



Operating instructions

(Incl. Assembly instructions in accordance with the EC Machinery Directive 2006/42/EC, Annex VI for partly completed machinery)

Axial Fan

Year: 2017

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1 Important basic information

1.1 Scope of delivery

Area of Application

Kaiser axial fans are in accordance with the Machinery Directive incomplete machines (no ready-to-use products). They are available as components for machine cooling, air transport and air-conditioning and ventilation systems. A speed control by reducing the voltage is provided constructive/possible.

Note:

The axial fans of the Kaiser Ventilatorenbau are incomplete machines in accordance with the machinery directive DIN EN ISO 2006/42/EC Article 2g. Therefore need this only an installation manual referred to in Annex VI. This operating manual contains in addition still danger notes (low-voltage directive 2014/35/EU) and other maintenance instructions for safe operation for specialist personnel.

Demarcation of responsibilities for work during installation, commissioning, maintenance, repair:

Persons with planning, installation, commissioning, maintenance and service in connection with the device, must be relevant to their field of work skills and knowledge. In addition, knowledge of safety rules, EC Directives, accident prevention regulations and the corresponding national regulations as well as regional and internal regulations. School end to pointing or to learning staff should only be used under the supervision of an experienced person on the fan assembly. In the general training resident staff should only be used under the supervision of a trained specialist in low-mass on the fan assembly. The statutory minimum age is to be observed.

Interfaces

Neither control nor control elements, electrical connection cable are included in the scope of delivery of the fan assembly.

Other applicable documents

These operating instructions on axial fans
The data sheet of the respective fan.

Procedures for the implementation of the risk assessment and risk assessment

Language of the risk assessment

german

Procedures for the implementation of the risk assessment

Machinery Directive 2006/42/EC, Annex I, first general principle
EN ISO 12100-1 Safety of machinery - General principles for design - Risk assessment and risk reduction

Procedures for risk assessment

DIN ISO/TR 14121-2 Safety of machinery - Risk assessment - Part 2: practical guidelines and procedures examples, 6.3 Risk graph

1.2 Responsibilities of the operator

Persons with planning, installation, commissioning and maintenance and Maintenance in connection with the device, must have activities relevant skills and knowledge. In addition, knowledge of safety rules, EC Directives, accident prevention regulations and the relevant national rules as well as regional and internal regulations. Staff to be trained should only be used under the supervision of an experienced person. Training resident staff should only be allowed under the supervision of a trained specialist on the fan assembly. The legal minimum age is to be observed.

1.3 Legal Information

Disclaimer

Changes to the design and technical data we reserve in the interest of the further development. No claims can therefore be derived from information, illustrations and drawings and descriptions. Error is reserved. We are not liable for damages caused by misuse, incorrect use, improper use or as a consequence of unauthorized repairs or modifications on the fans.

Copyright:

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1.4 Documentation

1.4.1 Technical terms and symbols used according to DIN ISO 7010

	General warnings		Voltage free switch
	Warning: Hot Surface		Warning against electrical voltage
	Wear head protection		Protective footwear
	Wear gloves		Caution Danger of slipping

2 Security

2.1 Proper use of the machine

Intended Use

Type of use

The fans are solely for the promotion of air or air similar mixtures.

Any other or further use is regarded as not in compliance with the intended purpose.

The manufacturer is liable for any damage resulting from this. The risk is borne solely by the user companies and/or the users.

The fan must not be connected to gas and other combustion devices can be connected.

Also includes the reading of this document, as well as the observance of all instructions contained therein - in particular the hazard and safety information for the proper use.

It is important to note also the documentation of the connected components and machines.

Area of Application

- Industrial Area,
- Business/Commercial Area,
- Small businesses,
- Machine cooling.

User Groups

The operating manual is intended for persons involved in the planning, installation in machines, installation, commissioning, and servicing and maintenance are responsible for and have the appropriate skills and knowledge for the implementation of the assigned tasks.

Example:

- Operator person (age in accordance with national law, technical qualifications to operate electrical equipment, Task: Switch on/off of the fan assembly),
- Maintenance personnel/technician (age in accordance with national law, technical qualifications to build in and off and for the maintenance of fans (experienced electrician, ventilation engineers),
- Apprentices/trainees/students may without the supervision of a specialist does not operate the fan assembly or repair/l.
- All other user groups is the handling with the fan assembly, prohibited for safety reasons.

