PRODUCT DATA

COMPACT S BY NILAN

GO GREEN BY NILAN

Domestic

Passive heat recovery

Active heat recovery

Ventilation < 375 m³/h

Comfort heating

Comfort cooling

Sanitary hot water production

NILAN®
OUTSTANDING INDOOR CLIMATE

COMPACT S

Product description

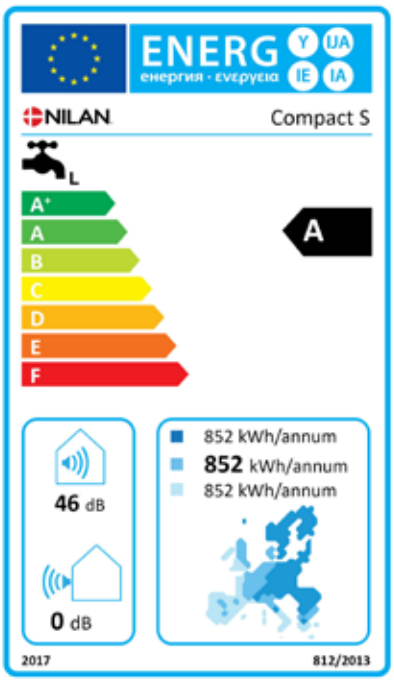
Compact S is an energy-efficient total indoor climate solution for all types of low-energy buildings, single-family homes, flats and small office areas in commercial leases with a ventilation requirement of up to 375 m³/h.

Compact S recovers the energy from the extracted air using a highly efficient counter flow heat exchanger. The remaining energy that is not utilised by the counter flow heat exchanger is used by the heat pump to produce hot water, and to further heat the supply air.

The heat pump has a reversible cooling circuit, which means that, in the summer, the unit can cool the supply air by up to 10 °C. Due to the low air exchange, the cooling does not function as an air conditioning system. On cooling, the supply air is dehumidified, which gives a more pleasant indoor climate than is possible with an ordinary ventilation unit without a heat pump.

Future-proof system

Compact S hot water production fulfils the most stringent requirements in the ecodesign regulation and thereby achieves the highest energy labelling.

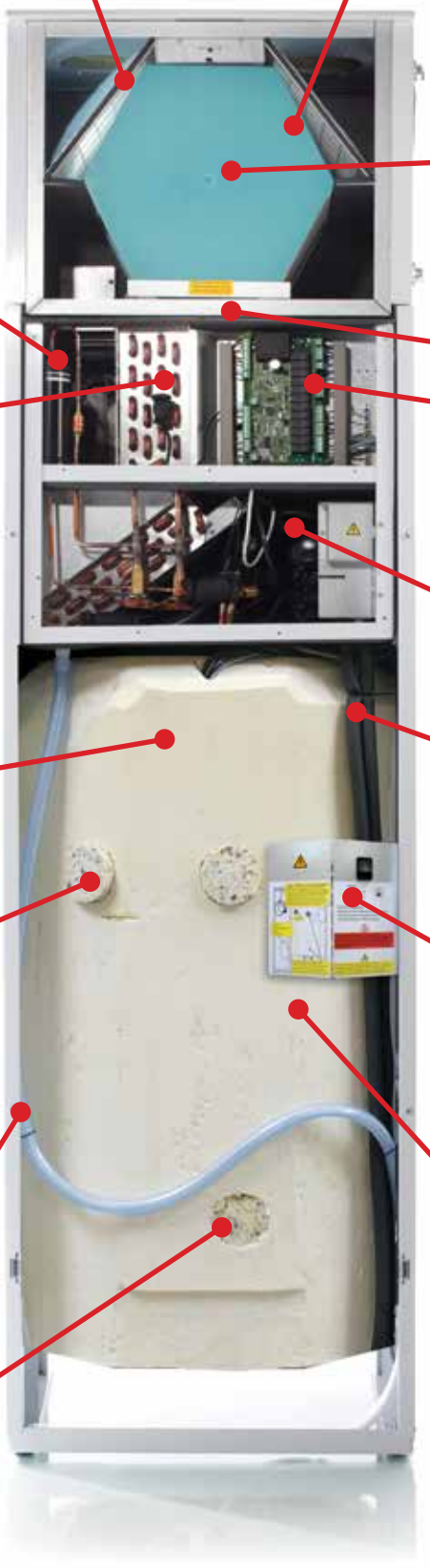


Time-controlled filter change alarm.
Easy filter access by opening the top front panel with the help of two finger screws.

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

8 duct connections.
Compact S is supplied as standard with 4 duct connections in the top.

Plates are mounted on the side, which makes it possible to move the ducts from the top to the side as required.



Counterflow heat exchanger in polystyrene, with a temperature efficiency ratio of up to 86 %.

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

The unit comes with a clear and user-friendly HMI touch panel.

The modern CTS 602 control runs Modbus communication.

A powder-coated condensation tray prevents the formation of "acid water", leading out the condensation water.

Compact S has an integrated water lock.

Heating pump with hermetically sealed cooling circuit, for production of hot water and active heat recovery. Can raise the air intake temperature up to 34 °C.

Reversible cooling circuit that can also cool the air intake in the summer up to 10 °C, with simultaneous hot water production.

Intelligent humidity control.
Adapts ventilation to the home's current humidity level. See page 14.

CO_2-sensor can be purchased, for further demand management.

The efficient fans are powered by energy-saving EC motors.

The hot water tank is foam-insulated, giving good insulation and saving energy.

180 l hot water tank.
2 layers of glass enamelling to ensure a long lifetime.

Electrically monitored sacrificial anode and corrosion protection.

On any need for replacement, an alarm is activated in the operating panel.

1.5 kW electrical completion.
For high hot water consumption where the heating pump cannot cope.

Emergency operation.

Attractive white-painted front with large front panels, giving easy access to service the system.

Automatic anti-legionella.

Compact S can be supplied with built-in soar coil.
The solar coil is intended for solar heating with solar panels of about 0.6 m^2.

