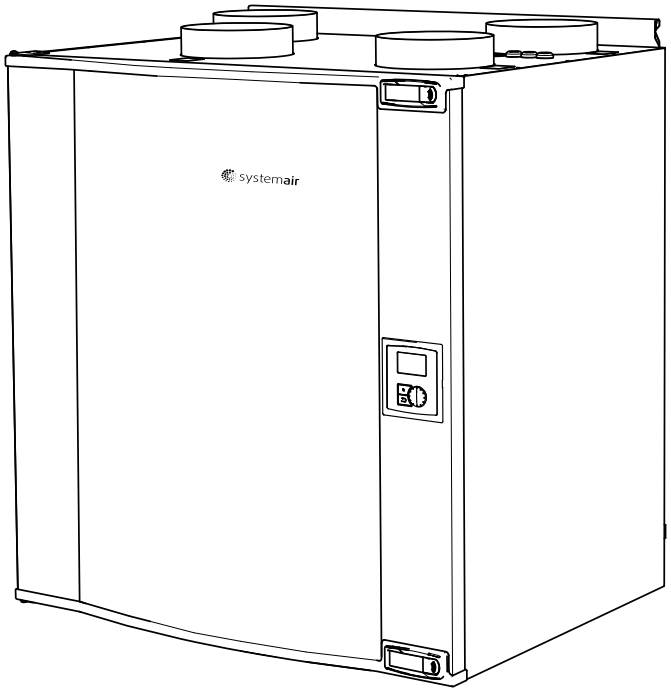
SAVE VTC 300

Heat Recovery Ventilation Unit



GB Installation and Service

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Contents

1 Declaration of Conformity

Manufacturer

Systemair AB
Industrivägen 3
SE–739 30 Skinnskatteberg SWEDEN
Office: +46 222 440 00 Fax: +46 222 440 99

hereby confirms that the following products:

Heat recovery ventilation unit:SAVE VTC 300

(The declaration applies only to product in the condition it was delivered in and installed in the facility in accordance with the included installation instructions. The insurance does not cover components that are added or actions carried out subsequently on the product)

Comply with all applicable requirements in the following directives:

- **Machinery Directive 2006/42/EC**
- **Low Voltage Directive 2006/95/EC**
- **EMC Directive 2004/108/EC**

The following harmonized standards are applied in applicable parts:

EN ISO 12100-1	Safety of machinery – Basic concepts, general principles for design – Part 1: Basic terminology, methodology
EN ISO 12100-2	Safety of machinery – Basic concepts, general principles for design – Part 2: Technical principles
EN ISO 14121-1:2007	Safety of machinery – Risk assessment – Part 1: Principles
EN 13857	Safety of machinery – Safety distances to prevent hazard zones being reached by upper or lower limbs
EN 60 204-1	Safety of machinery – Electrical equipment of machines – Part 1: General requirements
EN 60 335-1	Household and similar electrical appliances – Safety Part 1: General requirements
EN 60 335-2-40	Safety of household and similar electrical appliances – Part 2-40: Particular requirements for electrical heat pumps, air-conditioners and dehumidifiers
EN 60529	Degrees of protection provided by enclosures (IP Code)
EN 50 366:2003	Electric domestic products and similar everyday articles Electromagnetic fields-Methods for evaluation and measurements
EN 50 106	Safety of household and similar appliances – Particular rules for routine tests referring to appliances under the scope of EN 60 335-1 and EN 60967
EN 60 034-5	Rotating electrical machines – Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code)
EN 61000-6-2	Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments
EN 61000-6-3	Electromagnetic compatibility (EMC) – Part 6-3: Generic standards – Emission standards for residential, commercial and light-industrial environments

The complete technical documentation is available.

Skinnskatteberg, 14–03–2011

Mats Sándor
Technical Director

2 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!
- All electrical connections and maintenance work must be carried out by an authorized installer and in accordance with local rules and regulations.

⚠ Warning

- The system should operate continuously, and only be stopped for maintenance/service.
- The installation of the unit and complete ventilation system must be performed by an authorized installer and in accordance with local rules and regulations.
- Beware of sharp edges during mounting and maintenance. Use protective gloves.
- 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.
- Make sure that filters are mounted before starting the unit.
- 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.

⚠ Caution

- Do not connect tumble dryers to the ventilation system
- Duct connections/duct ends must be covered during storage and installation

3 Product information

3.1 General

This installation manual concerns air handling unit type SAVE VTC 300 manufactured by Systemair AB.

SAVE VTC 300 include the following model options:

Right or Left models: R (Right), **L** (Left) (see figure 2).

The different models are recognized by the control panel which is situated on the right side of the unit in an (R) unit and on the left side in an (L) unit.

Re-heater battery (electrical or water heating battery) is optional and can be ordered as an accessory.

This manual consists of basic information and recommendations concerning the design, installation, start-up and operation, to ensure a proper fail-free operation of the unit.

The key to proper and safe operating of the unit is to read this manual thoroughly, use the unit according to given guidelines and follow all safety requirements.

