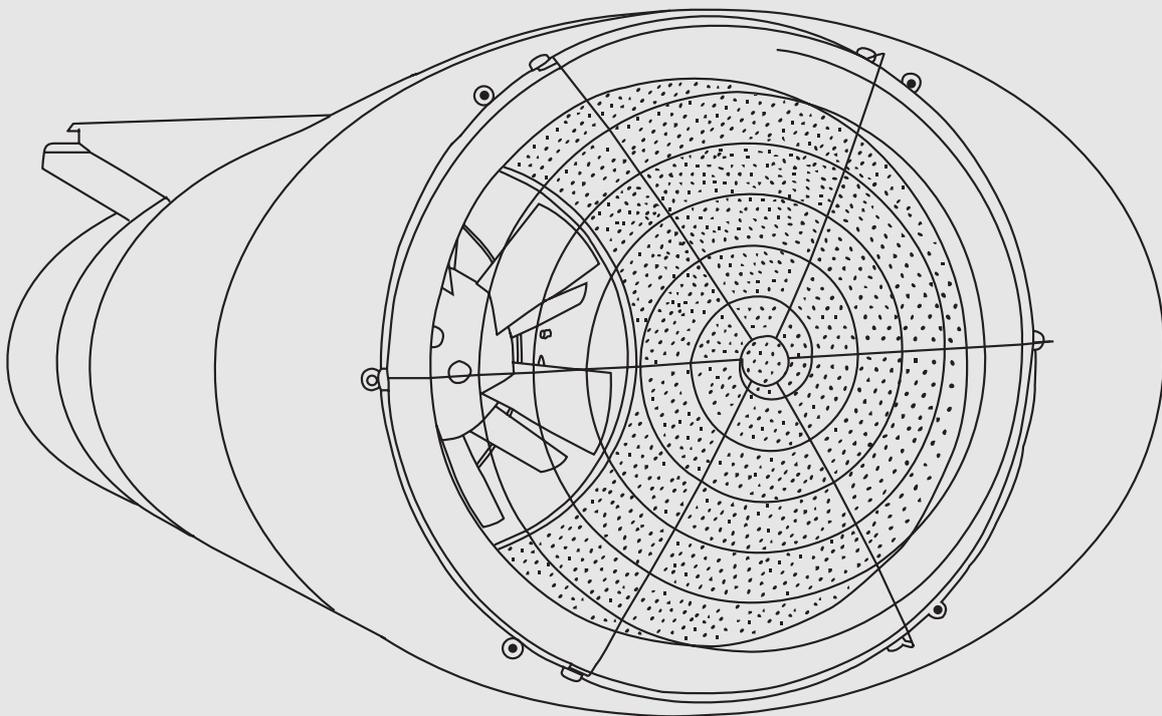


Building & Industry

**NOVENCO** 

SCHAKO Group



# NOVENCO<sup>®</sup> Jet fans

## type AUO-ARO-AUZ-AUT-ART

### Installation and maintenance

# Novenco® jet fan types AUO/ARO - ARP/AUZ - AUT/ART - AZT

## Installation and maintenance

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### 1. Application

The Novenco jet fans are standard car park ventilation fans suitable for conventional ventilation and for smoke

control in the event of fires in car parks.

Type	Temperatures
Air	-20 to 55 °C
Environment	-20 to 55 °C
Fire 1	F200 200 °C for 120 min.
	F300 300 °C for 60 min.
	F400 400 °C for 120 min.

**Table 1.** Temperature ranges

1. See also specifications on motor plate.

#### 1.1 Reading guide

Please read this complete guide, before beginning installation or maintenance.

Icons	Description
	Risk of damage to equipment
	Risk of injury or death

**Table 2.** Icons in guide

### 2. Handling

 Avoid exposure of fans and motor parts to shocks, as these can result in imbalance and deformations. Motor bearings and fan components are vulnerable parts.

#### 2.1 Marking

The Novenco AUO/ARO-ARP/AUZ-AUT/ART-AZT jet fans have nameplates and motor nameplates on the fan casings.

#### Fan nameplate information

- Manufacturer information
- Product type, e.g. AUO 380/160-4
- Serial no.
- Fan speed
- Year of manufacture
- Weight
- CE-marking
- For smoke fans also
  - Air performance
  - Max. temperature
  - Working period
  - Category or class

#### Motor nameplate information

- Manufacturer information
- Power consumption and efficiency
- Voltages
- RPMs
- Weight
- Terminal connections

Documentation and instructions from the motor manufacturer are included with the fans. Refer to these when performing maintenance on the fans.

#### 2.2 Fan weights

Types and sizes	Weights [kg]
AUO/ARO 290	80
AUO/ARO 380	110
AUO/ARO 500	160
ARP 340	100
AUZ 340	78
AUT/ART 400	63
AZT 280	35
AZT 355	42
AZT 450	70

**Table 3.** Fan weights

#### 2.3 Design conditions

The AUO/ARO-ARP/AUZ-AUT/ART-AZT fans are designed for operation at standard temperatures from -20 to +55 °C. Jet fans for hot smoke removal are certified according to the EN 12101. Refer to the Novenco product declarations of performance for specific certification.

#### 2.4 Transport and lifting

The fans are delivered on pallets or bearers to allow for forklift transport. Transport and lifting must be done with care, as the fans are vulnerable to vibrations and shocks. These can result in imbalance and deformations. Refer to the weights in the shipping papers, on the motor and fan casing nameplates and in section "2.2 Fan weights".

 Any transport or lifting of the fans must be in accordance to current directives, regulations and guidelines for safety. Pay attention to limitations and directions for use of lifting gear.



Verify that the fans and accessories are undamaged upon receipt. Also, spin the rotors by hand to see they rotate freely in the fan casings. Inform the carrier and Novenco immediately of damages.

### Transport

- **Jet fans on pallets**  
Transport and store these on pallets.
- **Jet fans bolted together with transport brackets**  
Transport and store these as received, i.e. on the pallets and bolted together with the brackets.

### Lifting

- **Lift in eyebolts fitted in the suspension brackets**  
Preferably, fit four eyebolts (optional accessory) in a square configuration in the suspension brackets on top of the fan casing.  
**AZT:** Remove the base plate on top of the fan casing, if this is mounted, to access the mounting plate. Use a strap through the two large holes in the plate. These are at the fan centre of gravity.

