the fan is then put under tension and can lead to serious injury or death on contact. Therefore, use a second protective conductor.
   ✓ The electrical connection of fans with frequency inverter is completed.

5.5.2 **Connection IV Fans**

Preconditions:

- Frequency inverters Omron and Kostal can be operated at 50 and 60 Hz input frequency
- Supply voltage must match the information on the nameplate of the frequency inverter
- The supply voltage on the frequency inverter can be between 400 and 480 V. The frequency inverter converts the supply voltage to the required motor voltage of 400V.
- Installation of wiring must conform with local building codes, or in the absence of local codes, with the National Electric Code ANSI/NFPA 70 - Latest Edition70. Unit must be electrically grounded in conformance to this code. In Canada, wiring must comply with CSA C22.1, Part 1, Electrical Code.
- Wearing protective equipment (protective gloves, work clothes, safety shoes, safety helmet)
- Fan is securely installed

NOTE

Property damage due to misuse

Fans must always be connected to a frequency inverter. Operation directly on the mains leads to damage to the motor and other property damage.

➢ Always connect the fan to a frequency inverter.

Important information on frequency inverters not mounted directly at the motor

Observe the following instructions for handling frequency inverters not mounted directly at the motor:

- For supply voltages 460 and 480V, a motor filter between the frequency inverter and the motor is required.
- Max input voltage is also 480V for customer-supplied frequency inverters.
- Max cable length between motor and frequency inverter:
  - IV (customer-owned): please contact the frequency inverter supplier and specify the

maximum permissible pulse control (see below).

- IV & Omron (in the control cabinet): max. 65 feet / 20m
- IV & Kostal, close to the motor with wall adapter plate: max. 9 feet / 3m

- In the case of inverter supply voltages > 400 V, longer cables (see above) and/or exceeding the pulse voltages (max. 1000 Vpk for drive motors up to 0.75 kW, max. 1300 Vpk for drive motors greater than 0.75 kW) on the motor terminals, suitable measures such as a motor filter to protect the motor must be installed. Please contact the inverter supplier for customer-owned frequency inverters.
- If a motor filter is required, it must be installed between the inverter and the motor. Please ensure sufficient space in the control cabinet and reference the specifications for installation and installation in the operating instructions of the frequency inverter/motor filter manufacturer.
- Further information on near-motor wall mounting can be found in Kostal's original operating and assembly instructions.
- In all cases, the electrical interconnectors between the motor and the frequency inverter must be designed with suitable, shielded cables, laid in the shortest possible way and without any further clamping or plug connections, and must be professionally connected on both sides.
- The shielding mesh of the connecting cables must be fully, consistently and on both sides, which means on the frequency inverter and on the motor, electrically low-resistance and permanently connected to protective conductor systems or the potential equalizing rail. For this purpose, suitable EMC cable glands must be used on the motor side and, if necessary, also on the frequency converter.
- The large-area connection of the device to the protective conductor system or the potential equalization rail must be ensured by one or more additionally suitable potential equalizing lines low-impedance and permanently.
- The scope of delivery Omron includes an EMC filter. Instructions for installation can be found in our guide.
- Further information on EMC-compliant installation and installation can be found in the instructions in the operating and assembly instructions of the frequency inverter supplier.
- When parameterizing customer-specific frequency inverters, care must be taken to ensure that the output voltage on the frequency converter corresponds to the voltage on the motor power plate.

To perform the electrical connection in the terminal box, proceed as follows:

1. Make sure that the above points are true.
2. Insert the electrical connection cable into the terminal box.
3. Connect the protective conductor connection in the terminal box to a suitable protective conductor system.
4. Connect the existing temperature sensor (PTC thermistor or optional temperature guard, opener contact) to the converter. The frequency converter must evaluate the values of the temperature sensor.
5. Perform the electrical connection according to the diagram in the terminal box.
6. Close unused cable guides in the terminal box. This prevents dust and moisture from entering the terminal box.
7. Tighten all contact screws and nuts to avoid transition resistors. (see Tab. 7: Tightening Torques for Threads in Motor terminal Box (IV / IV & Omron /IV & Kostal))
8. Connect an external frequency inverter. Please refer to the manufacturer's operating instructions or the quick guide.

✓ The electrical connection in the terminal box is complete.

5.5.2.1 Possible Circuits

△ **Circuit**

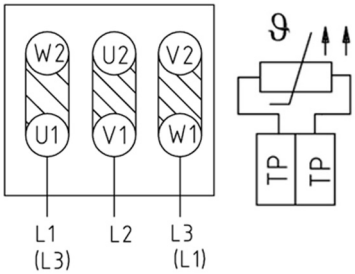


Fig. 26: Triangular Circuit

If the main's phase "L1" is connected to "U1" and to "W1" the main's phase "L3", the impeller rotates to the left (counterclockwise).

If the main's phase "L3" is connected to "U1" and the main's phase "L1" to "W1", the impeller rotates to the right (clockwise).

⏚ Connect the protective conductor. This is marked with this symbol and is also located in the terminal box.

NOTE	
	Material damage due to faulty connection. If a main's voltage is connected to the temperature sensor, this will lead to the destruction of the sensor. ➢ Keep main's voltage away from the temperature sensor terminals (TP).

A three-way switch is required for the following fans:

- Indication of the interconnection on the power plate △
- e.g. with the specification on the rating plate 230/400V or △/ Y, the motor may only be used for the lower voltage (230V, 3-phase current!) in the △ be connected.

Y-Circuit

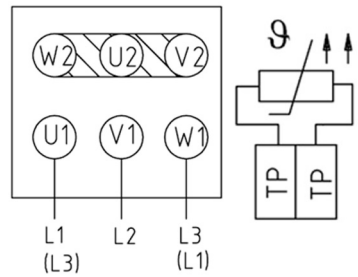


Fig. 27: Star Circuit

If the main's phase "L1" is connected to "U1" and to "W1" the main's phase "L3", the impeller rotates to the left (counterclockwise).

