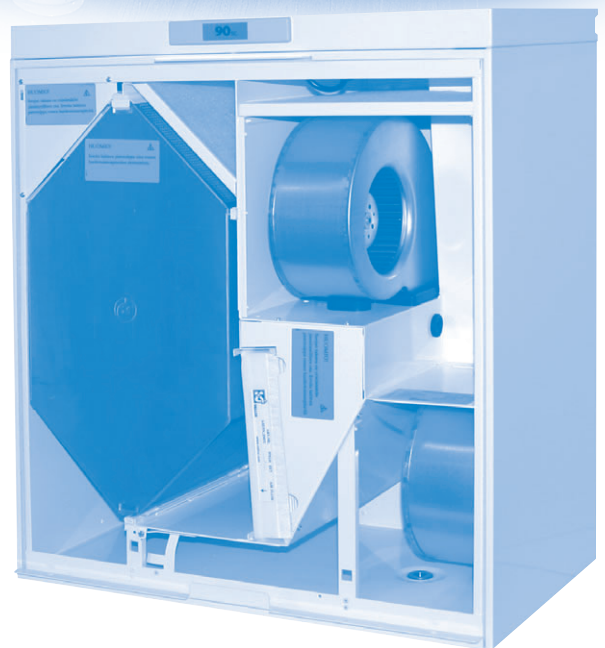


SUPPLY AND EXTRACT AIR VENTILATION WITH HEAT RECOVERY



MODELS:
DV 90 SE R
DV 90 SE L

DIGIT SED
ELECTRONIC CONTROLLER
WITH LCD DISPLAY



DV 90 SE

CONTENTS

EVERYDAY QUICK GUIDE

DV 90 SE has been initially adjusted for normal circumstances in your home. Ventilation adjustment is needed mainly in the following circumstances:

• Taking a bath:

Boost ventilation in bathing and washing facilities in order to ensure that the rooms get dry as quickly as possible. It is advisable to have boosted ventilation on for 2 to 3 hours after taking a sauna bath, unless there is an automatic adjustment based on humidity content.



• Washing and drying clothes:

Boost ventilation in washing and drying rooms during the activity, unless there is an automatic adjustment based on humidity content.



• Sleeping:

Ventilation in a bedroom has to be sufficient throughout the night. The level is correct when air does not smell fusty when you enter the room in the morning. If the carbon dioxide content of a room is monitored and ventilation is adjusted accordingly, air will always be fresh.



• Empty dwelling:

To save energy, ventilation can be adjusted to the minimum level.



• Cooking:

If the ventilation unit is connected to a cooker hood, boost ventilation during cooking.

The most common way to abate cooking fumes is to have a separate cooker hood.



NOTE!

Never switch ventilation off, because ventilation keeps indoor air quality uniform and removes gases and dust emanating from the structures.

DV 90 SE models

Code: 3520

Models

The letter L or R after the name of the unit indicates the handedness of the unit.

DV 90 SE R

- With direct current fans

DV 90 SE L

- With direct current fans

VTT certificate number

- Direct current fan model: C326/05

Pre-/post-heating radiator

- Preheating radiator electric, max. 900 W, standard
- Post-heating radiator electric, max. 900 W, standard

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DV 90 SE

THREE QUESTIONS ABOUT VENTILATION

1. THREE QUESTIONS ABOUT VENTILATION

1.1. Why is air replaced in dwellings?

Good ventilation promotes healthy living for both residents and the building. Air in a dwelling needs to be replaced in order to remove humidity brought about by living as well as impurities emanating from structures and human bodies. Impurities of indoor air include carbon dioxide, formaldehyde, radon and other gases as well as dust.

Mechanical ventilation is needed in order to be able to adjust air circulation as needed by the residents. In a tightly sealed house, air does not circulate sufficiently by natural means. Even in a poorly sealed house air is only replaced because of differences between indoor and outdoor air temperatures, or because of winds. This means that ventilation is dependent on weather conditions and cannot be regulated.

It is especially important that humidity and carbon dioxide content of the indoor air stay at a healthy level. Recommended humidity content of good indoor air is approximately 45%. Humidity content is lower in winter and higher in summer and autumn. Dust mites thrive in indoor air if humidity exceeds 50%, and if humidity stays at over 60% for a long time in winter, water condenses in the cold structures of the house and mould starts to form.

The recommended maximum carbon dioxide content in good indoor air is circa 1,000 ppm.

1.2. What are the characteristics of adequate ventilation?

- Indoor air stays fresh in all the rooms of the dwelling, also in bedrooms during night. **Without adequate ventilation**, carbon dioxide content tends to rise high especially in bedrooms.
- The bathroom and the sauna get dry quickly.
- During the heating season, the windows and other outer wall structures remain dry.
- Humidity in indoor air is not condensed in the ventilation ducts.
- Air is fresh in the toilet as well.

1.3. How much air is replaced?

For air to be clean to breathe, it has to be replaced with outdoor air **every two hours**.

In a new and a renovated house, air needs to be circulated continually, at least once an hour, during the first year in order to remove harmful gases and structural humidity. In buildings that are more than a year old and dry, ventilation can be regulated as needed. Ventilation is boosted during for instance a sauna bath, clothes washing and cooking, and reduced during very cold periods or when there is nobody at home. Carbon dioxide and humidity sensors adjust ventilation in the rooms automatically as needed.

SEASONAL CALENDAR

Autumn

- Wash or change the coarse filter and clean or change the fine filter if needed. The recommendation is approximately once a year.
- Check that the heat recovery cell is clean.
- Check that the condensing water outlet is not clogged.



