

Installation and maintenance for Novax fan type ACL

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1. Application

Novax ACL fans are compact, sturdy axial flow fans. They are designed for replacing existing fans for energy-saving reasons. The fans are capable of meeting everyday ventilation requirements under normal conditions in all types of commercial and industrial buildings.

Please read the relevant sections of these instructions carefully before installing the product or performing any maintenance.

2. Handling

2.1 Marking

ACL fans are equipped with nameplate, stating Novenco's name and address and providing information on product type, e.g. ACL 710/380, serial or order number, and fan speed.

A motor nameplate with relevant motor data, including insulation class, is also provided.

2.2 Weight

The total weights of ACL axial flow fans are shown in table 1.

2.3 Transport

During transport, care must be taken to prevent water (e.g. rainwater) from entering the motor or other sensitive components.

Novax ACL fans are supplied on pallets or skids, enabling fork-lift transport. The forks must be positioned beneath the base. The unit must be set down as slowly as possible on a soft surface. Impacts, vibrations and falls may cause imbalance and deformation or damage to motor bearings.

3. Storage

Novax fans can withstand outdoor storage for up to one month providing the packaging is intact. After removing the packaging, fans must be stored in a rain-proof shelter.

If stored indoors under well-ventilated conditions with no risk of condensation, storage duration may be extended to six months.

The storage place must not be exposed to vibrations, which may damage the motor bearings. If stored for longer than three months, the impeller should be turned regularly by hand.

4. Installation

Before installing the ACL fan in the ventilation system, a suitable location must be identified and prepared. This will include removing the existing fan and closing off any holes capable of allowing false air to be sucked into the system.

Note that it is of the utmost importance for the performance and sound level of the axial flow fan that the air flow is unimpeded and free of eddies.

The required direction of air flow must also be taken into consideration when deciding location. The fan is provided with an arrow plate denoting the direction of air flow through the housing. The housing can only face one way.

	Sizes	Motor size						
		-80	-90	-100	-112	-132	-160	-180
Hub diameter 230, 330 and 380	400	65	72	79				
	500	82	89	96	104	130		
	560	87	94	100	109	135	170	
	630	97	104	110	119	145	180	
	710	107	114	120	129	155	190	
	800	119	126	132	141	167	202	
	900	131	138	144	163	179	214	261
Motor type		-80	-90	-100	-112	-132	-160	-180
Motor weight		11	18	25	34	59	94	141

Table 1. Total fan weights (incl. motor) and weights of motors alone [kg]

It is important to provide sufficient free space for assembling and dismantling the system and to facilitate cleaning and maintenance.

4.1 Preparation

Measure out and mark the hole to be cut for the fan on the panel itself.

If existing duct height necessitates standing the fan on a raised base or support, this should be prepared first.

Then measure the height from the base to the centre of the fan and mark this position on the panel. Drill a hole through the panel at the centre point.

Mark the circumference of the hole on both sides of the panel using, for example, a cord and felt-tip pen as a drawing compass.

	Sizes	Centre height	Diameter
Hub diameter 230, 330 and 380	400	403	535
	500	403	635
	560	413	695
	630	503	775
	710	503	855
	800	603	945
	900	753	1065

Table 2. ACL fan dimensions [mm]

Check the measurements and markings before cutting the hole.

Cut the hole through the panel and any insulating material. Smooth any rough edges.

Fit and secure edging strip.

4.2 Installing the fan

ACL fans are supplied ready to install, with factory-fitted mount, guides, cross supports, protective grille and end plate.

Loosely position accompanying rails on base where fan is to stand.

Then place fan on rails and push into position against stops on rails so that fan is aligned with hole cut in panel beside stops. Note that rails are held securely in place by fan after it has been positioned on them.

Push fan along cross supports towards panel until end plate and panel are in close contact.

Horizontally centre fan in relation to hole in panel.

Screw mount securely to cross supports.

