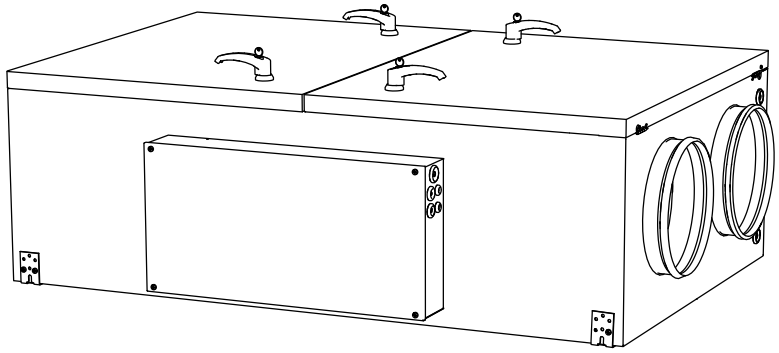
Topvex FR03, FR06, FR08, and FR11

Compact Air Handling Unit



GB Operation and Maintenance Instructions

206575-EN_GB
100113 V.10-01 (C. 1.2-1-00)

Contents

1 Warnings

The following admonitions will be presented in the different sections of the document.

⚠ Danger

Make sure that the Mains supply to the unit is disconnected before performing any maintenance or electrical work!

⚠ Warning

- The inspection doors are heavy! Take care when opening if the unit is ceiling mounted with the inspection doors facing downwards.
- When opening the inspection doors, if facing downwards, make sure to open the door on the exhaust air side (the unit section where the outdoor connections are located) first before opening the other door. The door can also be identified through a Systemair logo attached to it.
- Although the Mains supply to the unit has been disconnected there is still risk for injury due to rotating parts that have not come to a complete standstill.
- Beware of sharp edges during mounting and maintenance. Use protective clothing.

2 Product Description

2.1 Principle drawing

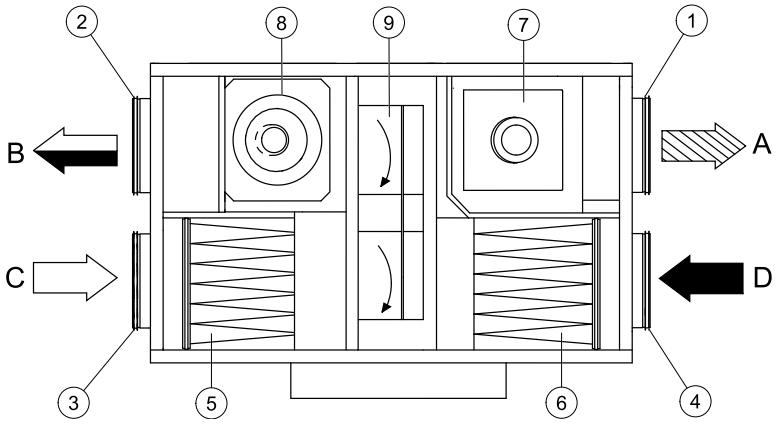


Fig. 1 Right hand connected unit

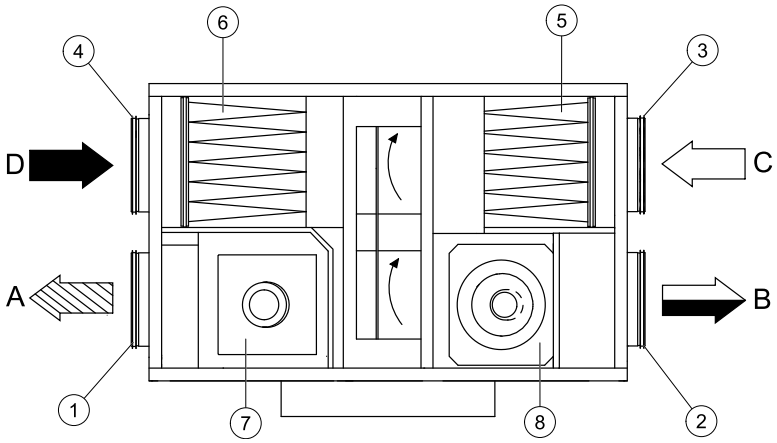


Fig. 2 Left hand connected unit

Position	Description	Symbol	
1	Connection supply air	A	
2	Connection exhaust air	B	
3	Connection outdoor air	C	
4	Connection extract air	D	
5	Filter supply air		
6	Filter extract air		
7	Fan supply air		
8	Fan extract air		

