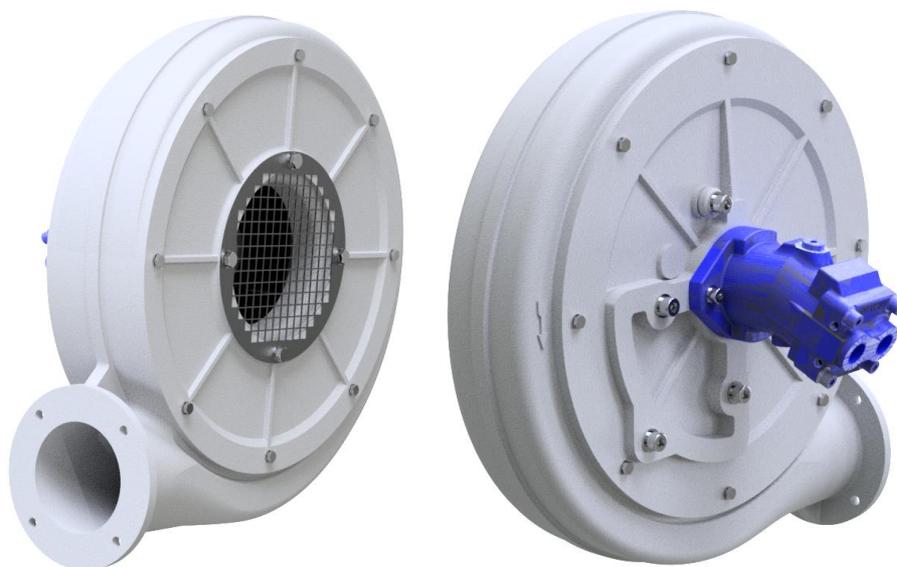


**OPERATION AND ASSEMBLY INSTRUCTIONS
OF CENTRIFUGAL FANS OF TYPE
HPB-HD**



INTRODUCTION

This manual applies to the fan listed on the title page. It is a source of information necessary for safety and proper operation. It should be read carefully before any use of the unit, the requirements contained therein should be followed, and it should be kept in a place where it is accessible to maintenance personnel and other plant services. If you have any doubts about the use of the fan, contact the manufacturer.

Detailed guidelines for the use of electrical components are presented in their documentation and on the markings - they must be followed.



Upon receipt of the fan, please check:

- whether the device is in accordance with the order
- whether the data on the nameplate of the fan corresponds to the requested parameters.
- whether the fan was not damaged during transport (e.g. whether there are dents/cracks).
- whether the documentation of the hydraulic components used is attached to the fan.

If any abnormalities are found, please contact the sales point or SERVICE of Venture Industries Group

1. GENERAL DATA

1.1 Device information

- The fan is an unfinished machine within the meaning of the Machinery Directive 2006/42/EC.
- The device is intended for use by properly trained, qualified adults, for use in an industrial environment. The fan is not intended for domestic or similar use.
- The device is designed to transport clean air. MTA fans are also suitable for the transport of slightly dusty medium -prior contact with the manufacturer is required. It is forbidden to transport explosive mixtures, solids (not applicable to dusts approved by the manufacturer for MTA), liquids, abrasive substances, chemically aggressive compounds. The minimum temperature of the transported medium is -20°C, the maximum is specified on the nameplate.
- The fan should be protected from the influence of atmospheric conditions (e.g. snow, rain, excessive sunlight, lightning). The device is not intended for outdoor installation. The fan environment must not contain explosive mixtures, abrasive substances, chemically aggressive compounds, viscous substances, liquids, substances with high humidity. The maximum ambient temperature is specified on the product nameplate, the minimum is -20°C.
- The device must not be exposed to radiation (such as microwave, ultraviolet, laser, X-ray).
- The fan impeller is balanced in accordance with the minimum class G2.5 according to ISO 1940-1, and the entire fan structure in accordance with the BV-3 category according to ISO 14694.
- Description of the fan design is shown in Appendix D.
- Additional information on the application of the fan is placed on the unit in the form of markings. More information is presented in Appendix A.
- The hydraulic motor is designed to be powered by mineral-based hydraulic fluid. The use of other fluids is possible, but may require modification of the unit. In this case, please contact us and provide the characteristics of the fluid.

1.2 General risks and guidelines

During the entire life cycle of the fan, special attention should be paid to the following **risks and guidelines**:

1.2.1 moving parts

-The fan is equipped with moving parts (e.g., fan's impeller), contact with which may cause serious injury or death. Do not use the fan unless guards and protection against contact with rotating parts have been applied.



1.2.2 suction power

-The fan features high suction power. Clothes, hair, foreign elements and even body parts can be easily sucked in. It is forbidden to approach in "loose" clothing and to extend your hand towards the inlet of the running fan. Make sure that the fan is used in a way that eliminates the possibility of sucking in foreign elements.

