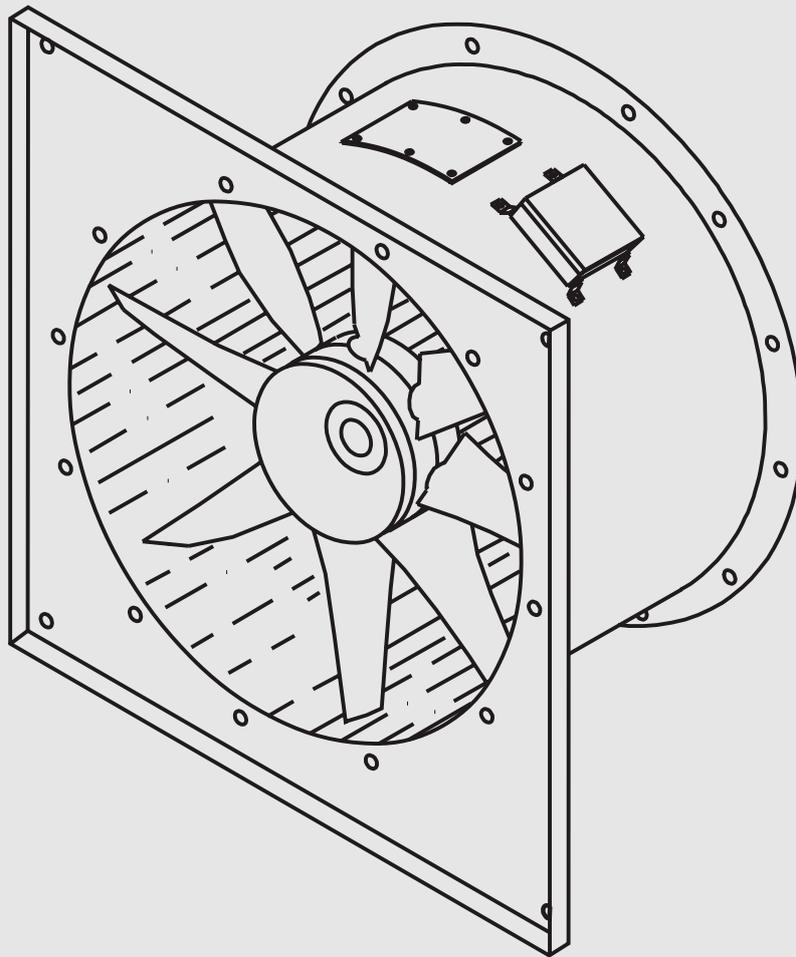


Building & Industry



SCHAKO Group



# NOVENCO<sup>®</sup> NovAx<sup>™</sup>

## Axial fans ACN-ACW-ARN

### Installation and maintenance

# Novenco® NovAx™ axial fans ACN-ACW-ARN Installation and maintenance

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### 1. Application

The axial flow fan types ACN, ACW and ARN are sturdy standard fans for applications within land-based industries and marine sectors.

### 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 1. Icons in guide

## 2. Handling

### 2.1 Marking

The ACN-ACW-ARN fans have nameplates on the fans and motors.

### Fan nameplate information

- Manufacturer information
- Product type, e.g. ACN 1000/380
- Serial no.
- Fan speed
- Year of manufacture
- Weight

### Motor nameplate information

- Manufacturer information
- Power consumption, IE class etc.
- Voltages
- RPMs
- Weight
- Terminal connections
- Lubrication and service info.
- Etc.

	Fan size [mm]	Motor size [mm]																	
		-71	-80	-90	-100	-112	-132	-160	-180	-200	-225	-250	-280						
Hub diameters [mm] Ø160, Ø230, 280, Ø330 and Ø380	Ø250	17.3																	
	Ø315	20	23.5																
	Ø400	33.5	37	43	50.5														
	Ø500	48.5	52	58	65.5	69	90												
	Ø560	61.5	65	71	78.5	82	103	142											
	Ø630	66.5	70	76	83.5	87	108	147	205										
	Ø710	79.5	83	89	96.5	100	121	160	218										
	Ø800	88.5	92	98	105.5	109	130	169	227										
	Ø900	104.5	108	114	121.5	125	146	185	243										
	Ø1000			150	157.5	161	182	221	279										
Hub diameters [mm] Ø403 and Ø578	Ø900						165	240	298										
	Ø1000						205	244	337	382									
	Ø1120						154	215	262	354	410	489							
	Ø1250						175	240	278	375	432	510	574						
	Ø1400							251	356	414	470	549	623	1179					
	Ø1600										496	621	660	1216					