### 3. Storage

Correct storage is important for the function and durability of the fans.



Damages due to incorrect storage void the warranty.

Conditions	Specifications	Comments
Outdoor	One month	<ul style="list-style-type: none"> <li>• Packaging must be intact</li> </ul>
Indoor or sheltered	Max. six months	<ul style="list-style-type: none"> <li>• For unprotected fans with no or broken packaging</li> <li>• Ventilated location</li> <li>• No condensation</li> </ul>
Prolonged	Max. two years	<ul style="list-style-type: none"> <li>• Indoor</li> <li>• Remove packaging</li> <li>• Ventilated location</li> <li>• No condensation</li> <li>• Turn rotor 20 times every six months</li> <li>• Add additional anti-corrosive coating on motor shaft</li> <li>• Change motor ball bearings after two years of storage</li> </ul>
Vibrations	No	<ul style="list-style-type: none"> <li>• Location must be vibration free</li> </ul>
Temperatures	-20 to 55 °C	<ul style="list-style-type: none"> <li>• Constant temperature, preferably 20 °C</li> <li>• Ventilated</li> <li>• No condensation</li> </ul>

**Table 4.** Storage recommendations

Conditions	Specifications	Comments
Humidity	Below 70%	<ul style="list-style-type: none"> <li>• Avoid condensation</li> <li>• Exceedance requires airtight packaging of complete fan and use of a moisture absorbent agent such as silica gel</li> </ul>

**Table 4.** Storage recommendations

## 4. Installation

### 4.1 Preparations

Complete the below tasks to ensure a safe work environment and fan functionality.

#### Before installation

- Unpack the fan with care.
- Check that the rotor rotates freely in the fan casing with equal blade tip distances to the casing around the circumference.
- Ground the fan before installation to avoid static electricity. For example, by assembly on non-conductive mats.
- Clear the fan installation location to ensure free and unimpeded airflows through the inlet and outlet. Optimum airflow from all sides removes risk of stall, gives best performance and keeps sound levels down.
- Secure the installation to at least IP20, i.e. protect people and surroundings against solid objects up to 12 mm.  
Also, install wire guards on fans where there is direct access to the rotor. Wire guards from Novenco can be installed as close as 120 mm before and after the rotor.
- **AZT:** Release the fan for installation by removal of the screws that secure it to the transport brackets. Save the screws and reinsert them in the corresponding holes in the casing after installation.



The vibration level of the installation depends on how the fans are installed, the operational conditions and the natural frequency of the foundation and supports.

Follow the below guidelines to avoid resonance.

- **Soft suspension:** Fan is fixated through springs or dampers. The natural frequency [Hz] of the system should be at least 20% below fan speed.  
Soft suspensions are available from Novenco.
- **Stiff suspension:** Fan is fastened to a duct or a hard surface. The natural frequency of this system should be at least 20% above fan speed.
- **Elastic structure:** Fan is fastened to an elastic structure. The natural system frequency should be at least 20% higher or lower than fan speed.

The owner is responsible for compliance with the above requirements. Non-compliance affects the product warranty.

### 4.2 Installation



Jet fans that are installed within smoke reservoirs must be fastened to non-flammable materials only, which must meet current national requirements. In general, the jet fans must be mounted so that there is no risk of them falling down in case of fire.



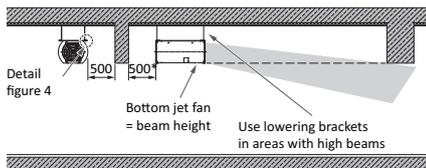
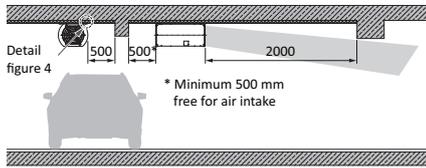
The jet fans must be fixed to a horizontal plane with a natural frequency at least 20% from the fan speed.

#### Installation of fans

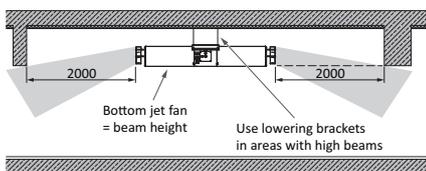
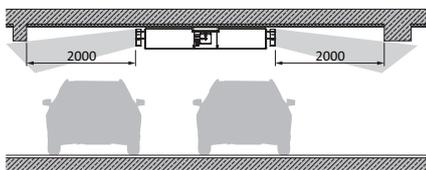
1. Verify the installation location and check the distances to nearby obstructions. See figures 1 and 2 below.
    - On the inlet side, the jet fans require a free field of at least 0.5 m.
    - On the outlet side, unidirectional jet fans require a free field of at least 2 m.
    - For reversible fans there must be a free field of 2 m on either side.
- Notice:** Arrows on the fans indicate the airflow direction and rotor rotation.



It is essential for the performances and sound levels that the airflows are unimpeded and free from eddies.



**Figure 1.** Minimum distance requirements for unidirectional jet fans

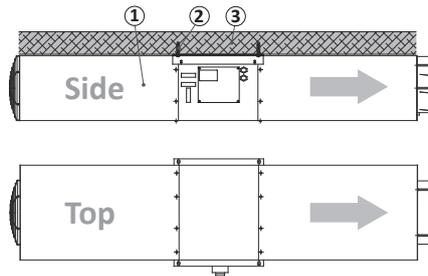


**Figure 2.** Minimum distance requirements for reversible jet fans

2. Drill holes in the ceiling in accordance to the installation footprint. See figure 7 on page 10.  
**AZT:** Use the ceiling plate as a drilling rig.



If unapproved expansion bolts for high temperature are to be used, these must be made from steel, must be size M8 or bigger and must be mounted twice as deep as recommended, at least 60 mm deep. The static load must not exceed a pull of more than 500 N.

