

**BVMR AXIAL VENTILATOR**

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## PRODUCT DESCRIPTION



## 1.1 Type designation

### BVMR F400-1250-10-30°-4

BVMR	=	Smoke extraction fan
F400	=	Fire resistance class EN 12101-3; according to 2006-4 (400°C/120min)
1250	=	Fan construction size
10	=	Blade number
30°	=	Blade angle
4	=	Motor pole number

## 1.2 Intended use

The BVMR heat-resistant smoke extraction axial fans were developed for use in modern ventilation and air conditioning systems and for safe emergency ventilation. They are primarily blown into a pipeline or diffuser, but they are also suitable for transporting air from open space to open space.

They can also be used as roof fans.

**The BVHAD fans can operate in smoke extraction mode at the specified temperature and duration:**

F Class	Temperature [°C]	Period [minute]
F200	200	120
F300	300	60
F400	400	120
Not classified	300	120

If the fan was operating in smoke extraction mode, its service life has expired, regardless of the duration of operation, and it must be replaced!

The fans - under normal conditions (from -20 °C to +50 °C) - are also suitable for continuous operation. In this case, in addition to performing maintenance work, the lifetime of the fans is in principle unlimited. The fans were tested and approved for normal and smoke extraction mode. A certain degree of deviation from the previously specified temperature interval is possible, ask for the manufacturer's opinion on this.

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The regulations of the applying countries provide for the possibility of continuous operation with the emergency function (smoke extraction), which may differ, therefore the regulations of the applying country are the guiding principles, as well as the local regulations. The product manuals, descriptions, and datasheets issued for the fans contain the basic condition.

### Terms of Use:

#### Environmental limitations:

- Temperature:
  - **vészeseti:** maximum 400°C (F400 – 120 perc)
  - **folyamatos üzemeltetés:** -20°C - +40°C
- Pressure: The atmospheric pressure at all time
- Relative humidity: max. 95%
- It can be used for application based on the provisions of the regionally valid fire protection regulations, under the conditions described in the equipment certificate.
- **BVMR type axial fans are suitable for transporting the following media:**
  - clean air; max. 1,2 kg/m<sup>3</sup>, max 95% moisture content
  - The fan must not be used to ventilate air spaces classified in zones Z0, Z1, Z2, Z20, Z21, Z22, or to transport such classified media!
  - In heat and smoke extraction function, for gases with a temperature corresponding to the class, in that for a specified period of time
  - Media with temperatures between -20 +40 °C
  - For CO ventilation of garages

A certain degree of deviation from the previously specified temperature interval is possible, ask for the manufacturer's opinion on this.

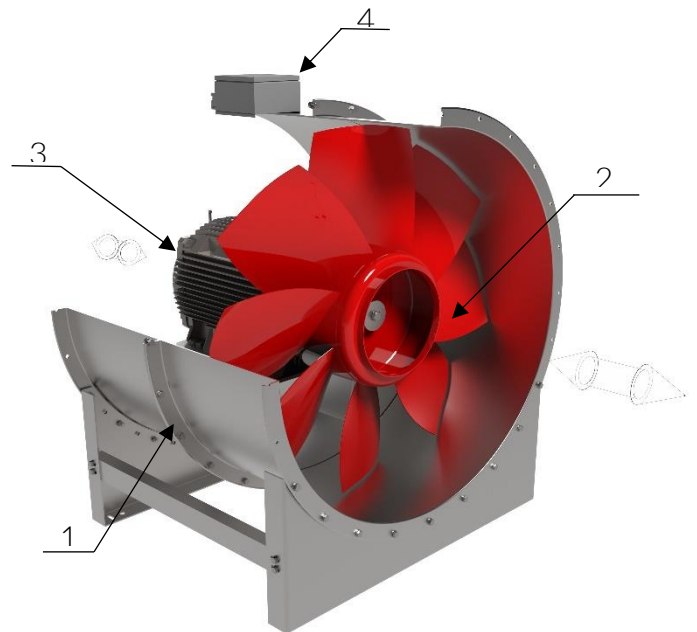
#### Installation conditions:

- The fans are installed either in a pipeline or in an arrangement without a pipeline or air duct connection, and as a roof fan they are installed on a plinth element.
- They are allowed installed with a horizontal or vertical axis, using a suitable accessory.
- In the case of operation without a pipeline or air duct connection, in order to prevent access to the rotating parts, the use of a protective grid is mandatory!
- The fans are not allowed to be operated without the necessary safety devices.
- Foreign objects must be prevented from entering the device.
- Adequate air inlet and outflow conditions must be ensured during installation.

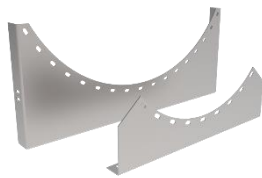
### 1.3 Structure

The main parts of the axial fan are as follows:

- 1) Fan housing
- 2) Fan impeller
- 3) Electric motor
- 4) Terminal box



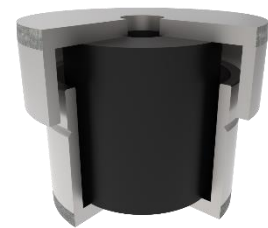
### 1.4 Optional accessories



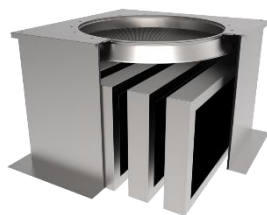
Mounting feet



Bracket for vertical installation



Heat-resistant vibration absorber



Roof silencer socket



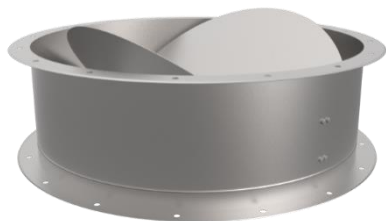
Thermally insulated Roof socket



Insert Plate

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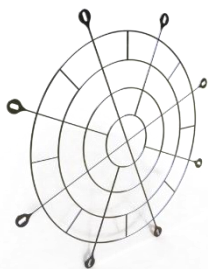
Automatic shut-off damper  
for vertical use



Automatic shut-off damper  
for horizontal use



Flexible Canvas



Protection grill



Motorized control damper  
with connection plate



Tube silencer



Diffuser



Inlet cone



45° intake or exhaust idom  
with protective grid



Lamellar Roof Cup  
(DL type – for exhaust only)

## 1.5 General description

The BVMR ventilátor is solidly constructed, welded device. Its surface protection can be galvanized or painted.

**The fan housing** is a welded steel plate, which is an integral part of the rear deflector blade. The flanges are flanged from the housing material.

**The edge of the house** is equipped with a standard hole distribution, which can be used to install it in a pipeline, or in the case of horizontal installation, it can be equipped with mounting feet. In the case of vertical installation, brackets are placed on the casing of the fan housing, and when used as a roof fan, the edge of the fan housing is set up on the base plate.

**The axial impeller** is attached directly to the motor shaft (latch and locking screw). Under the head of the safety screw, a hub fixing flat washer of suitable size and strength and a "Rip-lock" washer are placed. The screw is mounted with Euro-Lock type A24.20 screw securing glue. The impeller consists of a steel hub and steel blades welded to the hub, the angle of which is fixed and cannot be changed. The impeller is balanced both statically and dynamically. The impeller can be made with a normal or increased blade gap (gap between the impeller blade and the fan housing), which allows the fan to be set up in different places. (see under point 3.1)

**The blades with a special profile** are made of 2 steel plates, which are welded to each other and to the casing of the impeller.

**The electric motor** is an asynchronous, alternating current, pedestal motor, with IP 55 protection.

**The terminal box** is placed outside the fan housing, in which there is a ceramic terminal block, for which only metal glands can be used. The motor and terminal are wired with a heat-resistant cable.

## 1.6 Functional description

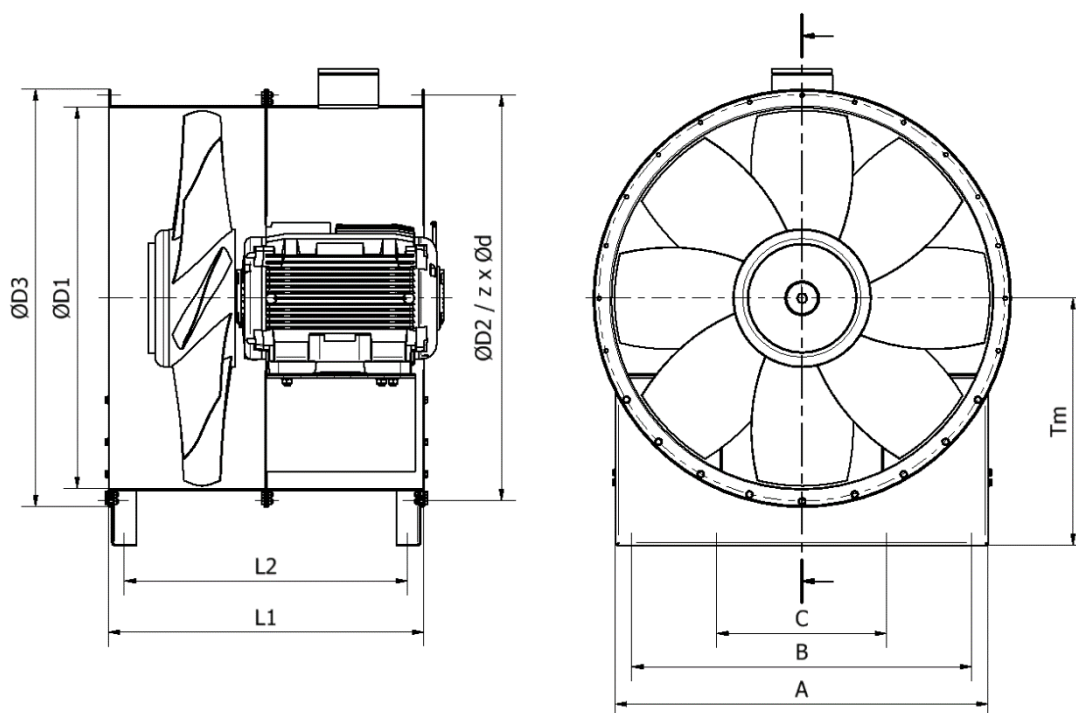
Through the rotating impeller, the fan, depending on its direction of rotation, sucks in air from one direction, which it transports to the other side of the fan, axially.

The transport direction depends only on the direction of rotation of the impeller. In both cases, the engine is in an air stream that cools it. In the case of two-way operation of the fan, it must be taken into account when installing the fan that the suction and discharge sides can be interchanged, therefore the fan must be connected accordingly with the usual solutions: pipeline, diffuser, etc..

