INSTALLATION INSTRUCTIONS

CTS602 HMI BY NILAN

VPL28 (English)

Version 3.10 - 19.07.2019

NILAN®
OUTSTANDING INDOOR CLIMATE

TABLE OF CONTENTS

Ventilation installation

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, always contact an authorised electrician to rectify the error.

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

Disposal

Ventilation unit

Nilan's units consist mainly of recyclable materials. They must, therefore, not be mixed with household waste, but must be delivered to your local recycling center for disposal.

Heatpump

Concerning disposal of units with heat pumps, it is important to contact the local authorities for information about correct handling of these. The heatpump contains the refrigerant R134a, which is harmful to the environment if not handled correctly.

General information

Introduction

General information prior to installation

The following documents are supplied with the unit:

- Installation instructions
- Software instructions
- User manual
- Wiring diagram

Instructions can be downloaded from Nilan's website: https://www.nilan.dk/en-gb/frontpage/download

If you have questions regarding installation of the unit after having read the instructions, contact your nearest dealer of Nilan products. You can find Nilan dealers on www.nilan.dk/en-gb/frontpage/download/dealers.

The purpose of these instructions is to advice the installer on correct installation and maintenance of the unit.

ATTENTION

The unit must be started up immediately after installation and connection to the duct system. When a ventilation unit is not in operation, humidity from the rooms may penetrate into the ducts and create condensation. Condensate water may leak out of the valves and damage furniture and floors. Condensation may also form inside the unit, which can damage its electronics and fans.

The unit is delivered fully tested and ready for operation.

Unit type

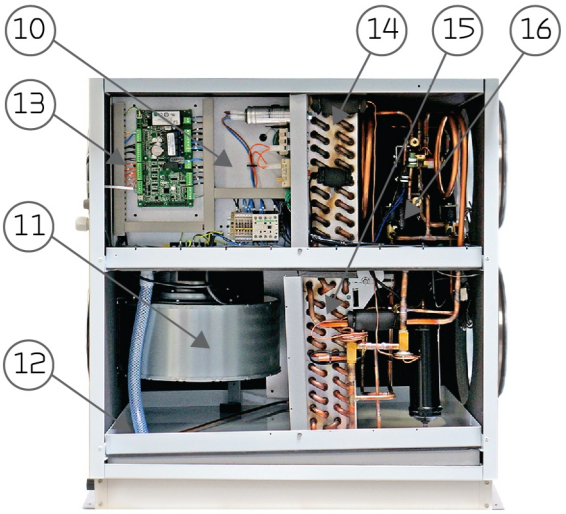
Product description

VPL28 is a ventilation unit that allows for active heat recovery via a high-efficiency heat pump. The unit is intended for air volumes up to 1.000 m^3/h at 100 Pa external duct pressure.

The unit extracts humid and vitiated air from the dwelling via bathroom, lavatory, kitchen and utility room. It blows fresh air into living areas such as living room, bedrooms and study. Cold outdoor air is heated in the heat exchanger by warm extract air. If the supply air/the dwelling needs heating, the heat pump will heat up the supply air, depending on the room temperature. VPL28 has a reversible cooling circuit and it can therefore cool the supply air in the summer.

As a standard, VPL28 is supplied with an ISO ePM1 65-80% (F7) filter in outdoor air and an ISO ePM10 (M5) in extract air.

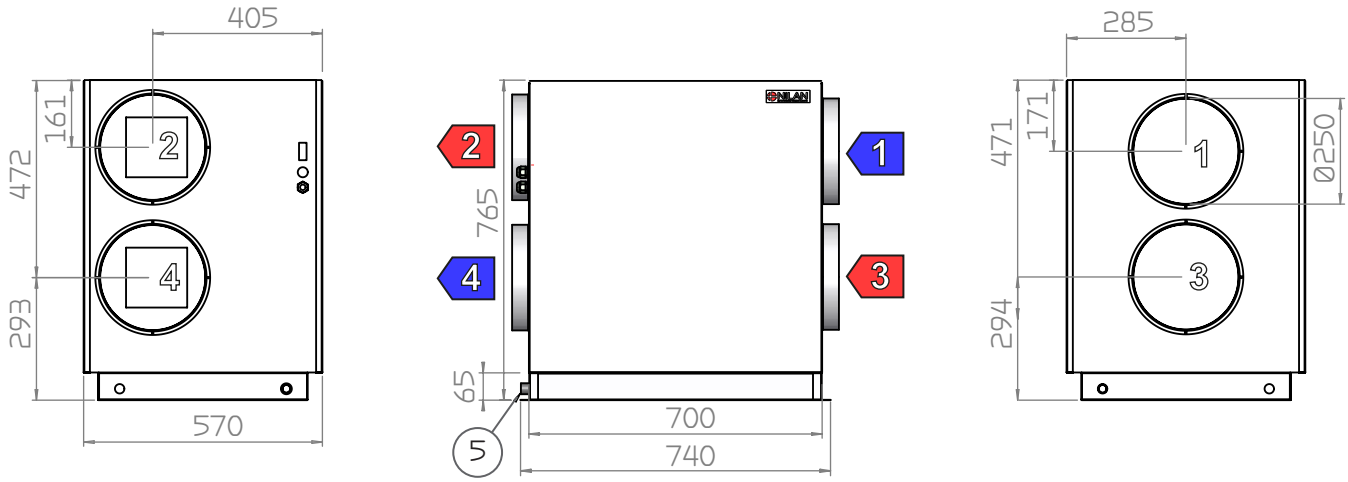
The unit
1. Outdoor air duct connection
2. Supply air duct connection
3. Extract air duct connection
4. Discharge duct connection
5. Electrical connection



Front open
10. Supply air fan
11. Extract air fan
12. Condensate drain
13. Control system
14. Evaporator
15. Condenser
16. Compressor

Dimensional drawing

All measurements are in mm.

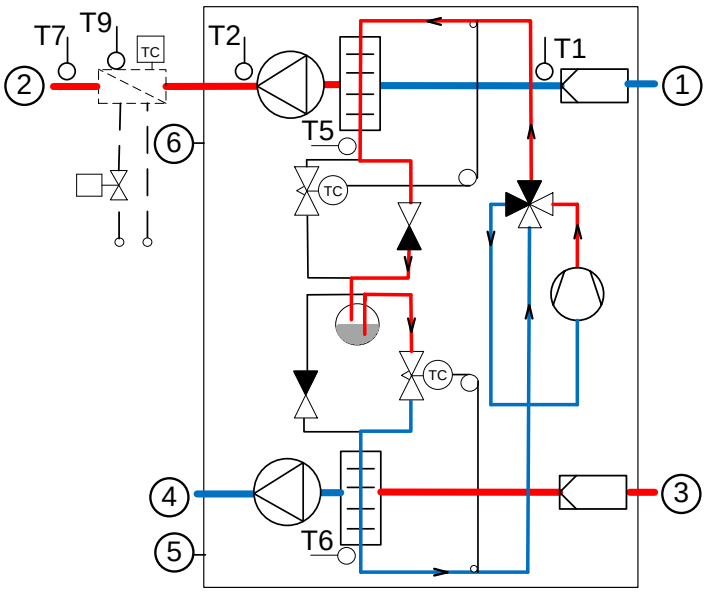


Connections:

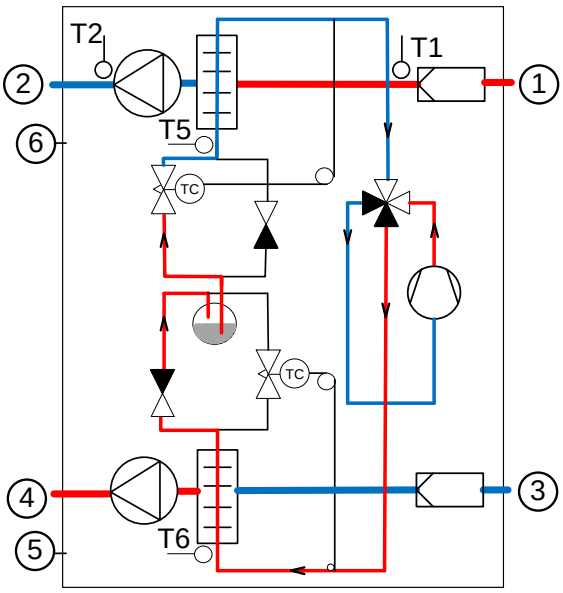
1. Outdoor air
2. Supply air
3. Extract air
4. Discharge air
5. Condensate drain

Functional diagram

Heating function



Cooling function



Connections
1. Outdoor air
2. Supply air
3. Extract air
4. Discharge air
5. Condensate drain
6. Electrical connection

Automation
T1: Outdoor air sensor
T2/T7: Supply air sensor
T5: Condenser sensor
T6: Evaporator sensor
T9: Water after-heating element
T10:Extract air sensor (room temperature)

Accessories

FU28 heat pipe

An FU28 heat pipe raises the temperature of the outdoor air a fraction. This increases the efficiency of the heat pump considerably during the cold season.

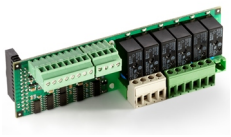
In most cases if you install an FU28 heat pipe, an after-heating element with a mixing circuit will not be necessary for the supply air to remain of reasonable temperature.

Electrical pre-heating element

When the outdoor temperature falls below 0 °C, the efficiency of the heat pump will decrease. If there is no room to install an FU15 / FU28 heat pipe, you would benefit from installing a pre-heating element. This ensures that the heat pump remains highly efficient.

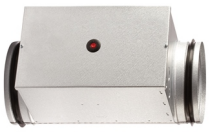
The pre-heating element ensures that the temperature of the outdoor air in the unit does not fall below 0 °C. It has a regulator that ensures minimal energy consumption.

Expansion PCB



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

Electrical after-heating element



With an electrical after-heating element you can increase the supply air temperature to the desired level. Electrical after-heating elements are supplied for mounting in the supply air duct. Included are the necessary sensors.

Water after-heating element incl. regulation

With a water after-heating element you can increase the supply air temperature to the desired level. The water after-heating element is for duct mounting and should be connected to the primary heat supply.

It is supplied with a two-way regulation valve, a temperature sensor and a frost thermostat.

EM-box

With an EM box it is possible to divide the extract air between the kitchen and the bathroom.

If a cooker hood is connected to the unit and is switched on, extract air from the bathroom will be reduced slightly to allow sufficient air for the cooker hood to extract kitchen fumes.

The EM-box has a fitted metal filter that clears the air in the cooker hood of grease particles effectively, and thereby protects the unit.

Water trap

To ensure that condensate water can drain freely, a water trap must be installed.

You should check regularly that there is water in the trap. The water trap may dry out during late spring, summer and autumn, when no condensation is formed. If the water trap dries out, air will be sucked into the unit and condensate water will not be able to drain. This will cause water damage.

Nilan's water trap contains a ball that ensures that no air is sucked into the unit and that condensate water can drain freely.

Vibration absorbers

Four vibration absorbers are placed under the unit to ensure effective softening of the vibrations of the unit against its foundation.

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.

Set up

Installation

Positioning the unit

ATTENTION
When positioning the unit, you should always consider future services and maintenance.

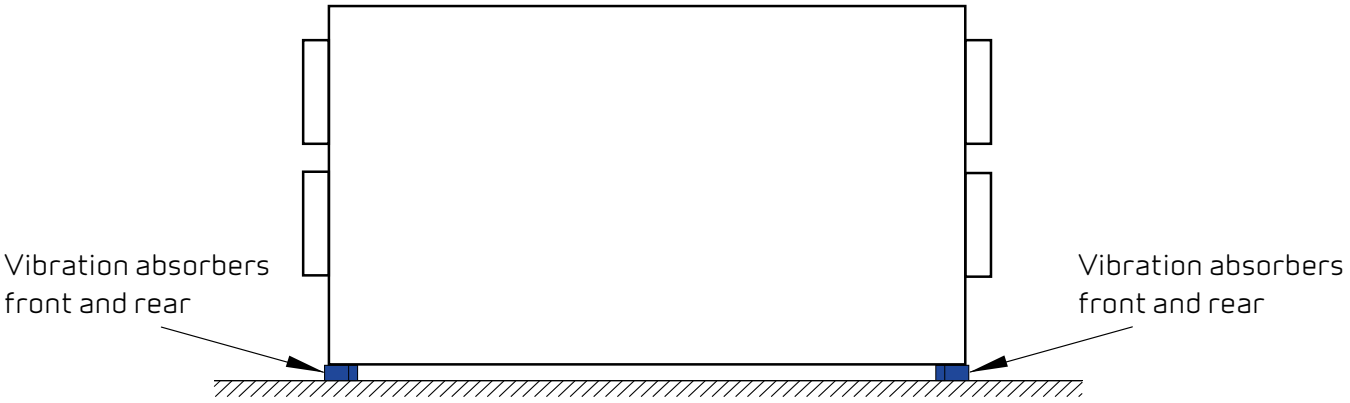
It must be easy to replace filters and it must be possible to replace, for instance, fans and other components.

ATTENTION
It is recommended that you leave a minimum of 60 cm of clear space in front of the unit.

ATTENTION
The unit must be level to enable proper drainage from the condensate tray.

The unit makes little noise and produces only weak vibrations, but you should still take into account potential vibrations that can spread from the unit to individual building components. In order to separate the unit from its foundation, it is therefore recommended that you install vibration absorbers under the unit. There should be approx. 10 mm distance to other building components and to permanent fixtures.

Installing the unit



ATTENTION
The unit must be installed on a level and firm surface.

