PRODUCT DATA

COMFORT 252 TOP BY NILAN

GO GREEN BY NILAN

Ventilation & passive heat recovery

Domestic

Passive heat recovery

Ventilation < 250 m³/h

NILAN®
OUTSTANDING INDOOR CLIMATE

COMFORT 252 TOP

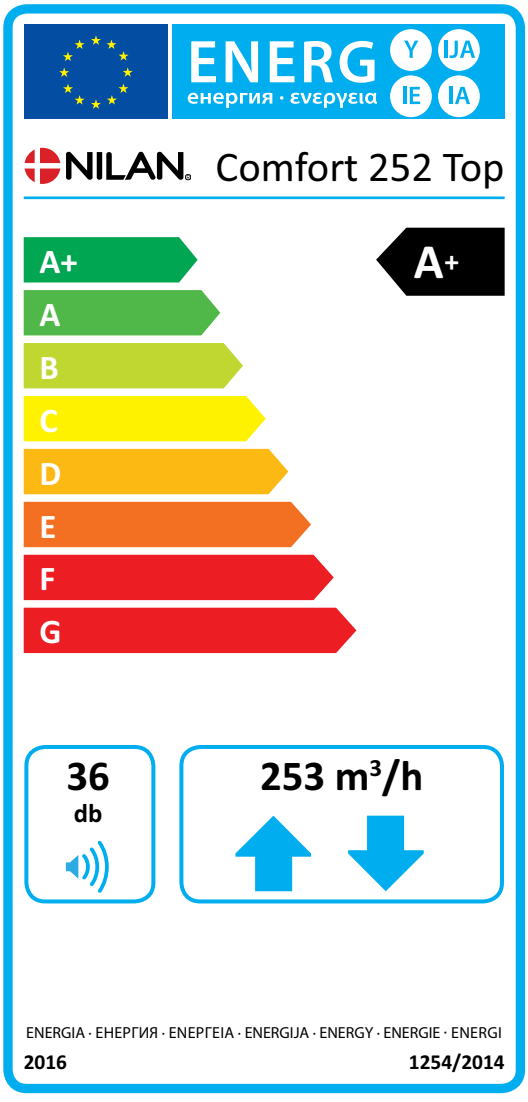
Product description

The Comfort 252 Top is an energy efficient ventilation unit, offering heat recovery for homes and smaller commercial buildings with ventilation requirements of up to 250 m³/h.

Comfort 252 Top is a system with compact dimensions, fitting into standard cabinets (60 cm).

To protect against frost, the Comfort 252 Top can be ordered with a built-in pre-heater.

The Comfort 252 Top is factory tested and ready for use.



Highest energylabeling

Comfort 252 Top meets stringent requirements and has earned the best energy rating for ventilation systems used in residential housing.

Can be connected to an external water or electrical pre-heating element

Time controlled alarm for filter change. Easy filter access - the top front panel manually unscrews easily.

There is plenty of space to replace filters and vacuum the filter space.

Visual alarm for filter change.

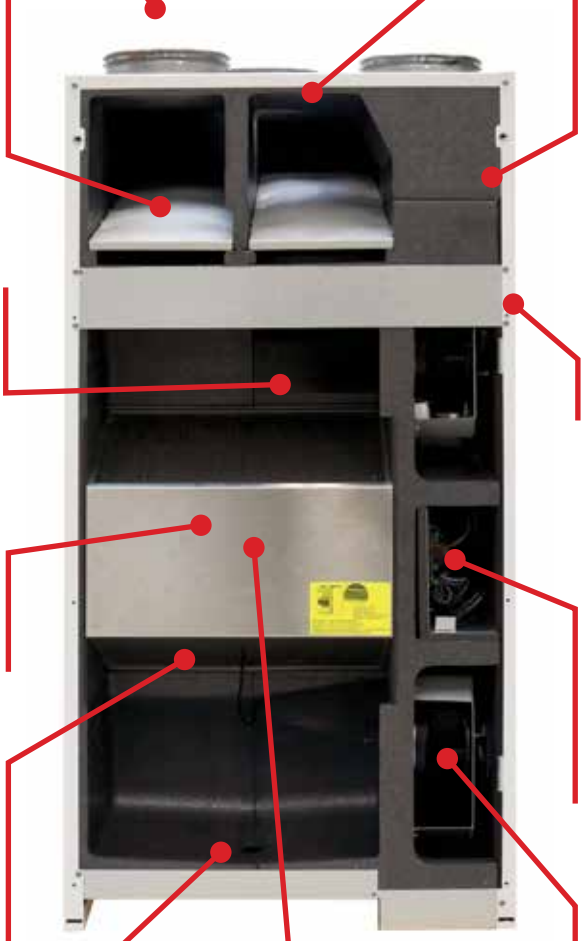
100 % automatic bypass function that carries the air past the counterflow heat exchanger when heat recovery is not required.

Efficient counterflow heat exchanger providing high temperature efficiencey and low pressure loss, resulting in good heat recovery and low energy consumption.

With built-in humidity control system for ventilation on demand.

Low speed ventilation at low humidity levels and high speed ventilation at high humidity levels (e.g. a bath).

Flexible condensate drain design means that the system can be fitted horizontally, vertically or at an angle.



Comfort 252 Top is also available as a Polar model with an integral frost-protection heating element.

Comfort 252 Top is built of an aluzinc housing with an EPS hub. The EPS material is easy to shape so that air is led smoothly through the system, and therefore consumes as little energy as possible.

Aluzinc steel plate,
white powder coating (RAL9016)

Comfort 252 Top offers a choice of control units:

CTS150 - a control unit with a simple control panel and few functions.
CTS602 - an advanced control unit with a very user-friendly HMI touch panel.

Chamber fan with B-wheel runs on energy-saving EC motors.

Stepless regulation at four different levels.

Air nozzles on the front measure air flow. This is used to regulate the system.

TECHNICAL DATA

Technical specifications

Dimensions (W x D x H)	562 ×575 ×1120 mm
Weight	41 kg
Plate type casing	Aluzinc steel plate, white powder coating RAL9016
Heat exchanger type	Polyethylenterephthalat counterflow heat exchanger
Fan type	EC, constant rotation
Filter class	ISO Coarse >90% (G4)
Duct connections	Ø 160 mm
Condensate drain	PVC, Ø 20×1,5 mm
Leakage classification (1*)	A1

Supply voltage	230 V (±10 %), 50/60 HZ
Max. input/power	177 W /0.77 A
Max. input/power (Polar)	777 W / 2.95 A
Tightness class	IP31
Standby power	3.4 W
Ambient temperature	-20/+40 °C
Heat loss (2*)	0.84W/m².K
Heat loss classification	T2