2.2 Component description EL and HW units

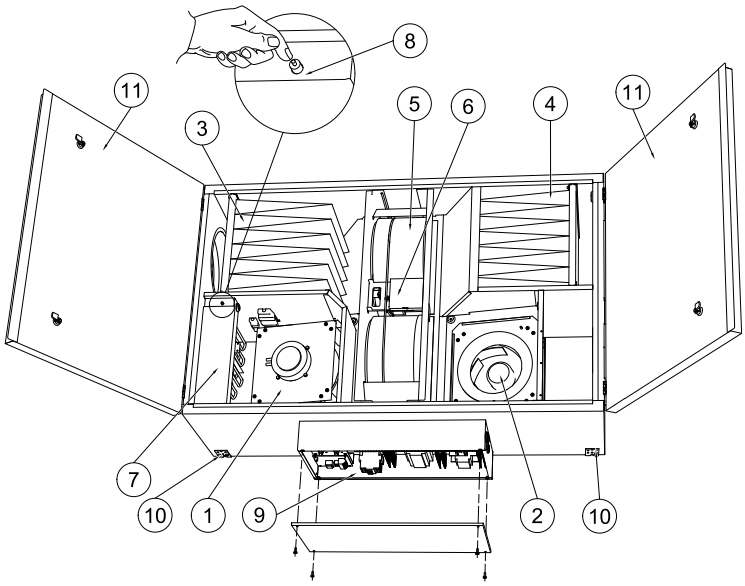


Fig. 3 Components EL units

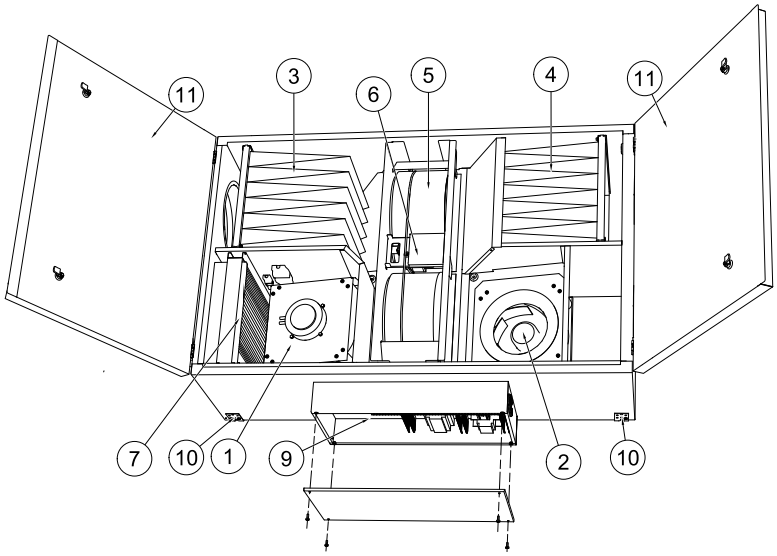


Fig. 4 Components HW units

Table 1: Component descriptions EL and HW units

Position	Description
1	Fan supply air
2	Fan extract air
3	Filter extract air
4	Filter supply air
5	Heat exchanger
6	Rotor motor
7	Re-heater battery, water or electric
8	Reset button, manual over heat protection (only units with electrical heater)

Component descriptions EL and HW units (cont'd.)

Position	Description
9	Electrical connection box
10	Mounting brackets
11	Inspection doors

2.3 Heat Exchanger

This unit is equipped with a high efficient rotating heat exchanger. Required supply air temperature is therefore normally maintained without adding additional heat via the built in re-heater battery (water or electric). The operation of the heat exchanger is automatic and depends on the set temperature. The heat exchanger is removable for cleaning and maintenance.

2.4 Heater Battery

The unit has a built in heater battery (water or electric). The operation of the heating battery is automatic and dependent on the set temperature.

2.5 Electrical Heater

The heating rods are located in the heater beside the supply air fan and the material is stainless steel. The electric heating coil has both automatic and manual overheating protection. The manual overheat protection is reset by pushing the red button on top of the electrical heater frame (pos.8, figure 3). The power demand of the electric heating coil is controlled by a triac power regulator (Pulser) according to the desired supply/extract or room air temperature that is set in the control panel.

2.6 Hot Water Heater

In HW units the hot water coil is located beside the supply air fan (figure 4.) The coil is mounted with the connection pipes projecting from the side of the unit and is therefore easy to connect. The material is copper piping with a frame of galvanized sheet steel and aluminium fins. The coil has a venting nipple and an immersion sensor as frost guard. If there is a risk of freezing in the hot water coil, the control valve is forced open to prevent freezing. If there is still a risk of freezing, the unit is stopped and the outdoor air dampers (accessory) are closed.

3 Interface Description

3.1 Control Panel

The SCP control panel is delivered with a 10 m cable that is connected to the panel and with a fast coupling contact, connected to the Topvex unit. The contact is connected to the ***Corrigo*** controller in the electrical connection box (figure 3). The cable can be unscrewed in the back of the control panel (figure 5).

General information is shown in figure 5.