Electrical installation

Electrical connections

Safety

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

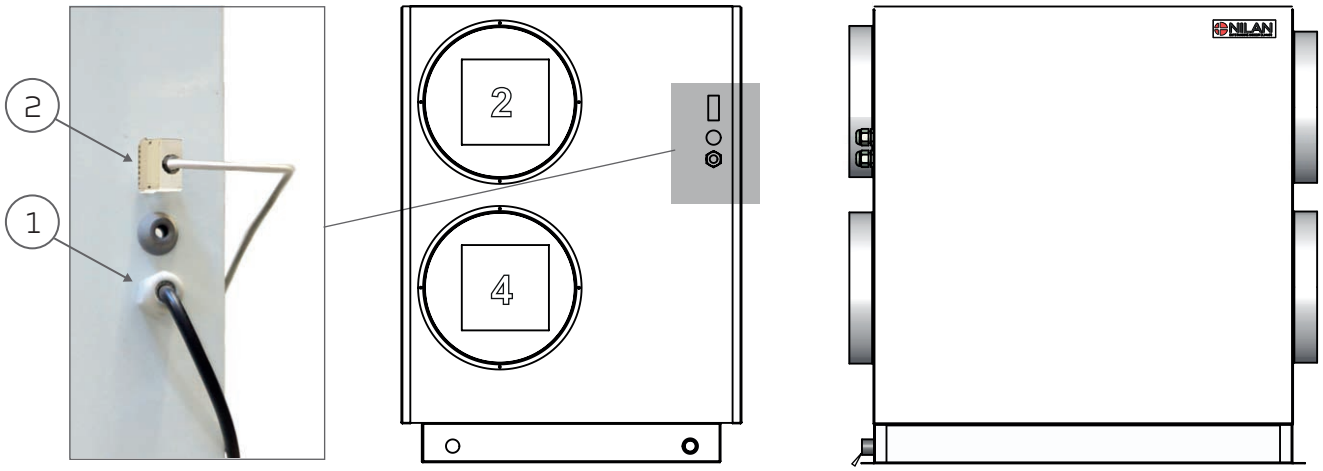
ATTENTION
It is important that the power is off, if you do work to the electrical components of the unit.

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

Connections overview

Facing the unit from the front, the electrical connections are placed on the left side of the unit.

1. Connecting 230V (remember electrical grounding)
2. Connecting the control panel



Control panel

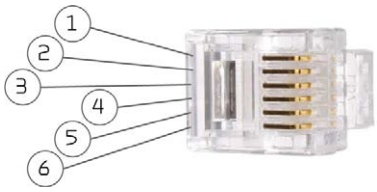
HMI User panel

The user panel is supplied with 1½ m cable. Connect the panel to the CTS602 control system in the unit using a CAT.5e cable (max. length 50 m).

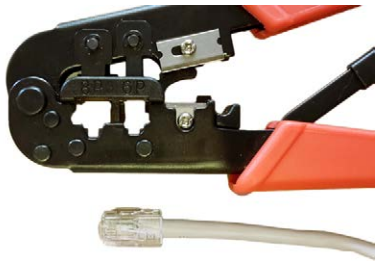
ATTENTION
If you want a longer cable, use an ordinary LAN-cable, not a crossover cable, max. 50 m.

If you want to extend the cable, please be aware of the following:

Installation in the RJ12 plug

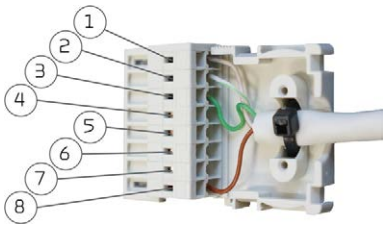


1. Empty
2. Empty
3. **Green (A2)**
4. **Green/white (B2)**
5. **Brown (12V)**
6. Brown/white (GND)



Use RJ12 plug and RJ12 crimping tool.

Installation in the 8 pole plug



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

Wall bracket

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

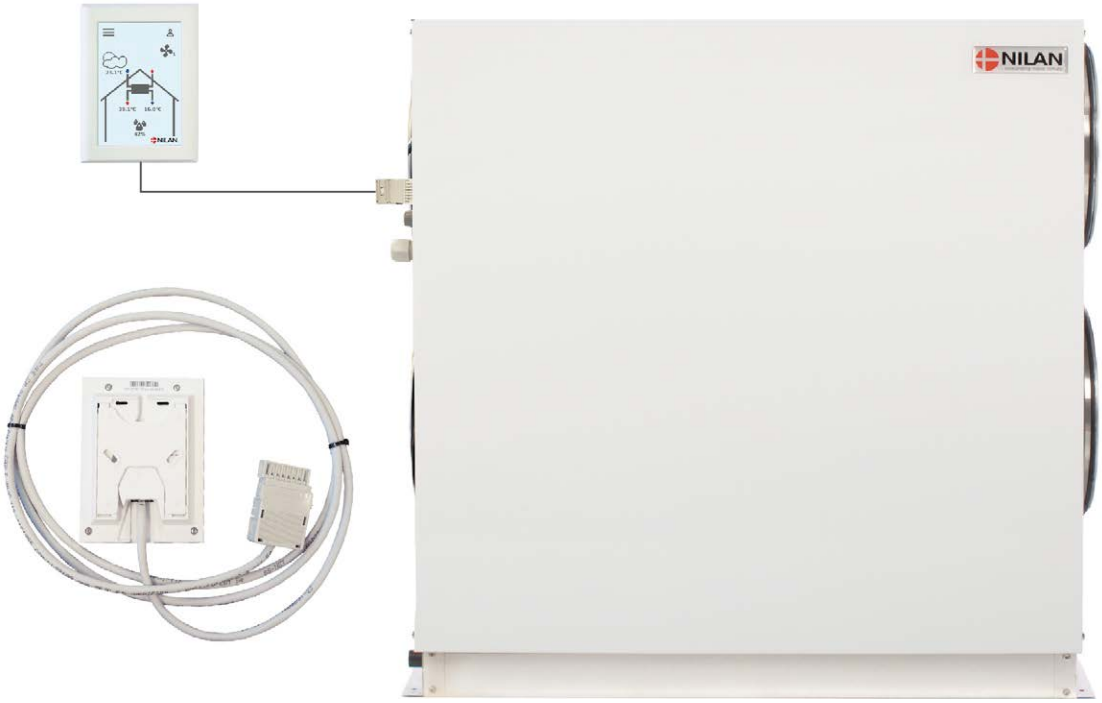
The panel should be visible so it is possible to change settings and to monitor warnings or alarms regarding operation.

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 then remove it.

Mount the 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.

Connecting the control panel



Electrical connection of the unit

Power supply

CAUTION
The power supply, including a safety switch, must be installed by an authorized electrician.

A power cable for connection to a power socket is included. It is important that the unit is earthed.

The unit is supplied with an EU plug for a 230V power supply. This means that, in principle, you have no protection of electrical grounding. You can secure electrical grounding by connecting the plug to a socket with a ground pin.

