

# PRODUCT DATA

COMPACT P - CTS602 HMI BY NILAN



Domestic



Passive  
heat recovery



Active  
heat recovery



Ventilation  
< 430 m<sup>3</sup>/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.

The integrated AIR 9, GEO 3, GEO 6 and GEO 9 heat pumps utilise the latest compressor technology to ensure that the heat output is continuously matched to the home's requirements.

## 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. The unit can be combined with a geothermal or an outdoor air heat pump that can be fully integrated into Compact P. 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 AIR 9 or GEO 3/6/9)

## Compact P

- Ventilation with heat recovery
- Sanitary hot water production

Compact P can ventilate up to 275 m<sup>3</sup>/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 PEK has a built in electrical kettle to heat the home via the central heating system.*



## Compact P AIR 9

- Ventilation with heat recovery
- Sanitary hot water production
- Space heating via an air/water heat pump

Besides ventilating the home and producing hot water, Compact P AIR 9 can also heat the home via underfloor heating or low-energy radiators.

AIR 9 is an air/water heat pump with a high heat output and a low energy consumption.



## Compact P GEO 3/6/9

- Ventilation with heat recovery
- Sanitary hot water production
- Space heating via a geothermal/water heat pump

Besides ventilating the home and producing hot water, Compact P GEO 3/6/9 can also heat the home via under floor heating or low-energy radiators.

GEO 3, GEO 6 and GEO 9 are geothermal heat pumps that all have a high output and low energy consumption compared to their sizes.



# 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 275 m<sup>3</sup>/h.

Compact P is also available in a XL-version, which can provide an air volume of 430 m<sup>3</sup>/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.

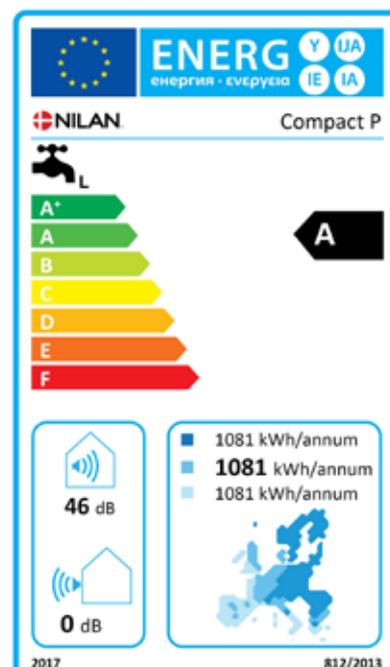
The heat pump has a reversible cooling circuit, which means that, in the summer, the unit can cool the supply air by up to 10 °C. Due to the low air exchange, the cooling does not function as an air conditioning system. On cooling, the supply air is dehumidified, which gives a more pleasant indoor climate 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.



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<sub>2</sub>-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.

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.

Electrically monitored sacrificial anode and corrosion protection.

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

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

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.

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



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.

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

Emergency operation.

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

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

## Compact P

Dimensions (W x D x H)	900 x 610 x 2065 mm
Weight	202 kg
Plate type casing	Aluzinc steel plate, white powder coating RAL9016
Heat exchanger type	Polyethyleneterephthalat counterflow heat exchanger
Fan type	EC, constant rotation
Filter class	ISO Coarse >90% (G4)
Duct connections	Ø 160 mm
Condensate drain	PVC, Ø 20x1,5 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).

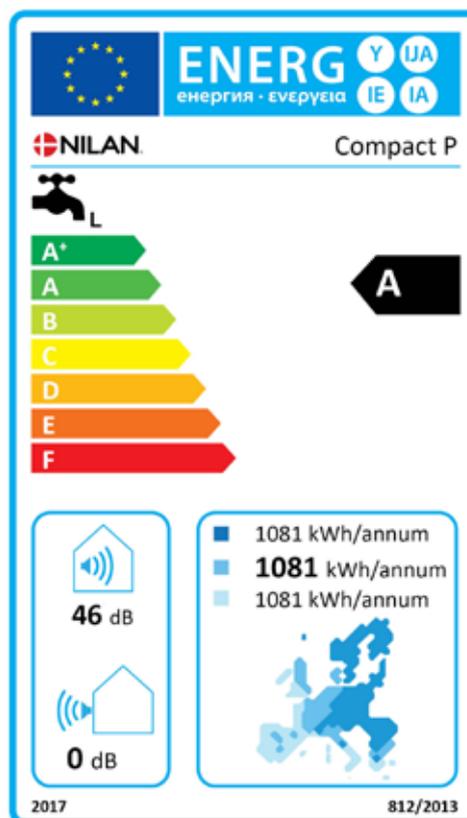
\*2 Input Compact Polar

\*3 At ± 250 Pa and 265 m<sup>3</sup>/h according EN 308/EN 13141-7.

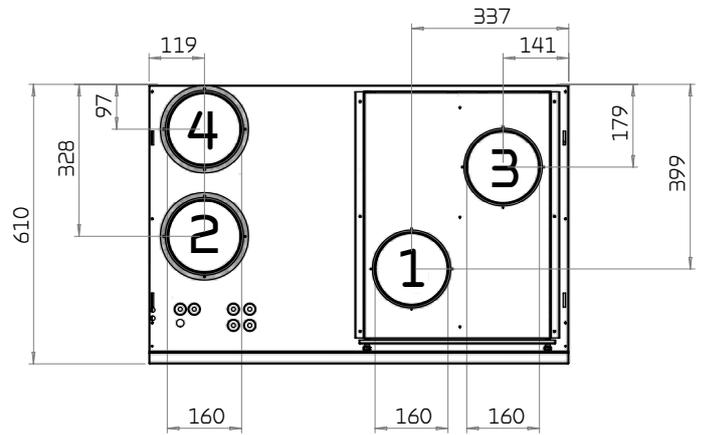
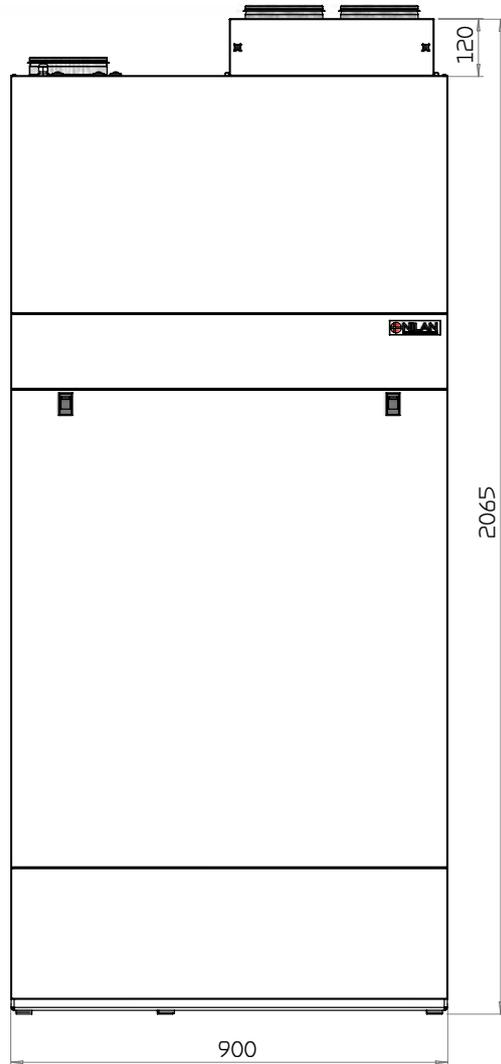
\*4 At ± 100 Pa and 265 m<sup>3</sup>/h according EN 308/EN 13141-7.

## 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 <sub>WA</sub>	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.

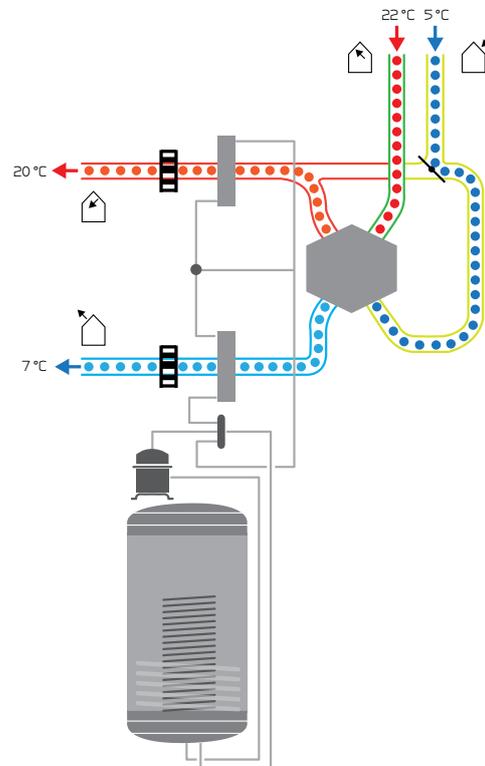
Via a counter flow heat exchanger, up to 95% of the energy in the extracted air is used to heat the supply air.

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

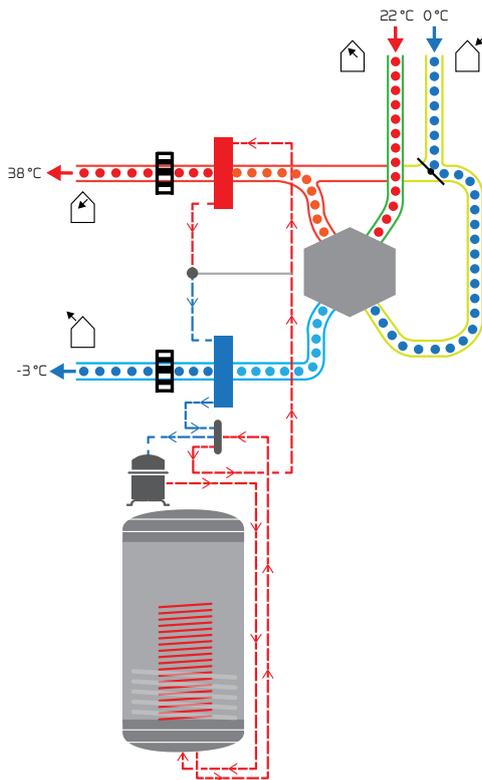
New homes are well-insulated and therefore easy to heat. On the other hand, outdoor temperatures do not need to be very high before getting rid of the heat in the home becomes problematic.

Compact 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.



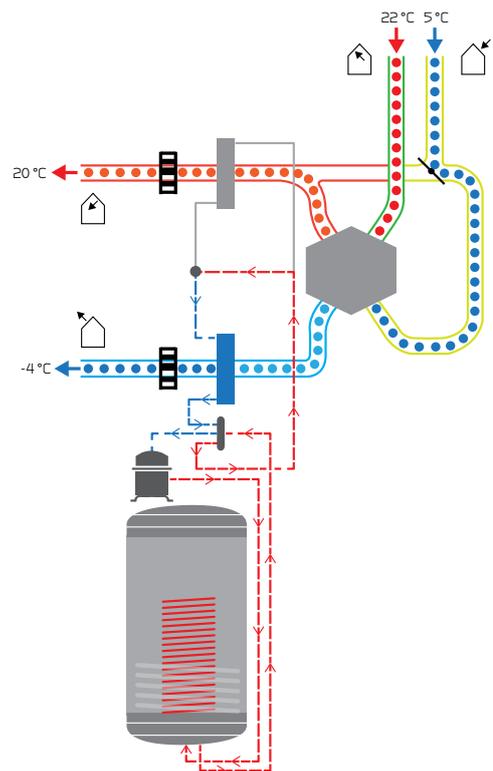
## Passive heat recovery

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.



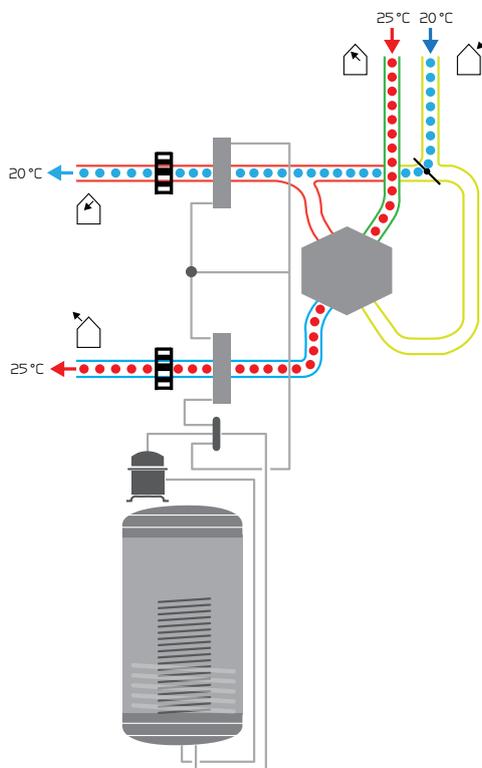
### Passive and active heat recovery

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



### Hot water

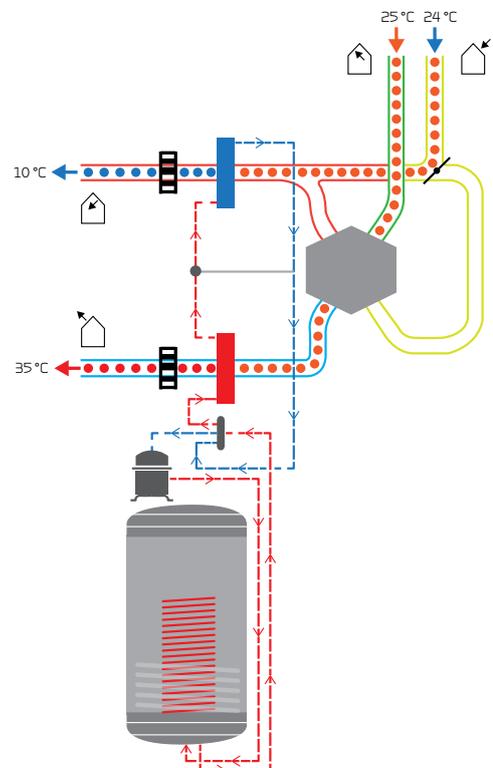
Utilising the residual energy that the counterflow heat exchanger does not use, the heat pump produces hot water.



