VDL Klima

USER MANUAL

KLIMA
AXIAL FAN

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1 General Information

Pictograms used in this manual

Dangerous situation with possibility of personal injury as well as damage to the equipment.

Reference to tips, comments and supplements with regard to using the equipment.

If this symbol is stated on the type plate, then the apparatus satisfies the ATEX 94/9/EG Guideline.

The general standards apply to symbols that are applied to the installation by the owner.

This manual supplies information and instructions for the correct and safe use of the unit.
Many accidents are the result of incorrect use.
Instructions in this manual must therefore always be followed.
The safety instructions must also always be observed when work is done on the equipment. The complete manual must be carefully read. If, after reading this manual, questions still exist, you must contact the supplier / contractor for more information.

The installation may NOT be put into operation before all unclear issues have been resolved.

1.1 Product Information

Product **:** Axial Fans.
Type **:** See Technical Specification Sheet or type plate

The customer chooses the fan with corresponding volume of air and noise levels from the data that can be found in the technical documentation. De axial fan is designed for transporting air. This means that in the case of land installations one can find Klima fans in large parking garages, tunnels and factories and also in storage facilities for agricultural products where they not only serve a ventilation function, but also for cooling and drying potatoes, onions, grain and hay. On ships, this Klima product can be found ventilating engine rooms and holds. Axial fans are also used for installation on or in technical ventilation units like air heaters, coolers and ventilation in general.

1.2 Installation Parts

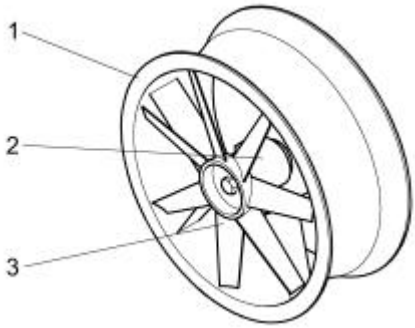

Fig 1

1. Fan Housing
2. Motor
3. Fan

1.3 Prohibitions on (putting into) Operation

It is Prohibited to operate the Unit beyond Design Conditions

The unit is designed according to the design parameters as stated in the enclosed technical specification sheet. If these parameters are exceeded then it is PROHIBITED to put the installation into operation without prior consultation with the manufacturer.
Moreover, all continued use in such a non-design situation is considered contrary to the regulations. The manufacturer is not liable for any material damage or personal injury that results from further use: this risk is solely the responsibility of the owner / user.

Prior to using the unit, the user must have read and understood the accompanying MANUFACTURERS STATEMENT (Guideline 89/392/EEC art.4 paragraph 2 and Appendix II under B).

The materials used in the ventilator are in accordance with the VDMA 24169 norm.

Klima has advised on the choice of materials, the user remains responsible for the media used with regards to corrosion.

1.4 Guarantee

Unless covered by a separate agreement, Klima guarantees the products supplied by the company to be sound and in good working order, according to the technical specifications, for a period of 6 months after being put into operation, up to a maximum of 12 months after delivery.
The General Terms of Sale and Delivery can be requested from your supplier.
Any damage and/or decrease in capacity due to non-observance of this user manual are not covered by the guarantee.
The guarantee expires if any adaptations or changes are made to the fan.

The equipment must always be inspected upon delivery for damage to the equipment during transport.
The manufacturer must immediately be notified of any damage during transport.

2 Safety

2.1 General Safety

Physical injuries

Physical injuries can be caused by:

- Burns from contact with the motor
- Electrocution from contact with the electrical components
- Electrocution from touching live parts due to short circuiting of the motor
- Maiming from contact with the rotating fan
- Sucking in or trapping of clothing
- Flying parts of the unit(breakage)
- Bumping against pointed and/or sharp parts of the installation

Damage to the equipment

Damage to the equipment can be caused by:

- External forces.
- Corrosion.
- Flooding.
- Erosion.
- Fatigue.
- Pressure / temperature too high.
- Impact load.
- Transport
- Imbalance of the fan (vibrations).
- Assembly errors of the motor installation.
- Assembly errors in the fan installation.
- Overheating of the motor (from overloading)

When applying the ATEX 94/9/EG Guideline

- The safety devices must operate independently of the measuring and operating mechanisms necessary for operation.
- The malfunctioning of a safety device must be reported within sufficiently short space of time, as far as possible using suitable technical means, in order to minimise the chance that a dangerous situation occurs.
- As a rule fail safe procedures must be applied.
- The safety devices' controls must as a rule operate directly on the control mechanism concerned and not via the software.
- Failure of the safety device must as far as possible result in the devices and/or safety devices defaulting to a safe state.

