# INSTALLATION INSTRUCTIONS

CTS602 HMI BY NILAN


## Compact P / Compact P Polar - AIR9/AIR9+

Gateway

Version 5.01 - 18.09.2021
M24 Compact P AIR9 GB

NILAN®
OUTSTANDING INDOOR CLIMATE

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# General information

## Safety

### Power supply

CAUTION
Always disconnect the power supply to the unit if an error occurs that cannot be rectified via the control panel.

CAUTION
If an error occurs on electrically conductive parts of the unit, alway contact an authorised electrician to rectify the error.

CAUTION
Always disconnect the power to supply to the unit before opening the unit doors, for instance for installation, inspection, cleaning and filter change.

### Heat pump domestic hot water

CAUTION
Avoid direct contact with the heating system pipes in the heat pump as they can get very hot.

CAUTION
To protect the heat pump against damage, it is fitted with the following safety equipment.

The heat pump must undergo suitable service inspections under applicable legislation and regulations to keep it in good condition and in compliance with safety and environmental requirements.

Responsibility for maintenance of the heat pump rests with the owner/user.

### Heat pump for central heating

CAUTION
To secure the heat pump against damages, it is fitted with the following safety equipment:
- Expansion systems for central heating and buffertank
- Safety valve for central heating and buffertank
- Low and high pressure switch for compressor

The heat pump must undergo suitable service inspections under applicable legislation and regulations to keep it in good condition and in compliance with safety and environmental requirements.

Responsibility for maintenance of the heat pump rests with the owner/user.

### Starting the external unit

The external AIR unit is equipped with a compressor heater, which heats up the compressor prior to starting and in case of low outdoor temperatures. This facilitates start-up and extends the compressor's service life.

CAUTION
The compressor heater must be left on for a minimum of 3 hours before starting the compressor for the first time.

# Water quality requirements

## Requirements for water quality

The hot water tank in the Nilan units is made of steel, which has been given a double enamelling, to ensure an extra long service life. In addition, the tank is equipped with a sacrificial anode as extra protection. It is important that the sacrificial anode is replaced regularly.

Most units are equipped with an electronic monitoring sacrificial anode, which gives an alarm on the user panel when it is time to replace it.

In order for the sacrificial anode to function and protect the tank, it is required that the water quality complies with the following:
- Electrical conductivity (EC): Between 30 mS/m and 150 mS/m (millisiemens pr. m) @ 25 °C
- Chloride must be below 250 mg/L @ 65 °C

If the above criteria are not met, the sacrificial anode will not work as intended, after which the tank will be corroded., to

# Introduction

## Documentation

The following documents will be supplied with the unit:

- Quick guide
- Wiring diagram

In the Quick guide you will find important information regarding installation and start-up of the unit. If you require further information regarding, for instance, installation of accessories or additional settings in the software, or if you need an extended user manual, the following documents can be downloaded from the Nilan website:

- Installation instructions
- Software instructions
- User Manual
- Wiring diagram

The instructions can be downloaded from www.nilan.dk.

If you have questions regarding installation and operation of the unit after having read the instructions, please contact your nearest Nilan dealer. A list of Nilan dealers is available on www.nilan.dk.

ATTENTION

The unit must be started up immediately after installation and connection to the duct system.

When the ventilation unit is not in operation, humidity from the rooms will enter the duct system and create condensate water that can run out of the valves and cause damage to floors and furniture. Condensation may also form in the ventilation unit, which can damage its electronics and fans.

From factory, the unit has been tested and is ready for operation.

# Unit type

## Product description

Compact P AIR is a ventilation unit with heat recovery, that has a built-in heat pump, which is used for the production of domestic hot water, and which is also able to heat and cool the home by central heating via an air/water heat pump.

Compact P is designed for air flows of up to 275 m3/h at 100 Pa external counter-pressure. Compact P XL can handle air flows up to 430 m3/h at 100 Pa external counter-pressure.

The unit is primarily used in residential construction such as single-family houses and apartments. It ventilates the home by drawing out the moist and bad air via valves in e.g. bathrooms, toilet, kitchen and utility room, and introduces fresh outdoor air in via valves in living rooms such as. living room, bedrooms and family room.

The cold outdoor air is heated via the high-efficiency counterflow heat exchanger by the hot exhaust air. The heat loss that occurs via heat recovery, the built-in heat pump use to produce domestic hot water. All the energy in the exhaust air is utilized, and you have not really seen any heat loss that you experience with an ordinary ventilation unit. In case of high hot water consumption, there is a 1.5 kW electric supplement heater in the hot water tank, which can also be used to heat the water.

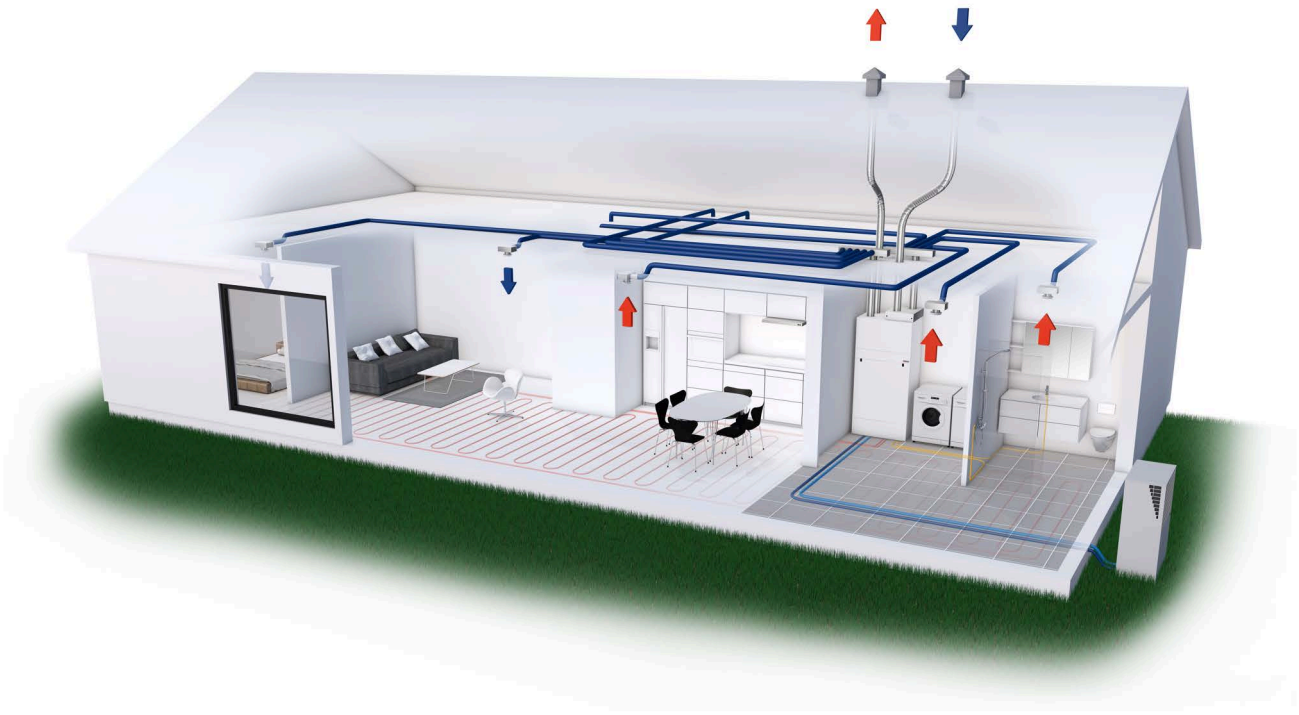
In the winter, the built-in heat pump can heat the supply air up to 34 ° C, and thus contribute to heating the home. When the supply air is heated, at the same time a little heat is deposited in the hot water tank and ensures a constant high hot water temperature.

The heat pump has a reversible cooling circuit, which means that the cooling circuit can be turned and it can cool the supply air in the summer. Compact P can cool the supply air by up to 10 ° C in relation to the outdoor air. Due to the low air exchange, usually 1/2 time per hour, it will not act as an air conditioning system. However, when cooling, moisture in the supply air is removed, which results in a lower humidity in the home. The lower humidity means that it is easier to withstand a slightly higher temperature, which therefore provides good comfort in the home.

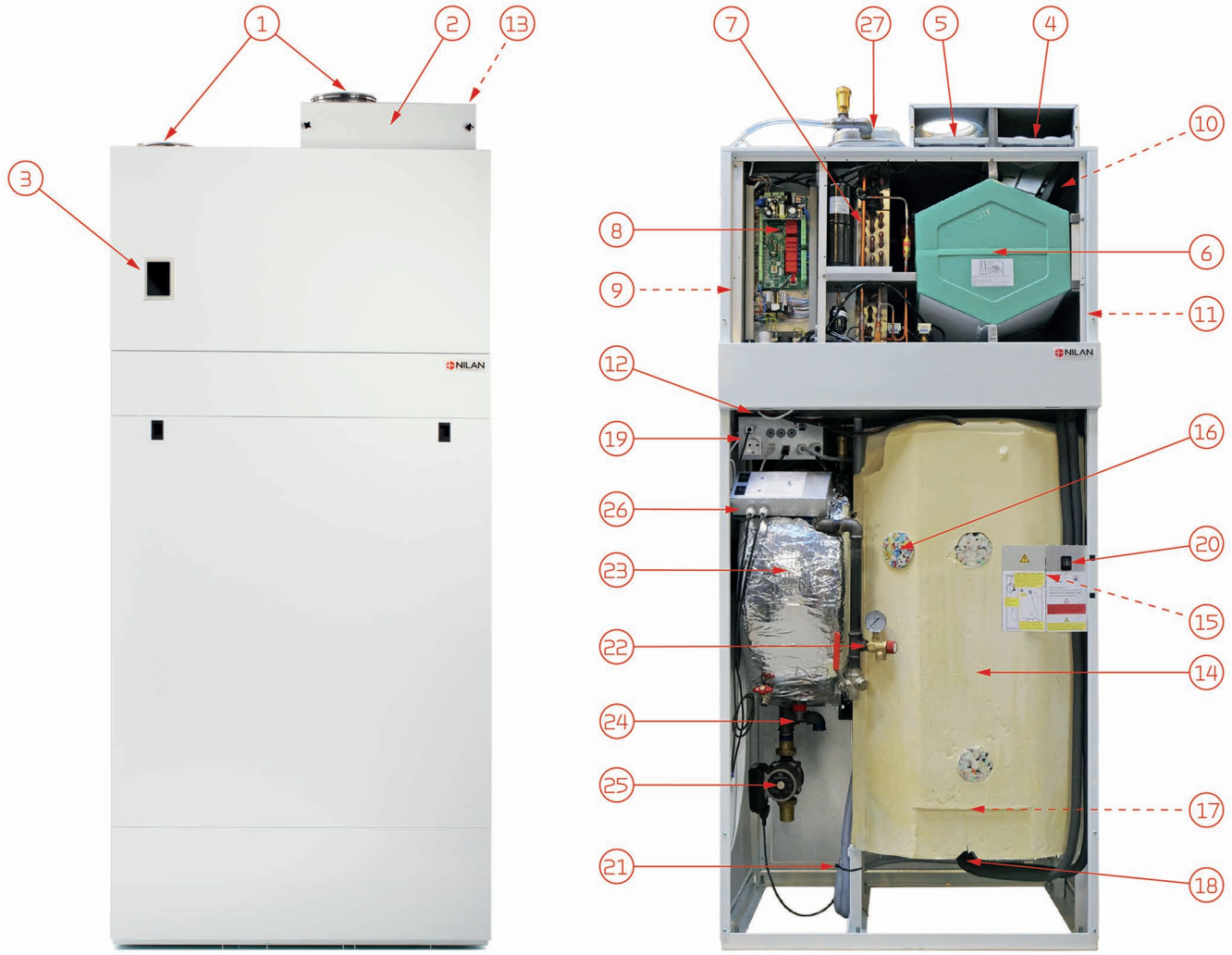
When Compact P cools the supply air, the energy is deposited in the hot water tank, and it can thus be said that "free" domestic hot water is produced during those periods.

The energy-efficient and low-noise AIR air/water heat pump heats the home via floor heating or low-temperature radiators. It retrieves the energy from outside air and functions at temperatures as low as -22 °C. The heat pump has an electrical power supply to help it to function during very cold periods. AIR can cool the home in the summer with passive cooling, either through the underfloor heating system or fan coils.

The AIR air/water heat pump can also be used to help produce hot water for domestic use, either by pre-heating the water in a buffer tank, or directly in a Compact P hot water tank, if bought with a solar coil.



# Unit - the indoor unit



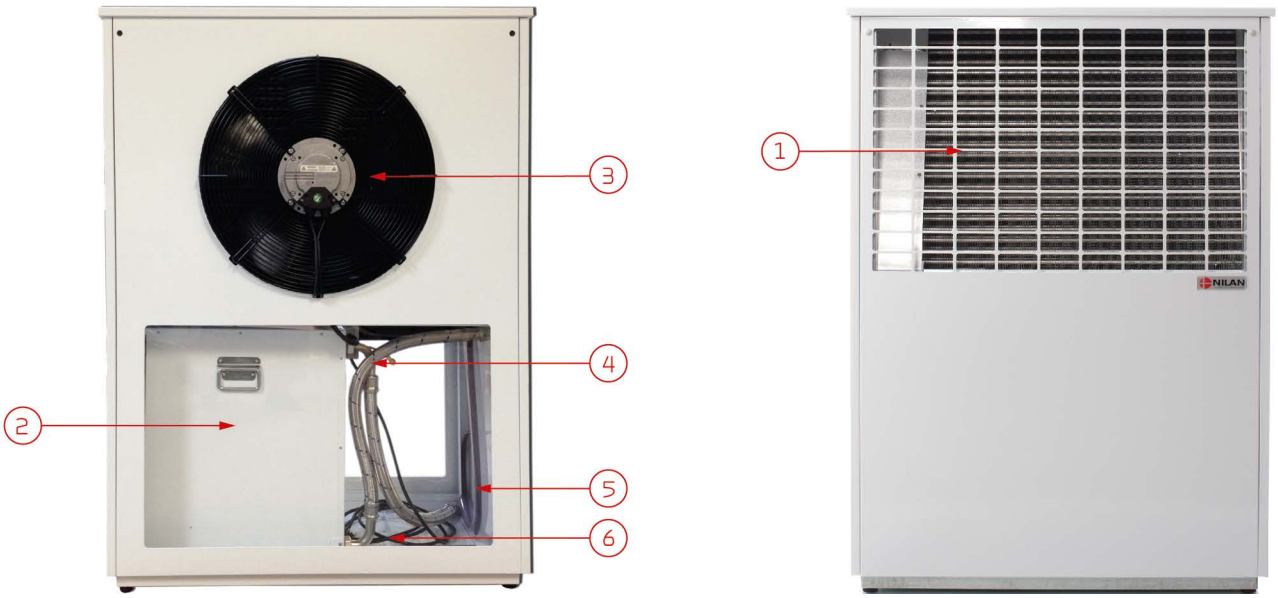

**Compact P:**

1. Duct connections
2. Front panel for filter changes
3. The control panel (HMI touch-screen)
4. Extract air filter
5. Outdoor air filter (pollen filter placed here if required)
6. Counterflow heat exchanger
7. Heat pump
8. Automation CTS602
9. Fans
10. 100% bypass damper
11. Pre-heating element (Polar version only)
12. USB cable (for connection to PC)
13. Gateway for App solution
14. 180 l domestic hot water tank (DHW)
15. 1,5 kW electrical supply heating element (with overheating cut-out)
16. Electronically monitored sacrificial anode
17. Solar coil (SOL version only)
18. Plumbing connections
19. Electrical connection panel
20. Emergency mode (DHW)
21. Condensate drain with water trap

**AIR:**

22. Safety valve and manometer for the central heating circuit
23. 50 l buffer tank
24. Filling tap and particle filter for the central heating circuit
25. Circulation pump for circulation to the external unit
26. Supplementary electric for central heating 2x3kW
27. 8 l expansion tank for central heating circuit

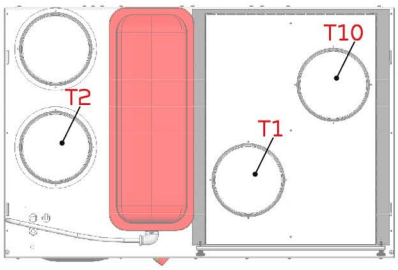
# Unit - the outdoor unit

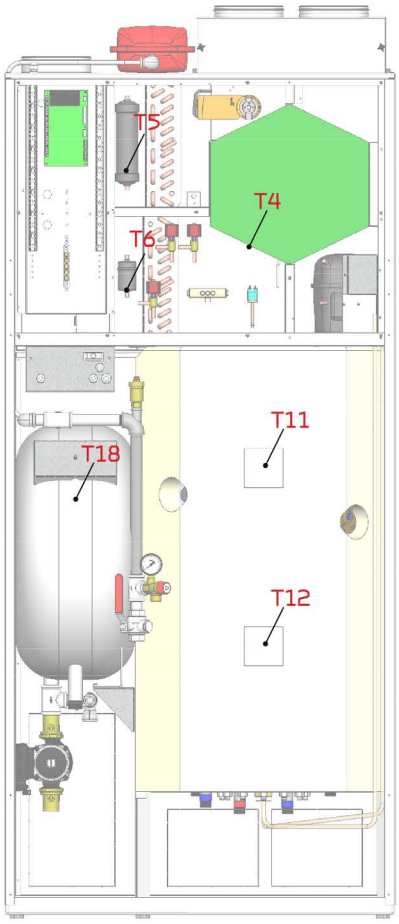


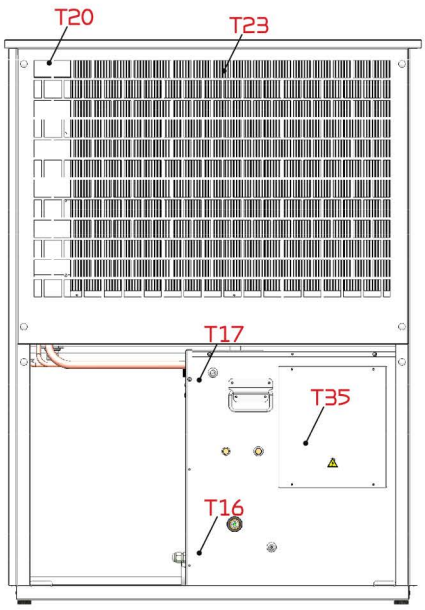

* Photo: Example of AIR outdoor unit. The outdoor unit is available in several variants.