User APP solution via gateway LAN / WiFi

TECHNICAL DATA

Technical specifications

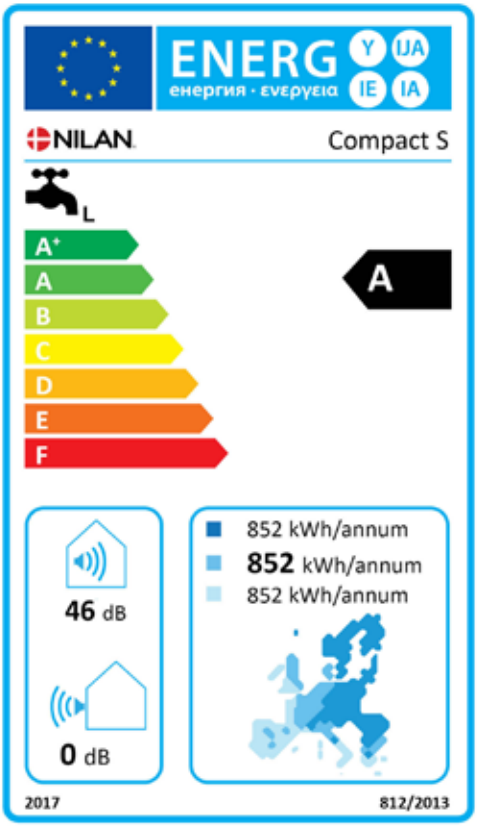
Dimensions (W x D x H)	600 x 600 x 2250 mm
Weight	160 kg
Plate type casing	Aluzinc steel plate, white powder coating RAL9016
Heat exchanger type	Polyethylenterephthalat counterflow heat exchanger
Fan type	EC, constant rotation
Filter class	ISO Coarse >90% (G4)
Duct connections	Ø 160 mm
Condensate drain	PVC, Ø 20×1,5 mm
Refrigerant	R134a
Refrigerant filling	2.25 kg
Capacity SHW tank	180 l
Supplementary electrical heating (sanitary hot water)	1.5 kW
Connection dimension	3/4"

Supply voltage	230 V (±10 %), 50/60 HZ
Max. input/power (*1)	2,2 kW/ 9,6 A
Max. input/power (*2)	2,8 kW/12,2 A
Tightness class	IP31
Standby power	3 W
Ambient temperature	-20/+40 °C
Power consumption build-in preheating element (Polar)	600 W
External leakage (*3)	< 0.79%
Internal leakage (*3)	< 1.47%

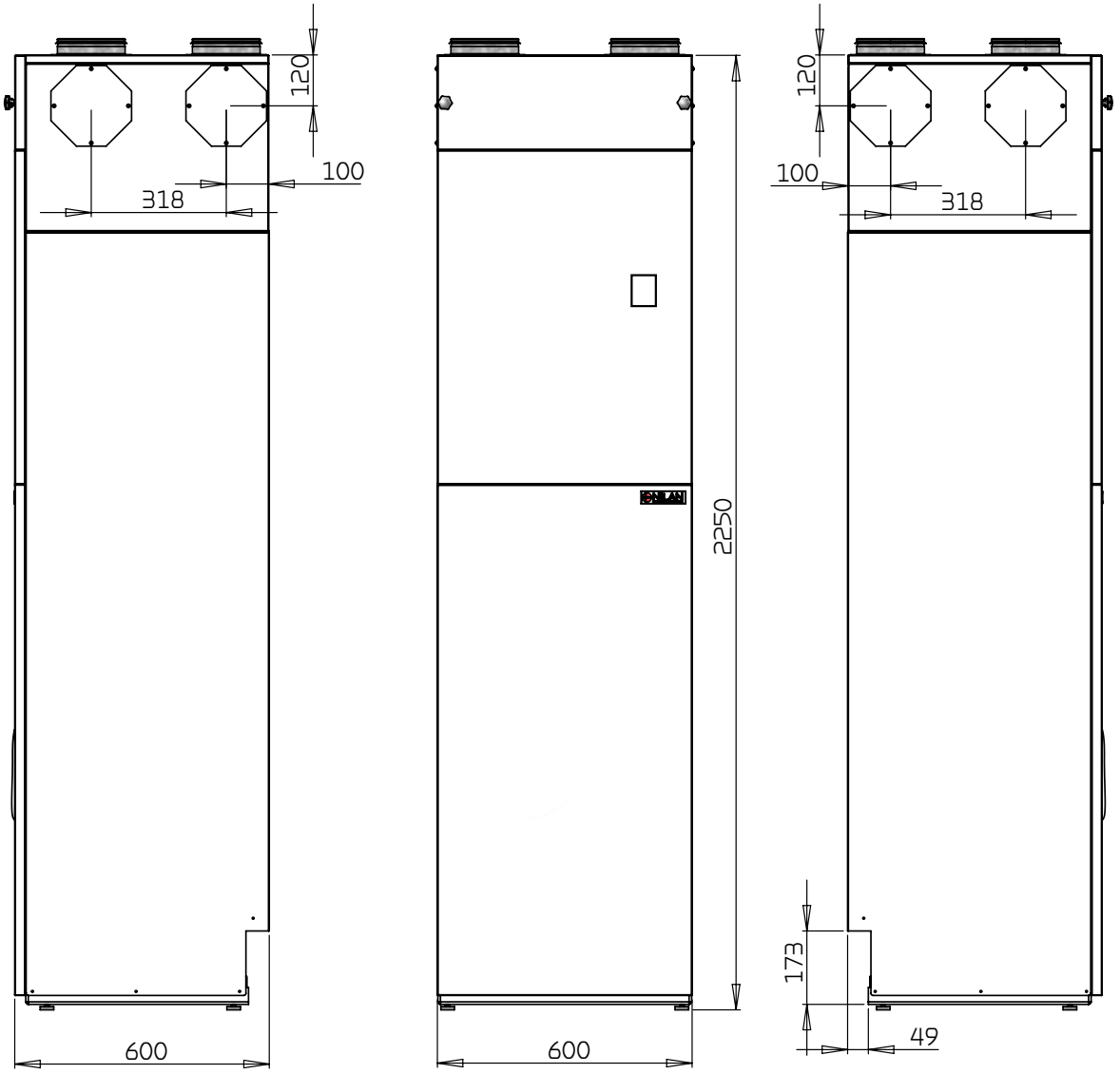
*1 Input without heating element (accessory).
*2 Input Compact Polar
*3 At ± 250 Pa and 265 m³/h according EN 13141-7.
*4 At ± 100 Pa and 265 m³/h according EN 13141-7.

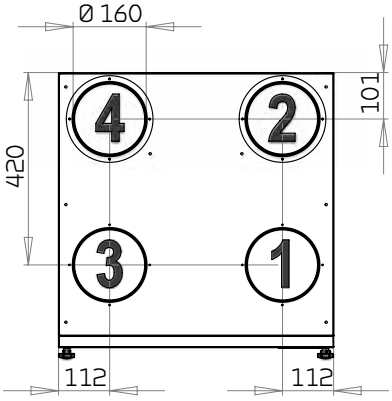
Hot water production

Consumer profile, water heater	L (large)
Energy efficiency class	A
Energy efficiency for water heating - average climate	118 %
Annual electricity consumption - average climate	852 kWh/annum
Temperature settings on the thermostat	10 - 65 °C
Sound power level L_{WA}	46 dB(A)
The water heater can function outside peak load periods (Smart-grid)	No
Guidelines for assembly, installation and maintenance	See installation instructions
Energy efficiency for water heating - cold climate	118%
Energy efficiency for water heating - warm climate	118%
Annual electricity production - cold climate	852 kWh/annum
Annual electricity consumption - warm climate	852 kWh/annum



Dimensional drawing





Connections

1: Fresh air
2: Supply air
3: Extract air
4: Discharge air

MULTI-FUNCTIONAL

100 % heat recovery

Compact S ventilates the home, ensuring a good indoor climate. While also producing hot water.

