VENTOVIND™ PRO

Demand controlled ventilation for attics

USER MANUAL







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Area of use

VentoVind[™], designed for cold attics, is a system which provides optimised ventilation thereby minimising moisture-related problems such as mould and rot. This is achieved by the system's control unit reading off the climate both outdoors and indoors using sensors, and ensures that the supply air fan is only activated when the outdoor air has a moisture content lower than the indoor air. The principle is patented and originally developed at Chalmers University in Gothenburg, where it was evaluated in practice in several reference installations that were carefully monitored. VentoVind[™] is a proven technology which has been used for several years to solve moisture problems in attics in an energy-efficient way. A big advantage of VentoVind[™] is that the method is suitable for both large and small cold attic spaces as found in tenement buildings, schools etc., and it can be installed during and after construction.

A prerequisite for the installation of VentoVind™ is that the attic is thoroughly sealed so that uncontrolled air exchange towards the surroundings or towards the residence does not occur, but only through the supply air fan and the dampers that are part of the system. The fan is speed controlled to always supply the correct level of ventilation, and during operation it creates weak over pressure in the attic, which prevents humid air from entering the attic space.

To be able to handle even very unfavourable cases VentoVind™ is prepared to be supplemented with a dehumidifier which is put into operation as required, i.e. only when surrounding air is not able to lower the humidity.

Properties:

- Energy efficient
- Very quiet
- Flexible
- Service-friendly
- Robust



Manufacture directive

VentoVind™ is CE-labelled.

Disclaimer

- Incorrect installation and/or incorrect handling can cause property damage as well as injury.
- The manufacturer assumes no liability for damage arising as a result of failing to follow these instructions. Such damage is not covered by the warranty.
- Changes or modifications to the machine must not be performed without written permission from Corroventa Avfuktning AB.
- The product, technical data and/or installation and operating instructions are subject to change without notice.
- These user instructions contain information protected by copyright laws. No part of this
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Safety information

- This device is not intended for use by persons with reduced physical, mental or sensory impairments nor other persons lacking the necessary skills or experience, unless supervised or instructed by another person with responsibility for their safety.
- Children may only use the device under the supervision of an adult to ensure that the device is not used as a toy.
- Electrical installations carried out in connection with VentoVind™ installation must be done
 by a qualified electrician in accordance with local and national regulations.

The following instructions must also be observed:

- 1. VentoVind™ must not be powered on before installation is completed in accordance with this manual.
- 2. VentoVind™ and its fan(s) as well as any electromechanical dampers must not be covered as this can cause overheating and a fire hazard.
- 3. VentoVind™ may not be used in areas where it can produce explosive gases.
- 4. Do not insert objects into the fan as this could damage the apparatus and injure people.
- 5. Install VentoVind™ and its fan(s) and dampers in accordance with this manual so that it cannot tip over, fall or in any other way injure anybody or damage property.
- 6. Keep children, animals and bystanders away from the workplace.
- 7. Any installation work at height, on roofs or facades must be carried out in accordance with occupational safety regulations to prevent fall accidents and fall injuries.
- 8. Contact the supplier if VentoVind™ is damaged or if the plug or the electrical cable is damaged. Do not make any repairs yourself if you have not undergone adequate training.
- 9. Do not damage the electrical cable. The cable must not run through water or over sharp edges.
- 10. Never carry or drag VentoVind™ by its cables.
- 11. Using electrical equipment in very damp or wet conditions can be dangerous. Do not use VentoVind™ if it is standing in water.
- 12. Use an earth-fault breaker to minimise the risk of electric shock.
- 13. Water must not come into contact with the system's electrical components. If it does, ensure that they are dried thoroughly before the unit is used again.
- 14. Never open VentoVind™ or any of its components without first ensuring that it is disconnected from power.
- 15. When servicing the fan, after first disconnecting it from power, you must wait two minutes before opening the fan. This is so that the fan wheel has time to stop. Warning decals with this can be found on the fan, and are also shown in this manual in chapter: <u>Maintenance and Service</u>.
- 16. The control panel is only intended for indoor use. Temperature: $-0 +40^{\circ}$ C. Humidity: 20 70 % relative humidity, non-condensing.
- 17. The control unit is only intended for indoor use. Temperature: $-20 +40^{\circ}$ C. Humidity: 20 100 % relative humidity, non-condensing. Max. height above sea level: 0 to 2000m
- 18. Sensors can be installed outdoors well-protected from rain and sun. Temperature: $-20 +40^{\circ}$ C. Humidity: 20 100 % relative humidity, non-condensing. Max. height above sea level: 0 to 2000m
- 19. VentoVind™ must not be used with accessories other than those described in this manual or approved by Corroventa Avfuktning AB.
- 20. Installation work in attic spaces can involve: Uncomfortable working positions, dusty air, mould spores, poor lighting etc. Use the relevant protective equipment and protective clothing in accordance with the employer's regulations/ applicable local work environment plan.
- 21. Fans such as KVKE 250 or larger weigh more than 25 kg. Use of a two-man lift is recommended according to AFS2012:02
- 22. Installation of the product can involve work at height/work on roofs. Work in accordance with AFS 1981:14, Protect against injury by falls.

