

Heat recovery unit RDKS

Technical instructions for installation, operation and maintenance



Software version: 1.19

June 2013

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WARNING! The device can be used by children from 8 years upwards and people (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge unless they have received guidance or information on how to use the device safely and understand the risks that can occur. Children should not play with the appliance. Cleaning and maintenance is not carried out by children without supervision.

Note! Installation, adjustment and commissioning that is described in this manual must be carried out by competent, authorised personnel.

Operation & Maintenance - Functions

Comfort

The unit controller card controls the rotary heat recovery unit and any additional heating to maintain the supply air temperature at the desired level.

Energy savings

The unit controller card provides stepless control of the fans to achieve the desired air flow. The type of fans used has so-called electronically commutated (EC) motors, which are very energy efficient. Thanks to the energy efficient fans and the fact that the air flow can be adjusted steplessly, energy consumption is reduced.

Heat consumption is minimised through the use of a rotary heat recovery unit. This recovers the heat from the exhaust air and transfers it to the supply air.

Heat recovery & Additional heating

In climates where the temperature seldom drops below $-10\text{ }^{\circ}\text{C}$, the rotary heat recovery unit usually recovers enough thermal energy and no additional heating is required.

At lower external temperatures, when the supply air cannot achieve the desired temperature, a post-heating battery is required, which can be controlled to maintain the set supply air temperature. In very cold areas there is also a facility to supplement the unit with an electric heater battery, which pre-heats the outdoor air. This battery starts to provide heating when the external temperature falls below $-12\text{ }^{\circ}\text{C}$.

NOTE! The electric post-heating device only operates if the impeller is working.

Defrosting

During cold periods, when frost could form in the impeller, the built-in control unit automatically takes care of defrosting. The unit defrosts for 15 minutes every 6 hours if the external temperature is lower than $-10\text{ }^{\circ}\text{C}$. The supply air stops and the impeller moves forward in sections.

Cooling recovery

In the summer, if the exhaust air is cooler than the outdoor air, the rotary heat exchanger starts to recover cooling from the cooler exhaust air. This primarily applies if there is some form of refrigeration machine in the house.

Moisture control

The unit has a built-in automatic function which limits moisture recovery by the rotary heat exchanger at high levels of humidity in the indoor air.

How to adjust setpoint values and set energy modes, etc.

See the instructions for installation and service engineers under the heading Adjustment, commissioning, p.13.

Managing the control panel functions

RDKS has a built-in control unit which controls the operation of the two high-efficiency fans, the rotary heat exchanger and the electric batteries.

The fan speed is selected via the external control panel RDKZ-41 (accessory), which is fitted in a suitable location, for instance on a wall or set into a wall box.

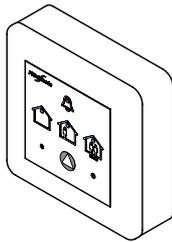


Figure 1. Control panel RDKZ-41 with connection cable.

The user can select between the following operating modes:

"AWAY"	is used when there is nobody home for a longer period to save energy
"HOME"	is used for normal ventilation flow
"FORCED"	is used when there is a greater need for ventilation (it will automatically revert after 120 minutes).

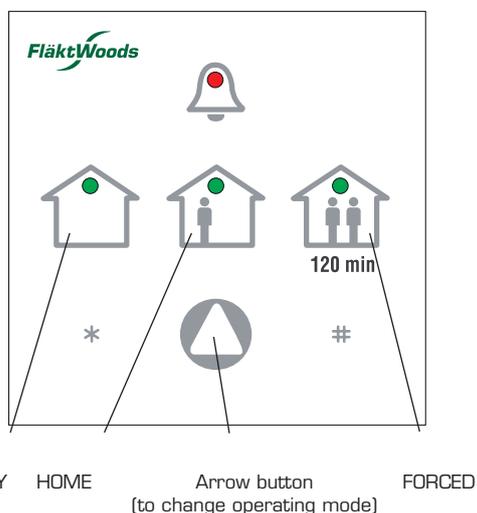


Figure 2. Control panel (RDKZ-41) operating modes.

AWAY mode

When the arrow button is pressed so that the diode lights up in the AWAY symbol, see figure 2, the operating mode has changed to AWAY mode, that is, a basic ventilation flow will be maintained in the house when there is nobody at home for a longer period.

HOME mode

When the arrow button is pressed so that the diode lights up in the HOME symbol, see figure 2, the operating mode has changed to HOME mode, that is, normal ventilation, which means a nominal ventilation flow is achieved.

FORCED mode

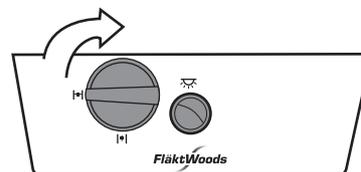
When the arrow button is pressed so that the diode lights up in the FORCED symbol, see figure 2, the operating mode changes to forced mode, that is, additional ventilation to achieve an extra high ventilation flow. The duration of the forced mode is 120 minutes, after which it reverts to the previous mode.

If forced ventilation is required for a shorter period, the mode can be cancelled manually by pressing the arrow button and choosing the HOME or AWAY mode.

Unit with cooker hood

When the damper in the hood is opened, the fans will operate in forced mode as long as the damper is open. When the damper is closed, the fans revert to their previous speed.

FORCED



AWAY/HOME

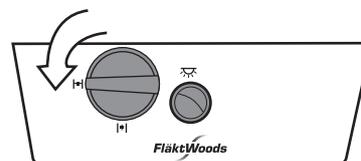


Figure 3. Forced via cooker hood CPDJ.

Control panel - overview of symbols and functions

Symbols for normal use

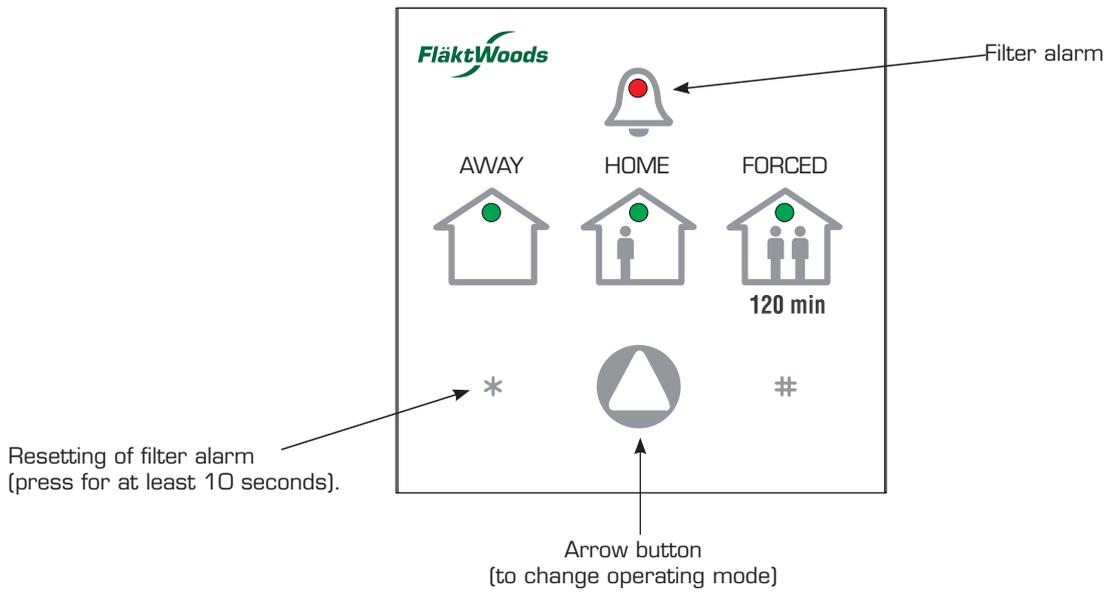


Figure 4.