1.2.3 ejected items

-The air on the discharge side of the fan has high energy. Parts sucked in and inside the unit may be ejected at high speed. The fan has a stable, reliable structure; however, due to failure or misuse, parts (including accelerated parts with high kinetic energy) may fall out of the fan. Before starting and during operation of the fan, make sure that there are no objects that can be sucked in near the inlet and that there are no persons in the direct flow of the conveyed medium and on the inlet and outlet sides. Do not operate the fan unless the appropriate guards are used on the inlet and outlet sides and on the moving parts.

1.2.4 sharp edges

-At the stage of production, the sharp ends of the fan are mitigated, however, it may have edges that if touched may cause injury. The use of appropriate protective gloves is recommended.



1.2.5 inertia

-The device is characterized by high inertia. If it is not permanently fixed, it may move uncontrollably when turned on. The device can be started only after proper installation.

1.2.6 noise

-The sound pressure level depends on the operating point of the fan. Check the sound pressure level and use mufflers and/or individual noise protection measures for personnel if the noise is too high.

1.2.7 materials

-In case of fire or transport of unsuitable medium - fan components may generate vapors hazardous to health.

1.2.8 operating environment

-The operating fan creates a pressure difference. In installations, rooms where a certain pressure and amount of air is required (e.g., rooms where combustion takes place), it must be ensured that there is no shortage/overflow of air.

1.2.9 temperature (hot surfaces)

-The housing and components of the device take on the temperature of the transported medium. During operation (due to the compression process, among other things), the temperature of the medium, housing and components of the device increases. The motor and hydraulic components heat up to a high temperature. Appropriate measures must be taken to protect against burns and the occurrence of fire.



1.2.10 unexpected startup / power connection

-Before performing any work on the fan (e.g., installation, maintenance and inspection, disassembly), it must be completely and reliably disconnected from the power supply (check the absence of pressure in the system). Ensure that the power supply is not connected while work is being carried out on the unit, and that moving parts of the unit do not move.

-Take appropriate steps to protect against high pressure prevailing in the system prevent unauthorized access to hydraulic components.

-The fan is not equipped with a control system - connecting the hydraulic pump to the power supply causes immediate start-up. The device is not equipped with a system that permanently shuts it down in the event of a temporary loss of pressure in the system, due, for example, to a pump stoppage.

-In case of impeller blockage - its unblocking may lead to sudden movement. Appropriate steps should be taken to prevent blockage of the impeller, and in case of blockage, the fan should be completely disconnected from the power supply and repaired.

-After disconnecting the power supply, the fan continues to work for a certain period of time (moving parts move) under the influence of accumulated energy.

1.2.11 usage

- Improper installation and/or operation may lead to damage to the device and the occurrence of a hazardous situation. The unit may only be installed, maintained, dismantled and operated by qualified and authorized personnel, in accordance with health and safety rules, company safety rules and the relevant country's legal regulations (including the relevant electrical authorizations). Personnel must be familiar with the reaction effects that the fan may cause.

- It is forbidden to use (work on) the device in a disassembled/incomplete state.

-When performing work on the unit (e.g. maintenance, installation), the surroundings of the fan must be protected from access by unauthorized persons.

- Any modification of the unit is not allowed. Complicated maintenance works, e.g. requiring disassembly of the motor, impeller, should always be performed at the SERVICE of Venture Industries Sp. z o.o. or outside the service - after obtaining the manufacturer's approval, according to additional guidelines. Incorrect installation may worsen operating parameters, lead to damage to the device, as well as to the occurrence of a dangerous situation.

1.2.12 Dust deposition

- It is necessary to counteract the accumulation of dust, deposits on/from the fan. Dirt deposited on: shrouds - causes a decrease in the performance of the fan; impeller - may cause improper balancing; fan housing and motor - may impede cooling. In the area of hot surfaces (see 1.2.9) - can catch fire.

1.2.13 presence of an explosive zone

-Contact of the fan with an explosive medium will cause ignition. It is forbidden to use or store the fan when there is an explosive atmosphere inside and/or around the unit.



2. TRANSPORTATION AND STORAGE

2.1 transport and storage guidelines

-The fan must be transported and stored in its original packaging, without exposure to excessive shocks. The device must be located in a place sheltered from the weather, in a dry and ventilated environment, free from substances harmful to the device -Do not transport, store the device in rooms where artificial fertilizers, chlorinated lime, acids, other aggressive chemicals are collected. It is necessary to protect the fan from getting foreign bodies inside.

-During transport and storage, the fan should be protected from mechanical damage, including crushing. During handling, the device must not be violently lowered.

-The device should be lifted by the elements of the housing. Do not lift the device by the elements of the hydraulic motor.

When lifting, the device must be stable.