1. Evaporator element
2. Heat pump
3. Fan
4. Connectors to indoor unit (liquid)
5. Condensate drain with integrated heating cable
6. Communication with indoor unit and electrical connection

# Overview of temperature sensors




**Temperature sensors in the unit**
T1: Outdoor air
T2: Supply air
T4: Extract air after heat exchanger
T5: Condenser
T6: Evaporator
T10: Extract air

**Temperature sensor in indoor unit**
T18: Buffer tank (supply flow)

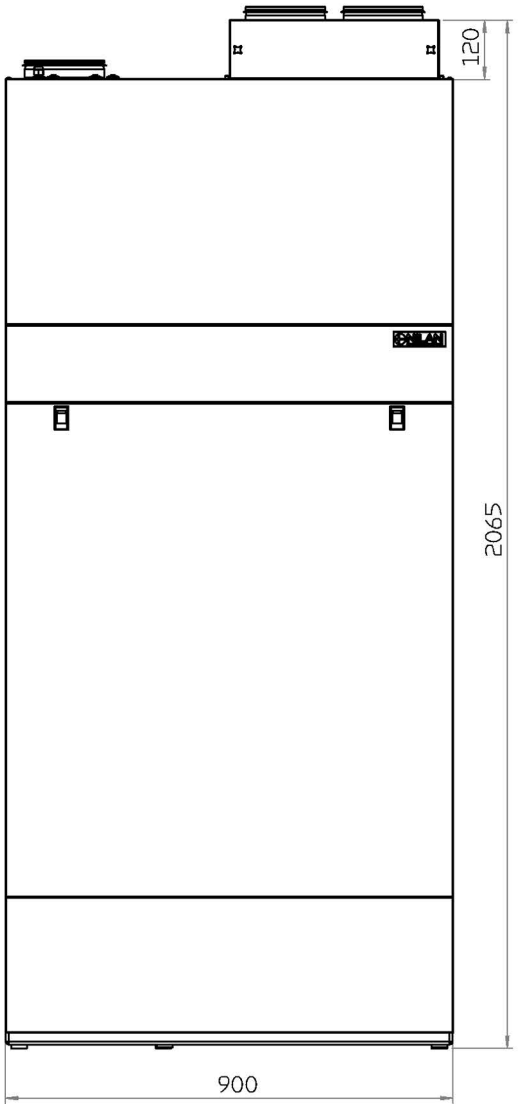
**Temperature sensors outside the unit**
T7: Supply air after after-heating element (accessory)
T8: Outdoor air before pre-heating element (accessory)
T9: On heating element (accessory)
TExt: External temperature sensor (accessory)

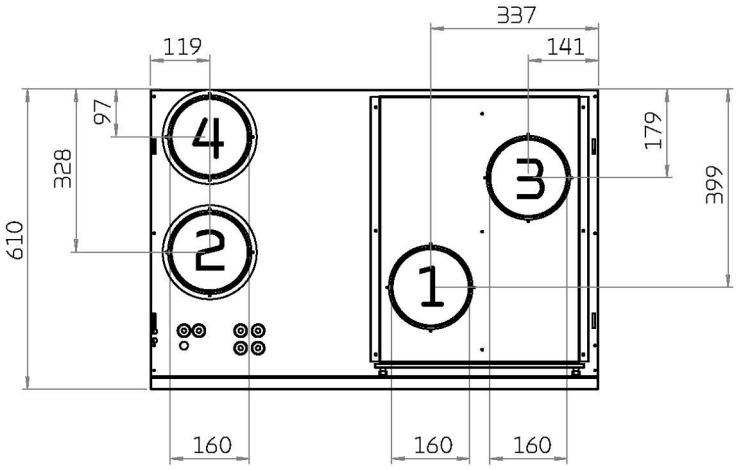
**Temperature sensor in outdoor unit**
T16: Before condenser (to external unit)
T17: After condenser (from external unit)
T20: Outdoor temperature
T23: Evaporator surface
T35: Pressure pipe temperature

**Temperature sensors in the hot water tank**
T11: Top of tank
T12: Bottom of tank

# Dimensional drawing

**Indoor unit:**




**Connections:**

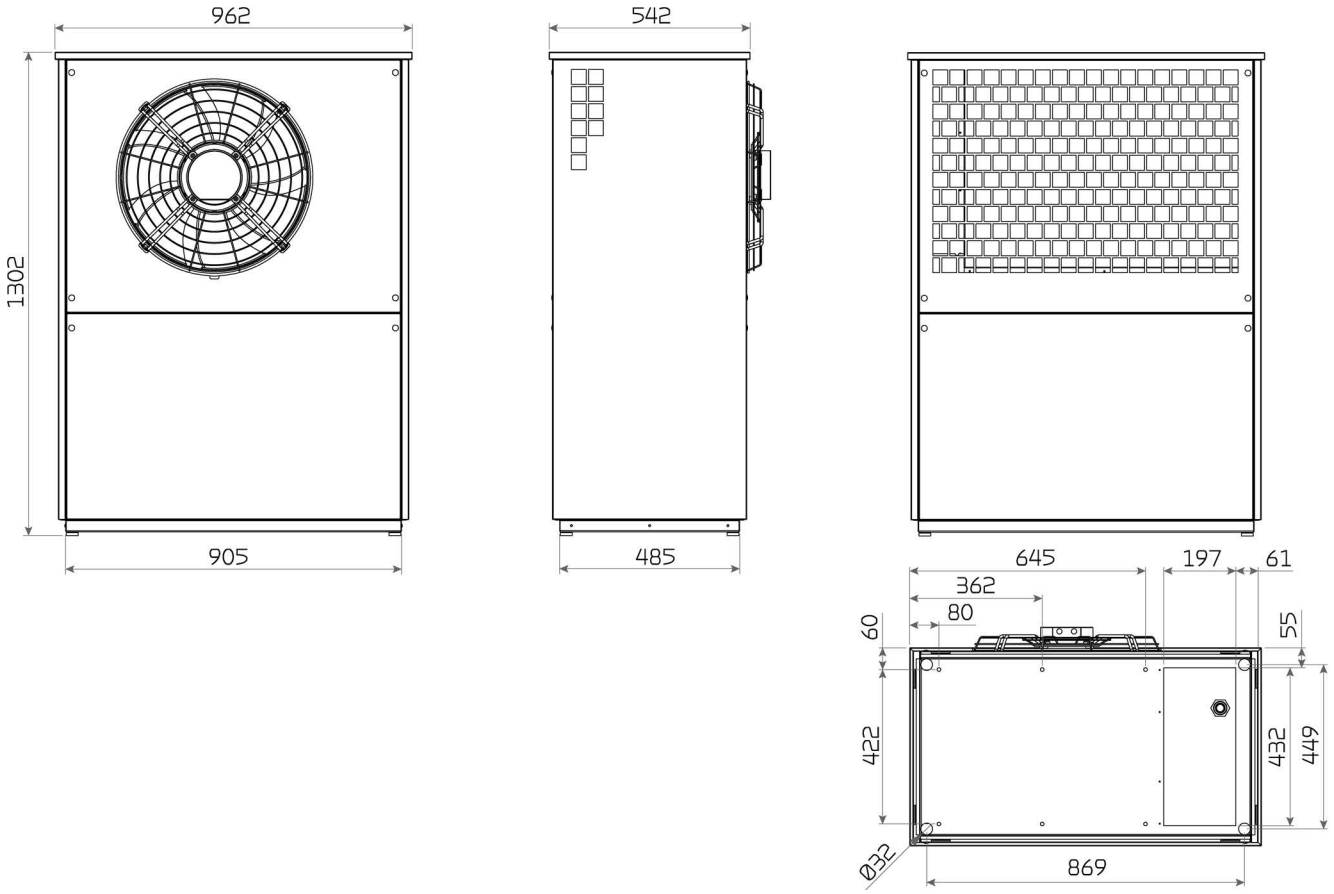
1. Outdoor air
2. Supply air
3. Extract air
4. Discharge air

Indoor unit weight: 257 kg

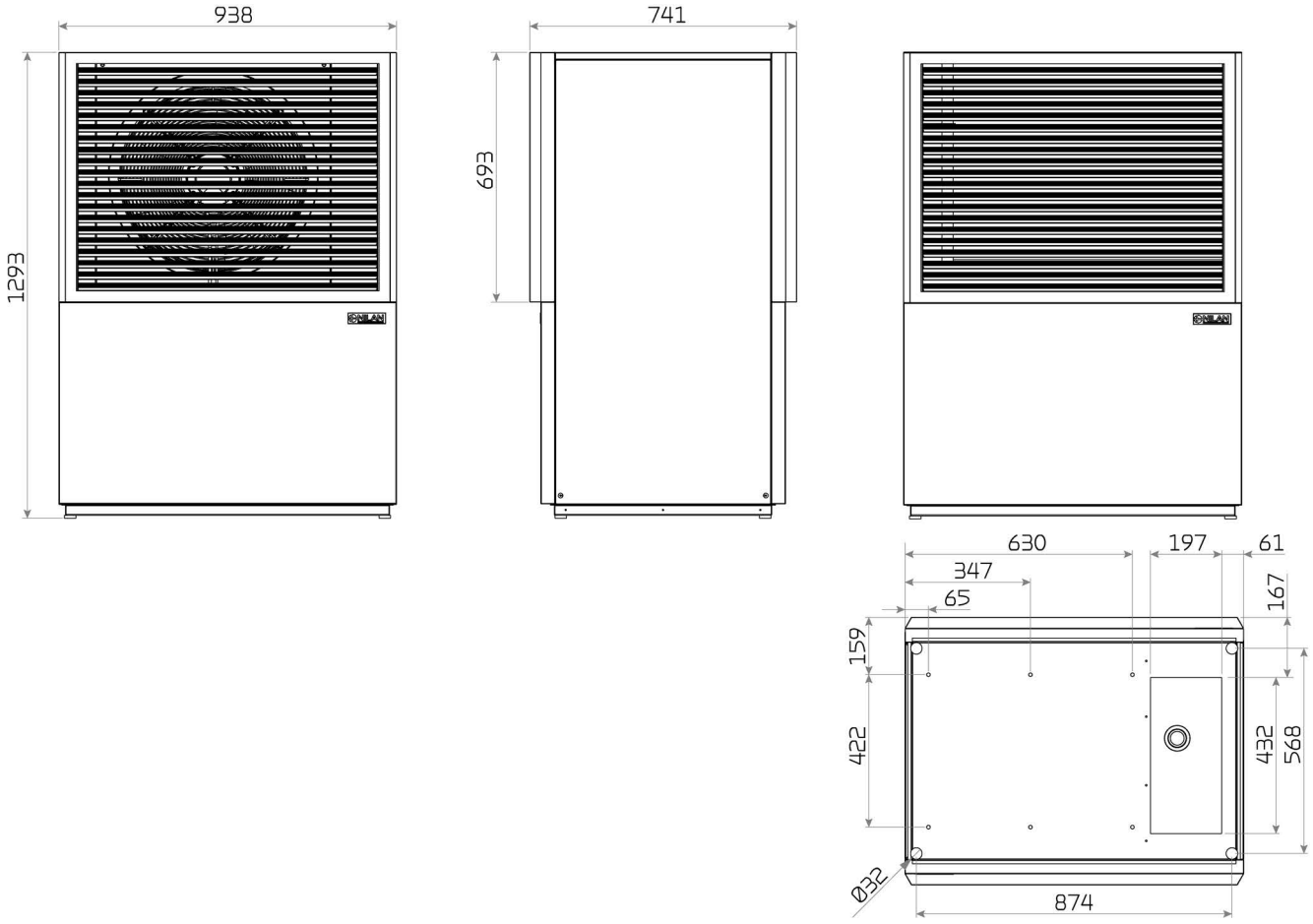
AIR9 outdoor unit weight: 125 kg
AIR9+ outdoor unit weight: 165 kg

**All listed measurements are in mm.**

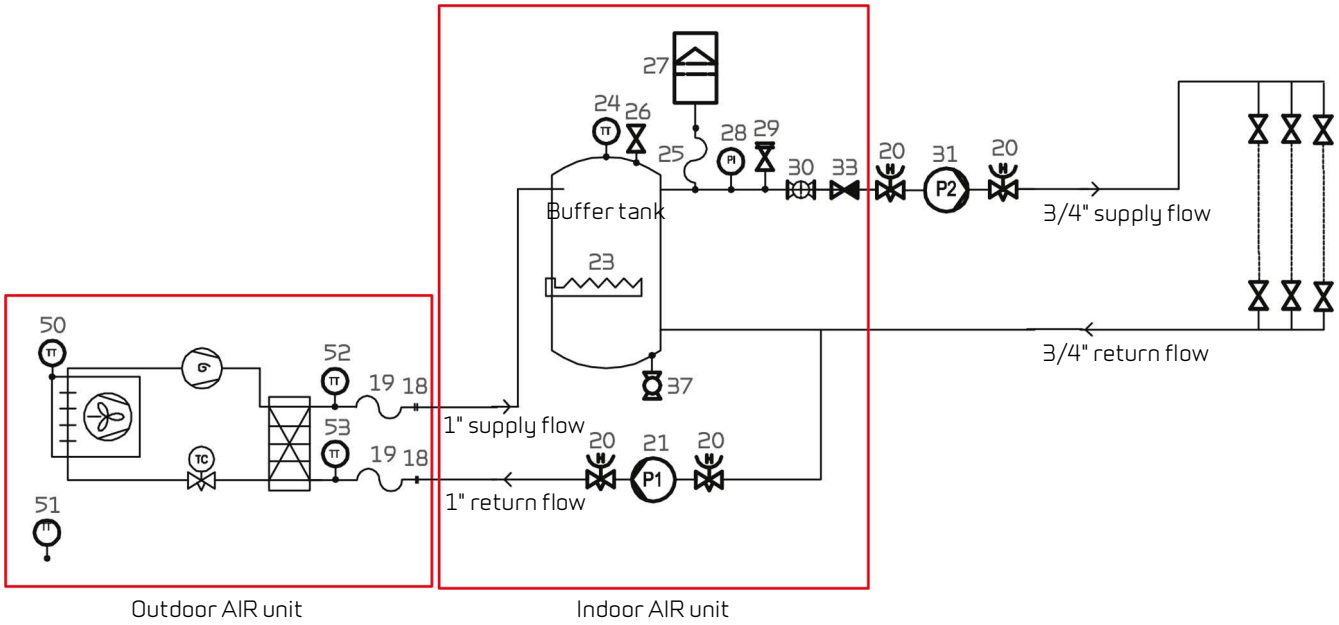
AIR9 outdoor unit:




AIR9+ outdoor unit:



# Piping diagram




* Everything within the red box is Nilan delivery.

18. Connection 1"
19. Flexible hose 1"
20. Shut-off valve
21. P1 circulation pump 130 mm
23. Supplemental electric heating 2 x 3 kW
24. Temperature sensor T18 buffer tank (flow)
25. Flexible hose 10 mm
26. Automatic control vent 3/8"
27. Expansion vessel 8 litre
28. Manometer
29. Safety valve 2.5 bar
30. Shut-off valve with particle filter
31. P2 circulation pump
33. Check valve 3/4"
37. Feed tap 1/2"
50. Temperature sensor T23 evaporator element
51. Temperature sensor T20 outdoor temperature
52. Temperature sensor T17 after condenser
53. Temperature sensor T16 before condenser

# Accessories

## Electrical pre-heating element for frost protection of the unit

If your ventilation unit is not a Polar version with an integral pre-heating element, we recommend that you purchase an external pre-heating element as frost protection of the ventilation unit.

During prolonged periods of frost, the high efficiency counterflow heat exchanger will ice up. To prevent ice formation, we recommend that you install an electrical pre-heating element.

The pre-heating element consumes limited energy and it ensures efficient heat recovery without periods of defrosting the counterflow heat exchanger. You thereby achieve an overall reduction in energy consumption.

## $CO_2$-sensor

If you want to adjust the fan speed level according to use of the dwelling/building (amount of people), you can retrofit a $CO_2$-sensor.

You select the $CO_2$-level you want via the control panel. If this level is exceeded, ventilation will increase.

## Expansion PCB

With an expansion PCB, it is possible to expand the functions within the control system.

- Connecting an after-heating element (supplied with the heating element)
- Connecting a $CO_2$-sensor
- Connecting a joint alarm

## EM-box

If you want to run the cooker hood via the ventilation unit, in some cases there may be insufficient air for cooker hood extraction.

If you install an EM-box, you can regulate the extracted air when the cooker hood is in operation, so that less air is drawn from, for instance, the bathroom and the utility room. This will allow enough air for the cooker hood to extract sufficiently.

The EM-box is fitted with a metal filter that cleans the air in the cooker hood of grease particles efficiently. It thereby protects the ventilation unit.

## DTBU damper

If there is insufficient space for mounting an EM-box in the installation, you can achieve the same effect by controlling the extract air with a DTBU damper.

You then have to adjust the duct system yourself with a connection to the cooker hood.

## Extension cable HMI user panel for 8-pin plug

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.

Is the unit located in a place where you can not immediately see the control panel, e.g. in a closet or on a unused ceiling, you can order a 10 or 20 m extension cable with plugs, so that the control panel can be placed in a place where the user has the opportunity to see it.

It is important that the control panel is located so that the user can see any alarms such as when changing filters i needed.

## 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

By law, a safety group must be fitted for the cold water connection to the hot water tank.

Nilan offers a safety valve in brass with the following functions:

- Safety valve
- Check valve
- Stop valve
- Drain tab

## Safety group with scalding protection

The control has a software scald protection that ensures that the water in the hot water tank does not gets too hot.

If you have a large cooling and / or heating need, it may be necessary to deactivate the software scald protection. The water in the hot water tank can be up to 90 ° C, which is why you need to install a safety group with scald protection.

If a solar panel is used to heat the domestic hot water via the supplementary coil in the hot water tank, a safety group with scald 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 esay to service the unit in the future, we recommend that you fit a flexible connection between the unit and the duct system.

Nilan flexible sound damper absorbs sounds effectively from both the duct system and from roof stacks.

## Pollen filter

The ventilation unit comes, as standard, with a plate filter to protect the unit.

If the dwelling is used by anybody with, for instance, pollen allergies, you may benefit from purchasing a pollen filter. This should be placed in the outdoor air intake, which will reduce the pollen count in the dwelling.

## Trolley

A Nilan trolley makes it easy to transport the heavy units into the home, without having to carry out heavy lifting yourself with the risk of injury.

A set consists of two lifting carts that are fastened on each side of the unit while it is standing on the pallet. Using the two handles, lift the unit off the pallet and drive it to where it is to be used.

## SHW hot water tank

The SHW tank is a Nilan-produced 250 liter hot water tank with built-in solar coil and heat pump supplemental coil that can be connected to all Compact P solutions.

The SHW tank is prepared for mounting a temperature sensor for external solar heat control. The supplemental spiral is intended for solar heating systems with solar collectors of approx. 4 m2.

The steel container is with double enamelling to guarantee a perfect water quality. It comes with a 1.5kW insert heating element as well as an electrically monitored magnesium sacrificial anode, both of which are controlled by the CTS automatics.

The solution is ideal for families with a large consumption of hot water.

# Set-up

## Installation

### Transport into the building

Compact P is supplied in one piece on a pallet, packed in cardboard.

You can use Nilan lifting trolley, with which the unit can be lifted directly off the pallet and into the building. If the filter box is removed, the unit can be manoeuvred through an ordinary door.

The unit is fitted at the factory with 4 lifting straps, one for each top corner.

This makes it possible to lift in the unit with a crane, which is a great advantage if the terrain does not allow you to drive with a lift truck.

When lifting the units with the supplied straps, these must be at an angle of max. 45°from the vertical.

### Positioning of unit

The unit should be positioned on a level and vibration-free substrate, with good access for servicing and filter change.

**ATTENTION**

When setting up the unit, consideration must always be given to future servicing and maintenance, therefore a free space in front of the unit of at least 60 cm is recommended.

**ATTENTION**

To achieve a proper run-off from the condensate tray, it is important that the unit is installed in level.

**ATTENTION**

If a screen is mounted over the Compact P, it must be easy to dismantle this.

At the lower rear and sides of the unit, there are punched areas which can be clipped out, so you do not cuts the holes yourself.

The rear angle iron on the base frame can be removed, allowing the unit to be pushed closer to the wall, thereby concealing the water connections.

# Installation outdoor unit

## Transport into the building outdoor unit

The outdoor AIR unit is supplied film-wrapped and fastened with straps to a transport pallet.

If ground conditions allow, it is recommended that a lifting truck is used to move it.

ATTENTION

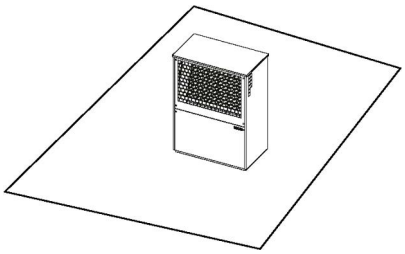
If the AIR unit is lifted in using a crane, please notice that the weight is not evenly distributed at the front and back.

ATTENTION

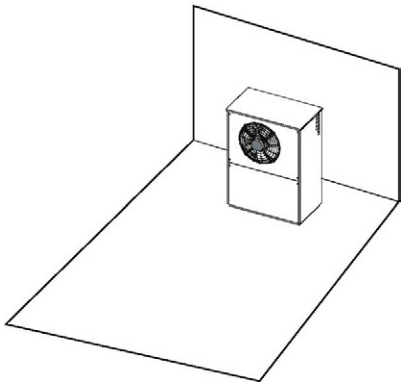
The + model must not be lifted at the doors, so these should be removed during transport.