Symbol	Operating mode
	Flashing alarm symbol indicates filter alarm
	Unit operating in AWAY mode
	Unit operating in HOME mode
	Unit operating in FORCED mode for 120 minutes
	Change operating modes between: AWAY, HOME or FORCED
#	Go to the display mode for temperature setpoint value (desired value)
* min. 10 sec	Press*for a minimum of 10 seconds to reset the filter alarm.

Maintenance and cleaning of heat exchanger and fans

General

Fans, filters and rotary heat exchangers are very important for the function and economic running of the unit. It is therefore important that these are kept clean and in good condition.

We recommend a general check-up in connection with filter replacement every 6 months. For safety reasons, general caution should be observed during maintenance of the unit. If necessary, use protective gloves.

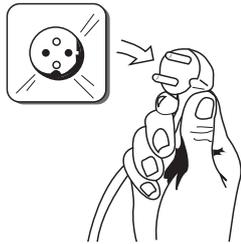


Figure 5. Before cleaning the heat exchanger and fans, etc., the unit should always have the power disconnected.

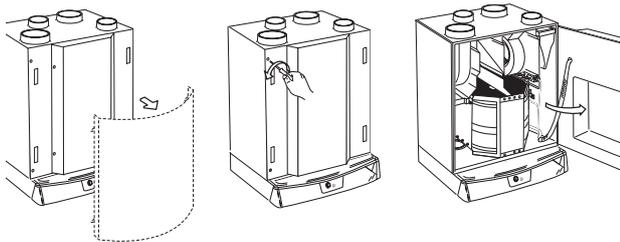


Figure 6. The front cover of the unit, if there is one, is dismantled, the screws on the door are unscrewed and the door is opened.

Cleaning of the heat exchanger

Check that the surface of the impeller is not covered in dust. Clean by using a vacuum cleaner or by blowing through using compressed air. If vacuum cleaning is not sufficient, apply a grease-dissolving fluid using a hand-spray pump and then blow clean using compressed air. **Note!** Acetone or a similar solvent must not be used.

Because of wear and tear, the drive belt and seals may need replacing. Check these for damage and replace if necessary. For designations, see the spare parts list on page 17.

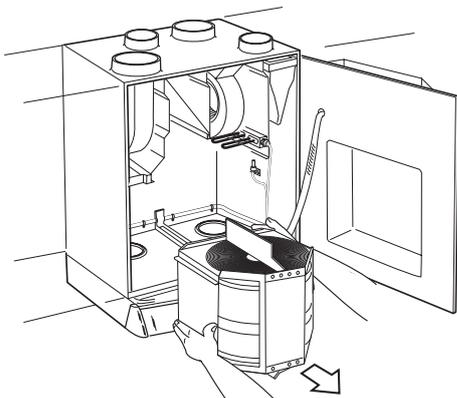


Figure 7. The heat exchanger package is removed from the unit. The electrical connection to the impeller motor is disconnected.

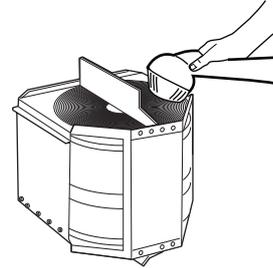


Figure 8. The heat exchanger is vacuum cleaned from both sides.

Cleaning the fans

Note that the fans must not be cleaned with water or other fluids but must only be vacuumed or brushed.

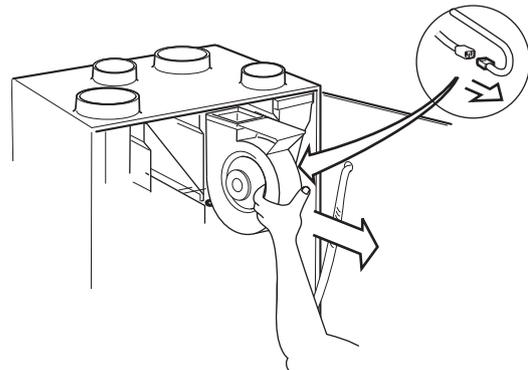


Figure 9. The fan is removed from the unit. The electrical connection is disconnected.

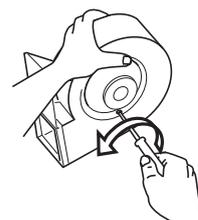


Figure 10. The impeller is removed from the fan housing by unscrewing the screws on the side of the fan housing.

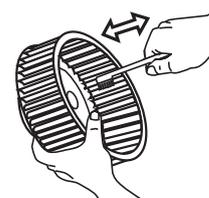


Figure 11. Clean the impeller housing and the fan blades with a brush.

NOTE! Do not damage any impeller housing balancers

NOTE! Ensure that no cables are trapped during reassembly.

Filter alarm, filter replacement

Filter alarm

The alarm light on the control panel flashes. Read more about filter replacement below.

Filter replacement

The filters for supply and exhaust air should normally be replaced every six months. In dirty areas more frequent filter changes may be required.

A built-in timer is normally set to provide a reminder about filter replacement after six months.

The steps below show how to replace the filter.



Figure 12. Pull out the power plug.

1. Disconnect the power to the unit, see figure 12.
2. Open the unit door by unscrewing the two screws on the front, see figure 13.

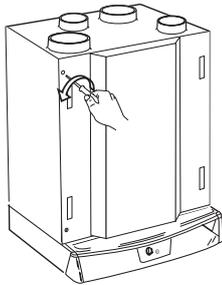


Figure 13. Opening the unit door.

3. Pull out filters A and B, see figure 14.

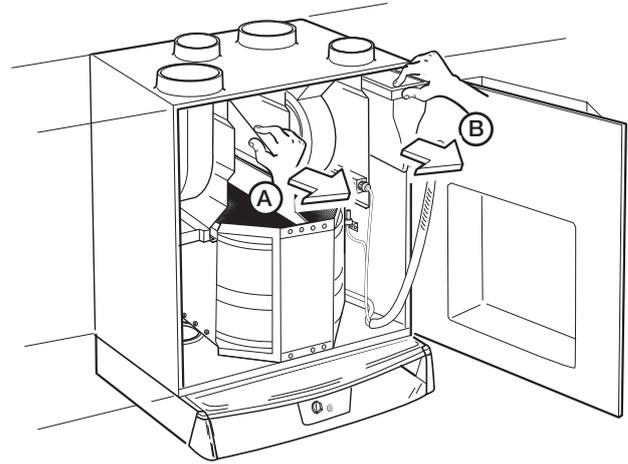
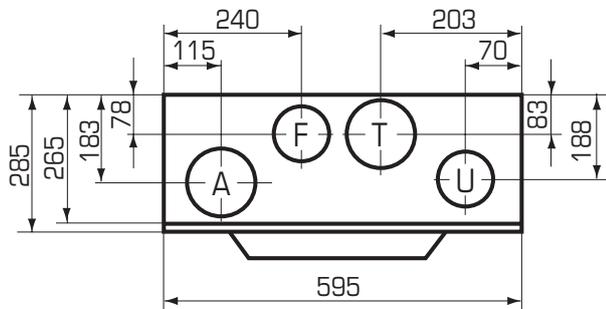


Figure 14. The position of the filters in the unit (the filters may be of a different type than the one shown in the picture).

4. Install new filters.
5. Close the unit door
6. Put the plug in the wall socket.
7. After replacing the filter, the timer should be reset by pressing the * button on the control panel for a minimum of 10 seconds (see page 5).