-Do not go under the load being carried. If broken, a falling device can cause serious injury or death.

-We recommend that the storage period of the device should not exceed one year. After long storage, check the condition of the fan before installation (Chapter 5).

3. ASSEMBLY AND INSTALLATION

3.1. General information

-Installation of the fan should be carried out in accordance with the guidelines specified in section 1.2.

-The device is not a ready-to-use product (in the meaning of Directive 2006/42/EC) - before application it must be ensured compliance with the requirements of the Machinery Directive 2006/42/EC. After installation, the device must meet the requirements of EN ISO 12100, EN ISO 13857, EN ISO 13850 and EN 60204-1.

-Before installation, remove temporary items that protect the fan from contamination (e.g., cardboard, foil, inlet and outlet caps - not to be confused with covers) - Leaving them in place during start-up may damage the unit. Ensure that the device does not bear signs of damage.

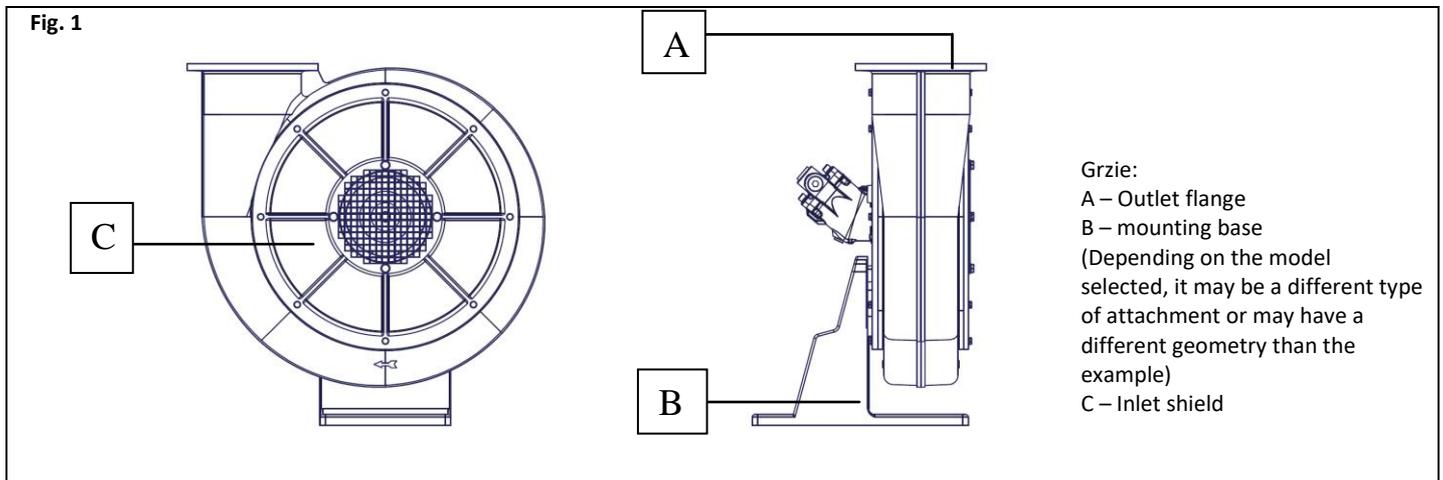
-Ensure that no foreign objects (e.g., mounting parts, tools) are inside the fan or in its vicinity, the fan is properly secured after installation (including tightened fasteners). Acceptance of the fan should be carried out in accordance with Annex- B.

When making mechanical connections, increased precautions must be taken to prevent particles and/or debris from entering the fan, which can damage the unit.



3.2 Installation information

-The fan should be installed as shown in Fig.1, in the horizontal position of the motor shaft, with the mounting base (Depending on the model selected, it may be a different type of attachment or may have a different geometry than the example) at the bottom. Use all holes located in the fan mounting foot for installation. The ventilation system should be connected to the outlet flange and/or inlet disc (using a dedicated inlet flange) - all mounting holes should be used. Use fasteners secured against loosening.



-Fan support structure must be strong enough to withstand the weight of the fan and the vibrations it may generate (including fan malfunction). The fan must not be subjected to vibration.

-The fan, when used in an installation, must be protected on the inlet and outlet sides from contact with moving parts (impeller) in accordance with ISO 13857. Note: Some models may already be equipped with a suitable inlet guard.

-The fan must be protected against intake and ejection of foreign elements (see 1.2.3). Inlet and outlet guards must meet IP20 requirements according to EN 60529 Note: Some models may already be equipped with a suitable inlet guard. If, in spite of the safeguards used, there is still a risk of foreign elements entering the fan - additional solutions should be used.

