

BVHA SMOKE EXTRACTION AXIAL FAN

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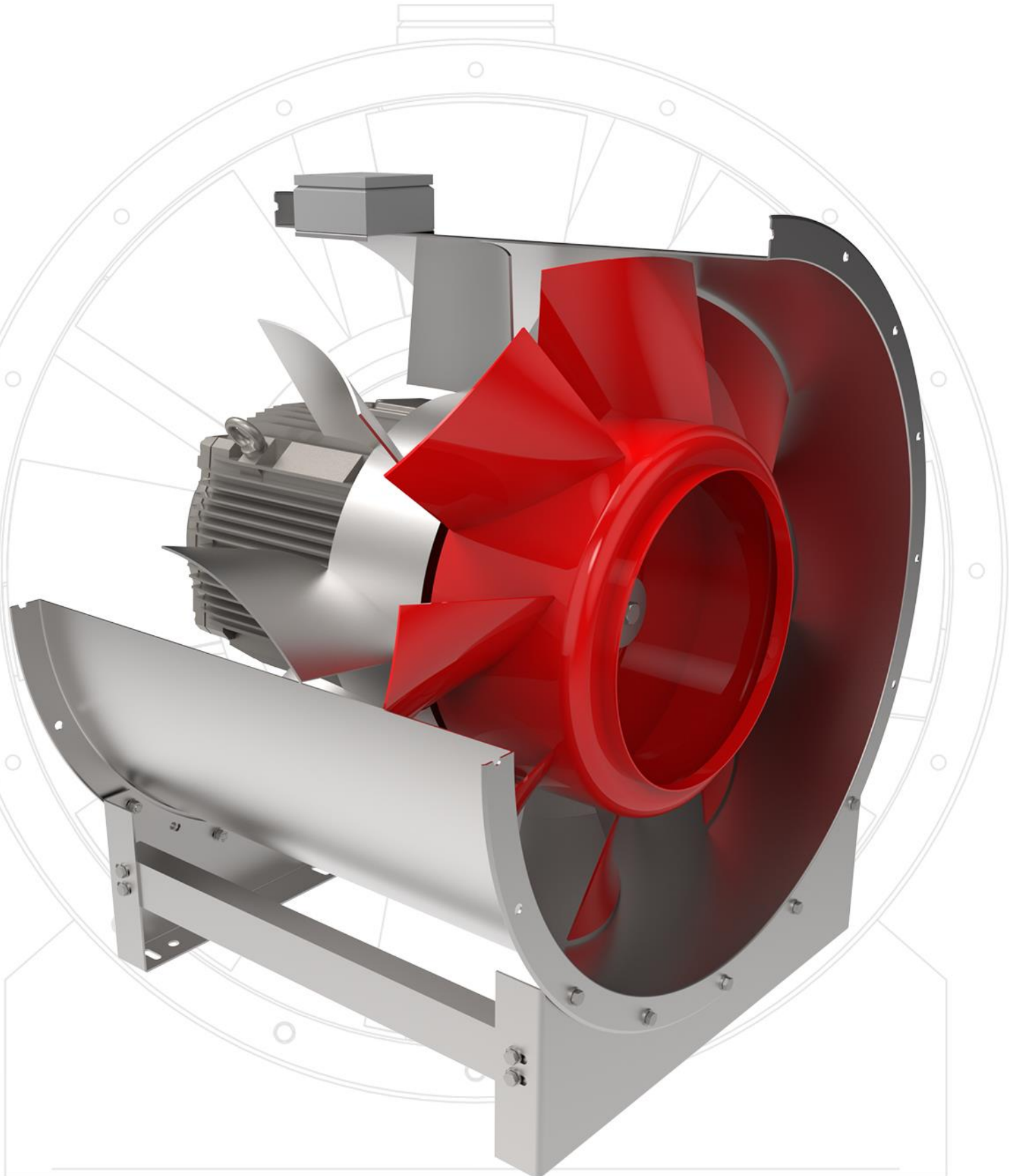
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PRODUCT DESCRIPTION



1.1 - Type designation

BVHA 355-8-23°-2

400°C / 120 min.

BVHA	=	Smoke extraction fan
355	=	Fan factory size
8	=	Impeller blade number
23°	=	Impeller Blade angle
2	=	Motor pole number
400°C/120min.	=	F400 (Class according to EN 12101-3; 2006-4)

1.2 - Intended use

The BVHA 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. BVHAD roof ventilators are used for safe emergency ventilation from a room through the roof. Roof fans usually have an air duct on the side of the building, but they can also be operated outdoors with the suction side. In the case of a free suction side, it can only be operated with a suitable protective grid!

The manufacturer selects the equipment according to its design - axial fan or roof fan - and its function, taking into account the applicable regulations of the European Union on energy consumption (ErP directives). These are recorded on the data sheet issued for the equipment and, in the case of an order, on the data plate on the equipment. The equipment may only be operated according to the conditions specified on the data plate.

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 +40 °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.

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:

BVHA smoke extraction axial fan:

- Function: Heat-resistant design F400 (+400°C/120 minutes); F300 (+300°C/60 minutes); F200 (+200°C/120 minutes); Not classified +300°C/120 minutes
- Pressure: The atmospheric pressure at all times
- 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.

They are suitable for transporting the following media:

- clean air; max. 1.2 kg/m³; 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.
- Media with temperatures between -20 +40 °C, equipped with F400 ISO H, F300 ISO H, F200 ISO F motor
- For CO ventilation of garages

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.

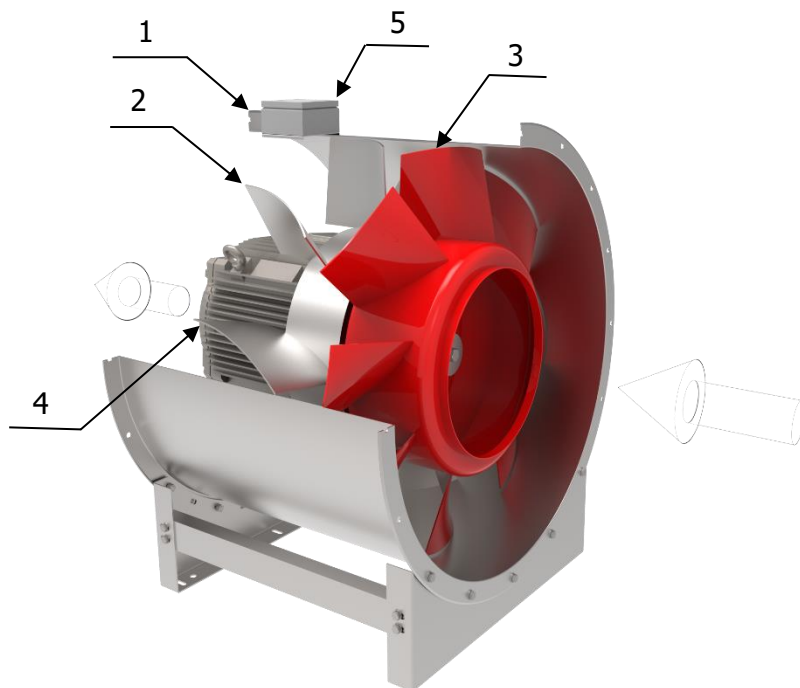
Installation conditions for a roof fan:

- Roof ventilators fitted with a DL type roof cap are suitable for extraction only.
- The fan unit must be placed on the roof on a plinth element corresponding to the base plate.
- The minimum plinth height: 280 mm
- The edge of the plinth must be horizontal and smooth, with a smooth closing edge.
- A sealing strip must be placed between the plinth and base plate.
- The clamping screws of the base plate must also be sealed.
- It is recommended to insulate the inner surface of the base plate from the inside to avoid unwanted condensation.
- The part under the roof can be connected to a pipeline or air duct with the available accessories.