*1 Testet according to EN13141-7
*2 Testet according to EN1886

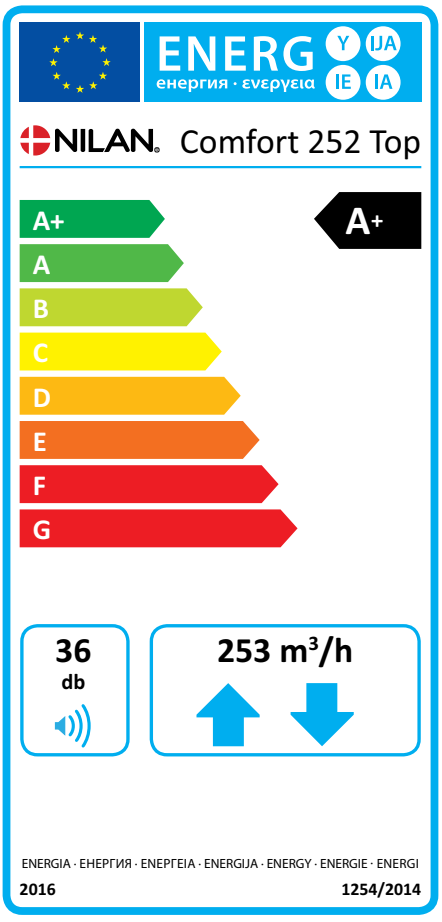
Data ecodesign

SEC* average climate	-42.3 kWh/(m².a)
SEC* cold climate	-81.4 kWh/(m².a)
SEC* warm climate	-17.2 kWh/(m².a)
SEC-Class	A+
Type	Two-way ventilation unit for residential
Type of drive	Variable speed drive
Type of heat recovery system	Recuperative (counterflow heat exchanger)
Thermal efficiency of heat recovery	91 %
Maximum flow rate	253 m³/h (100 Pa)
Electric power input of fan drive, including any motor control equipment, at maximum flow rate	77.6 W
Sound power level $L_{WA)}$	36 dB(A)
Reference flow rate	0.049 m³/s (177.1 m³/h)
Reference pressure difference	50 Pa
SPI	0.17 W/(m³/h)
Central demand control	0.85
Maximum internal leakage	1.5 %
Maximum external leakage	2.9 %
Visual filter warning	An alarm on the user panel appears when filters need changing. To maintain the performance and energy efficiency of the unit it is very important to change filters regularly.
Disassembly instructions	www.nilan.dk

* Specific energy consumption

AEC - annual electricity consumption	199 kWh/year (100 m²)
AHS** average climate	4667 kWh (100 m²)
AHS** cold climate	9110 kWh (100 m²)
AHS** warm climate	2106 kWh (100 m²)

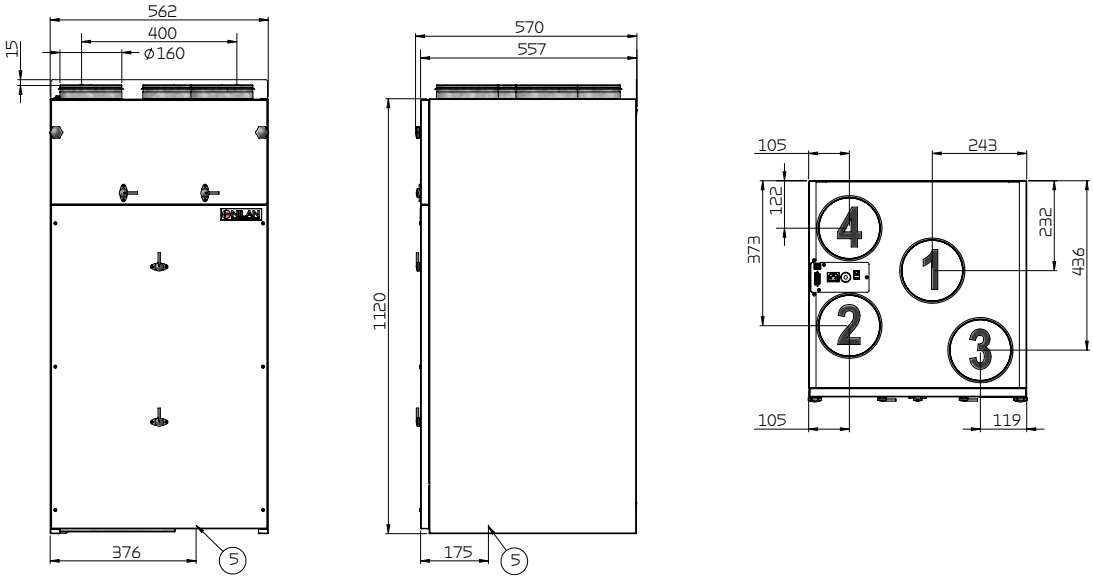
** Annual heating saved



Dimensional drawing

All dimensions are in mm.

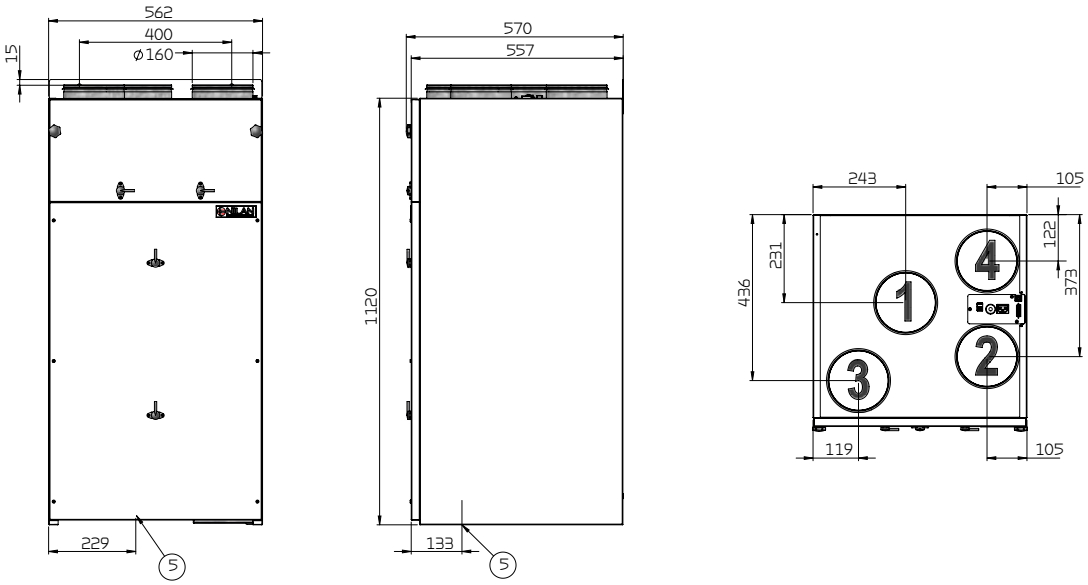
Left version:



Connections

1: Fresh air
2: Supply air
3: Extract air
4: Discharge air
5: Condensate drain

Right version:



PLANNING DATA

Capacity

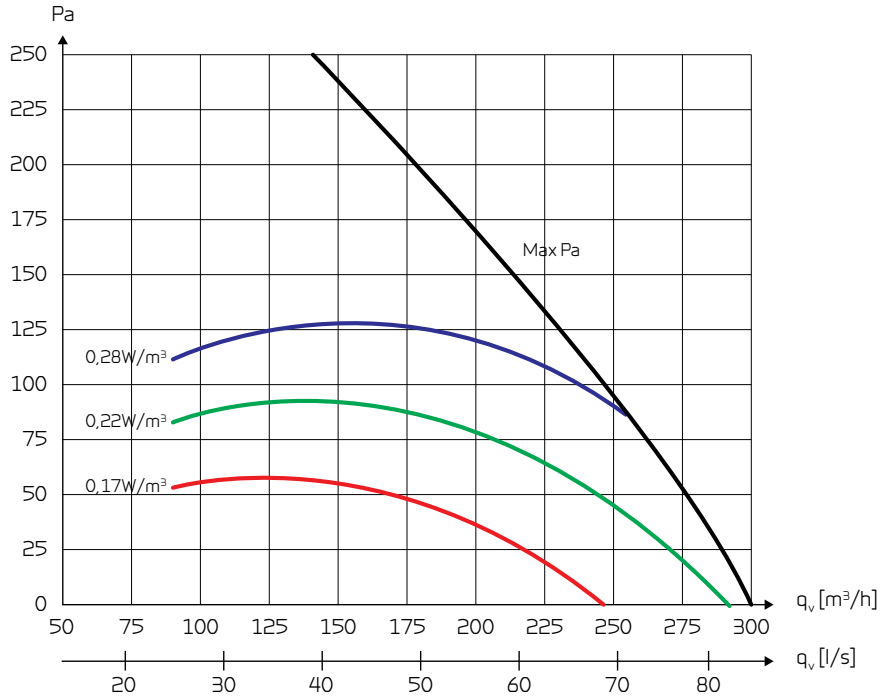
Capacity of standard unit as a function of q_v and $P_{t,ext}$.

SEL values according to EN 13141-7 are for standard units with ISO Coarse >90% (G4) filters and without heating element.

SEL values represent the unit´s total power comsumption for both ventilator, excl. control.

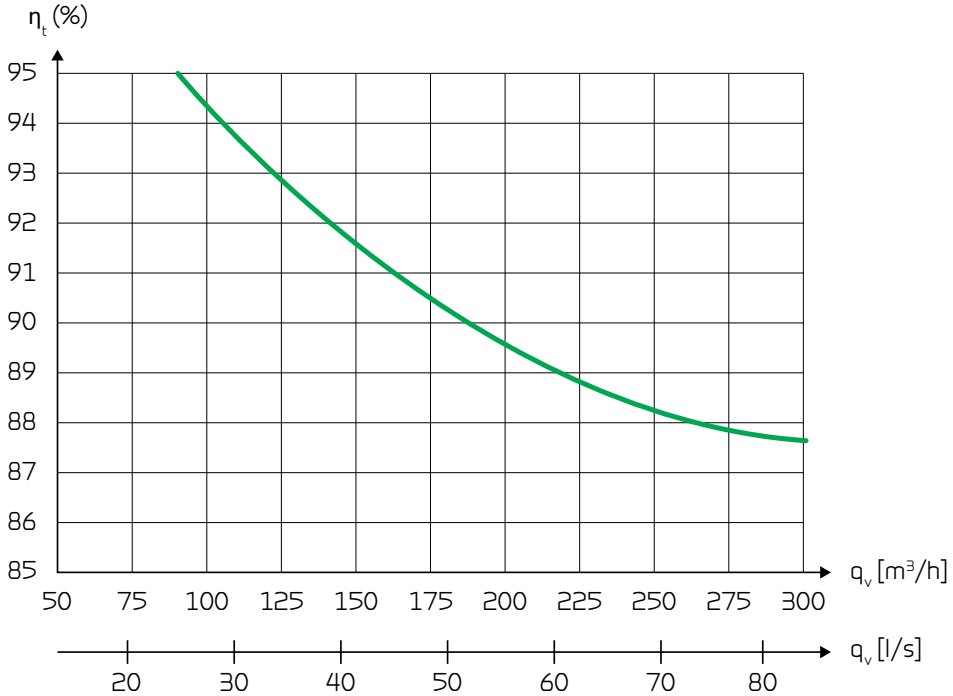
Testet according to EN13141-7

Attention! The SEL values are measured and stated as a total value for both fans.



Temperature efficiency

Temperature efficiency for units with counterflow heat exchanger according to EN13141-7 (dry).



Sound data

Sound data for q_V = 126 m^3/h and $P_{t, ext}$ = 100 Pa according to EN3744 for surfaces and EN 5136 for ducts.

Sound output level L_{WA} drops with falling air volume and falling back pressure.

Sound pressure level LpA in a semi-hemisphere at a distance of 1 m from the system.

Sound output level (L_{WA})

Octave band Hz	Surface dB(A)	Supply air dB(A)	Extract air dB(A)
63		29	26
125		53	45
250		63	52
500		64	50
1000		62	43
2000		61	39
4000		52	31
8000		36	17
Total ±2 dB(A)	25.8	69	55
LpA	18		

Sound data

Sound data for q_V = 220 m^3/h and $P_{t, ext}$ = 100 Pa according to EN3744 for surfaces and EN 5136 for ducts.

Sound output level L_{WA} drops with falling air volume and falling back pressure.

Sound pressure level LpA in a semi-hemisphere at a distance of 1 m from the system.

Sound output level (L_{WA})

Octave band Hz	Surface dB(A)	Supply air dB(A)	Extract air dB(A)
63		46	30
125		56	46
250		76	55
500		74	55
1000		71	49
2000		68	46
4000		60	32
8000		45	21
Total ±2 dB(A)	46.4	79	59
LpA	38		

OPERATION

Intelligent humidity control

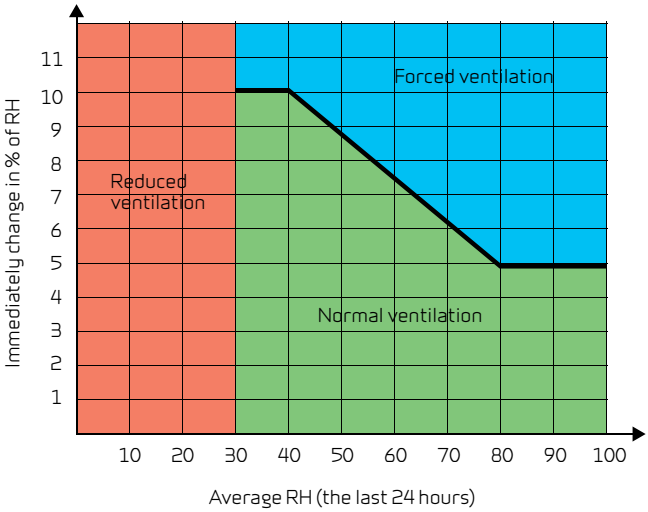
Nilan's humidity control automatically adapts to the needs of inhabitants or the building itself.

