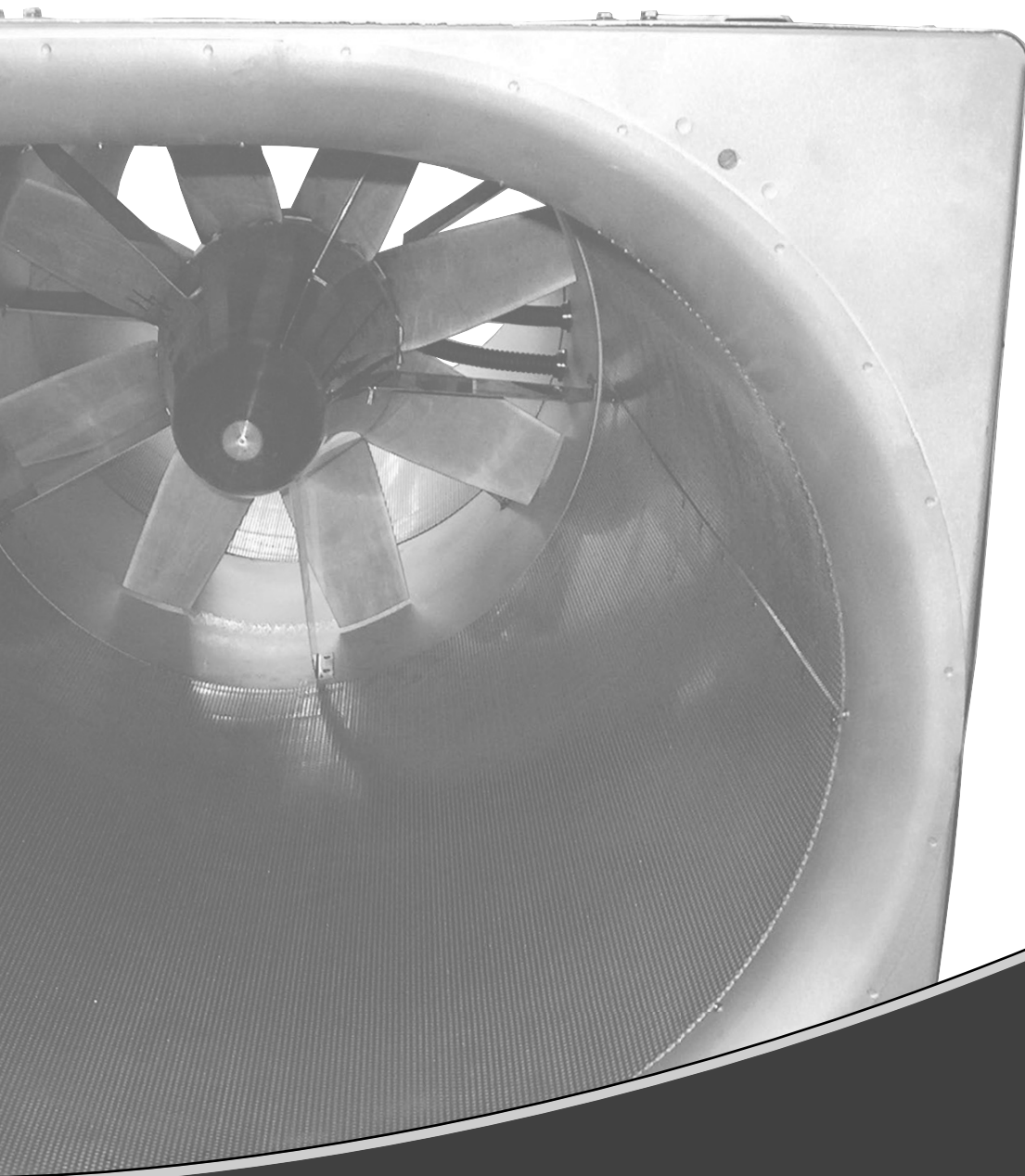




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English

# AUC-ARC

Tunnel fans  
Installation and maintenance



# Tunnel fan types AUC and ARC 630-800

## Installation and maintenance

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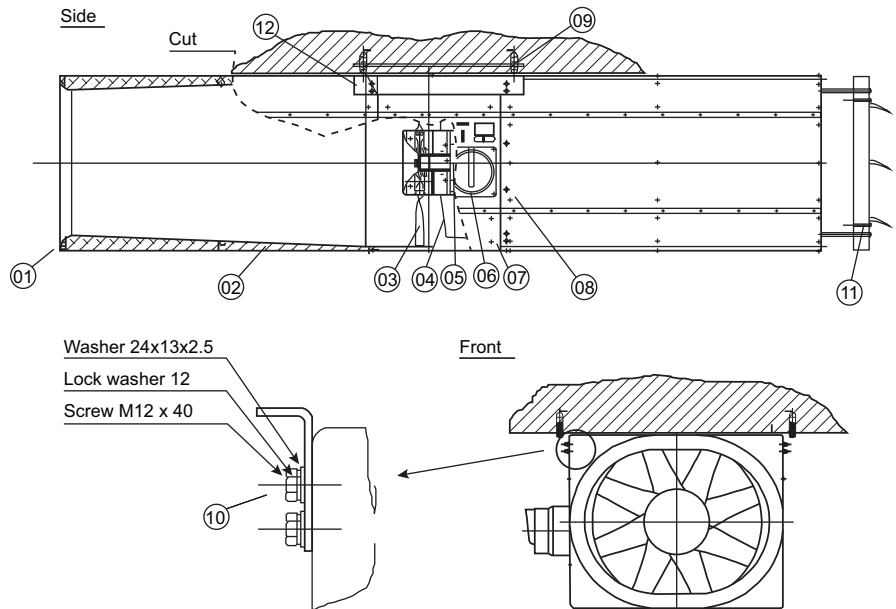
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### 1. Main components



- |        |                       |         |   |
|--------|-----------------------|---------|---|
| 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

### 2. 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.

<b>Air</b>	-20 to 40 °C
<b>Surroundings</b>	-20 to 40 °C
<b>Fire</b>	Specifications on motor plate

Table 1. Temperature range

### 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	520
710	600
800	650

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 along the circumference.