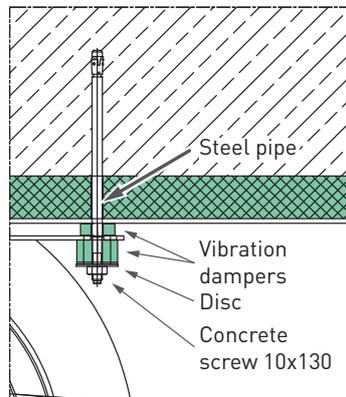


- item 1 Jet fan
- item 2 Expansion bolt
- item 3 Ceiling

**Figure 3.** Principle of installation

3. **Optional:** Install lowering brackets in the ceiling, if applicable.
4. Place the fan on a platform that can be raised, for example a scissor lift.
5. **AUO/ARO-ARP/AUZ-AUT/ART:** Fasten the fan in the suspension points to the ceiling or, if applicable, to lowering brackets.

**Notice:** It is recommended to install vibration dampers. These are optional and not included as standard.



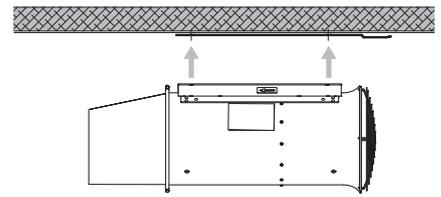
**Figure 4.** AUT: Example of installation with vibration dampers

6. **AZT:** Prepare the ceiling plate for installation by insertion of four threaded bolts with washers from the top in the holes for fan mount. If applicable, install lowering brackets in the ceiling. Mount the ceiling plate in the two centre holes of the plate. See figure 7 on page 10.



Expansion bolts certified for fire conditions must be used and loaded according to the approval.

Lift the fan in place and fasten it in the suspension bolts with nuts.



**Figure 5.** AZT: Secure fan to ceiling plate

7. Check that the rotor rotates freely in the fan casing.
8. **AUO/ARO-ARP/AUZ:** Remove the transport brackets on the underside of the fan casing. Reinsert the screws from the brackets in the casing.  
**AZT:** Reinsert the screws from the transport brackets in the casing.

### 4.3 Electric connection



The installation and connection to the supply network must be done by authorised personnel and according to current local legislation, e.g. the EU standard for electromagnetic compatibility (EMC).

### Electric connection

1. Check if current legislation prescribes installation of f.x. an emergency stop and include this in the installation.
2. Remove the lid on the external terminal box.
3. Connect the motor through a thermal relay based on the motor nominal current. Refer to the following information.

#### Connection references

- Motor name plate
- Order specification
- Appendix "D. Wiring" on page 11

Make the connections directly in the external terminal box.

4. Remount the lid on the terminal box.

### 4.4 Approval for operation

The installation must be approved with regard to operation and interaction. The person responsible for the operation of the system must initiate this approval test. The test must be confirmed.

The person responsible for the operation of the system must keep the approval test documents. For jet fans approved for smoke control, the documents must be

presented upon request from the authorities.

## 5. Start of operation

Perform the below steps every time the fans have been stopped.

### 5.1 Before start-up

Check the fans and installation location in accordance to the below checklist. Correct and improve as necessary.

#### Before start-up

- **Safe operation**  
Make sure that any wire guards on the suction side as well as guide vanes on the pressure sides are correctly mounted.
- **Clean fans**  
The fans must be clean and free from tools and objects that can affect the airflow.
- **Electrical connections**  
The electrical connections must be correct and in accordance to the prescribed requirements. Switch the fan power briefly On, then Off, to verify the rotational direction of the rotor. Refer to the arrow plates on the fan casings.

### 5.2 Start-up procedure

#### Start-up procedure

1. Start the fan.
2. Check that no abnormal sounds and vibrations are present.
3. Check that the vibration levels are acceptable.  
See section "6.4 Vibrations".
4. Check that the fan operates without abnormal sounds and vibrations after 30 minutes of operation.

In the very first 30 minutes of operation, the motor may use more power than stated on the motor plate. This is the running-in period. The amperage depends among other things on the temperature.



The fans are designed for continuous operation. The below kinds of operation may cause fatigue breaks in the rotors and endanger people.

- Operation with uninterrupted and repeated starts and stops
- Uneven flow velocity through the fans

Ask Novenco if in doubt.

## 6. Maintenance

Keep the fans in good and operational condition to ensure functionality, fan life and warranty.

### 6.1 Before maintenance



Disconnect the fans from the electrical system, before initiation of any kinds of service on the fans. Make sure the fans cannot start accidentally. Fans controlled by automation may start suddenly, unless they are disconnected. Fan units with external safety switches must be disconnected at the switches and secured, e.g. with locks. This is done in the fuse box or other centrally placed switch.

#### Switch off power supply for fans

1. Locate the central fan power supply.
2. Turn off the power for the fans.
3. Disconnect the power supply.
4. Lock the power switches.  
Alternatively, lock access to the power switches.

Service of the fans can now begin.

### 6.2 Intervals

Safe and proper function of the fans require maintenance at regular intervals. Faulty maintenance of fans covered by warranty voids the warranty.

Maintenance of the fans must include the following.

#### Maintenance checklist

- Inspection of each complete unit
- Repair and service of units
- Test of functionality

Fan types	Intervals
CO-fans	Once a year
Smoke fans	Every six months
Unused fans	Every three months

**Table 5.** Maintenance intervals

It is recommended to implement procedures in accordance with the above requirements.

### 6.3 Cleaning

Clean fans and silencers when needed by means of pressurised air or vacuum cleaning.



Do not use high-pressure water for cleaning the fans or silencers.

### 6.4 Vibrations

In the production, all fans are balanced to run without vibrations.

Vibrations that occur, when the fans are in operation, usually indicate accumulations of dust and dirt or foreign bodies on the rotor system. If ordinary cleaning cannot remove the vibrations, the fans must stay off-line and expert assistance be called in. Prolonged operation with vibrations present is likely to damage motor bearings and rotors.

Measure fan vibration velocities in accordance with ISO 14695 and with instruments that can measure Root Mean Square (RMS) vibration velocities. Refer also to ISO 13350:2015.

### 6.5 Motor

The fan motor is a key component, that require regular service to ensure safety, performance and warranty.



Service the fan motor in accordance to the motor manufacturer's maintenance instructions.

The motor bearings are greased-for-life and must be replaced according to the motor manufacturer's instructions.

### 6.6 Motor removal

Before beginning work on the motor, follow the procedure in section "6.1 Before maintenance".

References to specific items below are to figure 8 on page 11, unless noted otherwise.