## Sound data

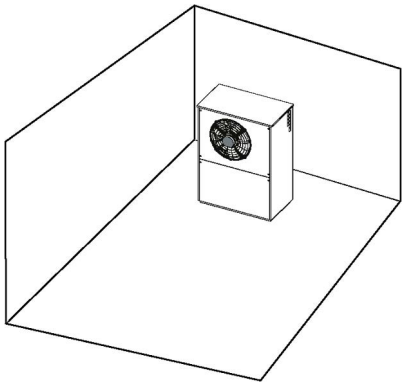
The sound from the AIR unit's external unit can be propagated depending on where it is sited relative to the building and the underlying surface, as well as on other surrounding objects and surfaces.



Q = 2 (free-standing)



Q = 4 (against a wall)



Q = 8 (in a corner)

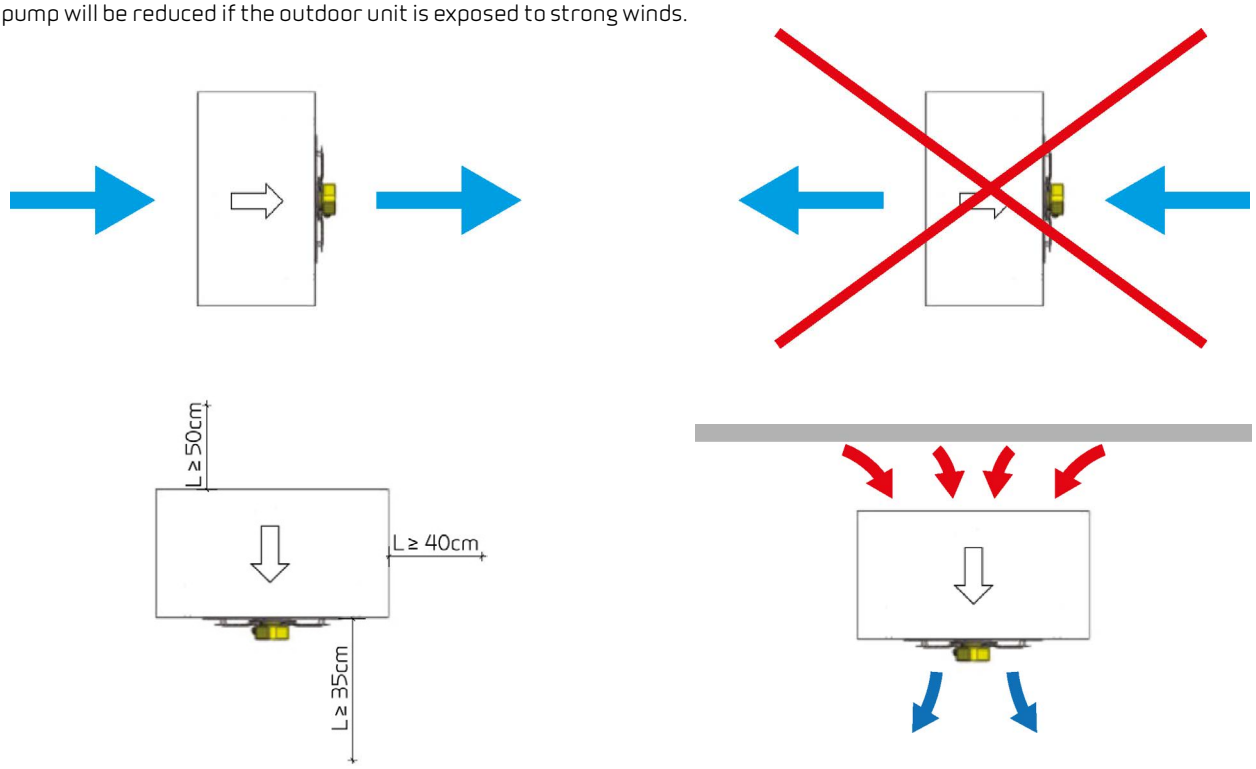
Sound effect LWA dB(A) 7/6 °C - 30/35 °C = 46 db(A) in accordance with EN14511, EN12102 and EN3743/1

Sound pressure LpA dB(A) calculated in accordance with EN13487:2003:

| Distance in metres | 1 | 2 | 6 | 10 | 21 |
|---|---|---|---|---|---|
| Location factor 2 | 38 | 32 | 22 | 18 | 12 |
| Location factor 4 | 41 | 35 | 26 | 21 | 15 |
| Location factor 8 | 44 | 38 | 28 | 24 | 18 |

## Positioning an outdoor unit

An outdoor unit must always be positioned on a firm, horizontal and vibration free surface. Consider securing it to a fixed base. You should also take into account the prevailing wind direction during the cold months when heating is required, as the performance of the heat pump will be reduced if the outdoor unit is exposed to strong winds.




If required, you can consider putting up a windbreak. However, clearance requirements must be met.

Shown below are the horizontal minimum distances to building parts and sim. that are required for the heat pump to perform properly.

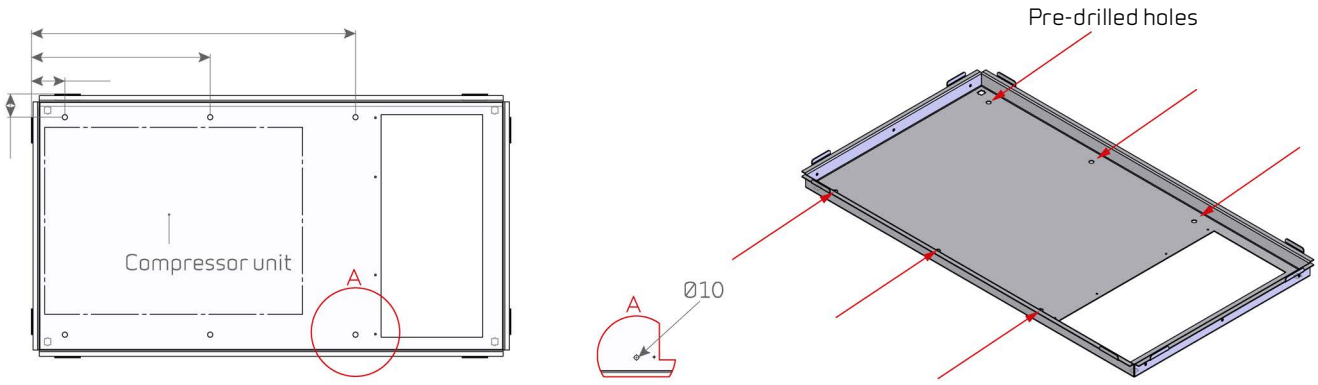
If you want to position AIR up against the building, it is important that you take into account potential noise from the outdoor unit so it does not become a cause of irritation indoors.

Position AIR so air is supplied from the dwelling. The air gains added energy from solar heating of the building walls during the day and from general heat loss from the building. This can then improve the efficiency of the heat pump.

If AIR is positioned with air extraction directed up along the wall, cold and humid air will hit the building, adding no extra energy to the air.

## Fixing of outdoor unit to substrate

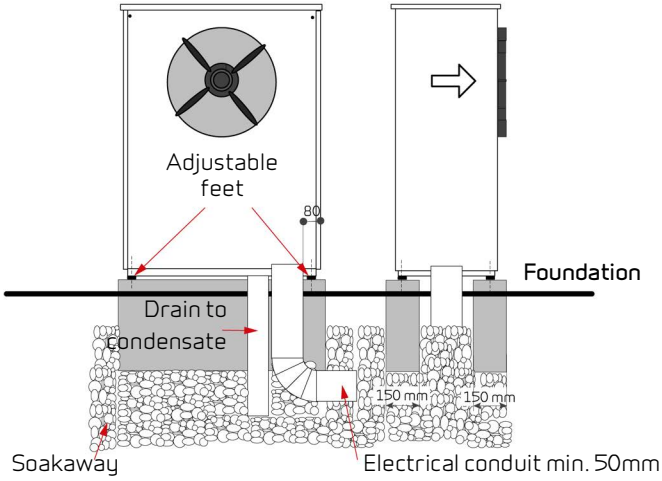
If the outdoor unit is placed in a place with a lot of wind, e.g. on a roof, it is necessary to attach it to the substrate using the 6 pre-drilled holes in the bottom.




**ATTENTION**

The illustration above shows an example of an AIR outdoor unit. See dimensional sketch for details on AIR9 and AIR9 +.

## Foundation




The illustration above shows an example of an AIR9 outdoor unit. See dimensional drawing for details on AIR9 and AIR9 +.

ATTENTION
Place the AIR unit on a stable base, ideally a cast foundation.

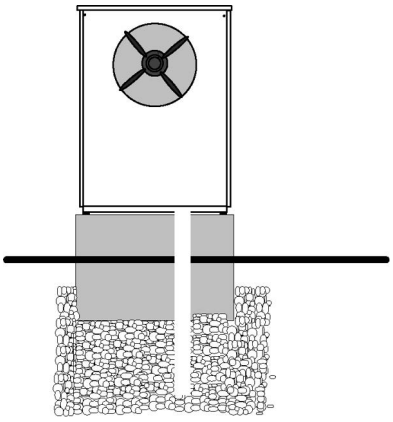
## Condensate drain

During operation, condensate water will form in the evaporator of the outdoor unit. It must be able to drain away safely. A 700 mm hose has been fitted to the condensate tray of the evaporator. You run this to a drain.

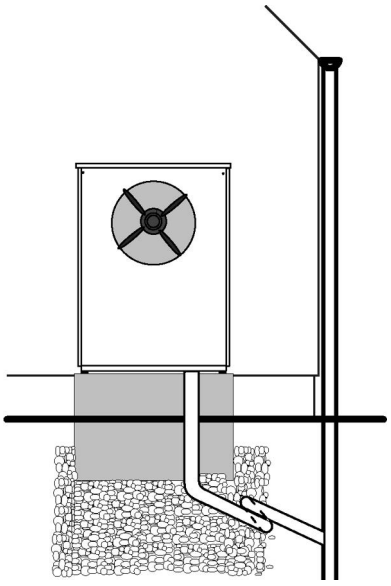
The condensate drain must be protected against frost although the 1.5 m heating cable Ø25/4 mm, included, also helps keep the condensate drain frost free. The heating cable starts heating at an outdoor temperature < 2 °C.

ATTENTION
The condensate water must be able to drain safely so it does not cause damage to the building.

ATTENTION
The condensate drainage system from the outdoor unit must be dimensioned so that it can drain up to 6 litres/hour.



If the condensate water drains into gravel, you must ensure that the drainage system reaches the frost-free subsoil.



If the outdoor unit is placed close to the building, the condensate water can simply drain into one of the downpipes. Remember to install a water trap.

The condensate water can also be led directly to a surface water drainage system.

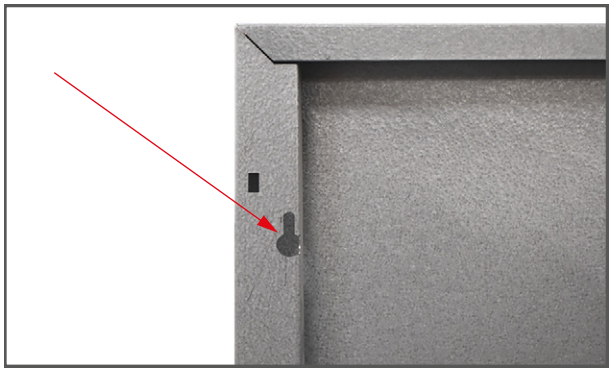
# Dismantling the front doors of the + model

If you need access to mechanics, electronics or plumbing connections in the AIR + outdoor unit, it is possible to remove the upper and lower front plate.

**WARNING**

Always disconnect the power to the unit before opening the doors at e.g. installation, inspection, cleaning and maintenance etc..

1. The AIR outdoor unit has an upper front plate with slats, as well as a smooth lower front plate.

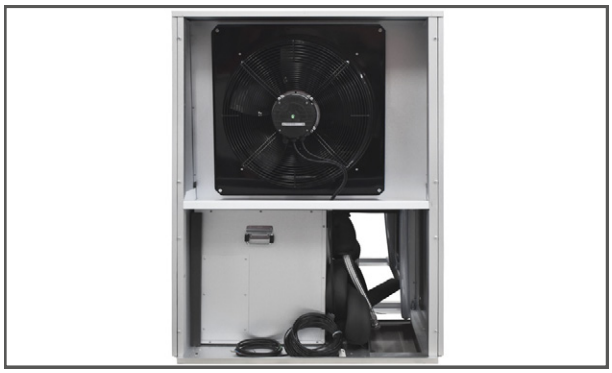


2. The two front plates are mounted with hook brackets.

3. Remove the top front plate by first lifting it up and off the screws.

4. Then tilt the plate away from the outdoor unit and remove it completely.

5. The lower front plate is removed in the same way as the upper one, by first lifting the plate and then tilting it out.



6. The AIR outdoor unit is now open, and you can access mechanics, electronics and plumbing connections.

**ATTENTION**

The illustration above shows an example of an AIR9+ outdoor unit. The outdoor unit is available in several variants.

# Electrical installation

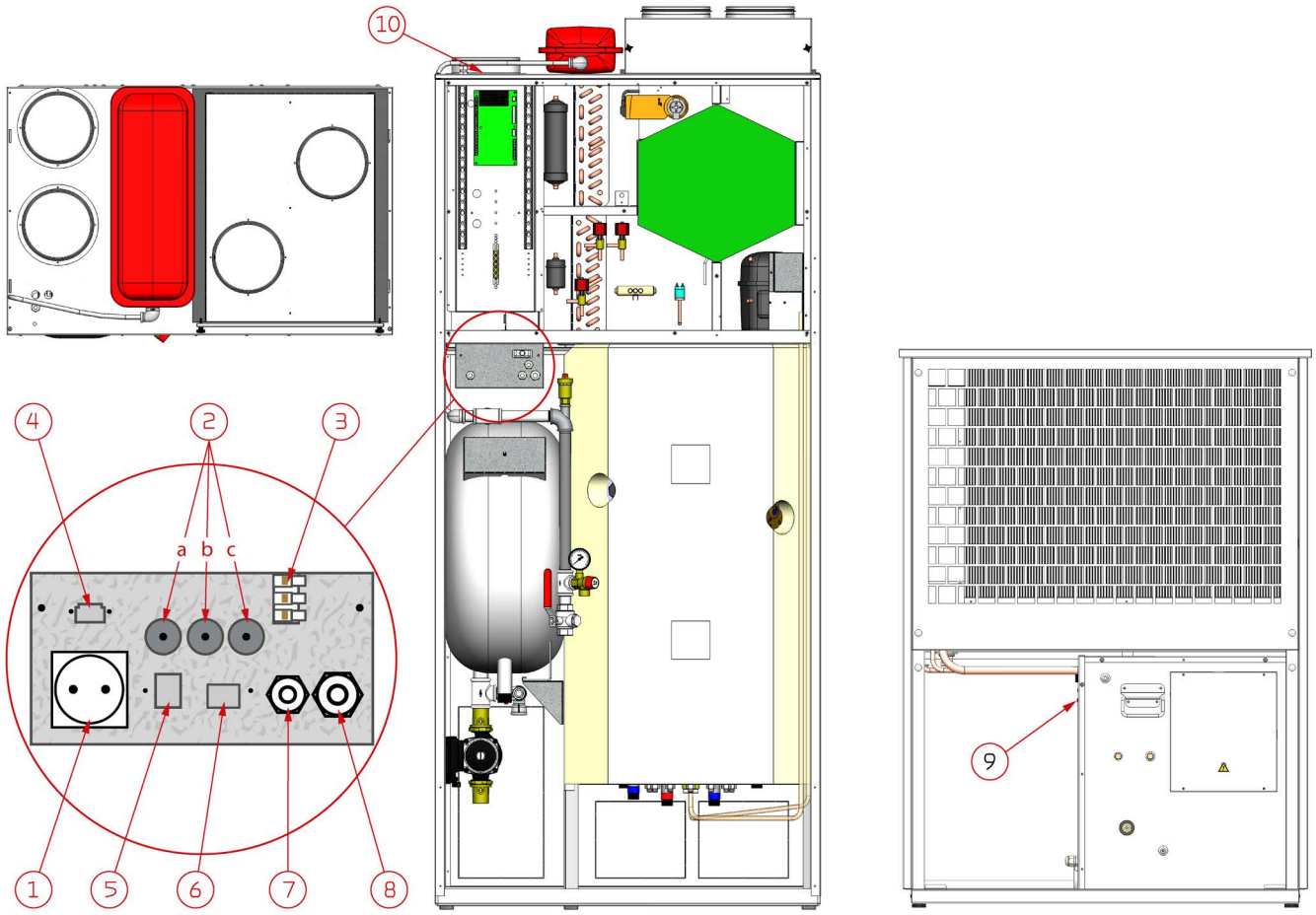
## Safety

**ATTENTION**
All work must be carried out by qualified persons and in compliance with existing legislation and regulations.

**ATTENTION**
It is important that the power is off, if you do work to the electrical components of the unit.

It is important to check that wires are not damaged or squeezed during connection and use.

## Connections overview




1. Power supply 230V for Compact P
2. Grommets (a: Transmission cable between internal unit and Compact P, b: Sensor T18 to buffer tank, c: 3-way valve for SHW tank)
3. Crown sleeve for heat / cooling control (HEAT + COM: heat control. COM + COOL: cooling control)
4. Signal cable to AIR heat pump external unit
5. RJ45 connector for T21, T22 and anode in SHW tank
6. Plug for additional electric heating in SHW tank
7. Power cable for additional electric heating in buffer tank
8. Electrical connection cable for AIR heat pump indoor unit + Compact
9. Electrical connection for AIR heat pump outdoor unit
10. 8-pin plug for the option to connect User selection 1, Modbus and HMI control panel

# HMI User panel

## Moving the user panel

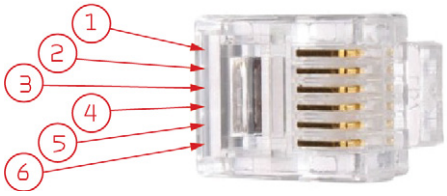
The user panel is from the factory mounted in the front of the unit. It is important that the user panel is located in a visible place so that the user can follow the operation and become aware of any. alarms. Therefore, it may be necessary to move the user panel to another location.

A cover plate can be purchased for mounting in the hole in the front of the unit where the user panel is located from the factory.

Wires from the 8-pin socket, for connection of the HMI control panel, are loose in the unit and must be connected to the circuit (according to the electrical diagram), where the wires from the front connection are removed.

Nilan offers a connection cable with RJ12 connectors of 10 m and 20 m, respectively. It is also possible to customize a cable up to 50 m in length. A standard LAN cable is used for this.

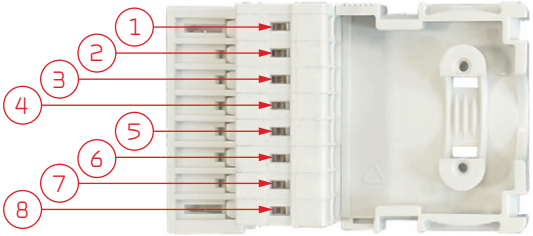
**Mounting the RJ12 plug**




1. Empty
2. Empty
3. Green (A2)
4. Green/white (B2)
5. Brown (12V)
6. Brown/white (GND)

Use a RJ12 crimping tool

**Mounting in the 8-pin plug**




1. Brown/white (GND)
2. Green/white (B2)
3. Green (A2)
4. Empty (User programe 1)
5. Empty (User programe 1)
6. Empty (Modbus A1)
7. Empty (Modbus B1)
8. Brown (12V)

## Wall bracket

Mount the HMI panel on the wall using the integrated wall bracket..

The panel should be placed in a visible spot so it is possible to change settings and to monitor warnings or alarms regarding operation of the unit.

The wall bracket is located at the back of the panel. You can detach it by loosening the bracket at the bottom of the panel. You can remove it.

Mount the wall bracket on the wall using 2 screws.


Click the RJ12 plug into place at the bottom of the HMI panel. The wire can run down along the wall, into the wall or through the groove at the back of the panel.

# Electrical connections unit

## Power supply

**CAUTION**

The power supply is plugged into a 230V socket with a safety switch. It is important that the unit has ground connection.

The ventilation unit is supplied with an EU Schuko plug for 230V power supply.

This means that if you have not installed a shoko socket with side earth or pin earth, an Adapter schuko plug with pin earth must be used.