### 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 must be put up according to current rules. The connection of the fan must be done by authorised personnel and in accordance with current rules. The fan is connected through 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

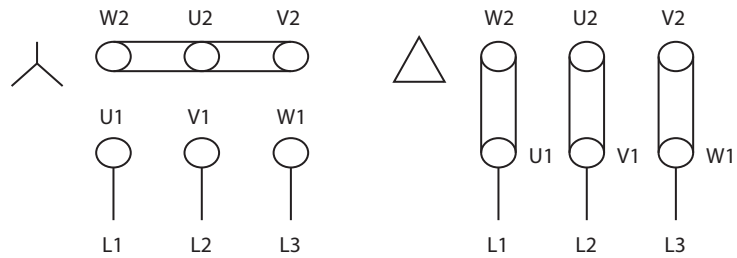


Figure 2. Connection of motor

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.

## 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 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.

### 7.5 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 For type AUC: Remove hub cover (figure 3, item 17).  
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).
- 6 Remove the centre disc of the hub cover (figure 3, item 16). Remove the hub cover (item 17).

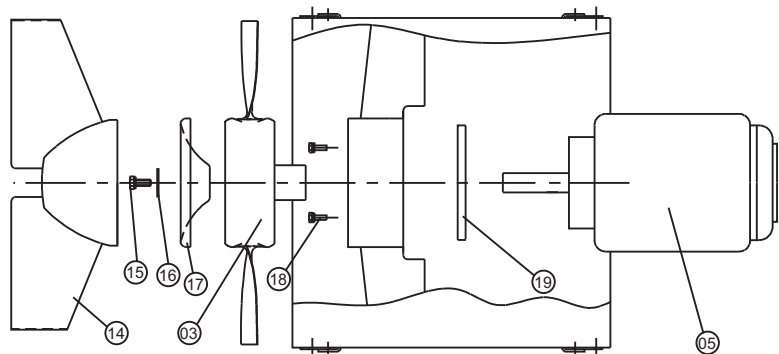


Figure 3. Dismounting and mounting of motor

- 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). Dismount 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). See that the motor flange (item 19) is correctly positioned. Make sure the motor shaft is concentrically placed in 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 special tool (fixture) to deliver the required performance. The pitch 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 A/S  
 Industrivej 22  
 DK-4700 Naestved

hereby declares that tunnel fan types AUC and ARC 630-800 have been manufactured in conformity with the Council's directives 2006/42/EC regarding mutual approximation of the machinery laws (the Machinery Directive) of the member states.

### Directives

- EC Machinery Directive 2006/42/EC
- EMC Directive 2004/108/EC
- LVD 2006/95/EC

### Applied standards

EN ISO 12100:

Safety of machinery

EN ISO 12100-3:

Smoke and heat control systems - Part 3, class 1

EN ISO 13857:

Safety of machinery - Safety distances

EN 60204-1:

Safety of machinery - Electrical equipment of machines Part 1: General requirements

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

## Eco-design requirements

The tunnel fans types AUC-ARC 630-800 comply with the EU's requirements for energy efficiency. Refer to EU regulation no. 327/2011 and to the below items for specific information.

### 1. – 6.

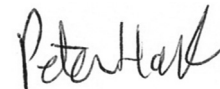
These appear from the nameplates on the fans and include the following.

- 1 Efficiency,  $\eta$
- 2 Measurement category used to determine the energy efficiency
- 3 Fan efficiency category (static or total)
- 4 Efficiency grade, N, at the optimum energy efficiency point
- 5 Whether the efficiency depends on a frequency converter and if so, whether this is built-in or installed with the fan.
- 6 Year of manufacture
7. Product name and manufacturer's details  
See nameplates on fans or the beginning of section "9. Declaration of conformity".
8. Model type and size  
See nameplates on fans.
9. Rated motor power input, flow rate and pressure at optimum energy efficiency  
See the power on the nameplates and the other details in the technical specifications for the fans.
10. Rotations per minute at the optimum energy efficiency point  
See the technical specifications for the fans.
11. Specific ratio between inlet and outlet  
See the technical specifications for the fans.
12. Information relevant for facilitating disassembly, recycling or disposal  
Disassembly of the fans is described elsewhere in this guide.  
Pure metal and plastic parts can be delivered for recycling directly.  
Motors containing oil and heavy metals, and panels with insulation must be treated as environmentally unsafe scrap.
13. Information relevant to minimise impact on the environment and ensure optimum service life  
The best return on the fans and service life is secured by following the prescribed service and maintenance.

14. Description of additional items used when determining the fan energy efficiency that are not described in the measurement category and not supplied with the fans.

No accessories, such as silencers, diffusers, inlet cones etc., have been taken into consideration in connection with measurement and calculation.

Naestved, 01.05.2014



Peter Holt  
 Technology director  
 Novenco A/S



Novenco develops and manufactures ventilation systems that are marketed worldwide through subsidiaries and agents.

The company was founded in Denmark 1947 and has become one of the world-leading suppliers.

Novenco symbolises quality and environmentally responsible operation and is certified according to ISO 9001 and ISO 14001.

The company headquarters are located in Naestved, Denmark.

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Read more about Novenco on the internet.