#### Dismounting motor

1. Disconnect the supply cable from the terminal box (figure 6, item 6).
2. **AUO/ARO-ARP/AUZ-AUT/ART:** Support the fan, remove the nuts from the four expansion bolts item 1 and take down the fan.  
**AZT:** Support the fan and remove the nuts that fasten it to the ceiling plate suspension bolts. Take down the fan.
3. **AUO/ARO:** Remove set screws item 2 and dismount silencers items 03. Mark the silencers with tape so they are not mixed up.  
**ARP/AUZ:** Remove set screws item 2

and dismantle the silencers and suspension brackets. Mark positions of brackets and silencers with tape so they are not mixed up.

**AUT/ART:** Loosen and remove the wire guards in both ends (figure 6, item 11).

**AZT:** Loosen the two pairs of nuts and bolts, which hold the hose clamp together. Remove clamp and outlet cone. Also, remove the wire guard on the inlet.

4. Disconnect the cable from terminal box to motor.
5. **AUO-AUT/ART-AUZ-AZT:** Remove hub cap item 6 by removing screws item 4, and centre disc item 5. For AUZ and AZT, also remove the centre bolt item 13.  
**ARO-ARP:** Remove the rivets in the guide vane arrangement item 11 to remove the arrangement.
6. Dismount rotor item 7 by means of a puller fastened in two threaded holes of hub boss (M8 × 16 with distance 50 mm).
7. **AUO/ARO-ARP-AUT/ART:** Remove the four set screws item 8.  
**AUZ and AZT:** Remove the nuts and bolts, items 14 and 15.
8. Mark the motor position and direction of rotation for later remounting.
9. Dismount motor, item 10.  
**AUO/ARO-ARP-AUT/ART:** Remove the motor mounting flange item 9.  
**AZT:** Remove the four stiffeners items 16 that hold the motor.

Service the motor according to the manufacturer's instructions. These are included with the fan.

## 6.7 Mounting of motor

Assemble the fan after motor service.



Grease all bolts and screws before mounting.

References to specific items below are to figure 8, unless noted otherwise.

### Mounting motor

1. Mount motor, item 10.  
**AUO/ARO-ARP-AUT/ART:** Remount the motor with the set screws, item 8.  
**AUZ and AZT:** Remount the motor with bolts and washers, items 14 and

15. For AZT also mount the stiffeners, items 16.

2. **AUO/ARO-ARP-AUT/ART:** Check that the mounting flange item 9 is correctly located and that the motor shaft is centred in the fan casing, before tightening the set screws item 8.  
**AUZ and AZT:** Check that the motor shaft is centred in the fan casing, before tightening the bolts items 14.

Sizes	Torques [Nm]	
	Motor fastening (items 08 and 14)	Rotor fastening (items 04 and 13)
M6	9.4	6
M8	23	12
M10	45	20
M12	78	20
M16	190	25
M20	370	25

**Table 6.** Motor and rotor fastening torques

3. Mount the rotor item 7 on the motor shaft by means of a jack fastened in the threaded hole of the motor shaft. Press the rotor hub to contact against the motor shaft collar.



Leave out use of hammers or similar, as the motor bearings are sensitive to shocks.

4. Use a feeler gauge to check that the blade tip clearance is the same throughout the circumference. Adjust the motor position in the suspension arrangement with reference to table 7.

Fan size	Minimum [mm]		
	Std. temp.	F300	F400
AUO/ARO 290	1	1.9	2
AUO/ARO 380	1.5	2.2	2.5
AUO 500	1.5	2.2	3.1
AUZ 340	0.5	1.7	2.7
ARP 340	1.3	2	2.5
AUT/ART 340	1.3	2	2.5
AZT 280	0.5	1.5	2.3
AZT 355	0.5	1.8	2.8
AZT 450	0.5	2	3.3

**Table 7.** Blade tip clearances

5. Connect the cable between motor and terminal box. Use same routing as from the factory.
6. **AUO-AUT/ART:** Mount hub cap item 6, centre screw item 4 and centre disc item 5 and tighten.  
**AUZ and AZT:** Mount the centre disc item 5, centre bolt item 13, hub cap

item 6 and screws items 04 and tighten.

7. **ARO-ARP:** Mount guide vane arrangement item 11 by means of ten blind rivets ø3.2 × 10 (monel metal).  
**ARO 500:** Use ten blind rivets ø4 × 10 (monel metal).
8. **AUO/ARO:** Mount silencers items 03 to fan casing by means of set screws item 2.  
**ARP/AUZ:** Mount silencers items 03 together with the suspension brackets to the fan casing by means of set screws item 2.  
**AUT/ART:** Mount wire guards (figure 6, item 11).  
**AZT:** Mount the outlet cone, fit the hose clamp and tighten both pairs of nuts and bolts to hold the cone. Mount the wire guard on the inlet.
9. Lift the fan back into position.  
**AUO/ARO-ARP/AUZ-AUT/ART:** Mount four expansion bolts item 1, nuts and tighten.  
**AZT:** Mount nuts onto the four suspension bolts to secure the fan to the ceiling plate. Adjust the outlet cone for correct directional thrust. Tighten nuts and bolts on the hose clamp to secure the cone.
10. Connect the supply cable to the terminals (figure 6, item 6).

To start the fan, follow the procedure described in section 6.

## 6.8 Blade angle adjustment

The blade angle has been adjusted in the factory with a mounting fixture to deliver the performance required. Do not change the blade angle without previous agreement with Novenco.

## 7. Troubleshooting

Locate and identify problems with and around the fans in as much details as possible, before f.x. calling for service or ordering parts. Things to look for include the following.

### Lacking performance

- Inlet or outlet blocked
- Auxiliary fans stopped
- Motor defective
- Motor disconnected
- Electric connection defective
- Wrong direction of rotation

### Noise and vibrations

- Motor bearings defective
- Rotor in imbalance
- Rotor worn or damaged
- Loose components
- Rotor blades with different angles (loose blades).
- Fan operates in the stalling area, which may result in breakdown. Correct errors – see “Lacking performance”.

## 8. Inspection and test

### Extent of inspection

- Measure power consumption at full and half speeds
- Vibration measuring on fan casing (outside motor)
- Check of fan suspension
- Visual inspection of rotor, casing, silencers and electric connection
- Cleaning
  - Internal with compressed air or vacuum cleaning
  - External with a wrung cloth. No water must get in the electric systems or the acoustic insulation.