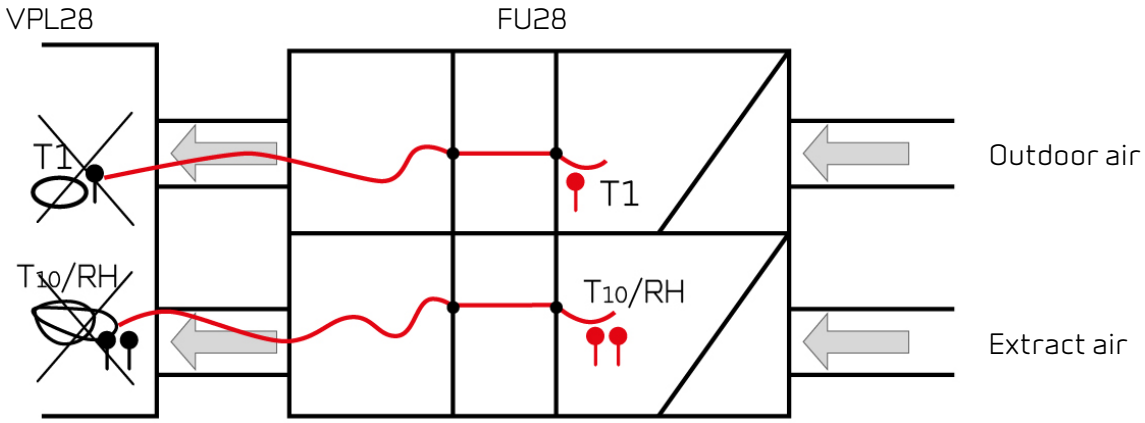
You can also connect an adapter for a plug with a ground pin. You can fit this plug adapter on the unit, so that the unit is secured electrical grounding to the earthing system.

Unit

Electrical connection accessories

FU28 heat pipe

Having an FU28 heat pipe installed before the unit will increase VPL28 COP (efficiency) considerably; especially at low outdoor temperatures.



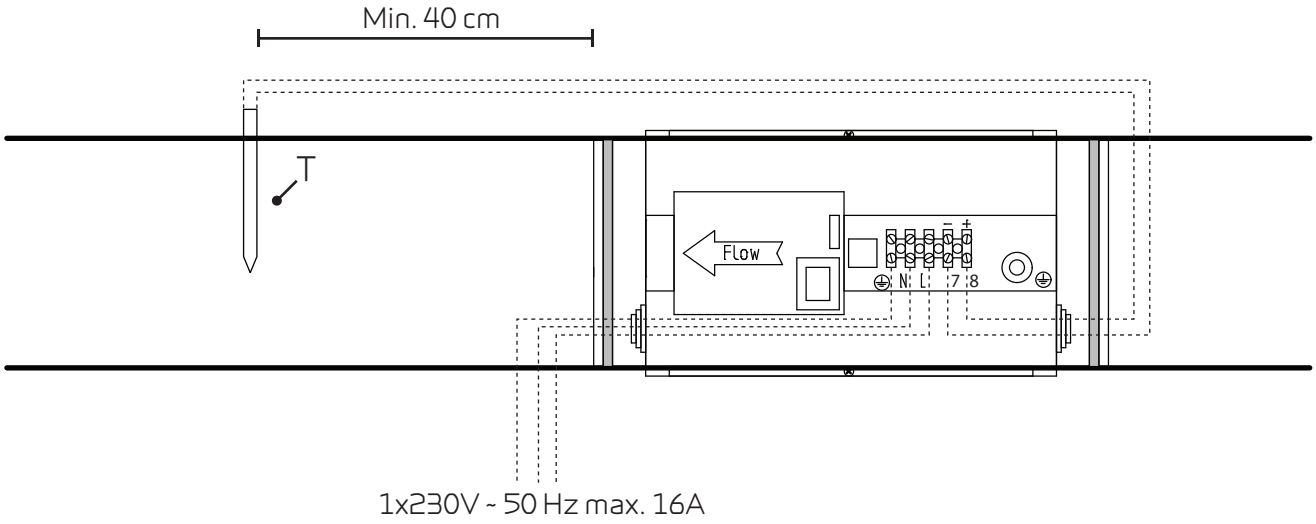
The temperature sensor T1, T10 and the humidity sensor RH must be moved as illustrated. It is important that they are moved and placed before the heat pipe in order for the unit to operate correctly.

Note! A heat pipe is not a recuperative or a regenerative heat exchanger. Therefore it does not have to comply with requirements for temperature efficiency, but is included in the COP calculation of VPL28.

External electrical pre-heating element

If installing an FU28 heat pipe is not an option, you can purchase an external electrical pre-heating element in order to secure efficiency of the heat pump.

Install the electrical pre-heating element together with the required temperature sensor in the outdoor air duct before the unit.



It is important that the sensor is placed at least 40 cm from the pre-heating element to achieve correct regulation.

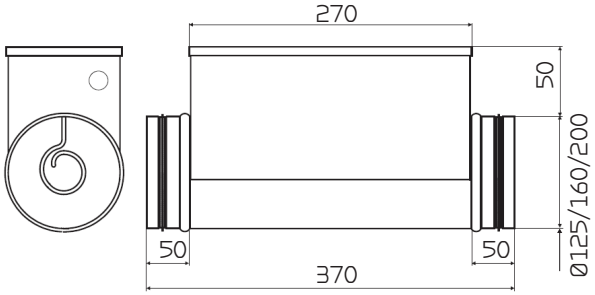
The pre-heating element has a three-step safety system that prevents overheating.

1. An operating thermostat regulates the heating and ensures that the supply air temperature does not fall below -1 °C
2. There is a max. thermostat, which shuts down the preheating element if the temperature rises above 50 °C (For vertical mounting with airflow downwards, the preheating surface will switch 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.

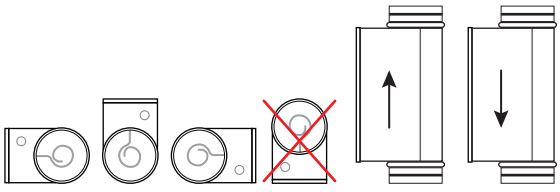
Minimum air volume at Ø200: 170m³/h.

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:



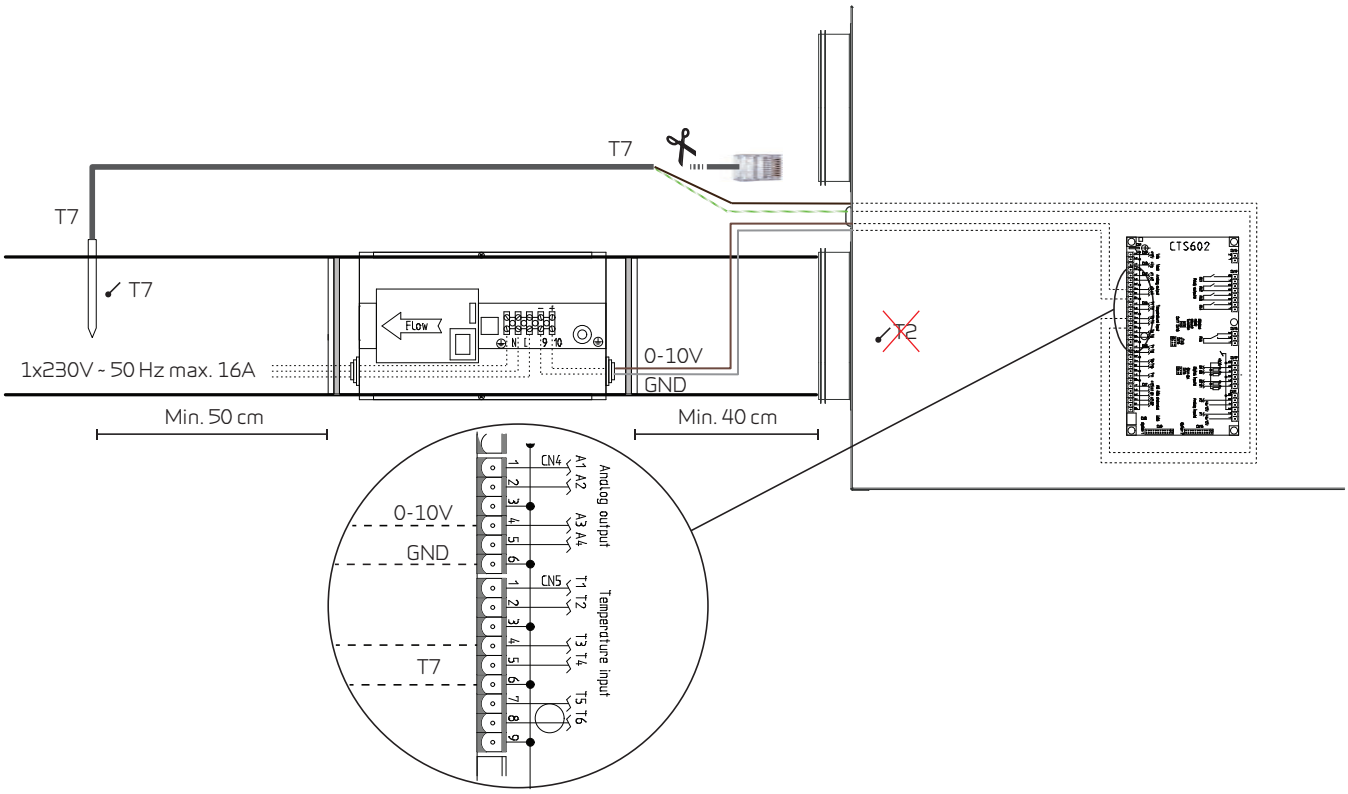
Positioning options:



Electrical after-heating element

An after-heating element is necessary if you want to control the supply air temperature.

The electrical after-heating element can be purchased for installation in the supply air duct. The required sensor and connectors for the unit are included.



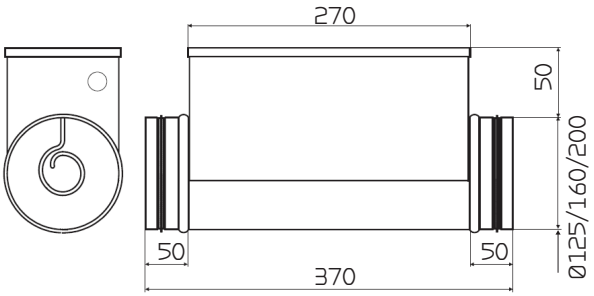
Wiring diagrams are supplied with the products.

Run the wires along the duct and install them in the screw terminal that has been fitted on the unit.

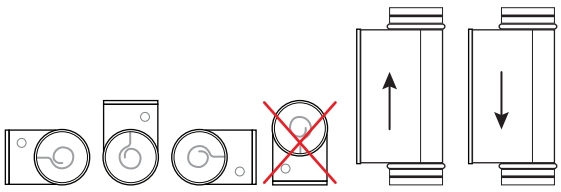
ATTENTION
The T7 temperature sensor has been fitted after the heating element. The T2 sensor **MUST**be disconnected from the circuit board. The T7 sensor should then be connected to where the T2 sensor was previously connected up.

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:



Water comfort heater

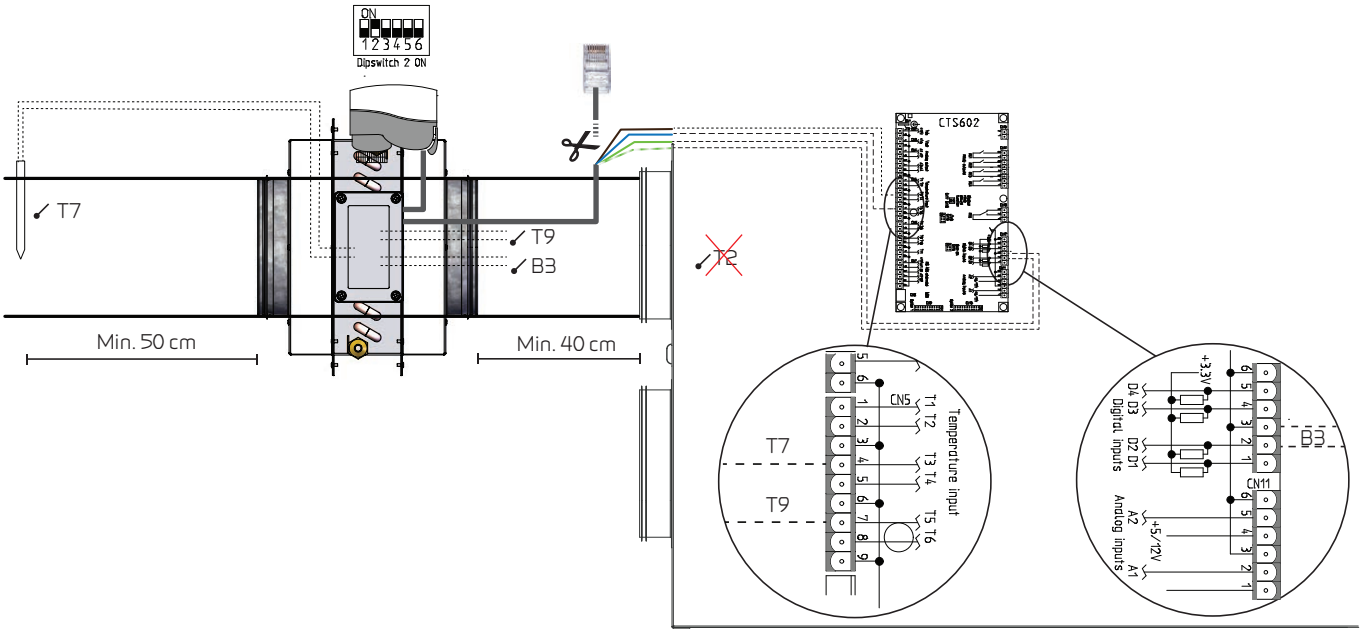
For precision control of supply air temperature, a comfort heater is required.

The water after-heating element can be purchased for installation in the supply air duct. The required sensors and connectors for the unit are included.

Snip the RJ 45 plug at the heat-shrink sleeve connection and install the wire on the circuit board.

ATTENTION
The T7 temperature sensor has been fitted by the heating element. The T2 sensor**MUST** detached in the PCB and T7 connect the sensor where T2 sensor was connected.

