systemair TR4000 Compact Air Handling Unit Instruction Manual

systemair

Topvex TR800, TR1300,
TR1800, TR4000
Compact Air Handling Unit

Operation and Maintenance
Instructions

Contents

Warning

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

⚠ **Danger**

- Make sure that the Main power supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.

⚠ **Warning**

- Although the Main power supply to the unit has been disconnected there is still risk of injury due to rotating parts that have not come to a complete standstill.
- Beware of sharp edges during maintenance. Use protective clothing.
- This product is not intended to be used by children or people with reduced physical or mental ability or lack of experience and knowledge, if no instruction concerning the use has been given by the person responsible for their safety or that this person is supervising the operation. Children should be supervised so that they can not play with the product.

Product Description

2.1 Internal Components Topvex TR800-4000

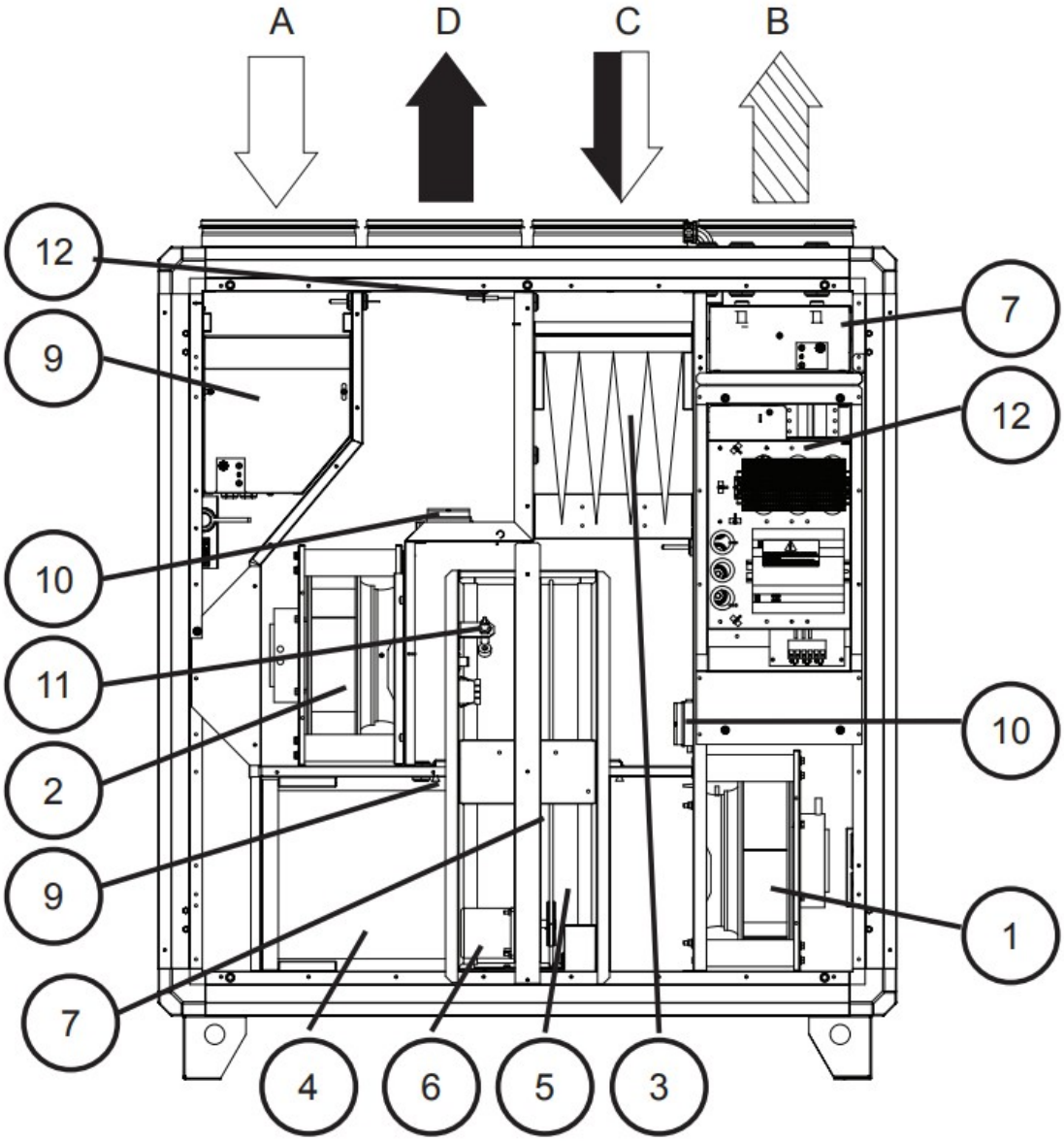
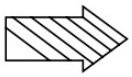
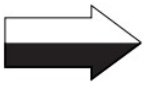


Fig. 1 Internal components with air connection symbols

Table 1 Internal components with air connection symbols

Position	Description	Symbols
A	Connection outdoor air.	
B	Connection supply air.	
C	Connection extract air.	
D	Connection exhaust air.	
1	Fan supply air.	
2	Fan extract air	
3	Filter extract air.	
4	Filter outdoor air.	
5	Heat exchanger.	
6	Rotor motor.	
7	Rotor belt	
8	Re-heater electric or hydronic.	
9	Pre-heater electric or water hydronic.	
10	Pressure transmitter for fan & Filter guard.	
11	Rotation guard for heat exchanger.	
12	Electrical connection box.	

2.2 Description of Internal Components

2.2.1 Supply and Extract Air Fans

The fans have external rotor motors of EC type which can be steplessly controlled individually 0 – 100%. It is possible to program the speed in 2 steps (normal/reduced) depending on the programming of the week schedule. The motor bearings are permanently lubricated and maintenance free. It is possible to remove the fans for cleaning. (Chapter 5)

2.2.1.1 Pressure Transmitter and clogged filter alarm

Two pressure transmitters maintain the airflow at a constant level (CAV) by measuring the differential pressure over the inlet cone of the fan impellers. The pressure transmitters are installed from factory in all units. An accessory kit is available to convert the unit to a VAV in order to maintain a constant pressure in the duct. See “VAV Installation Instructions” manual (420300) for more information.

In addition, the pressure transmitters measures the differential pressure over the supply and extract air filters. When the pressure drop reaches the set value an alarm is triggered in the main controller. The differential pressure can be set between 0.2 in.wg. (40Pa) and 1.2 in.wg. (300 Pa). The pressure switch is preset from factory to 1.0 in.wg. (240 Pa).

2.2.2 Outdoor and Extract Air Filters and Pre-Filter**

The filters are of bag filter type with filter quality MERV13 for the outdoor air filter and MERV9 for the extract air filter. The filters need to be replaced when dirty. New sets of filters can be acquired from your installer or wholesaler.

The pre-filter(s) is of a screen type and can be cleaned by using soap water or compressed air. It can be acquired

from installer or wholesaler. **(only with units with pre-heater)

2.2.3 Heat Exchanger

Topvex TR models are equipped with a highly efficient, belt driven, rotating heat exchanger. Required supply air temperature is therefore normally maintained without adding additional heat. The operation of the heat exchanger is automatic and depends on the set temperature. An extra driving belt is included on the rotor on delivery (pos.6 figure 1).
The heat exchanger is removable for cleaning and maintenance. (Chapter 5)

2.2.3.1 Rotor Motor

The rotor motor drives the exchanger rotor with a constant rotational speed as long as there is a heat demand. The motor is controlled by an on/off digital control signal (pos.5 figure 1).

2.2.3.2 Rotation Sensor

A sensor registers the rotation of the heat exchanger rotor. It's connected to the main controller which gives an alarm if the rotor stops while there is a heat demand (pos.7 figure 1).

