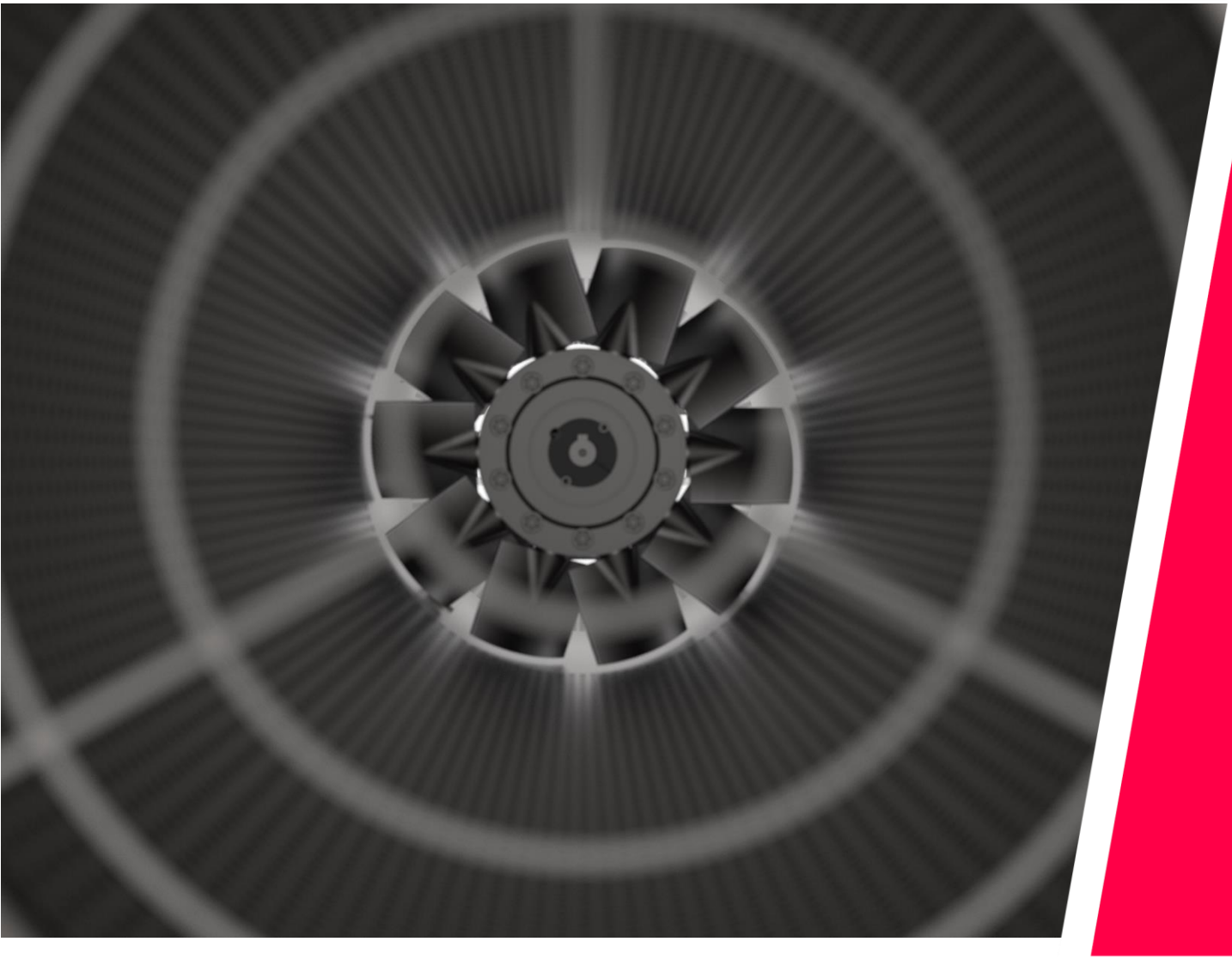
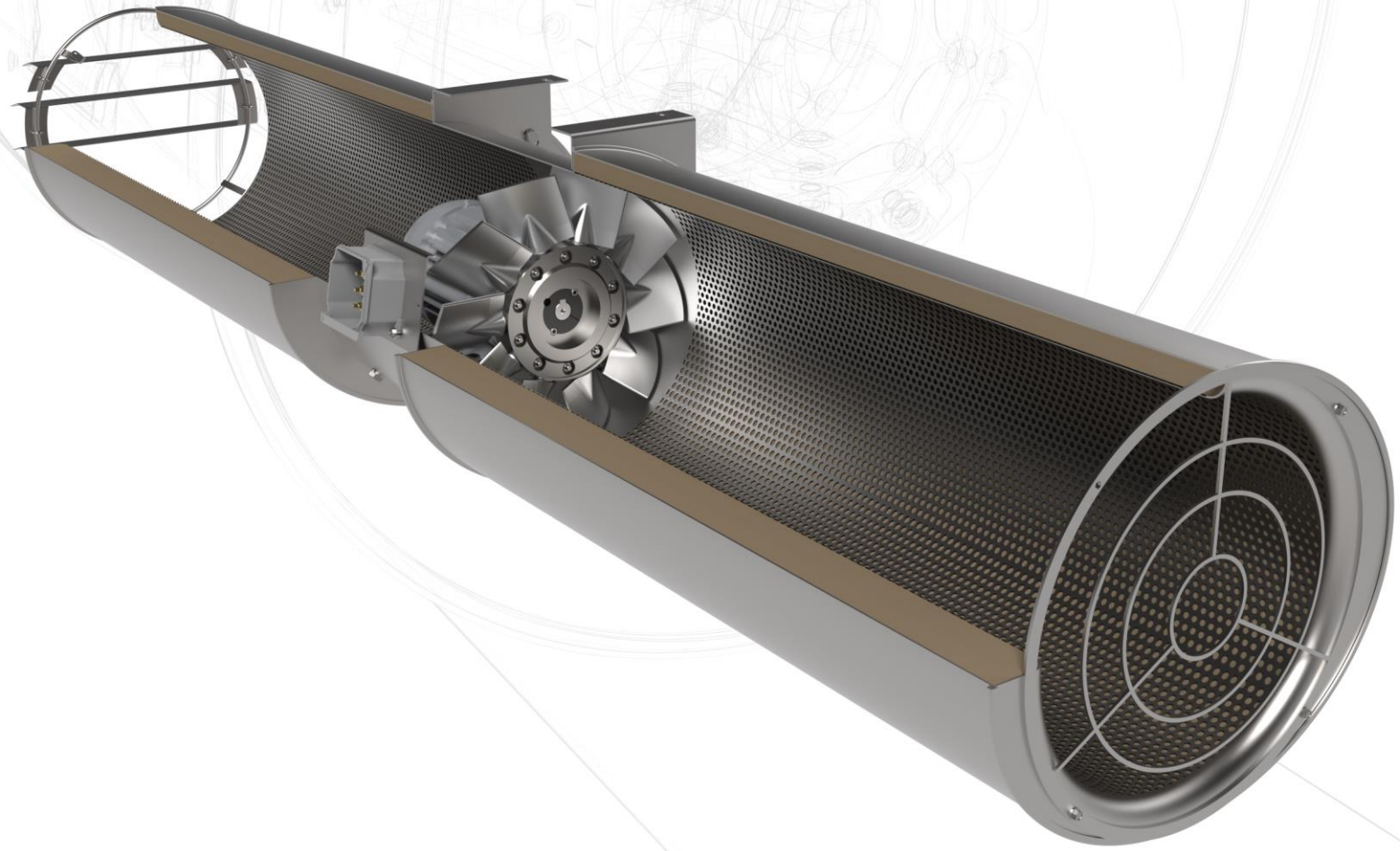
HVVENT
THE FAN FACTORY



# AIRJET AJU/AJR

HVVENT
THE FAN FACTORY

# PRODUCT DESCRIPTION



## 1.1 Type designation

**JET-AJU315-150-5 F300**

| | | |
|---|---|---|
| JET | = | JET fan |
| AJU | = | Direction of airflow (AJU - unidirectional; AJR - reversible) |
| 315 | = | Fan factory size |
| 150 | = | Impeller hub size |
| 5 | = | Impeller blade number |
| F300 | = | Heat resistance class (according to EN 12101-3 standard)<br>If it is not named, the equipment is only suitable for transporting air at normal temperature. |

## 1.2 Intended use

According to their installation principle, the jet fans are underground garages or devices with a free suction and free pressure operating principle to be placed on the ceiling of above-ground garages. The rotating impeller sucks in the air on the suction side of the fan, in an axial direction and then transports it towards the pressure side. This rapid air flow results in a secondary air movement on the pressure side of the fan, whose function is to move the air through the garage and mix with the exhaust-containing air. Jet fans are usually not used as separate units, but as elements of an extraction system with jet fans, which provide additional supply and they contain exhaust fans, sensors, control and regulation devices.

Their function is twofold. In normal mode, they have the task of deflecting air in the CO ventilation of the room, at the desired speed. If this function is provided and the temperature of the transported medium is not higher than 50°C, the service life of the equipment is, in principle, unlimited, provided that the required maintenance is carried out.