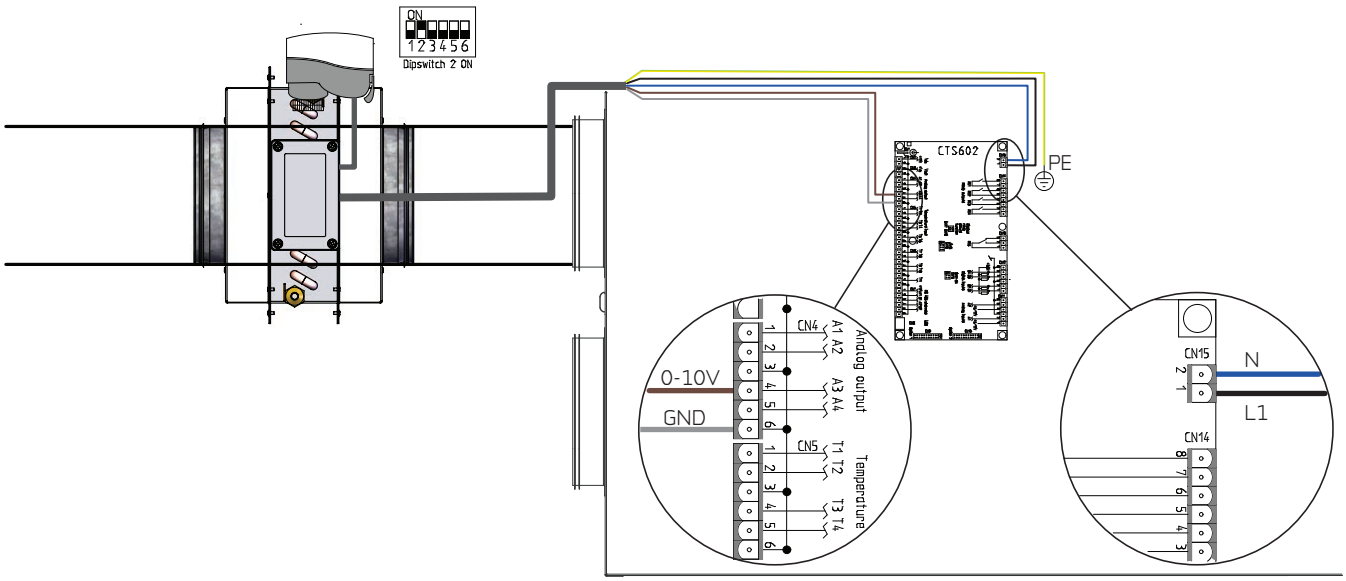
Connecting of sensors



T7: Temperature sensor - T9: Temperature sensor heating element - B3: Frost protection

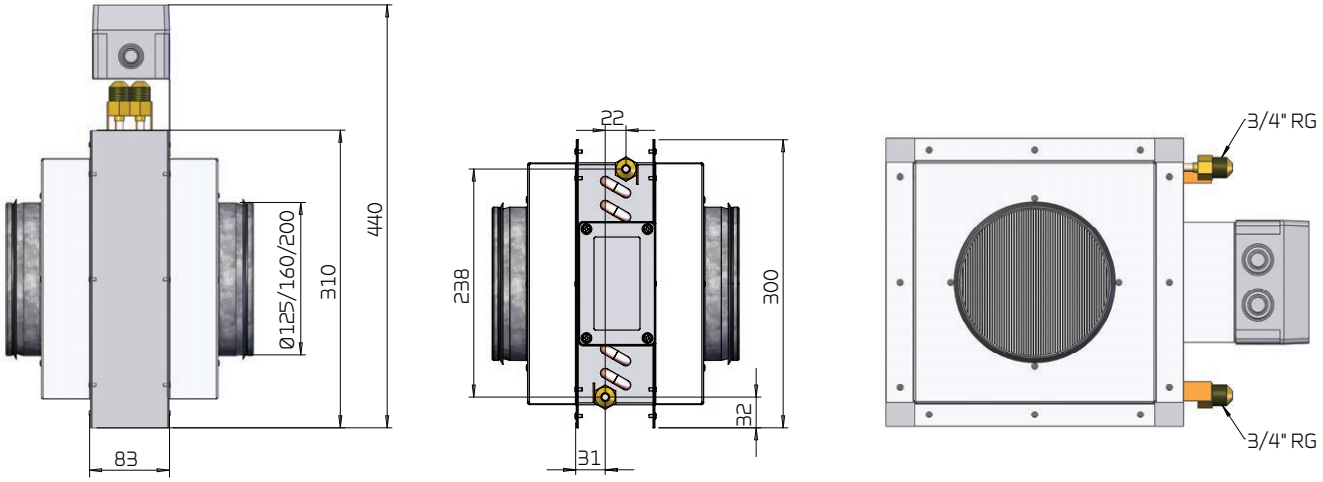
Run the wires along the duct and through a grommet on the unit down to the circuit board. Connect the wires in accordance with the wiring diagram.

Electrical connection of regulation valve



Run the wires along the duct and through a grommet on the unit down to the circuit board. Connect the wires in accordance with the wiring diagram.

Dimensional drawing:



Mounting of expansion PCB on CTS602 circuit board

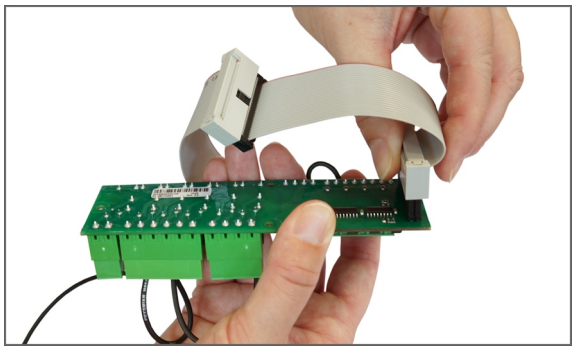
If you connect an expansion PCB to the CTS602 circuit board, you will be able to use user selection 2.

Similar to user selection 1, user selection 2 allows you to override the functions of the unit via an external signal from a potential free contact.

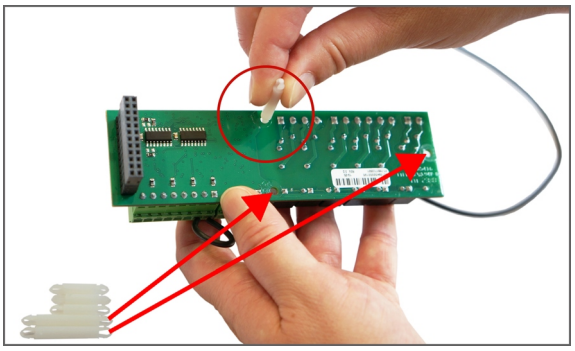
In addition, when activating user selection 2, the control system gives an output signal.

User selection 2 has a higher priority than user selection 1. It can be used in the same manner as user selection 1.

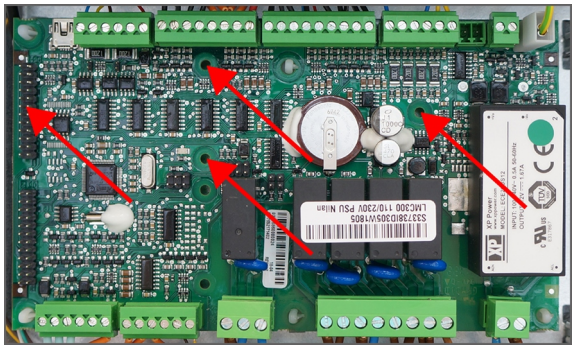
The expansion PCB also enables activation of external space heating. It includes an alarm output and a de-icing signal.