1.3 - Structure

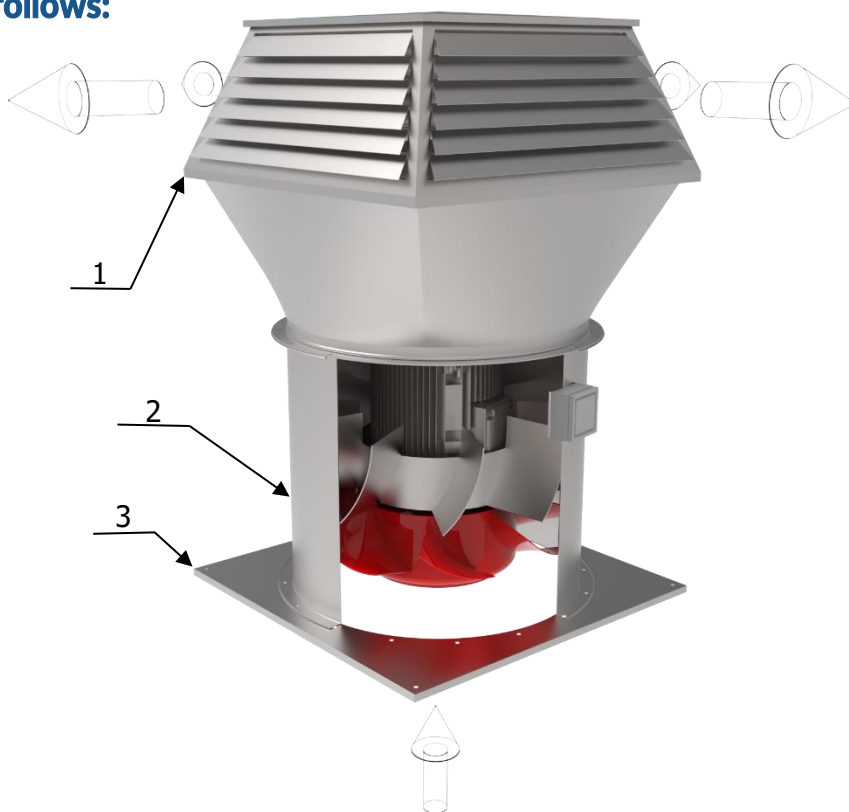
The main parts of the axial fan are as follows:

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

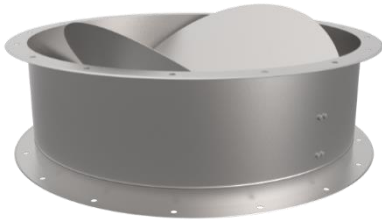


The main parts of the roof fan are as follows:

- 1) Roof cap (DL type)
- 2) Axial fan
- 3) Base plate



1.4 – Optional accessories



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



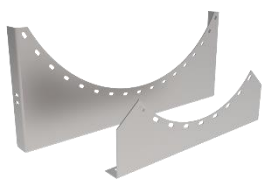
Diffuser



Inlet cone



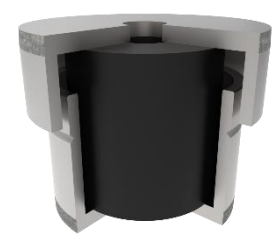
45° intake or exhaust
idom with protective grid



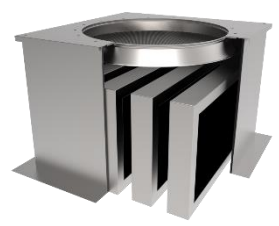
Mounting Feet



Bracket for vertical installation



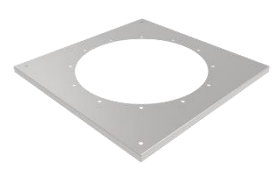
Heat-resistant vibration absorber



Roof silencer socket



Thermally insulated Roof Socket



Insert Plate



Lamellar Roof Cup
(DL Type – for exhaust only)



1.5 – General description

The BVHA and BVHAD fans are solidly constructed, welded devices. 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, which was included in the construction to optimize air flow. The central part of the guide vane is also the engine mount. 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, barckets 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). 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 electric motor is an asynchronous, alternating current, peripheral motor with at least IP 55 protection. The aluminum 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 (DIN 4102-12).

The BVHAD roof fan is made by assembling a vertical axis BVHA axial fan with a base plate and a roof cap. The base plate can be ordered in several sizes according to the size of the plinth element, it is a supporting structure made of galvanized sheet, which allows the BVHA fan to be attached to the supporting plinth.

The BVHAD roof fan can be ordered with a **DL type roof cap**.

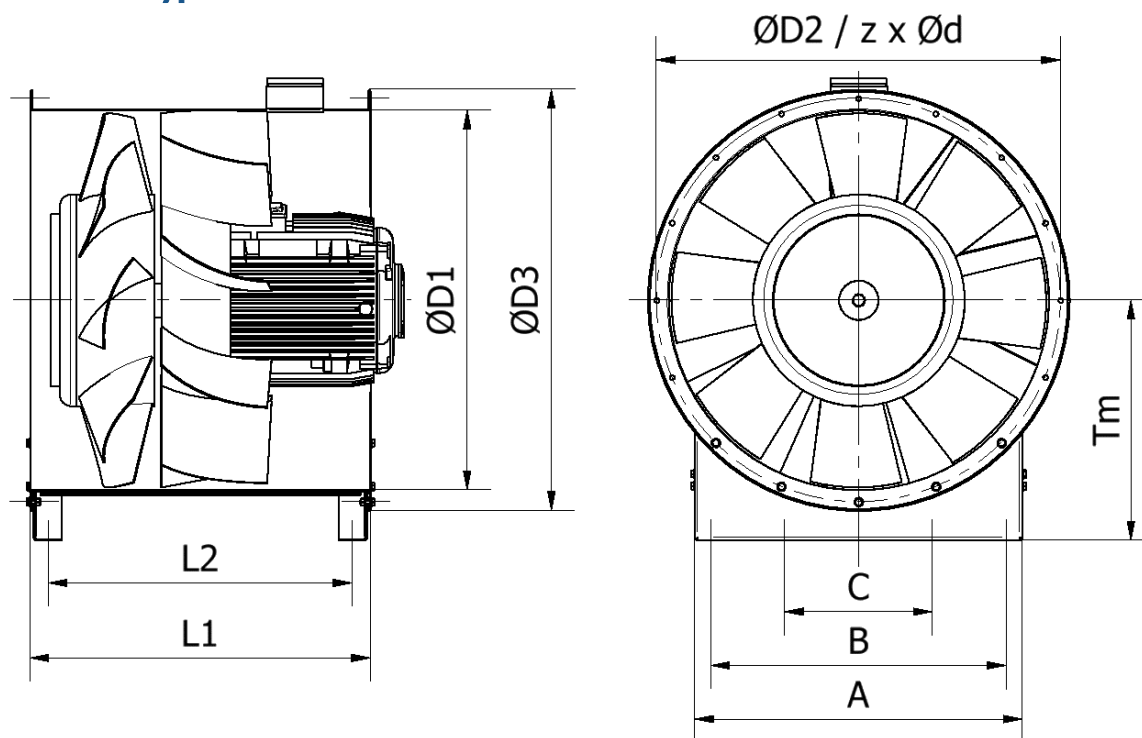
1.6 – Functional description

The BVHA axial fan draws in air from the intake side through the rotating impeller, which it transports in the axial direction through the trailing vane, through the engine to the exhaust side. The engine is in the air stream that cools it.

The BVHAD roof ventilator must be installed on the roof of the building in a vertical axis position. Suitable for smoke extraction.

1.7 - Size range

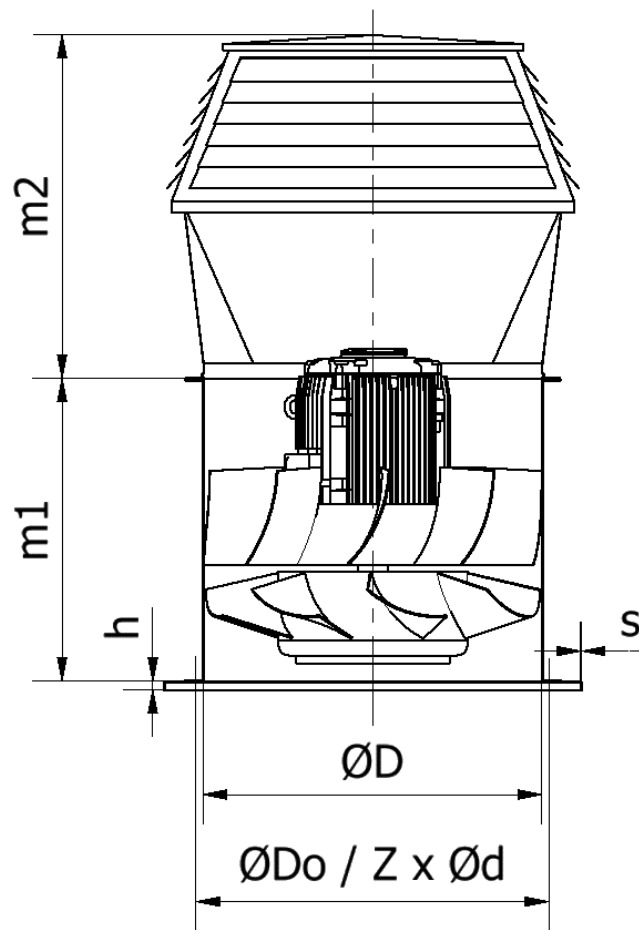
Size range of BVHA Type:



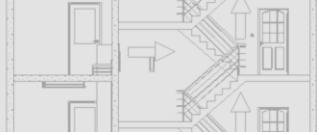
Nominal diameter (mm)	ØD1 (mm)	ØD2 (mm)	ØD3 (mm)	L1 (mm)	L2 (mm)	A (mm)	B (mm)	C (mm)	Tm (mm)	Ød1 (mm)	z (pcs)
315	315	356	395	425	375	315	260	130	210	12	8
355	356	395	436	425	375	355	300	150	230	12	8
400	400	438	480	425	370	400	340	170	255	12	12
450	450	487	530	425	370	450	400	200	280	12	12
500	500	541	580	425	365	500	440	220	315	12	12
560	557	629	669	520	460	560	500	250	360	14	16
630	634	698	744	520	450	630	560	280	405	14	16
710	710	775	820	525	450	710	640	320	450	14	16
800	794	861	904	525	450	800	720	360	500	14	16
900	907	958	1017	900	825	900	820	410	580	14	16
1000	1001	1067	1111	900	825	865	780	390	635	14	16
1120	1114	1200	1234	895	815	1024	940	470	775	14	16
1250	1256	1337	1376	895	815	1228	1120	560	815	14	24
1400	1401	1491	1521	1040	940	1367	1260	630	894	14	24
1600	1589	1663	1709	1040	945	1550	1440	720	994	14	24

- BVHA F200: Ø450-Ø1600
- BVHA F300: Ø560-Ø1600
- BVHA F400: Ø315-Ø1400

Size range of BVHAD Type:



Nominal diameter (mm)	ØD (mm)	ØDo (mm)	m1 (mm)	m2 (mm)	s (mm)	h (mm)	Z x Ød (pcs x mm)
315	315	356	425	-	2	25	8 x M10
355	356	395	425	750			8 x M10
400	400	438	425	750			12 x M10
450	450	487	425	750			12 x M10
500	500	541	425	780			12 x M10
560	557	629	520	840			16 x M12
630	634	698	520	855			16 x M12
710	710	775	525	875			16 x M12
800	794	861	525	910			16 x M12
900	907	958	900	940			16 x M12
1000	1001	1067	900	985			16 x M12
1120	1114	1200	895	1150			16 x M12
1250	1256	1337	895	1470			24 x M12
1400	1401	1491	1040	1600			24 x M12



About our Company:

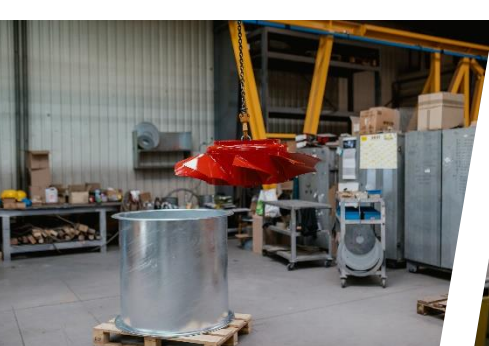
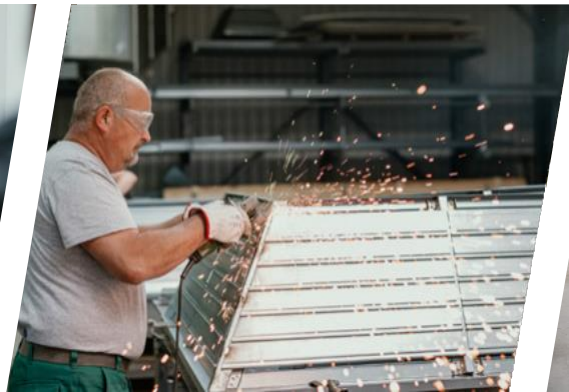
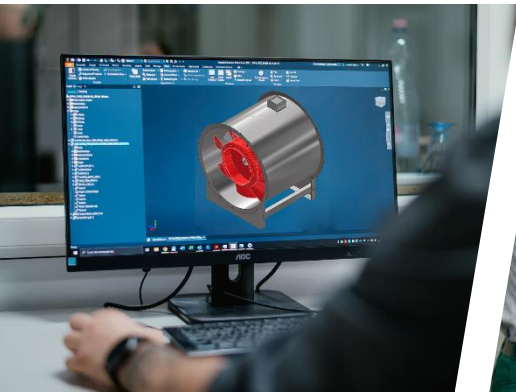
The name of Hungaro-Ventilator Ltd. is now completely connected to quality and expertise.

Our company was founded in 2005, now has 50 employees and manufactures smoke extraction and emergency ventilation equipments in Sopronköves on 6.500 m² 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

BVHA and BVHAD 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.

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:

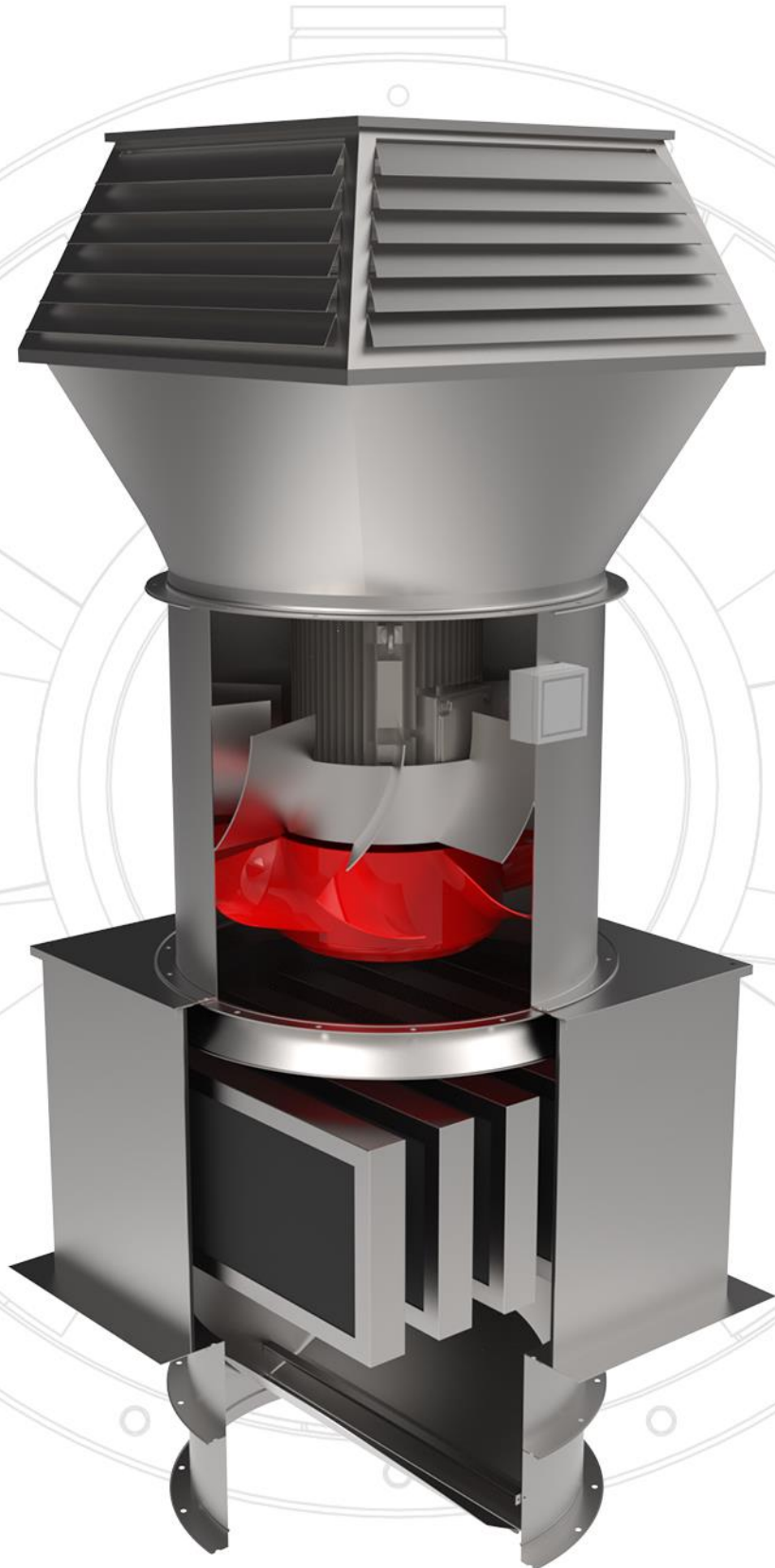
- Do not hold the rotating impeller; do not attempt to apply the brakes manually during maintenance work.
- In the case of open suction operation, the operating personnel should always wear closed clothing, because the high air flow can suck in loose clothing and light items of clothing.
- Any larger 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 BVHA 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. In the case of dual-function operation, spring support is required, but not in the case of single-function operation. **Attention:** 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!)