Properties of User Groups

Disabled persons or persons with physical disabilities (cardiac pacemakers, illnesses, etc.) are dealing with the fan prohibited for safety reasons.

2.2 Possible incorrect application

Non-intended use

Reasonably foreseeable misuse

1. Demand from gaseous aggressive and explosive media.
2. Use in hazardous areas for the promotion of gases, mists, vapors or their richness.
3. Call of solids or solids contents in the conveyor medium.
4. Operate with wing wheels, iced up.
5. Operate at temperatures outside the range approved by the manufacturer.
6. Call of liquid, abrasive or adhesive media.
7. Liquids in the fan
8. Climbing the fan or use as a climbing replacement
9. Unauthorised architectural change the fan.
10. Operate the fan as a safety-technical component or for the acquisition of safety-relevant functions in the context of the DIN EN ISO 13849 (Safety of machinery - Safety-related parts of control systems).
11. Block or braking of the fan with the help of objects (bring).
12. Loosen fan blades or impeller.
13. Change of the balancing weights.

Still all is not in the proper use of these applications and possibilities.

For all personal and property damage resulting from improper use

That is not the manufacturer, but the operator of the device fully responsible.

Incorrect operation:

- Incorrect application by untrained / not trained personnel,
- Use of the wrong materials/products for the repair or maintenance without the written consultation with the manufacturer.
- Faulty electrical connection, electrical connection without the appropriate fuses.
- Maintenance without power supply.
- Do not install or shutdown of the restart prevention.
- Installation, operation without protective equipment.
- Operation without protective measures according to the operating instructions.

2.3 In compliance with the operating instructions

This operating manual is an integral part of the fan assembly. Without a precise study of the manual may not a fan installed or put into operation. Defects resulting from failure to observe the instructions will relieve the manufacturer of any liability and warranty claims.

These operating instructions are valid only for the fan and not for the complete plant, in which it is installed. This operating manual is used for safety-oriented work on and with the specified device. It contains safety directives that must be observed. as well as information on the f u r a trouble-free operation of the device are required. The operating instructions must be kept on the fan assembly.

2.4 Residual hazards and protective measures

2.5 Life stage: Operation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Engine surface	Electrical hazards	Electrical Shock	Live parts

Description of the risk



Engine runs with power, so it can take to electric shock by leading voltage supply to the motor.
Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Engine before contact voltage free switch

Protective measures



Before contact with Engine switch voltage free by emergency stop or by fuses.

3 Technical data for axial fans

The technical data specified here are general notes on the axial fans.

These are based on the data on the data sheet of the fan assembly and on the rating plate.

Changes to the design and technical data we reserve in the interest of further development. From the information, illustrations and drawings and descriptions can be derived therefore no claims.

The error is reserved.

Mains voltage(type plate) ⇨	Alternating current motor: 230V +/- 10%, 50 Hz Three-phase motor: 400V +/- 10%, 50 Hz
The switching frequency of the fans:	Control must not allow any extreme switching operations! These are designed for continuous operation.
Minimum and maximum permissible ambient temperature for operation	Three phase types: -10°C to +60°C Deviations to this are taken from the data sheet. The values of the data sheets are decisive.
Permissible temperature range for storage and transport	-40°C to.+60 ° C When switching to avoid the formation of ice.
DB(A) Values	⇨ Data Sheet
The degree of protection of the motor according to DIN EN 60529	IP 44, IP 54 on request Special case IP X6

4 Delivery, Internal Transport, Unpacking

4.1 Storage

Store the fan dry and weather-protected and protect it until the final assembly from dirt and weather effects, particularly moisture.

Avoid extreme heat or cold.

Observe the specified minimum and maximum storage temperatures.

Avoid long storage periods and check before the installation of the proper function of the motor bearings and whether the impeller/impeller can move freely without touching.

4.2 Internal Transport

When handling use safety shoes and use protective gloves!

Move the fan or fans only at the provided transport devices (housing ring) with appropriate means of transportation.

Caution: in no case under a floating fan, because in the event of a defect on the transport medium danger to life.

It is essential to observe the indications of weight to the fan and the perm. Load capacity of the means of transport.

