POLLRICH

MOVING AIR.
SAVING ENERGY.





OPERATING MANUAL
CENTRIFUGAL FANS

Edition 1 - 12/2020

Observe machine-related main documentation!

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1. GENERAL INFORMATION

1.1 INFORMATION ABOUT THIS MANUAL

- This operating manual is part of the fan.
- Keep the operating manual in the immediate vicinity of the machine and accessible at all times.
- Read through this manual carefully before starting any work.
- Observe all specified safety instructions and handling instructions.
- Observe local accident prevention regulations and general safety regulations.
- Illustrations in this manual can be different from the actual version.

The manuals of the installed components are applicable in addition to this manual.

The user of this operating manual must have appropriate language skills to be able to understand the text and follow the technical terms.

1.2 OTHER APPLICABLE DOCUMENTS

The following information must be observed:

- Type plate
- DIN EN ISO 12100 : 2011-03
- DIN EN ISO 13857 : 2020-04
- Machinery Directive 2006/42/EU
- ATEX-Directive 2014/34/EU

1.3 EXPLANATION OF SYMBOLS

SAFETY INSTRUCTIONS

Safety instructions in this manual are identified by symbols. The safety instructions are introduced by signal words which express the severity of the hazard.

Safety instructions must be strictly observed and care must be taken to prevent accidents, Personnel injury and damage to property.

DANGER!
This combination of symbol and signal word indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING!
This combination of symbol and signal word indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION!
This combination of symbol and signal word indicates a potentially hazardous situation which, if not avoided, could result in minor or slight injury.

NOTE!
This combination of symbol and signal word indicates a potentially hazardous situation which, if not avoided, could result in property and environmental damage.

TIPS AND RECOMMENDATIONS

This symbol highlights useful tips and recommendations as well as information for efficient and trouble-free operation.

SPECIAL SAFETY INSTRUCTIONS

The following symbols are used in safety instructions to draw attention to particular dangers:

DANGER!
Indicates hazards from electrical current. If the safety instructions are not observed, there is a risk of serious or fatal injuries.

WARNING!
This combination of symbol and signal word indicates contents and instructions that apply for use in potentially explosive atmospheres according to Directive 2014/34/EU. Non-observance of these contents and instructions may result in the loss of explosion protection.

SYMBOLS IN THIS MANUAL

The following symbols and highlights are used in this manual to identify instructions for action, descriptions of results, lists, references and other elements:

➲ Indicates step-by-step instructions for action.
⇨ Indicates a state or an automatic sequence as the result of an action step.
■ Indicates lists and list entries without a fixed order.
↳ Indicates references to chapters of this manual.

1.4 COPYRIGHT

1.5 LIMITATION OF LIABILITY

All information and instructions in this manual have been compiled taking account of the applicable standards and regulations, the state of the art and our many years of knowledge and experience.

The manufacturer shall not be liable for damages due to:
- Failure to comply with the applicable safety, accident prevention and environmental protection regulations
- Failure to observe these instructions
- Non-intended use
- Deployment of untrained personnel
- Unauthorised conversions
- Technical changes
- Use of non-approved spare parts

The actual scope of delivery can be different from the explanations and illustrations described here in the case of special designs, the taking up of additional order options or due to the latest technical changes.

The obligations agreed in the supply contract, the general terms and conditions of business as well as the manufacturer's terms of delivery and the applicable legal regulations at the time of conclusion of the contract shall apply.

1.6 SPARE PARTS

WARNING!
Risk of injury from the use of incorrect spare parts!

The use of incorrect or defective spare parts can cause dangers for the personnel as well as damage, malfunctions or total failure.

- Only use original spare parts from the manufacturer or spare parts approved by the manufacturer.
- Always contact the manufacturer in the case of doubt.

Purchase spare parts from authorised dealers or directly from the manufacturer. See www.pollrich.com .

1.7 EXPLOSION PROTECTION

WARNING!
Risk of explosion from the use of incorrect spare parts!

The use of incorrect or defective spare parts can result in explosions in the Ex-zone. This can result in serious injuries or even death, as well as considerable damage to property.

- Only use original spare parts from the manufacturer or spare parts expressly approved by the manufacturer.
- Always contact the manufacturer in the case of doubt.

Failure to comply with these instructions will result in loss of explosion protection.

1.7.1 Fans according to 2014/34/EU

If the fan is a design according to Directive 2014/34/EU (ATEX), the intended use is limited to:

- The application area
- The Use Category
- The explosion group for gases and vapours
- The gas or dust type
- The temperature class

This information can be found again on the ATEX type plate on the fan and in the associated ATEX questionnaire. Use in installation environments or plant areas other than those specified is prohibited.

1.7.2 Limits for the use of fans according to 2014/34/EU

The boundary conditions for the use of fans according to 2014/34/EU are:

- Maximum intake temperature under ambient atmospheres in the temperature range from -20 °C to +60 °C
- Absolute pressure of 0.8 to 1.1 bar
- Maximum oxygen volume fraction 21%

If the operating conditions are different from the above mentioned boundary conditions, the rules from the work instruction P-AA-025, chapter 12.3 apply.

Extract from work instruction P-AA-025, chapter 12.3:

12.3 Deviations from the inlet conditions

If the operating conditions are outside the specified limits, there are 2 possible courses of action:

12.3.1 POLLRICH responsibility

POLLRICH confirms to the customer that the fan is constructed in accordance with the standard:

The existing operating conditions are outside the limits specified by the standard DIN EN 14986:2017. The fan design complies with the requirements of the stated standard.
The fan does not have a declaration of conformity according to Directive 2014/34/EU.

12.3.2 Customer responsibility

The customer confirms to POLLRICH that a change in operating conditions will not result in an increased risk of ignition of the medium:

The operating conditions for the fan requested by the customer are outside the operating conditions defined in DIN EN 14986: 2017-04 for fans for use in potentially explosive atmospheres.
The customer ensures that the change in the operating conditions does not result in an increased ignition risk.

Based on the available data and the assurance from the customer, POLLRICH determines that the fan can be used in the defined, explosion-protected area and that a declaration of conformity according to Directive 2014/34/EU can be issued.

Deviations from the operating conditions defined by the customer invalidate the product conformity.

The “P-QF-048_ATEX_Questionnaire” form should be used for this.

<u>The following additional instructions are applicable for fans according to Directive 2014/34/EU (ATEX):</u>
In the event of modifications of any kind to a fan marked in accordance with Directive 2014/34/EU (ATEX), which are not carried out in agreement with POLLRICH, the originally issued Declaration of Conformity becomes invalid.

The validity of the declaration of conformity can be maintained if appropriate checks are made and documented by a competent person after completion of the modification work and before commissioning the fan. These include in particular the gap dimension check, vibration measurement and other checks to ensure that sparking is ruled out.

The competent person must have been authorised to install the components in accordance with the Industrial Safety Regulation §14 and §15. In addition, the competent person must be able to recognise and prevent possible dangers for persons as well as damage to property and the environment. Written confirmation of the tests performed with corresponding test reports must be sent to POLLRICH without being asked. Please always contact us if there are any questions or uncertainties.

If the fan is in Use Category II, we will inform the Notified Body where the documentation has been filed in an appropriate form.

2. SAFETY

The owner, as the responsible party for the product, is responsible for the optimal and complete protection of the personnel as well as for safe and trouble-free operation.

The handling instructions and safety instructions included in this manual must be observed to avoid significant hazards.

2.1 REGULATIONS

- Observe safety and accident prevention regulations and the EC Machinery Directive 2006/42/EC.
- The owner is legally responsible for the product.
- Only operate the fan in faultless condition.

2.2 INTENDED USE

The machine has been designed and constructed exclusively for the intended use described here. The fan has been developed, designed, built, tested and delivered for the design conditions specified in the purchase order. Any use that goes beyond this definition is considered to be non-intended use.

The fan is used exclusively to transport the medium defined in the order and the defined performance limits.

Intended use also includes compliance with all information in this manual.

Any use beyond the intended use or any other use is considered misuse.

Claims of any type for damages due to misuse are excluded.

WARNING!
Danger from misuse!
Misuse of the fan may result in dangerous situations.

- Transport of unsuitable media.
- Operation of the fan outside the specified performance limits (speed, maximum temperature).

- Operation without protection devices.
- Non-compliance with the specific cleaning intervals.
- Operation despite inadequate or no lubrication.
- Operation of the fan in potentially explosive atmospheres.
- Operation of the fan within an unintended group, category, zone or temperature class according to ATEX.

2.2.1 Suction and pressure side flow losses

NOTE!

The flow behaviour of a fan can be negatively influenced by unfavourable installation conditions. The operating point of the fan can shift to an unauthorised work area (demolition zone). In this case, there is no warranty claim for consequential damage - in particular due to (resonance) vibrations.

2.3 RESPONSIBILITY OF THE OWNER

OWNER

The owner is the entity that operates the machine itself for commercial or economic purposes or entrusts a third party with the use/application of the machine and bears the legal product responsibility for the protection of the user, personnel or third parties during operation.

OBLIGATIONS OF THE OWNER

The machine is used in the commercial sector. The owner of the machine is therefore subject to the legal obligations for occupational health and safety.

In addition to the safety instructions in this manual, the applicable safety, accident prevention and environmental protection regulations for the area of application of the machine must be observed.

This particularly applies for the following:

- The owner must inform itself about the applicable occupational health and safety regulations and determine additional hazards resulting from the special working conditions at the operating site of the machine in a hazard analysis. These must be implemented in the form of operating instructions for the operation of the machine.
- During the entire operating time of the machine, the owner must check whether the operating instructions
  prepared by it correspond to the current status of the regulations and, if necessary, adapt them.
- The owner must clearly regulate and define the responsibilities for installation, operation, troubleshooting, maintenance and cleaning.
- The owner must ensure that all employees who work with the machine have read and understood these instructions. In addition, the owner must train the personnel at regular intervals and inform them about the dangers.
- The owner must provide the necessary protective equipment to the personnel.
- The owner must install a fixed protective device in the fan intake area for free-inlet fans to ensure that no clothing or objects are drawn in.
- In the case of free-blowing fans, the owner must install a fixed guard in the fan blow-out area to prevent objects or persons from falling into it.
- The prohibition of access for unauthorised persons
- The clear signage of all prohibitions

Furthermore, the owner is responsible for ensuring that the machine is always in technically faultless condition, therefore the following applies:

- The owner must ensure that the maintenance intervals described in this manual are observed.
- The owner must arrange for all safety equipment to be checked regularly for proper functioning and completeness.

ADDITIONAL OWNER OBLIGATIONS FOR EXPLOSION PROTECTION:

The owner must comply with further obligations of the Occupational Health and Safety Directive (ATEX153) 99/92/EC to improve the health and safety of workers potentially at risk from explosive atmospheres.

This includes compliance with further organisational measures such as:

- the marking of the Ex-zones
- compiling an explosion protection document for each zone
- securing the fan against foreign bodies falling in and being drawn in. The suction of foreign bodies can be prevented by a protective device of protection class IP 20 which must be integrated into the connection line. This protective device must be conductively connected to the conductive plant components and earthed.

2.4 SAFETY DEVICES

WARNING!
Danger to life from non-functioning safety devices!

- Before starting work, check that all safety devices are functional and correctly installed.
- Never disable or bypass safety devices.
- Ensure that all safety devices are always accessible.

NECESSARY INTEGRATION IN AN EMERGENCY STOP CONCEPT

The device is intended for use within an installation. It does not have its own controller and no autonomous emergency stop function.

The device must be equipped with an emergency stop device before commissioning and integrated into the safety concept of the installation.

The emergency stop devices must be connected so that the occurrence of dangerous situations for persons and property is ruled out in the event of an interruption or activation of the power supply.

The emergency stop devices must be installed so that they are freely accessible.

AUTOMATIC OR SEMI-AUTOMATIC OPERATION

If the fan is integrated into a ventilation system and is operated by a semi-automatic or automatic control system, the fan must be brought to a safe standstill in the event of an emergency shutdown. The plant owner is responsible for the correct control of the installation.

The fan itself does not have an emergency stop or emergency stop device.

INTERVENTION PROTECTION

Compliance with DIN EN ISO 13857 only refers to the installed contact protection if it is included in the scope of delivery. The owner is responsible for providing complete protection against accidental contact in the installation environment.

2.5 PERSONNEL REQUIREMENTS

2.5.1 Qualifications

WARNING!
Risk of injury in the event of inadequate qualification of the personnel!

If unqualified personnel carry out work on the machine or stay in the danger area of the machine, dangers arise which can cause serious injuries and substantial damage to property.

- Only allow all activities to be performed by appropriately qualified personnel.
- Keep unqualified personnel away from the danger zones.

Definition of terms:

QUALIFIED ELECTRICIAN

Due to their professional training, knowledge and experience as well as knowledge of the relevant standards and regulations, qualified electricians are able to carry out work on electrical installations and to independently recognise and avoid possible hazards.

Qualified electricians are specially trained for the working environment in which they work and are familiar with the relevant standards and regulations.

The qualified electrician must comply with the provisions of the applicable statutory accident prevention regulations.

Qualified electricians with additional qualification in explosion protection are specially trained for the field of activity in which they work and are familiar with the relevant standards and regulations.

Qualified electricians with additional qualification in explosion protection are able to carry out work on electrical installations and independently recognise and avoid possible dangers due to their technical training and experience.