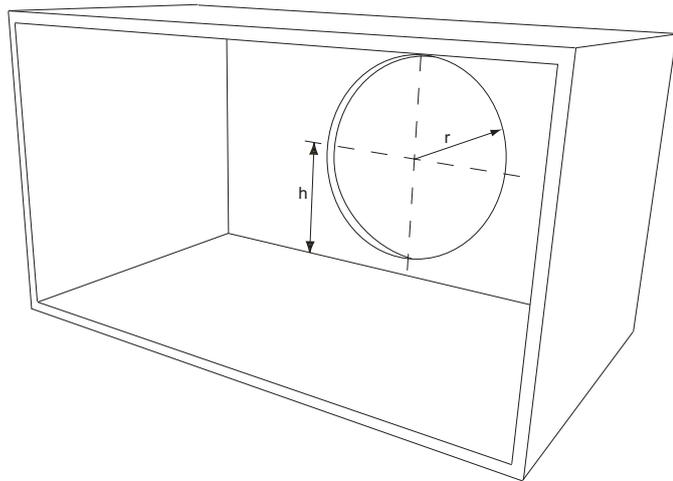


Figure 1. Measurements for cutting hole in panel



Figure 2. Installing the fan

Check position of fan in relation to hole in panel and adjust if necessary. Check that end plate is in close contact with panel.

Secure fan in position with screws through guides and rails and through rails and base.

Before tightening screws, adjust rails to ensure they are parallel with panel.

Firmly tighten screws holding guides and rails in place.

Screw rod holders to panel. Secure fan by fitting rod to panel across end plate above fan housing.

Turn impeller by hand to check that it can freely rotate in fan housing. Check also

that clearance between impeller blade tips and fan housing is equal all the way round.

4.3 Installing the acoustic diffuser (optional)

Fit sealing strip to outside panel surface around circumference of hole. See figure 3.

Centre diffuser opposite fan.

Attach diffuser to panel using self-cutting screws.

Adjust inner core of diffuser to provide 1-1.5 cm clearance between core and fan motor.



Figure 3. Fitting the sealing strip



Figure 4. Fully installed diffuser

4.4 Duct connection (alternative)

ACL fans are prepared for circular duct connections on the outlet side.

The duct may need to be adapted prior to connection, e.g. the outlet side may need to be shortened to make room for the diffuser.

If the existing duct has a different diameter than the diffuser, an adapter must be fitted.

Systems with high vibration levels or exacting performance requirements must be provided with expansion joints between the fan and duct. The fan should not be used to support the duct.

4.5 Electrical connection

Electrical connection must be made by an authorised electrician in accordance with current legislation. Power should be connected direct to the frequency converter. See figure 6. Connections should be made in accordance with frequency converter wiring diagrams. Note that the fan cable is screened. It must be connected in such a way that the screen remains unbroken.

If an external frequency converter is to be used, its interference filter must meet current requirements and regulations.

After connecting the fan, check that the direction of impeller rotation complies with the arrow plate on the fan housing.

Alternatively, the fan can be installed without frequency converter. In such situations, the fan should be connected via a terminal box or plug socket. Note! A switch must be installed in the immediate vicinity of the fan.

5. Start-up

5.1 Before start-up

Before start-up, check that the fan has been installed correctly. The section in which the fan is installed and the adjoining duct should be checked and cleaned of dirt, foreign matter and tools before the fan is started.

Also ensure that the electrical connections fulfil applicable requirements, that any protective grilles on the fan outlet side are correctly fitted, and that the direction of impeller rotation complies with the arrow plate (check by briefly starting the fan).

5.2 Motors with Δ/Y starter

The relay must be set to the calculated time.

5.3 Start-up procedure

Starting the fan

- 1 Start the fan
- 2 Check that no abnormal sound occurs.
- 3 Check that the vibration level is normal. At operating speed, fan vibration must not exceed 7 mm/s rms measured radially at two points with 90° offset and at the free shaft end of the motor. Otherwise, the fan must be re-balanced.
Operation at vibration levels higher than 18 mm/s rms is inadvisable if vibration dampers have been used. See *ISO 2954 – Requirements for instruments for measuring vibration severity*.
- 4 After thirty minutes of operation, check that the fan operates normally.

6. Maintenance

6.1 Safeguards prior to inspection and maintenance

Before inspecting or servicing the fan, it must be switched off and disconnected from the electrical system. Safeguards must be taken to prevent the fan from re-starting unintentionally.

6.2 Fan housing

As standard, the fan housing requires no maintenance other than cleaning.