Table 2. Max. weights of ACN-ARN fans with motors, excl. accessories [kg] <sup>1</sup>

1. ARN fans are available with hub sizes Ø403 and Ø578.

	Fan size [mm]	Motor size [mm]																	
		-71	-80	-90	-100	-112	-132	-160	-180	-200	-225	-250	-280						
Hub diameters [mm] Ø160, Ø230, 280, Ø330 and Ø380	Ø250	29.5																	
	Ø316	38.5	42																
	Ø400	54.5	58	64	71.5														
	Ø500	67.5	71	77	84.5	88	109												
	Ø560	96.5	100	106	113.5	117	138	177											
	Ø630	105.5	109	115	122.5	126	147	186	244										
	Ø710	127.5	131	137	144.5	148	169	208	266										
	Ø800	144.5	148	154	161.5	165	186	225	283										
	Ø900	172.5	176	182	189.5	193	214	253	311										
	Ø1000			206	213.5	217	238	277	335										
Hub diameters [mm] Ø403 and Ø578	Ø900						230	304	362										
	Ø1000						291	330	388	430									
	Ø1120					287	347	387	445	487	566								
	Ø1250					333	397	437	495	537	616	655							
	Ø1400						398	512	570	612	690	730	1274						
	Ø1600									684	763	802	1347						

Table 3. Max. weights of ACW fans with 6 mm fan casings and motors, excl. accessories [kg]

		Motor size [mm]												
		Fan size [mm]	-71	-80	-90	-100	-112	-132	-160	-180	-200	-225	-250	-280
Hub diameters [mm] Ø160, Ø230, Ø280, Ø330 and Ø380	Ø250													
	Ø316	50.5	54											
	Ø400	74.5	78	84	91.5									
	Ø500	102.5	106	112	119.5	123	144							
	Ø560	129.5	133	139	146.5	150	171	210						
	Ø630	143.5	147	153	160.5	164	185	224	282					
	Ø710	178.5	182	188	195.5	199	220	259	317					
	Ø800	201.5	205	211	218.5	222	243	282	340					
	Ø900	245.5	249	255	262.5	266	287	326	384					
	Ø1000			294	301.5	305	326	365	423					
Hub diameters [mm] Ø403 and Ø578	Ø900					304	378	436						
	Ø1000					341	417	475	518					
	Ø1120				392	453	492	550	592	671				
	Ø1250				464	528	568	626	668	747	786			
	Ø1400					553	667	725	767	846	885	1429		
	Ø1600								861	940	980	1524		

**Table 4.** Max. weights of ACW fans with 10 mm thickness of plate in tubes and motors [kg]

Motor types	-71	-80	-90	-100	-112	-132	-160	-180	-200	-225	-250	-280
Motor weights	6.5	10	16	23.5	27	48	87	145	190	270	305	850

**Table 5.** Max. motor weight estimates [kg]

## 2.2 Weight

The total weights shown in tables 2, 3 and 4 are determined on the basis of fan type and size, and the maximum motor size employed.

## 2.3 Design conditions

The ACN-ACW-ARN fans are designed for operation at standard temperatures from -20 to +50 °C. With reduced fan speed and increased blade clearance the temperature range can be extended from -40 to +120 °C. Contact Novenco for details.

## 2.4 Transport and lifting



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.

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 tables 2, 3 and 4.



Check the fans and accessories for damages upon receipt. Also, check that the rotors rotate freely in the fan casings. Inform the carrier and Novenco immediately of damages.

Further transport depends on the fan size and the fitted accessories.

### Transport

- **Fans mounted on support frames**  
Transport and store these on the transportation pallets. Leave in the transportation rods for fans with vibration dampers.
- **Fans without support frames**  
Transport fans resting on the inlet flanges or cones. The rotors must point downwards.
- **Large fans or fans with large motors**  
Transport and store these on the transportation pallets. Store very large fans on suitable bearers.

### Lifting

- **With straps**  
Lift with a strap around the fan casing at the centre of gravity. Please note, that directives, regulations and guidelines may dictate lifting in the flange holes. Novenco recommends lift of fans

with straps.