This Schuko adapter can be plugged into the ventilation unit's Shuko plug and then into a socket with earth.

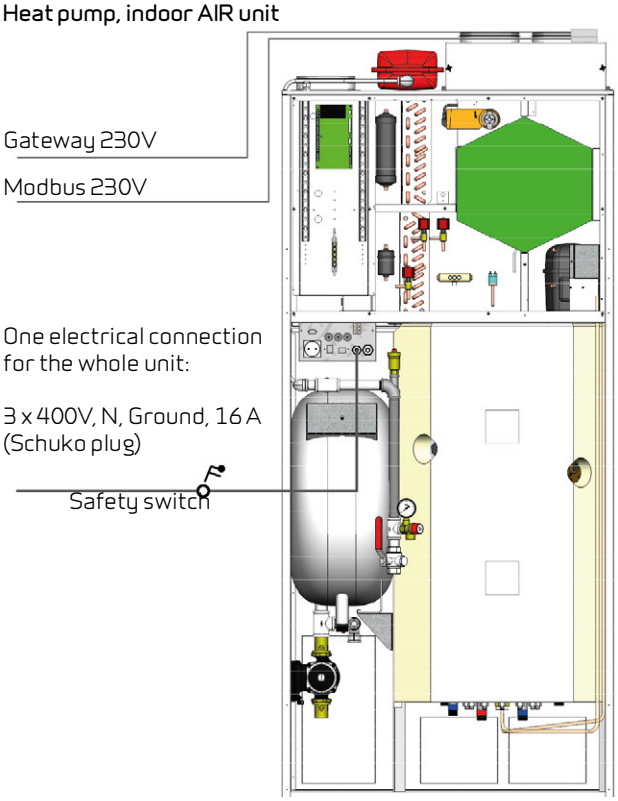
Schuko socket with side earth

Schuko socket with pin earth

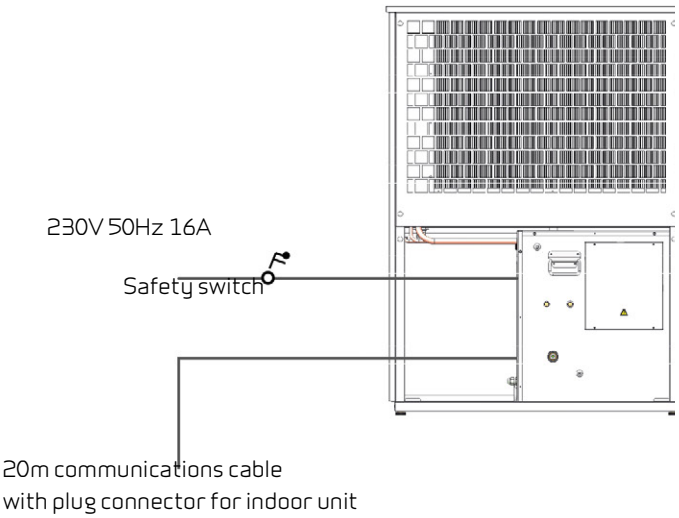
Example of Adapter Schuko plug with pin ground

## Compact P AIR

**Heat pump, indoor AIR unit**

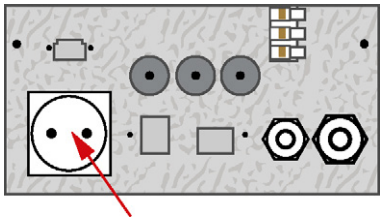



**Heat pump, outdoor AIR unit**




**ATTENTION**

Due to the risk of faults caused by inductive influence, the communication cable must be routed in a separate pipe with a minimum of 100mm distance to other live cables.



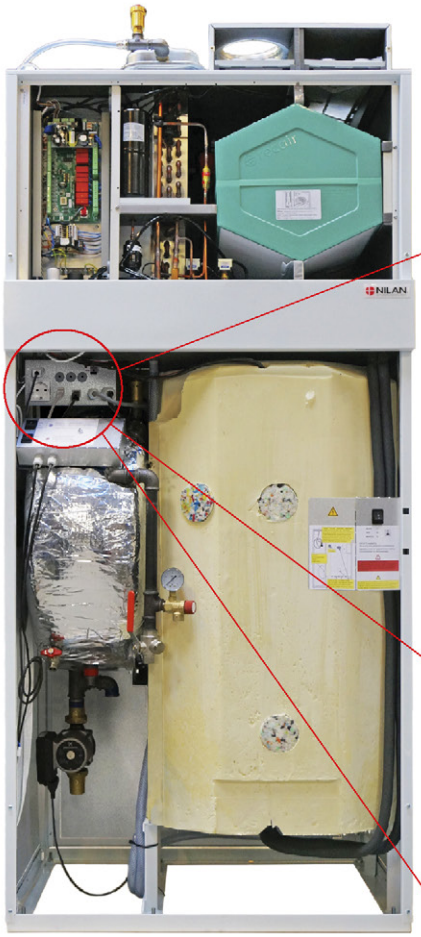
**Power connection for Compact P, ventilation and hot water**

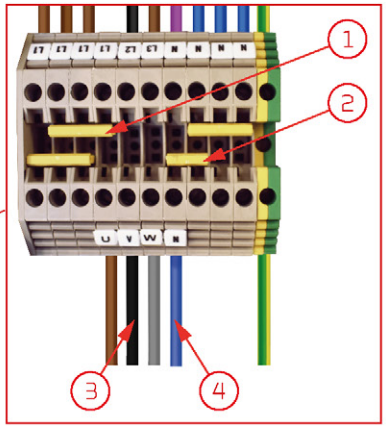
This power connection via Schuko socket allows to measure the power consumption of the ventilation separately, as well as the possibility that the hot water part does not have the same connection as the heat pump.

# Change from 400V to 230V

The standard connection in the unit is 3x400V + N. In those countries or areas where this standard is not applicable, the unit can easily be switched to either 3x230V or 1x230V.

The terminal block can be found in the control for AIR. Please refer to the wiring diagram enclosed with the unit.





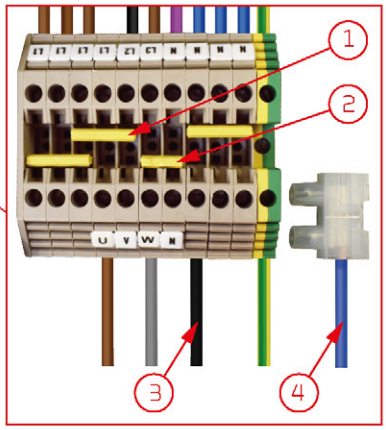

**3 x 400V + N**

1. Jumper located in L1+L1+L1 (top clamping row)

2. Jumper located in N + zero on the right (bottom clamping row)

3. Black wire located in V (bottom clamping row)

4. Blue wire located in N (bottom clamping row)



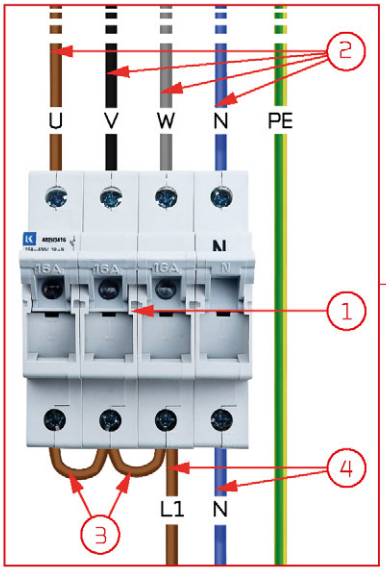

**3 x 230V**

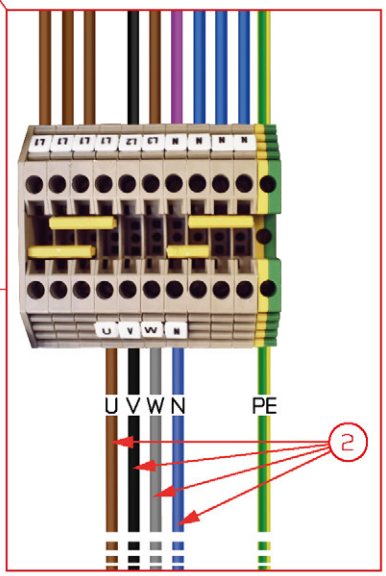
1. Jumper located in L1 + L1 + L2 (top clamping row)

2. Jumper located in W + N (bottom clamping row)

3. Black wire located in zero to the right of N (lower clamping row)

4. Blue wire disconnected and secured with crown sleeve




**1 x 230V**

1. In the panelboard there must be mounted a 3x16A circuit breaker. There must be 40A available before the circuit breaker.

2. Wires are connected between the terminal block and the circuit breaker:
U = brown, V = black,
W = gray, N = blue/zero.

3. Jumpers are mounted on the access side of the circuit breaker from 1-2 and 2-3.

4. Brown (L1) is mounted in the third wire inlet.
Blue/zero (N) is mounted in the fourth wire inlet.

**ATTENTION**

The installer carries the responsibility for the electrical installation work.

## Circulation pump

In Compact P AIR and Compact P GEO, there is a Power supply cable for circulation pump for central circuit in the Electrical connection panel. The cable is marked with a sticker with the text "Circulation pump" and ends in 3 screw terminals.

Compact P AIR

Power supply cable for circulation pump for central circuit

Compact P GEO

# Connecting the gateway

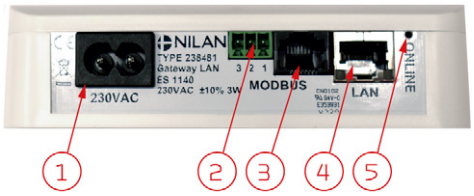
## Location on the unit

On Compact P (AIR/GEO) units, the gateway is installed on the filter box on top of the unit.

The gateway arrives from the factory already connected to the Modbus connection of the unit.

A wire for a 230V connection is included. Connect this to an external power socket.

## Connections overview Gateway




1. 230V connection (wire included)
2. Reserved for future connections
3. Connection to the Modbus connection of the unit
4. Connection to the user's internet router
5. Light to check connection

## Electrical connection

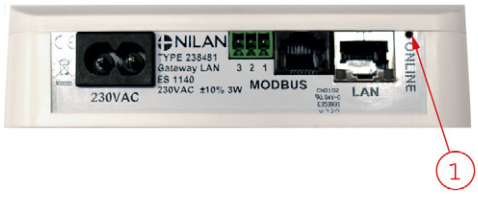
Using the supplied cable, connect the Gateway to 230V.

## Connecting to the internet

Using an RJ45 cable, you connect the gateway to a router with internet connection (cable not supplied by Nilan).

Once the gateway is connected to a power supply and connection to the router has been established, you will have a secure cloud connection. You can now use the Nilan User APP to communicate with the gateway.


## Checking connections




The ONLINE indicator makes it possible for you to check the connections by using the following code:

- When connecting 230V - the light will flash for 5 sec.
- When connecting Modbus communication - the light flashes continuously
- When connecting a Router - the light comes on and stays on
- When connecting a Router without Modbus communication - the light does not come on

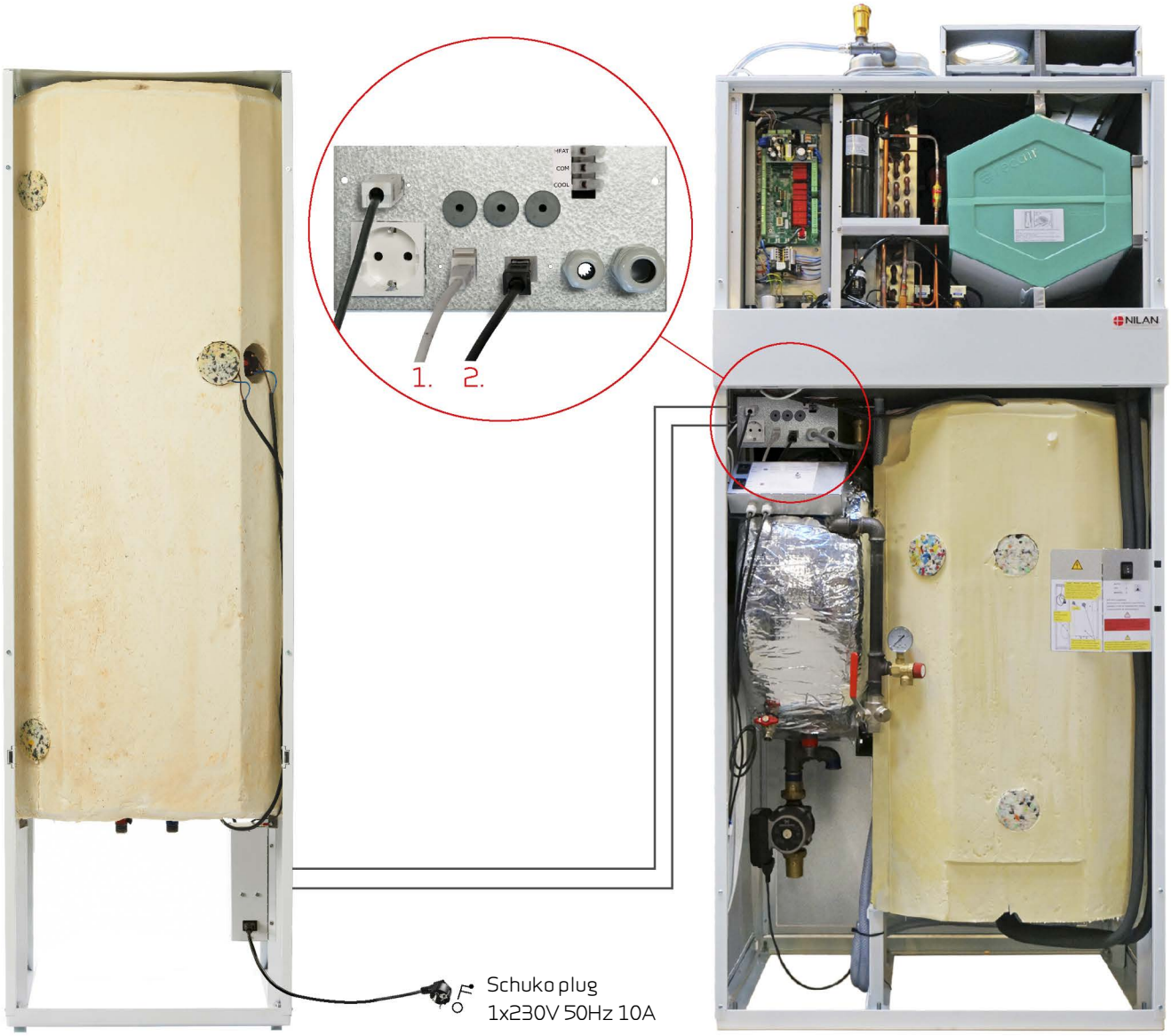
# Electrical connections accessories

## SHW hot water tank

The SHW hot water tank is connected to Compact P AIR connection panel as shown below. The SHW tank has its own power supply via a Schuko plug.

1. RJ45 plug for transmitting top temperature (T21), bottom temperature (T22) and anode monitoring in the SHW tank.

2. Plug for control of supplementary electric heating in the SHW tank.



## User selection 1

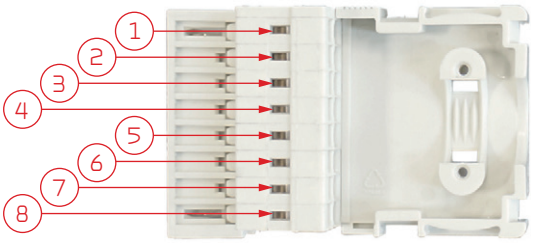
User selection 1 is connected via the 8-pin plug mounted on top of the unit.

The user selection functions are used to override normal operation. The input signal must come from a potential-free switch. When closed, the function is activated with the settings selected in the control panel under Service / User selection.

Some examples of the situations in which the user selection functions are used:

| | |
|---|---|
| Cooker hood | If you choose to run the cooker hood over the ventilation unit, the cooker hood sends a potential-free signal to the ventilation unit when it is switched on. When this happens, the ventilation unit increases the air volume to the set level, so that enough air is extracted through the hood. |
| Fireplace/wood burning stove | Normally, the ventilation is balanced with a small negative pressure in the home, so that no moisture is forced into the building's construction. It is a disadvantage if you light up your fireplace / wood stove, as the smoke will then enter the home instead of out of the chimney.<br><br>When you switch on the fireplace/burning stove, you can activate the user function with a potential-free switch, which ensures that there is an overpressure in the home, so that the smoke smokes out of the chimney as it should. |
| Extended operation | If the ventilation unit is used in an office or school where the ventilation is reduced outside the opening hours, it may be necessary to turn it up briefly if, for example when a meeting is held in the evening.<br><br>There you can then have a switch that is activated and the ventilation is increased e.g. for an hour before it then goes back into operation. |

Connection via the 8-pin plug:



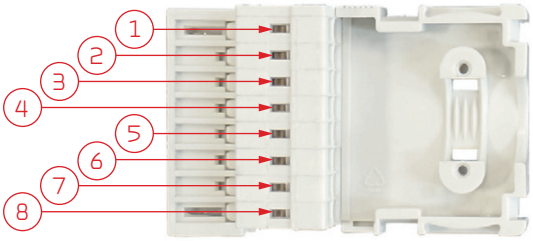

User selection 1 is connected to pin 4 and 5 in the 8-pin plug.

## Modbus

The CTS602 controller has an open Modbus RS485 communication, that allows you to communicate with it and control the ventilation unit via external control systems.

We refer to the software manual and the Modbus protocol for further information about settings and registers.

Connection via the 8-pin plug:




Modbus is connected in following pins:
1. GND
6. A1 (Modbus +)
7. B1 (Modbus -)

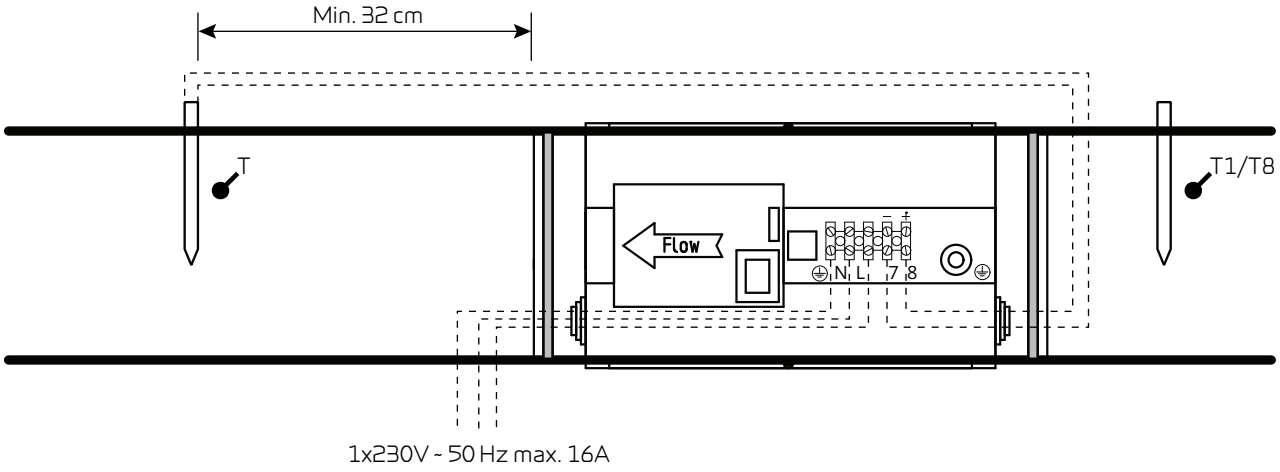
# External pre-heating element

It is possible to purchase an external electric pre-heating element for frost protection of the ventilation unit.

The electric preheating element is mounted in the outdoor air duct before the unit with the necessary temperature sensor.

If it is desired to see the actual outdoor air temperature on the control panel, the temperature sensor T1 / T8 must be led out into the duct before the preheating surface.

.




It is important that the sensor is placed at least 32 cm from the preheating element to achieve correct regulation.


The pre-heating element has a three-step safety system that prevents overheating.