Keep a journal of all measured values and observations for each fan.

## 9. Sound

The fan sound emission depends on installation and operating conditions, hence no general data can be given. Refer to the product catalogue and the technical fan specifications.

## 10. Safety

The jet fans must be installed according to Novenco’s and the current safety regulations. At a minimum these include EN 13850.

It is recommended to review and revise safety procedures regularly.

### Safety check

- Test if safety procedures and the installation work correctly.
- Check if safety regulations have been changed and if the installation needs revising.
- Consider taking additional measures to improve the safety of the installation. For example, by mounting wire guards on inlet and outlet.

## 11. Reference documentation

Please refer to the below documents on the Novenco website for further information about the fans.

- Catalogue  
Car park jet fans, standard and hot smoke
- Data sheets, drawings, certificates and declarations of performance for  
AUZ-ARP 340  
AUT-ART 400  
AUO-ARO 290-380-500  
AZT 280-355-450
- Technical specifications

## 12. Disposal

Dispose of fans suitable for scrapping in environmentally safe ways and in accordance to current regulations.

The fans and especially the electric motors contain a wide range of materials, which can all be recycled. Make sure worn-out motors and fan parts are disassembled and recycled for the benefit of the environment.

## 13. Patents and trademarks

Novenco®, 诺文科, 诺万科 and 诺克 are registered trademarks of Novenco Marine & Offshore A/S.

ZerAx® is a registered trademark of Novenco Building & Industry A/S.

AirBox™, NoVa™ and NovAx™ are trademarks of Novenco Building & Industry A/S.

The Novenco ZerAx processes of manufacture, technologies and designs

are patented by Novenco A/S or Novenco Building & Industry A/S. Pending patents include India no. 821/CHENP/2014 and 825/CHENP/2014; PCT no. EP2012/064908 and EP2012/064928.

Granted patents include Brazil no. BR-11-2012-008543-3; BR-11-2012-008545-0, BR-11-2012-008607-3, BR-11-2014-002282-8 and BR-11-2014-002426-0; Canada no. 2.777.140, 2.777.141, 2.777.144, 2.832.131 and 2.843.132; China no. ZL2010800458842, ZL2010800460965, ZL2010800464275 and ZL2012800387210; EU no. 2488759, 2488760, 2488761, 2739860 and 2739861; India no. 312464, 360298 and 367515; South Korea no. 10-1907239, 10-1933724, 10-1980600, 10-2011515 and 10-2127529; US no. 8.967.983, 9.200.641, 9.273.696 B2, 9.683.577 and 9.926.943 B2.

Granted designs include Brazil no. BR-30-2012-003932-0; Canada no. 146333; China no. 1514732, 1517779, 1515003, 1555664 and 2312963; EU no. 001622945-0001 to 001622945-0009 and 001985391 - 0001; India no. 246293; South Korea no. 30-0735804; UK no. 001622945-0001 to 001622945-0009 and 001985391 - 0001; US no. D665895S, D683840S, D692119S, D704323S, D712023S, D743018S, D755363S, D756500S, D821560S and D823452S.

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Granted designs include EU no. 001069884-0003, 001069884-0008, 001069884-0010, 001069884-0013, 001069884-0017, 001069884-0019, 001069884-0022, 001069884-0026 and 001069884-0028; United Arab Emirates no. D223/2009.

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## 14. Quality management

Novenco is ISO 9001 and 14001 certified. All fans are inspected and tested, before leaving the production.

## 15. Warranty

Novenco provides according to law a standard 12 months warranty from the product is sent from the factory. The warranty covers materials and manufacturing defects. Wear parts are not covered.

Extended warranty can be agreed upon.

## 16. Spare parts

Contact Novenco for information about and ordering of spare parts.

## 17. Classifications

### Environment

- Meet requirements for operation in unheated, low corrosive environments according to DS/EN ISO 12944-2

### Corrosion category

- C3

### Temperature ranges

- **Standard:** -20 to 55 °C
- **Max.:** -40 to 120 °C

### Temperature approvals, hot smoke fans

- Certified as F200, F300 or F400 class fans according to EN 12101-3 and tested for two hours at 300 or 400 °C.

### Balancing of rotor unit

- According to VDI 2060, DS/ISO 21940-11:2016 class Q 6.3

### Fan aerodynamic performance

- According to DS/EN ISO 13350:2015

### Sound performance

- According to ANSI/AMCA 300-14

## 18. Product lifetime

The fans have a product lifetime of 20 years when they are stored, installed and maintained in accordance with Novenco's instructions. These include this installation and maintenance guide.

## 19. Declaration of conformity

Novenco Building & Industry A/S  
Industrivej 22  
4700 Naestved  
Denmark

hereby declares that the Novenco jet fan types AUO/ARO - ARP/AUZ - AUT/ART - AZT have been manufactured in accordance to the below directives of the European Council and that they comply with the below standards and regulations.

### EU directives

- Ecodesign 2009/125/EU and energy labelling regulation 2017/1369/EU
- EMC 2014/30/EU
- LVD 2014/35/EU
- Machinery 2006/42/EU

### UK regulations

- Ecodesign for ErP 2010 and Energy Information 2011
- Electrical Equipment (Safety) 2016
- EMC 2016
- Supply of Machinery (Safety) 2008

### Applied standards

- ANSI/AMCA 300-14
- EU regulation 327/2011
- DS 428:2019 + A1:2020 + A2:2021
- BS/DS/EN ISO 1461:2009
- BS/DS/EN 1886:2007
- BS/DS/EN ISO 5801:2017
- BS/DS/EN ISO 9001:2015
- BS/DS/EN ISO 12100:2010
- BS/DS/EN 12101-3:2015
- BS/DS/EN 12101-6:2005 + AC:2006
- BS/DS/EN ISO 12499:2008
- BS/DSF/FprEN ISO 12759-5:2021 (draft)
- BS/DS/EN ISO 12944-2:2017
- BS/DS/ISO 13347-1:2004
- BS/DS/ISO 13347-2:2004
- ISO 13348:2007, class AN3
- BS/DS/EN ISO 13350:2015
- BS/DS/EN ISO 13857:2019
- BS/DS/EN ISO 14001:2015
- BS/DS/EN ISO 14118:2018
- DS/ISO/TR 14121-2:2012
- BS/ISO 14694:2003 + A1:2010
- BS/DS/EN 16798-3:2017
- BS/DS/EN ISO 20607:2019
- BS/DS/ISO 21940-11:2016