By definition, the fan is also suitable for one-way air transport, in which case it can also be combined with other fittings, e.g.: automatic return valve, self-operating roof cap, etc.

## 1.7 Size Range

### BVMR type size range



Fan	Motor	ØD1 [mm]	ØD2 [mm]	ØD3 [mm]	A [mm]	B [mm]	C [mm]	Tm [mm]	z [db]	Ød [mm]	L1 [mm]	L2 [mm]
710	132	710	775	820	710	640	320	450	16	14	649	558
800	132 160	794	861	904	800	720	360	500	16	14	649	552
900	132 180	907	958	1017	900	820	410	580	16	14	652	553
1000	132 180	1001	1067	1111	865	780	390	635	16	14	652	553
	200										902	803
	225											
1120	160 250	1114	1200	1234	1024	940	470	750	16	14	892	787
1250	180 250	1256	1337	1376	1228	1120	560	815	24	14	1040	933
1400	225 315	1401	1491	1521	1367	1260	630	894	24	14	1168	1059
1600	250 315	1589	1663	1709	1550	1440	720	994	24	14	1171	1061
1800	280 315	1801	1856	1920	1725	1560	780	1094	24	14	1171	1061
2000	315	2000	2073	2120	2000	1840	920	1256	32	14	1171	1061

## About our Company:

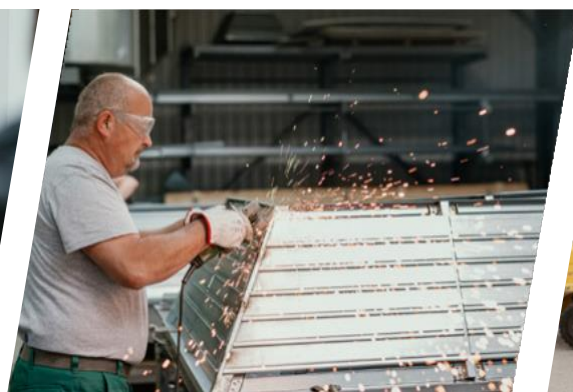
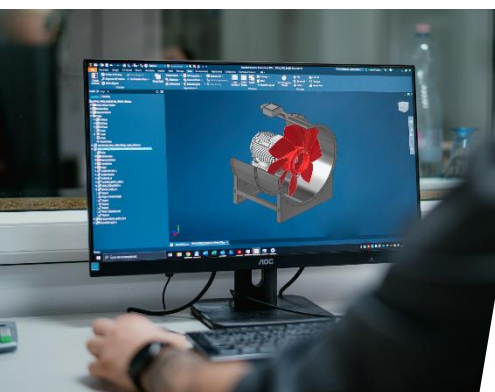
The name of Hungaro-Ventilator Ltd. is now completely connected to quality and expertise.

Our company was founded in 2005, now has 50 employees and manufactures smoke extraction and emergency ventilation equipments in Sopronköves on 6.500 m<sup>2</sup> production area.

We have more, than 15 years of experience and we are one of the largest Hungarian manufacturing and exporting companies in the sector.

Beside of Hungary, the additional export destinations are in EU, and we have several partners outside the EU as well.

The equipments manufactured by the company, - with exception of electric motors, - are entirely self-developed. Year to year thousands of fans and pressure relief dampers were manufactured is our factory in Sopronkövesd.





# GENERAL SAFETY REGULATIONS



## 2.1 Operating regulations

BVMR type fans are manufactured in accordance with the requirements of today's technical standards, thanks to which the fans guarantee a high degree of operational safety. However, this operational safety can only be achieved in operational practice by following the instructions in the operating instructions. Plan and carry out the installation, operation and maintenance of the devices taking these regulations into account.

### It is especially important that:

- The fans should only be installed in accordance with the regulations (see the product description chapter).
- The fans should only be operated in perfect, functional condition, and the safety devices should be regularly checked for their functionality.
- The operating instructions must be permanently available in a legible state in their entirety at the place of operation of the fan.
- Only properly trained and authorized personnel may operate and maintain the machines.
- The operating personnel must be familiar with the operating instructions - and the safety regulations contained therein.
- All safety and warning instructions on the fans must be clearly visible and legible.

## 2.2 Explanation of safety signs



### Warning

Risk of injury to life and health.



### Danger to life

Danger of electric shock. Ignoring this instruction can have serious - even fatal - consequences.



### Advices

User suggestions, useful advice. Ignoring them can cause significant material and personal damage, or the desired technical parameters cannot be achieved.

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## 2.3 Basic safety measures

Axial fans and roof fans manufactured by Hungaro-Ventilátor Kft. are made according to high technical requirements. Numerous material, functional and quality tests guarantee the correct operation and long service life of the devices. Nevertheless, the operation of the machines can be dangerous if they are not used by qualified and competent people.



- The fans may only be operated when installed - connected on the air side. (with air duct connection or using a protective grid)



- Installation, electrical connection and maintenance may only be carried out by qualified personnel.
- Operate the fan only according to the regulations, within the specified power limits (see type plate) and with a permitted medium.

## 2.4 Dangerous operation

**Due to the rotating impeller and the high air speed, the following must be observed:**

- Do not hold the rotating impeller; do not attempt to apply the brakes manually during maintenance work.
- In the case of open suction operation, the operating personnel should always wear closed clothing, because the high air flow can suck in loose clothing and light items of clothing.
- Any larger objects (tools, etc.) that get into the device can brake or destroy the impeller, therefore a protective grid is required in open suction or open-air operation.

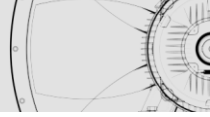
## 2.5 Occupational health and safety regulations

When moving, installing, operating and maintaining the fans and their accessories, the general and special occupational safety regulations must be strictly observed, especially when working at heights! (For example: Roof fan)



# INSTALLATION REQUIREMENTS





## 3.1. Where can the ventilator be placed

- The fan can be placed inside the fire section to be extracted without external insulation. (Fan with normal blade spacing).
- The fan can be placed in a well-ventilated room. The concept of a well-ventilated room is defined in standard DIN 4102, Teil 4-1994/03. In the case of such a location, the fan housing must be thermally insulated from the outside, and the air duct and its fittings (e.g.: vibration damping canvas) must also be thermally insulated until the exit to the open space. The same standard provides for the quality of the insulation and the permissible external surface temperature of the insulation. (in the case of insulation, a fan with normal blade spacing can be used).
- The fan can also be placed outdoors. In this case, the fan does not need to be insulated, but it must be safely protected from precipitation. (if installed without insulation, a fan with an increased blade gap is used)
- **IMPORTANT: The fan can only be placed where the blade gap allows from the previous placement options! The normal or increased blade gap is indicated on the fan nameplate! When ordering the fan, it must always be clarified what fan blade spacing the customer needs!**

## 3.2. Ventilator mounting

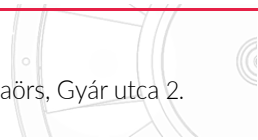
The fan can be installed with both a horizontal and vertical axis. For horizontal installation, the fan must be mounted on legs, for vertical installation, on appliance feet, or set on the edge of the fan. A vibration-damping steel kick can be used for the support points.

**Caution:** The installation height of the fan must consider the subsidence due to the softening of the kick. (May occur when smoke extraction is in operation!)

## 3.3. Suction and discharge side connections

If BVMR is installed in the fan pipeline, the use of a vibration damper is recommended. In the case of dual-function mode, the use of a vibration damper is required. In the case of a single-function mode - if the possibility of thermal expansion is not ensured by another device - the use of a vibration damper is also necessary. A silencer can be installed on both sides of the fan. In this case, the muffler is attached to the rim of the fan housing with screws. In the case of suspended installation, the silencer must also be provided with a safety attachment, which will hold the device in the event of failure of the original, intended installation, thereby preventing accidents or material damage. The original intended grip must also meet the heat resistance requirements for the application class. The safety fastening can be a fastening rope or a fastening chain, which must be fixed regardless of the original attachment points (the original attachment points must also be heat-resistant, according to the application class) and in a normal situation these safety attachments must be in a loose, unloaded state! These safety elements are also subject to the heat resistance requirement for the application class. If it is installed with a free fan side, a suction or pressure fitting must be used to increase performance. In any case, they must be provided with a protective grid.

For use as a roof fan, the installation of the automatic roof cap is a prerequisite, but in this case only one-way operation is possible.



## 3.4. Electric power supply

The motor side of the terminal strip located in the electrical terminal box is connected. (See wiring diagram under point 5.0)



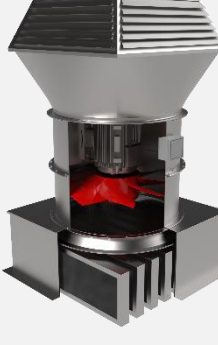
A suitable heat-resistant cable (min. 400°C/120 minutes) must be used to connect the motor, and a metal gland must be used for its introduction into the terminal box. The supply cable must be properly secured and mechanically protected, and the cable must not come into contact with the fan housing. These requirements apply throughout the entire area of the fire section. **When choosing the cable type, the installation method used and the contact protection solution, the relevant standards (DIN 4102-12) and the laws in force and those prescribed by the local authorities must be taken into account to the maximum extent.**

## 3.5. Ventilation system connected to fan

When the fan is installed, the air flow measured during commissioning must be within the operating range defined by the fan's characteristic curve. If it falls outside this, there is a possibility of the equipment being destroyed, and this fact in itself leads to loss of warranty. **By default, the fan motor is selected to transport a medium with a density of 1.2 kg/m<sup>3</sup>! Fans must not be used to transport media with a higher density than this! In this case, ask for the manufacturer's opinion or statement.**

## 3.6. Roof fan assembly variations

### Roof Silencer Sockets:

		
<p><b>Plinth package "A"</b> BVMR fan with lamellar roof cap (DL), Roof Silencer Socket with Inlet cone and automatic shut-off damper.</p>	<p><b>Plinth package „A1”</b> BVMR fan with lamellar roof cap (DL), Roof Silencer Socket with Inlet cone and insert plate.</p>	<p><b>Plinth package „C”</b> BVMR fan with lamellar roof cap (DL), Roof Silencer Socket with Inlet cone,</p>

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## Thermally insulated plinth elements:

			
<p><b>Plinth package „E1”</b></p> <p>BVMR fan with lamellar roof cap (DL), with thermally insulated plinth element, and with Inlet cone.</p>	<p><b>Plinth package „E2”</b></p> <p>BVMR fan with lamellar roof cap (DL), with thermally insulated plinth element.</p>	<p><b>Plinth package „F”</b></p> <p>BVMR fan with lamellar roof cap (DL), with thermally insulated plinth element and with automatic shut-off damper.</p>	<p><b>Plinth package „Zs”</b></p> <p>BVMR fan with lamellar roof cap (DL), with thermally insulated plinth element és motorized damper.</p>