If the main's phase "L3" is connected to "U1" and the main's phase "L1" to "W1", the impeller rotates to the right(clockwise).

Connect the protective conductor. This is marked with this symbol and is also located in the terminal box.

NOTE	
	Material damage due to faulty connection. If a main's voltage is connected to the temperature sensor, this will lead to the destruction of the sensor. ➢ Keep main's voltage away from the temperature sensor terminals (TP).

A star circuit is required for the following fans:

- Indication of the interconnection on the power plate Y
- e.g. when specified on the 230/400V or / power plate △/ Y, the motor may only be connected for the high voltage (400V, three-phase current!) in the Y be connected.

If the direction of rotation is incorrect, check that L1 and L3 are reversed.

5.5.3 Frequency Converter Operation

Important information on parameterization

Frequency inverters supplied by TCF are already configured for communication with the motor. No settings are necessary.

Requirements for customer-supplied frequency inverters

- Inverter power equal to or greater motor power *)
- Inverter current equal to or greater motor current *)
- Output voltage of the inverter equal to the motor rated voltage
- Supply voltage max. 480V (including +5% voltage tolerance)
- The pulse rate of the inverter should be 8 kHz, as a lower pulse frequency produces strong motor noises
- The frequency converter must contain an overload protection.
- The values for the maximum/minimum frequencies must be observed (see page Tab. 4, page 17).
- The inverter must have a connection for temperature sensors (PTC thermistor) or a temperature guard (opener contact)

*) Values see nameplate

The motor can be operated in delta or star switching, depending on the input voltage of the inverter.

Set the following U/f assignment on the frequency inverter:

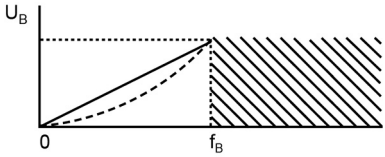


Fig. 28: U/f Assignment on the Inverter

f_B and U_B See nameplate

Prohibited Area

In case of non-observance, the motor current increases disproportionately and the drive motor does not come to rated speed.

⚠ WARNING!

Incorrect parameterization of the inverter

If the wrong parameters are set at frequency or speed, this leads to motor overload and/or destruction of the fan. There is a risk of personal injury.

- ➢ Use only the information on the nameplate
- ➢ Connect the temperature sensors at the inverter inputs
- ➢ Please keep the information in the manufacturer's documentation from the frequency inverter

Important information about acceleration and deceleration times

In order to avoid high component loads and malfunctions in inverter operation, the following times apply for the respective device motor power class (see nameplate) in the event of a ramp/run as well as a change in speed for the respective device motor power class (see nameplate):

Device motor power	Acceleration Time [s]	Deceleration Time [s]
0.34 HP < motor power <=4.0 HP	10	20
4 HP < motor power <= 10 HP	20	40
10 HP < motor power <= 14.8 HP	30	60
14.58 HP < motor power <= 40.2 HP	30	60

Table 8: Acceleration and Deceleration Times

Within the acceleration and deceleration times, a steady rise and fall time must be guaranteed.

During operation, no speed changes may occur that exceed the speed change during the acceleration and deceleration.

5.6 Electromagnetic Compatibility

NOTE

Interference by electromagnetic field

When used in a residential environment, the fan can affect and interfere with other nearby devices.

- Perform an electromagnetic measurement in a residential environment
- In the event of malfunctions, perform appropriate interference suppression measures

Our fans are components that are intended for installation by specialists in other machines or systems, i.e. not intended for the end user. The conformity of the terminal/machine with the EMC Directive must be ensured/confirmed by the manufacturer of the terminal/machine.

Before commissioning and operating the devices on the frequency inverter, it is essential to observe the EMC instructions of the frequency inverter manufacturer and the information in this operating instruction (See *5.5.2 Connection of Frequency Converter Fans*) in order to meet the requirements of the EC Directive "Electromagnetic Compatibility" 2014/30/EU.

Frequency inverters Omron and Kostal that all instructions in the operating instructions are complied with, comply

with the following US standard: 47 CFR Part 15B, adhered to class: Class A (products are intended for use in non-residential/non-domestic environments).

5.7 Commissioning

Important information about your safety

You are responsible!

In any case, the safety instructions in *Chapter 2: Safety* and the local safety regulations must be observed and complied with.

⚠ WARNING!

Risk of injury due to component failure

Exceeding the maximum permissible speed can lead to the impeller breaking. Fragments are thrown out of the fan and can injure nearby people.

- ➢ Keep the maximum speed specified on the power plate

⚠ DANGER!

Risk of injury due to rotating parts

When switching on the fan without protective grille, there is a considerable risk of injury.

- ➢ Remove all foreign objects from the fan before switching on.
- ➢ Install the protective grilles before switching on.
- ➢ Do not get into the fan or impeller.
- ➢ Wear protective gloves.

5.7.1 Vibration Values

The fan must not be subjected to vibration or shock loads at any stage of life. Prohibited vibration values can cause the fan to be broken and destroyed. The result may be property damage and personal injury.

During commissioning, therefore, a measurement must be carried out on the flange bearing of the fan. The vibration values detected must be within the following limits.

Maximum permissible vibration velocity (Limit values according to ISO 14694:2003 (E), category BV-3)		
	Rigid installation	Flexible installation
	Effective	Effective

Maximum permissible vibration velocity (Limit values according to ISO 14694:2003 (E), category BV-3)		
	Value [r.m.s.] mm/s (in./s)	Value [r.m.s.] mm/s (in./s)
In Installation		
Start-up	4.5 (0.18)	6.3 (0.25)
Alarm	7.1 (0.28)	11.8 (0.46)
Shutdown	9.0 (0.35)	12.5 (0.49)

Table 9. Maximum permissible vibration speed

Explanation

- Rigid installation = without isolator
- Flexible installation = with isolator

Prerequisite

- Measuring instrument

To measure the vibration values, do the following:

1. Place the measuring instrument at the measuring point on the flange end shield. The measurement should be carried out as close to the housing as possible. Observe the figure below.

