

Air handling unit STING
Manual Section A • Assembly Instructions STING Size 60-85



May 2008

Safety instructions

Operation of air handling units and accessories

WARNING



Before you start to use the air handling unit any free connections should be fitted with a protective mesh.



In addition, all electrotechnical and mechanical safety devices must be installed before the air handling unit is used.

When the unit needs to be opened ensure that the power supply to the unit is disconnected. Note that a possible electric air heater has a separate electrical supply, which is not disconnected via the air handling unit's main power switch.

Exercise care when opening the air connections for the hot water on the air heater. Risk of surging or steam discharge.

When carrying out service work and inspections the unit's main power switch must be switched off before inspection doors are opened. All safety devices must be reset before restarting.

Clearance (docking distance) in front of the electric heater and the electrical cabinet should conform to applicable electrical safety regulations.

Use the control panel to stop the unit.

Doors on the unit are fitted with lockable handles. Ensure the unit is always locked when left and that keys are kept inaccessible to unauthorized persons.

Inspection hatches on the filter/fan sections must not be opened when the unit is running. The fans generate a large positive pressure on the doors.

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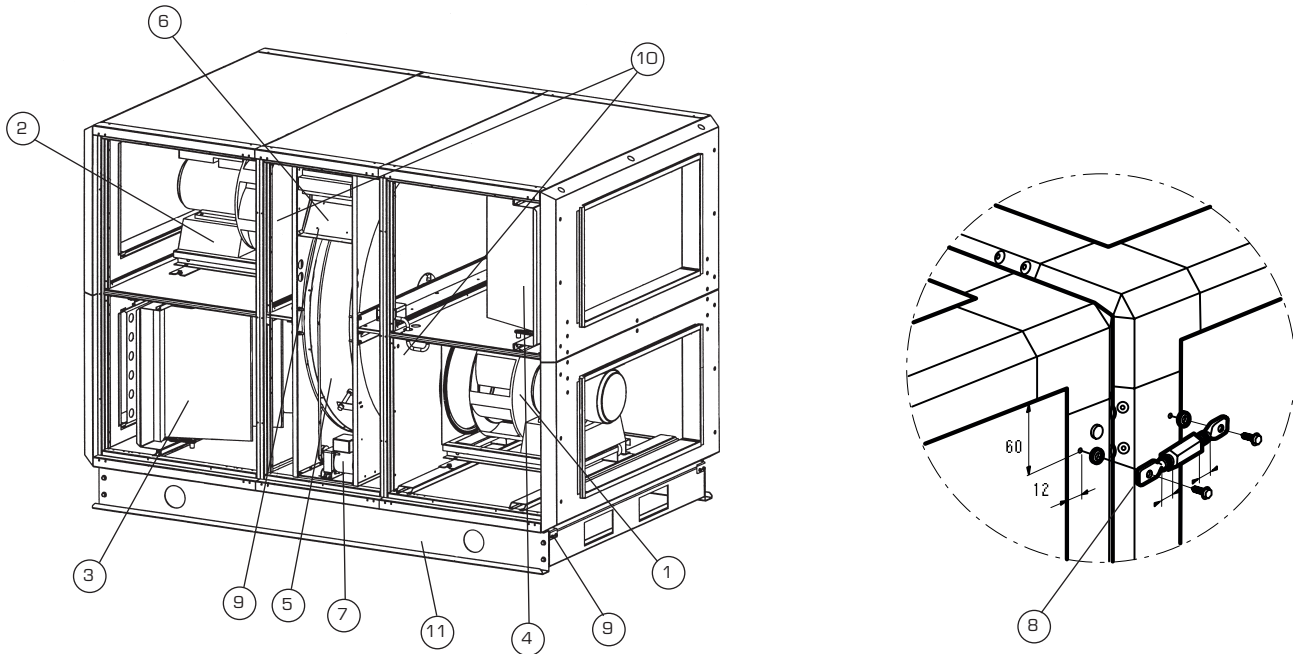
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Component parts



1. Supply air fan with integral motor
(Size 85 has a separate frequency converter)
2. Exhaust air fan with integral motor
(Size 85 has a separate frequency converter)
3. Supply air filter
4. Exhaust air filter
5. Rotary heat exchanger
6. Control equipment
7. Electric motor for rotary heat exchanger
8. Bolts to join sections
9. Quick connectors to the flow sensor and motors
(in the case of a unit divided into blocks)
10. Flow sensor (not when the unit is supplied without a controller)
11. Base frame



The unit is supplied in standard configuration with **the service side on the right and supply air fan below**. The supply air flow can be changed to left/top i.e. the opposite way round if required.