BVHAD roof fans are installed on the roof and only in a vertical position. The fan structure is connected to the plinth element on the roof by fixing screws through an intermediate plate. The plinth can be built (concrete, ytong, etc.) or steel in the case of factory accessories.

3.3 – Suction and discharge side connections

If BVHA 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.

When using BVHAD as a roof fan, the installation of the automatic roof cap is a prerequisite.

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 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. The relevant standards (DIN 4102-12) and the laws in force and prescribed by local authorities must be taken into account when choosing the cable type, the installation method used and the contact protection solution.

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. The fan motor has been selected to transport media with a density of 1.2 kg/m³!

3.6 – Roof fan assembly variations – BVHAD types





Roof Silencer Sockets:

		
<p>Plinth package "A"</p> <p>BVHA fan with Automatic Roof Cap, Roof Silencer Socket with Inlet cone and automatic shut-off damper</p>	<p>Plinth package "A1"</p> <p>BVHA fan with Automatic Roof Cap, Roof Silencer Socket with Inlet cone and insert plate</p>	<p>„Plinth package "C".</p> <p>BVHA fan with Automatic Roof Cap, Roof Silencer Socket with Inlet cone</p>

Thermally insulated plinth elements:

			
<p>Plinth package "E1"</p> <p>BVHA fan with Automatic Roof Cap, with thermally insulated plinth element, and with Inlet cone.</p>	<p>Plinth package "E2"</p> <p>BVHA fan with Automatic Roof Cap, with thermally insulated plinth element.</p>	<p>Plinth package "F"</p> <p>BVHA fan with Automatic Roof Cap, with thermally insulated plinth element and with automatic shut-off damper.</p>	<p>Plinth package "Zs"</p> <p>BVHA fan with Automatic Roof Cap, with thermally insulated plinth element és motorized damper.</p>

Built-in plinth elements:

			
<p>Plinth package "G1"</p> <p>BVHA fan with Automatic Roof Cap, with built-in plinth elements and Inlet cone.</p>	<p>Plinth package "G2"</p> <p>BVHA fan with Automatic Roof Cap, with built-in plinth elements.</p>	<p>Plinth package "H1"</p> <p>BVHA fan with Automatic Roof Cap, with built-in plinth elements and automatic shut-off damper.</p>	<p>Plinth package "H2"</p> <p>BVHA fan with Automatic Roof Cap, with built-in plinth elements, inlet cone and automatic shut-off damper.</p>



TRANSPORTATION AND STORAGE

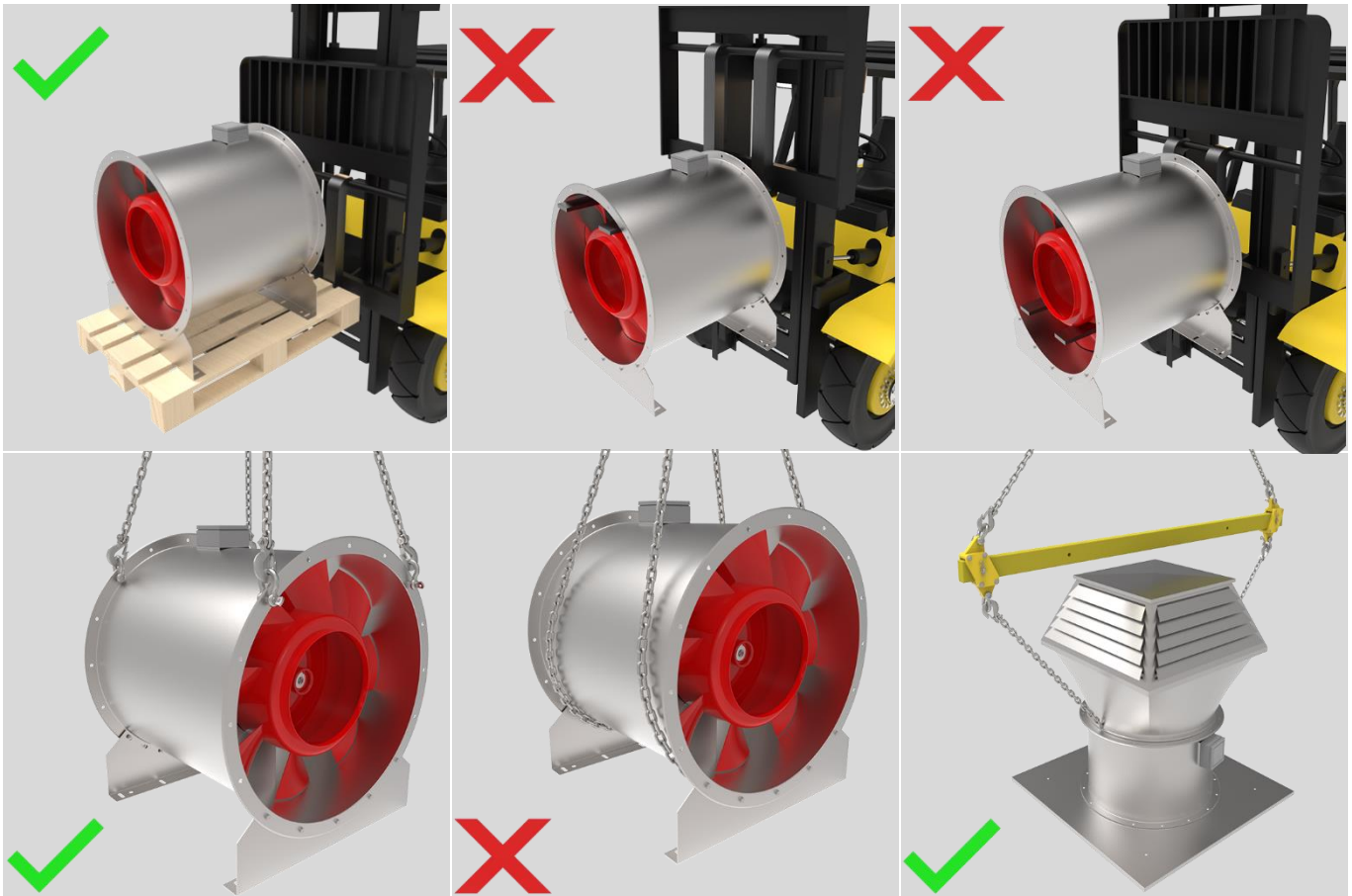


4.1 – Transportation

The fans are delivered fixed on a pallet. BVHAD roof 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 1MΩ when measured with a DC voltage of 500V, in a cold state (MSZ EN 60204-1: 1995). If the measured value is less than 1 MΩ, the fan must be dried, and the manufacturer must be informed immediately.

4.3 - Dimensions

See chapter "Size range" (1.7. point)



ASSEMBLING





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.
- The installation position must match the one specified in the order.
- In the case of **BVHAD** roof ventilators, at the connections under the roof, if there is a return valve, pay attention to the direction of installation (the slats should open upwards).



Warning: 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".

- Due to the smoke extraction function, electric motors have PTC. However, in the case of dual-function equipment, **the fan must be equipped with external motor protection for normal operation, which is also a condition of the warranty.** However, with such an installation method, if the fan operates in smoke extraction mode, these protections must be disabled!
- If the connection of the motor deviates from this function, the legal consequences of the resulting damages will be transferred to the operator, and neither the manufacturer nor the distributor will be charged from now on.

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 you should consider the following:

- Foreign objects 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.
- When connecting the motor, the supply cable must be provided with a separate glass fiber insulating tape (heat resistance grade: F-155) on the section between the gland of the terminal box and the terminal strip (with the wires exposed)!

