

# NOVENCO<sup>®</sup>

## Tunnel fans AUC-ARC

### Installation and maintenance

# Novenco® tunnel fans AUC and ARC

## Installation and maintenance

### 1. Application

### 2. Main components

### 3. Handling

- 3.1 Marks
- 3.2 Weight
- 3.3 Transport

### 4. Storage

### 5. Installation

- 5.1 Before installation
- 5.2 Installation
- 5.3 Electrical connection

### 6. Start-up

- 6.1 Before start-up
- 6.2 Start-procedure

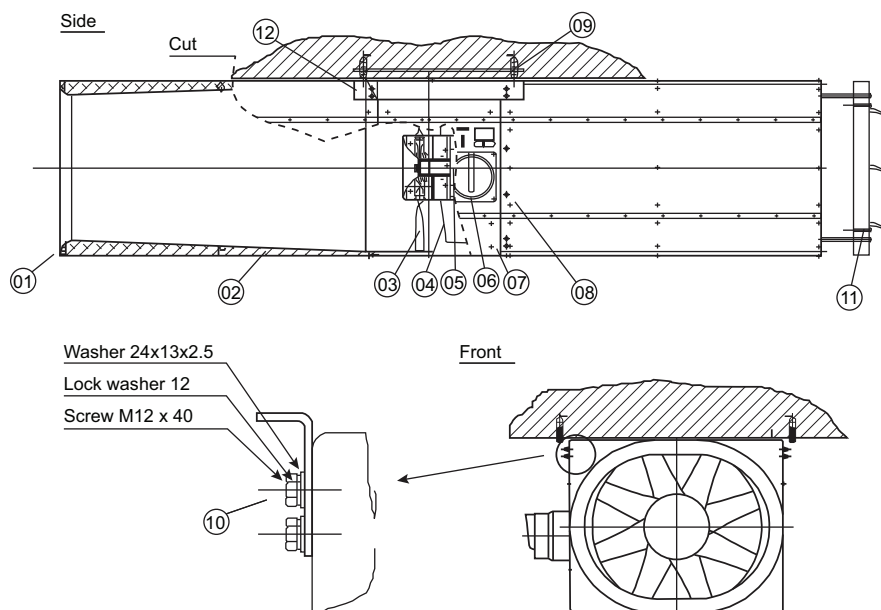
### 7. Maintenance

- 7.1 Protection before inspection and maintenance
- 7.2 Fan casing and silencers
- 7.3 Impeller
- 7.4 Motor
- 7.5 Dismount of motor
- 7.6 Mount of motor
- 7.7 Blade pitch adjustment
- 7.8 Troubleshooting

### 8. Periodic inspection

### 9. Declaration of conformity

### 2. Main components



- |        |                       |         |   |
|--------|-----------------------|---------|---|
| Item 1 | Inlet cone            | Item 7  | Fan casing  |
| Item 2 | Silencer              | Item 8  | Screws 10x30  |
| Item 3 | Impeller              | Item 9  | 4 set expansion bolts M16 according to DIN7991 (not included in delivery) |
| Item 4 | Motor suspension      | Item 10 | 8 set screws 12x40  |
| Item 5 | Motor                 | Item 11 | Guide vanes   |
| Item 6 | Switch for start/stop | Item 12 | Suspension  |

Figure 1. Main components for tunnel fans type AUC/ARC

### 3. Handling

#### 3.1 Marks

The tunnel fans have nameplates with Novenco's name and address as well as product type e. g. AUC 710/280-8, serial no., weight and CE-mark. A motor nameplate with motor data is on the side of the fan.

#### 3.2 Weight

Fan size, ØD [mm]	Weight [kg]
630	500
710	630
800	680

Table 1. Max. total weight with biggest possible motor size

#### 3.3 Transport

The tunnel fans type AUC/ ARC are delivered on pallets to allow fork-lift transport. Handle the fans carefully in order not to damage the casing.

### 4. Storage

The storage space must not be exposed to vibrations likely to damage the motor bearings.

For storage periods longer than 3 months, it is recommended to turn the impeller regularly by hand.

### 5. Installation

#### 5.1 Before installation

Make sure that the impeller rotates freely in the fan casing with equal distance between blade tip and fan casing a long the circumference.

### 1. Application

Tunnel fans type AUC/ARC are compact and sturdy standard fans, suitable for conventional installations for ventilation of tunnels. The fans must not be used in explosive environments.

Air	-20 to 40 °C
Surroundings	-20 to 40 °C
Fire	Specifications on motor plate

Table 1. Temperature range

## 5.2 Installation

The fan suspension is attached to a horizontal, steady plane with a natural frequency at least 20% from the fan speed.

