FUNKEN
Kunststoffanlagen

ROOF FAN

Type FDv/FDvF 125-280

Made
in
Germany

Operating and maintenance instructions www.funken.de EN

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1 GENERAL INFORMATION

1.1 Safety instructions

FDv/FDvF 125–280 roof fans comply with the EC Machinery Directive and have been developed and manufactured in line with current technological standards and recognised safety standards and guidelines. They are safe to operate and comply with high quality standards. This series of products comprises future-oriented technology and is exceptionally user-friendly and easy to maintain.

However, any fan can unavoidably pose a residual risk to users or third parties, or the device may become impaired or cause other material damage. For this reason, it is imperative to observe and comply with all safety instructions. Failure to comply with the safety instructions can endanger the life and health of persons, cause environmental damage and/or cause extensive material damage.

Compliance with the safety instructions given in the operating instructions helps you to operate the device economically and exploit the full product benefits.

Observe the following safety measures for your own safety:

- Disconnect the fan from the power supply before performing any tasks to prevent electrical injuries.
- Always wear protective gloves when transporting and installing the device to prevent injuries caused by sharp edges.
- Wear a helmet and safety shoes when transporting and installing the device to prevent injuries caused by falling components.

1.2 Accident prevention

Accident prevention regulations (VBG1, VBG4, VBG7w, VBG9a – Vorschriften der Berufsgenossenschaft – German regulations for employers' liability insurance association) and the generally accepted rules of technology, particularly DIN VDE 0100 and DIN VDE 0150 (VDE – Verband der Elektrotechnik, Elektronik und Informationstechnik e.V. – German Association for Electrical, Electronic and Information Technologies), apply.

For ATEX devices: VDE 0165, VDMA 24 169 (VDMA – Verband Deutscher Maschinen- und Anlagenbau – German Mechanical Engineering Industry Association) and EU Machinery Directive 2014/34/EU (ATEX) apply.

Ensure that no critical gas concentrations are present during repair, maintenance and assembly tasks in explosion protection zones. Use a gas detector. Handling sources of ignition of any kind is prohibited in explosion protection zones. Welding, cutting and grinding tasks may only be conducted after obtaining an appropriate welding permit.
Protect the fan from foreign bodies falling in and being sucked in using a protective device (VDMA 24 169).

1.3 Qualification of employed staff

The fan must only be installed, operated and serviced by trained, instructed and authorised persons. The transportation/storage, installation, electrical connection, commissioning and maintenance tasks described in the operating instructions and the servicing instructions must only be performed by qualified staff.

Only perform repairs to the FDv/FDvF 125–280 roof fans that are described in chapter 7 "Maintenance tasks and troubleshooting".

Fans in explosion protection areas must only be operated by persons who are qualified in line with the ATEX Directive 2014/34/EU.

1.4 Intended use

FUNKEN fans from the FDv/FDvF 125–280 product series are suitable for extracting dust-free air and other corrosive and/or explosive gases, vapours or mists. The temperature of the exhausted media is -5 °C to +40 °C. Furthermore, in this series, the dust content of the gas being conveyed must not be greater than the dust content of outside air in industrial areas (< 5 mg/m³).
The temperature at the installation site must not exceed +40 °C.

If included, the sole purpose of the repair switch on the device is to switch off the fan. It prevents accidental activation during maintenance tasks. This switch is not the main switch and not an emergency off switch.
If control devices with electronic components (e.g. frequency converters) are employed, observe the device manufacturer's advice on preventing electromagnetic interference (EMC) (earthing, cable lengths, cable shielding etc.).

Ensure that the fan is suitable for use in explosion protection areas.

DANGER OF INJURY FROM ROTATING PARTS!

If installation makes it possible to accidentally reach into the rotating impeller, fit a suitable protective device (e.g. protective grille). Any other use or use which goes beyond the above constitutes misuse. The manufacturer/supplier is not liable for resulting damage. The risk is borne solely by the user.

The user is responsible for proper use. Proper use also includes compliance with the operating instructions and adherence to the mandatory inspection and service conditions.

1.5 Private use

This fan has been developed, designed and built for industrial and commercial use. Use in the private sector is therefore prohibited.

1.6 Danger zone

The danger zone extends around the entire fan during assembly, maintenance and repair tasks. Keep the area around the fan free of objects.

2 TRANSPORTATION/STORAGE

2.1 Transportation

Transport fans carefully!