Wiring diagrams:

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

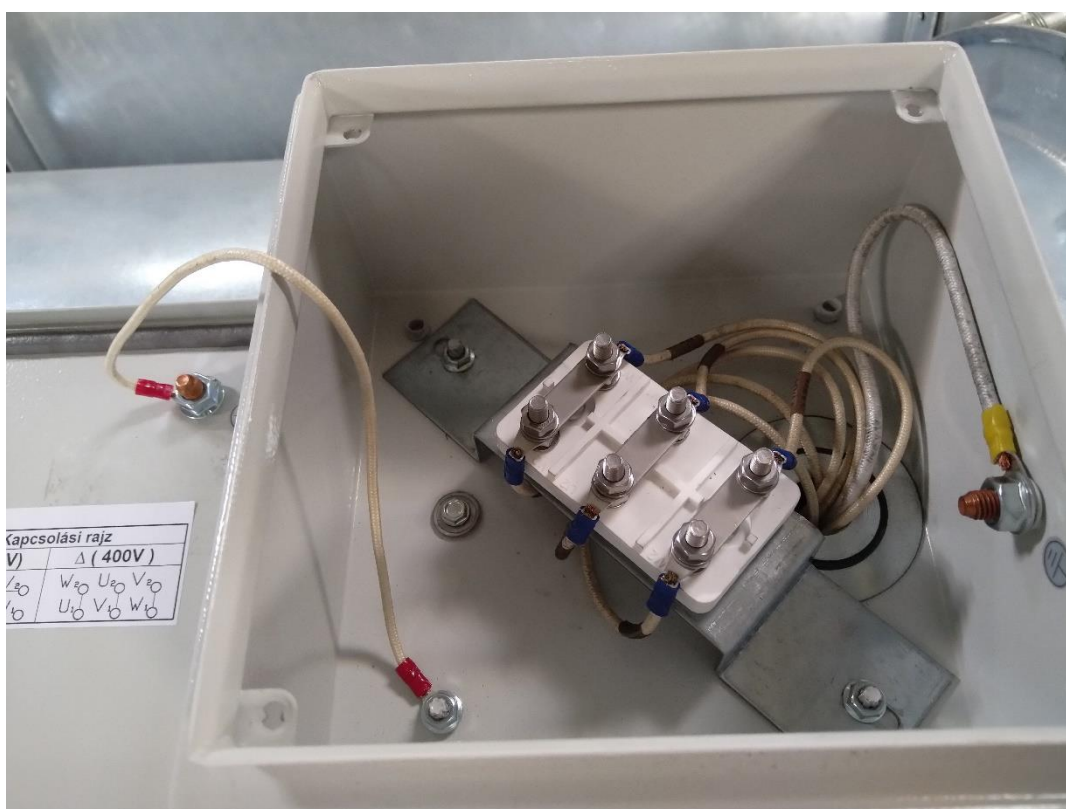
	Wiring diagram	Pole number	Motor voltage	Remarks
C	<p>High speed</p> <p>YY</p>	2/4 4/8 6/12	~400 V	3x400V two-turn motor, with Dahlander coil
	<p>Low speed</p> <p>Y</p>			
D	<p>High speed</p> <p>Y</p>	4/6 6/8 8/12	~400 V	3x400V two-turn motor with split winding
	<p>Low speed</p> <p>Y</p>			
E	<p>Rotating clockwise</p> <p>L1 C N</p>	2 4 6	~230 V	1x230V motor
	<p>Rotating counter-clockwise</p> <p>L1 N</p>			

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

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. Tightening of the nuts is done with appropriate resistance, considering 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

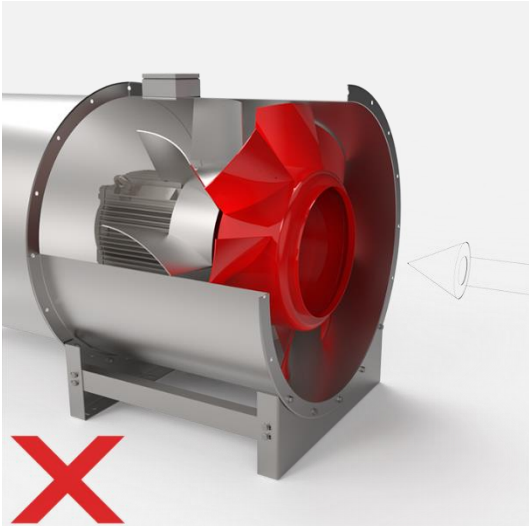
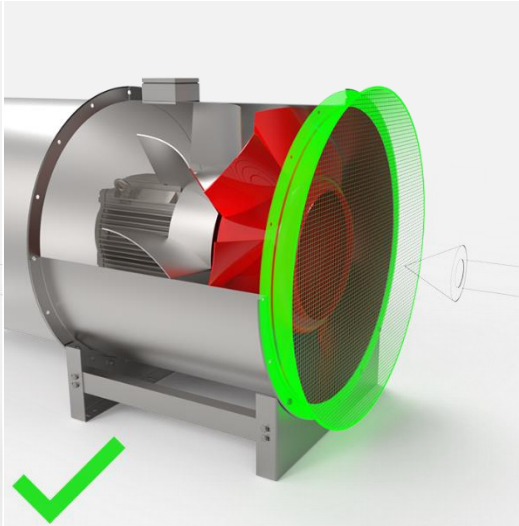
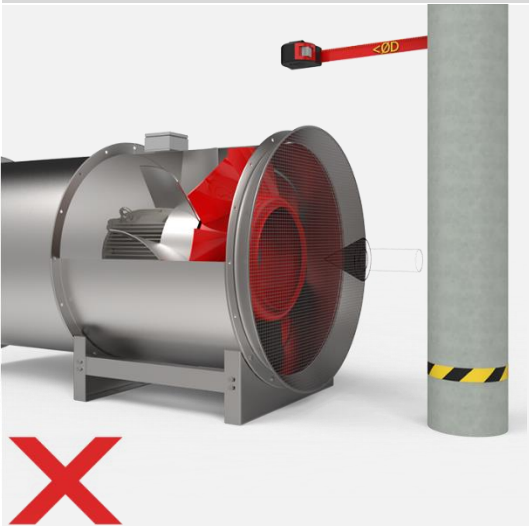
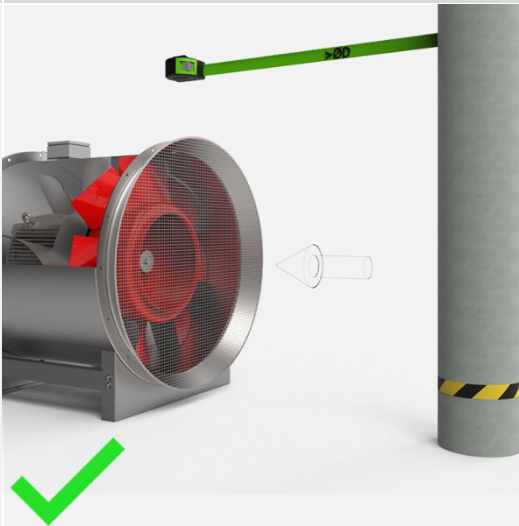


Exceeding the specified torque values can lead to breakage of the terminal strip! We are not responsible for damages resulting from improper tightening of the nuts!