The intelligent CTS602 control unit does not require a set air humidity level (RH) to manage the air exchange. Using the integrated humidity sensor, the control unit calculates the average humidity over the past 24 hours and regulates the air flow accordingly.

Consequently the unit's efficiency is based on actual instead of theoretical air humidity levels.

Automatically adapting to air volume requirements saves energy as the number of persons in a home is relevant as to how much humidity is produced.

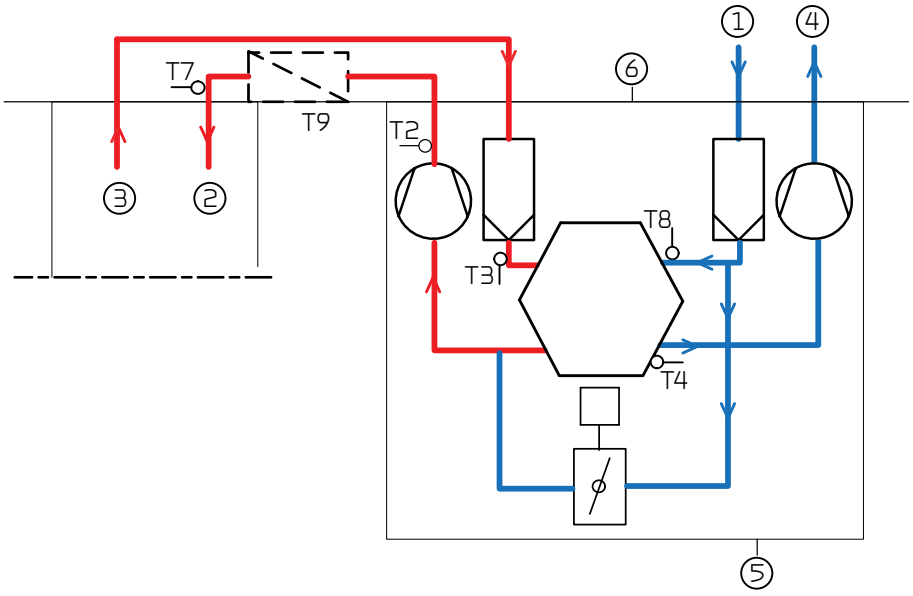
The unit also adjusts automatically to summer and winter levels.



If the air humidity changes by more than 5-10% in relation to the average level, the unit responds with a higher rate of air exchange accordingly.

When air humidity falls below 30%, ventilation scales back automatically. The percentage is adjustable from 15 - 45 %.

Functional diagram



Automation

T2/T7: Supply air sensor
T9: Heating element frost protection
T3: Extract air sensor
T4: Discharge air and defrost sensor
T8: Fresh air sensor

Connections

1: Fresh air
2: Supply air
3: Extract air
4: Discharge air
5: Condensate drain
6: Electric and water heating

Capacity - Heating element (accessory CTS602)

Electrical heating element

The electrical heating element is fitted in the supply air duct at a distance of min. 2 x duct diameter from the system´s fresh air inlet connection pipe (normally min 320 mm.) and connected to the CTS602 control panel and 230 V supply.

The electrical heating surface can supply up to 1,2 kW of heat.

Water heating element for duct fitting

The water heating element is designed to be built into duct and must be connected to the primary heating supply and the CTS602 control. The water heating element includes copper pipes and aluminium fins.

Capacities can be seen in the table below.

Capacity water heating element

Water side				Air side			
Temperature input/output [°C]	Flow [m³/h]	Pressure drop [kPa]	Output [kW]	Flow [m³/h]	Temperature before WHE* [°C]	Temperature after WHE* [°C]	Pressure drop over WHE* [Pa]
40/30	0.04	0.85	0.52	100	16	31.1	2
	0.06	1.25	0.64	135	16	29.8	3
	0.08	2.18	0.87	210	16	28.1	6
60/40	0.04	0.69	0.94	100	16	43.5	2
	0.05	1.00	1.16	135	16	41.1	3
	0.07	1.75	1.58	210	16	38.0	6
70/40	0.03	0.40	1.06	100	16	47.0	2
	0.04	0.58	1.30	135	16	44.2	3
	0.05	1.00	1.76	210	16	40.5	6

* Water heating element.

AUTOMATION CTS150

CTS150 Control

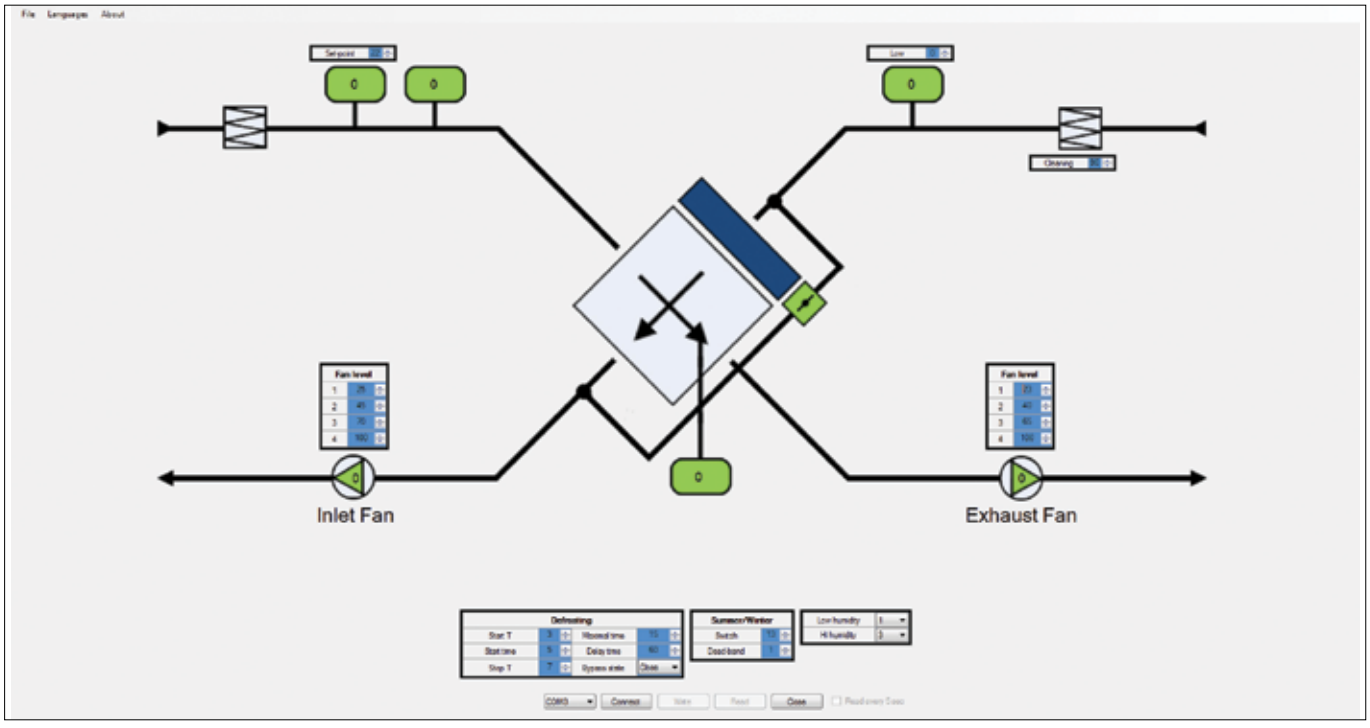
The CTS150 control unit is a simple control unit used to control the 252 Top system. It offers the user only limited access to settings.

