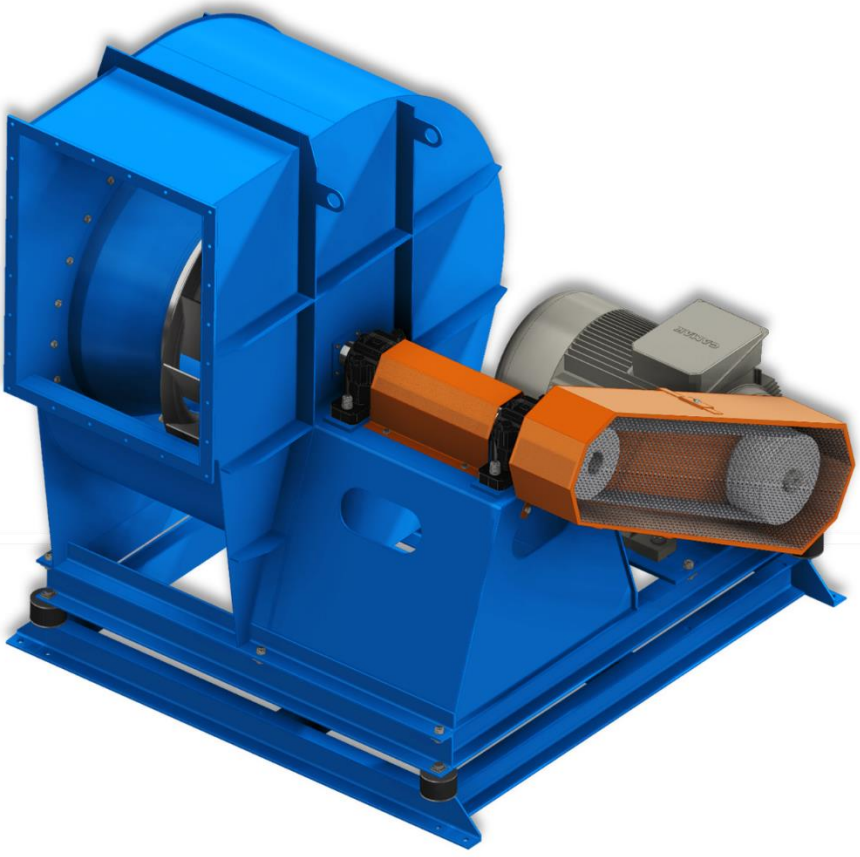
CENTRIFUGAL FAN
OPERATING & MAINTENANCE INSTRUCTIONS



2024

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1.INTRODUCTION

1.1. Company Introduction

ED_VAN provides services in the solution of all dedusting and industrial-type ventilation problems with its specialised technical staff members. Our company has been established over an area of 19.500 m^2 since 1975 and maintains its operations in an indoor area of 8.000 m^2.

ED_VAN products may be applied in all areas of the industry and are manufactured in compliance with the national and international standards and norms with a view to protect the consumer in each area of industry. All products manufactured by our company are designed, projected, and manufactured at its own production plants by its own team.

Our R&D group continuously follows up any technological developments without sacrificing our quality. Tests on our fans are performed in the light of the technological developments at our Edremit factory. The test results and test diagrams obtained as a result of such tests are available with our company and our customer may be provided with them upon request. Quality controls are carried out on the products at each stage prior to both production and shipment and we thus identify and control all problems which may occur in our products in advance.

We declare that we manufacture our products in accordance with the requirements of
-CE,
-TSE,
-ATEX,
-ISO 45001,
-ISO 9001:2008,
-ISO 14001:2015.



WARNING: Your compliance with these operating and maintenance instructions will ensure trouble-free operation of our product at your business concern.

1.2. Information About This Manual

- Read this manual before installation, commissioning and maintenance to ensure safe working and trouble-free operation of the product.
- Observe the safety and warning instructions on the product and in this manual.
- This manual is part of the specified product and must be given to the customer with the product when it is sold.

1.3. Regulations And Standards

- ATEX 2014/AB/34 AB Directive,
- TSE K 453, Fans – Industrial Fans,
- ISO 5801, Fans – Performance testing using standardized airways,
- ISO 12100, Safety of machinery — General principles for design — Risk assessment and risk reduction,
- ISO 12499, Industrial fans - Mechanical safety of fans - Guarding,
- ISO 12759-2, Fans — Efficiency classification for fans – Part 2: Standard losses for drive components,
- ISO 12759-3, Fans — Efficiency classification for fans – Part 3: Fans without drives at maximum operating speed,
- ISO 12759-4, Fans — Efficiency classification for fans – Part 4: Driven fans at maximum operating speed,
- ISO 13348, Industrial fans — Tolerances, methods of conversion and technical data presentation,
- ISO 13349, Fans – Vocabulary And Definitions Of Categories,
- ISO 13351, Fans – Dimensions,
- ISO 14694, Industrial fans - Specifications for balance quality and vibration levels,
- ISO 14695, Industrial fans — Method of measurement of fan vibration,
- EN 14986, Design Of Fans Working In Potentially Explosive Atmospheres,
- ISO 20816-3, Mechanical vibration – Measurement and evaluation of machine vibration
- ISO 21940-11, Mechanical vibration – Rotor balancing - Part 11: Pocedures and tolerances for rotors with rigid behaviour
- EN ISO 80079-36:2016, Explosive atmospheres – Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements,
- EN ISO 80079-37:2016, Explosive atmospheres – Part 37: Non-electrical equipment for explosive atmospheres - Non-electical type of protection constructional safety “c”, control of ignition sources “b”, liquid immersion “k”,

1.4. Atex Regulation

The name ATEX comes from the French term "ATmospheres EXplosibles". It began to be implemented on 23 March 1994 for products used in potentially explosive atmospheres with the European Union Regulation 94/9 / EC. The regulation, renewed by the directive 2014 / 34 / EU, was published in our country as "Regulation on Equipment and Protective Systems Used in Potentially Explosive Atmospheres" with the official newspaper number 29758 on 30 June 2016.

This Regulation lays down the principles of the procedures for the safe placing on the market of electrical or non-electrical equipment and protective equipment intended for use in potentially explosive atmospheres.

Some workplace examples of explosive gas and dust environments are underground mines, tobacco factories, cement factories, petrochemical plants, power plants, powder coating plants, flour, starch, sugar and oil factories, all processes using solvents, fuel and LPG refineries, fuel filling, storage and distribution facilities, battery rooms, propane lines, farms and greenhouses, carpentry shops, etc.

According to European Union standards, hazardous zones are divided into three, separately for gases (0,1,2) and dusts (20,21,22):

1. Zone 0 / Zone 20: Zone in which an explosive atmosphere is constantly or frequently present,
2. Zone 1 / Zone 21: A zone in which an explosive atmosphere is unlikely to occur during normal operation,
3. Zone 2 / Zone 22: A zone in which an explosive atmosphere is unlikely to occur in normal operation, but if it does occur, it will only last for a short time,

The equipment requirements to be used according to the zones are as follows.

1. Zone 0 / Zone 20: Category 1
2. Zone 1 / Zone 21: Category 2
3. Zone 2 / Zone 22: Category 3

All equipment operating in hazardous areas should be classified according to the maximum surface temperatures that may occur in normal operation and in the event of failure. The temperature classes are as follows.

- T1 ≤ 450 °C
- T2 ≤ 300 °C
- T3 ≤ 200 °C
- T4 ≤ 135 °C
- T5 ≤ 100 °C
- T6 ≤ 85 °C

1.5. Obligations Imposed On The User By The Atex Directive

According to the ATEX regulation, the user is responsible for the following.

- Preventing the formation of explosive atmospheres and possible ignition hazards,
- Assessing the explosion risk of the process and the environment in which the process is located,
- Eliminate or reduce the risk of explosion in the process and/or environment,
- Zone/category classification of the area where the work and equipment is located for documentation purposes,
- Identifying hazardous areas and placing the necessary warning signs to warn personnel.
- Selection of the categories of auxiliary equipment to be used in accordance with the internal/external ATEX zones of the product.

The user must assess the area where the equipment will be placed and operated. When making a hazardous area assessment; it is very important to consider the hazardous substance (gas or dust), how the substance may interact with its environment (atmosphere, equipment and personnel), the possibility of an explosion due to environmental conditions and how effective or ineffective other ignored effects may be. It is very important to carry out this assessment correctly in order to make the correct choice of equipment for working in the hazardous area.

1.6. Scope

The fans covered by this manual are listed in the table 1 below.

#	Type	□□□	ATEX Category	Operation Range
1	ECF-102/□□□-O3-SDA	101-116	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
2	ECF-102/□□□-O3-SKD	101-116	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
3	ECF-102/□□□-O3-SKK	101-116	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
4	ECF-122/□□□-O2(O3)-SDA	101-114	Ex II 2D IIIC T 135°C Db	-20°C < t_{amb} < +40°C
5	ECF-122/□□□-O2(O3)-SKD	101-114	Ex II 2D IIIC T 135°C Db	-20°C < t_{amb} < +40°C
6	ECF-122/□□□-O2(O3)-SKK	101-114	Ex II 2D IIIC T 135°C Db	-20°C < t_{amb} < +40°C
7	ECF-201/□□□-O2(O3)-SDA	211-296	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
8	ECF-201/□□□-O2(O3)-SKD	211-296	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
9	ECF-202/□□□-O2(O3)-SDA/G	211-294	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
10	ECF-202/□□□-O2(O3)-SDA/D	211-294	Ex II 2D IIIC T 125°C Db	-20°C < t_{amb} < +40°C
11	ECF-202/□□□-O2(O3)-SKD	211-294	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
12	ECF-507/□□□-O2-SKK	101-105	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
13	ECF-106/□□□-O2(O3)-SKK	101-111	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
14	ECF-126/□□□-O2(O3)-SKK	101-108	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
15	ECF-203/□□□-O2-SKK	211-296	Ex II 2D IIIC T 125°C Db	-20°C < t_{amb} < +40°C
16	ECF-124/□□□-O1(O2)-SKD	101-113	Ex II 2/3D IIIB T125˚C Db/Dc	-16°C < t_{amb} < +40°C
17	ECF-301/□□□-O1(O2)-SKD	301-313	Ex II 2/3D IIIB T125˚C Db/Dc	-16°C < t_{amb} < +40°C
18	ECF-121/□□□-O3-SDA	101-110	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
19	ECF-203/□□□-O2-SDA	211-244	Ex II 2D IIIC T125°C Db	-16°C < t_{amb} < +40°C
20	ECF-126/□□□-O1-SDA	101-104	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
21	ECF-121/□□□-O1-SKK	101-113	Ex II 2D IIIB 150°C Db	-20°C < t_{amb} < +40°C
22	ECF-203/□□□-O1-SKK	101-244	Ex II 2G IIB T4 Gb	-20°C < t_{amb} < +40°C
23	ECF-101/□□□-O2-SKK	101-109	Ex II 2D IIIC T 120°C Db	-20°C < t_{amb} < +40°C
24	ECF-209/□□□-O1-SKK	211-282	Ex II 2D IIIC T 120°C Db	-20°C < t_{amb} < +40°C
25	ECF-301/□□□-O1-SKK	301-305	Ex II 2G IIB T4 Gb / II 2D IIIC T130°C Db	-20°C < t_{amb} < +40°C
26	ECF-501/□□□-O1-SKK	501-507	Ex II 2G IIB T4 Gb / II 2D IIIC T130°C Db	-20°C < t_{amb} < +40°C
27	ECF-202/□□□-O1-SDA	211-263	Ex II 2G IIB T4 Gb / II 2D IIIC T130°C Db	-20°C < t_{amb} < +40°C

Table 1 - Product Types and Categories

2.WARRANTY



- Our products are under a **1-year** warranty as from the date of invoice against material and manufacturing defects, except for motor failures, wear, and misuse.
- The supply of material for overseas sales (EXW) is within the scope of warranty, and the service will be charged separately.
- The warranty period continues provided that the delivered products are used and commissioned within a maximum of **120 days**. Otherwise, any malfunction resulting from the waiting period is not covered by the warranty.
- Items not included within the scope of warranty by the seller:

a) Defects caused by the failure to provide the appropriate installation environment for the product,

b) Damages arising from the use of the product for purposes other than for which it was purchased,

c) Damage caused by disasters such as fire, flood, wind, and lightning,

d) Damage caused by unapproved additions and modifications;

e) Any abuse and / or misuse by the purchaser, including improper installation;

f) Products damaged or altered by the buyer and / or their customers; or

g) Performance problems caused by incorrect information.