Compact S is an untraditional ventilation unit that, in contrast to other ventilation units, recovers 100% of the heat in the extracted air.

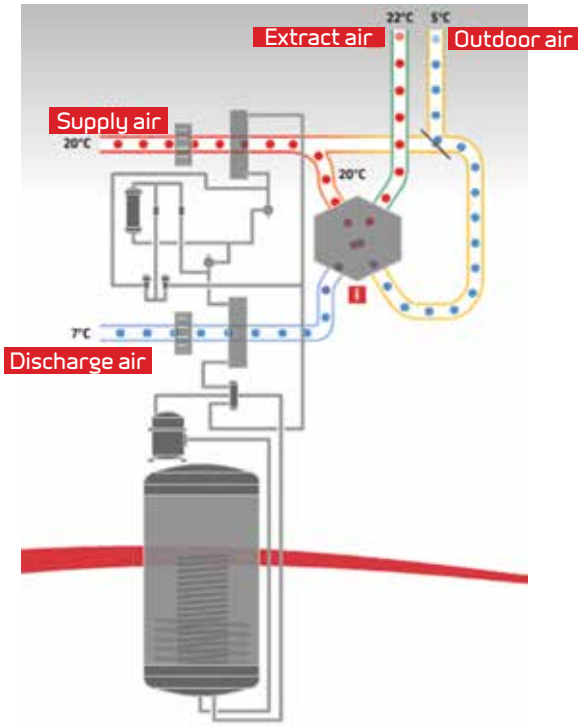
Via a counter flow heat exchanger, up to 95 % of the energy in the extracted air is used to heat the supply air.

The built- in heat pump uses the remaining energy to further heat the supply air, while also producing hot water.

Cooling the home is the challenge of the future

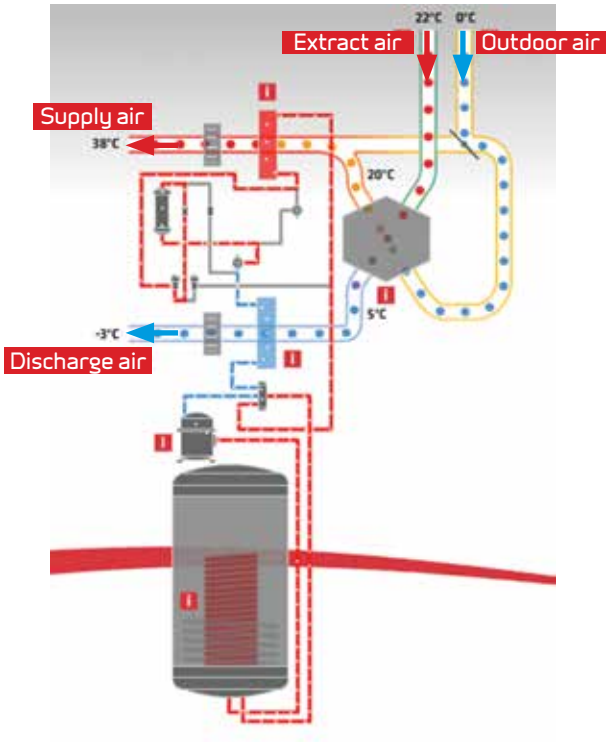
New homes are well-insulated and therefore easy to heat. On the other hand, outdoor temperatures do not need to be very high before getting rid of the heat in the home becomes problematic.

Compact S has a reversible cooling circuit, to cool the supply air. Due to the low air exchange, it will not function as an air conditioning system. When cooling the supply air will be dehumidified, which contributing to a pleasant climate in the home.



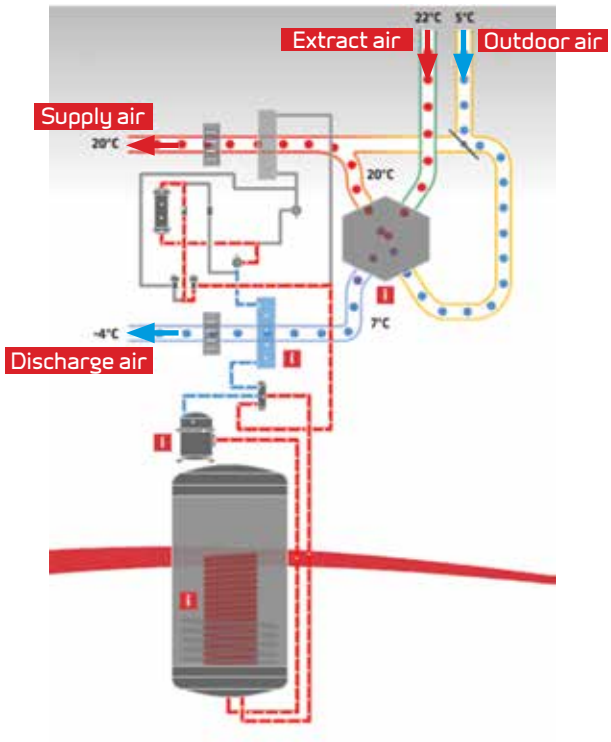
Passive heat recovery

Passive heat recovery takes place via a counter flow heat exchanger with a high temperature efficiency, whereby the supply air is heated by the extracted air.



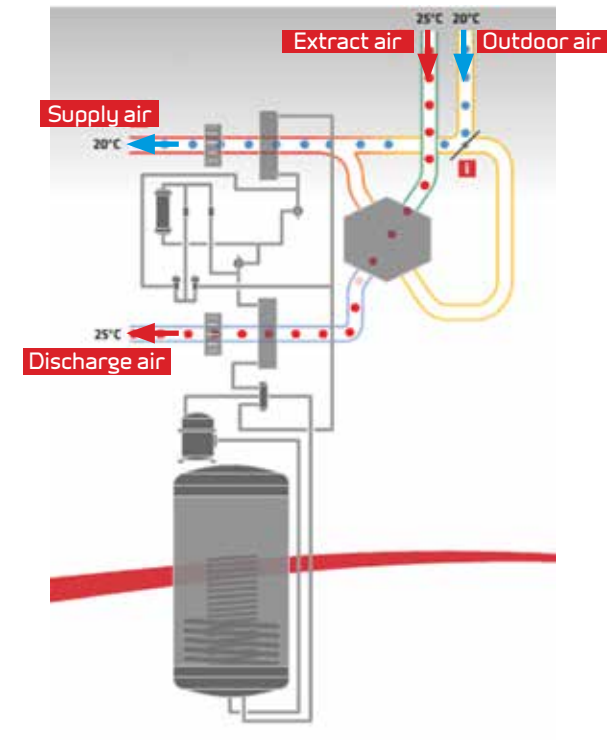
Passive and active heat recovery

Utilising the residual energy that the counterflow heat exchanger does not use, the heat pump further heats the supply air.



