PRODUCT DATA

COMPACTP -CTS602 HMI BY NILAN

SL SERVICES
Horsham, West Sussex
01403 563045

CERTIFIED COMPONENT
Passive House Institute

Domestic

Passive heat recovery

Active heat recovery

Ventilation <300 m³/h

Comfort heating

Comfort cooling

Sanitary hot water production

Heating

THE VENTILATION AND HEATING SOLUTION OF THE FUTURE

Compact P is developed for future homes. The system can be used in all types of low-energy and passive buildings, but can also ensure low energy consumption in any home or flat.

Top-class efficiency

Compact P is equipped with the latest technology, comprising a highly-efficient counterflow heat exchanger, as well as a special designed heating pump that utilises the residual energy in the extracted air.

Overall, the system yields top-class performance. The counter flow heat exchanger has a temperature efficiency of up to 95%, combined with a heat pump that ensures a high supply air temperature and very low costs to production of sanitary hot water.

Many benefits

The compact design and numerous functions combined in one unit ensures minimum installation, space requirements, as well as rapid and easy installation. The latest technology and high-quality components not only provide an optimum indoor climate, but also low annual operating costs, making this a sound investment in every respect.

ONE UNIT – SEVERAL SOLUTIONS

Since Compact P is module-based, it offers not just one, but several solutions. As either a supplementary or total heating solution, Compact P combines up to five functions:

- Ventilation with active and passive heat recovery
- Comfort heating
- Comfort cooling
- Sanitary hot water production
- Heating of the home (with EK)

Compact P

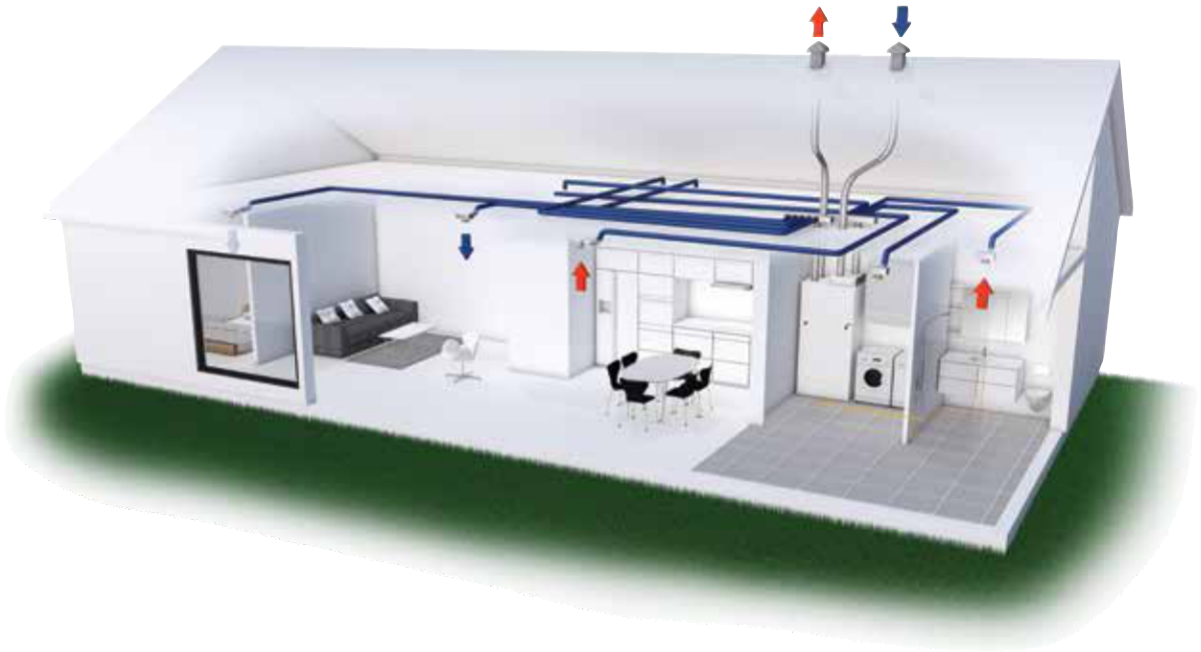
- Ventilation with heat recovery
- Sanitary hot water production

Compact P can ventilate up to 300 m^3/h and recovers more than 100 % of the energy from the extracted air via a counter flow heat exchanger that is combined with a heat pump.

The heat pump produces hot water and contributes to heating the supply air.

The heat pump has a reversible cooling circuit, so that in the summer it can cool the intake air while it also producing hot water.

Compact P EK has a built in electrical kettle to heat the home via the central heating system.



COMPACT P

Product description

Compact P 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 300 m^3/h.

Compact P 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.

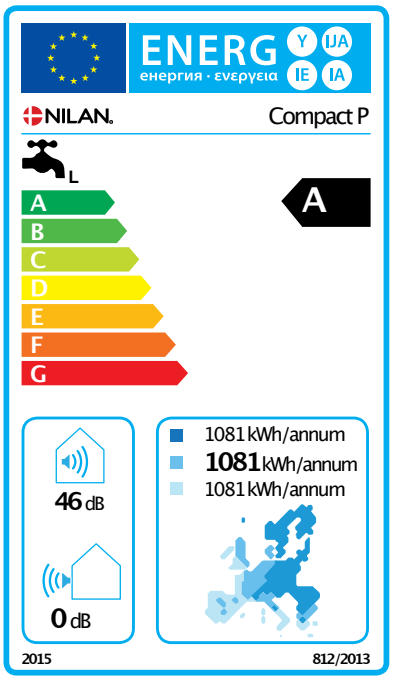
The heat pump has a reversible cooling circuit, which means that, in the summer, the unit can cool the supply air by up to 10 °C. Due to the low air exchange, the cooling does not function as an air conditioning system. On cooling, the supply air is dehumidified, which gives a more pleasant indoor climate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

Future-proof system

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

The system is tested by an independent testing institute and has achieved the demanding Passive Building Certificate, as further confirmation that this is a highly energy-sustainable solution.

CERTIFIED COMPONENT
Passive House Institute



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

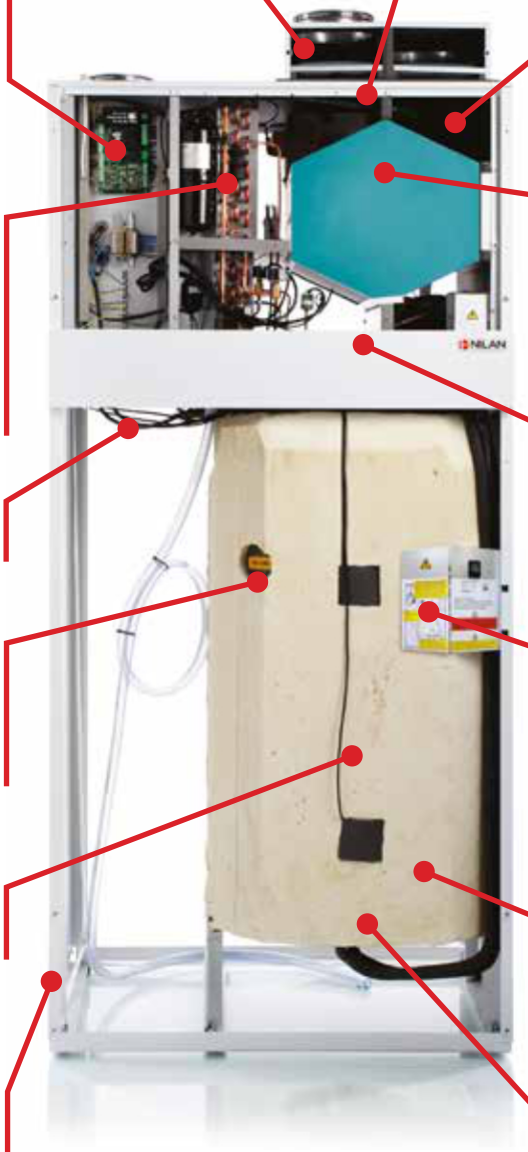
There is plenty of space to replace filters and to vacuum clean the filter space.

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

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

A clear, user-friendly HMI Touch panel is included.

The modern CTS 602 control runs Modbus communication.



Low-energy EC-ventilators with B-wheel, adjustable from 20 to 100%.

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.

The USB cable is led down, so that the control can be easily accessed without using tools.

Counterflow heat exchanger in polystyrene, with a temperature efficiency ratio of up to 94%.

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

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

Compact P has an integrated water lock.

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.

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

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

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

The cabinet has holes for pipes and tubes for water and heating installations.

Automatic anti-legionella.

Compact P is also offered in a Polar version with a built-in preheating element to frost proof the counterflow heat exchanger and heat pump.

TECHNICAL DATA

Technical specifications

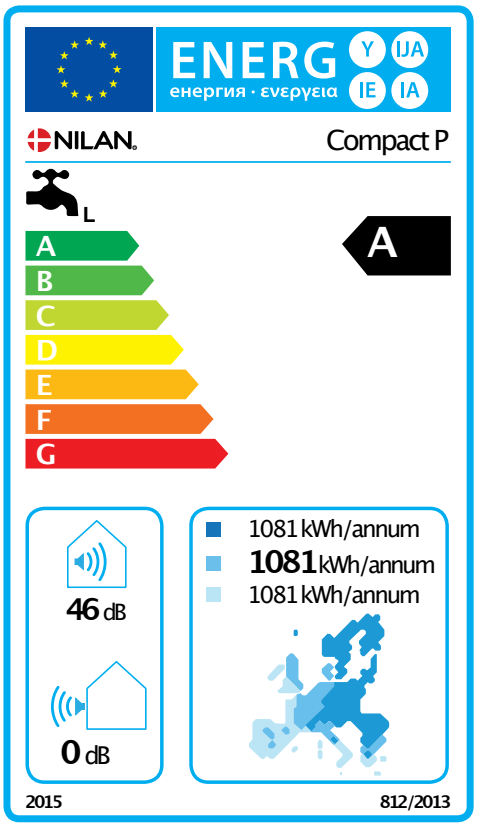
Dimensions (W xD xH)	900 x610 x2065 mm
Weight	202 kg
Plate type casing	Aluzinc steel plate, white powder coatingRAL9016
Heat exchangertype	Polystyrene counterflow heat exchanger
Fan type	EC,constant rotation
Filter class	ISOCoarse >90% (G4)
Duct connections	Ø 160 mm
Condensate drain	PVC, Ø 20×1,5 mm
Refrigerant	R134a
Refrigerant filling	2 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)	3,4 kW/14,8 A
Tightness class	IP31
Standby power	3 W
Ambient temperature	-20/+40 °C
Power consumption build-in preheating element (Polar)	1,2 kW
External leakage (*3)	<1,4%
Internal leakage (*4)	<1,1%