Note: If the fan has not been installed in accordance with the specified conditions, or if the fault/damage is generally due to improper modification or operation, all claims for damages and warranty claims will be void. The user must prove that the fault was not caused by improper installation.

Note: ED-VAN cannot be held responsible for any changes made to the product by the user without the knowledge of ED-VAN. In this case the product will lose its ATEX certificate.

3.SAFETY PRECAUTIONS

In order to prevent injury, fire and other hazards from improper use of the equipment, follow these instructions.

- Ensure that installation, electrical connections, maintenance, commissioning, repairs, etc. are carried out by qualified personnel only.
- Before working on the fan, ensure that the power supply is fully disconnected and the rotor has stopped. Also ensure that the fan cannot be operated without authorisation.
- It is strongly recommended that all maintenance personnel working in the ATEX zone wear protective gloves with anti-static properties in accordance with EN 16350. If this is not possible, and personnel must work with bare hands, they must prevent electrostatic charging by touching a grounded conductive metal (e.g. copper) with the palm of their hand for earthing purposes prior to operation.
- Do not switch on the fan until it is completely assembled.
- Ensure that the maintenance covers are closed before starting the fan.
- Always follow the maintenance instructions for ED-VAN centrifugal fans.
- Ensure that all authorised personnel read, understand and comply with the operating and maintenance instructions.
- Make sure that the personnel working on the fan wear safety equipment.
- Make sure that the thermistor connections and thermal relay connections of the motor are made before starting the fan.
- Personnel working near fans with a nameplate sound power level above 85 dB must wear hearing protection, as prolonged exposure to high noise levels can cause hearing loss.
- Do not operate the fan at speeds higher than the operating speed indicated on the label.
- The ventilator has been selected according to the operating values indicated on the label. In bellows type high pressure ventilators, the device must be stopped immediately and the problem must be eliminated, as blockage on the suction side or closed valve may cause overheating.
- After start-up, check for any noise, vibration or unusual conditions.
- Check the power consumption. It must not exceed the permissible power.
- Ensure that the ATEX category of the fan matches the ATEX zone in which it will operate.
- Fans without ducts at the inlet or outlet must be enclosed to at least IP20 to prevent the ingress of foreign matter and ignition sources.
- If fans are installed in larger systems with inlet ducts, the necessary precautions must be taken to prevent foreign objects from entering the fan and causing an ignition.
- The observation covers placed on the ducts should be positioned so that the ventilator cannot be touched by hand.
- Ensure that the ambient temperature differs sufficiently from the minimum ignition temperature of the explosive mixture present, in accordance with EN 1127-1.
- The maximum inlet temperature specified for the air-gas and/or dust mixture conveyed by this fan is 60°C**.**
- The ambient temperature ranges in which these fans can operate safely are given in Table 1 in Section 1.6.
- Even though a shaft seal is used at the entrance of the shaft to the body, CFD analyses and tests have shown that there is gas leakage from inside the fan to the outside. Therefore, the user should take this into account when determining the ATEX zone; define the zone outside the fan body at the same or lower risk in accordance with the category of the device and select the auxiliary equipment accordingly.



Figure 1 – Safety Symbols

4. DESCRIPTION OF CENTRIFUGAL FAN

4.1. Product Description

A centrifugal fan can be defined as a mechanical device that moves air or other gases. Centrifugal fans transfer the kinetic energy of the impeller to the air/gas passing through it, moving it against the resistance of ducts, valves and other components. In centrifugal fans, the flow enters the fan in the axial direction and exits in the radial direction. The small inlet area compared to the rotor diameter limits the flow rate. With the effect of centrifugal forces, the pressure rise is higher than with axial fans. They are robust, quiet, reliable and can operate in a wide range of conditions.

1. **Applications**:
    a. Centrifugal fans deal with high volume flow rates and high pressures and are generally used for the following applications:
        i. Exhaust gases from manufacturing processes.
        ii. Dust-laden gas transport.
        iii. Greasy conditions.
        iv. Continuous exhaust at high temperatures.
    b. They are vital in industrial environments where reliability matters.

2. **Construction**:
    a. They are usually made of structural steel, stainless steel or aluminum.
    b. Various impeller designs exist.
        i. Air handling impellers for clean and light material-laden air.
        ii. Material handling impellers with radial blades.
        iii. Long shavings impellers without shroud for long, fibrous materials (e.g., wood shavings, yarn, or paper trimmings).
        iv. Open radial impellers without backplate and shroud for abrasive dust (e.g., sawdust, shavings and granular materials).
    c. The stages of design varies according to the specific needs of the industry.
    d. Some models are anti-spark and certified according to ATEX Directive.

3. **Performance**:
    a. Flow capacity ranges from 100 to 700000 m^3/h.
    b. Static pressure capability can reach up to 3500 mmWG.

4.2. Product Card

Customer Name			
Product Tracking Information		**Motor Specifications**	
Order Number		Voltage (V)	
Manufacturing Date		Current (A)	
Product Type		Frequency (Hz)	
Serial Number		Power (kW)	
Design Data		Motor Speed (rev/min)	
Drive Type		Motor Serial Number	
Operating Temperature (^{0}C) (O.C.)		**Drive Details**	
Elevation (m) (O.C.)		Motor Pulley Dia. (mm)	
Flow Density (kg /m^3) (O.C.)		Shaft Pulley Dia. (mm)	
Flow Rate (m^3/h- N.C.)		Belt Dimensions (mm)	
Total Pressure (mmSS) (N.C.)		Number of Belts	
Total Pressure (mmSS) (O.C.)		Coupling Type	
Fan Speed (rev/min)		Bearing Type	
Fan Position		Bearing Housing	
Net Weight (Kg)		Bearing Lubricant Type	
N.C. : Normal Conditions			
O.C. : Operating Conditions			
Design operating conditions:			

4.2. Fan Positions

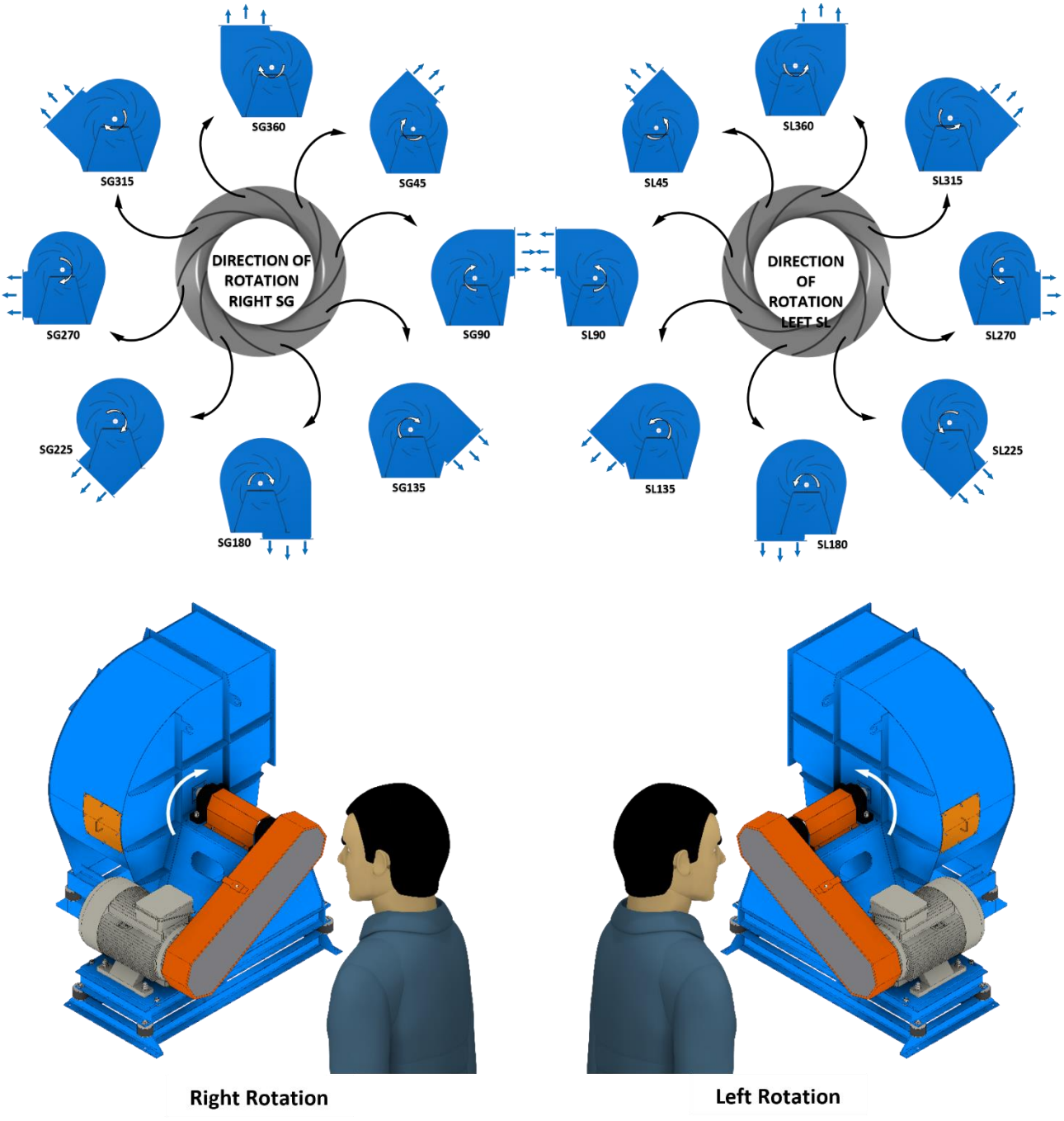


Figure 2 - Fan Positions

While selecting the fan position, it is designated by viewing from the motor side if it is **directly coupled** and from the pulley side if it is **belt pulley**.