AirJET jet ventilators are also suitable for operation in an emergency function (in the event of a fire), during which their task is to expel the smoke produced during combustion from a closed space. The fan is available with heat resistance class F200 and F300. In both cases, the operation of the installation is ensured for at least 2 hours. If a jet fan has been operating in emergency mode, it must be replaced, regardless of how long the emergency mode lasted.

## Terms of Use:

### Environmental limitations:

#### Normal mode:

- Temperature: from -20°C to +50°C
- Pressure: Atmospheric pressure
- Relative humidity: max. 95%

The values given here refer to permanent and long-term use.

#### Emergency mode:

The environmental limits are the same as before, except for temperature:
• Temperature: max. +200°C or +300°C! In this case, the guaranteed operating time is min. 2 hours

## Parameters of air to be transported:

#### Normal mode:

- clean air max. 1,2 kg/m3
- air mixed with exhaust gas
- It is strictly forbidden to use the fan to ventilate the air spaces classified in the Z0/ Z1/ Z2 / Z20/ Z21/ Z22 zones and to transport such classified media!
- slightly aggressive gases and vapors
- medium with a density of max. 1.2 kg/$m^3$
- max. 95% humidity media
- Mediums with temperatures between -20 +50 °C, equipped with an ISO F motor
- Mediums with temperatures between -20 +50 °C, equipped with an ISO H motor

The values given here refer to constant and long-term use, in addition to the delivery performances guaranteed by the manufacturer. In the case of parameters other than the above, a consultation with the manufacturer is required!

#### Emergency mode:

The parameters of the air to be transported are the same as the previous ones, except for the temperature:

- Temperature: max. +200°C or +300°C! In this case, the guaranteed operating time is min. 2 hours!

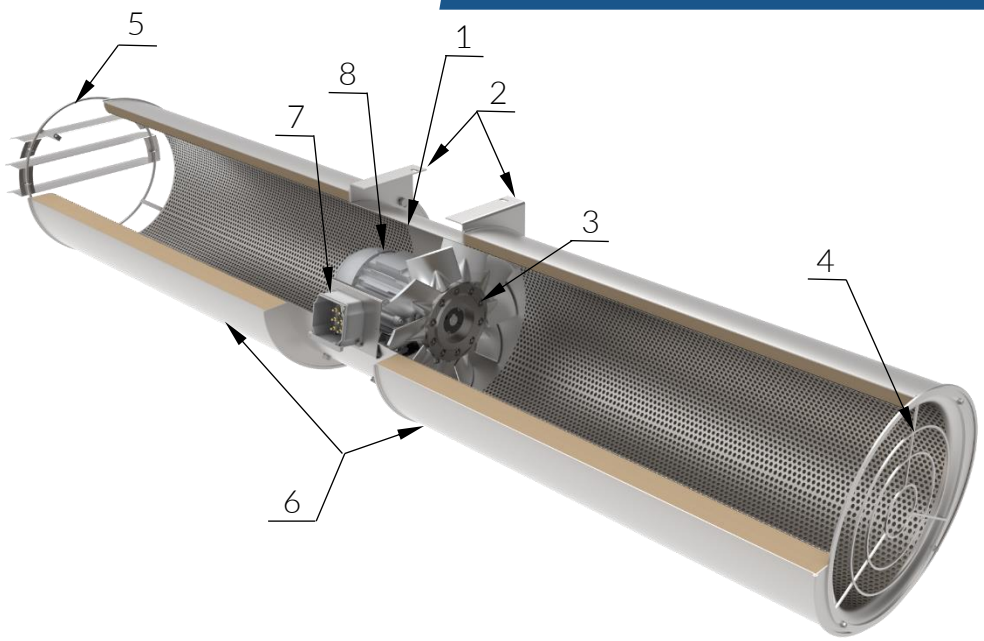
### Installation conditions:

- The fans can only be installed with a horizontal axis, suspended from the ceiling.
- Fans cannot be operated without the necessary safety devices.
- Foreign objects must be prevented from entering the device.
- Adequate air inflow and outflow conditions must be ensured during installation.


Hungaro-Ventilátor Ltd.
Tax number: 13657396-2-08 / Headquarter: 9483 Sopronkövesd, Táncsics utca 18. / Branch: 2040 Budaörs, Gyár utca 2.

## 1.3 Structure

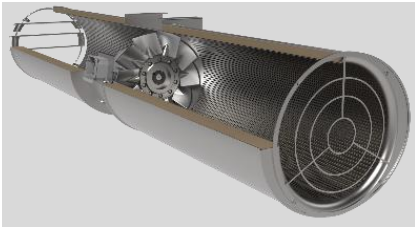
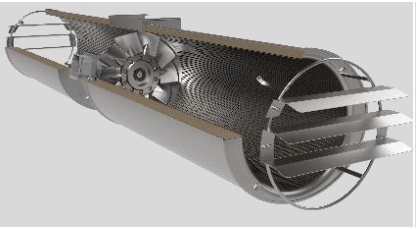
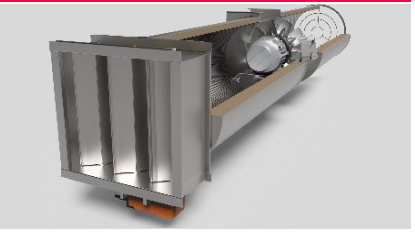
1) Fan Housing
2) Hanging element
3) Impeller
4) Protection grill
5) Deflector lamella
6) Tube silencer
7) Terminal box
8) Electric Motor




## 1.4 Optional accessories

Various accessories can be installed on the suction and discharge side of the jet fan. These accessories ensure the protection of the equipment as well as the necessary direction of the air flow. The optional accessories and their properties are listed in the following table.

In the case of JET fans with CO operation, to increase the efficiency of air mixing, a row of motor-operated, continuously variable, heat-resistant deflector lamellas can be ordered on the discharge side. The BELIMO BFL 230 type motor, controlled by built-in automation, moves the angle of the parallel row of slats in such a way that the JET's blow-out angle changes in a scanning manner between the axial direction and an angle of 45° relative to it. The drive motor is located below or above the JET fan. The scanning cycle time is approx. 40 seconds. In the event of a fire, the moving motor takes off the power and moves the slats in the axial direction. Scanning does not work in the event of a fire, in which case the motor moves spring-loaded to its end position and its safety position hold is activated here. Since the scanning function only works in CO mode, it can also be powered with a normal cable, if it is not prohibited by other regulations.

| | Protection grill | Deflector lamella | Air deflector louver |
|---|---|---|---|
| |  |  |  |
| Ventilator type | AJU | AJU; AJR | AJU; AJR |
| Place of installation | suction side | discharge/pressure side | discharge/pressure side |
| Function | preventing foreign objects from entering the fan | diverting the air flow on the pressure side of the fan | control of the air flow on the pressure side of the fan |

## 1.5 General description

The AirJET jet fan is a solidly constructed, assembled device. Its surface protection can be galvanized or painted.

On both sides of the fan housing, an oval edge is formed from the material of the mantle itself. The motor mount takes up space in the housing, which is fixed with a hex head screw and rivet nut. When repairing or maintaining the fan, the entire internal unit (motor holder-electric motor-impeller) can be easily removed by loosening these connections. Steel surfaces are protected from corrosion by hot-dip galvanizing or powder coating.

A rigid silencer pipe is attached to each side of the fan housing. The outer casing of the mufflers has an oval design, the inner perforated part is a tube with the same diameter as the inner diameter of the fan. The silencers are attached to the edge of the house with non-removable ties. Rivets are located on the free ends of the silencers, which enable the attachment of accessories (protective grid, deflector lamella, air deflector louver) to the fan.

The jet fans can only be installed in a horizontal position, suspended. The suspension elements are attached directly to the edge of the fan housing. The surface protection of these parts is ensured by hot-dip galvanizing or powder coating.

The impeller of the fan is attached directly to the shaft of the electric motor by means of a tension cone. The hub of the impeller is a 150 mm diameter aluminum casting, which consists of two halves. One half is equipped with a steel sleeve, which enables tension cone fastening. The impeller of the fan is equipped with 5 or 10 cast aluminum blades, the angle of which can be adjusted in the rest position.

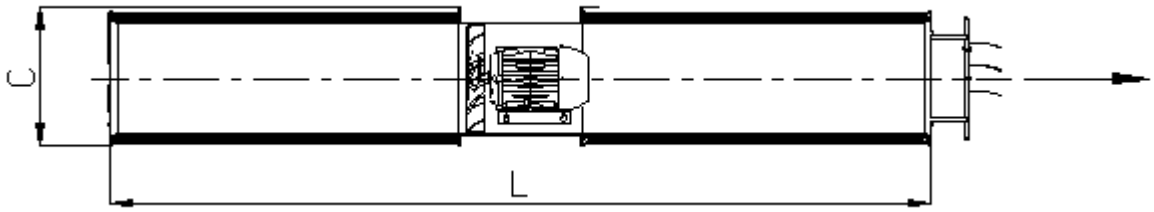
The electric motor is an asynchronous, alternating current, pedestal motor with at least IP 55 protection. In order to facilitate the installation work, the junction box, and thus also the motor wiring outlet, is attached to the cover plate that closes the 100 mm diameter hole formed on the casing.