Users can adjust the air volume and humidity levels.

The control unit also shows whether the system is working and when an alarm is triggered.

To set and regulate the system, it has to be connected to a PC via a USB flash drive. Download the software from NilanNet and install. The software can be used not only to set the system, but also to read operating data.

Functional overview		+ Standard - Accessories
Filter monitor	Filter monitor with timer (factory default setting is 90 days). Adjustable to 30/90/180/360 days.	+
100 % bypass	Bypassing the outdoor air reduces heat recovery when heat recovery are not required.	+
Humidity control	Allows you to set a higher or lower ventilation step in the case of high/low air humidity.	+
Summer/Winter operation	Possible to set operation for summer and winter.	+
Winter low	Allows you to select a low ventilation step in the case of low outside temperatures.	+
Defrost function	Temperature-based automatic function for defrosting the heat exchanger.	+
Temperature control	The system's overriding temperature sensor is T3 extract air.	+
Air volume	Allows you to set four ventilation steps stepless. Supply air and extract air are set individually. Step 1 < 25% - Step 2 < 45% - Step 3 < 70% - Step 4 < 100%	+
User option	It is also possible to activate user selection mode (Step 4) via a potential-free contact.	-



Software screen shot of the CTS150 automatic control and good overview on system settings.

ACCESSORIES CTS150

Electrical pre-heating element (Frost protection)

To prevent the highly efficient counterflow heat exchanger from freezing, we recommend that you fit an electrical pre-heating element. The element consumes very little energy but improves heat recovery. The net result is more cost-efficient operation. See page 16.

User selection/Range hood solution

It is also possible to activate user selection mode (Step 4) via a potential-free contact. The set includes a cable with two RJ12 connectors. Connect the connector at the unit and connect the control panel and the 10 m of cable, for example, to a range hood, ind the two-connectionbox.

User selection/range hood-damper solution

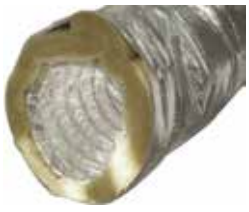
It is also possible to activate user selection mode (Step 4) via a potential-free contact. The set includes an RJ12 cable, a connection box for the range hood, damper connections as well as a 230V main supply plug.

Pollenfilter ISO ePM1 65-80% (F7)

Comfort 252 Top are as standard delivered with ISO Coarse >90% (G4) filter. If there are someone in the housing which suffers of pollen allergy, it is possible to order a ISO ePM1 65-80% (F7) pollenfilter to minimize the amount af Pollen in the supply-air.

Water trap

To prevent "false" air being sucked into the system via the condensate drain, the system must be fitted with a water trap. While there is water in the condensate drain, the water trap works well. However, during the summer months when there is no condensation of extract air, the water trap will dry out (and therefore cease to prevent "false" air intake). A Nilan water trap with ball prevents "false" air flow all year round.

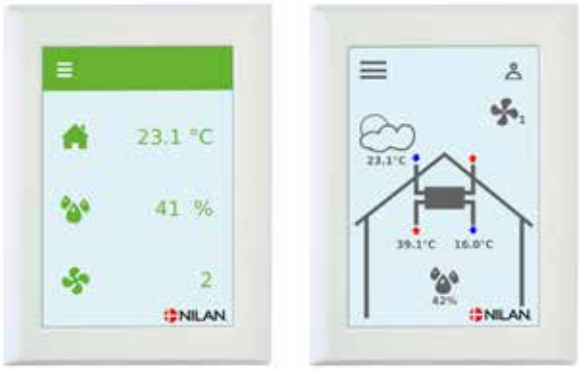


Flexible silencing

For easy fitting and excellent noise reduction between the system and the distribu-tion box and/or between the system and roof vents.

AUTOMATION CTS602

CTS602 Control



The CTS602 HMI touch panel is featuring a wide range of functions, e.g., menu-controlled operation, weekly programme settings, filter monitor with timer, fan speed adjustment, summer bypass (free cooling), supply-heating element control, error messages etc.

The CTS602 comes with factory settings, including a default setting which can be customised to operational requirements to achieve optimum operation and utilisation of the system.

There is an option for selecting between 2 front page images for the main screen.

Operating instructions for the CTS 602 can be found in a separate user manual supplied with the unit.

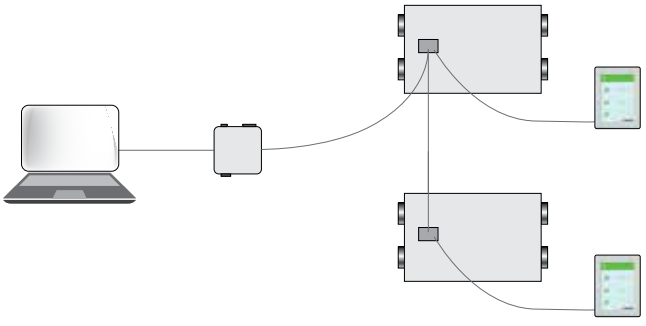
External communication

The CTS602 control unit communicates by default with Modbus RTU RS485 communication. A CTS system using this form of communication can easily be connected to the unit.

Nilan units have an open Modbus communication, i.e. not only can the unit be monitored, but its operation can also be set in the same way as it can via the operating panel.

The protocol is by default set up for a Modbus RTU30 address; however, values can be set between 1 and 247.

A Modbus converter allows you to connect one or more units to a computer to monitor and control the unit.