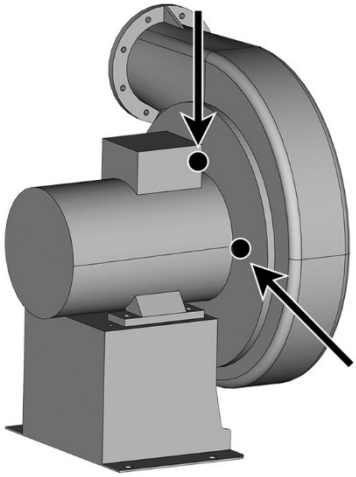


Fig. 29: Vibration Measurement

● = Measuring point

← = Measuring direction

2. Repeat the measurement at the second measuring point.
3. Verify that the readings are within the permissible limits.
   ✓ The vibration measurement is complete.

5.7.2 Check the Direction of Rotation

Before commissioning, the direction of rotation of the fan must be checked. There are arrows on the fan housing that represent the correct direction of rotation.

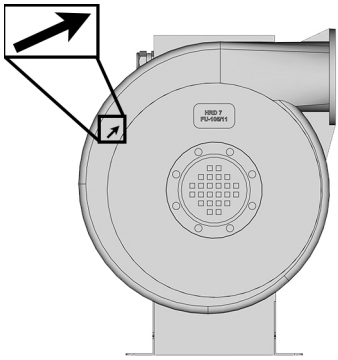


Fig. 30: Fan Housing with Direction of Rotation Arrow

To check the direction of rotation, proceed as follows:

1. Turn the fan on briefly and then off again.
   - ➢ The fan starts briefly, the fan impeller rotates a bit.
2. Check the running direction of the fan using the arrow on the fan housing.
3. If the direction of rotation is reversed, swap the polarity (L1 for L3).
   - ✓ The rotational direction check is complete.

5.7.3 **Commissioning of the Fans**

To put the fan into operation, proceed as follows:

1. Make sure there are no foreign objects in the fan housing or ductwork system.
2. Let the fan run at a slow speed.

- In the IK variant with Kostal: Turn the potentiometer up a bit. Note the information in the guidelines for the Kostal frequency converter.
- In the IV / Omron variant - set speed according to instructions by frequency inverter manufacturers

Fig. 31: Kostal Potentiometer

1 Potentiometer

3. Operate the fan at 50% of the maximum speed for at least 2 minutes.
4. Check the direction of rotation.
5. Set the desired operation point.
6. For fans that cannot be used over the entire characteristic curve, the motor can be overloaded if the system resistance is too low (due to excessive current consumption). In this case, throttle the volume flow by reducing the operating frequency.
7. Check the function of the protective devices:

- For IV / Omron: Disconnect the PTC thermistor (observe all safety instructions). The fan must no longer start.
- For IK Kostal: The fan is pre-programmed with correct parameters.

8. Check the voltage consumption at the operating point (if value is

available). It must be less than the Full Load Amps.

9. For customer-supplied frequency inverters - check start-up and shut-down times.
10. Check the fan for unusual noises or vibrations.
11. Measure the vibration levels.
12. Check the cooling air supply for the electric motor.
13. Check the seal (only for sealed fans).
    - ✓ Once everything is in order, commissioning is complete and the fan can be used.

5.7.4 Surge, Stall, Unstable Operations

When the fan is operated to the left of the maximum pressure of the characteristic curve, pumping effects (aka surge) can occur in the interaction between the fan and the system. In a few cases, these pumping effects can lead to an impairment of the process result. In rare cases, unstable operating conditions can occur, which can lead to damage to the fan and the connected system.

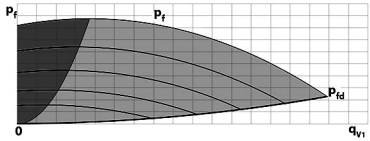


Fig. 32: Pump Effect

Unstable Operation

Performance Curve

q_{V1} = Volume Flow at the Inlet

p_f = Fan Pressure

p_{fd} = Dynamic Fan Pressure

6 TROUBLESHOOTING

The following chapter describes possible malfunctions and their elimination. In the case of frequent faults, the maintenance intervals must be shortened and adjusted according to the actual load. If faults cannot be corrected by the following notes, the manufacturer must be contacted.

6.1 Introductory Notes on Safety

Important information about your safety

You are responsible!

In any case, the safety instructions in *Chapter 2: Safety* and the local safety regulations must be observed and complied with.

Personnel qualification

The following personnel are approved for "fault removal":

- Manufacturer's staff
- Trained staff with regular training in the handling of fans
- All electrical work may only be carried out by trained and authorized electricians

⚠ DANGER!

Danger to life due to electric current

Touching voltage-carrying parts results in an electric shock. Damage to components or insulation material can be life-threatening.

- ➢ Work on electrical installations/equipment may only be carried out by electrical professionals
- ➢ If the insulation material is damaged, switch off the power supply immediately and secure the fan against re-engagement. Have the damage rectified immediately.
- ➢ Keep moisture away from voltage-carrying parts. This is how you prevent short circuits.

⚠ DANGER!

Danger to life due to unauthorized switching on and off

There is a risk that the energy supply will be switched on without authorization. There is then a risk to life for people in the danger zone.

- ➢ Disconnect the power supply before all work.
- ➢ Secure the power supply against re-connection.

6.2 Steps to Take in the Event of Malfunction

Rules of conduct in the event of malfunction:

- In the event of a fault that poses an imminent danger to persons or property, shut the fan down.
- Determine the cause of the fault.
- If the fault requires work in the hazardous area, turn off the fan and secure it against re-energizing.
- Inform the person responsible about the fault.
- Have the malfunction remedied by suitable personnel.
- After the protective shutdown of the frequency inverter (e.g. triggering the motor circuit breaker), a restart of the device is only permitted after identification and elimination of the cause of the fault.

6.3 Fault Table

The fault table can be found in the appendix.

