

## ***Residential ventilation for single-family houses***



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Sustainable Solutions Engineered to Save

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# Single-family houses

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# General

The purpose of ventilation is to provide us with healthy fresh air indoors. It removes old, stale air and takes in clean, fresh air. Of course its main task is to ensure that the air indoors is healthy to breathe. Nowadays ventilation is also focused on energy, on saving energy costs by using ventilation with heat recovery.

## Ventilation in homes - technical solutions

There are three key types of technical solution for ventilation. Naturally there are variations within these but the three main types are:

- Natural ventilation systems
- Mechanical exhaust air systems
- Balanced ventilation systems containing supply air and exhaust air fans. These are also called mechanical supply and exhaust air systems.

Today the last two systems are almost always combined with some form of heat recovery. Apart from natural ventilation, good control systems are needed for all ventilation systems.

### Natural ventilation

The principles of natural ventilation are simple. Warm air in the house rises and leaves through air ducts creating a partial vacuum in the building.

This partial vacuum sucks in new air from outside through gaps in the structure of the house. The greater the temperature difference between outdoor and indoor air, the greater the air volume replaced.

However, natural ventilation, even when it is working well, has some unwelcome effects.

Airflows great enough to provide healthy air indoors waste energy as heated air escapes literally straight up the chimney. Remedying this by reducing the air flow has a negative effect on the indoor environment making the air stale. Another problem with natural ventilation is that it cannot be controlled. The air is also not cleaned, one cannot install a filter in all the gaps.

### Mechanical exhaust air systems

Mechanical exhaust air ventilation is just that. Air is sucked out of the home using fans. Air is sucked out of the kitchen, toilets, bathrooms and utility rooms and replaced in the same way as for houses with natural ventilation, through outdoor air terminal devices, windows and leaks in the building. However, one difference is that air is generally taken in through vents or airing panels, not through gaps under doors or other leaks. It is important not to remove air from bedrooms and reception rooms as the air would then be flowing in the wrong direction. This would result in cooking smells and humidity spreading throughout the home. Mechanical exhaust air ventilation is popular because it is cheap and easy to install.

However, in the past mechanical exhaust air systems have often had the same disadvantages as natural ventilation with outdoor air, it is not cleaned and it is cold. Nowadays supply air terminal devices in outer walls can be fitted with filters that remove the worst dirt. Careful design and positioning of these devices can counteract draughts.

## Balanced ventilation systems

The most complete form of ventilation system is the balanced ventilation system.

Fans control both the supply and exhaust air, this achieves full control of the volume of fresh air, which does not occur in the other two systems. In fairly well sealed houses this means that almost all supply air comes through supply air terminal devices as the system is not based on a partial vacuum. This also means that it is easy to clean the air, filters are installed on the air intakes. These systems are normally more expensive to buy but do allow lower energy consumption and better comfort. Today these systems are both effective and quiet and there is plenty of research showing that if one wants an installation with low energy consumption and good indoor climate, one needs a balanced ventilation system. Low energy use requires heat recovery and energy efficient products such as fans, filters and heat exchangers. A good balanced ventilation system is both stable and flexible.

Stability means that the system must work as intended, irrespective of what happens in the house.

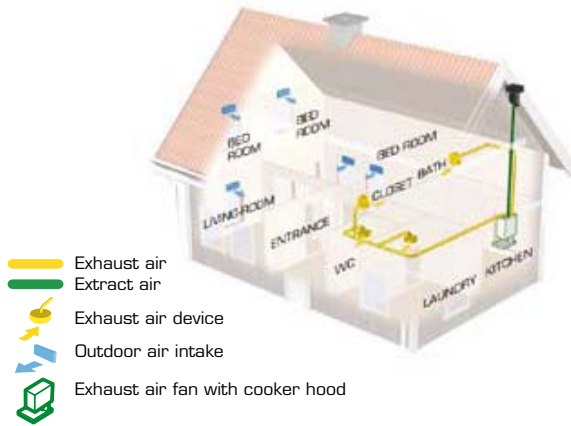
Flexibility means that the ventilation can be controlled to meet requirements. If there are more people in the house more ventilation is needed than if the house is empty. Such on-demand control of ventilation is becoming ever more common. This, and heat recovery, reduce energy consumption and lower the operating costs of the house. Instead of releasing the used, warm air straight into the atmosphere, it passes a heat recovery unit in which the exhaust air heats the cold outdoor air as it comes in. In new installations, heat recovery is often a matter of course.

## Control systems

Control systems have a crucial effect on the function of the installation and the air quality in the house. A good control system will maintain set functional requirements for a long time with a minimum of energy use. Fläkt Woods has control systems for the various systems.

Source: Indoor Air - The Silent Killer

# Mechanical exhaust air, balanced ventilation



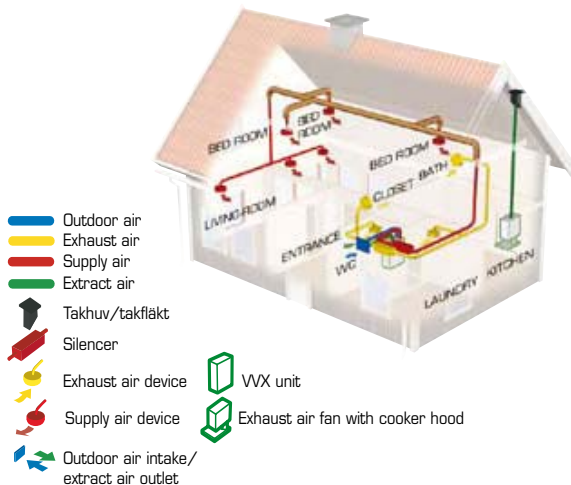
## Mechanical exhaust air ventilation

Mechanical exhaust air ventilation is just that. Air is sucked out of the home using fans. Outdoor air is often taken in through slot ventilators in the window frames. The warm used air is sucked out through exhaust air vents in wet rooms and through the kitchen extractor. These exhaust air vents are connected by a ducting system from which the air is expelled through a roof cowl using an exhaust air fan.

The disadvantage is that outdoor air is untreated when it is taken in, this causes cold draughts when it is cold outside. This leads to the outdoor air vents being closed and never reopened which results in the ventilation system ceasing to work. Also the outdoor air is not filtered when it comes into the home.

### Summary of mechanical exhaust air systems

Function	Yes	No	Comment
Control of air change rate	X		
Low energy consumption.		X	In modern systems energy consumption can be low as heat recovery is possible.
On-demand control	X		
Filtration of outdoor air		X	In modern systems air intakes can be fitted with filters.
Good comfort		X	Risk of noise and draughts.
Noise from outside	X		Supply air vents can propagate noise which can be a big problem in noisy environments.
Good air quality	X		As long as the ground does not contain radon and the outdoor air is not polluted.



## Balanced ventilation with heat recovery

The most complete form of ventilation system is the balanced ventilation system with heat recovery. In a supply and exhaust air system with heat recovery the outdoor air vents are positioned in living rooms and bedrooms and the exhaust air vents in the bathroom, toilet and utility room. This system makes use of the heat in the used ventilation air, air that would otherwise be released straight out into the cold.

The heated indoor air passes through a heat recovery unit before being expelled and is used to heat the incoming outdoor air. This saves energy while providing a better climate indoors. So it is possible to control the air quality and the air volume coming into the home.

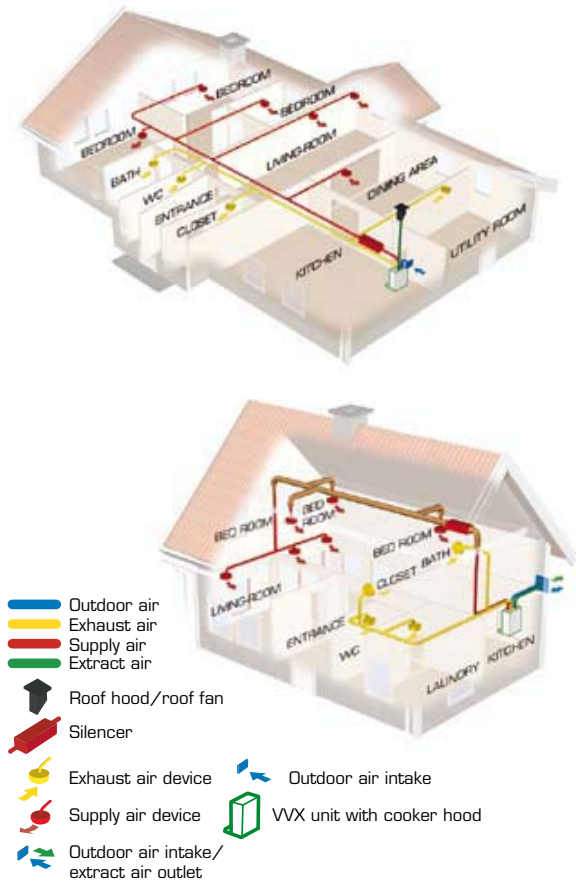
Balanced ventilation systems also have effective filters which filter out dust and pollen from the outdoor air.

### Summary of balanced ventilation systems

Function	Yes	No	Comment
Control of air change rate	X		Both supply and exhaust air flows can be controlled easily.
Low energy consumption.	X		Heat recovery and on-demand control save energy.
On-demand control	X		Provides better air quality during periods of high contamination.
Filtration of outdoor air	X		Filters should be changed twice a year.
Good comfort	X		Draught problems are avoided as the supply air is preheated.
Noise from outside		X	Ducts are fitted with silencers.
Good air quality	X		On-demand control ensures this.

Source: Indoor Air - The Silent Killer

# Balanced ventilation 0 - 130 m<sup>2</sup> One storey/Two storey house



## Minimaster system

### RDKG with cooker hood CPDK or RDKR heat recovery unit with cooker hood CPDJ

The Minimaster is a balanced ventilation system for ventilation with heat recovery in houses and apartments. The RDKG or RDKR heat recovery unit with cooker hood CPCC/CPDC or CPDJ is used as the principal unit in the system.

- Kitchen based unit:  
Simple installation located in a warm area, easily accessible for maintenance and service.
- Comfort advantages of the balanced ventilation system  
Preheated supply air is distributed to all rooms. No cold draughts caused by replacement air from outside.
- Effective energy recovery
- Energy efficient defrosting
- With a test socket for air flow measurement.
- Allows the effective filtration of outdoor air and exhaust air.