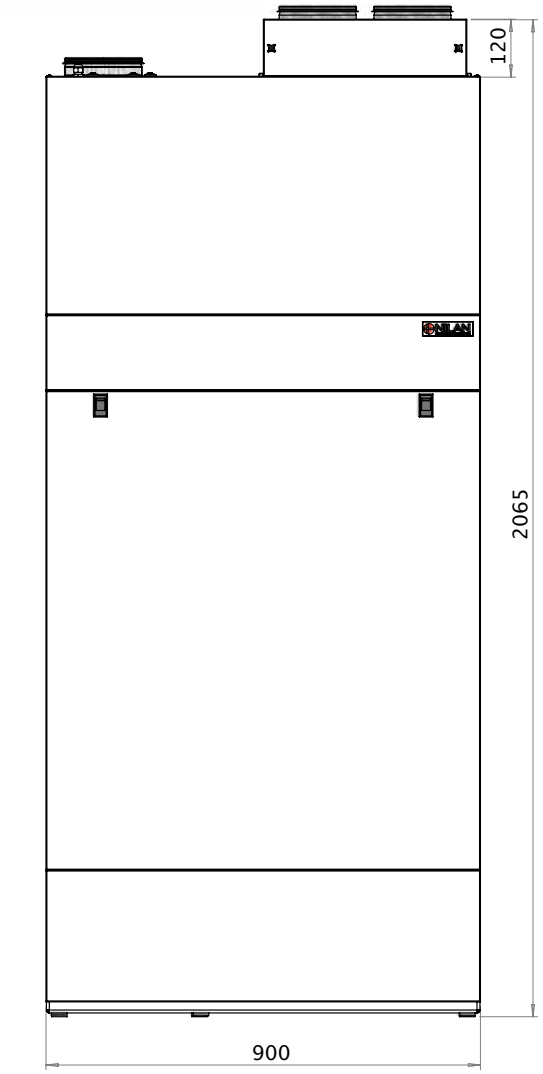
*1 Input without heating element (accessory).
*2 Input Compact Polar
*3 At ±250 Pa and 265 m³/h according EN 308/EN 13141-7.
*4 At ±100 Pa and 265 m³/h according EN 308/EN 13141-7.

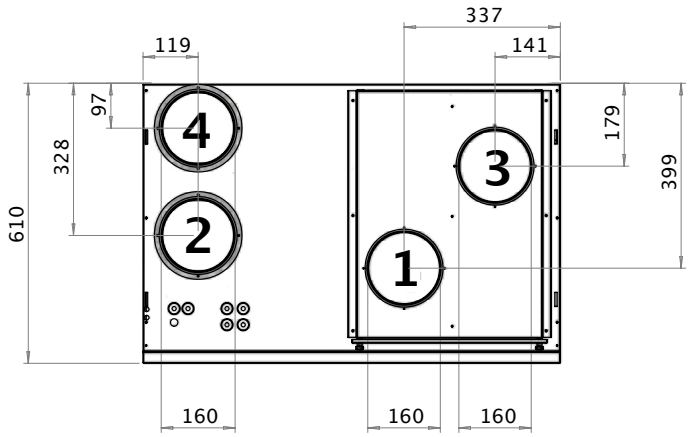
Hot water production

Consumer profile,water heater	L (large)
Energy efficiency class	A
Energy efficiency for water heating-average climate	94 %
Annual electricity consumption -average climate	1081 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	94%
Energy efficiency for water heating-warm climate	94%
Annual electricity production -cold climate	1081 kWh/annum
Annual electricity consumption -warm climate	1081 kWh/annum



Dimensional drawing





Connections

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

MULTI-FUNCTIONAL

100% heat recovery

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

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

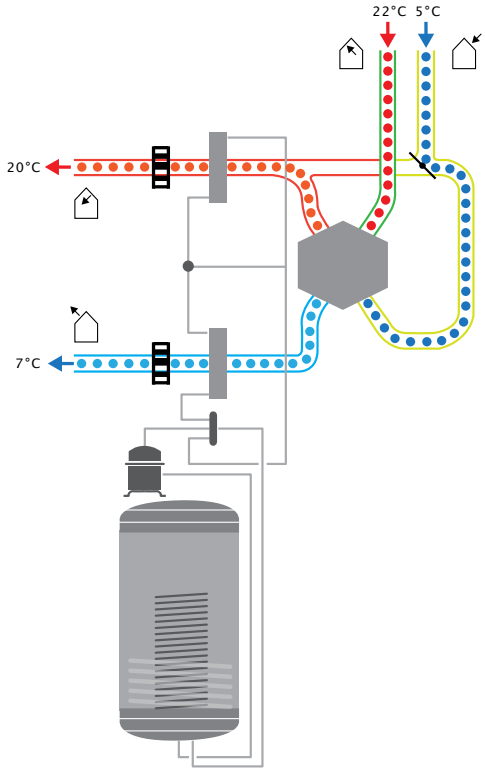
Via a counter flow heat exchanger, upto 95 % of the energy in the extracted air is used to heat the supply air.

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

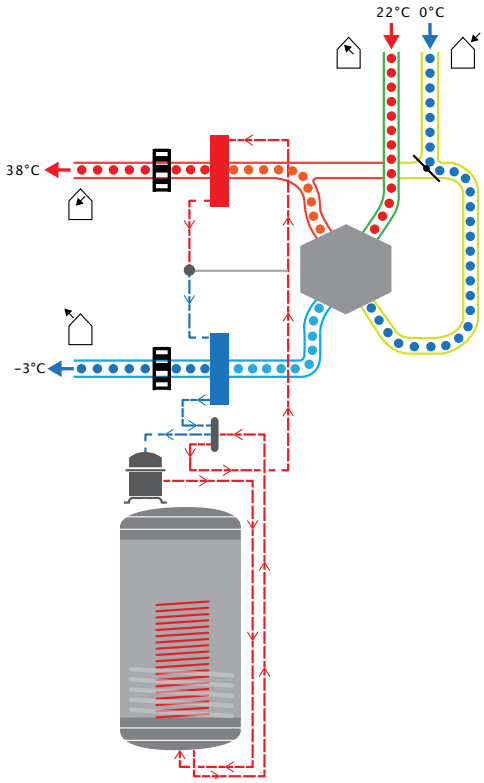
New homes are well-insulated and therefore easy to heat. On the other hand, outdoor temperatures do not need to be very high before getting rid of the heat in the home becomes problematic.

Compact P 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.



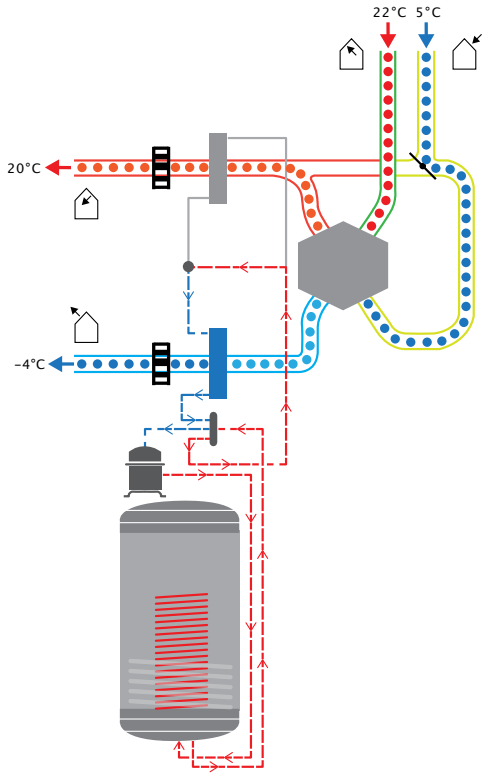
Passive heat recovery

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.



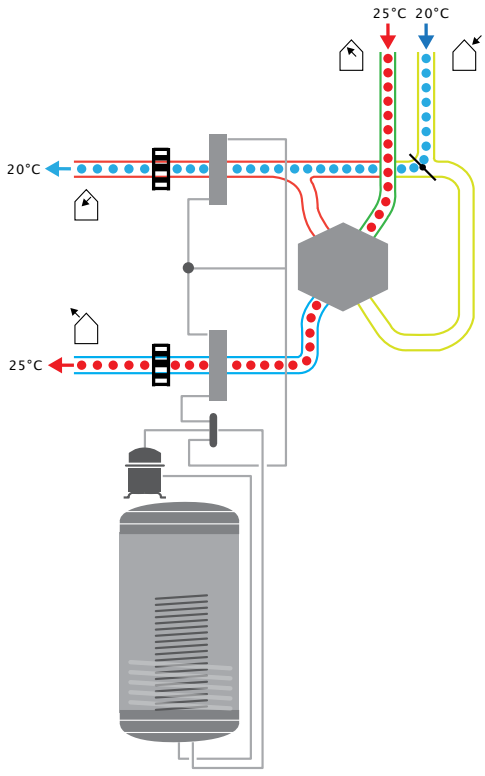
Passive and active heat recovery

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



Hot water

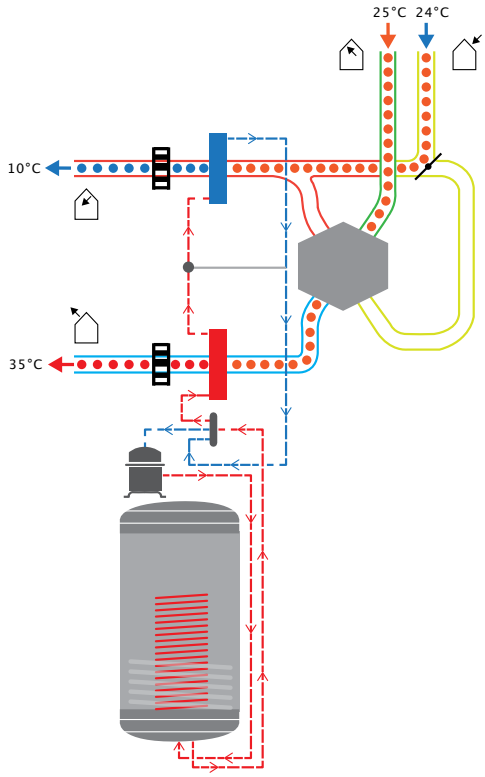
Utilising the residual energy that the counterflow heat exchanger does not use, the heat pump produces hot water.