7 MAINTENANCE AND REPAIR

7.1 Introductory Notes on Safety

Personnel qualification

The following personnel are approved for "maintenance and repair":

- Manufacturer's staff
- Trained staff with regular training in the handling of fans
- All electrical work may only be carried out by trained and authorized electricians

Important information about your safety

You are responsible!

In any case, the safety instructions in *Chapter 2: Safety* and the local safety regulations must be observed and complied with.

Important information for maintenance and repair

In addition to the operating instructions of the fan, the regulations and instructions in the operating instructions of the entire system must be observed.

Important information about repair work

Repairs may only be carried out by the manufacturer. For repairs, we assume no liability for modifications or replacements of components by third parties.

⚠ DANGER!

Danger to life due to unauthorized switching on and off

During maintenance work, there is a risk that the power supply will be switched on without authorization. There is then a risk to life for people in the danger zone.

- ➢ Disconnect the power supply before all maintenance work.
- ➢ Secure the power supply against re-connection.

⚠ WARNING!

Risk of fire and electric shock due to loose or incorrectly tightened connections

Incorrectly tightened or loose connections can cause electric shocks, fires, property damage and personal damage.

- ➢ Check the connections for loose fit and tighten them according to the tightening torques in the following table.

⚠ WARNING!

Risk of injury and/or destruction of the fan

If the fan continues to be used in an unsuitable operating state, components can be damaged and destroyed. Destroyed parts are ejected from the fan at high speed and can injure people.

- Check the condition of the fan regularly
- In the event of vibration and or oscillation due to reduced air performance, immediate inspection and maintenance shall be carried out.

⚠ WARNING!

Risk of injury due to improper maintenance and repair

Improper maintenance and repair can result in serious personal injury or property damage.

- Maintenance work may only be carried out by qualified personnel authorized by the operator.
- Use only original spare parts.
- Observe and adhere to rotation and tightening torques.
- Secure against unauthorized restart.
- After the maintenance work is complete, make sure that all protective devices and covers are mounted and working.

NOTE

Damage to property due to incorrect spare parts

Incorrect or faulty replacement and components from third-party manufacturers can cause serious damage. When using unapproved spare parts, all warranty and service claims will be forfeited.

- Use only original spare parts

7.2 Measures Before Maintenance and Repair Work

Before starting maintenance, check the following points:

- The fan is switched off
- The fan is secured against re-energizing and disconnected from the mains
- The fan impeller is not moving
- The fan has cooled down
- Required tools and spare parts are available
- Discontinued operating states or control settings are noted
- Note our information in the guidelines to the frequency converter.

7.3 Notes on Maintenance and Repair Work

Wear parts are subject to the recommended maintenance intervals. The service life of consumables (ball bearings and filters) depends on the operating hours, the load and other influences such as temperature, etc.

Depending on operating hours, loads and operating conditions, the operator must set the cleaning, inspection and maintenance interval himself.

Cleaning or maintenance shall not result in damage or alteration of the device and its components that affect health or safety, and must not, for example, impair the balance of the impeller.

7.4 Review and Control

Perform the following checks each time you perform maintenance:

- Check the fan for clean and reliable condition
- Check the fan for unusual movements, running noises, smooth running (ball bearings)
- Perform vibration testing
- Check fan for overheating
- Check the fan for odor development
- Clean fan and impeller if needed
- Remove dust deposits on electric motor and frequency inverter
- Check electrical cables, connections and fittings for damage, tightness and fixed seat
- Check connections in the terminal box for torques (see Tab. 7: Tightening torques for threads in the motor terminal box (IV / IV & Omron /IV & Kostal)
- Check impeller for signs of wear

7.5 Cleaning IK devices

Important information for cleaning IK devices

In the case of IK devices, it should be noted that in special environmental conditions, the cooling fins may be severely contaminated. If the cooling capacity on the cooling fins is not sufficient, the frequency inverter switches off. Regular cleaning is required for devices in these environments.

7.6 Ball Bearings

The fan motors are equipped with sealed ball bearings, which do not require relubrication.

Check the ball bearings during maintenance and before each recommissioning. Operation is only permitted with flawless ball bearings. To do this, turn the impeller by hand and check it for smoothness.

Important information about the ball bearings

In case of frequent start-up and shutdown, an early replacement of the bearings is required. It is up to the maintenance and repair personnel to determine the time for the replacement of the bearings on their own responsibility.

Device	Minimum Service Life of Ball Bearings	
	horizontal motor shaft	vertical motor shaft
Model TXR	22,000 hours	11,000 hours

Table 10: Maintenance Intervals Ball Bearings

Recommendation for ball bearing change:

- Before reaching the minimum lifetime
- No later than 30 months after delivery
- Check after 12 months of storage, change if necessary.
- During commissioning with 50% of the frequency let the fan run for 2 minutes, so that the ball bearing grease can mix after a long standstill or storage time under low load.

7.7 Fine Filter

If a filter is used the degree of contamination of the filter mats must be checked at regular intervals depending on the operating/environmental conditions and, if necessary, environmental protection requirements. The permeability of the filters must be ensured by the operator.

7.8 Seals and Radial Shaft Seals

Sealing components and radial shaft seals shall be renewed for safety reasons at least during any maintenance in which sealing elements are opened, removed or modified in any other way.

7.9 Structural Maintenance

All structural components or devices for supporting and fastening the fan must be checked regularly. Vibration dampers, bolts, foundations, etc. can fail due to corrosion, erosion and other causes. This can cause the operating performance or fatigue or failure of the fan.

Check the metallic components for corrosion, fractures or other signs of overload. The foundation must be examined to ensure structural stability.

7.10 Spare Parts

NOTE

Damage to property due to incorrect spare parts

Incorrect or faulty replacement and components from third-party manufacturers can cause serious damage. When using unapproved spare parts, all warranty and service claims will be forfeited.