Hot water

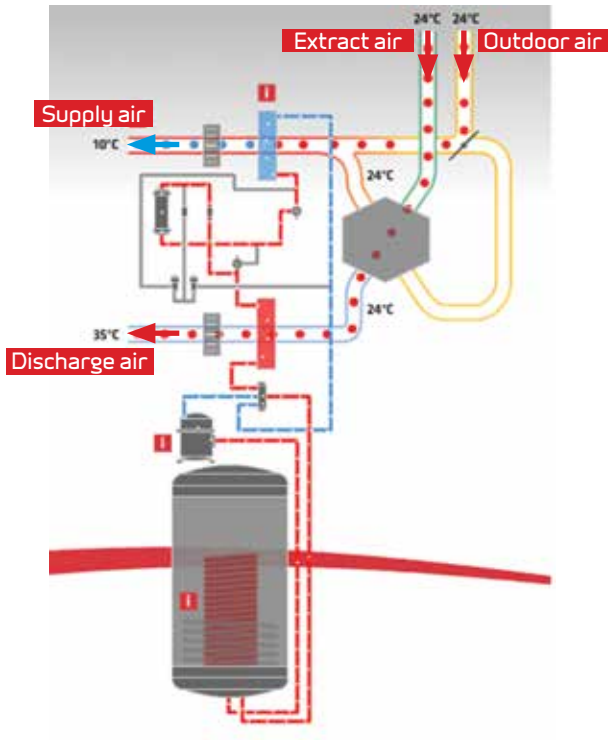
Utilising the residual energy that the counterflow heat exchanger does not use, the heat pump produces hot water.



100% bypass function

If heat recovery is not required, the bypass damper closes off 100% and leads the outdoor air past the heat exchanger.

Hot water can be produced at the same time. Hot water is produced with a high efficiency (COP).



Active cooling

The heat pump has a reversible cooling circuit and can cool the supply air during hot periods.

This function does not affect the production of hot water, which takes place with high efficiency (COP).

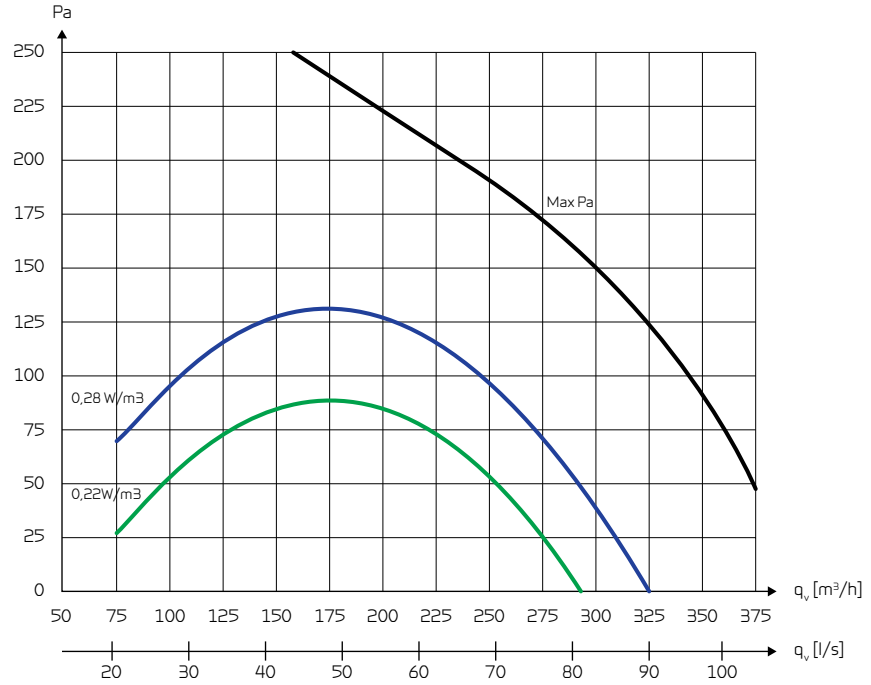
PLANNING DATA

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 comprise the unit's total power comsumption incl. control.

Conversion factor: $\frac{J/m^3}{3600} = W/m^3/h$

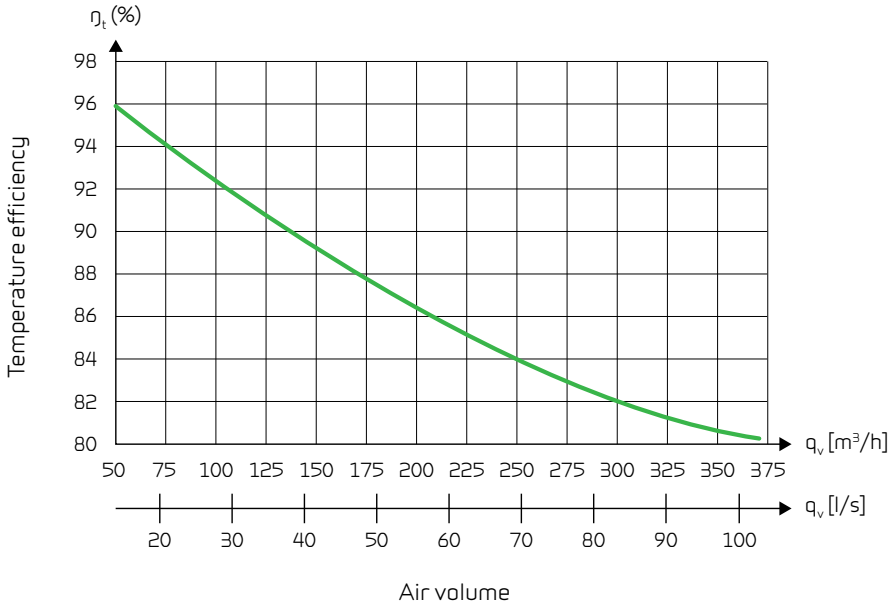
Attention! The SEL values are measured and stated as a total value for both fans.



Temperature efficiency

Temperature efficiency for units with counterflow heat exchanger according to EN308.