### The following products are included:

RDKG or RDKR, wall mounted units in the kitchen

RDKG



Cooker hood CPDK



RDKR



Cooker hood CPDJ



## Minimaster temperature efficiency

Air flow l/s	Living space <sup>2</sup>	Temperature efficiency*	
		RDKG	RDKR
30	85	66	83
35	100	64	82,5
40	115	61	82
45	130	60	81,5

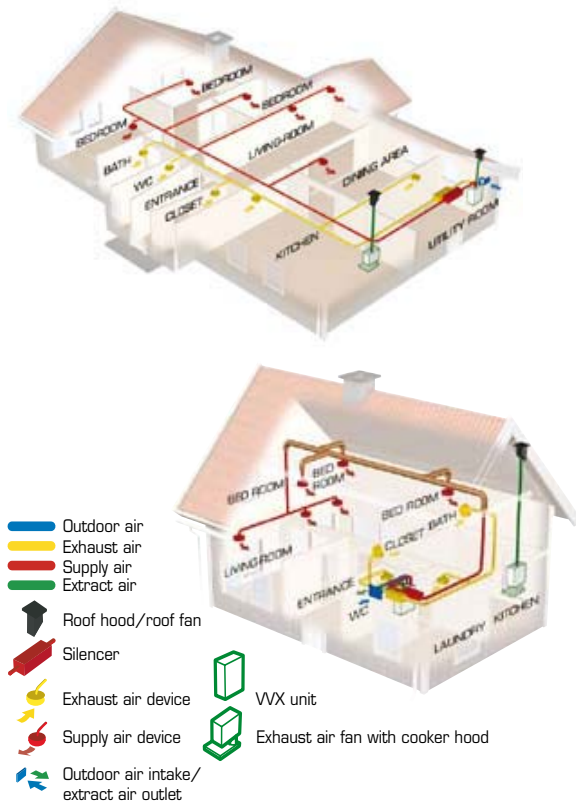
## Energy saved using heat recovery

Air flow l/s	Living space m <sup>2</sup>	Energy saving* for heating southern Sweden kWh/year		Energy saving* for heating mid Sweden kWh/year		Energy saving* for heating northern Sweden kWh/year	
		RDKG	RDKR	RDKG	RDKR	RDKG	RDKR
30	85	2830	3100	2920	3290	3920	4410
35	100	3190	3490	3310	3800	4390	5110
40	115	3520	4070	3700	4370	4850	5800
45	130	3880	4590	4010	4910	5370	6500

\* The following annual temperature averages have been used in calculations:  
 Southern Sweden 7.1 °C    Mid Sweden 6.6 °C    Northern Sweden 2.5 °C

Energy savings are based on a comparison with a mechanical exhaust air system with an equivalent air flow.

# Balanced ventilation 131 - 155 m<sup>2</sup> One storey/Two storey house



## Minivent system

### RDKG, RDKR or RDAR ventilation unit with built-in control unit

The Minivent system is a balanced ventilation system for ventilation with heat recovery in houses, apartments and small commercial premises. RDKG, RDKR or RDAR ventilation unit with built-in control unit is used as the principal unit in the system.

- Location in warm spaces in homes or commercial premises.
- Easily accessible for maintenance and service.
- Allows the effective filtration of outdoor air and exhaust air.
- Advantages of the balanced ventilation system: Pre-heated supply air is distributed to all spaces that are in use more than temporarily.
- No cold draughts caused by replacement air from outside.
- Effective heat recovery
- Energy efficient defrosting.
- With a test socket for air flow measurement.
- Can be equipped with remote fan speed control .

### The following products are included:

RDKG or RDKR, wall mounted units in kitchens or utility rooms

RDKG



RDKR



RDAR



### Minivent temperature efficiency:

Air flow l/s	Living space <sup>2</sup>	Temperature efficiency*		
		RDKG	RDKR	RDAR
30	85	66	83	-
40	115	61	82	84
50	145	58	81	84
60	170	56	80	83
80	230	-	-	82
100	285	-	-	81
120	345	-	-	80
140	400	-	-	78

### Energy saved using heat recovery

Air flow l/s	Living space m <sup>2</sup>	Energy saving* for heating southern Sweden kWh/year			Energy saving* for heating mid Sweden kWh/year			Energy saving* for heating northern Sweden kWh/year		
		RDKG	RDKR	RDAR	RDKG	RDKR	RDAR	RDKG	RDKR	RDAR
30	85	2830	3100	-	2920	3290	-	3920	4410	-
40	115	3520	4070	4250	3700	4370	4500	4850	5800	5800
50	145	4200	5080	5250	4340	5460	5600	5820	7260	7300
60	170	4850	6050	6250	5040	6450	6650	6840	8640	8750
80	230	-	-	8300	-	-	8800	-	-	11650
100	285	-	-	10400	-	-	10900	-	-	14500
120	345	-	-	12250	-	-	12900	-	-	17250
140	400	-	-	14100	-	-	14800	-	-	19950

\* The following annual temperature averages have been used in calculations:

Southern Sweden 7.1 °C

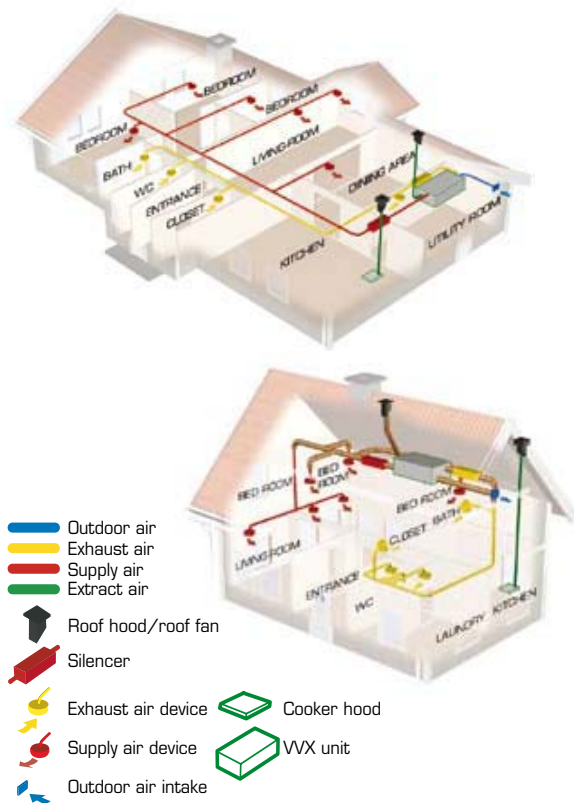
Mid Sweden 6.6 °C

Northern Sweden 2.5 °C

Energy savings are based on a comparison with a mechanical exhaust air system with an equivalent air flow.

# Balanced ventilation 156 - 280 m<sup>2</sup>

## One storey/Two storey house



### Minivent temperature efficiency:

Air flow l/s	Living space <sup>2</sup>	Temperature efficiency*	
		RDAB-01	RDAR
40	115	67	84
60	170	60	83
80	230	56	82
100	285	54	81
120	345	-	80
140	400	-	78

### Energy saved using heat recovery

Air flow l/s	Living space m <sup>2</sup>	Energy saving* for heating southern Sweden kWh/year		Energy saving* for heating mid Sweden kWh/year		Energy saving* for heating northern Sweden kWh/year	
		RDAB-01	RDAR	RDAB-01	RDAR	RDAB-01	RDAR
40	115	3950	4250	4100	4500	5650	5800
60	170	5550	6250	5800	6650	7820	8750
80	230	7010	8300	7300	8800	9750	11650
100	285	8330	10400	8650	10900	11500	14500
120	345	-	12250	-	12900	-	17250
140	400	-	14100	-	14800	-	19950

\* The following annual temperature averages have been used in calculations:  
 Southern Sweden 7.1 °C    Mid Sweden 6.6 °C    Northern Sweden 2.5 °C

Energy savings are based on a comparison with a mechanical exhaust air system with an equivalent air flow.

### Rexovent system

#### Ventilation unit RDAB-01 or RDAR

The Rexovent system is a balanced ventilation system for ventilation with heat recovery in houses and small commercial premises. It is based on the RDAB-01 or RDAR ventilation unit located in a cold space.

The system provides effective ventilation for all rooms and recycles the heat in the used air leaving the house. In addition it contains a number of components customised for the system.

- External insulation for cold spaces.
- Easily accessible for maintenance and service.
- Advantages of the balanced ventilation system: Preheated supply air is distributed to all spaces that are in use more than temporarily.
- No cold draughts caused by replacement air from outside.
- Effective heat recovery
- Energy efficient defrosting.
- With a test socket for air flow measurement.

#### The following products are included:

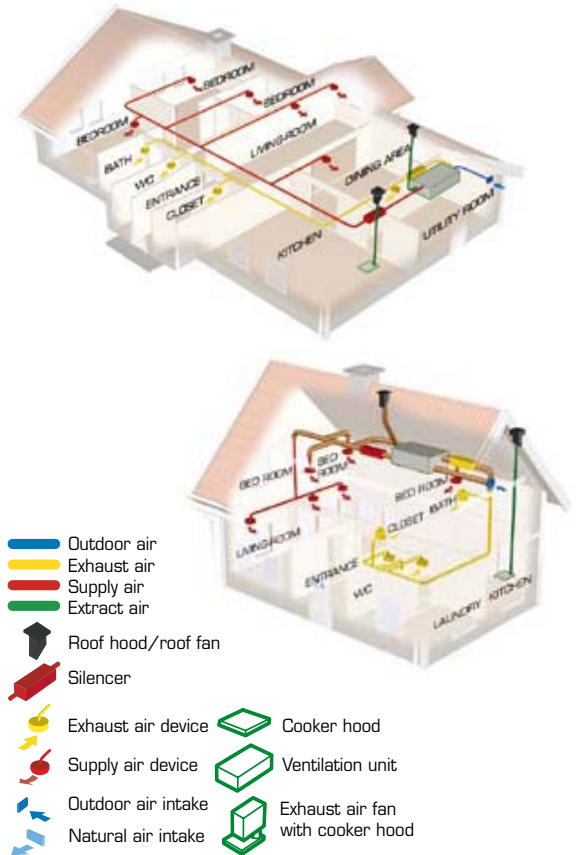
RDAB-01, unit located in cold spaces, lofts for example



RDAR, unit located in cold spaces, lofts for example



# Balanced ventilation 281 - 370 m<sup>2</sup> One storey/Two storey houses



## Rexovent Turbo system

### Ventilation unit RDAB-02 or RDAR

The Rexovent "Turbo" system is a balanced ventilation system for ventilation with heat recovery. It is especially suitable for use in apartment buildings where a common unit is required for stairwells, offices, childcare centres, small industrial premises, storerooms etc.