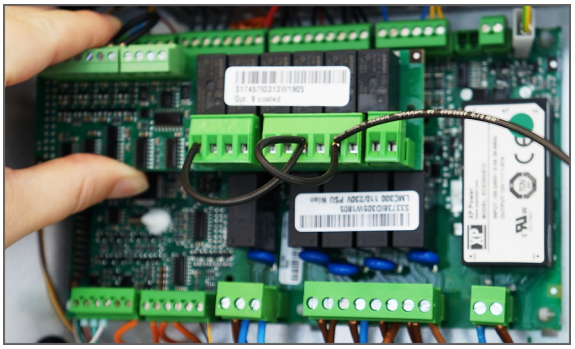
1. Remove the shown bus cable on the expansion PCB.



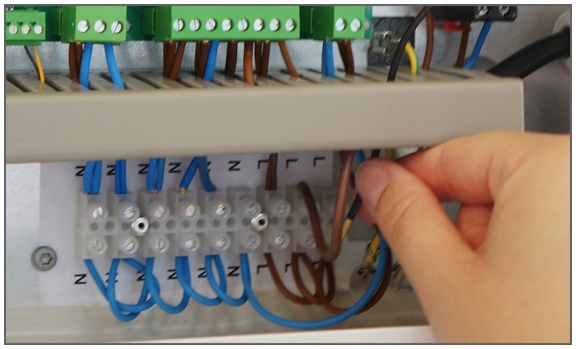
2. Install the large of the supplied print card holders in the 3 holes of expansion PCB.



3. The expansion PCB must be connected to connector CN9, and the caps must be mounted in the holes provided for this on the CTS602 circuit board.



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



5. Connect the wires as indicated on the electrical diagram.

ATTENTION
The expansion PCB and the connections must be installed by an authorised electrician.

The expansion PCB is an accessory to the CTS602 circuit board. Nilan does not supply external components.

Electrical connection - other

Connection to user selection and modbus

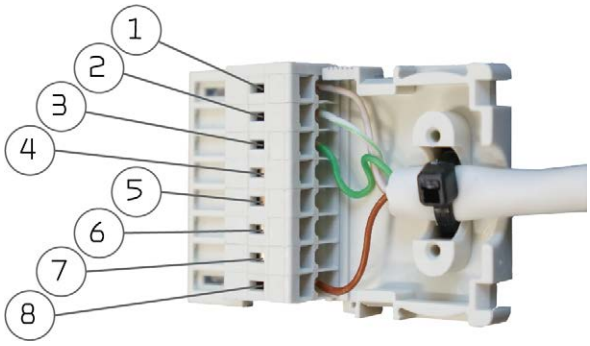
User selection: Connection to user selection can be used, for instance, for controlling a cooker hood. This happens via a potential free contact in the cooker hood that sends a signal to the unit, which, in turn, increases ventilation when the cooker hood is on. You connect it using pin 4 and 5 in the 8 pole plug of the control panel.

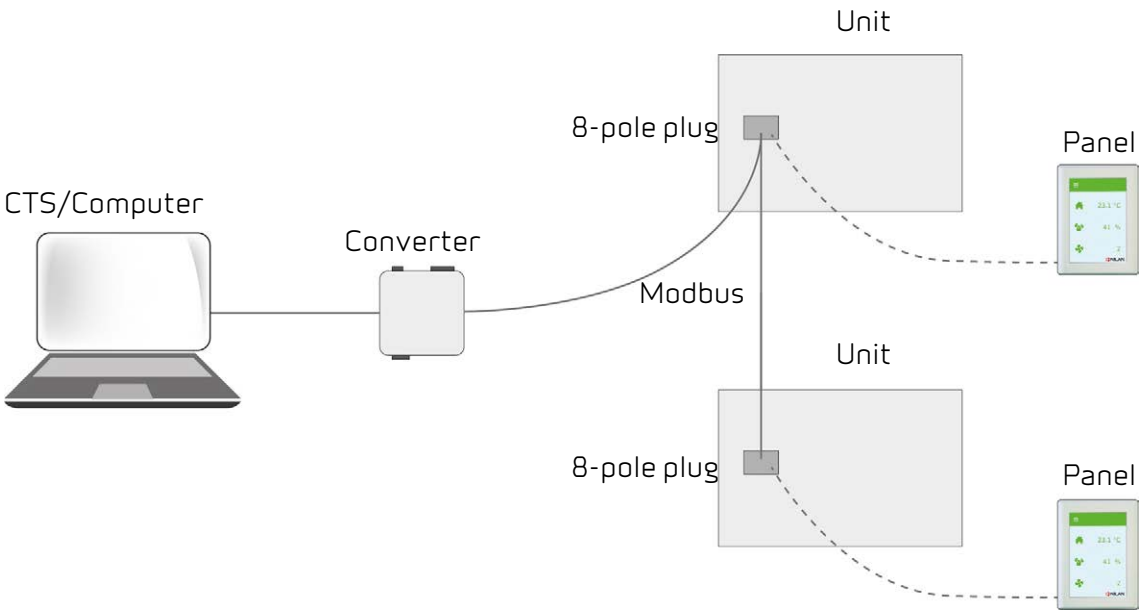
User selection can also be used for other functions such as to create imbalance in supply air and extract air ventilation.

Modbus: You can communicate with the unit via Modbus, which can be connected in pin 1 (GND), pin 6 (A1) and pin 7 (B1) in the 8 pole plug of the control panel.

Please, consult user manual for software settings etc.

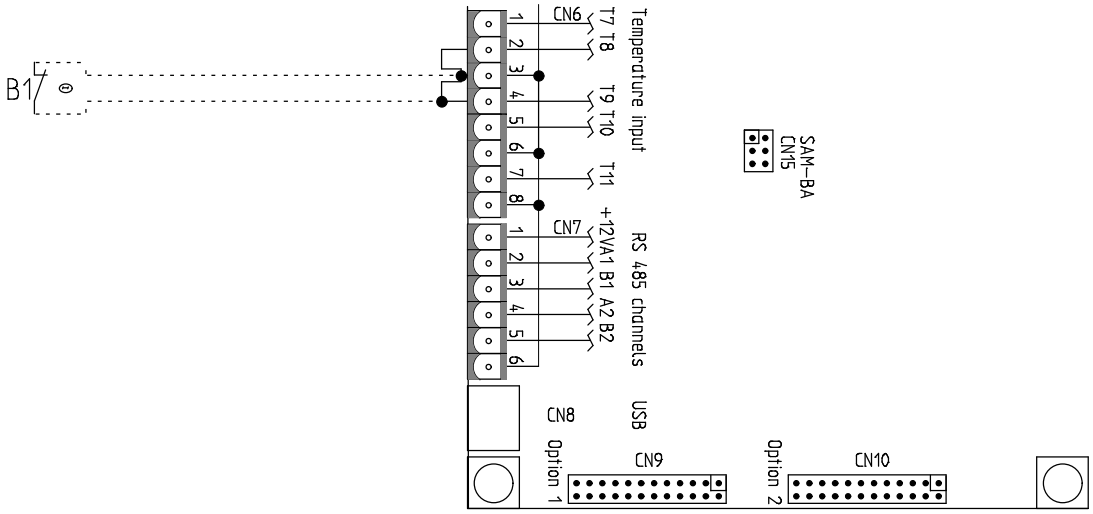
Connect the plug to the unit in point 2: Connecting the user panel.