## Built-in plinth elements:

			
<p><b>Plinth package „G1”</b></p> <p>BVMR fan with lamellar roof cap (DL), with built-in plinth element and Inlet cone.</p>	<p><b>Plinth package „G2”</b></p> <p>BVMR fan with lamellar roof cap (DL), with built-in plinth element.</p>	<p><b>Plinth package „H1”</b></p> <p>BVMR fan with lamellar roof cap (DL), with built-in plinth element and with automatic shut-off damper.</p>	<p><b>Plinth package „H2”</b></p> <p>BVMR fan with lamellar roof cap (DL), with built-in plinth element with Inlet cone and with automatic shut-off damper.</p>



# TRANSPORT AND STORAGE

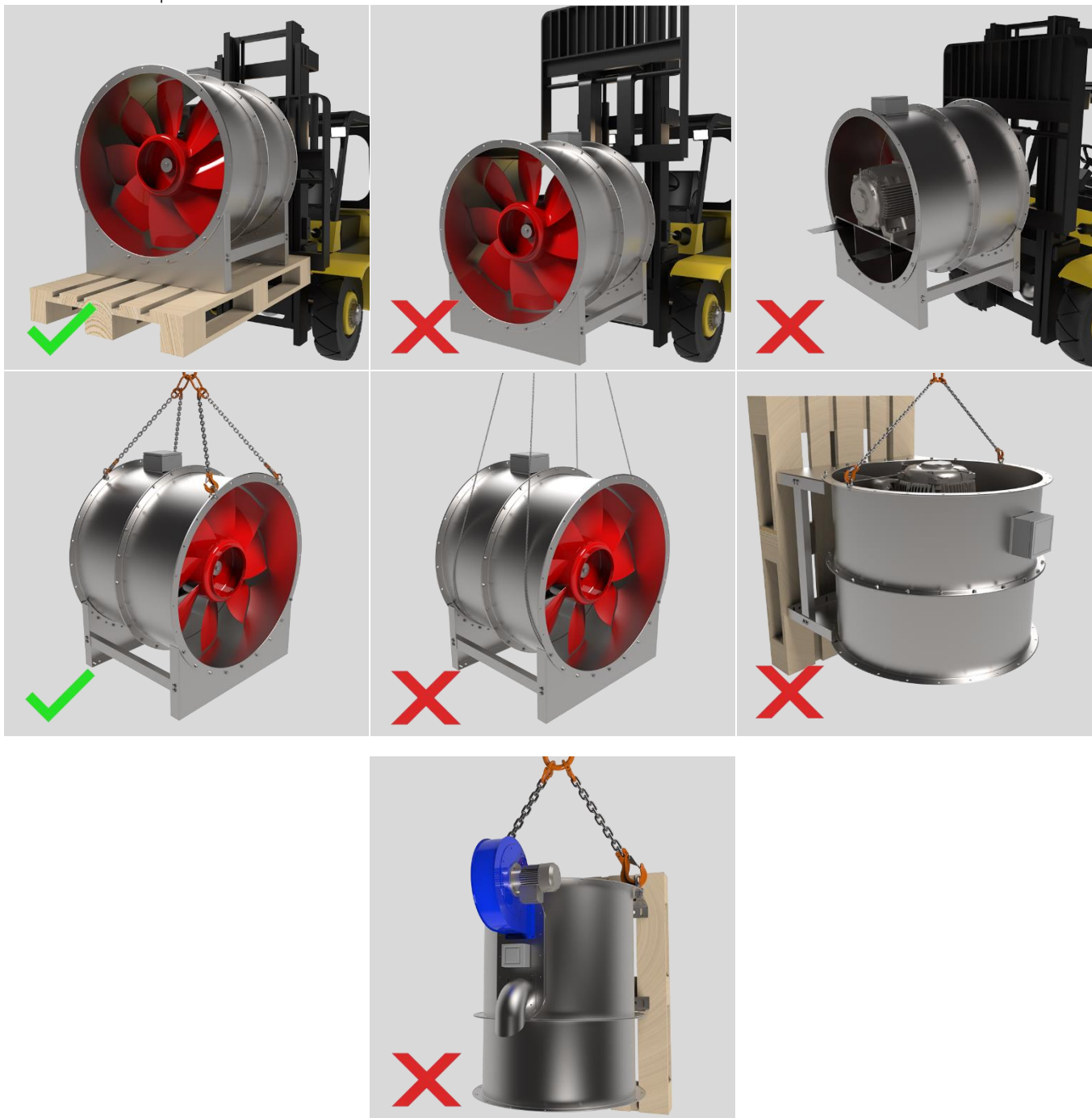


## 4.1 Transportation

The fans are delivered fixed on a pallet. BVMR ventilators are delivered fixed on individual pallets.

### The following must be observed during transport:

- use suitable equipment (hoist, forklift, crane) for transport, only;
- in the case of manual transport, take into account the human lifting and holding power.
- the fan attached to the pallet cannot be transported and lifted upside down in a vertical position



### The following hazards must be considered when transporting machines:



- The transport packaging does not prevent damage caused by improper transport. The machines must not be tipped or thrown.
- Protruding, sharp edges and corners can cause injury.
- Suspended objects can fall, so do not stay under a suspended load!
- Objects piled too high may fall!



- The highly flammable packaging material is a fire hazard, so the use of open flames and smoking are prohibited!
- When working on the roof, the occupational safety rules for working at height must be strictly observed!

## 4.2 Storage

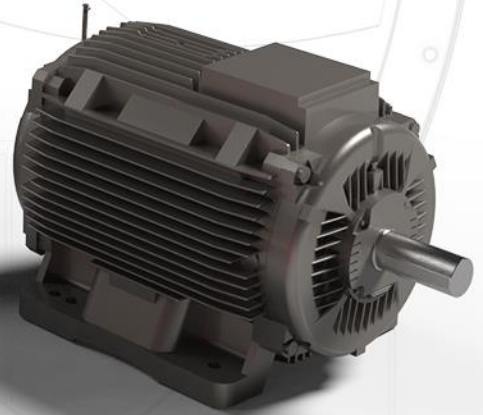
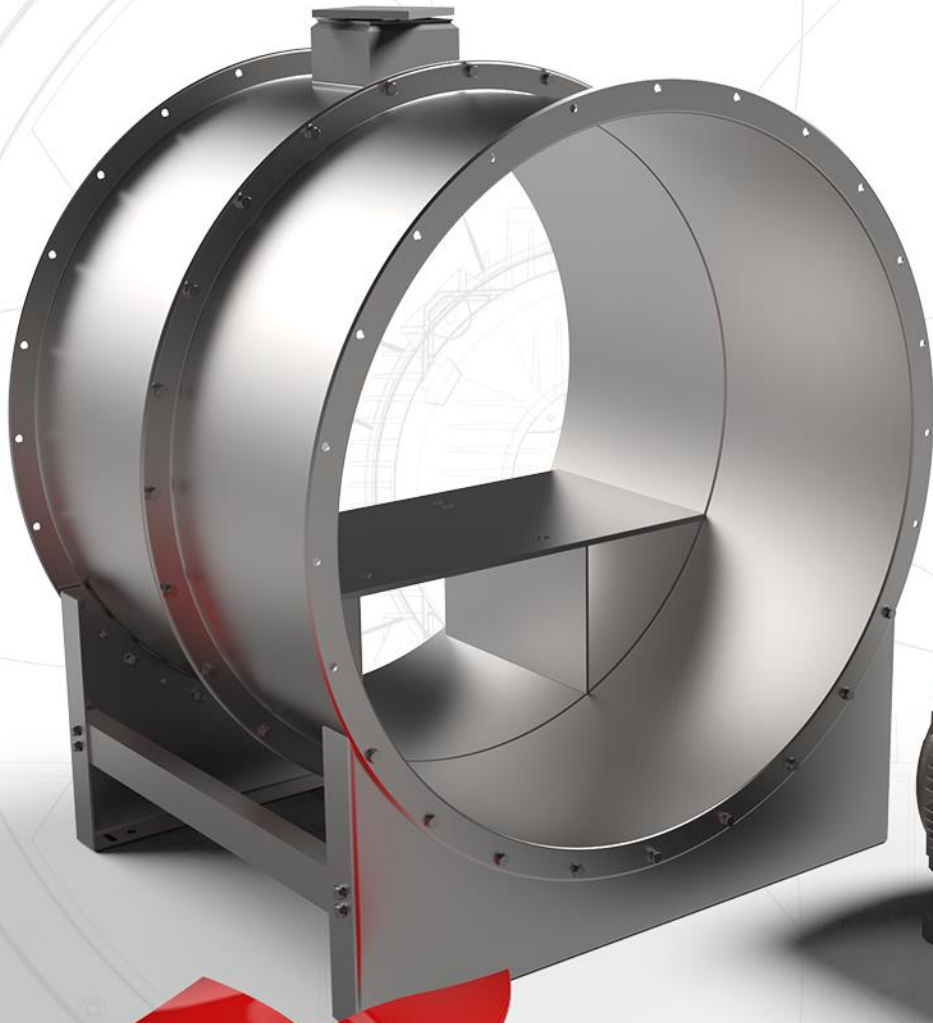
- The fan must be stored in a dry, covered place, protected from the elements, possibly covered with a tarp, protected from dirt.
- The fan must be protected from extreme temperatures!
- An excessively long storage time (max. 1 year is recommended) causes a rapid decrease in the service life of the equipment. Before installation, the correct operation of the motor bearings must be checked, as well as the insulation resistance between the windings and the phases and the fan body must be measured. The insulation resistance is adequate if the measured value is greater than  $1\text{M}\Omega$  when measured with a DC voltage of 500V, in a cold state (EN 60204-1: 2019). If the measured value is less than  $1\text{M}\Omega$ , the fan must be dried, and the manufacturer must be informed immediately.

## 4.3 Dimensions

See chapter "Size range" (1.7. point).



# ASSEMBLY



## 5.1 Electrical connection



Electrical and mechanical installation work may only be carried out by a **qualified specialist**, taking into account the regulations in force at all times.

Installation, repair and maintenance are permitted only after the fan has been **completely disconnected** from the electrical network.



### The following must be observed when installing the fan:

- Proper fixing of the fan.
- The fan housing must not be strained, use compensation if necessary.
- Vertical damper for correct installation position (only suitable for extraction, the slats should open upwards).



**Caution:** The wiring of the electrical equipment must be carried out primarily according to the data plate of the electrical motor of the equipment, and secondarily based on the wiring diagrams supplied by the manufacturer, as well as the relevant regulations. You can find the circuit diagrams on the next page!