Contact the supplier of this unit for further advice on safety and product use.



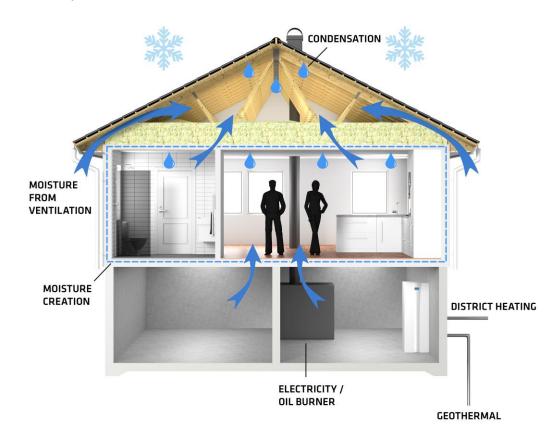
Relative humidity and its impact on materials

All air contains a greater or lesser degree of moisture. We can't see it with the naked eye until it appears in the form of small water drops against a cold metal or glass surface for example. However, before it is visible, moisture is already causing problems by affecting materials and manufacturing processes, causing corrosion and growth of micro-organisms. It can be taken for granted that the Nordic climate is always humid. Large areas of water, in the shape of thousands of lakes and the surrounding sea, cause a lot of humidity.

Air moisture is measured and usually given in relative humidity (% RH). This is a measurement of how much moisture the air contains compared to how much it can hold in total at a given temperature and pressure. The higher the temperature, the more water the air can hold but it is the relative humidity which is calculated, and which must be controlled.

At 100% RH the air is saturated and the moisture falls in the form of small water droplets. Steel corrodes at 60% RH and at 70% RH there is a risk of mould. A rule of thumb is that 50% RH is a good climate for most materials but here in Scandinavia, it is rarely that low. The annual average value in most places is around 80% RH and can be equally high in both summer and winter.

Moisture problems in cold attics



An adult human being evaporates approximately 40 - 50 grams of water per hour when at rest at room temperature and a family can easily produce 10 litres of water per day that evaporates into the



indoor air. Other sources of moisture production in a residence are baths/showers, drying laundry and cooking.

Most of the moisture is transported away by the residence's ventilation but when hot air wants to rise upwards, some of that moist air can flow into the attic through leaks at attic joist level.

Nowadays, plastic wrapped joists are available in order to create a seal but some leakage always occurs.

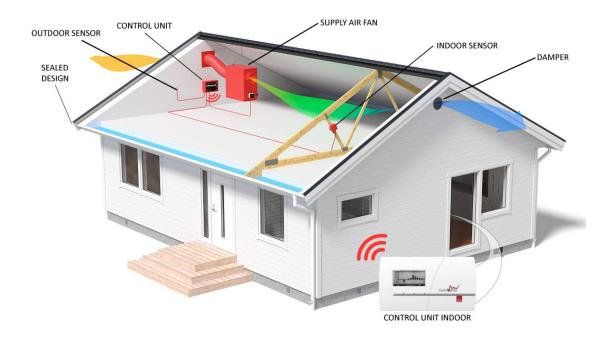
Moisture in the attic can also come from other sources. Incoming moisture via the attic's ventilation can condense when moisture content and temperature differences occur between the climate outside and in the attic space.