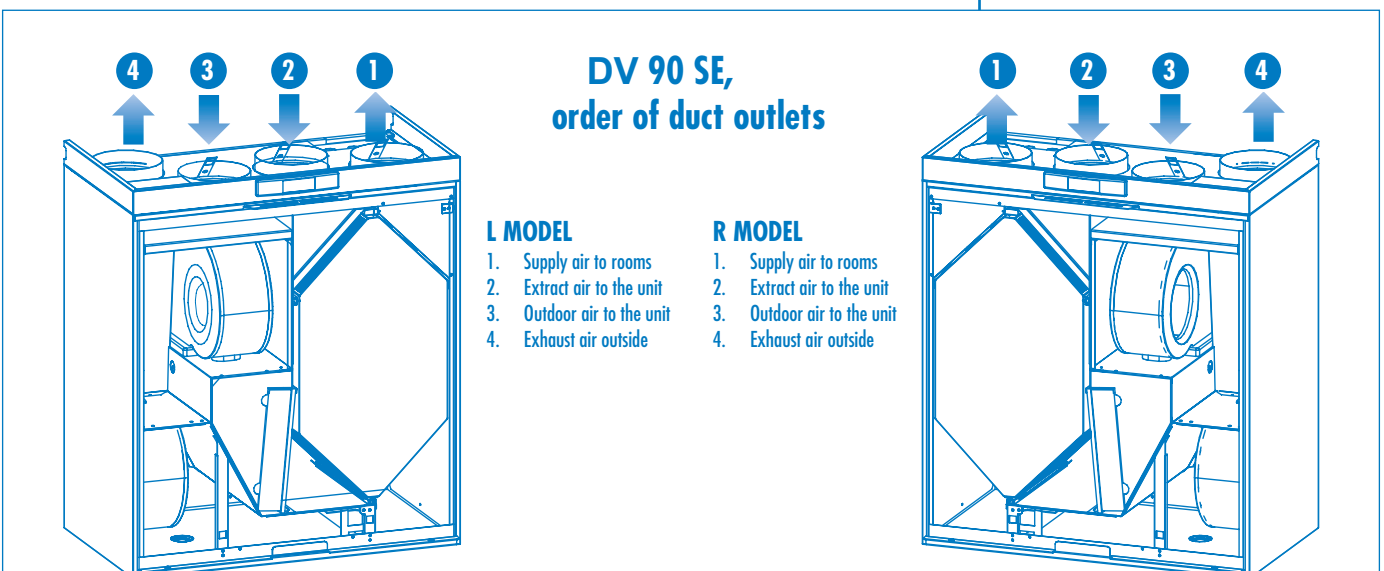
Spring:

- Wash or change the coarse filter and clean or change the fine filter if needed.
- Clean the fan blades and the post-heating unit if needed.
- Check that summer ventilation is in operation.



NOTE!

For further details, see inner pages.



DV 90 SE

INSTRUCTIONS FOR USE

2. Instructions for using DV 90 SE

For indoor air to stay healthy and beneficial also for the structures of the dwelling, ventilation has to be in operation continually. It is not advisable to stop ventilation even for longer holidays, because it makes indoor air stuffy. Also, during the heating season indoor air humidity may condense in the ducts and structures and therefore cause humidity damage. The sensors automatically adjust ventilation to an optimal level even if the dwelling is empty.

2.1. Making the unit ready for operation

1. Connect the plug to the mains supply. DV 90 SE is now ready for operation.
2. Turn the unit on and choose a suitable power of ventilation at the control panel. There are either one or more control panels. See the instructions for using the control panel in sections 3.2. 1. and 3.2.2.

In normal conditions **basic ventilation** with change of air every two hours is sufficient in living areas. Boosting is needed during for example sauna baths, cooking, clothes washing or family parties. If a carbon dioxide and/or humidity sensor is installed in the system, DV 90 SE will also take care of demand controlled ventilation.

2.2. Ventilation control

The unit can be fully controlled with the control panel delivered with the unit or with an optional LON converter.

The standard week clock control can be used to control the fan power of the unit and the setpoint for supply air temperature.

Furthermore, demand controlled ventilation can be adjusted with optional carbon dioxide and humidity sensors.

The fan power of the unit can also be controlled with a voltage or current signal.

2.3. Ventilation control with control panel

The control panel can be used for the following ventilation control functions:

Functions for adjusting ventilation power

- Starting and stopping.
- Power adjustment (8 positions).
- Setting the basic fan speed and the maximum fan speed.

Ventilation power cannot be set lower than the basic fan speed. When carbon dioxide and/or relative humidity adjustments are activated, power cannot be adjusted higher than the maximum fan speed. When humidity and carbon dioxide adjustments are switched off, fan speed can be raised to speed 8.

Supply air temperature adjustment functions (post-heating radiator is optional)

- Switching the electric post-heating unit on / off.
- Setting the desired supply air temperature (+10°C...+30°C).
- Selecting the method for controlling the desired supply air temperature (constant temperature control, cascade control of temperature).

Preheating

- Setting the control temperature for the preheating unit (-6°C...+15°C exhaust air).
- Changing the setpoints.

There may be three control panels at most. When two or more control panels are used, the most recent control function is valid.



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WITH LCD DISPLAY

2.4. Ventilation control with carbon dioxide sensor (option)

- In carbon dioxide control, DV 90 SE adjusts fan speed so as to keep carbon dioxide content in the ventilation zone below the setpoint. When two or more sensors are used, fan speed is adjusted according to the highest measuring result.
- 1...5 carbon dioxide sensors can be connected as options to the DV 90 SE unit.
- The adjustment is switched on / off and, if needed, the setpoint (500...2000 ppm) is set at the control panel. The factory setting is 900 ppm. The recommended maximum carbon dioxide content in good indoor air is 1,000 ppm.
- When carbon dioxide control is on, the control panel may be used to raise fan speed to the maximum fan speed and to decrease it to the basic fan speed. In carbon dioxide control, maximum fan speed limitation is enabled.

2.5. Ventilation control with humidity sensor (option)

There are two methods for adjusting fan speed.