The qualified electrician with additional qualification in explosion protection is also familiar with all standards and regulations relevant to explosion protection, in particular, but not exclusively, with all parts of EN 60079 [Electrical apparatus for explosive gas atmospheres] and 2014/34/EU (ATEX).

The qualified electrician with additional qualification in explosion protection must comply with the provisions of the applicable statutory accident prevention regulations.

QUALIFIED PERSONNEL

Due to their technical training, knowledge and experience as well as their knowledge of the relevant regulations, qualified personnel are able to carry out the work assigned to them and to independently recognise and avoid possible hazards.

Qualified personnel for potentially explosive atmospheres are able to carry out work on systems or subcomponents in potentially explosive atmospheres and to recognise possible hazards independently due to their specialist training, knowledge and experience as well as knowledge of the relevant standards and regulations.

Qualified personnel for potentially explosive atmospheres have knowledge of the various types of ignition protection, installation procedures and division of areas in potentially explosive atmospheres and have proof of the claimed experience and knowledge.

Qualified personnel for potentially explosive atmospheres are familiar with the rules and regulations relevant to their work and explosion protection, in particular, but not exclusively, with ATEX Product Directive 2014/34/EU and all parts of EN 60079 (Electrical apparatus for explosive gas atmospheres).

MANUFACTURER

For some work, only the manufacturer is able to carry out this work professionally due to its special knowledge and experience with the product.

PERSONNEL

Only persons who can be expected to perform their work reliably are allowed as personnel. Persons whose ability to react is affected, e.g. by drugs, alcohol or medication, are not allowed.

When selecting personnel, observe the applicable age and occupation specific regulations at the operating site.

2.5.2 Unauthorised persons

WARNING!
Danger to life for unauthorised persons from dangers in the danger and working area!

Unauthorised persons who do not meet the requirements described here are not aware of the hazards in the work area. Therefore, there is a risk of serious injury or death for unauthorised persons.

- Keep unauthorised persons away from the danger and work area.
- If in doubt, speak to persons and instruct them to leave the danger and work area.
- Interrupt the work while unauthorised persons are present in the danger and work area.

2.5.3 Instruction

The personnel must be instructed regularly by the owner according to his safety documentation. The implementation of the instruction must be documented for better tracking.

The owner must include a template for the documentation of the instruction in his safety documentation.

2.6 FUNDAMENTAL DANGERS

The following section lists residual risks which may arise from the machine and which have been determined by a risk assessment.

Observe the safety instructions listed here and the safety instructions in the other chapters of this manual to reduce health hazards and avoid dangerous situations.

2.6.1 General hazards at the workplace

NOISE

WARNING!
Risk of injury from noise!

The occurring noise level in the work area can cause serious hearing damage.

- Always wear hearing protection when working.
- Only stay in the danger area for as long as is necessary.

DIRT AND OBJECTS LYING AROUND

CAUTION!
Risk of injury from falling over dirt and objects lying around!

Dirt and objects lying around create slipping and tripping hazards. A fall can cause injuries.

- Always keep the work area clean.
- Remove objects that are no longer required from the work area and particularly from floor level.
- Mark unavoidable tripping points with yellow-black marking tape.

2.6.2 Dangers from electrical energy

ELECTRIC CURRENT

DANGER!
Danger to life from electric current!

- Only allow work on the electrical system to be performed by qualified electricians.
- If the insulation is damaged, switch off the power supply immediately and arrange repair.
- Before starting work on active parts of electrical systems and equipment, ensure that they are de-energised and remain so for the duration of the work. Observe the 5 safety rules:
  - *Disconnect completely.*
  - *Secure against reconnection.*
  - *Check absence of voltage.*
  - *Ground (earth) and short-circuit.*
  - *Cover or shield adjacent live parts.*

Never bypass or disable fuses. Observe the correct current rating when replacing fuses.

- Keep moisture away from live parts. This can cause a short circuit.

2.6.3 Mechanical hazards

MOVING PARTS

WARNING!
Risk of injury from moving parts!

Rotating and/or linear moving parts can cause serious injuries.

- Do not reach into moving parts or handle moving parts during operation.
- Do not open covers during operation.
- Observe run-on time: Make sure that no parts are still moving before opening the covers.
- Wear close-fitting protective work clothing with low tear resistance in the danger zone.

FAN

WARNING!
Risk of injury from rotating parts!

- Do not reach into or handle the moving impeller during operation.
- Do not open covers and maintenance panels during operation.
- Make sure that the impeller is not accessible during operation.
- Observe run-on time: Make sure that no parts are still moving before opening the covers for maintenance purposes.
- Switch off the machine and secure it against restarting before doing any work on moving parts of the fan. Wait until all parts have come to a standstill.

VIBRATIONS

WARNING!
Risk of injury from strong vibrations!

- Never disable vibration isolators.
- Do not stay within the vibrating area during operation.

SHARP EDGES AND POINTED CORNERS

CAUTION!
Risk of injury on sharp edges and pointed corners!

- Proceed carefully when working in the vicinity of sharp edges and pointed corners.
- In the case of doubt, wear protective gloves.

2.6.4 Dangers from pressurised gases

PNEUMATICS

WARNING!
Risk of injury from movements due to stored pneumatic energy!

Pneumatically driven components can move unexpectedly due to stored residual energy and cause serious injuries.

- Only allow work on the pneumatic system to be performed by pneumatics specialists.
- Completely depressurise the pneumatic system before starting work on it. Completely depressurise the pressure reservoir.

PRESSURISED COMPONENTS

WARNING!
Danger to life from pressurised components!

Pressurised components can move uncontrollably and cause serious injuries if handled improperly. Liquid under high pressure can escape from pressurised components if handled improperly or in the event of a defect, causing serious injuries or even death.

Before starting work on these components:

- Establish a depressurised condition. Also discharge residual energies.
- Always ensure that no accidental discharge of liquids can occur.
- Defective components, which are pressurised during operation, must be replaced immediately by qualified personnel.

2.6.5 Explosion hazards

EXPLOSION PROTECTION

WARNING!
Risk of explosion!

The introduction of ignition sources such as sparks, open flames and hot surfaces can result in explosions in the Ex-zone.

- Obtain written permission to work in the Ex-zone before starting work.
- Work may only be carried if no potentially explosive atmosphere is present.
- Only use tools that are approved for use in the Ex-zone.

Failure to comply with these instructions will result in loss of explosion protection.

EXPLOSIVE DUSTS

WARNING!
Danger to life in the case of fire and explosion due to swirling dust deposits!

Dust deposits can catch fire or form an explosive mixture with the ambient air when stirred up. This may result in serious, possibly even fatal injuries.

- Do not smoke within the danger zone and in the immediate vicinity. Do not handle naked flame, fire or ignition sources of any kind.
- Keep the danger zone dust-free.
- Stop working immediately in the event of high dust levels. Wait until the dust has settled and then remove the layer of dust.
- Stop work immediately in the event of fire. Leave the danger zone until the all-clear and alert the fire brigade.

2.6.6 Hazards from working at heights

RISK OF FATAL INJURY DUE TO FALLING FROM A GREAT HEIGHT

WARNING!
Risk of fatal injury due to falling from a great height!

When working at great heights, people can fall if the workplace is not secured by a railing.

- When working at great heights, always wear a safety harness with a suitable safety rope.
- Safety harness may only be used by specially trained persons.
- Connect the safety harness to a suitable, fixed anchorage point using the safety rope.
- Provide fall arrester.

2.7 PERSONNEL PROTECTIVE EQUIPMENT

2.7.1 Personnel protective equipment

HEARING PROTECTION

Hearing protection provides protection against hearing damage.

PROTECTIVE WORK CLOTHING

Protective work clothing is close-fitting work clothing with low tear resistance, with tight sleeves and no protruding parts. It is mainly used for protection against being caught by moving machine parts. Do not wear rings, chains and other jewellery.

PROTECTIVE GLOVES

Protective gloves are used to protect the hands against friction, abrasions, punctures or deeper injuries and against contact with hot surfaces.

SAFETY FOOTWEAR

Safety footwear is used to protect against heavy falling parts and slipping on slippery surfaces.

HAIR NET

The hair net is a special protective measure for people with long hair; it is mainly used to protect against being caught by moving machine parts.

SAFETY GOGGLES

The safety goggles are used to protect the eyes from flying parts and liquid splashes.

SAFETY HARNESS

The safety harness is used to protect against falls from a height when there is an increased risk of falling. This is the case if certain height differences are exceeded and the workplace is not secured by a railing.
Position the harness so that the safety rope is connected to the harness and to a fixed anchorage point, if necessary, provide fall arresters.
Safety harnesses may only be used by specially trained persons.

HELMET

The helmet is used for protection against falling and flying parts and materials.

2.7.2 Securing against restarting

WARNING!
Danger to life from unauthorised or uncontrolled restarting!

- Before restarting, ensure that all safety devices are installed and functional and that there are no dangers for persons.
- Always follow the procedure described below for securing against restarting.

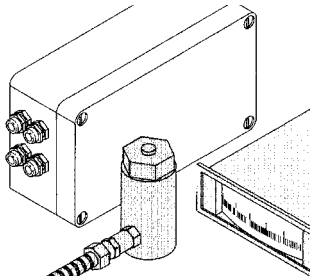
SECURING AGAINST RESTARTING

- ➲ 1. Disconnect power supply.
- ➲ 2. Inform responsible person about work in the danger zone.
- ➲ 3. Provide the machine and controller with a sign indicating work in the danger area and prohibiting switching on. Provide the following information on the sign:
  - Switched off on: ..... at: ..... by: .....
  - Note: Do not switch on!
- ➲ 4. Make sure that there are no dangers for persons after all work has been completed.
- ➲ 5. Ensure that all safety and protective devices are installed and functional.
- ➲ 6. Remove sign.

2.8 DESCRIPTION OF THE INSTALLED SAFETY DEVICES

The listed safety devices are not necessarily part of the scope of delivery.

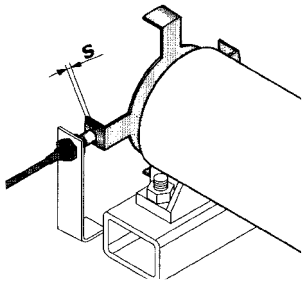
BEARING VIBRATION MONITORING



Bearing vibration monitoring

The bearing vibration is continuously monitored using a sensor.

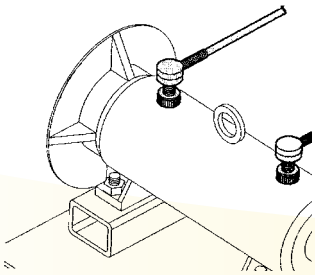
SPEED MONITOR



Speed monitor

The speed monitor monitors the speed of the impeller. If the impeller is blocked by a disturbance or runs too fast, this is reported to the control system to be provided by the owner.

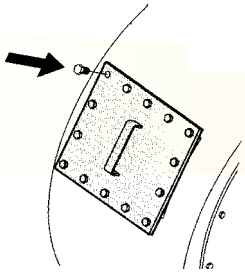
BEARING TEMPERATURE MONITORING



Bearing temperature monitoring

The bearing temperature is continuously monitored using a resistance thermometer.

INSPECTION OPENING



Inspection opening

There are inspection openings on closed housing parts that can be used during maintenance and repair work to reach components that are difficult to access. The inspection openings can only be opened with tools (strictly pay attention to the following page).

WARNING!
Danger to life from opening the inspection openings during operation!

If inspection openings are opened during operation, objects and materials can be ejected and sources of danger made accessible. Therefore, there is a risk of serious injuries or death.

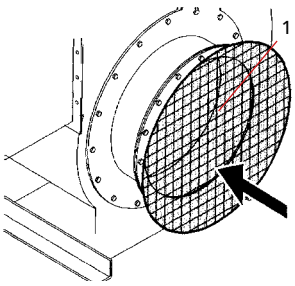
- Only open the inspection openings when the machine is at a standstill and the power supply is disconnected and secured.
- Note run-on time of the impeller.
- After the work is finished, close the inspection openings and reattach all fasteners.

CAUTION!
Risk of injury from falling or flapping access panel!

When the access panel is removed or swung open, the panel may fall down or flap uncontrollably and cause injuries.

- Never unscrew, remove or swing open the access panel alone.
- For access panels with safety chain, check that the chain is correctly attached before swinging the panel open.

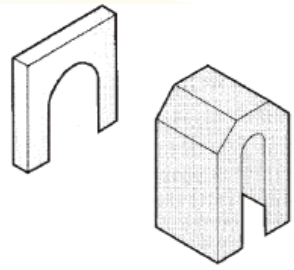
INTAKE PROTECTION GRILLE



Intake protection grille (example)

If the fan is not connected to a pipe system on the intake side, the owner is obligated to install an intake protection grille (1) to prevent suction into the interior of the fan.

PROTECTIVE COVERS



Protective covers

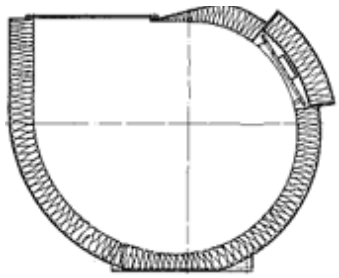
Protective covers are fitted to the fan at various points to prevent intervention in rotating and moving parts.