Building moisture that comes from materials that are naturally moist during the construction period such as wood and concrete. If too much moisture leaks into the attic, there is a risk that the humidity will be so high that there may be problems with mould and rot on the tongued and grooved timber or plywood of the outer roof structure. The risk of growth is often greatest in particularly cold areas where the relative humidity is highest: for example at a northern corner, far down towards a ventilated eave. If it gets too cold, there is a large risk of the moisture precipitating as condensation.

The residential ventilation, which mostly consists of natural draft or a mechanical exhaust air system, helps to reduce moisture leakage up to the attic by creating a negative pressure in the residence. Today, however, it is quite common to change heating systems from firing with heated chimneys to, for example, geothermal heat pumps or district heating. In such a situation it is important to check that there is still sufficient ventilation, since the driving force of the natural draft has been removed. There is otherwise a great risk, among other things, of increased transport of moist air up to the attic.



How VentoVind™ works



VentoVind™ is a patented method for adaptive controlled ventilation that guarantees that ventilation only takes place when it benefits the attic space. The supply air system ensures ventilation at the right times while establishing a positive pressure scenario in the attic that prevents the travel of moisture up from the residence. The technology works best if the attic is sealed as tightly as possible where the aim is that all ventilation occurs via the VentoVind™ system. The system's mechanical parts consist of a controlled supply air fan and a mechanical or motorised exhaust air damper. The supply fan is powered and the speed controlled via a control unit placed inside the attic. Sensors that measure the outdoor climate and the climate in the attic are connected to the control unit. The control unit reads off the sensors and determines, via an algorithm, whether the ventilation should be open or closed, and also controls the fan speed accordingly. In this way, the ventilation is optimised to the temporary ventilation requirement and as little energy as possible is consumed. The ventilation system is only operational when the moisture conditions are beneficial for ventilation using outdoor air.

Auxiliary dehumidifier

To ensure satisfactory drying even in very unfavourable conditions, VentoVind™ can be supplemented with a backup dehumidifier. This is an option and requires extra wiring-installation. The VentoVind™ system is pre-set so that the dehumidifier is put into operation as required, i.e. only when drying with adaptive ventilation is not able to lower the humidity below the set level. Only dehumidifiers intended for fixed installations in cold attics are recommended for this type of installation.



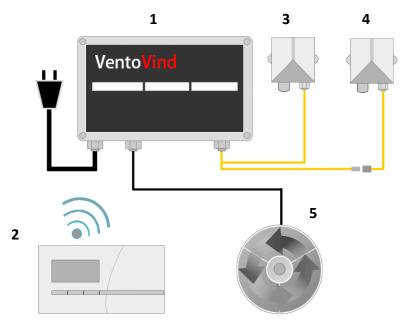
Delivery check

VentoVind™ PRO Villa has a 160mm connection. VentoVind™ PRO Villa Large has a 200mm connection and is supplied with the following parts in the package:

Control unit VentoVind™	1 x
Outdoor sensor with 15m cable	1 x
Indoor sensor with 15m cable	1 x
Fan unit with 15m cable	1 x
Back draft damper 160	1 x
Hose SC 1.3m	1 x
Wall plate (internal)	2 x
Protective cover	2 x
Hose clamps	2 x
Nipple	1 x
User instructions	1 x
Brackets for Control unit	4 x
Mounting screws	8 x
Plastic pouch + operation & maintenance instructions	1 x
Bracket for Fan	1 x
HomeVision PRO Control panel	1 x
AC adapter	1 x

Control unit VentoVind™

Overview, controls and connections. The following images show the VentoVind™ control unit with external components.



1.	Control unit. Voltage 230 VAC 50Hz 5W (plug)
2.	Control panel. Voltage +5 VDC 800mA (Only use the AC adapter supplied)
3.	Indoor sensor. Voltage +24 VDC via ModBus
4.	Outdoor sensor. Voltage +24 VDC via ModBus
5.	Fan. Voltage 230 VAC 50Hz Max output 315W



VentoVind[™] installation



Note that any electrical installations carried out in connection with this work must be done by a qualified electrician in accordance with local and national regulations. VentoVind™ must be connected to an earthed, single phase 230 VAC/50 Hz socket. The socket must be fused up to 16A and an earth-fault breaker is recommended. Relevant protective equipment and protective clothing must be used in accordance with the employer's regulations/applicable local work environment plan AFS2012:02 AFS1981:14.