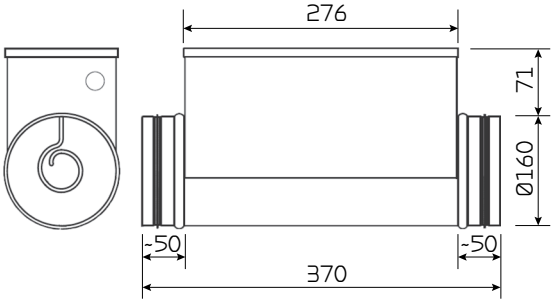
1. An operating thermostat regulates the heating and ensures that the supply air temperature does not fall below -1 °C
2. Should the temperature exceed 50 °C, a max. thermostat switches off the pre-heating element. (If installed vertically with downward airflow, the pre-heating element switches off at 70 °C)
3. A safety thermostat switches off the pre-heating element if the temperature exceeds 100 °C. Then, you must reset it manually.

Minimum airflow at Ø160: 110m$^3$/h.

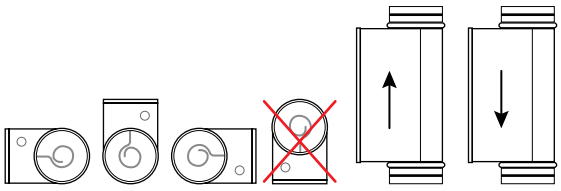
**ATTENTION**

The heating element must be insulated with a fire retardant insulation material. The cover of the connection box, however, must not be insulated.

**Dimensional drawing:**



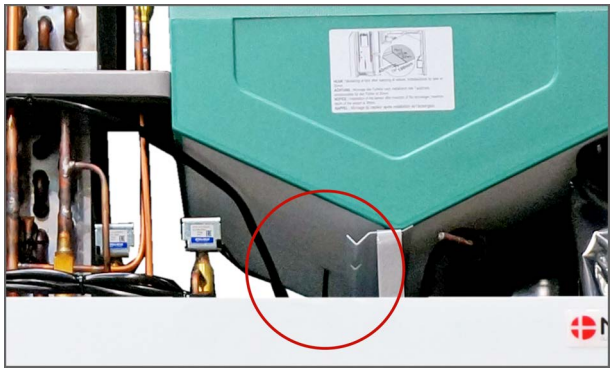

**Positioning options:**



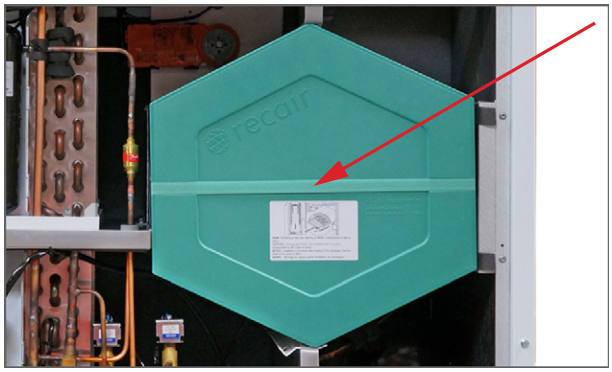
# $CO_2$ sensor

If there is a large load change in the home / building, it is advantageous to install a $CO_2$ sensor to control the air exchange.
The $CO_2$ sensor measures the $CO_2$ level in the exhaust air, and regulates the ventilation level accordingly.

The $CO_2$ sensor is mounted in the unit as illustrated below:



1. Remove the T4 sensor in the heat exchanger.



2. Remove the heat exchange by pulling the strap (do nut cut).

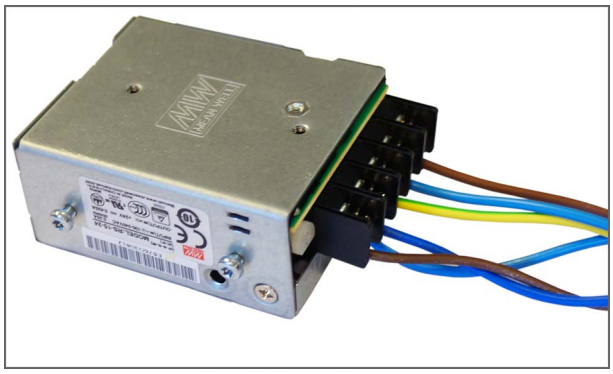
3. Pierce a hole into the foam over the crossbar, (where the heat exchanger is positioned) to gain access to the recess in the top cover.

4. Run the wire from the CO2 sensor through this recess.

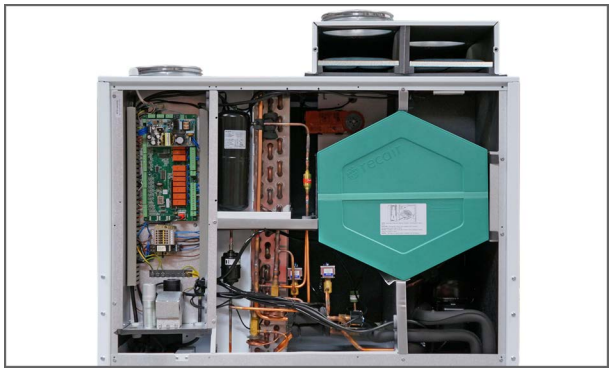
5. Mount the $CO_2$ sensor in the top cover, using self-threading screws (included in the CO2 sensor kit).

6. Run the wire from the CO2 sensor through the cable grommet to the automation.
Wire is subsequently tied up with cable strips.

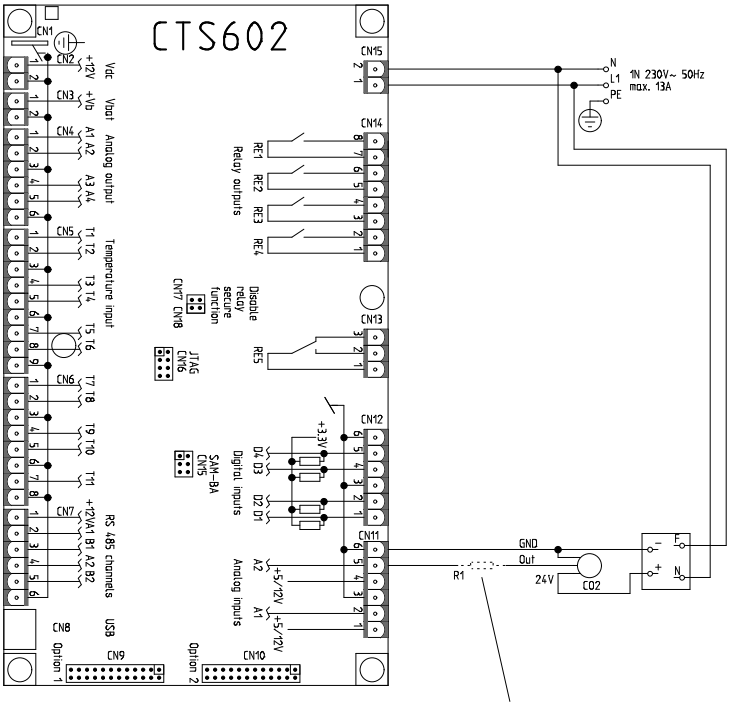
7. Mount the power supply box in the box for automatic. (pre-drill 2 holes for the screws).



8. Connects as shown in the electrical diagram below.



9. Reinstall the counterflow heat exchanger. Remember to reinstall the T4 sensor.

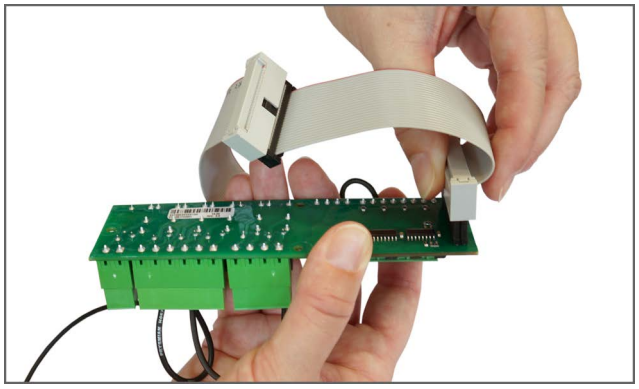



For SW version 2.00x or less, the resistor must be mounted in series with a black signal cable
For SW version 2.01x and above, do not mount a resistor.

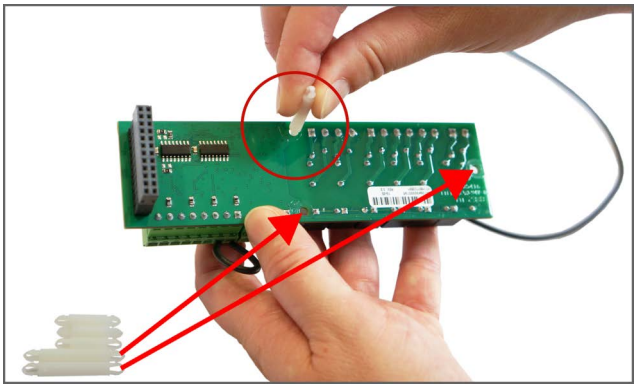
# Installation of expansion PCB on CTS602 circuit board

With an expansion PCB, it is possible to expand the functions within the control system.

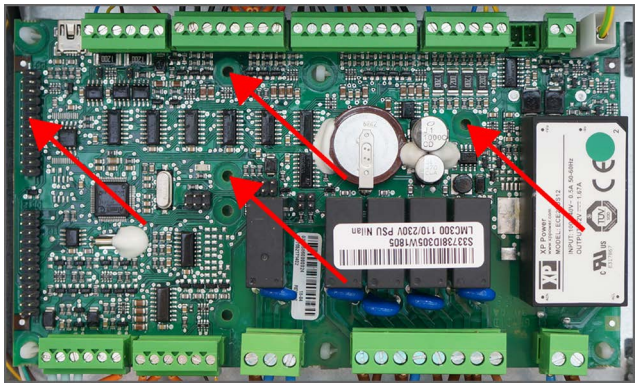
You can connect a $CO_2$-sensor, a joint alarm and User selection 2 (expansion PCB is included with the heating element)



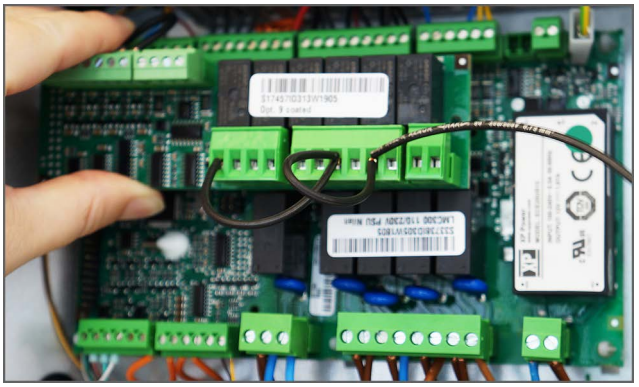
1. Demount the shown bus cable from the expansion PCB.



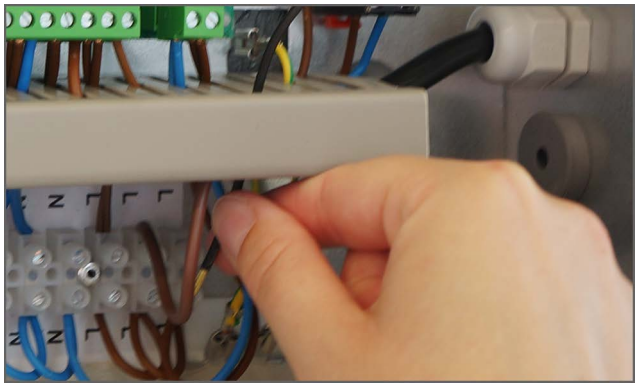
2. Mount the large circuit board supports in the 3 holes on the expansion PCB.



3. Connect the expansion PCB to CN9. Mount the circuit board supports in the holes provided for this on the CTS602 Light circuit board.



4. Mount the expansion PCB on the CTS602 Light circuit board.



5. Connect the wires up in accordance with the wiring diagram.

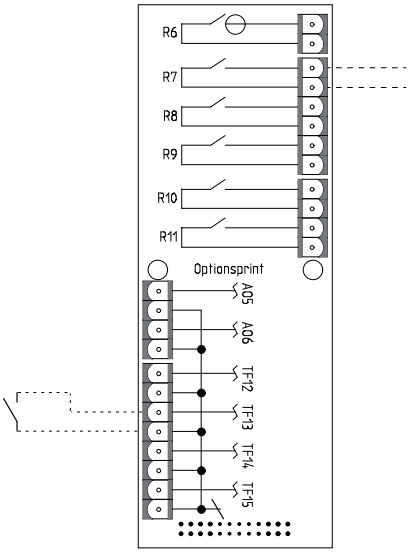
ATTENTION

The expansion PCB and the connections must be installed by a certified electrician.
The expansion PCB is an accessory for the CTS602 circuit board. Nilan does not supply external components.

## User selection 2

With User selection 2, the same options are achieved as with User selection 1. In addition, you get the option of a relay output that can control e.g. a damper or whatever need one may have to control an external function.

User selection 2 potential-free input is connected to TF13 and User selection 2 output is connected to relay R7 on the PCB board.



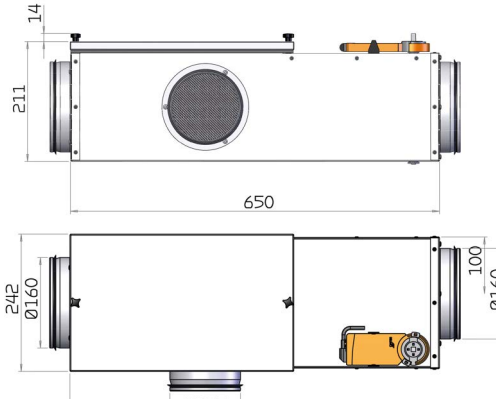

## EM-box (damper solution)

If it is desired to run the cooker hood over the ventilation system, it may in some cases be difficult to get enough air for the cooker hood.

With an EM box installed and when the cooker hood is in operation, you can regulate the extraction so that less air is extracted out of the other rooms, e.g. bathroom and utility room so that there is enough air for the cooker hood to extract sufficiently.

The EM box is equipped with a metal filter that effectively cleans the cooker hood air of grease particles, as extra protection for the ventilation unit.

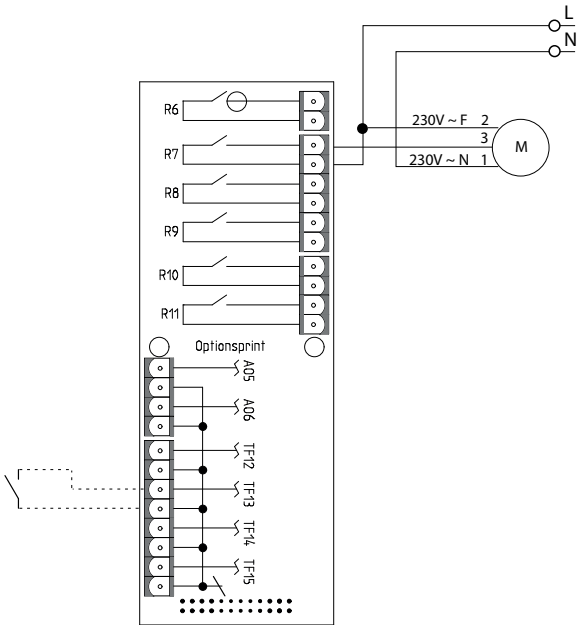
**Dimensional drawing:**




**The system works as follows:**
When the cooker hood is switched on, User selection 2 is activated. The ventilation unit increases the ventilation and at the same time sends an output signal to the EM box that it must close the damper for extract air from the other rooms. However, the damper does not close completely in, there will still be extraction from the other rooms, just reduced.

When balancing, the small stop blocks on the damper must be set so that the basic ventilation is maintained from the other rooms.

The EM-box solution is connected to the PCB board via the following electrical diagram:



# DTBU damper solution

If it is desired to run the cooker hood over the ventilation system, it may in some cases be difficult to get enough air for the cooker hood.

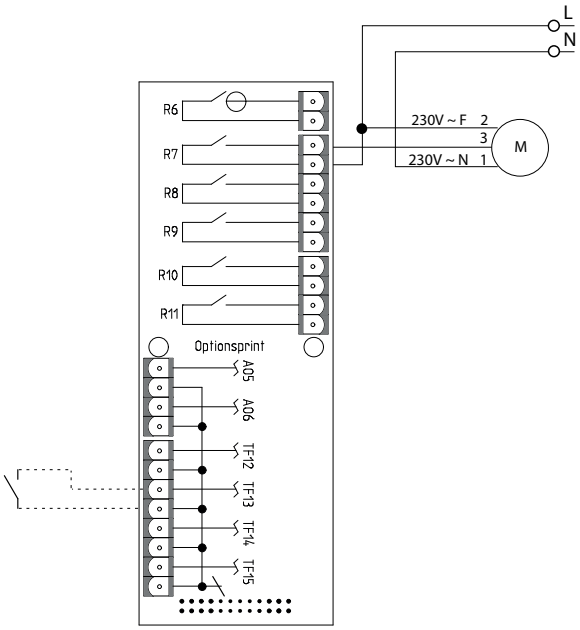
To solve that challenge, an EM-box solution can be used. However, if there is not enough space in the installation for an EM box, you can alternatively connect a DTBU damper in the duct system, which has the same function, except that it does not have a built-in dirt filter. However, a filter box with a steel filter can be purchased, which can be mounted in the duct system in a suitable place.

The DTBU damper regulates the extract air so that less air is extracted out of the other rooms, e.g. bathroom and utility room so that there is enough air for the cooker hood to extract sufficiently.

**The system works as follows:**
When the cooker hood is switched on, User selection 2 is activated. The ventilation unit increases the ventilation and at the same time sends an output signal to the DTBU damper that it must close the damper for extract air from the other rooms. However, the damper does not close completely in, there will still be extraction from the other rooms, just reduced.

When balancing, the small stop blocks on the damper must be set so that the basic ventilation is maintained from the other rooms.

The DTBU damper is connected to the PCB board via the electrical diagram.



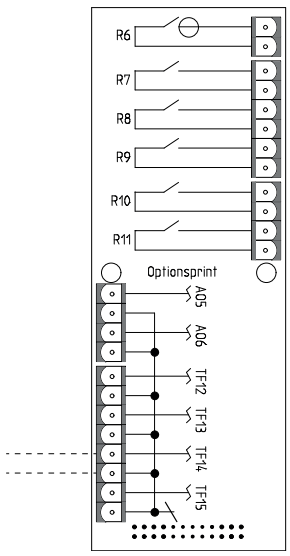

# Fire thermostat / external fire automation system

The ventilation unit can be connected up to an external fire thermostat that will stop the ventilation unit in the event of fire. The same port can be used for connection of an external fire automation system.

The control system identifies a broken input signal as fire, and stops. It will only restart once connection to the fire thermostat has been established or the external fire automation system starts signaling again. This must be done manually via the control panel.

When you connect up an external fire automation system, it will be necessary for the ventilation unit to restart automatically. You can set for this to happen on the control panel. Please consult the software instructions for further information.

The connection is made on the expansion PCB via the electrical diagram.

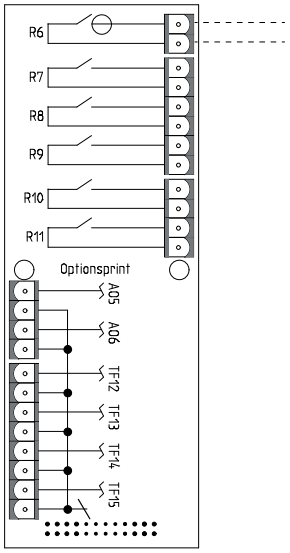



ATTENTION
If this function is not used, a jumper must be established on the expansion PCB. Otherwise there will be a fire alarm in the control system.

## Joint alarm

It may be difficult to notice alarms if the unit is located in a place where access is difficult or infrequent, and if the control panel is located in the same place.

An external alarm indicator in the form of an electric bulb or an acoustic signal can be connected to the ventilation unit and announce when an alarm occurs. This could, for example, be when filters need replacing.