- **In flange holes**  
Lift in a minimum of three holes – two in the outlet flange and one in the inlet. On fans with inlet cones mounted, remove the bolt in the topmost position to use the hole as the third point for lifting. Reinsert and tighten the bolt once the fan is in place.  
Deformation of the flanges must be avoided.



Eyebolts on motors are unsuited for lifting the fans.

## 3. Storage

Correct storage conditions are 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	-25 to 65 °C	<ul style="list-style-type: none"> <li>• Constant temperature, preferably 20 °C</li> <li>• Ventilated</li> <li>• No condensation</li> </ul>
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 2.** Storage recommendations

## 4. Installation

### 4.1 Preparations

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

#### Checklist prior to 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.
- **Outdoor installations:** Make sure the installation location is sheltered and conforms to the applicable IP class. Fans, motors and frequency converters must be protected from rain and water that drips.
- Ground the fan before installation to avoid static electricity. For example, by assembly on non-conductive vibration dampers and foundations.
- 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. See section "4.5 Connection to duct" for minimum distances for undisturbed airflow.



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

Generally, it is of the utmost importance for the performance and sound levels of axial fans that the airflows are unimpeded and free from eddies.

#### Installation of fans

1. Place and orient the fans in accordance with the airflow direction arrows on the fan casings.
2. Adjust the fan positions to have the motor drain holes point downwards at the lowest point.



The environment and conditions of operation may cause condensation in the fan motors. It is therefore important, that the motor drain holes point downwards, are at the lowest point and are open. On fan motors mounted at angles, the drain holes are typically in the motor back-covers. Contact Novenco if the drain holes are missing.

3. Unplug the lowest positioned drain holes on the motors.
4. **Recommendation:** Install the fans on support frames. See section "4.3 Support frames". The support frames are optional and available from Novenco.
5. **Optional:** As an alternative to installation on support frames, fans may be suspended in the casing flanges or in special carriers. The

carriers must not obstruct the free inlet and outlet of air.

6. Check that the fan rotors rotate freely once the fans are in position and finally secured.
7. **Fans on support frames and with vibration dampers:** Remove the transportation rods from the support frames. The handles are marked with a strong colour.

### 4.3 Support frames

Support frames for the ACN-ACW-ARN consist of two mounting plates. See fig. 1, item 01.

Mount the two stiffeners (item 02) between the mounting plates by means of joining elements (item 03). Stiffeners are only available for fan size 630 mm and up.

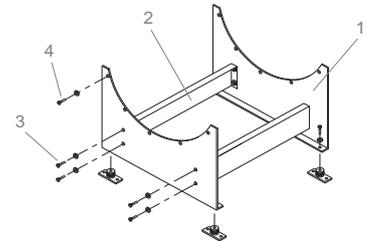


Figure 1. Support frame for ACN

To prevent spread of vibrations from the fan to the surroundings, anti-vibration mountings are optionally available from Novenco and may be inserted between fan and support, between fan and flexible connections or a combination of the two. Anti-vibrational measures can also be fitted in the ducts before and after the fan.

Secure anti-vibration mountings (fig. 2, item 06) in the support frame by means of bolts (item 05).

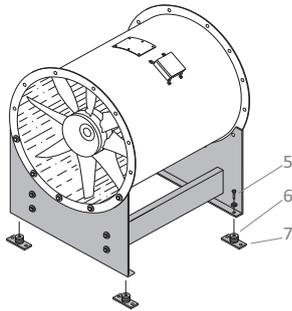
Mount base plates (item 07) for attachment to the foundation at the bottom of the anti-vibrational rubber elements.



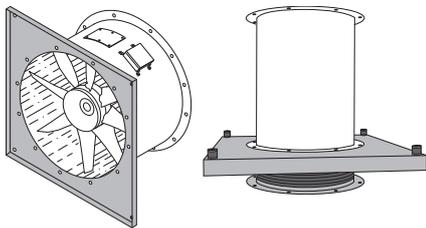
The natural frequency of the support must lie at least 20% from the fan speed.

The anti-vibration mountings serve to ensure that the natural frequency of the system does not exceed 10 Hz and that the damping is at least 80% at 1500 RPM.

If needed, contact Novenco for help with calculation of anti-vibration mountings.