Functional overview		+ Standard - Accessories
3 levels	The control function is divided into 3 levels: User/Service/Factory with various options at each level	+
Weekly plan	The unit has 3 weekly programmes (with a factory setting of "off") • Programme 1: for working families • Programme 2: for stay-at-home families • Programme 3: for businesses There is also an option for you to set your own weekly programme.	+
User option 1 & 2	This allows you to override the operating mode in the main menu via an external potential-free contact or PIR sensor.	+
Alarms	Alarm log featuring the last 16 alarms.	+
Datalog	Possible to log data. Capacity 46.000 logs • Adjustable between 1 and 120 minutes • If "OFF", only events and alarms are logged	
Filter monitor	Filter monitor with timer (factory default setting is 90 days). Adjustable to 30/90/180/360 days.	+
Bypass	Bypassing the outdoor air reduces heat recovery when heat recovery are not required.	+
Air quality	Allows you to choose whether to switch humidity sensors and/or CO_2 sensors on and off.	+/-
Humidity control	Allows you to set a higher or lower ventilation step in the case of high/low air humidity.	+
CO_2 control	Allows you to set a higher or lower ventilation step in the case of a high CO_2 level.	-
Summer/Winter operation	Possible to set operation for summer and winter	
Winter low	Allows you to select a low ventilation step in the case of low outside temperatures	+
Defrost function	Temperature-based automatic function for defrosting the heat exchanger.	+
Frostprotection	Should a heating system fail, the unit is turned off automatically to reduce the risk of damage to the water heating coil from frost due to further cooling by the system.	+
Temperature control	Allows you to select the temperature sensor which will control the unit. • T3 EXHAUST (extract air)	+
Room low	Stops the unit when the room temperature reaches a pre-determined low, avoiding further cooling in case of a malfunction in the central heating system. The low temperature can be set from 1 - 20 degrees, controlled by: • T3 EXHAUST (extract air)	+
Air volume	Allows you to set four ventilation steps stepless. Supply air and extract air are set individually. Step 1 < 25% - Step 2 < 45% - Step 3 < 70% - Step 4 < 100%	+
External fire alarm	Possible to connect the unit to external firealarm.	+
Joint alarm	The unit can be connected to an external fire alarm.	+
Constant pressure control	Allows control from both the extract air and supply air side.	-
Cooling	Via bypass (can only cool with outdoor temperature) and cool recovery (can only cool with indoor temperature). This allows you to choose whether to run the system at a higher or the highest ventilation step during cooling. The weekly programme has an option for setting cooling at night.	+
Intake air control	Allows you to set the regulator to control the intake air temperature/supply air (only available if the control unit has been configured for a supply-heating element).	+
External water heating element	• Temperature sensor T7 is an supply air sensor • Integrated frost protection for external water heating element • Motorised valve and circulation pump control unit	-
External electric heating element	• Temperature sensor T7 is an supply air sensor • Overheating protection	-
Delayed start-up	There is a possibility for a delayed start-up by the fans, when a closing damper is installed.	+
Reset	Allows you to restore the factory settings.	+
Manual test	Allows you to test the unit's functions manually.	+
Language	Option for setting the relevant language (Danish/Finnish/Norwegian/Swedish/German/English/ French/Polish).	+

ACCESSORIES CTS602

Electrical pre-heating element (Frost protection)

To prevent the highly efficient counterflow heat exchanger from freezing, we recommend that you fit an electrical pre-heating element. The element consumes very little energy but improves heat recovery. The net result is more cost-efficient operation. See page 16.

Comfort 252 Top Polar model has an integral frost-protection heating element.

Water heating element incl. regulation

The supply temperature can always be raised to the required level using a water heating element. The water heating element is designed to be built into the duct and must be connected to the primary heating supply. Supplied with two-way adjustment valve, temperature sensor and frost thermostat ***(expansion PCB required)***.

Electrical heating surface incl. regulation

When fitting an electrical heating surface, fresh air temperatures can be raised to desired levels at any time. The electrical heating surface is supplied ready to fit into the fresh air duct and, for easy fitting, the device is pre-fitted with all the required sensors.

EM-Box

The EM-Box distributes extract air between kitchen and bathroom. If the range hood runs via the ventilation system and is operating, extract air flow from the bathroom is reduced to ensure that there is enough air to allow the cooker hood to extract cooking odours. To protect the system, the EM-box is fitted with a metal filter, which efficiently eliminates fat particles from range hood air ***(expansion PCB required)***.

DBTU damper

If there is not enough space to fit an EM-box, Nilan offers a DTBU damper, which can be fitted between kitchen and bathroom. The damper functions precisely like the EM-box but requires longer cables.

Expansion PCB

The expansion PCB provides additional functions for the CTS 602 control unit.

Pollenfilter ISO ePM1 65-80% (F7)

Comfort 252 Top are as standard with ISO Coarse >90% (G4) filter delivered. If someone in the housing suffers from pollen allergy, it is possible to order a ISO ePM1 65-80% (F7) pollenfilter to minimize the amount af Pollen in the supply-air.

Project model

Comfort 252 Top can be supplied with all connectors leading from the housing. This solution makes it easier to connect external components, such as range hood, damper and Modbus.

Fire suppression system

Comfort 252 Top can be supplied with an integral fire suppression system, for use in apartment blocks with a common discharge air duct and possibly common outdoor air duct.

Water trap

To prevent "false" air being sucked into the system via the condensate drain, the system must be fitted with a water trap. While there is water in the condensate drain, the water trap works well. However, during the summer months when there is no condensation of extract air, the water trap will dry out (and therefore cease to prevent "false" air intake). A Nilan water trap with ball prevents "false" air flow all year round.

Flexible silencing

For easy fitting and excellent noise reduction between the system and the distribution box and/or between the system and roof vents.

CO_2-sensor

Installing a CO_2 sensor allows for ventilation speed to be pre-programmed with the CTS602 and to increase ventilation at higher CO_2 levels in the extract air. CO_2 levels are programmable ***(expansion PCB required)***.

OPERATION

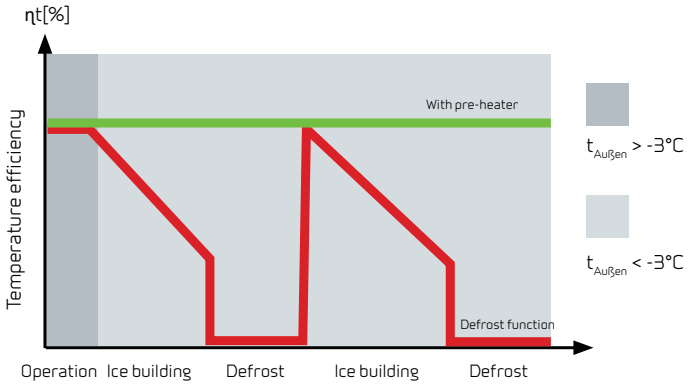
Frost protection

All ventilation units with a counterflow heat exchanger will ice up if the outdoor temperature is below freezing for a prolonged period.