2.2.4 Temperature Sensors

In Topvex FR800-3800 all temperature sensors are mounted and wired inside the unit except for the supply air sensor, which is delivered uninstalled with the unit and needs to be installed in the supply air duct externally from the unit. See Installation instruction for more detailed information.

- Supply air sensor
- Extract air sensor
- Outdoor air sensor
- Exhaust air sensor
- Extra unit sensor

1. Only if pre heater is installed

In Topvex FR800-3800 all temperature sensors are mounted and wired inside the unit except for the supply air sensor, which is delivered uninstalled with the unit and needs to be installed in the supply air duct externally from the unit. See Installation instruction for more detailed information.

2.2.5 Hydronic Heater for TR800-4000

In units equipped with a hydronic pre-heater, the water coil is located below the outside air connection. In units equipped with a hydronic re-heater, the water coild is located below the supply air connection. The coil material is copper piping with a frame of galvanized sheet steel and aluminun fins. Both pre-heater & reheater are equipped with a frost protection sensor.
Both hydronic pre-heater and re-heater function outputs are modulated by the unit control in order to maintain their respective air temperature set points.
For Topvex TR800-4000 units without pre-heater and/or re-heater, a heating water coil can be equipped inside the unit. See “HWC-EPH Installation Instructions” manual (420353) for correct procedure.

2.2.6 Electrical Heater for TR800-1800

In unites equipped with an electric pre-heater, the heating rods are located below the outdoor air connection. In units equipped with a built in electric re-heater (EL units only), the heating rods are located belowthe supply air connection. The heater material is stainless steel. Both electric heaters have automatic and manual overheating protection. The manual overheat protection is reset by pushing the reset button on the electrical (see figure 3).
Both electric pre-heater and re-heater function outputs are modulated by the unit control in order to maintain their respective air temperature set points.
For Topvex FR800-1600 units without pre-heater, an electric heater can be equipped inside the unit. See “HWC-EPH Installation Instructions” manual (420353) for correct procedure.

⚠ Danger

- Make sure that the Main power supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.

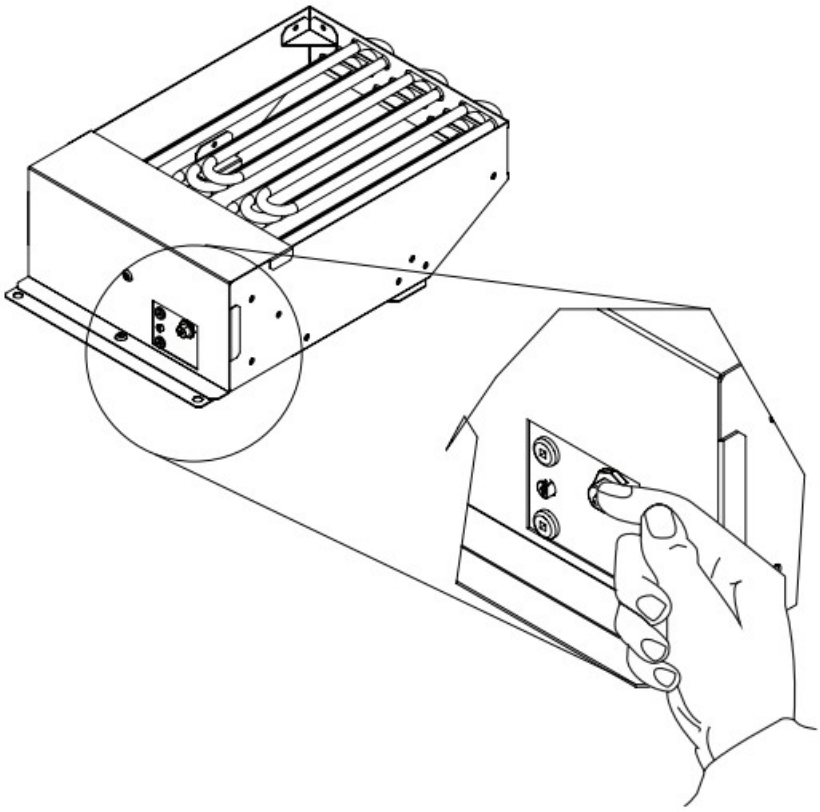


Fig. 2 Reset of the manual overheat protection in Topvex TR800-4000

2.3 Internal Components – Electrical Connection Box

⚠ Danger

- Make sure that the Main power supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.

.3.1 Electrical Connection Box Topvex TR800-1800 EL

Topvex TR800-1800 are equipped with a built in controller and internal wiring (Figure 3).

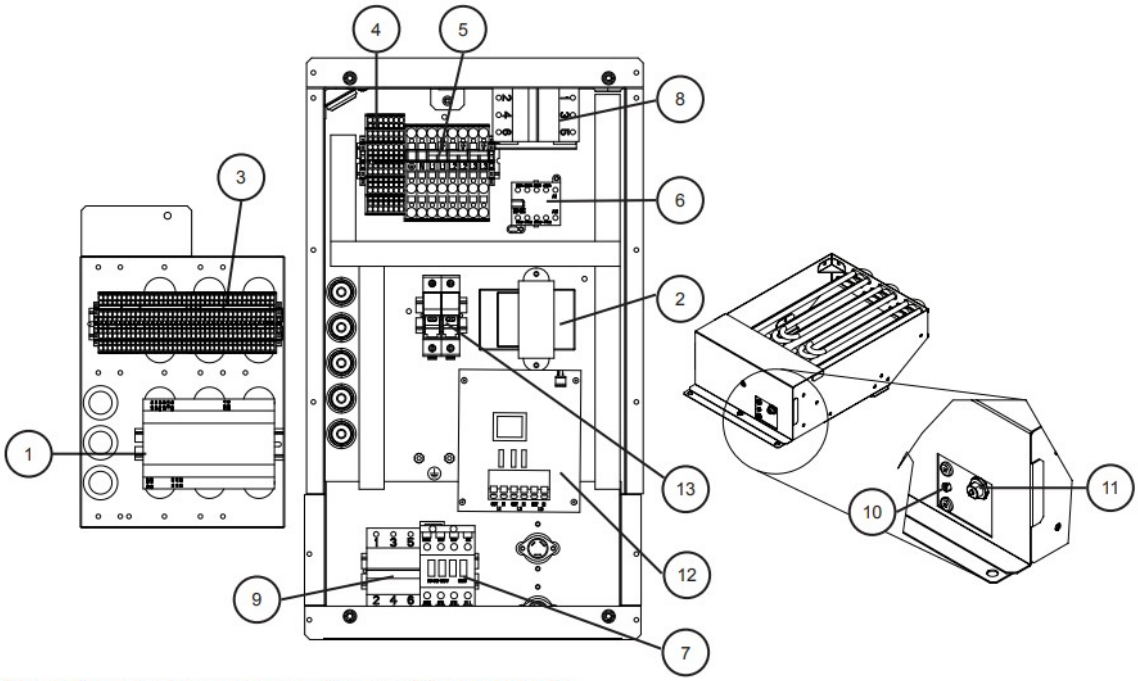


Fig. 3 Electrical components Topvex TR800-1800 EL

Table 2: Description of electrical components Topvex TR800-1800 EL

Position	Description
1	Controller E-28 (UC)
2	Transformer 208-230/24VAC (TR24)
3	Terminals for internal and external components (TB3)
4	Terminals for internal wiring (TB2)
5	Terminals for main power voltage to the unit (TB1)
6	Contactor (K1) On/Off rotor motor
7	Contactor (K3) On/Off control of EL heater
8	Automatic fuse (AS1)
9	Automatic fuse for heater (AS2)
10	Automatic over heat protection reset (EL units) (OT1)
11	Manual over heat protection reset (EL units) (ET1)
12	TTC El heater control
13	Fuse holder F1 and F2

Note:
For pre-heater components, please refer to the “Pre-Heater installation instructions (420353).