WARNING!
Risk of injury due to removal of the protective covers during operation!

If protective covers are removed during operation, there is a risk of being caught, wound up, pulled in, trapped or crushed. There is therefore the risk of serious injuries.

- Only remove the protective covers when the machine is at a standstill and the power supply is disconnected and secured.
- Note run-on time of the drive.
- After the work is finished, reattach the protective covers with all fasteners.

INSULATION MATERIALS / INSULATION



Insulation materials are attached to the outside of the fan for protection against contact with hot surfaces. They also reduce noise emissions and increase fire safety.

Insulation

POTENTIAL EQUALISATION, RESIDUAL CURRENT CIRCUIT BREAKER

After installation, the frame and all housing parts must be connected to the local equipotential bonding rail in order to prevent ignition sparks and contact voltages in the event of a fault in combination with the residual current circuit breaker.

WARNING!
Danger to life from contact voltages and ignition sparks!

Contact voltages and ignition sparks can occur due to missing or faulty potential equalisation. Therefore, there is a risk of injuries or death.

– Before the initial commissioning, connect the machine to the local equipotential bonding rail and check the function of the potential equalisation.

2.9 ACCIDENT PREVENTION

- The danger area for unauthorised persons must be secured over a large area.
- Before carrying out any work on the fan, disconnect the power and secure it against unauthorised switch-on.
- Wait for impeller standstill!
- Danger to life from high voltage current!

2.10 BEHAVIOUR IN THE EVENT OF FIRE AND ACCIDENTS

PREVENTIVE MEASURES

- Always be prepared for fire and accidents!
- Keep first aid equipment (first aid kit, blankets, etc.) and fire-fighting equipment in good working order and within easy reach.
- Familiarise personnel with accident reporting, first aid and rescue equipment.
- Keep access routes clear for emergency vehicles.

ACTIONS IN THE EVENT OF FIRE AND ACCIDENTS

- Immediately trigger an emergency stop using the emergency stop device.
- Rescue people from the danger zone if there is no danger to your own health.
- Initiate first aid measures if necessary.
- Alert the fire brigade and/or emergency service.
- In the event of a fire outbreak: If there is no danger to your health, fight the fire with fire extinguishing equipment and continue firefighting until the fire brigade arrives.
- Inform responsible person at the operating site.
- Clear access routes for emergency vehicles.
- Direct emergency vehicles to the scene.

2.11 ENVIRONMENTAL PROTECTION

NOTE!
Risk to the environment due to incorrect handling of environmentally hazardous substances!

Incorrect handling of environmentally hazardous substances, particularly incorrect disposal, can cause significant damage to the environment.

- Always observe the instructions below for handling and disposal of environmentally hazardous substances.
- If environmentally hazardous substances are accidentally released into the environment, take appropriate measures immediately. In the case of doubt, inform the competent local authority about the damage and ask for appropriate actions to be taken.

The following environmentally hazardous substances are used:

LUBRICANTS

Lubricants such as greases and oils contain toxic substances. They must not be released into the environment. The disposal must be performed by a specialist disposal company.

HEAT TRANSFER OIL

Heat transfer oil must not be released into the environment. Heat transfer oil can cause long-term adverse effects in water. The disposal must be performed by a specialist disposal company.

3. DESIGN AND FUNCTION

3.1 WORKING AND DANGER AREAS

No permanent working areas are envisaged in the area of the fan.

3.2 CONTROLS

The fan is controlled by the controller provided by the customer.

Refer to the relevant operating manual for information about the operation.

3.3 SHORT DESCRIPTION

This machine is used to transport gaseous media. Using an impeller, gaseous medium is drawn in on the inlet side and discharged again on the outlet side. The machine is usually driven by an electric motor. Other drive concepts are possible.

3.4 REGULATION USING VANE CONTROLLER

A vane controller is fitted before the fan intake to control the air flow.

Vane controllers cannot be used as shut-off devices due to their design, as they are not completely tight when closed.

The vane controller is operated either manually or via an actuator.

The actuator is controlled by the controller provided by the customer.

CAUTION!
Caution! Risk of injury during the adjustment process!

During the adjustment process of the vane controller, injuries can occur in the area of the flap lever of the adjustment lever and the swirl flaps.

- Always keep a distance from the vane controller during the adjustment process.
- During necessary maintenance work make sure that the vane controller is secured against unintentional adjustment.

4. TRANSPORT, PACKAGING AND STORAGE

4.1 SCOPE OF DELIVERY

A list of the delivered components is included in the accompanying documents.

4.2 TRANSPORT INSPECTION

Inspect the delivery immediately on receipt for completeness, technical changes and transport damage. Proceed as follows in the case of externally recognisable transport damage or technical changes:

- Do not accept delivery or accept it only with reservation.
- Note the extent of damage on the transport documents or on the carrier's delivery note.
- Initiate complaint.

Complain about every defect as soon as it is detected. Damage compensation claims can only be made within the applicable complaint periods.

4.3 PACKAGING

FOR PACKAGING

The packaging complies with the expected transport conditions. The packaging should protect the individual components against transport damage, corrosion and other damage until assembly. Therefore, do not destroy the packaging and do not remove it until just before the assembly.

Symbols on the packaging
Always observe the following symbols on the packaging:

UP

The arrowheads of the symbol indicate the top side of the package. They must always point upwards, otherwise the contents could be damaged.

FRAGILE

Indicates a package with fragile or sensitive contents.
Handle the package with care, do not drop it and do not subject it to shocks.

KEEP DRY

Protect the package against moisture and keep dry.

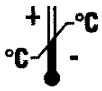
ATTACH HERE

Only attach slings (sling chain, hoisting belt) at the points marked in this way.

CENTRE OF GRAVITY

Indicates the centre of gravity of the package. Observe the centre of gravity position when lifting and transporting. This is only applied for sensitive packages.

TEMPERATURE RANGE



Only transport and store the package within the specified temperature range.

4.4 SAFETY INSTRUCTIONS FOR THE TRANSPORT

SUSPENDED LOADS

WARNING!
Danger to life from suspended loads!

- Always cordon off the transport area in accordance with local regulations.
- Never step under or into the swivel range of suspended loads.
- Only move loads under supervision.
- Only use approved lifting equipment and slings with sufficient load capacity.
- Do not apply lifting equipment such as ropes and straps to sharp edges and corners, do not knot and do not twist.
- Set down the load when leaving the workplace.

EYE BOLTS

WARNING!
Risk of injury from the use of incorrect eye bolts!

- Only use the eye bolts designated by the manufacturer for the entire package.
- Always contact the manufacturer in the case of doubt.

ECCENTRIC CENTRE OF GRAVITY

WARNING!
Risk of injury from falling or tipping packages!

- Only use the attachment points approved by the manufacturer.
- Always contact the manufacturer in the case of doubt.

SWINGING OUT TRANSPORT ITEM

WARNING!
Risk of injury from swinging out transport item!

- Ensure that no persons, objects or obstacles are within the swivel range of the transport item during transport by crane.

EXPLOSION PROTECTION

WARNING!
Loss of explosion protection after transport damage!

Transport damage may result in the loss of explosion protection.

- If transport damage is visible, do not put the machine into operation and contact the manufacturer.

Failure to comply with this instruction will result in the loss of explosion protection.

UNAUTHORISED TRANSPORT

NOTE!
Damage to property in the case of unauthorised transport by untrained personnel!

Transport items may fall or tip over during unauthorised transport by untrained personnel. This can cause significant damage to property.

- Only allow trained personnel to unload the transport items on delivery and to carry out internal transport under the supervision of the manufacturer's employees.
- Refrain from any unauthorised transport or attachment/removal of transport aids.
- Do not remove packaging without authorisation.

INCORRECT TRANSPORT

NOTE!
Damage to property due to incorrect transport!

- Proceed carefully when unloading the transport items on delivery as well as during internal transport and observe the symbols and instructions on the packaging.
- Only use the specified attachment points.
- Transport fans without shocks and impacts.

LOW TEMPERATURE (ONLY FOR FANS WITH COATING)

NOTE!
Damage to property due to too low temperature during transport!

Transporting the fan at a temperature below 0 °C can cause significant damage to the coating.

- Only transport fan at temperatures above 0 °C.

PROTECTING COATING

NOTE!
Risk of damage to the coating (rubber coating / glass fibre) during transport!

Significant damage to the coating can be caused by friction or pressure during transport of the fan.

- Protect vulnerable areas with suitable cushioning material (e.g. wooden covers with soft rubber).
- Secure the cushioning material sufficiently against falling down during transport.

4.5 TRANSPORT

ATTACHMENT POINTS

Attachment point

NOTE!
Lifting eyes on the motor, bearing or housing are only intended for the weight of the respective machine part.

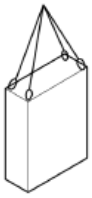
Attachment points for transport are marked as shown in the figure.

The position of the attachment points depends on the fan size and the individual transport conditions.

Contact the manufacturer in the case of uncertainties.

TRANSPORT OF TRANSPORT ITEMS USING A CRANE

Transport items that have lifting eyes can be transported directly with a suitable crane:



Attachment of transport items

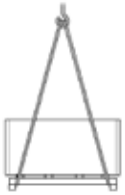
➲ 1. Attach ropes, straps or multi-point lifting equipment accordingly.

CAUTION!
Do not damage the surface protection during hooking and transport!

➲ 2. Ensure that the transport item hangs straight; if necessary, pay attention to eccentric centre of gravity.
➲ 3. Start transport.

TRANSPORT OF PALLETS USING A CRANE

Transport items that are fixed on pallets can be transported with a suitable crane:



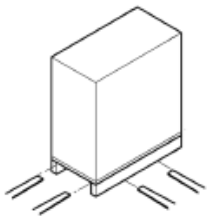
Attachment of pallets

Protective equipment: ■ Helmet

➲ 1. Attach ropes, straps or multi-point lifting equipment to the pallet accordingly and secure the pallet against slipping.
➲ 2. Check that the transport items are not damaged by the slings. Use other slings if required.
➲ 3. In the case of an eccentric centre of gravity, make sure that the pallet cannot tip over.
➲ 4. Start transport.

TRANSPORT OF PALLETS USING A FORKLIFT

Transport items that are fixed on pallets can be transported with a suitable forklift:

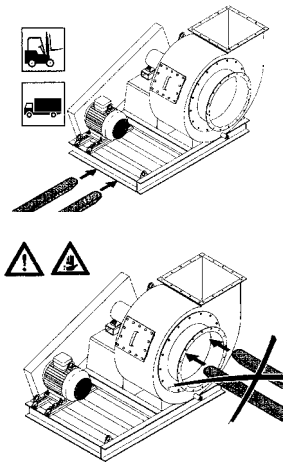


Transport using a forklift

Protective equipment: ■ Helmet

➲ 1. Move the forklift with the forks between or under the bars of the pallet.
➲ 2. Insert the forks so far that they protrude on the opposite side.
➲ 3. In the case of an eccentric centre of gravity, make sure that the pallet cannot tip over.
➲ 4. Lift the pallet with transport item and start the transport.

Fans that are mounted on a base frame can be transported with a suitable forklift.



- 1. Insert the forks so far that they protrude on the opposite side.
- 2. In the case of an eccentric centre of gravity, make sure that the fan cannot tip over.
- 3. Do not exceed the specified speed.
- 4. Lift the fan and start the transport.

Transport using forklift

4.6 INTERIM STORAGE

Store packages under the following conditions:

- Do not store outdoors.
- Keep dry and free of dirt and dust.
- Do not expose to any aggressive media.
- Protect from direct sunlight.
- Avoid mechanical vibrations.
- Relative humidity: max. 60%.
- Storage temperature: -10 to 35 °C.

Under certain circumstances there may be storage instructions on the packages that go beyond the requirements mentioned here. Comply with these accordingly.

4.7 STORAGE

The maximum permissible downtime of the fan components depends on the existing corrosion protection classes and the possible type of storage.

Type of storage	Corrosion protection class	Maximum permissible downtime	
in dry, enclosed rooms	1	6	Months
	2	12	Months
	3	24	Months
In roofed open or closed humid rooms	1	4	Months
	2	8	Months
	3	16	Months

PERFORM THE FOLLOWING WORK IN THE CASE OF PROLONGED STORAGE:

Renew the corrosion protection depending on the type of storage and duration.
Storage of POLLRICH fans with V-belt or flat belt drive (motors > 200 kW).
Slacken the belt by loosening the fixing bolts on the motor and the tensioning bolts of the tensioning rails and tighten the bolts slightly when the belt is slackened, so that the motor cannot become detached during transport.

Interval	Corrosion protection class	Personnel
monthly	Turn impeller	Qualified personnel
	Separate storage for motor Turn motor by hand (1-2 revolutions)	Qualified personnel

4.7.1 Turn impeller

TURNING IMPELLER

Store Pollrich fans in their original packaging (film packaging or tensioning straps) according to the symbols on the packaging until installation.

FOR PROLONGED INTERIM STORAGE

IMPELLER

Turn carefully by hand once per month (1-2 revolutions)

WARNING!
Risk of injury from rotating parts!

Risk of injury from rotating parts!
see chapter ↳ 2.6 Fundamental dangers

MOTOR

For separate storage, turn once per month by hand (1-2 revolutions). Observe motor operating manual!

STORAGE LOCATION

Max. 6 months downtime in dry, enclosed rooms.