NB! Temperature efficiency is only for the counter flow heat exchanger (without heat pump operation)



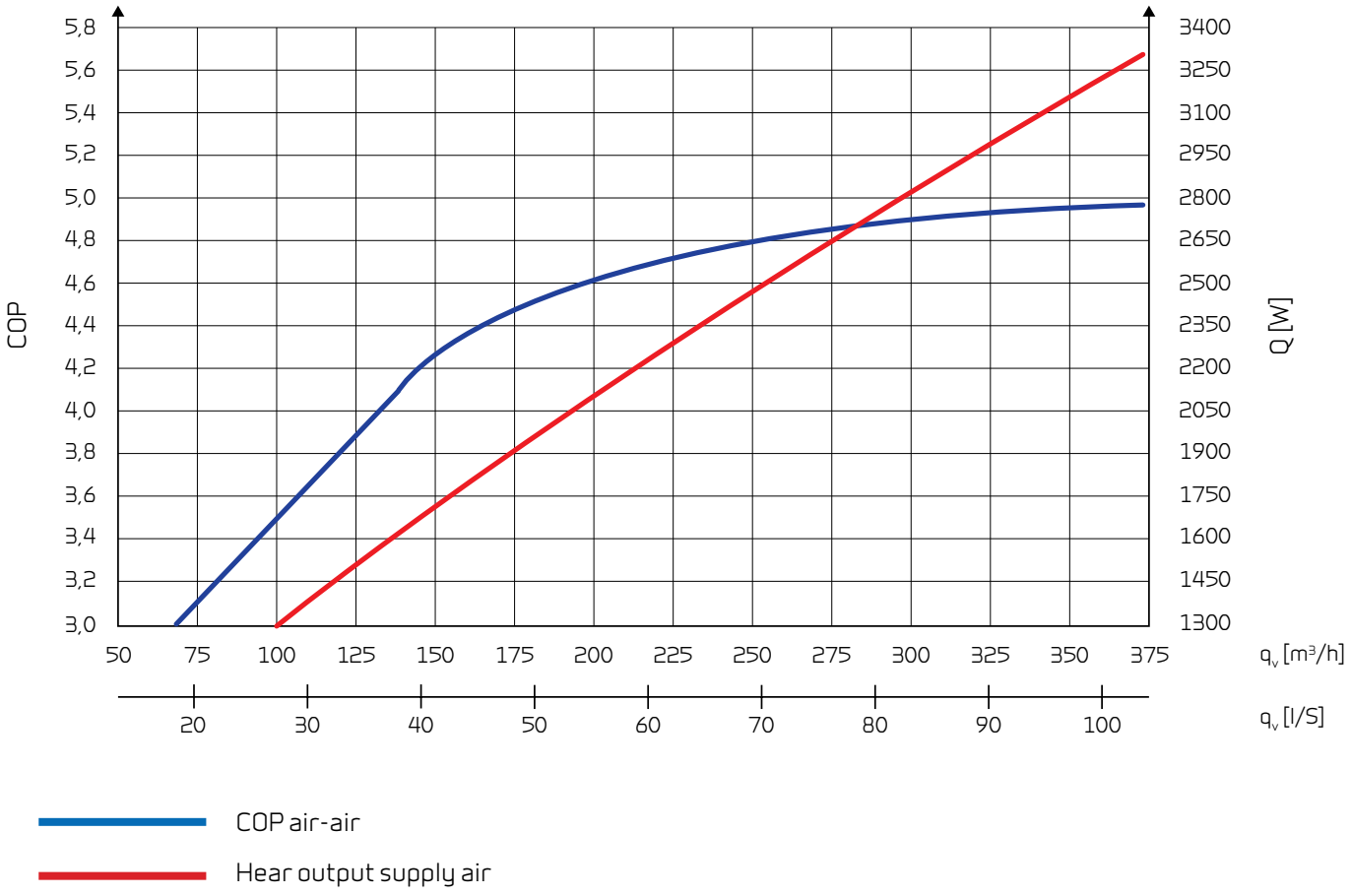
Heat output supply air

Heat output Q_c [W] as a function of q_v [m³/h] and outdoor air temperature t_{21} [°C]. In accordance with EN 14511, t_{11}=21°C (extract air)
Heat output is the contribution to room heating added to the fresh air via Compact S to the supply air.
The ventilation loss is the heat output that is lost without heat recovery at the given volume flow air.

COP (air-air)

Heat output factor COP [-] supply air as a function of outdoor temperature t_{21} [°C] and volume flow q_v [m³/h] in accordance with EN14511 at a room temperature t_{11} = 21°C

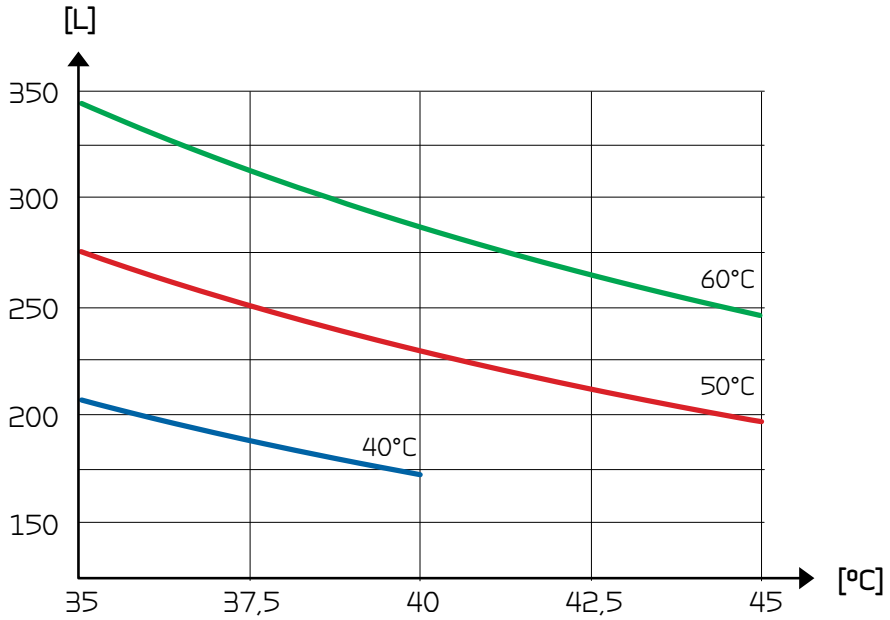
COP according EN14511 is calculated for the heat pump and counter flow heat exchanger combined.



PLANNING DATA

Tapped water

Tapped volume in liters V_{max} [L] from Compact S tank as a function of tapped temperature t [C°] and tank temperature at 40°, 50° and 60°C



Sound data

Sounddata is for q_v = 210 m^3/h and $P_{t, ext}$ = 100 Pa in accordance with EN 9614-2 for surface and EN 5136 for ducts.

