

Centrifugal Smoke Extraction Unit
CELN
Not 04/005-2
INSTALLATION AND START UP





IT IS CRITICAL TO ASSIGN THE HANDLING AND INSTALLATION OF THIS EQUIPEMENT TO PROFESSIONALS

This range of F400 centrifugal smoke extraction units is equipped with so-called reaction turbines whose blades are inclined to the rear, and consists of 7 sizes: 400, 450, 500, 560, 630, 710 and 800.

The normal operating temperature when not extracting smoke ranges between -16°C and $+85^{\circ}\text{C}$.

IMPORTANT: In order to maintain the compliance of all devices that are subject to the EN 12101-3 standard, all part replacement operations must be effectuated by AREM and performed identically whether on-site or in the plant. Failure to comply with these instructions removes all AREM liability concerning CE certification.

1 DESCRIPTION

1.A. CONSTRUCTION

The reaction turbines are manufactured in cold-rolled galvanised sheet steel and are balanced both statically and dynamically in compliance with the NF E 90-600 standard for G6.3 quality. The casings are also manufactured in cold-rolled galvanised sheet steel.

1.B. TURBINE ACCESS

To dismantle the turbine, unscrew the nuts securing the inlet mouth and remove it. Then remove the screw on the end of the shaft fixing the turbine to the engine shaft. Extract the turbine from the shaft using a puller. Proceed in the reverse order to reassemble.

1.C. MOTOR REMOVAL

This operation must be performed by qualified personnel **after verifying that the motor is not powered and ensuring that no one can restore electrical power without the authorisation of the maintenance operations manager.**

- Disconnect the turbine motor then loosen the motor mounting bracket bolts.



2 TRANSPORT

2.A. SHIPPING

The contractual guarantee of this equipment begins at the delivery date and covers defects where it is possible to conclude that poor manufacturing or faulty materials are the cause.

In the case of particularly long transportation or (and) transport on particularly rough roads, it is advisable to block the rotating turbine in order to prevent vibrations damaging the raceways.

2.B. RECEPTION

After receiving the device check the number and condition of parts. Non conformities resulting from poor transport conditions should be immediately specified on the transport form and confirmed by registered letter with acknowledgement of receipt addressed to both us and the carrier.

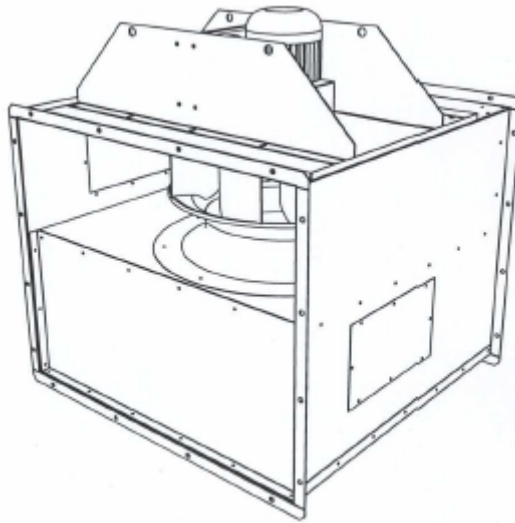
2.C. STORAGE - PROTECTION

Fans must be stored inside, safe from dust, shocks and weather conditions.

Similarly, it is preferable not to store the units near a source of vibration in order to maintain the integrity of the motor bearings. In the event of long-term storage, rotate the motor rotor a quarterturn every fortnight to avoid marking the bearings under the effect of the turbine's weight.

2.D. HANDLING BEFORE IMPLEMENTATION

Handle the unit with care. Avoid shocks, no matter how slight, which could cause damage to the components and subsequently affect the turbines balance. If necessary, it may need to be rebalanced. The elements which comprise the unit can be bulky and heavy. It is therefore necessary to provide adequate safety and handling devices.



3 ASSEMBLY - INSTALLATION

3.A. VERIFICATIONS

Verify the following points before beginning the installation:

- Verify that the equipment is really appropriate for the intended use.
- Ensure that the electric motor characteristics are compatible with the supply voltage and the planned start-up mode.
- Verify that the turbine spins effortlessly when turned by hand.
- Check the tightness of all screws, paying particular attention to the fixing of the turbine onto its shaft.

3.B. INSTALLATION - CONNECTION

- The mounting must be rigid and flat.
- It is recommended to interpose vibration isolators between the unit and its mounting.
- Put in place the mechanical safety features required by the current regulations.
- Ducting must never be supported by the unit, but rather by suitable clamps or fixations.
- Insert a flexible connector between the fan and ducts when possible.