3.2 Technical Data

3.2.1 Dimensions and Weight

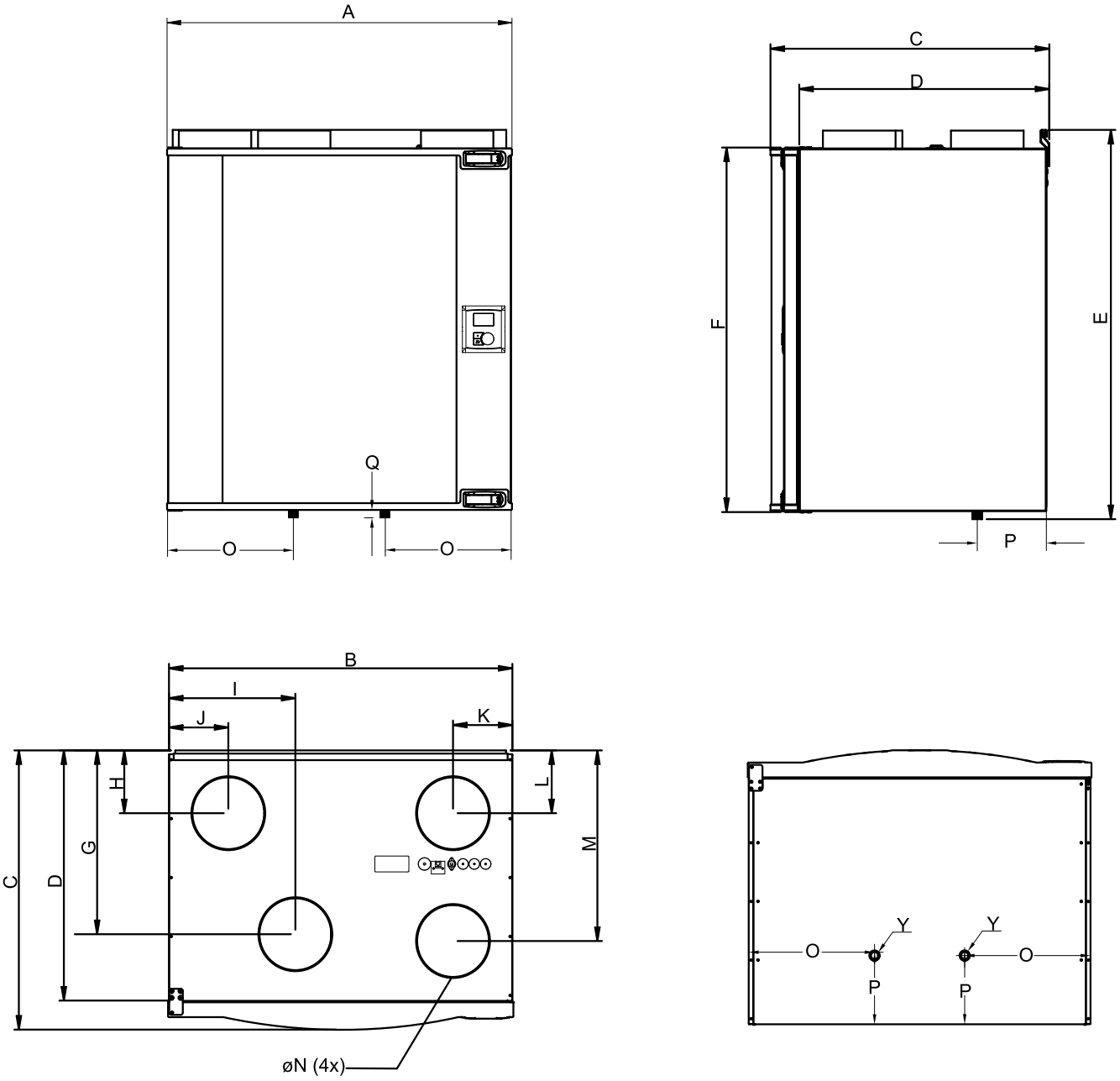


Fig. 1 Dimensions (mm) and Weight, drawn as a right hand connected unit

Model	A	B	C	D	E	F	G	H	I
VTC 300	762[1]	758	616	553	857	802	406	139	279

1. Inspection hatch

Model	J	K	L	M	N	O	P	Q	Weight (kg)
VTC 300	131	131	139	421	160	279	152	17	72

Y: ½″ outer thread

3.2.1.1 Connections Right and Left Models

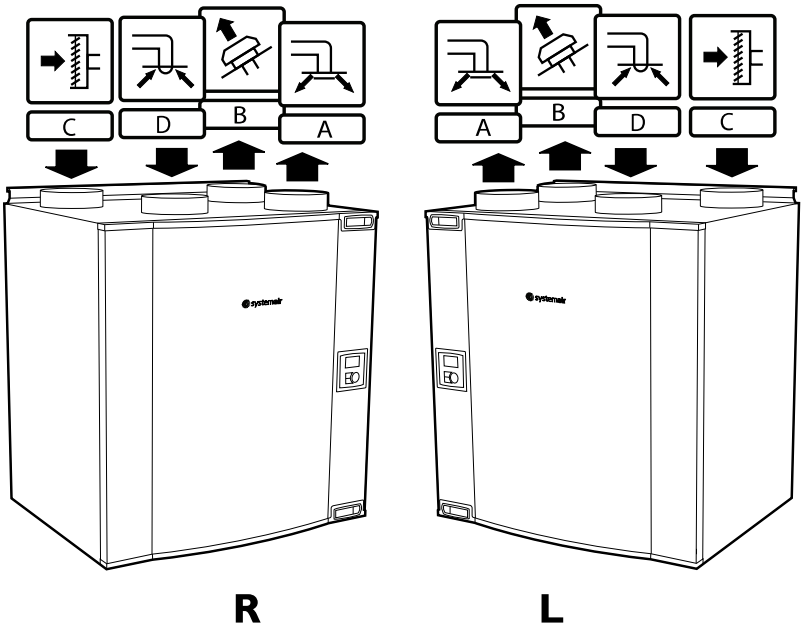


Fig. 2 Right and Left models

Position	Description
R	Right hand model (Supply air connection and control panel is situated on the right hand side of the unit viewed from the front)
L	Left hand model (Supply air connection and control panel is situated on the left hand side of the unit viewed from the front)

Table 1: Symbol description

Symbol		Description
	**A**	Supply air
	**B**	Exhaust air
	**C**	Outdoor air
	**D**	Extract air

3.2.2 Required Space

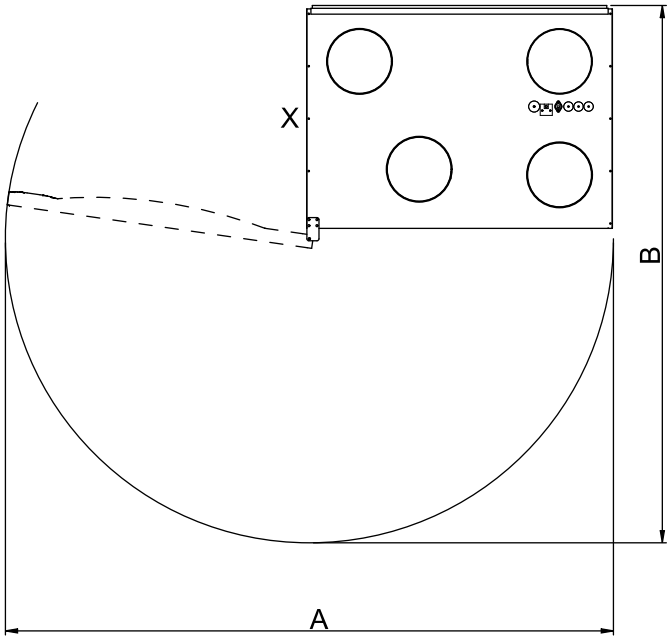


Fig. 3 Space required

Model	A	B
VTC 300	1507	1332

Note:

Do not place the side marked X (figure 3) too close to a side wall (distance to side wall must be at least 150 mm). Make sure that the inspection door can be opened sufficiently to allow easy maintenance and changing of filters. If necessary the inspection door can be removed completely (see “User manual” for details).

3.2.3 Power consumption and Current

Table 2: Power Consumption

Model	Fans (W)	Heater (W)	Total (W)	Fuse (mains) (A)
VTC 300	170	–	170	10
VTC 300 with reheater	170	1700	1870	10

3.3 Transport and Storage

The SAVE VTC 300 should be stored and transported in such a way that it is protected against physical damage that can harm panels, display etc. It should be covered so that dust, rain and snow cannot enter and damage the unit and its components. The appliance is delivered in one piece containing all necessary components, wrapped in plastic on a pallet for easy transportation.

4 Installation

This section describes how to install the unit correctly. To ensure a proper and fail free operation it is important that the unit is installed according to these instructions.

Please note the following admonitions:

⚠ Danger

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

⚠ Warning

- Beware of sharp edges during mounting and maintenance. Use protective gloves
- The installation of the unit and complete ventilation system must be performed by an authorized installer and in accordance with local rules and regulations

⚠ Caution

- Duct connections/duct ends must be covered during storage and installation
- Do not connect tumble dryers to the ventilation system

4.1 Unpacking

Verify that all ordered equipment are delivered before starting the installation. Any discrepancies from the ordered equipment must be reported to the supplier of Systemair products.

4.2 Where/how to install

SAVE VTC 300 are meant for indoor installation in a heated space. Mount the unit on a vertical flat surface. It's important that the unit is completely levelled before it is put into operation.

Place the unit preferably in a separate room (e.g. storage, laundry room or similar).

When choosing the location it should be kept in mind that the unit requires maintenance regularly and that the inspection door should be easily accessible. Leave free space for opening the door and for taking out the main components (figure 3).

The outdoor air intake of the building should if possible be put in the northern or eastern side of the building and away from other exhaust outlets like kitchen fan exhausts or laundry room outlets.

4.3 Installing the Unit

The unit must be installed in the following position (figure 4). It is important that the unit is completely vertical in order for the condensation drainage to work properly.

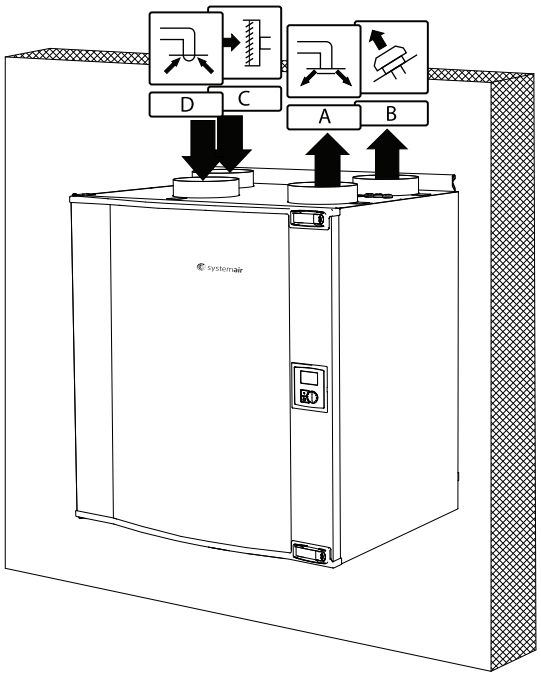


Fig. 4 Installation position (right hand unit)

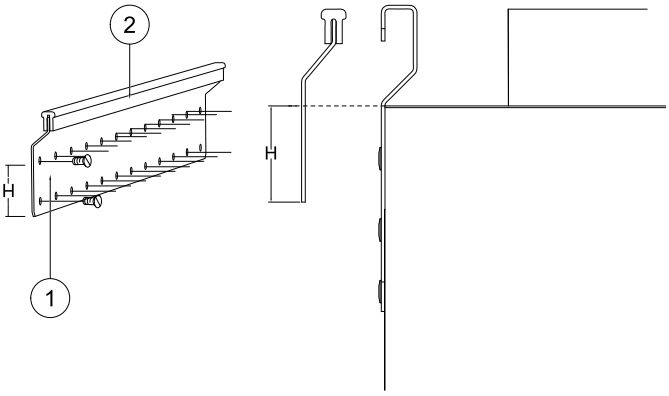
4.3.1 Installation Procedure SAVE VTC 300

1

Prepare the surface where the unit is to be mounted. Make sure that the surface is flat, levelled and that it supports the weight of the unit. Perform the installation in accordance with local rules and regulations.

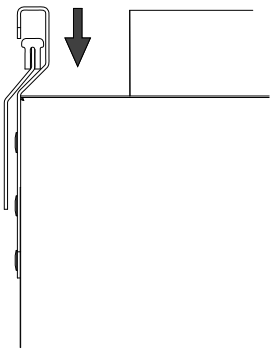
2

Fit the mounting bracket (pos. 1) with the anti vibration pad (pos. 2) to the wall with enclosed screws. Use appropriate holes to screw the bracket firmly to the wall. Bottom side of bracket should be 40 mm (H) below top of unit position.