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

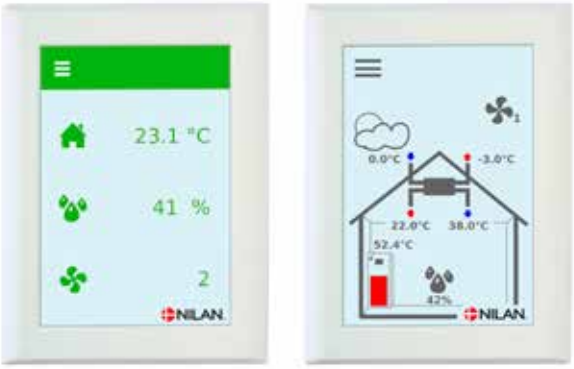
At a given distance, the sound pressure level L_{pA} will depend on the acoustic conditions at the installation site.

Sound output level (L_{wa})

Octave band Hz	Surface dB(A)	Supply air dB(A)	Extract air dB(A)
63	-	51	38
125	-	59	46
250	-	66	51
500	-	61	41
1.000	-	56	31
2.000	-	54	28
4.000	-	47	20
8.000	-	40	13
Total ±2	46	69	53

AUTOMATION

CTS 602 Control



Compact S is controlled using its CTS 602 HMI touch panel, featuring a wide range of functions, e.g., menu-controlled operation, weekly programme settings, filter monitor with timer, fan speed adjustment, summer bypass, supply-heating element control, error messages etc.

The CTS 602 comes with factory settings, including a default setting which can be customised to operational requirements to achieve optimum operation and utilisation of the system.

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

Nilan User APP

A Nilan gateway is fitted as standard on the Compact S, where the user can gain access to the unit via a Nilan User APP. The APP enables the user to access and monitor the current operation, also from the outside of the property.

The APP allows you to adjust the default settings of, for instance, room temperature, fan speed level and the humidity control system.

The APP shows when filter change is next due. This is an important function, and you are automatically notified when filters need changing or an alarm is triggered.

It also provides you with useful trend curves so you can follow the operation of the unit for the previous week with regards to, for instance, room temperature or humidity level.

Using a LAN connector, you connect the gateway to the Modbus of the unit and then to the user's internet router via a LAN or a WiFi connection. This creates a secure cloud connection between the unit and the smartphone.

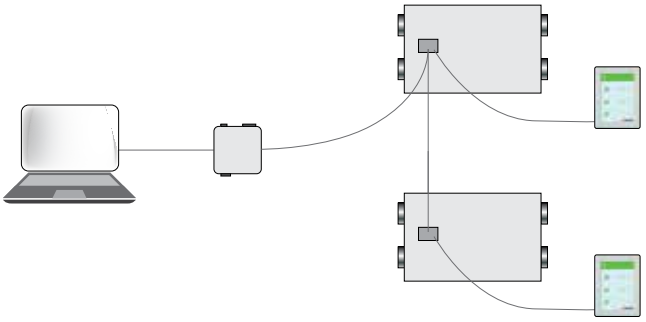
External communication

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.



Functions overview		+ Standard - Accessories
Filter monitor	The time controlled filter monitor indicates when filter change is due. You can set it between 30 and 180 days.	+
Operating mode	Can be set to operate Auto in accordance with set values or, alternatively, to operate in heating or cooling mode.	+
Stepless regulation	The four fan speed levels can be set at stepless regulation 20-100% and with different values for supply and extract air respectively.	+
Humidity control system	The integral humidity control system can be set to run with a high degree of ventilation when humidity levels are high (e.g. when you are having a shower/bath). Equally, it can be set to run with a low degree of ventilation if humidity levels in the dwelling become too low.	+
Active cooling	If necessary, you can set the unit to cool the supply air in the summer. When the heat pump is cooling, the heat is stored in the hot water tank. This means that you get "free" domestic hot water when the unit operates in cooling mode.	+
Low outdoor temperature	You can reduce ventilation at low outdoor temperatures to prevent the indoor humidity level from becoming too low.	+
CO_2 control system	This allows you to control the fan speed level so it follows the CO_2 level in the dwelling.	-
Temperature settings	The control system utilises the temperature settings to regulate operation of the entire unit.	+
Frost protection	The control system has an automatic function for de-icing the exchanger, should ice form within it.	+
Frost protection Polar	The Polar model has an integral pre-heating element for frost protection. This prevents ice from forming within the counterflow heat exchanger.	+
Domestic hot water	Compact S heats the domestic hot water via the air to air heat pump in the ventilation part.	+
Pausing domestic hot water	You can pause the production of domestic hot water e.g. if no hot water is required for a period of time. This saves energy.	+
Frost protection hot water tank	In order to protect the hot water tank, it has been equipped with a frost protection function.	+
Supplementary electrical heating of hot water	If, at times, the requirement for domestic hot water exceeds the ability of the heat pump, you can add a supplementary electric heater to help heat the hot water.	+
Anti-scald safety function	The control system has an integral anti-scald safety function to ensure that the domestic hot water does not get so hot that it potentially scalds the user.	+
Anti-Legionella	The control system can be used to activate an Anti-Legionella treatment of the domestic hot water either manually or automatically.	+
Anode	Electronically monitored anode. It indicates when it needs replacing, which helps extend the life of the hot water tank.	
Domestic hot water	If you order Compact S with a solar coil, it will then help produce domestic hot water. This is a good solution if the requirement for domestic hot water is high.	+
Week program	You can set up a week program with different settings depending on use of the dwelling.	+
User selection 1	You can use this if you want to override the operation of the unit via a potential free signal. It can be used if e.g. a cooker hood has been connected up to the unit.	+
User selection 2	User selection 2 can be used in the same way as user selection 1, but it has an additional output signal that you can use e.g. to control a damper.	+
Event log	This function logs events in the control system, error messages and warnings.	+
Read data	This allows you to read all current values in relation to the operation of the unit. It is most often used for troubleshooting.	+
Emergency stop of ventilation	Do not turn off ventilation as this may cause damage to the unit, the duct system and, potentially, even to the dwelling. It may nevertheless be necessary briefly to turn off ventilation e.g. due to an emergency notification.	+

You can find further information about all the functions in the Software and Installation instructions for the unit.

OPERATION

Intelligent humidity control

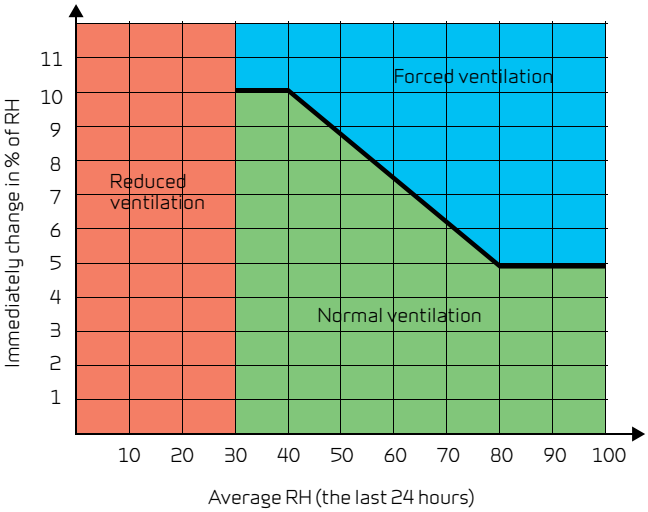
Nilan's humidity control feature automatically adapts to the needs of the family or the building.