An arrow on the outside shows the air flow direction through the fan casing. Install the fan in accordance with the desired air flow.

When the fan is fully secured, make sure that the impeller rotates freely in the fan casing.

The air flow must be unimpeded and free from eddies to secure performance and low sound level. See figure 1 for installation.

## 5.3 Electrical connection

The power supply cable to the fan as well as the connection of the fan must be done by authorised personnel and in accordance with current rules. The fan is connected through a thermal relay based on motor rated current. The connection is done directly in the switch mounted outside on the fan.

For  $\wedge$  /  $\triangle$  connection see installation instructions in figure 2.

For the reversible fan type ARC, it is necessary to insert a relay which brings the fan to a standstill before the direction of rotation is changed. If this is left undone, the force from the reversing might damage the fan hub.

The fan can optionally be provided with thermistors to monitor the temperature in the windings.

## 6. Start-up

### 6.1 Before start-up

Make sure that the fan is clean and free from tools and foreign bodies before it is put into operation.

Also make sure that the electric connections meet the prescribed requirements, and that the wire guard on the suction side and the guide vanes on the pressure side are correctly mounted. Verify the direction of rotation by a short start-stop operation. The direction must comply with the arrow on the side of the fan.

### 6.2 Start-procedure

- Start the fan.
- Make sure that no abnormal sounds occur.
- After 30 minutes make sure that the fan operates correctly.

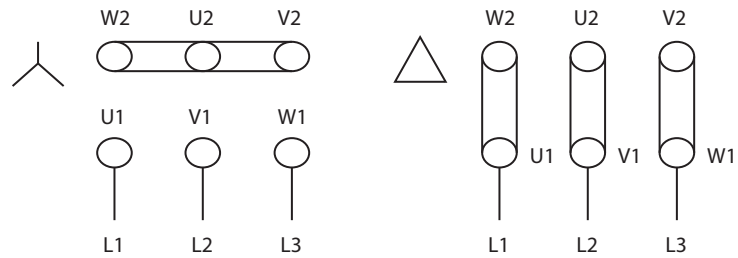


Figure 2. Connection of motor

**Important:** 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.

this position.

Vibrations occurring during operation are usually due to dust or dirt on the hub and blades. Vibrations occurring after cleaning must be dealt with immediately by calling expert assistance. Continued operation can otherwise shorten the life of blades and motor bearings.

## 7.4 Motor

The motor has sealed-for-life bearings, which must be replaced according to the motor manufacturer's instructions.

## 7. Maintenance

### 7.1 Protection before inspection and maintenance

When the fan is out of operation, the electric system must be turned off and locked so that the fan cannot be started unintentionally.

### 7.2 Fan casing and silencers

The fan casing and silencers require as standard no other maintenance than ordinary cleaning.

### 7.3 Impeller

From the factory the impeller (rotor unit) is supplied with the blades set in the angle corresponding to the desired operating point (thrust and air quantity) at the fan speed in question. To make sure that operation is vibration-free the impeller has been carefully balanced in

### 7.5 Dismount of motor

Before work on the motor, follow the procedure in section 7.1.

#### To dismount the motor

- 1 Disconnect the motor cable in the switch.
- 2 Remove the nuts (figure 1, item 10) and take down the fan from the ceiling.
- 3 Remove screws for silencers (figure 1, item 08) and dismount the silencers (item 02).
- 4 **AUC:** Remove hub cover (figure 3, item 17).
- 5 **ARC:** Remove screws in guide plates of centre fairing (item 14) and pull out the guide plates.
- 5 Remove centre screw of impeller (figure 3, item 15).

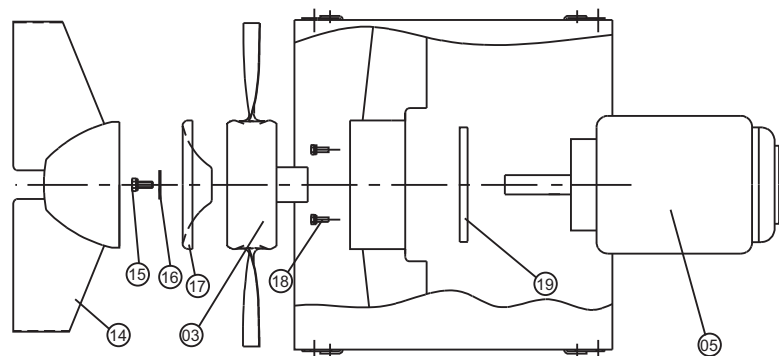


Figure 3. Dismounting and mounting of motor

- 6 Remove the centre disc of the hub cover (figure 3, item 16). Remove the hub cover (item 17).
- 7 Dismount impeller (figure 1, item 03) with a puller fastened in the two threaded holes of the hub boss.
- 8 Remove the four set screws (figure 3, item 18).
- 9 Dismount motor (figure 3, item 05) and motor flange (item 19). Note the motor position before removal.