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 $P_{t,ext}$.

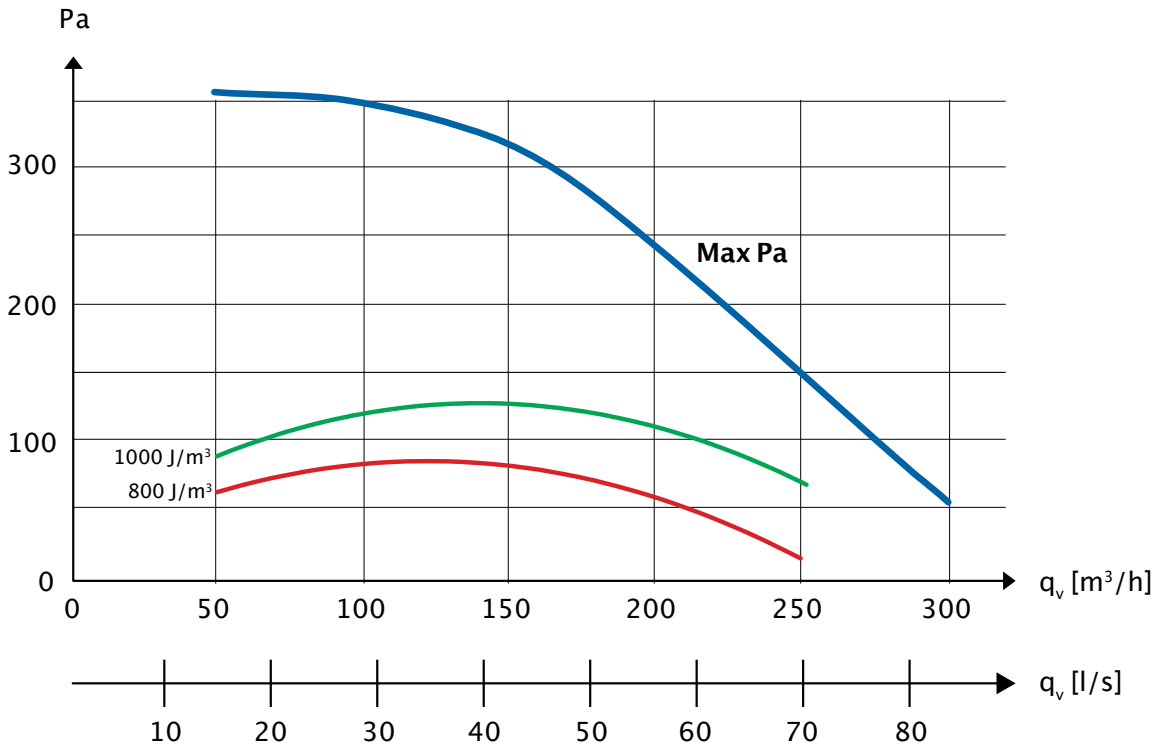
SEL values according to EN 13141-7 are for standard units with ISO Coarse >90% (G4) filters and without heating element.

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

Compact P is also available in a XL-version, which can provide an air volume of 430 m³/h at 100 Pa

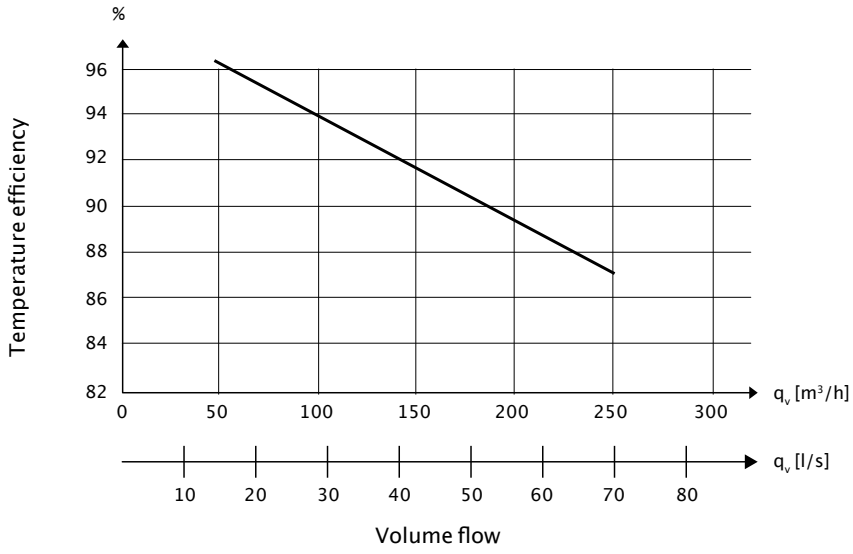


Temperature efficiency

Temperature efficiency as a function of volume flow q_v [m³/h] for unit with counterflow heat exchanger.

Temperature efficiency according to EN13141-7 (2°C / 20°C).

NB! The temperature efficiency, is for the heat exchanger only (without heat pump operation).

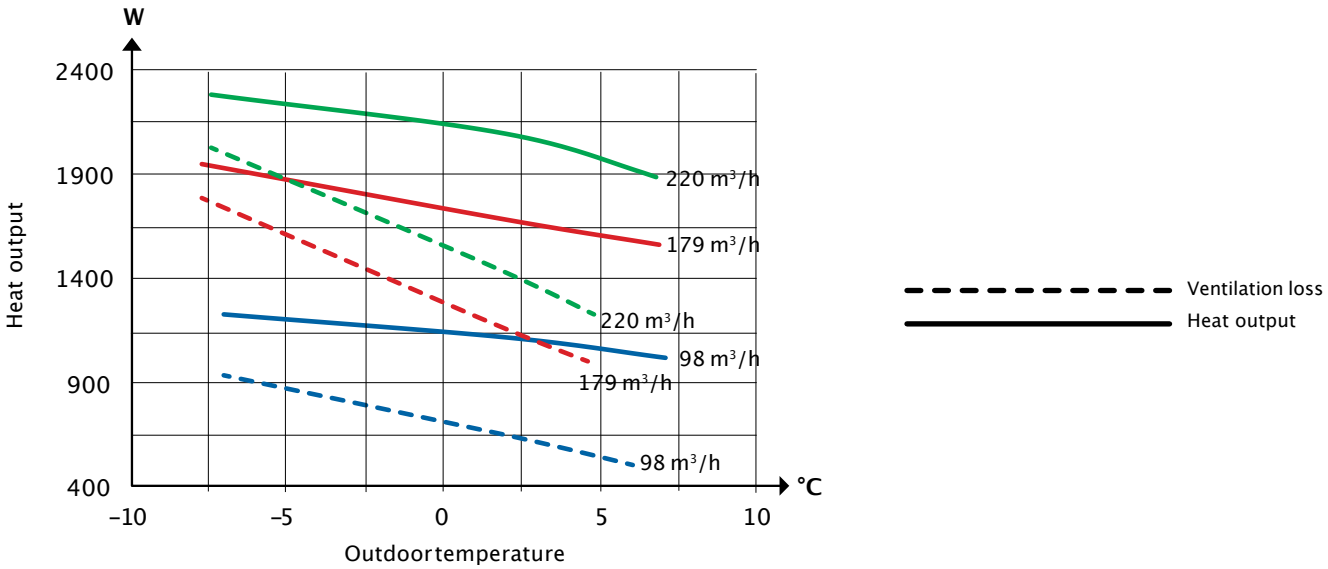


Heat output supply air

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 P to the supply air.

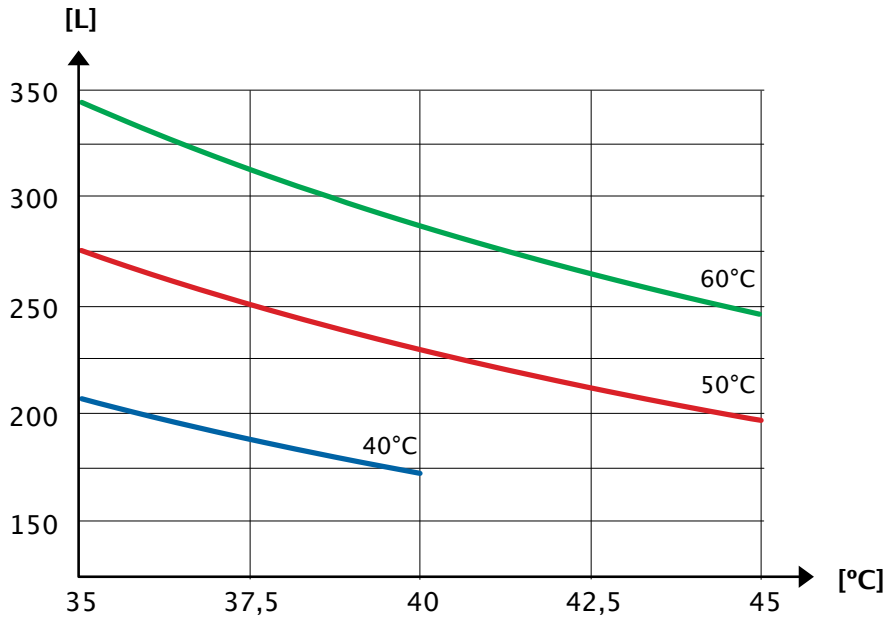
The ventilation loss is the heat output that is lost without heat recovery at the given volume flow air.