### 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  $P_{t,ext}$ .

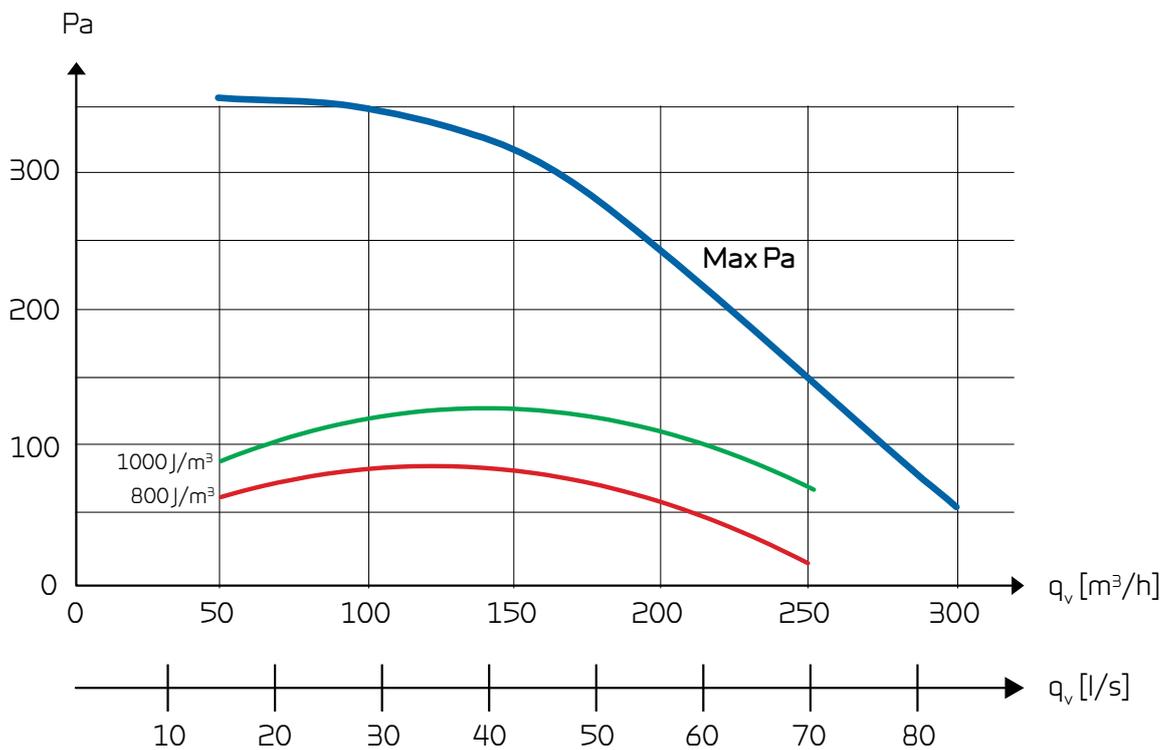
SEL values according to EN 13141-7 are for standard units with ISO Coarse >90% (G4) filters and without heating element.

SEL values comprise the unit's total power consumption 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 m<sup>3</sup>/h at 100 Pa*

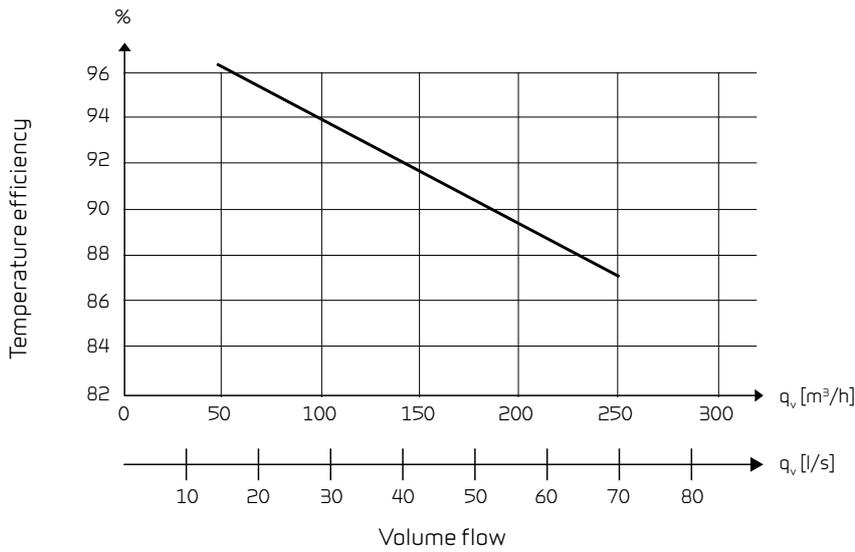


## Temperature efficiency

Temperature efficiency as a function of volume flow  $q_v$  [ $\text{m}^3/\text{h}$ ] for unit with counterflow heat exchanger.

Temperature efficiency according to EN13141-7 ( $2^\circ\text{C} / 20^\circ\text{C}$ ).

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

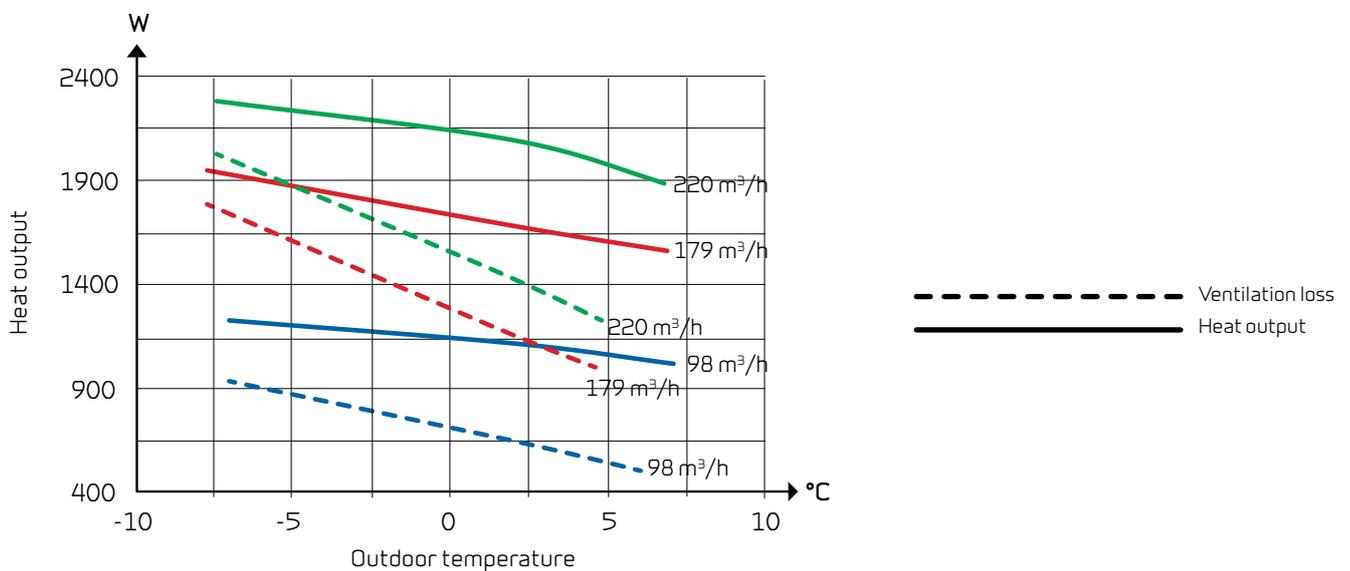


## Heat output supply air

Heat output  $Q_c$  [W] as a function of  $q_v$  [ $\text{m}^3/\text{h}$ ] and outdoor air temperature  $t_{21}$  [ $^\circ\text{C}$ ]. In accordance with EN 14511,  $t_{11}=21^\circ\text{C}$  (extract air)

Heat output is the contribution to room heating added to the fresh air via Compact P to the supply air.

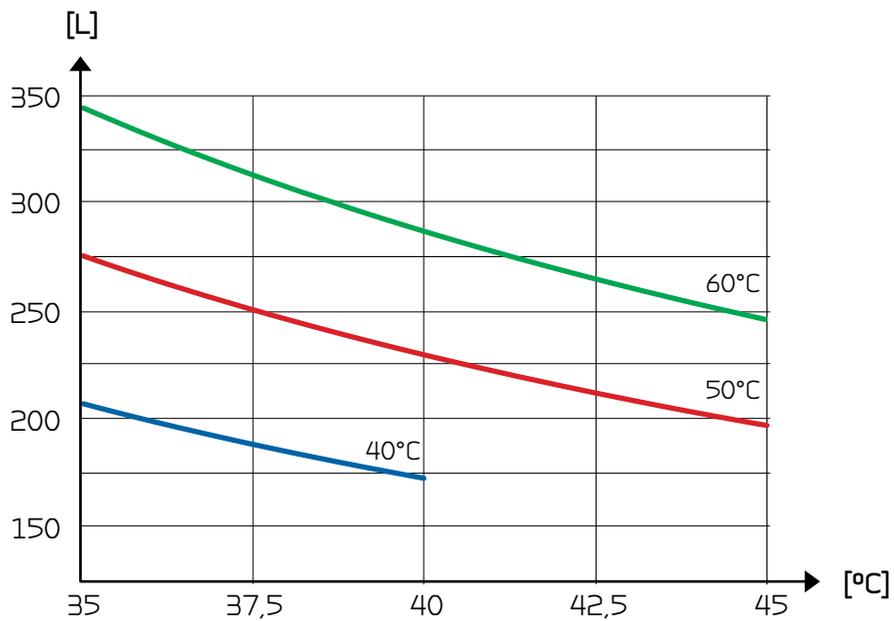
The ventilation loss is the heat output that is lost without heat recovery at the given volume flow air.



# PLANNING DATA

## Tapped water

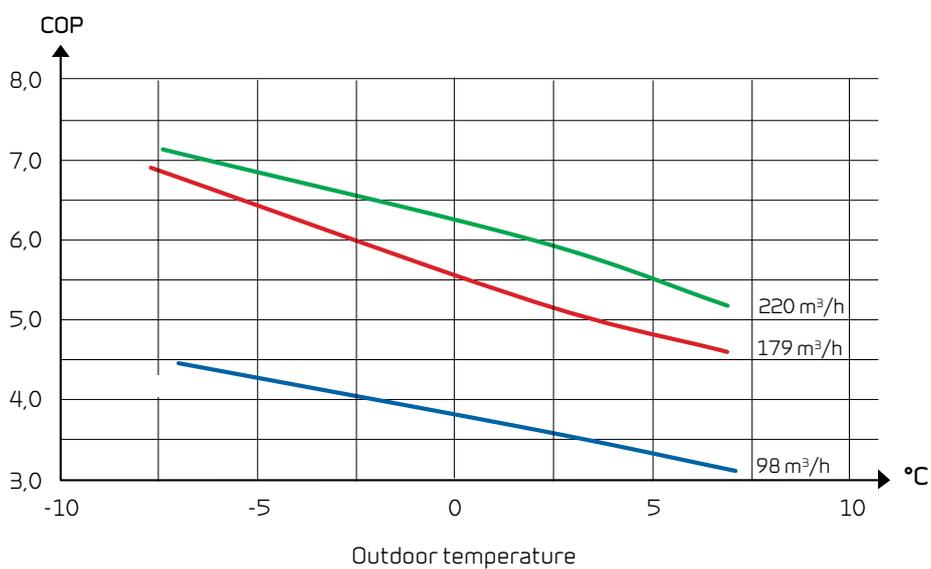
Tapped volume in litres  $V_{\max}$  [L] from Compact P tank as a function of tapped temperature  $t$  [°C] and tank temperature at 40°, 50° and 60°C



## 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  $t_{11} = 21^\circ\text{C}$

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



## Sound data

Sound data is for  $q_v = 210 \text{ m}^3/\text{h}$  and  $P_{t, \text{ext}} = 100 \text{ Pa}$  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)	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 $\pm 2$	46	66	51	64	48

# TECHNICAL DATA XL

## Compact P XL

Dimensions (W x D x H)	900 x 610 x 2065 mm
Weight	202 kg
Plate type casing	Aluzinc steel plate, white powder coating RAL9016
Heat exchanger type	Polyethyleneterephthalat counterflow heat exchanger
Fan type	EC, constant rotation
Filter class	ISO Coarse >90% (G4)
Duct connections	Ø 160 mm
Condensate drain	PVC, Ø 20x1,5 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).

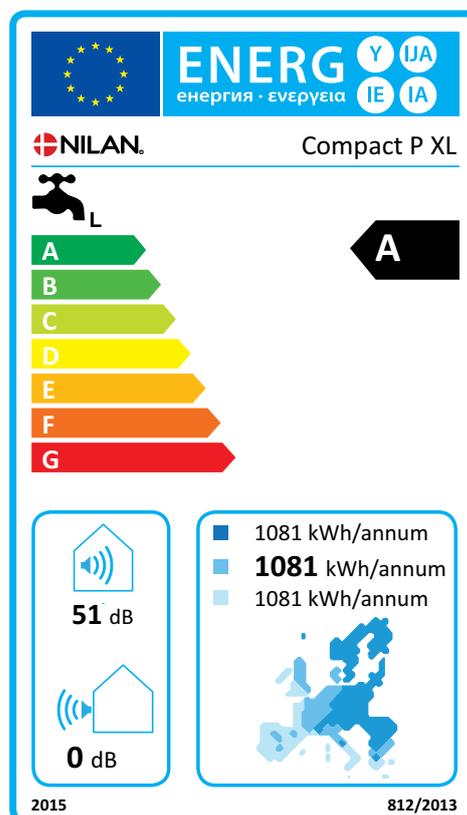
\*2 Input Compact Polar

\*3 At ± 250 Pa and 265 m<sup>3</sup>/h according EN 13141-7.

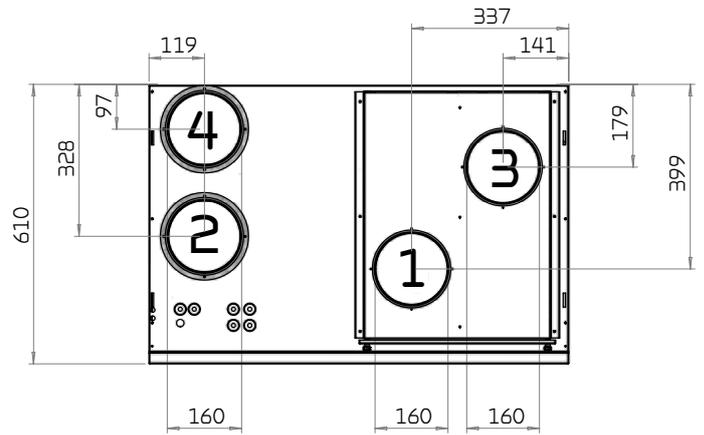
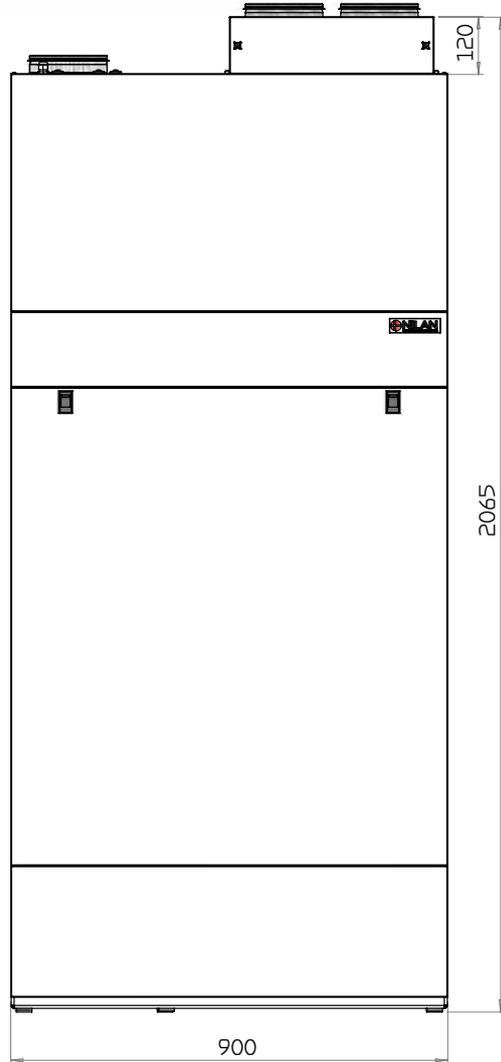
\*4 At ± 100 Pa and 265 m<sup>3</sup>/h according EN 13141-7.