- Emergency shutdown facilities of the safety devices must, as far as possible, be equipped with a system that inhibits switching the equipment on again. A new start command may only reactivate normal operations once the emergency shutdown has been deliberately revoked.

For transport see: the Instructions for Transport and Hoisting
If handled incorrectly, danger for physical injury and/or damage to the equipment exists

The fan is only suitable for transporting non aggressive air unless otherwise agreed with the customer (in writing).

The values stated in the technical specification sheet must not be exceeded.

This manual describes other safety instructions than those safety instructions related to the chapter in which they occur. The complete manual must therefore be read to be aware of all safety provisions and measures to be taken when using this installation.

The fan's electrical components must be earthed, except for those components with double insulation.

The application of a operating switch in the main or driving current, if safe maintenance of the fan cannot be guaranteed during normal operation.

Inspect the clearance of the fan before using for the first time or after maintenance.

After switching off the fan's motor it will take a little while before the fan stops.

The motors assembled by Klima are suited to working in environmental temperatures between -20°C en +55°C. For lower temperatures, if stated on the order, the motor can be greased with special grease for operating temperatures down to -40°C. For higher environmental conditions than +55°C it is necessary to place the motor outside the airflow. A special motor (suitable for higher temperatures) is also available.

2.2 Protection:

The fan's drive is protected.
If the cooler is set up close to people, presenting a risk of contact, the must be shielded in accordance with Euro Norm EN 294. These protective materials can be delivered by the manufacturer if requested.

3 Transport, Storage and Installation Site

3.1 Instructions for Transport and Hoisting

Use the hoisting facilities/crane hooks on the unit.
These hoisting facilities are only intended for hoisting the axial fan prior to it being assembled to other equipment. The hoisting facilities may no longer be used to lift and/or move the assembly once the cooler is assembled with other equipment.
For global hoisting instructions, see Fig. 2. 2.

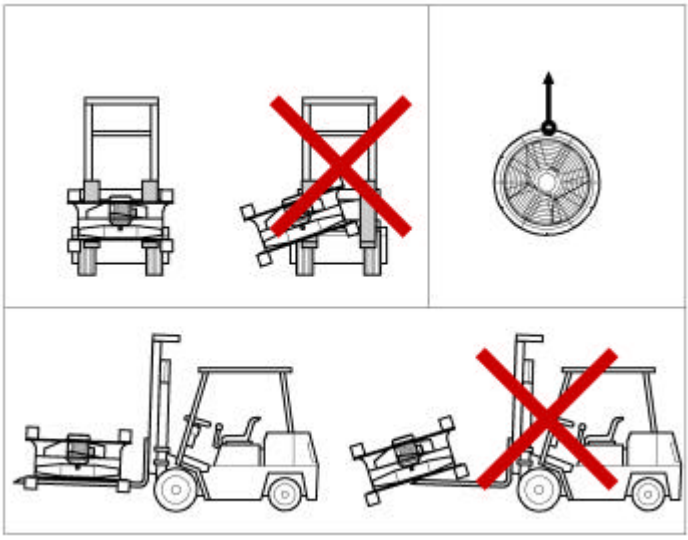

Fig 2

Transport and Packaging

For transport see: the Instructions for Transport and Hoisting

Always use the appropriate hoisting facilities and equipment.

Respect the prescribed safety norms and regulations.

If handled incorrectly, danger for physical injury and/or damage to the equipment exists

Any packaging must be removed carefully and disposed of in an environmentally friendly way.

3.2 Storage:

The unit must always be stored covered and dry.
For long-term storage the axial ventilator's fan must be turned 90° at least 1x per month. This is to prevent damage to the electromotor.