- BS/DS/ISO 21940-14:2012
- BS/DS/EN/IEC 60034-7:2020 ED3
- PD/DS/IEC TS 60034-30-2:2016
- BS/DS/EN 60204-1:2018
- BS/DS/EN IEC 61000-6-1:2019
- BS/DS/EN IEC 61000-6-2:2019
- BS/DS/EN 61000-6-3:2007 + A1:2011
- BS/DS/EN IEC 61000-6-4:2019
- BS/DS/EN 61800-3:2018

This declaration is valid, provided the product is installed, maintained and changed in accordance with instructions from Novenco Building & Industry A/S.

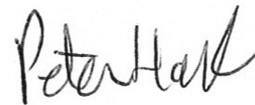
### UK representative

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Naestved, 01.05.2022



Peter Holt

Technical director

Novenco Building & Industry A/S



## Appendices

### A. Main components

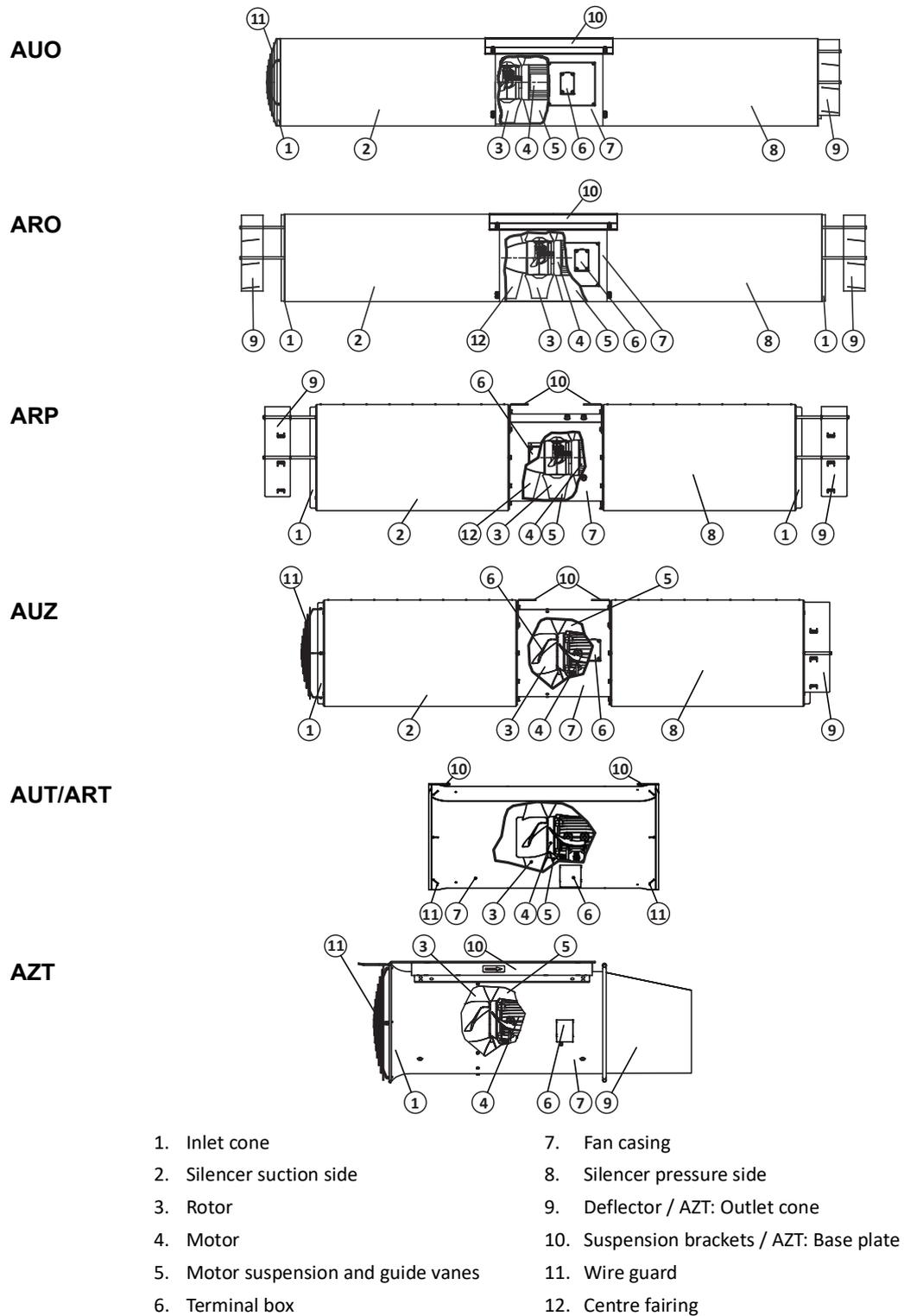
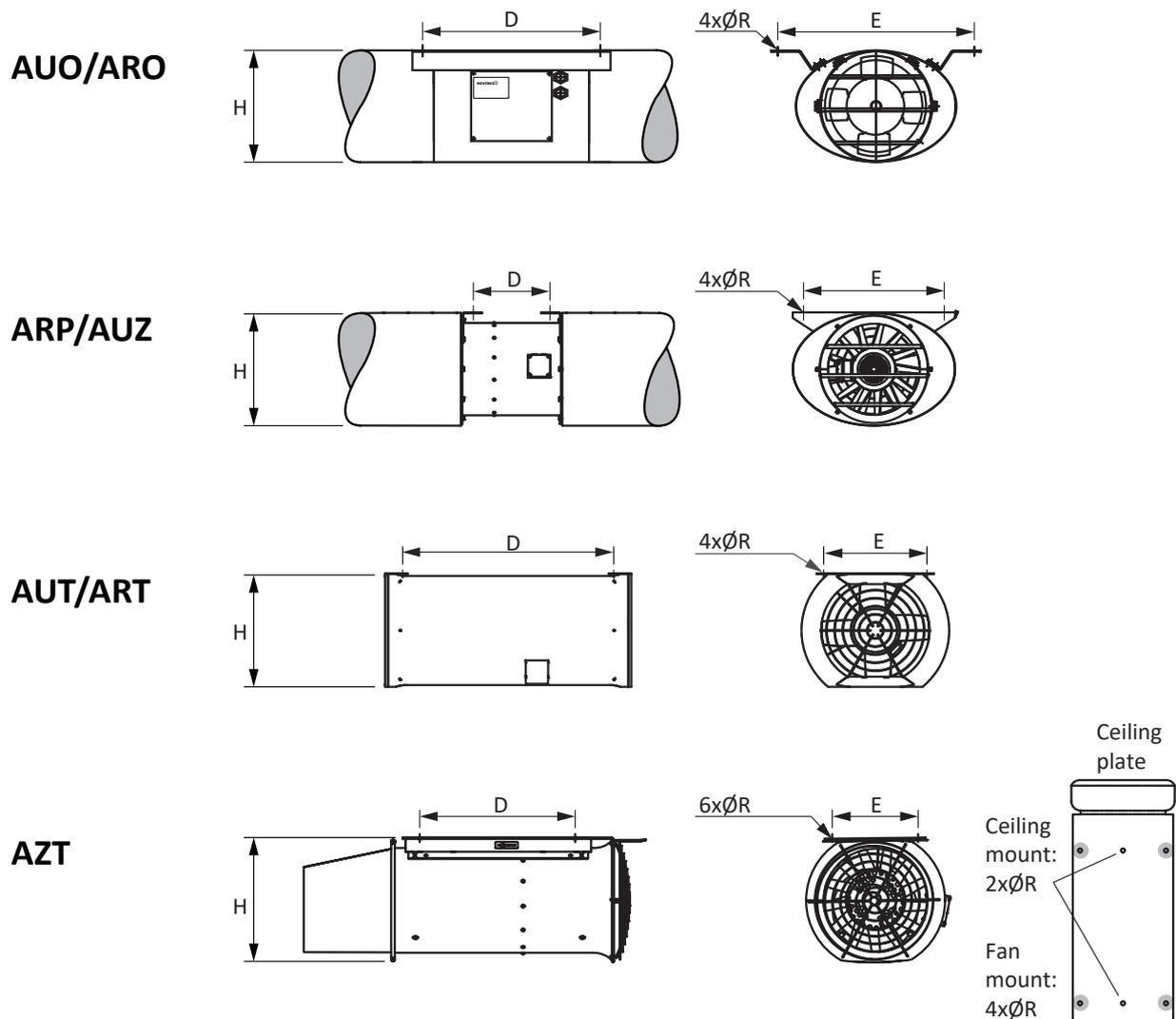