The function of the fans, supply and exhaust air fans, is switched and the rotor's direction of rotation is changed.

See the section about Changing the flow direction.

Components

Fan

The unit has two direct driven radial fans.
The fans are driven by the integral motors.

Rotary heat recovery unit

The unit is fitted with a rotary heat recovery unit made of non-hygroscopic aluminium equipped with cleaning sector, electronic speed control and rotation monitor.

Duct connection

Rectangular connection sleeves are fitted and have PG-connections. External function components such as heaters, sound attenuators etc. can be connected directly on the unit.



Important!

The weight of the air duct system with components must not load the unit.

Unit data

Electrical cabinet connection

3 x 400 V, 50 Hz

Mains connection

The electrical connection of the unit is made via the connection box on top of the unit.

The unit is fed with 3 x 400 V.

The supply cable must be equipped with an external circuit breaker.

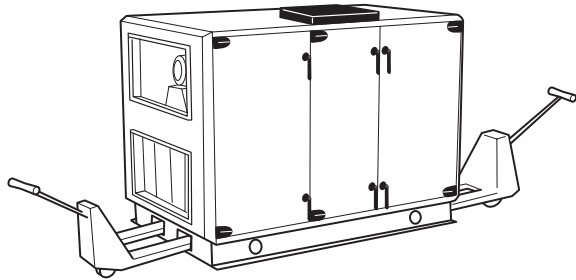
When the unit needs to be fed with 3 x 230 V a transformer must be used.

Fuse protecting the unit, motor, max frequency, weight

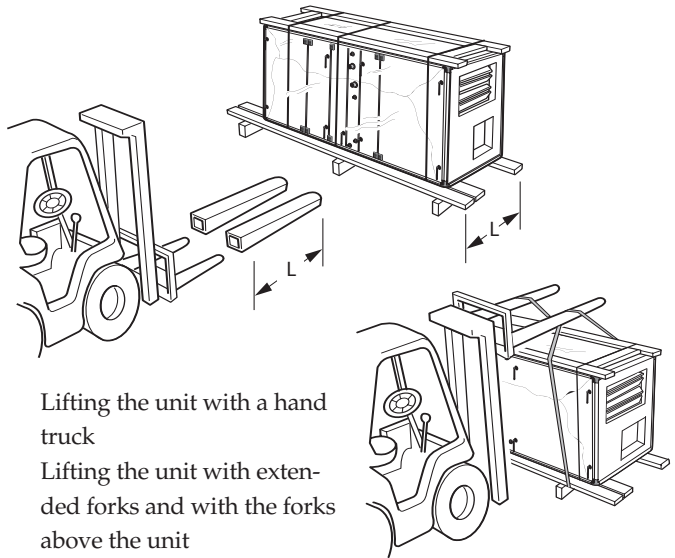
Size	Fuse prot. the unit, 3x400V	Fuse prot. the unit, 3x230V	Motor (at max motor output)	Max frequency	Weight (kg)
STING 65	45 A	100 A	7,5 kW, 4-pole IP55	51 Hz	1441
STING 80	45 A	100 A	7,5 kW, 4-pole IP55	43 Hz	2230
STING 85	63 A	160 A	11 kW, 4-pole IP55	48 Hz	2278