Improper transportation can cause damage. If damaged by impacts or dropping, carefully check that the fan is working correctly and that the current consumption of the fan is correct. Do not operate damaged fans.

The fan or the transport unit can tip over during transportation. Pay attention to the centre of gravity (approximately central) and the weight (see technical data). Secure the fan using appropriate slings before transportation. Ensure the stability of the unit, i.e. do not stack units.

2.2 Items delivered

Remove the packaging immediately on delivery. Check the roof fan for possible transportation damage (report to the forwarding agent immediately) and check that the delivery is complete and correct. To do this, compare the details on the fan identification plate with the details on the delivery note. The same applies to accessories. Incorrect quantities or transport damage can only be processed via the transport insurance if the damage is confirmed by the forwarding agent's driver.

2.3 Packaging

The fans can be delivered in robust and secure transport boxes and/or on pallets.

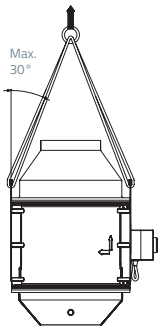
2.4 Temporary storage

Attention must be paid to the following points during temporary storage:

- Store the fan in the original packaging or supplement the original packaging depending on external influences.
- The storage site must be protected from weather, dry and free of dust and must not be subject to high humidity (max. 70%). The storage temperature must be between -25 °C and +60 °C.
- The fan must be protected against impacts, vibrations etc.

2.5 Transportation

Lift the fan carefully out of its packaging. The fan is fixed to a transport panel to protect it from damage. Remove this panel.



For transportation to the intended installation site, the roof fans must only be attached at the side openings between the drive unit and plates. The angle of inclination must not be greater than 30°.

Ensure that the weight is evenly distributed. Select a means of transportation that is suitable for the weight of the fan.

2.6 Disposal

Ensure that operating and auxiliary materials, packaging materials and scrap parts are disposed of safely and in an environmentally friendly manner. Local recycling options and regulations must be used/observed.
If the fan is moving toxic or aggressive media, the fan must be treated as hazardous waste and disposed of appropriately.

3 INSTALLATION

Installation must only be performed by trained specialist staff in compliance with these operating instructions and the applicable regulations.

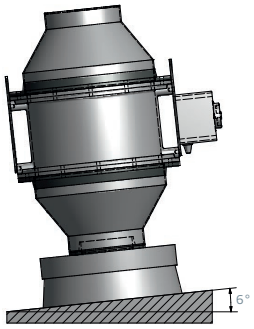
3.1 Installation site

The type, conditions and ambient temperature of the installation site must be suitable for the fan.

The following points must be observed:

- The mounting surface must be suitable for supporting the weight of the device and accessories.
- The mounting plane must be as level as possible. If using a flat-roof socket, the angle of inclination of the device must not exceed 6° if the water drain is located at the lowest point of the device.
- The fan must be accessible for maintenance tasks at all times and be surrounded by sufficient free space.
- Ensure that the fan has a sufficient supply of fresh air for cooling the motor.
- During installation, ensure that operation generates negative pressure in the shaft opening due to the fan's structural arrangement.
- Installation of the fan and its components is based on the operator's installation plan.

Installing a roof fan



Angled roof sockets can be used on site to compensate larger angles of inclination.
The roof fan must be accessible at all times for the performance of maintenance tasks and be surrounded by sufficient free space.

3.2 Installation on a mounting plane/foundation

3.2.1 Roof sockets

FUNKEN roof fans have been designed for mounting on sockets.

The following socket models are available:

- Flat-
  roof socket for angles of inclination of up to 6°
- Pitched-roof socket for angles of inclination of up to 45°
- Sound-insulation socket with a damping value of approx. 6 dB (A)

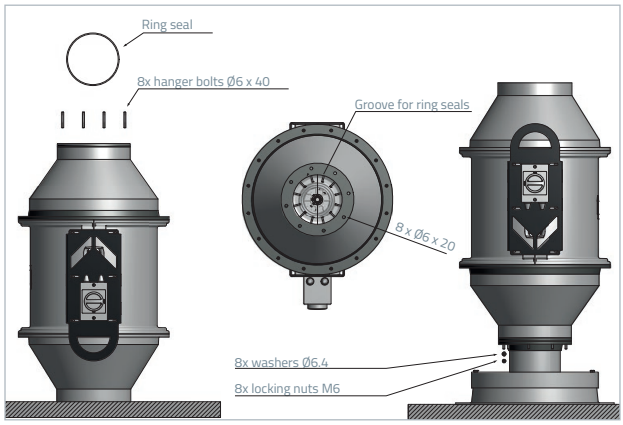
The base plate inclination cannot be varied – the roof pitch must be known!