The Rexovent Turbo system is based on the RDAR-02 or RDAB ventilation unit located in a cold space. The system provides effective ventilation and recycles the heat in the used air leaving the building.

- External insulation for cold spaces.
- Easily accessible for maintenance and service.
- Advantages of the balanced ventilation system: Preheated supply air is distributed to all spaces that are in use more than temporarily.
- No cold draughts caused by replacement air from outside.
- Effective heat recovery
- Energy efficient defrosting.
- With a test socket for air flow measurement.

### The following products are included:

RDAB-02, unit located in cold spaces, lofts for example.



RDAR, unit located in cold spaces, lofts for example.



### Minivent temperature efficiency:

Air flow l/s	Living space <sup>2</sup>	Temperature efficiency*	
		RDAB-02	RDAR
40	115	67	84
60	170	60	83
80	230	56	82
100	285	54	81
120	345	51	80
140	400	-	78

### Energy saved using heat recovery

Air flow l/s	Living space m <sup>2</sup>	Energy saving* for heating southern Sweden kWh/year		Energy saving* for heating mid Sweden kWh/year		Energy saving* for heating northern Sweden kWh/year	
		RDAB-02	RDAR	RDAB-02	RDAR	RDAB-02	RDAR
40	115	3950	4250	4100	4500	5650	5800
60	170	5550	6250	5800	6650	7820	8750
80	230	7010	8300	7300	8800	9750	11650
100	285	8330	10400	8650	10900	11500	14500
120	345	9600	12250	10000	12900	13200	17250
140	400	-	14100	-	14800	-	19950

\* The following annual temperature averages have been used in calculations:  
Southern Sweden 7.1 °C Mid Sweden 6.6 °C Northern Sweden 2.5 °C

Energy savings are based on a comparison with a mechanical exhaust air system with an equivalent air flow.

# Mechanical exhaust air ventilation

## One storey/Two storey house

JBDD



Living space of a maximum 170 m<sup>2</sup>  
**One storey/Two storey house**

For improving the ventilation in houses with a maximum living space of 170 m<sup>2</sup> with natural ventilation systems the Exonet system is recommended. The Exonet system is a mechanical exhaust air system consisting of the JBDD exhaust air fan and cooker hood\*.

Living space of a maximum 250 m<sup>2</sup>  
**One storey/Two storey house**



For improving the ventilation in houses with a maximum living space of 250 m<sup>2</sup> with natural ventilation systems a system with a roof mounted exhaust air fan is recommended. This system consists of the JBFG roof fan and cooker hood\*.

Living space of a maximum 370 m<sup>2</sup>  
**One storey/Two storey house**

JBFG/STEF



For improving the ventilation in houses with a maximum living space of 370 m<sup>2</sup> with natural ventilation systems a system with a roof mounted exhaust air fan is recommended. This system consists of the STEF roof fan and cooker hood\*.

For more information about the products see Products for Single-family Houses.

\*See separate documentation on cooker hoods for information about which cooker hoods are suited to the exhaust air fans.

**The following products are included:**

Exhaust air fans



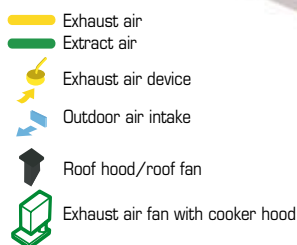
JBDD



JBFG



STEF



## Do you have a balanced ventilation system?

Is it time to evaluate your existing balanced ventilation systems?

Replacing your existing air handling unit allows you to obtain a more effective and economical balanced ventilation system with heat recovery.

Which system do you have?

System	Unit designation	
Bahco Minimaster	ACF or ACC	
Fläkt Rexonet	RDKA, RDKB or RDKE	
Fläkt Minivent	RDKG-a-b-c-d-1	
Fläkt Rexovent	RDA A, RDAC	

Replacement products:

### **RDKG (Minimaster/Rexonet/Minivent)**

- Easy to install in place of an existing unit
- Same electrical connectors
- Can be connected to the existing ducting
- High recovery capacity, up to 66%

### **RDKR (Minimaster/Rexonet/Minivent)**

Same advantages as the RDKG, with the addition of:

- Higher recovery capacity, approximately 20%, in total up to 83 % with rotary heat exchanger
- Low energy consumption and service life thanks to DC motor
- No need for drainage

The unit can easily be moved from above the cooker to another location.

The unit can be combined with the FläktWoods cooker hood range and designer hoods (see range under "Designer hoods").

### **RDAB (Rexovent)**

- Easy to install in place of an existing unit
- More efficient filter than in earlier RDAA, RDAC.

### **RDAR (Minivent/Rexovent)**

- Can be installed both horizontally and vertically
- Higher recovery capacity, approximately 20%, in total up to 83 % with rotary heat exchanger
- Low energy consumption and service life thanks to DC motor
- No need for drainage

Find your nearest Fläkt Woods dealer at:

[www.flaktwoods.com](http://www.flaktwoods.com).

The connection unit may need some modification.

## Ventilation unit RDKG



For one storey and two storey houses with a living space up to 155m<sup>2</sup>. The RDKG ventilation unit is a component in the Minimaster/Minivent systems. The unit is supplied with control equipment for use with the Minivent system. It can also be located in kitchens in combination with the Minimaster system cooker hood CPDK. These systems are primarily intended for homes and small commercial premises.

### Unit with plate heat exchanger, RDKG.

The unit is available with a plate heat exchanger and with a bypass function for the Minimaster system. The air flow does not pass through the heat exchanger when the bypass function is engaged, this gives a greater forced air flow and better odour extraction when cooking.

### Energy consumption

Compared with a mechanical exhaust air ventilation system there are significant energy savings with the RDKG. This is because the energy in the outgoing air is effectively recovered in the heat exchanger.

### Product data

- High temperature efficiency.
- Easy to install.
- Easy to maintain.
- Equipped with effective filters.
- Equipped with an electric battery as an afterheater.
- Supply and exhaust air flows 20-80 l/s.
- Can serve living areas up to 155 m<sup>2</sup>.
- Bypass function as standard.

### Product code example:

RDKG-1-1-2-2-2

# Description, materials, technical data

## Casing

The unit is manufactured in white-enamelled sheet metal with a galvanised inner casing. The service hatch is secured with quick-release screws.

## Fans

The fans are easy to remove for service and maintenance. The speed of the fans is controlled by cooker hood CPDK, or, when used without cooker hood, by control panel RDKZ-41.

## Heat exchangers

The cross flow heat exchanger is made of aluminium with completely separate supply and exhaust air ducts. It has a temperature efficiency of between 60-70%. The unit is fitted with an automatic defrost function controlled by time and outside temperature.

## Defrosting and afterheater

The unit has an afterheater (electric) to regulate the supply air towards set value. The set value of the supply air can be set between 15 and 23 °C from the control panel. During very cold periods it may happen that the effect of the afterheater is insufficient to get the temperature up to set value.

When outdoor temperature sinks under -5°C the defrosting function is started. The supply air fan and the afterheater is stopped during 5 minutes twice an hour.

The afterheater in the unit is equipped with two internal overheat prtectors.

In regions where the dimensioned outdoor temperature (DUT5) is lower than -25°C we recommend that a preheater is installed in the plant. Note that a preheater is not included in Fläkt Woods range for this unit.

## Variants with bypass

The bypass function means that the forced air flow from the cooker hood does not pass the unit's plate heat exchanger. The basic exhaust air flow passes the heat exchanger in order to save energy.

### Advantages:

- Reduced pressure drop in the unit during forcing
- Increased forced air flow up to 50 l/s
- Significantly better suction in the cooker hood
- Less risk of premature fouling and blocking of the plate heat exchanger with grease from cooking
- Less cleaning of the unit
- Low noise level maintained despite better performance

Note that: There is no heat recovery of the air passing through the cooker hood while the air flow is forced.

**Function:** The basic flow through the hood through a separate basic flow damper 10 l/s, otherwise exhaust air flow 30 l/s. Sealed damper which is forced and provides a maximum of 50 l/s.

## Control equipment

The unit has a control equipment based on a microprocessor. In System Minimaster with cooker hood CPDK the fan speed is chosen in the cooker hood.

The fan speed can also be remote controlled with control panel RDKZ-41.

## Filter

The unit can be fitted with class G3 filters. Filter classes up to F7 are available as accessory.

## Packaging/Installation

The unit is supplied in a cardboard box. The unit is intended for wall mounting in a heated space. The supplied mounting brackets must be screwed into a stud wall.

## Supply air fan

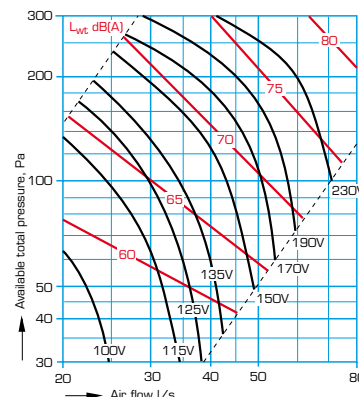


Diagram 1. a) Supply air fan, (supply voltage 100-230V)  
b) Sound to duct,  $L_{we}$ , for supply air and exhaust air fans  
c) Filter EU3

## Exhaust air fan

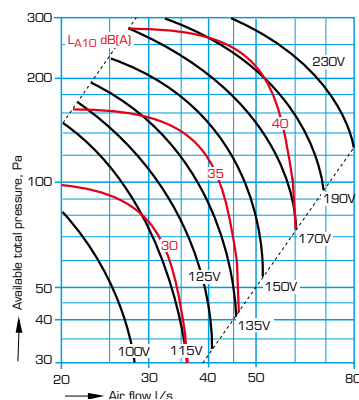


Diagram 2. a) Exhaust air fan, (supply voltage 100-230V)  
b) Sound to kitchen,  $L_{A10}$ , from unit including cooker hood with flow 10 l/s  
c) Filter EU3

## Sound data, dimensions, accessories

### Sound power level in octave bands

The sound power level  $L_w$  in octave bands to ducts is calculated by adding the correction factor (with the relevant characters) to the sound power level  $L_{wt}$  read off diagram 1.