1. **Automatic humidity setting**, which is suitable for controlling humidity in washing rooms, for instance. The program records current humidity level and selects it as the setpoint, which it then uses as the target for drying air in a bathroom after a shower, for example. The setpoint automatically varies according to season, for instance, and is always at the right level. This setting is factory selected.
2. Humidity level can also be set **fixed**. The setting can range between 1...99% RH and is set at the control panel. This can be used in public saunas and swimming pools, for instance. The program aims at keeping humidity at the setpoint. The setpoint can be changed if needed.

The mode of adjusting is chosen at the controller. Recommended humidity content of good indoor air is approximately 45%.

- When this control is on, the control panel may be used to raise fan speed to the maximum fan speed and to decrease it to the basic fan speed.
- In humidity control, fan speed varies between the basic and maximum fan speeds selected.
- When the unit is taken into use for the first time **with automatic setpoint search selected** (factory setting), **it will take 3 to 10 hours for the program to define the value**. During this time, humidity adjustment is not enabled (because the first value, selected at the factory, is 100%).
- Automatic search is enabled even if humidity control is not selected.

2.6. Ventilation control with voltage or current signal

- DV 90 SE fan power can be controlled with a voltage or current signal coming from remote monitoring.
- The signal can be used to select speeds 0–8. However, if carbon dioxide or humidity adjustment is enabled, the maximum fan speed cannot be exceeded.
- The signal changes the basic fan speed.
- The signal does not lock fan speed, i.e. fan speed can be changed at the control panel within the set limits. Carbon dioxide and humidity adjustment also operate within the set limits.

2.7. Ventilation control with remote monitoring system (option)

- With an optional LON converter, DV 90 SE can be connected to the remote monitoring system.
- When DV 90 SE is connected to the remote monitoring system, compatibility between the two needs to be ensured.
- The remote monitoring system can control the same functions as the control panel does.
- The remote monitoring system works in parallel with the control panel as well as carbon dioxide and humidity sensors.

2.8. Post-heating (option)

For most of the year, heat recovered from the air being extracted is enough to warm the cold air coming from the outside to a suitable temperature. If the heat of extract air is not enough, air coming from the outside may be heated further, as needed, with an electric radiator, which can be ordered as an option for the unit. Post-heating is switched on at the control panel (see the instructions for using the control panel, section 3.1.). When heating has been switched on, the unit automatically adjusts the selected supply air temperature.



Carbon dioxide sensor (CO₂)



Humidity sensor (RH)



LON converter

2.8.



DV 90 SE


INSTRUCTIONS FOR USE

Remember!


Switch post-heating off when it gets too warm in the dwelling.

Switch post-heating on again when it gets cooler in autumn.

2.9. Supply air constant temperature control

- DV 90 SE has a relative post-heating control; when the temperature selected exceeds supply air temperature by more than 2.5 °C, the radiator is on 100%, and when the temperature difference gets smaller, the period of active operation is automatically reduced in two-minute sequences. The adjustment range of heating is 10...30 °C.
- The heating radiator is on when the  sign is displayed.
- Temperature control is only active when post-heating has been switched on.

2.10. Supply air cascade control

- Supply air temperature control can be changed into cascade control.
- It changes the controlling principle of the post-heating radiator. The temperature of air blown to the ventilation zone is controlled on the basis of extract air.
- The program tries to keep supply air temperature at a value determined by the difference between extract air and the setpoint as follows: if extract air is warmer than the setpoint, supply air temperature is lower than the setpoint by the difference. If extract air is cooler, supply air is warmer by the difference. As an example, if room temperature is 25 °C and the setpoint 24 °C, the aim is to blow 23 °C air to the ventilation zone. If the temperature in the ventilation zone is 24 °C and the setpoint is 25 °C, the aim is to blow 26 °C air to the ventilation zone.
- The aim is to keep the temperature of air blown to the ventilation zone always between 10...30 °C.
- Cascade control can be selected at the control panel, and it is active when post-heating has been switched on.
- The heating radiator is on when the  sign is displayed.

2.11. Heat recovery bypass function

- The bypass function tries to get as cool supply air as possible to the ventilation zone by comparing the measuring results of the outdoor air and extract air sensors.
- The heat recovery cell is bypassed when post-heating is switched off, outdoor air temperature is two degrees more than the setpoint and extract air is warmer than outdoor air.
- The setpoint can be changed between 0...+25 °C. (Factory setting 12 °C.)


2.12. Heat recovery defrost function and preheating

- Defrost prevents the heat recovery cell from freezing, thus ensuring proper ventilation even in cold periods.
- In DV 90 SE defrosting is implemented by intermittently stopping the supply air fan. The stopping function is controlled on the basis of the temperature sensor measuring the temperature of exhaust air after the heat recovery cell.
- The supply air fan stops when exhaust air temperature falls below +3 °C and starts when exhaust air temperature has risen to the value set (the amount corresponding to hysteresis, factory setting +3 °C. See sections 3.3.19 and 3.3.20).

Preheating

- DV 90 SE is also equipped with an electric preheating radiator. The preheating radiator enables the defrosting of the heat recovery cell without the stopping of the supply air fan. **If you wish to use the preheating radiator, you have to change the setpoint for preheating to +5 °C (factory setting is -3 °C, see section 3.3.21).**
- The preheating radiator switches on before the stopping of the supply air fan and heats cold outdoor air, thereby preventing the heat recovery cell from freezing.

2.13. Maintenance reminder

- The maintenance reminder switches on the maintenance reminder symbol  in the main display of the control panel at defined intervals, the factory setting being 4 months.
- The maintenance reminder symbol is acknowledged at the control panel (see the instructions for using the control panel, section 3.3.7.).
- The interval can be set between 1...15 months at the control panel.