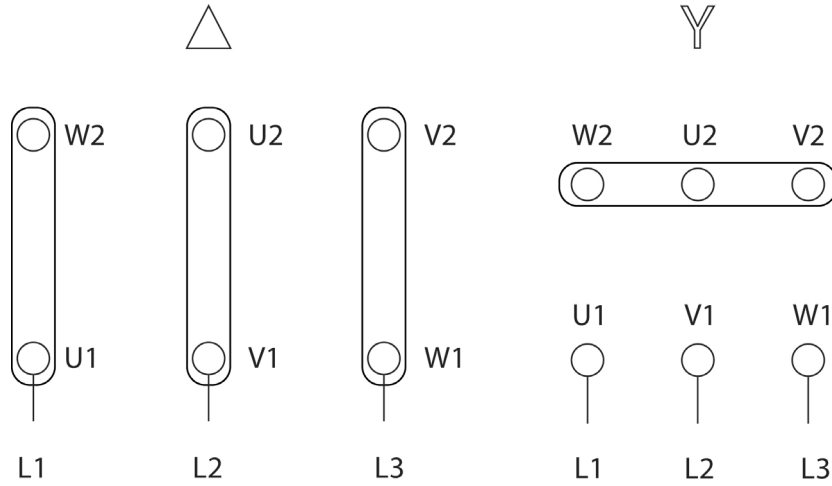
4 MOTORS

4.A. THREE PHASE MOTOR WIRING DIAGRAMS

1 speed motor - 230/400V

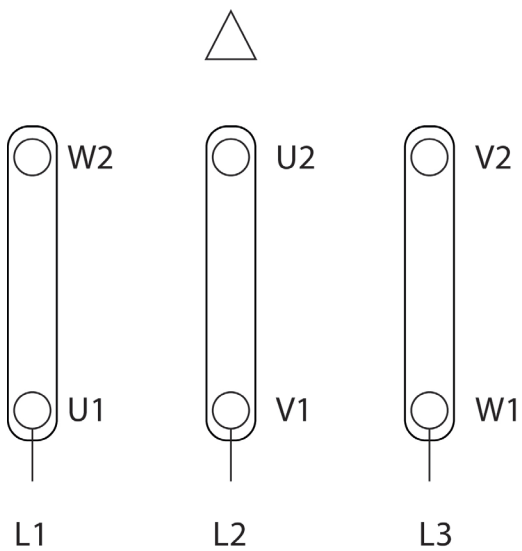
230V Δ

400V Y

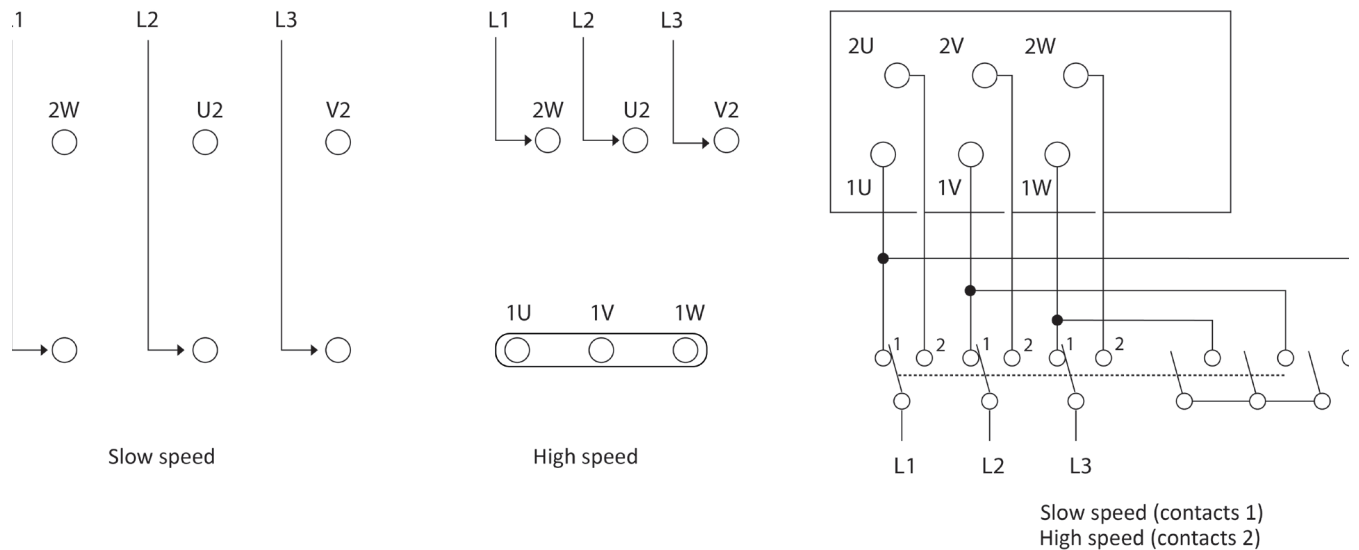


1 speed motor - 400/660V

400V Δ



2 speeds motor - DAHLANDER - 400V



5 COUPLING THE MOTORS

To complete the electrical connection perform the following operations:

- Open the connection housing.
- Refer to the wiring diagram located inside the housing.
- Adopt the coupling mode and the connection adapted to the voltage supply.
- Do not place either nuts or washers between the terminals of the power cable.
- At the entrance of the terminal box, bend the cable into a goose-neck shape to prevent water infiltration through the cable gland.
- Use cables with a sufficient section and exterior diameter to correspond to the gland size and ensure its seal.
- Check that there are no contacts between the terminals.
- Close the lid of the terminal box ensuring the proper positioning of the seal.

6 EARTHING

It is essential that the equipment is earthed.

7 PERMISSIBLE OVERLOAD

The motors are designed to accept an amperage 10% higher than that specified on the rating plate without risk. Note that after start-up, the amperage decreases until the engine reaches its operating temperature. (approx. 2 hours)

8 THERMAL PROTECTION

Use a safety device to protect against overload, such as a temperature calibrated on the amperage indicated on the motor rating plate, increased by 10%.

9 PRECAUTIONARY PRINCIPLE

- Rotate the turbine by hand and make sure it turns freely without encountering any friction point.
- Ensure the quality of electrical connections.
- Check that the mains voltage matches the installed equipment.
- Ensure that all safety measures are in place.
- Place the bleed hole on the underside of the motor and do not install it in a different position from the one planned for in the order. Condensate drain plugs can be removed when there is no risk to motor protection.

10 VERIFICATION

10.A. BEARINGS LUBRIFICATION

The motors powering these devices are lubricated for life and do not require any special maintenance.

11 PROTECTION OF ROTATING PARTS

- The fan is connected to the outlet: place a grill on the intake side.
- The fan is connected to the intake: place a grill on the outlet side