PLANNING DATA

Tappedwater

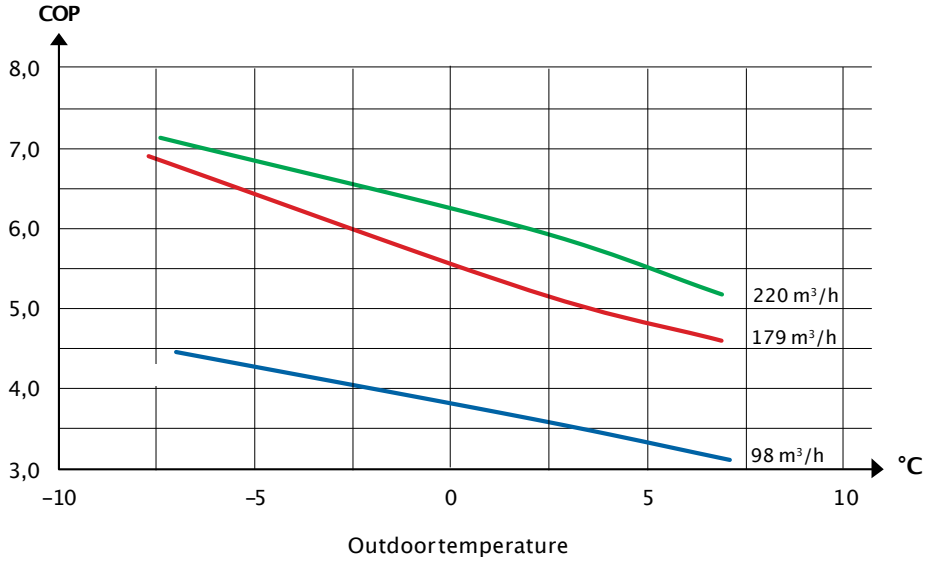
Tappedvolume in litres V_{max} [L] from Compact P tank as a function of tapped temperature t [C°]and tank temperature at 40°,50° and 60°C



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.



Sound data

Sounddata is for q_v =210 m³/h and $P_{t,ext}$ =100 Pa in accordance with EN 9614-2for 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 conditionsat the installation site.

Sound output level (L_{wa})

Octave band Hz	Surface dB(A)	Supply air dB(A)	Extract air dB(A)	Discharge air dB(A)	Outdoor air dB(A)
63	-	46	32	43	34
125	-	54	39	52	38
250	-	63	50	61	46
500	-	59	42	58	40
1.000	-	54	34	53	34
2.000	-	54	29	49	27
4.000	-	46	18	38	12
8.000	-	36	4	25	2
Total ±2	46	66	51	64	48

TECHNICAL DATAXL

Compact P XL

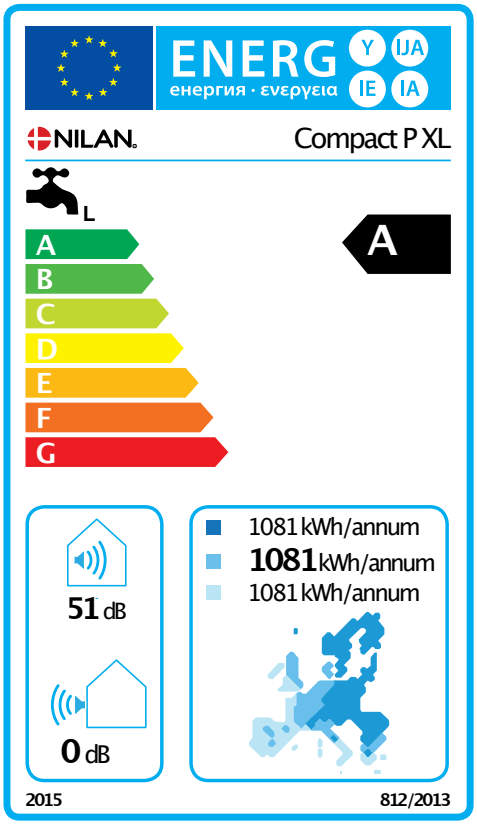
Dimensions (W xD xH)	900 x610 x2065 mm
Weight	202 kg
Plate type casing	Aluzinc steel plate, white powder coatingRAL9016
Heat exchangertype	Polystyrene counterflow heat exchanger
Fan type	EC,constant rotation
Filter class	ISOCoarse >90% (G4)
Duct connections	Ø 160 mm
Condensate drain	PVC, Ø 20×1,5 mm
Refrigerant	R134a
Refrigerant filling	2 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)	2,4 kW/ 10,4 A
Max.input/power (*2)	3,6 kW/15,6 A
Tightness class	IP31
Standby power	3 W
Ambient temperature	-20/+40 °C
Power consumption build-in preheating element (Polar)	1,2 kW
External leakage (*3)	<1,4%
Internal leakage (*4)	<1,1%

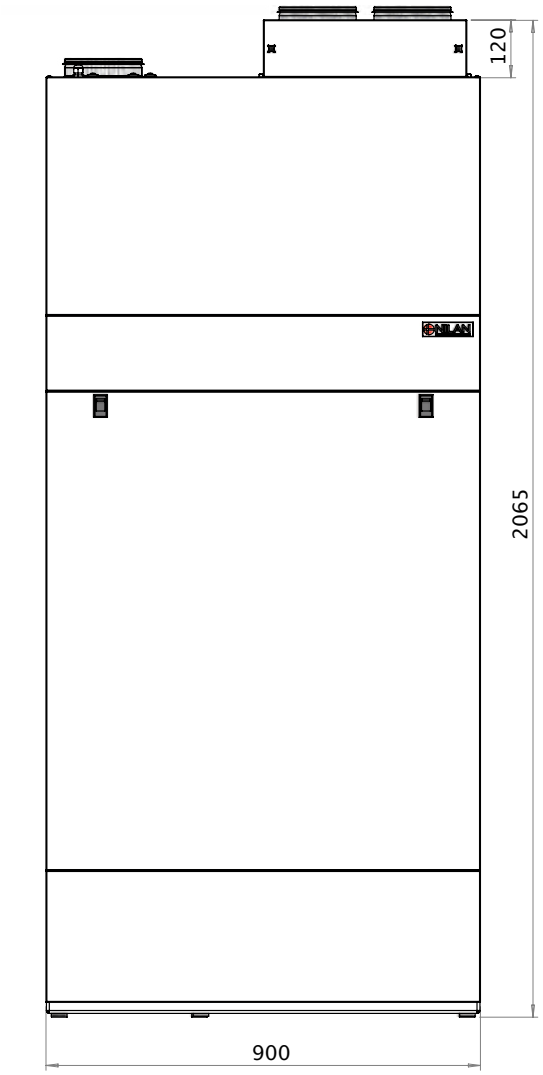
*1 Input without heating element (accessory).
*2 Input Compact Polar
*3 At ±250 Pa and 265 m³/h according EN 13141-7.
*4 At ±100 Pa and 265 m³/h according EN 13141-7.

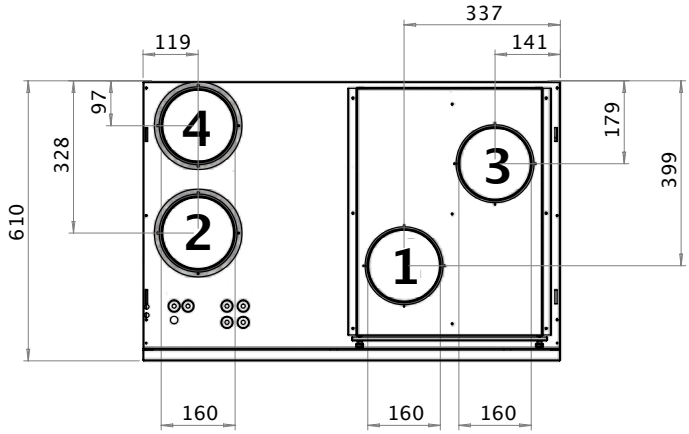
Hot water production

Consumer profile,water heater	L (large)
Energy efficiency class	A
Energy efficiency for water heating-average climate	94 %
Annual electricity consumption -average climate	1081 kWh/annum
Temperature settings on the thermostat	10 -65 °C
Sound power level L_{WA}	51 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	94%
Energy efficiency for water heating-warm climate	94%
Annual electricity production -cold climate	1081 kWh/annum
Annual electricity consumption -warm climate	1081 kWh/annum



Dimensional drawing





Connections

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

PLANNING DATAXL

Capacity

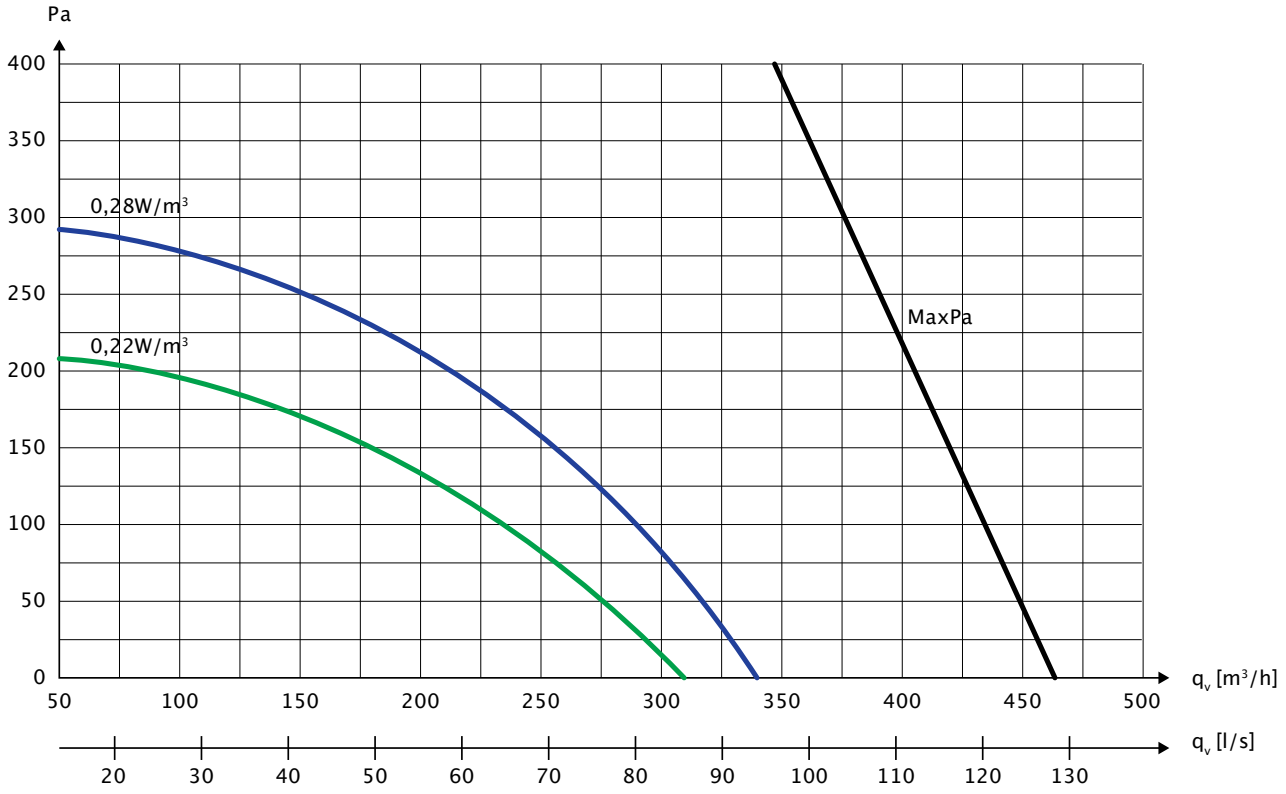
Capacity of standard unit as a function of q_v and $P_{t,ext}$.