3.2.2 Roof apertures

Roof apertures must be agreed and constructed in consultation with the architect or with a structural engineer and the building contractor.

3.2.3 Roof flashing

Seals between the roof and the socket must be constructed by specialists.

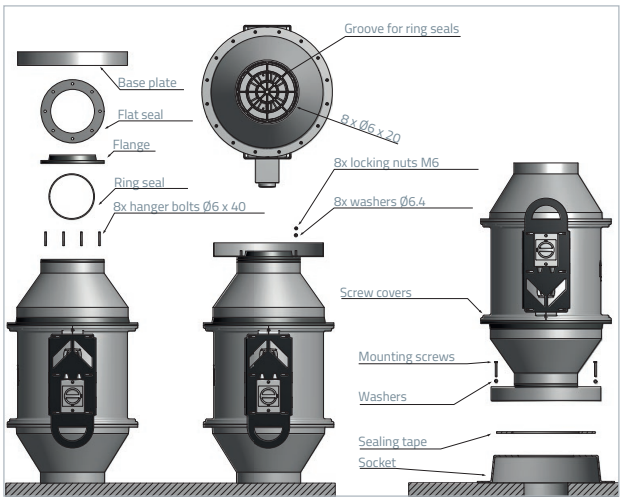


3.2.4 Installation on an existing flange

Install as follows:

- Turn the fan upside down, secure it against falling and screw eight M8 hanger bolts (twelve in case of FDv/FDvF 250–280) into the existing stud holes by approx. 30 mm.
- For reasons of stability, we recommend using connecting flanges with eight bore holes!
- Insert the ring seal into its groove.
- Turn the fan and insert it into the connecting flange so that the threads penetrate the flange bore holes.
- Secure the fan against falling and screw washers and

safety nuts into the protruding threads.
- Ensure that the fan has been installed in the correct position (see “Installation”)!
- The torque must not exceed 2.4 to 2.5 Nm as otherwise the threads in the plastic bore holes or the connecting flange may be damaged! The maximum speed must not exceed 500 rpm!



3.2.5 Installation on a base plate

Install as follows:
- Turn the fan upside down, secure it against falling and screw eight M8 hanger bolts (twelve in case of FDv/FDvF 250–280) into the existing stud holes by approx. 30 mm.
- Insert the ring seal into its groove.
- Insert the connecting flange.
- Insert the flat seal.
- Insert the roof panel so that the threads penetrate the bore holes in the panel. Ensure that the fan has been installed in the correct position – see chapter 3.1 “Installation site”. It is advisable to mount any accessories (such as cable inlets) on the base plate before attaching the fan to the base plate.
- Screw the washers and safety nuts into the protruding threads. The torque must not exceed 2.4 to 2.5 Nm as otherwise the threads in the plastic bore holes or the connecting flange may be damaged! The maximum speed must not exceed 500 rpm.
- Stick the self-adhesive sealing tape included with the base plate to the contact surface of the roof socket. The sealing tape prevents water and air from penetrating between base plate and socket.
- Position the fan and mounted base plate on the socket.
- Drill through the four indicated mounting holes using a 6-mm diameter drill. Then enlarge only those in the base plate to 9 mm.
- Attach the base plate using mounting screws and installation covers.

3.3 Inlet pipe joint connection

The flow to the fan must be supplied via a straight, circular pipe without obstruction. The pipe must be at least three times longer than its diameter.

Attachments, such as check valves or butterfly valves, must not be attached directly in front of the fan inlet as this can otherwise cause a significant reduction in output.

3.4 Earthing the device via the lightning conductor

The operator must provide an effective lightning conductor system if local circumstances make this necessary. The roof fan must be taken into consideration for any local lightning protection regulations regarding lightning conductors.
Equipotential bonding in line with DIN VDE 0100 and DIN VDE 0100-710 must always be provided. If an existing lightning protection system is present, the roof fan must be included in the lightning protection measures by a professional technician.

3.5 Removal

Removal must only be performed by trained specialist staff in compliance with these operating instructions and the applicable regulations.