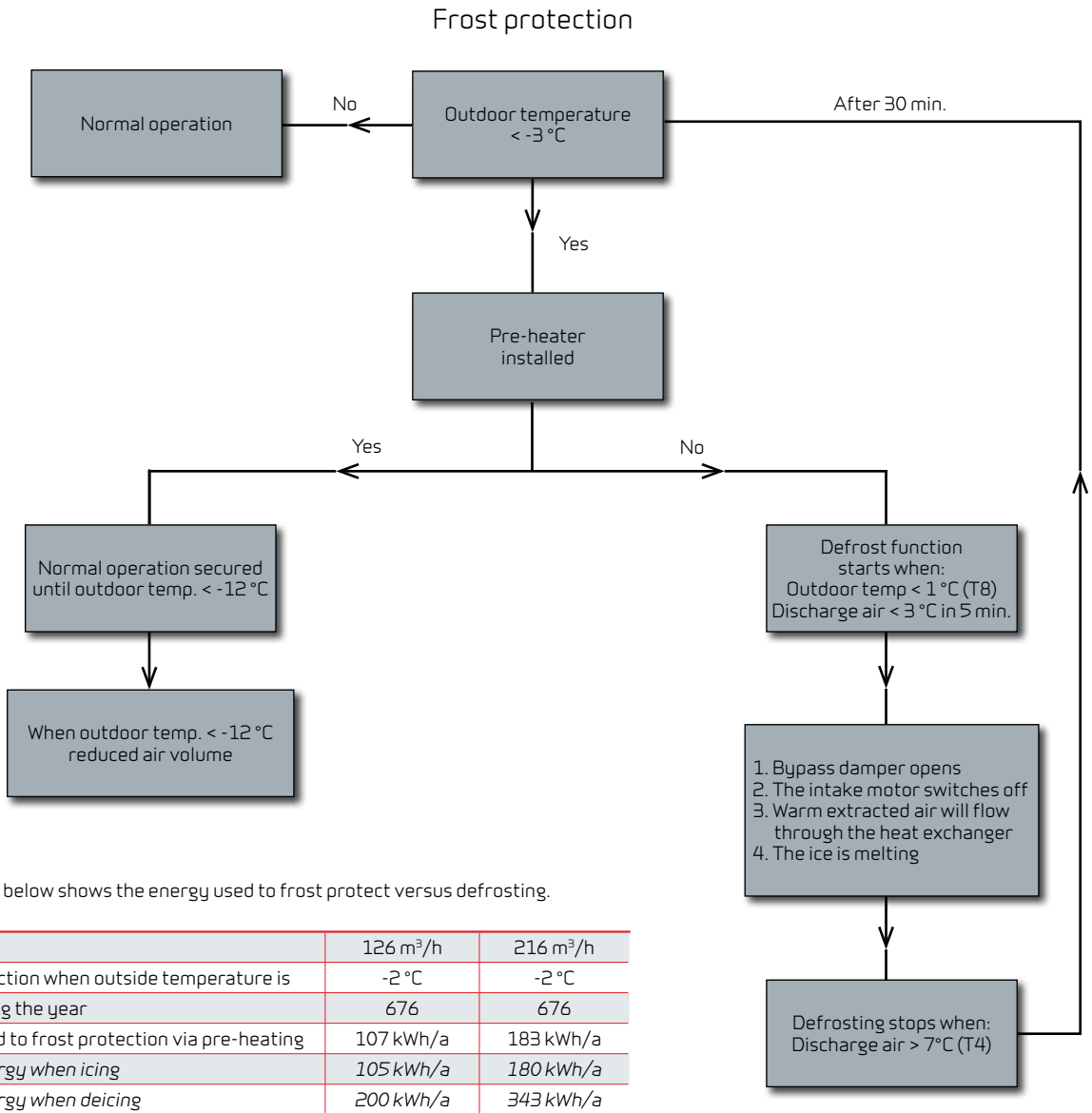
The extracted air condenses when it is cooled down during heat recovery. The high temperature efficiency will slowly turn the condensate to ice, which will block up the counterflow heat exchanger unless remedial action is taken.

It should be considered whether the unit's operation can be protected during a lengthy period of frost or whether it is acceptable to decrease its operation.

In homes which are occupied at night, it would be advisable to protect the unit against frost when the outdoor temperature is coldest by using a pre-heating element. On the other hand, if the ventilation is for an office, it may be acceptable to decrease the operating level at night.



The energy used for the preheating is not wasted, as it ensures a constant high temperature efficiency



The example below shows the energy used to frost protect versus defrosting.

Air volume	126 m³/h	216 m³/h
Frost protection when outside temperature is	-2 °C	-2 °C
Hours during the year	676	676
Energy used to frost protection via pre-heating	107 kWh/a	183 kWh/a
Loss of energy when icing	*105 kWh/a*	*180 kWh/a*
Loss of energy when deicing	*200 kWh/a*	*343 kWh/a*
Energy savings by using frost protection	**198 kWh/a**	**340 kWh/a**

Average calculation by Danish dry weather data.

DELIVERY AND HANDLING

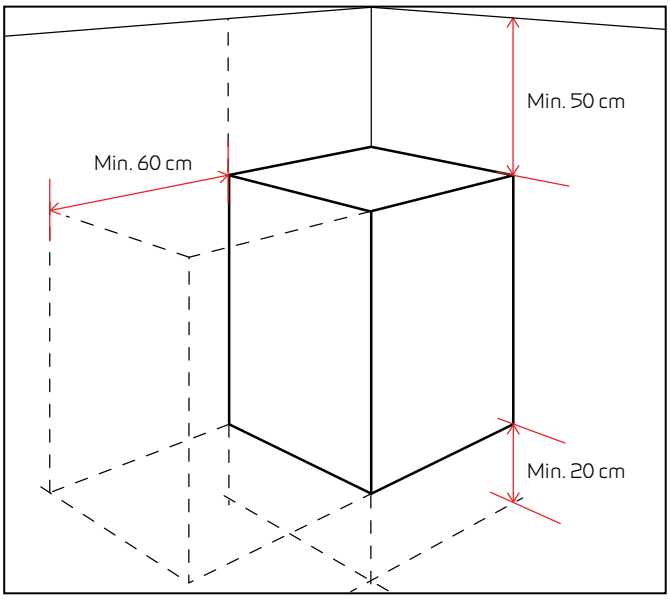
Transport and storage

Comfort 252 Top is shipped in protective packaging for transport and storage.
Comfort 252 Top must be stored in a dry place in its original packaging until installation.
The packaging should only be removed immediately prior to installation.

Installation conditions

During installation, future service and maintenance should be taken into account. We recommend a minimum gap in front of the unit of 60 cm.

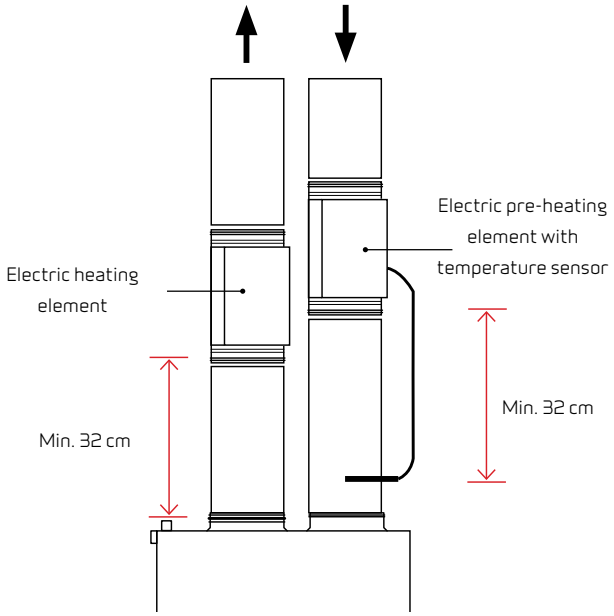
The unit must be installed level for the sake of the condensate drain. The condensate drain requires clearance of min. 12,5 cm under the drain nozzle.