- The fan is connected to the intake and the outlet: no access to the turbine is possible → no grill.

12 INSPECTION HATCH

This feature allows for the inspection and cleaning of the turbine as well as other maintenance operations. Produced in galvanised sheet steel, there are two hatches which are installed with screws on the units' side panels.

13 FLEXIBLE SLEEVES

- Firstly check the geometry of the pipe flanges. (alignment, parallelism...)
- Sealing surfaces must be free of welds.
- Assemble the sleeves with a pre-compression of 15mm.
- To avoid premature wear of the sleeve, assemble with the screw heads on the sleeve side.
- Respect the direction of the deflector's position in relation to the direction of the fluid.
- Mount the deflectors and flanges with all edges in contact with the rounded sleeve.
- It is essential to mount soldered, glued or sown joints on the upper part of the sleeve in case of wet-air transportation or when there is risk of condensation.

14 BOLT TIGHTENING

Check the tightness of the screws, paying particular attention to the fixing of the turbine onto the motor shaft.

15 ELECTRICAL CONNECTION

Before each intervention it is essential **to ensure that the device is not powered and that no-one can restore power without the authorisation of the maintenance operations manager.**

Observe the indications on the motor rating plate and on the wiring diagram.

16 START UP

This phase must be conducted by trained personnel who will perform the following operations:

- Check the rotational direction of the turbine.
- Observe the voltage and frequency shown on the motor's rating plate, making sure not to deviate $\pm 5\%$ from voltage extremes marked on the rating plate and $\pm 1\%$ frequency
- Check the amperage consumption.
- Ensure the absence of any abnormal vibration.
- Check the noise level is in compliance with current standards.
- Check the tightness of screws and bolts after a few operating hours, in case vibrations loosen a few screws.

17 GENERAL INFORMATION

17.A. COMPLIANCE WITH EUROPEAN STANDARD

The motorised centrifugal fan must comply with European directives concerning machines, low voltage and EMC. As this material is integrated into an installation, the compliance of the entire device with norms will be ensured and declared by the final installer.