## 1.6 Functional description

In the standard case, the AirJET jet fan (AJU) draws air from the intake side through the rotating impeller, which it transports in the axial direction through the engine to the exhaust side. The engine is in the air stream that cools it. The type is also available in a reversible (AJR) version, in which case the direction of air delivery can be freely selected.


**Hungaro-Ventilátor Ltd.**
Tax number: 13657396-2-08 / Headquarter: 9483 Sopronkövesd, Táncsics utca 18. / Branch: 2040 Budaörs, Gyár utca 2.

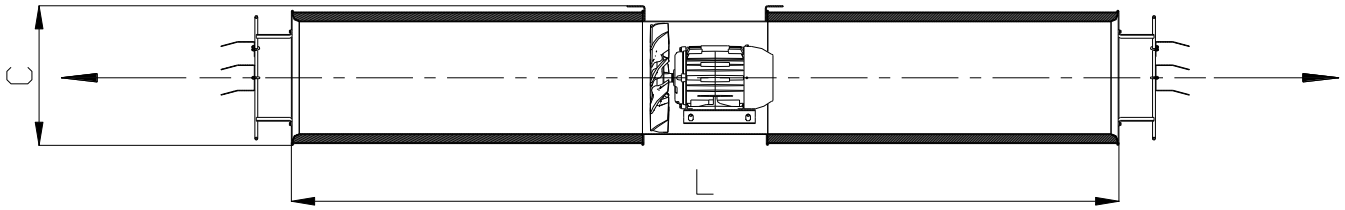
## 1.7 Size range




| AIRJET AJU-400 | 400-5-32 | 400-5-27 | 400-5-23 | 400-5-18 |
|---|---|---|---|---|
| Thrust [N]<br>Air flow [m3/h] | 89 / 22<br>10990 / 5440 | 71 / 18<br>9800 / 4730 | 61 / 15<br>9100 / 4390 | 52 / 13<br>8400 / 4150 |
| Dimensions L x C [mm] | 2426 x 495 | 2426 x 495 | 2426 x 495 | 2426 x 495 |
| Weight [kg] | 126 | 111 | 111 | 107 |
| Rotation speed [1/min] | 2890 / 1430 | 2940 / 1420 | 2940 / 1420 | 2900 / 1435 |
| Max. power consumption [A] | 6,20 / 1,99 | 4,63 / 1,54 | 4,63 / 1,54 | 3,54 / 1,25 |
| Motor nominal power [kW] | 3,1 / 0,8 | 2,2 / 0,5 | 2,2 / 0,5 | 1,5 / 0,37 |

| AIRJET AJU-355 | 355-5-32 | 355-5-27 | 355-5-22 | 355-5-18 |
|---|---|---|---|---|
| Thrust [N]<br>Air flow [m3/h] | 56 / 14<br>7740 / 3830 | 38 / 10<br>6350 / 3140 | 29 / 7<br>5550 / 2740 | 21 / 5<br>4730 / 2340 |
| Dimensions L x C [mm] | 2426 x 448 | 2426 x 448 | 2426 x 448 | 2426 x 448 |
| Weight [kg] | 96 | 95 | 95 | 9 |
| Rotation speed [1/min] | 2900 / 1435 | 2810 / 1390 | 2810 / 1390 | 2810 / 1390 |
| Max. power consumption [A] | 3,9 / 1,38 | 2,41 / 0,75 | 2,41 / 0,75 | 2,41 / 0,75 |
| Motor nominal power [kW] | 1,5 / 0,37 | 1,1 / 0,25 | 1,1 / 0,25 | 1,1 / 0,25 |

| AIRJET AJU-315 | 315-5-32 | 315-5-27 | 315-5-22 | 315-5-18 |
|---|---|---|---|---|
| Thrust [N]<br>Air flow [m3/h] | 33 / 8<br>5270 / 2620 | 24 / 6<br>4500 / 2230 | 17 / 4<br>3780 / 1880 | 13 / 2<br>3300 / 1640 |
| Dimensions L x C [mm] | 2426 x 388 | 2426 x 388 | 2426 x 388 | 2426 x 388 |
| Weight [kg] | 67 | 67 | 67 | 67 |
| Rotation speed [1/min] | 2820 / 1400 | 2820 / 1400 | 2820 / 1400 | 2820 / 1400 |
| Max. power consumption [A] | 1,91 / 0,6 | 1,91 / 0,6 | 1,91 / 0,6 | 1,91 / 0,6 |
| Motor nominal power [kW] | 0,8 / 0,2 | 0,8 / 0,2 | 0,8 / 0,2 | 0,8 / 0,2 |




| AIRJET AJR-400 | 400-5-40 | 400-5-35 | 400-5-30 | 400-5-20 |
|---|---|---|---|---|
| Thrust [N]<br>Air flow [m3/h] | 55 / 13<br>8640 / 4270 | 46 / 11<br>7900 / 3900 | 31 / 7<br>6450 / 3190 | 12 / 3<br>4000 / 1980 |
| Dimensions L x C [mm] | 2426 x 495 | 2426 x 495 | 2426 x 495 | 2426 x 495 |
| Weight [kg] | 111 | 111 | 108 | 107 |
| Rotation speed [1/min] | 2900 / 1435 | 2900 / 1435 | 2810 / 1390 | 2820 / 1400 |
| Max. power consumption [A] | 3,9 / 1,38 | 3,54 / 1,25 | 2,41 / 0,75 | 1,91 / 0,6 |
| Motor nominal power [kW] | 1,5 / 0,37 | 1,5 / 0,37 | 1,1 / 0,25 | 0,8 / 0,2 |

| AIRJET AJR-355 | 355-5-43 | 355-5-35 | 355-5-30 | 355-5-20 |
|---|---|---|---|---|
| Thrust [N]<br>Air flow [m3/h] | 38 / 9<br>6350 / 3140 | 27 / 6<br>5350 / 2650 | 19 / 4<br>4500 / 2200 | 8 / 2<br>2900 / 1440 |
| Dimensions L x C [mm] | 2426 x 448 | 2426 x 448 | 2426 x 448 | 2426 x 448 |
| Weight [kg] | 96 | 94 | 94 | 94 |
| Rotation speed [1/min] | 2900 / 1435 | 2820 / 1400 | 2820 / 1400 | 2820 / 1400 |
| Max. power consumption [A] | 3,54 / 1,25 | 1,91 / 0,6 | 1,91 / 0,6 | 1,91 / 0,6 |
| Motor nominal power [kW] | 1,5 / 0,37 | 0,8 / 0,2 | 0,8 / 0,2 | 0,8 / 0,2 |

| AIRJET AJR-315 | 315-5-43 | 315-5-40 | 315-5-30 | 315-5-20 |
|---|---|---|---|---|
| Thrust [N]<br>Air flow [m3/h] | 22 / 6<br>4300 / 2170 | 17 / 4<br>3780 / 1870 | 12 / 3<br>3170 / 1570 | 5 / 1<br>2050 / 1020 |
| Dimensions L x C [mm] | 2426 x 388 | 2426 x 388 | 2426 x 388 | 2426 x 388 |
| Weight [kg] | 67 | 67 | 67 | 67 |
| Rotation speed [1/min] | 2820 / 1400 | 2820 / 1400 | 2820 / 1400 | 2820 / 1400 |
| Max. power consumption [A] | 1,91 / 0,6 | 1,91 / 0,6 | 1,91 / 0,6 | 1,91 / 0,6 |
| Motor nominal power [kW] | 0,8 / 0,2 | 0,8 / 0,2 | 0,8 / 0,2 | 0,8 / 0,2 |

The fans can also be ordered with a single-turn motor



**Hungaro-Ventilátor Ltd.**
Tax number: 13657396-2-08 / Headquarter: 9483 Sopronkövesd, Táncsics utca 18. / Branch: 2040 Budaörs, Gyár utca 2.

# About our Company:

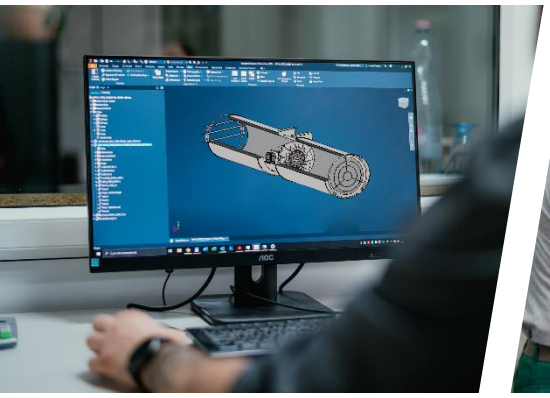
The name of Hungaro-Ventilator Ltd. is now completely connected to quality and expertise.

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 eqiupments 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.