Measure the insulation resistance of the electrical part according to the chapter under "4.2 Storage".

In case of any problem, please contact our company. Hungaro-Ventilátor Kft. assumes no responsibility for damages resulting from faulty wiring. Such a defect is not covered by the warranty.



### Checking the direction of rotation is mandatory, before which the following must be taken into account:

- Foreign bodies must be removed from inside the fan.
- Objects that do not belong in the electrical connection box must be removed and the inner surface must be kept clean.
- It is necessary to check that the connections of the wires are secure.
- The tightness of the junction box must be checked (tight packing glands, lid seal) in accordance with the protection classification.
- Rotating parts should be protected against contact by installing a protective grid (see accessories).
- The impeller must be turned a few times by hand to check for free rotation.
- The direction of rotation must be checked with a short (impulse-like) activation according to the direction arrow on the housing.

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## Wiring diagrams:

	Wiring Diagram	Pole number	Motor voltage	Remarks
<b>A1</b>		2 4 6 8 12	~400/690 V	3x400V motor in star connection
<b>B</b>	<p>With direct actuator</p> <p>Y With direct actuator</p>	2 4 6 8 12	~400/690 V	3x400V motor in delta connection  For star/delta (Y/D) start, appropriate timing must be included.

	Wiring Diagram	Pole number	Motor voltage	Remarks
C	<p>High speed</p> <p>YY</p>	2/4 4/8 6/12	~400 V	3x400V  two-turn motor, with Dahlander coil
	<p>Low speed</p> <p>Y</p>			
D	<p>High speed</p> <p>Y</p>	4/6 6/8 8/12	~400 V	3x400V  two-turn motor, split winding
	<p>Low speed</p> <p>Y</p>			
E	<p>Rotating clockwise</p>	2 4 6	~230 V	1x230 V motor
	<p>Rotating counter-clockwise</p>			

For equipment other than the above, as well as equipment equipped with special motors, ask our company for additional information.

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## Connecting fans

For the electrical connection of the fan motor, polymer or ceramic terminal strips are placed in the junction box. When tightening the cable fixing nut, the load capacity of the terminal strip material must be taken into account. The nuts are tightened **with appropriate resistance**, taking into account the maximum tightening torque values in the table below.

Screw size	M6	M8	M10
Maximum pulling torque (+0% / -10%)	6 Nm	15 Nm	20 Nm


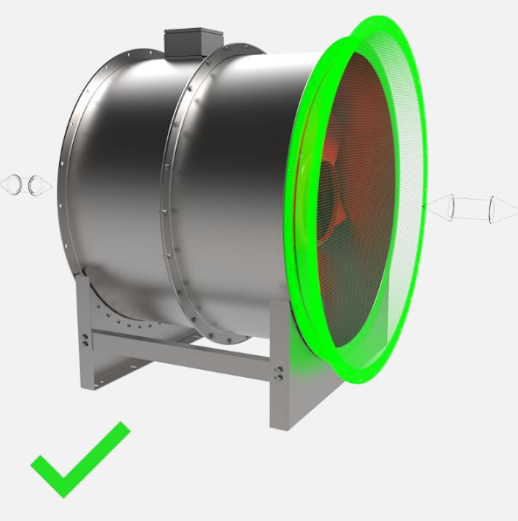
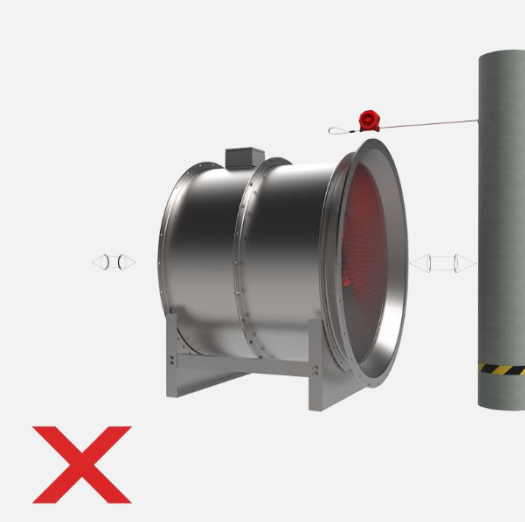
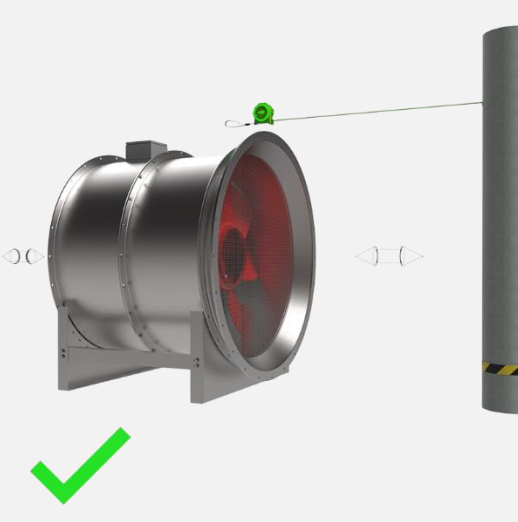


Exceeding the specified torque values can lead to breakage of the terminal strip!  
We are not responsible for damages resulting from improper tightening of the nuts!


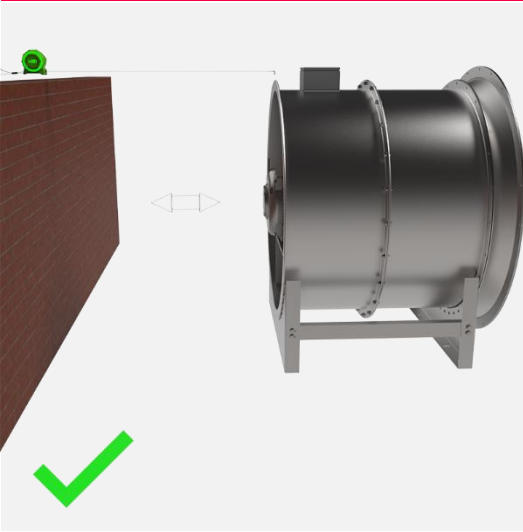

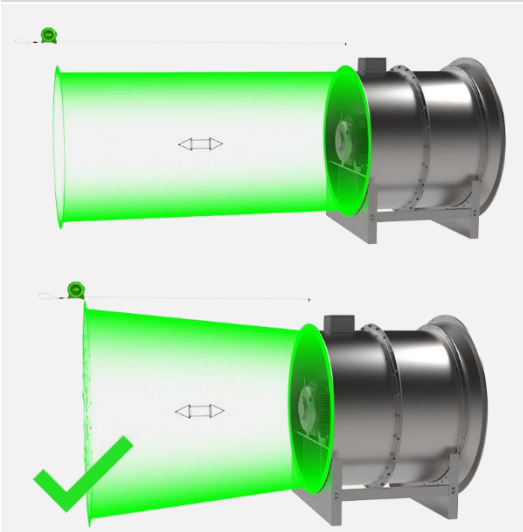
## 5.2 Common installation errors

To reach the desired working point and to guarantee the safe operation of the fan, the following points must be constantly taken care of.

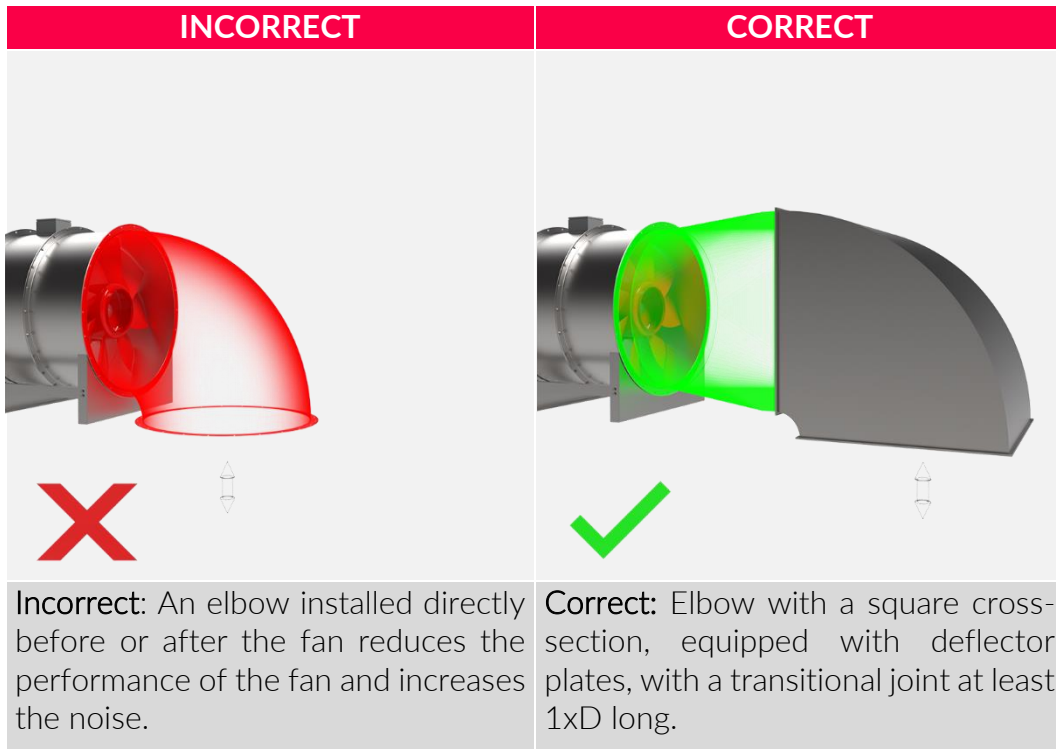
### 5.2.1 Inflow

INCORRECT	CORRECT
	
<p><b>Incorrect:</b> Without suction nozzles, the ends of the blades are not in the air flow, so the air delivery is reduced, the power consumption and the noise increase. Impeller blades may be damaged. The operating point will not be on the characteristic curve.</p>	<p><b>Correct:</b> In the case of free suction, a suction pipe must be installed in front of the fan.</p>
	
<p><b>Incorrect:</b> There is an obstacle near the inlet side, the performance decreases, the impeller may be damaged.</p>	<p><b>Correct:</b> In the case of free intake, min. before the fan. <math>1 \times D</math> free space must be provided.</p>