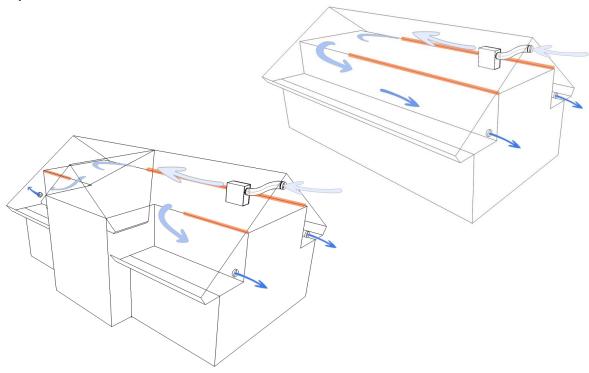
VentoVind™ is installed and assembled in the following steps.

Step 1: Make connections to outdoor air and power.

Step 2: Seal the attic.

Step 3: Assemble the equipment.

Step 4: Start the unit.



Planning installation, vents and air flow

In the vast majority of cases, existing vents can be found in the gable ends of the house which can be used for VentoVind™. Ensure that vents have satisfactory capacity in order to achieve the correct air flows. Avoid existing vents with louvres as these are very likely to cause wind noise when the fan operates. Regardless of whether it is one continuous roof space attic, divided roof space attic or attic space on the same level as the living space, try to design the installation so that the drier outdoor air flows through the entire attic space before it is evacuated to the surroundings again. In simpler



attics, that consist of a single space, the air is most easily taken in at one end and evacuated at the other. For more complex attics with several spaces as the images above illustrate, ensure that the air can pass between the spaces. Seal unnecessarily long air gaps in order to control the flow optimally. If there are no gable vents, or, if for aesthetic reasons you do not want to use them, or if they are positioned so that any noise can be disturbing, ventilation can instead occur through a roof hood. A hood is not supplied and must be purchased separately. Install according to its instructions. In these cases a diameter equal to the supply air fan's duct is recommended to achieve the correct air flows.

Electrical socket

An earthed electrical socket, 1-phase 230VAC, fused up to 16A with earth-fault breaker must be available, and if such is to be installed new, place it near the entrance to the attic for easy access to the control unit. NOTE! Check the location of the control unit in relation to the fan and sensors so that the 15m long cables are long enough for the intended installation.

Sealing the attic.

This should of course be done in different ways for different houses and house constructions. The principle works best the better sealed the attic is against outdoor air. The idea is that all air that ventilates the attic should be controlled by the equipment to create the best conditions to keep the moisture levels down. The following is only a general description intended to give an understanding of what has to be achieved and knowledge of some different materials that may come into question. If in doubt about what kind of material and which principle is best suited for the relevant house, consult a professional.

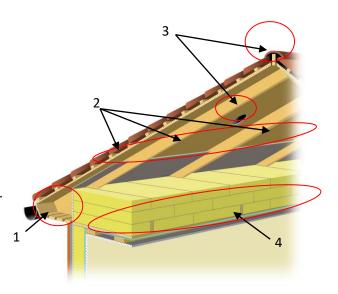
Gable and ridge vents

Vents that are not to be used for supply or exhaust air are best sealed using insulating board, bottom strip, polyurethane foam, sealant or similar material. When vents in or adjacent to the suspended ceiling are to be sealed, be careful so that no screws or nails penetrate the suspended ceiling and penetrate roofing such as baseboard, surface board or similar.

Air gaps

There are several alternatives for sealing air gaps. Of course, the house design determines which of the following is most suitable and feasible:

- 1. Screw painted wooden strips over the joist openings.
- 2. Caulk/seal the ventilation gap to the eaves using suitable material.
- Attach age-resistant construction plastic over the inlet or outlet for ceiling ventilation.
- 4. Seal the vapour barrier downwards to the living area with PE tape, polyurethane foam and age-resistant construction plastic.