4.3 Security information's

4.4 Life stage: assembly and installation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Location	Mechanical Hazards	Rub, abrade	Sharp Edges

Description of the risk

At the edges of the frame can be abrasions.

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

To avoid abrasion

Protective measures

When installing use gloves and protective clothing.



4.5 Life stage: assembly and installation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Location	Mechanical Hazards	Slips, trips and falls	The lack of stability/security; slippery surface

Description of the risk

During transportation and assembly may be due to slippery flooring and incorrect footwear to fall.

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Safe and Secure

Protective measures



Secure stand in the assembly elections, safety shoes and safety equipment. At the risk of tripping during transport.



5 Mounting and installation, initial commissioning

5.1 Assembly and Installation

Installation, electrical connection and commissioning may only be performed by qualified personnel.

	<p>When handling safety shoes and use protective gloves!</p>
	<p>The system or system manufacturer has the responsibility to ensure that plant-specific installation and safety instructions in accordance with the applicable standards and regulations (DIN EN ISO 12100 / 13857).</p>

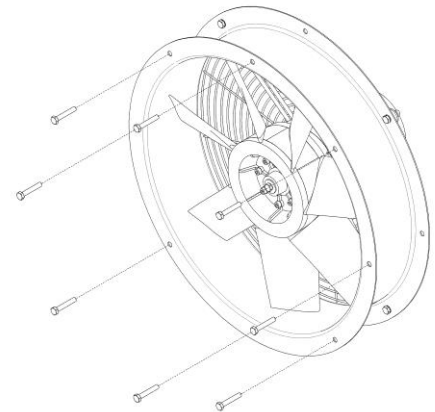
When mounting on the housing ring screws size M5 (K- and L-series) or M6 (M- and G-series) and of strength class 8.8 and use suitable screws to lock. Permissible tightening torques in accordance with DIN EN ISO 4014 (cap), the lower coefficient of friction $\mu=0.12$.

All fittings with a suitable thread lock.

Install not strained. Flange and housing ring must rest plan.



In the event of a fan built distorted by uneven ground, strips of the impeller to the failure of the fan.

Avoid touches of the impeller on the housing ring



Inspect for any transport damage.

The condensation drain hole must be down and must be opened to allow water to drain. Note the installation position according to the catalog.


	<p>Caution: All operating support points must be securely connected to the Foundation. In case of insufficient mounting there is a risk of tipping of the fan assembly.</p>
	<p>The fan should be over-the-head or be mounted at head height, during the mounting wear a safety helmet.</p>

5.2 Electrical connection

The electrical connection of the fan assembly must only be made by a skilled electrician in accordance with DIN VDE 1000-10 (VDE 1000-10):2009-01.

The fan may only be connected to circuits with an all phases dividing-switch (all-pole protection switch).

Electrical connection according to diagram table (also on the website of the manufacturer under Service).

	<p>Before Connecting: All lines have to be checked with a two-pole voltage tester to check for non-voltage. Work on devices that are under voltage/tension is prohibited and may lead to electric shock.</p>
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No metal cable gland on the terminal box - electric shock in the case of incorrect connection possible!


Use only cables that guarantee permanent tightness in cable glands (pressure-resistant-form-stable, centrally-round jacket) Depending on the type of cable entry water drain sheets provide or use dope.

Ground connection must always be used, even in the case of test or test conditions.

Tightening torque for terminal box M3: 1.1 Nm

The alternative current motors (2-phase, 230V) are equipped with PTC thermistors (internally interconnected thermostat switches).

There is no external connection necessary.