3.2 Operating the control panel

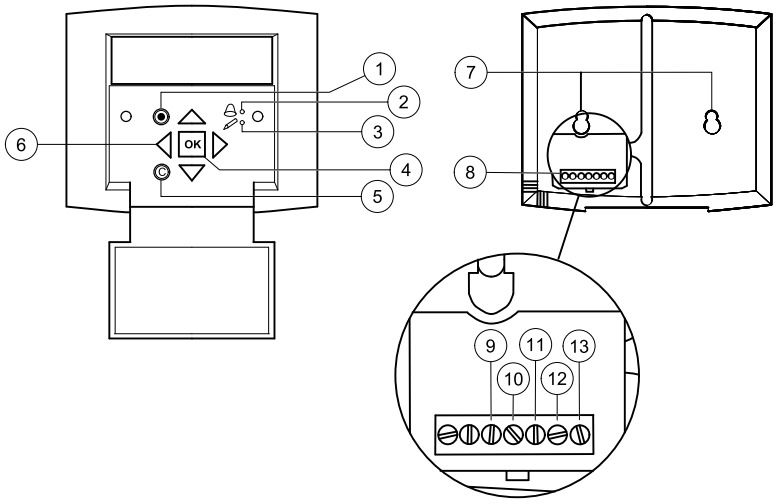


Fig. 5 The control panel

Posi-tion	Explanation
1	Alarm button: Gives access to the alarm list
2	Alarm LED: Indicates alarm by flashing red light
3	Write LED: Indicates by flashing yellow light that parameters can be set or changed
4	OK button: Press this button to be able to change or set parameters whenever possible. Also used to move between changeable parameters in one dialogue window frame
5	Cancel button: Used to abort a change and return to the initial setting
6	Right/Left & Up/Down buttons: Used to move up, down, left & right in the menu tree. Up/Down buttons are also used to increase or decrease values when setting or changing parameters
7	Mounting holes
8	Connection block
9	Connection to yellow cable
10	Connection to orange cable
11	Connection to red cable
12	Connection to brown cable
13	Connection to black cable

3.2.1 Navigating the menus

The start display (the display normally shown) is at the root of the menu tree. Pressing DOWN will move you through the menu options. UP will move you back through the options. To enter a higher menu level, use UP or DOWN to place the cursor at the menu you wish to access and press RIGHT. If you have sufficient log on privileges the display will change to the menu you have chosen.

At each level there may be several new menus which you move through using UP/DOWN. Sometimes there are further sub menus linked to a menu or menu item. This is indicated by an arrow symbol at the right-hand side of the display. To enter a menu, press RIGHT again. To step back to previous menu level, use LEFT.

4 Commisioning

4.1 Before Starting the System

When the installation is finished, check that:

- The unit is installed in accordance with these instructions
- The unit is correctly wired
- Sound attenuators are installed and that the duct system is correctly connected to the unit
- Outdoor air intake is positioned with sufficient distance to pollution sources (kitchen ventilator exhaust, central vacuum system exhaust or similar)
- All external equipment are connected
- The following data is available:
  - Intended configuration, for example temperature control functions, fan control, external control functions etc.
  - How the unit is supposed to operate according to a weekly schedule (normal and reduced speed)

4.2 Initial Configuration

There are four things to consider when starting up the system:

- Language setup
- Control temperature
- Weekly schedule
- Type of function

All these can be set during start up.

1 Setting Language

Press the OK button while switching on the mains supply.

Then press the OK button again after which the cursor appears. Choose language with the UP/DOWN buttons. Confirm the choice with the OK button after which the cursor disappears. Press the LEFT button to go back in the menus.

The language can also be change in the `Language` menu, see the control unit manual.

2 Setting Control Temperature

Set control temperature by choosing `Control temp.` and edit the value to the desired temperature.

The value can be between 16°C and 30°C.

3 Setting Weekly Schedule

Set the time and date by choosing `Time/Date` and edit the values to valid time and date.

4

Set the weekly schedule by choosing `Week program` and edit the values. For more information, see section 4.3.

5 Setting Type of Function

The unit is preset for `Not Active`.

Change the function by choosing `Functions` and then some of the menu alternatives. For more information, see section 4.3.

4.3 Software Description

Menu Item	Sub-menu Item	Sub-sub-menu Item	Explanation
`Man / Auto`:			Show if the unit is running in `Manual` or `Automatic` mode.
`Fanspeed`:			Show if the fans are running on `Low`, `Medium` or `High` speed or if the unit is stopped
`Extended / Forced running`			Activate extended/forced running. Extended/Forced running is the time the unit goes from shut down mode, Low or Medium fan-speed to the fan speed of your choice. OFF and ON times and fan-speeds are set at the submenu `Week program`.
`Control temp.`			Set the desired control temperature value, 16-30°C.
`Running mode`			Set the running mode of the unit. Choose between: `Auto`, `Manual high`, `Manual medium`, `Manual low`, or `Manual shut off`.
`Service`			Login with 1111 to service level. Log's out after 5 minutes of inactivity, with main supply on.
	`Time / Date`		Set the present time, date and weekday.
	`Week program`		Set the units ON time for each week day, 2 periods/ day Preset time is Period 1. 07:00-16:00 Monday-Sunday and Period 2. 00:00-00:00 Monday-Sunday, 00:00-00:00 inactivates the period. For continuous run 00.00–23.59 must be set
			Set the fan-speed when the unit is on to `Low`, `Medium` or `High` and the fan-speed when the unit is off to shut off, `Low`, `Medium` or `High`. Preset is: ON = `Medium` (75%) and OFF = `Low` (35%).