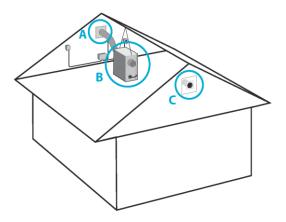
Vapour barrier at joist level

Newer houses have plastic sheeting at attic joist level, usually reinforced ones. Even in such houses, however, there may be some leaks that should be sealed. Large leaks through attic joists are usually most easily detected in the wintertime when there is a greater risk of condensation. Sometimes the leak manifests itself as local mould infestation on the ceiling above. Depending on the type of construction and leakage, aging-resistant PE tape intended for the vapour barriers or polyurethane foam can be used as sealing materials. Ensure that the vapour barrier is not damaged by the selected sealing material.

Other leaks

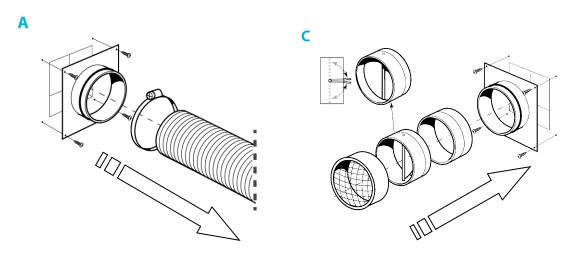
Other ventilation leaks, for example at roof lead-ins, roof entrances or gable ends can be sealed as best as possible using suitable material. Joint foam and sealant can be used for smaller cracks and plastic or sheet material may be needed for larger holes.

Installation



Dampers and wall plates

Install wall plates in the attic space over the openings for inlet (A) and outlet air (C). Install nipples, mechanical dampers and guards on the wall plates for outlet air (C). To ensure the mechanical opening and closing function of the damper, the damper must be installed with the centre shaft in the vertical position. The function of the damper is to allow air to exit the attic in the event of overpressure. Ensure that the damper opens when touched lightly, and springs back and closes without problem. Finally, install the guard. The intended air flow is indicated by arrows.





Fan installation



For fans weighing more than 25 kg, a two-man lift according to AFS2012:02 is recommended. If the fan is installed in a public area lock the guard on the fan's exhaust using a screw or pop rivet.

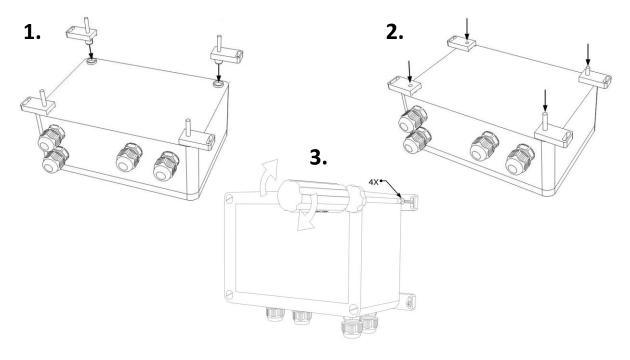
The fan can be installed suspended from the first truss a max. 1.3 m from the outer wall. Use the suspension equipment supplied. Ensure that the suspension point can withstand the weight of the fan. The fan must be freely suspended from the roof structure to avoid any structure-borne sound. Connect the fan's inlet to the wall plate via the supplied hose and hose clamps. Install the guard on the fan's outlet.

- 1. Weighing the fan for optimal balance.
- 2. Install the bracket on the edge. Screw into place.
- 3. Install the guard on the fan's outlet connection.



Installing the Control unit

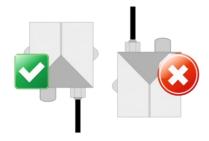
Install the supplied brackets on the control unit. Tap in the pins to secure the mountings to the control box. Then mount the control unit on a flat surface centrally and make sure it is easy to access.





Installing Sensors

VentoVind™ PRO is supplied with one indoor sensor and one outdoor sensor. It is important to position the sensors in the designated locations at installation. An incorrectly positioned sensor can cause incorrect operation of the VentoVind system.



Indoor sensor

The indoor sensor is connected to the control unit via a 15m cable upon delivery. The indoor sensor must be installed so that the measured values are representative of the general climate in the attic space. When VentoVind ventilates the attic space, the indoor sensor must not be affected by the incoming air too fast. Normally, the sensor is mounted in the far part of the attic in relation to incoming air flow from the fan and approximately at half the ridge height. Sensor and cable output must be pointing down. In cramped attics, the sensor should primarily be placed at the exhaust air damper, alternatively, the sensor can be placed behind the fan. The airflow of the fan must be directed away from the sensor so that the attic space can be ventilated before the indoor sensor is affected by incoming air.