3

Lift the unit in place



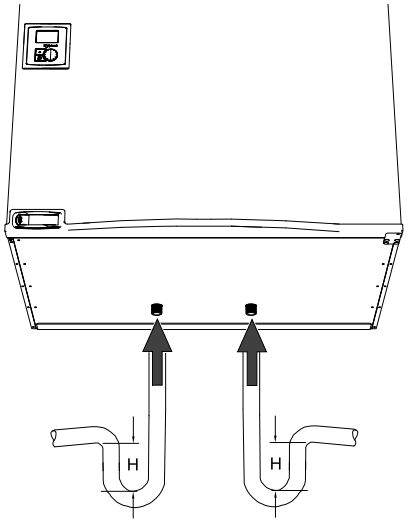
> **Warning**
>
> Beware of sharp edges during mounting and maintenance. Use protective gloves

Note:

Assure that the unit is completely vertical once mounted on the wall. The unit must not be tipping forward in order for the condensation drainage to function.

4

Connect the condensate drainage to the 2 drain plugs in the bottom of the unit. Make sure to use correct drain traps on both connections. The height (H) must be at least 60 mm. Drain traps are not included on delivery and can not be obtained from Systemair.



5

Connect the unit to the duct system. Make sure that all necessary accessories are used to create a functional ventilation solution.

> **Warning**
>
> The installation of the unit and complete ventilation system must be performed by an authorized installer and in accordance with local rules and regulations.

6

Connect the unit electrically to the mains with the enclosed plug and check that it starts up correctly.

4.3.2 Electric Connections

The SAVE VTC 300 is wired internally from factory. The electrical connection box can be found in the supply air fan compartment. The top cover plate is removed by removing 2 screws in the lower front edge of the cover plate (figure 5).

All external connections to possible accessories are made to terminals on the main print card (chapter 4.3.2.2).

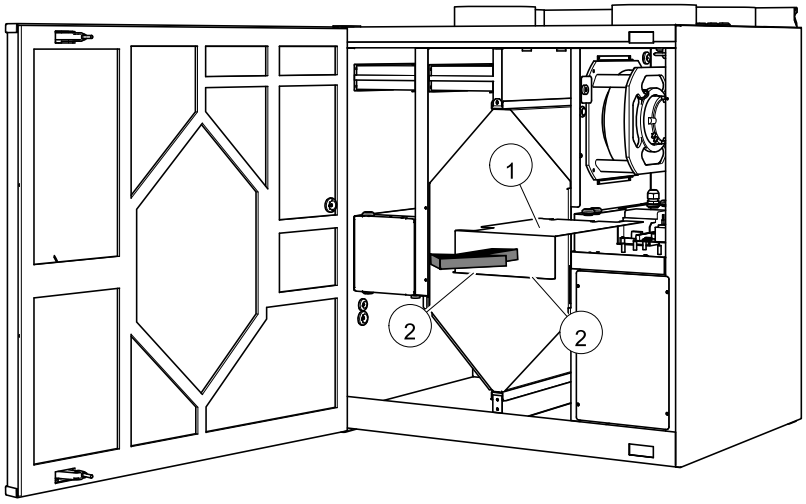


Fig. 5 Opening the electrical connection box

⚠ 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.

4.3.2.1 Electrical connection box, Components

The unit is equipped with built in regulation and internal wiring. See below illustration (figure 6) for an overview of the enclosed components.

The figure shows the electrical connection box for the VTC 300 units. See wiring diagram for more detailed information.

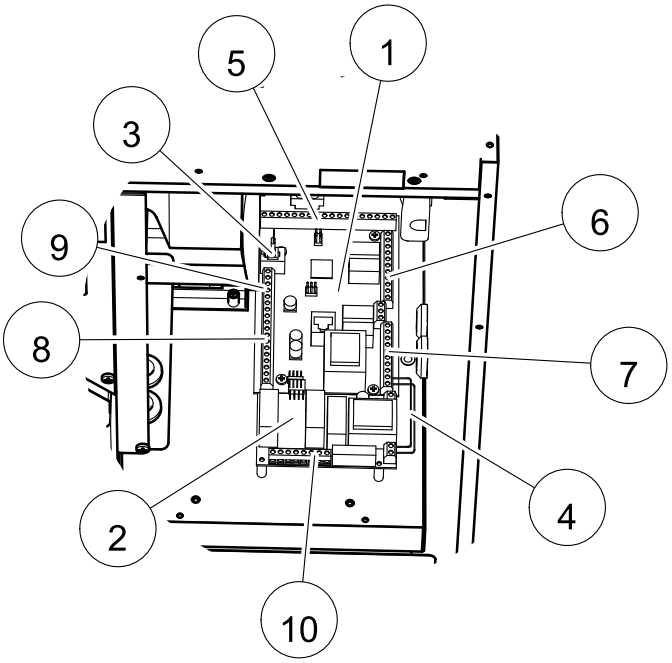


Fig. 6 Electric components

Position	Description
1	Main print card
2	Print card for electrical re-heater (if installed)
3	Connection to external control panel (connected to unit casing)
4	Mains supply connection between main print card and electrical re-heater print card (if installed)
5	Terminals for AI 1–4 (temp sensors) and motor control
6	Terminals for external connections
7	Terminals for mains supply connections
8	Terminals for digital inputs (DI 1–7)
9	Terminals for internal control panel
10	Terminals for mains supply connections to electrical re-heater (if installed)

4.3.2.2 SAVE VTC 300 External Connections

Connection terminals for external equipment (figure 7) can be found on the main print card inside the unit in the electrical connection box (figure 6).

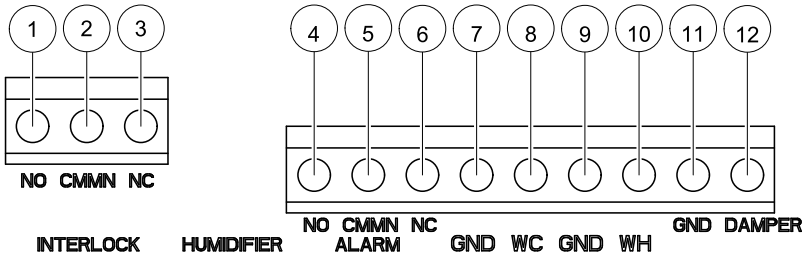


Fig. 7 Terminals for external connections

Position	Description	Remark
1	Outdoor/exhaust air damper	Normally open contact, 230 V 1~, max 1 A
2	Outdoor/exhaust air damper	Reference
3	Outdoor/exhaust air damper	Normally closed contact, 230 V 1~, max 1 A
4	Connection to external alarm	Normally open contact, 24 V, max 1 A
5	Connection to external alarm	Reference
6	Connection to external alarm	Normally closed contact, 24 V, max 1 A
7	GND	Reference
8	Water cooler control signal (AO2)	0–10 V DC
9	GND	Reference
10	Water heater control signal (AO1)	0–10 V DC
11[1]	GND	Reference
12[1]	Bypass damper control signal (AO3)	0–10 V DC

1. Internally wired from factory

4.3.2.3 External connections on top of the unit

Two of the connections on the main print card are wired to plugs on top of the unit casing; connection to an external control panel through a modular contact and a connection to DI 3 with possibility to configure the fan speeds individually through a potential free on/off switch (figure 8).

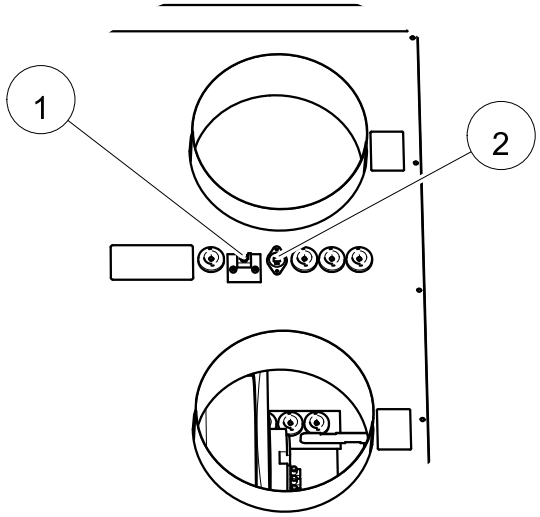


Fig. 8 Connections on top of the unit casing

Position	Description
1	Connection to external control panel
2	Connection to DI 3 through an on/off switch

4.3.3 Installation procedure Electrical Re-heater battery

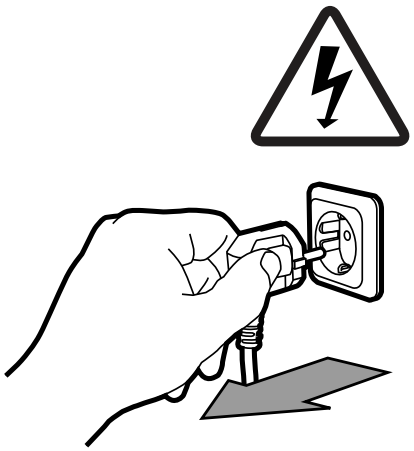
An electrical re-heater battery can be ordered as an accessory and be installed inside the unit. Below instruction describes the procedure for the installation in a right hand unit.