WARNING!
Risk of injury from turning impeller!

Significant injuries can be caused by the rotation of the impeller.

- Secure the impeller against uncontrolled rotation during transport, storage and installation.
- If the impeller is turned by hand during storage, only turn the impeller briefly and do not reach into the danger zone again until after it has come to a standstill.
- Reinstall separating guards immediately.

5. INSTALLATION AND INITIAL COMMISSIONING

See Declaration of Incorporation or Declaration of Conformity according to the Machinery Directive 2006/42/EC.

Document initial commissioning.

If values are outside the performance limits, stop the machine immediately and contact the manufacturer.

Perform further commissioning according to the initial commissioning.

5.1 SAFETY

ELECTRICAL SYSTEM

DANGER!
Danger to life from electric current!

see chapter ↳ 2.6.2 "Electric current"

EXISTING LINES

DANGER!
Danger to life from existing lines in floors, walls and ceilings!

There may be gas, water and electrical lines in floors, walls and ceilings, from which dangers may arise in the event of damage.

Ensure before installation that no lines will be damaged by the work.

SECURING AGAINST RESTARTING

WARNING!
Danger to life from unauthorised restarting!

See ↳ chapter 2.7.2 "Securing against restarting"

INCORRECT INSTALLATION AND INITIAL COMMISSIONING

WARNING!
Risk of injury from incorrect installation and initial commissioning!

- Ensure that there is sufficient space for installation before starting work.
- Be careful when handling sharp-edged components.
- Make sure that the installation site is tidy and clean! Loose components and tools lying on top of each other or around each other are sources of accidents.
- Install components properly. Observe specified bolt tightening torques.
- Secure components so that they can not fall down or topple over.
- Note the following before initial commissioning:
  - *Ensure that all installation work has been carried out and completed according to the information and instructions in this manual.*
  - *Make sure that there are no persons within the danger area.*

BOLT TIGHTENING TORQUES

WARNING!
Risk of injury due to incorrect bolt tightening torques!

If bolts are tightened to the wrong torque, components can become loose and cause Personnel injury and damage to property.

- Comply with tightening torques according to VDI 2230.
- Never exceed the maximum permissible bolt tightening torque.
- Check bolt tightening torques regularly.
- Always observe the relevant guidelines and design criteria for screw connections.

MOISTURE

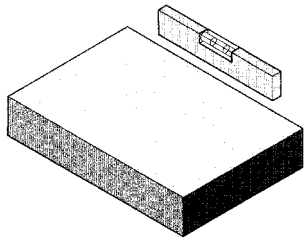
NOTE!
Risk of damage to equipment due to moisture!

Contact of electrical components with moisture can cause significant damage.

- Protect electrical components from moisture.

5.2 PREPARATIONS

5.2.1 Foundation



Foundation

The foundation on which the fan is mounted must have the following characteristics:

- Minimum weight: 20 x weight of the rotating parts or 10 x static total weight
- Dry and completely set
- No slope

The owner is responsible for the faultless implementation. Contact the manufacturer if you have any questions.

5.2.2 Steel substructure

Steel structures on which the fan is mounted must have the following characteristics:

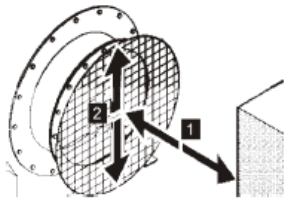
- At least the stability specified in the contract documents
- No slope
- The owner is responsible for the static design: the forces of the fan must be taken into account for the design (see ↳ chapter "Weights").

The owner is responsible for the faultless implementation. Contact the manufacturer if you have any questions.

5.2.3 Free spaces

The fan must be mounted so that sufficient free space is available for maintenance and repair work.

INTAKE OPENING DISTANCE FROM THE WALL FOR FREE-INLET FANS

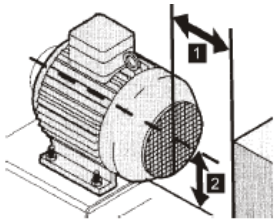


Wall / intake opening distance

The distance between walls and the fan intake opening must be at least equal to the diameter of the intake opening (Fig.).

The position of the intake opening is marked in the adjacent sketch.
1 ≥ 2

WALL DISTANCE FROM MOTOR



Wall / motor distance

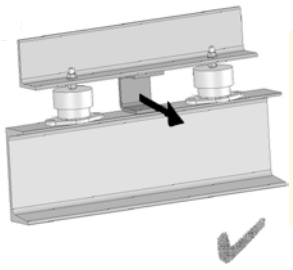
The distance (Fig.) between walls and the motor air intake opening must be at least equal to the size of the motor (Fig.).

The position of the intake opening is marked in the adjacent sketch.
1 ≥ 2

5.2.4 Running direction

See arrows on the rotation direction sign.

5.2.5 Transport locks



Remove any existing transport locks before aligning the fan.

5.3 ASSEMBLY

WELDING PROHIBITED

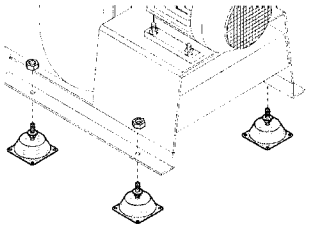
NOTE!
Risk of machine damage from welding work on the fan!

– Do not perform any welding work on the fan.

5.3.1 Fastening fan

FASTEN WITH SPRING ELEMENTS.

The fastening holes on the fan and on the base frame are arranged so that all spring elements are evenly loaded.

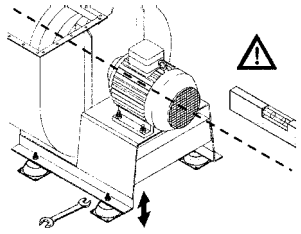


Mounting spring elements

Requirements: Fastening of the spring elements

- The foundation is prepared according to ↳ chapter 5.2.1 "Foundation".

➲ 1. Guide spring elements (fig.) through the fixing holes provided for them.
➲ 2. Place the fastening nuts (fig.) on the spring elements from above and tighten them using a ring spanner.
➲ 3. Properly connect all vibration dampers to the substrate using suitable dowels and heavy-duty anchors.
➲ 4. Align the fan straight on the substructure (fig.) using a spirit level by adjusting the adjusting nuts on the spring elements.

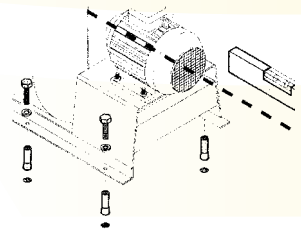


Aligning fan

NOTE!
Risk of machine damage from vibrations on the fan!

For all fans that are mounted on spring elements, the connection to the plant connections must be made using elastic intermediate pieces.

FASTENING WITHOUT SPRING ELEMENTS



Mounting directly on the substructure

Requirements: Fastening without spring elements

- The foundation is prepared according to ↳ chapter 5.2.1 "Foundation".
- The steel substructure is prepared according to ↳ chapter 5.2.1 "Foundation".

➲ 1. Align fan (fig.) straight using a spirit level and shims.
➲ 2. Properly connect the fan and base frame to the substrate at all fastening holes using suitable dowels and heavy-duty anchors.

Fastening fan

- Properly connect the fan to the substrate and/or wall at all fastening holes using suitable dowels and bolts and heavy-duty anchors.

➲ Check bolts for tightness and lock them!
➲ If the nozzle is supplied loose, adjust and/or check the installation depth and gap

5.3.2 Bearing lubrication

NOTE!
Risk of damage to equipment from bearing damage!

– Check bearings for corrosion damage before start-up.
– Check bearings for sufficient filling with lubricant.

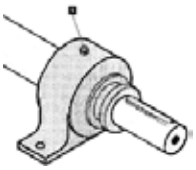
Corrosion damage is indicated by abnormally high running noise.

Bearings damaged by corrosion must be replaced before start-up.

GREASE LUBRICATED BEARINGS

Grease lubricated bearings are delivered with corrosion protection class 2. Lubricant initial filling: OKS402.

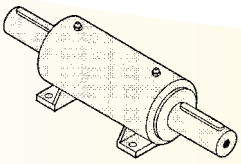
NOTE!
Lubricants such as greases and oils contain toxic substances. They must not be released into the environment. The disposal must be performed by a specialist disposal company.



Relubricatable roller bearings

The roller bearings which can be relubricated are already completely assembled and filled with grease on delivery. However, excess grease escapes in relatively large quantities during initial commissioning.

➲ Therefore, the roller bearings must be refilled with three times the amount of grease after one hour of operation.



Relubricatable roller bearings in block bearing

NOTE!
Risk of machine damage from incorrect lubricants!

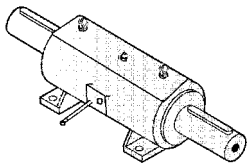
Significant damage to the machine can be caused by the use of incorrect lubricants.

– Only use suitable lubricants.
– Do not mix different lubricants.

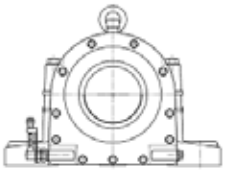
Sign for relubrication

OIL LUBRICATED BEARINGS

Oil lubricated bearings are delivered as standard with corrosion protection class 1.



Oil block bearings



Oil pedestal bearings

NOTE!
Risk of machine damage from lack of oil!

The bearings with oil lubrication are shipped from the factory without oil. The machine can be significantly damaged for any start-up without or with too little oil.

– Fill oil bearings with suitable oil before commissioning.

- Fill bearings with one type of oil up to the indicated mark.

NOTE!
Additional sign on the bearing (red)

If a red warning sign is attached to the bearings, the bearings are provided with a higher corrosion protection for prolonged storage.

The bearings must then be cleaned with oil before the filling.

In the case of standard corrosion protection, you can start directly with step 4.

➲ 1. Fill the bearing housing up to the lower edge of the shaft with solvent, e.g. benzine, paraffin, chlorinated hydrocarbons or alkaline cleaner, etc.
➲ 2. Turn the race by hand a few turns.
➲ 3. Drain solvent and let housing interior dry.
➲ 4. Fill bearings with one type of oil up to the indicated mark.

NOTE!
Risk of machine damage from incorrect lubricants!

Significant damage to the machine can be caused by the use of incorrect lubricants.

– Only use suitable lubricants.
– Do not mix different lubricants.

See separate instructions for plain bearings.

NOTE!
Risk of machine damage from dried grease barrier!

The grease barriers of the bearings are greased with OKS402 at the factory.

See appendix for information relevant to maintenance.

5.3.3 Motor machine alignment

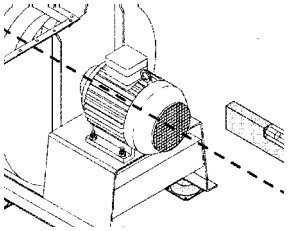
MOTOR MACHINE ALIGNMENT

NOTE!
Risk of machine damage from incorrect alignment of the drive train!

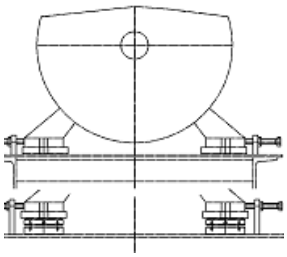
Significant machine damage can be caused by incorrect alignment of the drive train.

– Align drive train precisely.

NOTE!
The alignment of the drive train can be disturbed by vibrations during transport.
Therefore, check these as described below.



Alignment



Adjusting screw

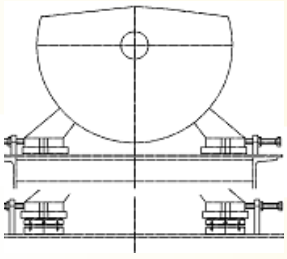
Requirements:

- The fan, including the substructure, is connected to the substrate as specified.

➲ 1. Check alignment of motor and impeller using a spirit level.
➲ 2. Change the alignment of the motor by turning a possibly existing adjusting screw (Fig.).
➲ 3. Repeat previous steps until motor, shafts and impeller are precisely aligned.

5.3.4 Mounting the drive and aligning the coupling machine

MOUNTING MOTOR ON COUPLING MACHINE



Mounting motor

- Observe the operating manual of the motor, coupling and, if necessary, machine base manufacturer!
- Mount the motor coupling half onto the motor journal.
- Mount the motor carefully, observing all safety regulations, on the supplied motor supports and any supplied machine feet and screw them together.
- The tightening torques are based on the calculation principles of VDI 2230.

ALIGNING COUPLING MACHINE

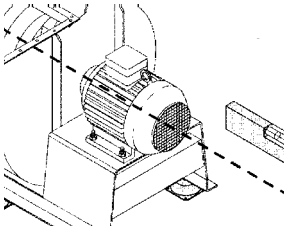
NOTE!
Risk of machine damage from incorrect alignment of the drive train!

Significant machine damage can be caused by incorrect alignment of the drive train.

– Align drive train precisely.

NOTE!
The alignment of the drive train can be disturbed by vibrations during transport.

Therefore, check these as described below.

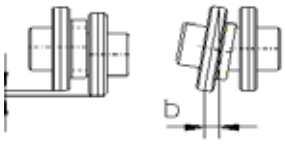


Alignment

Requirements:

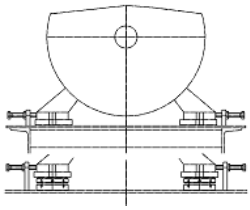
- The fan, including the substructure, is connected to the substrate.
- The bearings of the fan have been lubricated according to ↳ chapter 6.3.2 "Bearing Lubrication".