	<p>Caution: The thermostat (PTC thermistors) switches again automatically after tripping due to high temperature and cooling. The fan can start up independently.</p>
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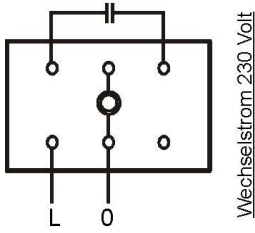
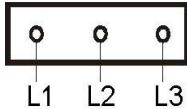
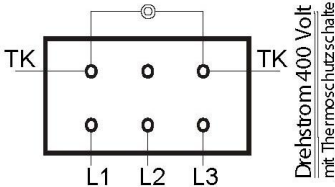
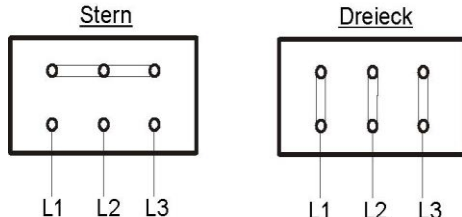
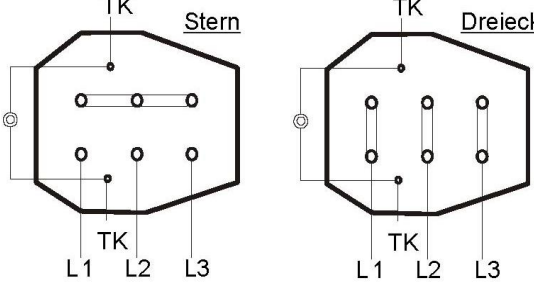

The three-phase AC motors (400V) are equipped with lead-out thermostat switches.

Connecting these PTC thermistors on the PTC tripping device (contactor control unit with connection for PTC). Thermostats (PTC thermistors) have to be inserted into the control circuit, that in case of failure after cooling no automatic reconnection is affected.

Some axial fans are without thermal protection. Therefore there is a motor circuit breaker built in front.

Unauthorized changes/modifications to the fan are not allowed ⇒ security risk.

Fan Type	Connection-Diagram
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<p>LE 254; LE 304; LE 354;</p> <p>KE 254; KE 304; KE 354;</p>	<p>ME 304; ME 354; ME 404; ME 454;</p> <p>GE 404; GE 454; GE 504;</p>	 <p>Wechselstrom 230 Volt</p>
<p>LD 254; LD 304; LD 354;</p>	<p>KD 254; KD 304; KD 354; KD 404;</p>	 <p>Drehstrom 400 Volt ohne Thermoschutz</p>
<p>LD 252; LD 302; LD 352;</p>	<p>KD 252; KD 302; KD 352;</p>	 <p>Drehstrom 400 Volt mit Thermoschutzschalter</p>
<p>Without thermal protection switch</p> <p>MD 404; MD 454;</p> <p>GD 404; GD 454; GD 504;</p>	 <p>Drehstrom 400/690 Volt</p>	
<p>With thermal protection switch</p> <p>MD 304; MD 354; MD 404; MD 454;</p> <p>GD 404; GD 454; GD 504;</p>	 <p>Drehstrom 400/690 Volt mit Thermoschutzschalter</p>	
<p>TK = thermal contact (-switch) L1, L2, L3 = external power supply cables; N, 0 = neutral conductor</p> <p>The motor housing must be connected with the grounding connection. </p>		

5.2.1 Standard Voltage:

	The supply voltage must be in the IEC 60038 defined standard voltages!
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5.3 Initial Commissioning

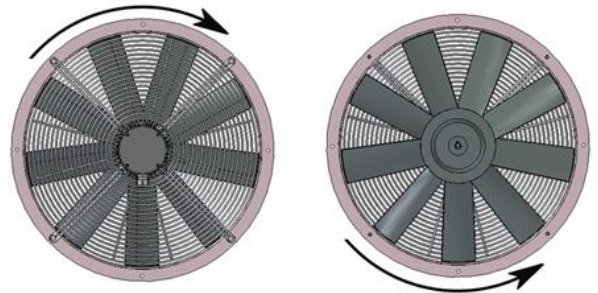
Before the first commissioning is to check:

1. Is the installation and the electrical installation has been completed in a professional manner?
2. Safety devices are installed (touch protection grid) and have been fixed?
3. Are the fitting residues and debris from the fan compartment has been removed?
4. Protective conductor connected?
5. Temperature Monitor/motor protection switch is correctly connected and fully operational?
6. Cable entry seal (see "Installation")?
7. Is the installation location suitable for condensation drainage holes opened and in the correct position?
8. Voice connection data with data on the type plate?

	Commissioning may only be carried out if all safety information is checked and a risk is excluded
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The direction of rotation/air direction control:
With a view to the impeller and the motor in a clockwise direction.

Check for quiet operation. Strong vibrations by roughness (unbalance), e.g. through transport damage or improper handling can cause failure.