Transport and installation

Trucklyft



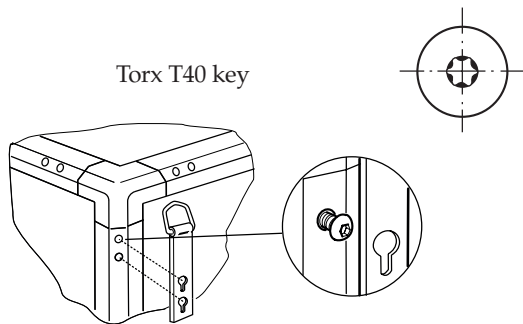
Lifting the unit with a hand truck



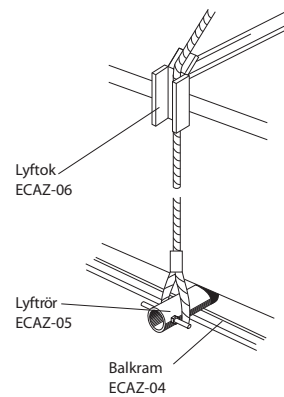
Lifting the unit with a hand truck
Lifting the unit with extended forks and with the forks above the unit

Lifting the unit with a crane

The fan/filter components and the rotor can be lifted individually using lifting eyes.

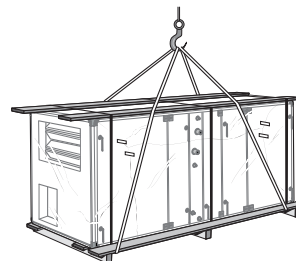


Torx T40 key



Lifting the unit with the base frame or the supporting legs

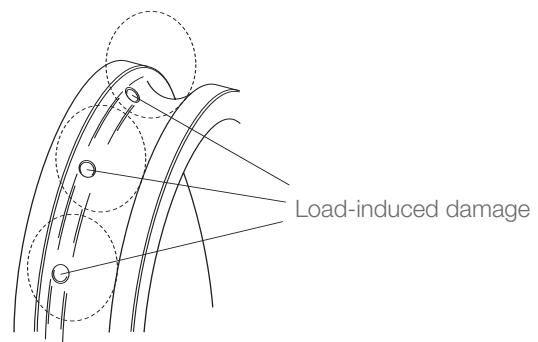
Put the unit on a level surface. Slacken the top bolts in the corner sections. Hook in the lifting equipment and tighten the bolts to 18–20 Nm.



Leave the unit in its packaging when lifting it with a crane. The load is limited by the lifting straps.

Important!

If the fans are not operated for more than 3 months before or after installation, the load on the belt drive must be relieved and the fans rotated by hand at regular intervals. If not, the ball bearing may suffer the following damage; see the illustration.



Load-induced damage

Assembly of one or more block units

The seals are supplied loose and must be fitted before the components are assembled. See figures 1 and 2.

Installation

The unit can be positioned directly on the foundation if it is flat and horizontal. Adjustable feet can be used for adjustment. These are available as accessories ETAZ-20-b. Adjustable foot 15-85 mm. Six adjustable feet.



Take care that the filter bags are not damaged when removing or fitting the filter cassettes.

Space requirements

Space around the unit must be planned to take into account routine service work, for example, filter replacement as well as cleaning of the fan and outer casing.

In front of the electrical cabinet there should be a service aisle with a width as set out in the Swedish National Electrical Safety Board's recommendations ELSÄKR-FS 2004:1. The future replacement of the unit's components should also be taken into consideration. The planning of this work is a condition that must be fulfilled to make the CE-marking of the installation possible.

The unit must be positioned or arranged so that service of the electrical cabinet is facilitated.

Sound transmission

When a unit is positioned next to a wall, low frequency sound can generate vibrations in the wall even when the sound level from the fan room is acceptable. First and foremost you should choose to install the unit against a wall in the fan room that borders a space insensitive to sound. When this is not possible the unit should be positioned 400-500 mm from the wall.

Duct lead-throughs must be designed with care so that rigid connections between the duct and wall do not occur. In addition, precise seals around the duct must be produced to prevent the transfer of sound to adjacent areas. It may be wise to connect the ducts using fabric sleeves in sensitive installations.