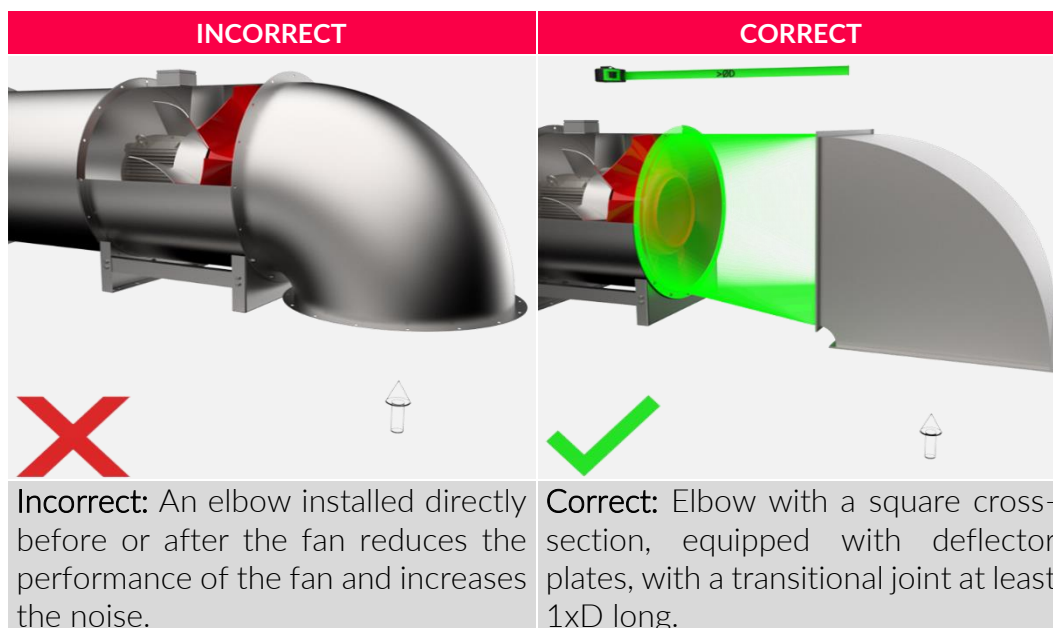
5.1 - Common installation errors

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

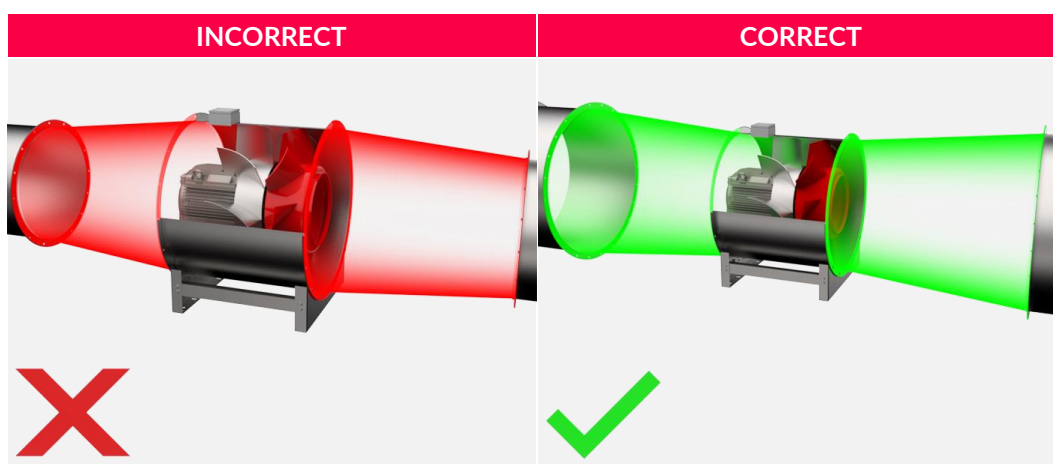
5.1.1 Inflow

INCORRECT	CORRECT
	
<p>Incorrect: 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>Correct: In the case of free suction, a suction pipe must be installed in front of the fan.</p>
	
<p>Incorrect: There is an obstacle near the inlet side, the performance decreases, the impeller may be damaged.</p>	<p>Correct: In the case of free intake, min. before the fan. 1xD free space must be provided.</p>

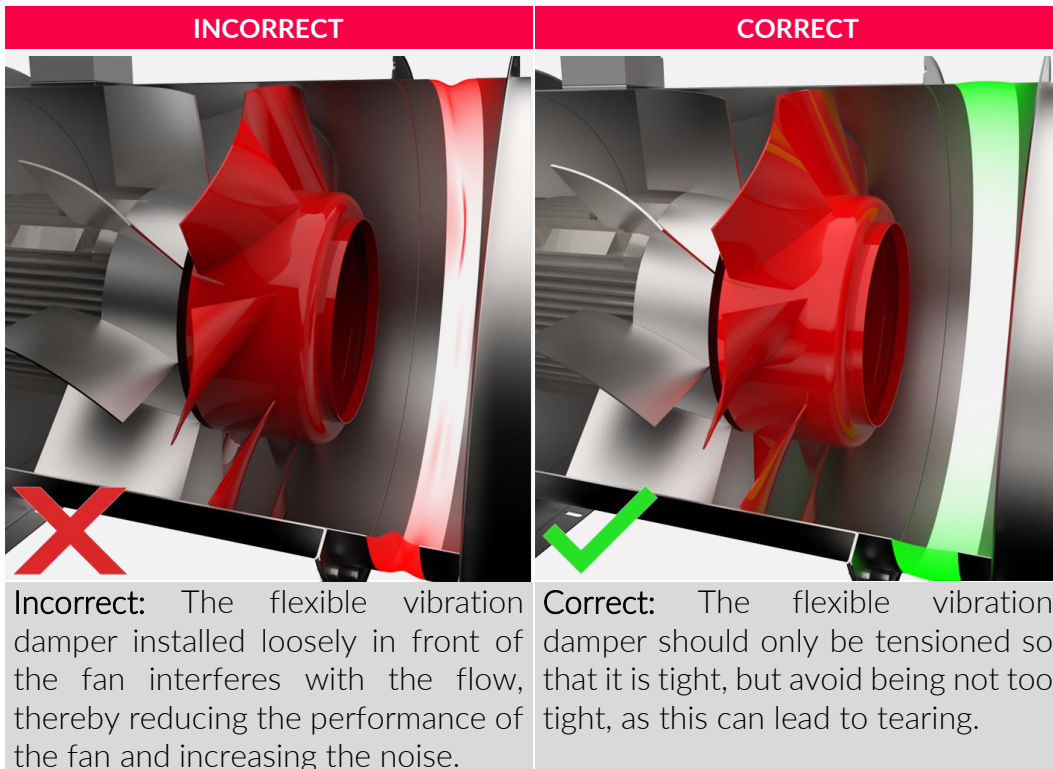
5.1.3 – Arches and elbows before and after the fan



5.1.4 – Cross section changes

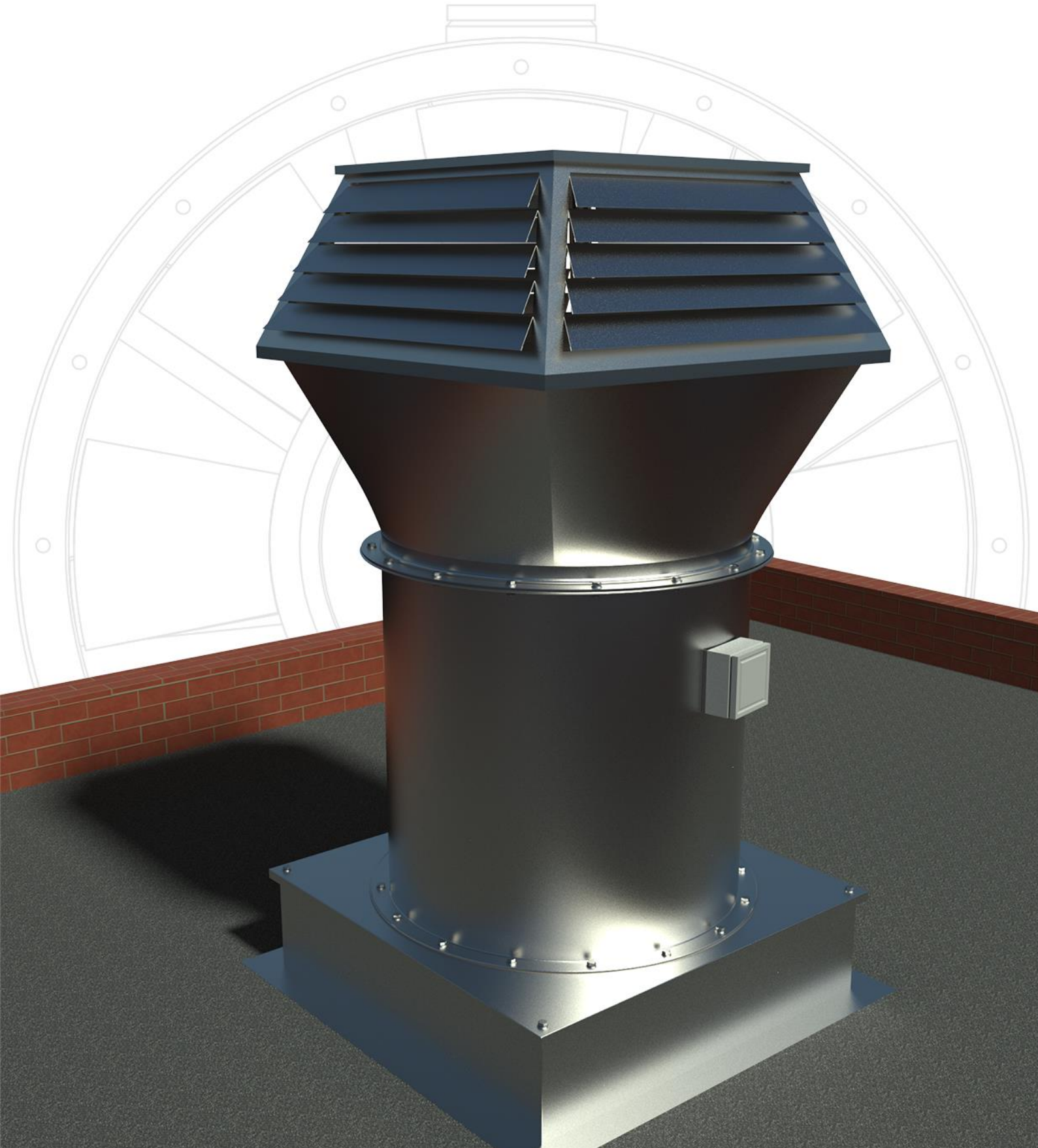


5.1.5 – Flexible connections





COMMISSIONING



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 performance?
- 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. **Motor protection is allowed only in the case of dual-function applications, in normal operating mode, or required! It cannot be used in the smoke extraction function, it cannot stop the operation of the fan!**
- 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 based on 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 if it has been installed in accordance with the specifications!