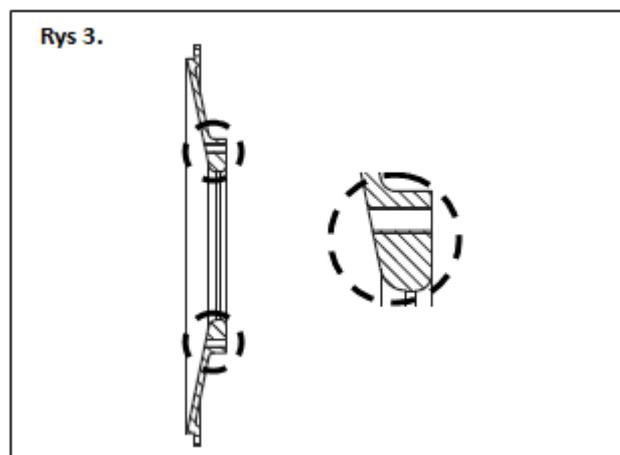
-It is recommended to use measures to minimize the transmission of vibrations from/to the fan. In the case of flexibly seated fans - the connection on the inlet and outlet side must also be made in flexible form.

-The device should be installed at a safe distance from combustible elements (attention to hot surfaces of the device).

-Realization of the connection of hydraulic lines should be in accordance with the recommendations of the manufacturer of the hydraulic motor, in order to achieve the desired operating parameters and the correct direction of rotation of the motor shaft.

-Solutions should be used to protect the user from being burned by hot parts of the device.

-When assembling performed from the inlet side, make sure that the fasteners do not extend beyond the outline of the fan housing from the impeller side (Fig. 3.) - the risk of contact between the fastener and the impeller.



3.3 Hydraulic connection guidelines

- The hydraulic system during operation is under high pressure. Before connecting, make sure that the system is not under pressure (for example, when connecting to the tractor's hydraulic system).

- If the hydraulic system is damaged, take the unit out of service until the fault is corrected.

- Use hydraulic oil in accordance with the parameters specified by the manufacturer.

- Never mix two types of oil together.

- If injured by a strong stream of hydraulic oil, seek immediate medical attention. Hydraulic oil can penetrate under the skin and cause infection. If oil gets into the eyes, flush them with plenty of water and if irritation occurs - contact a doctor. If oil comes into contact with the skin, wash the contaminated area with soap and water. Do not use organic solvents (gasoline, kerosene).

3.4 Direction of rotation of the rotor

Make sure that once the fan is installed and started up, its impeller will rotate in the correct direction. For this purpose, after attaching the fan to a suitable structure, with extreme caution and observing the requirements listed in Chapter 1 and 4. Operation of the fan with incorrect direction of rotation reduces the performance of the fan and may lead to its destruction. If the incorrect direction of rotation is found, disconnect the power supply completely, wait for the impeller to stop, and swap the corresponding power cords.

4. SERVICE

4.1 Operating guidelines

- Make sure that commissioning the device will not create a risk to the safety of personnel and property. Follow the guidelines specified in section 1.2.
- The fan is designed for continuous operation (S1) as standard.
- The device is adapted for operation in the specified characteristic area. Excessive volume of transported medium (capacity), start/operation of the device with fully open inlet and/or outlet, may lead to overheating of the hydraulic oil, resulting in a significant deterioration of its parameters and even damage to the entire installation.
- The operating parameters of the device (temperature of the medium, ambient, min and max.... capacities) refer to the rated speed.
- Repairs, replacements of components of the hydraulic system and its service should be entrusted to appropriately qualified persons.
- Hydraulic hoses should be replaced every 4 years regardless of their condition.
- Store used or expired oil in original containers or in hydrocarbon-resistant replacement containers. Replacement containers must be accurately labeled and properly stored.

5. MAINTENANCE, PERIODIC INSPECTIONS

5.1 Maintenance guidelines

- Subject the fan to regular periodic inspection and maintenance (Section 5.2).
- The condition of the hoses and hydraulic connections must be checked regularly. Oil leaks are unacceptable.
- Inspection and maintenance of the motor must be carried out in accordance with the motor documentation and its markings. Bearings should be replaced before the expiration of the operating time of the fan equal to the life of the bearings.
- To clean the structure, use a slightly moistened cloth, it is forbidden to use detergents and pressurized liquids, as well as tools that can scratch the surface of the device.
- The condition of hydraulic oil should be controlled by laboratory tests. Recommended following cleanliness: NAS 1638 class 9, SAE class 6, ISO/DIS 4406 class 18/15.
- Run the fan a minimum of once a month (a minimum of several impeller revolutions).
- Ensure that no foreign objects (e.g., mounting parts, tools) are inside or near the fan, the impeller can move freely, and that the fan is dry and properly protected after maintenance, inspection. After cleaning the unit, the fan should be run at maximum speed for a minimum of 30 minutes.