HV VENT
THE FAN FACTORY

# GENERAL SAFETY REGULATIONS

## 2.1 Operating regulations

An AirJET type jet 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

**Caution** — 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

Jet fans by Hungaro-Ventilátor Ltd. 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 in accordance with the regulations.

- 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 fall into the device can brake or damage the impeller. In order to avoid damage, foreign objects must be prevented from entering the equipment.

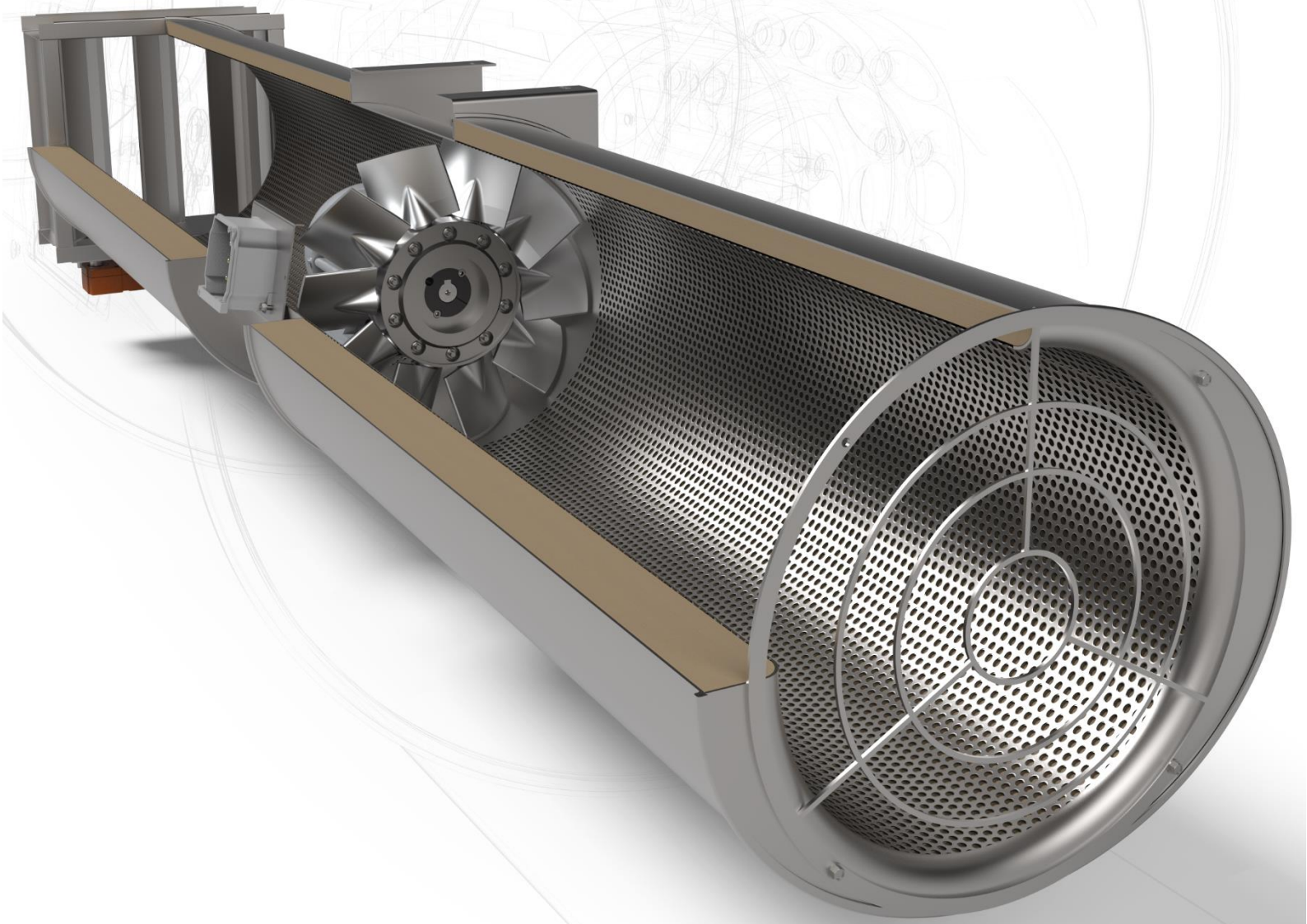
## 2.5 Occupational health and safety regulations

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! (E.g.: mounting equipment on the ceiling)


**Hungaro-Ventilátor Ltd.**
**Tax number:** 13657396-2-08 / **Headquarter:** 9483 Sopronkövesd, Táncsics utca 18. / **Branch:** 2040 Budaörs, Gyár utca 2.

HVVENT
THE FAN FACTORY

# INSTALLATION REQUIREMENTS



## 3.1 Ventilator mounting

The AirJET jet fan can only be installed suspended with a horizontal axis. Only the suspension element provided by the manufacturer, attached to the edge of the fan housing, can be used to fix the equipment.

## 3.2 Suction and discharge side connections

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 safety attachment can be a lashing rope or a lashing chain, which must be attached independently of the original attachment points and in a normal position these safety attachments must be in a loose, unloaded state.

## 3.3 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)

*The supply cable must be properly secured and mechanically protected, and the cable must not come into contact with the fan housing. When choosing the type of cable, the installation method used and the contact protection solution, the relevant standards must be taken into account to the maximum extent (DIN 4102-12).*

## 3.4 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!**


**Hungaro-Ventilátor Ltd.**
Tax number: 13657396-2-08 / Headquarter: 9483 Sopronkövesd, Táncsics utca 18. / Branch: 2040 Budaörs, Gyár utca 2.

HV VENT
THE FAN FACTORY

# STORAGE AND TRANSPORTATION

## 4.1 Transportation

The fans are delivered fixed on a pallet.

**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.


**Hungaro-Ventilátor Ltd.**
**Tax number:** 13657396-2-08 / **Headquarter:** 9483 Sopronkövesd, Táncsics utca 18. / **Branch:** 2040 Budaörs, Gyár utca 2.

### 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!

- 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!

## 4.2 Storage

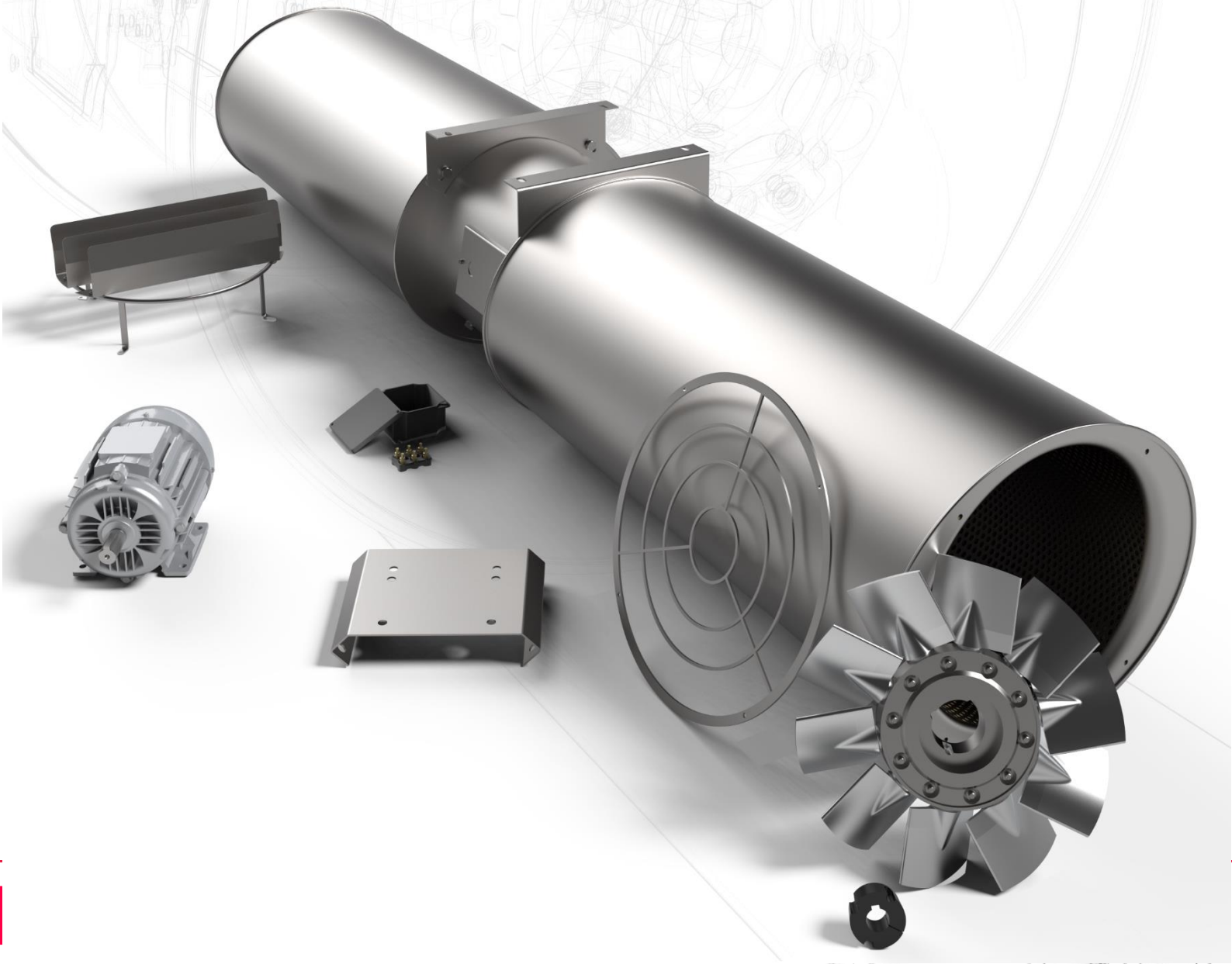
- The fan must be stored in a dry, covered place, protected from the elements, possibly covered with a tarp, protected from dirt.
- The fan must be protected from extreme temperatures!
- An excessively long storage time (max. 1 year is recommended) causes a rapid decrease in the service life of the equipment. 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).