Important!

- Do not place the indoor sensor so that it is affected by heat radiation or leaking air from outside or from the residential environment such as the proximity of an attic hatch or other leaks in the attic structure.
- Do no place the indoor sensor too close to incoming air from the fan.
- Do not place the indoor sensor in direct contact with the outer roof
- The indoor sensor may not be covered with insulation
- When removing the sensor cable ensure that the current to the control unit is disconnected

Outdoor sensor

The outdoor sensor is connected to the control unit via a 15m cable upon delivery. The cable has a connector 1.5m from the sensor that can easily be separated to facilitate routing the cable through pipes or walls. The connector is 10mm in diameter and holes for lead-through should be a diameter of at least 11mm. The connector must be weather-protected at installation.

The sensor must be installed so that the measured values are representative of the general climate in the outdoor air. It is therefore extremely important that the outdoor sensor is placed outdoors in a location that is protected from direct sunlight, rain and snow, preferably under the roof overhang or under the eaves on the house's north or west side. Sensor and cable output must be pointing down.



Important!

- Position the outdoor sensor so that it is not affected by heat radiation from the sun or other heat source.
- Do not install the outdoor sensor in or on any steel roof hood on the roof.
- Do not place the outdoor sensor too close to the vent for outgoing air from the attic space.
- Do not place the outdoor sensor by outgoing air from the house's ventilation system.
- the outdoor sensor must not be recessed, the sensor must be installed with a good exchange of air.
- When removing the sensor cable ensure that the current to the control unit is disconnected.



Starting and Settings

Make sure that the installation is completely finished before the current is connected to the control unit. The control panel is used for settings and test operation so connect it temporarily to an AC adapter close to the installation in the attic. More information about menu selections and settings can be found in the manual: *HomeVision PRO control panel*.

Once the settings have been made, the system automatically shifts to normal operating mode and the fan is then controlled by the current climate.

Connect the control panel to the control unit

The control unit is open for connection for 2 minutes after the control unit is powered. After 2 minutes, connection to the control panel is no longer possible, and the control unit must be restarted by disconnecting the current for a short period.

Setting date and time

Set the correct date and time via the control panel. In order for the timeline in the log that is stored on the USB memory to be easy to read, the date and time should always be checked and set as necessary. If the control unit is unpowered for longer than 24h the date and time must be reset.

Checks at start-up

To ensure the system's operation and function it is very important that the following points are checked.

Test operation of fan

The fan can be operated manually via the control panel (see control panel instructions)...

- Test operate the fan gradually at speeds between 30–100%.
- During test operation, check that air exits the attic space via the exhaust air damper.
- Check that no strange noises are heard from the fan or that whistling sounds occur at in and outlet vents at maximum speed.
- Check that the guard on the fan is installed. If the fan is installed in a public area lock the guard on the fan using a screw or pop rivet.

Mechanical exhaust air damper

The mechanical damper's flaps open when an overpressure of approx. 3-5pa is achieved in the attic space. At what fan speed an overpressure of 3-5Pa can be achieved and the damper opens, depends entirely on how well sealed the installation is. The mechanical damper should open at the latest when the fan is operating at 80 - 100%. If the damper does not open, the leak in the attic space is too large and additional sealing is required for proper function. Check that the damper flaps open without any problems when touched lightly and spring back to the closed position.



Maintenance and service

VentoVind™ requires minimal maintenance.

The attic space should be inspected visually one to two times per year to check the function of the system. Fans should be checked and cleaned as necessary, however, at least 1 time/year. This is to prevent imbalance that can result in unnecessary bearing damage. Servicing is performed according to the following instructions:



Note that the fan must always be disconnected from power and you must wait 2 minutes before opening it so that the fan wheel has time to stop.



Warning decal on the fan

- 1. Disconnect the fan from power (all-pole break)) and wait until the fan wheel has stopped.
- 2. Open the cover.
- 3. Clean the inside of the fan but be careful not to deform the fan wheel or upset its balance weights. Do not spray water inside the fan wheel.
- 4. Check that the fan wheel is not obstructed and can rotate freely without making any strange noises.
- 5. Close and screw the cover into place. Reconnect power.
- 6. Test operate the entire system and perform checks according to section: Checks at start-up
- 7. Check date, time and reset the service counter via the control panel.