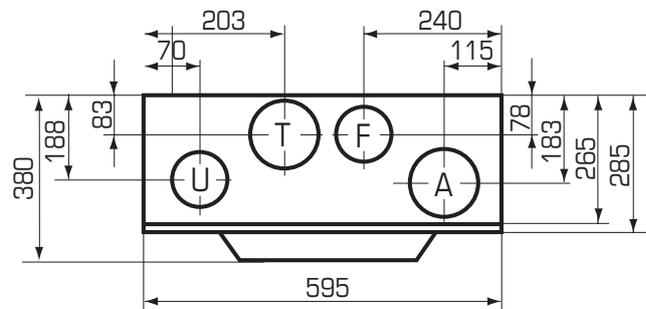
Installation - Dimensions, definitions

Dimensions



RDKS-1

Supply air and outdoor air to the right



RDKS-2

Supply air and outdoor air to the left

T = Supply air
 F = Exhaust air
 U = Outdoor air
 A = Extract air

Duct definitions

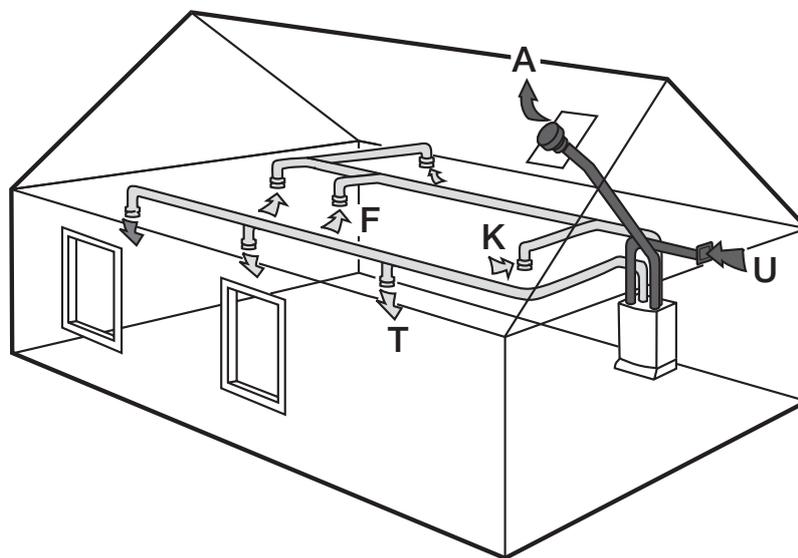


Figure 15. Duct definitions

T = Supply air
 F = Exhaust air
 U = Outdoor air
 A = Extract air
 K = Exhaust air device in kitchen (not above cooker).

Ducts U and F should be increased to $\varnothing 125$ mm as soon as feasible after the unit.

Duct connection, insulation of ducts

Note! During installation, the instructions relating to unit installation and duct insulation must be adhered to without deviation. Otherwise, there is a risk of condensation and moisture resulting in major damage.

Duct connection

Extract air from the unit must only be connected to a ventilation duct intended for the purpose. Connection must not be made to a smoke or gas flue. In the case of exhaust air ventilation in premises where a smoke or gas flue is used (for instance, an open fireplace or heating stove), an adequate supply air flow must be provided. A kitchen flue must be provided in accordance with applicable regulations.

We recommend a separate exhaust air device in the kitchen as well as an airtight forced air damper to ensure heat recovery from the air in the kitchen.

Insulation of ducts

In order for the installation of RDKS to be effective, it is very important that the installation of the ventilation ducts in the unit, as well as the installation of ducts through external walls containing insulation and vapour barriers, external roofs and joists, is executed in a professional manner. Otherwise there is a risk of condensation, resulting in damage due to moisture.

During replacement of older units, it is also necessary to ensure the quality of defective ducts and duct insulation.

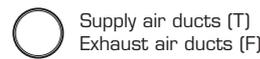
Supply air ducts (T) and exhaust air ducts (F), that is, ducts filled with warm air, which are located in unheated spaces, must be insulated. The insulation should be applied externally and have a wind-proof surface layer.

Supply air ducts (U) and extract air ducts (A), that is, ducts filled with cold air, which are located inside the building's vapour barrier, must be insulated and have a diffusion-proof (moisture-proof) surface layer. Given the high degree of heat recovery achieved by RDKS, the extract air too gets very cold and must be thermally insulated. Ducts which run alongside each other must also have a common vapour barrier.

For designations of the various ducts, please see figure 15 on the previous page. The wall on which the unit will be mounted must be well insulated.

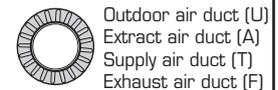
Ducts in warm spaces (indoors)

The temperature of the air in the duct is above +10 °C



No insulation

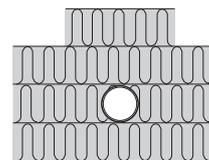
The temperature of the air in the duct is below +10 °C



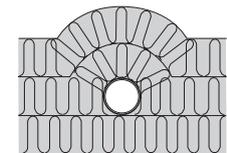
Fire insulated
30 mm mineral wool mat
with moisture-proof surface layer

Ducts in cold spaces

Supply air duct (T) Outdoor air duct (U)
Exhaust air duct (F) Extract air duct (A)

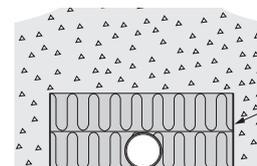


Moisture barrier



Moisture barrier

Ducts in loose wool



The sheet must be bound tightly to the duct.
Min thickness 10 cm.

Moisture barrier

Roof truss

Moisture barrier

Recommended insulation and vapour barriers for different types of ducting

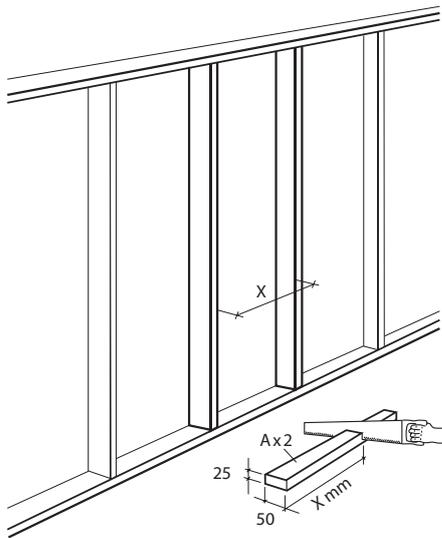
Type of ducting	Approved material and location	Duct in a warm space Insulation	Vapour barrier	Duct in a cold space Insulation	Vapour barrier
Extract air (flue) In kitchen Between joists and in the attic	Metal, accessible for inspection Metal	Armaflex AF3 19 mm Fire protection E15, mesh mat 30 mm	Yes Yes	– Fire-insulated E15, mesh mat 50 mm	– Only inside the buildings vapour barrier
Extract air (no flue) Between joists and in the attic From tumble dryer	Metal Metal Metal	Mineral wool 25 mm Mineral wool 30 mm Mineral wool 30 mm	Yes Yes No	– Mineral wool 30 mm Mineral wool 100 mm	– Yes No
Outdoor air In kitchen Between joists in the attic	Metal, accessible for inspection Metal	Armaflex AF3 19 mm Mineral wool 60 mm	Yes Yes	– Inside the buildings vapour barrier Mineral wool 60 mm,	– Only inside the buildings and vapour barrier
Supply air Exhaust air	Metal	No requirements		Mineral wool minimum 80 mm or equivalent.	No

All figures in this table are recommended values which apply in central Sweden. Please check for local variations.