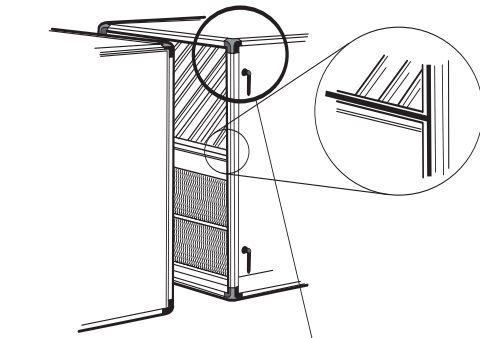


Fig. 1

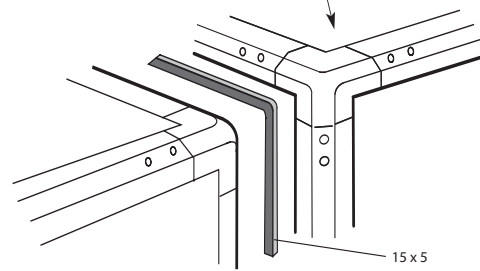
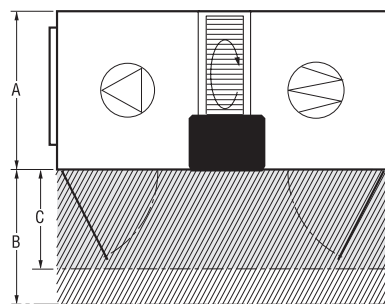


Fig. 2



A = Unit width, Removal of components
 B = Filter replacement
 C = Inspection hatches

Space requirements (mm)

Size	A	B	C
65	2004	800	1025
80	2604	800	1275
85	2604	800	1275

Corresponding sound transmission through the floor can occur when the floor's mass and rigidity are insufficient.

The mass should at least correspond with the recommendations VVS AMA 98 (RA part section QE) that is, a floor with an area 4 times the unit area should have a mass that is at least 5 times the dampened mass (i.e. the mass above the vibration dampers).

When the floor structure is light it can be improved by a heavy insulating mat under the unit's entire area. The entire bottom of the unit should rest on the mat, which can be fitted with a covering board.

Changing the flow direction

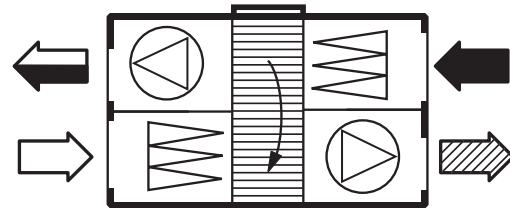


Note! Before the conversion of control equipment can be carried out the units power supply must be disconnected. Switch off the external circuit breaker before starting work!

Standard configuration, supply air right/below

When the unit is delivered with supply air fan on the lower floor to the right it can be changed to supply air flow left/top i.e. the other way. The function of the fans as supply and exhaust air fans switches and the heat exchanger's direction of rotation is changed.

The setting of DIP-switch 6 is shown in the figure:

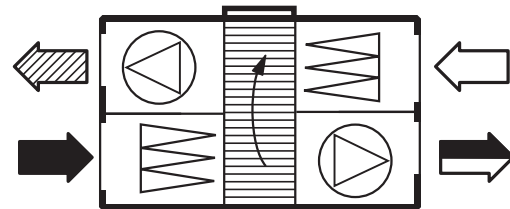


Supply air fan located on the lower plane to the right, extract air on the upper plane to the left. The rotor rotates downwards.

Supply air left/top

Supply air fan located on the upper plane to the left, extract air on the lower plane to the right. The rotor should rotate upwards.

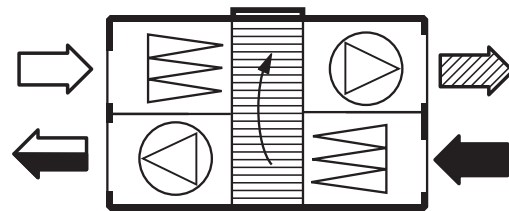
Action: Set DIP-switch 6 as shown in the figure:



Standard configuration, supply air right/top

When the unit is delivered with supply air fan on the top floor to the right it can be changed to supply air flow left/below i.e. the other way.. The function of the fans as supply and exhaust air fans switches and the heat exchanger's direction of rotation is changed.