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

6.3 Impeller

The impeller (rotor unit) is supplied with blade pitch factory adjusted to the required operating conditions (pressure and air flow) and actual fan speed. To ensure vibration-free operation, the impeller has been carefully balanced in this position.

Vibration during operation is usually caused by dust or dirt accumulating on the hub and blades, and can normally be corrected by cleaning. Should this not be the case, technical assistance should be called in immediately as continued vibration will shorten the service life of the blades and motor bearings.

6.4 Motor

Normally, only the motor bearings require maintenance. This should be performed as described in the maintenance instructions for electric motors.

6.5 Detaching the motor

Before detaching the motor, disconnect the power supply to the fan.

Remove rod from top of end plate. Loosen mount from cross supports and pull fan housing away from panel until motor is free of panel opening.

Now loosen mount from rails on base. Remove entire assembly (fan housing plus mount) from rails and lay aside on an even surface.

Remove motor cable (pos. 12) from motor.

Remove impeller centre screw (pos. 01), centre disc (pos. 02) and hub cover (pos.

03).

Remove impeller using puller secured in the two threaded puller holes in the hub boss (pos. 05).

Loosen bolts in motor shell (pos. 06). Motor (pos. 11) and motor flange (pos. 10) can then be removed.

When dismantling the fan, be careful not to expose individual parts to impacts or other forces that might damage the motor bearings or other fan parts.

6.6 Fitting the motor

After servicing is complete the motor must be refitted. Check that the motor flange (pos. 10) is correctly positioned and that the motor shaft is concentrically positioned in the fan housing before tightening the bolts (pos. 06).

Refit impeller (pos. 04) on motor shaft using puller secured in threaded hole on motor shaft. Tighten impeller hub against motor shaft collar.

Check that blade tip clearance is equal around the entire circumference of the housing. If this is not the case, adjust motor position in suspension system.

	Sizes	Min.	Average
Hub diameter 230, 330 and 380	400	0.6	1.2
	500	0.5	1.4
	560	0.6	1.5
	630	0.6	1.7
	710	0.7	2.0
	800	0.8	2.2
	900	0.9	2.5

Table 3. Blade tip clearance [mm]

Then refit hub cover (pos. 03), centre disc (pos. 02) and centre screw (pos. 01). It is recommended that lock washers and

lock nuts be replaced when reassembling the fan. Finally, reconnect motor cable (pos. 12) to motor.

The fan must then be reinstalled against the panel as previously described in section 4. Installation.

To restart the fan, follow the procedure described in section 5. Start-up.

6.7 Blade adjustment

The blade pitch is factory adjusted using a special tool (fixture) to provide the output required by the customer/order on delivery.

If a different output is required, it is possible to alter blade pitch. This requires knowledge of the motor load and the max. permissible blade pitch in relation to the motor rating (in case of blade pitch increase).

Please contact Novenco before any such adjustment of blade pitch. Special tools for blade pitch adjustment and instructions for impeller balancing are available from Novenco.

A brochure describing the blade pitch tool and its use is available on request.

6.8 Fault finding

Possible operating faults are described in the following.

Insufficient output

- Blocked air supply on inlet side
 - Damper closed
 - Duct blocked
 - Supply fan (if any) stopped
 - Motor defective
 - Motor cut out

- Incorrect direction of impeller rotation

Noise/vibration

- Bearings in electric motor defective
- Impeller out of balance
- Impeller worn/damaged
- Bolts/components loose
- Impeller blades have different pitch
- Fan operating in "stall" mode. This may damage the system and should be remedied immediately, see "Insufficient output".