5. PARTS AND ACCESSORIES OF CENTRIFUGAL FAN

5.1. Part List

5.1.1. Direct Drive Centrifugal Fan

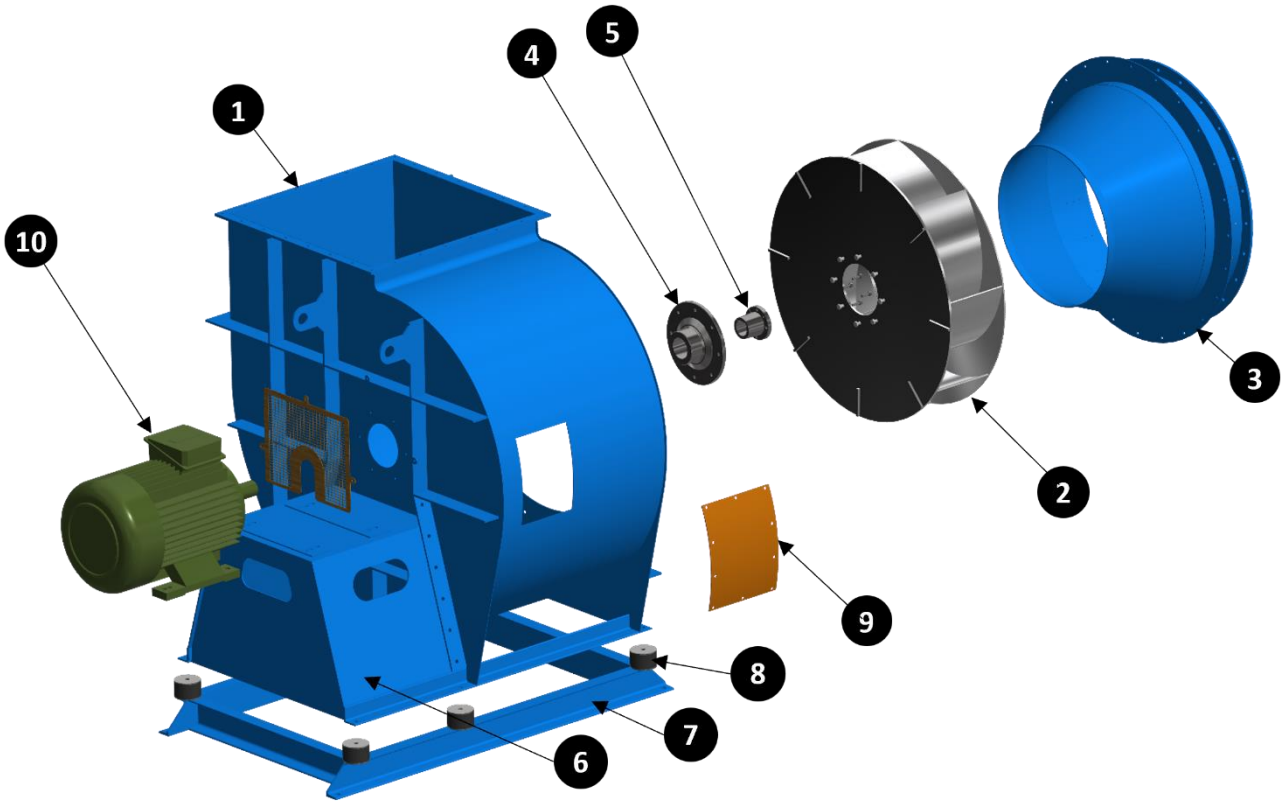


Figure 3 - Direct Drive Centrifugal Fan Components

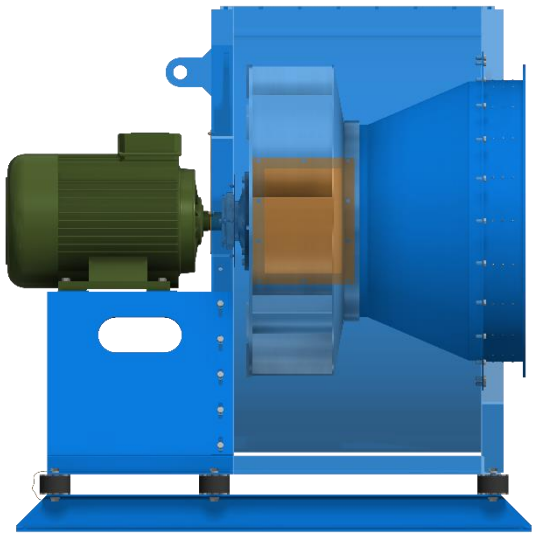


Figure 4 - Direct Drive Centrifugal Fan Assembly

1	BODY
2	IMPELLER
3	SUCTION
4	HUB
5	TAPER BUSH
6	FAN BASE
7	CHASSIS
8	ANTI-VIBRATION MOUNT
9	MAINTENANCE COVER
10	MOTOR

Table 2 - Direct Drive Components Table

5.1.2. Direct-Drive Centrifugal Fan With Coupling

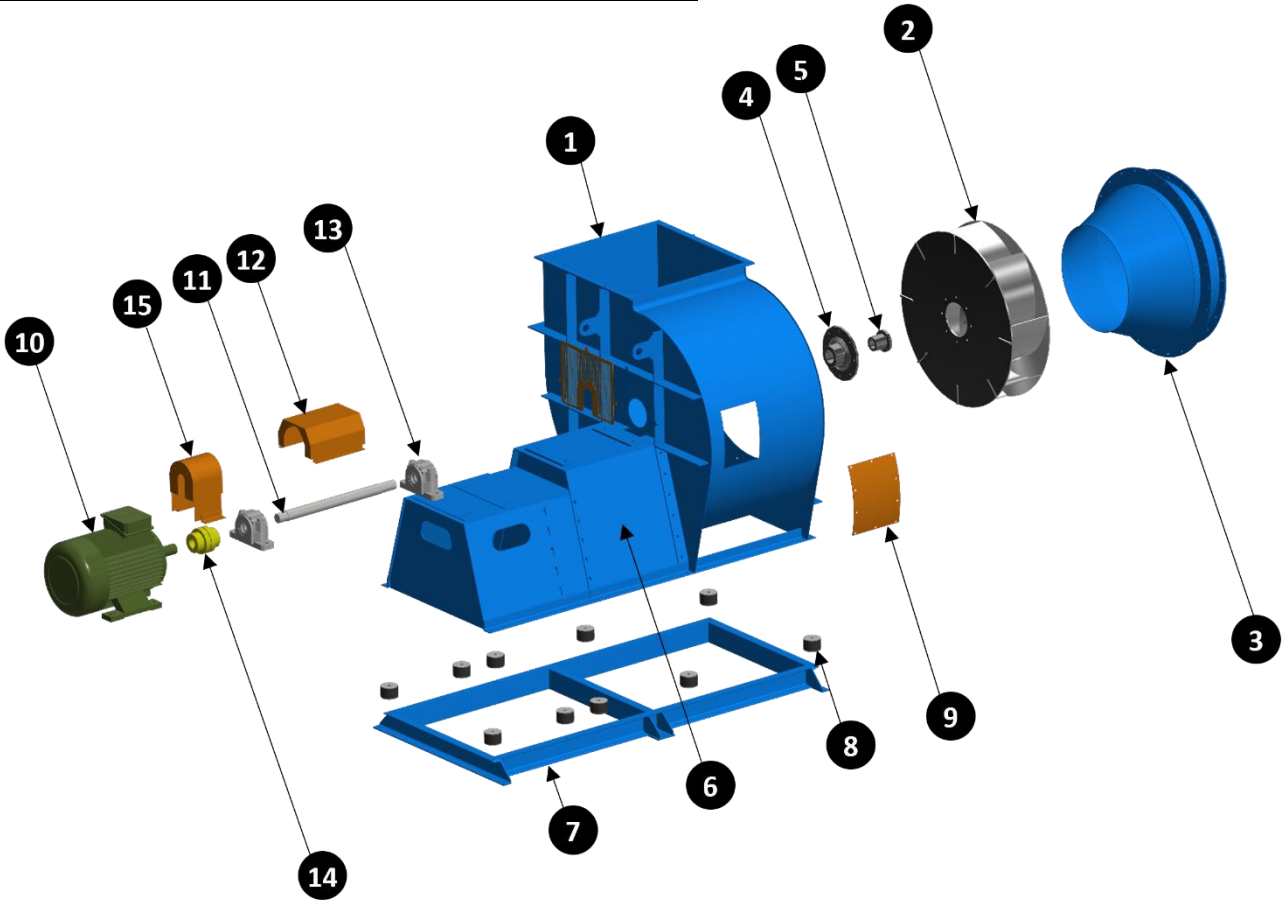


Figure 5 - Direct Drive Centrifugal Fan with Coupling Components

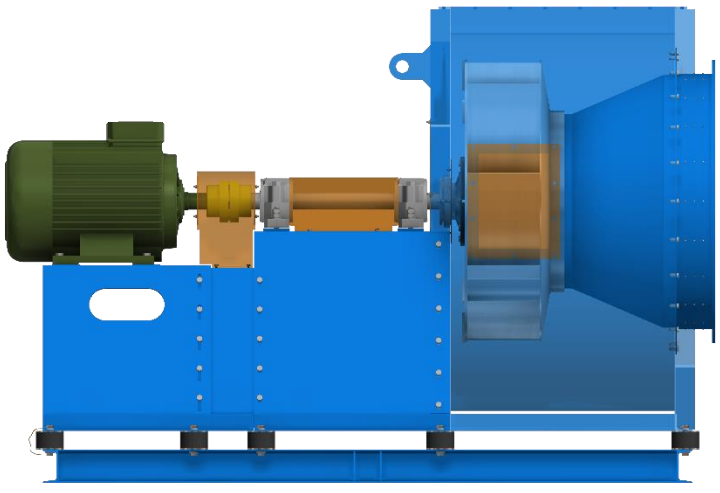


Figure 6 - Direct Drive Centrifugal Fan with Coupling Assembly

1	BODY
2	IMPELLER
3	SUCTION
4	HUB
5	TAPER BUSH
6	FAN BASE
7	CHASSIS
8	ANTI-VIBRATION MOUNT
9	MAINTENANCE COVER
10	MOTOR
11	SHAFT
12	SHAFT GUARD
13	BEARING
14	COUPLING
15	COUPLING GUARD