Follow these instructions step by step:
1) Switch off the fan using the control unit – see chapter 6.1 “Decommissioning”.
2) Disconnect the wiring and isolate the bare wire ends.
3) Unscrew the mounting screws and remove the fan from its counter piece. To do so, follow the instructions given in chapter 4.2.2 “Initial commissioning procedure” in reverse order.
4) Pack the fan properly for decontamination.

4 COMMISSIONING

Commissioning must only be performed by trained specialist staff in compliance with these operating instructions and the applicable regulations.

Never reach into the area of the impeller if this test run is conducted without a protective grille!

Ensure that no parts or articles of loose clothing are sucked in!

4.1 Safety inspections

Conduct the following tests before commissioning:

- After the fan has been positioned at its intended destination, rotate the impeller manually to check that it turns smoothly.
- Check the pipe system and fan for foreign bodies (tools, small parts etc.). Free air passage must be ensured.
- Check all (mechanical and electrical) protective measures employed (e.g. protective grille, grounding resistor, TC relay, motor protection switch).
- Check that the current type, voltage and frequency of the mains connection are suitable for the fan and that they match the details stated on the motor identification plate.
- Check that the connected regulating elements are working correctly.
- Check that all screws, nuts etc. are firmly seated.

DANGER OF HEARING IMPAIRMENT!

We recommend using suitable ear protector devices in sound levels above 85 dB (A).

4.2 Initial commissioning

4.2.1 Test run

Perform a test run after conducting the tests listed above.

Next, switch on fans with repair switches using the knob. Wire all terminals in fans with terminal boxes.

During the test run, check the direction of rotation of the impeller. The direction of rotation must match that indicated by the direction of rotation arrow on the housing and motor cover. If the fan rotates in the wrong direction, the roof fan conveys less air.

Reverse the electrical polarity of the motor in compliance with the safety regulations. This is done by inverting the phase using the repair switch or the terminal box.

After a successful test run, switch the fan back off using the repair switch or by disconnecting the terminal connections.

4.2.2 Initial commissioning procedure

After a successful test run:
Connect the fan to the supply air/exhaust air pipe system (chapter 3 “Installation”).

1) Switch on the fan using the control unit (control station). If the fan has a repair switch, this switch must be set to “I”. If the fan has a terminal box, all terminals must be wired.
2) Once operating speed has been reached, measure the power consumption and compare it with the rated motor current stated on the motor or fan identification plate. Switch off immediately if continuous excess current is measured. Check extraction mode at all available speeds. If a motor fitted with suitable full motor protection is operated with continuous excess current, the thermal contact/PTC thermistor switches off the motor.
3) Check that the fan and motor are running smoothly and not making any unusual noises. No unusual oscillations or vibrations must be present.
4) Lock the control unit, fan and switch cabinet, if present, according to specifications (locking mechanism).
5) Hand over the system according to specifications. Excess grease may leak out of the labyrinth grease filling during initial commissioning.

5 ELECTRICAL CONNECTION

MORTAL DANGER FROM ELECTRICAL CURRENT!

The electrical installation of the fan must only be conducted by qualified electricians in compliance with these operating instructions and the applicable regulations:

- VDE regulations including the safety regulations
- Accident prevention regulations
- Installation instructions

5.1 Terminal connection diagrams

Only connect FUNKEN fans in line with valid terminal diagrams. A plan of the terminal connection diagrams can be found on the plate on the motor cover, and at other locations.

5.2 Cable connections

Cable routing is determined by local conditions and regulations. The type of cable and wire sizes are specified by the authorised qualified electrician.

Motor protection and winding protection cables must be routed separately to prevent interference.

Use a shielded cable for winding protection. The shielding must be connected to the protective conductor clamp (PE) in the control unit. The decision of whether the cable shield must be applied on both sides can only be made on site (e.g. due to very significant interference). In this case, the applicable regulations must be complied with.

If on-site control units are employed, it is not necessary to route a shielded cable as the thermal contact can be used for 230-V control voltage (up to 4 A).

After routing the cables, all cable inlets must be fitted with splashproof seals.

5.3 Thermal contact/PTC thermistor for motor protection

The client must ensure that the motor is equipped with an interlock shutdown that stops the motor if the highest permissible winding temperature is exceeded. This prevents the motor from restarting after a malfunction.

5.4 Fluctuating power supply

DIN EN 60034-1 specifies a voltage tolerance of +/- 5% (range A) for motors.
DIN IEC 60038 specifies a tolerance of +/- 10% for the mains voltages 230 V, 400 V and 690 V.