5.4 Operation on frequency converters

	<p>When operating with frequency converters is urgently plan to ensure that between the frequency converter output and the motor input allpoligen sine-wave filter (sinusoidal output voltage! Phase-to-phase, Phase to protective conductor) is connected. These are offered by many manufacturers converter or are sold separately.</p> <p>So-called du/dt filter (also engine or damping filter) may not instead of allpoligen sine-wave filters are used.</p>
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Referring to the European standard for rotating electrical machines, DIN IEC/TS 60034-17, is the increased stress on the motor winding systems by voltage peaks and the risk of bearing currents through capacitive induced voltage to prevent that from happening by a sine-wave filter is used.

5.5 Security

5.6 Life stage: Operation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Engine surface	Electrical hazards	Electrical Shock	Live parts



Description of the risk

Engine runs with power, so it can take to electric shock by leading voltage supply to the motor.
Vulnerable persons



Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Switch Engine of free voltage before contact.

Protective measures

Before contact with Engine switch voltage free by emergency stop or by fuses.

5.7 Life stage: Operation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Air outlet	Additional common hazards	Break during operation	Ejected objects or liquids; malfunctions of the machine

Description of the risk

Parts of the impeller can be thrown out in the event of breakage

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Air outlet secure against partial loss

Protective measures

Protective grilles at air outlet install.
Observe the maintenance plan.

5.8 Life stage: Operation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Air outlet	Additional common hazards	Ejected objects or liquids	Ejected objects or liquids; malfunctions of the machine

Description of the risk

Parts of the impeller can be thrown out in the event of breakage

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Air outlet against partial loss back through the protective grating.

Protective measures

Protective grille at air outlet install.
Observe the maintenance plan.

5.9 Life stage: Operation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Engine surface	Protection against electrical hazards	Leakage Current	Live parts

Description of the risk

In the case of incorrect connection can lead to an electric shock through leading voltage supply to the motor.

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Engine before contact voltage free switch, grounding is to properly connect and external cabling.

Protective measures

Connect Motor through the grounding cable and external security hardening.

**5.10 Life stage: Operation**

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Engine surface	Protection against electrical hazards	Electric shock	Live parts



Description of the risk

Electric shock through leading voltage supply line to the motor

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Engine before contact voltage free switch

Protective measures

Engine before contact voltage free switch by automatically switch off or external fuses.

5.11 Life stage: assembly and installation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Location	Mechanical Hazards	Rub, abrade	Sharp Edges

Description of the risk

At the edges of the frame can be abrasions.

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

To avoid abrasion

Protective measures

When installing, gloves and protective clothing.



5.12 Life stage: assembly and installation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
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Hazard location	Risk Group	Risk Consequence	Hazard Origin
Location	Mechanical Hazards	Slips, trips and falls	The lack of stability/security; slippery surface

Description of the risk

During transportation and assembly may be due to slippery flooring and incorrect footwear to fall.

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Safe and Secure

Protective measures

Secure stand in the assembly elections, safety shoes and safety equipment. At the risk of tripping during transport.



6 Operation

6.1 Commissioning

Before commissioning, it is necessary to check whether the safety distances in accordance with DIN EN ISO 13857 are maintained.

At a mounting height (hazardous area) is greater than or equal to 2700 mm relative to the reference plane and this is not the result of reduced aid, a protection grille on the fan assembly is not required.

If the fan is in the hazardous area, the operator of the plant must install a protective grille which can be supplied by the manufacturer or a protective construction corresponding to DIN EN ISO 13857 should be avoided

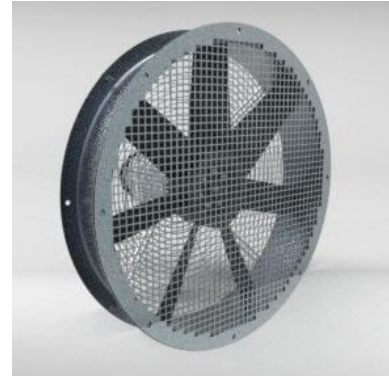


Figure 1: Axial Fan with protective grille

6.2 Safety Instructions

6.3 Life stage: Operation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Air inlet and outlet	Mechanical Hazards	Crushing	Rotating parts

Description of the risk

Risk of fingers being crushed between the impeller and fan ring by reaching in during operation.