The intelligent CTS 602 control unit does not need to have a set level input for air humidity (RH) to control the air exchange. By using the integrated humidity sensor, the control unit calculates the average level itself for the last 24 hours. The average level provides a basis for deciding whether to change the air exchange if the air humidity fluctuates.

This ensures that the unit always runs at its most efficient, based on the actual air humidity level and not on a theoretical one.

This helps save energy because it automatically adapts to the requirements in the home. Whether a large family or a single person is living in the building has a considerable influence on how much humidity is produced.

The unit also adjusts automatically to summer and winter level.



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.

At an air humidity below 30% is reduced ventilation stp activated (adjustable between 15 and 45%)

OPERATION

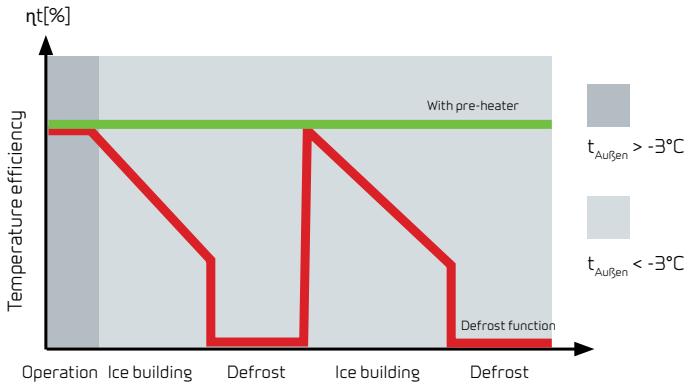
Frost protection

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

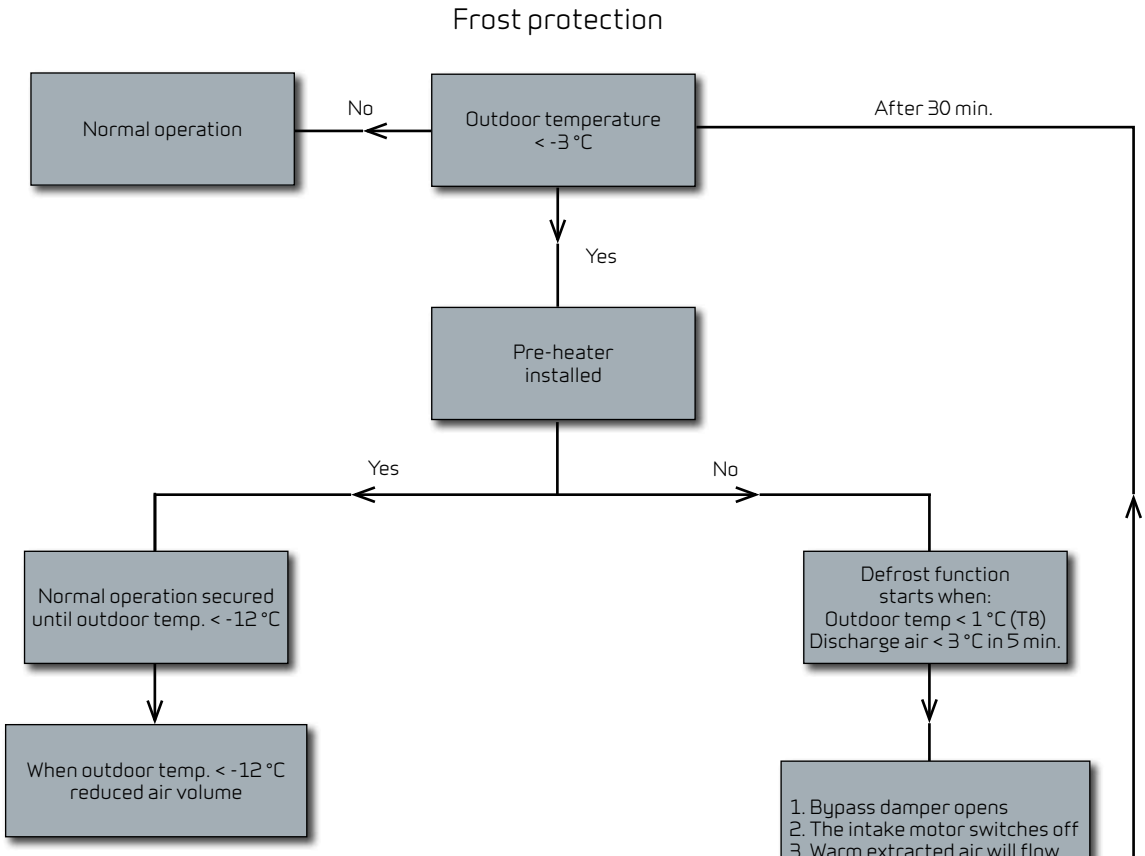
The extracted air condenses when it is cooled down during heat recovery. The high temperature efficiency will slowly turn the condensate to ice, which will block up the counterflow heat exchanger unless remedial action is taken.

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.

ACCESSORIES

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.

Electrical heating element incl. regulation

When you fit an electrical heating element, you can raise the fresh air temperature to the desired level at any time. The electrical heating element 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.

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.

CO_2-sensor

With a CO_2-sensor installed, the ventilation speed can be pre-programmed with CTS 602 to run at a higher ventilation steps when CO_2 reaches high level in the extract air. CO_2-level is programmable.

Expansion PCB

The expansion PCB provides additional functions for the CTS 602 control unit, e.g., controlling the EM box.

Pollenfilter ISO ePM1 50-65% (F7)

Compact S 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 pollenfilter ISO ePM1 50-65% (F7) to minimize the amount af Pollen in the supply-air.

Noise-attenuating flexible hose

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

Safety group

The safety group, which is made of brass, consists of a stop valve with an integral non-return valve, a safety valve and drain cock. It can be installed directly beneath the hot water tank.

Safety features

During periods with cooling ventilation, hot water in the tank can reach very high temperatures - up to 80 ºC. A maximum temperature of up to 60 ºC can be set in the control system to prevent scalding, but active cooling is then limited. To make full use of the cooling function, scalding protection should be fitted that mixes hot water with cold to bring the temperature down. If a solar panel is used to supplement hot water heating, scalding protection must be fitted.