➢ Use only original spare parts

For spare parts orders, provide the following information from the nameplate:

- Model
- Serial Number

7.11 Measures after Maintenance and Repair Work

After the maintenance is complete, perform the following measures:

- Check all loosened screw connections for a tight fit.
- Verify that all removed protective grilles and protective devices are reassembled and functional.
- Check that all tools, materials, and other items have been removed from the workspace.
- Clear the working area of substances such as liquids, processing materials, dusts, etc.
- Check if no one is in the danger zone that could be injured by the starting fan.

Important information on security

Only after inspection and implementation of these measures may the fan be put back into operation.

8 DISPOSAL

8.1 Introductory Notes on Safety

Personnel qualification

The following personnel are approved for "disposal":

- Manufacturer's staff
- Trained staff with regular training in the handling of fans
- All electrical work may only be carried out by trained and authorized electricians

Important information about your safety

You are responsible!

In any case, the safety instructions in *Chapter 2: Safety* and the local safety regulations must be observed and complied with.

Wear the following protective equipment:

- Hearing protectors
- Safety shoes
- Gloves
- Work clothes
- Goggles
- Hairnet

8.2 Dismantling and Disposal

⚠ DANGER!

Danger to life from electricity and other energies

Serious bodily injury or death due to electric shock or other energies on the fan.

- Disconnect the fan from any external power supply before disassembly
- Depressurize equipment (relieve built-up pressure) before disassembly
- Pack components that are prone to breakage

⚠ WARNING!

Risk of injury due to improper disassembly!

Stored residual energies, angular components, points and corners on the device can cause injury.

- Make sure there is enough space before dismantling.
- Handle sharp-edged components carefully.
- Dismantle components properly and observe the weight of the components. If necessary, use lifting equipment.
- Secure components so that they cannot fall or tip over.
- If there are any ambiguities, contact the manufacturer.

Important information for dismantling

The fan may only be dismantled by trained and authorized personnel.

To dismantle and dispose of the fan, proceed as follows:

1. Turn off the fan.
2. Secure the fan from starting.
3. Wait until all rotating parts have reached a complete stop and make sure that a restart is no longer possible.
4. Physically disconnect the entire power supply from the device.

Unload stored residual energy. (Ground any built-up energy.)

5. Remove all operating and auxiliary materials and remove processing materials. Dispose of everything in an environmentally friendly manner.
6. Disassemble all assemblies and components professionally and comply with applicable local occupational health and safety and environmental regulations.
7. Recycle recyclable material such as aluminum, stainless steel, steel, copper and plastic. Some components require special treatment (e.g. frequency inverters). Follow the instructions in the respective operating instructions.
   - ✓ The dismantling and disposal is complete.

9 LIABILITY AND DISCLAIMER

The operator is responsible for the intended use of the device.

Twin City Fan & Blower (TCF&B) disclaims all liability for improper use of its devices and components. This applies in particular to special uses and conditions of use that have not been expressly coordinated with TCF&B.

TCF&B also disclaims all liability for modifications or changes to the supplied device or accessories.

Likewise, TCF&B is not liable for improper or delayed work, or maintenance work and repairs carried out by non-TCF&B personnel and their possible consequences.

10 FAULT TABLE

10.1 Fault Table

Disturbance	Possible cause	Solution
Fan does not start	Electrical connection is missing or incorrect	Check the connection
	PTC thermistor frequency converter is not connected	Connect PTC thermistor
	For fans with customer-owned frequency inverter: frequency inverter is not properly parameterized	Properly parameterize the frequency inverter according to the motor nameplate and information in operating instructions
	Motor defective	Changing the motor
The current consumption specified on the motor nameplate is exceeded	Fan runs outside the characteristic line (system resistance too low)	Adjust the operating point with throttle valve or by reducing the frequency
	Impeller rotation direction wrong	Control the direction of rotation
	One or two phases not connected correctly	Connect missing phases
	Motor not properly connected in star or delta	Connect motor properly
	Motor defective	Replacing the motor
	For customer-owned frequency inverter: start-up time not set correctly	Setting the start-up time correctly
	For customer-specific frequency inverters: too high base frequency (max. frequency) set in the frequency inverter.	
	Applied voltage too low	Ensure the required power supply

Disturbance	Possible cause	Solution
Fan switches off	For fans with frequency inverters: motor winding too hot	Eliminate cause of too hot motor winding
Fan does not bring desired performance	Direction of rotation impeller wrong	Correct direction of rotation
	Pressure losses in the system higher than expected	
	Medium temperature higher than when designed	
	Filter dirty	Cleaning filters
	Object obstructs air passage in system / valves closed	Checking the plant
	For customer-supplied frequency inverter: wrong base frequency (max. frequency) set.	Set the corner frequency (max. frequency) correctly
	For fans with customer-supplied frequency inverter: frequency inverter is not properly parameterized	Frequency inverter is correctly parameterized
Impeller runs unevenly	Contaminated impeller	Clean the impeller and avoid contamination in the future (install filters)
	Impeller defective	Replacing the impeller
	Vibrations are transmitted from the environment / system to the fan	Use rubber isolators and flex connectors
	Connection on suction inlet and pressure side connected with voltage	Connect without voltage or use flex connectors
Grinding Noises	Bearing corrosion at the storage	Replacing bearings