➲ 1. Check alignment of motor, coupling, shafts and impeller using a spirit level.



Coupling alignment

➲ 2. Align the coupling according to the manufacturer's operating manual.



Adjusting screw

➲ 2. Change the alignment of the motor by turning a possibly existing adjusting screw (fig.).
➲ 4. Repeat previous steps until motor, coupling, shafts and impeller are precisely aligned.

5.3.5 Mounting the drive and aligning the belt drive machine

MOUNTING THE DRIVE AND ALIGNING THE BELT DRIVE MACHINE

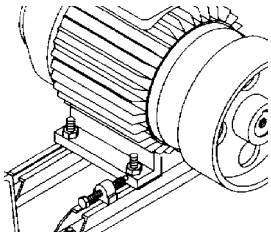
NOTE!
Risk of machine damage from incorrect alignment of the drive train!

Significant machine damage can be caused by incorrect alignment of the drive train.

– Align drive train precisely.

NOTE!
The alignment of the drive train can be disturbed by vibrations during transport.

Therefore, check these as described below.

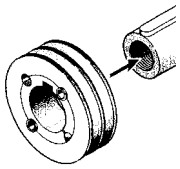


Tensioning rails

Requirements:

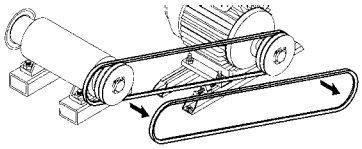
- The fan, including the substructure, is connected to the substrate.
- The bearings of the fan have been lubricated according to ↳ chapter 5.3.2 "Bearing Lubrication".

➲ 1. Place the motor on tensioning rails (fig.) and fasten.



Mounting pulley

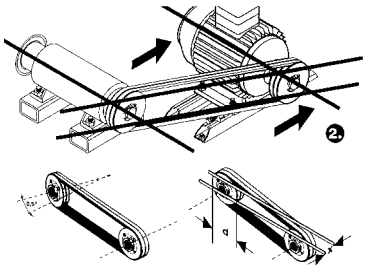
➲ 2. Mounting pulley



Fitting belt

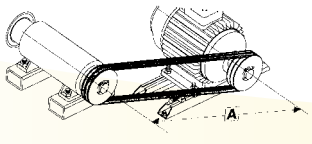
➲ 3. Fit belt.

Do not use auxiliary tools such as screwdrivers!



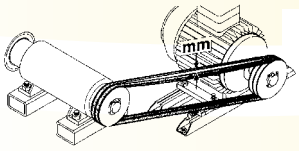
Aligning shafts and pulleys flush

➲ 4. Align shafts and pulleys flush.
➲ 5. Tension V-belt.



Measuring centre distance

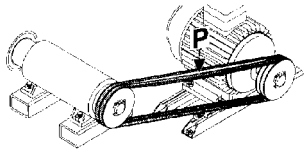
➲ 6. Measuring centre distance



Measuring deflection

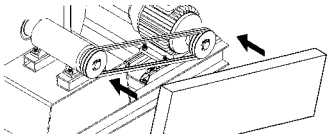
➲ 7. Multiply centre distance by 16 = belt bending force in mm

➲ Measure centre distance A (e.g. 1.0 m).
➲ Multiply centre distance by 16 = belt bending force in mm (1.0 m x 16 = 16 mm
➲ Adjust belt bending force on the measuring instrument (not shown)
➲ Perform measurement according to the manual of the measuring instrument.
➲ Mount cover.



Deflection force

➲ 8. Adjust belt bending force on the measuring instrument.
➲ 9. Perform measurement according to the manual of the measuring instrument.
➲ 10. Tighten motor bolts.



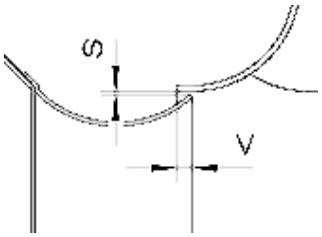
Belt guard

➲ 11. Mount cover (see chapter ↳ 5.3.8 Installing safety devices)

- Tension the V-belt after one hour of operation.
- Check V-belt every 3 months and tension if necessary.

5.3.6 Checking nozzle gap

CHECKING NOZZLE GAP:



Nozzle gap

WARNING!
Risk of explosion if s < permissible value!

The operation of a fan with too small a nozzle gap can cause explosions in the Ex-zone.

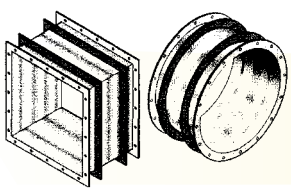
The nozzle gap of explosion-protected fans must be checked and documented accordingly.

5.3.7 Connecting plant components

WARNING!
Risk of damage to health due to escape of the conveyed medium!

Serious injuries and death could be caused by the escape of the conveyed medium at leak points in the area of the plant connections.

– Properly install and seal plant connections.
– Only install connections that are suitable for the transported medium.

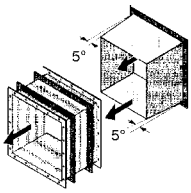


Elastic intermediate pieces

NOTE!
Risk of damage to machines/systems due to vibration transmission!

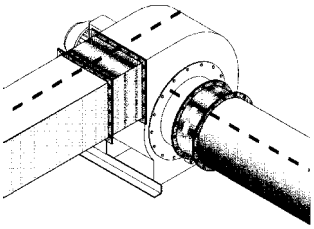
If non-elastic connectors are used, vibrations can be transmitted to other machines / plant components and cause damage there.

– Only use elastic intermediate pieces for the connection to plant connections.

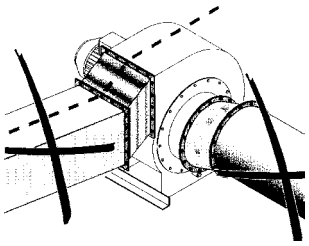


Elastic intermediate pieces with guide plates

For elastic intermediate pieces with guide plate, the taper must point in the direction of flow.



Flush installation

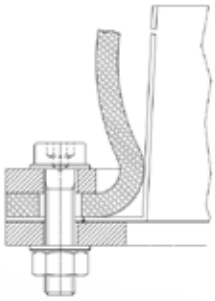


Incorrect installation

The following points must be strictly observed when installing the plant connections:

- Do not drill into the fan housing.
- Do not mount any components directly on the fan housing.

- If the temperature of the conveyed medium is more than 60 °C, take account of thermal expansion and mark hot surfaces.
- Always install connections loosely to avoid tensions in the fan housing.
- Always install connections flush with the inlet and outlet openings to avoid narrowing the cross section.
- Observe the specified installation length.



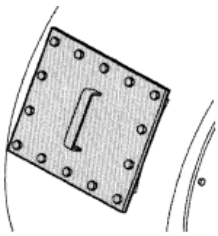
Elastic intermediate piece

➲ 1. Fit an elastic intermediate piece to the inlet or outlet opening using suitable bolts, nuts and washers.
➲ 2. Connect the elastic intermediate piece to the rigid plant connection in the same way.

Use cylinder head bolts or domed nuts to avoid damage due to friction on the fabric. Avoidance of sharp edges.

5.3.8 Mounting safety devices

ATTACHING INSPECTION COVER



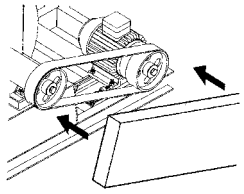
Inspection cover

Requirements:

- A second person is on site to secure the inspection cover.

➲ 1. Seal the cover of the inspection opening with a suitable sealing cord.
➲ 2. Attach the cover at the intended place.
➲ 3. Screw in the bolts using a ring spanner to fix the inspection cover.

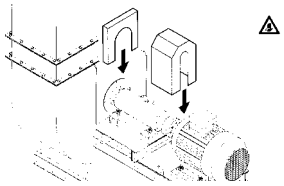
V-BELT COVER



Belt cover

- 1. Attach the V-belt cover at the intended place.
- 2. Screw in the supplied bolts using a ring spanner to fix the V-belt cover.

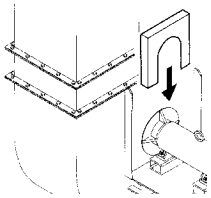
COUPLING GUARD



Coupling guard

- 1. Attach the coupling guard at the intended place.
- 2. Screw in the supplied bolts using a ring spanner to fix the coupling guard.

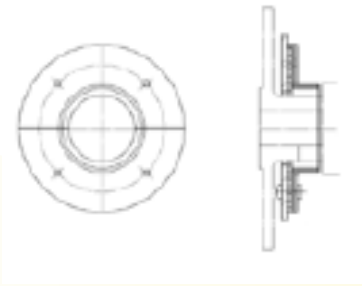
COOLING DISC GUARD



Cooling disk guard

- 1. Attach the cooling disc guard at the intended place.
- 2. Screw in supplied bolts to fix the cooling disc guard.

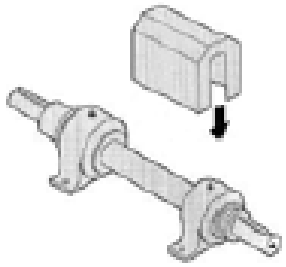
HUB GUARD



Hub guard

- 1. Attach the hub guard at the intended place.
- 2. Screw in the supplied bolts using a ring spanner to fix the hub guard.

SHAFT PROTECTOR



Shaft protector

- 1. Attach the shaft protector at the intended place.
- 2. Screw in the supplied bolts using a ring spanner to fix the shaft protector.

5.3.9 Vane controller

NOTE!
Risk of damage to machines/systems due to vibration transmission!

Risk of machine damage from welding work on the vane controller!

- Welding work on the vane controller is prohibited to avoid machine damage.
- The only exception is when the necessary claw for the actuator is supplied loose so that it can be welded to any part of the adjustment ring in coordination with the actuator and the connecting linkage. Special care must be taken when welding on the claw to prevent damage to the machine and bearings.

The vane controller must be mounted so that sufficient free space is available for maintenance and repair work.

VANE CONTROLLER ADJUSTMENT

CAUTION!
Caution! Risk of injury during the adjustment process!

During the adjustment process of the vane controller, injuries can occur in the area of the flap lever of the adjustment lever and the swirl flaps.

- Always keep a distance from the vane controller during the adjustment process.
- During necessary maintenance work, make sure that the vane controller is secured against unintentional adjustment.

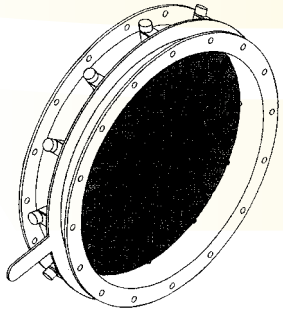
FIXING VANE CONTROLLER

WARNING!

Special care is required if additional stresses occur due to the effect of heat. This particularly applies to the conveyance of hot gases.

WARNING!
Plant connections!

The suction and pressure lines may not be connected until the fan is aligned with the vane controller and securely fastened by firmly tightening the foundation and fastening bolts.



Vane controller

Requirements:

- The vane controller is attached to the fan and properly connected to the substrate and aligned using a spirit level.

➲ 1. Check the direction of flow using the attached direction of rotation arrow.
➲ 2. Attach vane controller at the intended place on the inlet opening.
➲ 3. The fan with connections and sealing material must be loosely connected to the vane controller in order to avoid tension in the fan housing and resulting running disturbances; if necessary, readjustments must be made.

➲ 4. Screw the vane controller to the inlet pipe.
The tightening torques are based on the calculation principles of VDI 2230.
➲ The pipes with their connectors and sealing material must be loosely connected to the vane controller in order to avoid tension in the fan housing and resulting running disturbances; if necessary, the pipes must be readjusted.
➲ Screw in supplied bolts to fix the vane controller.

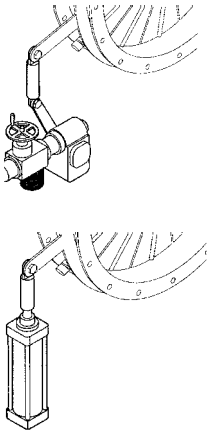
ACTUATOR MOUNTING

WARNING!
Special care must be taken during installation, as improper implementation can result in permanent damage!

Care must be taken during installation to ensure that there is no distortion that could affect the smooth adjustment mechanism. The vane controller is adjusted using an actuator.

FIXING ACTUATOR

CAUTION!
The actuator must be installed by a qualified person in accordance with the applicable requirements and instructions of the manufacturer.



Requirements:

- The vane controller is attached to the fan and properly connected to the substrate and aligned using a spirit level.

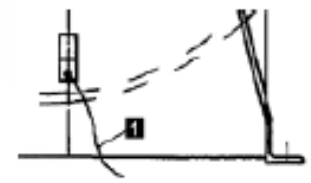
➲ 1. Connect the actuator correctly to the bracket. The tightening torques are based on the calculation principles of VDI 2230, "Bolt tightening torques".
➲ 2. Properly connect the linkage to the vane controller and actuator.
➲ 3. See the actuator operating manual for electric or pneumatic connection.

Vane controller with electrical or pneumatic adjustment

5.3.10 Electrical connection

The fan must be connected by qualified electricians according to the wiring diagram in the motor terminal box.