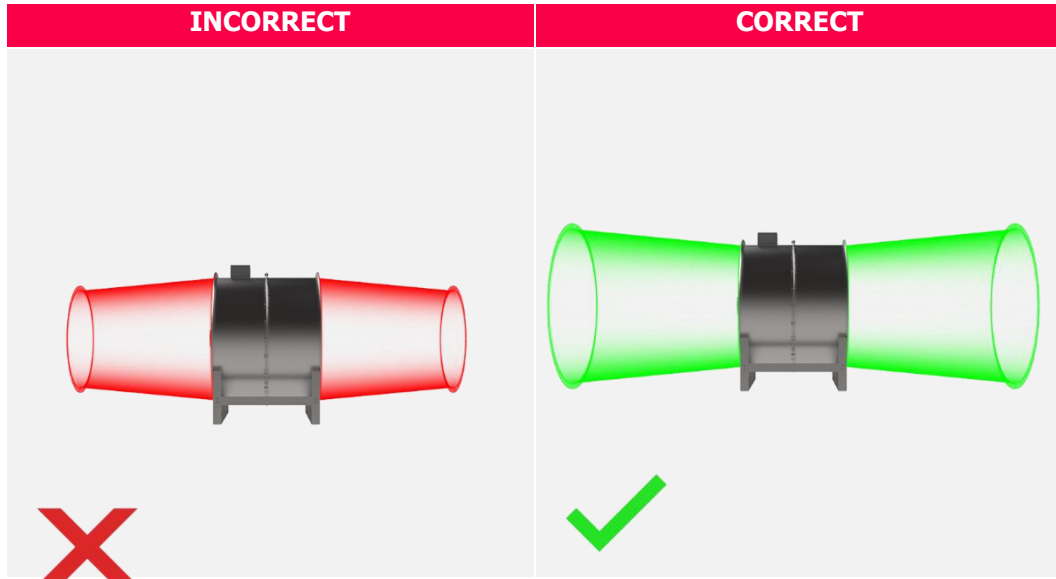
5.2.2 Exhaust

INCORRECT	CORRECT
	
<p><b>Incorrect:</b> An object obstructing the outflow on the pressure side of the fan prevents correct operation.</p>	<p><b>Correct:</b> There should be at least 1xD free space on the pressure side of the fan.</p>
	
<p><b>Incorrect:</b> The air duct ends with the fan, the fan blows outside, the exit loss is high!</p>	<p><b>Correct:</b> After the fan, a 2xD duct or diffuser reduces exit losses.</p>

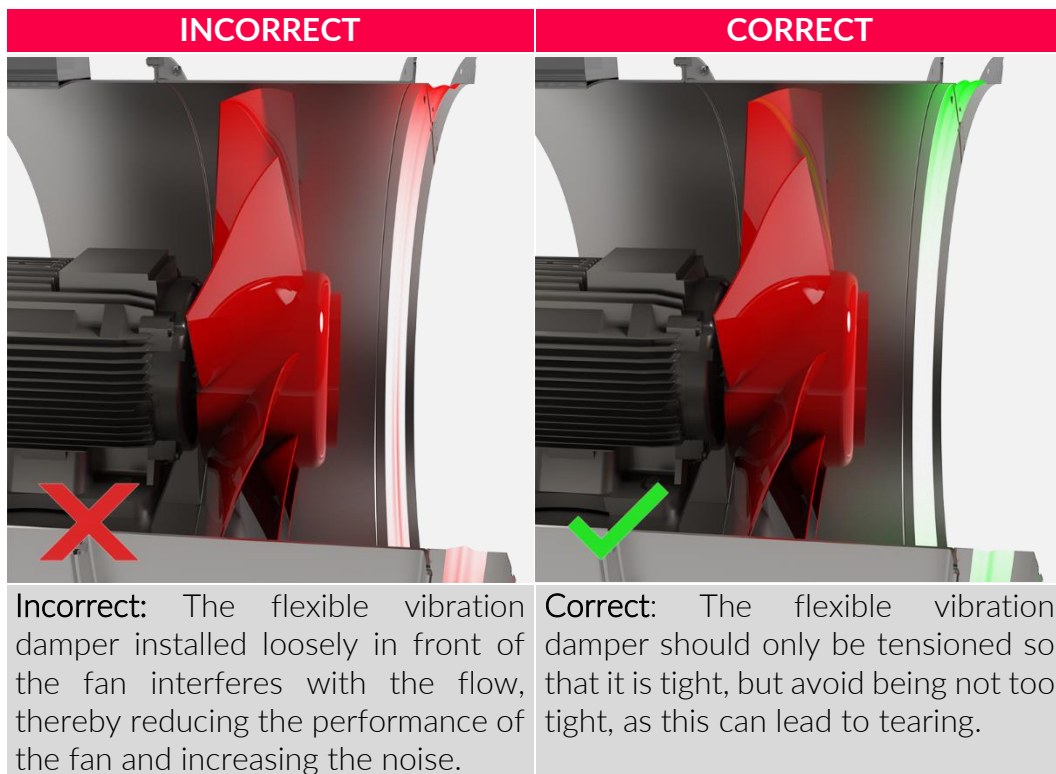
### 5.2.3 Arches and elbows before and after the fan



### 5.2.4 Cross section changes

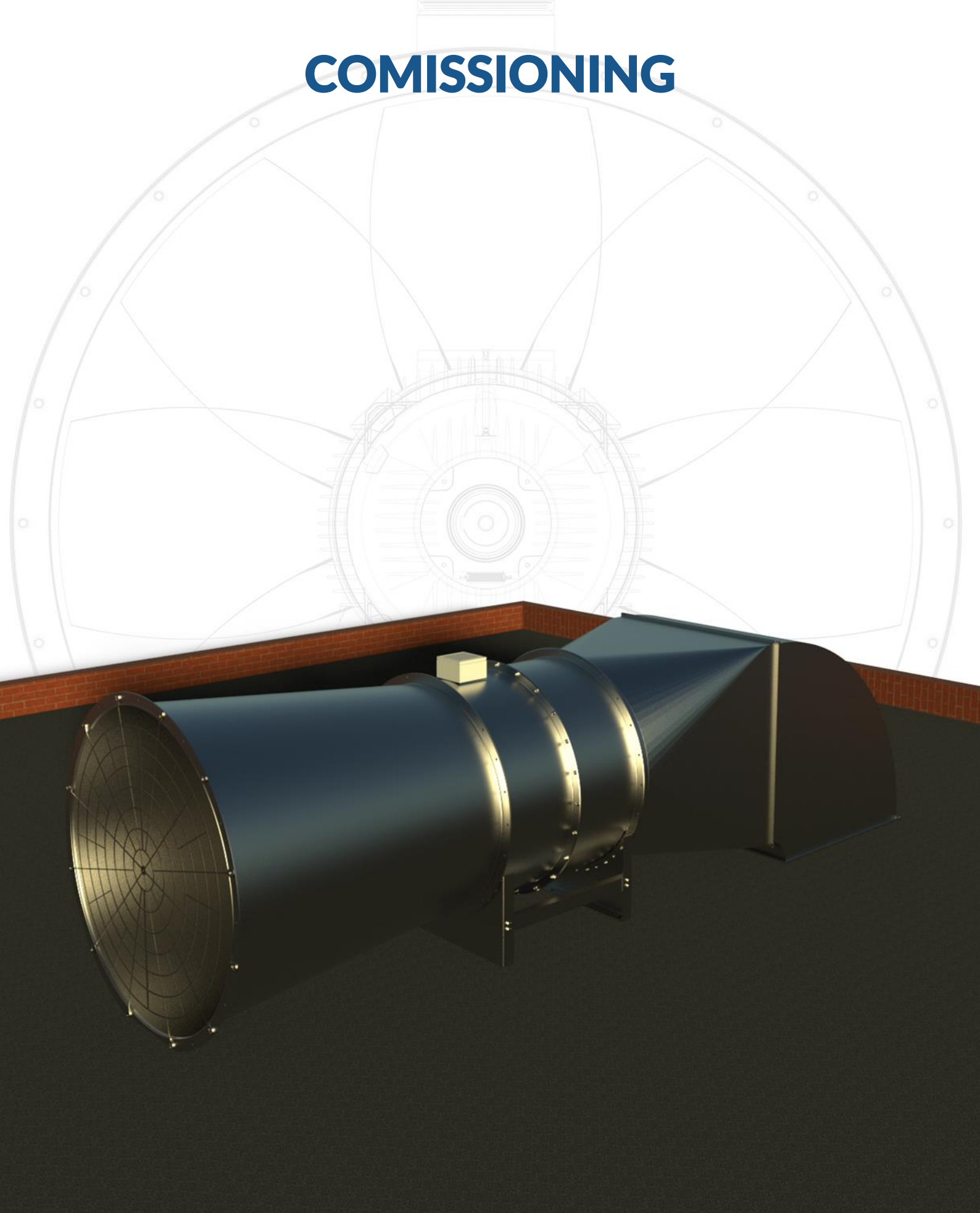


## 5.2.5 Flexible connections





# COMISSIONING



## To avoid damage to the machine and life-threatening injuries during commissioning, the following points must be observed:

- Commissioning of the machine - in compliance with safety regulations - may only be carried out by qualified personnel.
- Before starting, check that all tools and foreign objects have been removed from the machine.
- Before installation, activate all safety devices and emergency switches.
- Before installation, check the direction of rotation of the motor.
- Read the 'general safety regulation'. chapter. (2.0 points)
- The existence of the commissioning protocol is a condition of the guarantee.

### 6.1 Check before the first start

#### When installing the fan, proceed in the following order:

- Check for proper installation!
- Remove foreign objects from the suction and discharge side.
- Check that the electrical connection has been made in accordance with the factory wiring diagram and local electrical regulations.

Is the mains voltage the same as the voltage on the machine's nameplate?

Is the switch used suitable for the motor in terms of switching functions, switching conditions and switching power?

- Is the motor protection set correctly for the rated current of the motor? The adjustment must be made according to the corresponding values of the motor data plate.
- Is the motor connected correctly according to the wiring diagram? The connection of the motor must basically be carried out based on the motor data plate or on the basis of the circuit diagram attached/sent by the manufacturer.

#### Accident prevention:

To protect rotating parts from contact, a protective grid (see accessories) must be installed.

If the fan draws in or pushes to the outside, the suction or pressure opening must be equipped with a protective grid for accident prevention reasons

## 6.2 Starting the ventilator for the first time

Only put the fan into operation after it has been installed according to the specifications!

**Caution:** If the fan is installed as a roof fan, before starting it for the first time, you must check the condition of the automatic roof cap, whether it was damaged during transport or assembly, and whether the slats are working properly.

The fan cannot be operated with an improperly functioning roof cap!

- Check for correct operation (vibration, unbalance, current consumption, etc.).
- At the first start-up, the measured electrical data must be recorded in the attached "COMMISSIONING LOG". This also applies to the fan motor and the cooling fan motor.