2.14. Fireplace switch function / boosting

Fireplace switch function

- The fireplace switch stops the extract air fan for 15 minutes and produces overpressure in the ventilation zone. This makes it easier to light the fireplace, for instance.
- The function is started at the main display of the control panel by simultaneously pressing and holding down the + and - buttons for 2 seconds.
- The function can also be started at a separate auto-reset push-button switch, wired from the connection box of the unit to a wall in the fireplace room, for instance. Upon each pressing, the stopping function continues for 15 minutes (the switch is not included in the delivery).
- During the function, the fireplace/booster switch symbol (🔥) is visible in the main display of the control panel.

NOTE!

The starting of the extract air fan may weaken draught in the fireplace.

During cold winter seasons, the flowing of cold air to the extract ducts may cause the antifreezing and defrost functions to start. The situation will normalise in a while, after the functions stops.

Booster switch function

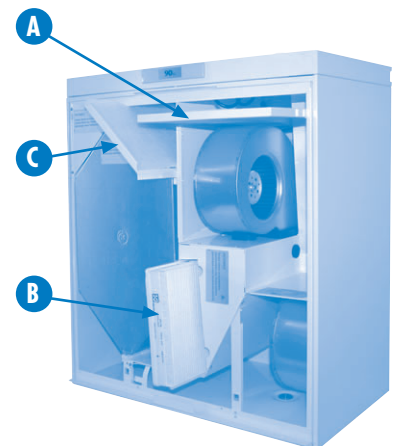
- The booster switch raises the fan speed to the set maximum speed for 45 minutes.
- The function is started at the main display of the control panel by simultaneously pressing and holding down the + and - buttons for 2 seconds.
- The function can also be started at a separate auto-reset push-button switch, wired from the connection box of the unit to a wall in a classroom, for instance. Upon each pressing, the booster function continues for 45 minutes.
- During the function, the fireplace/booster switch symbol (🔥) is visible in the main display of the control panel.
- The function is selected at the control panel.

2.15. Fault signal relay (remote monitoring)

- The fault signal relay has potential-free points (24 VDC, 1 A).
- The points provide information on various failure modes of the unit.
- When the antifrost function of the water-circulating radiator is on, the points of the relay close and open at 10-second intervals. (The DV 90 SE unit does not have a water-circulating radiator.)
- Alarm of high carbon dioxide content switches the relay at 1-second intervals.
- In other fault situations, the points are closed.

2.16. Air filtering

DV 90 SE features coarse filtering of both extract and supply air before the fans. The unit has F7 (B) and G3 class (A) fine and coarse filters on the supply side, and a G3 class coarse filter (C) on the extract side. The filters need to be in place in the unit whenever ventilation is in operation.



DV 90 SE

INSTRUCTIONS FOR USING THE CONTROL PANEL

3. Control panel

3.1. Keyboard



1 Start button

With this button, you switch the unit on and off. When the indicator is lit, the unit is on.

2 Carbon dioxide adjustment

With this button, you set carbon dioxide adjustment on and off. When the indicator is lit, the adjustment is on.

3 Humidity adjustment

With this button, you set humidity adjustment on and off. When the indicator is lit, the adjustment is on.

4 Post-heating

With this button, you set post-heating on and off. When the indicator is lit, post-heating is on. The summer function is active when the indicator is not lit.

5 Scrolling up

With this button, you can scroll the displays upward.

6 Scrolling down

With this button, you can scroll the displays downward.

7 Increase button

With this button, you can increase values.

8 Decrease button

With this button, you can decrease values.

Power failure

After a power failure, the unit starts at minimum fan speed. The adjustments and setpoints chosen will remain in the memory of the unit in spite of the power failure.

3.2. Operating menu

The displays of the operating menu (sections 3.2.1.–3.2.6.) can be scrolled with the scrolling buttons (see section 3.1., items 5 and 6 in the figure).

3.2.1. Main display and change of fan speed



Fan speed (3).

Supply air temperature (21 °C).

Post-heating is on.

10:20 Time.

Filter guard alert.

Maintenance reminder alert.

Fireplace / booster switch on. The fireplace / booster switch is activated in this display by simultaneously pressing down the + and – buttons for 2 seconds.

Week clock control on.

Fan speed can be changed in this display with the + and – buttons (see section 3.1., items 7 and 8 in the figure).

3.2.2. Moving to the settings menu

To settings menu
See manual

In order to move the control panel to the settings menu, press the + and – buttons simultaneously. In the settings menu, you can change setpoints for the ventilation unit.

3.2.3. Week clock control

Week program
on

Week clock control can be activated by pressing the + button and deactivated by pressing the – button. Week clock control is on when the symbol of week clock control is shown in the main display. In week clock control, the basic fan speed and supply air temperature of the unit are adjusted in accordance with the programme in section 3.3.4.

3.2.4. Content display

RH1 35% RH2 40%
CO2 0821 PPM

The content display shows humidity and carbon dioxide content. The corresponding sensors are required (options).

3.2.5. Temperature display

Out 20 In 20
Sup. 20 Exh. 20

The temperature display shows the temperatures of outdoor air, indoor air, supply air and exhaust air. The accuracy of the temperature sensors is ± 2 °C.

3.2.6. Setting supply air temperature

Temp. setting
20C

Supply air temperature setting is changed with the + and – buttons.

DV 90 SE

INSTRUCTIONS FOR USING THE CONTROL PANEL

3.3. Settings menu

You can reach the settings menu from the operating menu as indicated in section 3.2.2. The displays of the settings menu (sections 3.3.1.–3.3.26.) can be scrolled with the scrolling buttons (see section 3.1., items 5 and 6 in the figure).

3.3.1. Setting the basic fan speed

MIN speed
1

The desired basic fan speed (minimum fan speed) is selected with the + and – buttons. Active when week clock control is not on. Week clock control changes this speed.

3.3.2. Moving to the operating menu

To main menu
Press + and -

You can return to the operating menu by pressing the + and – buttons simultaneously.