Table 3 - Direct Drive with Coupling Components Table

5.1.3. Centrifugal Fan With Belt Drive

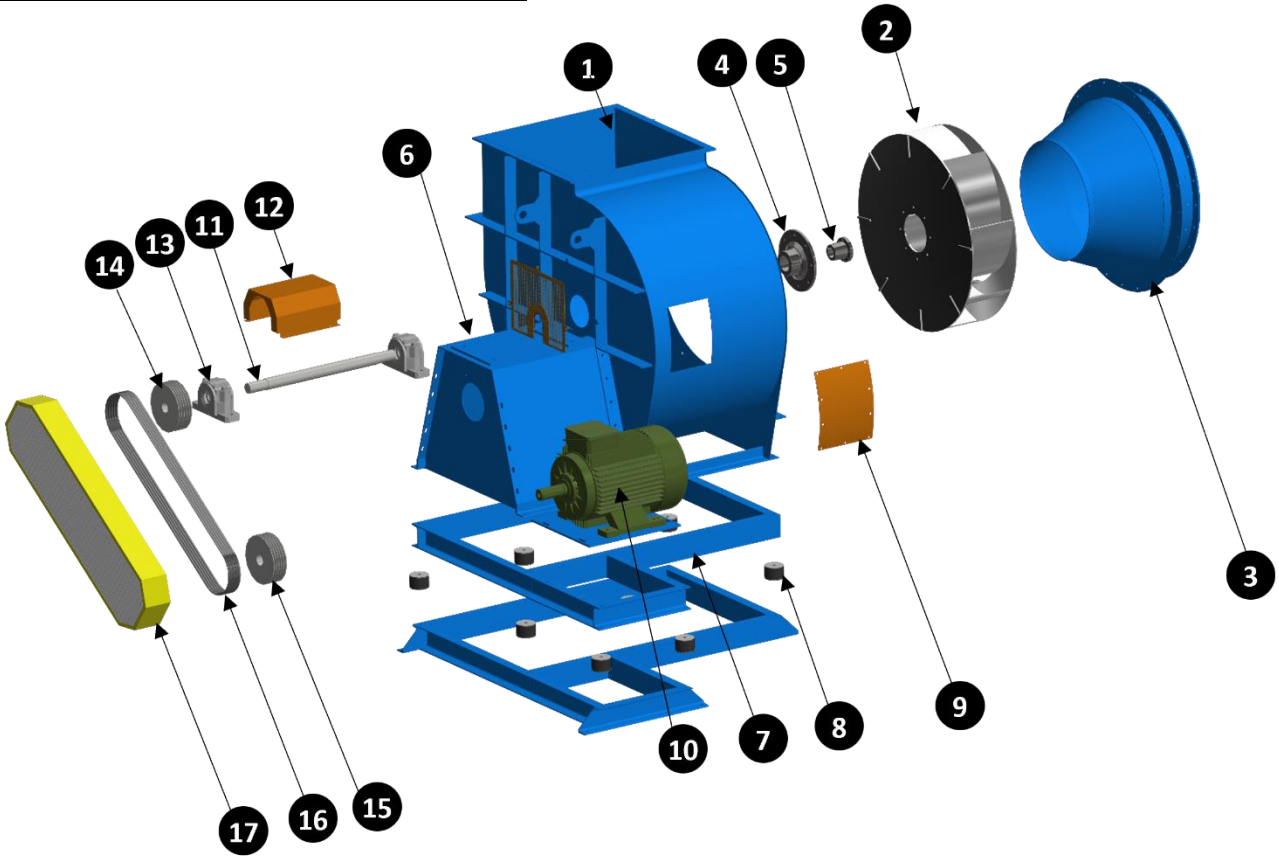


Figure 7 – Belt Drive Centrifugal Fan Components

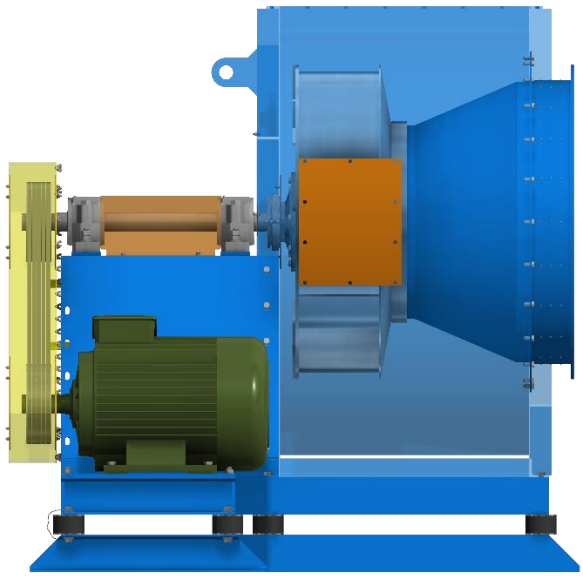


Figure 8 – Belt Drive Centrifugal Fan Assembly

1	BODY
2	IMPELLER
3	SUCTION
4	HUB
5	TAPER BUSH
6	FAN BASE
7	CHASSIS
8	ANTI-VIBRATION MOUNT
9	MAINTENANCE COVER
10	MOTOR
11	SHAFT
12	SHAFT GUARD
13	BEARING
14	SHAFT PULLEY
15	MOTOR PULLEY
16	BELT
17	BELT-PULLEY GUARD

Table 4 - Belt Drive Components Table

5.2. Accessories

5.2.1. Valves



Figure 9 – Butterfly Valve



Figure 10 – Drallregler Valve



Figure 11 – Volumetric Valve



Figure 12 – Slide Valve

NOTE: The drive mode can be selected as manual, pneumatic piston, proportional or on-off actuator.

5.2.2. Compensators



Figure 13 – Rectangular Cloth Compensator

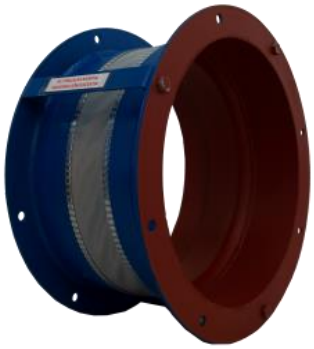


Figure 14 - Circular Cloth Compesantor

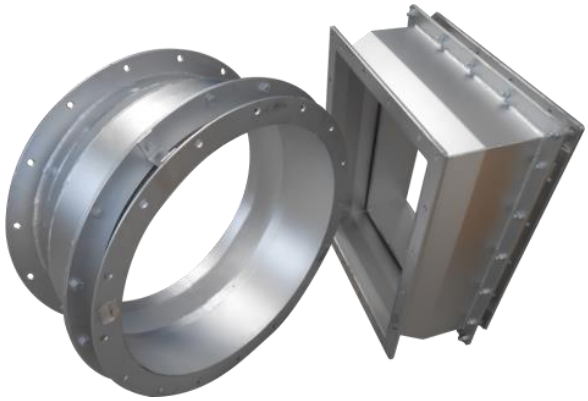


Figure 15 - Metal Compensator

5.2.3. Mufflers



Figure 16 - High Pressure Resistant



Figure 17 - Low Pressure Resistant

6. INSTALLATION OF THE FANS

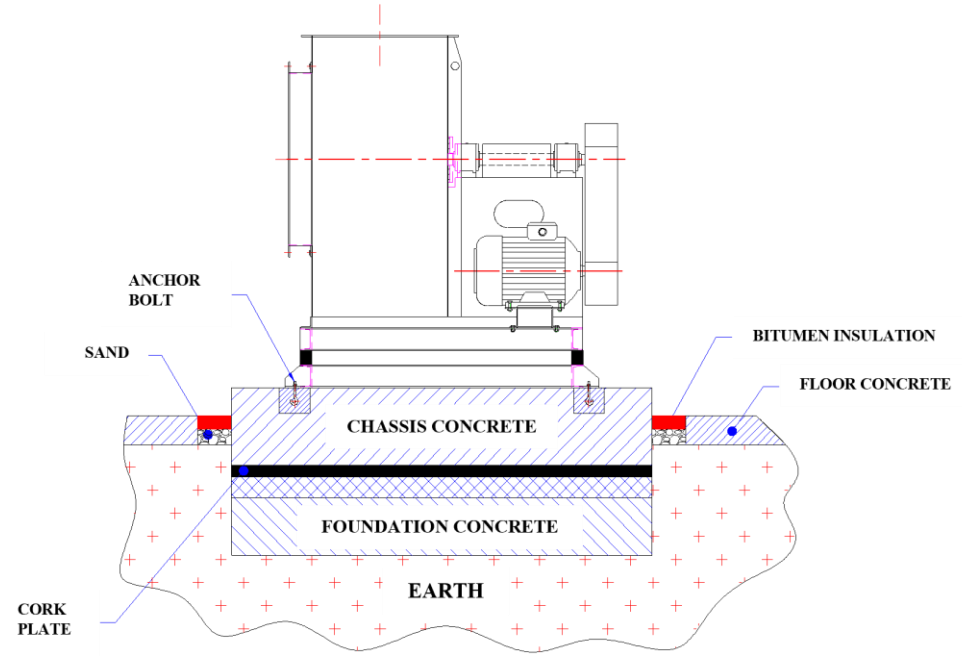


Figure 18 - Installation of the Fans on the Floor

CAUTION: *While placing the chassis of the fans on the concrete floor, it should be detached from the concrete floor.*

- In accordance with the construction technique, the thickness should be between 5 cm and 10 cm.
- A 3-5 cm layer of cork should be laid on top of the concrete foundation.
- Chassis concrete should be poured over the layer of cork and should be 2 to 4 times the weight of the fan, depending on the size of the fan.
- The concrete of the chassis on which the fan will rest should be 10 cm to 20 cm above the concrete of the floor. Wooden wedges should be inserted into the joints to ensure that there are no holes. The foundation should be well dried and set before the fan is installed.
- Once the fan has been placed on the foundation, it should be accurately installed using a water level in the direction of the shaft axis. Once the fan has been correctly installed, tighten the foundation anchor bolts and check again using a water level.

Note: In cases where the aforementioned foundation system could not be properly prepared, the fan is precisely placed on the flat floor, pre-cast or to be cast, by means of a water level in accordance with the direction of the shaft axis and then fixed with extruded steel dowels.

WARNINGS:

- In locations where foundation and chassis concrete is not used, a common base with anti-vibration mounting should be used.
- If it is unfavourable to transmit vibrations to the intake and exhaust ducts, flexible canvas or flexible compensators can be fitted to the intake and exhaust ducts.
- Do not strike rotating parts such as the fan, shaft, bearings, motor, etc. with a hammer or similar hard tool during installation.
- If the fan is to be installed outdoors, it must be protected against rain and external factors.
- If it is likely that water will accumulate in the fan, drill a drain hole in the base and ensure that the water is drained off using a hose connected to this hole.
- Double inlet and single inlet fans should be placed at least half the suction diameter of the fan away from walls or other obstructions that would prevent the fan from sucking in, allowing for maintenance and disassembly.