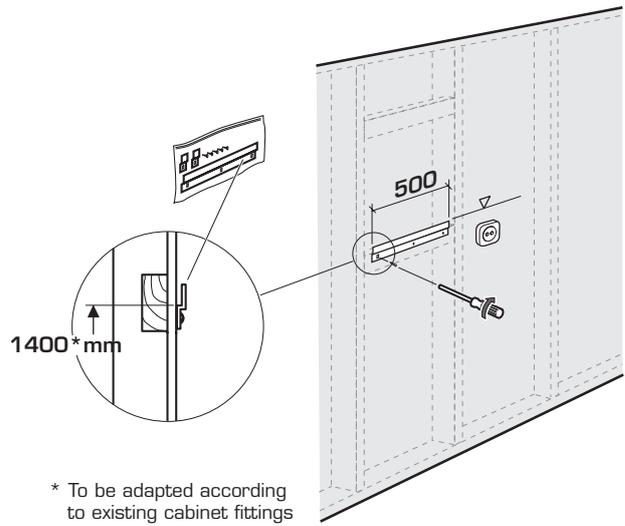
Installation of unit with accessories

If the unit is not installed immediately after delivery, the unit shall be stored in a protected place under cover and in its original packaging. The unit is intended for installation indoors in a warm space and must not be used without being connected to ducts. We recommend that the unit be lifted into place by two people wearing protective gloves.

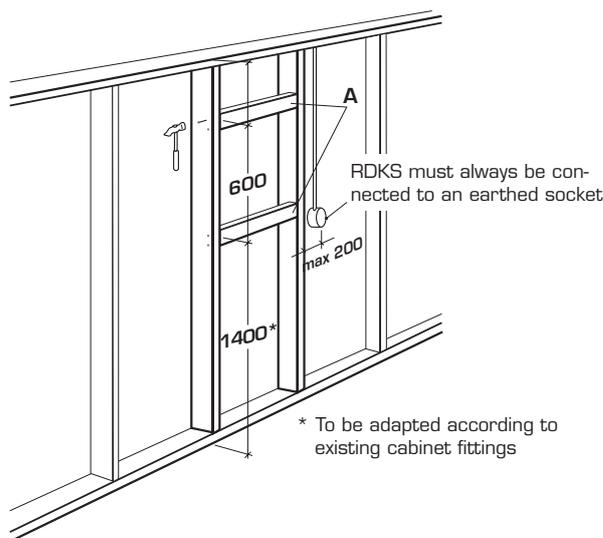
1



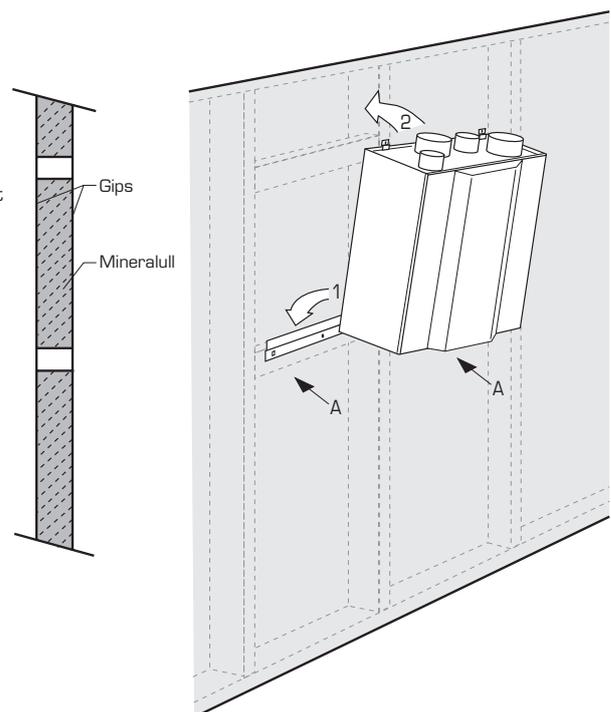
3



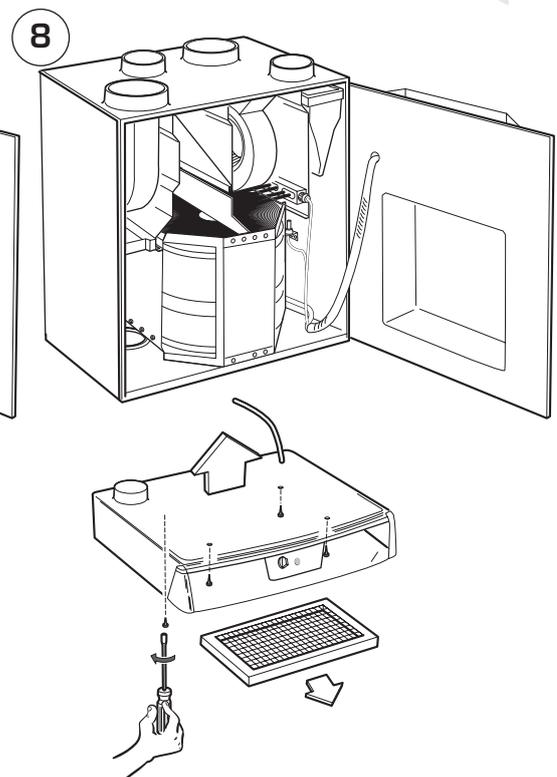
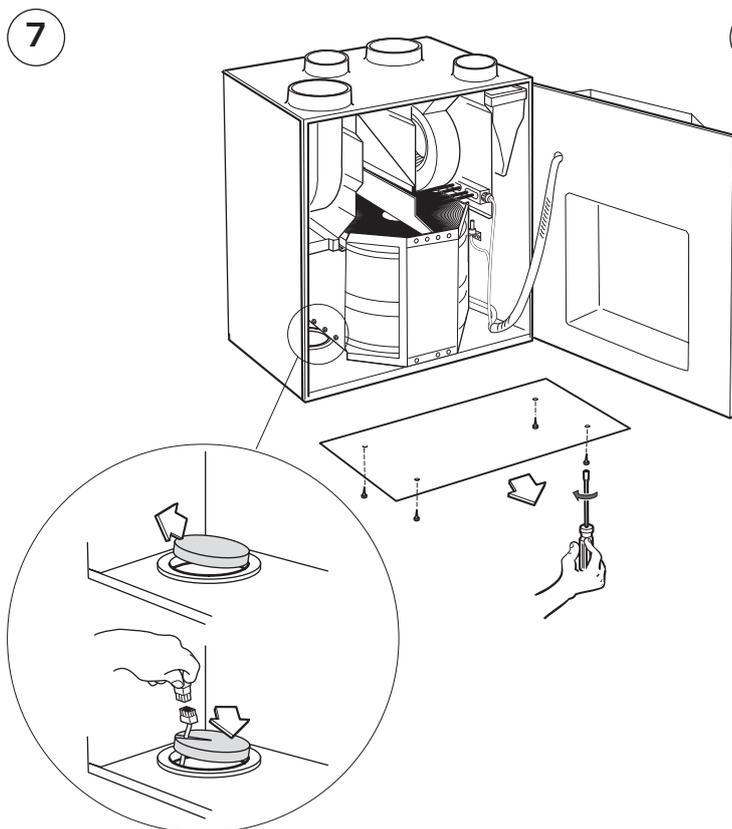
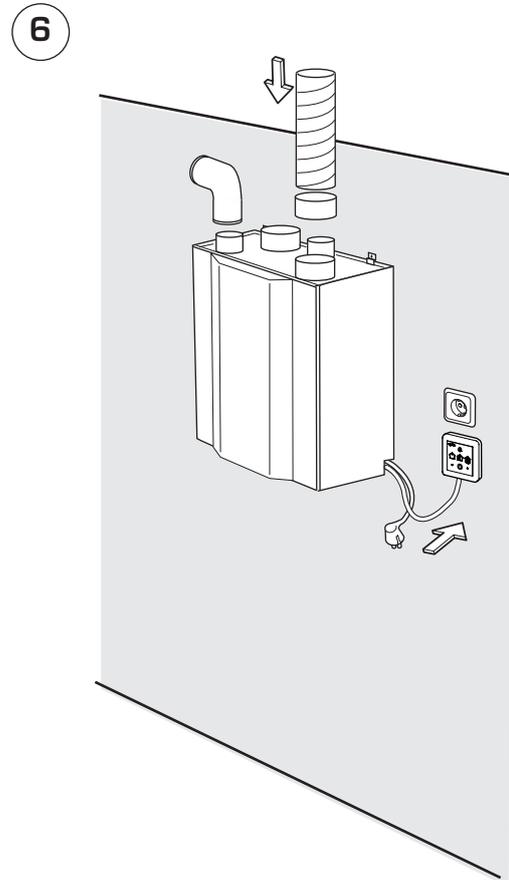
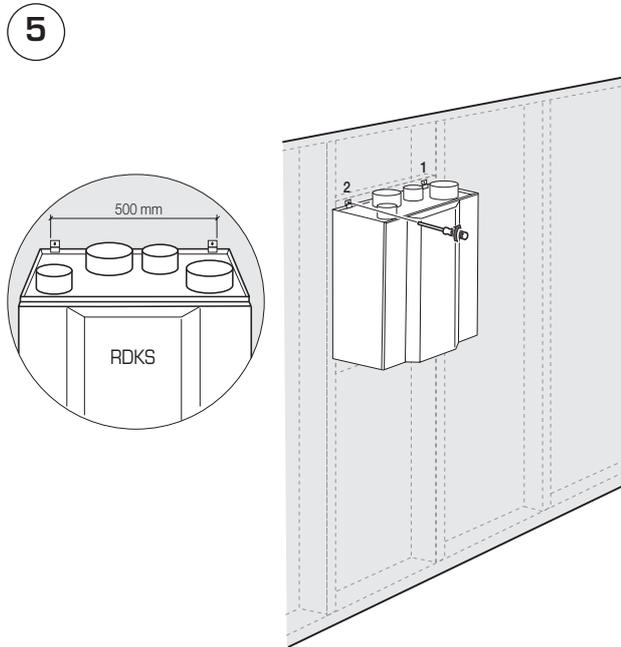
2