## 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 <sub>WA</sub>	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 DATA XL

## Capacity

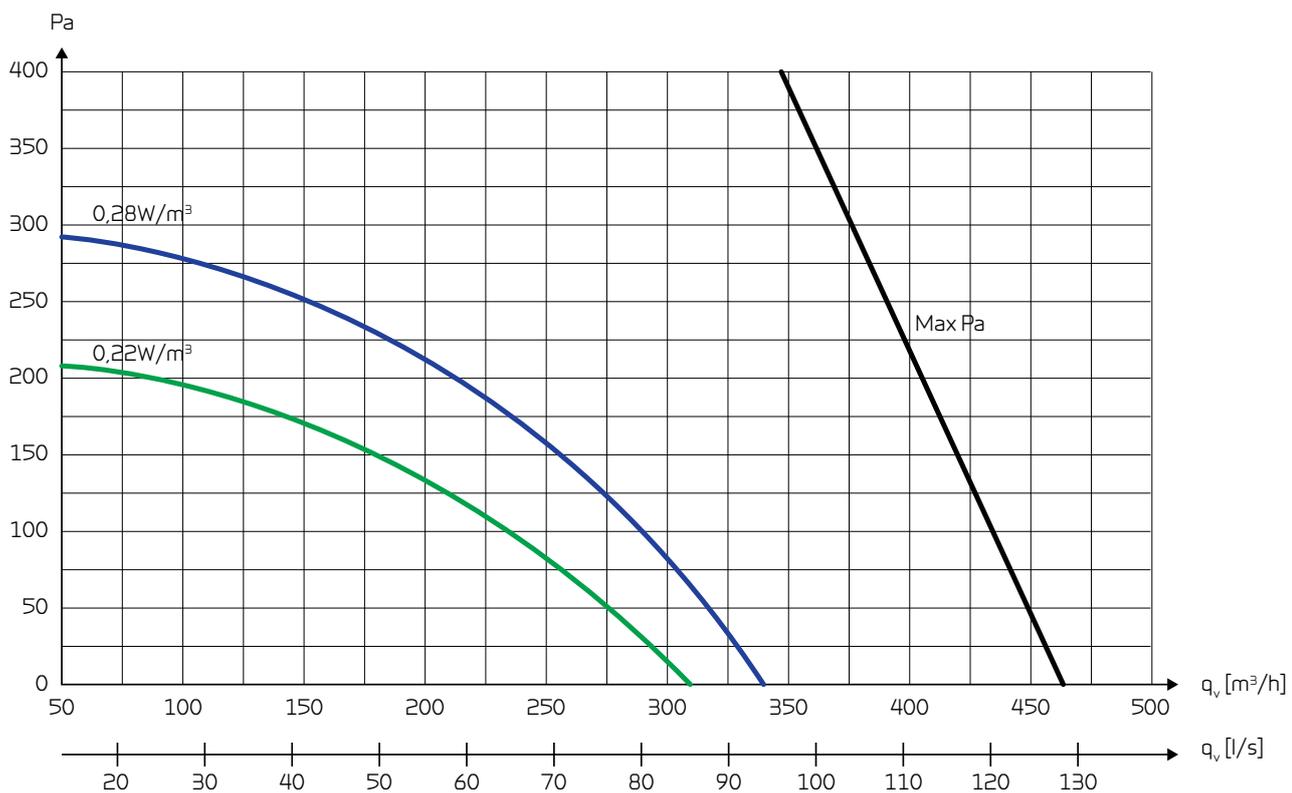
Capacity of standard unit as a function of  $q_v$  and  $P_{t,ext}$ .

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 consumption incl. control.

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

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

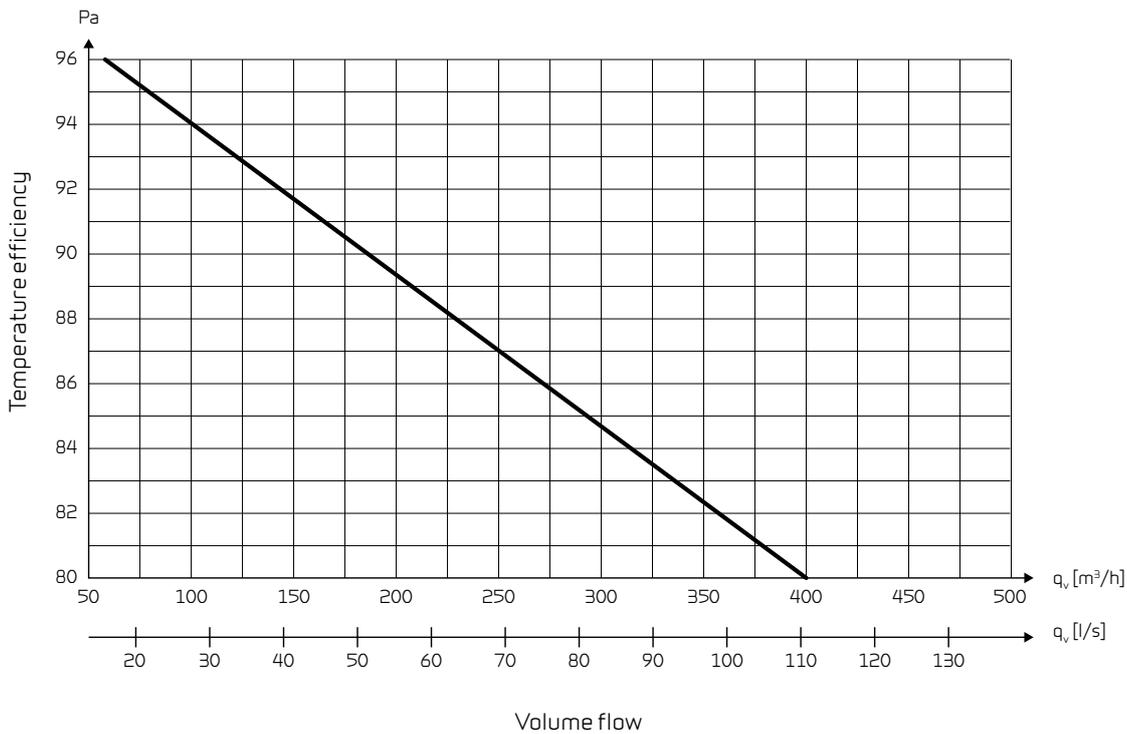


## Temperature efficiency

Temperature efficiency as a function of volume flow  $q_v$  [ $\text{m}^3/\text{h}$ ] for unit with counterflow heat exchanger.

Temperature efficiency according to EN13141-7 ( $2^\circ\text{C} / 20^\circ\text{C}$ ).

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

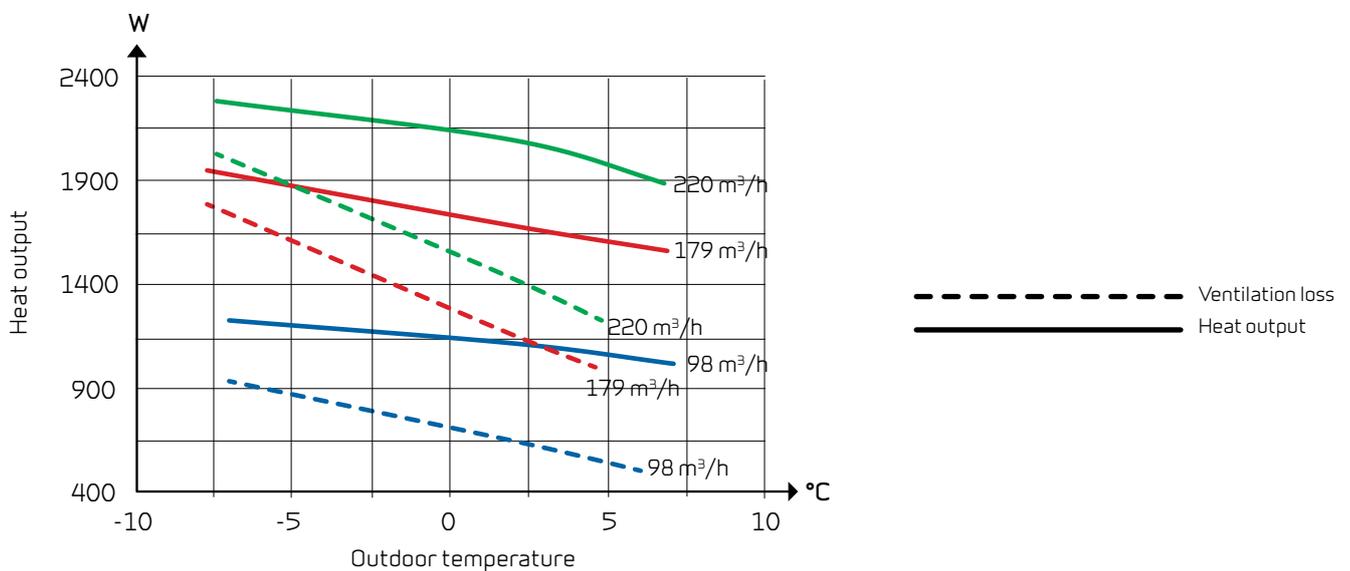


## Heat output supply air

Heat output  $Q_c$  [W] as a function of  $q_v$  [ $\text{m}^3/\text{h}$ ] and outdoor air temperature  $t_{21}$  [ $^\circ\text{C}$ ]. In accordance with EN 14511,  $t_{11}=21^\circ\text{C}$  (extract air)

Heat output is the contribution to room heating added to the fresh air via Compact P to the supply air.

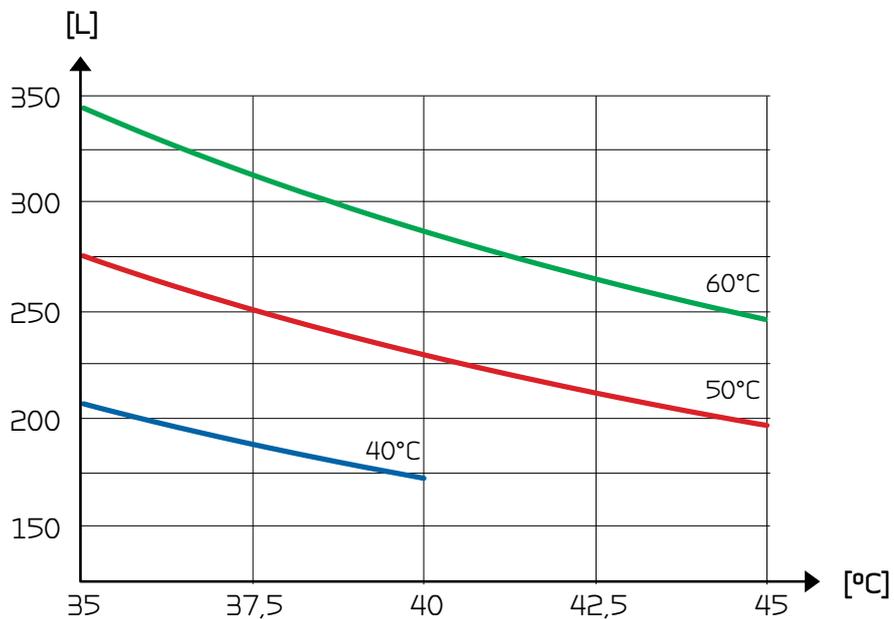
The ventilation loss is the heat output that is lost without heat recovery at the given volume flow air.



# PLANNING DATA XL

## Tapped water

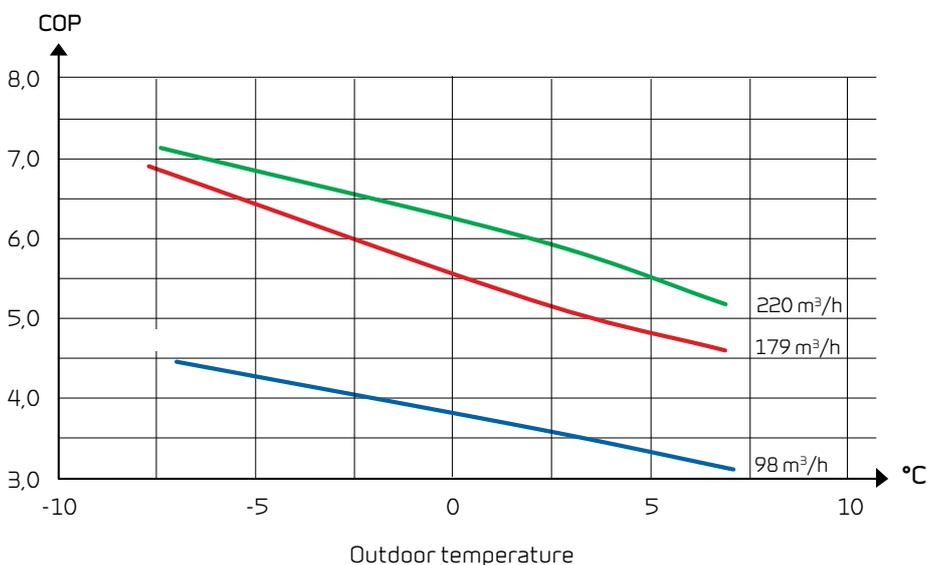
Tapped volume in litres  $V_{\max}$  [L] from Compact P tank as a function of tapped temperature  $t$  [°C] and tank temperature at 40°, 50° and 60°C



## 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  $t_{11} = 21^\circ\text{C}$

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



## Sound data

Sound data is for  $q_v = 275 \text{ m}^3/\text{h}$  and  $P_{t,\text{ext}} = 100 \text{ Pa}$  in accordance with EN 9614-2 for surface and EN 5136 for ducts.

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

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

### Sound output level ( $L_{\text{WA}}$ )

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 $\pm 2$	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.

## Nilan User APP

A Nilan gateway is fitted as standard on the Compact P, 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.