5.5 Speed control via the frequency converter

If the device is driven by a frequency converter, there is no need to use an all-pole sine filter between the frequency converter and motor.

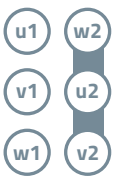
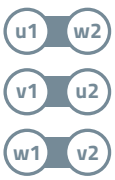
MORTAL DANGER FROM ELECTRICAL CURRENT!

Do not confuse sine filters with motor filters (often called attenuation filters or du/dt filters).

An all-pole sine filter is the best and most reliable option for preventing problems from arising in the first place. All-pole sine filters produce sinusoidal output voltages: phase to phase and phase to protective conductor. Using sine filters prevents high discharge currents, additional noise and damage to the motor insulation.

Operation in the field-weakening range (above 50 Hz) is inadvisable.

5.6 Connection diagrams

Three-phase AC (3 x 400 V)	**Three-phase AC (3 x 230 V)**
Squirrel cage motor	Squirrel cage motor
3 x 400 Y	3 x 230 Δ
	

6 OPERATION

The control unit regulates normal operation of the fan (switching on and off). During maintenance and inspection tasks, either the repair switch is used to switch the device on and off or the connection cable in the terminal box is disconnected and isolated.

Check that the fan is working correctly on a daily basis, giving particular attention to smooth running and noise generation.

6.1 Decommissioning

Switch the fan off using the control unit. The roof fan itself either has a repair switch or a terminal box. The fan is deactivated by setting the repair switch to the "0" position or by disconnecting the motor connection cable in the terminal box.

MORTAL DANGER FROM ELECTRICAL CURRENT!

If disconnecting in the terminal box, the power supply must be switched off via the control unit and secured against reactivation before disconnecting the connecting cable of the drive motor.

To prevent the fan from being unintentionally reactivated via the control unit,

- set the repair switch to "0" or
- disconnect and isolate the motor cable in the terminal box. Subsequently, close the terminal box.

Both methods disconnect the motor unit from the electrical connection.

6.2 Re-initialising the device after maintenance or repair tasks

Before re-initialising the device, it is vital to conduct a safety inspection in line with chapter 4.1 "Safety inspections".

CAUTION! FLYING PARTS! Wear safety goggles!

- After completing the maintenance and repair tasks, set the roof fan back into operation using the repair switch ("I" position).
- If the fan has a terminal box, reconnect the terminal wiring. Before wiring, check again that the power supply has been switched off via the control unit.

7 MAINTENANCE TASKS AND TROUBLESHOOTING

Only specialist staff trained in electronics/electrical engineering/mechanics must perform maintenance tasks in compliance with these operating instructions, the servicing instructions and the applicable regulations.

Tasks that can only be performed during operation whilst observing the applicable safety regulations and accident prevention regulations (e.g. checking smooth running) are excepted from this rule.

DANGER OF INJURY FROM ROTATING PARTS!

Before performing any work on fans:
If the fan has a repair switch, switch off the drive motor by moving the switch to the "0" position. If the fan has a terminal box, the power supply must be switched off via the control unit and secured against reactivation before disconnecting the connecting cable of the drive motor. Subsequently, disconnect the motor wiring in the terminal box and insulate the cable ends.

Only begin maintenance or repair tasks once the fan impeller has come to a standstill and the motor has cooled.

DANGER OF INJURY FROM FLYING PARTS!

Before conducting maintenance tasks, remove harmful or hazardous residue from the conveyed medium present in the fan using appropriate measures.

Safety and hazard warnings during maintenance, repair and cleaning tasks

Be aware of all rotating parts during cleaning, maintenance and repair tasks. TANGLING HAZARD! Wear close-fitting clothing in the danger zone.

Be aware of the danger of crushing during cleaning, maintenance and repair tasks.

Be aware of the danger from electrical current when performing cleaning, maintenance and repair tasks.

Cleaning, maintenance and repair tasks must only be conducted in non-explosive atmospheres. For reasons of safety, only tools made from non-sparking materials must be used when performing tasks of this kind.

Be aware of contaminated components during cleaning, maintenance and repair tasks.

7.1 Standstill

Standstill or temporary storage of the fan must be avoided. If this is not avoidable in certain cases, the fan must be run for at least two hours every two months. This is important to prevent the motor bearings from sustaining damage caused by prolonged standstill.

7.2 Sporadic fan operation

If the roof fan is not employed in continuous operation but only sporadically, it must be run for at least two hours every two months. This is important to prevent the motor bearings from sustaining damage caused by prolonged standstill.