2.3.2 Electrical Connection Box Topvex TR800-1800 HW

Topvex TR800-1800 are equipped with a built in controller and internal wiring (Figure 4).

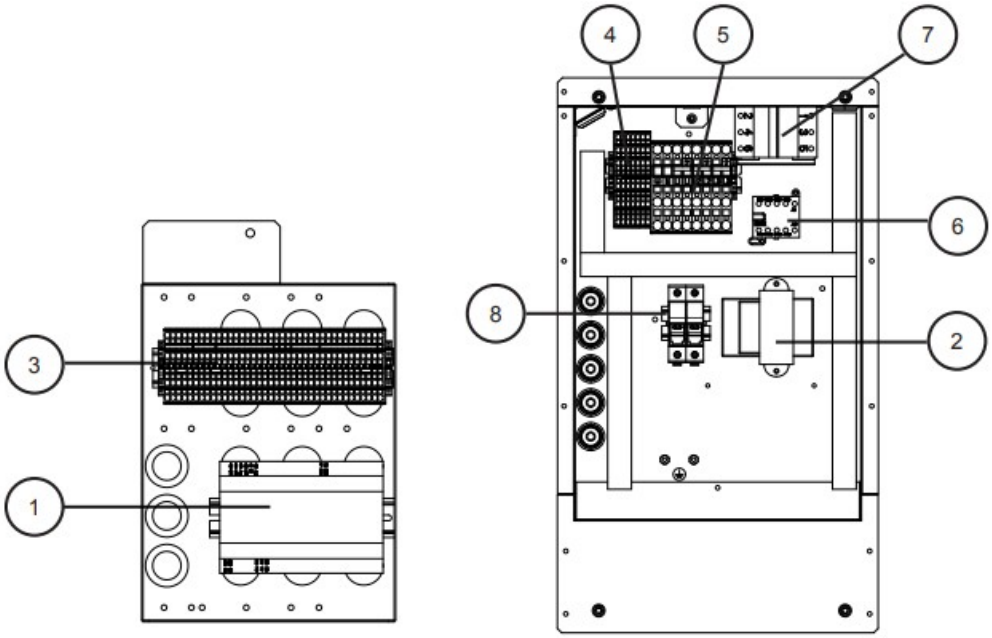


Fig. 4 Electrical components Topvex TR800-1800 HW

Table 3: Description of electrical components Topvex TR800-1800 HW

Position	**Description**
1	Controller E-28 (UC)
2	Transformer 208-230/24VAC (TR24)
3	Terminals for internal and external components (TB3)
4	Terminals for internal wiring (TB2)
5	Terminals for main power voltage to the unit (TB1)
6	Contactor (K1) On/Off rotor motor
7	Automatic fuse (AS1)
8	Fuse holders F1 and F2

Note:
For pre-heater components, please refer to the “Pre-Heater installation instructions (420353).

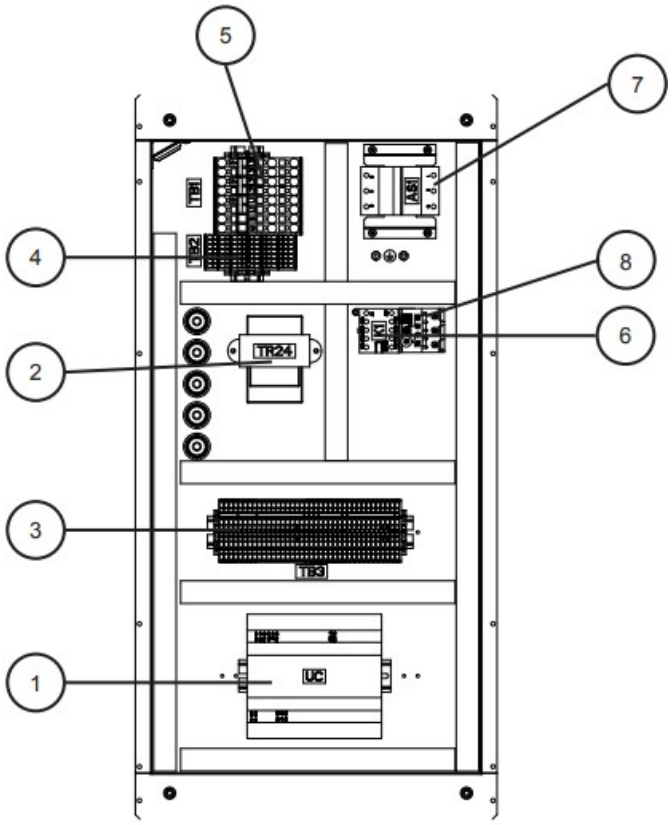


Fig. 5 Electrical components Topvex TR4000

2.3.3 Electrical Connection Box Topvex TR4000
Topvex TR4000 are equipped with a built in controller and internal wiring (Figure 5).

Position	Description
1	Controller E-28 (UC)
2	Transformer 208-230/24VAC (TR24)
3	Terminals for internal and external components (TB3)
4	Terminals for internal wiring (TB2)
5	Terminals for main power voltage to the unit (TB1)
6	Contactor (K1) On/Off rotor motor
7	Automatic fuse (AS1)
8	Thermal overload relay (TOR)

Note:
For pre-heater components, please refer to the “HWC-EPH Installation Instructions” manual (420353).

Interface Description

3.1 Control Panel
The SCP control panel is delivered with a 32.8 Ft. (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 (pos.1, figure 3-4-5). The cable can be unscrewed in the back of the control panel (figure 6)
3.1.1 Operating the Control Panel

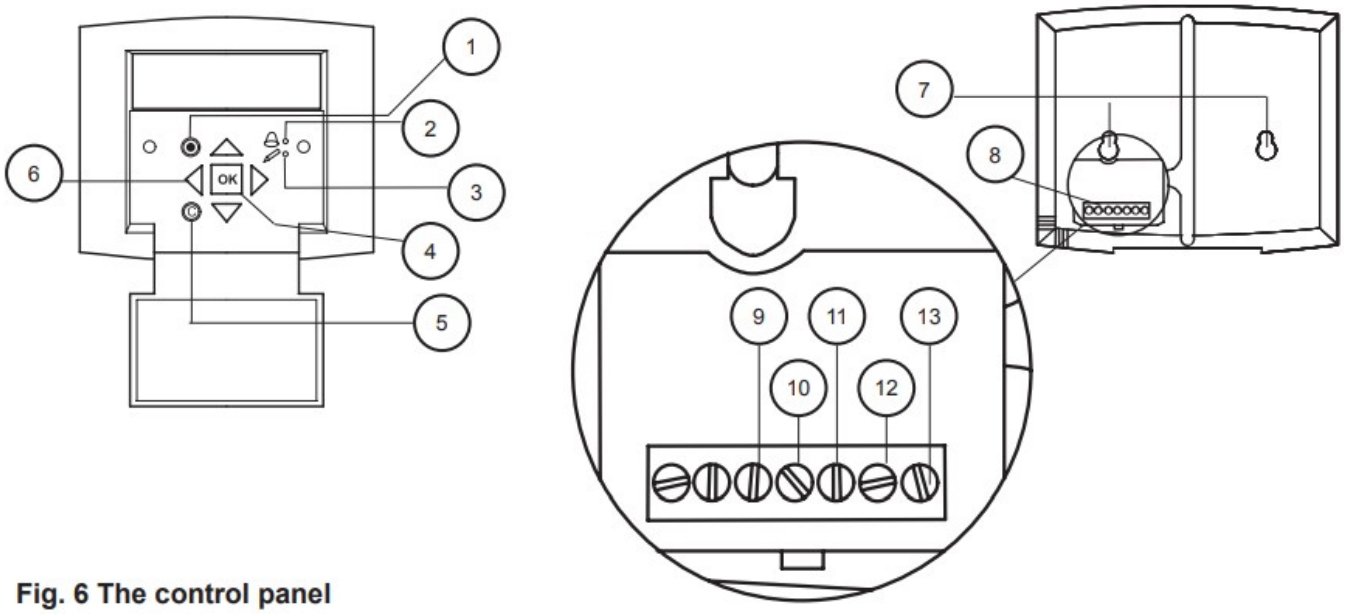


Fig. 6 The control panel

Table 4: Description of Control panel and wire connection

Position	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 t o move between chargeable 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 butto ns are also used to increase 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

3.1.1.1 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.