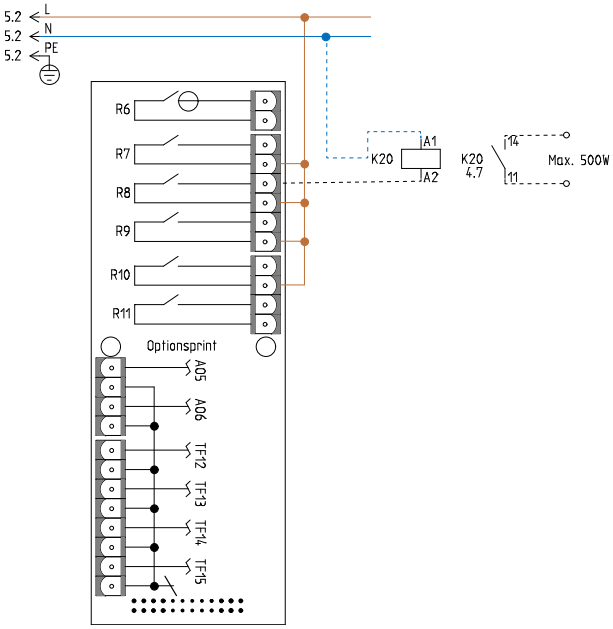

## External heat supply

The unit can control an external heat supply, such as electric radiators or an underfloor heating system. This feature is used in the cases where the unit contributes to the heating of the house via a heat pump and/or a after-heating element.

The room temperature is monitored by the unit's control system, which only releases the external heat supply if it cannot heat the home/house to the desired room temperature.

External heating supply is connected to the expansion PCB via relay R8, and the settings are set in the control panel.

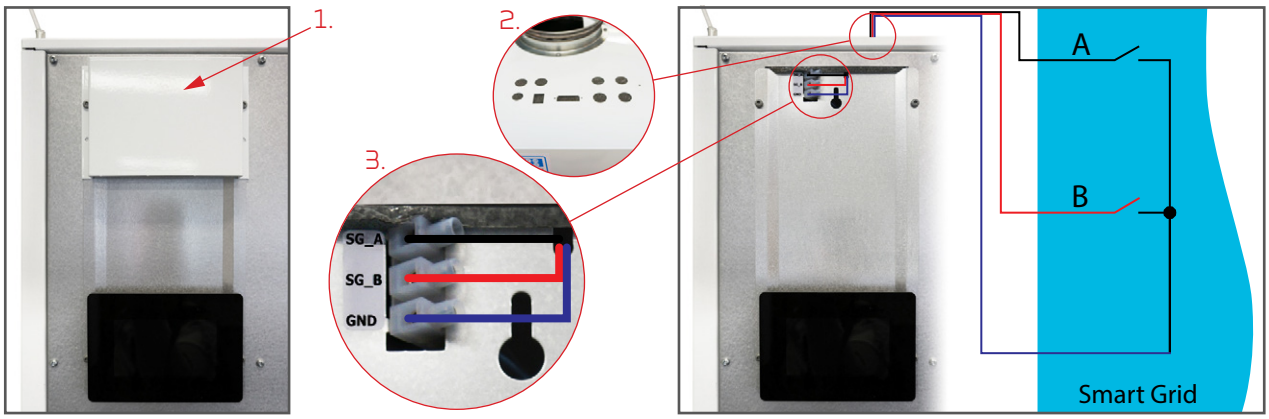
Read the software manual to see which settings to set.



## Smart Grid

If you wish to run Smart Grid, you will need to update to the latest Software version and connect the Smart Grid modem to Compact P, as shown.

The Smart Grid signal is connected to the LC circuit board in the Compact P, which will also control AIR and GEO, if connected. Connect the signal directly, without resistance, as these are pre-installed in the cable.




1. Remove the white plate.

2. Route the wires from the SG through the hole in the top of the unit.
3. Connect the wires:
   SG-A: black, SG-B: red, GND: blue.

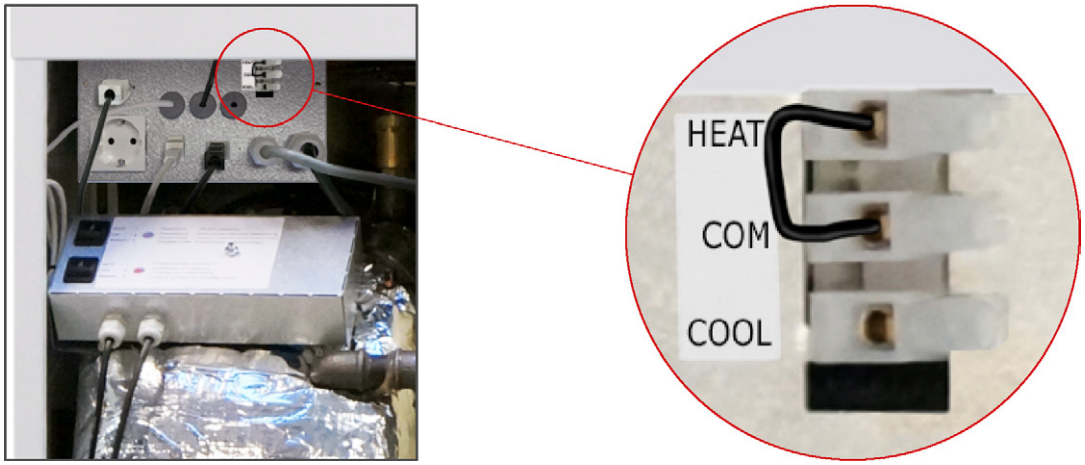
Smart Grid is programmed in the unit's software under General settings. See the options in the Software Instructions.

## External underfloor heating control

To avoid the heat pump producing heat when there is no need for it, it is advisable to connect the underfloor heating control on the telestats to AIR/GEO.

A screw terminal is mounted on the connections panel for controlling heating/cooling. The loop, which is in HEAT and COM, is removed and the signal from the floor heating control is connected here. Closed contact set: heating requiret! Open contact set: no heating required!

The circulation pump for floor heating can also beneficially be connected to the external heating control.



# Active cooling function

The AIR unit has a reversible cold circuit, which means that it can be used to actively cool the home, using either the floor heating system or fan coils.

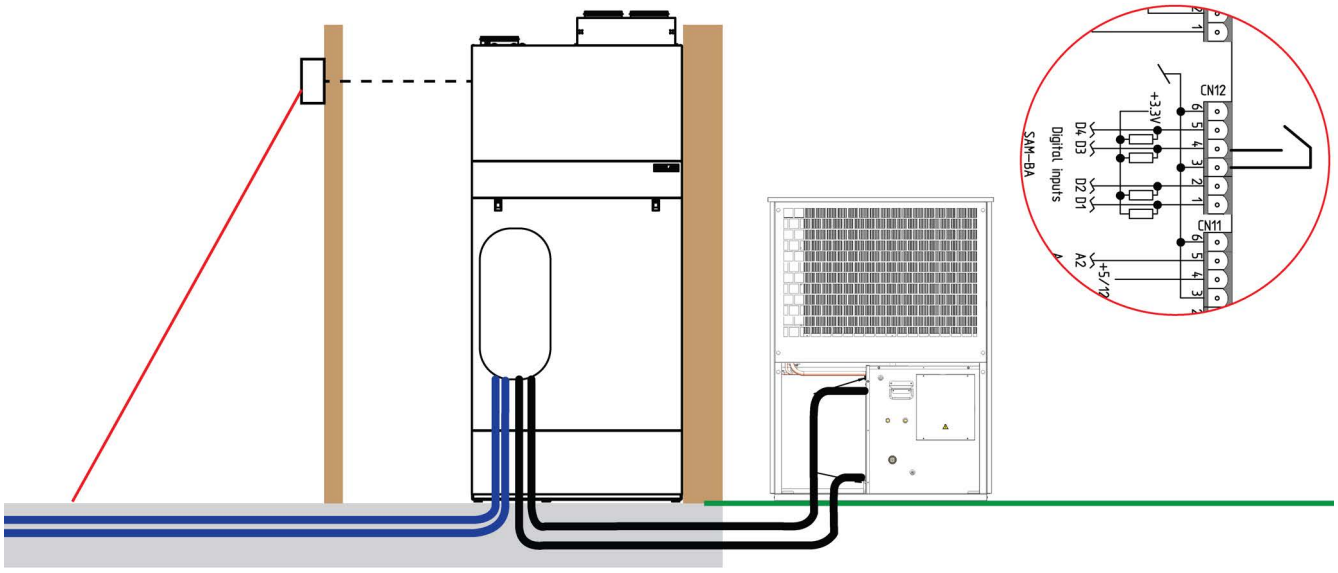
CAUTION

If it is wished to operate with cooling, it is important to use glycol in the brine circuit to avoid icing in the heat pump.

### Active cooling using the floor heating

There is an external temperature sensor connected to digital input D3. When the switch is activated, the AIR unit goes into cooling mode and cools the home down to a pre-set value. When the switch is deactivated, the AIR unit returns to normal operation.

The external temperature sensor often has an infra-red sensor, which measures the temperature of the floor and stops the cooling function before condensation forms on the floor.



# Plumbing installation

## Condensate drain

### Important information

Compact P is supplied with a reinforced 20 mm condensation drain pipe with built-in water lock.

ATTENTION

Run the condensate drain to the nearest drain, allowing an even fall of at least 1 cm per m.

The overflow from the safety valve for domestic cold water must likewise be led to a visible drain.

ATTENTION

If the unit is positioned outside the climate screen, it is important to secure the condensate drain against icing.

Frost protection of the unit is the installer's responsibility.

The connection of the water trap must be air-tight, otherwise air will be sucked into the unit and condensate water will not be able to run out. It could cause water damage if the condensate tray overflows and condensate water runs out of the unit.

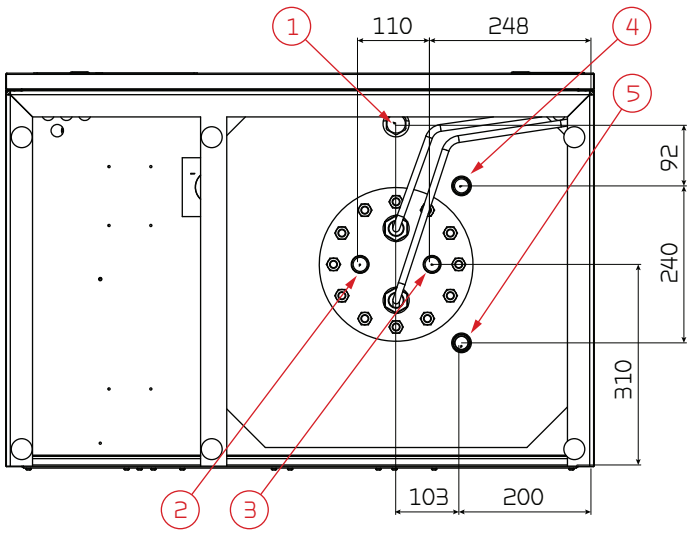
After installing the water trap, its function is tested as follows (the unit must be connected to the duct system):
Fill the condensate tray with water, close the door and start the unit at the highest fan speed level. Allow it to run for several minutes. Open the door and check that there is no more water in the condensate tray.

There is provided a loop of tubing from the condensate drain, which acts as a water trap. It is fixed with strips, which in no case must be cut up.

# Hot water tank

## Connection overview

Compact P front




**Connections:**

1. Connection for 3/4" circulation pipe
2. Hot water outlet 3/4"
3. Cold water intake 3/4"
4. Return supplementary coil 3/4"
5. Supply supplementary coil 3/4"

All listed measurements are in mm.

Supplementary coil is only standard on Compact P SOL models.

The coil is located in the bottom, and has an external diameter of 22 mm and is 8,500 mm long, equivalent to 0.6 $m^2$.

## Connection

**ATTENTION**
All work must be performed by qualified personnel and in accordance with relevant legislation and provisions.

Nilan's hot water tanks are double-enamelled, ensuring long life. The efficient foam insulation protects against unnecessary heat loss.

All connection nozzles for water have 3/4" thread and are located in the tank bottom.

The tank is also fitted with an electronically-monitored sacrificial anode that automatically displays a warning on the display when it needs changing.

**CAUTION**
Changing the anode when notified on the display is important. Failure to do so can cancel the guarantee on the hot water tank.

The tank is fitted with supplementary electrical heater deactivated by default and activated via the control panel if required.

**ATTENTION**
The supplementary heating must not be activated before the water tank is full of water.

## Requirements for water quality

The hot water tank in the Nilan units is made of steel, which has been given a double enamelling, to ensure an extra long service life. In addition, the tank is equipped with a sacrificial anode as extra protection. It is important that the sacrificial anode is replaced regularly.

Most units are equipped with an electronic monitoring sacrificial anode, which gives an alarm on the user panel when it is time to replace it.

In order for the sacrificial anode to function and protect the tank, it is required that the water quality complies with the following:

- Electrical conductivity (EC): Between 30 mS/m and 150 mS/m (millisiemens pr. m) @ 25 °C
- Chloride must be below 250 mg/L @ 65 °C

If the above criteria are not met, the sacrificial anode will not work as intended, after which the tank will be corroded., to

## Hot water circulation

Hot water circulation can be established by fitting a non-return valve and a circulation pump for domestic water to the tank's circulation connector.

If hot water circulation is not established, the connector must remain closed with the factory-mounted shut-off plug.

ATTENTION

Hot water circulation can lead to a significant heat loss in the pipes, diverting a good proportion of the heat pump's output. To avoid this, circulation pipes and the hot water loop must be insulated with at least 30 mm mineral wool.

It is advisable to set a timer so that the circulation pump is not running constantly.

## Supplementary coil

All units ordered as a SOL models have integral supplementary coil, see connections list.

The supplemental coil is intended for solar heating systems, though it can also be connected to other heat sources, e.g. a heat pump.

ATTENTION

If a solar collector or other heat source is connected to the supplementary coil, it is recommended to install a scald protection on the hot water outlet.

## Softened water

If it is wished to soften water with salt in a Nilan hot water tank, the following must be observed:

- The conductivity must be between 30 mS/m og 150 mS/m (millisiemens per m)
- The chlorine content must be under 250 mg Cl/l

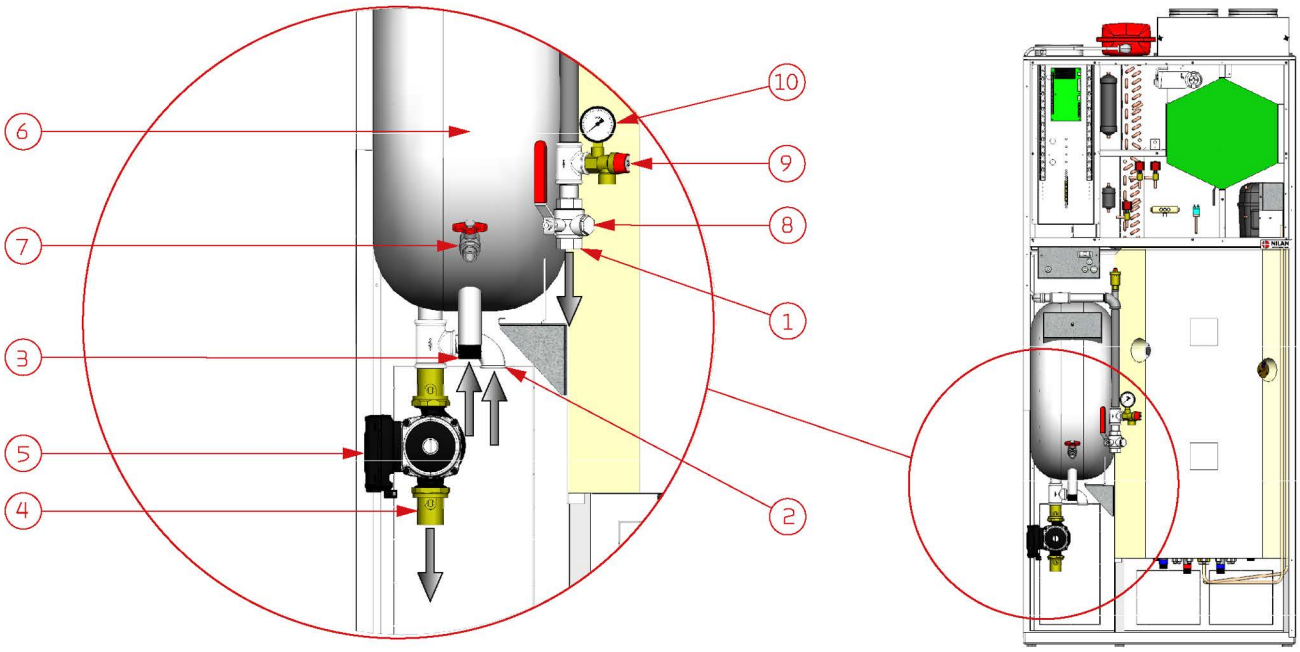
If the above criteria are exceeded, the anode current will be too high, the anode will break down too quickly and the water will begin to smell bad.

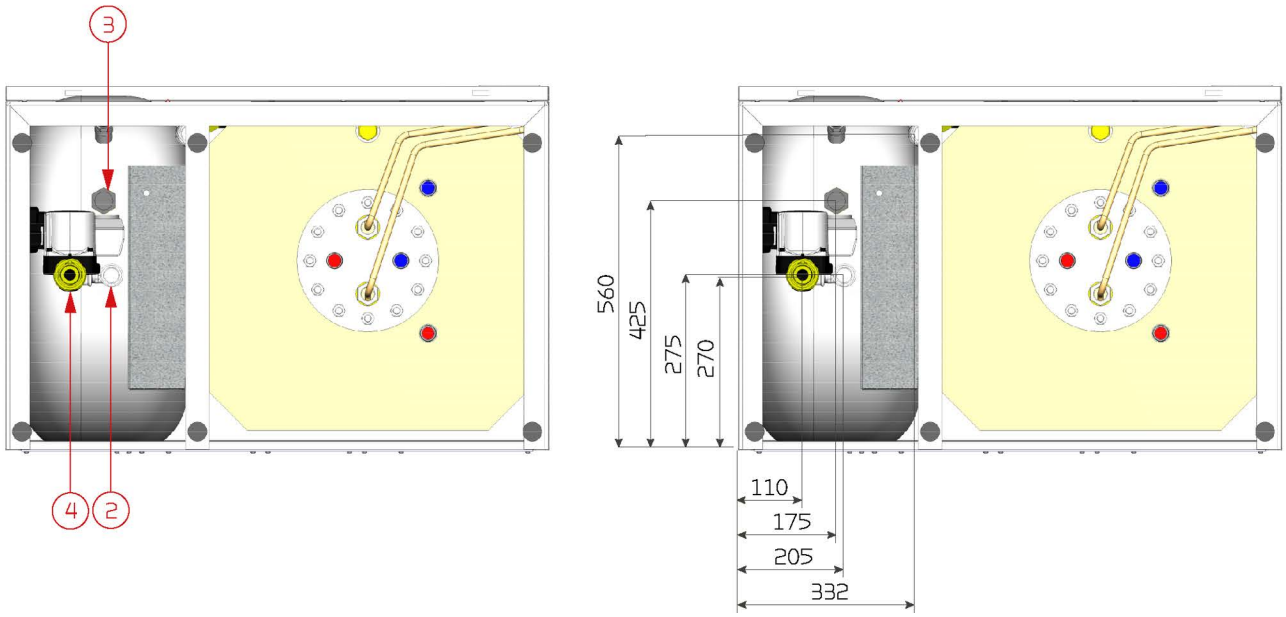
CAUTION

De-mineralised water (double ion exchange) must not be used, as the tank will quickly corrode. De-mineralised is also referred to as desalinated and de-ionised water.