HV VENT
THE FAN FACTORY

# ASSEMBLING



## 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.
- The installation position must match the one specified in the order.

**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!

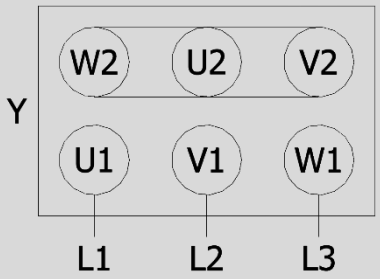
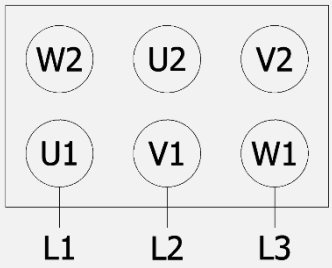
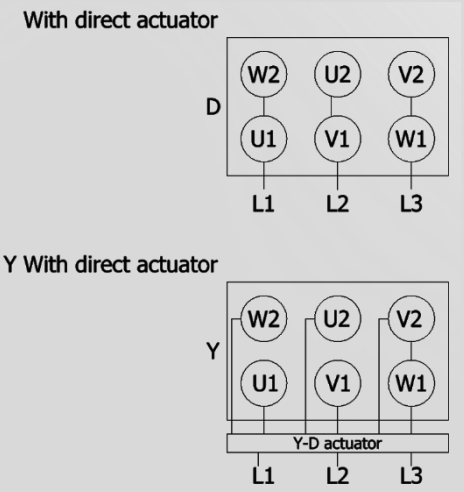
Measure the insulation resistance of the electrical part according to the chapter under "4.2 Storage".

**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.**

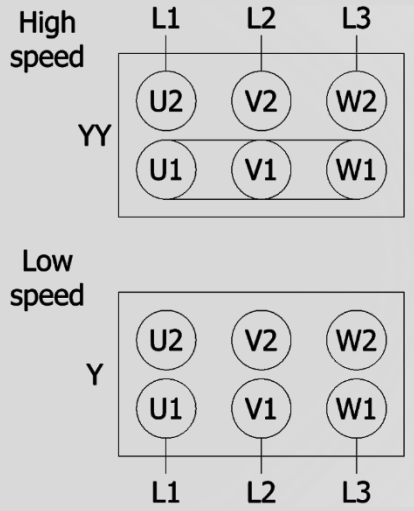
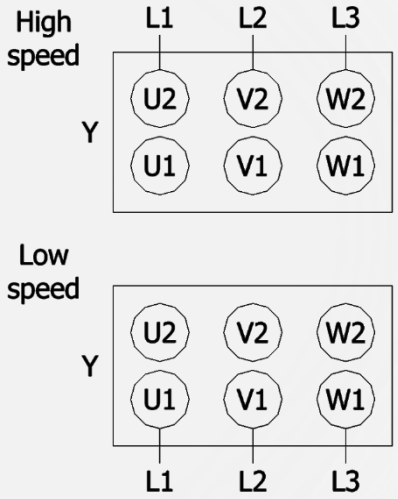
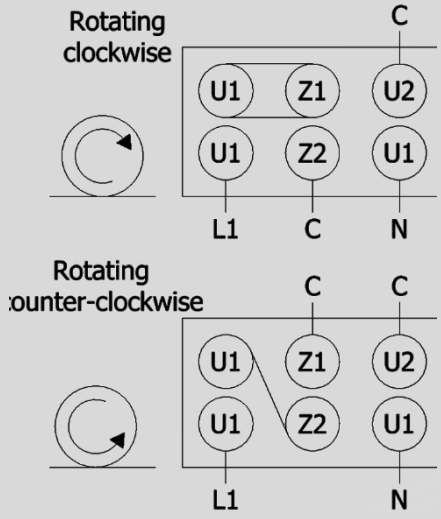
### Checking the direction of rotation is mandatory, before which you should consider the following:

- 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.
- 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.

## Wiring diagrams:

| | Wiring diagram | Pole number | Motor voltage | Remarks |
|---|---|---|---|---|
| A1 |  | 2<br>4<br>6<br>8<br>12 | ~400/690 V | 3x400V motor star circuit |
| A2 |  | 2<br>4<br>6<br>8<br>12 | ~230/400 V | 3x400V motor |
| B |  | 2<br>4<br>6<br>8<br>12 | ~400/690 V | 3x400V motor in delta connection<br><br>For star/delta (Y/D) start, appropriate timing must be included. |


**Hungaro-Ventilátor Ltd.**
Tax number: 13657396-2-08 / Headquarter: 9483 Sopronkövesd, Táncsics utca 18. / Branch: 2040 Budaörs, Gyár utca 2.

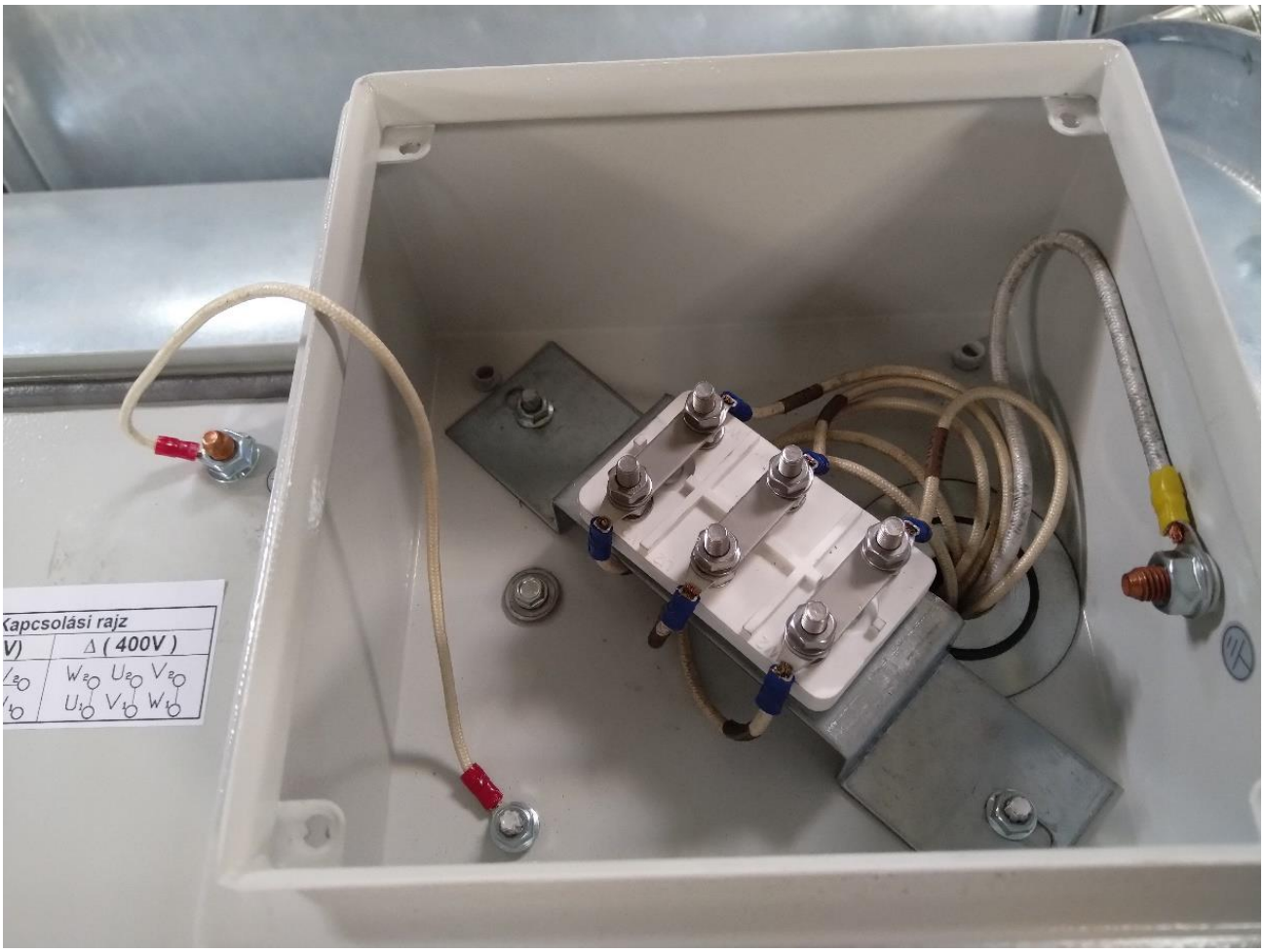
| | Wiring diagram | Pole number | Motor voltage | Remarks |
|---|---|---|---|---|
| C |  | 2/4<br>4/8<br>6/12 | ~400 V | 3x400V<br>two-turn motor, with Dahlander coil |
| D |  | 4/6<br>6/8<br>8/12 | ~400 V | 3x400V<br>two-turn motor with split winding |
| E |  | 2<br>4<br>6 | ~230 V | 1x230V motor |

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.