Menu Item	Sub-menu Item	Sub-sub-menu Item	Explanation
	Extended / Forced running		Set how many minutes (0-240) the unit should go to the desired fan speed according to below setting. Set the desired fan speed for the extended/forced running mode. Choose between High, Medium or Low Activating extended running can be done by pressing the OK button in sub menu Extended/forced running (user level) or by using an external timer or a push button. Set the minutes to 0 when using a timer.
	Filter alarm		Reset filter alarm by setting the Reset alarm to Yes. **Note:** The filter alarm needs to be reset in the service menu in order to disappear from the alarm list
			Set the time until the filter alarm should be activated, 1-15 month.
	Functions	Cooling	Set the status for Cooling to Active or Not Active. Preset is: Not Active. Function: Controls a cold-water cooling battery with a 0-10 V DC signal.
		Cool Recycling	Set the status for Cool Recycling to Active or Not Active. Preset is: Not Active. Function: Starts the heat exchanger, to recycling the cold extract air temperature, when the extract temperature is 3K lower than the Fresh air temperature.
		Free cooling	Set the status for Free cooling to Active or Not Active. Preset is: Active. Function: Starts the fans under certain conditions to use the cool night air to cool down the interior of the building during night time between Start Cooling Hour (0:00) and Stop Cooling Hour(06:00). Free cooling active: Yes (changeable, Yes or No) Outdoor temp activation 22°C (changeable, the average daytime temp. needs to be over this value in order to start the function)

Menu Item	Sub-menu Item	Sub-sub-menu Item	Explanation
		Outdoor temperature night	High: 15.0°C (changeable, Outdoor temp. needs to be below this value to start the function) Low: 5.0°C (changeable, Outdoor temp. needs to be over this value to start the function) Room temperature min: 18.0°C (changeable, Room temp. (extract air temp. sensor) needs to be over this value to start the function)
		Fire function	Set the status for Fire function to Active or Not Active. Preset is: Not Active. Set how the unit should operate if the fire alarm function is activated, run on High fan-speed or Shut off. Preset is: Shut off. Function: Decides how the unit should operate at fire alarm.
		Air control	Set the Air control mode to: • Supply. • Supply & Outdoor compensation. Set how much the control temperature should be compensated when the outdoor temperature is –20°C and +15°C (the compensation will be linear between these two points). E.g. At –20 : 5°C. E.g. At +15 : -2°C. Control temp. = 18°C. Outdoor temperature –20°C gives a Control temp. of 23°C (18+5). Outdoor temperature +15°C gives a Control temp. of 16°C (18-2). • Extract. Set the permitted maximum and minimum supply air temperature.
		Fan speed control	Set the Fan speed control in % of maximum fan speed. Choose between: 0% to 100%. All fan speeds LOW, MEDIUM& HIGH can be set in this interval

Menu Item	Sub-menu Item	Sub-sub-menu Item	Explanation
	In-/Outputs		Show the Analogue inputs. AI1: Show the actual temperature of the supply air. AI2: Show the actual temperature of the extract air. ***AI3 applies only to HW units.*** AI3: Show the actual temperature of the return water in the hot water battery (frost protection). AI4 Show the actual outdoor temperature
			Show the status and settings of the digital inputs. DI1: Fan alarm. Connected to the thermal contact in the fan motor. Stops the fan and disconnect the electrical heater when the alarm is activated. **DI2: applies only to EL units**. DI2: Overheating of the electrical heater. Connected to the thermal contact in the heater. Disconnects the heater when the alarm is activated. DI3: Timer / P.B. Starts the Extended running when an external contact, Timer or Push button, closes. Only when the unit is running in Off mode. DI4: Alarm VVX. Stop the fans and close the dampers (accessories) when the alarm is activated. **DI5: Is only shown when the Fire function is activated.** DI5: Fire alarm. Connects to an external fire central. Stops the unit or changes the fan speed to High if the alarm is activated.
			Show and set the Analogue outputs. AO1: Heating battery, Electric or hot-water. Show the output signal, 0- 10V. Set the status to: Auto, Manual or Off. In Manual status it is possible to set the output signal within a range from 0 to10V, more than 2V activates the electrical re-heater (on/off function). ***AO2 is shown only when the cooling function is activated.*** AO2: Cooling battery, cold-water. Show the output signal, 0-10V. Set the status to: Auto, Manual or Off. In Manual status it is possible to set the output signal within a range from 0 to10V. **AO3:** Control signal, 0-10V, to the supply and extract fan