If the fan is not operating at the correct (designed) working point (the air delivery is low or the current consumption measured per phase is higher than that stated on the data plate), then ask for the help of a specialist company or the manufacturer. In order to prevent overloading and motor burnout, measure the current consumption, the value of which must not exceed the nominal/maximum current specified on the fan's data plate. If the current consumption of the motor is higher than the value given on the data plate, the overload protection must switch off the motor!

**In emergency mode, no motor protection can work, but in this case, operating current higher than the maximum - or nominal - current specified on the data plate is also not allowed!!!**

After a longer period of operation, check the temperature of the bearings. The suction opening must always be kept free and clean! Dirt deposited on the protective grid must be removed!

Commissioning does not include adjustment, ventilation measurement, vibration control and does not exempt the contractor from the obligation to adjust. Measurements must be taken to make sure - and this must be documented in the adjustment/air-technical measurement protocol - that the operating point of the air-technical equipment (hereinafter referred to as the fan) does not fall in the unstable part of the fan's characteristic curve (the operating point of the fan can only fall in the stable part of the characteristic curve, otherwise the fan can be destroyed). It is the responsibility of the contractor to check the operating and natural vibrations of the ventilation system created during the construction of the fan and air duct network. Operation of the built-in fan at the critical vibration rate for even a short period of time can cause the fan and/or other elements of the ventilation system to break down - shatter, break its parts. In addition to commissioning and adjusting the fan, you must make sure that it will not operate in the critical speed range under any operating conditions. Have this determined by a professional. Operation at an inappropriate speed results in loss of warranty, neither the manufacturer nor the supplier accepts responsibility for damages resulting from operation.

## 6.3 Check after the first start

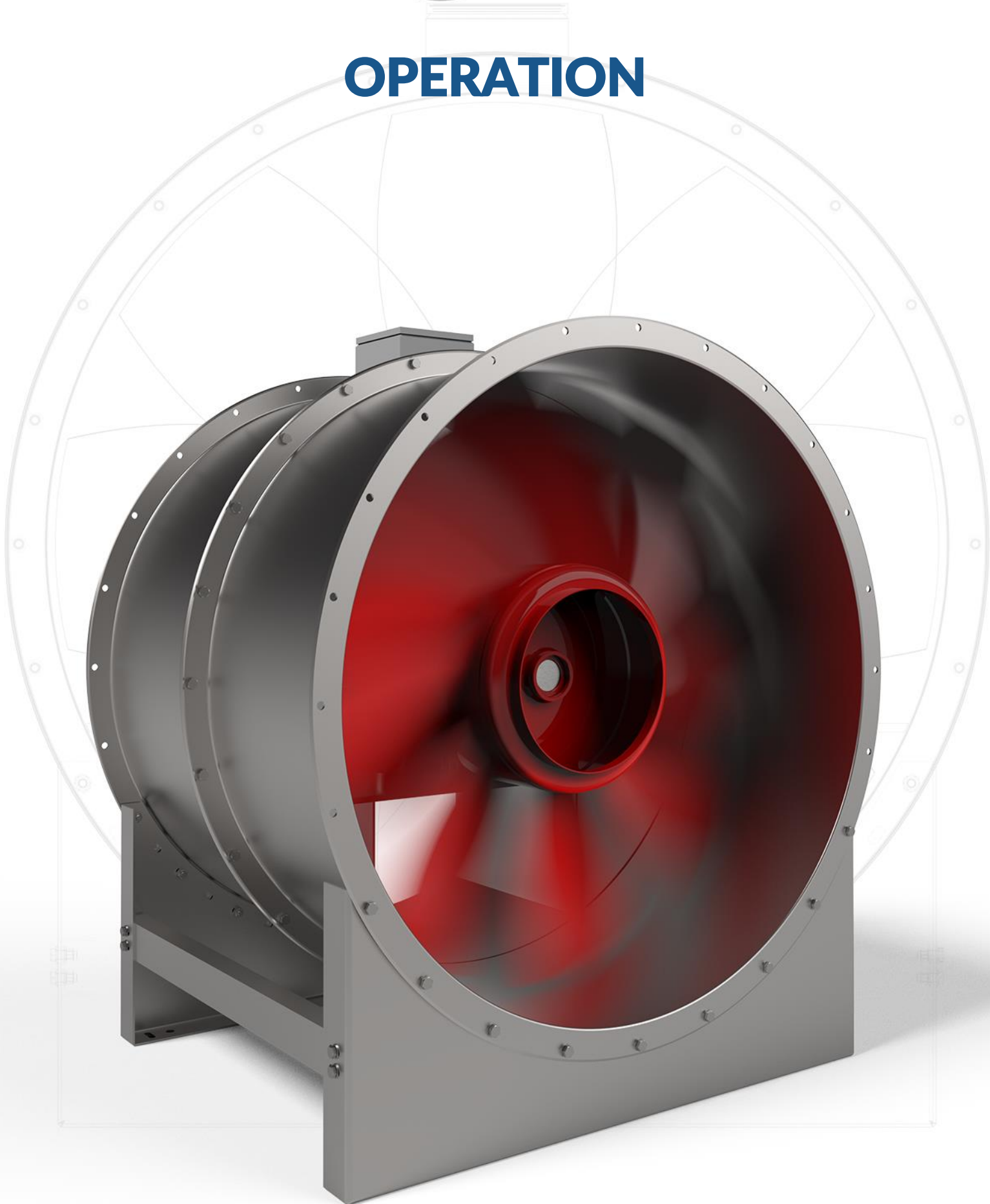
After the first start-up, check the mechanical connections, especially the fan screws.

### Contact:

Phone: +36 99 536 072 / Fax: +36 99 536 073 / E-mail: sales@hungaro-ventilator.hu



# OPERATION



During the operation of the machine, to prevent life-threatening injury to the operator and damage to the machine, the following safety advice must be observed.

Cleaning and maintenance work - in strict compliance with the operating instructions - may only be carried out by qualified personnel.

- Repair work may also only be carried out by specialist personnel - in compliance with accident prevention regulations.
- Before carrying out cleaning, repair, maintenance and other installation work, the fan must be completely disconnected from the electrical network, with a reconnection prohibition (padlock, lock, etc.) at the same time.
- Secure the area before starting operational work.
- The specified sequence of work must be followed.
- Only qualified electricians may work on electrical equipment.
- The specified tightening torque of the screws must be observed.
- Read the "general safety regulations". chapter. (2.0 points)

### **Electrical operating conditions:**

- 1) In the case of starting a motorized closing damper and a fan together, the damper must be opened in the first step. The fan should be started with an open damper, optimally with a delay of **20 seconds** - but at least **10 seconds**.
- 2) Hungaro-Ventilátor Kft.'s smoke extraction fans are certified for fire operation in accordance with the Local Fire Regulation according to the EN 12101-3 standard together with the **DANFOSS FC 102** series frequency converter. By using a frequency converter, you can save a significant amount of expensive automation elements.
- 3) The smaller STAR motor - usually under 3 kW - marked **"Y"** on the data sheet - **230/400 V (50 Hz)** - starts directly, i.e. **DOL (Direct On Line)** - its current can be found on the data sheet.
- 4) The DELTA motor with a higher power - usually above 3 kW, marked **"D"** on the data sheet - **400/690 V (50Hz)** - is usually started with star/delta (**Y/Δ**) switching in the case of a 3x400V supply voltage. In this case, the short-term current maximum is approx. the rated current of the motor. **3** times. If there is sufficient available current, direct, i.e. **DOL (Direct On Line)** starting is also possible. Its current can be found on the data sheet.
- 5) In the case of starting with a soft starter or a frequency converter, the starting current does not exceed the rated current of the motor.
- 6) **In case of fire operation, the motor protection must be disabled**, the fan cannot stop in case of overcurrent or overheating. In the case of a trial run or function test, the guarantee condition is that the motor protection is active!
- 7) In a non-fire function, the fan motor must be protected against overheating with PTC motor protection and against overcurrent with overcurrent protection. To protect the fans from overcurrent, a small circuit breaker with characteristic **"D"** or a fuse of category **"aM"** must be used! If a fuse is used, a **phase monitoring relay** must be apply to prevent phase loss. Malfunctions resulting from the lack of motor protection are not covered by the warranty.

#### **Contact:**

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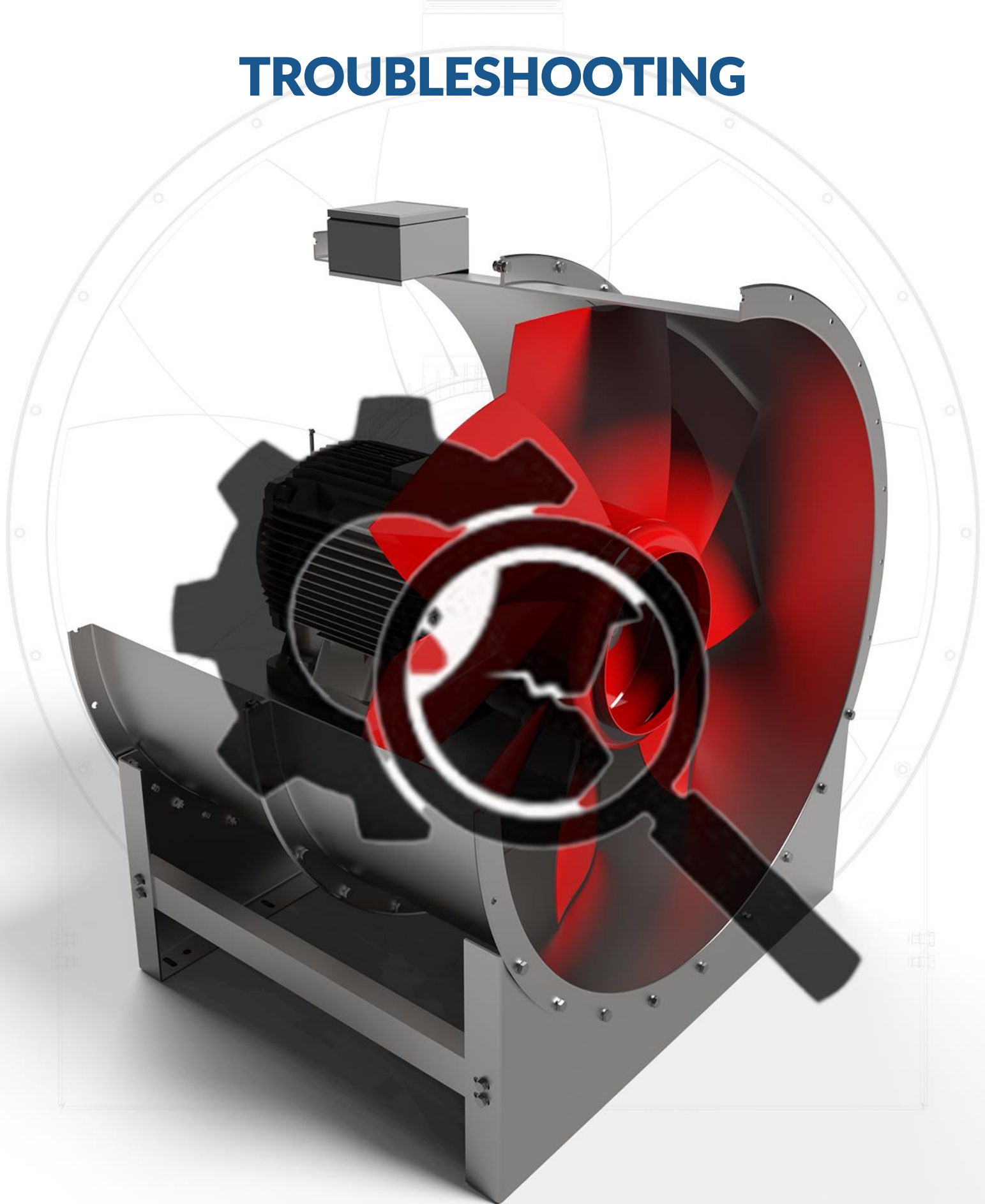
### *Application of a frequency converter:*