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



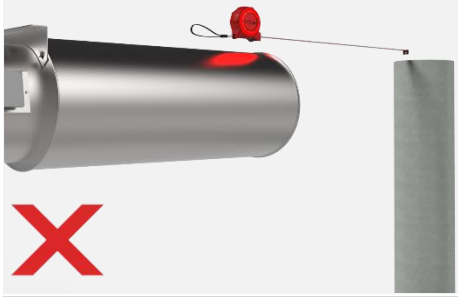
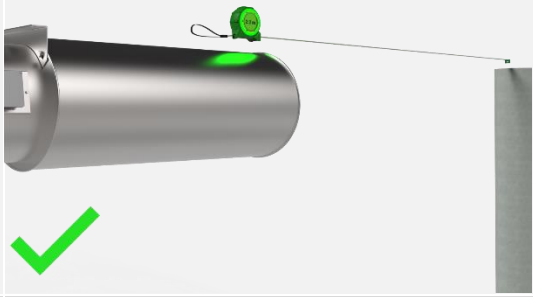

**Exceeding the specified torque values can lead to breakage of the terminal strip!**
**We are not responsible for damages resulting from improper tightening of the nuts!**


**Hungaro-Ventilátor Ltd.**
Tax number: 13657396-2-08 / Headquarter: 9483 Sopronkövesd, Táncsics utca 18. / Branch: 2040 Budaörs, Gyár utca 2.

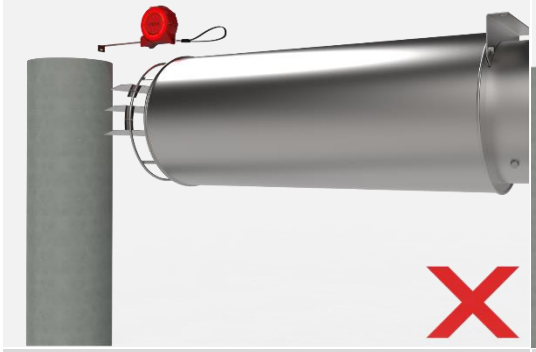
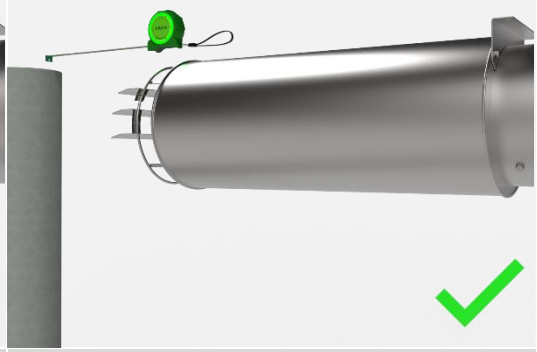
## 5.2 Common installation errors

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 |
|---|---|
|  |  |
| **Incorrect:** Fan performance is reduced because an obstruction (projecting wall, pipe, board, etc.) is in the fan's air stream. The resulting turbulence can result in fan damage and increased noise levels. | **Correct:** There must be no physical obstacles on the suction side of the fan within a distance of 2 meters. |

### 5.2.2 Exhaust

| INCORRECT | CORRECT |
|---|---|
|  |  |
| **Incorrect:** Fan performance is reduced because an obstruction (projecting wall, pipe, board, etc.) is in the fan's air stream. The resulting turbulence can result in fan damage and increased noise levels. | **Correct:** There must be no physical obstructions on the exhaust side of the fan within a distance of 0.5 meters. |

In the case of reversible (AJR) fans, depending on the direction of transport, both sides of the fan can be suction and discharge sides at the same time. Therefore, in this case, a distance of at least 2 meters must be kept on both sides of the fan.

HV VENT
THE FAN FACTORY

# 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 if it has been installed in accordance with the specifications!

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!

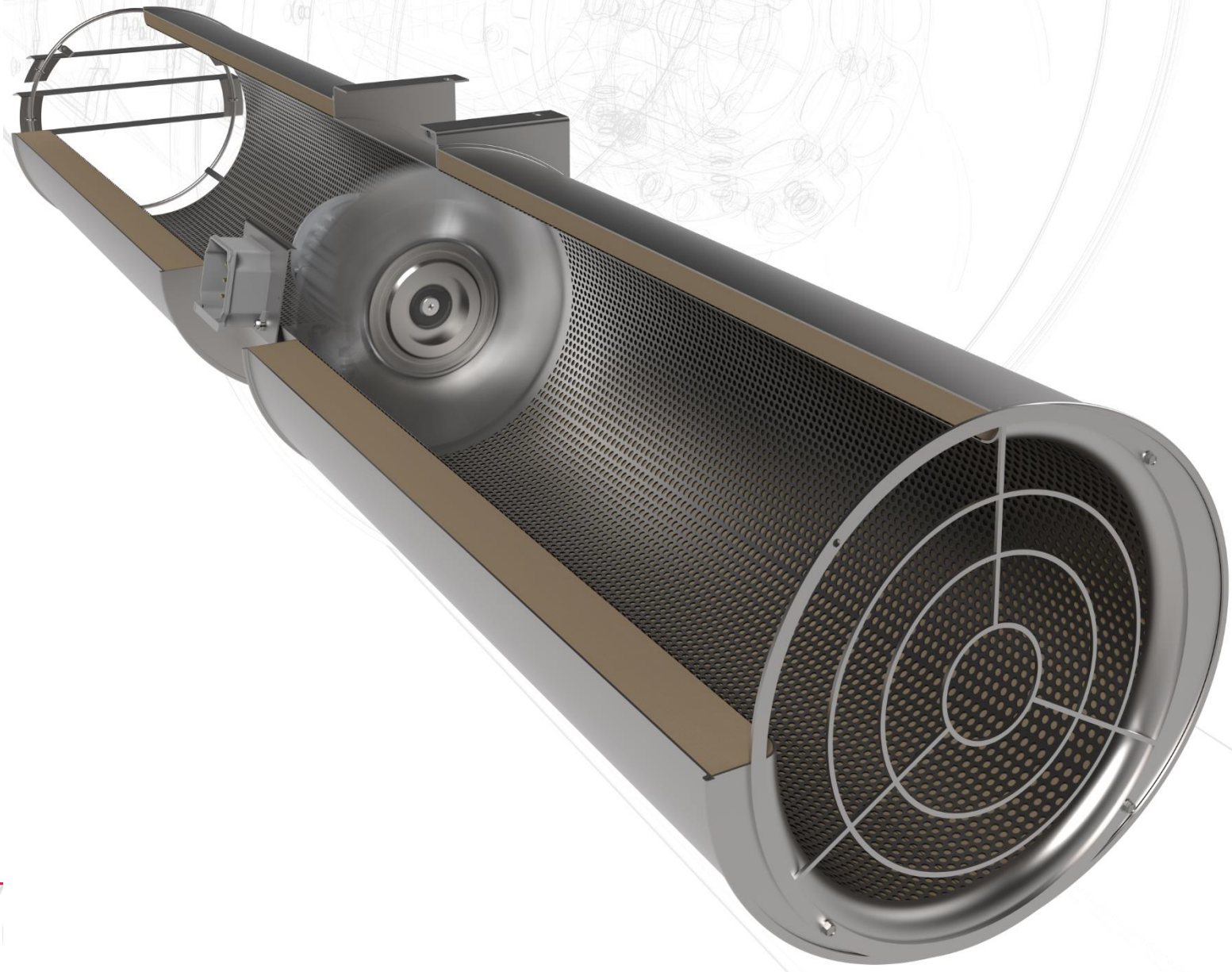
After a longer period of operation, check the temperature of the bearings. The suction opening must always be kept free and clean! Dirt deposited on the protective grid must be removed!

## 6.3 Check after the first start

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


**Hungaro-Ventilátor Ltd.**
Tax number: 13657396-2-08 / Headquarter: 9483 Sopronkövesd, Táncsics utca 18. / Branch: 2040 Budaörs, Gyár utca 2.

# 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** (**D**irect **O**n **L**ine) - 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** (**D**irect **O**n **L**ine) 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.


**Hungaro-Ventilátor Ltd.**
Tax number: 13657396-2-08 / Headquarter: 9483 Sopronkövesd, Táncsics utca 18. / Branch: 2040 Budaörs, Gyár utca 2.