4

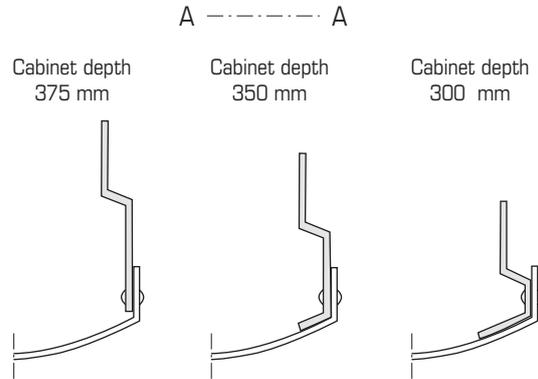
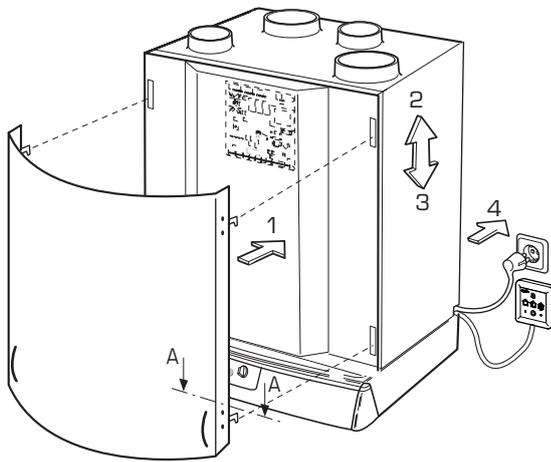


Installation of unit with accessories, cont.



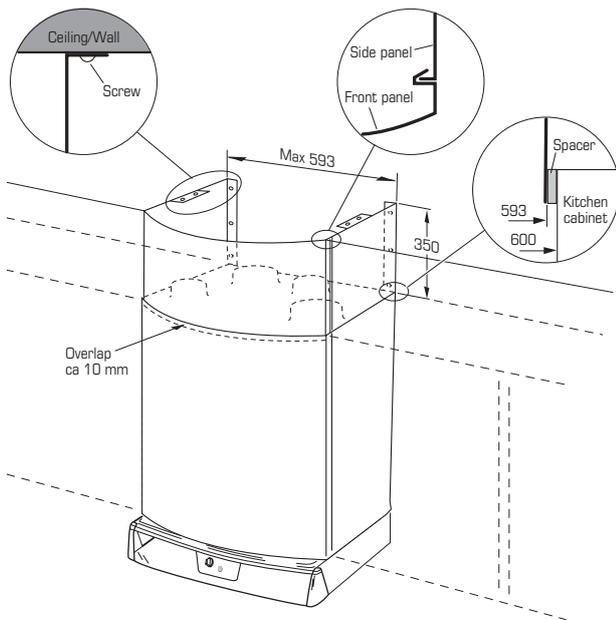
Installation of unit with accessories, cont.

9 Installation of front cover RDKZ-14-b-0-c-d-1 (accessory)



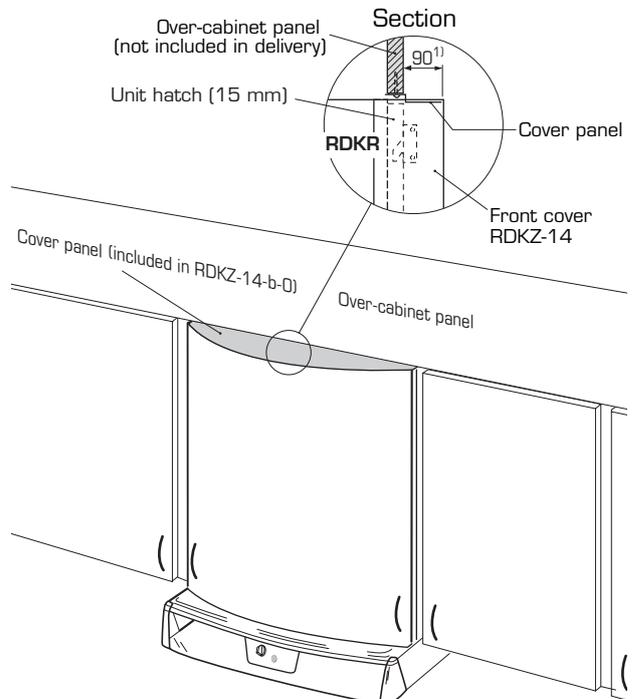
The brackets for the front cover can be bent or cut along a perforated line to fit different cupboard depths. They are then attached to the front cover using a blind-rivet tool.

10 Installation of front cover with extension unit towards the ceiling RDKZ-14-b-1-d-1 (accessory)



An extension unit for the front cover is available to order so that the front cover reaches all the way up to the ceiling, see figure above. It is placed inside the front cover, slightly overlapping. The height is 305 mm.

11 Installation of front cover RDKZ-14 with flyshelf above the kitchen cabinets



¹⁾ The measurement 90 applies to the distance from the outside of the unit front cover to the outer edge of the curved cover plate.

Adjustment, commissioning

Functions

- Fan speeds can be adjusted independently of each other. All speeds in both fans are adjustable.
- Normally, only normal speed is required, HOME mode, adjusted to meet the design ventilation rates.
- Users can choose between AWAY mode, HOME mode for normal ventilation or FORCED mode when there is an increased need for ventilation. Forced ventilation reverts to the previous mode after 120 minutes. In addition, a further forced flow is available by using the knobs on the cooker hood. This operating mode is adjusted separately.
- The controller card regulates the rotary heat exchanger and electric batteries to achieve the required supply air temperature. The heaters and fans have built-in protection devices to prevent overheating.
- The controller card also regulates automatic defrosting and, through a built-in timer (6 months), indicates when it is time to replace the air filters.
- Facility to regulate air flows from external devices, for instance cooker hood. When the cooker hood damper is open, the fan speeds are adjusted to forced flow.