⚠ Danger

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

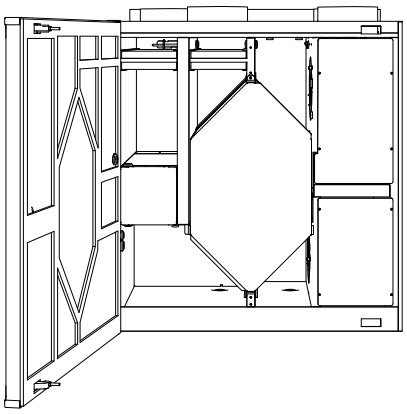
1

Disconnect the unit from the mains supply



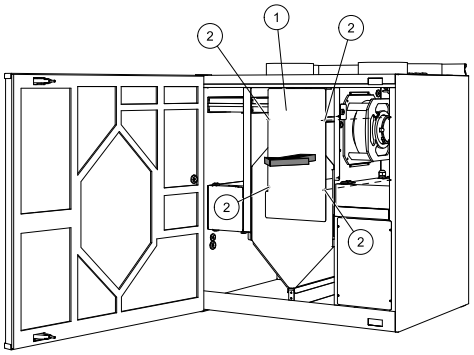
2

Open the front hatch



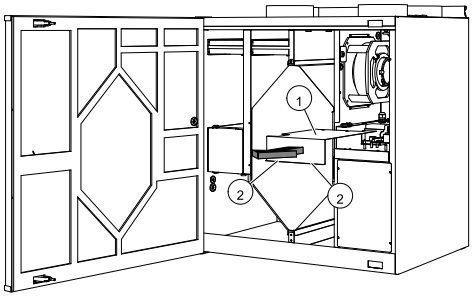
3

Remove the upper plate to the right of the heat exchanger (pos. 1) by loosening the 4 screws (pos. 2)



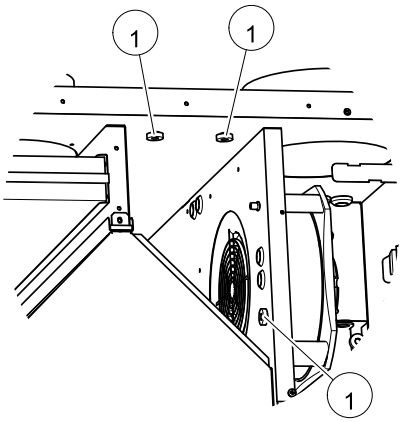
4

Remove the plate covering the electrical connection box (pos. 1) by loosening the 2 screws in the lower front edge of the plate (pos. 2)



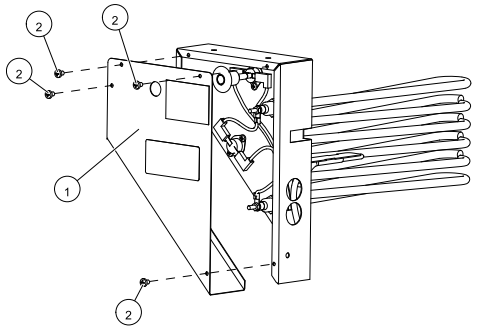
5

Remove the 3 screws with the black knobs (pos. 1) from the inner casing.



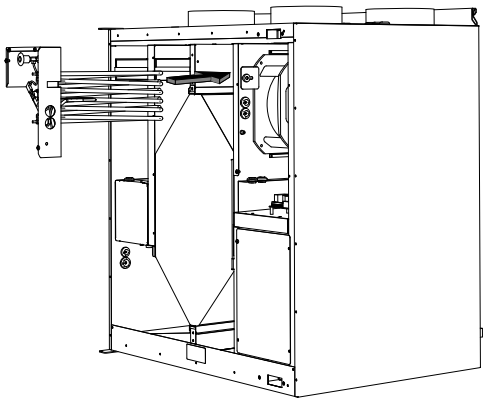
6

Remove the covering plate (pos. 1) of the electrical re-heater by loosening the 3 screws (pos. 2)



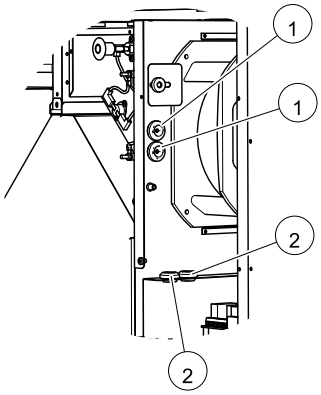
7

Insert the electrical re-heater kit (pos. 1) in the compartment next to the supply air fan and fasten the mounting bracket against the inner walls with the 3 black knob screws.



8

Lead the gray 4 lead cable, containing the wiring for the mains supply and emergency thermostat (ET), and the black 2 lead OT sensor cable through the prepared lead through's (pos. 1) situated in the plate separating the re-heater and motor compartments. The 2 cables are then lead through the prepared lead through's marked by pos. 2 in the illustration.

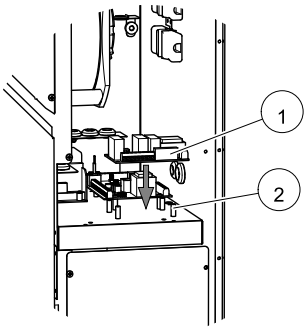


9

Fasten the re-heater cover plate with the 4 prepared screws as illustrated in step no. 6.

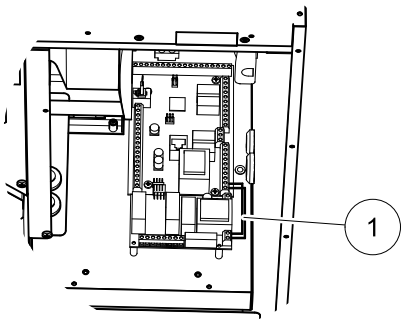
10

Continue with fastening the re-heater print card (pos. 1) on the prepared distances (pos. 2) next to the main print card with the 4 enclosed screws. Connect it to the main print card by the use of the prepared connections on the side of the 2 circuit boards.



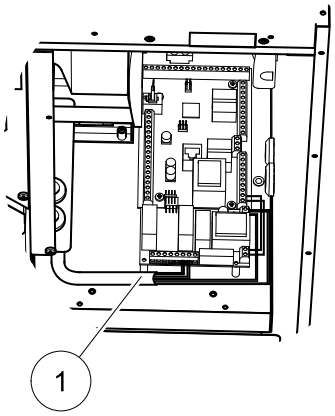
11

Connect the blue and brown cables (pos. 1) to the free L/N terminals on the main print card. See wiring diagram for detailed information.



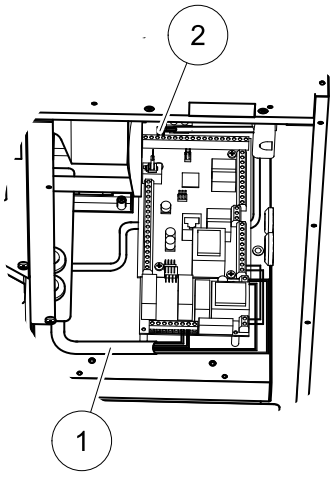
12

Connect the wires in the 4 lead gray cable (pos. 1) to mains supply (brown and blue wire) and the terminal for the emergency thermostat (black and gray wire). See wiring diagram for detailed information.



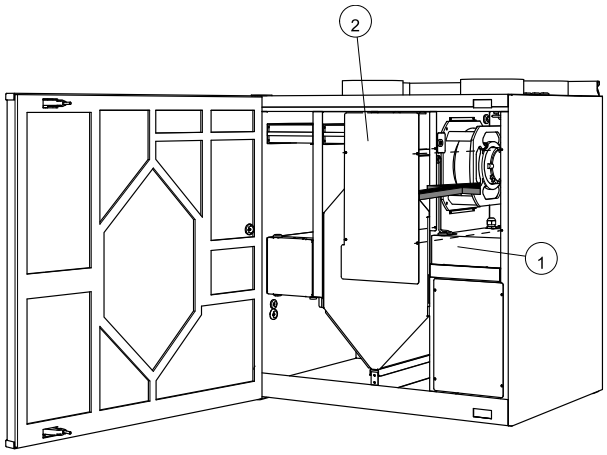
13

Connect the wires in the 2 lead black sensor cable (OT) to terminals on the main print card (pos. 2). See wiring diagram for detailed information.