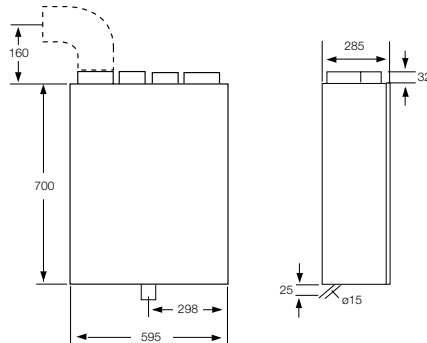
	Octave band, mid-frequency, Hz					
	63	125	250	500	1k	2k
Corrected dB	+11	-3	-5	-12	-10	-16
Tol ± dB	6	3	2	2	2	2

### Sound level

Sound level  $L_{A10}$  is shown for a room with a  $10\text{m}^2$  soundabsorption area. To obtain the true sound level the following are added dB(A) values (with the relevant characters) to the value read off in diagram 2.

Area of room	Normally furnished room	Heavily furnished room, a kitchen for example
5 m <sup>2</sup>	+2 dB(A)	+7 dB(A)
10 m <sup>2</sup>	0 dB(A)	+4 dB(A)
15 m <sup>2</sup>	-1 dB(A)	+1 dB(A)

### Dimensions and weight



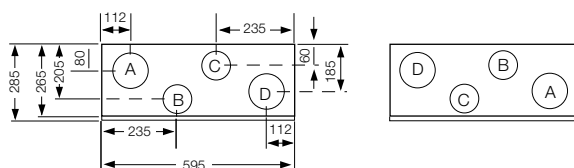
Weight 35 kg.

Conn. (female)	A	B	C	D
Diameter	125	100	100	125
	Supply air	Exhaust air <sup>x)</sup>	Outdoor air <sup>x)</sup>	Extract air

<sup>x)</sup> Increased to  $\varnothing 125$  as space permits.

Outdoor air right

Outdoor air left



### Technical specifications

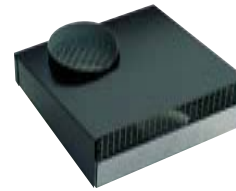
Voltage: 230 V, single phase, 50Hz  
 Rated output: 810 W (850W with cooker hood)  
 Afterheater: Electric heater 600W  
 Motors: Combined rated output 260W  
 Connection: Earthed plug.

### Materials and coatings

**Casing:** Alu-zink coated sheet steel or white enamelled  
**Colour:** NCS 0502 Y08R (RAL9010)  
**Heat exchanger:** Aluminium

### Accessories

#### Combined air terminal device RDKZ-26



The combined air terminal device takes in outdoor air and removes extract air from the heat recovery device serving a home. It is mounted on an outside wall. Outdoor air is taken in at the bottom and extract air is blown straight out. Both openings are fitted with screens. The screen over the extract air opening can be easily removed for inspection and cleaning.

#### Positioning

The RDKZ-26 must be positioned on a free wall so that the extract air flow is not obstructed.

#### The device must not be positioned

- under porches balconies or eaves wider than 1 m.
- next to enclosed spaces, where there is a risk that the extract air will be recirculated, for example next to the inside corners of L-shaped buildings.
- closer to neighbour's windows or air intakes than approximately 3 m.
- So that the extract air flow is directed at nearby patios (minimum 5 m to neighbour's patio).
- close to streets, parking spaces etc.
- so close to neighbouring plots that the noise level from the device exceeds 40 dB(A) at normal flow.

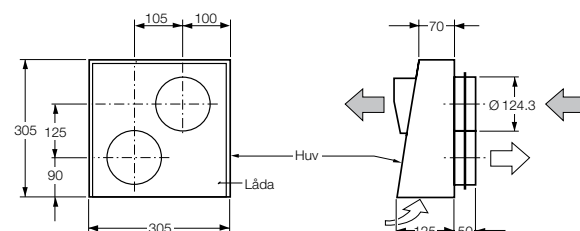
Connecting ducts must be insulated for condensation and heat.

If the device is located closer to the lower edge of the eaves than 0.3 m then they must be fitted with a protective plate.

#### Materials and coatings

The device is mainly manufactured from alu-zink coated sheet steel with visible components black enamelled. On the reverse of the device are two connection sleeves,  $\varnothing 125$  mm. The sleeves are fitted with rubber seals.

#### Dimensions and weight



Weight: 2 kg

## Accessories, product codes

### Total pressure drop

Flow, l/s	30	40	50	60	70
Exhaust air, Pa	6	10	16	23	30
Supply air, Pa	8	14	21	31	41

In certain wind conditions there may be a slight transfer of exhaust air to supply air when using a combined air terminal device. This is generally always prevented when exhaust air is expelled from the roof and outdoor air is drawn in from the outside wall.

### Control panel RDKZ-41-1

External control panel for wall installation. The fan speed to select is AWAY, HOME or FORCED. The panel shows also filter alarm and can be used to adjust the air flow.

### Summer insert RDKZ-100

For use in the summer when no heat recovery is normally required. Cool outdoor air can be drawn in to lower the indoor temperature, at night for example.

### Ventilation hood CBAE-12-111

For connection to kitchen fans, exhaust air systems or ventilation systems with heat recovery. It is connected to sheet metal ducting or flexible steel tubing.

### Air intake BSDB-20-012

For positioning on outside walls. The intake consists of a box which has a outside wall grille as a rain guard. So it does not need to be positioned where it is not exposed to rain.

### Pipe insulation RDKZ-45

For condensation and heat insulation for ducts routing cold air through heated spaces. Pipe insulation consists of nonflammable cellular polyethylene plastic. The thickness of the insulation is 15 mm and it comes in one metre lengths. Pipe insulation is pushed on from the end of the duct.

### Mounting kit RDKZ-102

The fitting kit is used to attach the decorative panel in front of the ventilation unit when it is installed between two continental height high level cabinets.

### Silencer BDER-38-012-100

Rectangular silencer for 125 mm diameter pipes.  
L x B x H = 1000 x 250 x 175.

Noise attenuation at	Centre frequency, Hz							
	63	125	250	500	1k	2k	4k	8k
BDER-38-012-100	13	12	18	34	46	43	44	24

### Product code

Ventilation unit with plate heat exchanger **RDKG-a-2-c-1-2**

#### Connection (a)

- 1 = Outdoor air right
- 2 = Outdoor air left

#### Function type (b)

- 2 = Electric battery with bypass function

#### Casing (c)

- 1 = Galvanised sheet metal
- 2 = White enamelled

#### Filter Supply/Exhaust air (d)

- 1 = G3 flat filter/G3 flat filter

### Accessories

#### Filter

RDK(G/R)

**RDKZ-13-b-c**

#### Filter T/F (b)

- 1 = G3 flat filter
- 2 = F5 bag filter
- 3 = F7 bag filter

#### Generation (c)

- 1

#### Installation cable to control panel

**RDKZ-43-1-cc-1**

#### Model (b)

- 1 = 6-pole flat cable

#### Length (cc)

- 10 = 10 meters
- 25 = 25 meters

#### Generation (d)

- 1

#### Control panel

**RDKZ-41-1**

#### Combined air terminal device

**RDKZ-26-000**

#### Summer insert

**RDKZ-100**

#### Ventilation hood

**CBAE-12-111**

#### Air intake

**BSDB-20-012**

#### Cooker hood for RDKG-1-b-c-d-2

**CPDK-b-cc-d-1-1**

#### Cooker hood for RDKG-2-b-c-d-2

**CPDK-b-cc-d-2-1**

#### Silencer

**BDER-38-012-100**

#### Fitting kit

**RDKZ-102**

## Ventilation unit RDKR



The RDKR ventilation unit is a component in the Minimaster/Minivent systems. These systems are primarily intended for homes and small commercial premises. The unit is supplied with control equipment for use with the Minivent system. It can also be located in kitchens in combination with the Minimaster system CPDJ cooker hood .

### Unit with rotary heat exchanger, RDKR

This unit has been developed from our standard RDKG unit. The unit has an extremely efficient rotary heat exchanger. The unit does not need draining, which is a great advantage when replacing existing installations. All units are supplied in right-hand and left-hand versions with all connectors facing upwards. The unit is intended for wall mounting.

### Energy consumption

The RDKR is an extremely energy efficient air handling unit and this means lower operating costs every year. Savings are made in two ways: The fans are driven by EC motors, which have an energy consumption of only 50 - 60 percent of that of an equivalent AC motor. The RDKR unit also has a rotary heat recovery unit. It is so effective that supplementary heating is only needed at outside temperatures of below 10° C.

### Product data

- High temperature efficiency
- Easy to install
- Service friendly.
- Can be fitted with effective filters.
- Can be fitted with an electric battery as an afterheater.
- Supply and exhaust air flows between 20 - 80 l/s.
- Can serve living areas up to 155 m<sup>2</sup>.
- No need for drainage.

### Product code example:

RDKR-1-1-3-2-2

# Description, materials, technical data

## Casing

The unit is manufactured in galvanised sheet metal. The casing consists of an inner door, an outer protective hatch and a front cover (accessory). The inner door is locked with screws. The control electronics inside the protective hatch are easily accessible without the need to open the unit.

The front cover is available in white painted sheet metal or stainless steel. It can be adjusted to fit all kitchen cabinet depths.

## Fans

The fans are driven by very quiet and energy efficient EC motors. Fans are easy to remove for service and maintenance. The fan speed can be regulated in three steps.

## Heat exchanger

The heat exchanger is an aluminium rotary heat exchanger. It has a temperature efficiency of 80 - 83%. Thanks to the rotary heat exchanger it needs no drainage. The unit is fitted with an automatic defrost function controlled by outside temperature. The heat exchanger can easily be removed for cleaning.

In the Minimaster system the air from the cooker hood bypasses the heat exchanger to avoid odour exchange. We recommend a separate exhaust air terminal device in the kitchen and a sealed forced air damper to ensure the heat recovery of air in the kitchen. The cooker hood is equipped with an effective damper, used while cooking. Exhaust ventilation in the kitchen is arranged by a separate exhaust valve.

## Preheater and afterheater

The unit is prepared for a built-in electric preheating and afterheating battery. In areas where the rated outside temperature (DUT5) is lower than -25°C the installation is fitted with a preheater. The preheater is controlled by a thermostat. The afterheater in the unit regulates the supply air temperature. The unit can easily be retrofitted with a preheating and afterheating battery.

## Control equipment

The unit has control equipment that automatically manages its operation. The control equipment is placed behind the protective hatch. The normal flow of the supply and exhaust air fans and the desired supply air temperature are adjusted with an easily accessible potentiometer.

The desired air flow is set on a control panel (accessory). There are three different settings, "Not home" for saving energy, "Normal" and "Forced" air flow. "Forced" air flow is used when a higher need of ventilation is wanted, i.e. when cooking. The control panel also has a filter replacement indicator lamp.