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.

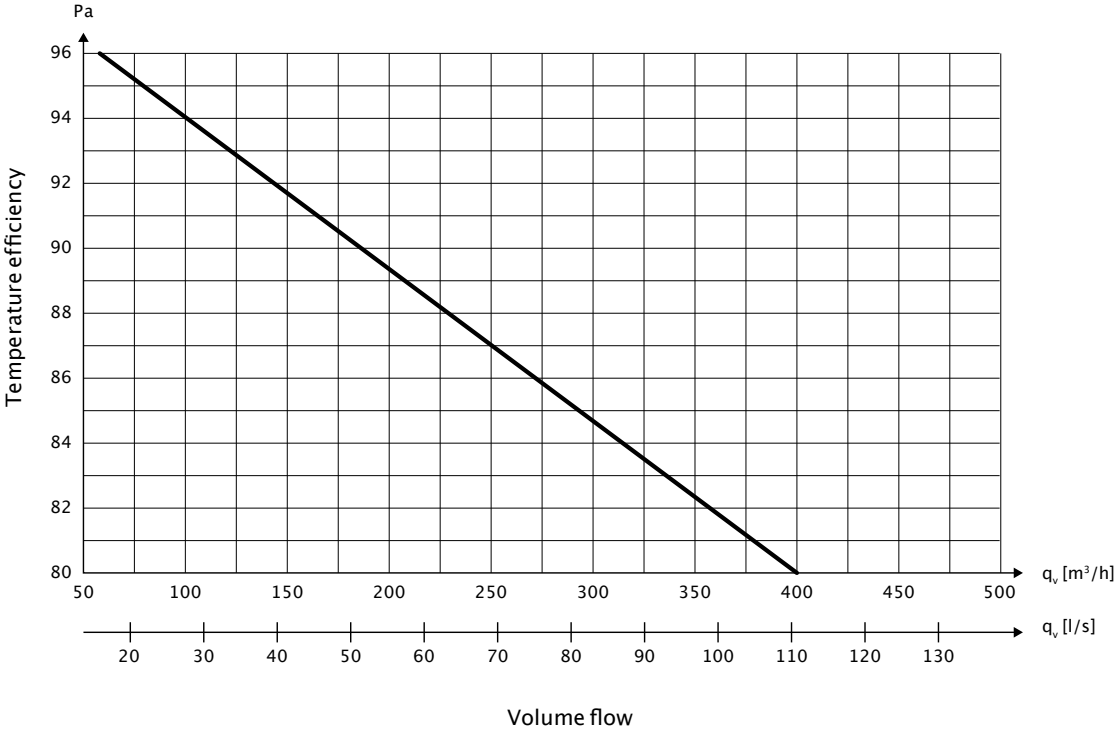


Temperature efficiency

Temperature efficiency as a function of volume flow q_v [m³/h] for unit with counterflow heat exchanger.

Temperature efficiency according to EN13141-7 (2°C / 20°C).

NB! The temperature efficiency, is for the heat exchanger only (without heat pump operation).

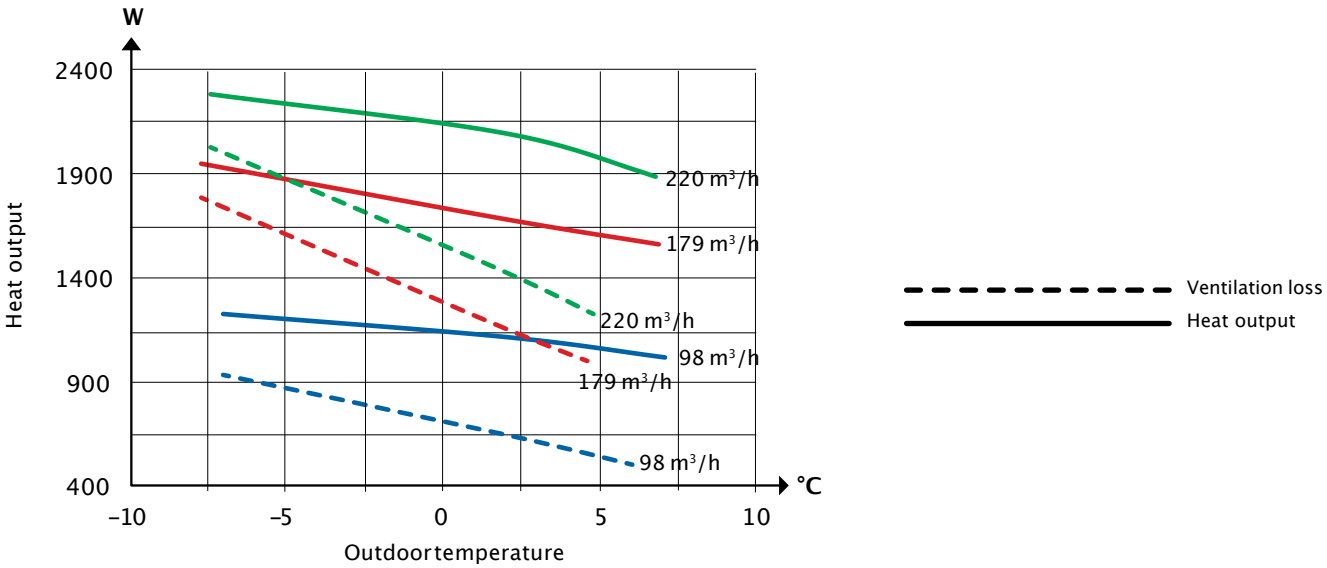


Heat output supply air

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 P to the supply air.

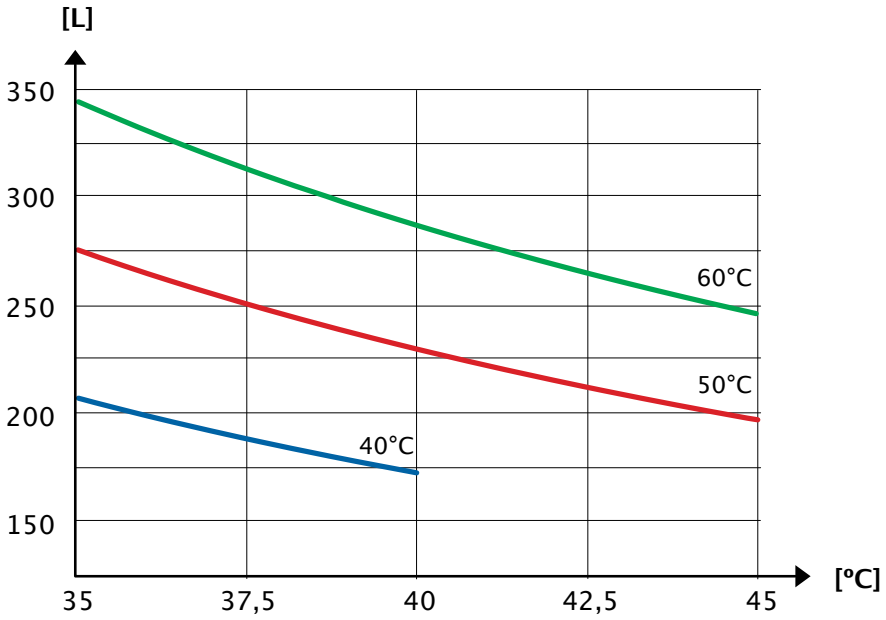
The ventilation loss is the heat output that is lost without heat recovery at the given volume flow air.



PLANNING DATAXL

Tappedwater

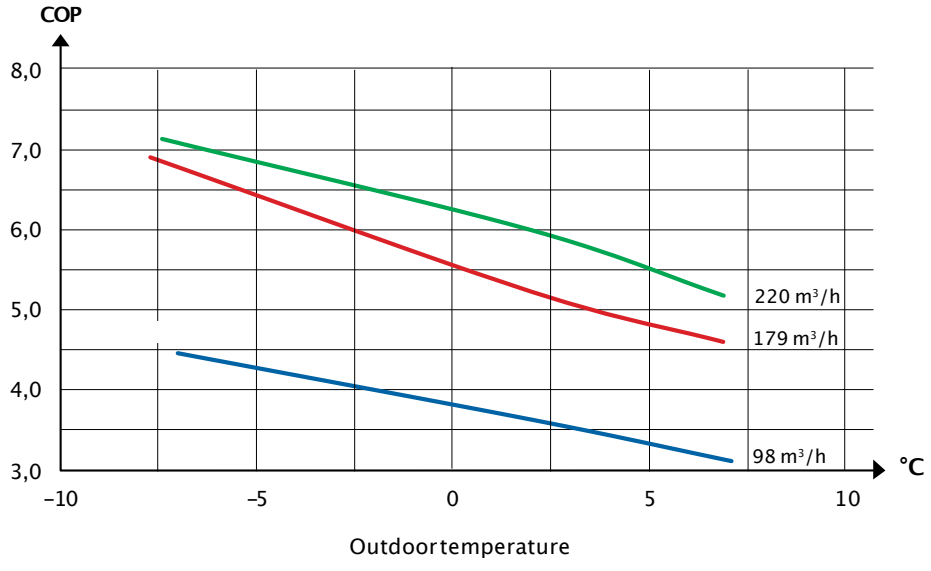
Tappedvolume in litres V_{max} [L] from Compact P tank as a function of tapped temperature t [C°]and tank temperature at 40°, 50° and 60°C



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.



Sound data

Sounddata is for q_v =275 m^3/h and $P_{t,ext}$ =100 Pa in accordance with EN 9614-2for 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 conditionsat the installation site.