14

Put back the cover plate (pos. 1) and the plate (pos. 2) and fasten them with the enclosed screws



15

Turn the power back on and start the software configuration in the display according to below procedure (chapter 5.2.5).

After completed installation of the electrical re-heater battery the unit looks as described in below illustration (figure 9).

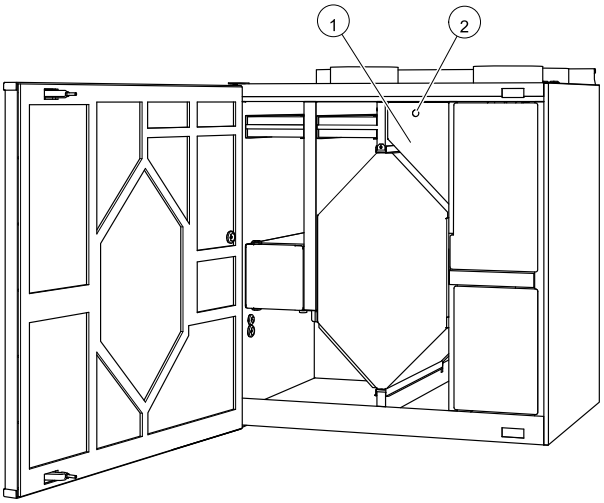


Fig. 9 Installed electrical re-heater

Position	Description
1	Electrical re-heater battery front plate
2	Reset button emergency thermostat

Note:

After the re-heater battery has been installed and connected properly, apply the 2 type labels belonging to the electrical re-heater battery next to the labels of the unit. The first label is placed next to the unit label situated on the inner lower frame of the casing behind the inspection hatch. The second label is placed next to the unit label situated on top of the unit next to the duct connections.

5 Operation

5.1 Interface description

5.1.1 Control panel

The control panel is built into the unit on either the left or right hand side of the VTC 300. The control panel is always situated on the same side of the unit as the supply air connection figure 2.

Below illustration shows the control panel with a short description (figure 10).

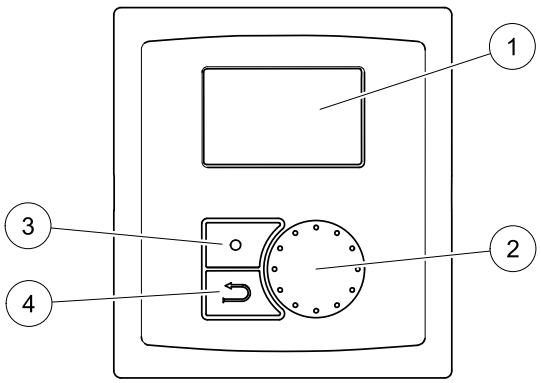
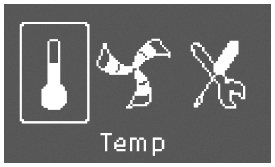
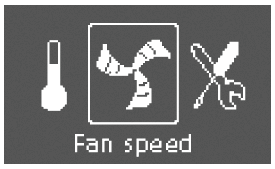


Fig. 10 Control panel

Position	Description	Explanation
1	Display	Shows symbols, menus and settings.
2	Selection knob	Move through the menu lists or change settings and values by turning the knob left or right.
3	Confirm button	Confirm menu choices or settings by pressing the button.
4	Back button	Step back in the menu levels by pressing the button.

5.1.2 Display symbols

Symbol	Description	Explanation
	Temp	Illustrates the current set temperature. The temperature setting is done in 5 steps (from completely empty to filled symbol) and can be changed manually by turning the “selection knob”. Confirm the setting with the “confirm button” (chapter 5.2.1 and chapter 5.2.3).
	Fan speed	Illustrates the current set fan speed. The fan speed can be set manually in 3 steps (Low, Nom and High) by turning the selection knob and confirming with the confirm button after completed setting.  • Low ventilation (A): Can be used when leaving the building for a longer period.[1] • Nominal ventilation (B): Will give required air change under normal conditions. • High ventilation (C): To increase the airflow if necessary.
	Service	Access the service menu by pressing the confirm button.
	Alarm	Access the alarm list by pressing the confirm button.

1. Can be set to OFF by activating “Manual fan stop”. See “Service menu overview” under “Functions”.

5.2 Service menu Overview

Enter the service menu by selecting the service symbol in the display.

Below overview displays the service menu structure in 3 levels.

Menu level 1	Menu level 2	Menu level 3	Explanation
Service →Password	**Password** Password XXXX Locked YES/NO		Enter the service level by typing 1111. Use the selection knob for each digit and confirm with the confirm button after each set digit.
Service →Change password Filter period Time/Date	**Change password** Actual XXXX New XXXX Confirm XXXX		**Set** new password if necessary. In case the new password would be forgotten or misplaced it's still possible to enter the service level by writing 8642. This overrides the earlier set password.
Service Change password →Filter period Time/Date	**Filter period** Reset: NO Time to replace 9 month		**Shows** selected time interval between filter change. **Set** Reset of the filter period to YES after completed filter change. **Set** time between filter changes.
Service Change password Filter period →Time/Date	**Time/Date** YY/MM/DD Date: 10/05/08 Time: 10:00 Weekday: SAT		**Shows** current set date and time. **Set** Correct date and time.
Service →Ext/Forc Run Week program Fan speed log	**Ext/Forc Run** Minutes: 0 Fan speed: Nominal		Use this dialogue frame to program extended time you want the unit to work under operation conditions other than determined by the week schedule. **Shows** set time for extended/forced running. **Shows** Set fan speed. **Set** the time in minutes the unit is to run in extended/forced running mode. **Set** the fan speed for this mode. Choose between Low, Nom or High. Default is Nom.
Service Ext/Forc Run →Week program Fan speed log	**Week program** Week program Fan speed	**Week program** Day MON Per1: 07:00 16:00 Per2: 00:00 00:00	Program how you want the unit to operate according to the week schedule. It's possible to set 2 periods per day. **Set** week day and time interval for the time you want the unit to be in ON mode.
		Fan speed ON level: Low/Nom/High OFF level: OFF/Low/Nom/High	Use this dialogue frame to determine the ON and OFF speed for the fans in the week schedule. **Set** ON level. Choose between Low, Nom or High. Default is Nom **Set** OFF level. Choose between OFF, Low, Nom or High. Default is Low.

Menu level 1	Menu level 2	Menu level 3	Explanation
Service Ext/Forc Run Week program →Fan speed log	**Fan speed log** Level: 1-5 Reset: No/Yes SF: 140 / 140 EF: 140 / 140		Use this dialogue frame to see how the fans have operated during the time (h) they have been active. The speeds are shown in 5 different levels: • Level 1: 0% • Level 2: 1–29% • Level 3: 30–44% • Level 4: 45–59% • Level 5: 60–100% Choose between the levels to see the time in hours the fans have been active in the different levels. `Reset Yes` resets the SF and EF time in the left column for all levels. The right column continues to count ahead and can not be reset. **Note:** `Factory reset` (see `Functions/Factory reset)` will not affect this function.
Service Week program Fan speed log →Functions	**Functions** →Heater/Cooler Frost protection Air flow	**Heater/Cooler** Heater: None/Electrical/Water Cooler: None/Water	Use this dialogue frame to set up the unit for heating and/or cooling. **Set** `Heater` to `None`, `Electrical` or `Water`. **Set** `Cooler` to `None` or `Water`.
	Functions Heater/Cooler →Frost protection Air flow	**Frost protection** Alarm limit 11°C	**Shows** current set frost protection alarm limit in °C for the installed water coil. **Set** `alarm limit` in °C. Default is 7°C.
Service Ext/Forc Run Week program →Functions	**Functions** →Air flow Air flow unit Manual fan stop	Airfl% EF SF Nom 50 50 Max 100 100 Low 25 25	Use this dialogue frame to set the fan speed in percentage of the maximum speed. The speed can be set individually for each fan (`EF`: Exhaust fan, `SF`: Supply fan) **Set** the fan speed for `EF` and `SF` for each step (`Low`, `Nom`, and `High`. **Note:** The values for Nom, Max and Low suggested in this overview are example settings.
	Functions Air flow →Air flow unit Manual fan stop	**Air flow unit** %	Only “%” is option (default)
	Functions Air flow Air flow unit →Manual fan stop	**Manual fan stop** Allow manual fan stop Y/N	**Set** if it should be possible to turn off the fans in the unit manually from the control panel. Chose between `Y` and `N`. If `Y` is selected the fans can be turned off by turning the selection knob to empty fan symbol