EARTHING



➲ Carry out the earthing properly.

EARTHING

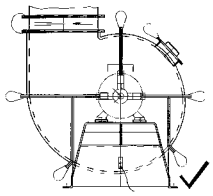
5.5 SPRING ELEMENTS

Vibration isolator with spring

The following must be observed if spring elements are included in the scope of delivery:

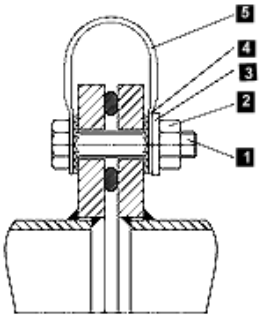
The design of the vibration isolators is based on the vibration decoupled fan. Directly mounted additional loads cannot be taken into account in the preliminary design. The design for vibration isolators for fans including directly mounted additional loads must be obtained from the manufacturer.

5.6 INSTALLING EQUIPOTENTIAL BONDING



Potential equalisation

Equipotential bonding must be provided at all connection points when installing in Ex-zones.



Installing equipotential bonding

➲ Install equipotential bonding according to the illustration.

- (1) Hexagon head bolt
- (2) Hexagon nut
- (3) Washer
- (4) Lock washer
- (5) Equipotential bonding

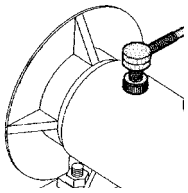
5.7 CONNECTING POWER SUPPLY

Requirements:

- The fan, including the substructure, is connected to the substrate as specified.
- The fan bearings must be lubricated by qualified personnel.
- Motor, shaft and impeller must have been precisely aligned by qualified personnel.
- All plant connections have been correctly installed by qualified personnel.
- All protective devices have been correctly installed by qualified personnel.

! Connection to the power supply must be carried out by a qualified electrician in accordance with the operating instructions for the components to be connected and the local regulations.

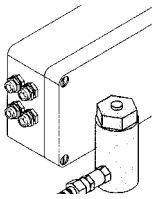
5.7.1 Installing bearing temperature monitoring



Temperaturüberwachung

- Screw the sensor into the provided holes on the bearing housing.
- Electrical wiring and integration of the sensors into the plant control system.
- The measuring range of the temperature monitoring must be set:
  - Usual operating range: approx. 50 K above ambient temperature
  - Prewarning: 70 K over ambient temperature
  - Shutdown: 80 K over ambient temperature

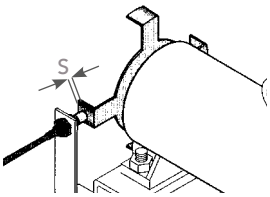
5.7.2 Installing bearing vibration monitoring



Vibration monitoring

- Screw the sensor into the provided holes on the bearing housing.
- Electrical wiring and integration of the sensors into the plant control system.
- The measuring range of the vibration monitoring must be checked.
  - Limit values according to P-AA-043:
    1. *Fan up to 355 kW*
    2. *Fans from 355 kW upwards*

5.7.3 Installing speed monitoring



Speed monitoring

- Screw the sensor into the holder.
- Set the required switching distance "s".
- Electrical wiring and integration of the sensor into the plant control system.

5.8 CHECKS BEFORE THE INITIAL COMMISSIONING

Requirements:

- The installation of the machine and safety devices has been carried out properly.
- The machine is secured against unauthorised switching on.

WARNING!
Danger to life from unauthorised restarting!

see ↳ chapter 2.7.2 "Securing against restarting".

WARNING!
Risk of injury from rotating parts!

➲ 1. Check free movement of the impeller by turning it.
➲ 2. Are the linkages on the vane controller and actuator correctly mounted?
➲ 3. Adjusting ring and linkage must be checked for free adjustability.
➲ 4. Check connection of the drive unit and all monitoring equipment to the power supply (qualified electrician).
➲ 5. It must be ensured that the type of current, voltage and frequency of the power supply for the actuator or the pneumatic connection cable and control system are compatible with each other and that the connections have been made in accordance with the standards.
➲ 6. Check that the control device is functioning as intended.
➲ 7. Make sure that all transport locks have been removed.
➲ 8. Ensure that there are no tools, small parts or assembly dirt in the fan housing.
➲ 9. For ATEX version: Check correct earthing. Pay particular attention to the correct installation of the equipotential bonding and the earthing strap on the earthing lug.

5.9 INITIAL COMMISSIONING

Obtain the approval of the plant owner before commissioning.

Log operating data during the commissioning.

Requirements:
- The assembly of the machine has been carried out and completed according to the specifications.
- All guards are installed according to regulations.
- All tests have been successfully passed.

➲ Switch on the fan via the control system provided by the owner.

At operating temperatures above 125 °C switch on the fan at the beginning of the heating phase.

The speed must not fall below 350 rpm at design temperature.

The bearing temperature may initially rise abnormally during initial commissioning until the correct quantity of grease is automatically adjusted. If the bearing temperature rises above 80 °C, switch off the fan, let the bearing cool down and then switch on the fan again.

CHECK AFTER THE INITIAL COMMISSIONING

Perform the following steps after one hour of operation:

Requirements:
- The initial commissioning has been performed in accordance with the specifications.
- The fan is switched on.

➲ 1. Check the fan for unusual noises and vibrations.
➲ 2. Check machine for vibrations.
➲ 3. Switch off the fan via the control system provided by the owner.

WARNING!
Risk of injury from rotating parts!

Rotating parts in the fan can cause very serious injuries.

- Do not reach into or handle the moving impeller during operation.
- Do not open covers and maintenance panels during operation.
- Make sure that the impeller is not accessible during operation.
- Observe run-on time: Make sure that no parts are still moving before opening the covers for maintenance purposes.
- Switch off the machine and secure it against restarting before doing any work on moving parts of the fan. Wait until all parts have come to a standstill.

➲ 4. Wait for the run-on time of the impeller to elapse.
➲ 5. Regrease bearings after one hour of operation with 3 times the quantity of grease as indicated on the maintenance plate.
➲ 6. Check belt tension ↳ chapter 7.5„"V-belt drive".
➲ 7. Regrease bearings after 24 hours with the quantity of grease as indicated on the maintenance plate.
➲ 8. In the case of split housings, check the screw connections at the housing split.

5.11 INVERTER OPERATION

NATURAL FREQUENCIES

Every component of a fan has natural frequencies (resonances) which can be passed through during start-up and shutdown, but which must not be constantly excited by operation at this critical speed. Component failure can occur for constant operation in this range.

Our fans are designed and calculated so that natural frequencies during operation at constant design speed are usually not excited.

If the fan is speed-controlled with a frequency converter, these frequencies must be suppressed at the frequency converter.

COMMISSIONING SPEED-CONTROLLED FANS

During commissioning, the natural frequencies must be checked over the entire speed range of the fan. The vibrations on the housing and the bearings must be measured and documented over the entire speed range in the installed state.

The measurement must be performed by qualified personnel or can be requested from POLLRICH.

The natural frequencies, which are within the speed range of the fan, must be suppressed on the frequency converter by appropriate parametrisation.

COMMISSIONING SPEED-CONTROLLED FANS

The acceleration and deceleration ramps on the frequency converter should be programmed flat to avoid high loads on the impeller and prevent fatigue. Fast and frequent acceleration and braking processes shorten the service life of the fan and can result in damage to the drive train or the impeller.

Periodic control behaviour must also be ruled out.

- In the case of frequency converter operation, conformity with the EC EMC Directive 2004/108/EC must be determined on-site.
- Permissible values according to the associated torque curve of the fan.

6. OPERATION

6.1 SAFETY

IMPROPER OPERATION

WARNING!
Risk of injury due to improper operation

- Carry out all operating steps according to the specifications and instructions in the manual of the control unit provided by the operator.
- Before starting work, ensure that
  - *all covers and safety devices are installed and functioning properly.*
  - *there are no persons in the danger zone.*
- Never disable or bypass safety devices during operation.

6.2 TARGETED SHUTDOWN

Perform the following steps to shut down the switched-on fan:

➲ 1. Switch off the fan via the control system provided by the owner.
➲ 2. Wait for the run-on time of the impeller to elapse.

Risk of injury from rotating parts!

A maximum bearing temperature of 80 °C is permissible during standstill. If the standstill temperature is higher, the bearings or the motor must be cooled.

6.3 SHUTDOWN IN AN EMERGENCY

SHUTDOWN IN AN EMERGENCY

Proceed as follows in an emergency:

➲ 1. Immediately trigger an emergency stop using the emergency stop device.
➲ 2. Rescue people from the danger zone if there is no danger to your own health.
➲ 3. Initiate first aid measures if necessary.
➲ 4. Alert the fire brigade and/or emergency service.
➲ 5. Inform responsible person at the operating site.
➲ 6. Disconnect machine from the power supply and secure against restarting.
➲ 7. Clear access routes for emergency vehicles.
➲ 8. Direct emergency vehicles to the scene.
➲ 9. Inform the competent authorities if the severity of the emergency requires it.
➲ 10. Assign qualified personnel to eliminate the fault.
➲ 11. Check the machine before restarting and make sure that all safety devices are installed and functioning properly.

WARNING!
Danger to life from unauthorised restarting!

see ↳ chapter 2.7.2 "Securing against restarting“

7. MAINTENANCE

7.1 SAFETY

ELECTRICAL SYSTEM

DANGER!
Danger to life from electric current!

SECURING AGAINST RESTARTING

WARNING!
Danger to life from unauthorised restarting!

see ↳ chapter 2.7.2 "Securing against restarting"

TOXIC MEDIUM

WARNING!
Risk of damage to health from residues of the conveyed medium in the fan housing!

– Make sure that there are no longer any toxic media residues inside the fan before working in the interior.

MOVING PARTS

WARNING!
Risk of injury from moving parts!

IMPROPERLY PERFORMED MAINTENANCE WORK

WARNING!
Risk of injury due to improperly performed maintenance work!

- Ensure that there is sufficient space for installation before starting work.
- Make sure that the installation site is tidy and clean! Loose components and tools lying on top of each other or around each other are sources of accidents.
- If components have been removed, ensure correct installation, reinstall all fixing elements and observe bolt tightening torques.
- Note the following before restarting:
  - *Ensure that all maintenance work has been carried out and completed according to the information and instructions in this manual.*
  - *Make sure that there are no persons within the danger area.*
  - *Ensure that all covers and safety devices are installed and functioning properly.*

VANE CONTROLLER DISMANTLING

NOTE!
Dismantling of the vane controller must always be avoided.

ENVIRONMENTAL PROTECTION

Observe the following instructions for environmental protection during maintenance work:

- At all lubrication points which are manually supplied with lubricant, remove any escaping, used or excess grease and dispose of it in accordance with the applicable local regulations.
- Collect exchanged oils in suitable containers and dispose of them in accordance with the applicable local regulations

FOR ALL MAINTENANCE WORK

WARNING!
Danger from falling parts!

Serious injury can be caused by falling parts during maintenance work.

- Always wear helmet!

MAINTENANCE WORK AT GREAT HEIGHTS

WARNING!
Risk of injury from falling hazard!

Serious injuries can be caused by falling during maintenance work at great heights.

– Here, the owner must install fall protection in the surrounding area of the machine.

7.2 MAINTENANCE SCHEDULE

- We recommend having the maintenance carried out by the manufacturer.

The following maintenance tasks must be performed:

Interval	Maintenance work	Personnel
See lubrication plate on fan for exact relubrication intervals	Relubricate motor bearings	Qualified personnel
	Relubricate bearings	Qualified personnel
Weekly	If the shaft is sealed by a labyrinth shaft seal, check for leakage. It is recommended to continuously monitor the seal gas consumption and to regrease the grease barrier.	Qualified personnel
	Check oil level of the bearings.	Qualified personnel
monthly	Check impeller and interior of housing for dirt, caking and grinding noises, clean if necessary.	Qualified personnel
	Check suction and pressure lines and, if necessary, parts of them for leaks, seal new ones if necessary.	Qualified personnel
	Check belt tension.	Qualified personnel
	Regularly check the function of all attached monitoring equipment, e.g. speed monitoring, temperature monitoring, vibration monitoring.	Qualified personnel
	If necessary, clean sensor contacts of the speed monitoring regularly.	Qualified personnel
	Check bearing vibrations regularly.	Qualified personnel

7. MAINTENANCE

Interval	Maintenance work	Personnel
monthly	Check bearing temperature regularly.	Qualified personnel
	Clean and check bearings.	Qualified personnel
	Vane controller function check	Qualified personnel
	Vane controller cleaning	Qualified personnel
Every 3 months	Check housing, frame and coverings for dirt and caking, clean if necessary.	Qualified personnel
	Check all screw connections on the foundation, motor and plant connections for tightness.	Qualified personnel
	Check surface protection for damaged areas, repair if necessary.	Qualified personnel
	Check whether all vibration isolators can move freely.	Qualified personnel
	Check whether all elastic intermediate pieces can move freely.	Qualified personnel
	Check motor for increased bearing temperature.	Qualified personnel / Qualified electrician
	Remove dirt and caking from the motor and electrical and pneumatic accessories.	Qualified personnel
	Check motor for smooth running.	Qualified personnel / Qualified electrician
	Check torsional backlash between the two coupling parts according to the manufacturer's documentation and fan drawing.	Qualified personnel
Annually	The impeller must be rebalanced once a year. Replace if necessary.	Qualified personnel / Manufacturer
	Check whether the shaft seal is worn. Replace if necessary.	Qualified personnel
	Check drive motor according to motor documentation.	Qualified personnel / Qualified electrician
	Perform a 2-hour test run.	Qualified personnel
	Check connection terminals for firm seating.	Qualified personnel
Every 20,000 operating hours or after 3 years at the latest	When using bearing condition monitoring: Measurement of bearing condition and documentation of the evaluation.	Qualified personnel
	Renew grease.	Qualified personnel
Every 10 years	After a running time of 10 years, the impeller must be checked for material fatigue by the manufacturer.	Manufacturer
Acc. to notice	In the case of bearing condition monitoring without bearing temperature monitoring: Replace the motor bearing, irrespective of the indicated bearing condition.	Qualified personnel
Acc. to notice	In the case of bearing condition monitoring with bearing temperature monitoring: Replace the motor bearing depending on the indicated bearing condition.	Qualified personnel

NOTE!
Do not damage surface protection!