The unit can also be equipped with a cooker hood. In this case the air flow can be forced from the cooker hood.

## Filter

The unit can be fitted with class F3-F7 filters in various combinations, see product code.

## Supply air fan

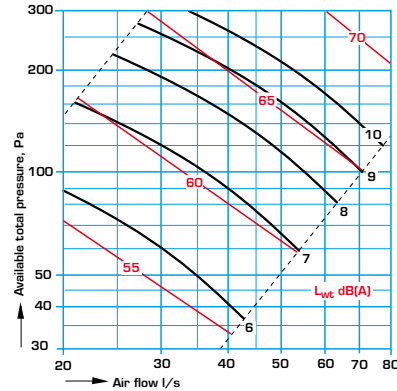


Diagram 1. a) Supply air fan, potentiometer setting  
b) Sound to duct,  $L_{wt}$ , for supply air fans  
c) Filter F5

## Exhaust air fan

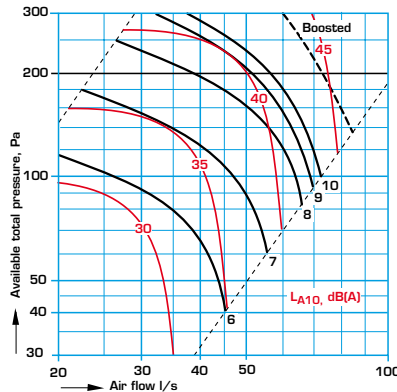


Diagram 2. a) Exhaust air fan, potentiometer setting  
b) Sound to kitchen,  $L_{A10}$ , from unit with the forced air damper in the cooker hood closed  
c) Filter F3

## Sound power level in octave bands

The sound power level  $L_w$  in octave bands to ducts is calculated by adding the correction factor (with the relevant characters) to the sound power level  $L_{wt}$  read off diagram 1.

Sound path correction, dB	Octave band, mid-frequency, Hz					
	63	125	250	500	1000	2000
Supply air	+5	+6	-1	-5	-6	-15
Extract air	+4	+3	0	-4	-5	-15
Exhaust air	0	-3	-11	-15	-22	-30
Outdoor air	-2	-3	-11	-15	-25	-33

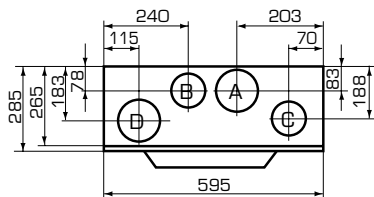
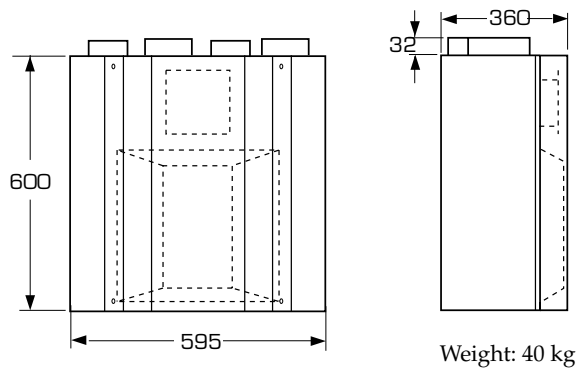
## Sound level

Sound level  $L_{A10}$  is shown for a room with a 10 m<sup>2</sup> sound-absorption area. To obtain the true sound level the following are added dB(A) values (with the relevant characters) to the value read in diagrams.

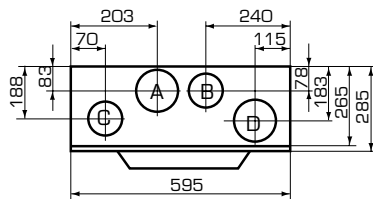
Area of room	Normally furnished room	Heavily furnished room, a kitchen for example
5 m <sup>2</sup>	+2 dB(A)	+7 dB(A)
10 m <sup>2</sup>	0 dB(A)	+4 dB(A)
15 m <sup>2</sup>	-1 dB(A)	+1 dB(A)

# Dimensions and weight, control equipment

## Dimensions and weight



**RDKR-1**  
Connection -  
outdoor air right



**RDKR-2**  
Connection -  
outdoor air left

Connection (female)	A	B	C	D
Diameter	125	100	100	125
	Supply air	Exhaust air <sup>1)</sup>	Outdoor air <sup>1)</sup>	Extract air

<sup>1)</sup> Increased to  $\varnothing 125$  as space permits.

## Technical Specifications

<b>Voltage:</b>	230 V, single phase, 50 Hz
<b>Rated output:</b>	1 170 W (1 210 W with cooker hood)
<b>Preheater:</b>	Electrical, 500 W
<b>Afterheater:</b>	Electrical, 500 W
<b>Motors:</b>	Combined rated output 2 x 82 W
<b>Connection:</b>	Earthed plug

## Materials and surface finish

<b>Casing:</b>	Galvanised sheet steel, Front in galvanised sheet metal, white enamelled sheet metal or stainless steel.
<b>Colour:</b>	NCS 0502 Y08R (RAL9010)
<b>Heat exchanger:</b>	Aluminium

## Control

The unit has control equipment that automatically manages the operation of the fans, rotary heat exchanger and electrical heater.

## Fan speed

There are three fan speeds. Only the normal operation fan speed needs to be adjusted. Maximum speed is used for forcing the air flow.

The minimum speed can also be adjusted and used when one is not at home in order to save energy. The fan speed of the two fans can be adjusted independently of each other. Adjustment is carried out on the unit's control unit.

The desired speed can be selected on the control panel which can be positioned anywhere, for example in the hallway or entrance to the bathroom.

The control panel has a button of an arrow used to select "Not home"/"Normal" or "Forced" mode. The latter can be set for 120 min. After that time the speed returns to normal operation. If the unit is located in the kitchen in combination with a cooker hood the air flow can be forced from the cooker hood. When the damper in the cooker hood is opened, the air flow is automatically forced.

An external alarm, a fire alarm for example, can be connected to the unit. This will stop the unit in the event of an alarm.

## Filter replacement

Filter replacement is indicated by a lamp which lights on the control panel when it is time to replace the filter.

## Energy operating modes NORMAL and REDUCED

RDKR has two energy operating modes that are used to control exactly how the supply air temperature is regulated, which provides the facility for extra energy-saving.

- In the "NORMAL" position, the supply air temperature is adjusted to the desired reference value in two stages. As a first stage with the energy recovery from the rotary heat exchanger, and, if this is insufficient, as a second stage with the electrical after heater.
- In the "REDUCED" position, the rotor and the electrical after heater have separate reference values. The supply air temperature is first adjusted to the desired reference value with the energy recovery from the rotary heat exchanger. If the rotor is not able to recover sufficient heat, the electrical after heater is used, but with a reference value that is 2° C lower than the normal reference value.

In both energy operating modes, the electrical after heater can only heat the supply air if the rotor is in operation.

## Function

The rotary heat exchanger is very efficient. Under some periods of the year, as in fall and spring, the temperature efficiency can sometimes be too high and thereby the supply air temperature higher than wanted. If you want to save energy and can accept the higher temperature under these few days, set the unit in "Normal" mode.

# Accessories, product code

## Accessories

### Combined air terminal device RDKZ-26

The combined air terminal device takes in outdoor air and removes extract air from the heat recovery device serving a home. It is mounted on an outside wall. Outdoor air is taken in at the bottom and extract air is blown straight out. Both openings are fitted with screens. The screen over the extract air opening can be easily removed for inspection and cleaning.

For more information about the RDKZ-26 combined air terminal device, see the section on the RDKG ventilation unit in this documentation.

### Ventilation hood CBAE-12-111

For connection to kitchen fans, exhaust air systems or ventilation systems with heat recovery. It is connected to sheet metal ducting or flexible steel tubing.

### Air intake BSDB-20-012

For positioning on outside walls. The intake consists of a box which has a outside wall grille as a rain guard. So it does not need to be positioned where it is not exposed to rain.

### Pipe insulation RDKZ-45

For condensation and heat insulation for ducts routing cold air through heated spaces. Pipe insulation consists of non-flammable cellular polyethylene plastic. The thickness of the insulation is 15 mm and it comes in one metre lengths. Pipe insulation is pushed on from the end of the duct.

### Silencer BDER-38-012-100

Rectangular silencer for 125 mm diameter pipes.  
L x W x H = 1000 x 250 x 175

Noise attenuation at	Centre frequency, Hz							
	63	125	250	500	1k	2k	4k	8k
BDER-38-012-100	13	12	18	34	46	43	44	24

### Control panel RDKZ-41

External control panel for installation on wall. There is three different settings for choosing the fan speed; "Not home" for saving energy, "Normal" and "Forced" air flow. The control panel also has a filter replacement indicator lamp.

## Packaging/Installation

The unit is supplied in a cardboard box. The unit is intended for wall mounting in a heated space. The supplied mounting-brackets must be screwed into a stud wall.

## Product code

Ventilation unit with rotary heat exchanger RDKR-a-b-0-d-2

Connection (a) \_\_\_\_\_  
1 = Outdoor air right  
2 = Outdoor air left

Electric heater (b) \_\_\_\_\_  
0 = Without  
1 = Only afterheater  
2 = Afterheater and preheater

Filter Supply/Exhaust air (d) \_\_\_\_\_  
2 = F5 bag filter/F3 flat filter

## Accessories

Combined air terminal device	RDKZ-26-000
Ventilation hood	CBAE-12-111
Air intake	BSDB-20-012
Cooker hood for RDKR-1-b-c-d-1	CPDJ-b-cc-d-1-1
Cooker hood for RDKR-2-b-c-d-1	CPDJ-b-cc-d-2-1
Pipe insulation ø 100	RDKZ-45-010
Pipe insulation ø 125	RDKZ-45-012
Silencer	BDER-38-012-100
Control panel	RDKZ-41-1
Afterheater/preheater	RDKZ-12-001/002