Commissioning

4.1 Before Starting the System
When the installation is finished, check that:

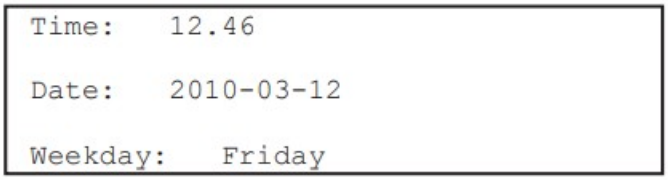
- The unit is installed in accordance with the installation instructions
- The unit is correctly wired
- Sound attenuators, if used, are installed and that the duct system is correctly connected to the unit
- Outdoor air intake is positioned with sufficient distance from pollution sources (kitchen ventilator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

4.2 Initial Setup of the Unit
On the first start-up, the controller will start a special program for setting language, supply air temp set point, Time & Date and week schedule for normal speed. Use the “OK” button to move between changeable parameters and the UP/DOWN arrows to see the displayed alternatives. Confirm by pressing “OK” once more. Move through the menu structure by use of the UP/DOWN arrows.

1. Select language by pressing OK followed by the UP/DOWN arrow buttons. Confirm by pressing OK. Move to the next level by pressing the DOWN arrow button.

2. Shows the supply air temperature setpoint
   Press OK to access the supply setpoint. Enter password 2222 by pressing OK followed by the UP/ DOWN arrow buttons. Select next digit by pressing the RIGHT arrow button. Press OK when all 4 digits have been entered.
   Change setpoint value by using the UP/DOWN arrow buttons, select next digit by pressing the RIGHT arrow button. Press OK to confirm followed by the DOWN arrow button.

3. Press OK button to enter Time. Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK when all digits have been entered and enter date.
   Change date using the UP/DOWN arrow buttons. Press RIGHT arrow buttons to select next digit. Press OK to confirm.
   Change weekday using the UP/DOWN arrow buttons. Press OK to confirm followed by the DOWN arrow button

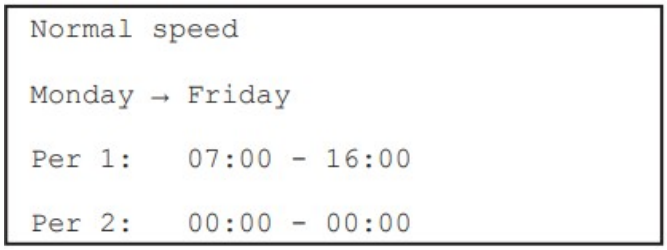


4. To enter Per 1 START time. Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and enter Per 1 STOP time.
   Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and

enter Per 2 START time.

Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and enter Per 2 STOP time.

Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm followed by the DOWN arrow button.

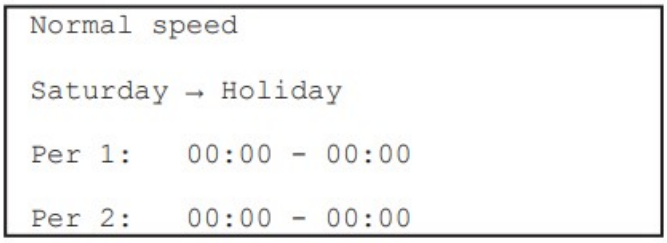


5. To enter Per 1 START time. Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and enter Per 1 STOP time.

   Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and enter Per 2 START time.

   Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and enter Per 2 STOP time.

   Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm followed by the DOWN arrow button.

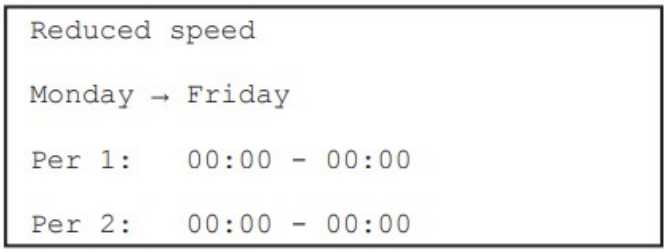


6. To enter Per 1 START time. Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and enter Per 1 STOP time.

   Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and enter Per 2 START time.

   Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and enter Per 2 STOP time.

   Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm followed by the DOWN arrow button.



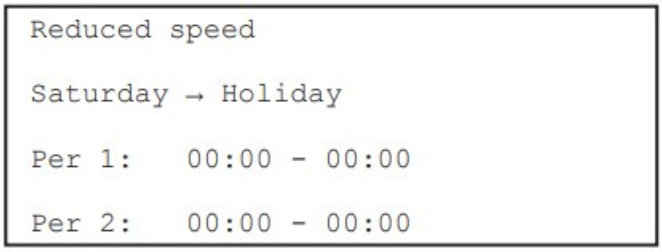
7. To enter Per 1 START time. Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and enter Per 1 STOP time.

   Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and enter Per 2 START time.

   Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm and enter Per 2 STOP time.

   Change time using the UP/DOWN arrow buttons. Press RIGHT to select next digit. Press OK to confirm

followed by the DOWN arrow button.



8. To end Wizard press OK. Using the UP/DOWN arrow buttons to select YES. Press OK to confirm followed by the DOWN arrow button.

After finishing the setup the menu system for “Operator level” will be available.
See menu overviews below that display the available menus in the Operator level followed by the “Service level” manual.
To enter Service level use code 2222 in the “Access rights” menu. For operator level use code 1111.
Note:
To perform more advanced settings please see the enclosed CD which contains the Corrigo E – manual.

4.3 Menu Overview Operator/Service Level

The menu overview below shows both the Operator and Service level. The overview of the parts unique to the Service level in the table below are marked with grey background color. To logon to the Service level use code 2222 under Access rights.
Table 6: Operator and Service Level

Main menu item	Sub-menu item 1	Sub-menu item 2	Explanations
TR 800 EL flow			Start screen headline Can be set t o 5 different layouts (Changeable a t “system level” under the configuration menu).
2010-03-15 9:00			
System:Stopped			
Sp:18.0 Act: °F			
→ Running mode	→ Running mode	Running mode Auto	Set running mode to Auto, On or O ff
		Running time SAF: 0.0 h	Shows the time in hours that motor s have been operating
		EAF: 0.0 h	SAF = Supply air fan EAF = Exhaust air fan
	→ Selected function	Control function	Shows type of air temperature cont rol the unit is configured for
		Extract air control	Shows type of fan speed control th e unit is configured for
		Fan control	
		Flow control	
		Heating: Water	Shows type of heating selected
		Exchanger: Rot. Exch a	Shows type of exchanger selected
		Cooling: Water	Shows type of cooling selected