17.B. SAFETY

Before each intervention it is essential to ensure that the device is not powered and that no-one can restore power without the authorisation of the maintenance operations manager.

17.C. GREASING

The motors that equip these fans are lubricated for life and do not require any special maintenance. Concerning the bearings, refer to the manufacturer's instructions.

17.D. CLEANLINESS OF THE FAN

When using the ventilation unit in a dusty atmosphere, the turbine can be progressively coated to the detriment of its performance and balancing. It is therefore necessary to monitor the clogging of the turbine and to clean it when coated by dust and dirt.

18 ANOMALIES

18.A. CHECKING INSUFFICIENT FLOW

1. Measuring devices

- Check their power supply, correct operation and calibration.

2. Duct network

- Check the network and ensure the installation complies with instructions.
- Change the fan for a upgraded model.

3. Turbine speed too slow

- Check the voltage of the motor power supply and verify the connections.
- Check the real speed of the motor and compare with that on the rating plate.
- Check the real speed of the fan and compare with that on the rating plate.

4. Dampers and valves

- Check the damper openings.
- To increase the flow, widen the air flow section. (warning, the amperage consumption increases with the flow).

5. Leaks

- Ensure that the installation has no leaks and seal as necessary.

6. Duct connection

- Ensure proper duct connection and remedy faults if necessary.

7. Direction of rotation

- Check that the turbine's rotational direction complies with that shown on the fan scroll of the fan.
- Where appropriate, on a three-phase network reverse the direction of rotation by reversing the order of two phases.

8. Network clogging

- Check that nothing is obstructing the duct network.

18.B. CHECKING EXCESSIVE FLOW

1. Measuring devices

- Check their power supply, correct operation and calibration.

2. Duct network

- Verify that the installation is properly connected.
- Review the circuit and/or accentuate load losses in order to fix the desired resistance by reducing the air flow section.
- Reduce the rotational speed of the turbine by the potential use of a regulator.
- Change the motor or the fan.

3. Excessive turbine speed

- Check the voltage of the motor power supply and verify the connections.
- Check the real speed of the motor and compare with that on the rating plate.
- Check the real speed of the fan and compare with that on the rating plate.

4. Dampers and valves

- Check the damper settings.
- To reduce the flow, diminish the air flow section.

5. Leaks

- Ensure that the installation has no leaks and seal as necessary.

18.C. ABNORMAL VIBRATIONS

These vibrations can be related to problems concerning the following elements:

1. Turbine

- Disassemble, clean and/or rebalance the turbine

2. Bearings

- Perform a standard exchange of the motor or defective bearing where appropriate.

3. Shaft

- If it is deformed, proceed to a standard motor exchange.

4. Excessive output

- Ensure the installations compliance with instructions.

5. Dampers and valves

- Ensure the installations compliance with instructions.

6. Excessive turbine speed

Ensure the installations compliance with instructions or change the fan.

7. Direction of rotation

- Ensure the installations compliance with instructions.
- Check that the turbine's rotational direction complies with that shown on the fan scroll of the fan.
- Where appropriate, on a three-phase network reverse the direction of rotation by reversing the order of two phases.

8. Loosening or loss of screws or bolts

- Ensure the installations compliance with instructions.
- Replace missing or loose screws with selflocking bolts.

9. Fragile floor

- Ensure the installations compliance with instructions.
- Strengthen the devices base support.

10. Environment

- Analyse the source of the problem and insulate the fan by adding vibration isolators for example.

18.D. ABNORMAL NOISES

1. Magnetic motor noises

- Find the disturbing elements in the power network and isolate the fan power supply.
- When using a variable speed drive, verify its compatibility with the motor.

2. Bearing noises

- Replace the engine or the faulty bearing where appropriate.

3. Other mechanical noises

- Check for abnormal friction between the turbine and the fan scroll.
- Verify the motor fixation.

18.E. MOTOR OVERLOAD

This phenomenon may be the direct result of the following causes:

1. Excessive output

- Reduce the output by increasing the voltage drop, which will result in reduced amperage consumption.

2. Density of the conveyed fluid

3. Friction of a rotating element

- Remove the cause

4. Direction of rotation

- Check that the turbine's rotational direction complies with that shown on the fan scroll of the fan.
- Where appropriate, on a three-phase network reverse the direction of rotation by reversing the order of two phases.

5. Electrical connection

- Ensure the installation is in compliance with instructions
- Ensure that three phases are present at the three-phase motor terminals.
- Measure the supply voltage and frequency for comparison with the indications on the fan rating plate.