# Central heating

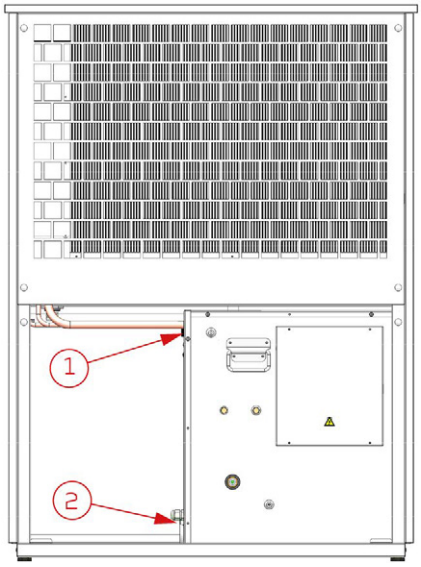
## Water connection overview, indoor unit

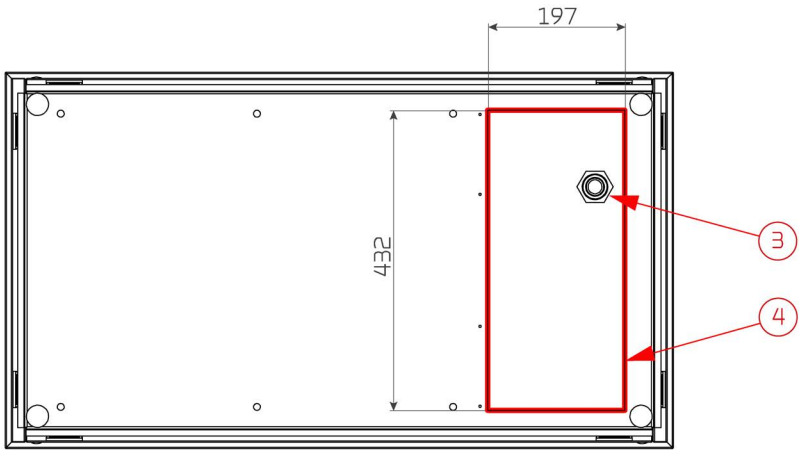



1. Feed to central heating, 3/4"
2. Return from central heating, 3/4"
3. Feed from external unit (hot), 1"
4. Return to external unit (cold), 1"
5. Circulation pump between outdoor and indoor units
6. Buffer tank
7. Filling and drain cock
8. Stop valve with particle filter
9. Safety valve (central heating)
10. Manometer (central heating)

# Connections list, outdoor unit



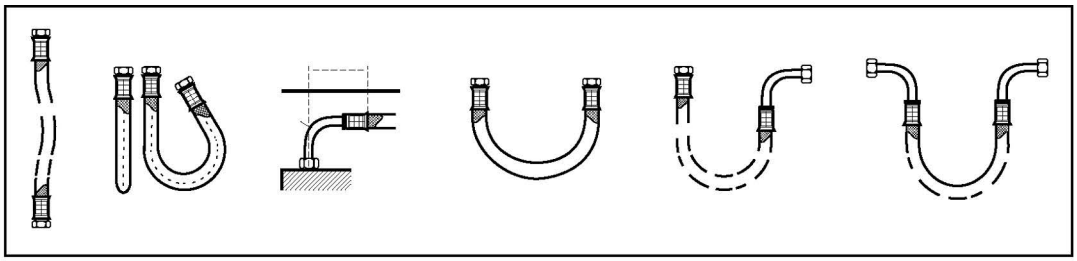




1. Supply flow to indoor unit (hot), fitted with 1" flexible hose
2. Return flow from indoor unit (cold), fitted with 1" flexible hose
3. Condensate drain
4. Hole for connections

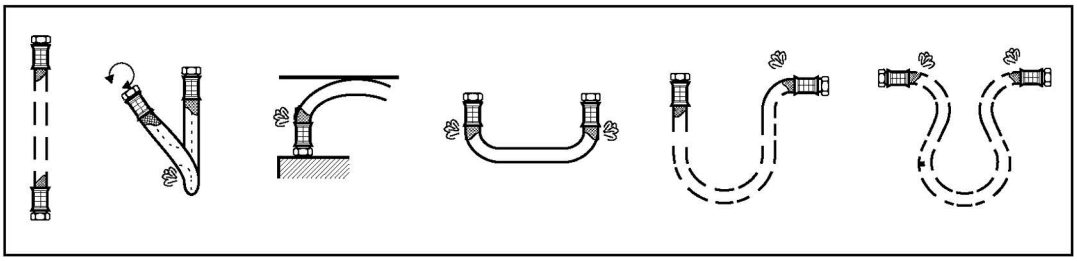
**ATTENTION**

The illustration above shows an example of an AIR outdoor unit. See dimensional sketch for details on AIR9 and AIR9+.

RIGHT



WRONG



## Insulation of hoses from the outdoor unit

It is important that the brine hoses between the indoor part and the outdoor part are well insulated, according to current standards. This is done to avoid heat loss and to achieve good operation.

CAUTION

If the brine hoses is not well insulated, the AIR heat pump will use significantly more energy and in worst case, there will not be enough heat in the house.

## Check list for the central heating system prior to start-up

The check list is used when starting and delivering the system, and it should always be filled in. See the other sections in the manual for further information.

| Electrical connection and controls | Checked - date | Notes |
|---|---|---|
| The power supply is connected and secured in accordance with the wiring diagram and manual | | |
| The control panel is installed in a place that can easily be seen by the user | | |

| Central heating circuit | Checked - date | Notes |
|---|---|---|
| The central heating circuit is sealed | | |
| The central heating circuit has been vented after filling | | |
| Central heating circuit pressure, overpressure | | Bar |
| The opening pressure for the central heating circuit's safety valve is correct | | |
| The circulation pump is rated correctly for the installation | | |
| The circulation pump is in constant operation or is controlled by the heating pump | | |

# Plumbing connections for accessories

## Safety group

CAUTION
Safety group must be installed in connection with hot water tanks.

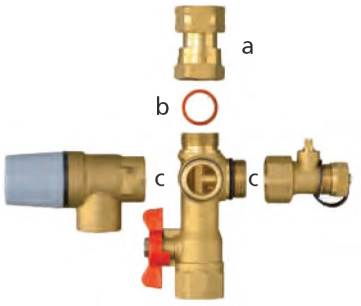
When water is heated to 60 °C, it expands by 2%. A pressured tank could burst without a safety valve keeping excess water out. The safety valve should therefore drip during warming up.

**Installation:**

a. The double nut is attached to the water heater´s cold water pipe so that the arrows are pointing in towards the water heater (in the direction of the flow). The joint with the water heater is sealed using a threaded washer.

b. The joint between the double nut and the unit is sealed using fibre packing.

c. The rubber ring seal (the O-ring) is fitted to the unit so that it can function as a seal between the safety valve and the unit in such a way that the valve is locked.




The end of the overflow pipe must be visible, and it must be able to run out safely via the drain.

ATTENTION
s water expands as it heats up, the safety valve will drip.

ATTENTION
The installer is responsibly to instruct the consumer about the location and function of the safety valve, as well as that the safety group at least twice a year should be tested to avoid overgrowth.

# Safety group with anti-scald protection

In the control, a temperature limit for the domestic hot water of 65ºC is set as standard. This setting prevents scalding of the users when the hot water tap is opened.

When the unit is in cooling mode, the energy is deposited in the hot domestic water tank instead of leading it out of the house. This also means that if the hot water temperature exceeds 65ºC, the unit stops cooling the supply air.

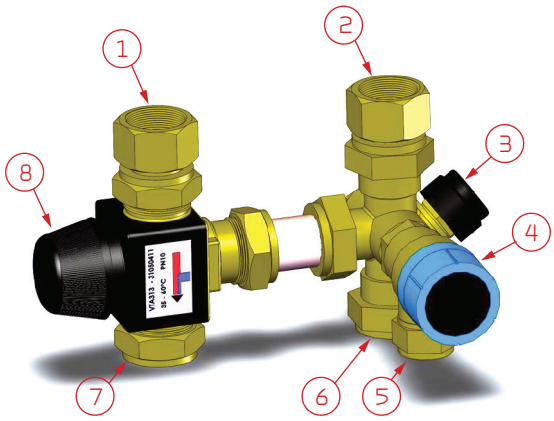
If there is a larger need for cooling, the temperature limit can be raised to 80ºC, but then a scalding fuse must be fitted under the hot water tank, which prevents users from scalding when they open the hot water tap.

The scald protection mixes the hot water with cold water so that the temperature is lowered and scalding is avoided. This extended the period during which Compact can cool.

**CAUTION**

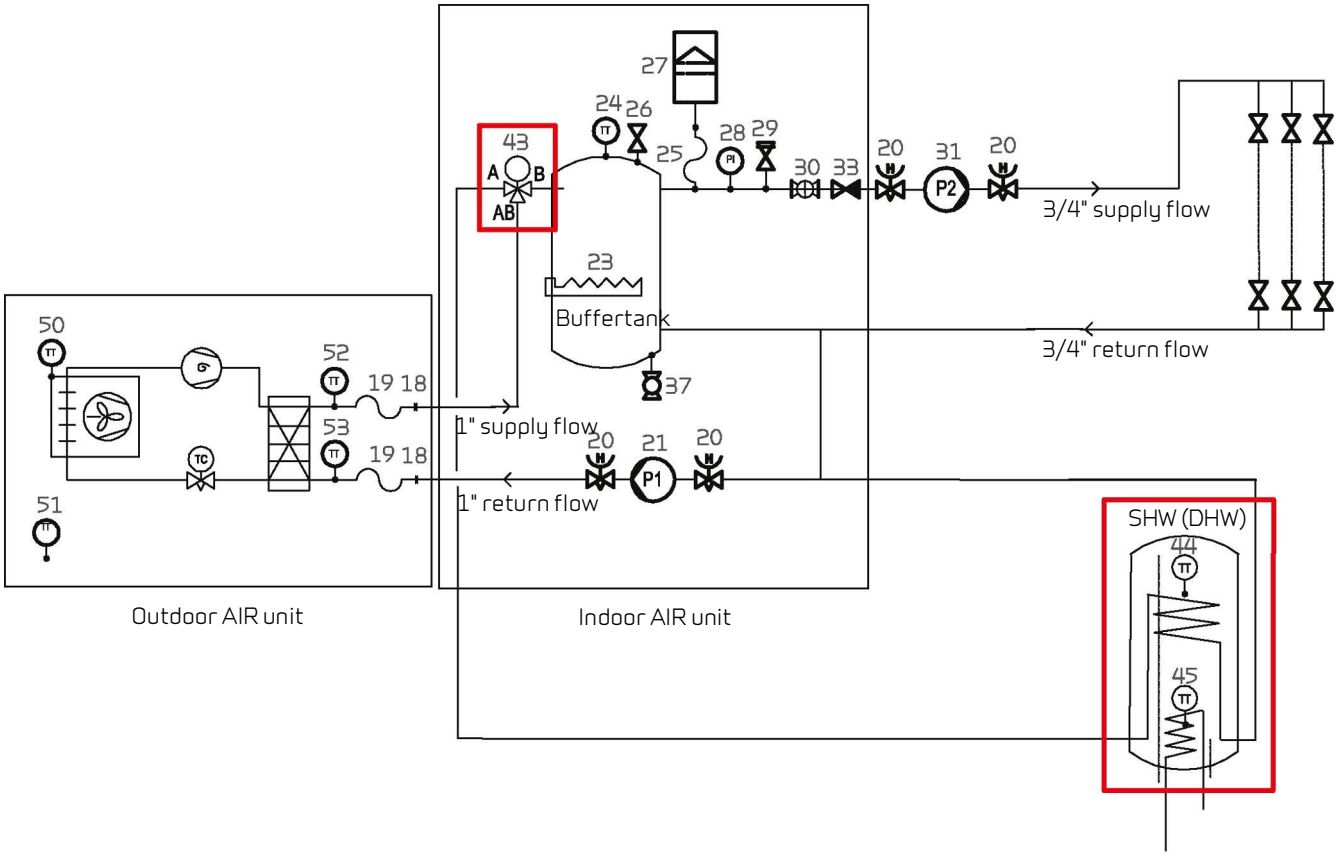
If a solar panel is connected to the hot water tank, an anti-scald device must be mounted.

1. Hot water from the hot water tank
2. Cold water to the hot water tank
3. Stop tap cold water
4. Pressure relief valve (6 bar or 10 bar)
5. The overflows from the safety valve are led to a prominent drain
6. Cold water supply
7. Domestic hot water for the dwelling
8. Mixing valve for domestic hot water for the dwelling (can be set between 35 - 60 ºC)



# Hot water tank

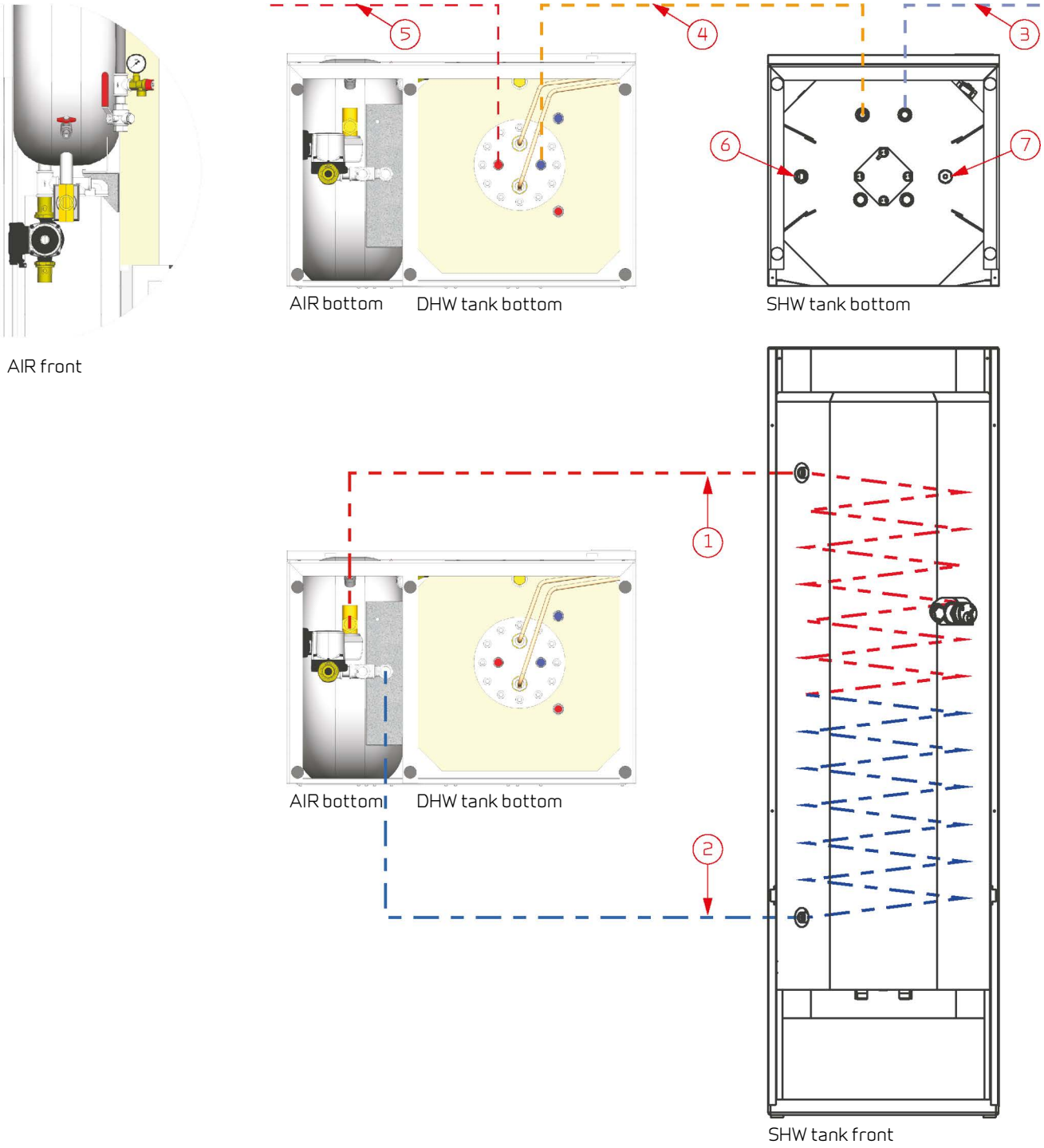
The AIR unit can be connected to an external hot water tank (SHW) or to the hot water tank in the Compact P (DHW). A three-way valve, which can be purchased as an accessory, is required.




18. Connection 1"
19. Flexible hose 1"
20. Shut-off valve
21. P1 circulation pump 130 mm
23. Electrical supplement heating 2 x 3 kW
24. Temperature sensor T18 buffer tank (supply flow)
25. Flexible hose 10 mm
26. Automatic vent 3/8"
27. Expansion tank 8 litre
28. Manometer
29. Safety valve 2,5 bar
30. Stop valve with particle filter
31. P2 circulation pump
33. Check valve 3/4"
37. Filling tap 1/2"
43. 3-way valve
44. Temperature sensor T21 hot water tank top
45. Temperature sensor T22 hot water tank bottom
50. Temperature sensor T23 evaporator surface
51. Temperature sensor T20 outdoor temperature
52. Temperature sensor T17 after condenser
53. Temperature sensor T16 before condenser

## Connecting to SHW hot water tank

The domestic cold water is pre-heated in the SHW tank up to 45 °C by the AIR heat pump (factory setting 40 °C) through the heating pump coil. It is then fed to the DHW tank in the Compact P, where it is heated to the desired hot water temperature.

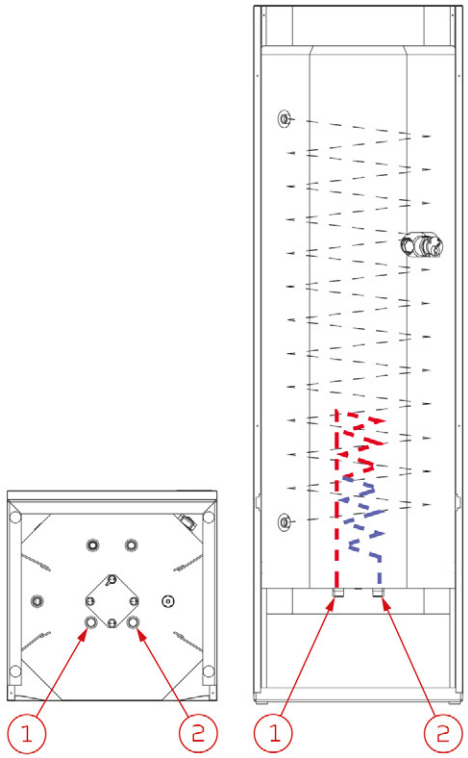



1. Supply flow to the heat pump coil in the SHW tank from the AIR heat pump (three-way valve included but not mounted)
2. Return flow from the heat pump coil in the SHW tank to the AIR heat pump
3. Connection for domestic cold water supply
4. Supply flow of pre-heated domestic hot water from the SHW tank to the DHW tank in Compact P
5. Supply flow of domestic hot water from the DHW tank
6. Connection for hot water circulation
7. Sensor pocket

# Connection to supplementary coil in SHW hot water tank

The SHW container is equipped as standard with a supplementary coil with a length of 8.5m.

The supplementary coil can be connected to a solar panel with external solar heating control (not Nilan supply), or other heat source, which contributes to heating the domestic water.