3.3.3. Erasing the week programme

Erase week prog.
Press + and -

The week programme can be totally erased by simultaneously pressing the + and – buttons.

3.3.4. Week programme programming

Adjust week prog.
Press + and -

You can access the programming mode for the week clock programme by simultaneously pressing the + and – buttons. See section 3.4.1.

3.3.5. Adjusting time

Adjust time
Press + and -

You can adjust time by simultaneously pressing the + and – buttons. For more details, see section 3.4.2.

3.3.6. Mode of operation of the maximum speed setting

MAX Speed limit
with adjustments

The maximum fan speed setting can be selected to be active either in connection with (carbon dioxide and humidity) adjustments or permanently. The selection is done with the + and – buttons.

3.3.7. Choosing the language version

Kieli / Language
English

Select the desired language (German, English, Swedish, French or Finnish) with the + and – buttons.

3.3.8. Restoring factory settings

Factory settings
see manual

The general factory settings can be restored by pressing the + and – buttons simultaneously. Remember to ensure that the setpoints are in accordance with the factory settings for this unit. Especially, check the unit model (electricity / water) and change if needed as stated in section 3.3.20.

3.3.9. Adjustment interval

Adjust interval
10

The adjustment interval for humidity and carbon dioxide adjustments is selected with the + and – buttons. The adjustment interval refers to minutes.

3.3.10. Resetting the service reminder

Mainten. reset
Press + and -

The maintenance reminder is reset by pressing the + and – buttons simultaneously. This turns out the maintenance reminder symbol (🔧) in the main display.

3.3.11. Contrast of the control panel display

Display contrast
05

The contrast setting for the control panel display is changed with the + and – buttons.

3.3.12. Address of the control panel

Panel address
1

The address of the control panel is changed with the + and – buttons. Two control panels cannot have the same address. If control panels have the same address, they will go to the bus fault state and will not operate.

3.3.13. Adjusting the direct current fan on the extract air side

DC fan exhaust
100%

The desired adjustment value for the DC fan is selected with the + and – buttons. The rotation speed of the extract air fan can be lowered by decreasing the percentage value. If the unit has alternating current fans, this adjustment has no impact on the operation of the unit.

DV 90 SE

INSTRUCTIONS FOR USING THE CONTROL PANEL

3.3.14. Adjusting the direct current fan of the supply air side

DC fan - supply
100%

The desired adjustment value for the DC fan is selected with the + and – buttons. The rotation speed of the supply air fan can be lowered by decreasing the percentage value. If the unit has alternating current fans, this adjustment has no impact on the functioning of the unit.

3.3.15. Changing the operating temperature of heat recovery cell bypass

Cell bypass
10C

The desired cell bypass temperature is selected with the + and – buttons. If outdoor temperature is lower than cell bypass temperature, the summer / winter damper is in the winter position.

3.3.16. Setpoint of the basic humidity level

Basic %RH level
40%

The desired setpoint is chosen with the + and – buttons when manual adjustment has been selected as the Rh level setting (humidity setting, section 3.3.19).

3.3.17. Mode of operation of the fireplace / booster switch

Switch type
Fireplace switch

The mode of operation of the switch (either fireplace or booster switch) is selected with the + and – buttons.

3.3.18. Choosing cascade control for supply air temperature

Cascade adjust
Off

Cascade control is activated or deactivated with the + and – buttons.

3.3.19. Choosing the basic humidity level

Rh-level setting
automatic

The basic humidity level can be chosen as either automatic or manual. The selection is done with the + and – buttons.

3.3.20. Choosing post-heating for the unit

Radiator type
electric rad.

A water or electric radiator is selected with the + and – buttons, depending on the type of post-heating radiator the unit is equipped with.

Note! Choosing the wrong type of post-heating causes a faulty post-heating function.

3.3.21. Choosing maintenance reminder interval

Maintenance rem.
04

The interval for the maintenance reminder is selected with the + and – buttons. The maintenance reminder interval refers to months.

3.3.22. Hysteresis of the anti-frost function in the heat recovery cell

Hysteresis
03C

The hysteresis of the anti-frost function in the heat recovery cell is selected with the + and – buttons.

3.3.23. Stopping temperature of the supply air fan for the anti-frost function in the heat recovery cell

Supply fan stop
05C

The stopping temperature of the supply air fan for the anti-frost function in the heat recovery cell is chosen with the + and – buttons.

3.3.24. Pre-heating temperature for the anti-frost function in the heat recovery cell

Preheater
07C

The preheating temperature for the anti-frost function in the heat recovery cell is chosen with the + and – buttons.

3.3.25. Changing the setpoint for carbon dioxide adjustment

CO₂-setting
0900 PPM

The setpoint for CO₂ adjustment is chosen with the + and – buttons.

3.3.26. Choosing maximum fan speed

MAX speed
8

The desired maximum fan speed is selected with the + and – buttons. Maximum fan speed is on either with adjustments or permanently. See section 3.3.6. Mode of operation of the maximum speed setting.

DV 90 SE

INSTRUCTIONS FOR USING THE CONTROL PANEL

3.4. Week clock control

3.4.1. Week programme programming

D	Hr	Sp	Tmp	Exit
1	12	5	20	Exit

↑
Cursor

D	Day 1...7
	1 = Monday, 2 = Tuesday, etc.
Hr	Hours, 0...23
Sp	Fan speed, 1...8
Tmp	Supply air temperature, 10...30 °C
Exit	Save the setting and exit
N	No change to previous

D	Hr	Sp	Tmp	Exit
1	7	2	17	Exit

D	Hr	Sp	Tmp	Exit
1	16	4	20	Exit

D	Hr	Sp	Tmp	Exit
1	19	6	N	Exit

D	Hr	Sp	Tmp	Exit
1	21	4	N	Exit

The week programme can be used to set the desired fan speed (basic fan speed) and supply air temperature for each hour of the day on seven days a week. The week programme overrides manual adjustments.