Menu Item	Sub-menu Item	Sub-sub-menu Item	Explanation
			Show and set the digital outputs, output 24V AC. DO1: Damper motor on/off. Opens the damper when the unit is started DO2: Not in use DO3: Not in use DO4: Activates the VVX rotor. Shows the status. Possible to change the status to: Auto, On or Off. Default is Auto. DO5: Alarm output. Show the status.
	Version		Show the program version Present version 1.2-1-00.
	Configura-tion	1. AHU type (choose correct AHU type)	(Enter into the configuration menu using code 8642)
		Fan speed control	High: 100% (changeable 0-100%) Medium: 50% (changeable 0-100%) Low: 5% (changeable 0-100%)
		2. Type of heater (choose correct type of heater)	
		3. Control parameters	P-band: 30°C (changeable) I-Time: 100s (changeable)
		4. Display unit type (E DSP preset)	
		5. Modbus Comm. (Not Active or Active, Preset is Not Active) Modbus: Active	Modbus address: 7 (changeable) Speed: 9600 bps (changeable) Two stop bits: Yes (changeable) Parity: No (changeable)
		6. Modbus- / Exoline Activation	Comm. Code: (enter the communication code given by the supplier of the unit)
		7. Address:	PLA: 254 ELA: 30

Menu Item	Sub-menu Item	Sub-sub-menu Item	Explanation
	Language		Set the menu language. **Note:** A short cut to the menu language is by pressing the OK button at the same time as the main voltage is switched on.
Change codeword			Set a new code for service level.

4.4 Free cooling description

The objective of the Free cooling function is to provide cool out door air if available during the night time when the unit is in OFF position to cool down the interior of the building. During this time the heat exchange rotor is stopped.

Note:

The following is only valid if the free cooling function is set to Active in the program menu.

The fans are started at Start Cooling Hour if the following criteria are met **simultaneously:**

- all time channels are in **OFF** position and that the unit goes back to normal operation the following day (set operation time during the following 24 hours) **and**
  - the average outdoor temperature is higher than the outdoor temperature limit **and**
  - the actual outdoor temperature is lower than the outdoor temperature set upper limit and
  - the actual outdoor temperature is higher then the outdoor temperature set lower limit **and**
  - the actual outdoor temperature is lower than the actual room temperature **and**
  - the actual room temperature is higher than the set room temperature limit.

The fans are stopped at the Stop Cooling Hour or if the following conditions are met:

- the room temperature is lower than the set room temperature limit **or**
- the outdoor temperature exceeds the set outdoor temperature upper limit **or**
- the outdoor temperature is lower than the lowest set outdoor temperature limit.

The unit checks the night temperature (indoor and outdoor temperature) during 3 minutes at 12.00 PM when the fans are started so that the sensors can perform a temperature measurement. If above conditions are met the free cooling function is started, if not the unit goes back to OFF position.

4.5 Changing fan speed

All three possible fan speed settings LOW, MEDIUM and HIGH can be set between 0-100% of the maximum fan speed.

4.6 Fine tuning of fan speed

It is possible to manually regulate the set airflow with 2 potentiometers situated in the electrical compartment figure 6. This enables the fan motors to be regulated individually down to 75% of the set airflow, i.e. if the fan is running at 100% capacity (10V) it's possible to regulate it down to 75% of that particular set point (7,5V), i.e. if the fan is set to run at 5V control signal the same result would be 3,75V etc.

Note:

The potentiometers are meant to be used for commissioning of the unit to ensure a proper pressure balance between extract and supply inside the Topvex unit.

Explanation:

- SF: Supply air fan
- EF: Extract air fan

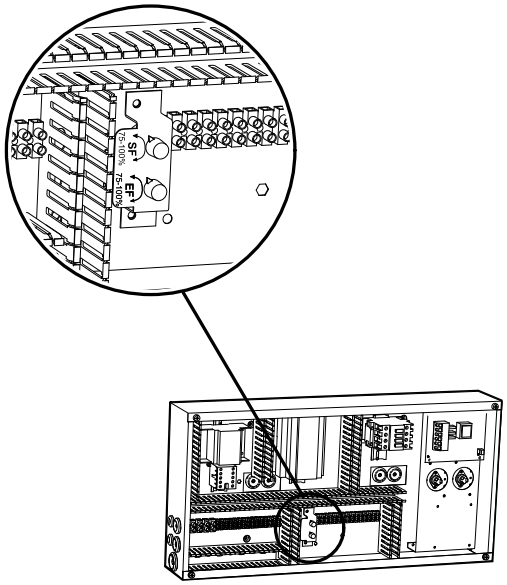


Fig. 6 Potentiometers for fine tuning of fan speeds

5 Maintenance

5.1 Important

⚠ Danger

Make sure that the Mains supply to the unit is disconnected before performing any maintenance or electrical work!