Extension cable HMI control panel

The control panel for the ventilation unit is connected up with a short wire so it can be installed close to the unit. If you place the unit so the control panel is out of sight, for instance in a cupboard or in the loft, you can order a 15 m extension cable with plug. This allows you to place the control panel where it is visible to the user.

It is important that the control panel is visible so the user can see alarms when, for example, filters need replacing.

Trolley

A trolley makes it possible to lift the unit of the pallet without physical strain. The same trolley can be moved to wheel the unit around.

NIL*AIR*

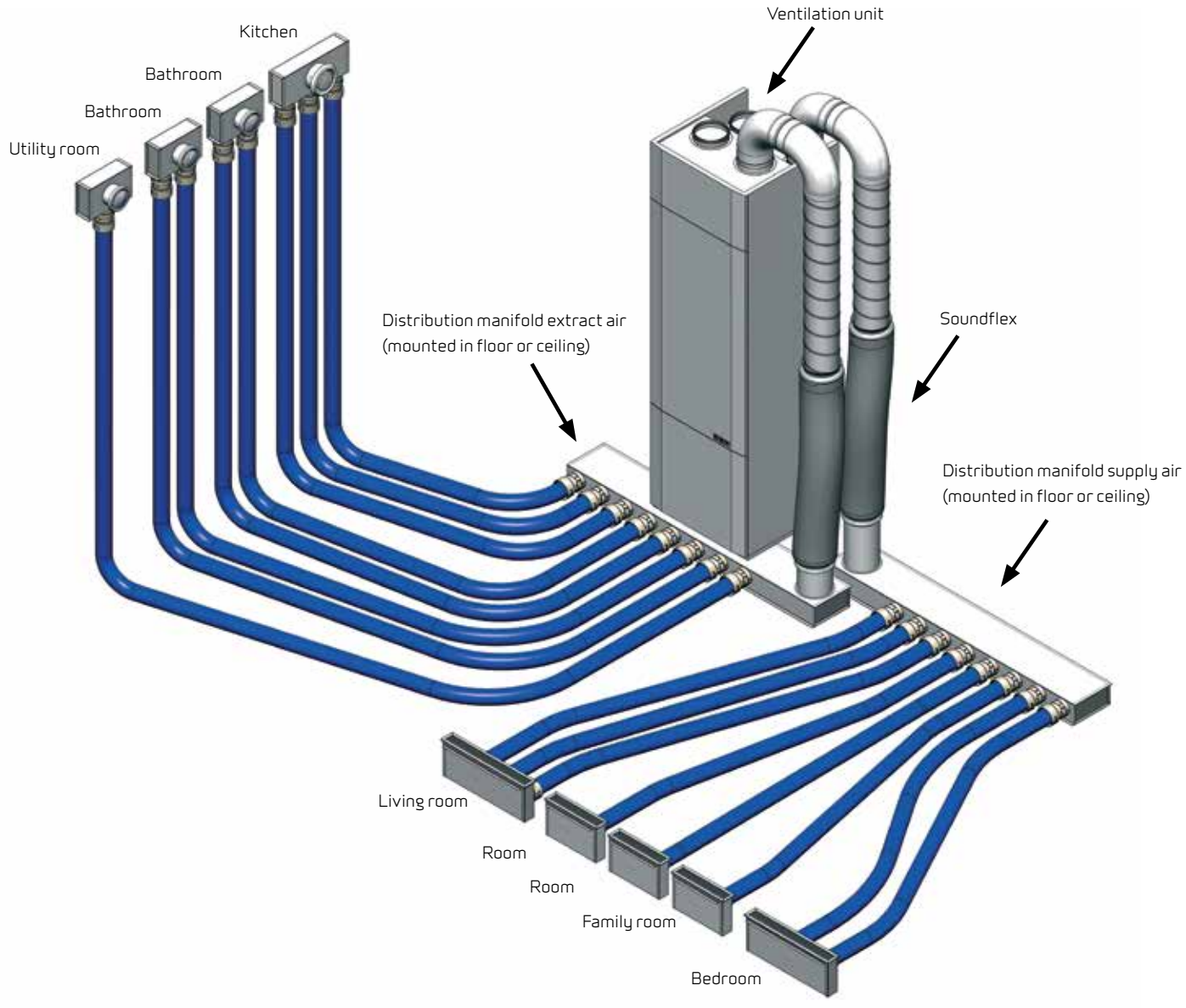
Nil*AIR* is installed together with a ventilation unit,which in simple terms consists of distribution boxes from which tubes are led out to air extraction and air supply boxes in the individual rooms.

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

Air extraction
(mounted in wall or ceiling)



Air supply
(mounted in floor, wall or ceiling)

DELIVERY AND HANDLING

Transport and storage

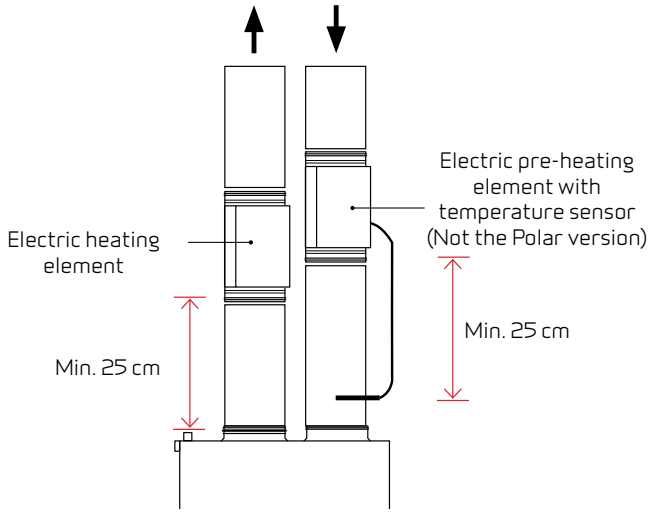
Compact S comes in factory packaging that protects it during transport and storage.
Compact S must be stored in a dry place in its original packaging until installation. The packaging should only be removed immediately prior to installation.

Lifting tool

Lifting cover for Compact S makes it possible to lift Compact S of the pallet without making any heavy lifts and transport the system around in the home. Detach the filter box and the system fits under an average inner door.

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.



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

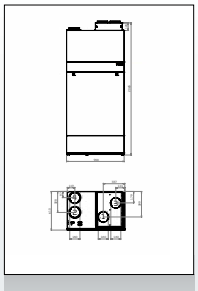
Technical information to ensure correct choice of solution.

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®
OUTSTANDING INDOOR CLIMATE

Nilan A/S
Nilanvej 2
8722 Hedensted
Danmark
Tlf. +45 76 75 25 00
Fax +45 76 75 25 25
nilan@nilan.dk
www.nilan.dk