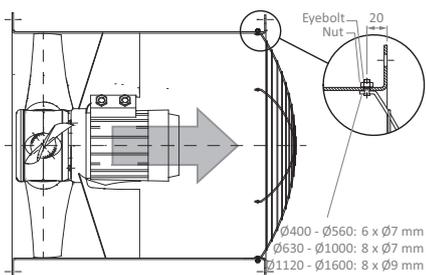
**Figure 2.** ACN with support frame and anti-vibration mountings



**Figure 3.** ACN with mounting plate, flexible connection and anti-vibration mountings

#### 4.4 Wire guard installation

Fans must always be installed so that parts that rotate cannot be touched. The fans can be optionally fitted with wire guards on the inlet and outlet sides. If ducts are connected, these can alternatively be provided with wire guards. Novenco offers wire guards for in-pipe installation on outlets. Drill holes in the pipe and fixate with bolts and nuts.

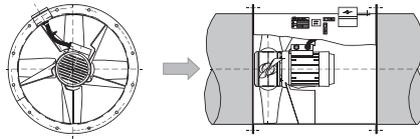


**Figure 4.** In-pipe installation of wire guard

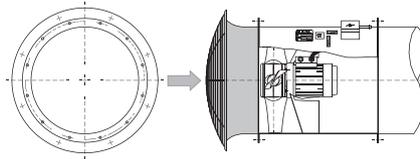
#### 4.5 Connection to duct

In order to achieve the capacities stated on the performance curves the fans must

be provided with ducts as shown in fig. 5 and fig. 6.

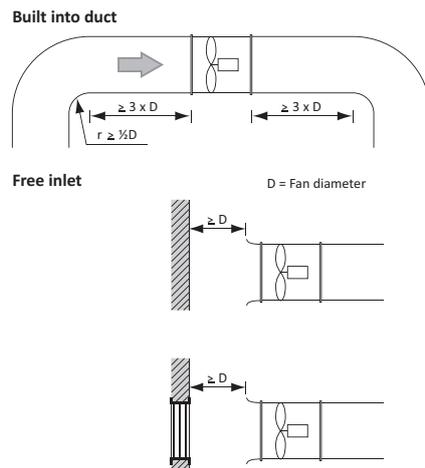


**Figure 5.** Installation in duct system

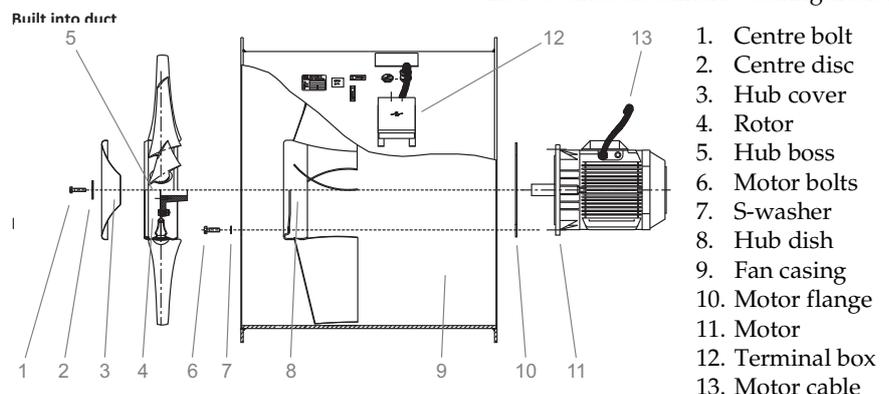


**Figure 6.** Inlet cone for connection to duct

The duct or inlet cone on the fan inlet side must be designed to ensure smooth and undisturbed flow of the air. Avoid sharp bends immediately in front of the inlet opening and place flexible connections at least  $0.5 \times$  the fan diameter,  $D$ , in front of the leading edge of the rotor.



**Figure 7.** Optimal installation



**Figure 9.** Exploded view of axial flow fan types ACN-ACW-ARN

ACN-ACW-ARN fans are prepared for circular duct connection on both inlet and outlet sides.

Flanges supplied as standard for type ACN comply with Eurovent 1/2.

Flanges supplied as standard for type ACW comply with DIN 24154 row 4.

Systems with higher vibration level or more exacting performance requirements must be provided with expansion joints between fan and duct. Ducts must not be supported by the fan.

It is important to allow for free areas to facilitate mounting and dismantling as well as ordinary maintenance.

#### 4.6 Electric connection

**STOP** 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).

Connection of the supply voltage depends on the motor type and if a frequency converter is to control the motor.

#### Connection of motor types

- **Alternating current (AC) motors**
  - Connect the supply voltage directly in the terminal box or connect the supply voltage to the frequency converter and the converter to the terminal box

The terminal box is on the outside of the fan casing. Connection diagrams are inside the box lid.