Main menu item	Sub-menu item 1	Sub-menu item 2	Explanations
		Free cool active: No	Shows the status of the free coolin g function
		Support control Active : No C02/VOC active Never	Shows the status of the support co ntrol function Shows the status of the demand v entilation (C02/VOC) function
		Fire damper function ot active Operation w hen alarm Stopped	Shows the status of the fire damper function
		Frost protection Active Cooling recovery No	Shows the status of the frost prote ction function Shows the status of the cooling re covery function
		External set point Not active	Shows the status of the external s et point
	→ Alarm events		Shows all registered alarms along with the time and date they occurr ed Move down and up in the list by pressing ↑↓
	→ Input/ Output	→ Analogue inputs	Shows the status of the Analogue i nputs
		→ Digital inputs	Shows the status of the Digital inp uts
		→Universal inputs	Shows status of Universal Analogue inputs Shows status of Universal Digital i nputs
		→Analogue outputs	Shows the status of the Analogue outputs
		→Digital outputs	Shows the status of the Digital out puts
→Temperature	Extract air temp Act.: °F Setp: 64.4°F		Shows the configured temperature control (Default is Extract air temp) Shows the actual temperature in t he chosen control mode Shows the temperature for the cho sen control mode

Main menu item	Sub-menu item 1	Sub-menu item 2	Explanations
		If cascade control Max/min supply setp. Max: 86°F Min: 53.6°F	Shows the maximum and minimum allowed supply air temperature in case of cascade control Login to service level needed to change settings
	Outdoor temp: °F Supply air temp Actual: °F Setp: 64.4°F		Shows the actual outdoor air temperature Shows the actual supply air temperature Shows the calculated supply air set point. The exhaust air controller output signal generates the supply air controller's set point value
	Frost protection Actual: °F		Shows the actual water temperature in the water heating coil. (Only visible for HW units)
	Exhaust air temp Actual: °F		Shows the actual exhaust air temperature.
	Efficiency Exchanger Actual: %		Shows the actual heat recovery efficiency The function calculates the heat exchangers temperature efficiency in % when the output signal to the exchanger is higher than 98% and the outdoor temperature is lower than 50°F. When the control signal is lower than 98% or the outdoor temperature is higher than 50°F the display will show 0%.
→Air Control			This menu option becomes visible if the unit is configured for "flow control" or "Pressure control"
	Flow control SAF Actual: CFM Setp.: CFM		Shows airflow for the supply air fan (constant airflow control) Only visible if the unit is configured for Flow control
		Flow control SAF Setp 1/1: 647.4 CFM Setp 1/2: 323.7 CFM	Set the normal (1/1) and reduced (1/2) airflow for the supply air fan

Main menu item	Sub-menu item 1	Sub-menu item 2	Explanations

		Outdoor comp.Setp. 1 -4°C = 5.9 CFM 32°C = 0 CFM Act. Comp: 0 CFM	Set the SAF airflow compensation for the settable outdoor temperature. The outdoor compensation is linear and is set using two parameter pairs which give the value of the compensation at two different outdoor temperatures. The compensation can be positive or negative.
			Shows the actual airflow compensation.
	Flow control EAF		Shows airflow for the extract air fan (constant airflow control)
	Actual: + INF CFM		Only visible if the unit is configured for Flow control
	Setp.: CFM		
		Flow control EAF Setp 1/1: 647.4 CFM	Set the normal (1/1) and reduced (1/2) airflow for the extract air fan
		Setp 1/2: 323.7 CFM↓	
		Outdoor comp.Setp. 1 -4°F = 5.9 CFM 32°F = 0 CFM Act. Comp: 0 CFM	Set the EAF airflow compensation for the settable outdoor temperature. The outdoor compensation is linear and is set using two parameter pairs which give the value of the compensation at two different outdoor temperatures. The compensation can be positive or negative.
			Shows The actual airflow compensation.
	Pressure control SAF Actual: in.wg		Shows the actual external pressure and set point for the supply air fan.
	Setp.: in.wg		Only visible if the unit is configured for “Pressure control” (VAV)
		Pressure control SAF Setp 1/1: 0.6 in.wg	Set the external pressure set point for normal speed (1/1) and reduced speed (1/2) for the supply fan.
		Setp 1/2: 0.4 in.wg	

Main menu item	**Sub-menu item 1**	**Sub-menu item 2**	**Explanations**

		Outdoor comp.Setp. 1 -4°F = 0 in.wg 50°F = 0 in.wg Act. Comp: 0 in.wg	Set the SAF pressure compensation for the settable outdoor temperature. The outdoor compensation is linear and is set using two parameter pairs which give the value of the compensation at two different outdoor temperatures. The compensation can be positive or negative.
			Shows the actual pressure compensation.
	Pressure control EAF Actual: in.wg		Shows the actual external pressure and set point for the extract air fan.
	Setp.: in.wg		Only visible if the unit is configured for “Pressure control: (VAV)
		Pressure control EAF Setp 1/1: 1.0 in.wg	Set the external pressure set point for normal speed (1/1) and reduced speed (1/2) for the supply air fan.
		Setp 1/2: 0.4 in.wg	
		Outdoor comp.Setp. 1	Set the EAF pressure compensation for the settable outdoor temperature. The outdoor compensation is linear and is set using two parameter pairs which give the value of the compensation at two different outdoor temperatures. The compensation can be positive or negative. Shows The actual pressure compensation.
		-4°F = 0 in.wg	
		50°F = 0 in.wg	
		Act. Comp: 0 in.wg	
→ Time settings	→ Time/Date		Set correct time and date.
	→ Timer normal speed		Set week schedule Monday to Sunday + Holiday for normal speed. Possible to set 2 periods per day.
			00:00 24:00 for continuous running. 00:00 00:00 inactivates the period.
			Note the settings in the commissioning record
	→ Timer reduced speed		Set week schedule Monday to Sunday + Holiday for reduced speed. Possible to set 2 periods per day.
			00:00 24:00 for continuous running. 00:00 00:00 inactivates the period.
			Note the settings in the commissioning record

Main menu item	Sub-menu item 1	Sub-menu item 2	Explanations
	→ Extended running	Extended running 60 min Time in ext. running	Set the time for extended running. Digital inputs can be used to force the unit to start or increase to Nor mal running although the timer say s the running mode should be Off or Reduced
		0 min	If the running time is set to 0 the u nit only runs as long as the digital i nput is closed.
			The time that extended running is active is monitored in “Time in ext. Running”,
			It’s also possible to set a time here in order to shorten the initial set pe riod.
	→ Holidays	Holidays (mm:dd)	Set up to 24 separate holiday perio ds for a full year.
		1:01-01 – 01-02	A holiday period can be any numb er of consecutive days
		2:09-04 – 09-10	from one and upwards.
		3:01-05 – 01-05	The dates are in the format: MM:D D
			When the current date falls
			within a holiday period, the
			scheduler will use the settings
			for the weekday “Holiday”.

→ Manual/Auto			In this menu the running mode of a ll the configured output signals and a number of control functions can be manually controlled. The supply air controller's output si gnal can be manually set (Manual/ Auto) to any value between 0 and 100%. The temperature output sig nals will change accordingly if they are in Auto mode. It is also possibl e to manually control each of the temperature output signals indi vidually. Since leaving any of the outputs in manual control will disrupt the nor mal control, an alarm will be gener ated as soon as any output is set t o a manual mode.
	Supply Temperature contr.		Set the supply air temperature to "Auto", "On" or "Off".
	Auto		Set the output signal between 0-100%.
	Manual set: 0.0		The outputs Y1, Y2 and Y3, if in A uto-mode, will follow the signal acc ording to the set split values.