In case of an application of a frequency converter there is a risk of resonance on the fan, so the following points are to be applied:

- The fan must not be operated in that speed ranges where resonance occurs.
- At speeding up and slowing down, the speed of the fan should pass through the resonance ranges as quickly as possible.
- In case of an operation of various speeds, a vibration monitoring system should be used at the fan.
- The operating speed of the fan should not exceed the value given on the fan's data plate.



# TROUBLESHOOTING



## When troubleshooting, pay particular attention to the following points:

- The fault can only be eliminated by a person with appropriate professional qualifications.
- First, the machine must be secured against unintentional restart (accidental) by turning the machine's switch or closes its switch cabinet.
- Secure moving parts against rotation.
- Read the “general safety regulation” chapter. see (2.0. point)

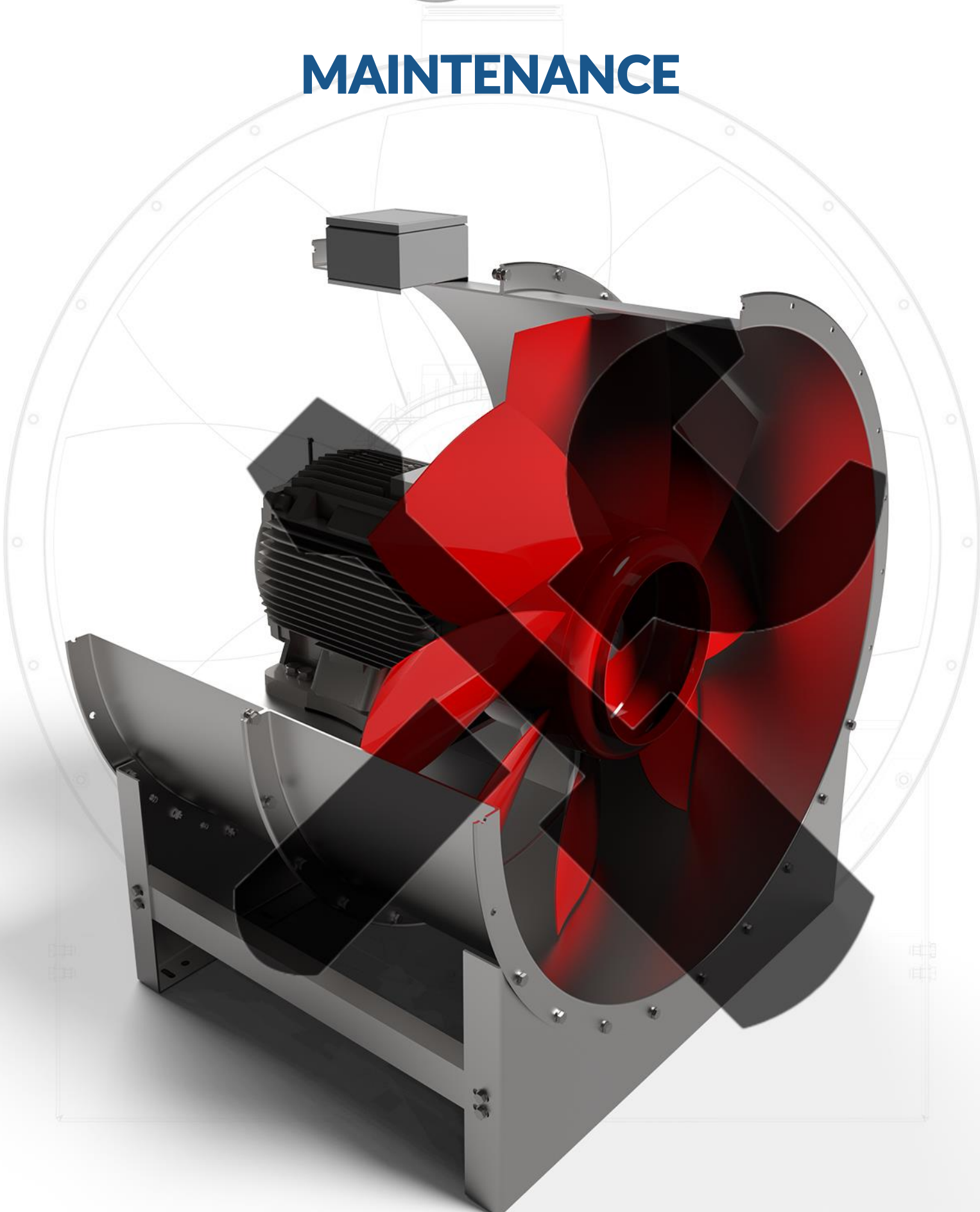
## Tabular overview of possible disturbances and help for troubleshooting:

In dual function mode, compared to the normal mode of the fan:

Failure	Cause	Elimination
The motor or motor control switches off	The motor has overheated, the thermal contact trips.	Cool down the engine. Depending on the switch, the fan restarts itself or needs to be restarted.  Check that: <ul style="list-style-type: none"> <li>• Is the delivered medium too hot?</li> <li>• Are all phases equally loaded and connected?</li> <li>• Does the fan's operation point match the selection?</li> <li>• Is the impeller jammed/stuck?</li> </ul>
	The impeller is blocked.	Turn off the fan.  Remove the obstruction. In the meantime, pay attention to the safety regulations.
	The impeller is damaged and worn.	Turn off the fan. Remove the impeller and install a new one.
	Filter or roof cap perforation is dirty	Replace or clean the filter.
	The back draft damper was installed in the reverse position.	Reverse the installation direction of the back draft damper.
The fan pumps, the air flow is interrupted periodically.	The fan works in the unfavorable characteristic curve area	Check the correct installation of the non-return valve. In case of incorrect (inverted) installation, turn it over. Reduce system resistance if possible. In case of continuous operation, the impeller of the fan will be destroyed.
Inadequate air flow	The slats of the automatic sunroof are dirty and do not open.	Turn off the fan. Carry out the necessary cleaning or repair.



# MAINTENANCE



Regarding maintenance, a distinction must be made according to the fan's function and mode of operation. (The regulations shall be applied mutatis mutandis accordingly)

## Function:

to air at normal temperature  
smoke extractor - for high temperature air

## Operating cycle:

permanent or regular operation (S1)  
emergency plant - (S2)

In order to ensure correct operation of the fan and to achieve a suitable service life, the prescribed periodic inspection and planned maintenance must also cover the accessories assembled with it. (e.g.: checking, cleaning, etc. of the slats of the automatic roof cap.)

When installing and operating the smoke removal system, the laws in force in the country in question must be observed, together with local authority regulations.

## Professional maintenance is a condition of the warranty!

### Factory Service:

Hungaro-Ventilator Kft. (H-9483 Sopronkövesd, Táncsics M. u 18.)  
E-mail: [service@hungaro-ventilator.hu](mailto:service@hungaro-ventilator.hu)  
Tel.: +36-99-536-072

## Maintenance intervals:

- for normal air ventilation fans: 3 months recommended (depending on air pollution)
- For CO and smoke removal fans: mandatory every 6 months

## Caution!

Please carry out the maintenance work in this guide at the specified intervals - failure to do so will void the warranty. It also voids the warranty and endangers the safety of operation if you do not use spare parts distributed by the manufacturer!

Dust, caustic and acidic vapors and gases mixed with the transported air flow have a natural abrasive and corrosive effect on the impeller and the housing, and can deposit. Because of these natural wear and tear, the material can wear out to such an extent that it no longer meets expectations. Uneven deposits on the impeller can cause imbalance and thus unstable running, which in turn leads to damage to the motor bearings. Deposits on the housing lead to a reduction of the free cross-section and a roughening of the housing, which adversely affects the performance data of the fan. If the inspection, which depends on the transported medium and the different operating conditions in each case, shows even a small amount of wear, then the individual parts must be cleaned in time, in case of greater wear, immediate replacement is justified.

## Before any maintenance work:

- The fan must be properly stopped and completely disconnected from the electrical network, simultaneously with reconnection prohibition (padlock, lock, etc.).
- Wait until the impeller comes to rest!
- Ensure non-restartability!
- Clean the fan.
- Clean the suction opening.
- Clean the impellers (if necessary, remove the protection against penetration).



In addition to following the prescribed safety instructions, only use commercially available cleaning agents! The use of scratching or rubbing tools that damage the surface protection is prohibited!

- Protect the engine from water jets!
- The integrity of the impeller and blades must be checked!

## General checks:

- Is lubricant leaking from the bearing?
- Is the surface protection intact? (Caution: Aggressive transported medium?)
- Unusual operating noises

**Important:** The screws of the fan (except for the screws of the electrical connection. see: Installation) and the screws for fixing the impeller must be tightened with the torque specified in the attached tables!

**Caution:** If the fan impeller is dismantled, when reassembling, pay attention to the following: Under the head of the fixing screw, place the original large flat washer and a new "Rip-lock" washer, and mount the screw with Euro-Lock type A24.20 screw securing glue.

**Caution:** The screws of the fan (with the exception of the screws of the electrical connection, see: Installation) and the screws for fixing the impeller must be tightened with the torque specified in the attached tables!

## Screws (strength class 8.8):

Screws	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20
<b>pulling torque</b> (+0% / -10%)	3,4 Nm	6,5 Nm	11 Nm	28 Nm	55 Nm	95 Nm	155 Nm	230 Nm	275 Nm	385 Nm

The given values refer to galvanized screws and non-oiled screw joints only !!