Figure 6. Main components

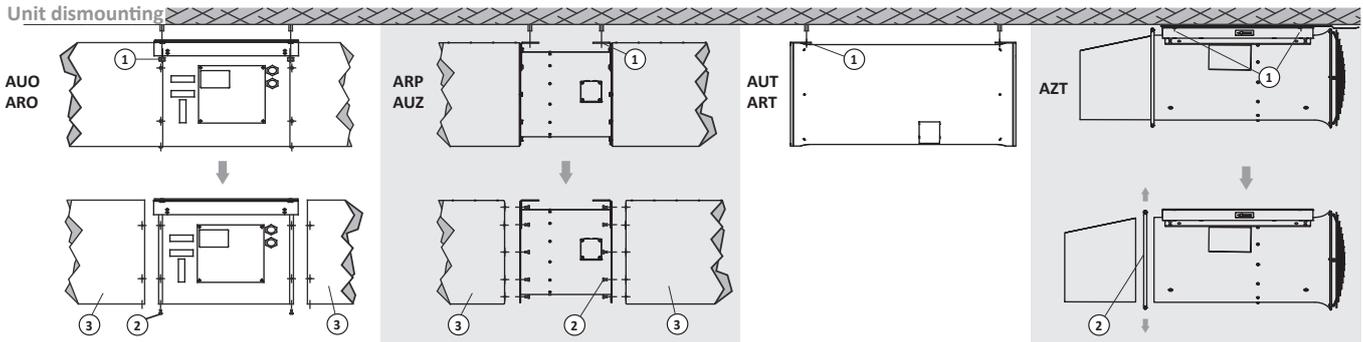
## B. Installation footprints



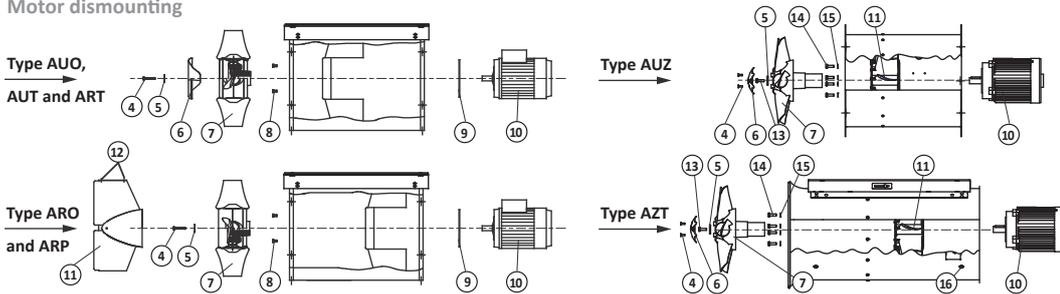
	H [mm]	D [mm]	E [mm]	ØR [mm]
AUO/ARO 290	320	506	560	Ø14, M12
AUO/ARO 380	420	506	720	Ø14, M12
AUO 500	540	600	830	Ø14, M12
AUZ/ARP 340	422	283	520	Ø14, M12
AUT/ART 340	423	779	470	Ø14, M12
AZT 280	334	417	233	Ø11, M10
AZT 355	435	500	305	Ø11, M10
AZT 450	552	610	364	Ø11, M10