## *Application of frequency converter*

When using a frequency converter, there is a risk of resonance on the fan, so the following must be observed:

- The fan must not be operated in the speed ranges where resonance occurs.
- When braking and accelerating, you must pass through these ranges as quickly as possible.
- A vibration monitoring system must be operated in the case of variable speed operation.
- The operating speed must not be higher than the value on the fan's data plate.

HV VENT
THE FAN FACTORY

# TROUBLESHOOTING

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

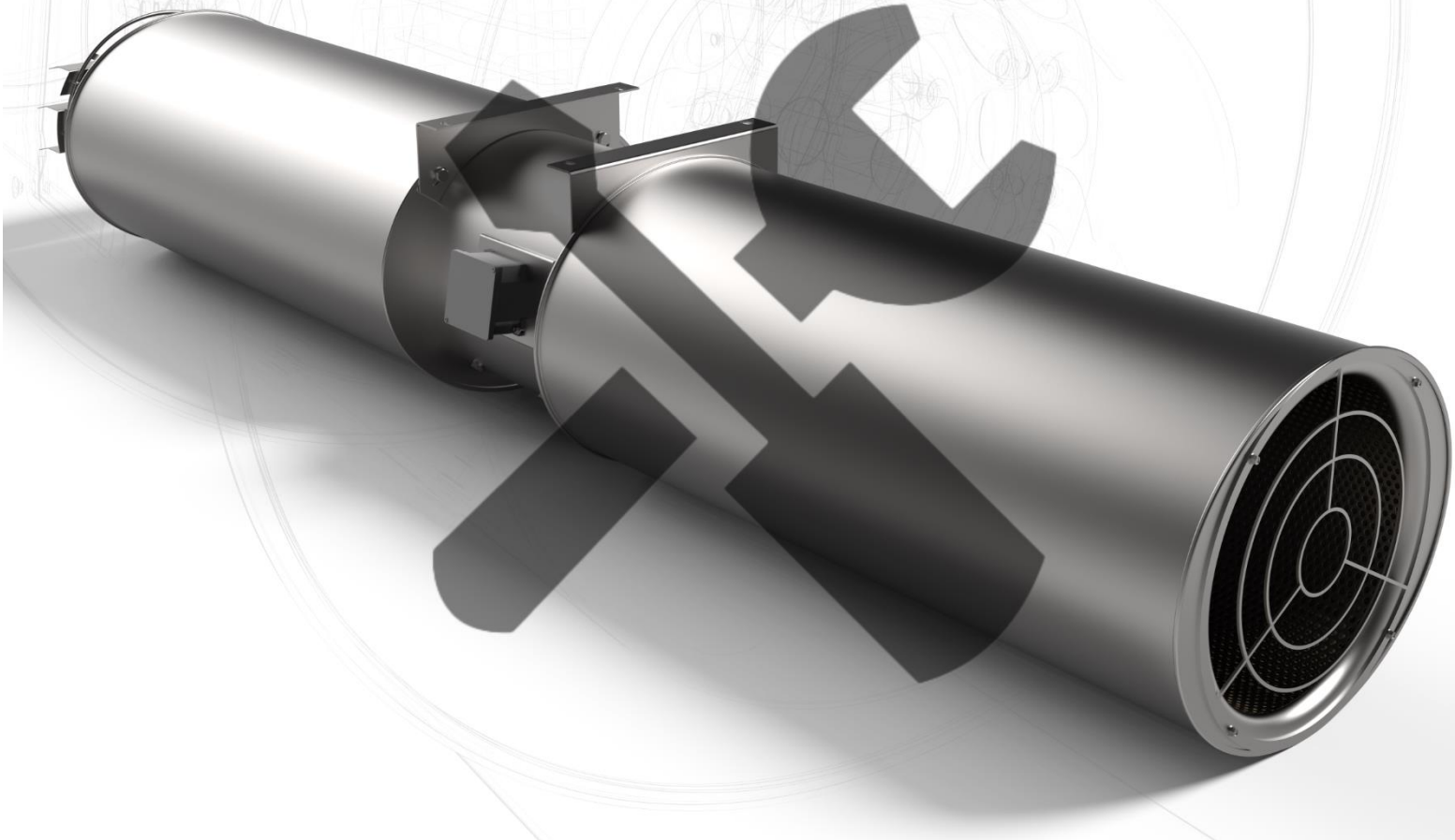
- The fault can only be eliminated by a person with appropriate professional qualifications.
- First of all, the machine must be secured against unintentional restart (accidental) by turning the machine's switch or closes its switch cabinet.
- Secure moving parts against rotation.
- Read the “general 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.<br>Check that:<br>• Is the delivered medium too hot?<br>• Are all phases equally loaded and connected?<br>• Does the fan’s operation point match the selection?<br>• Is the impeller jammed/stuck? |
| | The impeller is blocked. | Turn off the fan.<br>Remove the obstruction. In the meantime, pay attention to the safety regulations. |
| | The impeller is damaged and worn. | Turn off the fan.<br>Remove the impeller and install a new one. |
| | Filter perforation is dirty | Clean the filter. |
| The fan pumps, the air flow is interrupted periodically. | The fan works in the unfavorable characteristic curve area | Reduce system resistance if possible. In case of continuous operation, the impeller of the fan will be destroyed. |
| Inadequate air flow | Protection grill is dirty | Turn off the fan.<br>Carry out the necessary cleaning or repair. |

HV VENT
THE FAN FACTORY

# 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.

**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).

The maintenance work must carry out the 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 impeller (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!

- The motor must be protected from water!
- 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

## 9.1 Removing the impeller

Loosen the 2 axial Allen screws (1) on the side of the tensioning cone, unscrew one completely, move it to the empty screw slot (2), then loosen the cone by screwing it in. The impeller can then be pulled off the shaft by hand.


## 9.2 Impeller installation

The mounting steps are the same as the dismounting operations, which must be carried out in reverse order. Tightening the screws is only possible with a torque wrench, up to the specified value.


**Hungaro-Ventilátor Ltd.**
**Tax number:** 13657396-2-08 / **Headquarter:** 9483 Sopronkövesd, Táncsics utca 18. / **Branch:** 2040 Budaörs, Gyár utca 2.

## 9.3 Screw connections

**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 |
|---|---|---|---|---|---|---|---|---|---|---|
| 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 |

**Tension cone (Buchsen) used for fastening the impeller:**

| Type | 1210<br>1610 | | 2012 | 2517 |
|---|---|---|---|---|
| Hole (mm) | 19<br>24<br>28<br>38 | 42 | 19<br>24<br>28<br>38<br>42<br>48<br>55 | 19<br>24<br>28<br>38<br>42<br>48<br>55 |
| Srcews | 3/8" | | 7/16" | 1/2" |
| Torque (Nm) | 20 | 17 | 32 | 49 |

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

## 9.4 Electric motor maintenance

### Engine bearing maintenance intervals:

| Motor size | Maintenance interval in operating hours | | |
|---|---|---|---|
| | 3000 ($min^{-1}$) | 1500 ($min^{-1}$) | 1000 and 750 ($min^{-1}$) |
| 56 | 20000 | 20000 | 20000 |
| 36 | 20000 | 20000 | 20000 |
| 71 | 20000 | 20000 | 20000 |
| 80 | 18000 | 20000 | 20000 |
| 90 | 15000 | 20000 | 20000 |
| 100 | 14000 | 20000 | 20000 |
| 112 | 14000 | 20000 | 20000 |
| 132 | 12000 | 20000 | 20000 |
| 160 | - - | 20000 | 20000 |
| 180 | - | 18000 | 20000 |
| 200 | - | 18000 | 20000 |
| 225 | - | 18000 | 20000 |

**Engine Bearings check:** Using bearing diagnostic tools

**CAUTION: The electric motor can 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!**


Hungaro-Ventilátor Ltd.
Tax number: 13657396-2-08 / Headquarter: 9483 Sopronkövesd, Táncsics utca 18. / Branch: 2040 Budaörs, Gyár utca 2.

## 9.5 Commissioning steps after maintenance

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

### Steps of Comission:

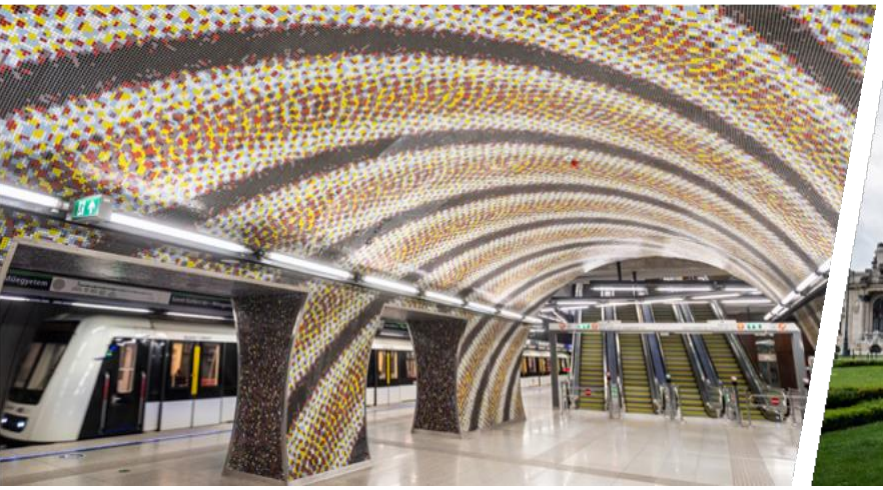
- Before starting, check that all tools and foreign objects have been removed from the machine.
- Reinstall protection against intrusion
- Before installation, activate all safety devices and emergency switches.
- Before installation, check the direction of rotation of the motor.
- Read carefully the "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.