7.3 Continuous fan operation

Annual routine inspections must take place if the fan is used in continuous operation:

Check operational readiness:

- Check plastic parts, e.g. for wear, damage, contamination and water-tightness. If wear, damage or leaks are found, shut down the fan for reasons of operational safety and contact the supplier. If contamination is found, shut down and clean the fan.
- Free passage of air vents and condensate outlets.
- Check that bolted connections are tight.
- Check that the fan does not vibrate when running (if the fan vibrates, see chapter 7.7 “Malfunctions”).
- Check that the identification plate is legible and request a new one if necessary.
- Check the accessories.

Check the electrical connections:

- Check electrical wires and connecting terminals for corrosion and clean if necessary.
- Check the power consumption (if motor problems occur, see chapter 7.7 “Malfunctions”).

Wear personal protective equipment (PPE)! Individual components may be contaminated depending on their area of application.

The warranty is rendered invalid if damage occurs due to a failure to conduct the regularly required inspections.

7.4 Removing the components

DANGER OF INJURY!

Before performing any work on fans:
If the fan has a repair switch, switch off the drive motor by moving the switch to the “0” position.
If the fan has a terminal box, the power supply must first be switched off via the control unit and secured against reactivation. Subsequently, disconnect the motor wiring in the terminal box and insulate the cable ends.

Only begin the maintenance or repair tasks once the fan impeller has come to a standstill and the motor has cooled.

Only the components listed below are permitted to be removed. All warranty claims are invalidated if further components are removed from the roof fan.

7.4.1 Removing the impeller

The designation of components in the following instructions is based on the device parts diagram on page 11.

- Switch off the power supply to the fan using the control unit. Disconnect the motor cable from the repair switch or in the fan terminal box and withdraw it from the repair switch or terminal box.
- Disconnect the fan from the supply air/exhaust air pipe system. Remove the fan from the mounting surface.

The following tasks must be conducted in the workshop or at a suitable workstation:

- Release the mounting screws on the bottom part.
- Remove the bottom part of the fan. If electronic tools are used, do not exceed a speed of 500 rpm and a torque of 2.5 Nm.
- After removing the plug, release the impeller/motor hub mounting screw.
- Release the impeller from the motor hub using the roof fan extractor and store it safely.
- The edges of the impeller are very sensitive to rough impacts. Carefully remove the impeller.
- Carefully remove the seals. Warning: do not use any sharp-edged tools!

7.4.2 Removing the drive motor

Perform the steps listed above.

- Remove the impeller in line with the instructions in 7.4.1.
- Carefully remove the carrier along with the associated O-ring.
- Unscrew the two opposite plates.
- Remove the mounting screw from the upper fan part. If electronic tools are used, do not exceed a speed of 500 rpm and a torque of 2.5 Nm.
- Remove the upper fan part.
- Carefully remove the seals. Warning: do not use any sharp-edged tools!
- Remove the motor cover.
- Remove the drive motor from inside the fan housing by carefully pressing the drive shaft and then pulling the motor body. At the same time, push the cable in from the outside. Take the weight of the motor into consideration.

7.5 Maintenance tasks

The FUNKEN roof fan is maintenance-free under normal operating conditions. Nevertheless, routine inspections should be conducted at regular intervals (annually at least). This is particularly important if the type of conveyed medium is likely to deposit contamination (e.g. material accretions due to extracting crystallising vapours) on the housing and impeller. Local regulations must be complied with during all cleaning and maintenance tasks.

7.5.1 Cleaning tasks

Only the impeller, protective outlet grille and condensate outlet must be cleaned. The internal air passages must also be cleaned if the medium has a strong tendency to crystallisation. Cleaning must be conducted carefully. In particular, the following must not be used:

- Cutting tools
- Tools that exceed a temperature of 40 °C
- Cleaning agents that can dissolve plastic
- Steam jet/high-pressure cleaners

7.5.2 Topping up the grease filling

The grease reservoir can gradually diminish over time depending on the operating conditions (operating temperature, speed, operating time) and the rotary motion of the impeller. We advise topping up the grease reservoir regularly to guarantee the highly-effective function of the sealing system in the long term. The particularly maintenance-friendly construction of FUNKEN roof fans allows this maintenance task to be performed without any special preparations being required for the fan. This task can even be performed during operation.