6.1. Maximum Tightening Torques

Maximum Tightening Torques	
Bolt Type (mm)	**Bolt Quality**
	Grade 8.8
M5	7.0
M6	11.8
M8	28.8
M10	57.3
M12	99.8
M16	248
M20	500

Table 5 - Tightening Torques

7. CONTROL PHILOSOPHY

7.1. System Commissioning (Start-up)



7.1.1. Pre-Commissioning Checks

i. General Inspection

- Check that the product matches your order and the delivery order.
- Ensure that the electric motor is suitable for the intended conditions.
- Never operate the fan without connecting it to the system. (Ducts planned at the suction and/or outlet)
- Make sure that the installation is correct.
- Take all necessary precautions to prevent foreign bodies from entering the fan and coming into contact with the rotor.

ii. Mechanical Inspection

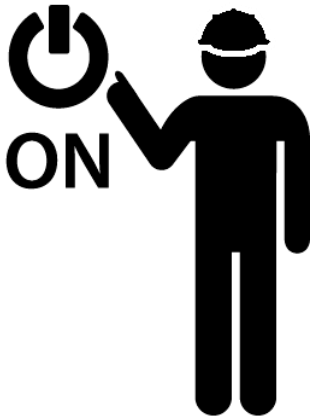
- Ensure that the product is not damaged during loading, transport and storage.
- In order to prevent deformations that may occur in the fan body, make sure that the ducts and supports mounted on the inlet and/or outlet are on the correct axis and in order. In cases where it is difficult to carry out this installation correctly, it can be fitted to the system using compensators.
- Check that the bolts are properly tightened.
- Check that the impeller rotates freely with the shaft. (Check by hand before making the electrical connections to the motor).
- Check belt alignment and tension (for belt-driven types).

iii. Electrical Inspection

- Ensure that the electric motor and electrical circuits are connected and operated by a qualified electrician.
- Refer to the instructions provided by the motor manufacturer.
- Check that the operating voltage indicated on the motor label matches the mains voltage.
- Refer to the wiring diagram on the motor plate, terminal box or terminal box cover.
- Ensure that the electrical connections and control panel comply with EN 60079-14.
- Make sure that the motor is protected by selecting and connecting a suitable thermistor (overcurrent protection) adapted to the motor current. It is essential to connect the thermistor (temperature limiter) in order to maintain the temperature class of the explosion-proof motors and thus eliminate any risk of explosion.
- Ensure that the body is earthed in accordance with standard earthing instructions. (All conductive components must be earthed with contact washers).

iv. Safety Checks

- Check all safety precautions before operating the fan.
- Before the first start-up of the fan, check the ducts for foreign matter and clean them if necessary.
- Ensure that the maintenance cover is closed before switching on the fan.
- Each time the fan starts, close one of the valves on the inlet and outlet nozzles. Check that the rotor rotates in the correct direction (as indicated by the arrow on the fan) by briefly switching the motor switch on and off; if it does not rotate in the correct direction, change the pole connections of the motor.



7.1.2. Operation

i. Initial Start-up

- Make a short start and check that there is no rubbing due to possible assembly errors.
- After starting the fan motor, check the motor current with an ammeter.
- Check the power consumption. Make sure that the maximum power does not exceed the permissible power.
- Monitor the vibration and noise levels.
- After one hour of operation, check that all the fasteners are tight.
- After commissioning, the belts will lengthen over time. Check and tighten the belt tension within the second week and one month of operation. Check again every three months. Tension the belts according to section "7.2.3. Belt Tensioning".
- Check the bearings for heat and noise during the first few hours of operation. If the bearings become hot, stop the fan, cool the bearings with air and restart the engine. If this does not prevent the bearings from overheating, please contact us for a solution.

ii. Normal Operation

- Monitor the fan's performance regularly.
- Protect the fan belts from dust, grease and chemicals, taking into account the operating conditions. (for belt-driven types)
- Check for unusual noises or vibrations. Address them immediately.
- Do not neglect the fan maintenance intervals.

7.1.3. Shutdown

i. Planned Shutdown

- Gradually reduce the fan speed using the control system to avoid sudden changes that could cause mechanical stress.
- Keep an eye on vibration levels, temperature, and noise during deceleration to ensure everything is operating smoothly.
- Once the fan has slowed down sufficiently, switch off the control panel to cut power to the fan motor.
- Ensure that the fan has come to a complete stop before proceeding to the next steps.
- Make sure all moving parts are secured and that the fan is in a safe state to prevent accidental start-up.

ii. Emergency Shutdown

- Use the emergency stop switch to immediately cut power to the fan in case of an emergency.
- This action should be taken if there are any signs of critical failure, such as excessive vibration, unusual noises, or smoke.
- If the bearing temperature tends to rise to 80 °C or above, the fan must be stopped immediately.
- Check the bearings for heat and noise during the first few hours of operation. If the bearings become hot, stop the fan, cool the bearings with air and restart the engine. If this does not prevent the bearings from overheating, please contact us for a solution.
- Bellows-type high-pressure ventilators must be stopped immediately if a blockage is detected on the suction side or the flapper is closed, as this can cause overheating.

WARNINGS:

- ***According to IEC standards, fan can be operated for a maximum of two minutes at 1.5 times the amperage of the corresponding motor. Set the motor relay according to this amperage and time value. In general, the motor current can be up to 90% of the labelled value during operation.***
- ***If the fan is to be used in conditions other than those specified in the order, a risk assessment is required. Please contact our company.***

7.2. Installations And Modifications Which May Be Done During Usage

When the fan is commissioned, the following sections should be followed for any maintenance and installations that may be carried out on the drive group.

WARNING: Ensure that the machine is switched off and disconnected from the mains supply before carrying out any work on the fan.

In cases where the rotor has to be removed from the shaft, mark the point on the shaft where the packing gland meets the shaft. This way you can be sure that the rotor is in the same place when reassembling it.

7.2.1. Removing And Installing the Pulley

All ED_VAN fan pulleys are equipped with tapered clamping element (taper bush). The taper bush makes it very easy to remove the pulley. In this tapered taper bush, rotating parts are secured to the shaft by the contraction method. Hexagon socket screws are used for assembly and disassembly only.

The chuck surface on the small diameter side of the taper bush has tapped holes parallel to the axis. Some of these are tightening holes and some are extraction holes. When the taper bush is placed in its slot in the pulley, the ones that coincide with the holes on the taper bush are used for tightening and the others are used for removal. When the bolts are inserted into the tightening holes and then tightened, they pull the tapered taper bush into place in the pulley and tighten the shaft with great force. To remove, all the bolts are removed and some are inserted into the assembly holes, it is easily removed from the shaft. Do not try to pull this type of pulley in as it may damage the pulley.



Figure 19 – Belt Pulley Assembly

7.2.2. Advantages Of Tapered Clamping Element (Taper Bush)

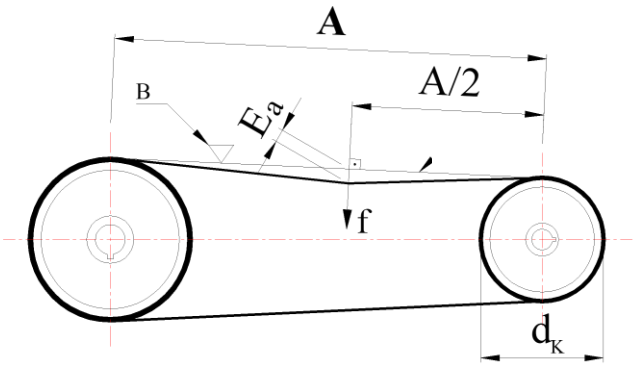
- It eliminates additional operations such as hole machining, keyway drilling in the pulley hub.
- It does not require a shoulder to rest on the shaft. It is tightened in any position on the shaft.
- It does not require qualified personnel as assembly is very simple using a tightening bush.
- Parts such as chuck washers, spacers, bolts, etc. are not required for installation.
- It is also easy to disassemble for maintenance and replacement of parts, and easy to remove during operation. In addition, the absence of additional tools such as pullers, etc. and the absence of hammer blows eliminate all risks.

7.2.3. Belt Tensioning

The fan belts should be checked for elongation after 15 hours of operation. This should then be repeated on a quarterly basis. When the belts are replaced for this or any other reason, adjust them as follows.

Belt Profile	Pulley Dia d_k (mm)	Bending of belts Ea (mm)								
		Axis distance of belts A (mm)								
		500	630	800	1000	1250	1600	2000	2500	3150
SPZ (10)	100<d_k<125	14	17	22	28	34	44	55	-	-
	140< d_k <160	13	16	20	25	31	40	50	63	-
	180< d_k <200	11	14	18	22	28	36	45	56	71
SPA (13)	180< d_k <200	15	19	24	30	38	48	60	75	95
	224< d_k <250	13	16	20	25	31	40	50	63	79
SPB (17)	224< d_k <250	15	19	24	30	38	48	60	75	95
	280< d_k <355	15	19	24	30	38	48	60	75	95
SPC (22)	315< d_k <355	15	19	24	30	38	48	60	75	95
	400	14	17	22	28	34	44	55	69	87
	450	13	16	20	25	31	40	50	63	79
	500	11	14	18	22	28	36	45	56	71

Table 6 – Belt tensioning Table



A = Distance between pulley hubs (mm)

f = Compressive force

E_a = Belt drift

Required E_a belt bending amount is measured by a compass by placing a steel ruler on the B surface.

Figure 20 - Belt Pulley Diagram

8. MAINTENANCE AND LUBRICATION

8.1. Maintenance

The most expensive maintenance is cheaper than the cheapest repair. The better the fan is maintained, the healthier and more trouble-free it will run. Ensure that the fan is switched off and disconnected from the mains before carrying out any work on the fan. To maintain the validity of the fan's ATEX certificate, ensure that these operations are carried out by authorised personnel in accordance with the safety instructions. Those responsible for the operation and maintenance of the fan must follow the instructions in this manual and carry out the daily, weekly, monthly, quarterly and annual maintenance operations as listed below.

8.1.1. Daily Maintenance

- Remove any dust that has accumulated on the outside of the fan (A dust layer not exceeding 0.8 mm in thickness is considered non-hazardous according to NFPA 654) with a damp cloth. Never clean in such a way as to allow dust to escape or to cause static electricity in the fan housing.
- Check for vibration and shaking.
- Ensure that the bearings are protected from moisture. (Direct drive with coupling and belt-drive)
- Check the motor temperature. (In practice, it should be warm enough to touch with the palm of your hand).

8.1.2. Weekly Maintenance

- Check that all fixing bolts are tight (e.g. frame fixing bolts, bearing fixing bolts and motor fixing bolts).
- Check the belt tension. (Belt-drives)
- Open the maintenance cover on the fan body and clean the foreign matter and dust particles accumulated on the rotor blades. If the rotor is damaged or worn, have the rotor replaced. Rotate the rotor slowly by hand to make sure that there is at least 2 mm clearance and no contact(friction) between the rotor suction - the suction cone and the shaft-packing gland.
- Check the appearance of the pipe connections and anti-vibration mounts for any changes.

8.1.3. Monthly Maintenance

- If the belts are worn, replace them with new ones. If this wear occurs in a short period of time, check that the pulleys are in the same plane. (Belt-drives)
- Open the fan maintenance cover and check that the fan hub is tight. Then clean any corrosion (rust) from the motor shaft.
- If the fan is repaired or modified for any reason, the fan must be dynamically balanced prior to installation.
- Check cable and panel connections.

8.1.4. Quarterly Maintenance

- Grease lubrication shall be carried out according to the Greasing instructions given in section 8.2. If there is a loss of grease in the bearing, add the same brand and same type of grease.
- Check the rotor for wear.
- Check the packing gland for wear. Replace with a new one if necessary.

8.1.5. Annual Maintenance

- If the paint has deteriorated, repaint the fan. In exceptional cases this period may be reduced.
- Greases applied inside the bearing can only protect the bearing for a certain period of time. After that, they lose their lubricating properties. Renew the greases once a year. (Direct drive with coupling and belt-drive)
- Check the integrity of the rotor blades, coupling and pulleys.
- Check the tightness of the packing cover and check the seals. Replace if necessary.

WARNING: Never use a water jet, steam or pressure washer to clean the electric motor or ancillary electrical components such as the isolation switch, frequency converter, control cabinet, etc.

WARNING: Sparks may occur due to static charge. Do not use dry cloths when cleaning!