3.3 Installation Siting:

General conditions on installation siting / location should satisfy:

- Sufficiently firm and level ground or construction, adapted to the load that is expected.
- Sound construction and vibration-free installation of the unit.
- Protect if necessary against possible damage by e.g. internal transport.
- See the technical specification sheet for product-related information.
- Protection. For safety, see Chapter 2.2 under "Safety".
- The location where the equipment is placed must have enough space for installation, maintenance and cleaning. See the relevant chapters.
- Sufficient light and space for inspection and maintenance.
- The unit is anti seismic to maximum earthquake intensity in accordance with Eurocode 8.

4 Installation

The assembly and start-up must be carried out by a suitably qualified person appointed by the buyer or by a qualified contractor.
The installation may only be operated, maintained and repaired by authorised, trained and instructed personnel.

In general: requirements related to the positioning, assembly, as well as the noise produced, are in accordance with the requirements for a specific product (see technical specification). The foundation, construction and mounting must be sufficiently strong, adapted to the expected load. The use of insulators is advisable.

4.1 Safety Measures and Facilities on the axial fan.

Installation must be carried out in such a manner that all likely risks are excluded.
To achieve this, the following points must at least be observed:
When installing the axial ventilator one should ensure that the installation that the ventilator is being assembled onto is shut down.

4.1.1 Electrical connections:

If the ATEX 94/9/EG Guideline is applicable then the manufacturer will under no circumstances bear the responsibility for the electrical installation of the unit.

Equipment and safety devices must be fitted with suitable bushings for cables and other wiring.
Prior to connecting the fan motor one must consult the wiring diagram in the connector box. **One must be very careful specially when connecting pole reversible motors. Experience shows that many mistakes are made when installing these motors.**
The connection must be in accordance with local regulations. A thermal safety switch for the motor is built into the electrical circuit of 3 phase motors for which the setting corresponds to the maximum allowable current as stated on the motor type plate. If the relay is incorrectly set then any damage to the motor will not be compensated either by the manufacturer of the electromotor or by VDL Klima b.v.

How the unit is switched on, the thickness of the wiring, type and settings of the safety measures, must be agreed on in consultation with your contractor or power supplier. All electrical components must be earthed, except for those components with double insulation.

4.1.1.1 Connection Regulations.

- The electrical equipment must be connected in compliance with Euro Norm EN 60204-1.
- Local regulations (e.g. NEN 1010) must be applied.
- Dangerous overload must be avoided by the use of over-current limiters and such like control devices in the electrical system.
- Please refer to the electromotor's User Manual for the connection guidelines.

4.1.2 Moving Parts

The installation is equipped with moving parts like an electromotor that drives a fan.
These moving parts must be shielded. See the Chapter "Protection".

4.1.3 Open Without Danger

If the ATEX 94/9/EG Guideline is applicable and the axial ventilator is mounted in a housing or casing that is part of the anti explosion protection, then it may only be able to be opened using special tools or by applying suitable safety measures. Neither may the axial ventilator contain any parts that can be opened without using special tools or adhering to suitable safety measures.

4.2 Preparation for Installation

General:

- Sufficient space for carrying out assembly, disassembly, maintenance, cleaning, and other activities on the heat exchanger.
- The foundation, construction and mounting must be sufficiently strong.
- Mechanical vibrations must be prevented.

If ATEX 94/9/EG Guideline is applicable then there may be no sparks, flames, electric arcs, high surface temperatures, acoustic energy, optical radiation, electromagnetic waves or other possible sources that could cause combustion in the direct vicinity of the axial fan.

The design specifications stated in the technical specification sheet must always be adhered to. If the user deviates from these values, the responsibility rests with him.

4.3 Installation

If the ATEX 94/9/EG Guideline is applicable and the fan is part of a closed construction then the axial fan must be assembled gas-tight. The closed construction must also include a safeguard against overpressure.

If the ATEX 94/9/EG Guideline is applicable then the axial fan must be properly earthed.

- The instructions for transport and hoisting must be observed when placing or moving the equipment.
- Bolt-nut connections must be clean and lightly oiled.

5 Start-up

The assembly and start-up must be carried out by a suitably qualified person appointed by the buyer or by a qualified contractor.
The installation may only be operated, maintained and repaired by authorised, trained and instructed personnel.

5.1 Inspection before putting the unit into operation

All relevant safety regulations must be observed both before and during start-up.