Table. 11: Troubleshooting

10.2 Permissible Positions of Blower

Position	Mounting only at foot / console	Mounting at foot / console with rigid connection at pressure or suction side
1	TXR 1009-105/1.0 IK / IV TXR 1009-105/1.5 IK / IV TXR 1015-105/1.5 IK / IV TXR 1015-105/2.0 IK / IV TXR 1015-105/3.0 IK / IV TXR 1112-105/2.0 IK / IV TXR 1112-105/3.0 IK / IV TXR 1407-95/2.0 IK / IV TXR 1407-95/3.0 IK / IV TXR 1407-95/4.0 IK / IV	TXR 1009-105/1.0 IK / IV TXR 1009-105/1.5 IK / IV TXR 1015-105/1.5 IK / IV TXR 1015-105/2.0 IK / IV TXR 1015-105/3.0 IK / IV TXR 1112-105/2.0 IK / IV TXR 1112-105/3.0 IK / IV TXR 1112-105/4.0 IK / IV TXR 1112-115/5.5 IK / IV TXR 1407-95/2.0 IK / IV TXR 1407-95/3.0 IK / IV TXR 1407-95/4.0 IK / IV TXR 1508-105/5.5 IK / IV
2	All blowers	All blowers
3	Special motor with changed lose / fix bearing necessary TXR 1009-105/1.0 IK / IV TXR 1015-105/1.5 IK / IV TXR 1015-105/1.5 IK / IV TXR 1015-105/2.0 IK / IV TXR 1015-105/3.0 IK / IV TXR 1112-105/2.0 IK / IV TXR 1112-105/3.0 IK / IV TXR 1407-95/2.0 IK / IV TXR 1407-95/3.0 IK / IV TXR 1407-95/4.0 IK / IV	Special motor with changed lose / fix bearing necessary TXR 1009-105/1.0 IK / IV TXR 1015-105/1.5 IK / IV TXR 1015-105/1.5 IK / IV TXR 1015-105/2.0 IK / IV TXR 1015-105/3.0 IK / IV TXR 1112-105/2.0 IK / IV TXR 1112-105/3.0 IK / IV TXR 1112-105/4.0 IK / IV TXR 1112-115/5.5 IK / IV TXR 1407-95/2.0 IK / IV TXR 1407-95/3.0 IK / IV TXR 1407-95/4.0 IK / IV TXR 1508-105/5.5 IK / IV
4	TXR 1009-105/1.0 IK / IV	TXR 1009-105/1.0 IK / IV

Position	Mounting only at foot / console	Mounting at foot / console with rigid connection at pressure or suction side
5 6	TXR 1009-105/1.5 IK / IV TXR 1015-105/1.5 IK / IV TXR 1015-105/2.0 IK / IV TXR 1015-105/3.0 IK / IV TXR 1112-105/2.0 IK / IV TXR 1112-105/3.0 IK / IV TXR 1407-95/2.0 IK / IV TXR 1407-95/3.0 IK / IV TXR 1407-95/4.0 IK / IV	TXR 1009-105/1.5 IK / IV TXR 1015-105/1.5 IK / IV TXR 1015-105/2.0 IK / IV TXR 1015-105/3.0 IK / IV TXR 1112-105/2.0 IK / IV TXR 1112-105/3.0 IK / IV TXR 1407-95/2.0 IK / IV TXR 1407-95/3.0 IK / IV TXR 1407-95/4.0 IK / IV

Tab. 12: Possible Positions of Blowers

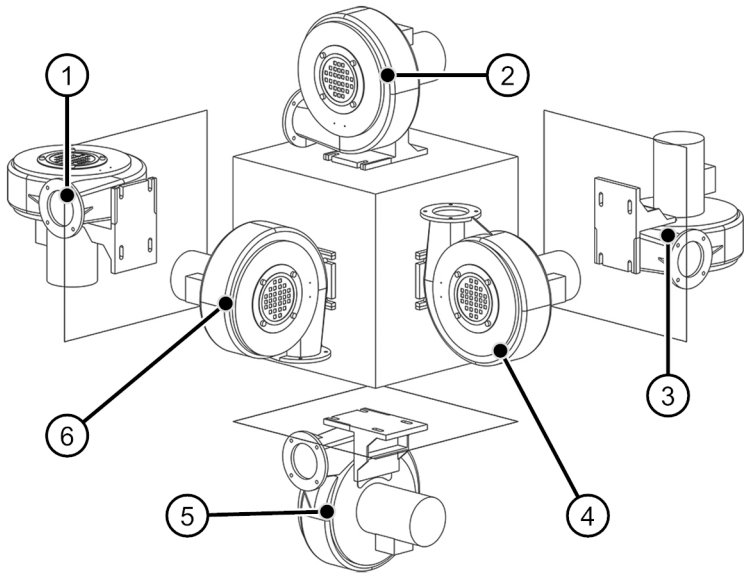


Abb. 33: Positions of Blowers

Position	Without foot Rigid connection at pressure and suction side	Without foot Rigid connection at pressure or suction side
1-6	TXR 1009-105/1.0 IK / IV TXR 1009-105/1.5 IK / IV TXR 1015-105/1.5 IK / IV TXR 1015-105/2.0 IK / IV TXR 1015-105/3.0 IK / IV TXR 1112-105/2.0 IK / IV TXR 1112-105/3.0 IK / IV TXR 1407-95/2.0 IK / IV TXR 1407-95/3.0 IK / IV TXR 1407-95/4.0 IK / IV	

Table 13: Installation Without Foot

10.3 Specifications

Devices with frequency inverter (IV / IK)

Model	Volume flow*	Total Pressure Difference*	Moto	Voltage	Frequency	Power Consumption	Motor Power at max. allowable speed	Weight	Sound pressure level min/max *1)	Ball Bearing Designation *2)
	[CFM]	[in wg]	[RPM]	[V]	[Hz]	[A]	[HP]	[lb]	[db A]	
TXR 1009-105/1.0 IV / IK	194	19.7	6090	230/400	105	3.05/1.75	1.0	29 (35)	84/89	6202
TXR 1009-105/1.5 IV / IK	353	19.7	6050	230/400	105	4.00/2.30	1.5	31 (42)	84/89	6204
TXR 1015-105/1.5 IV / IK	353	19.7	6070	230/400	105	4.15/2.40	1.5	38 (47)	85/94	6204
TXR 1015-105/2.0 IV / IK	583	19.7	6075	230/400	105	5.70/3.,30	2	42 (51)	85/94	6204
TXR 1015-105/3.0 IV / IK	848	19.7	6140	230/400	105	6.90/4.00	3	49 (58)	85/94	6205
TXR 1112-105/2.0 IV / IK	335	20.9	6175	230/400	105	5.80/3.30	2	47 (55)	90/96	6204
TXR 1112-105/3.0 IV / IK	706	20.9	6190	230/400	105	8,10/4.70	3	51 (6025)	90/96	6204
TXR 1112-	1183	20.9	6205	230/400	105	11.6/6.70	4	55 (77)	90/96	6205