Menu level 1	Menu level 2	Menu level 3	Explanation
	Functions →Analog input Analog output Digital input	**Analog input** 1: SS 20.0 2: ETS 20.0 3: Not used 4: OT/FPS 20.0 5: OS 10.5	**Shows** analogue inputs from active temperature sensors. SS: Supply air temp sensor. ETS: Extract air temp sensor. OT/FPS: Over heat protection sensor/Frost protection sensor. OS: Outdoor air temp sensor.
	Functions Analog input →Analog output Digital input	**Analog output** AO1 auto/man/off 0.0V AO2 auto/man/off 7.3V AO3 auto/man 10V	**Shows** current analogue outputs in 0–10 V to hot/cold water actuator and bypass damper. **Set** AO1(Analogue output to hot water actuator) to auto, man or off. Default is off. AO2 (Analogue output to cold water actuator) to auto, man or off. Default is off. AO3 (Analogue output to bypass damper) to auto or man. Default is auto. Selecting man enables the user to manually control the actuator/damper with a 0–10 V signal. 0V means completely closed and 10 V completely opened actuator/bypass damper. When used on the bypass damper the unit can be forced to go to summer operation or forced defrosting (10 V).
	Functions →Digital input Config DI 1-3 Config DI 4-7	**Digital input** DI1 ON/OFF DI2 ON/OFF DI3 ON/OFF DI4 ON/OFF DI5 ON/OFF DI6 ON/OFF DI7 ON/OFF	**Shows** current setting of the digital inputs ON or OFF DI1: Fan configuration DI2: Fan configuration DI3: Fan configuration DI4: Heater stopped DI5: Extended/forced running DI6: Damper test DI7: Home/leave
	Functions Digital input →Config DI 1-3 Config DI 4-7	**Config DI 1-3** 1 SF high EF nom 2 SF off EF low 3 SF high EF high	Use this dialogue frame to set how you want the fans to react to 3 different digital inputs when they are switched on or off (the settings in the column to the left are examples). On/off switches need to be connected physically to terminals on the main print card to obtain the different functions. See the wiring diagram for more information. **Set** the supply air fan (SF) and extract air fan (EF) to low, nom or High for digital inputs 1–3

Menu level 1	Menu level 2	Menu level 3	Explanation
	Functions Digital input Config DI 1-3 →Config DI 4-7	**DI 4–7** DI4: Stop heat DI5: Ext run DI6: Damper test DI7: Home/leave	DI 4–7 are default set from factory and can't be changed by the user. Below follows a short description of each function. DI4: Makes it possible to turn the electrical re-heater battery on or off. DI5: Turn the Extended/forced running function on or off by the help of a switch. The function overrides current set fan speed. DI6: Automatic test of the bypass damper function. This digital input is not available for the user. DI7: Switching on this input decreases the supply air temp set point with 10K . This function is used when the building is uninhabited for a longer period. **Note:** The "Home/leave" function is not working if Water heater is activated.
	Functions →Digital output Defrosting Modbus	**Digital output** 1: SF 67% 2: EF 67% 3: Not used 4: Alarm Y/N 5: Dmp OFF 6: Reheater Y/N	**Shows** The current settings of digital outputs 1–5 (the settings in the column to the left are examples). 1: SF 67%: Current set speed of the supply air fan (shown as percentage of the maximum speed). 2: EF 67% Current set speed of the extract air fan (shown as percentage of the maximum speed). 4: Alarm Y/N: Indicates if the sum. alarm is active or not 5: Dmp OFF: Outdoor/exhaust air damper is on or off (230 V signal relay). 6: Reheater Y/N: Indicates if the electrical re-heater is active or not.
	Functions Digital output →Defrosting Modbus	**Defrosting** Mode 1-5 Allow unbalance Yes/No Reduced flow Active Bypass defrosting Active Stop defrosting Active	Use this dialogue frame to set how aggressive you want the defrosting function to operate (chapter 6.2). **Set** defrosting mode between 1–5. Default is 3. **Set** If you during the defrosting cycle can accept a temporary unbalance of the air flow from the unit, i.e. supply air decreases. Select YES or NO. **Shows** if any defrosting cycle is active.
	Functions Defrosting →Modbus Factory reset	**Modbus** Address: 1-247 Baud: 9600/19200 Parity: None/Even/Odd	Information about Modbus communication and variables can be found in the Modbus user manual for residential units in the online

Menu level 1	Menu level 2	Menu level 3	Explanation
	Functions Defrosting Modbus →Factory reset	**Factory reset** Really reset? Yes/No	Use this dialogue frame to return to factory settings. **Set** YES or NO **Note:** This will erase all your personal settings that have been done for the unit.
Service →Language Versions Alarms	**Languages** Language ENGLISH		Use this dialogue frame to select your local language. **Set** Language by turning the selection knob.
Service Languages →Versions Alarms	Version VC300 CD EC Appl. 1.08.00 1.22.00 Boot 1.00.01 1.01.00		**Shows** current software version.
Service Languages Versions →Alarms	**Alarms** Fan Y EmT/Frost N Damp Y Pb Fail N Temp N Filter Y		**Shows** the alarm list and which alarms have been triggered (indicated by Y). See alarm list (chapter 8.3.1).

5.2.1 Setting Temperature

The supply air temperature is set manually in 5 steps in the main menu display by choosing the temperature symbol (figure 11).

If an electrical or water re-heater is installed the temperature steps are 12.0, 14.5, 17.0, 19.5 and 22.0 °C. Default is 12.0 °C.

If the unit is used without any re-heater installed or if the re-heater is deactivated, the temperature steps are 15.0, 16.0, 17.0, 18.0 or 19.0 °C . Default is 15.0 °C.

Each temperature step is illustrated by increasing the filling of the temperature symbol.

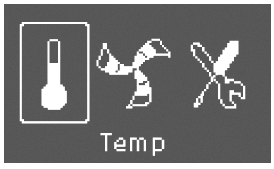


Fig. 11 Temperature symbol

5.2.2 Manual Setting of Fan speed

It's possible at any time to manually set the fan speed in the main menu display. By choosing the fan symbol and confirming (figure 12) it's possible to increase or decrease the fan speed in the 3 steps, Low, Nom and High. By doing so you override the programmed week schedule for the unit until the end of the present time period in the week program (chapter 6.3).

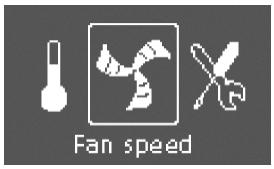


Fig. 12 Fan speed symbol

5.2.3 Manual Summer mode

Manual summer mode occurs if one step lower than 12 °C is selected. The temperature symbol on the main menu is then completely empty (figure 13). This means that the bypass damper opens (10 V control signal to output DAMPER). If the re-heater is active, it will switch off during manual summer mode. Manual summer mode aborts automatically after two minutes if the supply air temperature is ≤ 5 °C.

If water heater battery is installed and activated the manual summer mode is aborted if the outdoor air or supply air temperature is ≤ 5 °C.

Fig. 13 Symbol for manual summer mode

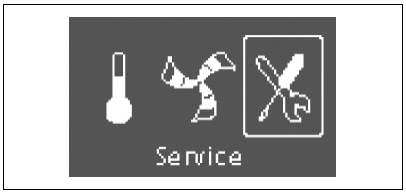
5.2.4 Cool recovery

Cool recovery occurs when there is a cooling need and the outdoor air temperature is higher than the extract air temperature.

5.2.5 Software configuration for electrical heater

1

Go to the service menu by using the selection knob.



2

Enter the service level by typing the password. Use the selection knob for each digit and confirm with the confirm button after each set digit.

```
Password
1 1 1 1
```

3

Go to `Functions`.

```
Ext/Forced Run
Week program
→Functions
```

4

Choose `Heater/Cooler`.

```
→Heater/Cooler
Frost protection
Air flow
```

5

Heater: Electrical

Select `Heater: Electrical`.

The unit is now ready to be used with the installed electrical heater.

6 Commissioning

6.1 Setting Fan speed

The fan speed may be adjusted in three steps; low, nom and high. This setting controls the output signals to the supply-and extract fans. The factory setting on each speed steps are 25, 50 and 100% of 10 V. These levels are possible to change in the service level.

See below airflow diagram to get an idea of how the airflow corresponds to each voltage output (figure 14) . This shows a fan performance diagram displaying performance curves for supply air and extract air.

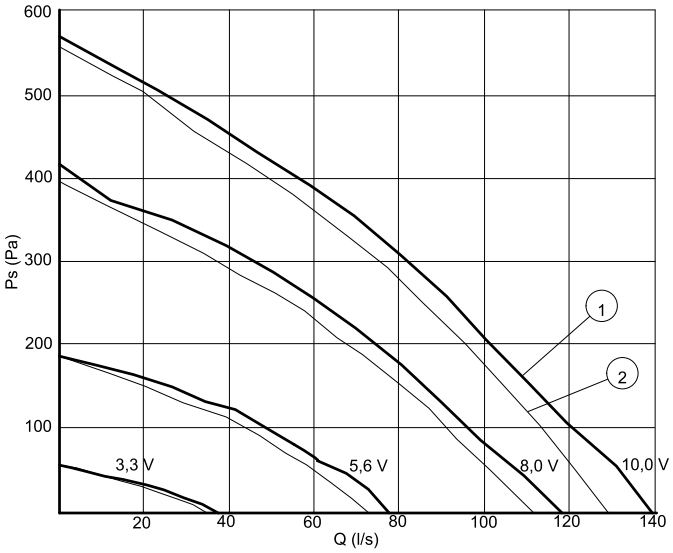


Fig. 14 Fan performance diagram

Position	Desription
1	Fan performance curve, supply air
2	Fan performance curve, extract air

6.1.1 Fan speed setting procedure

1

Go to the service menu by the use of the selection knob.