When cleaning, make sure that the surface protection is not damaged.

NOTE!

Protect bearings, electrical and pneumatic accessories against moisture! Do not use high pressure cleaners.

NOTE
Inadequate lubrication can damage the bearing!

Inadequate lubrication results in damage of the bearing and thus in premature failure.

WARNING!
Danger from defective bearings!

- The plant must be shut down if the bearing is defective.
- Defective bearings can endanger the function of the entire plant.

BEARING CHECK

- Remove dirt and dust deposits from bearings (dry cleaning).
- Check bearings for leaks.
- Defective bearings must be replaced.

7.3 RELUBRICATION OF BEARINGS

GREASE LUBRICATED ROLLER BEARINGS

Grease renewal

Renew grease after 20,000 operating hours, at the latest after 3 years.

Requirements:
- The fan is not connected to the power supply.

➲ 1. Evacuate the bearing completely.
➲ 2. Clean all bearing parts with a suitable cleaning agent (benzine or petroleum, chlorinated hydrocarbons, alkaline cleaners, etc.).
➲ 3. Dry the interior of the bearing.
➲ 4. Then immediately fill the bearing with grease, while turning the race a few turns by hand. Fill cavities completely, only half fill free spaces in the bearing housing.

WARNING!
Do not use petrol or other petroleum products!

OIL LUBRICATED ROLLER BEARINGS

Refilling oil bearings

Requirements:
- The fan is not connected to the power supply.
- Only the lubricants listed in the table may be used.

➲ 1. Remove plug from oil filling opening.
➲ 2. Fill bearings with one type of oil up to the indicated mark.
➲ 3. Close the oil filling opening again with plug.

DANGER!
There is a danger of slipping on spilled oil!

Do not let any oil drip onto the floor. Slipping hazard and environmental damage.

NOTE!
Risk of machine damage from incorrect lubricants!

Significant damage to the machine can be caused by the use of incorrect lubricants.
- Only use suitable lubricants.
- Do not mix different lubricants.

Lubricants such as greases and oils contain toxic substances. They must not be released into the environment. The disposal must be performed by a specialist disposal company.

NOTE
Inadequate lubrication can damage the bearing!

Inadequate lubrication results in damage of the bearing and thus in premature failure.
For maintenance intervals and relubrication quantities, refer to the lubrication list in the appendix.
Read the oil level on the oil level indicator. Arrange refilling if necessary.

Only gear oils with approval according to DIN 51517, Part 3 CLP are permissible. Hydraulic oils HLP are generally not approved due to their capability for water absorption.

The lubricant is designed for a bearing temperature of 80 °C, so that the condition for the viscosity ratio is met. This ensures that in the event of a malfunction for shutdown (t = 100 °C), K > 0.6 is still available.

- For k < 1, a reduction of the nominal service life can be expected.
- The viscosity class ISO VG 100 is sufficient for the range 75,000 ≤ dm x n ≤ 750,000 [mm/min].
- Consultation is required for deviating speed characteristics.

CHANGE INTERVALS FOR OIL LUBRICATION

Standard lubricant

Oil change after operating hours

1st change	2nd change	further changes
150	2,000	4,000

Synthetischer Schmierstoff

Oil change after operating hours

1st change	2nd change	further changes
150	4,000	8,000

RELUBRICATE GREASE BARRIER

Relubricate the grease barrier for shaft passage regularly after approx. 800 operating hours with sealing grease (K3K-30 DIN 51502).

Lubricant initial filling for grease barrier: OKS 402

Requirements:
- The fan is not connected to the power supply.
- Only the lubricants listed in the table may be used.

➲ 1. Refilling grease barrier
➲ 2. Removing excess grease

LUBRICANT TABLE

Manufacturer	Product	DIN designation (DIN 51502)	Base oil	Thickener	Colour	Operating temperature [°C]	DN value [mm/min]	Base oil viscosity at 40 °C [mm²/s]
Standard lubricant								
OKS	OKS 402	K2K-30	Mineral oil	Lithium soap	beige	-30° / +120	500,000	110
Special applications: High-speed machine DN > 500,000 mm/min								
OKS	OKS 422	KPHC2R -40	PAO	Barium complex	clear	-40° / +140	800,000	50
High temperature: For high-temperature applications up to tmax = 180 °C								
OKS	OKS 432	KP2R-20	Mineral oil	Aluminium complex	brown	-25° / +190	200,000	230
Food technology: Grease with NSF (National Sanitation Foundation) approval required								
OKS	OKS 470	KF2K-40	Mineral oil	Lithium soap	white	-30° / +120	800,000	110
Alternative lubricants:								
The miscibility of alternative lubricants must be checked. This is the responsibility of the operator.								
Oil bearings: Mineral oil based standard lubricant								
Manufacturer		**optionally for plain bearings**				**for rolling bearings**		
Viscosity class		ISO VG 46		ISO VG 68		ISO VG 100		
SIPS		EP 0		EP 1		EP 2		

7.4 MAINTENANCE WORK

CLEANING - INSTRUCTIONS

WARNING!
Whirled-up dust deposits can form explosive dust/air mixtures and result in explosions if ignition sources such as sparks, naked flames and hot surfaces are brought into the Ex-zone.

- Avoid dust deposits by regularly cleaning the operating site.
- Cleaning work may only be carried if no potentially explosive atmosphere is present.
- Only use cleaning equipment that is approved for use in the Ex-zone.
- Wear light respiratory protection during the work.

Failure to comply with these instructions will result in loss of explosion protection.

NOTE!
Do not damage surface protection!

When cleaning, make sure that the surface protection is not damaged.

NOTE!
Protect bearings, electrical and pneumatic accessories against moisture! Do not use high pressure cleaners!

TURNING IMPELLER

WARNING!
Risk of injury from turning impeller!

Significant injuries can be caused by the rotation of the impeller.

- Secure the impeller against uncontrolled rotation during transport, storage and installation.
- If the impeller is turned by hand during storage, only turn the impeller briefly and do not reach into the danger zone again until after it has come to a standstill.
- Reinstall separating guards immediately.

REQUIREMENTS FOR THE CLEANING

- The fan is not connected to the power supply.

CAUTION!
Maintenance shutdown

- Disconnect fan from the power supply.
- Wait for impeller standstill.
- Ensure the fan cannot be switched on again by unauthorised persons!
- Ensure the actuator cannot be switched on again by unauthorised persons!

CLEANING

- Remove dirt and dust deposits from all components.
- Remove foreign bodies from suction and pressure lines.
- Remove dirt and dust deposits from vane controller, linkage and actuator.

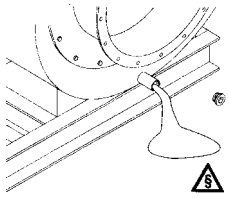
NOTE!
Do not damage!

When cleaning, make sure that no component is damaged.

NOTE!

Protect vane controller or flap bearings, actuator and any existing limit switches from moisture! Do not use high pressure cleaners!

DRAIN CONNECTION AVAILABLE!

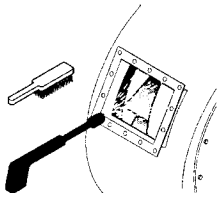


Drain connection

If there is a drain connection, the deposits on the impeller and in the interior of the housing can be removed with water or steam jet cleaner.

- Dispose of waste water according to regulations.

IMPELLER DEPOSITS



Cleaning opening

For impellers without special surface protection, deposits can be removed with a wire brush.

Use stainless steel wire brush for stainless steel.

WARNING!
Incorrect cleaning can damage coated surfaces!

Cleaning with a wire brush is not permitted. Warm coated parts (>50 °C) must not be sprayed with cold water. Risk of cracking!

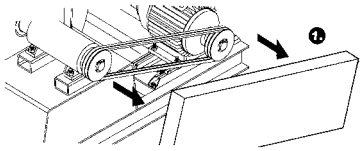
AFTER THE CLEANING

WARNING!

- After cleaning, the balancing state of the impeller must be checked.
- The fan and the plant connections must be checked for leaks.
- All protective devices must be reinstalled properly.
- Defective parts must be replaced.
- Renew damaged surface protection.
- All elastic elements must be able to move freely.
- If monitoring devices are installed, perform a functional test.

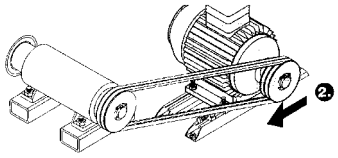
Do not reconnect the fan to the power supply and start it up until everything is in proper condition.

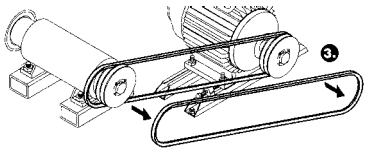
7.5 V-BELT DRIVE



The V-belts must be protected against dust, grease, chemicals and strong UV light.

- Check V-belt drive
- The condition and tension of the V-belt should be checked at regular intervals.

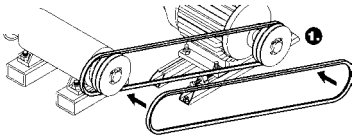




- Cleaning
- Dry clean the belt and pulley when the fan is at standstill.
- Replacing V-belt

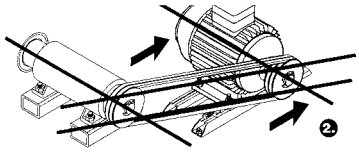
CAUTION!

- Disconnect fan from the power supply.
- Wait for impeller standstill.
- Ensure the fan cannot be switched on again by unauthorised persons!



- Removing V-belt

➲ 1. Remove belt guard
➲ 2. Slacken V-belt
➲ 3. Remove V-belt



- Mounting V-belt

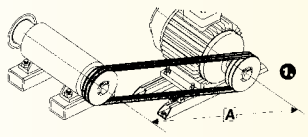
➲ 1. Fit V-belt

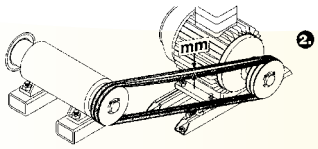
Do not use auxiliary tools such as screwdrivers!

➲ 2. Align shafts and pulleys flush.

Replace "only complete" V-belt set!

TENSION V-BELT, DETERMINE V-BELT PRE-TENSION

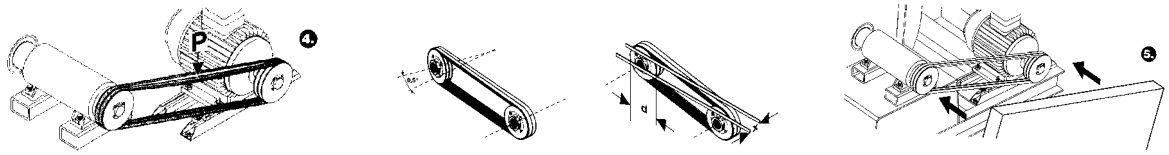




➲ 1. Measure centre distance A (e.g. 1.0 m).
➲ 2. Multiply centre distance by 16 = belt bending force in mm (1.0 m x 16 = 16 mm).
➲ 3. Adjust belt bending force on the measuring instrument (not shown).
➲ 4. Perform measurement according to the manual of the measuring instrument. Compare deflection force P with table.
➲ 5. Mount cover.

- Tension the V-belt after one hour of operation.
- Check V-belt every 3 months and tension if necessary.

Perform inspection and test run before start-up!



Tension force: see type plate

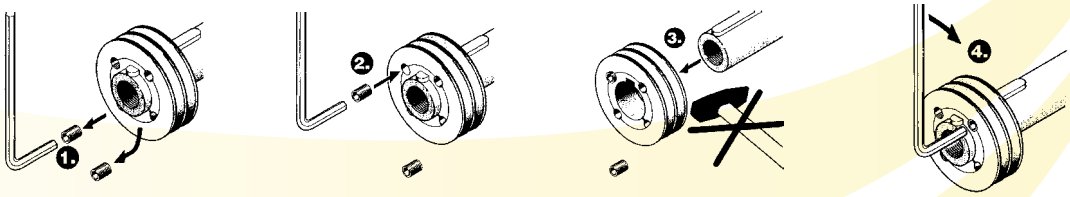
Maximum shaft deviation	
d (mm)	X max. (mm)
< 112	0.5
< 224	1.0
< 450	2.0
< 630	3.0
< 900	4.0
< 1100	5.0
< 1400	6.0
< 1600	7.0

7.6 INSTALLATION AND REMOVAL OF PULLEYS WITH TAPER-LOCK SYSTEM

REMOVING PULLEY

CAUTION!