8.2. Lubrication

8.2.1. Greasing

In case of losses of lubricant, turn on the bolt of the greaser on the upper part of the bearing. Grease is conveyed in from the hole of the greaser.

WARNINGS:

- If any heating occurs in the bearings after the addition of grease, it means that there is too much grease. Discharge some grease.
- In compensating loss of grease, grease of the same brand and type must be used.

In changing grease, discharge all the grease in the bearings. Then wash them with pure gasoline or benzole. Do not ever use diesel oil or kerosene. Do not dry using oakum and similar fibrous or linty materials. Always use clean and lint-free cloths. Press grease into the ball section of the bearings. In the meantime, fill 40 percent of the housing of the bearing with grease. See the **Lubrication Diagram** given in section **8.2.2.** for lubrication periods.



Figure 21 - Opening the Greaser and Bearing for Cleaning

Use of

- **UNDER NORMAL CONDITIONS**

✓ SHELL - *GADUS S2 V100C 3 (ALVALINA RT 3)*

- **IN HOT ENVIRONMENTS**

✓ SKF LGHP2/*150°*

or equivalent is recommended.

Lubricant originally filled in the bearings by ED_VAN

Chemical composition: Lubricating grease containing highly refined mineral oil and additives. Highly refined mineral oil contains DMSO extract at <3% (by weight) as per IP346.

Chemical name	CAS-No. EC-No. ***Registration number***	T.R. SEA No 28848	Concentration (%)
Zinc Naphthenate	12001-85-3 ***234-409-2***	Skin Irritation 2; H315 Aquatic Acute 1; H400 ***Aquatic Chronic 1; H410***	0,25 - 2,4
Triazole derivative	91273-04-0 ***401-280-0***	Skin Abrasion 1B; H314 Skin Sensitivity 1A; H317 ***Aquatic Chronic 1; H410***	0,01 - 0,09

Table 7 – Harmful Ingredients

Please contact the company for details about the safety precautions.

8.2.2. Lubrication Period

Determine the lubrication interval from the lubrication diagram below.

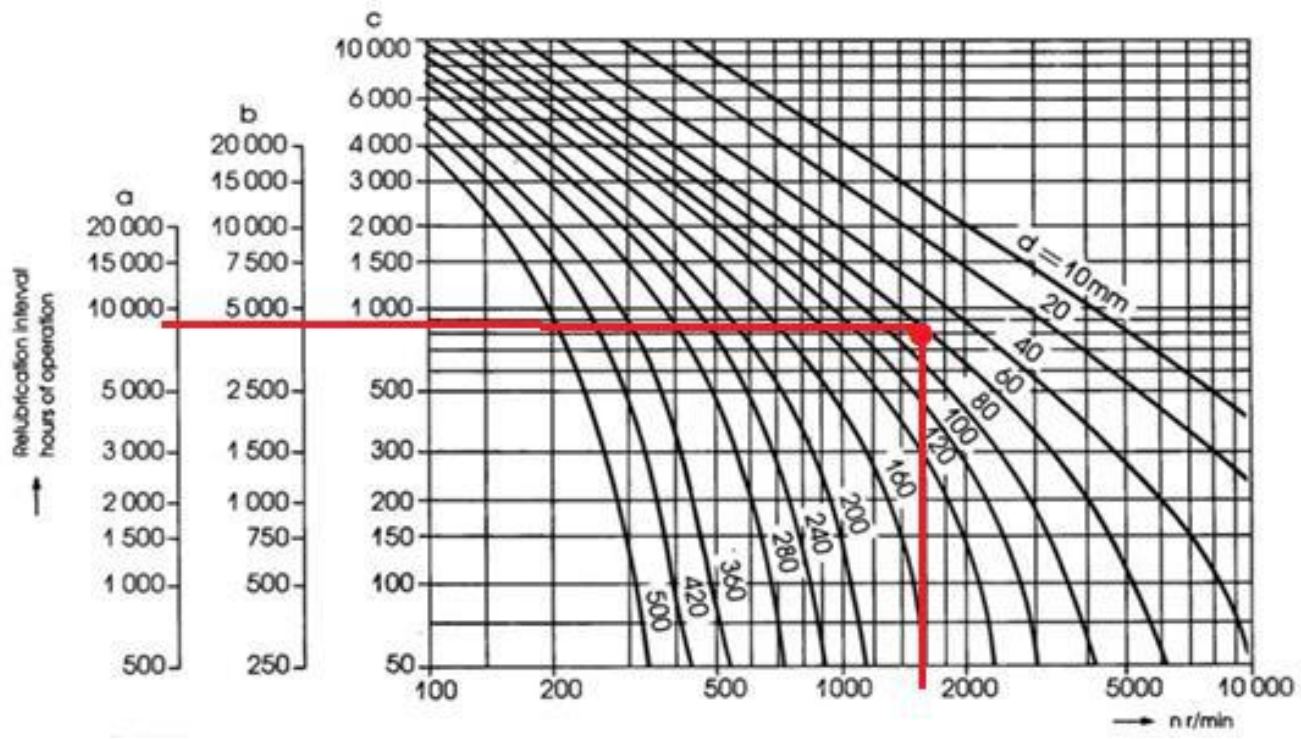


Figure 22 – Lubrication Diagram

scale a : Radial Ball Bearing
scale b : Cylindrical Roller Bearing, Needle Roller Bearing (Needle)
scale c : Spherical Roller Bearing, Tapered Roller Bearing, Axial Ball Bearing
d : Bearing Inner Diameter

Example:
A fixed-ball bearing with hole diameter of (d) 60 mm rotates at a speed of 1500 rev/min. Operating temperature varies between 60°C and 70°C (140-160°F). What is the required lubrication period? Draw a line upwards from the point showing 1500 rev/min on the axis x in the diagram and have it intersect the d=60 mm curve. Draw a line parallel to the axis x from the point so found and read the approximate value of 10.000 on the scale a (radial-ball). Thus, re-lubrication period is found to be 10.000 operating hours.

8.3. Spare Parts & Sub-Suppliers List

Fan Type	□□□	ATEX Category	Impeller	Shaft	Electric motor	Motor Power Upper Limit	Bearing	Gland Packing	Coupling	Belt	Pulley	Grease / Oil	Vibration Sensor
ECF-102/□□□-O3-SDA	101-116	Ex II 2G IIB T4 Gb	Edvan	n/a	WEG	37 kW	n/a	Ortaklar Kauçuk	n/a	n/a	n/a	n/a	n/a
ECF-102/□□□-O3-SKD	101-116	Ex II 2G IIB T4 Gb	Edvan	Edvan	WEG	37 kW	SKF	Ortaklar Kauçuk	SKF	n/a	n/a	Shell	n/a
ECF-102/□□□-O3-SKK	101-116	Ex II 2G IIB T4 Gb	Edvan	Edvan	WEG-ABB	37 kW	SKF	Ege Soylu Kauçuk	n/a	Megadyne	Ünlü Teknik	Shell	n/a
ECF-122/□□□-O2(O3)-SDA	101-114	Ex II 2D IIIC T 135°C Db	Edvan	n/a	Gamak	45 kW	n/a	Ortaklar Kauçuk	n/a	n/a	n/a	n/a	iFM
ECF-122/□□□-O2(O3)-SKD	101-114	Ex II 2D IIIC T 135°C Db	Edvan	Edvan	Gamak	45 kW	SKF	Ortaklar Kauçuk	SKF	n/a	n/a	Shell	iFM
ECF-122/□□□-O2(O3)-SKK	101-114	Ex II 2D IIIC T 135°C Db	Edvan	Edvan	Gamak	45 kW	SKF	Ortaklar Kauçuk	n/a	Bando	Yüksel Kasnak	Shell	iFM
ECF-201/□□□-O2(O3)-SKD	211-296	Ex II 2G IIB T4 Gb	Edvan	Edvan	WEG	90 kW	SKF	Ortaklar Kauçuk	SKF	n/a	n/a	Shell	n/a
ECF-201/□□□-O2(O3)-SDA	211-296	Ex II 2G IIB T4 Gb	Edvan	n/a	WEG	90 kW	n/a	Ortaklar Kauçuk	n/a	n/a	n/a	n/a	n/a
ECF-202/□□□-O2(O3)-SKD	211-294	Ex II 2G IIB T4 Gb	Edvan	Edvan	WEG	45 kW	SKF	Ortaklar Kauçuk	SKF	n/a	n/a	Shell	n/a
ECF-202/□□□-O2(O3)-SDA/G	211-294	Ex II 2G IIB T4 Gb	Edvan	n/a	WEG	45 kW	n/a	Ortaklar Kauçuk	n/a	n/a	n/a	n/a	n/a
ECF-202/□□□-O2(O3)-SDA/D	211-294	Ex II 2D IIIC T 125°C Db	Edvan	n/a	WEG	45 kW	n/a	Ortaklar Kauçuk	n/a	n/a	n/a	n/a	Monitran
ECF-507/□□□-O2-SKK	101-105	Ex II 2G IIB T4 Gb	Edvan	Edvan	WEG	30 kW	SKF	Ortaklar Kauçuk	n/a	Bando	Yüksel Kasnak	Shell	n/a
ECF-106/□□□-O2(O3)-SKK	101-111	Ex II 2G IIB T4 Gb	Edvan	Edvan	WEG	45 kW	SKF	Ortaklar Kauçuk	n/a	Bando	Yüksel Kasnak	Shell	n/a
ECF-126/□□□O2(O3)-SKK	101-108	Ex II 2G IIB T4 Gb	Edvan	Edvan	WEG	55 kW	SKF	Ortaklar Kauçuk	n/a	Bando	Yüksel Kasnak	Shell	n/a
ECF-203/□□□-O2-SKK	211-296	Ex II 2D IIIC T 125°C Db	Edvan	Edvan	WEG	90 kW	SKF	Ortaklar Kauçuk	n/a	Bando	Yüksel Kasnak	Shell	Monitran
ECF-124/□□□-O1(O2)-SKD	101-113	Ex II 2/3D IIIB T125°C Db/Dc	Edvan	Edvan	Nidec	55 kW	SKF	Ortaklar Kauçuk	SKF	n/a	n/a	Shell	Monitran
ECF-301/□□□-O1(O2)-SKD	301-313	Ex II 2/3D IIIB T125°C Db/Dc	Edvan	Edvan	Nidec	55 kW	SKF	Ortaklar Kauçuk	SKF	n/a	n/a	Shell	Monitran
ECF-121/□□□-O3-SDA	101-110	Ex II 2G IIB T4 Gb	Edvan	n/a	WEG	2,2 kW	n/a	Ortaklar Kauçuk	n/a	n/a	n/a	n/a	n/a
ECF-203/□□□-O2-SDA	211-244	Ex II 2D IIIC T125°C Db	Edvan	n/a	Nidec	7,5 kW	n/a	Ortaklar Kauçuk	n/a	n/a	n/a	n/a	Monitran
ECF-126/□□□-O1-SDA	101-104	Ex II 2G IIB T4 Gb	Edvan	n/a	Siemens	11 kW	n/a	Ortaklar Kauçuk	n/a	n/a	n/a	n/a	n/a
ECF-121/□□□-O1-SKK	101-113	Ex II 2D IIIB T150°C Db	Edvan	Edvan	ABB	30 kW	SKF	Ortaklar Kauçuk	n/a	Bando	Yüksel Kasnak	Shell	Monitran
ECF-203/□□□-O1-SKK	211-244	Ex II 2G IIB T4 Gb	Edvan	Edvan	WEG	5,5 kW	SKF	Ortaklar Kauçuk	n/a	Bando	Yüksel Kasnak	Shell	n/a
ECF-101/□□□-O2-SKK-SG360	101-109	Ex II 2D IIIC T 120°C Db	Edvan	Edvan	INNOMOTICS	4 kW	SKF	Ege Soylu Kauçuk	n/a	Megadyne	Ünlü Teknik	Shell	Monitran
ECF-209/□□□-O1-SKK-X	211-282	Ex II 2D IIIC T 120°C Db	Edvan	Edvan	INNOMOTICS	15 kW	SKF	Ege Soylu Kauçuk	n/a	Megadyne	Ünlü Teknik	Shell	Monitran
ECF-301/□□□-O1-SKK-SG360	301-305	Ex II 2G IIB T4 Gb / II 2D IIIC T130°C Db	Edvan	Edvan	INNOMOTICS	5,5 kW	SKF	Ege Soylu Kauçuk	n/a	Megadyne	Ünlü Teknik	Shell	Monitran
ECF-501/□□□-O1-SKK-SG360	501-507	Ex II 2G IIB T4 Gb / II 2D IIIC T130°C Db	Edvan	Edvan	INNOMOTICS	37 kW	SKF	Ege Soylu Kauçuk	n/a	Megadyne	Ünlü Teknik	Shell	Monitran
ECF-202/□□□-O1-SDA-SG360	211-263	Ex II 2G IIB T4 Gb / II 2D IIIC T130°C Db	Edvan	n/a	INNOMOTICS	7,5 kW	n/a	Ege Soylu Kauçuk	n/a	n/a	n/a	n/a	Monitran