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Phone: +36 99 536 072 / Fax: +36 99 536 073 / E-mail: sales@hungaro-ventilator.hu

## Engine Bearings check:

- The use of diagnostic tools is recommended
- Frequency: During maintenancel

**Caution:** The electric motor may only be dismantled by the manufacturer or a specialist company designated by the manufacturer!

In the event of a limited motor fault, notify the manufacturer or distributor of the fan! De-energize the fan motor at the same time as reporting the error, but do not disconnect the wiring, leave it unchanged.

**By disassembling the engine, the operator assumes all legal consequences!**

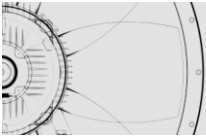
Commissioning of the machine - in compliance with safety regulations - may only be carried out by qualified personnel!

## Steps of Comission:

- Commissioning of the machine - in compliance with safety regulations - may only be carried out by qualified personnel.
- Before starting, check that all tools and foreign objects have been removed from the machine.
- Reinstall protection against intrusion
- Before installation, activate all safety devices and emergency switches.
- Before installation, check the direction of rotation of the motor.
- Read carefully the "General safety regulations". chapter. (2.0 points)

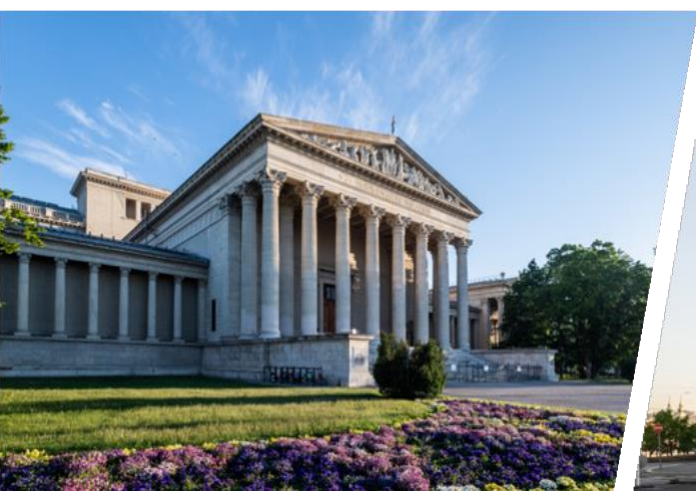
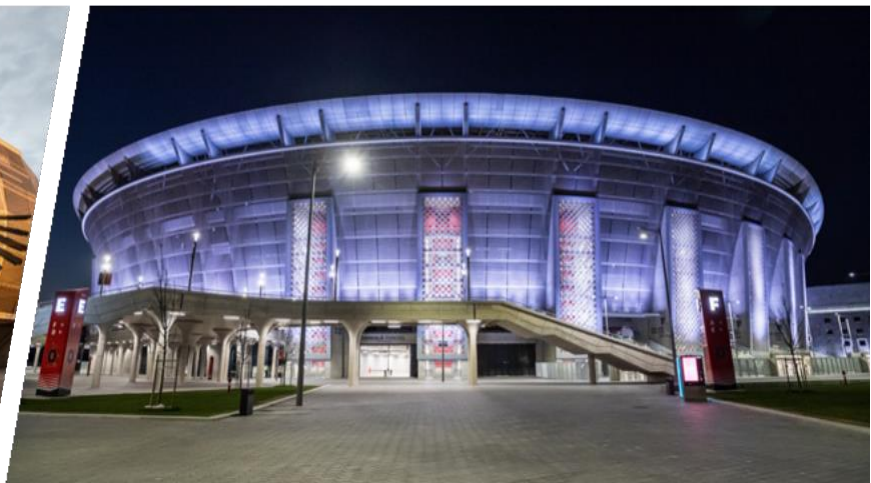
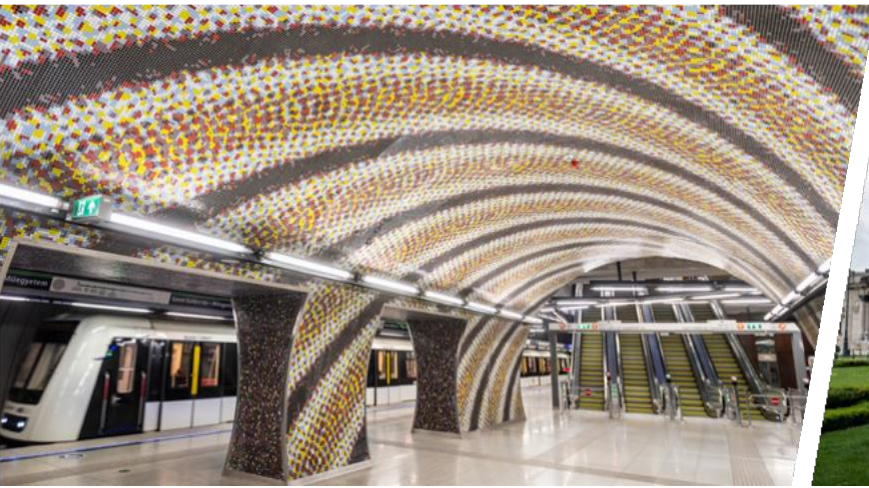
## Thank You for your attention!

We trust that the above instructions will help and support you in your work and that the equipment will operate as intended.



**They chose us:**

- ✓ Elysium Residential Park
- ✓ M4 Metro Budapest
- ✓ Széchenyi Bath
- ✓ Groupama Arena
- ✓ Puskás Stadium
- ✓ Museum of Fine Arts
- ✓ Hungarian Academy of Science

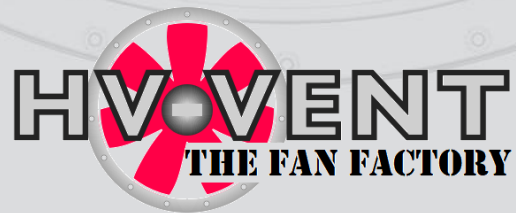
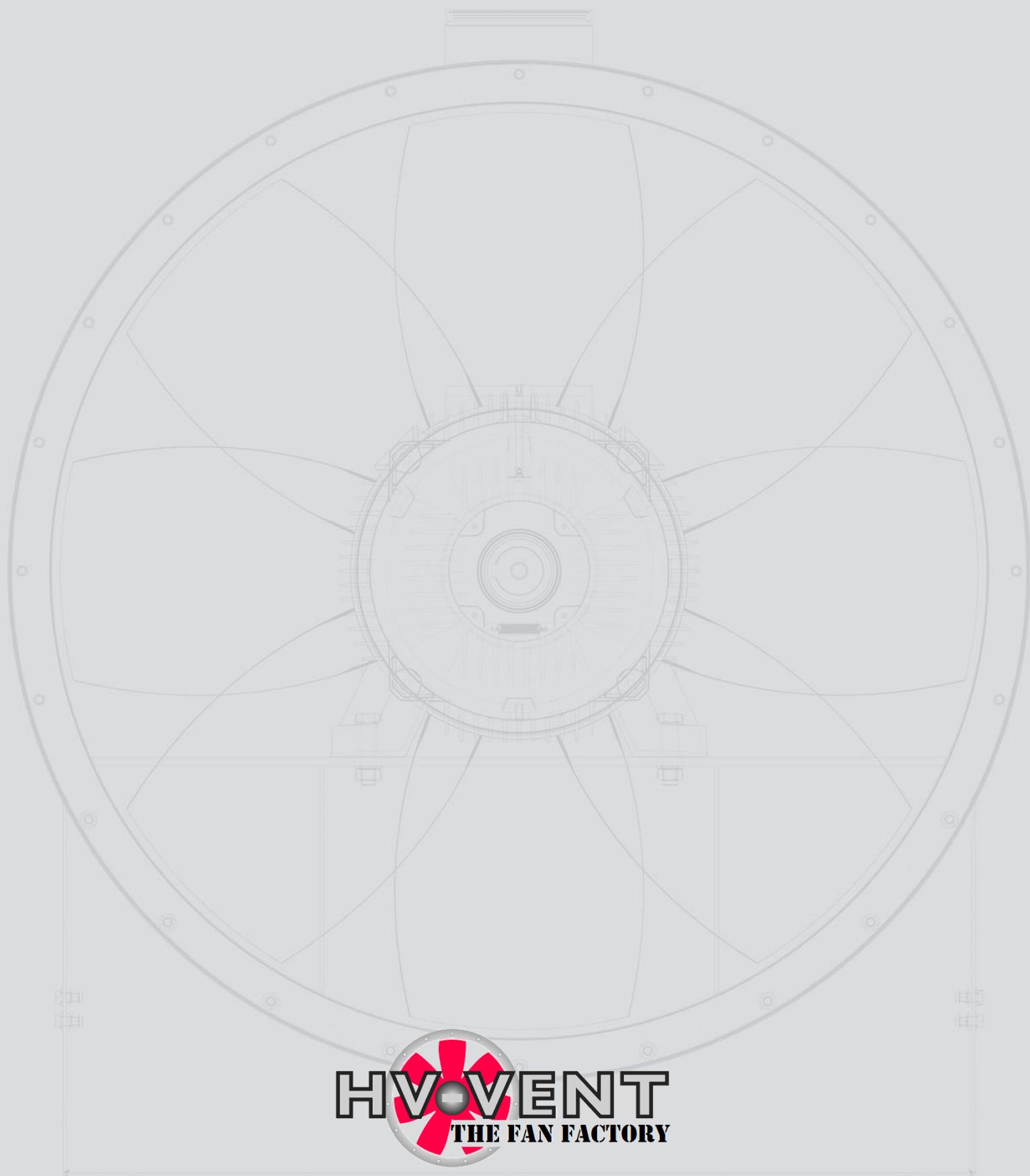




### Why choose us?

- ✓ We believe in the power of quality: due to the reliability of our products, the number of complaints is minimal
- ✓ Adherence to the delivery deadline is a basic requirement for the company
- ✓ Our products have outstanding price
- ✓ In addition to design and installation expertise, we also have the appropriate manufacturing tools
- ✓ Our products meet all comfort and technological, air-conditioning requirements, as well as modern, energy-saving and aesthetic
- ✓ The product innovation is continuous
- ✓ Thanks to the large stock, we can ensure a short delivery time
- ✓ Our excellent and recognized professionals are available to our clients
- ✓ All equipment's accessories are self-manufactured
- ✓ Our unique VentiCalc fan selection software for our business partners is connected to the main manufacture software, so there is no unnecessary lead time, thus the production time is shortened





[www.hungaro-ventilator.hu](http://www.hungaro-ventilator.hu)