The setting of DIP-switch 6 is shown in the figure:

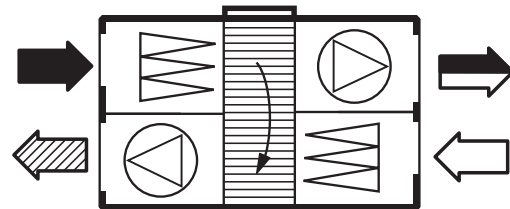


Supply air fan located on the upper plane to the right, extract air on the lower plane to the left. The rotor rotates upwards.

Supply air left/below

Supply air fan located on the lower plane to the left, extract air on the upper plane to the right. The rotor should rotate downwards.

Action: Set DIP-switch 6 as shown in the figure:



Commissioning



The detailed description of the electrical, automation and control equipment described in these instructions should be observed before the unit is connected to the mains supply and commissioned.

Connection to the mains supply 3x400 V

- The incoming supply (3x400 VAC TN-S) should be connected via an *external circuit breaker* placed in the vicinity of the unit.
- STING size 65 and 80 should be fuse protected using an *external fuse* 45AT as phase fault protection.
- STING size 85 should be fuse protected using an *external fuse* 63AT as phase fault protection.
- The incoming supply is connected to terminal group L1, L2, L3 and N as well as to the earth rail in the electrical cabinet.
- The cable is secured using e.g. cable ties to tie rail, before the cover on the electrical cabinet is refitted.

Connection to the mains supply 3x230 V

- The incoming supply (3x230 VAC TN-S) and transformer should be connected via an *external circuit breaker* placed in the vicinity of the unit.
- STING size 65 and 80 should be fuse protected using an *external fuse* 100AT as phase fault protection.
- STING size 85 should be fuse protected using an *external fuse* 160AT as phase fault protection.
- The incoming supply is connected to terminal group L1, L2, L3 and N as well as to the earth rail in the electrical cabinet.
- The cable is secured using e.g. cable ties to tie rail, before the cover on the electrical cabinet is refitted.



The fans must not be started with closed dampers on the inlet and outlet sides.

Connecting electrical components

External components are connected with the jackable terminals to the circuit card in the electrical cabinet. A detailed description of this can be found in *section B; STING Control equipment*.

NOTE! *The supplied temperature sensor must be connected to the unit in order for the unit to start.*

Settings

STING is supplied with a factory set controller (*does not apply to versions without control and dealer versions*). This means that all *ordered* functions have been activated and saved. In addition, the parameters concerning the unit size are set correctly.

Only the time and date, as well as the set points and operating times need to be set when commissioning by using the control panel. A detailed description of the procedure can be found in this instruction in the chapter operating the controller.

On delivery the integral motors and flow sensors are set to permit handling of the units entire working area. Only calibration of the flow sensors is necessary before the air flow is set.

Settings that affect the inputs and outputs must be saved when changed whereupon the controller must be restarted. These settings can all be found in the "Control mode" menu, and in the installation guide for the dealer versions (which starts when the Enter button is pressed in).



TIP! *Complete the commissioning protocol in connection with setting up the control unit!*

Functional check

Starting the unit

Starting the unit for inspection After the connection of the mains power supply and connection of external control components, the unit is ready to be started to test the connections.

1. Turn the external circuit breaker to 1 (ON).
2. Start the unit. See *STING Control equipment; Operating the controller, page B:18.*

Damper

Check that the damper opens and closes correctly.

Control valve

Check that the control valve on the air heater/air cooler works correctly.

Direction of rotation on the rotary heat exchanger

Check that the direction of rotation corresponds with the below. If not, see *Changing the flow direction, page A:8.*

- Supply air fan right/below:
Standard configuration. The rotor rotates downwards.
- Supply air fan left/top
The rotor should rotate upwards.
- Supply air fan left/below:
The rotor should rotate downwards.
- Supply air fan right/top:
The rotor should rotate upwards.

Pressure balance over the rotor

The pressure difference between the unit's planes must be checked. It is important for the operation that the exhaust air section has a lower pressure (greater negative pressure) than the supply air section. In doing so the air leakage and cleaning flow are guided towards the exhaust air and transfer to the supply air is avoided.