Adjustment of flow and temperature

Adjustment of air flow and temperature should only be carried out by an authorised person. The reason for this is regulations and is due to the fact that alterations may increase energy consumption or interfere with the air flow and pressure balance in the building, thereby seriously damaging building components if the adjustment is performed incorrectly.

General

The unit is equipped with 4 measurement points in the unit door inside the front cover, see figure 16 below. Measuring the pressure difference, p_m in Pa over the impeller gives the total supply air and exhaust air flows. The air flow q (l/s) is determined using the following formula:

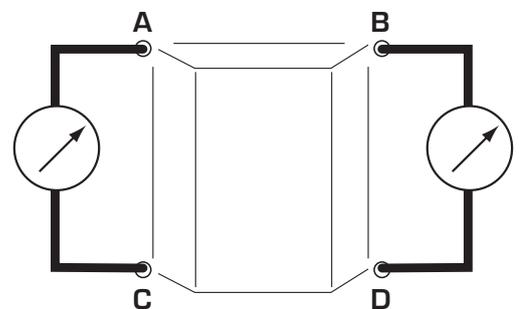
$$q = 0.73 \times p_m$$

If the total flows in the preset mode do not conform with the desired flows, they can be adjusted. For more information, see pp. 15 - 16.

Planning advice

In a rotary heat exchanger it is not possible to completely eliminate leakage between supply air and exhaust air. Air leakage at the seals is minimised by ensuring that the pressure difference between the supply air and exhaust air ducts is as small as possible.

The pressure difference between the supply air ducts and exhaust air ducts on both sides of the exchanger should be different depending on whether it is a right-hand or left-hand design, see figure 16 below. If required, a shut-off damper should be installed on the exhaust air side to achieve this.



	Supply air on the right-hand side of the unit	Supply air on the left-hand side of the unit
Supply air flow	D - B	C - A
Exhaust air flow	C - A	D - B
Pressure difference	B > A D > C	A > B C > D

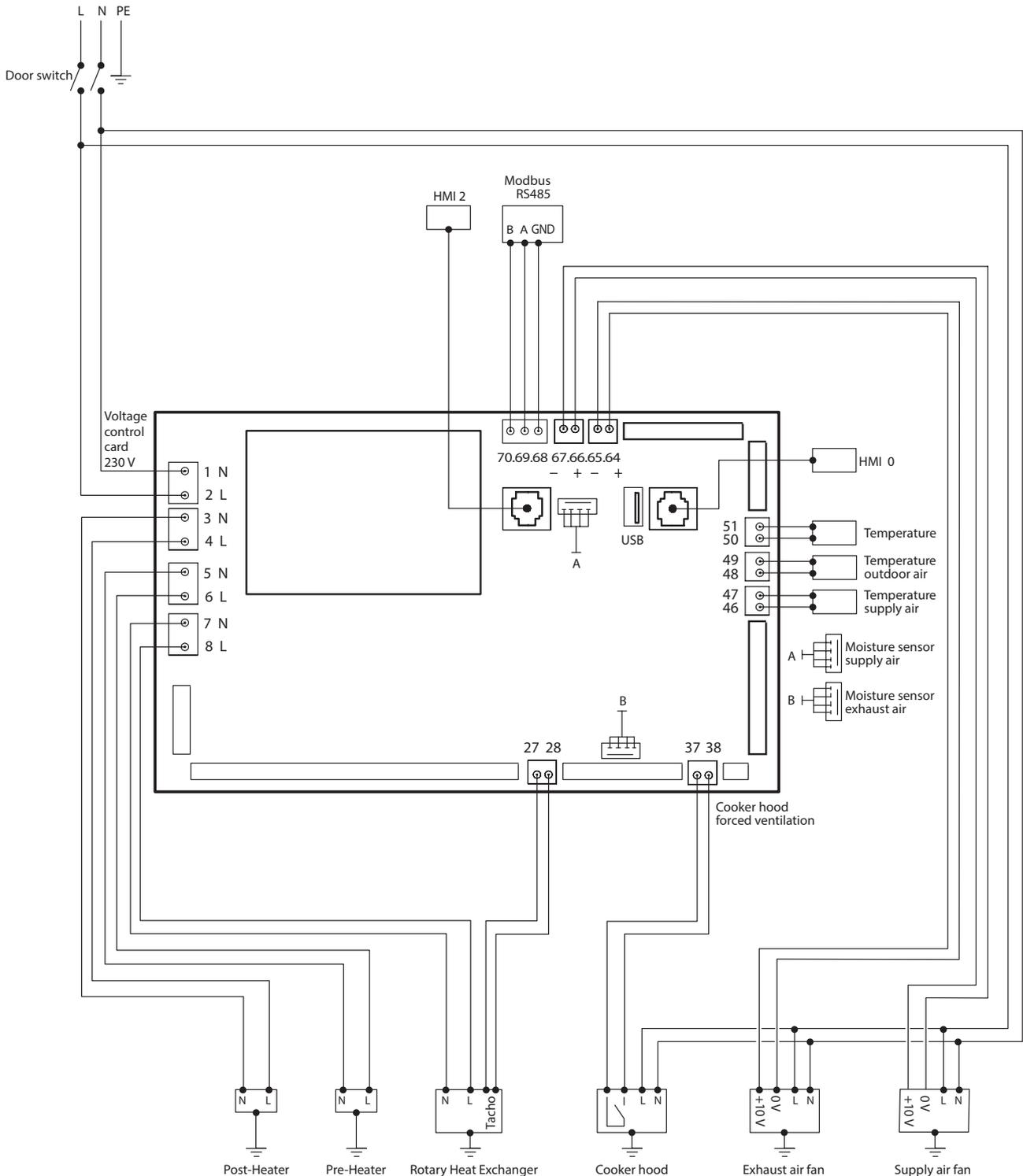
Figure 16. Measurement points for measuring differential pressure and pressure balance over the heat exchanger.

NOTE! Flow deviations of up to 25% may occur using this method of measuring on a unit with rotary heat exchanger. Used as a flow indication, but control measurement to be performed in the supply and exhaust air devices.

Electrical connection and wiring diagram

Right-hand version (RDKS-1)

Electrical connection and wiring diagram for RDKS-1 - right-hand version. Diagram for RDKS-2 - left-hand version is not shown. However, this is a mirror image of the one shown.



Adjustment of fan speeds and temperature setpoint value

Using the control panel for adjustments

The fan speeds in the modes HOME, AWAY, FORCED and cooker hood mode as well as the temperature setpoint value are adjusted using the following steps on the control panel:

1. Enter 'Display' mode by pressing both * and # simultaneously for approx. 3 seconds.	* + #
2. In Display mode the parameter values can be read by counting the number of flashes in the AWAY, HOME and FORCED lights. The parameter number flashes in the alarm symbol. See List of parameters on page 16. Switch between parameters using * (reduce parameter number) and # (increase parameter number). Example: To read the HOME speed of the exhaust air fan, use * and # to go to parameter number 2. When parameter 2 is selected, the alarm light should repeatedly flash red 2 times, followed by a short pause.	# Increase * Reduce
3. To change the parameter value, press '*' and '#' simultaneously again for approximately 3 seconds until the alarm light emits a steady glow.	* + #
4. Using * (reduce value) and # (increase value), the parameter value can now be adjusted. The parameter value is illustrated by the number of flashes in the green lights for AWAY (hundreds), HOME (tens) and FORCED (units). Example: To increase the value of the HOME speed of the exhaust air from 55% to 65%, press '#' 10 times. Then confirm that the HOME symbol flashes 6 times, followed by the FORCED symbol flashing 5 times.	# Increase * Reduce
5. Confirm the changes by pressing the ARROW button.	
6. The above procedure is repeated for all fan operating modes, as per the table 'List of parameters'. The temperature setpoint value is set using the above procedure using parameter number 1.	