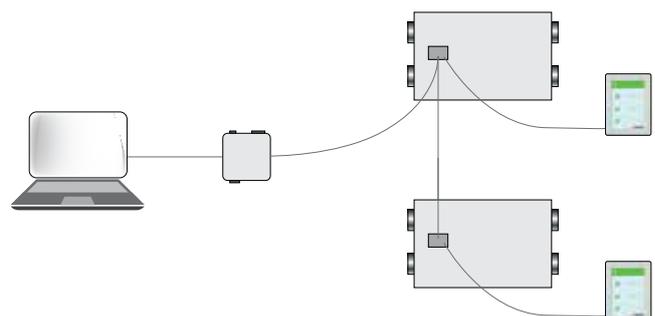
## External communication

The 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 <sub>2</sub> control	It is possible to control the ventilation level according to the CO <sub>2</sub> 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

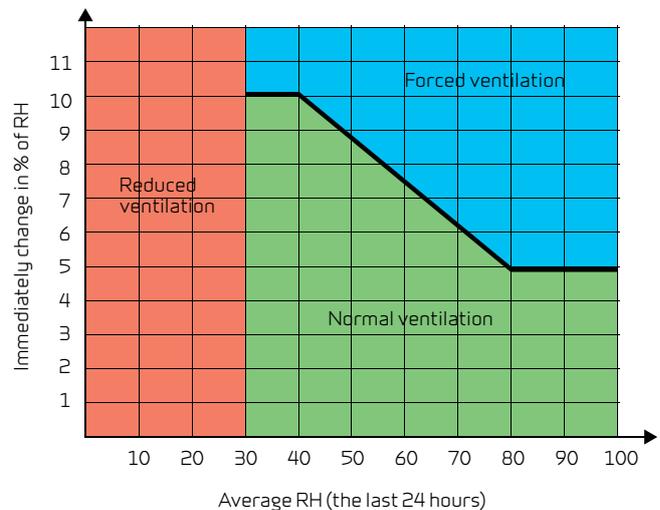
Nilan's humidity control feature automatically adapts to the needs of the family or the building.

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.

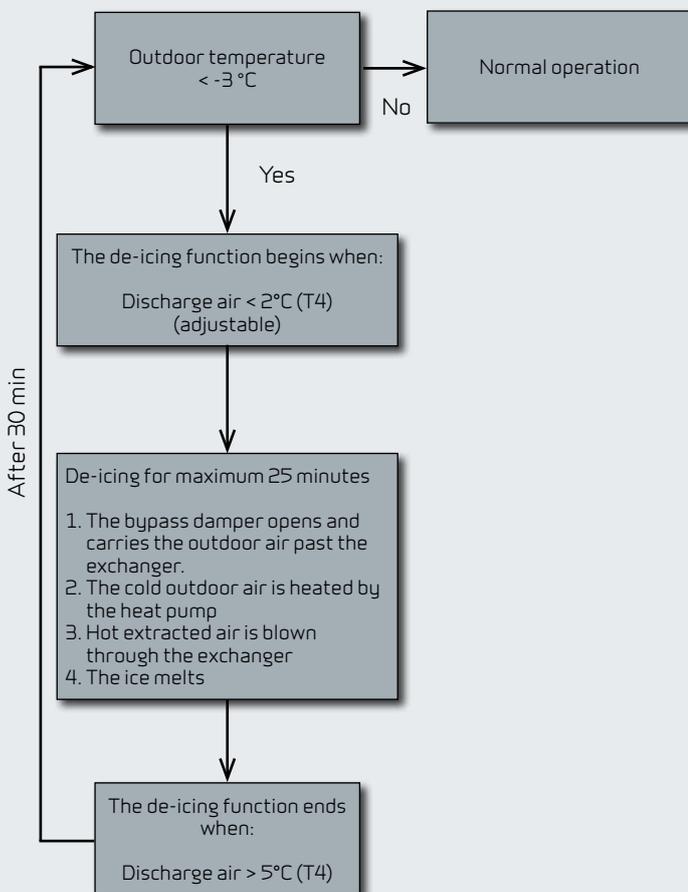
The extracted air condenses when it is cooled during heat recovery. Due to the high temperature efficiency, the condensation will slowly be converted into ice, which will block the counter-flow heat exchanger, unless action is taken.

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.

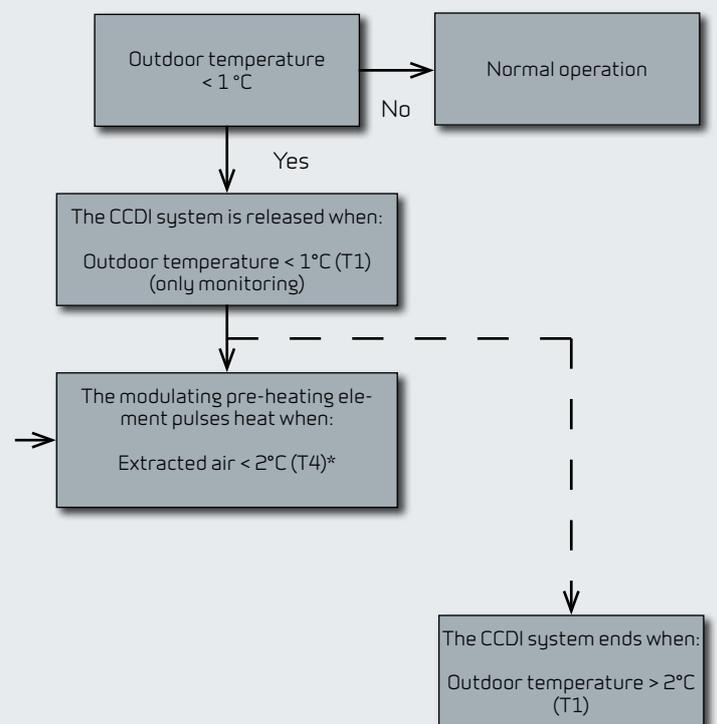


## Nilan CCDI-System (Condition Controlled De-ice System)

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 in 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<sub>2</sub>-sensor

With a CO<sub>2</sub>-sensor installed, the ventilation speed can be pre-programmed with CTS 602 to run at a higher ventilation steps when CO<sub>2</sub> reaches high level in the extract air. CO<sub>2</sub>-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

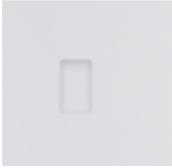
If there is not enough space to fit an EM-box, Nilan offers a DTBU damper, which can be fitted between kitchen and bathroom. The damper functions precisely like the EM-box but requires longer cables.



## 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 AIR 9

## Product description

Compact P AIR 9 has the same benefits and functions as Compact P, but also has an integrated air/water heat pump, with connection to waterborne underfloor heating or low-temperature radiators for central heating.

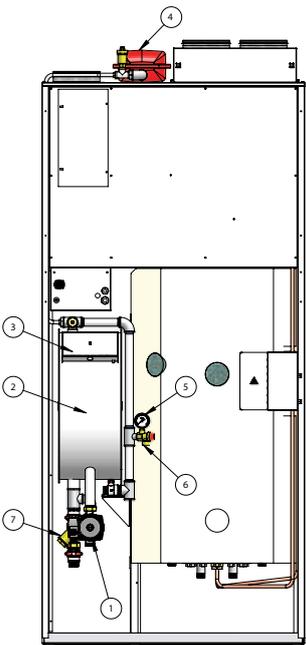
The solution consists of an integrated interior section in Compact P, as well as an exterior section that is easy to connect.

AIR 9 is delivered with a reversible heat pump, which also makes the unit capable of cooling.

AIR 9 is very silent and can be placed without disturbing its surroundings. During summer, when only hot sanitary water is needed, the fan is limited, reducing the noise level. This limit occurs when the outdoor temperature exceeds 7 °C and limiting the compressors output to a maximum of 60 %. These criteria can be set individually.

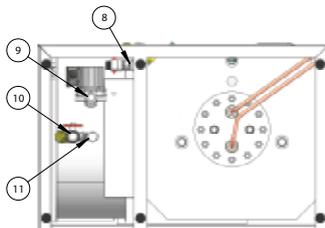


## Inside unit for Compact P AIR 9



### Front

1. Integrated circulation pump interior/ exterior sections 1"
2. 50-litre buffer tank
3. 2 x 3 kW supplementary electrical heating
4. Pressure expansion vessel (central heating circuit)
5. Manometer (central heating circuit)
6. Safety valve, 2.5 bar (central heating circuit)
7. Particle filter

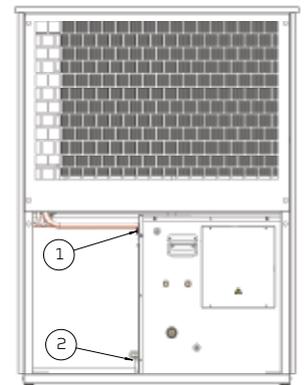


### Base

8. Flow, central heating 3/4"
9. Flow to exterior section 1"
10. Return flow from exterior 1"
11. Return flow from exterior 3/4"

## Outside unit for Compact P AIR 9

1. Flow 1"
2. Return flow 1"



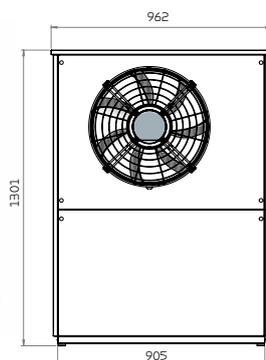
## One unit two designs



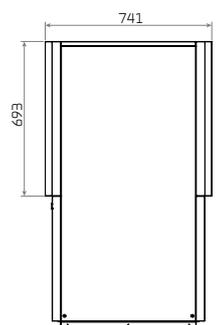
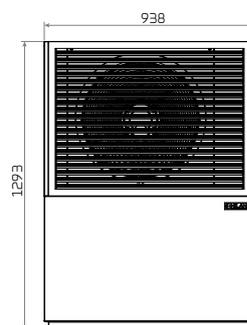
AIR9 classic

AIR9+ elegance

AIR9 classic



AIR9+ elegance





Effective and quiet ventilator with "owl wings".

Summer/winter setting ensures an extra low sound level in the summer.

Low-energy EC-motor.

AIR 9 exterior unit is made from white powder-coated aluzinc steel plate (RAL 9016).

Powder-coated condensation tray prevents "acid water" and leads off the condensation.

A heating cable for frost protection of the condensation drain is included.



Adjustment screws for levelling

AIR 9 is controlled via the same CTS 602 touch panel as is used for Compact P.

A large, well-dimensioned evaporator ensures a good output.

AIR 9 is reliable right down to -22°C

An inverter-controlled DC compressor ensures a variable output and low energy consumption.

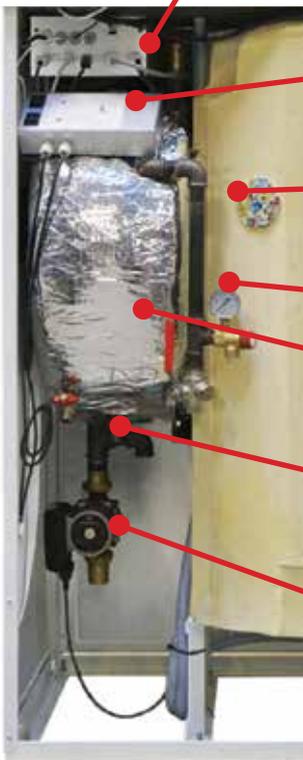
Hermetically-sealed cooling circuit.

The aggregate can therefore be installed without requiring a cooling technician.



AIR 9 interior unit is integrated in Compact P.

This saves space and ensures a neat and tidy installation.



Supplementary electrical heating of 2 x 3 kW Ensures indoor heating during periods of severe frost.

8-litre expansion tank for central heating. Placed on top of the system.

Safety valve to the central heating system.

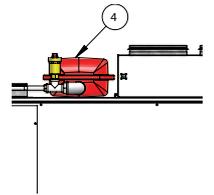
Manometer showing the current pressure in the central heating system.

50-litre buffer/charge circuit. The central heating can thus be activated as required.

Filling tank for central heating.

Soil filter.

Integrated circulation pump to AIR 9 (exterior unit).



# TECHNICAL DATA

## Technical specifications

Dimensions (inside part) (W x D x H) - Integrated in Compact P	550 x 300 x 1100 mm
Weight (inside part)	55 kg
Control	CTS 602
Dimensions (outside part) (W x D x H)	962 x 542 x 1301 mm
Weight (outside part)	125 kg
Supply voltage (inside part)	3 x 400 (3 x 230V), N, PE, 16A, 50 Hz
P <sub>MAX</sub> (inside part)	6.1 kW
Fuse size (inside part)	16 A
Standby electricity consumption	2.5 W
Supplementary electrical heating	2 x 3 kW
Buffer tank (integrated)	50 L
Design pressure (central heating)	4 bar
Opening pressure safety valve (central heating)	2.5 bar
Expansion vessel (central heating)	8 Litre
Booster expansion vessels	0.5 bar G
Max. air volume	3400 m <sup>3</sup> /h
Variable compressor	30 - 100 %
Tightness class fan	IP54
Supply voltage (outside part)	230V 1 N+PE, 50Hz
P <sub>MAX</sub> (outside part)	3.3 kW
Fuse size (outside part)	16 A
Rated output, (max/min) A-Pump	31/99 W
Rated output, (max/min) A-Pump	0.2/0.63 A
Condenser pressure loss (central heating)	15 kPa/0.42 l/s
Central heating connection	3/4"
Refrigerant	R410A
Refrigerant filling	3,15 kg
Pressostat low pressure (on/off)	2.2/3.4 bar G
Pressostat high pressure (on/off)	42/33 bar G
Operating temperatures	-22 °C → 50 °C
Central heating, flow temperature	25°C → 45°C
Connection dimension	1"
Heat output P <sub>H</sub> with variable compressor at 7°C/35°C, according to EN 14511:2012 (max. 5400 RPM)	8,4 kW
Heat output P <sub>H</sub> with variable compressor at 2°C/35°C, according to EN 14511:2012 (max. 5400 RPM)	6,7 kW
Heat output P <sub>H</sub> with variable compressor at -7°C/35°C, according to EN 14511:2012 (max. 5400 RPM)	5,7 kW
Heat output P <sub>H</sub> with variable compressor at -15°C/35°C, according to EN 14511:2012 (max. 5400 RPM)	4,5 kW
Heat output P <sub>H</sub> with variable compressor at 7°C/45°C, according to EN 14511:2012 (max. 5400 RPM)	7,8 kW
Heat output P <sub>H</sub> with variable compressor at -7°C/45°C, according to EN 14511:2012 (max. 5400 RPM)	5,4 kW
SCOP testet according to EN 14825:2012*	5,11
P <sub>design</sub> (t <sub>out</sub> -10°C)	5,21 kW

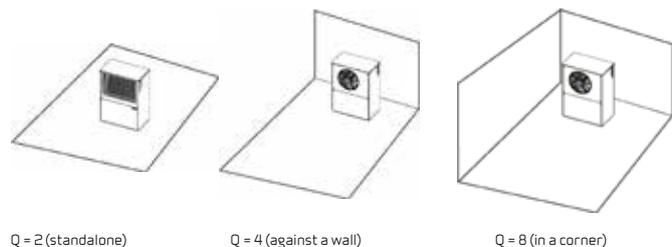
\*SCOP (Seasonal COP) is for "low temperature use, average climate, defined flow, reversible"

## Sound

The sound from the AIR outside part reverberates depending on the placement around the house as well as the substrate on which the unit stands and the surroundings. The below is measured for hard substrate.