- During inspections, pay special attention to the following risks:

| sludge and contamination of the fan | The accumulation of dust, deposits on the fan should be prevented. Dirt deposited on: covers cause a decrease in the performance of the fan; fan housing and motor - can impede cooling. In the area of hot surfaces - can catch fire. | | | | | | | | | | | | |
|-------------------------------------|--|---------------------|----------|---------------------|--|------|-------|------|--------|----------|----------|----------|----------|
| corrosion | Corrosion can lead to mechanical damage to the fan. Do not use the fan if corrosion is present. | | | | | | | | | | | | |
| overload | Exceeding the permissible temperatures may indicate, among other things, inappropriate selection of the fan for the installation, mechanical damage to the device (e.g. impeller, bearings), incorrect hydraulic connection. It is necessary to control the value of temperatures at the operating point, and if they increase, determine the cause and subject the device to repair. The value of motor operating temperatures should be within the range specified by the manufacturer. | | | | | | | | | | | | |
| vibration | Excessive vibration can cause mechanical damage to the fan or mounting structure. An increase in vibration may indicate, among other things, bearing damage and loss of impeller balance. The vibration value of the fan bearings at the operating point should be monitored, and if it increases to a value above the initial value, the cause of consideration should be determined and the unit should be repaired. The maximum vibration on the bearings of the fan (perpendicular to the impeller axis) used in the installation must not exceed the value specified in the table: <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2">Rigid mounting *</th> <th colspan="2">Flexible mounting *</th> </tr> <tr> <th>peak</th> <th>r.m.s</th> <th>peak</th> <th>r.m.s.</th> </tr> </thead> <tbody> <tr> <td>6.4 mm/s</td> <td>4.5 mm/s</td> <td>8.8 mm/s</td> <td>6.3 mm/s</td> </tr> </tbody> </table> | Rigid mounting * | | Flexible mounting * | | peak | r.m.s | peak | r.m.s. | 6.4 mm/s | 4.5 mm/s | 8.8 mm/s | 6.3 mm/s |
| Rigid mounting * | | Flexible mounting * | | | | | | | | | | | |
| peak | r.m.s | peak | r.m.s. | | | | | | | | | | |
| 6.4 mm/s | 4.5 mm/s | 8.8 mm/s | 6.3 mm/s | | | | | | | | | | |

*according to ISO 14694

5.2 Inspection and maintenance of the device

- The intervals between routine checks and inspections should be determined by the user on the basis of observation of the device and so selected as to take into account specific operating and operational conditions. At the same time, the inspection should not be less frequent than that shown below.
- If abnormalities are detected, the device should be taken out of service and repaired / cleaned (if found dirty). Appendix C shows examples of reasons for emergency operation of the device.
- Personnel operating the unit must be familiar with the operating conditions of the fan, and in the event of abnormal operation should shut down the unit for inspection.
- Detailed information on the components used and their tightening torque is available upon request.

Recommended daily inspection, but not less than once a week.

- the device is not damaged, works properly and is stable,
- there are no leaks,
- the device does not emit unusual noises and does not get excessively hot,
- the unit is clean (general inspection), there is no corrosion (general inspection),
- The hydraulic lines are not damaged,
- the unit is properly sealed,
- covers are clean and not damaged.

Minimum monthly inspection

- the pressure value has not increased from the initial value, at the same operating point,
- the vibration value has not increased from the initial value,
- the device and covers are clean,
- the filter is not clogged.

Inspection at least once a quarter, but at least every 6 months and 3,000 hours of operation

- there is no corrosion
- the condition of fasteners and hydraulic lines is adequate (fasteners are properly tightened),
- the protective apparatus is in working order and properly set, the electric shock protection is effective,
- the hydraulic oil has adequate cleanliness,
- the system is not excessively noisy and does not emit unusual noises,
- During operation, the system maintains a pressure no greater than the initial value at the operating point,
- The structure is complete, the components have not been damaged

We recommend that routine inspections be carried out by VENTURE INDUSTRIES SP. z o.o. service.



6. REPAIRS, WARRANTY

Only original spare parts should be used. Repairs to fans may be performed only at the Venture Industries Sp. z o.o. service center or outside the service center - after obtaining the manufacturer's approval. Warranty conditions are specified in the warranty card of the device.

7. DISMANTLING AND DISPOSAL

Disconnect the device from the power supply, and then disassemble it following the guidelines set forth in Chapter 1. Please dispose of all remaining packaging items in the appropriate recycling containers, and deliver said equipment to the nearest waste disposal company.

APPENDIX - A (Product markings)



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VENTUR

VENTUR TEKNISKA AB
VENTUR FINLAND OY
VENTUR DEUTSCHLAND GmbH

[1]

Mot.type: [2]

MAX [3] rpm

dp max:[4] kPa

Weight: [5] kg

SN: [8]

T max: [6] degC

Q max [7] m³/h

Art. No.: [9]

[1] - full name of the product

[2] - type of motor used

[3] - maximum allowable fan speed

[4] - maximum operating pressure of the system

[5] - device weight

[6] - maximum temperature of transported medium

[7] - maximum flow rate

[8] - unit serial number

[9] - Device Article No.