Changing the temperature setpoint value

To change the set temperature setpoint value, use either * or # in Operating mode. By pressing on one of these buttons the temperature setpoint value changes.

The value is shown as flashes in the AWAY, HOME and FORCED symbols as per the table on page 16 - Adjustment mode.

* reduces the temperature setpoint value by 1°

increases the temperature setpoint value by 1°

Control panel and List of parameters

Control panel

Symbol	Operating mode	Read mode	Adjustment mode
	Flashing alarm symbol indicates filter alarm	Number of flashes on the alarm symbol indicates which parameter is shown, see List of parameters below	When the lamp stays lit, the panel is in programming mode and the parameter value can be changed
	Unit operating in AWAY mode	Flashing indicates value in hundreds	Flashing indicates value in hundreds
	Unit operating in HOME mode	Flashing indicates value in tens	Flashing indicates value in tens
	Unit operating in FORCED mode for 120 minutes	Flashing indicates value in units	Flashing indicates value in units
	Change operating mode between; AWAY, HOME or FORCED	Revert to operating mode	Confirm parameter value and revert to operating mode
* or #	To set the adjustment mode for temperature setpoint value	—	* reduces the temperature setpoint value by 1°. # increases the temperature setpoint value by 1°
* + # min. 10 sec	Press * and # simultaneously for around 3 seconds to get the Display mode	For the selected parameter, press * and # simultaneously for around 3 seconds to enter the Adjustment mode for the parameter in question	—

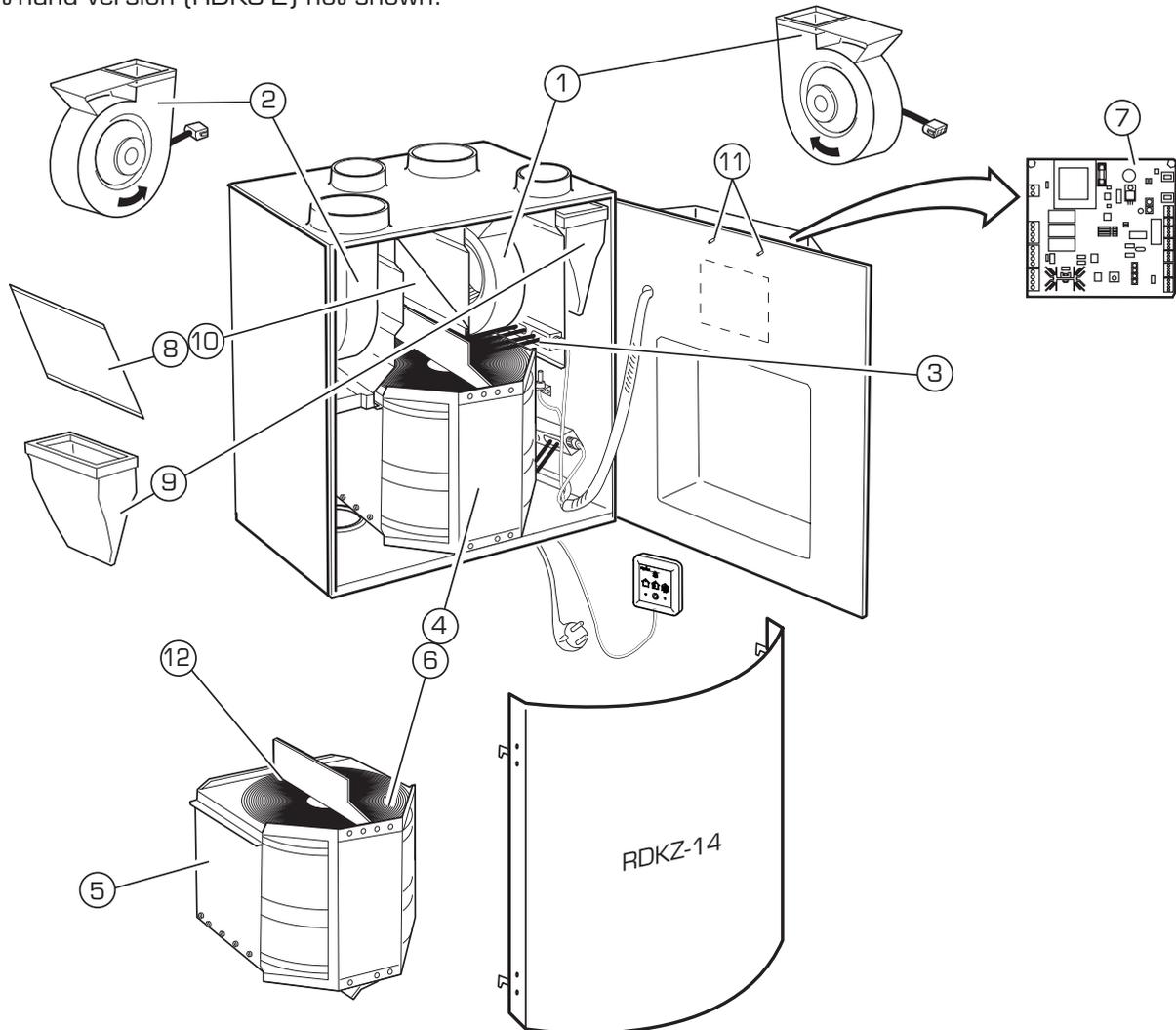
List of parameters

Parameter No	Function
1	Temperature setpoint value
2	Fan setpoint value exhaust air fan, HOME mode
3	Fan setpoint value exhaust air fan AWAY mode
4	Fan setpoint value FORCED mode
5	Fan setpoint value exhaust air fan. Forced mode via cooker hood
6	Fan setpoint value supply air fan HOME mode
7	Fan setpoint value supply air fan AWAY mode
8	Fan setpoint value supply air fan FORCED mode
9	Fan setpoint value supply air fan. Forced mode via cooker hood

Spare parts

Right-hand version (RDKS-1)

Left-hand version (RDKS-2) not shown.