Model	Volume flow*	Total Pressure Difference*	Moto	Voltage	Frequency	Power Consumption	Motor Power at max. allowable speed	Weight	Sound pressure level min/max *1)	Ball Bearing Designation *2)
105/4.0 IV / IK										
TXR 1112-115/5.5 IV / IK	1165	29.7	6785	400 △	115	8.50	5.4	55 (77)	91/97	6205
TXR 1407-95/2.0 IV / IK	272	34.1	5520	230/400	95	5.35/3.10	2	58 (66)	86/92	6204
TXR 1407-95/3.0 IV / IK	477	34.1	5520	230/400	95	7.80/4.50	3	64 (73)	86/92	6205
TXR 1407-95/4.0 IV / IK	953	34.1	5600	230/400	95	10.9/6.30	4	68 (91)	86/92	6205
TXR 1508-105/5.5 IV / IK	742	42.2	6190	400 △	105	9.5	5.4	80 (102)	93/98	6206
TXR 1508-105/7.5 IV / IK	1130	42.2	6140	400 △	105	12.0	7.4	102 (124)	93/98	6306
TXR 1508-105/10 IV / IK	1413	42.2	6235	400 △	105	14.5	10	111 (133)	93/98	6306
TXR 1512-100/7.5 IV / IK	953	36.2	5930	400 △	100	12.5	7.4	113 (122)	96/101	6306

Model	Volume flow*	Total Pressure Difference*	Moto	Voltage	Frequency	Power Consumption	Motor Power at max. allowable speed	Weight	Sound pressure level min/max *1)	Ball Bearing Designation *2)
TXR 1512-100/10 IV / IK	2190	36.2	5940	400 △	100	16.7	10	122 (144)	96/101	6306
TXR 1814-105/15 IV / IK	1130	64.3	6200	400 △	105	25.0	14.8	203 (250)	104/107	6308
TXR 1814-105/20 IV / IK	1766	64.3	6250	400 △	105	32,0	20	243 (289)	104/107	6308
TXR 1814-105/27 IV / IK	3426	64.3	6220	400 △	105	38,0	30	243 (289)	104/107	6308

Table 14: Specifications

The values in the table apply only to motors of Twin City Fan & Blower (other brands may vary).

*1) min. value / max. value of the characteristic curve

*2) -side / B-side standard designation

* Limit deviation according to DIN 24166 Accuracy class 3

10.4 Declaration

EINBAUERKLÄRUNG NACH ANHANG II 1 B
KONFORMITÄTSERKLÄRUNG NACH EVPG § 4 ABS. 1

Hiermit erklärt die

Elektror airsystems gmbh
Hellmuth-Hirth-Strasse 2
D-73760 Ostfildern

als Hersteller, dass das Produkt, auf das sich diese Erklärung bezieht, den unten folgenden grundlegenden Anforderungen der Maschinenrichtlinie **(2006/42/EG)** entspricht.

Beschreibung der unvollständigen Maschine:
Hochdruck-Ventilator A-HP 250/40, A-HP 305/30, A-HP 330/33, A-HP 355/35, A-HP 415/35

Serien-Nummer und Baujahr sind dem Typenschild und dem zugehörenden Lieferschein zu entnehmen.

Beschreibung der grundlegenden Anforderungen der Maschinenrichtlinie (2006/42/EG), denen die unvollständige Maschine entspricht:
Maschinenrichtlinie **(2006/42/EG)**: Anhang I, Artikel 1.1.2, 1.1.3, 1.1.5, 1.3.2, 1.3.3, 1.3.4, 1.3.7, 1.5.1, 1.6.1, 1.7.1, 1.7.3
Richtlinie über die elektromagnetische Verträglichkeit **(2014/30/EU)**
Richtlinie zur umweltgerechten Gestaltung energieverbrauchsrelevanter Produkte **(2009/125/EG)**

Die aufgeführte unvollständige Maschine erfüllt weiterhin die Schutzziele der **Niederspannungsrichtlinie (2014/35/EU)** gemäß Anhang I, Nr. 1.5.1 der Maschinenrichtlinie.
Die Inbetriebnahme der unvollständigen Maschine ist so lange untersagt, bis festgestellt wurde, dass die Maschine, in die die unvollständige Maschine eingebaut werden soll, den Bestimmungen der Maschinenrichtlinie **(2006/42/EG)** entspricht.

Die folgenden harmonisierten Normen wurden angewandt:

DIN EN ISO 12100	**2011**	Sicherheit von Maschinen, allgemeine Gestaltungsleitsätze, Risikobeurteilung und Risikominimierung
DIN EN 60034-1	**2011**	Drehende elektrische Maschinen, Teil 1: Bemessung und Betriebsverhalten
DIN EN 60034-5	**2007**	Drehende elektrische Maschinen, Teil 5: Schutzarten aufgrund der Gesamtkonstruktion von drehenden elektrischen Maschinen (IP-Code) – Einteilung
DIN EN 60204-1	**2019**	Sicherheit von Maschinen – Elektrische Ausrüstung von Maschinen, Teil 1: Allgemeine Anforderungen
DIN EN 60664-1	**2008**	Isolationskoordination für elektrische Betriebsmittel in Niederspannungsanlagen, Teil 1: Grundsätze, Anforderungen und Prüfungen

Die Elektror airsystems gmbh als Hersteller verpflichtet sich, die speziellen Unterlagen zu dieser unvollständigen Maschine einzelstaatlichen Stellen auf Verlangen elektronisch oder in Papier-Form zu übermitteln. Die zu dieser unvollständigen Maschine gehörenden speziellen technischen Unterlagen nach Anhang VII Teil B wurden erstellt.
Dokumentationsbevollmächtigter ist Herr Steffen Gagg, Tel. +49 711 31973-2124.