Additional information placed on the device:

- direction arrow informing about the correct direction of impeller rotation
- arrow informing about the correct direction of medium flow
- markings on the safe use of the device.

APPENDIX - B (equipment acceptance form)

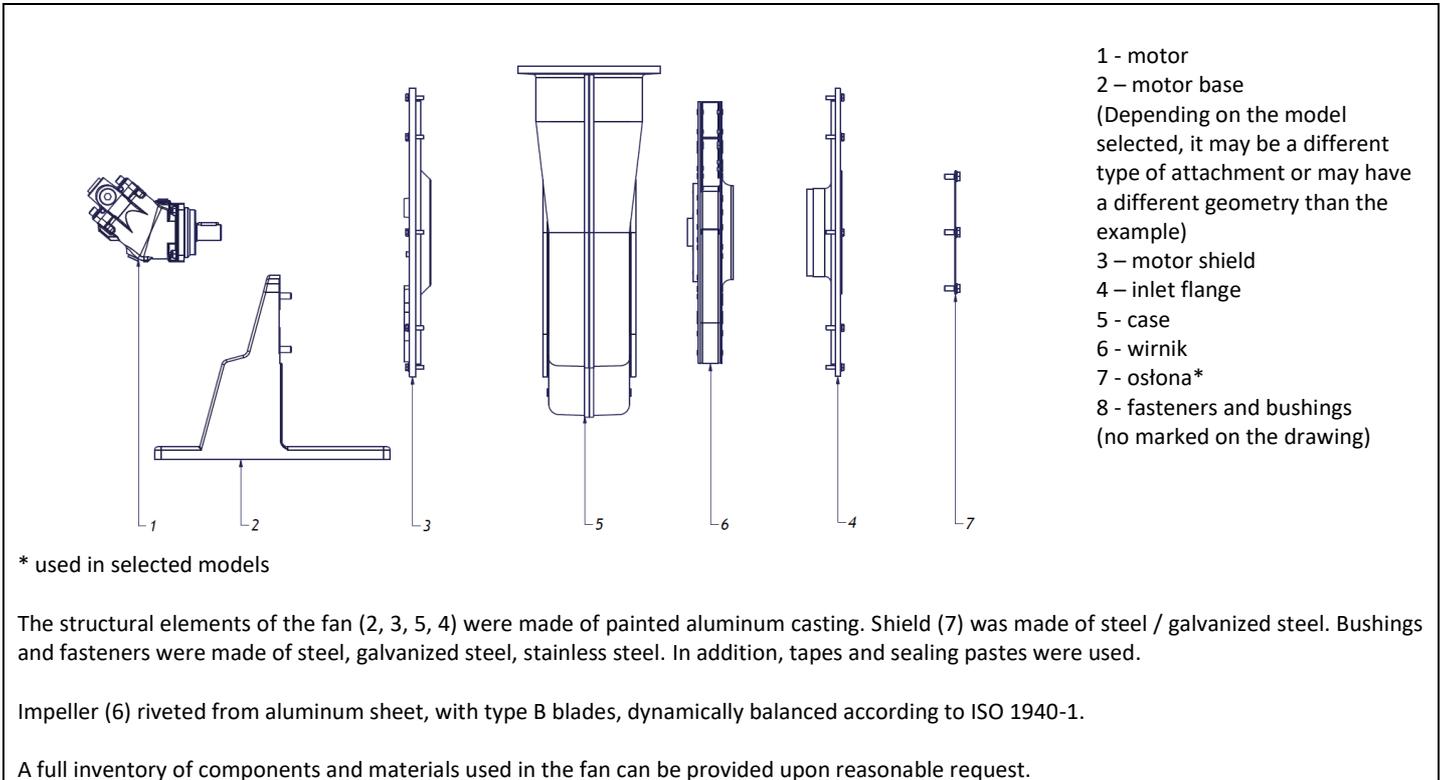
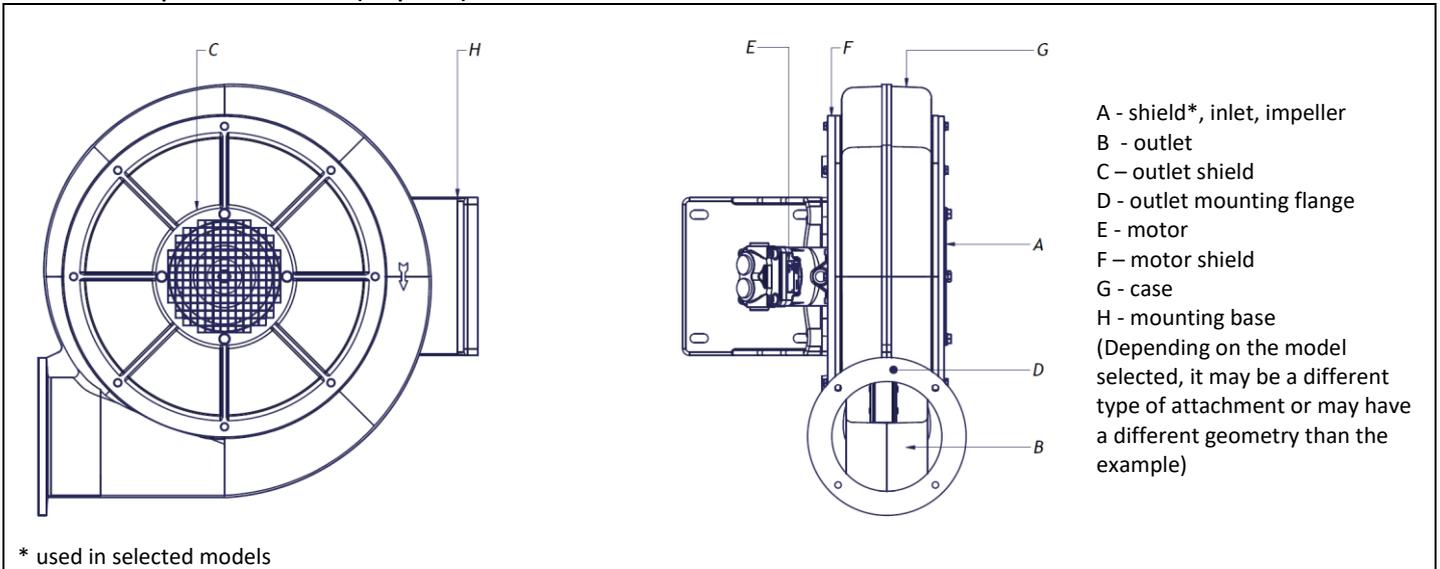
| Before starting | Confirmation of the verification |
|--|----------------------------------|
| The type, design of the fan is in accordance with the order. | |
| The fan is not damaged. | |
| The fan is clean and free of foreign objects. | |
| The fan has been securely and solidly planted in the workplace. | |
| The fan is leveled. | |
| The hydraulic lines have been properly tightened. | |
| The ambient temperature and transported medium of the fan is in accordance with the nameplate. | |
| Proper hydraulic safeguards were used. | |
| The fan has been grounded. | |
| The capacity of the pump is sufficient for the absorption capacity of the motor to achieve the established parameters of the fan. | |
| A system that allows disconnection of the supply hydraulic lines was used. | |
| People operating the fan have familiarized themselves with the operating instructions. | |
| Appropriate guards were used on the inlet and outlet sides. | |
| | |
| After starting the fan (period of continuous operation for a minimum of 30 minutes) | |
| The reading values and settings of the vibration measuring device were recorded so that they would be available in the future. | |
| The values of the readings and settings of the pressure measuring device have been saved so that they will be available in the future. | |
| The temperature value for each phase of the fan is not higher than the value within the manufacturer's allowable range. | |
| The vibration value on the motor bearings is not higher than the permissible value. | |