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Crushing/shearing/Abrasions avoid

Protective measures

Constructive solution, technical protective measure:

Protective grille at the air inlet and outlet fitting if a grasping would be possible.



6.4 Life stage: Operation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Air inlet and outlet	Mechanical Hazards	Shears	Rotating parts; sharp edges



Description of the risk

Crushing/shearing of the finger between the impeller and the inlet nozzle or housing by reaching in during operation.

The finger between the impeller and the inlet nozzle by reaching in during operation.

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Crushing/shearing/Abrasions avoid

Protective measures

Constructive solution, technical protective measure:

If a grasping in operation is possible, are protective grille at the air inlet and outlet. This order from the manufacturer or according to EN ISO 13857:2008 to manufacture and install.

6.5 Life stage: Maintenance

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Location	Protection against other hazards	Manufacture and interruption of the power supply	Operator error, malfunctions of the machine

Description of the risk

Accidental restarting of the fan

Vulnerable persons



Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Automatic restart must be prevented or observed.

Protective measures

Technical safety measure:

After a power failure or power shutdown is performed after return of voltage a

Automatic restart of the fan! Therefore, the fan before any

Switch off power to work.

In the case of automatic protection the fan in maintenance cases of hand to disconnect from the line.

In front of the approach to the standstill of the fan wait!

7 Troubleshooting








The first measures to eliminate the fault

Fault / Error Message	Possible Cause(s)	Remedy
Impeller rotates not (more) or Fan not running on	Failure of supply voltage, Failure of one or more phases	All phases of the line supply voltage check
	Ground Circuit	Check Engine Connection
	Winding short circuit / grounding circuit	Replace motor or send to manufacturer
	Thermal contact has been triggered	Air-free? ⇒ Remove the foreign object ⇒ Unblock blocked impeller The air intake temperature is too high? ⇒ Data Sheet test the voltage ⇒ Remove the overvoltage Only in the case of alternating current motors: check condenser
	Impeller is blocked or Dirty	<ol style="list-style-type: none"> 1. Switch off the power supply for the motor and secure against switching on again 2. Check if fit is voltage free 3. Remove debris or contamination 4. Further procedure as described in the section "Commissioning"
Impeller rotates in the wrong direction	Incorrectly connected	With three-phase motor ⇒ change 2 phases In the case of alternating current motors ⇒ black cable change against each other
Flow too low or Fan rotates too slowly	Phase failure	Check the tension of all phases
	For three-phase motors	Star-delta circuit check ⇒ for correct connect the line voltage
	Impeller slips	⇒ Impeller does not turn
	Air blocked	Air-free? ⇒ Remove foreign objects
	Pressure loss is too high	Incorrect Fan selection ⇒ fan change.

Fault / Error Message	Possible Cause(s)	Remedy
Vibration or noise too high	Impeller has imbalance or is defective	Check for damaged impeller, remove soiling ⇒ " Impeller is blocked or dirty"
Unusual noises	Bearing defective	Replace ball bearings against new ball bearings of manufacturer
	Impeller defective	Replace Impeller
	Impeller out of balance	Clean or replace impeller






8 Maintenance

8.1 Instructions for inspection and maintenance

	Only qualified personnel may repair and maintenance work. You must observe the safety instructions at the end of the chapter!
	If there are faults at the plant/machine/fan or on the electrical equipment or assemblies detected, these must be corrected immediately. Until then there is an acute danger, so the device / system must in the poor condition not be operated.
	Note for all maintenance and service work safety and labor regulations (EN 50 110, IEC 364).
	The fan is in front of maintenance work on the voltage disconnected and secured against switching on again!
	Fuses must only be replaced and not repaired or bypassed. The specifications for the maximum back-up fuse must be observed (⇒technical data).
	Keep the air through the fan-free - Danger by flying objects (see DIN EN ISO 12100:2010).
	Maintenance work on the running fan is prohibited.
	Check the impeller to run without vibrations! Impeller must be regularly checked for debris and pollution. This can lead to imbalance and thus to damage (danger of fracture). Maintenance intervals after wear/pollution degree of the wheel! An unbalanced or defective impeller is be replaced immediately. Repairs on the impeller or housing are prohibited for safety reasons.
	The axial fans are equipped with closed ball bearings that are maintenance-free. Nevertheless, should for security reasons the ball bearings have to be replaced, no standard ball bearings may be used. The ball bearings have a special bearing air. The ball bearings are lubricated for life with a high-temperature ball bearing grease.
	Do not use standard ball bearing! Spare ball bearings are available from the manufacturer.
	Periodic inspection, if necessary cleaning of deposits is necessary in order to avoid imbalance due to dirt.
	Cable glands on the fan / motor check. Defective or brittle glands and seals must always be replaced.
	After completion of the work and before re-commissioning the touch grid must be attached back correctly!