To top up the grease, open the lubricating nipple cap and position the grease gun on the lubricating nipple. Approx. 20 ml is usually sufficient for refilling. Excess grease is ejected by the impeller. Please only use heavy-duty lubricating grease based on lithium soap.

7.5.3 Motor maintenance tasks

The motor bearings are permanently lubricated. The nominal bearing service life is at least 40,000 hours. Using the maximum permissible load, the service life is at least 20,000 hours if the motor is operated at 50 Hz.
The service life of ATEX motors is at least 40,000 hours in 50-Hz operation. After lengthier downtimes, it is advisable to inspect the bearings before commissioning, even for brand-new motors.

The warranty/guarantee is invalidated if damage occurs due to a failure to conduct the regularly required inspections.

Bearing inspection and lubrication

	Grease service life at motor cooling temperature	
Number of poles	40 °C	25 °C
2	10,000 h	20,000 h
4/6/8	20,000 h	40,000 h

7.5.4 Maintenance tasks on the impeller and on suction-side accessories

If the type of conveyed medium is expected to cause contamination on the installation (material accretions), further inspections and cleaning tasks must be performed in addition to the recommended annual inspection. In this case, the intervals are based on the respective operating conditions and must be specified by the operator.

Extracting heavily contaminated conveyed media can cause deposits to accrete on the fan impeller and on plant parts. These affected devices and plant parts must therefore be regularly checked, cleaned and their seals inspected.

LEAKING MEDIUM!

Leaking connecting pieces, collars etc. cause malfunctions and hazards due to leaking conveyed medium and must be replaced.

Cleaning tasks:

- Move the fan into the desired position for performing cleaning tasks.
- Clean fan parts using appropriate measures (see chapter 7.4.1 “Cleaning tasks”).

7.6 Assembly

The components are basically assembled by performing the steps described above in reverse order.

Ensure that the seals are correctly inserted.

If electric tools are used, do not exceed a torque of 2.4 to 2.5 Nm and a speed of max. 500 rpm! Only apply a very low axial thrust when screwing in the screws.

Take particular care to position the seals precisely. Incorrectly enclosed seals can be blown away by the air flow and destroy the impeller. Replace defective seals to ensure the impermeability of the fan.

Rotate the impeller manually to check that it turns smoothly.

Perform a test run!

7.7 Malfunctions

Deviations from normal operating statuses of the fan can indicate possible malfunctions and must be checked immediately by the service team.

CAUTION!

Long-term malfunctions can damage the fan and also cause personal injury.

Before rectifying malfunctions, switch off the power supply to the fan and secure it against reactivation.

The following table is intended to provide the service team with pointers to possible causes of malfunctions and a guide to rectifying them:

Malfunction	Possible cause	Remedy
Fan not rotating.	**a) No power output present on the control unit.** **b) Main switch set to "0".** **c) Motor cable not wired in the terminal box.** **d) Mains power not being supplied.** **e) Defective control fuse.** **f) Motor protection relay triggered.**	▪ Establish power output. ▪ Set main switch correctly to "I". ▪ Connect motor cable. Check: Mains power, fuses, connections, motor temperature. Leave to cool if necessary (if the problem recurs, shut down the cause of overheating).
Motor protection triggered.	**Motor temperature too high.**	Check motor for blocking, bearing damage, winding damage; check connections and power supply.
Impeller scraping.	**a) Deposits on impeller or nozzle.** **b) Relative positions of impeller and nozzle have changed.**	Check impeller area for foreign bodies, check motor attachment. Release support, centre impeller/nozzle and retighten screws.
Fan rotates and does not convey any air or conveys too little air.	**a) Air flow interrupted.** **b) Fan rotating in incorrect direction.** **c) Non-uniform inflow to impeller.**	Establish free air passage, clean impeller, check pipe system, check cover flaps. Change direction of rotation by reversing polarity. Lengthen the inlet-side straight connection pipe to at least three times the nominal value of the fan inlet. Mount non-return valves or butterfly valves at the earliest after three times the nominal value of the fan outlet.
Fan vibrates while running.	**a) Deposits have formed on the impeller vanes.** **b) Condensate outlet blocked, impeller rotating in water.**	Clean the impeller. Clean the water drain.

The warranty is rendered invalid if damage occurs due to a failure to conduct the regularly required inspections.

7.8 Explanation of symbols

Warning. Dangerous electrical voltage!

Warning. Explosive atmosphere!

Warning. Corrosive substances!

Warning. Danger of hand injury!