Sound output level (L_{wa})

Octave band Hz	Surface dB(A)	Supply air dB(A)	Extract air dB(A)	Discharge air dB(A)	Outdoor air dB(A)
63	-	50	39	49	40
125	-	58	42	54	42
250	-	64	53	62	47
500	-	63	52	63	45
1.000	-	58	40	57	40
2.000	-	58	36	54	33
4.000	-	52	23	43	23
8.000	-	45	11	39	6
Total ±2	51	68	56	67	50

AUTOMATION

CTS 602 Control

The Compact P 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.

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.

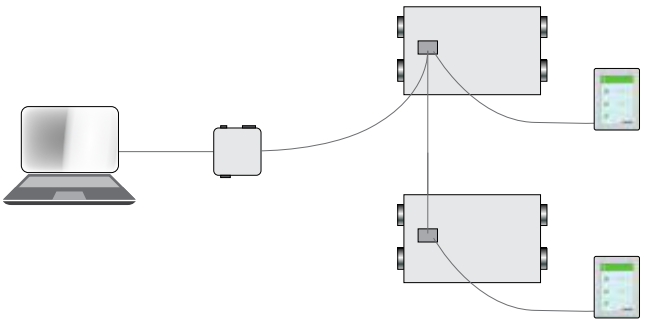
External communication

The CTS 602 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 set up by default for a Modbus RTU 30 address, but can be set to a value 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
Filter monitor	Filter monitor with timer notifies when it is time to change filters.Can be set between 30 and 180 days.	+
Operating mode	Can be set to Auto according to set values or set to heating or cooling mode.	+
Stepless regulation	The four ventilation steps can be set steplessly 20-100%,with various values for supply air and exhaust air.	+
Humidity control	Built-in humidity control can be set to high ventilation operation at high humidity (when in the shower) and low ventilation operation if the humidity in the home becomes too low.	+
Active cooling	The unit can be set to cool the supply air in the summer,should the need arise.When the heat pump cools,the heat is deposited in the hot water tank,so that you get "free"hot water when the unit is in cooling mode.	+
Low outdoor temperature	It is possible to lower the ventilation at low outdoor temperature,to avoid the indoor humidity becoming too low.	+
CO_2 control	It is possible to control the ventilation level according to the CO_2 level in the home.	-
Temperature settings	The temperature settings are used by the controller to regulate the operation of the entire system.	+
Frost protection	The control has an automatic function for defrosting the heat exchanger to prevent formation of ice.	+
Frost protection Polar	The Polar model has a built-in frost protection preheater to protect the counterflow heat exchanger so no ice occurs.	+
Frost protection EHD	The controller can control the EHD damper if the outdoor air enters through roof terminals.	+
Domestic hot water	Compact P produces the domestic hot water via the air / air heat pump in the ventilation part.	+
Pause domestic hot water	It is possible to set the hot water production on pause e.g.if no one is at home.In that way,energy is saved.	+
Frost protection domestic hot water	To protect the hot water tank,it is fitted with a frost protection function.	+
Supplementary electrical heater domestic hot water	If the need for domestic hot water increases and the heat pump cannot keep up,a supplementary electrical heater can be activated to heat the domestic hot water.	+
Anti-scald protection	The control has a built-in scalding protection,which prevents scalding of the users when the hot water tap is opened.	+
Anti-Legionella	The control has an Anti-Legionella treatment of the domestic hot water that can be activated manually or automatically.	+
Anode	Electronically monitored anode.Notifies when it is time to replace it to ensure a long service life of the hot water tank.	+
Week program	A week program can be made with various settings depending on the use of the home.	+
User selection program 1	A user selection program enables you to use special settings that override the standard operating settings via a potential-free signal.Used e.g.if a cooker hood is connected to the system.	+
User selection program 2	Used as user selection 1,but at the same time has an output signal that can be used e.g.to control a damper.	+
Datalog	Data logging as well as error messages and warnings.	+
Output data	All current values in the system operation.Most often used for troubleshooting.	+
Emergency stop ventilation	Do not turn off the ventilation,as this may damage the unit,duct system and in the worst case the home.But it may be necessary to briefly turn off the ventilation e.g.due to a emergency notification.	+

OPERATION

Intelligent humidity control

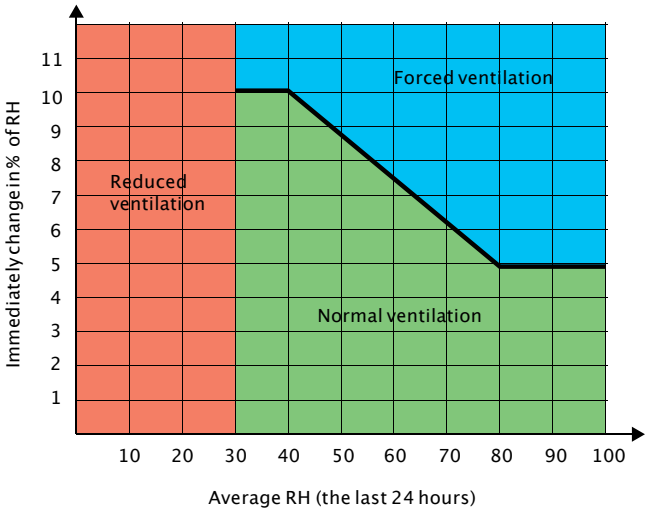
Nilan's humidity control feature automatically adapts to the needs of the family or the building.

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%)

CCDI-SYSTEM

All ventilation units with highly efficient heat recovery will ice up at extremely low outdoor temperatures.

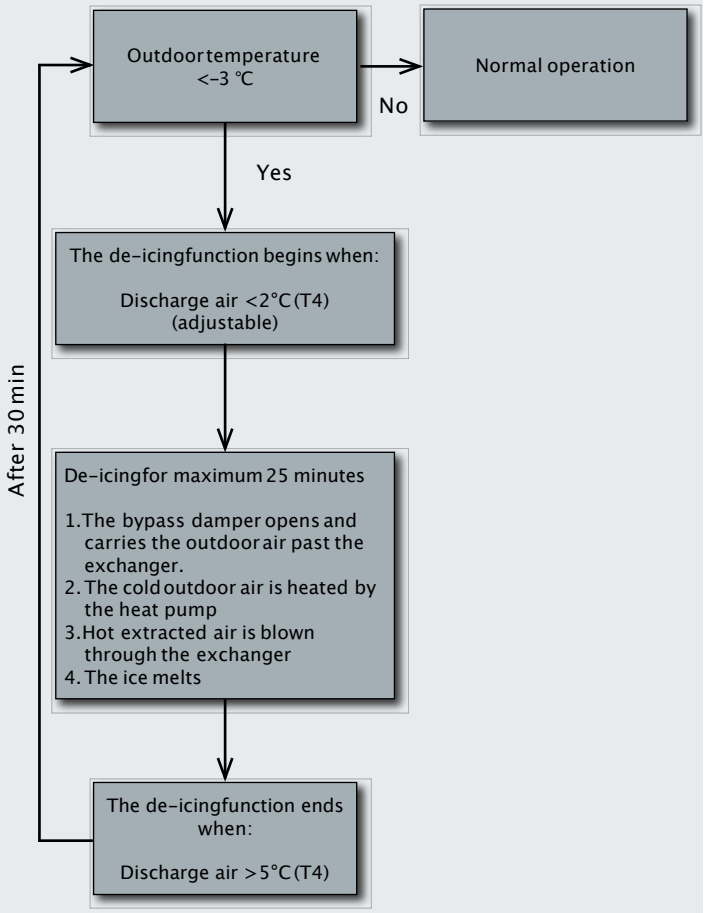
The extracted air condenses when it is cooled during heat recovery. Due to the high temperature efficiency, the condensation will slowly be converted into ice, which will block the counter-flow heat exchanger, unless action is taken.

It must be considered whether the unit's balanced operation should be protected in continuing frosty conditions, and whether shorter periods of imbalance or a lower air volume can be accepted.

Nilan standard de-icing

Compact P
(without preheating element)

If Compact P without preheating element is selected, the unit will react to icing as described below.

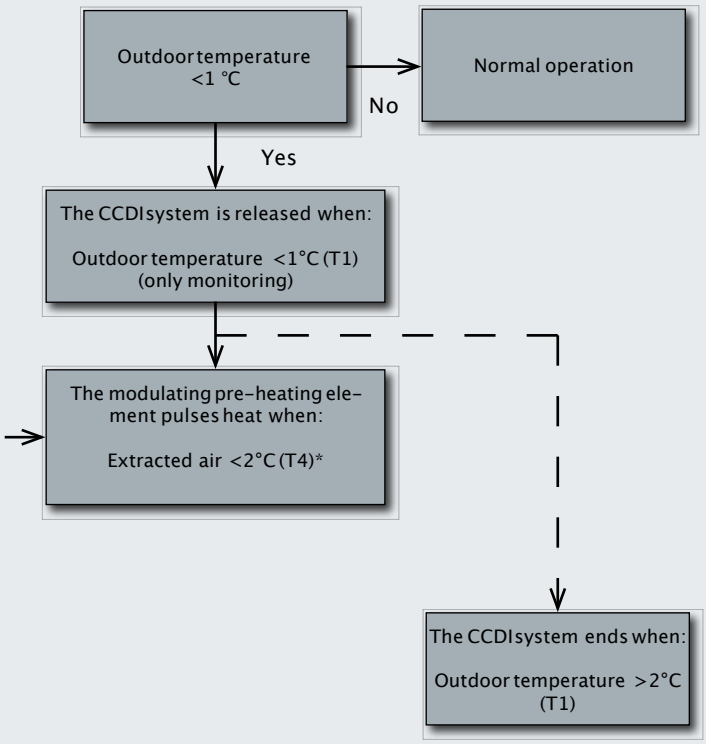


Nilan CCDI-System
(Condition Controlled De-ice System)

Compact Polar
(with built-in pre-heating element)

Compact P Polar has a built-in antifreeze preheating element installed at the factory.

The built-in pre-heating element is controlled by Nilan´s unique CCDI System (Condition Controlled De-ice System), which ensures a very low energy consumption at frost protection.



CCDI-System

Ordinary antifreeze pre-heating elements are controlled by the outside temperature, and ensure that no outdoor air below 0 °C enters the unit. That means, the pre-heating element heats the outdoor air for many hours without it actually being necessary.

Nilan CCDI-System measures the temperature in the part of the heat exchanger where ice forms, and only starts the pre-heating element when the temperature in the heat exchanger falls below 2 °C, and regulates stepless.