Spare filter RDKZ-13-b-c

Filter Supply/Exhaust air (b) \_\_\_\_\_  
1 = G3  
2 = F5  
3 = F7

Generation (c) \_\_\_\_\_  
1

Front cover RDKZ-14-b-c-d-1

Material (b) \_\_\_\_\_  
3 = White painted  
4 = Stainless steel

Extension part against ceiling (c) \_\_\_\_\_  
0 = Without  
1 = With

Height (d) \_\_\_\_\_  
6 = 600 mm  
7 = 700 mm

Generation (e) \_\_\_\_\_  
1

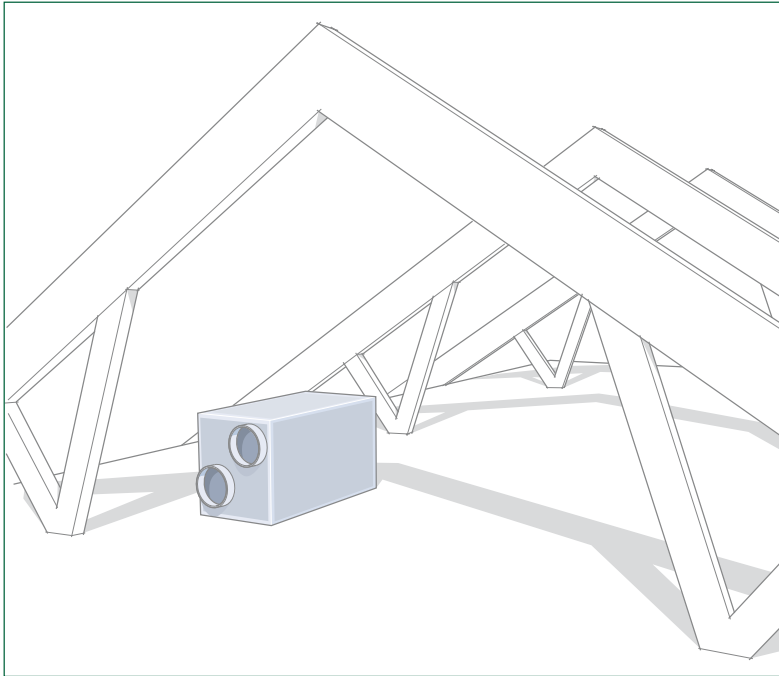
Installation cable for control panel RDKZ-43-1-cc-1

Version (b) \_\_\_\_\_  
1 = 6-pole flat cable

Length (cc) \_\_\_\_\_  
10 = 10 m  
25 = 25 m

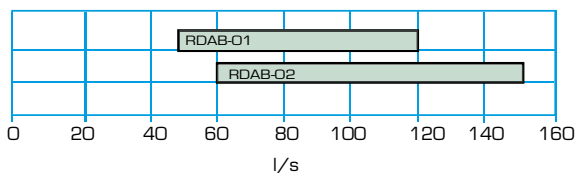
Generation (d) \_\_\_\_\_  
1

## Ventilation unit RDAB



RDAB-01 for one storey and two storey houses with a living space of 156-280 m<sup>2</sup>. RDAB-02 for one storey and two storey houses with a living space of 281-381 m<sup>2</sup>. Ventilation unit RDAB is equipped with heat recovery. It is primarily intended for the energy efficient supply and exhaust air ventilation of houses, child care centres and kiosks. The RDAB is the main component in the Rexovent system.

### Air flow area



### Product data

- Normally recovers 60-70% of the energy used to heat the ventilation air.
- Provides controlled supply and exhaust air ventilation.
- Easy to install – small and lightweight.
- Easy to maintain – easy to clean
- With a test socket for air flow measurement.
- Has individually adjustable supply and exhaust air fans.

### Product code example

Ventilation unit RDAB-01-1-0-1

# Description, materials, electrical data, dimensions

## Description

The casing is made from galvanised sheet steel with an intermediate layer of 25 mm mineral wool insulation.

The radial supply and exhaust air fans have forward curved blades. They are equipped with two-pole over-heating protection which is reset manually by cutting the supply voltage briefly. The maximum permitted ambient temperature is 40°C.

The unit has controls for heaters and fans and has transformers for individually adjusting supply and exhaust air fans.

The heat exchanger is of the cross flow type. The supply and exhaust air ducts in the heat exchanger are completely separate from each other. The surface structure of the materials has been developed in order to give the air a positive surface turbulence, this provides good heat exchange and pressure drop. The electric heaters are provided with both automatic and manual over heat protectors.

Filters, heat exchanger and fans are easily accessible for inspection and cleaning.

## Materials and coatings

Corrosion class:	C3
Fans:	Alu-zink coated sheet steel.
Heat exchanger:	Aluminium
Insulation:	Sheets of mineral
Exhaust air filter:	G 4
Supply air fan:	F5
Casing:	White painted steel sheet

## Electrical data

Voltage: 230V, single phase 50/Hz, 400V 3N ≈ 50Hz

Code	Fan motors <sup>1)</sup>		Preheater		Afterheater		Total kW
	Output kW	Current A	Output kW	Current A <sup>2)</sup>	Output kW	Current A <sup>2)</sup>	
RDAB-01	0.26	1.14	2	9.1	2	9.1	4.26
RDAB-02	0.50	2.34	2	9.1	2	9.1	4.50

<sup>1)</sup> Refers to two fan motors

<sup>2)</sup> Voltage 230V, single phase, 50 Hz

Preheater is always included. Afterheater can be ordered extra.

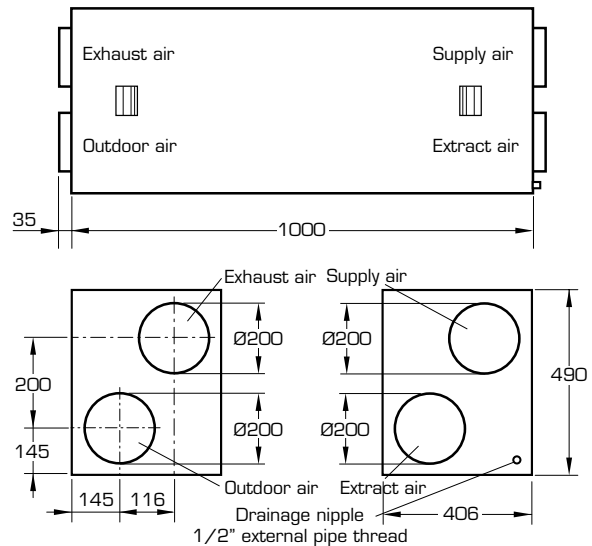
## Packaging

Corrugated cardboard box.

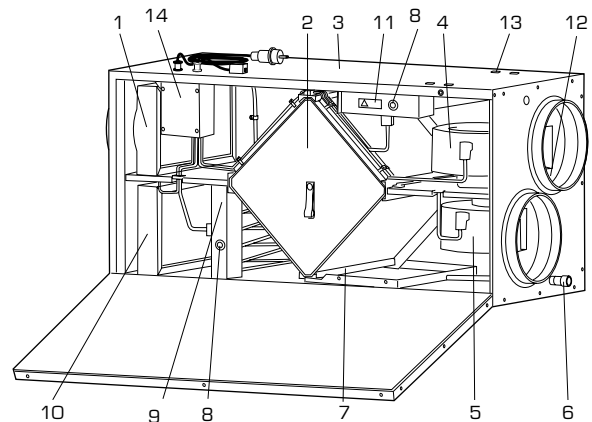
## Dimensions and weight

The unit's four connection sleeves are designed for connection to BDEK spiral ducts and have rubber seals. RDAB-01 can be connected with a reducer to duct system Ø160.

Weight: 55kg.



## Main components of the unit (RDAB-aa-1)



- |                                    |                                  |
|------------------------------------|----------------------------------|
| 1. Exhaust air filter              | 8. Manual overheating protection |
| 2. Heat exchanger                  | 9. Preheater                     |
| 3. Casing                          | 10. Supply air filter            |
| 4. Supply air fan                  | 11. Afterheater                  |
| 5. Exhaust air fan                 | 12. Supply air indicator         |
| 6. Condensation water outlet       | 13. Test socket                  |
| 7. Defrosting sensor "cold corner" | 14. Control unit                 |

# Functions, technical data

## Comfort

The control card in the unit controls the rotary heat exchanger and any supplementary heat to maintain the supply air temperature at the desired value.

The user chooses after consulting service personnel and adjusts manually the setpoint value of the supply air temperature and the normal air flow of the fans.

The supply air temperature is set to +18 °C at delivery and the normal air flows (HOME position) of the two fans are set to fan curve 5 without concurrent operation of electric heater.

## Adjustment of setpoint value:

See the instructions for service personnel under the heading "Adjustment of setpoint value for supply air temperature and fan speeds".

## Energy-saving

Energy is saved thanks to the energy-efficient fans and the ability to adjust the air flow to its correct value.

To set the fan speed, follow the instructions in this publication's section for settings. Only authorized service personnel who have measuring instruments for measuring the air flow are qualified to adjust the speed of the fans.

## Overheating protection

The electric heaters are supplied with one automatic and one manual thermostat for overheating. The automatic thermostat cuts the power when the temperature of the ambient air reaches +40 °C and restarts automatically. The manual thermostat, which cuts the power at +60 °C, has to be reset with a switch on the electric heater. The fans have an overheating protection in the motor winding which needs to be disconnected from the power supply and reconnected to be able to restart.

Contact service personnel if the malfunction occurs continuously.

## Supplementary heat

The heat exchanger recovers sufficient thermal energy during the major part of the year. Supplementary heating is switched on at low temperatures, when the desired supply air temperature cannot be achieved. Under very cold operating conditions it is also possible to include a heating coil to preheat the air. A coil of this kind will only be in operation at very low temperatures.

In climatic regions where the temperature rarely falls below -10° C, no supplementary heater is needed.

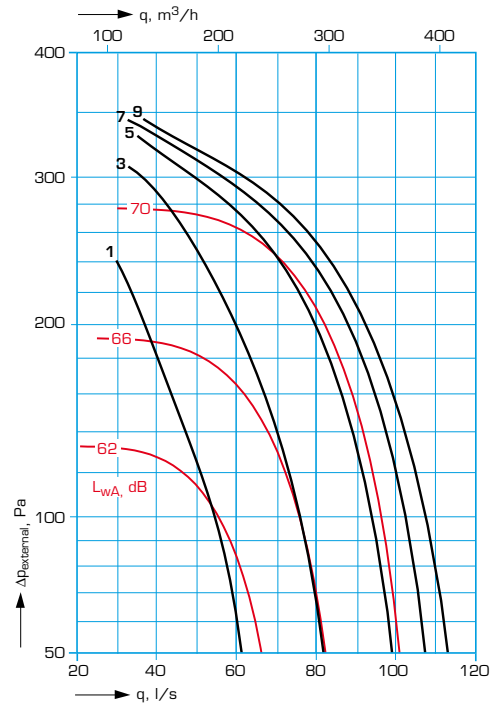
## Defrosting heat exchanger

During very cold periods, when frost can occur in the heat exchanger, the built-in control unit automatically takes charge of defrosting. The preheater is activated for short periods of time to melt the developed frost. The supply air fan reduces its speed to the lowest for short periods of time at very cold outdoor temperatures (about -20 °C) to make the defrosting procedure easier and faster.