Sound effect L<sub>w</sub>, dB(A) 7/6 °C - 30/35 °C = 46 dB(A) according to EN14511, EN 12102, EN3743/1 - Ecodesign 811/2013 and 813/2013.

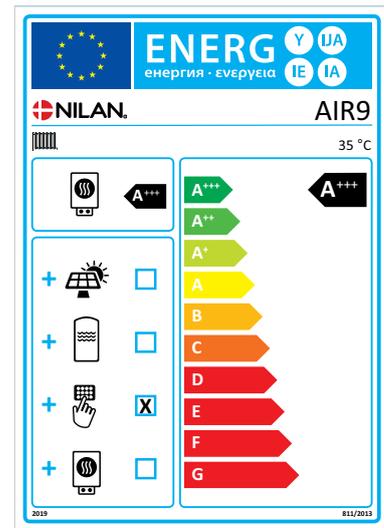
Sound pressure L<sub>pA</sub>, dB(A) according to EN13487:2003



Distance in meters	1	2	6	10	21
Position factor 2	38	32	22	18	12
Position factor 4	41	35	26	21	15
Position factor 8	44	38	28	24	18

# Heat pump for space heating

Model	AIR 9
Air-to-water heat pump	Yes
Water-to-water heat pump	No
Brine-to-water heat pump	No
Low-temperature heat pump	Yes
Equipped with a supplementary heater	Yes
Heat pump combination heater	No
<b>Temperature control:</b>	
Model	CTS602
Class	2
Contribution to seasonal space heating energy efficiency	2%



Item	Symbol	Value	Unit
------	--------	-------	------

Rated heat output	$P_{rated}$	5,21	kW
-------------------	-------------	------	----

Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature of  $T_j$

$T_j = -7\text{ °C}$	$P_{dh}$	4,79	kW
$T_j = +2\text{ °C}$	$P_{dh}$	2,88	kW
$T_j = +7\text{ °C}$	$P_{dh}$	1,90	kW
$T_j = +12\text{ °C}$	$P_{dh}$	2,12	kW
$T_j = \text{bivalent temperature}$	$P_{dh}$	5,21	kW

$T_j = \text{operation limit temperature}$	$P_{dh}$	0	kW
For air-water-heating pumps $T_j = -15\text{ °C}$ (if TOL < -20 °C)	$P_{dh}$		kW
Bivalent temperature	$T_{biv}$	-10	°C
Cyclling interval capacity for heating	$P_{cyc}$		kW
Degradation co-efficient	$C_{dh}$	0,94-0,99	

### Power consumption in modes other than active mode

Off mode	$P_{OFF}$	0,01	kW
Thermostat off-mode	$P_{TO}$	0,005	kW
Standby mode	$P_{SB}$	0,01	kW
Crankcase heater mode	$P_{CK}$	0	kW

### Other items

Capacity control:	Variable compressor Variable indoor water flow		
	Variable indoor temperature adjustment		
Sound power level, outdoors	$L_{WA}$	46	dB
Annual energy consumption	$Q_{HE}$	1464	kWh

Item	Symbol	Value	Unit
------	--------	-------	------

Seasonal space heating energy efficiency	$\eta_s$	206	%
--	----------	-----	---

Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature  $T_j$

$T_j = -7\text{ °C}$	$COP_d$	3,20	
$T_j = +2\text{ °C}$	$COP_d$	4,95	
$T_j = +7\text{ °C}$	$COP_d$	6,53	
$T_j = +12\text{ °C}$	$COP_d$	9,69	
$T_j = \text{bivalent temperature}$	$COP_d$	2,83	

$T_j = \text{operation limit temperature}$	$COP_d$	0	
For air-to-water heat pumps: $T_j = -15\text{ °C}$ (if TOL < -20 °C)	$COP_d$		
For air-to-water heat pumps: Operation limit temperature	TOL	-22	°C
Cyclling interval efficiency	$COP_{cyc}$		
Heating water operating limit temperature	WTOL	45	°C

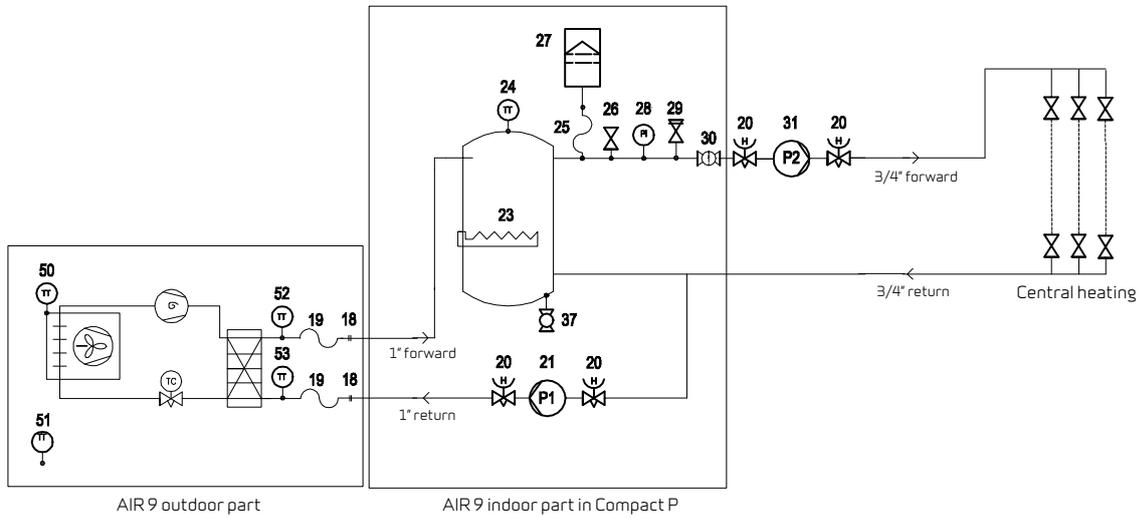
### Supplementary heater

Rated heat output	$P_{sup}$	6	kW
Type of energy input	Electrical		

For air-to-water heat pumps: Rated air flow rate, outdoors		3000	m³/h
For water-/brine-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger			m³/h

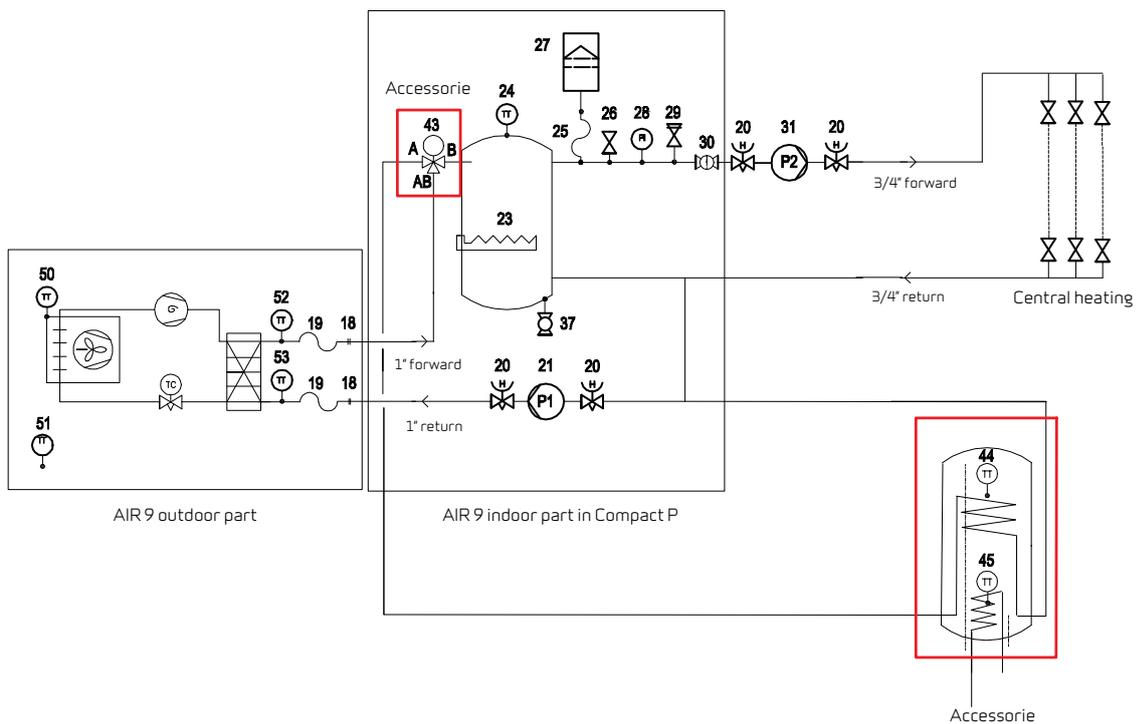
# INSTALLATION

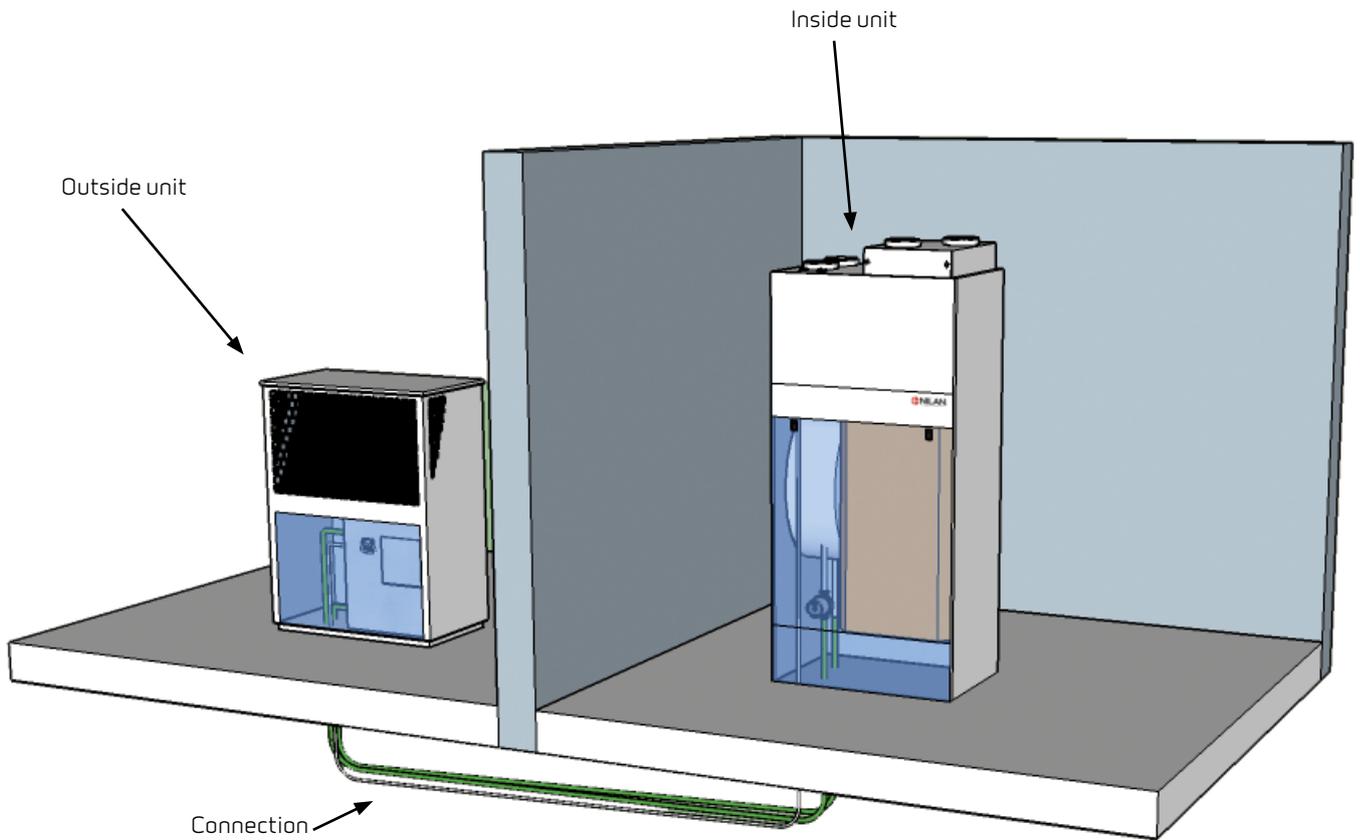
## Compact P AIR 9



- |   |   |
|---|---|
| 18 Connection 1"                                | 28 Manometer                                  |
| 19 Flexihose 1"                                 | 29 Safety valve 2,5 bar                       |
| 20 Shut-off valve                               | 30 Shut-off valve with dirt filter            |
| 21 P1 circulation pump 130 mm                   | 31 P2 circulation pump                        |
| 23 Supplementary electrical heating 2 x 3 kW    | 37 Feed tap 1/2"                              |
| 24 Temperature sensor T18 buffer tank (forward) | 43 3-way valve                                |
| 25 Flexihose 10 mm                              | 50 Temperature sensor T23 evaporator          |
| 26 Automatic control vent 3/8"                  | 51 Temperature sensor T20 outdoor temperature |
| 27 Expansion tank 8 litre                       | 52 Temperature sensor T17 after condenser     |
|   | 53 Temperature sensor T16 before condenser    |

## SHW warmwater-tank connected to Compact P AIR 9





## Simple installation

AIR 9 is an outdoor air heat pump that is connected to the Compact P interior section via tubes and a communication line.

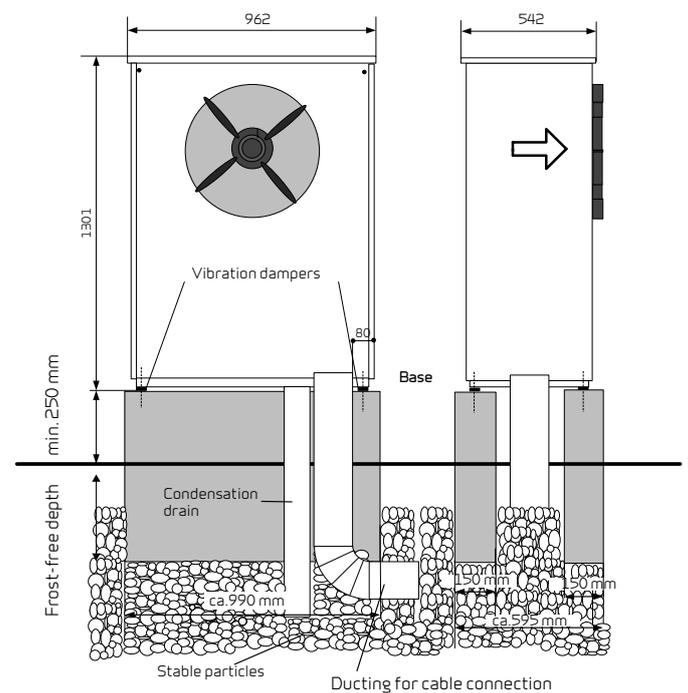
The hermetically sealed heat pump is installed in the outside part, with reliable operation right down to  $-22\text{ }^{\circ}\text{C}$ .