Ice formation in the heat exchanger is not only conditioned by the outside air temperature, but to a large extent also by the temperature and humidity in the exhaust air. With the Nilan CCDI-System the pre-heating element will typically only be activated at an outdoor temperature below -2°C and i many cases at an even lower temperature. In this way, the pre-heating element will run for a very limited number of hours per year, compared to a normal pre-heating element.

NB! All temperature settings are adjustable. On adjustment, they must be matched to the conditions in the home and the local climate.

ACCESSORIES

Electrical pre-heating element (Frost protection)

An electrical pre-heating element heats up the outdoor air before it enters the unit. This avoids having to defrost the unit, resulting in a loss of power. There are temperature sensors supplied to be fitted in the ducts (Integrated in the Polar version).

Electrical heating surface incl. regulation

When you fit an electrical heating surface, you can raise the fresh air temperature to the desired level 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.

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

With an expansion PCB, the features of the CTS 602 control expand option to use user select 2.

EM-box

An EM-box allows heat recovery from the air from the range hood and thereby helps to heat the supply air. The EM-box is equipped with a special filter which efficiently cleans the range hood air of fat particles and thereby protects the system.

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.

Extension cable HMI user panel

The control panel for the ventilation unit is connected to a short cable so that the panel can be mounted in the immediate vicinity of the unit. The panel can also be mounted on the front of the unit.

You can order a 10 or 20 m extension cable with connectors, so that the control panel can be placed in a place where the user has the opportunity to see it.

Cover plate HMI user panel

It is possible to move the HMI control panel away from the unit and place it in a more visible place. A cover plate can be ordered to cover the hole where the control panel was located.

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 °C. A maximum temperature of up to 60 °C 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.

Vibration absorbers

It is important to ensure that the ventilation unit does not transfer vibrations to the building. The ventilation unit should therefore be placed on a vibration absorbing material. Nilan can supply effective vibration absorbers to place under the ventilation unit. They are sold in packs of 4.

Flexible sound damper

To make it easy to service the unit in the future, we recommend that you fit a flexible connection between the unit and the duct system. Nilan's flexible sound damper absorbs sounds effectively from both the duct system and from roof stacks.

Pollen filter ISO ePM1 50-65% (F7)

A pollen filter class ISO ePM1 50-65% (F7) can be fitted in the unit. The pollen filter is fitted with the plate filter ISO Coarse >90% (G4).

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.

COMPACT P EK

Product description

The Compact P EK unit has a built-in electrical boiler that can be connected to a waterborne central heating system, thereby providing electrical heating to the home.

The advantage of Compact P EK is that it does not require buried geothermal coils, or the installation of an air extraction heat pump, which is the case for traditional heat-pump based heating solutions. This makes installation easier and less expensive.

Electrical heating is a good solution for very well-insulated homes that do not use a lot of energy for heating, such as passive buildings. However, it must be checked whether electrical heating is legally permitted.

Compact P EK 3 kW

Heat output	3 kW
Supply voltage	230V / 3 x230V / 3 x400V
Max. fuse size (1 x230 V) -N	25A
Max. fuse size (3 x230 V)	16A
Max. fuse size (3 x400V) -N	16A
Weight	21 kg
Standby electricity consumption	2 W
Expansion vessel	10 l

Compact P EK 6 kW

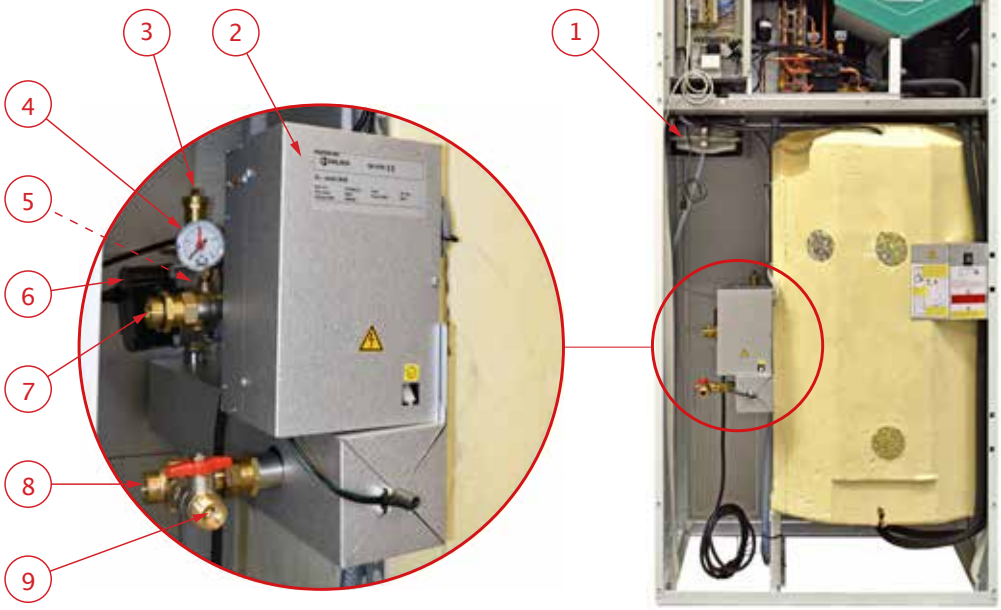
Heat output	6 kW
Supply voltage	230V / 3 x230V / 3 x400V
Max. fuse size (1 x230 V) -N	36A
Max. fuse size (3 x230 V)	16A
Max. fuse size (3 x400 V) -N	16A
Weight	21 kg
Standby electricity consumption	2W
Expansion vessel	10 l

Compact P EK 9 kW

Heat output	9 kW
Supply voltage	3 x 400V -N
Max. fuse size (3 x400 V) -N	20A
Weight	21 kg
Standby electricity consumption	2W
Expansion vessel	10 l

Electrical boiler

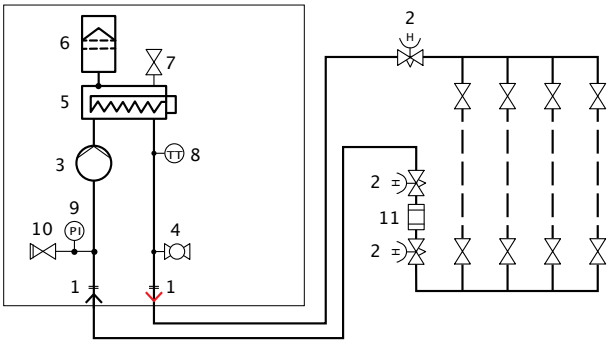
1. Pressure expansionvessel 8L
2. Built-in electrical boiler
3. Automatic vent
4. Manometer
5. Safety valve 2,5 bar
6. Circulation pump
7. Return flow central heating
8. Supply flow central heating
9. Fill valve 1/2”



Functional diagram

1 Connection 3/4”
2 Stop valve
3 Circulation pump
4 Fill valve 1/2”
5 Electrical boiler with electrical heating element (3 / 6 / 9 kW)
6 Pressure expansionvessel 8L
7 Automatic vent
8 Temperature sensor
9 Manometer
10 Safety valve 2,5 bar
11 Particulate filter (not Nilan delivery)

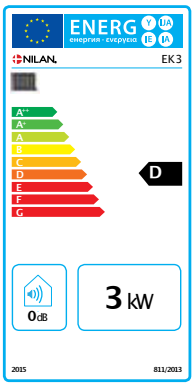
EK



TECHNICALPARAMETERS EK

Boiler system for space heating

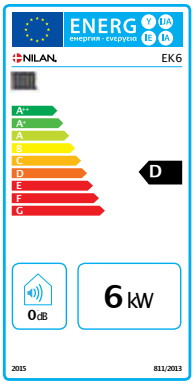
Model	EK 3 kW
Condensing boiler	No
Low temperature boiler	No
B1 boiler	No
Cogeneration space heater	No
Combination heater	No



Item	Symbol	Value	Unit
Rated heat output	Prated	2,914	kW
At rated heat output and high-temperature regime	P_4	2,914	kW

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	η_s	39	%
At rated heat output and high-temperature regime	η_4	39	%
Other items			
Standby heat loss	P_{stby}	0,0864	kW

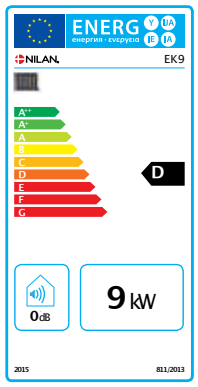
Model	EK 6 kW
Condensing boiler	No
Low temperature boiler	No
B1 boiler	No
Cogeneration space heater	No
Combination heater	No



Item	Symbol	Value	Unit
Rated heat output	Prated	5,914	kW
At rated heat output and high-temperature regime	P_4	5,914	kW

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	η_s	39	%
At rated heat output and high-temperature regime	η_4	39	%
Other items			
Standby heat loss	P_{stby}	0,0864	kW

Model	EK 9 kW
Condensing boiler	No
Low temperature boiler	No
B1 boiler	No
Cogeneration space heater	No
Combination heater	No



Item	Symbol	Value	Unit
Rated heat output	Prated	8,914	kW
At rated heat output and high-temperature regime	P_4	8,914	kW

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	η_s	40	%
At rated heat output and high-temperature regime	η_4	40	%
Other items			
Standby heat loss	P_{stby}	0,0864	kW

DELIVERY AND HANDLING

Transport and storage

Compact P comes in factory packaging that protects it during transport and storage.

Compact P must be stored in a dry place in its original packaging until installation. The packaging should only be removed immediately prior to installation.

Lifting cover

Lifting cover for Compact P makes it possible to lift Compact P 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.

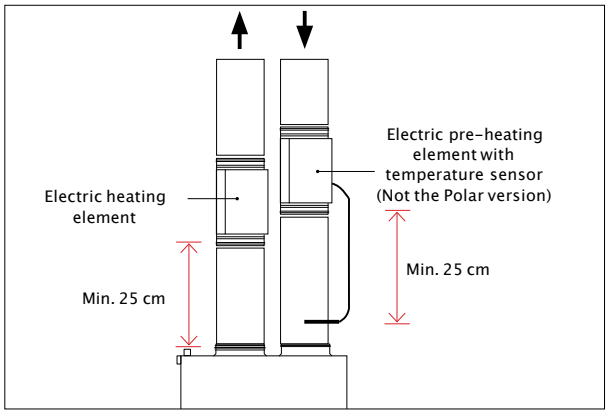
Installation conditions

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.

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.