⚠ Warning

- The inspection doors are heavy! Take care when opening if the unit is ceiling mounted with the inspection doors facing downwards.
- When opening the inspection doors, if facing downwards, make sure to open the door on the exhaust air side (the unit section where the outdoor connections are located) first before opening the other door. The door can also be identified through a Systemair logo attached to it.
- Although the Mains supply to the unit has been disconnected there is still risk for injury due to rotating parts that have not come to a complete standstill.
- Beware of sharp edges during mounting and maintenance. Use protective clothing.

5.2 Maintenance Intervals

The table below shows recommended maintenance intervals for the unit and the installation. To ensure a long operation lifetime for the unit it is important to perform maintenance according to below recommendations and that they are performed according to the operation and maintenance instructions. A thorough and recurrent maintenance is a must for a valid guarantee.

Type of maintenance	Every 3 months	Every 6 months	Every 9 months	Once a year	When necessary
Changing filters	(X)[1]	X	(X)[1]	(X)[1]	
Cleaning the heat exchanger				X	
Cleaning the fans				X	
Cleaning extract louvres and supply diffusers					X
Cleaning the outdoor air intake				X	
Cleaning the duct system					X[2]

1. Depending on the air pollution at the installation site
2. Or in accordance with local rules and regulations

5.3 Maintenance Instructions

5.3.1 Changing Supply/Extract air filter

Indicated as “filter to be changed” in the control panel.

The bag filter cannot be cleaned and must be changed when necessary. New filters can be ordered from Systemair. Operation time between filter changes must be reset after filter change (see table 3 ***Filter alarm***). To change the alarm activating time see section 4.3, ***Filter alarm***.

The filters are taken out after loosening a screw attached to the filter guide rail (figure 7)

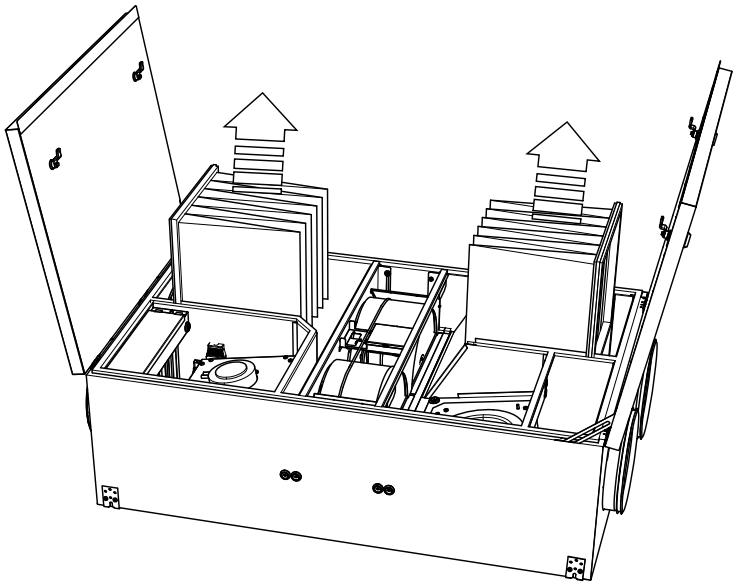


Fig. 7 Changing filters

5.3.2 Checking the heat exchanger

After a long time of use dust may build up in the exchanger (pos.5, figure 3) and block the airflow. It is important to clean the exchanger regularly to maintain high efficiency. The heat exchanger in the Topvex FR can be taken out of the unit. See table 2 for a weight overview. Wash in hot soapy water or use pressure air. Do not use detergent containing ammonia.

Table 2: Weight of heat exchanger block

Model	Weight of heat exchanger block (kg)
FR03	30
FR06	40
FR08	52
FR11	66

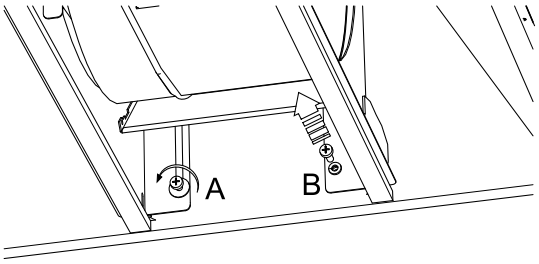
Note:

Make sure that the rotor motor is not exposed to moisture.