Main menu item	**Sub-menu item 1**	**Sub-menu item 2**	**Explanations**
	SAF: Auto		Set the heating to Auto,
	Manual set:		Manual or Off.
	0.0		Set the manual output 0-100%.
	EAF: Auto		
	Manual set:		
	0.0		
	Heating		Set the heating to Auto,
	Auto		Manual or Off.
	Manual set:		Set the manual output 0-100%.
	100.0		
	Exchanger		Set the exchanger rotor control
	Auto		to Auto, Manual or Off.
	Manual set:		Set the manual output 0-100%.
	0.0		
	Cooling Auto		Set the cooling to Auto, Manual or Off

	Manual set: 0.0		Set the manual output 0-100% Note:
			Needs to be activated in order to b e visible here
	P1-Heating Auto		Set the pump control for the heatin g coil to Auto,On or Off
	P1-Exchanger Auto		Set the pump control for a possible run around coil to Auto,On or Off
	P1-Cooling Auto		Set the pump control for the coolin g coil to Auto,On or Off
	Fire damper Auto		Set the fire damper to Auto, Open or Close
			Note:
			Needs to be activated in order to b e visible here
			Configuration of fire damper functi ons are made at System level
	Fresh air damper (Ou tdoor air damper)		Set the Outdoor damper to Auto, Open or Close
	Auto		

Main menu item	Sub-menu item 1	Sub-menu item 2	Explanations
	Exhaust air damper A uto		Set the Exhaust air damper to Auto, Open or Close
→ Settings			In this menu group the settings for the activated functions are availabl e. Depending on which choices ha ve been made in the configuration menu some of the possible alterna tives may not be displayed.
	→ Control temp	Supply air control	Set P-band and I-time for the Supp ly air control function
		P-band: 91.4°F	Note:
		I-time: 100.0 sec	See Corrigo E ventilation manual f or deeper explanation
		Shutdown mode P-band: 91.4°F	Set P-band and I-time for the Shut down function
		I-time: 100.0 sec	Note: See Corrigo E ventilation manual f or deeper explanation
		→ Frost protection Ac tive Setp shutdown: 77.0° F	P-band active 41° F means that th e frost protection controller will star t overriding the heating output whe n the frost protection temperature i s less than 41 degrees above the s et frost alarm default alarm limit is 45° F
		P-band active: 41.0°F	
		Fast stop at frost prot ection alarm	Set the fast stop of the unit in case of frost protection alarm to yes or No
		Yes	
	→ Control flow		Alternatively Pressure control is ch osen in the configuration of the uni t from factory
		Flow control SAF P-band: 5885.8 CFM I-time: 10.0 sec	Set P-band, I-time and Min. output for the supply air fan when the unit comes configured as Flow control f rom factory. Alternatively Pressure control if that configuration is chos en
		Min. output: 0%	

Main menu item	Sub-menu item 1	Sub-menu item 2	Explanations
		Flow control EAF P-band: 5885.8 CFM I-time: 10.0 sec Min. output: 0%	Set P-band, I-time and Min. output for the Extract air fan when the unit comes configured as Flow control f rom factory. Alternatively Pressure control if that configuration is chos en
	→ Alarm settings	→ Alarm limits	Set the alarm limits and allowed deviations for the different function s
		→ Alarm delays	Set the alarm delays and allowed deviation delays for the different fu nctions
	Restore factory settin gs: No Restore user settings: No		In this menu, it is possible to restor e all parameters to their factory set tings or to the user settings they w ere saved as earlier. Select Yes or No
	Save user settings No		The current configuration can be s aved in a separate memory area a nd can later be restored using the previous menu, Restore user setti ngs. Select Yes or No
→ Configuration	→ Control function	Control function Mode: Room control	Set type of temperature control fun ction you want the unit to operate under. Choose between Extract air control, “Room control, Outdoor comp. Supply, Supply air control, Extract /supply air →(possible to switch between the two depending on outdoor temp.), Room /supply air →(possible to switch between the two depending on outdoor temp.),
	→ Free cooling	Free cool active: No Outd. temp activation 71.6°F	Set free cooling active to Yes or N o. Set the lower outdoor day tempera ture limit for the activation of the fr ee cooling function. The temperatu re of the previous day needs to be over the set temperature in order t o activate the free cooling function.

Main menu item	Sub-menu item 1	Sub-menu item 2	Explanations
		Outd. temp night High: 59.0°F Low: 41°F Room temp min. 64.4 °F	Set the upper outdoor night temperature limit for the activation of the free cooling function Set the lower outdoor night temperature limit for the activation of the free cooling function Set the lower room temperature limit. The temperature needs to be above this value for the free cooling function to stay active
		Hour for start/stop Free cooling Start: 0 Stop: 7	Set the start and stop time for the free cooling function For example Start: 0 and Stop: 6 means that the free cooling sequence is active between 00.00 and 06.00 h.
		Time to block heat output after Free cooling 60 min	Set the delay in minutes from the time when the free cooling sequence has stopped until a possible heating sequence is initiated, i.e. how long a cooler room temperature than set temperature can be accepted
		Fan output when free cooling SAF: 0 % EAF: 0 %	Set the fan speed in percentage of the normal speed for each fan individually during the free cooling sequence
		Outdoor sensor placed in intake channel (intake duct) No	Set if the outdoor sensor is placed in the intake duct or not. Choose between No and Yes Preset is No.
	→ Support control	Support control Active: No EAF running during Support contr.: Yes	When using the room control or extract air temperature control functions, it is possible to utilize support-heating and/or support- cooling. Minimum running time is settable 0…720 minutes. (factory setting 20 minutes) Choose between “Active: yes or No”. (For start and stop temperatures see the :Temperature” menu)
		Min. run time for supp ort ctrl: 60 min	Set the minimum running time in minutes for support control

Main menu item	Sub-menu item 1	Sub-menu item 2	Explanations

	→ C02/VOC Control	C02/VOC active Never Type: Fan Min. time: 60 min	In applications with varying occupancy the fan speeds can be controlled by the air quality as measured by C02/VOC- sensor. See encl. corrigo manual (CD) for det. explanation Set active to Never, Always or If time channel off.
			Set what should be regulated. Select type Fan
			Set the min. time the unit is activated by the C02/VOC demand function
		Activation level	Set the activation level as 1/2 speed
		1/2-speed: 800 ppm	Set the activation level as 1/1 speed
		1/2-speed: 1000 ppm	Set allowed diff. value
		diff: 160 ppm	
	→ Humidity control	Humidity control Not active Start limit: 15% Stop limit: 5%	Set the humidity control to Humid/Dehumidification, Dehumidification, Humidification or Not active. Set the start limit and stop limit in %RH Applicable for external Humidification or Dehumidification device.
	→ Exchanger frost prevention	Mode: Off	Set mode to ON or OFF
		Type: Recirculation	Set Type to Recirculation or Exhaust Only
		Continue exhausting during recirculation: NO	Set exhaust air fan and exhaust air damper operation for recirculation to Yes or No.
	→ Cooling recovery	Cooling recovery	Set the cooling recovery to Yes or No.
		No Cooling limit: 35.6°F	Set the cooling limit (the difference in temperature between extract air and outdoor air that activates the cooling recovery).
→ Access rights	→ Log on	Log on Enter password xxxx Actual level: None	Log on to service level by entering a 4-digit code. After reaching the desired level go back with “LEFT” arrow (press 2 times) on the control panel. Standard code from factory to enter service level is 2222. Back to operator level: 1111

	→ Log off	Log off No Actual level: None	Log off from system level by changing “No” to “Yes” with the “O K” and “UP/DOWN” buttons Automatic logoff after 6 minutes of inactivity.
	→ Change password	Change password for level:None New password xxxx	Set a new password for the level o f your choice. Can only be done once logged on t o the service level.

4.4 Free Cooling Description

This function is used during the warm period to save energy by using cold outdoor air, e.g. during night time, to cool down the building.

Note

The following is only valid if the free cooling function is set to Active in the program menu.
Free cooling is only activated when the following starting conditions are met

Starting conditions:

- Less than 4 days have passed since the unit was last in running mode
- The outdoor temperature during the previous running period exceeded a set limit (71.6°F (22 °C))
- It is between 00:00 and 07:00:00 in the day (settable)
- The timer outputs for normal speed, Extended running normal and External stop are Off
- The timer channel will be On sometime during the recently started 24 hours.