SHW bottom SHW front

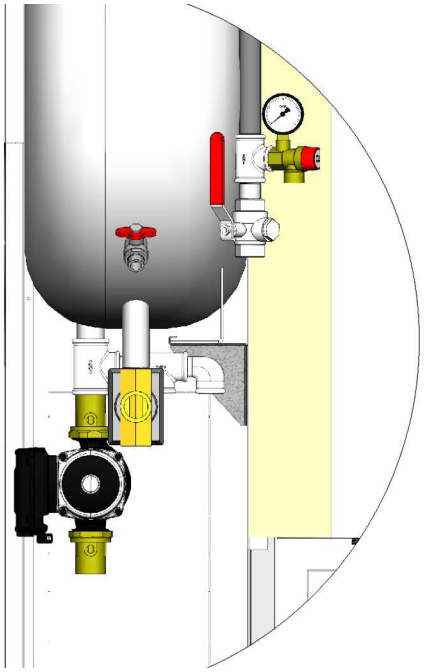
1. Supply flow to the supplementary coil in the SHW tank
2. Return flow from the supplementary coil in the SHW tank

**ATTENTION**

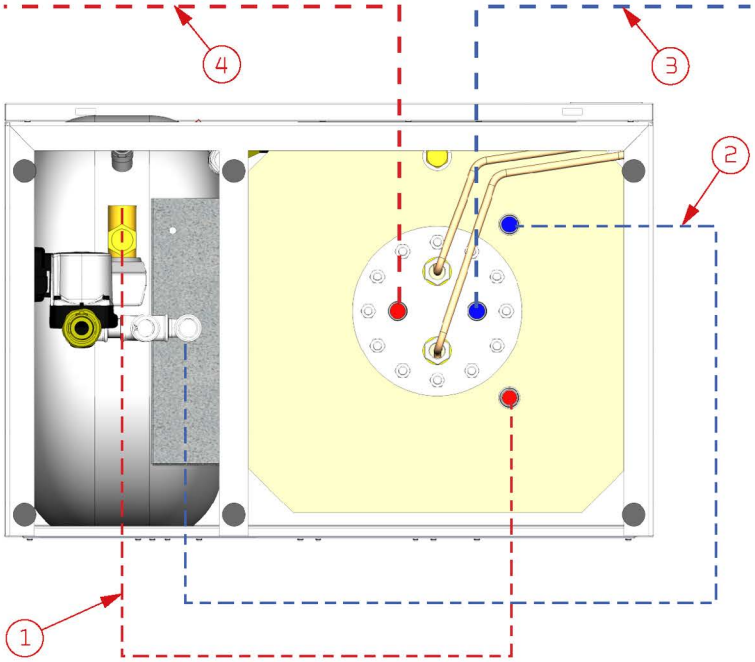
If another container with a shorter supplementary coil is connected, the compressor output in the hot water production must be reduced. See the Software manual

## Connecting to DHW hot water

If the demand for domestic hot water exceeds the capacity of the heat pump in the Compact P unit, AIR can be connected to the solar coil in the DHW tank. It will then help heat the domestic hot water.



AIR front




AIR bottom DHW tank

1. Supply flow from the AIR heat pump to the solar coil in the DHW tank (three-way valve is available as an optional extra)
2. Return flow from the solar coil in the DHW tank to the AIR heat pump
3. Connecting the domestic cold water supply
4. Supply flow of domestic hot water from the DHW tank

# Ventilation installation

## Duct system

### Legislation

ATTENTION
All work must be carried out by qualified persons and in compliance with existing legislation and regulations.

### Ducts

There are two systems you can use to lead air through the dwelling.

**Spiral ducts**
Spiral ducts are made from metal and are cut to size using an angle grinder. They are then connected using ducting bends and manifolds and are fitted in accordance with the blueprint. The ducts are typically placed on the tie beams where they are fixed with perforated band, or they are suspended using suspension band. Avoid unnecessary bending of the ducts.

To prevent sound transmission from room to room, you should install a silencer for each room.

The ducts must be insulated to prevent heat loss and condensation. In some cases this can be avoided if the ducts are run through the standard insulation or inside the climate screen.

**NilAIR tubes**
NilAIR tubes constitute a flexible system that is easy to install. You can easily cut the tubes to size with a Stanley knife and then situate them in accordance with the blueprint without having to use bends and manifolds. You install a manifold box after the unit and run the tubes from the box out to the individual rooms.

When using NilAIR tubes, you do not have to install silencers for each room. The sound-damping effect of the tubes ensures that sounds and noise will not be transmitted from room to room.

If you install the tubes outside the climate screen, you must insulate them to avoid heat loss and condensation. This is simpler than using spiral ducts as NilAIR tubes are easily led through the standard insulation.

NilAIR tubes are more flexible than spiral ducts and you can therefore run the tubes in places that are unsuitable for ordinary spiral ducts.

ATTENTION
If the unit's cooling function is activated, it is recommended to condensate-insulate the supply air ducts and NilAIR boxes.

### Ventilation unit

Nilan recommends installation of flexible connections between the ventilation unit and the duct system.

This is to avoid vibrations from the unit being transmitted to the duct system. It will also make it easier to move the unit, which may be necessary during future services of the unit.

Nilan can supply Soundflex tubes that you can use as flexible connections between the ventilation unit and the duct system. They will also reduce sounds from the system considerably.

The Soundflex tubes are insulated against condensation. It may, however, be necessary with further insulation in order to comply with local requirements with regards to insulation of duct systems.

## Extract air

Install the extract air valves in high-humidity rooms and place them strategically where they can extract humid and vitiated air from the dwelling/building most efficiently.

High-humidity rooms are, for example:

- Bathroom
- Lavatory
- Kitchen
- Utility room

## Supply air

Install supply air valves in living areas. Place them strategically so they cause minimum discomfort. It is, for instance, not recommended that you install supply air valves in areas where people are inactive, as the supply air may be experienced as draughty.

Living areas may be, for example:

- Living room
- Family room
- Bedroom
- Study

## Roof terminals

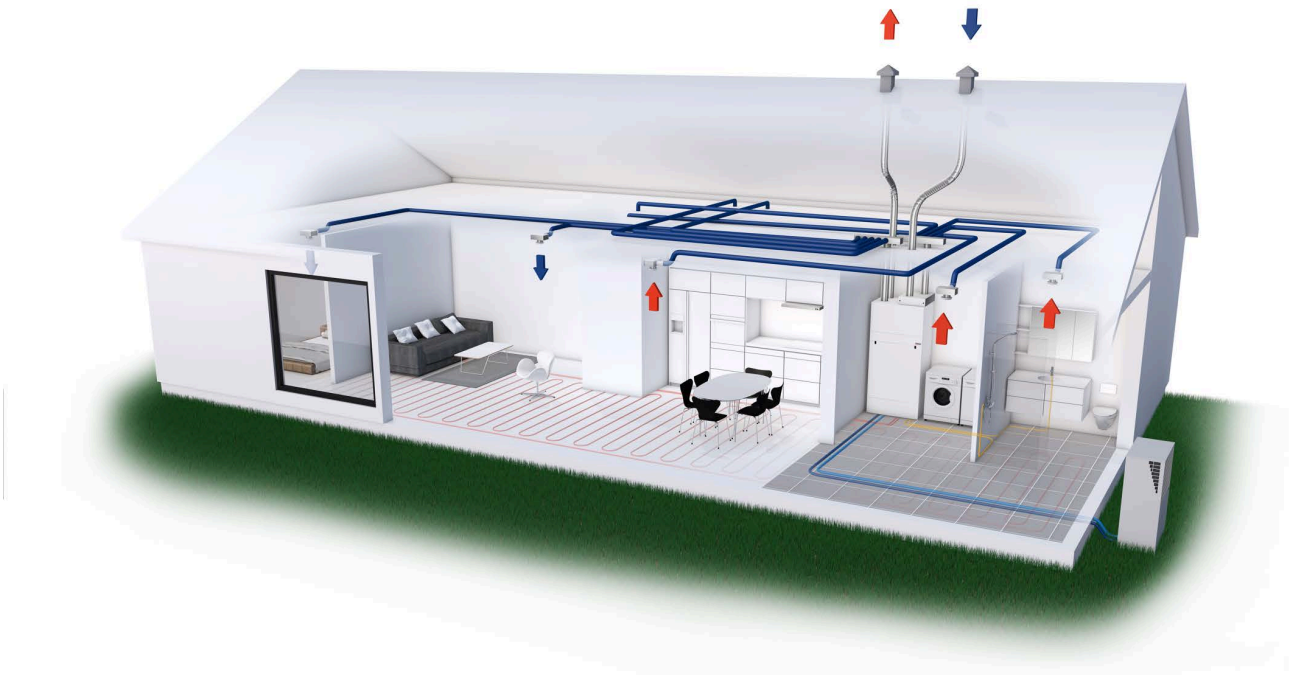
The position and design of air intake and air discharge should limit pressure oscillations in the ventilation unit caused by wind. Their position should also prevent birds and other animals from getting in. Finally, the position and design should ensure that air intake and the connected duct system are kept free of plants and foreign objects.

You must place the air intake so that the risk of a short-circuit from the discharge air is minimised, and with attention to the prevailing wind direction.

The air intake should be placed at least 50 cm above the roof surface. On black, flat roofs the distance from the roof to the underside of the intake should be at least 1 m. This will ensure that warm air is not drawn into the building during summer. Air intakes should be placed on the northern or eastern sides of pitched roofs.

You should also install a silencer between the unit and the roof stacks to prevent noise disturbance to your surroundings.

## Installation example



# Balancing

## Important information

ATTENTION
To ensure the ventilation system operates optimally, it is important that it is balanced correctly. We recommend that experts do this.

It is important to measure the total supply air and the total extract air. The system must have a minimum vacuum, which means it draw out more air than it blows in. This will prevent dampness from being forced into the constructions of the building.

## Balancing connectors

The ventilation unit is equipped with a balancing connectors to measure the air volume for supply air and extract air.

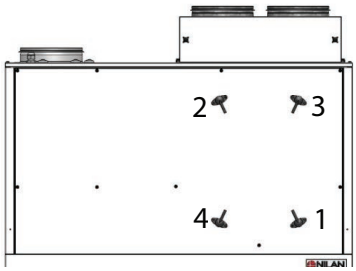
The curve can be used for coarse adjustment of the main air volume during dry operation without condensation.

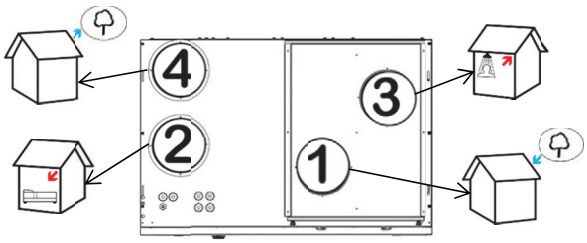
For the extract air side, the pressure difference dP3-4 [Pa] is measured between the holes marked 3 and 4. The air volume qv [$m^3$ / h] is read on the curve.

For the supply air side, the pressure difference dP1-2 [Pa] is measured between the holes marked 1 and 2. The air volume qv [$m^3$ / h] is read on the curve.

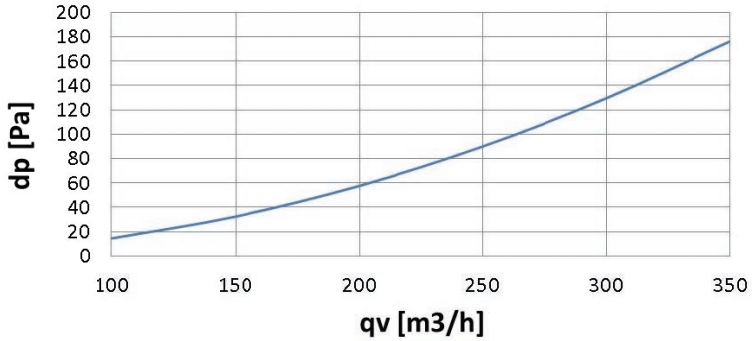
ATTENTION
The capacity in the pressure drop diagram is based on a dry heat exchanger.

## Pressure loss diagram




The measuring connectors are inside behind the top front panel.



# Start-up

## Central heating

### Filling with water

ATTENTION
Before starting the heat pump and the circulation pump, the central heating circuit must be filled with water.

Fill central heating circuit with water via the feed tap until the correct water pressure is obtained. It is important that all circuits in the central heating system are open during filling.

ATTENTION
Ordinary water or all common types of antifreeze can be used.

There is an automatic vent fitted, which is activated wen filling with water. Check that the cover on the vent is loose.

Once the central heating circuit has been filled to the correct water pressure, the circulation and heat pump can be started.

### Topping up water

The water pressure must be carefully checked the first few days, even several times a day. It may be necessary to top up the water in the central heating circuit if the water pressure has dropped.

ATTENTION
It is important that the circulation and heating pump is switched off while topping up the water.

The water pressure will stabilise after a few days, after which the checks can be reduced to once a month.

ATTENTION
If the central heating circuit requires topping up after the start-up phase, it should be checked for leaks.

### Check the particle filter

There may be some particulate matter in the central heating circuit, and the heating pump must be checked immediately after being put into operation.

The filter must be checked several times a day just after installation until it stays clean. With normal operation, it is enough to check the filter twice a year.

**Cleaning the particle filter:**

1. Switch off the heating pump on the control panel (Settings: Central heating / Standby functions /Turn off central heating)
2. Turn the shut-off valve to close off the circulation
3. Remove the filter and rinse until clean
4. Replace the filter
5. Turn the shut-off valve to open up the circulation
6. Switch the heating pump back on

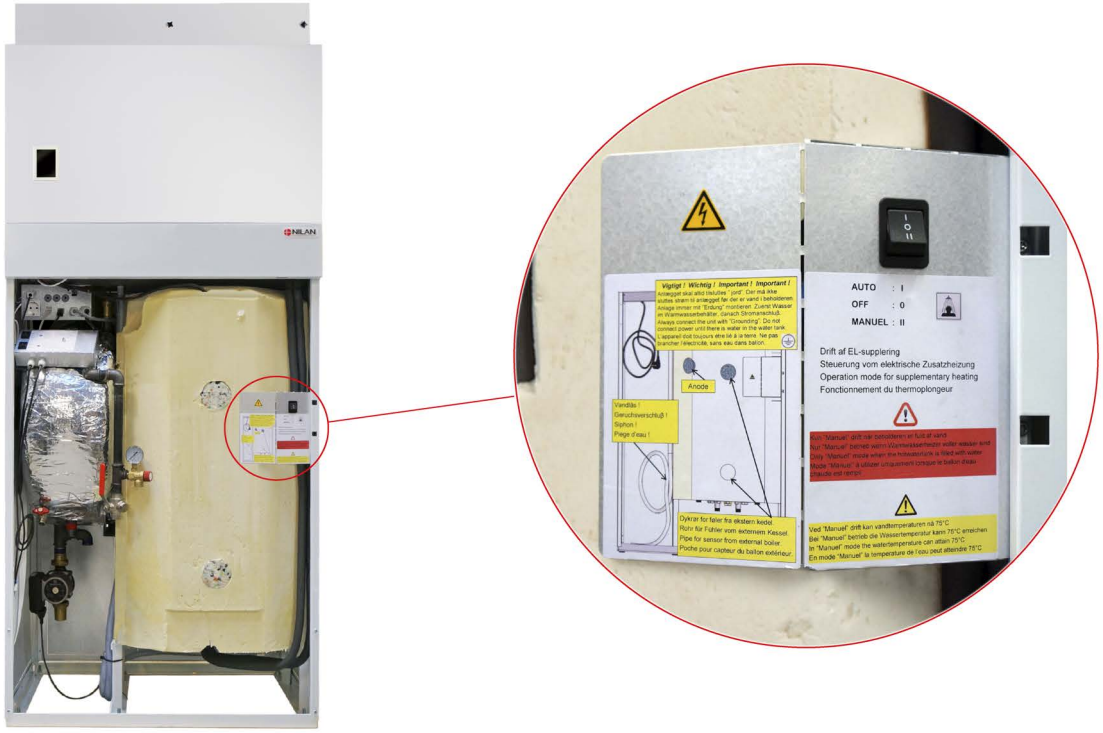
# Troubleshooting

## Emergency mode

### Emergency mode domestic hot water

If an error occurs in the control system or components in the Compact P, and the unit therefore stops, it will not be able to produce domestic hot water.

If the installer is not able to come right away or the error happens outside the opening hours, and you therefore cannot contact the installer, there is a possibility to get hot water by setting the unit into emergency mode.




The button for emergency mode is located behind the large door.

**The emergency mode has three settings:**

**I - Auto:**
The supplemental electric heating is controlled by the unit control system (standard setting).

**0 - Off:**
The supplemental electric heating is turned off and cannot be turned on via the unit control system.

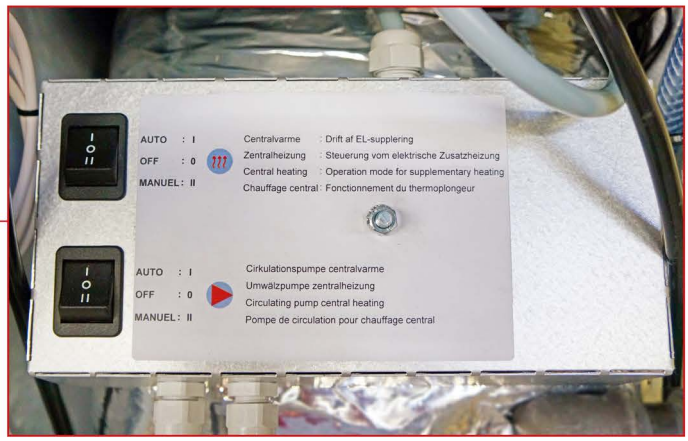
**II - Manuel:**
The supplemental electric heating is turned on and cannot be turned off via the unit control system (do not turn on if there is no water in the tank).

**WARNING**
In manual emergency mode, the water temperature can reach 75 °C, which can cause scalding if you are not careful when switching on the hot water.

# Emergency mode central heating

If an error occurs in the control system or components in the AIR air/water heat pump, and the heat pump therefore stops, it will not be able to heat up the house by the central heating.

If the installer is not able to come right away or the error happens outside the opening hours, and you therefore cannot contact the installer, there is a possibility to heat up the house by setting the AIR heat pump into emergency mode.




The button for emergency mode is located behind the large door.

**The emergency mode for supplemental electric heating has three settings:**

**I - Auto:**

The supplemental electric heating is controlled by the unit control system (standard setting).

**0 - Off:**

The supplemental electric heating is turned off and cannot by turned on via the unit control system.

**II - Manuel:**

The supplemental electric heating is turned on and cannot be turned off via the unit control system.

**The emergency mode for the circulation pump has tree settings:**

**I - Auto:**

The circulation pump is controlled by the unit control system (standard setting).

**0 - Off:**

The circulation pump is turned off and cannot be turned on via the unit control system.

**II - Manuel:**

The circulation pump is turned on and cannot be turned off via unit control system.

ATTENTION

When the supplemental electric heating is in I or II the circulation pump must be in the same position.

ATTENTION

In manual mode the supply flow temperature can reach 40 °C.

# Domestic hot water

## Errors and solutions domestic hot water

| Problem | Possible cause | Solution |
|---|---|---|
| The unit produces insufficient domestic hot water. | The filters may be blocked so that insufficient air is reaching the unit.<br>This can occur if the filters are not changed frequently.<br>This can occur if the unit has been operated during the building process and the filters are filled with dust and dirt. | Change the filters and, if necessary, change the filter change period to a shorter Interval. |

# Central heating

## Problems and solutions central heating

| Problem | Possible cause | Solution |
|---|---|---|
| The telestates call for heat, but the heat pump does not start | During the spring and autumn transition periods, some space telestates may call for heat, but the heat pump does not start.<br>This may be because the temperature in the extract air is warm enough compared to the temperature set in the control panel. That is, the exhaust air is an average of the room's room temperatures, as some rooms are hot and others are cold. Since the ventilation section considers the average temperature of the house to be high enough, it blocks the heat pump from running. This does it to save energy and to prevent the ventilation part and the heat pump part from counteracting each other. | If you still want to heat in some rooms, despite the average temperature of the house being warm enough, you can activate this function below: Settings / Central heating in the Menu item: Cooling and heating at the same time<br>This means that the cooperation between the ventilation part and the heat pump part ends, and if there is a need for heat in some rooms, the heat pump will start even if the ventilation part detects that the house is warm enough. |
| El-supplementation is turned on much or always | The heat pump will not work effectively, which may be due to various reasons. | - Check that there is no ice in the evaporator surface in the outdoor unit. It prevents the air from getting through. Make a manual defrost.<br>- Check that the evaporator surface in the outdoor unit is not stopped with leaves and other debris that can prevent the air from getting through. Clean the evaporator surface.<br>- Check that the hoses between the outdoor unit and the indoor unit are properly insulated so that there is no excessive heat loss.<br>- Check that there is a proper flow in the circuit between the outer part and the inner part. |
| AIR has a large power consumption | One must expect that electricity consumption in the first year will be greater than expected. This is quite natural as the house must dry out.<br>The higher humidity in the first year means that it costs more energy to heat the house.<br>This may also be because the heat pump does not run optimally for various reasons. | - Check that there is no ice in the evaporator surface in the outdoor unit. It prevents the air from getting through. Make a manual defrost.<br>- Check that the evaporator surface in the outdoor unit is not stopped with leaves and other debris that can prevent the air from getting through. Clean the evaporator surface.<br>- Check that the hoses between the outdoor unit and the indoor unit are properly insulated so that there is no excessive heat loss.<br>- Check that there is a proper flow in the circuit between the outer part and the inner part. |

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