1) Please contact ED-VAN for detailed information about spare parts replacement. Failure to use original parts will cause the ventillator to lose its ATEX feature.

2) The belts shall be antistatic in accordance with ISO 1813.

3) For motors, the maximum power limit must not be exceeded.

4) Since electric motors and vibration sensors are classified as electrical equipment, they must be ATEX certified in accordance with the ATEX category of the fan to which they belong. Please contact ED-VAN for detailed information.

9. VIBRATION

All fans manufactured by ED-VAN are vibration tested to ensure that they meet the vibration levels specified in ISO 14694. As stated in EN 14986:2024 article 5.3, since the fluid transported in category 2D fans contains dust, it can cause imbalance problems in the rotor. It is important to monitor vibration levels in order to prevent sparks that may occur due to friction. Ensure that the ATEX category of the vibration sensor used matches the zone (outside the fan). The alarm and shutdown levels specified in ISO 14694 are shown below.

Status	Rigid (mm/s)		Flexible (mm/s)	
	Max.	RMS	Max.	RMS
Good	6,4	4,5	8,8	6,3
Alarm	10,2	7,1	16,5	11,8
Critic	12,7	9,0	17,8	12,5

Table 8 – Vibration levels limit

Note: The RMS values given in this table should be preferred. Maximum values are commonly used in North America.

As long as the vibration monitoring readings do not reach alarm levels, the vibration is within acceptable and safe limits. If the vibration readings reach the alarm level, an investigation should be initiated immediately to determine the cause of the increase in vibration and steps should be taken to correct the problem. If the vibration levels reach a critical level, immediate action should be taken to correct the problem or the fan should be shut down. If the fan is not operated at its label flow rate - pressure values and frequency, different vibration values may be read, so in such a case, contact ED-VAN authorities in order to maintain the ATEX feature of the fan. Contact ED-VAN authorities for information on vibration levels of fans operating at variable speeds.

Where the vibration sensors should be placed is shown below.

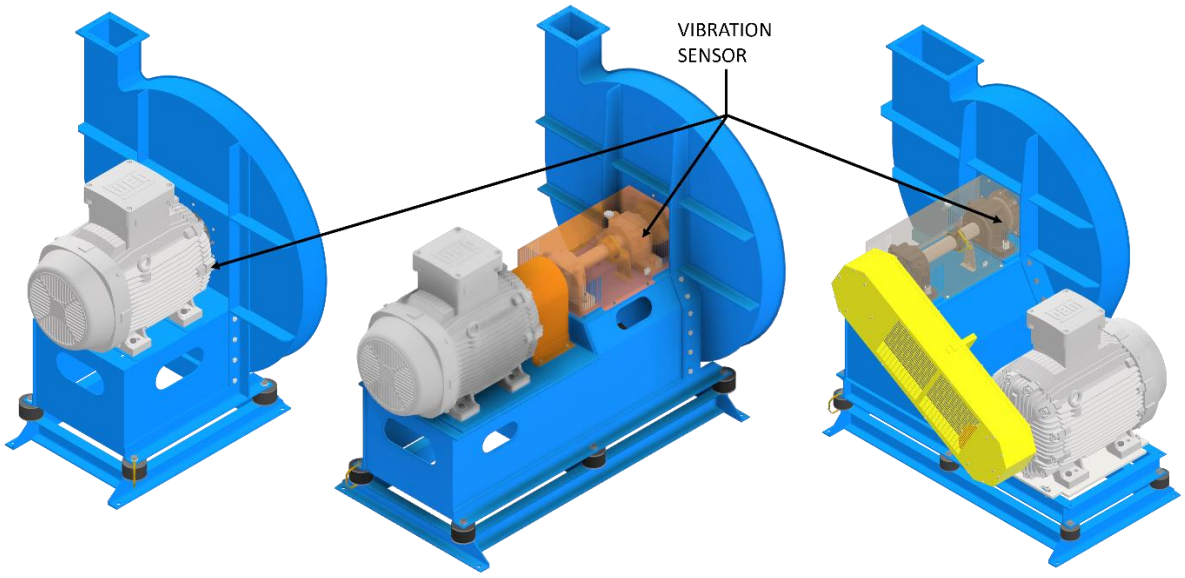


Figure 23 - Location of Vibration Sensor

10. POSSIBLE CAUSES OF CENTRIFUGAL FAN FAILURE (TROUBLESHOOTING)

The following points should be carefully monitored while troubleshooting during operation:

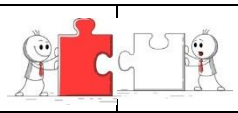
1. Fan imbalance,
2. Overheating of the bearings,
3. Incorrect bearing installation,
4. Belt elongation and breakage,
5. Loosening of the chassis, motor or bearing bolts.
6. Disruption of coupling adjustment.

Faults, causes and solutions can easily be found using the following table.

For faults marked with a sign and their solutions, please contact ED-VAN!

FAILURE 1: VIBRATION IN THE FAN.	
CAUSES:	**REMEDIES:**
Base has been incorrectly installed.	Check and level the base and the chassis connections.
There are impurities in the bearings.	Check them and remove impurities. Replace the bearing if necessary.
Bearing tensioning sleeve is distorted.	Check the installation and replace the sleeve if necessary.
Breakdown of the rotor, motor or pulley balance.	Check the balance and carry out re-balancing.
Eccentric shaft, imbalance in the fan, fan's friction on the body.	Check the shaft and the fan, position them correctly.
Coupling pulley or fan is mounted on the shaft with too much clearance.	Check the mounting.
Outer casing of the bearing moves in the housing or bearing moves on the shaft.	Stop the operation. Remove the rigid ducts. Start the motor and check the vibration in the duct connections.
Dust or impurities stick to the fan.	Replace with a proper fan or clean the fan at short intervals.
Fans have been connected to ducts without elastic seals or ducts rigidly connected to the fan have caused the body to get distorted.	Check the bearings, repair them and replace shaft or bearings if necessary.

Tablo 9 – Fault 1

FAILURE 2: ABNORMAL NOISE IN THE FAN.	
CAUSES OF FAILURE: 	**REMEDIES OF FAILURE:**
Imbalance in the fan.	Adjust the balance in accordance with permanent imbalance.
Deflection in the fan shaft.	Check the deflection of shaft. Replace with a new shaft if necessary.
Friction between the moving parts of the fan or in the motor.	Stop the fan; check and prevent friction.
Outer casing of the bearing moves in the housing or bearing moves on the shaft.	Check the bearings; replace the shaft or bearings if necessary.
Fan rubs against the body or suction funnel.	Stop the fan; check the installation and adjust it.
Dust or impurities stick to the fan.	Replace it with a proper fan or clean the fan at short intervals.

Tablo 10 – Fault 2

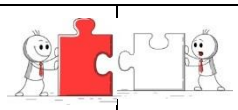
FAILURE 3: ROTOR WEARS OUT FAST.	
CAUSES OF FAILURE: 	**REMEDIES OF FAILURE:**
Operating temperature of the fan rises.	Replace with a fan with proper material quality.
There are corrosive gases not specified in the purchase order.	Replace with a fan with proper material quality.
Dust filter is clogged. (If there is a filter on the suction end.)	Clean the filter; replace it if necessary.
Fan blades wear as there is a leak in the dust filter.	Carry out the periodical maintenance of the dust filter.

Table 11 – Fault 3

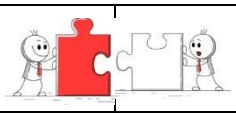
FAILURE 4: FAN FAILS TO REACH ITS DESIGN VALUES.	
CAUSES OF FAILURE: 	**REMEDIES OF FAILURE:**
Gas or air flow rate is not set (valve setting), thus flow rate is too high; motor consumes too much power.	Adjust the valves; check the consumed power.
Ducts of filters are not sealed.	Check the ducts and seals.
Problem in the ducts. (Broken, cracked ducts or turned-on valve)	Checks the ducts and valves.
Dust filter is clogged. (If there is a filter on the suction end.)	Clean the filter; replace it if necessary.
Fan rotates in the direction opposite to the arrow on the fan.	Check and reverse the direction of rotation of the motor.
Loss of pressure or incorrectly determined flow rate.	Check; replace the fan.

Table 12 – Fault 4

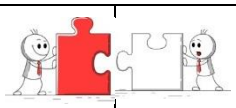
FAILURE 5: ELECTRIC MOTOR FAILS TO START UNDER LOAD.	
CAUSES OF FAILURE: 	**REMEDIES OF FAILURE:**
Poles and switch are incorrectly connected.	Check and correct.
Switch is not correctly turned or connection breaks off.	Correct the connections; check the switch. Repair or replace it.
Grid voltage is low or one of the phases is missing.	Check the grid voltage or the phases.
Moving parts of the fan are mechanically locked.	Uncouple the motor; check the coupling or belt-pulleys
Motor power is low. (Fan needs higher power.)	Check the operating curve of the fan and replace it with a correct motor.
Fan runs with hot air and starts cold.	Check the power of the fan on the operating curve. Turn off the valve.
Air flow rate of the valve is not well set, thus its flow rate is high. Therefore, it consumes much power.	Set the valve to its design value.
Thermal switch is incorrectly set.	Reset it.