The unit checks the night temperature (indoor and outdoor temperature) during 3 minutes at the set starting hour 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.
If the outdoor sensor is not located in the outdoor air inlet duct and a room sensor has been selected, the unit will not start free cooling as long as all the temperatures are not within the start and stop temperature intervals.
Stop conditions:

- Outdoor temp above the set max value (64.4°F (18°C)) or below the set min value (condensation risk, 50°F (10°C)) .
- The room temp/extract air temp is below the set stop value (64.4°F (18°C)) .
- One of the timer outputs for normal speed, External stop or External running normal is On
- The time is later than 07:00:00.

When free cooling is active, the fans run at normal speed or the set value for pressure/flow control and the digital output Free cooling is active. The outputs Y1-Heating, Y2-Heat exchanger and Y3-Cooling are shut down. After free cooling has been activated, the heating output is blocked for 60 minutes (configurable time).

4.5 Cooling Recovery

If the extract air is colder than the outdoor air and cooling is required, the heat exchanger control is reversed in order to return the cool extract air.

Note

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

4.6 Exchanger Frost Prevention

If the exhaust air temperature falls below the frost threshold of the unit the exchanger frost prevention function will be triggered and the unit will cycle between ventilation mode and the selected type of frost prevention mode in order to prevent any frost build up within the unit.
Types of frost prevention mode:

Exhaust only:

During exhaust only frost prevention, the supply fan will shut down and the outdoor air damper will close (interruption of the cold outdoor airflow). The unit will keep extracting warm air for a defined period of time preventing any frost build up before going back to normal ventilation mode.

Recirculation:

There are 3 different recirculation configurations. First is a 5th port configuration with continuous exhaust set to “NO”. Second is a 5th port configuration with continuous exhaust set to “YES” in order to maintain an uninterrupted rate of exhaust. The last option is an H-Type configuration where the unit exhaust air is recirculated through the supply stream (continuous exhaust has to be set to “NO” for this configuration).
These configurations require a dedicated recirculation damper interlocked with the outdoor air damper in order that as the outdoor air damper closes, the recirculation path is opened and vice versa.
During recirculation frost prevention, the outdoor air damper will close and the dedicated recirculation damper will open. The unit will recirculate warm air for a defined period of time preventing any frost build up before going back to normal ventilation mode.

Note

The following is only valid if the exchanger frost prevention function is set to Active in the program menu.

Maintenance

5.1 Important

⚠ Danger

- Make sure that the Mains supply to the unit is disconnected before performing any maintenance or electrical work!
- All electrical connections must be carried out by an authorized installer and in accordance with local rules and regulations.

⚠ Warning

- Although the main power supply to the unit has been disconnected there is still risk of injury due to rotating parts that have not come to a complete standstill.
- Beware of sharp edges during maintenance. Use protective clothing.

5.2 Maintenance Intervals

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

Type of maintenance	Once a year	When necessary
Cleaning the heat exchanger	X	
Cleaning the fans	X	
Cleaning extract louvres and supply air diffusers		X
Cleaning the outdoor air intake	X	
Cleaning the duct system		X1

1. Or in accordance with local rules and regulations

5.3 Maintenance Instruction

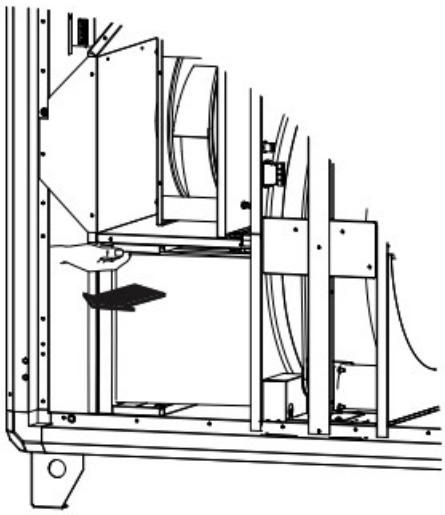
5.3.1 Changing Supply/Extract Air Filter and Pre-Filter

The bag filter cannot be cleaned and must be changed when necessary. New filters can be ordered from Systemair. Operation time between filter changes depends on the air pollution at the installation site. A differential pressure switch indicates when it's time to change the filters. This will trigger an alarm in the control panel. When this occurs do the following:

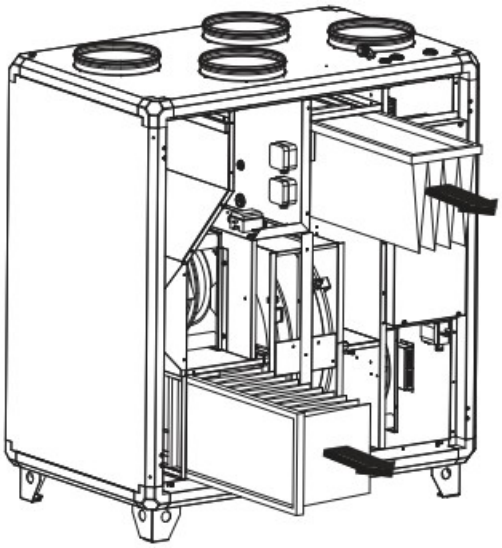
1. Replace the filters with new ones as described below
2. Acknowledge the alarm by pressing the red button on the control panel (pos. 1 figure 6) followed by OK (pos. 4 figure 6)
3. Choose →Acknowledge by pressing OK

The filters are taken out by releasing the filter locking handle as shown in (Step 1) below after which the filters can be taken out and replaced (Step 2) below.

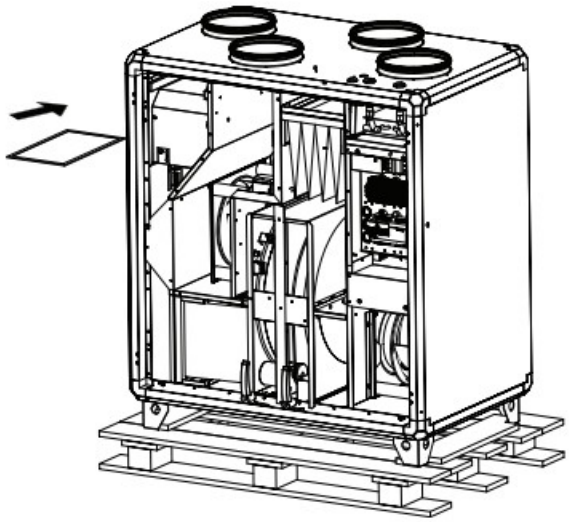
1. Releasing the filter locking handle



2. Changing filters



3. Changing pre-filter (only when pre-heater is installed)



4. Insert the new filter and fasten it against the inlet seal with the filter support bars.

5.3.2 Checking the Heat Exchanger

After extended use dust may build up in the exchanger and block the air flow. It is important to clean the exchanger regularly to maintain high efficiency. The complete rotating heat exchanger block can be taken out of the unit (figure 7) in the smaller models to facilitate cleaning and maintenance. Wash in hot soapy water or use pressurized air. Do not use detergents containing ammonia.
Check at least once a year that the exchanger rotor rotates easily. Check this by removing the drive belt and move the rotor by hand. Check also that the brushes are undamaged. The rotor bearings are permanently lubricated from factory and should not be re-greased.
Check 4 times per year that the drive belt is sufficiently tight, that it follows the tracks and that it is undamaged. If the belt tension is too low it needs to be shortened.