The following instructions also apply when starting the fan:

- The suction and exhaust openings must be connected to a duct system.
- The suction and/or exhaust openings must be fitted with a protective grid in the case of free suction and/or exhaust.
- There must be no foreign objects in the fan.
- Check if all bolts are properly tightened.
- Check that the fan is running freely (manually).

Inspection that the fan is running freely must be done without current.

Utmost caution must be taken when inspecting that the fan is running freely due to the extreme risk for physical injury if the fan were to unexpectedly go live during inspection.

- Inspect -if applicable- the setting of grids, valves, appendages and suchlike.
- Check the direction of the fan by applying current briefly.

Danger of maiming from contact with the rotating fan.

- The direction of the fan must be checked based on the directional arrow on the housing or the motor.

N.B. Never turn on again immediately; always wait until the fan and/or motor has completely stopped and never stop the fan by hand.

Klima has tested the unit for imbalance

5.2 Air Inflow

Once all inspections have been carried out the fan(s) may be started and the rest of the installation may be put into operation.

5.3 Inspection after Start-up:

Check whether the settings of the measuring and control devices reflect the expected values.

Check after starting the fan for:

- Vibrations.
- Unusual sounds.
- Current consumption in relation to the motor's maximum allowable amperage.

If any deviation is observed, the fan must immediately be stopped and the deviation must be corrected.

If the ATEX 94/9/EG Guideline is applicable then any deviation may be only corrected where this is not contrary to the aforementioned guideline.

5.4 Shut-Down of the Installation:

Normal operation is done with the on/off switch that is installed in the installation with an "on" and "off" indication. For remote control, the switch must be marked with a functional description.
The supplier of a third party must install a work switch enabling the main or drive current to be switched off.

6 Maintenance and Inspection:

The assembly and start-up must be carried out by a suitably qualified person appointed by the buyer or by a qualified contractor.
The installation may only be operated, maintained and repaired by authorised, trained and instructed personnel.

If the ATEX 94/9/EG Guideline is applicable then maintenance may only be carried out after release by the safety inspector.

If the ATEX 94/9/EG Guideline is applicable then dust accumulation must be avoided with regards to excessively high surface temperatures and/or dust explosions.

The owner must post warnings against environmental factors that can pose a threat. Preferably using pictograms and/or text.

The owner must enforce the wearing of protective clothing and gloves by the personnel wherever necessary.

Maintenance, cleaning etc. must only take place on a shutdown unit.

Depending upon operating conditions, maintenance should be carried out every 1000 hours of operation or minimally 1x per year.

6.1 Inspection

To guarantee a high degree of operational reliability regular inspection of the equipment by the maintenance and operating personnel is necessary for the following:

- Fouling of the fan and or motor (drop in capacity).
- Dust Accumulation.
- Vibrations / strange noises.
- General condition of the installation.
- Corrosion.
- Functioning of the safety devices.
- Temperature of the bearings max. 95°C (ambient temperature + 40°C).
- Temperature of the motor max. 135°C (ambient temperature +80°C).

6.2 Cleaning the Axial Fan.

Maintenance, cleaning etc. must only take place on a shutdown device. If this is not possible then these activities must be able to be carried out without danger.

6.2.1 Disassembly Axial Fan.

If the ATEX 94/9/EG Guideline is applicable then parts may only be disassembled or replaced by and at the manufacturer.

Beware! Never use excessive force due to danger of damaging and/or unbalancing the fan.

Proceed as follows:

Disassembly of the fan/motor.
If the fan is not directly accessible then the fan and motor/foot must first be disassembled from the housing (if necessary disconnect the power cable from the work switch).

Remove the bolt with which the boss is attached to the shaft and try, using an even amount of force to slide the boss from the shaft. If this turns out not to work, try using a central lock screw with drawing plate (see Fig. 3 and Fig. 4) or a so-called pulley puller (see Fig. 5 and Fig. 6).

Disassemble the locking plate.
Disassemble the locking plate. Then assemble a drawing plate to the boss and pull the fan off the shaft by turning the central bolt.