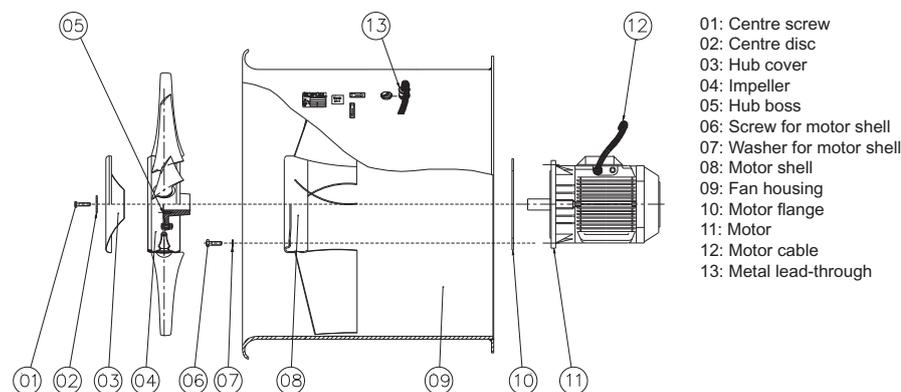
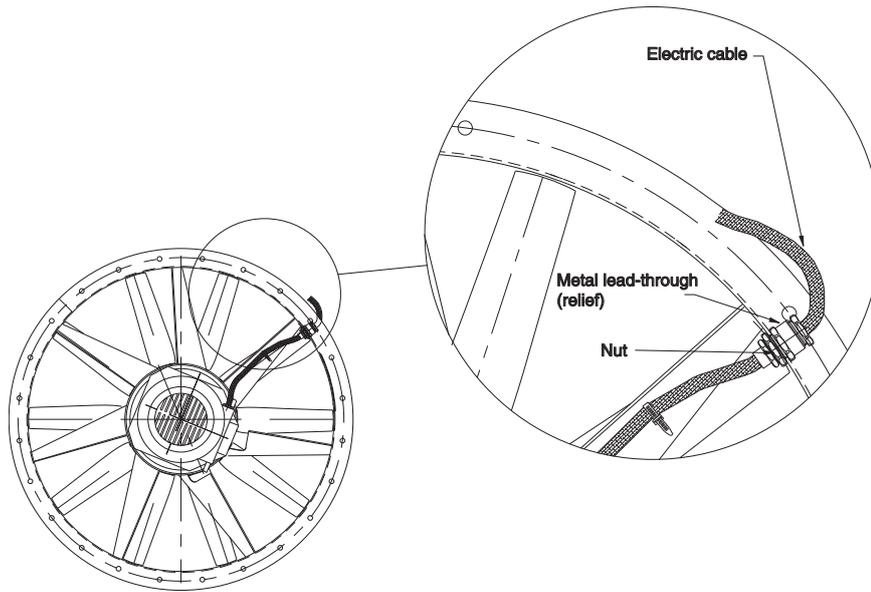


Figure 5. Exploded drawing of ACL fan



b have been manufactured in accordance with the following harmonised standards.

Applied standards

- EN ISO 12100-1:
Safety of machinery – Part 1
- EN ISO 12100-2 + 12100-2/A1:
Safety of machinery – Part 2
- EN ISO 13857:
Safety of machinery – Safety distances
- EN 60204-1:
Safety of machinery – Electrical equipment of machines – Part 1: General Requirements

On the proviso that Novenco installation instructions have been followed.

Naestved, 1.4.2010



Steen Hansen
 R&D manager
 Novenco A/S

Figure 6. Electrical connection through fan housing

7. Testing functionality and operational readiness

ACL fans should be tested every six months with respect to functionality and operational readiness provided the fan is started at least once a day by means of a time switch.

7.1 Periodic inspection

ACL fans must always be maintained in proper operating condition. To ensure satisfactory operation and long service life, the fans should be inspected every six months.

Inspection should include:

- Measurement of power consumption.
- Measurement of fan housing vibration.
- Control of fixation bolt torque and, if necessary, readjustment.
- Visual inspection of fan housing, impeller and electrical connection.
- Cleaning
 - with compressed air inside
 - with water outside

It is recommended that a log be kept of all values and observations.

8. Sound

The sound generated by the fans depends on installation and operating conditions, and general data on sound emission is therefore unavailable.

For further details, please refer to our catalogue material or computer programs designed to calculate specific sound emissions.

9. Declaration of conformity

In accordance with the European Machinery Directive 2006/42/EC, Annex II A.

Manufacturer: Novenco A/S
 Address: Industrivej 22
 DK-4700 Naestved

We hereby declare that axial flow fans, type ACL 400-900,

- a** fulfil the requirements contained in the following Directives on the condition that the product is installed in accordance with the installation instructions. If the product has been altered in any way, the declaration no longer applies.

Directives

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