When dismounting and disassembling the fan be careful not to expose the parts to shocks or other treatment, which can damage the motor bearings or other fan components.

## 7.6 Mount of motor

### To mount the motor

- 1 After service remount the motor as in (figure 3, item 05) and check the position of the motor flange (item 19). Check the motor shaft is concentric to the fan casing, before tightening the set screws (item 18).
- 2 Mount the impeller (figure 1, item 03) on the motor shaft with the screws fastened in the threaded hole of the motor shaft. Fix the impeller hub to rest against the motor shaft collar. Check that the blade clearance is the same throughout the circumference of the casing. If this is not the case, adjust the motor position in the suspension arrangement.  
**Caution:** Use of striking tools may cause damage to the bearings.
- 3 Mount centre screw (figure 3, item 15), centre disc (item 16) and for AUC hub cover (item 17).
- 4 Type ARC: Mount the centre fairing (figure 3, item 14).
- 5 Mount the silencers (figure 1, item 02) to fan casing with the set screws (item 08). Tightening moment for bolts (item 08) M10: 30 Nm  $\pm$ 10%
- 6 Mount the fan to the ceiling with the eight nuts (figure 1, item 10). Tightening moment for bolts (item 10) M12: 50 Nm  $\pm$ 10%
- 7 Connect the motor cable in the switch (figure 1, item 06).

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

## 7.7 Blade pitch adjustment

The blade pitch is adjusted in the factory with a fixture to deliver the required performance and cannot be changed.

## 7.8 Troubleshooting

In case of breakdowns, the following check-lists should be completed, before call for service is done.

### Lacking performance

- Air supply blocked on inlet side
- Motor defective
- Motor disconnected
- Wrong direction of rotor rotation

### Noise and vibrations

- Bearings in electric motor defective
- Impeller out of balance
- Impeller worn or damaged
- Bolts or components loose
- Impeller blades have different pitch angles.

Fans that operate in the stall area may result in breakdowns.

## 8. Periodic inspection

Make sure to inspect fans once a year for correct function and to get long fan life.

### Extent of inspection

- Measure power consumption
- Vibration measurement on fan casing
- Measure torques for bolts and tighten if necessary.
- Visual inspection of impeller, fan casing silencers and electric connection
- Cleaning
  - Internal with compressed air
  - External with water max. 100 bar at a distance of min. 0.2 m.

It is recommended to enter all values and observations in a log.

## 9. Declaration of conformity

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

hereby declares that Novenco tunnel fan types AUC and ARC 630-800 have been manufactured in accordance to the below directives of the EU Council and that they comply with the below

standards and regulations.

### Directives

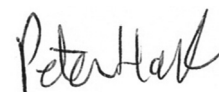
- Machinery 2006/42/EU
- ECO design 2009/125/EU and regulation 2017/1369/EU
- EMC 2014/30/EU
- LVD 2014/35/EU

### Applied standards and regulations

- ANSI/AMCA 300-14
- EU regulation 327/2011
- DS/EN 1037 + A1:2008
- DS/EN ISO 1461:2009
- DS/EN 1886:2008
- DS/ISO 2954:2012
- DS/EN ISO 5801:2017
- DS/EN ISO 9001:2015
- EN ISO 12100:2011
- DS/EN 12101-3:2015
- DS/EN ISO 12499:2009
- DS/EN ISO 12944-2:2017
- ISO 13348:2007, class AN3
- DS/EN ISO 13857:2008
- DS/EN ISO 14001:2015
- DS/ISO/TR 14121-2:2012
- ISO 14694:2003
- DS/EN 16798-3:2017
- DS/ISO 21940-11:2016
- DS/ISO 21940-14:2012
- DS/EN 60204-1:2006 + A1:2009
- DS/EN 61000-6-1:2007
- DS/EN 61000-6-2:2005
- DS/EN 61000-6-3:2007 + A1:2011
- DS/EN 61000-6-4:2007 + A1:2011
- DS/EN 61800-3:2005, class C2 + A1:2012


It is a condition that Novenco's instructions for installation are followed.

Naestved, 01.10.2020



Peter Holt  
Technical director  
Novenco Building & Industry A/S



A decorative graphic consisting of a large dotted circle and a solid circle. The dotted circle is centered in the upper half of the page, and the solid circle is centered in the lower half. They overlap in the middle of the page.

info@novenco-building.com  
+45 70 77 88 99  
novenco-building.com