1. Locking Plate
2. Drawing Plate
3. Boss Part
4. Fan
5. Shaft
6. Central Bolt
7. Locking Nut
8. Electromotor
9. Pin

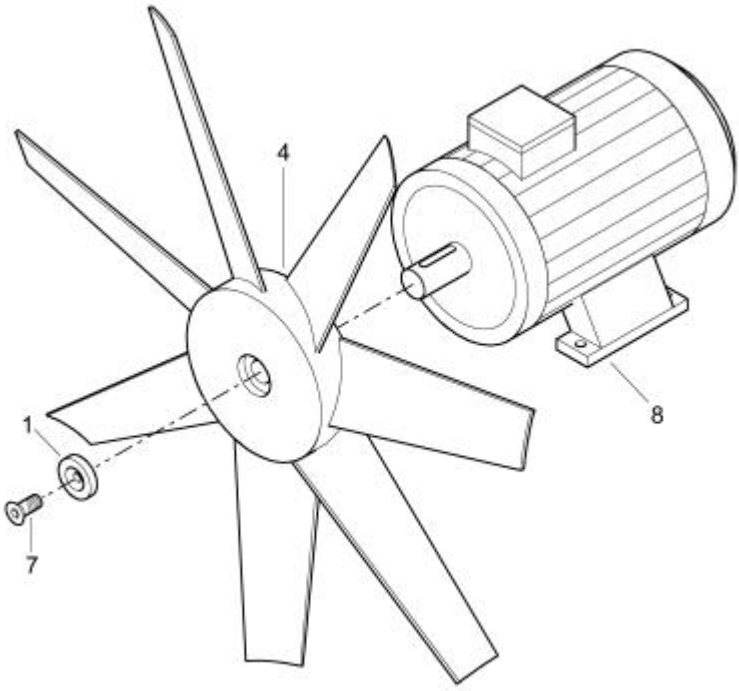

Fig 3

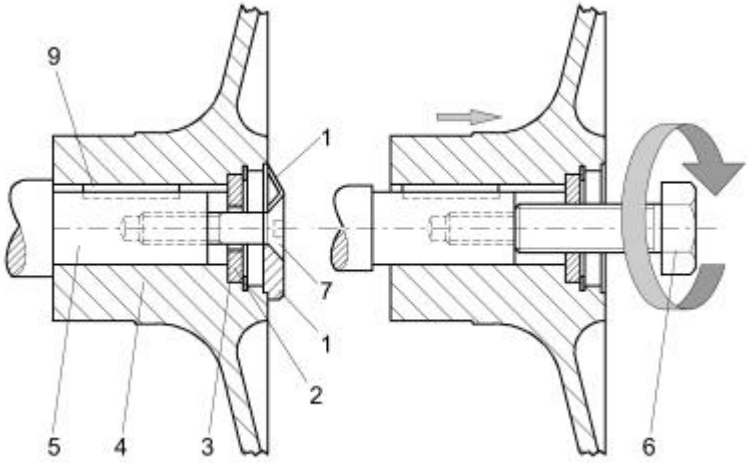

Fig 4

When using a pulley puller set to work as follows.
Disassemble the locking plate. Then assemble a pulley puller to the boss and pull the fan off the shaft by turning the central bolt.