Carbon dioxide and humidity adjustment can increase fan speed but never decrease it below the basic fan speed set in the week programme.

Example: Monday

Fan speed is increased to speed 2 and supply air temperature to 17 °C between 07:00 (7 a.m.) and 17:00 (5 p.m.) hours. After that, fan speed is raised to speed 4 and supply air temperature to 20 °C. For the evening, fan speed is boosted to speed 6 between 19:00 and 21:00 hours (for the period when a sauna bath is taken), after which fan speed is lowered back to 4.

Move the cursor with the arrow keys and change values with the + and – buttons. Note that Exit and saving are done when the programming is finished by moving the cursor below the word Exit and pressing + or –.

Changes in fan speed (Sp) and supply air temperature (Tmp) are only made for the hours desired; in other cases, use N (no change to previous).

Monday (D = 1), 07:00 hours (H = 7), fan speed 2 (Sp = 2), supply air temperature 17 °C (Tmp = 17). Move the cursor to the following hour.

Monday (D = 1), 16:00 hours (H = 16), fan speed 4 (Sp = 4), supply air temperature 20 °C (Tmp = 20). Move the cursor to the following hour.

Monday (D = 1), 19:00 hours (H = 19), fan speed 6 (Sp = 6), supply air temperature unchanged (Tmp = N). Move the cursor to the following hour.

Monday (D = 1), 21:00 hours (H = 21), fan speed 4 (Sp = 4), supply air temperature unchanged (Tmp = N). Move the cursor to the following day.

Similar changes have to be made separately for each day. Finally, exit the programming mode by selecting Exit. If you wish, you can erase the week programme as indicated in section 3.3.3. You can then start programming from the start. You can see the settings programmed by choosing a day and by scrolling the hours with the + or – button.

3.4.2. Adjusting time

day	hour	min	Exit
1	15	30	Exit

↑
Cursor

day	Day 1...7
	1 = Monday, 2 = Tuesday, etc.
hour	Hours, 0...23.
min	Minutes 0...60
Exit	Save the setting and exit

Move the cursor with the arrow keys and change values with the + and – buttons. Exit and saving are done when the programming is finished.

Monday (D = 1), hours 15 (H = 15), minutes (M = 30).

Time is maintained even though there is a power failure.

3.5. Factory settings

Basic fan speed	=	1
Maximum fan speed	=	8
Carbon dioxide adjustment (CO ₂)	=	900 ppm CO ₂
Basic humidity level	=	automatic or manually chosen value
Adjustment interval	=	10 min
Freezing protection (cell)	=	3 °C
Freezing protection hysteresis	=	3 °C
Preheating setting	=	-3 °C (change to +5 °C if you want to use preheating)
Maintenance reminder	=	4 months
Cell bypass	=	12 °C
Cascade control	=	not used
Humidity level (RH level) adjustment	=	automatic
Switch type	=	fireplace switch

DV 90 SE

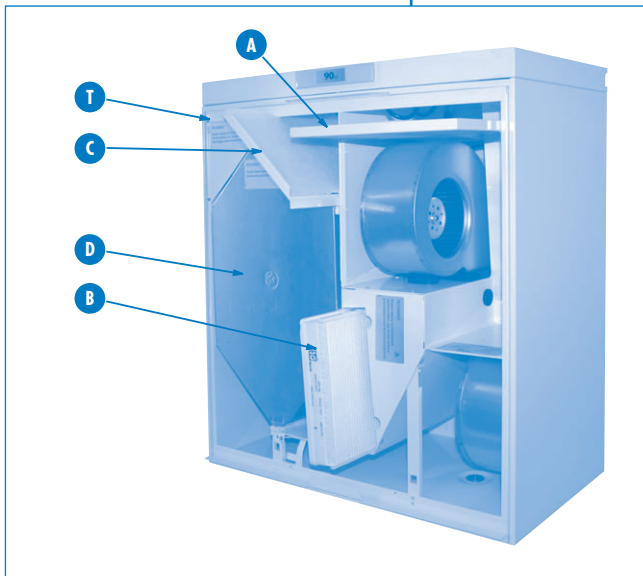
MAINTENANCE INSTRUCTIONS

4. MAINTENANCE INSTRUCTIONS

4.1. Before starting maintenance operations

When you open the door of the DV 90 SE unit, the safety switch (S) switches the unit off; in spite of that, please disconnect the plug of the unit. Always disconnect the plug before starting maintenance operations for the DV 90 SE unit. The post- and preheating radiators of the unit are PTC resistors.

When they are in operation, they have an alternating voltage of 230 V on the surface. Because of this, the plug must always be disconnected before starting maintenance operations.



4.2. Filters

When the maintenance reminder lights up the control panel indicator, the cleanliness of the filters must be checked. Outdoor air is filtered in the unit with two kinds of filters. A G3 class coarse filter (A) filters off insects, heavy pollen and other dust. An F7 class fine filter (B) filters off invisible dust. Extract air is filtered with a G3 class coarse filter (C). Clean the coarse filters A and C by **washing them at least twice a year**.

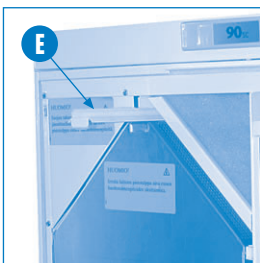
Wash the filters with +25...30°C warm water and washing-up liquid, pressing them smoothly. Do not handle the filters with force.

When washing is done properly, filters stand cleaning 3 to 4 times. In other words, you have to **replace them at least every two years**.

REMEMBER!

Clean the filters at least twice a year. Set the maintenance reminder interval according to your needs. See the instructions in section 3.3.18 (dependent on the cleanliness of outdoor and indoor air).