The pressure difference between the floors is adjusted using throttling plates before the exhaust air filter.

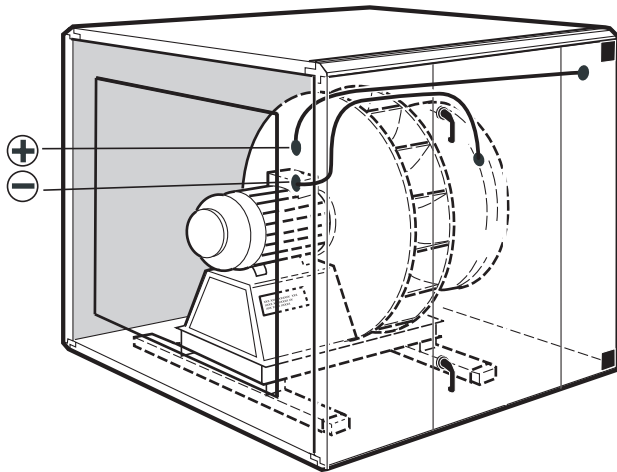
Start by measuring the pressure difference.

1. Connect a pressure gauge between the positive nipple on the supply air fan's outlet for flow measurement and the exhaust air filter's negative nipple.
2. Use the throttle plates to create balance or 0-20 Pa greater negative pressure on the exhaust air side.
3. Position the plates symmetrically in the opening.
The pressure difference is reduced by gradually uncovering the connection opening. The plate sections are pulled out of the unit. The remaining plates are distributed symmetrically in opening time. The filter must be drawn out to release the throttle plates.
When assembling the filter it must be pressed towards the rear edge and positioned correctly before engaging the filter's locking handle. There is also an arrow on the filter guide that indicates when the filter is positioned correctly.
4. Check the pressure again. It may be necessary to repeat the procedure.

There are nipples on the end of the unit used to connect pressure gauges or flow meters to the flow sensors on the fans. Four millimetre hoses are fitted between the nipples on the end of the unit and a pressure gauge. Positive to positive and negative to negative. The pressure gauge should have a pressure range of 0-2000 Pa and an accuracy of +/- 5 Pa or greater.

Air flow measurement

The flow can be directly read on the pressure gauge display when the unit is supplied with a control system. When the unit is not supplied with a control system the flow can be checked as set out below.



There are nipples on the end of the unit used to connect pressure gauges or flow meters to the flow sensors on the fans. **Important! The flow measuring device on the fans are not connected to the nipples on the unit when the unit is delivered with built in control system.**

Hoses, ø 4 mm, are fitted between the nipples on the end of the unit and a pressure gauge. Positive to positive and negative to negative. The pressure gauge should have a pressure range of 0-2000 Pa and an accuracy of +/- 5 Pa or greater.

Flow is determined according to the formula:

$$q = \frac{1}{k} \cdot \sqrt{\Delta p} \text{ m}^3/\text{s}$$

Where the constant *k* is unique for each unit size.

Temperature correction

The flow scale on the instrument and the flow formula above apply with an air temperature of +20°C. At other air temperatures the flow must be corrected with the formula:

$$q = q_{20} \sqrt{\frac{(273 + t)}{293}}, \text{ m}^3/\text{s}$$

q = the true flow through the fan

q₂₀ = the read flow

t = current temperature in °C

Size	k
STING 65	7,55
STING 80	6,15
STING 85	6,15

Filter, final pressure drop

The final pressure for the filter according to the table below i.e. the pressure drop when the filter cassette needs to be replaced, is 100 Pa above the pressure drop with a clean filter.

Pressure switch

When a pressure switch is used this should be adjusted for the final pressure drop stated below. When pressure regulation is used the pressure switch should be adjusted for a final pressure drop of +50 Pa.

Final pressure drop over the filter, STING 65, 80 och 85

Luftflöde m³/s	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5
<i>STING 65, Pa</i>	138	149	162	174	188	202	217	233	250					
<i>STING 80, 85, Pa</i>			131	137	144	150	157	164	171	179	186	194	202	211