The cable run must be in accordance with current regulations, e.g. the EU standard for electromagnetic compatibility (EMC).

Frequency converters must be installed in accordance to the manufacturer's installation documentation. Refer also to the Novenco document "Configuration

of frequency converters for Novenco fans".

Shield and connect the fans electrically to ground to eliminate interference and to protect the motor bearings and windings.

Refer to the motor documentation for methods to avoid impairment of the supply voltage quality, among them distances between supply and signal cables. Methods may involve installation of rectifiers, filters etc.

### Connection references

- Connection diagram in terminal box lid on fan
- Motor name plate
- Order specification



Only fans with steel inner hubs may be run in reverse and this for short periods at speeds up to the max. allowable of normal direction. The airflow is reduced to approx. 50% of normal for the same system resistance. The pressure is reduced to 25%.

Reversible operation increases the risk of stall and shortens fan life. The rotor must be completely stationary, before restart of the fan for directional change of rotation. It is recommended to install a time delay for this purpose.

Check that the rotational direction of the rotor complies with the arrow on the outside of the fan casing. Flick the fan power briefly On, then Off. If the direction is wrong, disconnect the main power supply and check the connections.

## 5. Start of operation

### 5.1 Before start-up

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

#### Checklist

- **Safe operation**  
The blade clearance must be minimum 0.1x motor shaft diameter (min. 2 mm, max. 13 mm) all around the rotor circumference. The axial distance between the rotor hub and stator must be min. 3.5 mm.  
Wire guards should be mounted on the inlet and outlet sides.

- **Transportation rods**

Fans on support frames and with vibration dampers have transportation rods in the support frames, which must be removed before start of operation. The handles are marked with a strong colour.

- **Clean ducts**

The fans and duct connections 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 check the rotational direction of the rotor.

## 5.2 Motors with Y/Δ starting

Set the relay for start of the fans to the start-up time from the technical specifications from the AirBox program. Alternatively, calculate the value with the below formula.

### Calculation of start-up time

$$t_s = \frac{0.24 \times n^2 \times (I_m + I_v)}{10^4 \times P \times \left( \frac{M_s}{M} + \frac{M_k}{M} - \frac{P_v}{P} \right)}$$

$t_s$  : Start-up time [s]

$P$  : Rated output of motor [kW]

$P_v$  : Required power of fan [kW]

$n$  : Fan speed [RPM]

$\frac{M_s}{M}$  : Ratio between the start and the nominal motor torque

$\frac{M_k}{M}$  : Ratio between maximum and nominal motor torque

$I_v$  : Polar moment of inertia for fan [kgm<sup>2</sup>]

$I_m$  : Polar moment of inertia for motor [kgm<sup>2</sup>]

The motor torque can vary within the below limits and affect the start-up time.

$M_s$  : -15% to +25% of catalogue value

$M_k$  : -10% to 0% of catalogue value

## 5.3 Starting procedure

Start the fan.

The maximum allowable fan speed depends among other things on the ambient temperature and the space in front and behind of the fan. Refer to the Air-

Box calculation program and technical fan specifications.

Check that no abnormal noises occur. See that the vibration level is normal. The vibration level at the fan operating speed must not exceed 7 mm/s rms, measured radially at 2 points, 90° offset and at the free shaft end of the motor. Otherwise, the fan must be balanced. Operation at a higher vibration level exceeding 11 mm/s rms\* is not allowed in case of fixed fan position.

Operation at a higher vibration level exceeding 18 mm/s rms\* is not allowed in case of position on feet or anti-vibration mountings.

After 30 minutes of operation check that the fan operates normally.

\* ISO 2954, Requirements for instruments for measuring vibration severity.



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

- Operation in stall area, i.e. with counter pressure that pulsates - called pump mode
- Operation with uninterrupted and repeated starts and stops
- Uneven flow velocity through the fans

Ask Novenco if in doubt.

## 6. Maintenance

### 6.1 Before maintenance



Switch off the power and disconnect the motor cable in the terminal box, before beginning work on the rotor and motor.

### 6.2 Fan casings

The fan casing requires no maintenance other than ordinary cleaning.

If the fan casing is painted, the painted surface should be checked regularly and repaired where necessary.

### 6.3 Rotors

At the factory, the rotor blades are set to the pitch that corresponds to the desired operating point with regard to pressure, airflow and fan speed. To ensure vibration-free operation the rotor has been carefully balanced in this position.