2

Enter the service level by typing the password. Use the selection knob for each digit and confirm with the confirmation button after each set digit.

Password 1 1 1 1

3

Go to `Functions`

```
Ext/Forced Run
Week program
→Functions
```

4

Choose `Air flow`

```
→Air flow
Heater
```

5

Set the fan speed in percentage of the maximum speed. All 3 speed categories can be set between 20–100% (chapter 6.1).

```
Airflow %   EF     SF
       Nom  50     50
      High  100    100
       Low  25     25
```

6.2 Setting defrost level

The unit is equipped with an automatic three-step defrost function that is activated when there is risk of icing in the area around the heat exchanger. It is possible to select if a heater is present and if unbalanced flows are allowed. The setting 1-5 (table 3) determines how aggressive the defrosting will be.

Table 3: Defrost levels

Defrost mode	Relative humidity indoors[1]	Description
1	Minimum <20%	Dry areas, such as warehouse buildings with few people or industrial buildings that don't use water in their production process.
2	Low 30%-40%	Office buildings.
3	Medium 40%-60%	Apartments or houses with normal humidity.[2]
4	High 60%-80%	Apartments or houses with high humidity.
5	Extremly high >80%	Buildings with very high humidity level.

1. Relative humidity in the extract air at cold outdoor temperatures.
2. In newly constructed houses it might be necessary with a higher defrost level during the first winter period.

Note:

The factory setting for the VTC 300 is mode 3.

6.2.1 Software configuration of Defrost settings

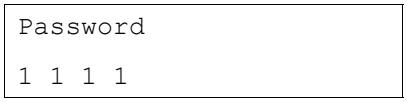
Set the defrost mode according to below procedure:

1

Go to the service menu by the use of the selection knob.

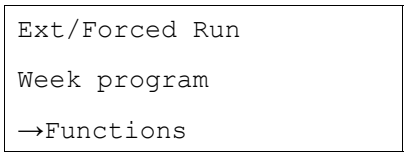
2

Enter the service level by typing the password. Use the selection knob for each digit and confirm with the confirm button after each set digit.



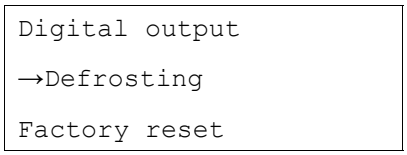
3

Go to `Functions`.



4

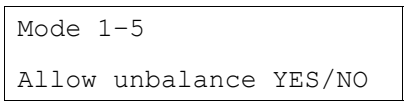
Go to `Defrosting`.



5

Select how aggressive you want the defrosting to be, choose defrost mode between 1–5 (table 3). Default is `3`.

Select if unbalanced airflows are allowed in the building during the defrost cycle. Choose between `YES` and `NO`. Default is `YES`.



6

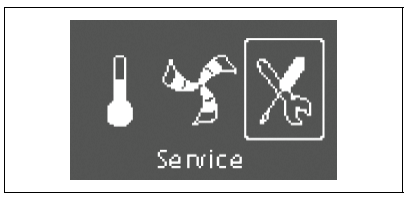
Step back to the main menu display by pressing the Back button until you reach the main display.

6.3 Programming the Week schedule

Set the week schedule according to below procedure:

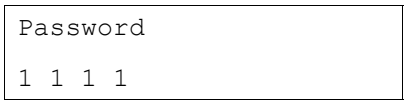
1

Go to the service menu by the use of the selection knob.



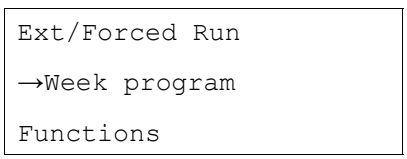
2

Enter the service level by typing the password. Use the selection knob for each digit and confirm with the confirm button after each set digit.



3

Go to `Week program`.



4

Choose `Week program` again.

```
Week program
→Week program
Fan speed
```

5

Set week day and time you want the unit to be in `ON level`. Two periods per day can be programmed. The rest of the time the unit will be in `OFF level`.

```
Week program
Day MON
Per 1:  07:00 16:00
Per 2:  00:00 00:00
```

6

Go back to the previous dialogue frame with the Back button and go down to `Fan speed`.

```
Week program
Week program
→Fan speed
```

7

Set which fan speed the fan is supposed to be running in the `ON level`, choose between `Low`, `Nom` or `High`.

Set which fan speed the fan is supposed to be running in the `OFF level`, choose between `OFF`, `Low`, `Nom` or `High`.

```
Fan speed
ON level:  Low/Nom/High
OFF level:
OFF/Low/Nom/High
```

Note:

If an electrical re-heater battery is installed and active and the unit is shut down from the control panel, for example by choosing `OFF`. When the unit is in `OFF` level in the week program, the fans will continue to run for 3 minutes, to prevent the heater from triggering the over heat protection sensor, before they stop.

Step back with the Back button until you reach the main menu display.

6.4 Extra functions

The unit is equipped with a number of extra on/off functions which can be activated from on/off switches that can be connected to the digital inputs on the main print card (see wiring diagram).

The following possibilities are available:

- Digital inputs 1–3: By connecting on/off switches to these inputs it's possible to choose 3 special individual fan speed settings in the control panel depending on a temporary need for the building (for example lowering the extract air fan speed when an open fire place is used)
- Digital input 4: Makes it possible to turn the electrical re-heater battery on or off
- Digital input 5: Turn the Extended/forced running function on or off with a switch. The function overrides current set fan speed. Choose between Low, Nom and High for this function
- Digital input 7: Home/leave, switching on this input decreases the supply air temp set point with 10K . This function is used when the building is uninhabited for a longer period. This function is however not working if the unit has been configured to operate with a hot water heater.

See menu options in “Service menu Overview” (chapter 5.2).

7 Before Starting the System

When the installation is finished, check that:

- The unit is installed in accordance with the instructions
- The unit is correctly wired (in case of installed electrical heater)
- Outdoor and exhaust air dampers and silencers are installed and that the duct system is correctly connected to the unit
- All ducts are sufficiently insulated and installed according to local rules and regulations
- 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 unit is correctly configurated and commissioned
- The week schedule and fan speed settings are correctly programmed.

8 Service

Note:

Questions regarding the unit and the installation are answered by your installer or place of purchase!

8.1 Warnings

⚠ Danger

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

⚠ Warning

- The system should operate continuously, and only be stopped for maintenance/service
- 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 maintenance. Use protective gloves
- Make sure that filters are mounted in their place before running the system
- 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.

8.2 Internal Components

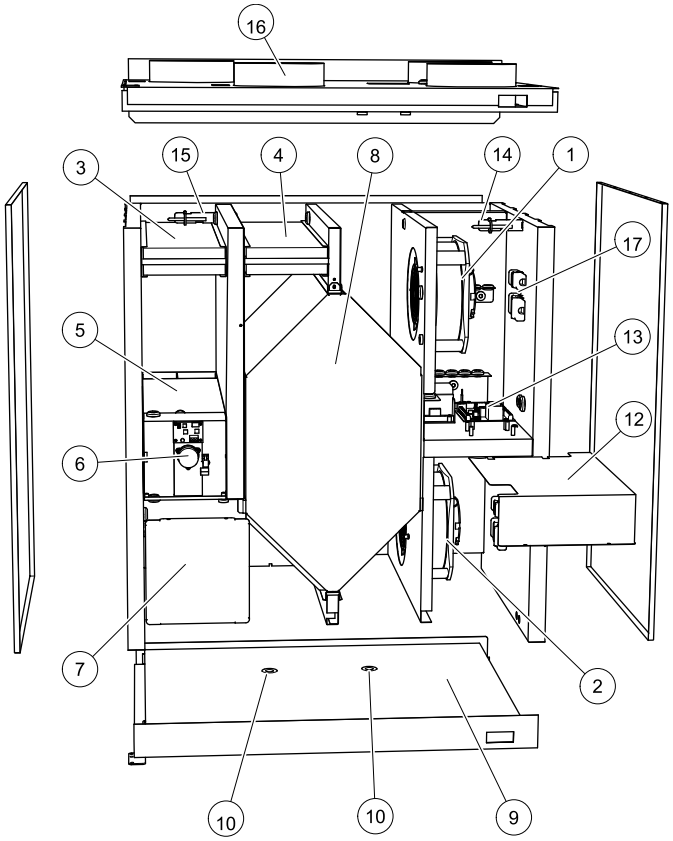


Fig. 15 Components

Position	Description
1	Fan, supply air
2	Fan, extract air
3	Filter, outdoor air
4	Filter, extract air
5	Defrost damper[1]
6	Motor, defrost damper
7	Cover plate, defrost damper
8	Heat exchanger
9	Condensation tray
10	Condensation drain
12	Cover plate, electrical connection box
13	Print card with terminals
14	Temperature sensor, supply air
15	Temperature sensor, outdoor air
16	Temperature sensor, extract air
17	Fast couplings for supply- and extract air fan

1. The damper may not be turned by hand!

8.2.1 Description of Components

8.2.1.1 Fans

The fans (pos. 1 and 2 figure 15) have external rotor motors of EC type which can be steplessly controlled individually 20–100%. The motor bearings are life time lubricated and maintenance free. It is possible to remove the fans for cleaning, see “User Manual” for more information.