A circulation pump is mounted on the inside part, to pump the boiler water between the outside and inside sections. The circulation pump is a low-energy pump.

There is an integrated frost protection cable to ensure that the condensation drain does not freeze.

The outside part is run by CTS602 automatic controls via the control panel used for the Compact P.

AIR 9 is placed on a stable base, e.g. a cast foundation, and towards the prevailing wind direction.



# COMPACT P GEO 3/6/9

## Product description

Compact P GEO offers the same benefits and functions as Compact P, but additionally has an integrated geothermal pump, with connection to waterborne underfloor heating or low-temperature central-heating radiators.

The heat pumps are available in two sizes: GEO 3 (0.5 - 3 kW), GEO 6 (1 - 6 kW) and GEO 9 (1,5 - 9 kW). The variable compressor makes Compact P GEO a far more efficient and energy-friendly solution than traditional heat pumps that often have compressors with a constant output.

As the output is subject to variable regulation, the heat pump never uses more energy than necessary, which gives a very high SCOP.

- With GEO 3, a SCOP of 5.17 is achieved
- With GEO 6, a SCOP of 5.15 is achieved
- With GEO 9, a SCOP of 5.49 is achieved



Variable Compressor

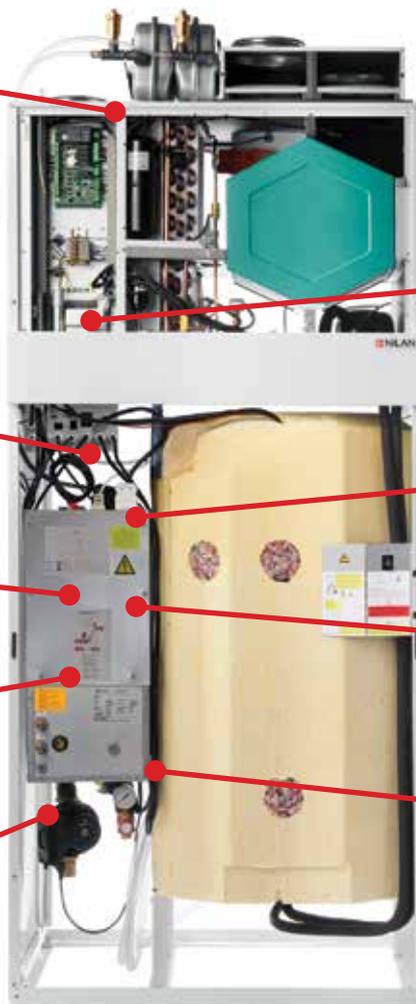
8-litre expansion tank for brine and the central heating circuit.

2 kW electrical completion. Ensures indoor heating in very cold periods.

Hermetically-sealed cooling circuit. Installation without the help of a refrigeration fitter.

An inverter-controlled DC compressor ensures a variable output and low energy consumption.

Integrated circulation pump for the brine circuit.



GEO 3/6/9 is controlled via the same CTS 602 touch panel as is used for Compact P.



Integrated in Compact P.

Low-noise components ensure a product that does not have an adverse impact on the surroundings.

Installed manometer and safety valve for the brine circuit. Also included for the central heating circuit.

## Technical specifications

## GEO 3

## GEO 6

## GEO 9

Dimensions (W x D x H)	Integrated in Compact P 550 x 300 x 1,100 mm	Integrated in Compact P 580 x 300 x 1,100 mm	Integrated in Compact P 580 x 300 x 1,100 mm
Weight	55 kg	55 kg	56 kg
Control	CTS 602	CTS 602	CTS 602
Compressor variable speed	Yes (20-100%)	Yes (20-100%)	Yes (20-100%)
Installation site, room temperature	5°C → 35°C	5°C → 35°C	5°C → 35°C
Supply voltage and connection	3 x 400V (3 x 230V), 3L+N+PE, 16A, 50 Hz	3 x 400V (3 x 230V), 3L+N+PE, 16A, 50 Hz	3 x 400V (3 x 230V), 3L+N+PE, 16A, 50 Hz
Fuse size	13A/20A	16A	16 A
Start current, $I_{max}$ , Start	14A	14A	15 A
Standby electricity consumption	2.5 W	2.5 W	2.5 W
Supplementary electrical heating	2 kW	2 kW	2 kW
Rated output, brine pump (max/min). A pump	87/6 W	87/6 W	87/6 W
Rated current, brine pump (max/min). A pump	0.7/0.06 A	0.7/0.06 A	0.7/0.06 A
Refrigerant	R410A	R410A	R410A
Refrigerant filling	1.1 kg	1.4 kg	1.4 kg
Pressostat low pressure (on/off)	2.2/3.4 barG	2.2/3.4 barG	2.2/3.4 barG
Pressostat high pressure (on/off)	42/33 barG	42/33 barG	42/33 barG
Antifreeze	Ethylene glycol/water Ethanol/water	Ethylene glycol/water Ethanol/water	Ethylene glycol/water Ethanol/water
Antifreeze, brine	-20°C → -18°C	-20°C → -18°C	-20°C → -18°C
Design pressure brine/central heating side	4/4 bar	4/4 bar	4/4 bar
Opening pressure safety valve brine/central heating side	3.5/2.5 bar	3.5/2.5 bar	3.5/2.5 bar
Expansion vessel brine/central heating side	8/8 litres	8/8 litres	8/8 litres
Booster expansion vessels	0.5 barG	0.5 barG	0.5 barG
Environmental pressostat brine, leak alarm (on/off)	0.6/1.1 barG	0.6/1.1 barG	0.6/1.1 barG
Heat output $P_H$ with variable compressor	0.5-3 kW	1-6 kW	1.5-9 kW
Central heating, flow temperature, operating area	25°C → 45°C	25°C → 45°C	25°C → 45°C
Brine temperature to evaporator, operating area	-5°C → 20°C	-5°C → 20°C	-5°C → 20°C
Central heating pressure loss, condenser	10 kPa/0.14 l/s	15 kPa/0.29 l/s	15 kPa/0.29 l/s
Central heating connection	3/4"	3/4"	3/4"
Brine pressure loss evaporator	10 kPa/0.19 l/s	15 kPa/0.39 l/s	15 kPa/0.39 l/s
Brine connection	1"	1"	1"
COP 0/35°C at max. $P_H$ , in accordance with EN14511:2012 with brine/water $dT=3/5$ °C*	4.5 ( $P_H$ max. 3 kW)	4.27 ( $P_H$ max. 6 kW)	4.19 ( $P_H$ max. 9 kW)
EHPA tested and approved	N/A	Yes*	
SCOP-tested in accordance with EN14825:2012**	5.17	5.15	5.49
Sound output level $L_{WA}$ at 100% heat output 0/35°C	≤ 47 dB(A)	≤ 51 dB(A)	≤ 51 dB(A)
Sound output level $L_{WA}$ at 50% heat output 0/35°C	≤ 45 dB(A)	≤ 44 dB(A)	≤ 44 dB(A)
Sound pressure level $L_{pA}$ in 1 m at 100% heat output 0/35°C	≤ 36 dB(A)	≤ 40 dB(A)	≤ 40 dB(A)
Sound pressure level $L_{pA}$ in 1 m at 50% heat output 0/35°C	≤ 34 dB(A)	≤ 33 dB(A)	≤ 33 dB(A)

\*) Complies with "EHPA Test Regulations vers. 1.4, 2011-02-01" with max. output 3 kW at 0/35°C in accordance with EN14511:2012

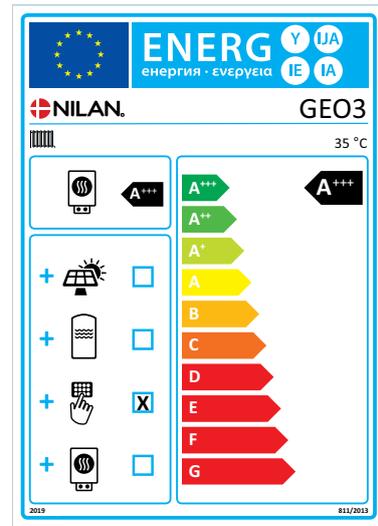
\*\*) SCOP (Seasonal COP) is for "low temperature use, average climate, defined flow"

Sound data in accordance with EN12102 and EN ISO 9614-2

# TECHNICAL PARAMETERS

## GEO 3 Heating pump system for space heating

Model	GEO 3
Air-to-water heat pump	No
Water-to-water heat pump	No
Brine-to-water heat pump	Yes
Low-temperature heat pump	Yes
Equipped with a supplementary heater	Yes
Heat pump combination heater	No
<b>Temperature control:</b>	
Model	CTS602
Class	2
Contribution to seasonal space heating energy efficiency	2%



Item	Symbol	Value	Unit
Rated heat output	$P_{rated}$	3,44	kW

Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature of  $T_j$

$T_j = -7\text{ °C}$	$P_{dh}$	3,04	kW
$T_j = +2\text{ °C}$	$P_{dh}$	1,88	kW
$T_j = +7\text{ °C}$	$P_{dh}$	1,26	kW
$T_j = +12\text{ °C}$	$P_{dh}$	1,02	kW
$T_j = \text{bivalent temperature}$	$P_{dh}$	3,03	kW

$T_j = \text{operation limit temperature}$	$P_{dh}$	0	kW
For air-water-heating pumps $T_j = -15\text{ °C}$ (if TOL < $-20\text{ °C}$ )	$P_{dh}$		kW
Bivalent temperature	$T_{biv}$	-7	°C
Cycling interval capacity for heating	$P_{cyc}$		kW
Degradation co-efficient	$C_{dh}$	0,97	

### Power consumption in modes other than active mode

Off mode	$P_{OFF}$	0,003	kW
Thermostat off-mode	$P_{TO}$	0,010	kW
Standby mode	$P_{SB}$	0,010	kW
Crankcase heater mode	$P_{CK}$	0,000	kW

### Other items

Capacity control:	Variable compressor Variable indoor temperature adjustment		
	Fixed indoor water flow Fixed outdoor water flow		
Sound power level, indoors	$L_{WA}$	47	dB
Annual energy consumption	$Q_{HE}$	931	kWh

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	$\eta_s$	208	%

Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature  $T_j$

$T_j = -7\text{ °C}$	$COP_d$	4,66	
$T_j = +2\text{ °C}$	$COP_d$	5,29	
$T_j = +7\text{ °C}$	$COP_d$	5,63	
$T_j = +12\text{ °C}$	$COP_d$	5,82	
$T_j = \text{bivalent temperature}$	$COP_d$	4,61	

$T_j = \text{operation limit temperature}$	$COP_d$	0	
For air-to-water heat pumps: $T_j = -15\text{ °C}$ (if TOL < $-20\text{ °C}$ )	$COP_d$		
For air-to-water heat pumps: Operation limit temperature	TOL		°C
Cycling interval efficiency	$COP_{cyc}$		
Heating water operating limit temperature	WTOL	52	°C

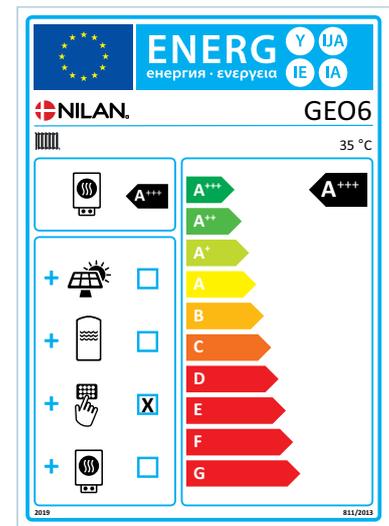
### Supplementary heater

Rated heat output	$P_{sup}$	2	kW
Type of energy input	Electrical		

For air-to-water heat pumps: Rated air flow rate, outdoors			$\text{m}^3/\text{h}$
For water-/brine-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger		0,518	$\text{m}^3/\text{h}$

## GEO 6 Heating pump system for space heating

Model	GEO 6
Air-to-water heat pump	No
Water-to-water heat pump	No
Brine-to-water heat pump	Yes
Low-temperature heat pump	Yes
Equipped with a supplementary heater	Yes
Heat pump combination heater	No
<b>Temperature control:</b>	
Model	CTS602
Class	2
Contribution to seasonal space heating energy efficiency	2%



Item	Symbol	Value	Unit
Rated heat output	$P_{rated}$	6,01	kW

Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature of  $T_j$

$T_j = -7\text{ °C}$	$P_{dh}$	5,29	kW
$T_j = +2\text{ °C}$	$P_{dh}$	3,32	kW
$T_j = +7\text{ °C}$	$P_{dh}$	2,09	kW
$T_j = +12\text{ °C}$	$P_{dh}$	1,30	kW
$T_j = \text{bivalent temperature}$	$P_{dh}$	6,01	kW

$T_j = \text{operation limit temperature}$	$P_{dh}$	0	kW
For air-water-heating pumps $T_j = -15\text{ °C}$ (if TOL < -20 °C)	$P_{dh}$		kW
Bivalent temperature	$T_{biv}$	-10	°C
Cycling interval capacity for heating	$P_{cyc}$		kW
Degradation co-efficient	$C_{dh}$	0,99 - 1	

### Power consumption in modes other than active mode

Off mode	$P_{OFF}$	0,002	kW
Thermostat off-mode	$P_{TO}$	0,024	kW
Standby mode	$P_{SB}$	0,002	kW
Crankcase heater mode	$P_{CK}$	0,000	kW

### Other items

Capacity control:	Variable compressor Variable indoor temperature adjustment		
	Fixed indoor water flow Fixed outdoor water flow		
Sound power level, indoors	$L_{WA}$	51	dB
Annual energy consumption	$Q_{HE}$	2386	kWh

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	$\eta_s$	208	%

Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature  $T_j$

$T_j = -7\text{ °C}$	$COP_d$	4,48	
$T_j = +2\text{ °C}$	$COP_d$	5,22	
$T_j = +7\text{ °C}$	$COP_d$	5,69	
$T_j = +12\text{ °C}$	$COP_d$	5,30	
$T_j = \text{bivalent temperature}$	$COP_d$	4,27	

$T_j = \text{operation limit temperature}$	$COP_d$	0	
For air-to-water heat pumps: $T_j = -15\text{ °C}$ (if TOL < -20 °C)	$COP_d$		
For air-to-water heat pumps: Operation limit temperature	TOL		°C
Cycling interval efficiency	$COP_{cyc}$		
Heating water operating limit temperature	WTOL	?	°C