## Air flow – pressure rise

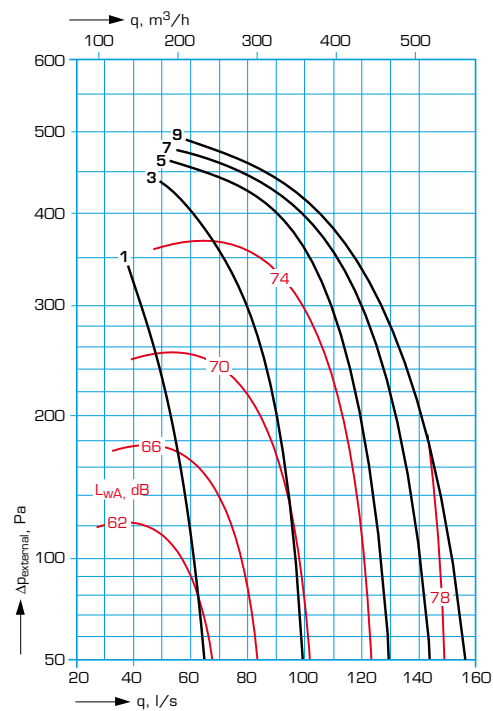
### RDAB-01

Supply and exhaust air fan



### RDAB-02

Supply and exhaust air fan



# Control, sound data, accessories, product code

## Control

The unit has controls for heaters and fans and has transformers for individually adjusting supply and exhaust air fans. Normal speed has seven settings. In addition, there are the minimum and maximum flow settings.

To reduce the rated power the afterheater and preheater cannot be engaged at the same time.

## Instructions

Installation and maintenance instructions are supplied with the product.

## Sound data

The fan curves in the diagrams relate to the supply air fan on the outlet side of the unit. Sound power level per octave band dB, is calculated from  $L_{w\text{tot}}$  in the diagram + octave band correction (with sign) according to the table below.

### RDAB-01 with fan effect 2 x 130W octave band correction

Sound path, HZ	63	125	250	500	1k	2k	4k	8k
Supply air duct, dB	8	7	2	-6	-6	-10	-13	-15
Exhaust air duct, dB	7	12	4	-4	-15	-21	-23	-35
Through unit casing, dB	6	-11	-9	-1	-6	-10	-8	-11

Supply air duct =  $L_{wA}$  in the diagram

Exhaust air duct =  $L_{wA}$  in the diagram minus (-15dB)

Noise to room =  $L_{wA}$  in the diagram minus (-31dB) gives sound pressure level, dB(A) vid 10 m<sup>2</sup> room absorption

### RDAB-02 octave band correction

Sound path, HZ	63	125	250	500	1k	2k	4k	8k
Supply air duct, dB	7	6	0	-5	-4	-11	-13	-15
Exhaust air duct, dB	7	11	5	-4	-14	-22	-25	-37
Through unit casing, dB	6	11	10	0	-6	-12	-12	-10

Supply air duct =  $L_{wA}$  in the diagram

Exhaust air duct =  $L_{wA}$  in the diagram minus (-15dB)

Noise to room =  $L_{wA}$  in the diagram minus (-28dB) gives sound pressure level, dB(A) vid 10 m<sup>2</sup> room absorption

## Accessories

### Summer insert RDAZ-08-001

For use in the summer when no heat recovery is normally required. Cool outdoor air can be drawn in to lower the indoor temperature, at night for example.

### Air intake BSDB-20-016

Used as an air intake on an outside wall.

## Descriptive text

Ventilation unit RDAB by Fläkt Woods.

## Product code

**Ventilation unit** **RDAB-aa-b-c-1**  
with preheater 2000 W and plate heat exchanger

Size (aa) \_\_\_\_\_

01 = Motor 130 W

02 = Motor 250 W

Supply air from (b) \_\_\_\_\_

1 = the right

2 = the left

Supply heat (c) \_\_\_\_\_

0 = Without

2 = Afterheater, electric 2000 W

## Accessories

**Summer insert**

**RDAZ-08-001**

**Air intake**

**BSDB-20-016**

**Silencer**

**BDER-30-020-120**

**Filters**

**RDAZ-09**

Set of 2+2, supply and exhaust air

**Connection cable**

**RDKZ-11**

For 3-phase connection , length 4 m

**Control panel**

**RDKZ-41-b**

Without display

Generation (b) \_\_\_\_\_

1

**Installation cable for control panel**

**RDKZ-43-1-cc-1**

Variant (b) \_\_\_\_\_

1 = 6-pole flat cable

Length (cc) \_\_\_\_\_

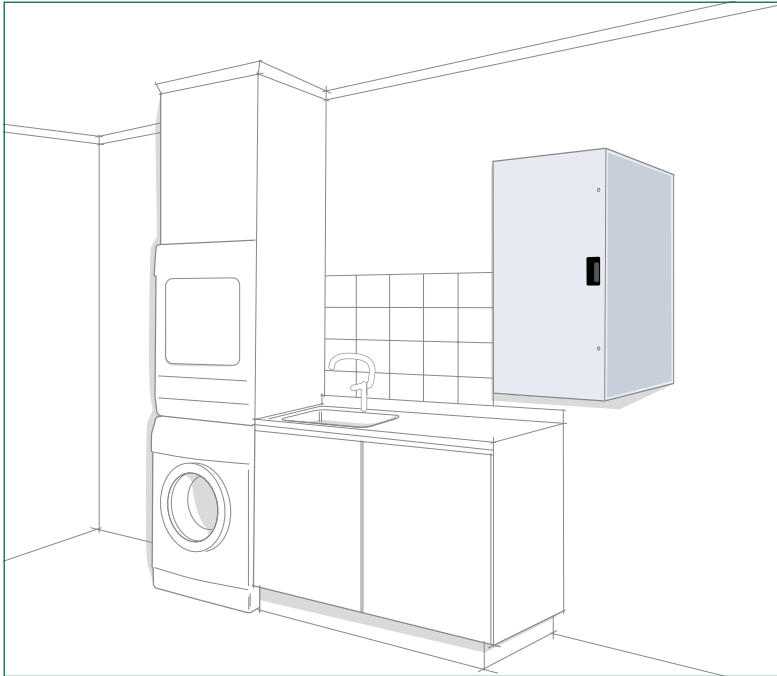
10 = 10 meters

25 = 25 meters

Generation (d) \_\_\_\_\_

1

## Ventilation unit RDAR



The RDAR ventilation unit is a component in the Rexovent/Minivent systems. These systems are primarily intended for homes and small commercial premises. The unit is supplied with control equipment. RDAR can be placed in cold or warm spaces. It has a width of 58 cm and therefore it fits in small areas, such as closets. The possibility of using water battery as an after-heater increases the energy savings.

### Unit with rotary heat exchanger, RDAR

This unit has been developed from our standard RDAB unit. The unit has an extremely efficient rotary heat exchanger which makes RDAR very efficient. The unit does not need draining, which is a great advantage when replacing existing installations. All units are supplied with all connectors facing upwards. The unit is intended for wall mounting either standing up or lying down.

### Energy consumption

The RDAR is an extremely energy efficient air handling unit and this means lower operating costs every year. Saving are made in two ways: The fans are driven by EC motors, which have an energy consumption of only 50 - 60 percent of that of an equivalent AC motor. The RDAR unit also has a rotary heat recovery unit. It is so effective that supplementary heating is only needed at outside temperatures of below 10° C.

### Product data

- High temperature efficiency
- Easy to install
- Service friendly.
- Can be fitted with effective filters.
- Can be fitted with an electric battery as a preheater.
- Can be fitted with an electric or a water battery as an afterheater.
- Supply and exhaust air flows between 20 - 120 l/s.
- Can serve living areas up to 350 m<sup>2</sup>.
- No need for drainage.

### Product code example:

RDAR-01-1-1-1

# Description, materials, specifications

## Casing

The outer casing is manufactured in white painted sheet metal and the inner casing is manufactured in galvanized sheet metal. Between the two layers there is a 25 mm thick isolation made of mineral wool.

## Fans

The fans are driven by very quiet and energy efficient EC motors. Fans are easy to remove for service and maintenance. The fan speed can be regulated.

## Heat exchanger

The heat exchanger is an aluminium rotary heat exchanger. It has a temperature efficiency of 80 - 83%. Thanks to the rotary heat exchanger it needs no drainage. The unit is fitted with an automatic defrost function controlled by outside temperature. The heat exchanger can easily be removed for cleaning.

## Preheater and afterheater

The unit is prepared for a built-in electric preheater, electric preheater+afterheater or electric preheater+water battery afterheater. In areas where the rated outside temperature (DUT5) is lower than  $-20^{\circ}\text{C}$  the installation is fitted with a preheater. The preheater is controlled by a thermostat. The afterheater in the unit regulates the supply air temperature. The unit can easily be retrofitted with a preheating and afterheating battery.

## Defrosting for RDAR

During very cold periods when frost can occur in the rotor, the built-in control unit automatically activates the defrosting function. The defrosting starts when the outdoor temperature drops below  $15^{\circ}\text{C}$ . During the defrosting, the supply air fan is shut off.

## Freezing protection for RDAR

In case of failure the air to the supply coil may come too low and cause a risk of too cold air into the room. The supply air temperature is limited from falling under  $5^{\circ}\text{C}$  firstly by reducing the supply air fan speed and secondly by stopping the supply air fan. The supply air fan is allowed to run with full speed at temperatures higher than  $10^{\circ}\text{C}$ . From  $10^{\circ}\text{C}$  downwards the supply air fan maximum allowed speed is gradually decreased from 100% down so that at  $5^{\circ}\text{C}$  the allowed speed is at 50%. If supply air temperature further falls below  $5^{\circ}\text{C}$  the supply fan and electrical heaters are shut off. The unit needs to be checked and restarted manually after the failure. The failure is indicated on alarm lamp.

There is no freezing protection function based on heating coil return water temperature. At climatic areas where outdoor temperature falls below  $-25^{\circ}\text{C}$  ..  $-30^{\circ}\text{C}$  the need for additional external freezing protection should be considered based on installation circumstances.