5.3.2.1 Dismounting the heat exchanger block on ceiling mounted units

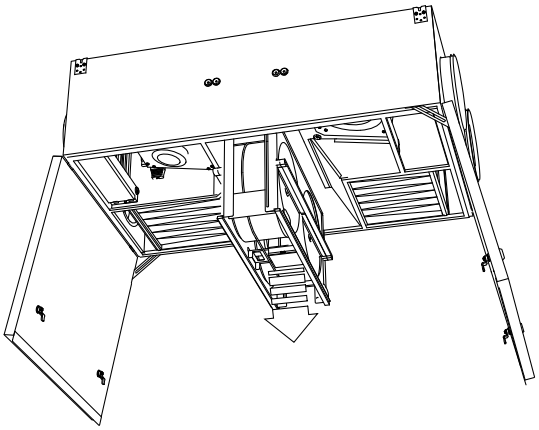
1

There are 4 screws (2 on each side) holding the heat exchanger block (Models FR08 and FR11 have 8 screws, 4 on each side). When removing the heat exchanger start with checking that the screw marked “A” is tightened properly. Remove the screw marked “B” completely as shown in the figure after which the screw marked “A” is loosened carefully, just enough to allow the exchanger frame to slide in the tracks.



2

Slide out the exchanger block until the end of the tracks.



> **⚠ Warning**
>
> The heat exchanger block is heavy. Use proper support device when taking out the heat exchanger block for maintenance!

3

After finished cleaning/maintenance, push back the heat exchanger block and fasten all screws tightly.

5.3.2.2 Dismounting the heat exchanger block on floor mounted units

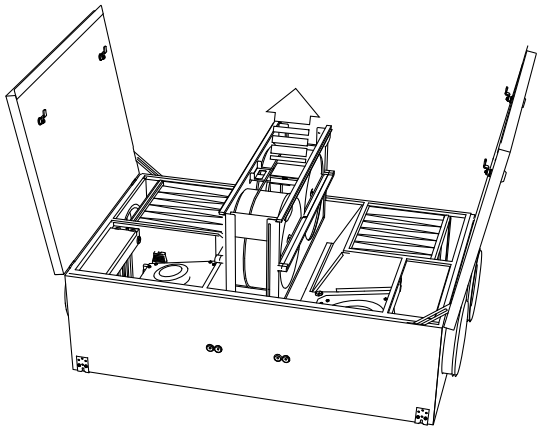
1

Loosen all screws completely holding the heat exchanger block .

2

Remove the heat exchanger block completely by lifting it straight up.

> **⚠ Caution**
>
> The exchanger block is heavy, make sure to use proper lifting device or sufficient number of persons to lift the heat exchanger out of the unit



5.3.3 Checking the fans

Even if the required maintenance, such as change of filters, is carried out dust and grease may slowly build up inside the fans (pos.1 and 2, figure 3). This will reduce the efficiency.

The fans can be dismounted by loosening the 4 screws on the fan casing (figure 8. They may be cleaned with a cloth or a soft brush. Do not use water. White spirit can be used to remove obstinate settlements. Allow drying properly before remounting.

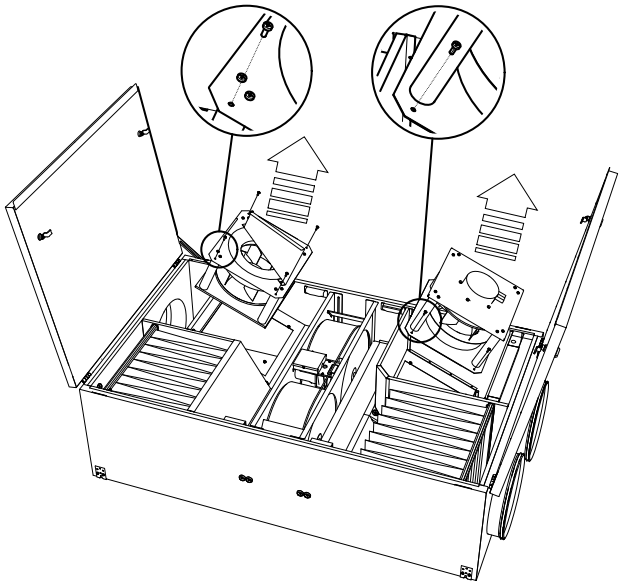


Fig. 8 Dismounting the fans

5.3.4 Cleaning extract louvres and inlet diffusers

The system supplies treated outdoor air to the building and extracts the used indoor air via the duct system and diffusers/louvres. Diffusers and louvres are mounted in ceilings/walls in bedroom, living room, wet rooms, WC etc. Remove diffusers and louvres and wash in hot soapy water if required. Diffusers/louvres must be put back with their original settings and positions in order not to unbalance the system.

5.3.5 Checking the outdoor air intake

Leaves and pollution could plug up the air intake grille and reduce the unit's capacity. Check the air intake grille at least twice a year and clean if necessary.