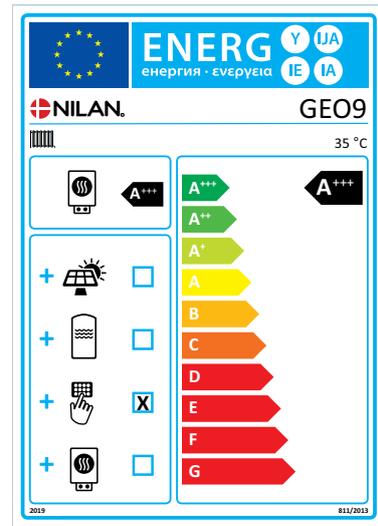
### Supplementary heater

Rated heat output	$P_{sup}$	2	kW
Type of energy input	Electrical		

For air-to-water heat pumps: Rated air flow rate, outdoors			m <sup>3</sup> /h
For water-/brine-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger		1,041	m <sup>3</sup> /h

# GEO 9 Heating pump system for space heating

Model	GEO 9
Air-to-water heat pump	No
Water-to-water heat pump	No
Brine-to-water heat pump	Yes
Low-temperature heat pump	Yes
Equipped with a supplementary heater	Yes
Heat pump combination heater	No
<b>Temperature control:</b>	
Model	CTS602
Class	2
Contribution to seasonal space heating energy efficiency	2%



Item	Symbol	Value	Unit
Rated heat output	$P_{rated}$	9,05	kW

Declared capacity for heating for part load at indoor temperature 20 °C and outdoor temperature of  $T_j$

$T_j = -7\text{ °C}$	$P_{dh}$	8,01	kW
$T_j = +2\text{ °C}$	$P_{dh}$	4,87	kW
$T_j = +7\text{ °C}$	$P_{dh}$	3,13	kW
$T_j = +12\text{ °C}$	$P_{dh}$	1,39	kW
$T_j = \text{bivalent temperature}$	$P_{dh}$	9,05	kW

$T_j = \text{operation limit temperature}$	$P_{dh}$		kW
For air-water-heating pumps $T_j = -15\text{ °C}$ (if TOL < $-20\text{ °C}$ )	$P_{dh}$		kW
Bivalent temperature	$T_{biv}$	-10	°C
Cycling interval capacity for heating	$P_{cyc}$		kW
Degradation co-efficient	$C_{dh}$	0,94-0,99	

## Power consumption in modes other than active mode

Off mode	$P_{OFF}$	0,010	kW
Thermostat off-mode	$P_{TO}$	0,015	kW
Standby mode	$P_{SB}$	0,010	kW
Crankcase heater mode	$P_{CK}$	0,010	kW

## Other items

Capacity control:	Variable compressor Variable indoor temperature adjustment		
	Fixed indoor water flow Fixed outdoor water flow		
Sound power level, indoors	$L_{WA}$		dB
Annual energy consumption	$Q_{HE}$		kWh

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	$\eta_s$	232	%

Declared coefficient of performance or primary energy ratio for part load at indoor temperature 20 °C and outdoor temperature  $T_j$

$T_j = -7\text{ °C}$	$COP_d$	4,42	
$T_j = +2\text{ °C}$	$COP_d$	5,33	
$T_j = +7\text{ °C}$	$COP_d$	5,96	
$T_j = +12\text{ °C}$	$COP_d$	5,96	
$T_j = \text{bivalent temperature}$	$COP_d$	4,16	

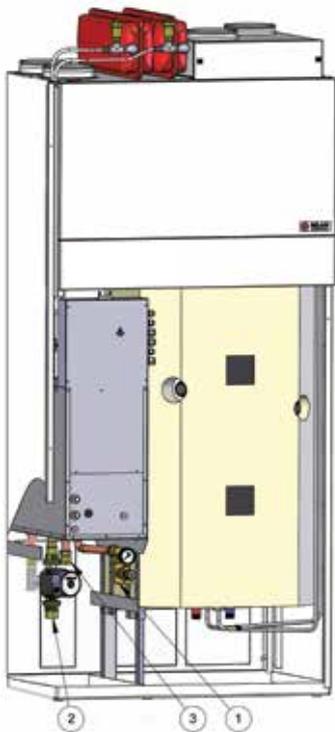
$T_j = \text{operation limit temperature}$	$COP_d$		
For air-to-water heat pumps: $T_j = -15\text{ °C}$ (if TOL < $-20\text{ °C}$ )	$COP_d$		
For air-to-water heat pumps: Operation limit temperature	TOL		°C
Cycling interval efficiency	$COP_{cyc}$		
Heating water operating limit temperature	WTOL		°C

## Supplementary heater

Rated heat output	$P_{sup}$		kW
Type of energy input	Electrical		

For air-to-water heat pumps: Rated air flow rate, outdoors			m <sup>3</sup> /h
For water-/brine-water heat pumps: Rated brine or water flow rate, outdoor heat exchanger		1,53	m <sup>3</sup> /h

# DIMENSIONS AND FUNCTION

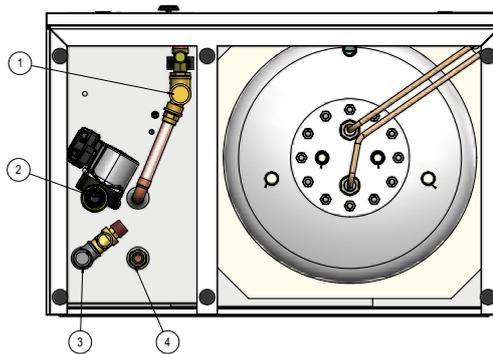


## Front

1. Return flow to brine 1"
2. Flow from brine 1"
3. Return flow, central heating 3/4"

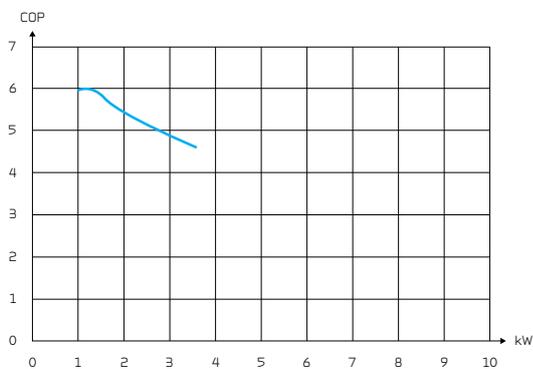
## Base

1. Return flow to brine 1"
2. Flow from brine 1"
3. Flow from central heating 3/4"
4. Return flow central heating 3/4"



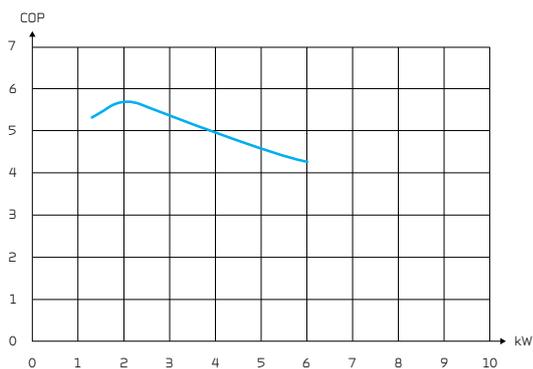
## COP - GEO 3

Tested in accordance with EN14825



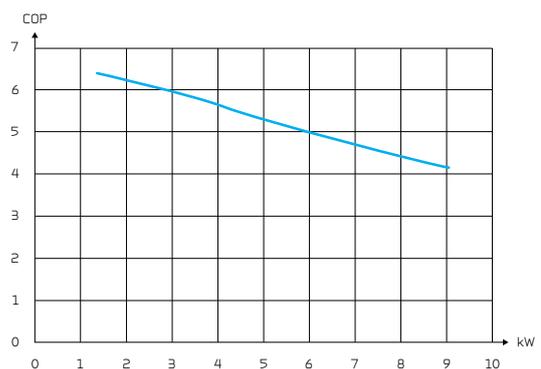
## COP - GEO 6

Tested in accordance with EN14825



## COP - GEO 9

Tested in accordance with EN14825



# FUNCTIONS



## Geothermal pump

GEO 3/6/9 is a geothermal pump that recovers energy from the ground to heat the home, and is not affected by periods of very cold weather. Heat is distributed in the home via Compact P for underfloor heating or low-energy radiators.

The GEO 3/6/9 interior section is integrated in the Compact P casing, giving a neat and tidy installation in the home.

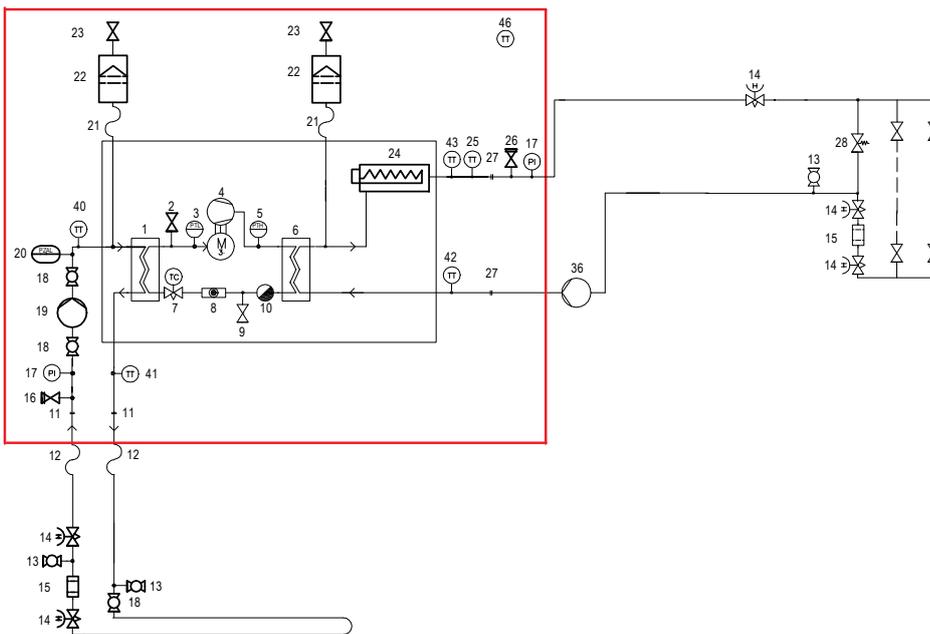
The heat pump has a hermetically-sealed cooling circuit and can therefore be installed without requiring a cooling technician.

## Passive cooling

By adding an external heat exchanger, Compact P GEO 3/6/9 can also cool the home in the summer, if required.

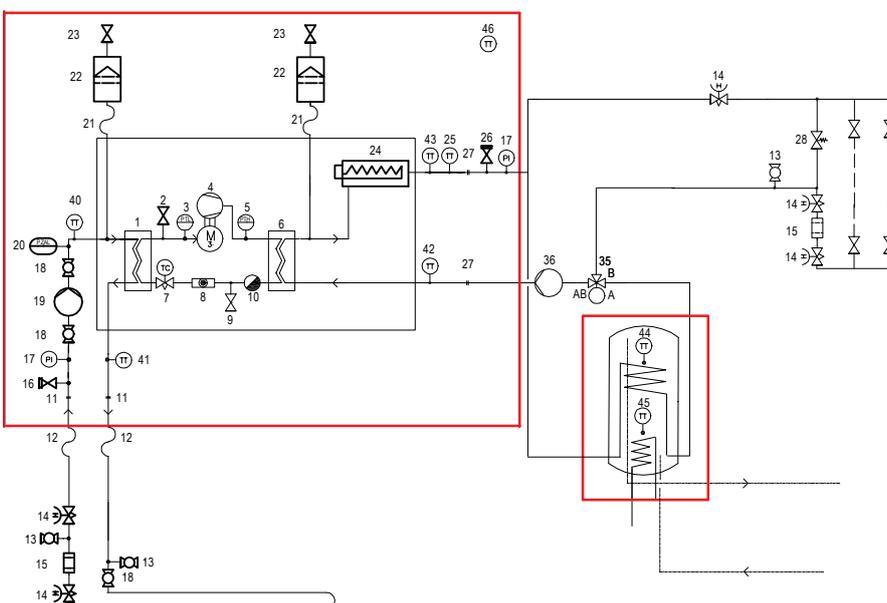
The cold brine water is led through an external heat exchanger that cools the water in the central heating system.

## Compact P GEO



- |                                       |                                 |  |
|---------------------------------------|---------------------------------|--|
| 1 Evaporator                          | 15 Dirt filter                  | 28 Overcurrent valve                       |
| 2 Service valve for low pressure      | 16 Safety valve 3,5 bar         | 36 Circulation pump                        |
| 3 Low-pressure pressostat             | 17 Manometer                    | 40 Temperature sensor T13                  |
| 4 Compressor                          | 18 Ball valve                   | 41 Temperature sensor T14                  |
| 5 High-pressure pressostat            | 19 Circulation pump 130 mm      | 42 Temperature sensor T16                  |
| 6 Condenser                           | 20 Pressure control 0,5/1,1 bar | 43 Temperature sensor T17                  |
| 7 Expansion valve                     | 21 Flexihose 10 mm              | 46 Temperature sensor T20 (outdoor sensor) |
| 8 Sight glass with humidity indicator | 22 Expansion tank 8 L           |  |
| 9 Service valve for high pressure     | 23 Automatic control vent 3/8"  |  |
| 10 Combi filter                       | 24 Electric cartridge 2 kW      |  |
| 11 Connection 1"                      | 25 Temperature sensor T18       |  |
| 12 Flexihose 1"                       | 26 Safety valve 2,5 bar         |  |
| 13 Feed tap                           | 27 Connection 3/4"              |  |
| 14 Shut-off valve                     |                                 |  |

## SHW warmwater-tank connected to Compact P GEO



# COMPACT P SHW TANK

## Product description

The SHW tank is a 250-litre hot water tank with a built-in solar spiral and a geothermal heat pump supplementary spiral that can be connected to all Compact P solutions. The solution is ideal for families with a high consumption of hot water.