8.2.1.2 Filters

The filters are of filter quality G 4 for both the supply air and extract air filter. The filters need to be replaced when polluted. New sets of filters can be acquired from your installer or wholesaler.

8.2.1.3 Defrost damper

The built in bypass damper (pos. 5 figure 15) is involved in defrosting, cool recovery, and supply air temperature regulation of the unit. The damper motor is controlled by an analogue 0–10 V signal.

A test sequence which opens and closes the damper will occur once every 24 hours. A micro switch detects if the bypass is able to close completely. If a signal from DI6 is not detected for one minute after the function test has been initiated, then the warning “DAMPER WARNING” appears in the control panel.

8.2.1.4 Heat exchanger

SAVE VTC 300 is equipped with a highly efficient, counter flow plate heat exchanger. Required supply air temperature is therefore normally maintained without adding additional heat.

The heat exchanger is removable for cleaning and maintenance, see “User Manual” for more information.

8.2.1.5 Condensation tray and drainage

Depending on the relative humidity in the extract air, condensation may occur on the cold surfaces of the heat exchanger. The condensate water is gathered in the condensation tray (pos. 9 figure 15) in the bottom of the unit and is led out through the drainage (pos. 10 figure 15) which are situated on each side of the heat exchanger. The drainage outlets are size ½″ with outer threaded tube connections (chapter 4.3.1).

8.2.1.6 Print card

The main print card (pos. 13 figure 15) controls the functions and set temperatures of the unit. It is possible to connect external accessories to terminals in the print card. See wiring diagram for more information.

8.2.1.7 Temperature sensors

Three temperature sensors (NTC, 10 kΩ) are included in the unit from factory:

- Supply air sensor (pos. 14 figure 15)
- Outdoor air sensor (pos. 15 figure 15)
- Extract air sensor (pos. 16 figure 15).

The sensors are wired to the main print card. See wiring diagram for more information.

8.2.1.8 Electrical Re-heater battery

The electrical re-heater is optional, i.e. not included from factory in a standard unit, and must be connected and activated in the control panel (chapter 5.2.5). The re-heater is activated by a relay and switches on if the supply air temperature is 2°C lower than the set point and switches off if one or more of the following conditions are met:

1. If the supply air temperature is ≥ 2°C over the set point
2. If the over heat protection is activated or the sensor is malfunctioning

3. If the emergency thermostat is triggered or broken
4. If the supply air sensor is in error state
5. If the supply air fan is not running
6. If the heater is set to not active in the menu.

8.2.1.9 Water Re-heater battery

A water re-heater battery (optional), which can be acquired as an accessory, can be controlled by the analog output WH (0-10 V DC). The water heater uses AI 4 for frost protection (OT, “Over heat protection”, changes to FPS , Frost protection in the menu). The frost protection sensor should then be a strap on surface sensor situated on the return water tube. The supply air sensor (SS) at AI 1 must be replaced with a duct sensor which can be acquired as an accessory. See wiring diagram for more information.

Only electrical or water re-heater is allowed, i.e. if a water re-heater is selected, the electrical re-heater is deactivated and vice versa.

Note:

If a water re-heater battery is installed we strongly recommend you to also install an outdoor air damper with a spring return actuator.

8.2.1.10 Water Cooler

A water cooler (optional) can be acquired as an accessory and be controlled by the unit. If a water cooler is installed the supply air sensor (SS) at AI 1 must be replaced with a duct sensor which can be acquired as an accessory. See wiring diagram for more information.

8.3 Trouble shooting

If problems should occur, please check the items below before calling your service representative.

Malfunction	Action
Fans do not start	1. Check the display for alarms. 2. Check that all fuses and fast couplings are connected (mains supply and fast couplings for supply and extract air fans, pos. 16 figure 15). 3. Check that the week program is in `ON` mode. The week program might be in `OFF` mode with the fan speed set to `OFF` (chapter 6.3). 4. Check if one of the digital inputs 1–3 (DI 1–3) is active and set to off. This would force one or both fans to stop depending on the setup (chapter 6.4).
Reduced airflow	1. Check the display for alarms. 2. The unit could be in defrost mode. This reduces the fan speed and in some cases shuts down the supply air fan completely during the defrosting cycle. The fans go back to normal after finished defrosting. Shown as `Defrosting` in the display 3. Check setting of fan speed in the control panel (chapter 6.1.1). 4. Check week program (chapter 6.3). 5. Check if one of the digital inputs 1–3 (DI 1–3) is active and set to off. This would force one or both fans to stop depending on the setup (chapter 6.4). 6. Check filters. Change of filters required? 7. Check diffusers/louvres. Cleaning of diffusers/louvres required? 8. Check fans and heat exchange block. Cleaning required? 9. Check if the buildings air intake and roof unit (exhaust) have been clogged. 10.Check visible duct runs for damage and/or build up of dust/pollution. 11.Check diffuser/louvre openings.
The unit cannot be controlled (control functions are stuck)	1. Reset control functions by pulling out the plug for 20-30 seconds. 2. Check the modular contact connection between the control panel and the main print card.
Low supply air temperature	1. Check the display for alarms. 2. Check set supply air temperature in the control panel. 3. Check the analogue inputs in the service menu to verify that the temp sensors are ok (chapter 5.2). Go to `Functions` > `Analogue input` and verify the temperature readings from the temp sensors. 4. In case of installed electrical re-heater battery: Check if the over heat protection thermostat is still alert. If necessary, reset by pressing the red button on the front plate of the electrical re-heater (pos. 2, figure 9). 5. Check if digital input 4 (DI 4) is set to off. This would force the electrical re-heater battery to be switched off (chapter 6.4) 6. Check if the extract filter must be changed. 7. Check if the unit has a re-heater battery connected. At very cold outdoor conditions an electrical or water heating battery might be necessary. A re-heater battery can be acquired as an accessory.
Noise/vibrations	1. Clean fan impellers. 2. Check that the screws holding the fans are tightened. 3. Check that the anti vibration lists are fitted to the mounting bracket and to the back of the unit.

8.3.1 Alarm list

Error is warned with text and warning triangle in the display. Turn the selection knob to the warning triangle and press 2x confirm

Alarm	Explanation	Result
Fan	Indicates error on either supply or extract air fan.	The alarm is displayed in the control panel May result in triggered over heat protection if an electrical re-heater battery is installed and active when the malfunction occurs.
EMT/Frost	Indicates triggered emergency thermostat (in case of installed electric re-heater battery) or frost protection (in case of installed water re-heater or cooling battery).	A triggered frost protection alarm results in the following: • Both fans stop • Outdoor and exhaust air dampers close • Water valve opens completely (10 V signal goes out to the actuator) The unit will restart once the water temperature reaches +5K over set frost protection temperature. A triggered emergency thermostat alarm gives an alarm in the control panel. Reset by pushing the button (pos. 2 figure 9) on the front of the electrical re-heater battery.
DAMP	Indicates malfunction in bypass damper	The alarm is displayed in the control panel. The unit will not be able to use the bypass damper for defrosting, i.e. stop defrosting will be initiated if a re-heater is installed and activated.
Pb Fail	Error in connection with relay card for electrical re-heater or re-heater disconnected	The alarm is displayed in the control panel. The electrical re-heater will not be activated.
Temp	Malfunction in one or more of the temperature sensors.	The alarm is displayed in the control panel. Check analogue inputs to verify which sensor is malfunctioning.
Filter	Time for filter change.	The alarm is displayed in the control panel. Change filter according to instructions in the “User Manual”.

8.4 Type label

Before calling your service representative, make a note of the specification and production number from the type label, which can be found on top of the unit close to the duct connections or inside in the bottom of the unit.

Fig. 16 Type label SAVE VTC 300 R

Position	Description
1	Product code (product specification)
2	Production date
3	Product item number
4	Production order number
5	Consecutive number

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