APPENDIX - C (Example of malfunction).

| INDICATIONS | POSSIBLE CAUSE |
|---|--|
| Excessive vibration or noise | <ul style="list-style-type: none"> - Worn out or damaged impeller; - Poorly leveled fan - Dirt deposited on the impeller caused loss of balance; - Loss of impeller balance; - Parts rubbing; - Failure or wear of bearings; - Failure of the measurement system responsible for signaling excessive vibration; - Deformed motor shaft; - Loose impeller mounting bolt, rotor loose on motor shaft; - Motor failure (wear / damage to discs, bearing housings); motor seizure due to poor oil quality; |
| Engine overload | <ul style="list-style-type: none"> - Friction of fan impeller against housing component; - Failure or wear of bearings; - Failure of the circuit breaker or protection system; - Excessive pressure in the system; - Exceeding the allowable motor speed; - Insufficient fan capacity. |
| Failure to start fan. | <ul style="list-style-type: none"> - Impeller rubs against the fan housing or there is a foreign object inside (e.g., a tool accidentally left during installation); - Incorrect system parameters, too low pump capacity; - Damaged, or leaking hydraulic line; - Pump failure; - Motor incorrectly connected or damaged; - Supply pressure too low during start-up. |
| Triggered devices Protection During operation and overheating | <ul style="list-style-type: none"> - Overloading of the hydraulic motor; - Incorrectly selected safety devices; - Incorrectly selected cross-section of supply lines; - Too low purity of hydraulic oil; - Failure to properly vent the system. |
| Fan capacity too low | <ul style="list-style-type: none"> - Equipment failure; - Reduced pressure of the motor supply system; - Obstructions in the ventilation system; - Damaged bearings. |