8.2 Regular maintenance / cleaning

Activity	Time Period
Check for contamination of the fan assembly and cleaning of the air-flow-through areas	On a regular basis depending on the load level.
Check the smoothness and balancing of the Impeller	Regularly
Visual inspection of the air ducts in the fan	Regularly

	<p>Before cleaning the fan disconnect from the voltage and secure it against switching on again.</p>
	<p>No aggressive cleaning solvent or paint, corrosion, caustic cleaning agents are used.</p>
	<p>There should be no water in the interior of the motor and the electronics (e.g. through direct contact with seals or engine openings), ⇒ degree of protection (IP).</p>
	<p>The mounting position matching the condensation water drain holes (if equipped) must be checked for continuity. For improper cleaning work is no warranty.</p>
	<p>After the cleaning process, the fan must be dry for a few hours. Switch on the fan only when this is completely dry, risk of electric shock.</p>

8.3 Safety Instructions**8.4 Life stage: Operation**

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Engine surface	Electrical hazards	Electrical Shock	Live parts

Description of the risk

Engine runs with power, so it can take to electric shock by leading voltage supply to the motor.

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Engine before contact voltage free switch

Protective measures

Engine before contact voltage free switch by emergency stop or by fuses.

**8.5 Life stage: Operation**

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Air outlet	Additional common hazards	Break during operation	Ejected objects or liquids; malfunctions of the machine

Description of the risk

Parts of the impeller can be thrown out in the event of breakage

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Air outlet secure against partial loss

Protective measures

Constructive solution, technical protective measure:

Protective grille at air outlet install.

Observe the maintenance plan.

8.6 Life stage: Operation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Air outlet	Additional common hazards	Ejected objects or liquids	Ejected objects or liquids; malfunctions of the machine

Description of the risk

Parts of the impeller can be thrown out in the event of breakage

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Air outlet against partial loss back through the protective grating.

Protective measures

Constructive solution, technical protective measure:

Protective grille at air outlet install.

Observe the maintenance plan.

8.7 Life stage: Operation

Hazard location	Risk Group	Risk Consequence	Hazard Origin
Engine surface	Lsc - Protection against electrical hazards	Electric shock	Live parts

Description of the risk

Electric shock through leading voltage supply line to the motor

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Engine before contact voltage free switch

Protective measures

Engine before contact voltage free switch by no-TAus or external fuses.



Location

Illustration and explanation of the warning symbol in the operating instructions.

8.8 Life stage: Maintenance

Hazard location	Risk Group	Risk Consequence	Hazard Origin
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Hazard location	Risk Group	Risk Consequence	Hazard Origin
Location	Protection against other hazards	Manufacture and interruption of the power supply	Operator error, malfunctions of the machine

Description of the risk

Accidental restarting of the fan

Vulnerable persons

Specialist staff is because of his technical training, knowledge and experience as well as knowledge of the relevant standards and regulations in the situation that the work assigned to run independently and possible hazards to recognize and to avoid hazards.

Protection Goal

Automatic restart must be prevented or observed.

Protective measures

Technical safety measure:


After a power failure or power shutdown is performed after return of voltage a Automatic restart of the fan! Therefore, the fan before any Switch off power to work.

In the case of automatic protection the fan in maintenance cases of hand to disconnect from the line.

In front of the approach to the standstill of the fan wait!

9 Additional Documents

9.1 Data sheet

	<p>The data sheet will be sent separately with this document. If the operator has not received a data sheet for the particular fan, this must be requested from the manufacturer or downloaded from www.kaiser-kg.de Please ask the manufacturer whether the data sheet is current and still valid. ⇒ Point 1.3.</p>
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