- Disconnect fan from the power supply.
- Wait for impeller standstill.
- Ensure the fan cannot be switched on again by unauthorised persons.



➲ 1. Unscrew both threaded bolts.
➲ 2. Screw one threaded bolt into removal thread.
➲ 3. Pull off the belt pulley.

The tightening torques are based on the calculation principles of VDI 2230.

MOUNTING PULLEY

➲ 1. Assemble in reverse order

CHANGING THE IMPELLER

An impeller change may only be performed or authorised by POLLRICH.

BEARING MAINTENANCE

NOTE!
Soiling can damage the bearing!

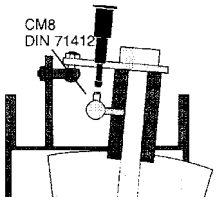
Soiling and moisture result in damage of the bearing and thus in premature failure. The penetration of even the smallest foreign bodies into the interior of the bearing results in noisy running and damage to the bearing.

VANE CONTROLLER MAINTENANCE

VANE CONTROLLER WITHOUT GREASE NIPPLE

The vane controller is designed for hot pure gases without corrosive components. The bearings are completely maintenance-free.

VANE CONTROLLER WITH GREASE NIPPLE



Lubricate all bearings of the vane controller: Lubricant: see vane controller technical data.

- Lubricant initial filling: OKS 402
- Lubricant initial filling: High temperature paste MF

7.8 ACTIONS AFTER COMPLETED MAINTENANCE

The following steps must be performed after completion of the maintenance work and before switching on the machine:

➲ 1. Check all previously loosened screw connections for tightness and secure.
➲ 2. Check that all previously removed guards and covers are properly reinstalled.
➲ 3. Ensure that all tools, materials and other equipment used have been removed from the work area.
➲ 4. Clean the work area and remove any leaked substances such as liquids, processing material or similar.
➲ 5. Make sure that all safety devices of the machine are working properly.

7.9 MAINTENANCE INTERVALS

FACTORY MAINTENANCE INTERVALS

Inspection sticker

Function and operational reliability of the fan depend on proper inspection, maintenance and repair.

We recommend that the owner informs the manufacturer's customer service department in good time in accordance with the marked inspection sticker.

CAUTION!

- Only original spare parts may be installed for safety reasons!
- Remove the fan carefully, observing all safety instructions.

CAUTION!

After assembly of impeller, motor and bearing, a vibration check is recommended before start-up (according to "Initial commissioning"), if necessary operational balancing.

7.10 REPAIR

PLEASE CONTACT MANUFACTURER.

7.11 SPARE PARTS

ORDERING SPARE PARTS

Order from the manufacturer stating the order number or type plate details. Please contact manufacturer.

WARNING!
Risk of explosion from the use of incorrect spare parts!

The use of incorrect or defective spare parts can result in explosions in the Ex-zone. This can result in serious injuries or even death, as well as significant damage to property.

- Only use original spare parts from the manufacturer or spare parts expressly approved by the manufacturer.
- Always contact the manufacturer in the case of uncertainties.

Failure to comply with these instructions will result in loss of explosion protection!

WARNING!
Risk of injury from the use of incorrect spare parts!

The use of incorrect or defective spare parts can cause dangers for the personnel as well as damage, malfunctions or total failure.

- Only use original spare parts from the manufacturer or spare parts approved by the manufacturer. Always contact the manufacturer in the case of uncertainties.

8. FAULTS

The following chapter describes possible causes of faults and the work required to eliminate them.
If faults occur more frequently, shorten the maintenance intervals according to the actual load.
Contact the manufacturer in the event of faults that cannot be rectified by the following instructions.

8.1 SAFETY

ELECTRICAL SYSTEM

DANGER!
Danger to life from electric current!

SECURING AGAINST RESTARTING

WARNING!
Danger to life from unauthorised restarting!

see ↳ chapter 2.7.2

INCORRECTLY CARRIED OUT WORK TO ELIMINATE FAULTS

WARNING!
Risk of injury due to improper troubleshooting!

- Ensure that there is sufficient space for installation before starting work.
- Make sure that the installation site is tidy and clean! Loose components and tools lying on top of each other or around each other are sources of accidents.
- If components have been removed, ensure correct installation, reinstall all fixing elements and observe bolt tightening torques.
- Note the following before restarting:
  - *Ensure that all work for fault clearance has been carried out and completed according to the information and instructions in this manual.*
  - *Make sure that there are no persons within the danger area.*
  - *Ensure that all covers and safety devices are installed and functioning properly.*

TOXIC MEDIUM

WARNING!
Risk of damage to health from residues of the conveyed medium in the fan housing!

- Make sure that there are no longer any toxic media residues inside the fan before working in the interior.

CORROSIVE MEDIUM

WARNING!
Risk of damage to health from residues of the conveyed medium in the fan housing!

- Make sure that there are no longer any corrosive media residues inside the fan before working in the interior.

MOVING PARTS

WARNING!
Risk of injury from moving parts!

EXPLOSION PROTECTION

WARNING!
Explosion hazards during troubleshooting!

see chapter ↳ 1.7

BEHAVIOUR IN THE EVENT OF FAULTS

The following generally applies:

- 1. In the case of faults which are an immediate danger to persons or property, initiate an emergency stop immediately.
- 2. Determine cause of malfunction.
- 3. If troubleshooting requires work in the danger zone, disconnect the machine from the power supply and secure it against restarting. Inform the responsible person at the operating site about the fault immediately.
- 4. Depending on the type of fault, arrange for it to be rectified by authorised specialist personnel or rectify it yourself.

The fault table listed under 8.3 provides information about who is authorised to rectify the fault.

8.2 FAULT INDICATORS

Faults are indicated via the control system to be provided by the owner.

For more detailed information about the fault indicators, refer to the relevant documentation for the control system.

8.3 FAULT TABLE

Error description	Cause	Remedy	Personnel
Fan does not start	No voltage	Check power supply and restore if necessary	Qualified electrician
	Drive motor incorrectly connected	Check connection	Qualified electrician
	With star-delta connection the motor remains in the star	Shorten changeover time from star to delta	Qualified electrician
	Fan starts up against insufficient system resistance	Close throttle elements or install additional sheet metal plates	Qualified personnel
	Start/restart: Switching frequency too high (regulation of the throttle elements)	Let motor run from warm operating condition	Qualified personnel
	Motor protection device designed too weak	Cable cross section and protective device must provide protection for the starting current during start-up	Qualified electrician
	Start-up time too long	Close throttle elements, check tightening torque of motor MA/MN	Qualified personnel

8. FAULTS

Error description	Cause	Remedy	Personnel
Fan does not start	Motor defective	Check motor and replace if necessary	Qualified electrician
	Starting current too high	Incorrect voltage. Provide star-delta start-up. Local grid too weak.	Qualified electrician
Motor protection has switched off	Motor defective	Check motor, replace if necessary	Qualified electrician
	Fuse defective	Check fuse, replace if necessary	Qualified electrician
	Impeller is stuck	Contact manufacturer	Manufacturer
	Bearing damage	Replace bearings	Qualified personnel
Motor temperature too high	Motor defective	Check motor, replace if necessary	Qualified electrician
Motor noises	Motor bearing damage	Replace bearings	Qualified personnel
The current consumption indicated on the motor plate is continuously exceeded	Air volume too high	Reduce the air volume using a throttle element until the permissible current consumption is reached	Qualified electrician
Fan does not run smoothly	Caking on the impeller blades	Clean impeller blades	Qualified personnel
	Impeller worn	Replace impeller	Qualified personnel
	Fan distortion due to uneven foundation	Detach foundation fastening. Level the foundation. Then fasten the fan to the foundation again.	Qualified personnel
	Damage to rings and rolling elements, rolling surfaces of roller bearings	Replace bearings	Qualified personnel
	Wear due to soiling or inadequate lubrication	Protect bearings against dirt. Use clean grease.	Qualified personnel
	Unsuitable lubricant	Only use lubricant according to manufacturer specification	Qualified personnel
	Coupling halves are not optimally aligned	Check alignment	Qualified personnel
Volume flow not OK	Incorrect rotation direction of the impeller	Check direction of rotation. Contact manufacturer if necessary.	Qualified personnel
	Speed deviation	Check frequency	Qualified electrician
Pressure / volume flow reduces	System parts are not functional, e.g. filter, flap, impeller	Check system parts. Contact manufacturer if necessary.	Qualified personnel
Gradual change of the running noise	Damage to the raceway (e.g. due to soiling or fatigue)	Protect bearings against temperature	Qualified personnel
Grinding noises on the fan		Contact manufacturer	Manufacturer
Grinding noises on the vane controller	Caking on the swirl flaps	Clean vane controller	Qualified personnel
No regulation of the vane controller	Inadequate lubrication	Lubricate	Qualified personnel

Error description	Cause	Remedy	Personnel
No regulation of the vane controller	Bearing defective	Replace bearing	Qualified personnel
	Actuator does not switch, incorrectly connected or defective	Check connection, repair or replace	Qualified personnel
	Linkage not correctly installed	Fasten linkage	Qualified personnel
Strong vibration	Unbalance	Contact manufacturer	Qualified personnel
Bearing noises	Bearing damage	Check bearings, replace if necessary	Qualified personnel
Bearing temperature too high (pre-warning at 70 K above ambient temperature, switch-off at 80 K above ambient temperature)	Bearing damage	Check bearings, replace if necessary	Qualified personnel
	Unbalance	Contact manufacturer	Qualified personnel
	Vibration	Check bearings, replace if necessary	Qualified personnel
Bearing vibrations (see P-AA-043)	Bearing damage	Check bearings, replace if necessary	Qualified personnel
	Unbalance	Contact manufacturer	Qualified personnel
Leakage at bearing housing (shaft-bearing housing)	Bearing seal defective	Replace seal	Qualified personnel
V-belt noises, slippage	Pulley alignment not exact	Check pulley alignment	Qualified personnel
	V-belt tension	Check V-belt tension	Qualified personnel
V-belts twist	Pulley alignment not exact	Check pulley alignment	Qualified personnel
	V-belt tension	Check pulley alignment	Qualified personnel
Noise from the coupling	Coupling alignment	Check coupling alignment	Qualified personnel
	Coupling pins defective	Replace coupling pins	Qualified personnel
Coupling breakage during test operation	Large torque shocks when restarting	Allow electrical rotor fields to abate, i.e. only restart the fan after the rotor has stopped. Check the function of the star-delta switch (switching time behaviour).	Qualified electrician
Strong shocks during start-up	Elastic elements are worn	Replace elastic elements	Qualified personnel
	Incorrect adjustment of the rubber-bonded metal buffers or spring isolators	Check settings	Qualified personnel
	Bolted on piping for tension	Use elastic piping (compensators)	Qualified personnel
Pumped medium escapes at the shaft seal	Shaft seal defective or worn	Replace seal	Qualified personnel

8.4 START-UP AFTER RECTIFIED FAULT

After rectifying the fault, perform the following steps for restarting:

- 1. Reset emergency stop devices.
- 2. Acknowledge fault on the controller.
- 3. Check all previously loosened screw connections for tightness and secure.
- 4. Check that all removed guards and covers are properly reinstalled.
- 5. Ensure that all tools, materials and other equipment used have been removed from the work area.
- 6. Clean the work area and remove any leaked substances such as liquids, processing material or similar.
- 7. Make sure that all safety devices of the machine are working properly.
- 8. Start according to the instructions in chapter 6 "Operation".

9. DISMANTLING AND DISPOSAL

After the end of use, dismantle the machine and dispose of it in accordance with environmental regulations.

9.1 SAFETY

ELECTRICAL SYSTEM

DANGER!
Danger to life from electric current!

INCORRECT DISMANTLING

WARNING!
Risk of injury from incorrect dismantling!

- Ensure sufficient space before starting work and handle exposed sharp-edged components with care.
- Make sure the workplace is tidy and clean! Loose components and tools lying on top of each other or around each other are sources of accidents.
- Dismantle components properly. Pay attention to the sometimes high own weight of the components. Use hoists if necessary.
- Secure components so that they can not fall down or topple over.
- Contact the manufacturer in the case of uncertainties.

9.2 DISMANTLING

Requirements:

- Switch off machine and secure against restarting.
- Physically disconnect the entire energy supply from the machine, discharge stored residual energies. Remove consumables and auxiliary materials as well as residual processing materials and dispose of them in accordance with environmental regulations.

Then clean assemblies and components properly and dismantle them in compliance with the applicable local occupational health and safety and environmental protection regulations.

9.3 DISPOSAL

If no take-back or disposal agreement has been concluded, send dismantled components for recycling:

- Scrap metals.
- Send plastic elements for recycling.
- Dispose of other components sorted according to material composition.

NOTE!
Environmental hazard due to incorrect disposal!

Incorrect disposal can cause hazards for the environment.

– Arrange for the disposal of electronic waste, electronic components, lubricants and other auxiliary materials by approved specialist companies.
– In the case of doubt, obtain information about environmentally compatible disposal from the local municipal authority or special waste management companies.

Lubricants

Lubricants such as greases and oils contain toxic substances. They must not be released into the environment. The disposal must be performed by a specialist disposal company.

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