Table 13 – Fault 5

FAILURE 6: ELECTRIC MOTOR STARTS HARD.	
CAUSES OF FAILURE:	**REMEDIES OF FAILURE:**
Motor power is low. (Fan needs higher power.)	Check the operating curve of the fan and replace it with a correct motor.
Fan runs with hot air and starts cold.	Check the power of the fan on the operating curve. Turn off the valve.
Air flow rate of the valve is not well set, thus its flow rate is high. Therefore, it consumes too much power.	Set the valve to its design value.
Load increases if there is any failure (breakage, crack, etc.) in the duct installation.	Check the duct installation.

Table 14 – Fault 6

FAILURE 7: OVERHEATING IN THE ELECTRIC MOTOR DURING OPERATION.	
CAUSES OF FAILURE:	**REMEDIES OF FAILURE:**
Poles and switch are incorrectly connected.	Check and correct.
Switch is not correctly turned or connection breaks off.	Correct the connections; check the switch. Repair or replace it.
Grid or motor phase is cut off.	Check the continuity of the phase.
Fan runs with hot air and starts cold.	Check the power of the fan on the operating curve. Turn off the valve.
Air flow rate of the valve is not well set, thus its flow rate is high. Therefore, it consumes much power.	Set the valve to its design value.
Friction between the moving parts of the fan or in the motor.	Stop the fan. Check the condition and prevent friction.
Motor fails to cool down or cooling fan is damaged.	Clean the motor and fan. Replace the motor if necessary.
Motor starts with excessive current.	Review the operating instructions of the motor.

Table 15 – Fault 7

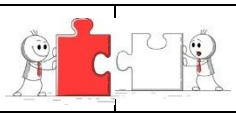
FAILURE 8: REVOLUTION REDUCES WHEN LOAD INCREASES.	
CAUSES OF FAILURE: 	**REMEDIES OF FAILURE:**
Poles and switch are incorrectly connected.	Check and correct.
Switch is not correctly turned or connection breaks off.	Correct the connections; check the switch. Repair or replace it.
Grid voltage is low.	Check the grid voltage.
Cracks or breaks in the ducts. Valve opens suddenly.	Check the ducts and valve.

Table 16 – Fault 8

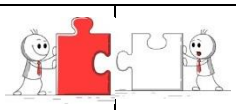
FAILURE 9: WHIRRING OR ABNORMAL SOUNDS IN THE ELECTRIC MOTOR.	
CAUSES OF FAILURE: 	**REMEDIES OF FAILURE:**
Switch of the electric motor is not correctly turned or connections break off.	Check the connections. Repair or replace the connections.
Grid or motor phase is cut off.	Check the continuity of the phases.
Friction between the moving parts of the fan or in the motor.	Stop the fan. Check the condition and prevent friction.

Table 17 – Fault 9

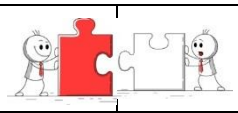
FAILURE 10: ABNORMAL HEATING IN THE BEARINGS OF THE FAN.	
CAUSES OF FAILURE: 	**REMEDIES OF FAILURE:**
The bearings are incorrectly mounted on the base.	Check the bearing assembly, level it.
The bearings are overgreased.	Drain the excess oil.
Lack of lubricant in the bearings.	Lubricate the bearings and replace them if necessary.
There are foreign materials in the bearings.	Clean bearings, re-grease, replace if necessary.
Bearings may have been used which do not correspond to the values indicated on the label.	Replace it with the correct bearing.
The bearing adapter sleeves are deformed.	Check the assembly, replace the sleeve if necessary.
There are excessive axial forces in the bearings.	Align the bearings and the shaft.
The belts are too tight.	Check and correct the tension.
The bearing adapter sleeve is overtightened.	Tighten according to the value in the bearing catalogue.
The outer ring of the bearing moves in the housing or the bearing travels on the shaft.	Check the bearings, replace the shaft or bearings if repairs are necessary.

Table 18 – Fault 10

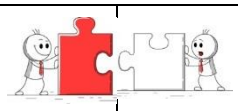
FAILURE 11: FAN BEARING NOISE.	
CAUSES OF FAILURE: 	**REMEDIES OF FAILURE:**
Bearing not in compliance with the rated values is installed.	Replace with a proper bearing.
Bearing tensioning sleeves are distorted.	Check and replace them if necessary.

Table 19 – Fault 11

Table 19 – Fault 11

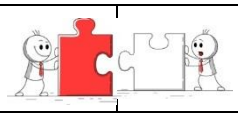
FAILURE 12: ABNORMAL HEATING IN THE PULLEYS.	
CAUSES OF FAILURE: 	**REMEDIES OF FAILURE:**
The pulleys are out of gauge adjustment.	Check. Carry out gauge adjustment.
The belts rested on the inside of the pulley groove.	Replace the pulleys or belts.
A pulley with the wrong diameter has been selected and fitted.	Check. Replace the pulleys.
Pulleys not complying with the pulley profile in the tag are installed.	Replace the pulleys.
The belts are not tight enough.	Tighten the belts.
An insufficient amount of belts are fitted.	Install belts at correct number and chose proper sizes.
Slippery belts contaminated with oil.	Clean the oil and prevent the belts from getting greasy.

Table 20 – Fault 12

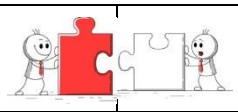
FAILURE 13: BELTS WEAR OUT FAST.	
CAUSES OF FAILURE: 	**REMEDIES OF FAILURE:**
Too much tension on the belts.	Check and correct the tension.
The belts are out of gauge adjustment.	Check. Carry out gauge adjustment.
Pulleys not complying with the original pulley profile are installed.	Check and replace the pulleys.
A pulley with the wrong diameter has been selected and fitted.	Check. Replace the pulley.
Insufficient number of belts and too long belts.	Correct the number of belts and select belts of proper length.

Table 21 – Fault 13

11.TRANSPORT AND STORAGE

11.1. Transport

Transport the fan from one place to another by attaching the lifting hooks to the lifting lugs on the reinforcement plates.

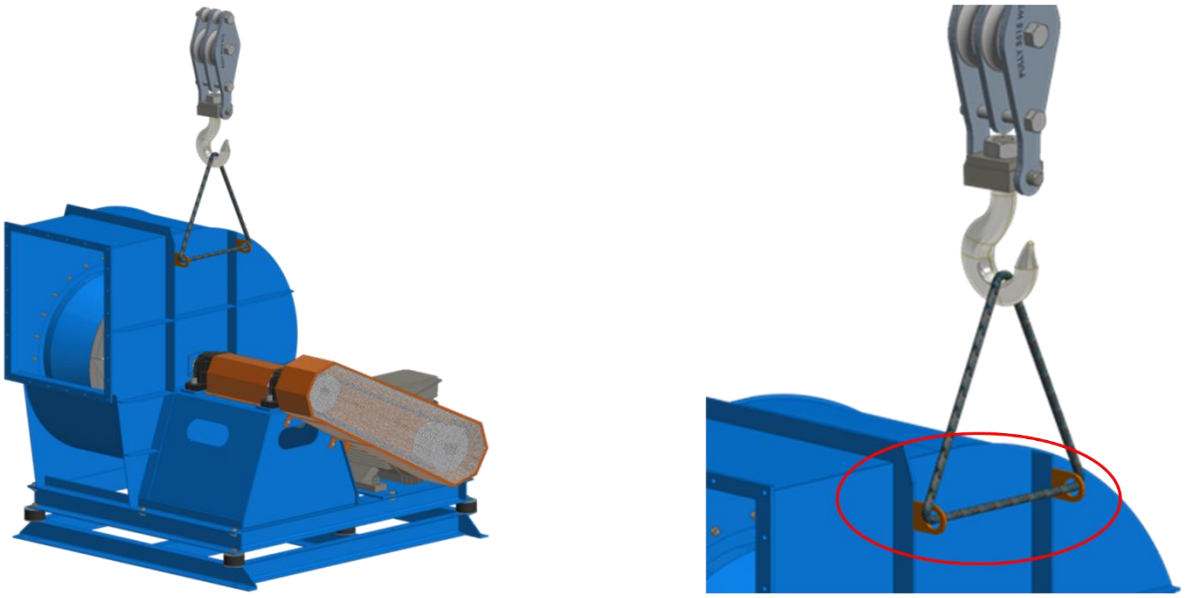


Figure 24 - Lifting Examples

WARNING: In case of relocation, do not ever handle the fan by its sensitive parts (shaft, rotor inlet, suction and exhaust end flanges, drive motor, etc.)

11.2. Storage

- Ideally, store the fan indoors to protect it from weather conditions. It is necessary to protect against moisture, chemical reactions.
- Especially shafts must be kept away from moisture and extremely high temperatures so that they will not be corroded.
- If an indoor location is not available and the equipment must be placed outdoors, you can store the fan outdoors as long as it is covered with a nylon or other cover that makes it waterproof. Just make sure it has a suitable cover and is placed on a pallet or skid to prevent it from being exposed to water and dirt.
- If the fan will not be operated for prolonged period of time, such parts as the shaft, bearings, etc. must be lubricated.
- Our company may not be held responsible for any damages which will occur upon the entry of the means of transport in the customer's premises and which will arise from storage.

12. Pre-Commissioning Checklist		
#	**Operation**	**Control**
1	Check that the product matches your order and the delivery order.	
2	Ensure that the electric motor is suitable for the intended conditions.	
3	Never operate the fan without connecting it to the system. (Ducts planned at the suction and/or outlet)	
4	Make sure that the installation is correct.	
5	Take all necessary precautions to prevent foreign bodies from entering the fan and coming into contact with the rotor.	
6	Make sure that the product is not damaged during loading, transport, and storage.	
7	Make sure that the ducts and supports connected at the inlet and outlet are in the correct axis and to avoid any deformation that may occur in the fan body.	
8	Check that the bolts are properly tightened.	
9	Check that the impeller rotates freely with the shaft. (Check by hand before making the electrical connections to the motor).	
10	Check belt alignment and tension (for belt-driven types).	
11	Ensure that the electric motor and electrical circuits are connected and operated by a qualified electrician.	
12	Refer to the instructions provided by the motor manufacturer.	
13	Check that the operating voltage indicated on the motor label matches the mains voltage.	
14	Refer to the wiring diagram on the motor plate, terminal box or terminal box cover.	
15	Ensure that the electrical connections and control panel comply with EN 60079-14.	
16	Ensure that the motor is protected by a thermal relay matched to the motor current.	
17	Ensure that the body is earthed in accordance with standard earthing instructions. (All conductive components must be earthed with contact washers).	
18	Check all safety precautions before operating the fan.	
19	Before the first start-up of the fan, check the ducts for foreign matter and clean them if necessary.	
20	Ensure that the maintenance cover is closed before switching on the fan.	
21	Each time the fan starts, close one of the valves on the inlet and outlet nozzles. Check that the rotor rotates in the correct direction (as indicated by the arrow on the fan) by briefly switching the motor switch on and off; if it does not rotate in the correct direction, change the pole connections of the motor.	
22	Make a short start and check that there is no rubbing due to possible assembly errors.	
23	After starting the fan motor, check the motor current with an ammeter.	
24	Check the power consumption. Make sure that the maximum power does not exceed the permissible power.	
25	Monitor vibration and noise levels.	
26	After one hour of operation, check that all the fasteners are tight.	

Table 22 – Pre-commissioning Checklist