Vibrations that occur during operation are normally due to accumulations of dust or dirt on the hub and blades. If the vibrations remain after cleaning, expert assistance should be called in immediately, as continued vibrations shorten the life of the motor bearings.

#### 6.4 Motors

Refer to the motor manufacturer's documentation and the nameplates for how to service the motors.

##### Motor maintenance

- Inspect the motor for wear signs and damaged parts.
- Clean the motor casing, motor cooling fan and motor shell.
- Drain the motor of condensed water.
- Check supply cables and electrical connections for impairments.
- Check terminal box seals and cable glands.
- Lubricate bearings  
Refer to the motor manual for service information such as lubrication intervals, grease amounts, when to replace bearings etc.

- **AC motors** up to size 132 have lifetime-lubricated bearings. Motor sizes 160 to 280 require lubrication according to the manufacturer's instructions. Fans with motor sizes 225 to 280 have nipples on the outer fan casings. For fans with motor sizes 160 to 200, nipples on the outer fan casings are optional. Refer to the motor nameplates for recommended grease type, amount and interval.

 Use a manual grease gun for lubrication. Excess grease causes bearings to overheat and results in failure.

Motor size	Poles	Lubrication		Grease amount [g]
		50 Hz	60 Hz	
160	2	22000	20000	13
	4			
	6	25000	25000	
	8			
180	2	17000	14000	18
	4			
	6	25000	25000	
	8			
200	2	15000	12000	21
	4			
	6	25000	25000	
	8			
225	2	5000	4000	27
	4	14000	12000	
	6	20000	17000	
	8	24000	20000	
250	2	4000	4000	34
	4	13000	10000	
	6	18000	16000	
	8	20000	20000	
280	2	16000	12000	13
	4			
	6	25000	25000	
	8			
180	2	11000	8000	18
	4			
	6	25000	25000	
	8			
200	2	9000	6000	21
	4		21000	
	6	25000	25000	
	8			
225	4	11000	9000	27
	6	16000	13000	
	8	20000	19000	
	8	19000	17000	
250	4	9000	7000	34
	6	14000	12000	
	8	19000	17000	
	8	19000	17000	

**Table 3.** Grease amounts and intervals for WEG W22 TEFC motors – ball bearings

Motor size	Poles	Lubrication		Grease amount [g]
		50 Hz	60 Hz	
160	2	16000	12000	13
	4			
	6	25000	25000	
	8			
180	2	11000	8000	18
	4			
	6	25000	25000	
	8			
200	2	9000	6000	21
	4		21000	
	6	25000	25000	
	8			
225	4	11000	9000	27
	6	16000	13000	
	8	20000	19000	
	8	19000	17000	
250	4	9000	7000	34
	6	14000	12000	
	8	19000	17000	
	8	19000	17000	

**Table 4.** Grease amounts and intervals for WEG W22 TEFC motors – roller bearings

#### 6.5 Dismounting of motor (fig. 9)

Prior to commencing the work, switch off the current and disconnect the motor cable. Next, dismount any ducts on the fan inlet and outlet sides. Remove the rotor centre bolt (item 01), centre disc (item 02) and hub cover (item 03).

Dismount the rotor by means of a puller fastened in the 2 threaded holes of the hub boss (item 05).

Detach the motor by loosening the bolts in the motor shell (item 06). Remove the motor (item 11) and motor flange (item 10).

In dismounting and disassembling the fan be careful not to expose the individual parts to shocks et., as these are likely to damage the motor bearings or other fan components.

#### 6.6 Mounting of motor (fig. 9)

After service, remount the motor; see that the motor flange (item 10) is correctly located and that the motor shaft is concentrically placed in the fan casing before tightening the bolts (item 06).

Size	Torques [Nm]	
	Motor bolts (06)	Centre bolt (01)
M6	9	6
M8	23	12
M10	45	20
M12	78	20
M16	190	25
M20	370	25

**Table 5.** Tightening torques

Mount the rotor (item 04) on the motor shaft by means of a tool fastened in the threaded hole of the motor shaft. Fix the rotor hub to rest against the motor shaft collar.

Use a feeler gauge to check that the blade tip clearance between the rotor blade tips and fan casing is the same throughout the circumference. If it deviates, adjust the motor position in the suspension arrangement.