Warning: 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.).



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. This can only be used if a dual-function fan is installed and can only work in normal mode!! **No engine protection can work in emergency mode!!!**

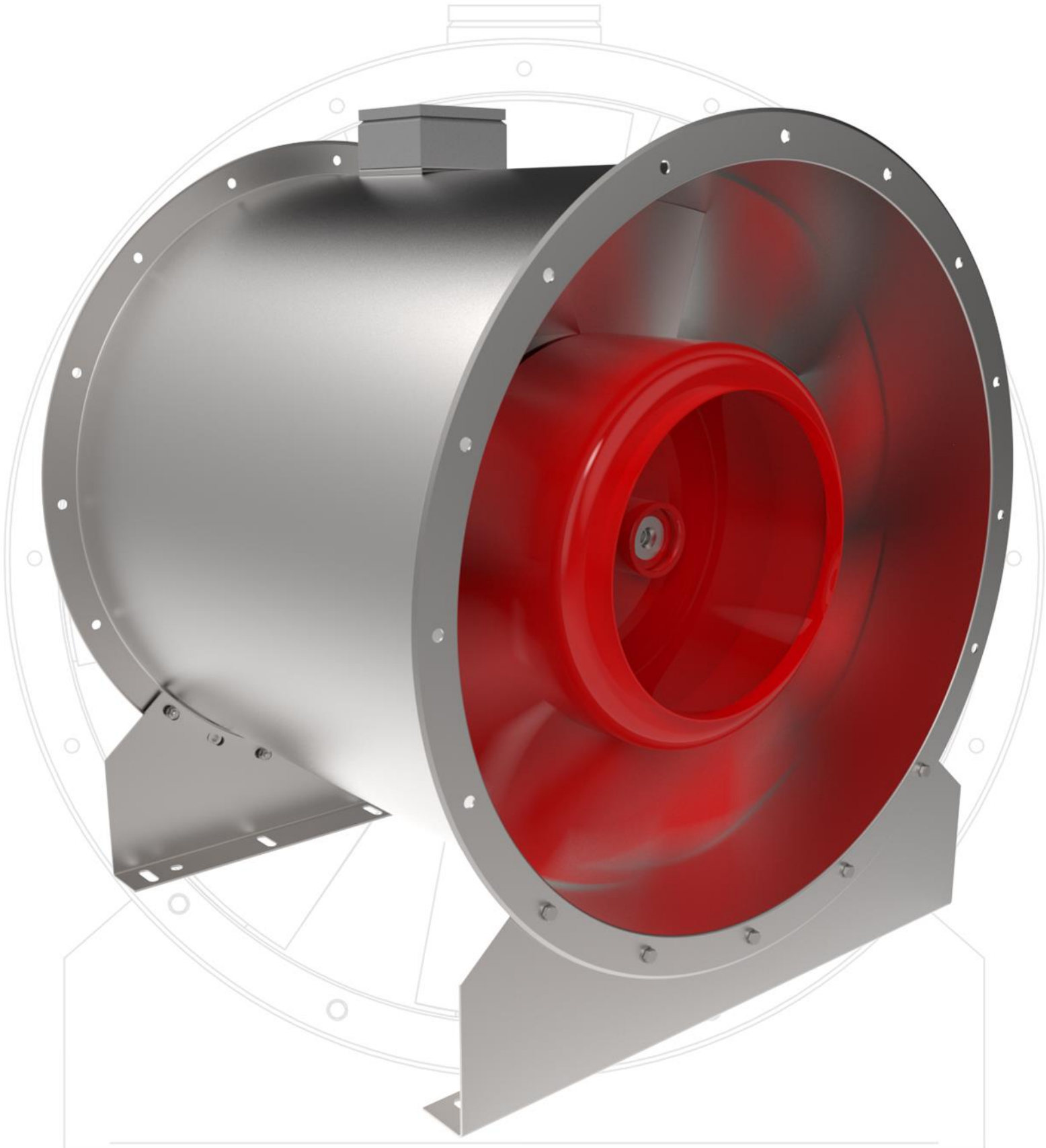
After a longer period of operation, check the temperature of the bearings. The suction opening must always be kept free and clean! Dirt deposited on the protective grid must be removed!

6.3 – Check after the first start

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



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.

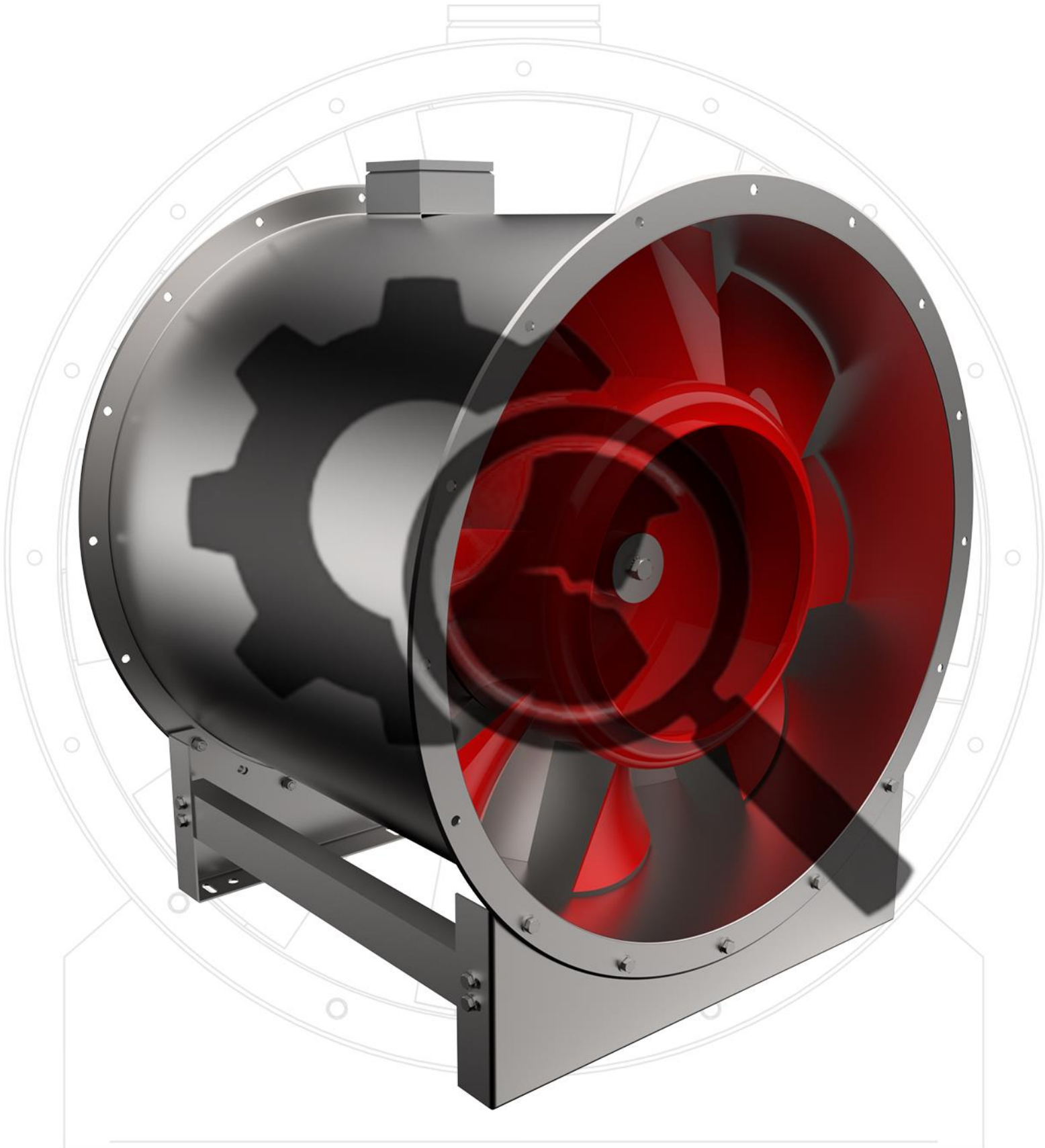
- Repair work may also only be carried out by specialist personnel - in compliance with accident prevention regulations.
- Before carrying out cleaning, repair, maintenance and other installation work, the fan must be completely disconnected from the electrical network, with a reconnection prohibition (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) In the case of operation with a frequency converter, care must be taken regarding the own frequency of the fan and its support structure. It is **FORBIDDEN** to operate the fan in that frequency range!
- 4) 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.
- 5) 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.
- 6) 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.
- 7) **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!
- 8) 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.