Warning. Danger of trapping!

Wear gloves!

Warning!
This combination of symbol and keyword indicates a possibly dangerous situation that may lead to death or serious injury
if not avoided.

8 COPYRIGHT

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9 EMERGENCIES

In emergencies, switch off the main switch or disconnect the power plug.

Fire extinguishers of fire classes A, B, C and F must be used in case of fire. These fire extinguishers must only be used on low-voltage plants (up to 1,000 volts).
Remain at a safe distance while extinguishing fires.

10 OPERATOR'S RESPONSIBILITIES

The operator of the fan procures and employs the materials/media required for the proper operation of the fan. Correct handling of these materials/media and the involved dangers are the sole responsibility of the operator. The operator must provide hazard warnings and disposal instructions. The safety data sheets of material manufacturers and media manufacturers must be observed.

11 IDENTIFICATION PLATE

The identification plate is located on the identification plate panel or housing wall of the fan.

EC DECLARATIONS OF CONFORMITY

CE

EC declaration of conformity

In line with the

- **EC Machinery Directive 2006/42/EC, Appendix II A**
- **EC Low-Voltage Directive 2014/35/EU**
- **EC Electromagnetic Compatibility Directive 2014/30/EU, Appendix I and II**

We hereby declare that the devices in the FUNKEN Kunststoffanlagen GmbH device series:

FDv/FDvF 125	**FDv/FDvF 160**	**FDv/FDvF 200**	**FDv/FDvF 250**
FDv/FDvF 140	**FDv/FDvF 180**	**FDv/FDvF 225**	**FDv/FDvF 280**

comply with all relevant fundamental safety and health requirements of the EC/EU directive as separate components within an installation on the basis of their design and construction and in the form which we have brought onto the market. They comply with the standards listed below:

Directive/standard	Title
DIN EN ISO 12100:2011	Safety of machinery – General principles for design – Risk assessment and risk reduction
DIN EN ISO 5801:2018-4	Fans – Performance testing using standardized airways
DIN ISO 21940-11:2017	Procedures and tolerances for rotors with rigid behaviour
DIN EN 61000-6-4:2011	Electromagnetic compatibility – Generic standards – Emission standard for industrial environments
DIN EN 61000-6-2:2011	Electromagnetic compatibility – Generic standards – Emission standard for industrial environments
VDMA 24167:1994	Fans – Safety requirements

This declaration is rendered invalid if any modifications are made to the devices in this device series without our agreement.

Device designations:
FDv/FDvF 125–280

Hennef, 11/03/2019 Peter Müller, Managing Director

CE

EC declaration of conformity

In line with the

- **EC directive – Equipment and protective systems intended for use in potentially explosive atmospheres 2014/34/EU (ATEX)**

We hereby declare that the devices in the FUNKEN Kunststoffanlagen GmbH device series:

FDvF 125 Ex	**FDvF 140 Ex**	**FDvF 160 Ex**	**FDvF 180 Ex**
FDvF 200 Ex	**FDvF 225 Ex**	**FDvF 250 Ex**	**FDvF 280 Ex**
FDv 125 Ex	**FDv 140 Ex**	**FDv 160 Ex**	**FDv 180 Ex**
FDv 200 Ex	**FDv 225 Ex**	**FDv 250 Ex**	**FDv 280 Ex**

Device designation:
II 3G c IIB T3 X 07 ATEX D049

comply with all relevant fundamental safety and health requirements of the EU directive as separate components within an installation on the basis of their design and construction and in the form which we have brought onto the market. They comply with the standards listed below:

Directive/standard	Title
DIN EN 1127-1:2011-10	Explosive atmospheres – Explosion prevention and protection – Part 1: Basic concepts and methodology
DIN EN ISO 80079-36:2016	Part 36: Non-electrical equipment for explosive atmospheres – Basic method and requirements
DIN EN ISO 80079-37:2016	Part 37: Non-electrical equipment for explosive atmospheres – Non-electrical type of protection constructional safety "c"
DIN EN 14986:2017-04	Design of fans working in potentially explosive atmospheres
DIN EN 13237:2013	Terms and definitions for equipment and protective systems intended for use in potentially explosive atmospheres

This declaration is rendered invalid if any modifications are made to the devices in this device series without our agreement.

Device designations:
FDv/FDvF 125–280

Hennef, 11/03/2019 Peter Müller, Managing Director

SPACE FOR NOTES

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EN . 11/2020

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