Kreher (Geschäftsführer)
Ostfildern, 06.05.2021

Abb. 34: Declaration of Conformity

10.5 Exploded View

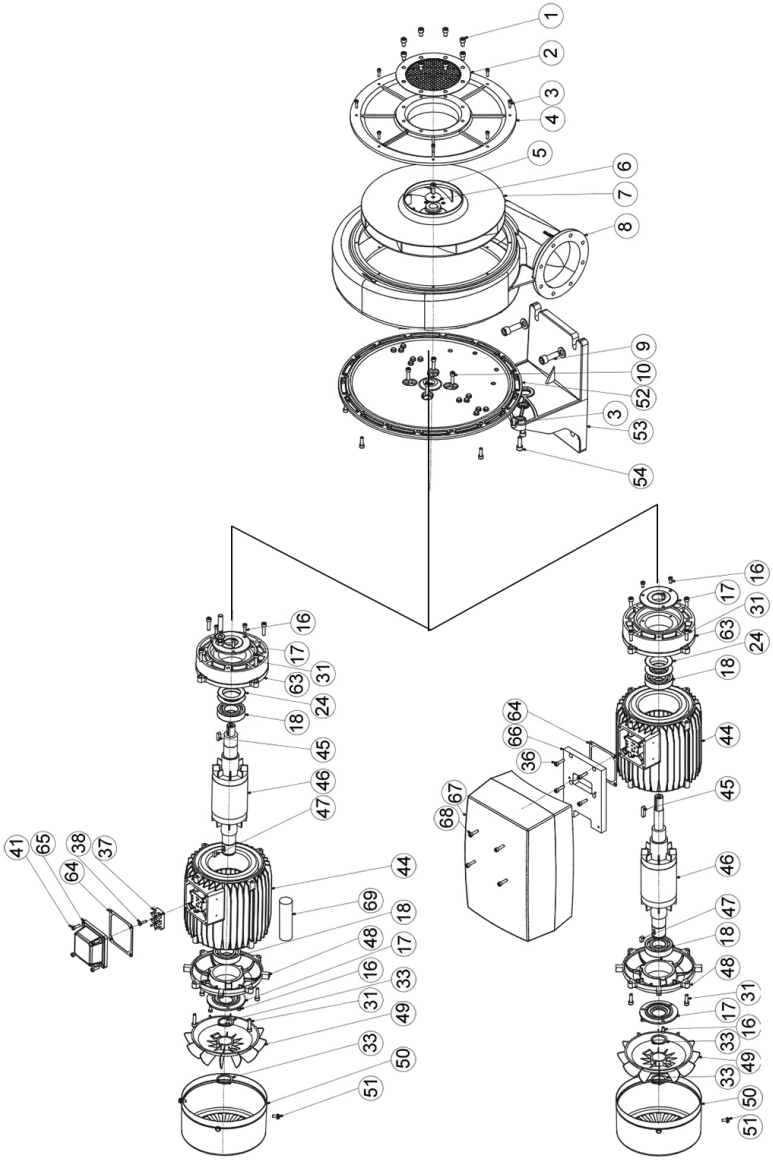


Abb. 35: Exploded View

Position.	Name
1	Screw
2	Wire mesh guard
3	Screw
4	Housing cover
5	Screw
6	Disc
7	Impeller
8	Blower housing
9	Screw
10	Screw
16	Screw
17	Bearing end cap
18	Deep-groove ball bearing
24	Disc spring
31	Screw
33	Retaining ring
36	Hex. socket bolt
37	Terminal board, complete

Position.	Name
38	Hex. socket bolt
41	Hex. socket bolt
44	Stator
45	Fitting key
46	Rotor
47	Fitting key
48	Endplate
49	Fan vane
50	Fan cowling
51	Screw
52	Blower flange
53	Blower base
54	Screw
63	Flanged end shield
64	Terminal box seal
65	Terminal box
66	Adapter plate
67	Frequency converter
68	Screw

Table 15: Spare Parts

Contact Twin City Fan & Blower for an individual spare parts list.

To do this, you need the serial number (see performance plate) of the device.

10.6 Housing Positions

The housing position of the fan is crucial for ordering some spare parts. Order spare parts to suit the direction of rotation.

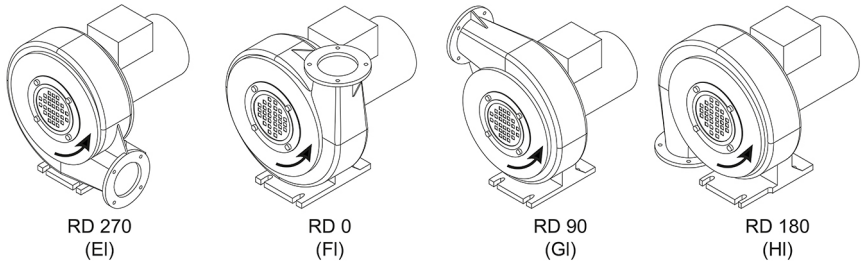


Fig. 36: Housing position left-hand-running

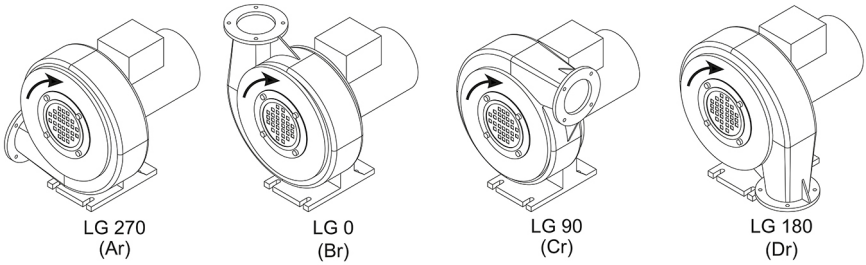


Fig. 37: Housing position right-hand drive

10.7 Table of Figures

10.8 List of Tables

10.9 Updates