Fan size, ØD [mm]	Minimum [mm]	Fan size, ØD [mm]	Minimum [mm]
250	0.4	800	0.8
315	0.5	900	0.9
400	0.6	1000	1.0
500	0.5	1120	1.1

**Table 6.** Blade tip clearances at standard temperatures

Fan size, ØD [mm]	Minimum [mm]	Fan size, ØD [mm]	Minimum [mm]
560	0.6	1250	1.3
630	0.6	1400	1.4
710	0.7	1600	1.6

**Table 6.** Blade tip clearances at standard temperatures (Continued)

Mount the centre bolt (item 01), centre disc (item 02) and hub cover (item 03). Replace lock washers and nuts during fan assembly. Finally, connect the motor cable (item 13) in the terminal box (item 12) and any ducts.

To start the fan follow the procedure described in section "5. Start of operation".

### 6.7 Blade pitch adjustment

The blade pitch has been adjusted in the factory with a special tool (fixture) to deliver the performance required by the customer.

If the fan performance is required to be changed it is possible to change the blade pitch. It requires knowledge of the motor load and the max. permissible blade pitch on the graph as related to the motor rating (in case of blade pitch increase). Contact Novenco before any such adjustment of the blade pitch. Novenco can supply special tools for blade pitch adjustment and instructions for rotor balancing. The brochure "Blade Angle Tool" is available on request.

## 7. Troubleshooting

It is recommended to go through the below checklist in case of breakdowns or lack in performance. Call for service, if problems persist.

### Lack in performance

- Damper closed
- Duct choked
- Supply fan, if any, stopped
- Motor defective
- Motor disconnected
- Wrong direction of rotation of rotor

### Noise and vibrations

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

## 8. Inspection and test

It is recommended to test and inspect the fans at regular intervals with regard to operability and operation conditions. Inspect the fans twice a year to ensure satisfactory function and long life.

### Extent of inspection

- Measure power consumption
- Verify torques of fixation bolts
- Cleaning
  - inside with pressurised air
  - outside with a lint-free cloth with a mild soapy water solution
- Visual inspection
  - Rotors
  - Fan casings
  - Electrical connections

Enter all values and observations in a log.

## 9. Sound

The sound generation of the fans depends on installation and operating conditions, hence no general data of the sound generation can be given.

Refer the product catalogue, AirBox computer program and the technical fan specifications.

## 10. Safety

The NovAx axial flow fans must be installed according to Novenco's, the current and the local 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. Spare parts

Contact Novenco for information about and ordering of spare parts.

## 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.

## Novenco Building & Industry A/S

Industrivej 22 Tel. +45 70 77 88 99  
 4700 Naestved www.novenco-building.com  
 Denmark

### 13. Patents and trademarks

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

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### 14. Quality management

Novenco Building & Industry A/S is ISO 9001 and 14001 certified. All fans are inspected and tested in the production.

### 15. Warranty

Novenco Building & Industry A/S provides in accordance to the law a standard 12 months warranty from the product leaves the factory. The warranty covers materials and defects from the manufacture. Wear parts are outside the warranty scope. Extended warranty can be agreed upon. Refer to the contract.

### 16. Product lifetime

The fans have a product lifetime of 20 years. Storage, installation and maintenance must be in accordance with Novenco's instructions, which include this installation and maintenance guide.

### 17. Declaration of conformity

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

hereby declares that the Novenco axial flow fans ACN, ACW and ARN 250-1600 have been manufactured in accordance to the below legislation of the European Council and of the United Kingdom. They comply with the below standards and regulations.

#### EU directives

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

#### UK regulations

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

#### Applied standards and regulations

- ANSI/AMCA 300-14
- EU regulation 327/2011
- DS 447:2013
- BS/DS/EN ISO 1461:2009
- BS/DS/EN 1886:2007
- BS/DS/EN 1993-1-1:2005 + AC:2007
- BS/DS/EN ISO 5801:2017
- BS/DS/EN ISO 9001:2015
- BS/DS/EN ISO 12100:2010
- BS/DS/EN 12101-6:2005 + AC:2006
- BS/DS/EN ISO 12499:2008
- DS/ISO 12759-2:2019
- BS/DS/EN ISO 12759-4:2019
- BS/DSF/FprEN ISO 12759-5:2021 (draft)
- BS/DS/EN ISO 12944-2:2017
- BS/DS/EN 13053:2019
- BS/DS/ISO 13347-1:2004
- 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
- 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 that the installation and maintenance instructions are followed. Changes to the product without prior consultation with Novenco Building & Industry A/S invalidates the declaration and warranty.