PASSIVE HOUSE CERTIFIED

CompactP is one of few compact ventilation and heat recovery units in the world to gain the internationally recognised passive building certification – in definitive recognition of the environmental benefits due to its high efficiency.

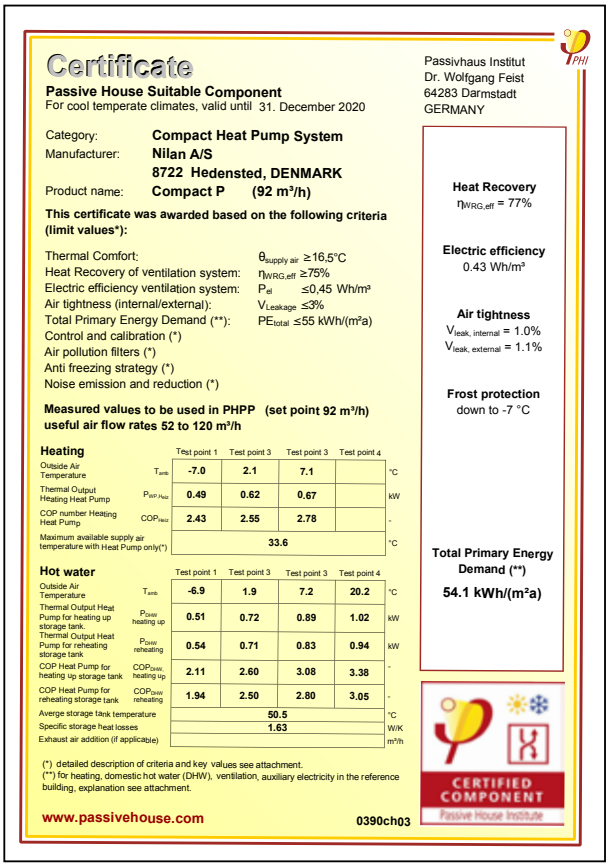
This certification means that CompactP is pre-approved for passive buildings, so that no further documentation is required.

The German Passivhaus Institut (PHI), which is behind passive building certification, is a key player in the low-energy construction industry, especially because the institute created the passive building concept.

In other words, PHI sets the standard for houses constructed as passive buildings due to their low energy consumption. The institute is thus also the trendsetter for coming EU requirements of low-energy construction.

CompactP is passive house certified via two certificates, according to efficiency and heating area. The certificates specify the following values for CompactP to certify the system's ability to provide a passive building with ventilation.

See or download the certificates at www.nilan.dk



Certificate

Passive House Suitable Component
For cool temperate climates, valid until 31. December 2020

Passivhaus Institut
Dr. Wolfgang Feist
64283 Darmstadt
GERMANY

Category: **Compact Heat Pump System**
Manufacturer: **Nilan A/S**
8722 Hedensted, DENMARK
Product name: **Compact P (92 m³/h)**

This certificate was awarded based on the following criteria (limit values*):

Thermal Comfort:	$\theta_{supply\ air}$ ≥16,5°C
Heat Recovery of ventilation system:	$\eta_{WRG,eff}$ ≥75%
Electric efficiency ventilation system:	P_{el} ≤0,45 Wh/m³
Air tightness (internal/external):	$V_{Leakage}$ ≤3%
Total Primary Energy Demand (**):	PE_{total} ≤55 kWh/(m²a)
Control and calibration (*)	
Air pollution filters (*)	
Anti freezing strategy (*)	
Noise emission and reduction (*)	

Measured values to be used in PHPP (set point 92 m³/h)
useful air flow rates 52 to 120 m³/h

Heating

	Test point 1	Test point 3	Test point 3	Test point 4	
Outside Air Temperature T_{amb}	-7.0	2.1	7.1		°C
Thermal Output Heating Heat Pump $P_{WP\ Heiz}$	0.49	0.62	0.67		kW
COP number Heating Heat Pump COP_{Heiz}	2.43	2.55	2.78		-
Maximum available supply air temperature with Heat Pump only(*)	33.6				°C

Hot water

	Test point 1	Test point 3	Test point 3	Test point 4	
Outside Air Temperature T_{amb}	-6.9	1.9	7.2	20.2	°C
Thermal Output Heat Pump for heating up storage tank. $P_{DHW\ heating\ up}$	0.51	0.72	0.89	1.02	kW
Thermal Output Heat Pump for reheating storage tank $P_{DHW\ reheating}$	0.54	0.71	0.83	0.94	kW
COP Heat Pump for heating up storage tank $COP_{DHW\ heating\ up}$	2.11	2.60	3.08	3.38	-
COP Heat Pump for reheating storage tank $COP_{DHW\ reheating}$	1.94	2.50	2.80	3.05	-
Averge storage tank temperature	50.5				°C
Specific storage heat losses	1.63				W/K
Exhaust air addition (if applicable)					m³/h

(*) detailed description of criteria and key values see attachment.
(**) for heating, domestic hot water (DHW), ventilation, auxiliary electricity in the reference building, explanation see attachment.

Heat Recovery
$\eta_{WRG,eff}$ = 77%

Electric efficiency
0.43 Wh/m³

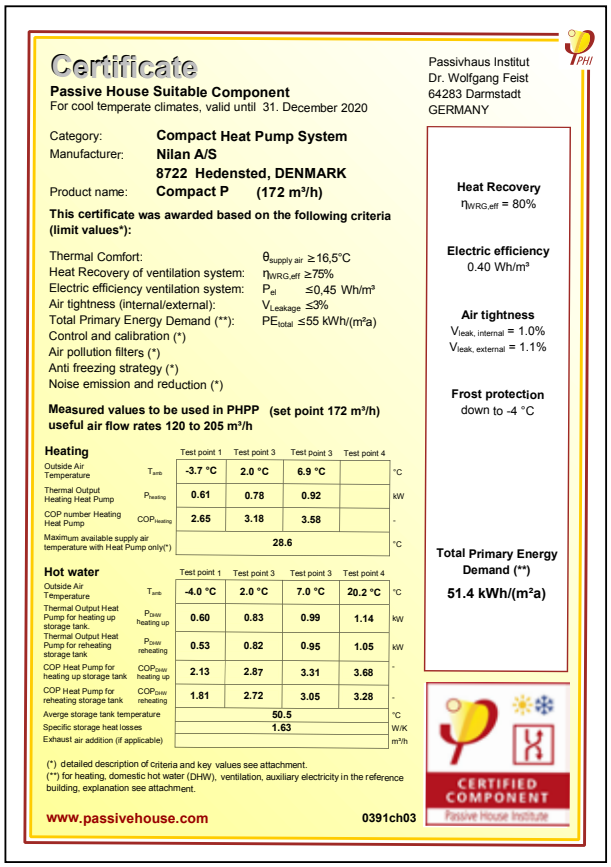
Air tightness
$V_{leak,\ internal}$ = 1.0%
$V_{leak,\ external}$ = 1.1%

Frost protection
down to -7 °C

Total Primary Energy Demand (**)
54.1 kWh/(m²a)

CERTIFIED COMPONENT
Passive House Institute

www.passivehouse.com
0390ch03



Certificate

Passive House Suitable Component
For cool temperate climates, valid until 31. December 2020

Passivhaus Institut
Dr. Wolfgang Feist
64283 Darmstadt
GERMANY

Category: **Compact Heat Pump System**
Manufacturer: **Nilan A/S**
8722 Hedensted, DENMARK
Product name: **Compact P (172 m³/h)**

This certificate was awarded based on the following criteria (limit values*):

Thermal Comfort:	$\theta_{supply\ air}$ ≥16,5°C
Heat Recovery of ventilation system:	$\eta_{WRG,eff}$ ≥75%
Electric efficiency ventilation system:	P_{el} ≤0,45 Wh/m³
Air tightness (internal/external):	$V_{Leakage}$ ≤3%
Total Primary Energy Demand (**):	PE_{total} ≤55 kWh/(m²a)
Control and calibration (*)	
Air pollution filters (*)	
Anti freezing strategy (*)	
Noise emission and reduction (*)	

Measured values to be used in PHPP (set point 172 m³/h)
useful air flow rates 120 to 205 m³/h

Heating

	Test point 1	Test point 3	Test point 3	Test point 4	
Outside Air Temperature T_{amb}	-3.7 °C	2.0 °C	6.9 °C		°C
Thermal Output Heating Heat Pump $P_{heating}$	0.61	0.78	0.92		kW
COP number Heating Heat Pump $COP_{heating}$	2.65	3.18	3.58		-
Maximum available supply air temperature with Heat Pump only(*)	28.6				°C

Hot water

	Test point 1	Test point 3	Test point 3	Test point 4	
Outside Air Temperature T_{amb}	-4.0 °C	2.0 °C	7.0 °C	20.2 °C	°C
Thermal Output Heat Pump for heating up storage tank. $P_{DHW\ heating\ up}$	0.60	0.83	0.99	1.14	kW
Thermal Output Heat Pump for reheating storage tank $P_{DHW\ reheating}$	0.53	0.82	0.95	1.05	kW
COP Heat Pump for heating up storage tank $COP_{DHW\ heating\ up}$	2.13	2.87	3.31	3.68	-
COP Heat Pump for reheating storage tank $COP_{DHW\ reheating}$	1.81	2.72	3.05	3.28	-
Averge storage tank temperature	50.5				°C
Specific storage heat losses	1.63				W/K
Exhaust air addition (if applicable)					m³/h

(*) detailed description of criteria and key values see attachment.
(**) for heating, domestic hot water (DHW), ventilation, auxiliary electricity in the reference building, explanation see attachment.

Heat Recovery
$\eta_{WRG,eff}$ = 80%

Electric efficiency
0.40 Wh/m³

Air tightness
$V_{leak,\ internal}$ = 1.0%
$V_{leak,\ external}$ = 1.1%

Frost protection
down to -4 °C

Total Primary Energy Demand (**)
51.4 kWh/(m²a)

CERTIFIED COMPONENT
Passive House Institute

www.passivehouse.com
0391ch03

INFORMATION FROM A TOZ

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

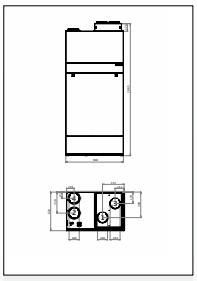
Technical information to ensure correct choice of solution.

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.

SERVICES

Horsham, West Sussex
01403 563045

www.slservicesgroup.com