TROUBLESHOOTING





When troubleshooting, pay particular attention to the following points:

- The fault can only be eliminated by a person with appropriate professional qualifications.
- First of all, 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)

8.1 - Tabular overview of possible disturbances and help for troubleshooting

Failure	Cause	Troubleshooting
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"> • Is the delivered medium too hot? • Are all phases equally loaded and connected? • Does the fan's operation point match the selection? • Is the impeller jammed/stuck?
	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



Professional maintenance is a condition of the warranty!

In the case of foreign countries, the regulations in force of the competent country are the guiding principles, taking into account the regulations of the local authorities as well! If the local legislation does not provide otherwise, the inspection maintenance should be carried out every six months.

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 the slats of the automatic roof cap, etc.)

Factory Service:



Hungaro-Ventilator Kft. (H-9483 Sopronkövesd, Táncsics M. u 18.)

E-mail: service@hungaro-ventilator.hu

Tel.: +36-99-536-072

Maintenance intervals:

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

Warning!

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 a reconnection prohibition (padlock, lock, etc.).
- Wait until the impeller stop!
- 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 (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):

Screw	M4	M5	M6	M8	M10	M12	M14	M16	M18	M20
pulling torque (+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 connections!

Checking motor bearings: Using bearing diagnostic tools

Caution: The electric motor can only be disassembled 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:

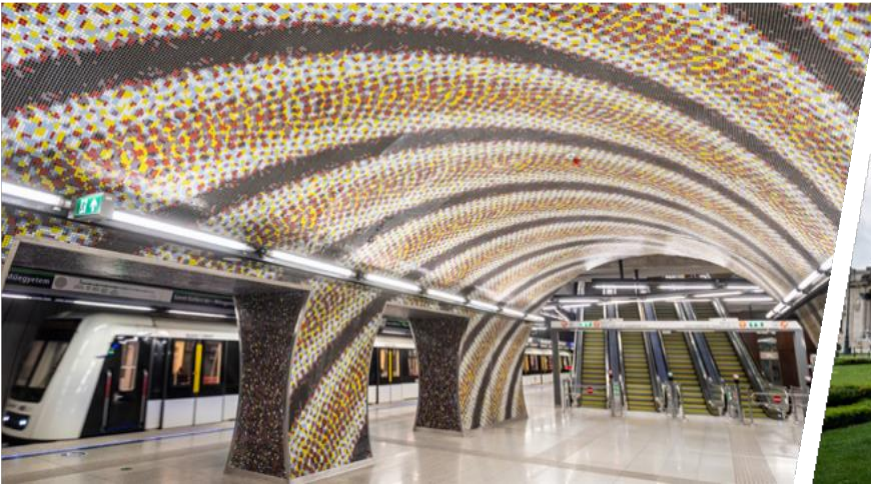
- Commissioning of the machine - in compliance with safety regulations - may only be carried out by qualified personnel.
- Before starting, check that all tools and foreign objects have been removed from the machine.
- Reinstall protection against intrusion
- Before installation, activate all safety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

Thank you for your attention!

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

Those who chose us:

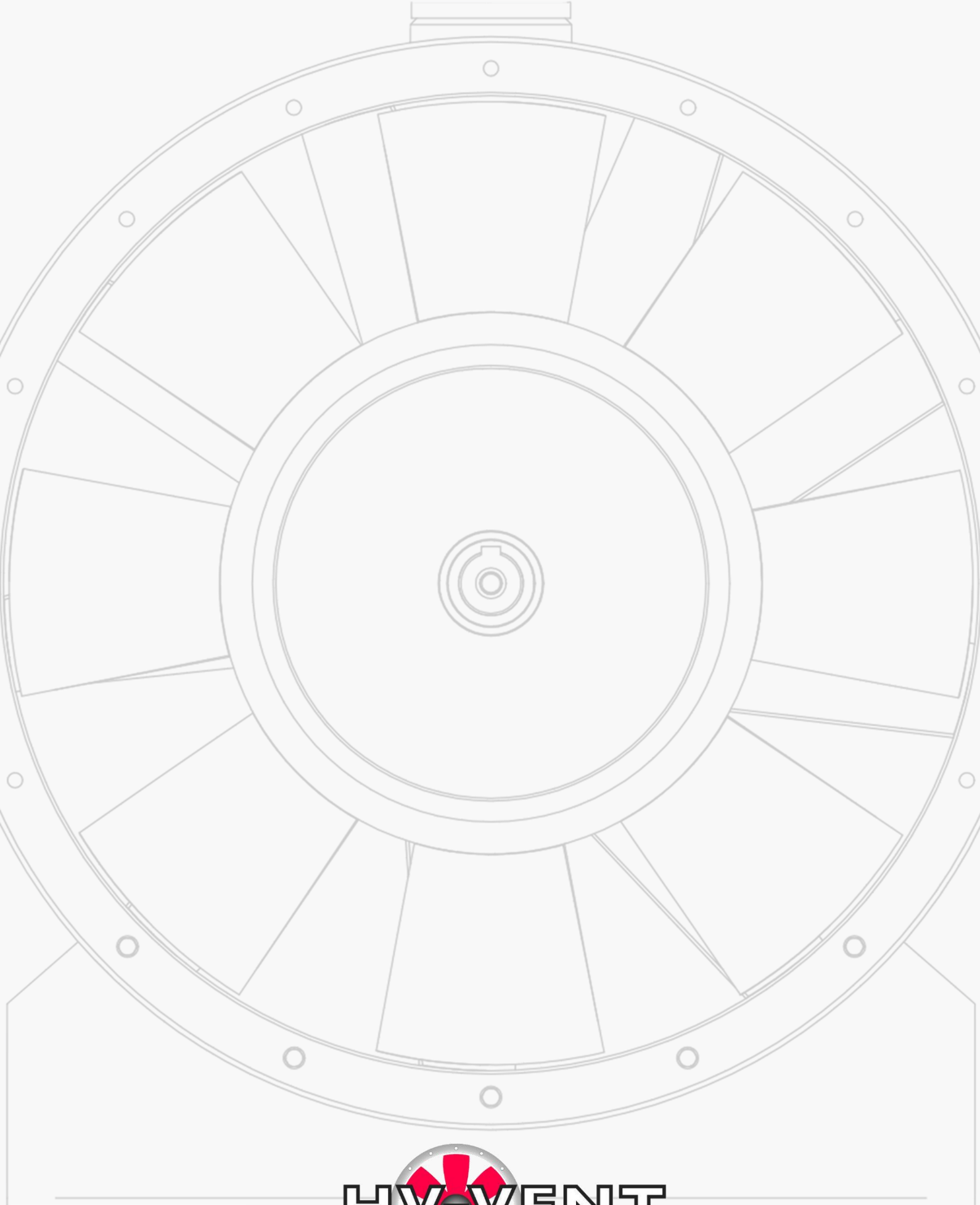
- ✓ Elysium Residential Park
- ✓ M4 Metro Budapest
- ✓ Széchenyi Bath
- ✓ Groupama Arena
- ✓ Puskás Stadium
- ✓ Museum of Fine Arts
- ✓ Hungarian Academy of Sciences



Why should you choose us?

- ✓ We believe in the power of quality: during production, we strive for the maximum reliability of our products
- ✓ Exact compliance with the delivery deadline is a basic requirement for the company
- ✓ Our products are characterized by excellent prices
- ✓ In addition to design and construction expertise, we also have the appropriate production tools
- ✓ Our products meet all comfort, technological and ventilation requirements, and are also modern, energy-saving and aesthetic.
- ✓ Product innovation is continuous
- ✓ Thanks to the large stock, we can guarantee a short production deadline
- ✓ Our excellent, recognized professionals are available to our customers
- ✓ All equipment accessories are self-made





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