Figure 7. Installation footprints – connection dimensions

### C. Dismounting and remounting of motor



#### Motor dismounting



- |  |                |                          |                 |
|--|----------------|--------------------------|-----------------|
| 1. Expansion bolts / <b>AZT</b> : Bolts and nuts | 5. Centre disc | 9. Motor mounting flange | 13. Centre bolt |
| 2. Set screws / <b>AZT</b> : Bolts and nuts      | 6. Hub cap     | 10. Motor                | 14. Bolts       |
| 3. Silencers                                     | 7. Rotor       | 11. Guide vanes          | 15. Washers     |
| 4. Screws  | 8. Set screws  | 12. Rivets               | 16. Stiffeners  |

Figure 8. Main components

### D. Wiring

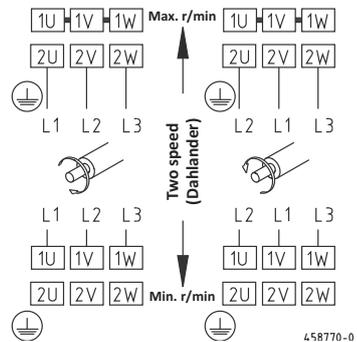


Figure 9. External terminal box and connection diagram

## E. Checklists

### Before installation

- Rotor turns freely in fan casing
- Ground fan to remove static electricity
- Clear installation location to ensure free airflows
- Install wire guards on front and back of fan (IP20)
- AZT:** Remove transport brackets  
- reinsert bracket screws in fan casing

### Before start-up

- Inspect wire guards
- Clear fans and airflow ways
- Brief on-off cycle to verify rotational direction

### Start-up

- Power on fans
- Check for abnormal sounds and vibrations
- Measure vibrations – section “Vibrations” on page 5
- After 30 min. operation – check for abnormal sounds

### Before inspection and maintenance

- Turn off power for fans
- Disconnect power supply
- Lock power switches

### Inspection and maintenance

#### Inspection of fans

- Measure power consumption at ½ and full speeds
- Measure vibrations on fan casing
- Check fan suspension
- Visual inspection – rotor, casing, silencers and electric connection

#### Maintenance of fans

- See “Before inspection and maintenance”
- Clean the fans
- Replace broken parts
- Service the fans
- Brief on-off cycle to verify rotational direction

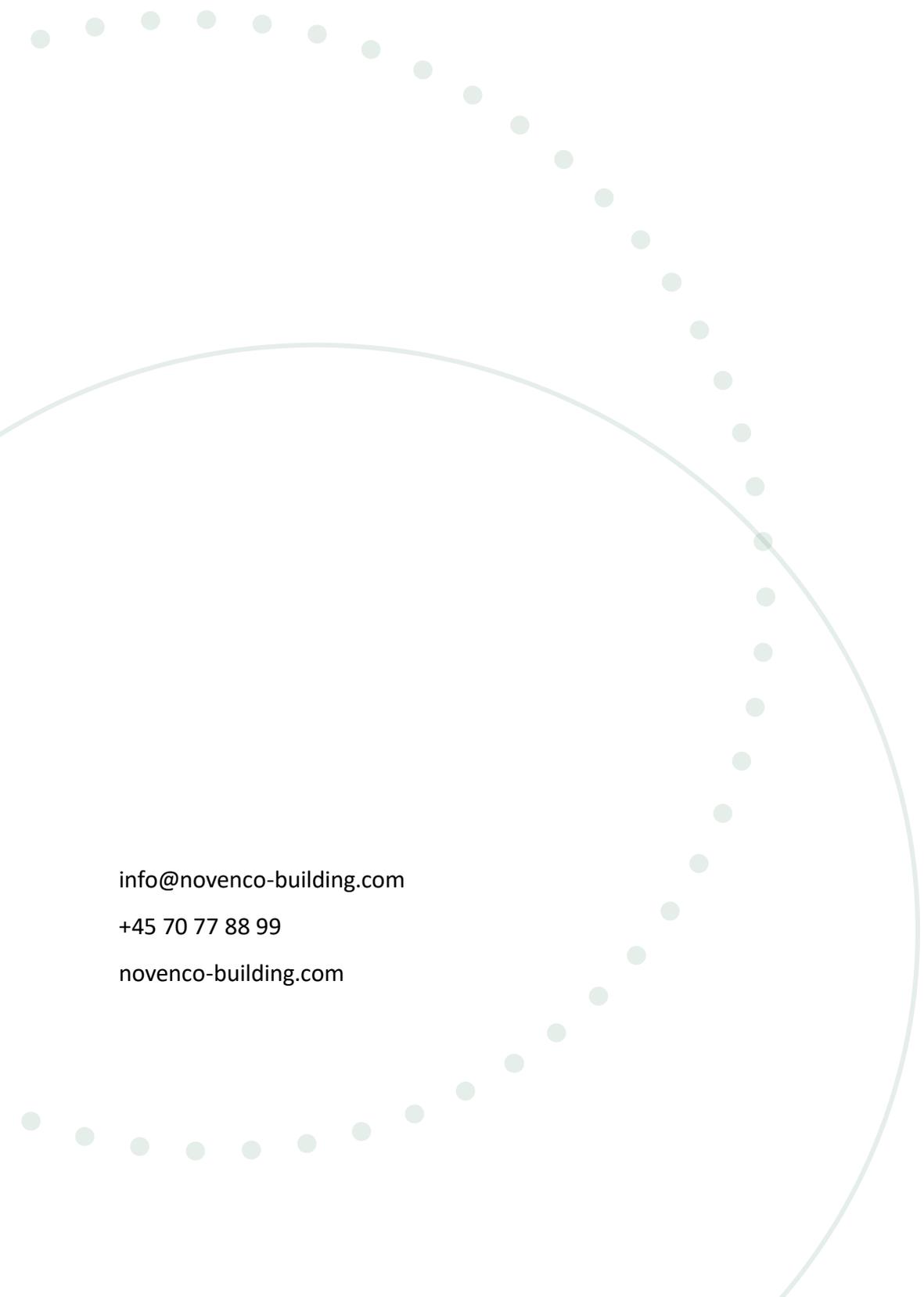
### Troubleshooting

#### Lacking performance

- Inlet or outlet blocked
- Auxiliary fans stopped
- Motor defective
- Motor disconnected
- Electric connection defective
- Wrong rotational direction of rotor

#### Noise and vibrations

- Motor bearings defective
- Rotor imbalance
- Rotor worn or damaged
- Loose components
- Rotor blades – different angles, loose or broken
- Fan operates in stalling area



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