5.3.6 Checking the duct system

Dust and grease settlements may build up in the duct system even if filters are changed regularly. This will reduce the efficiency of the installation. The ducts should therefore be cleaned/changed when necessary. Steel ducts can be cleaned by pulling a brush, soaked in hot soapy water through the duct via diffuser/louvre openings or special inspection hatches in the duct system (if fitted).

5.3.7 Changing the Internal Battery

Note:

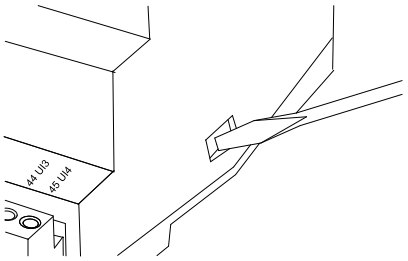
This procedure requires knowledge of proper ESD protection; i.e. an earthed wristband must be used!

When the alarm ”Internal Battery” is activated and the battery LED lights up red, the battery for backup of program memory and real-time clock has become too weak. The battery is replaced as described below. A backup capacitor saves the memory and keeps the clock running for at least 10 minutes after the power supply is removed. Therefore, if the battery replacement takes less than 10 minutes, there will be no need to reload the program, and the clock will continue to run normally.

The replacement battery must be of the type CR2032.

1

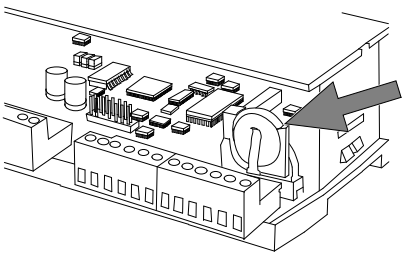
Remove the cover by pressing down the locking torques at the edge of the cover using a small screwdriver, and at the same time pulling the edges outwards.



2

Grip the battery firmly with your fingers and lift it upwards until it rises from its holder.

Press the new battery firmly down into place. Note that to preserve correct polarity, the battery can only be inserted the “right way round”.



5.4 Troubleshooting

Should problems occur, please check or correct the following before contacting your service representative. Always check if there are any alarms active in the control panel.

1. **Fan(s) do not start**
   - Check if there are any alarm messages
   - Check that the fuses are not defect
   - Check the settings in the control panel (times, week schedule, auto/manual operation etc.)
2. **Reduced airflow**
   - Check the settings for medium and low fan speed
   - Check that the outdoor/exhaust air damper (if used) opens
   - Check if filters need changing
   - Check if diffusers and louvres need cleaning
   - Check diffuser/louvre openings
   - Check if fans and exchanger block need cleaning
   - Check if the roof unit or air intake is clogged
   - Check ducts for visible damage and/or build up of dust/pollution
3. **Cold supply air**
   - Check the control temperature on the control panel
   - Check if the overheating thermostat has tripped. If necessary press the red button, marked RESET, on top of the electrical heater (see figure 3)
   - Check if the extract filter must be changed
   - Check if the fans have stopped due to overheating. If so the thermal contact might have tripped (shows as `Fan alarm` in the control panel). If necessary reset (see table 3)
4. **Noise/vibrations**
   - Clean the fan impellers
   - Check that the screws holding the fans are tightened properly

5.4.1 Alarms

The alarm button (pos.1, figure 5) opens the alarm queue. When pressing this button active and non-acknowledged alarms will be displayed in the menu window. The alarm-LED (pos. 2, figure 5) is flashing if there are non-acknowledged alarms and steady if the alarms are still active but have been acknowledged. If there are multiple alarms, use UP/DOWN to move between them. An alarm can be acknowledged or blocked by using OK and UP/DOWN. To abort and go back to start menu press cancel and then press LEFT.

Table 3: Alarms overview

Alarm text	Digital in or outputs	Description
Alarm fan motor	DI1	Thermal contact in the fan motor has tripped. Reset in the control panel.
Overheat	DI2	Thermal contact in the electrical heater has tripped (auto. reset: 60°C, manual reset: 110°C). Manual reset is done by pressing the red button (RESET) on top of the electric heater
Alarm VVX	DI4	Malfunction on the rotating heat exchanger. Check the rotor transmission belt.
Fire alarm	DI5	External fire alarm contact has tripped. Reset in the control panel.
Filter to be changed		Set time has expired. Reset in the control panel. **Note:** The filter alarm needs to be reset in the service menu in order to disappear from the alarm list
Alarm frost protect		Hot water heater outlet water below 7°C (temp. not changeable). Reset in the control panel.
Sensor error inlet		Supply air sensor interruption.
Sensor error exhaust		Extract air sensor interruption.
Sensor error outtemp.		Outdoor air sensor interruption.
Alarm output all alarms	DO5	Gives a signal (24V DC) whenever there is an alarm.
Internal backup battery error		Shows `Internal battery error`in the display

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