## Those who chose us:

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

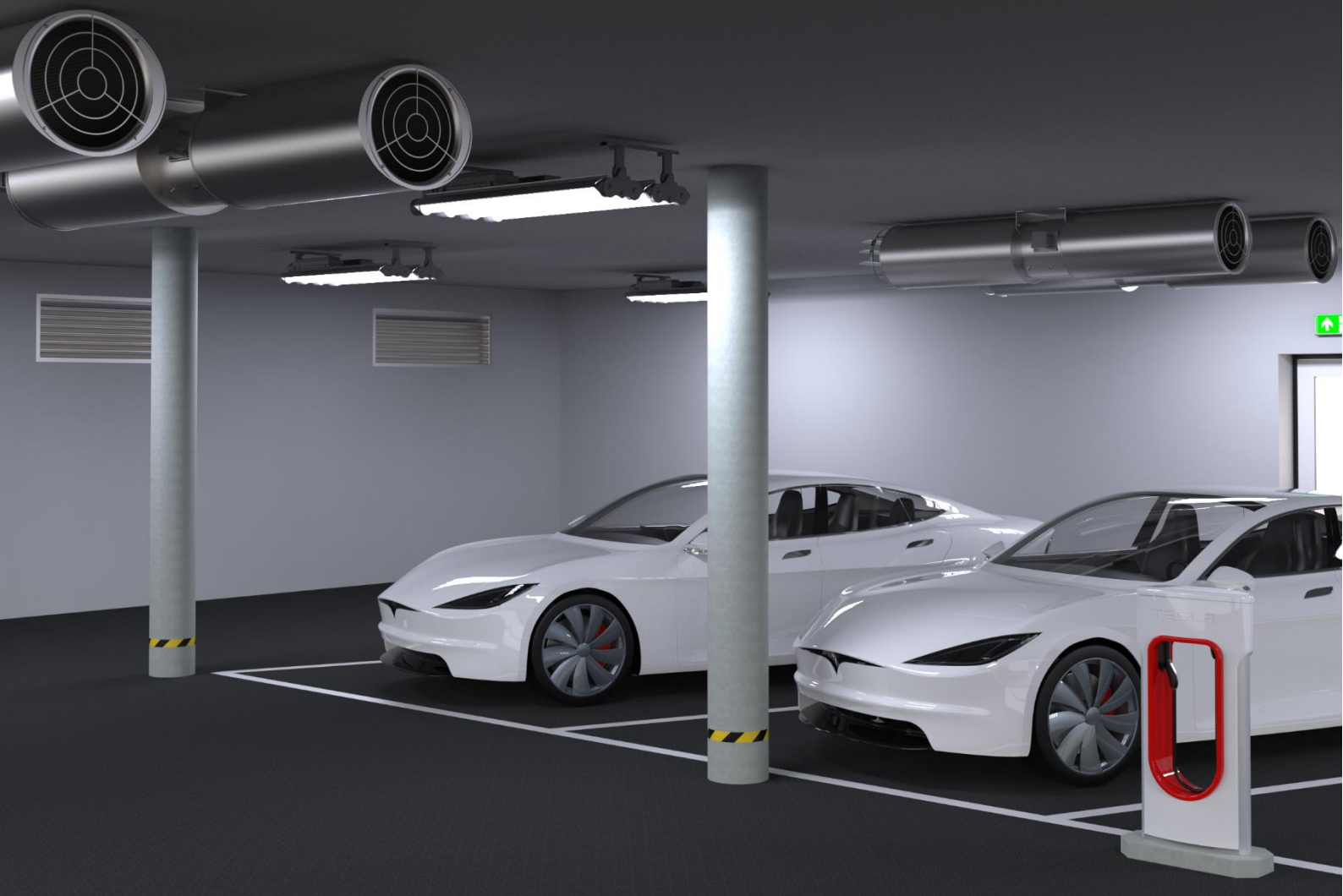



## Why choose us?

- ✓ 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

HVVENT

THE FAN FACTORY



www.hungaro-ventilator.hu

# COMMISSIONING RECORD
## Electrical ventilation equipment

| | | | |
|---|---|---|---|
| Name of the project: | | Working number: | |
| Title of the project: | | Date: | |

| | |
|---|---|
| Name/address of the commissioning company<br>Commissioning person's name: | |

| Designation of the product: | Type of the equipment, identification data: | Number of the system, identification data: |
|---|---|---|
| | | |

Electrical wiring of the motor is done according to the identification table of the motor/equipment: Yes / No*
Service switch: Yes / No*
Internal motor protection: No / Yes* PTC/thermocontact* is wired: Yes / No*
Control cabinet side motor protection: No / Yes* Adjusted current value according to the measured value: ..... A
Protection against phase failure: No / Yes* Testing is performed: Yes / No*
**Warning! In case of operation without an appropriate motor protection the manufacturer of the motor and the distributor of the equipment do not provide warranty for the electrical failure of the motor!**
Starting: timing of Y/Δ :.....sec / Dahlander / other: .....*; Operation: Y / Δ / Dahlander other: .....)
Frequency changer operation: Yes / No* 2 / 4 / 6 / 8 / 4/8* -pole motor, number of stages:.....

| Nominal data: | stage 1 | stage 2 |
|---|---|---|
| Nominal performance of the motor: | ..... kW | ..... kW |
| Nominal power consumption of the motor: | $I_{nominal}$ = .....Amper | $I_{nominal}$ = .....Amper |
| Nominal voltage of the motor: | .....V.....Hz.....phase | .....V.....Hz.....phase |

| Measurement data: | stage 1 | stage 2 |
|---|---|---|
| Rotary motion of the motor: | Right / Wrong* | Right / Wrong* |
| Power consumption of the motor, L1: | ..... Amper | ..... Amper |
| Power consumption of the motor, L2: | ..... Amper | ..... Amper |
| Power consumption of the motor, L3: | ..... Amper | ..... Amper |
| Measured supply voltage: | .....V.....Hz | .....V.....Hz |

| Description of the work performed/ characteristics: | | |
|---|---|---|
| Visual inspection: damage / wear / scaling / contamination / foreign object is visible: no / yes* Location:..... Removed / Eliminated: yes / no*<br>Springs/ bolted joints: wrong / right* Sail-cloth is spread: yes / no*<br>Starting the ventilator is allowed: no / yes* (special electrician / mechanical engineer will allow it)<br>Check: vibration of the ventilator is unusual: no / yes*<br>Measurement after checking the rotary motion of the motor: power consumption, output voltage, motor protection setting.<br>Equipment is left in ready-to-operate status: yes / no* | | |
| Commissioning person's name: | Commissioning person's telephone number: | Commissioning person's license number: |
| | | |

| Commissioning person's notes: | Customer's / Recipient's notes: |
|---|---|
| | |

**The commissioning does not include adjustment, air technology measurement, vibration check** and it does not exempt the contractor from the obligation of adjustment. It must be insured by measurements – and it must be documented in the adjustment/ventilation measurement record – that the operating point of the ventilation equipment (hereinafter ventilator) is not in the instable part of characteristic curve of the ventilator (the operating point of the ventilator must be at the stable part of the characteristic curve, otherwise, the ventilator might suffer damage). It is the contractor's task to check the operational vibration and the own vibration of the ventilation system formed in the course of building the ventilator and the air passage network together. Operating the built-in ventilator at the critical frequency even for a short period of time can cause the failure (braking of the parts, vibration) of other elements of the ventilator and/or the ventilation system. Besides the commissioning and adjustment of the ventilator it must be ensured that it will not work at the critical speed range in any operating status. This must be determined by a specialist. Operating at the inappropriate speed will lead to the loss of warranty. Neither the manufacturer, nor the supplier company take the responsibility for damages arising from this operating.
The appropriate, filled out and signed **commissioning record** and the presence of the appropriate, filled out, signed **adjustment/ventilation measurement record** (described in the previous paragraph) are the conditions of the distributor warranty. Please send the two documents above to the distributor via one of the options below, otherwise, no warranty can be enforced to the equipment(s).

| Commissioning person's signature | COMMISSIONED: | Customer's / Recipient's signature: |
|---|---|---|
| | Yes*<br>Yes, by observing the notes*<br>No*<br>* the applicable answer should be underlined | |

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

HV-VENT THE FAN FACTORY