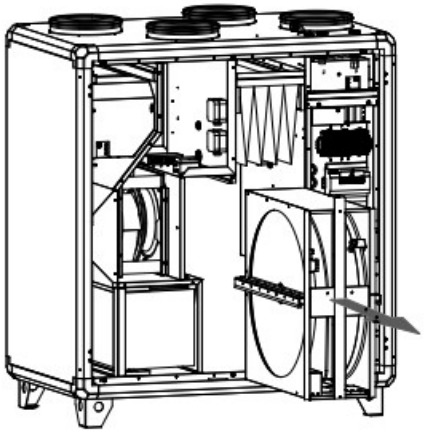


Fig. 7 Removing the heat exchanger

Note:
Make sure that the rotor motor is not exposed to moisture

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. This will reduce their efficiency.
The fans can be removed by loosening the screws which attach the rack to the unit's inner wall section.
The complete fan rack can then be pulled out after all the attached fast couplings to the electrical wires have been disconnected (figure 8). The fans may be cleaned with a cloth or a soft brush. Do not use water.
A mild solvent can be used to remove obstinate settlements. Allow fan to dry properly before reinstalling.
The fan motor bearings are permanently lubricated and should not be re-greased.

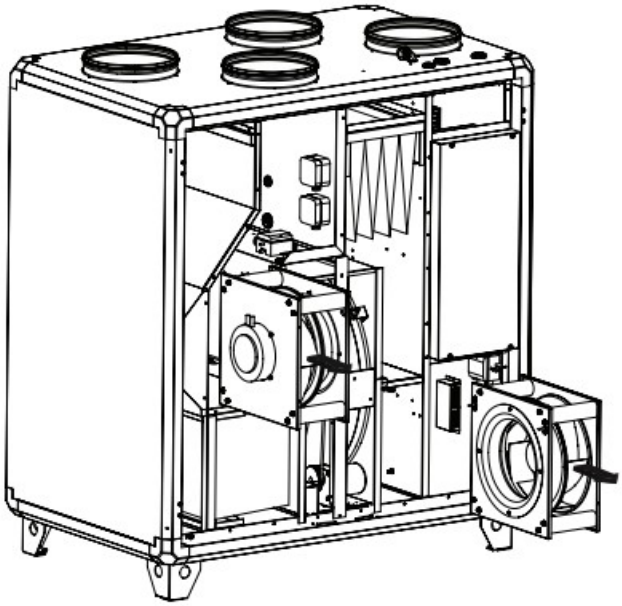


Fig. 8 Removing the fans

5.3.4 Checking the Hot Water Heating Coil

After long periods of operation (usually several years) dust may have deposited on the surface of the coil.
This may reduce coil capacity. The coil can be cleaned with a pressure washer with misting jets, or with compressed air. Cleaning should be carried out carefully so as not to damage the coil's aluminum fins.
Once a year the coil water circuit needs to be vented to maintain the coil capacity

5.3.5 Checking the Electrical Heater

After a long period of time dust and pollutants can build up on the heating rods. This can cause unpleasant odors and, in the worst case, fire. Clean with compressed air, vacuum or brush. The heating power can be measured, in the electrical connection box, before the heating season. The heater rods need to be measured to ensure there are no discrepancies in resistance between them. The automatic safety function needs to be tested and verified.

5.3.6 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 bedrooms, living rooms, wet rooms, bathrooms 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.

5.3.7 Checking the Outdoor Air Intake

Leaves and other debris can 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.

5.3.8 Checking the Duct System

Dust and grease may build up in the duct system even if filters are changed regularly. This will reduce the efficiency of the installation. The duct 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).

5.3.9 Changing the Internal Battery in the Corrigo Controller

Note:

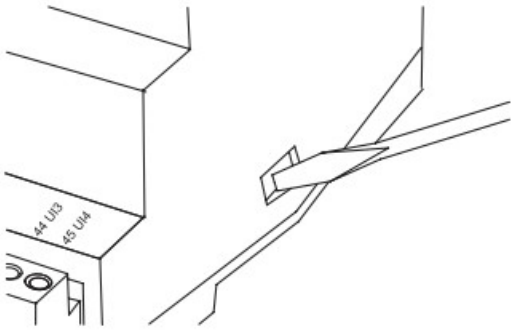
This procedure requires knowledge of proper ESD protection; i.e. an grounded wristband must be used!

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.

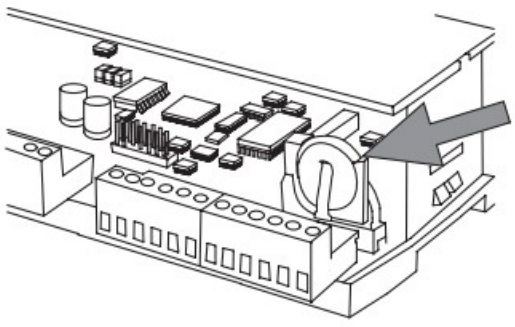
The replacement battery must be of the type CR2032.

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. See section 4.3 to learn how to navigate through the control panel menu. For more information on the alarm designations go to the Systemair website (**www.systemair.com/na/North-America**/) and download the controller user manual.

1. **Fan(s) do not start**
   - Check if there are any alarm messages
   - Check if the automatic fuse AS1 is tripped (figure 3, pos. 8; figure 4-5, pos. 7)
   - Check if fan(s) thermal contact is tripped due to overheating (shows as “Fan alarm” in the control panel).
   - Check the run status and the setting in control panel (schedules, auto/manual operation, airflow set points, etc.)
2. **Wheel motor does not start**
   - Check if there are any alarm messages
   - Check if the automatic fuse AS1 is tripped (figure 3, pos. 8; figure 4-5, pos. 7)
   - Check if the fuses in the fuse holders F1 & F2 are blown (figure 3, pos. 13; figure 4, pos. 8)
   - Check the run status and the setting in control panel (schedule, auto/manual operation, free cooling active, etc.)
3. **Reduced Airflow**
   - Check if there are any alarm messages
   - Check the run status and the setting in control panel (schedules, auto/manual operation, airflow set points, etc.)
   - Check if outdoor/exhaust air damper (if used) are opened
   - Check if filters need to be changed
   - Check if diffuser/louvers are opened
   - Check if diffusers/louvers need cleaning
   - Check if fans and/or exchanger need to be cleaned
   - Check for obstruction at the air inlets/outlets
   - Check ducts for visible damage and/or buildup of dust and debris
4. **Cold supply air**
   - Check if there are any alarm messages
   - Check the supply air temperature set point on the control panel
   - If electric re-heater is equipped, check if the automatic fuse AS2 is tripped (figure 3, pos. 9)
   - If electric re-heater is equipped, check if the overheating thermostat is tripped. If so, see section 2.2.6
   - If hydronic re-heater is equipped, check if the valve(s)/actuator(s) controlling the water flow are functioning properly
   - Check if filters need to be changed
5. **Noise/vibrations**
   - Check if the unit is completely leveled
   - Check if fans and/or exchanger need to be cleaned
   - Check if the screws holding the fans are tightened properly

5.4.1 Alarms

The alarm button (pos.1, figure 6) 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 6) will flash if there are non-acknowledged alarms and be on (but not flashing) 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.

See Commissioning record for an overview of possible alarms.

Service

Before calling your service representative, make a note of the specification and production number from the type label (figure 9)

Fig. 9 Type label

Table 7: Label description

Position	Description
1	Model number
2	Item number
3	Date of manufacturing (DOM)
4	Serial number

Notes

Systemair Inc. reserves the right to make changes
and improvements to the contents
of this manual without prior notice.

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Documents / Resources

	systemair TR4000 Compact Air Handling Unit [pdf] Instruction Manual TR4000 Compact Air Handling Unit, TR4000, Compact Air Handling Unit, Air Handling Unit, Handling Unit

References

- Systemair USA · Systemair
- Manual-Hub.com - Free PDF manuals!
- User Manual

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