Once the fan has been cleaned, check that the exhaust air damper opens as intended. Do this by lightly touching the damper flaps. The damper flaps should move freely and spring back after being touched. It can be advantageous to perform the same test as at installation, where you test operate the fan manually. See more under chapter <u>Starting and Settings</u>.





Servicing the control unit and sensors

After installation, the control unit and sensors require no maintenance and usually do not need further inspection. In the event of a fault with the control unit or sensors, only authorised staff may carry out repairs. Defective units must be removed by authorised installers.

Troubleshooting



Note that fans and the VentoVind™ system must be disconnected from power prior to servicing.

Fault symptom	Probable cause	Actions
The fan does not blow any air or is stationary.	The supply air side of the fan may be choked or obstructed. The fan has run hot and its overheating protection has tripped. The fan may be defective.	First try disconnecting the current to the fan for approx.: 10-60 min to allow the fan to cool. Then check the fan according to the points under maintenance and service. Then reconnect the current and see if the fan restarts. The fan can be test operated manually via the control panel.
The fan does not start when the connector is connected and HomeVision® control panel does not connect to the control unit.	Power connection and/or control unit connection	- Check that there is voltage in the electrical socket in which the Control unit is connected, that the fuse has not blown.
The damper does not open at 80–100% fan operation.	The installation is not well sealed and the required overpressure of 5 Pa is not achieved. The damper flaps have jammed.	Ensure that the damper opens when touched lightly, and springs back and closes without problemcheck that the installation is sealed and improve if necessary.
Noise from the fan.	Dirt/dust on the fan wheel causes imbalance and vibration noise.	-Clean the fan according to the service instructions.

If the measures described above did not remedy the error, contact your dealer for necessary service and support.



Technical data

Control panel

Height x Width x Depth, mm	85 x 150 x 30	
Weight, g	20	
Voltage AC adapter	+5 VDC / 800 mA	

Control unit VentoVind™ Pro

Cable length, m	5
Weight, g	50
Fuse Type	MAX T16A 250VAC
Voltage, VAC	230
Frequency, Hz	50

Sensor unit VentoVind[™] **PRO**

Height x Width x Depth, mm 110 x 100 x 5	
Cable length, m	15
Weight, g	150

VentoVind[™] PRO Villa fan, KVK Silent 160

Voltage, V	230
Frequency, Hz	50
Phase	1
Power, W	88
Current, A	0.402
Maximum air flow m³/s	0.153
Speed, p.m	2647
Max. temperature of transported air, °C	70
Max. temperature of transported air during voltage	70
control, °C	
Sound pressure level, 3m, db.(A)	37
Weight, kg	17.2
Insulation class, motor	F
Enclosure class, motor	IP44
Capacitor, off	2.5
Duct connection: circular, intake / Exhaust. mm	160



VentoVind™ PRO Villa Large fan, KVK Silent 200

Voltage, V	230
Frequency, Hz	50
Phase	1
Power, W	105
Current, A	0.465
Maximum air flow m³/s	0.205
Speed, p.m	2439
Max. temperature of transported air, °C	70
Max. temperature of transported air during voltage control, °C	70
Sound pressure level, 3m, db.(A)	40
Weight, kg	21.1
Insulation class, motor	F
Enclosure class, motor	IP44
Capacitor, off	2.5
Duct connection: circular, intake / Exhaust. mm	200

Accessories and Spare parts

The following parts are available as accessories and consumables for VentoVind™ PRO Villa / Villa Large

Article number	Designation
1002687	Sensor Indoor
1002686	Sensor Outdoor
6000194	Guard Ø 160mm
6000191	Wall plate 160mm
6000162	Collar Ø 160mm
6000192	Hose 1.5m Ø 160mm
6000193	Hose clamp
10328	Sensor cable, running meter for indoor sensor
6000190	Back draft damper 160mm
000565	Control unit VentoVind complete
10326	Panel HomeVision Pro
6000211	AC adapter white
6000221	Guard Ø 200mm
6000222	Wall plate 200mm
6000192	Hose 1.5m Ø 200mm
6000223	Back draft damper 200mm
1001112	Suspension wire VentoVind



DO YOU HAVE QUESTIONS OR NEED HELP?

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