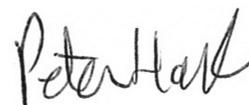
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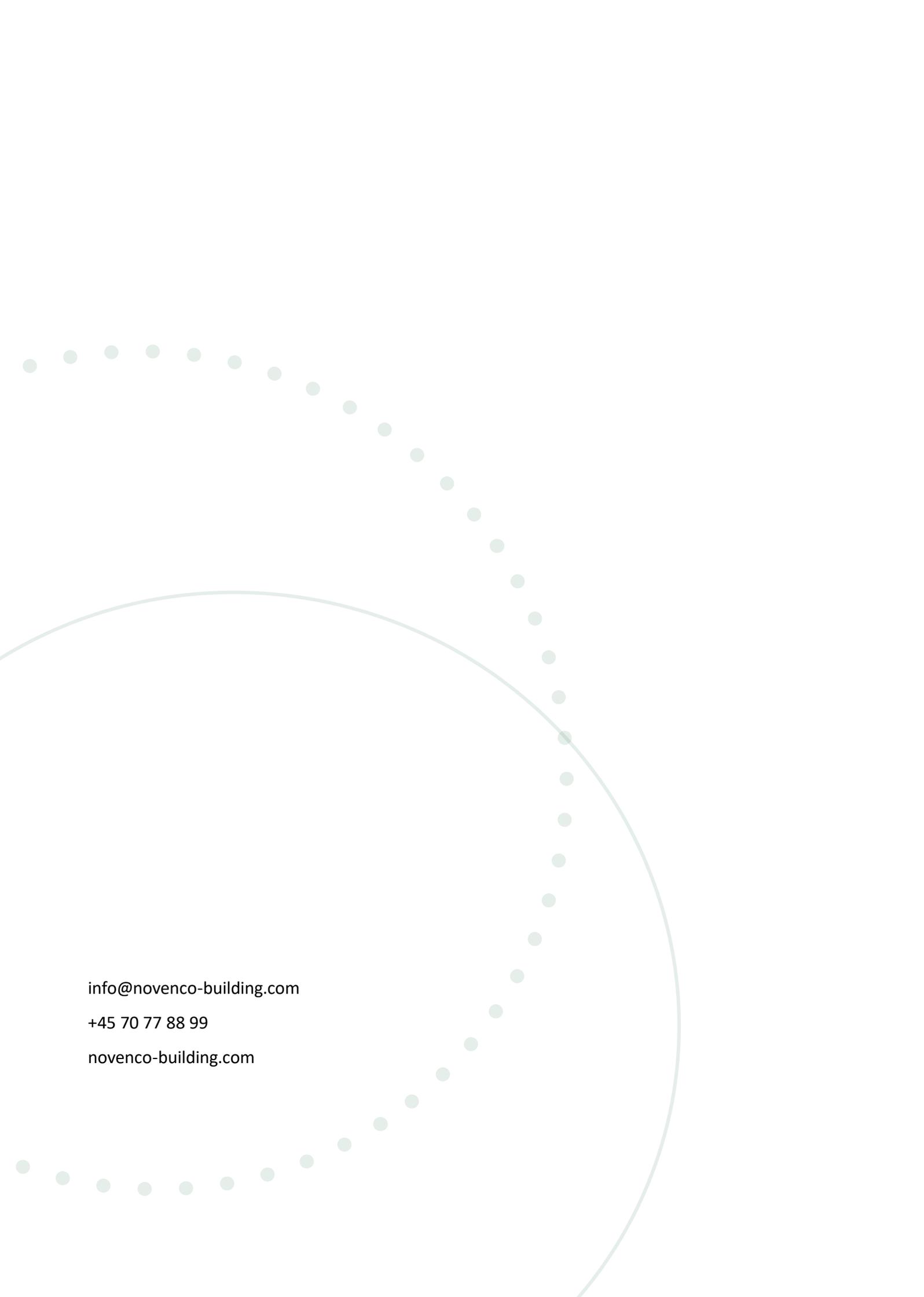
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Naestved, 01.06.2021



Peter Holt  
 Technical director  
 Novenco Building & Industry A/S



A decorative graphic consisting of a dotted arc at the top and a solid circle at the bottom, both in a light green color. The dotted arc is composed of small circles, and the solid circle is a thin line.

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