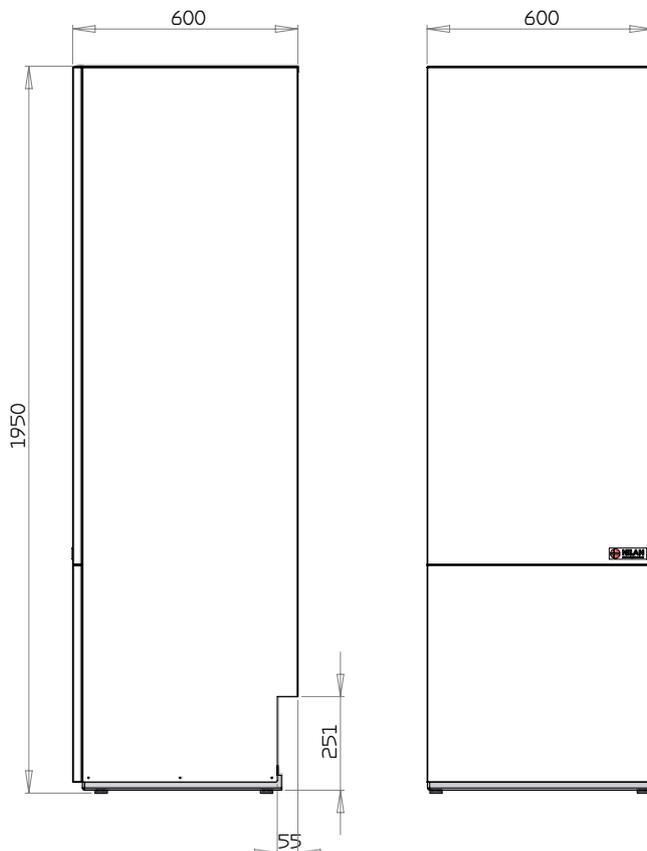
The heat pump is used to pre-heat the domestic hot water in the SHW tank to 30-45 °C (via a 3-way valve temperature sensor in the top of the SHW and the CTS 602 control).

The hot water is led in series through the SHW tank and Compact P 180-litre tank. This solution makes it possible to produce domestic hot water, since surplus heat from a heat pump and/or any solar heating system is accumulated in the tanks.

The SHW tank is prepared for the installation of a temperature sensor for external control of solar heating. The solar spiral is intended for solar heating systems with solar collectors of approx. 4 m<sup>2</sup>. The tank's foam insulation ensures minimum heat loss from the tank.



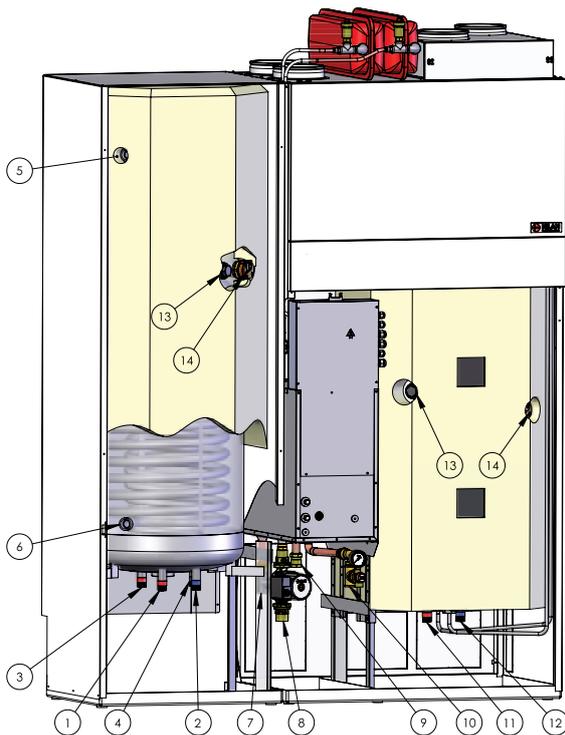
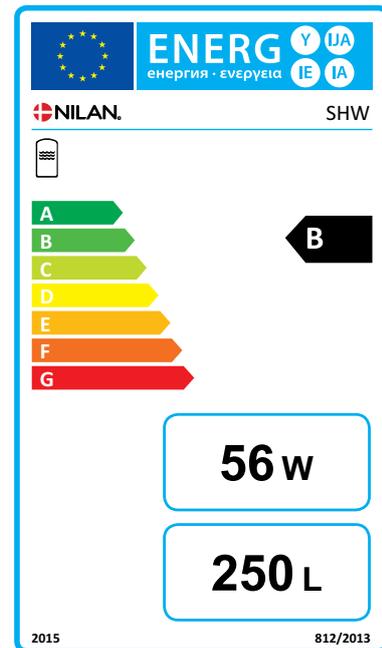
## Dimensional drawing, SHW-tank



All dimensions are in mm

## Technical specifications

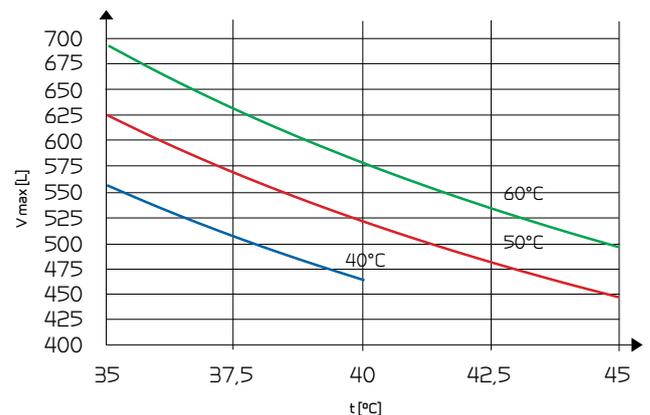
Dimensions (W x D x H)	600 x 600 x 1950 mm
Weight	200 kg
Plate type casing	Aluzinc steel plate, white powder coating RAL9016
Energy efficiency class	B
Standing loss	56
Volume	250 l



1. Hot water 3/4"
2. Cold water 3/4"
3. Flow, solar spiral 3/4"
4. Return flow, solar spiral 3/4"
5. Flow, GEO spiral 3/4"
6. Return flow, GEO spiral 3/4"
7. Flow, central heating 3/4"
8. Flow, brine 1"
9. Return flow, central heating 3/4"
10. Return flow, brine 1"
11. Hot water Compact 3/4"
12. Cold water Compact 3/4"
13. Anode 5/4"
14. Supplementary heating element 5/4"

## Tapped water

The maximum tapping volume  $V_{max}$  [L] from Compact P GEO 6 SHW as a function of tapping temperature  $t$  [°C] and tank temperature Compact Pat 40, 50 and 60°C. Tank temperature SHW is 45°C.



# COMPACT PEK

## Product description

The Compact PEK 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 PEK 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 PEK 3 kW

Heat output	3 kW
Supply voltage	230V / 3 x 230V / 3 x 400V
Max. fuse size (1 x 230 V) - N	25A
Max. fuse size (3 x 230 V)	16A
Max. fuse size (3 x 400V) - N	16A
Weight	21 kg
Standby electricity consumption	2 W
Expansion vessel	10 l

### Compact PEK 6 kW

Heat output	6 kW
Supply voltage	230V / 3 x 230V / 3 x 400V
Max. fuse size (1 x 230 V) - N	36A
Max. fuse size (3 x 230 V)	16A
Max. fuse size (3 x 400 V) - N	16A
Weight	21 kg
Standby electricity consumption	2 W
Expansion vessel	10 l

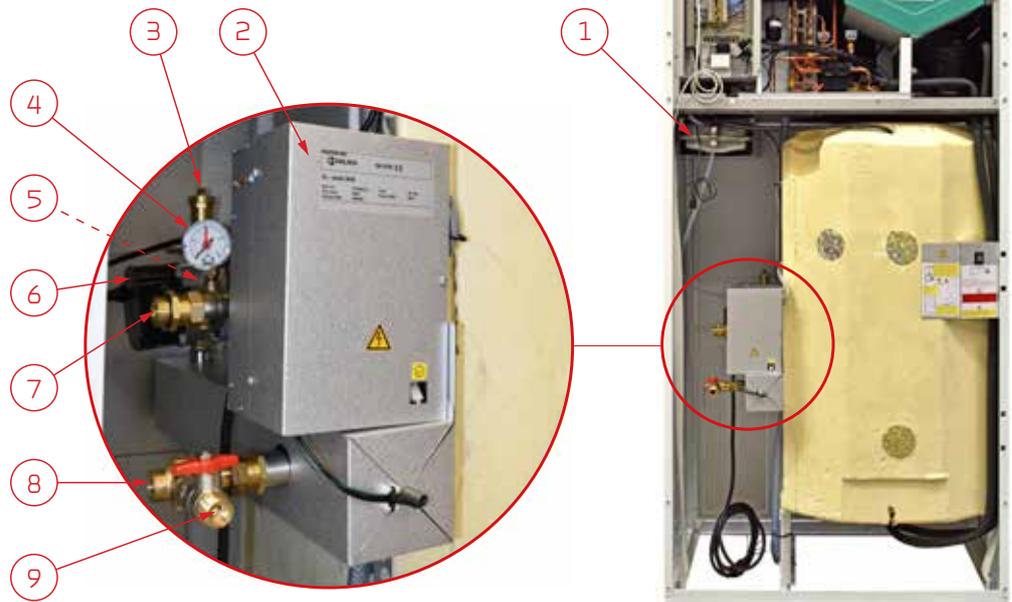
### Compact PEK 9 kW

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



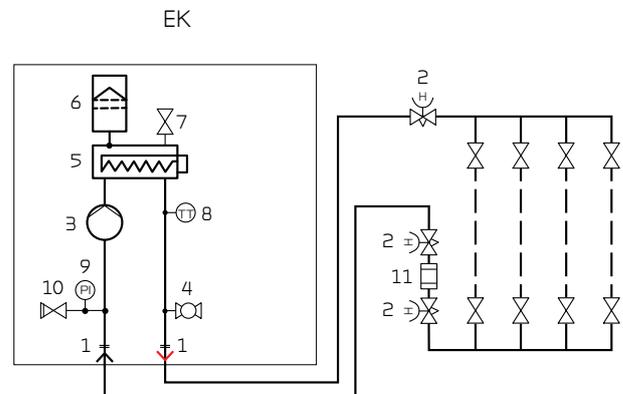
## Electrical boiler

1. Pressure expansion vessel 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

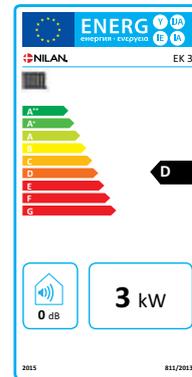
- 1 Connection 3/4"
- 2 Stop valve
- 3 Circulation pump
- 4 Fill valve 1/2"
- 5 Electrical boiler with electrical heating element (3 / 6 / 9 kW)
- 6 Pressure expansion vessel 8L
- 7 Automatic vent
- 8 Temperature sensor
- 9 Manometer
- 10 Safety valve 2,5 bar
- 11 Particulate filter (not Nilan delivery)



# TECHNICAL PARAMETERS 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	$P_{rated}$	2,914	kW

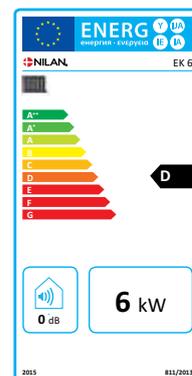
At rated heat output and high-temperature regime	$P_4$	2,914	kW
--	-------	-------	----

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	$\eta_s$	39	%

At rated heat output and high-temperature regime	$\eta_4$	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	$P_{rated}$	5,914	kW

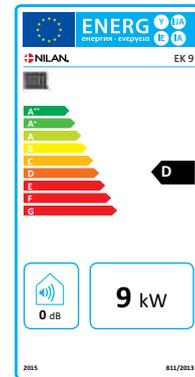
At rated heat output and high-temperature regime	$P_4$	5,914	kW
--	-------	-------	----

Item	Symbol	Value	Unit
Seasonal space heating energy efficiency	$\eta_s$	39	%

At rated heat output and high-temperature regime	$\eta_4$	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	$P_{rated}$	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	$\eta_s$	40	%
At rated heat output and high-temperature regime	$\eta_4$	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 off 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.



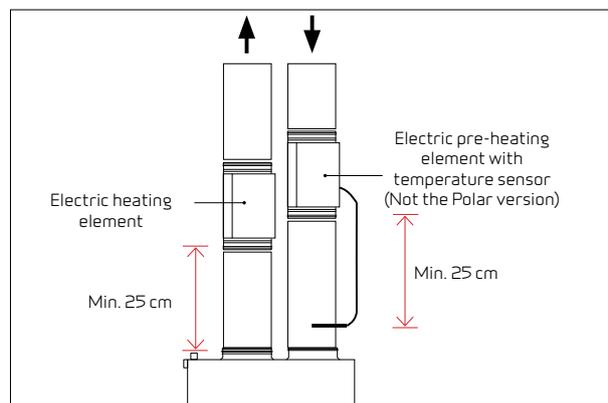
## Installation conditions

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.



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

This certification means that Compact P is pre-approved for passive houses, so that no further documentation is required.

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

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

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

See or download the certificates at [www.nilan.dk](http://www.nilan.dk)

## Certificate

**Passive House Suitable Component**  
For cool temperate climates, valid until 31. December 2021

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:  $\theta_{\text{supply air}} \geq 16,5^\circ\text{C}$   
Heat Recovery of ventilation system:  $\eta_{\text{WRG,eff}} \geq 75\%$   
Electric efficiency ventilation system:  $P_{\text{el}} \leq 0,45 \text{ Wh/m}^3$   
Air tightness (internal/external):  $V_{\text{Leakage}} \leq 3\%$   
Total Primary Energy Demand (\*\*):  $PE_{\text{total}} \leq 55 \text{ kWh/(m}^2\text{a)}$   
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**

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

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

Passivhaus Institut  
Dr. Wolfgang Feist  
64283 Darmstadt  
GERMANY

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

**Electric efficiency**  
0.43 Wh/m³

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

**Frost protection**  
down to -7 °C

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

**CERTIFIED COMPONENT**  
Passive House Institute

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

0390ch03

## Certificate

**Passive House Suitable Component**  
For cool temperate climates, valid until 31. December 2021

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:  $\theta_{\text{supply air}} \geq 16,5^\circ\text{C}$   
Heat Recovery of ventilation system:  $\eta_{\text{WRG,eff}} \geq 75\%$   
Electric efficiency ventilation system:  $P_{\text{el}} \leq 0,45 \text{ Wh/m}^3$   
Air tightness (internal/external):  $V_{\text{Leakage}} \leq 3\%$   
Total Primary Energy Demand (\*\*):  $PE_{\text{total}} \leq 55 \text{ kWh/(m}^2\text{a)}$   
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**

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

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

Passivhaus Institut  
Dr. Wolfgang Feist  
64283 Darmstadt  
GERMANY

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

**Electric efficiency**  
0.40 Wh/m³

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

**Frost protection**  
down to -4 °C

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

**CERTIFIED COMPONENT**  
Passive House Institute

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

0391ch03

# 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](http://www.nilan.dk).



**Brochure**  
General information about the solution and its benefits.



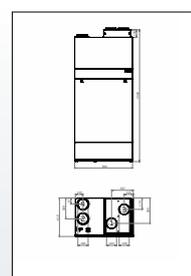
**Product data**  
Technical information to ensure correct choice of solution.



**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](http://WWW.NILAN.DK)

Visit us at [www.nilan.dk](http://www.nilan.dk) to find out more about our company and solutions, download further information and find your nearest dealer.



Nilan A/S  
Nilanvej 2  
8722 Hedensted  
Denmark  
Tlf. +45 76 75 25 00  
Fax +45 76 75 25 25  
[nilan@nilan.dk](mailto:nilan@nilan.dk)  
[www.nilan.dk](http://www.nilan.dk)