## Control equipment

The unit has control equipment that automatically manages its operation. The control equipment is placed behind the outer hatch. The normal flow of the supply and exhaust air fans and the desired supply air temperature are adjusted with an easily accessible potentiometer. The desired air flow is set on a control panel (accessory). There are three different settings, "Not home" for saving energy, "Normal" and "Forced" air flow. "Forced" air flow is used when a higher need of ventilation is wanted, i.e. when cooking. The control panel also has a filter replacement indicator lamp.

## Filter

The unit can be fitted with class G4 (exhaust air side) and F5 (supply air side) filters in various combinations, see product code.

## Materials and surface finish

<b>Casing:</b>	White painted sheet metal
<b>Colour:</b>	NCS 0502 Y08R (RAL9010)
<b>Heat exchanger:</b>	Aluminium

## Technical Specifications

<b>Voltage:</b>	230 V, single phase, 50 Hz
<b>Rated output:</b>	800 W
<b>Preheater:</b>	El, 1000 W
<b>Afterheater:</b>	El, 1000 W
<b>Motors:</b>	Combined rated output 2 x 175 W
<b>Connection:</b>	Earthed plug

# Technical and sound data, dimensions

## Supply air fan

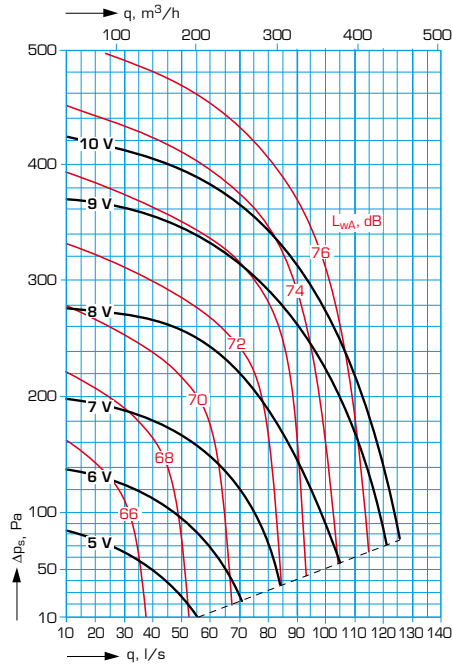


Diagram 1. a) Supply air fan, potentiometer setting  
b) Sound to duct,  $L_{WA}$ , for supply air fans  
c) Filter F5

## Exhaust air fan

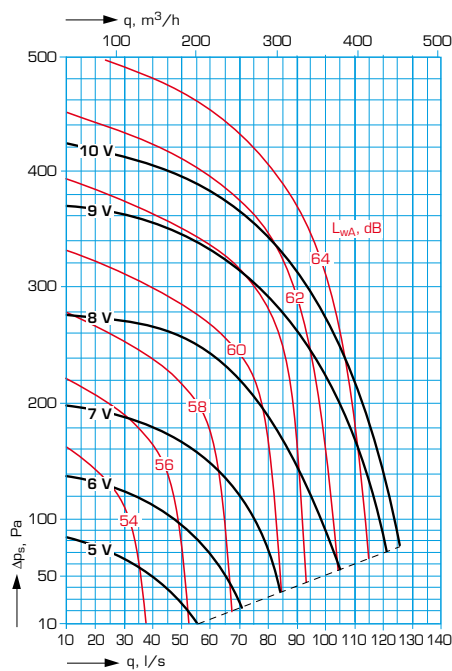


Diagram 2. a) Exhaust air fan, potentiometer setting  
b) Sound to room,  $L_{A10}$ , from unit with the forced air damper in the cooker hood closed  
c) Filter G4

## Technical data

The capacity data in the diagrams is based on an achieved even internal pressure balance between the supply air side and exhaust air side through a damper on the exhaust air side for example.

## Sound data

The sound curves in the fan diagrams applies to supply air duct and exhaust air duct on the exhaust side of the unit.

Sound power level in octave band, dB, is calculated from sound value in diagram ( $L_{WA}$ ) + octave band correction (with character) according to the table below.

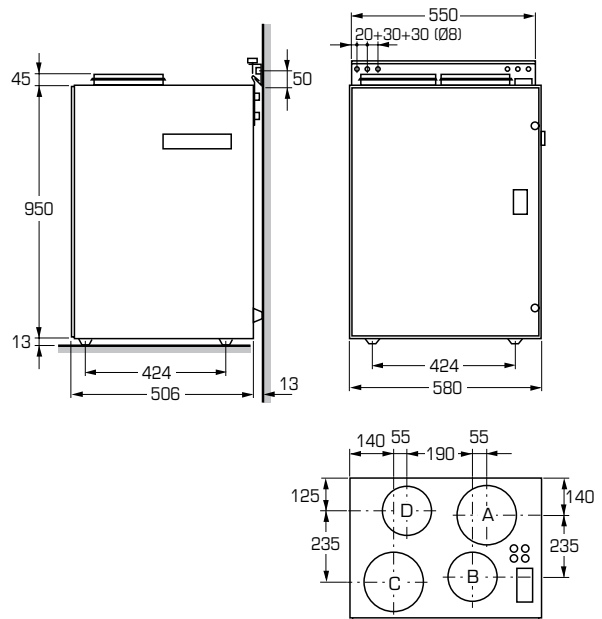
Sound way	Octave band, middle frequency, Hz							
	63	125	250	500	1k	2k	4k	8k
Supply air duct, dB	13	9	2	-4	-8	-11	-16	-21
Exhaust air duct, dB	18	11	2	-4	-16	-23	-33	-41
To room, dB [-13]	11	14	9	-2	-6	-12	-16	-17

Supply air duct =  $L_{WA}$  from diagram 1 for supply air fan

Exhaust air duct =  $L_{WA}$  from diagram 2 for exhaust air fan

Sound to room =  $L_{WA}$  from diagram 2 for exhaust air fan minus 13 dB provides sound pressure level, dB(A) at 10 m<sup>2</sup> room absorption

## Dimensions



Connection	A	B	C	D
Diameter	200	160 <sup>1)</sup>	200	160 <sup>1)</sup>
	Supply air	Exhaust air	Outdoor air	Extract air

<sup>1)</sup> Increased to Ø200 mm as space permits.

# Control equipment, accessories

## Control

The unit has control equipment that automatically manages the operation of the fans, rotary heat exchanger and electrical heater.

## Fan speed

There are three fan speeds. Only the normal operation fan speed needs to be adjusted. Maximum speed is used for forcing the air flow.

The minimum speed can also be adjusted and used when one is not at home in order to save energy. The fan speed of the two fans can be adjusted independently of each other. Adjustment is carried out on the unit's control unit.

The desired speed can be selected on the control panel which can be positioned anywhere, for example in the hallway or entrance to the bathroom.

The control panel has a button of an arrow used to select "Not home"/"Normal" or "Forced" mode. The latter can be set for 120 min. After that time the speed returns to normal operation.

An external alarm, a fire alarm for example, can be connected to the unit. This will stop the unit in the event of an alarm.

## Function

The rotary heat exchanger is very efficient. Under some periods of the year, as in fall and spring, the temperature efficiency can sometimes be too high and thereby the supply air temperature higher than wanted. If you want to save energy and can accept the higher temperature under these few days, set the unit in "Normal" mode.

## Energy operating modes NORMAL and REDUCED

RDAR has two energy operating modes that are used to control exactly how the supply air temperature is regulated, which provides the facility for extra energy-saving.

- In the "NORMAL" position, the supply air temperature is adjusted to the desired reference value in two stages. As a first stage with the energy recovery from the rotary heat exchanger, and, if this is insufficient, as a second stage with the electrical after heater.
- In the "REDUCED" position, the rotor and the electrical after heater have separate reference values. The supply air temperature is first adjusted to the desired reference value with the energy recovery from the rotary heat exchanger. If the rotor is not able to recover sufficient heat, the electrical after heater is used, but with a reference value that is 2° C lower than the normal reference value.

In both energy operating modes, the electrical after heater can only heat the supply air if the rotor is in operation.

There is no need for an afterheater in areas where temperatures rarely drop below -10 °C.

## Filter replacement

Filter replacement is indicated by a lamp which lights on the control panel when it is time to replace the filter.

## Tillbehör

### Combined hood ABRZ-01-1

Outsidewall hood for outdoor air and extract air, mounted on wall. It prevents leakage between the two air flows. The hood is manufactured in black, plastic coated sheet metal and consists of a wallsheet, a wall hood and a front sheet. The front sheet is detachable and reversible.

### Air intake BSDB-20-016

For positioning on outside walls. The intake consists of a box which has a outside wall grille as a rain guard. So it does not need to be positioned where it is not exposed to rain.

### Silencer BDER-30-020-090

Circular silencer for 200 mm diameter pipes.  
L x Dy = 900xØ300.

Noise attenuation at	Middle frequency, Hz							
	63	125	250	500	1k	2k	4k	8k
BDER-30-020-090	2	7	13	24	31	44	31	20

### Spare filter RDAZ-10

Set of 2+2, supply air and exhaust air for RDAR

### Control panel RDKZ-41-1

External control panel for installation on wall. There is three different settings for choosing the fan speed; "Not home" for saving energy, "Normal" and "Forced" air flow. The control panel also has a filter replacement indicator lamp.

## Packaging/Installation

The unit is supplied in a cardboard box. The unit is intended for wall mounting in a heated space. The supplied mountingbrackets must be screwed into a stud wall.

# Product code

## Product code

<b>Ventilation unit</b>	<b>RDAR-aa-b-c-d-e</b>
<b>Size (aa)</b> _____ 01	       
<b>Placement of supply air (b)</b> _____ 1 = supply air on the right	
<b>Recycler (c)</b> _____ 1 = not hygroscopic rotor	
<b>Additional heater (d)</b> _____ 0 = without 1 = electric afterheater 1000 W 2 = preheater + electric afterheater 2 x 1000 W 3 = electric preheater 1000 W + water battery afterheater	
<b>Generation (e)</b> _____ 1	

## Accessories

<b>Combined hood</b>	<b>ABRZ-01-1</b>
<b>Air intake</b>	<b>BSDB-20-016</b>
<b>Silencer</b>	<b>BDER-30-016-090</b>
<b>Filter</b>	<b>RDAZ-10</b>
Set of 2+2, supply air and exhaust air for RDAR	
<b>Control panel</b>	<b>RDKZ-41-1</b>
<b>Installation cable for control panel</b>	<b>RDKZ-43-1-cc-1</b>
<b>Version (b)</b> _____ 1 = 6-pole flat cable	   
<b>Length (cc)</b> _____ 10 = 10 m 25 = 25 m	
<b>Generation (d)</b> _____ 1	