Installation of electric heating element

Electric heating elements (accessories) are fitted in the duct. The heating element must be insulated using fire-resistant insulation material.

The electric heating element must be connected by an authorised electrician.



NIL*AIR*

Nil*AIR* is installed together with a ventilation unit,which in simple terms consists of distribution boxes from which tubes are led out to air extraction and air supply boxes in the individual rooms.

Nil*AIR* can be installed in ceilings, walls or floors. The lightweight tubes can be used for even the most complicated tube alignments, where e.g. traditional spiral ducts cannot be used.

Advantages

- Flexible and space-saving solution
- Rapid and simple installation with a click system
- Dimensionally stable and corrosion-resistant quality material
- Simple regulation of the air supply volume
- Low weight
- Airtight
- Easy to clean
- Easy to handle and transport
- Prevents sound travelling from room to room

Nil*AIR* is already installed in thousands of European homes and since its introduction more than ten years ago its use has steadily increased, due to the rapid and easy installation without any special tools being required.

Enabling the impossible

Traditional air distribution systems take up a lot of space and often make special building structures impossible. Nil*AIR* virtually eliminates this problem, due to the tubes' size and flexibility.

Installation examples



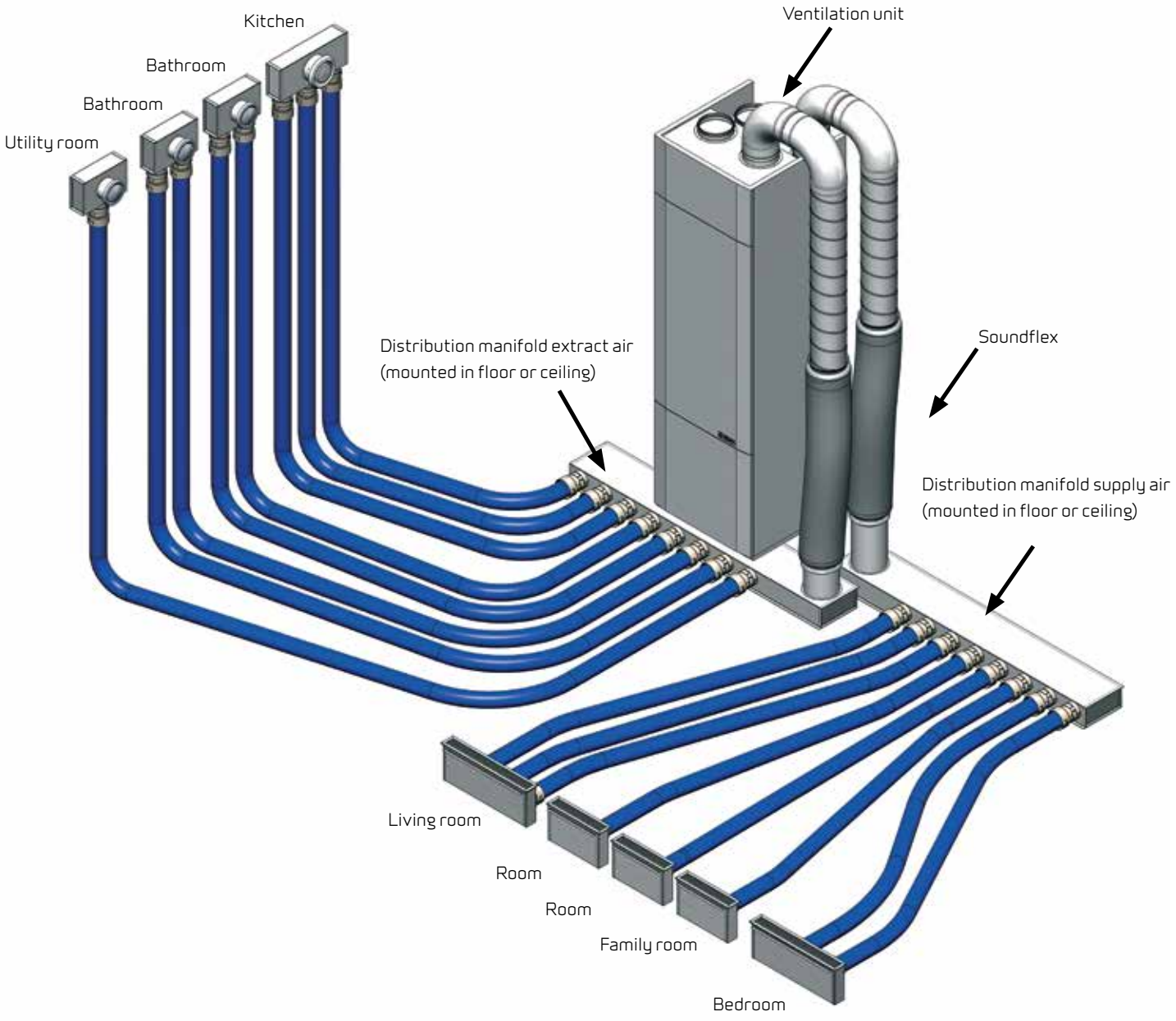





NILAIR PRINCIPLE

Air extraction

(mounted in wall or ceiling)



Air supply

(mounted in floor, wall or ceiling)

INFORMATION FROM A TO Z

Nilan develops and manufactures premium-quality, energy-saving ventilation and heat pump solutions that provide a healthy indoor climate and low-level energy consumption with the greatest consideration for the environment. In order to facilitate each step in the construction process - from choosing the solution through to planning, installation and maintenance - we have created a series of information material which is available for download at www.nilan.dk.

Brochure

General information about the solution and its benefits.

Product data

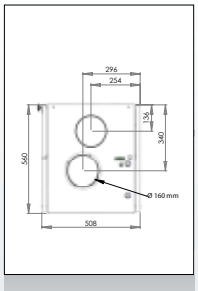
Technical information to ensure correct choice of solution.

Installation instructions

Detailed guide for installation and initial adjustment of the solution.

User manual

Detailed guide for regulation of the solution to ensure optimum day-to-day operation.



Drawings

Tender documents and 3D drawings are available to download for planning purposes.

WWW.NILAN.DK

Visit us at www.nilan.dk to find out more about our company and solutions, download further information and find your nearest dealer.

NILAN®
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