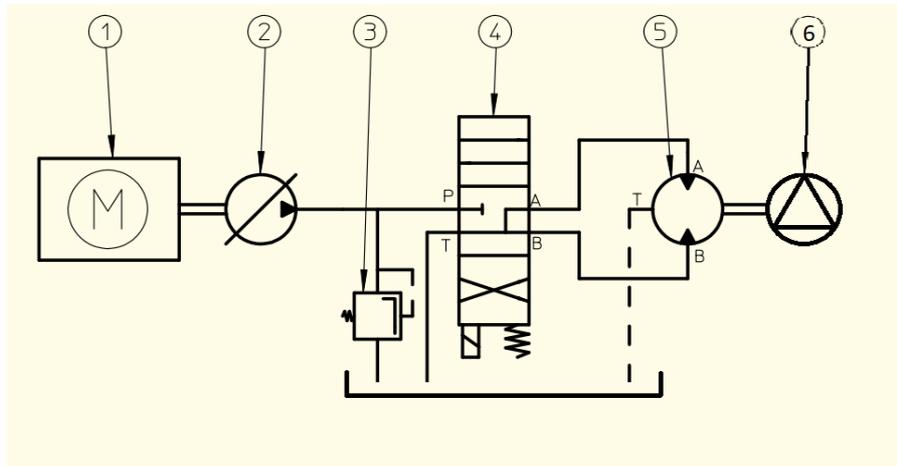
APPENDIX - D (Schematic diagram of the fan).

General description of the device (simplified)

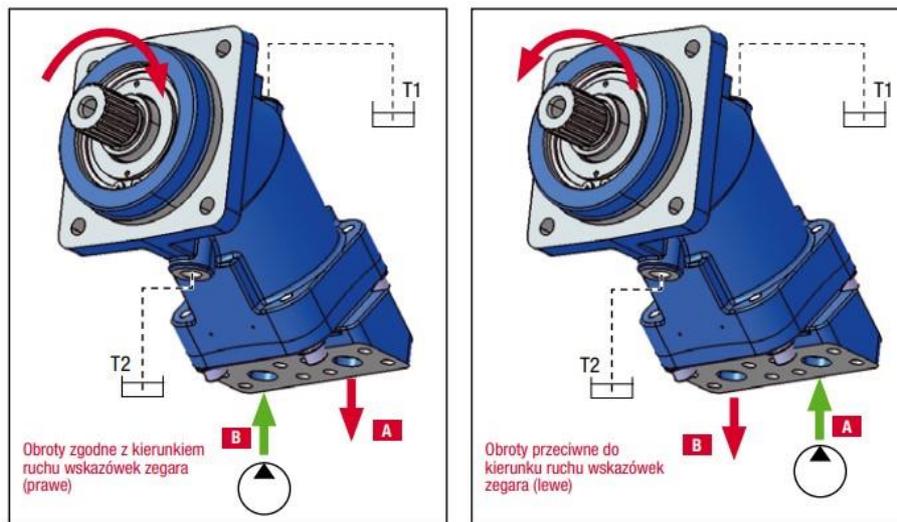


APPENDIX - E (example of connection of a hydraulic motor)

| | |
|---|----------------------------|
| 1 | Motor |
| 2 | Variable displacement pump |
| 3 | Overflow valve |
| 4 | Distributor |
| 5 | Hydraulic motor |
| 6 | Radial fan |



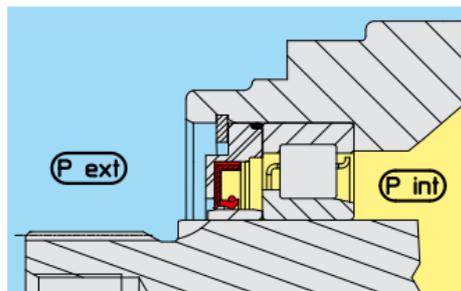
Direction of rotation



Clockwise (right) rotation

Counterclockwise (left) rotation

Runoff pressure



To avoid excessive pressure on the shaft seal, it is necessary to connect a T1 or T2 drain. The maximum permissible internal pressure depends on the motor speed.

However, following these tips will help you avoid problems when using the device:

- maximum internal pressure (P int) regardless of speed (continuous): 4 bar (60psi);
- maximum internal pressure (P int) regardless of speed (peak): 5.5 bar (80psi);
- minimum pressure in the motor housing must be higher than the ambient (external) pressure (P ext).

* The above recommendations for the hydraulic motor are illustrative, the overriding document is the manufacturer's manual of the hydraulic motor used.