DV 90 SE filters and heat recovery cell. The units are available in right and left handed models. In the right handed model (model R) outdoor air comes to the unit from the right side of the centre line as shown in the instructions. In the left handed model (model L) outdoor air comes from the left side of the unit. The filters, summer / winter damper and the heating radiator change places correspondingly.



The fine filter (B) is not washable. Clean it at the same time as the G3 class filters by vacuuming it with a brush nozzle. When cleaning, be careful not to break filter material. **To ensure good supply air quality, replace the filter preferably every year, and at least every two years depending on local air quality.** It is recommended to replace filters in autumn. This way the filters stay cleaner through the winter and can effectively filter off dust in the following spring.

In connection with the cleaning of the filters it is also advisable to check the cleanliness of the heat recovery (HR) cell (D) at about two-year intervals. The sealing ledge (E) above the HR cell must be torn off before it is possible to start removing the cell. When the sealing ledge has been removed, the HR cell can be pulled out of the unit. Note! The laminas of the HR cell are very thin and get easily damaged. The correct way to remove the HR cell is to put your hands behind the HR cell and slowly pull the cell outward. If the HR cell is dirty, soak it in a solution of water and washing-up liquid. Rinse the HR cell clean with a jet of water. When all the water has drained off from between the laminas, you can put the HR cell back in place. Finally, push the sealing ledge in place.

4.3. Fans

Check the cleanliness of the fans in connection with the maintenance of the filter and heat recovery cell. Clean the fans if necessary. You can remove the fans from the unit before cleaning them.

The fan blades can be cleaned with compressed air or with a brush. Do not remove or move the balancing pieces on the fan blade.

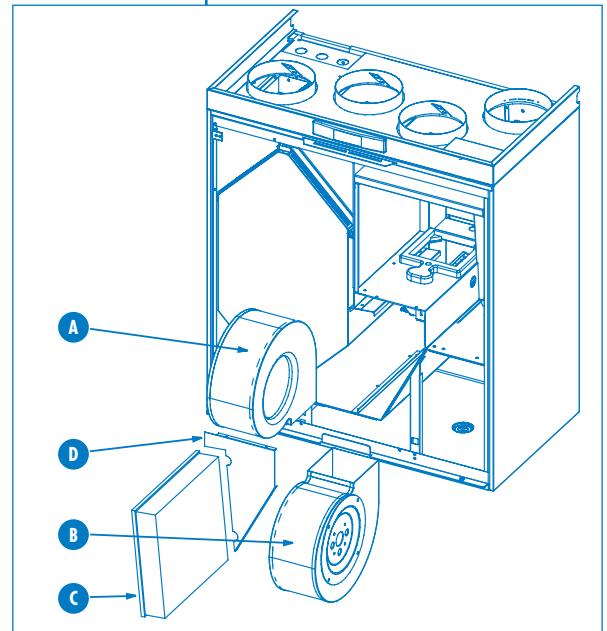
Removing the supply air fan (A)

Before removing the supply air filter, you have to remove the F7 fine filter (C) and the protective sleeve (D) of the preheating radiator. The F7 fine filter can be removed by pulling, and the protective sleeve of the preheating radiator is fixed with four screws. The fan is attached to the fixing plate with a butterfly nut. Loosen the butterfly nuts and lift the fan out. Finally disconnect the quick coupling of the fan conductor.

Removing the extract air fan (B)

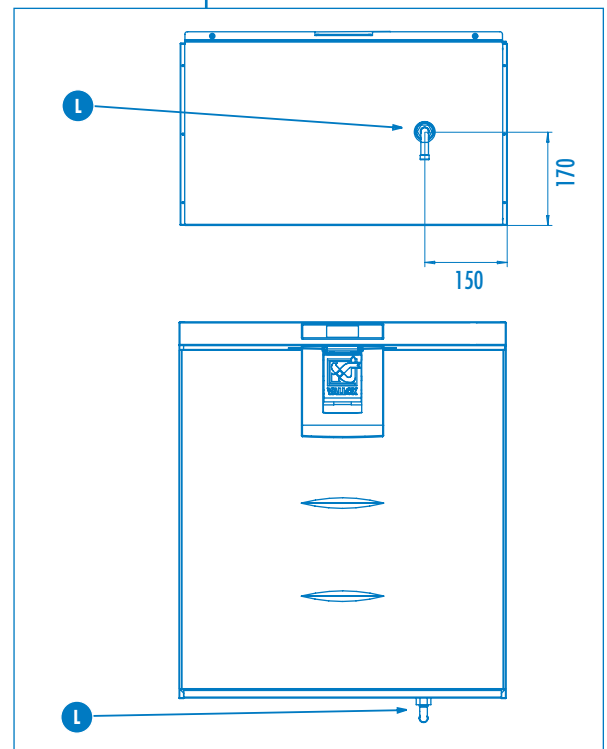
The fan is attached to the fixing plate with a butterfly nut. Loosen the butterfly nuts and lift the fan out. Finally disconnect the quick coupling of the fan conductor.

If you use water in cleaning the unit or its parts, do not let it flow to the electrical parts.