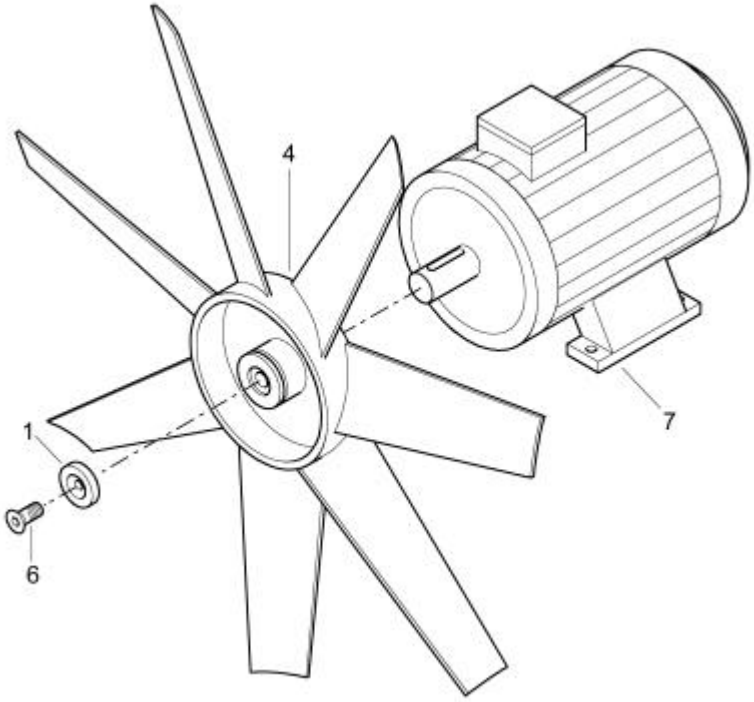

Fig 5

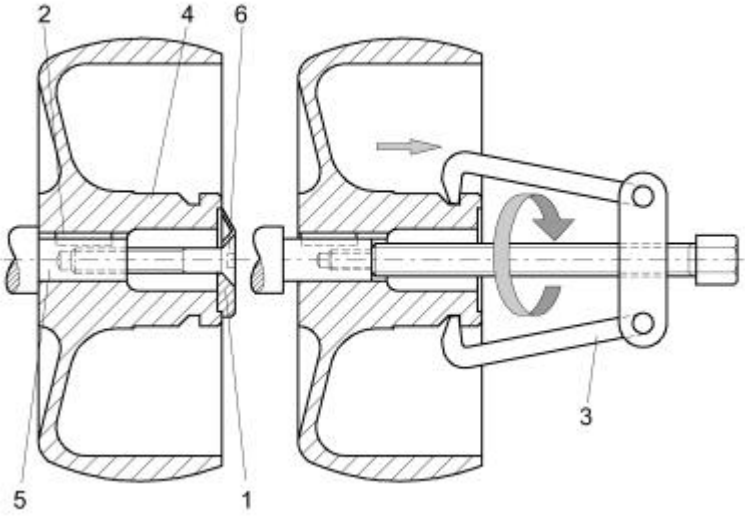

Fig 6

1. Locking Plate
2. Pin
3. Pulley puller
4. Fan
5. Shaft
6. Locking Nut
7. Electromotor

6.2.2 Cleaning the Axial Fan.

- Using a vacuum cleaner.
- Using compressed air to blow it clean.

6.2.3 Assembly Axial Fan.

Slide the fan onto the shaft (note the pin) and attach the fan using the locking plate and nut and lock the nut.
Assembly of the fan/motor with mounting plate to the housing must be done carefully to avoid damage to the fan. Mind the position of the junction box during assembly and check that the fan is running freely before tightening the bolts (See Fig. 3, 4, 5 and 6.)

7 Malfunctions

7.1 Identification and Correction of Malfunctions.

If the ATEX 94/9/EG Guideline is applicable then only apply the following instructions where this is not contrary to the aforementioned guideline.

Malfunction	Possible cause	Correction of the malfunction
Fan has insufficient capacity.	Fan malfunction	Replace fan
	The operating conditions deviate from those stated in the technical specification sheet.	Adjust the operating conditions.
	Suction and/or exhaust openings of the fan are fouled.	Clean suction and/or exhaust openings.
	Assembly error(s) in the motor installation.	Correct assembly error(s) in the motor installation.
	Assembly error(s) in the ventilator installation.	Correct assembly error(s) in the ventilator installation.
	Overheating of the motor (from overloading)	Contact your supplier.
	Airflow direction incorrect	Reverse the motor direction by connecting the electrical connections correctly.

Malfunction	Possible cause	Correction of the malfunction
Fan vibrates	Imbalance of the fan	Replace motor bearing and/or rebalance fan.
	Fan malfunction	Replace fan
	Assembly error(s) in the motor installation.	Correct assembly error(s) in the motor installation.
	Assembly error(s) in the ventilator installation.	Correct assembly error(s) in the ventilator installation.
	Insufficient stability	Optimize stability

7.2 Safety Measures / Facilities:

Facilities must be provided (ladders, steps, cat ways etc.) to be able to safely reach all places to make adjustments and to perform maintenance and repairs.

8 Customer Service:

8.1 Ordering Spare Parts:

When ordering spare parts it is important to provide the correct data.
One should at least state:

- Project and order number.
- Complete description of product / type (See Technical Specification / type plate).
- Required part (for name see documentation).

8.2 Complaints Procedure:

For complaints, requirements, or imperfections of the unit, please contact Klima, or your supplier's, service department.