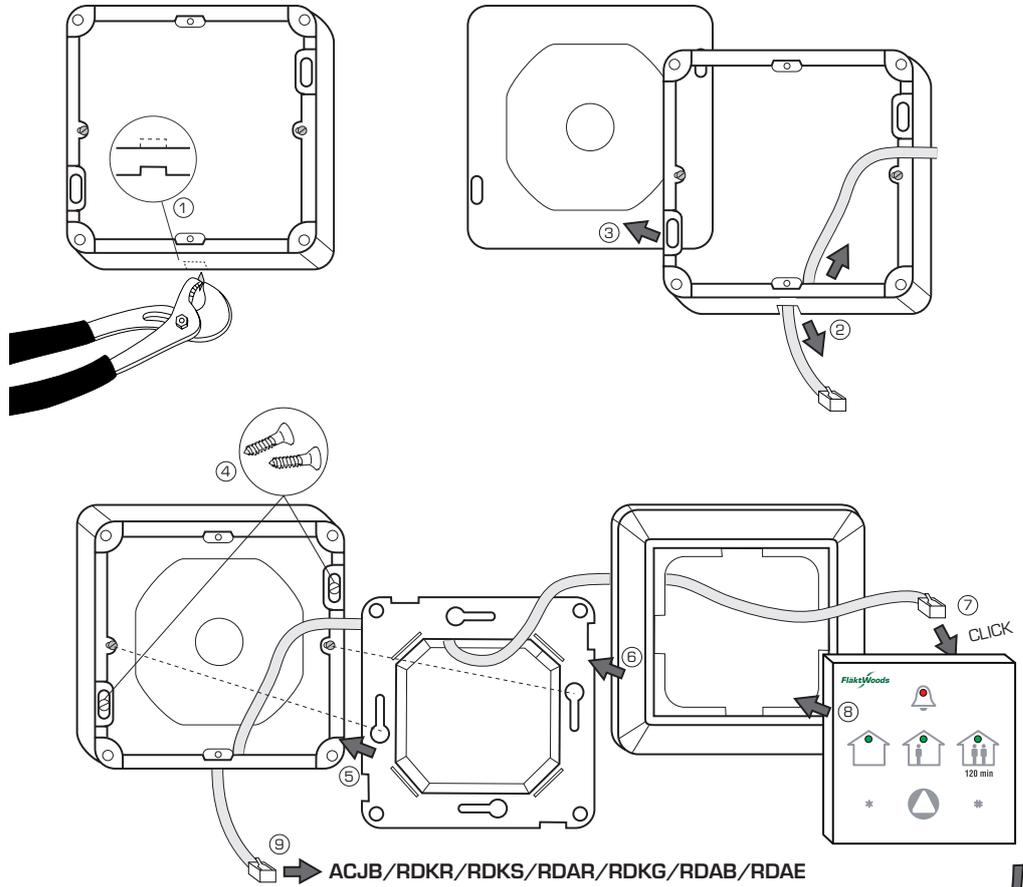
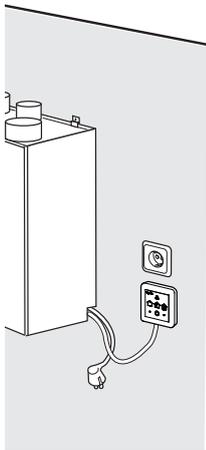


If the connection cable is damaged, it must be replaced by the manufacturer, an authorised service company or similar qualified personnel in order to avoid danger.

Pos.	Designation	Description	Used in	No	Remark
1	RDKR-99-01-1	Supply air fan, right-hand unit	RDKS-1	1	
1	RDKR-99-01-2	Supply air fan, left-hand unit	RDKS-2	1	
2	RDKR-99-02-1	Exhaust air fan, right-hand unit	RDKS-1	1	
2	RDKR-99-02-2	Exhaust air fan, left-hand unit	RDKS-2	1	
3	RDKR-99-03	Electric battery (pre-heating and post-heating)	RDKS-1.../RDKS-2...	1	
4	RDKS-99-02	Impeller, complete	RDKS-1.../RDKS-2...	1	
5	RDKR-99-08	Drive belt, impeller	RDKS-1.../RDKS-2...	5	
6	RDKS-99-01	impeller motor	RDKS-1.../RDKS-2...	1	
7	RDKS-99-03	Controller card	RDKS-1.../RDKS-2-a-b-c-d-1	1	
8	RDKG-99-14	Filter pad G3 (1)	RDKS-1.../RDKS-2...	1	
9	RDKG-99-15	Bag filter M5 (1)	RDKS-1.../RDKS-2...	1	
9	RDKG-99-16	Bag filter F7 (1)	RDKS-1.../RDKS-2...	1	
10	RDKG-99-22	Filter set G3, without frame	RDKS-1.../RDKS-2...	10	
11	RDKS-99-04	Temperature sensor	RDKS-1.../RDKS-2...	3	
12	RDKR-99-14	Brush strip	RDKS-1.../RDKS-2...	1	

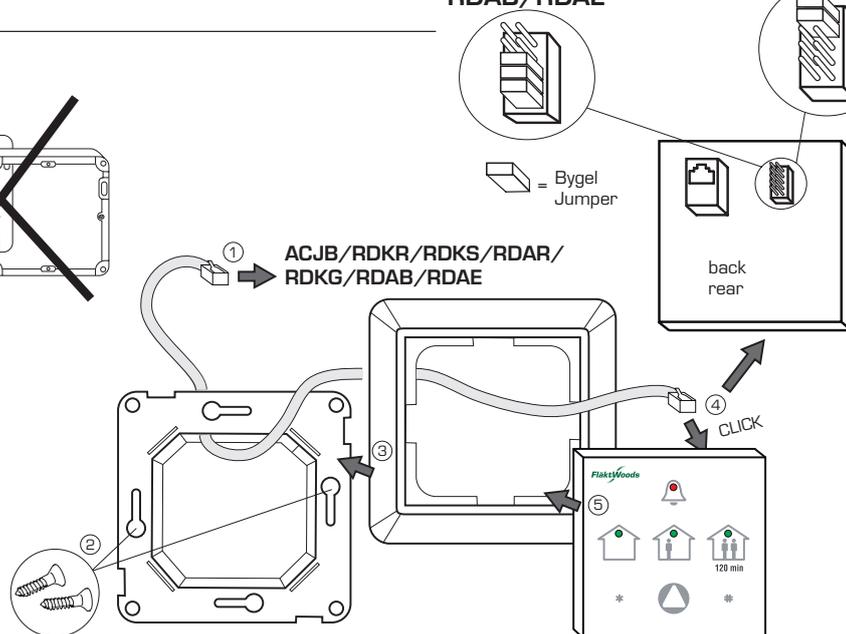
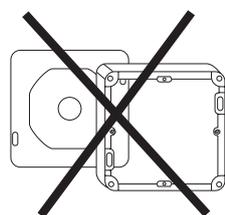
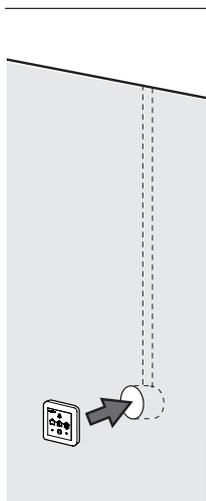
Installation of control panel RDKZ-41

 The power must be disconnected during installation/ dismantling of control panel RDKZ-41



ACJB/RDKG/RDKS/
RDAB/RDAE

RDKR/RDAR



FWG_Housing_RDKZ41 Instructions and maintenance_LIN_201111_8546

EU confirmation of conformity



Bilaga II A

Försäkran om maskinens överensstämmelse

med EG:s Maskindirektiv **2006/42/EG**,
EG:s EMC Direktiv **2004/108/EG** ,
EG:s Lågspänningsdirektiv LVD **2006/95/EG**

Tillverkaren Fläkt Woods AB
Gesällgatan 17
745 39 Enköping

Försäkrar härmed under eget ansvar att:

Produkten **RDKS** vilken levereras med komplett styrsystem överensstämmer med Och uppfyller de grundläggande hälso- och säkerhetskrav på konstruktion och tillverkning av maskiner och säkerhetskomponenter som ställs i rubricerade direktiv under förutsättning att de installeras i anläggning enligt medlevererad instruktion. Om ändringar görs på produkten blir denna försäkran ogiltig.

Maskinen är konstruerad och tillverkad i enlighet med följande standarder:

Maskinsäkerhet	EN ISO 12100-1, EN ISO 12100-2
Elsäkerhet	EN 60204-1, 60335-1,-2
Elektromagnetisk kompatibilitet	EN 61000-6-1,-3
Skyddsavstånd	EN 13857:2008
Strålning (människa/ maskin)	EN 50366:003

För produkten har riskanalys upprättats enligt krav i Maskindirektivet.

Behörig **Att sammanställa teknisk dokumentation:**
Ann-Sofie Andersson
Gesällgatan 17
745 39 Enköping

Försäkran gäller endast om installation av aggregatet skett enligt Fläkt Woods instruktioner och förutsatt att inga ändringar gjorts på aggregatet

Enköping 2013-01-01

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