4.4. Condensing water

During the heating season, humidity of extract air condenses to water. Water formation may be abundant in new buildings or if ventilation is low compared to the humidity build-up caused by the residents. Condensing water needs to flow out from the ventilation unit without hindrance. In connection with maintenance, e.g. in autumn before the beginning of the heating season, make sure that the condensing water outlet (L) in the bottom tank is not clogged. You may check it by pouring a little water in the tank. Clean if necessary. **Do not let water flow to the electrical parts.**



DV 90 SE

TROUBLESHOOTING

	SYMPTOM	REASON	DO THIS
1	Outdoor air coming to the dwelling is cold.	<ul style="list-style-type: none"> • Air cools down in the attic ducts. • The heat recovery cell is frozen, which is why extract air cannot heat outdoor air. • The post-heating radiator does not work. • The extract air filter or cell is clogged. • The initial adjustment of ventilation has not been done. 	<ul style="list-style-type: none"> • Check the insulation of the attic ducts. • If the heat recovery cell is frozen, check the setpoint for freeze protection. The setpoint for freeze protection can be raised by 1 or 2°C, or the sensor can be bent closer to the cell, in which case the supply air fan stops earlier (see the instructions for using the control panel, section 3.3.20). Thaw the cell before closing the door. • Check that the filters and the heat recovery cell are clean.
2	Supply air fan keeps stopping.	<ul style="list-style-type: none"> • The stopping of the supply air filter is active. <p>NOTE! If you decrease the setpoint too much, the cell may freeze. Compare with list item 1.</p>	<ul style="list-style-type: none"> • The fan stops more rarely and the efficiency of the heat recovery cell gets better when the setpoint is decreased by 1 or 2°C. (See the instructions for using the control panel, section 3.3.20.)
3	Supply air fan stops and starts too frequently.	<ul style="list-style-type: none"> • The difference between the stopping and starting temperatures is too small. 	<ul style="list-style-type: none"> • Raise the difference between the stopping and starting temperatures by 1 or 2°C. It extends the period between stopping and starting. (See the instructions for using the control panel, section 3.3.19.)
4	The maintenance reminder symbol (🔧) is displayed and the unit operates otherwise normally.	<ul style="list-style-type: none"> • The maintenance reminder lights up the service reminder symbol in the main display of the control panel at an interval of approximately 4 months (factory setting). • You may change the interval (see the instructions for using the control panel, section 3.3.18). 	<ul style="list-style-type: none"> • Check the cleanliness of the filters and the unit. If needed, clean or replace the filters. Also check the external grille. • Acknowledge the maintenance reminder symbol to make it disappear. (See the instructions for using the control panel, section 3.3.7.)
5	"Exh air sensor faulty" message is displayed and the unit is stopped.	<ul style="list-style-type: none"> • There is a fault in the freezing protection sensor. 	<ul style="list-style-type: none"> • Contact a maintenance company. The sensor installation must be checked and if necessary the sensor replaced.
6	"Inp. air sensor faulty" message is displayed and the unit is stopped.	<ul style="list-style-type: none"> • There is a fault in the supply air sensor. 	<ul style="list-style-type: none"> • Contact a maintenance company. The sensor installation must be checked and if necessary the sensor replaced.
7	"In air sensor faulty" message is displayed and the unit is stopped.	<ul style="list-style-type: none"> • There is a fault in the extract air sensor. 	<ul style="list-style-type: none"> • Contact a maintenance company. The sensor installation must be checked and if necessary the sensor replaced.
8	"Out air sensor faulty" message is displayed and the unit is stopped.	<ul style="list-style-type: none"> • There is a fault in the outdoor air sensor. 	<ul style="list-style-type: none"> • Contact a maintenance company. The sensor installation must be checked and if necessary the sensor replaced.

DV 90 SE

TROUBLESHOOTING

	SYMPTOM	REASON	DO THIS
9	"Bus fault" message is displayed and the unit operates at speed 1 (check the fan speed).	<ul style="list-style-type: none"> Wiring fault in the carbon dioxide sensor, in the control panel or in the humidity sensor. 	<ul style="list-style-type: none"> Contact a maintenance company. The connections have to be checked and corrected if necessary.
10	"Freezing alert" message is displayed and the unit is stopped.	<ul style="list-style-type: none"> Antifreezing of the water-circulating radiator is active (not in the DV 90 SE unit). <p>NOTE! If there is no non-freezing solution in the water of the radiator, the radiator is at risk of freezing.</p>	<ul style="list-style-type: none"> Immediately troubleshoot the situation. Find out from a maintenance company if there is non-freezing solution in the radiator. Check if the circulation pump is broken, the boiler out of operation, etc. The situation may pass by itself as soon as supply air temperature exceeds 10 degrees, but do not wait till it happens.
11	The desired automatic adjustment does not stay on.	<ul style="list-style-type: none"> There is a fault in the humidity or carbon dioxide sensor. One of the sensors is broken or missing. 	<ul style="list-style-type: none"> Contact a maintenance company. The sensor installation and connections have to be checked. (The sensors are optional.)
12	The unit does not work, the fans are not running and no indicator light is lit in the control panel.	<ul style="list-style-type: none"> The door switch may be broken, or the door is possibly not quite closed. The unit is out of power, e.g. because a fuse has blown. The glass tube fuse (located in the control card behind a protecting plate) the electronics inside the unit may have blown. 	<ul style="list-style-type: none"> Check the door switch and fuses. The unit includes a T800 mA glass tube fuse. If needed, contact a maintenance company (e.g. to check the glass tube fuse)
13	The unit does not obey the control panel.		<ul style="list-style-type: none"> Disconnect the plug of the unit from the wall socket, wait for 30 seconds and put the plug back. If this does not help, contact a maintenance company.
14	"Carbon dioxide alarm" message is displayed and the unit is stopped.	<ul style="list-style-type: none"> Carbon dioxide alarm. Carbon dioxide content has exceeded 5000 PPM for more than two minutes. May be caused by a fire. 	<ul style="list-style-type: none"> If there is a fire, take the necessary steps. You can make the unit operative by disconnecting the plug from the wall socket, waiting for 30 seconds and putting the plug back again.
15	The filter guard symbol (⊗) is displayed and the unit operates otherwise normally.	<ul style="list-style-type: none"> The pressure in the filter guard (pressure difference switch) has risen above the adjustment value or speed is 7 or 8. 	<ul style="list-style-type: none"> Check the cleanliness of the filters and the unit. If needed, clean or replace the filters. Also check the external grille.

After a power failure, the unit starts at minimum fan speed.
All the other selected adjustments and setpoints remain in the memory of the unit.