Fire connection

You can connect a fire thermostat or an external fire automation system. It must be a closed signal, so that the unit will register that there is a fire if the signal is interrupted.



NB! If you connect the unit to an external fire automation system, set the software: Service settings/ Restart/Fire. The unit will then start up again when the external fire automation system signals for it to do so.

Plumbing installation

Condensate drain

Important information

The unit is supplied with an Ø20 mm condensate drain (PVC, GF-fittings).

ATTENTION
You **MUST** install a water trap in connection with the condensate drain to ensure that condensate water can drain away.

ATTENTION
If you set up the unit outside the climate screen, it is important to use a heating cable to prevent the condensate drain from icing up. Frost protection of the unit is the installer's responsibility.

During operation, negative pressure of up to 500 Pa may occur in the drain, corresponding to a 50 mm water column. The water trap must therefore be fitted as illustrated to prevent it from drying out and to avoid return flow.

The connection of the water trap must be air-tight, otherwise air will be sucked into the unit and condensate water will remain in the unit. It could cause water damage if the condensate tray overflows and condensate water runs out of the unit.

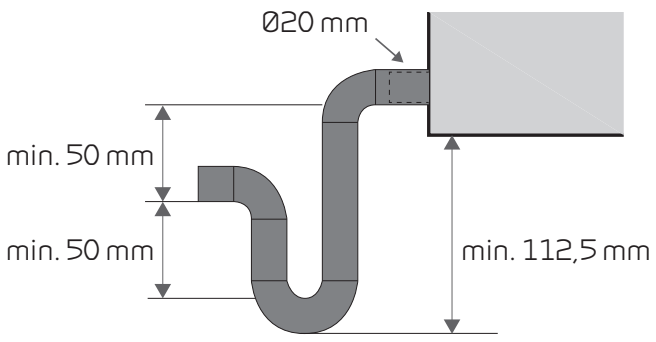
After installing the water trap, you should test it as follows (the unit must be connected to the duct system and the door must be closed):

Fill the condensate tray with water and start the unit at the highest fan speed level. Allow it to run for several minutes. Then check that there is no water in the condensate tray.

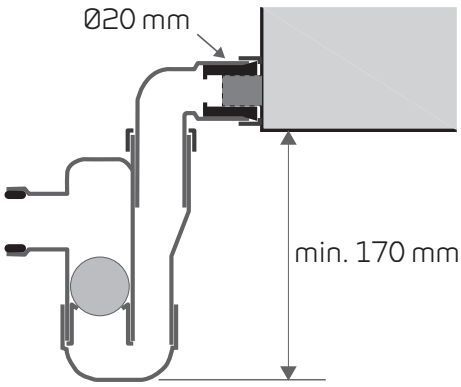
The water trap may dry out and prevent water from draining off the condensate tray, as air will then blow into the unit. The water trap should therefore be checked regularly, especially at the end of the summer, and it should be filled with water if necessary. Increasing the height of the water trap beyond the minimum requirements will minimize the need for refilling.

INFO
Nilan offers a water trap with a ball. The ball ensures that no air blows into the unit through the condensate drain if the water trap dries out. This ensures that water in the condensate tray can drain off, which makes it unnecessary to check the condensate drain quite so often.

Connection side



Connection of water trap generally



Connection of Nilan water trap with ball

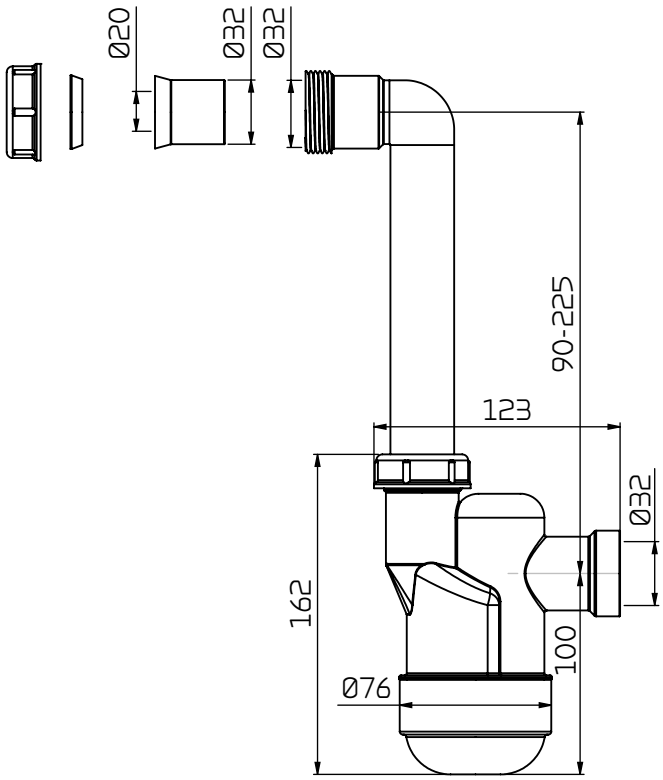
Plumbing connections - accessories

Water trap with ball (option)

Connection options with Nilan's water trap:

1. Water trap with Ø32 mm reducing fitting
2. Reducing fitting for Ø20 mm
3. Reducing fitting for ¾" RG
4. Reducing fitting for ½" tube

Dimensional drawing:
All measurements are in mm.



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 by which to lead air through the house.

Spiral ducts

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

To prevent sound from being transmitted from room to room, you should install silencers 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 general 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 let the tubes run from the box out to the individual rooms.

With NilAIR tubes you do not need to install silencers for every room, as there is no risk of sound transmission.

If you lead the tubes outside the climate screen, they must be insulated to avoid heat loss and condensation. This is simpler than using spiral ducts, as NilAIR tubes are easily led through ordinary 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.

Unit

Nilan recommends that you install a flexible connection between the unit and the duct system.

This is to avoid vibrations from the unit being transmitted to the duct system, but also to lighten future services of the unit that will make it necessary to move the unit.

Nilan offers flexible Sound Flex tubes that provide a flexible connection between the unit and the duct system, but also reduce the sound transmission from the unit to the duct system.

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

Extract air

Install exhaust air valves in rooms that generate humidity. Place them strategically where they can extract humidity most effectively.

Rooms that generate humidity:

- 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:

- Sitting room
- Living room
- Bedroom
- Home-office

Roof stacks

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 minimized, with attention to the prevailing wind direction.

The air intake should be placed at least 0.5 m from the roof surface. On black, flat roofs the distance from the roof to the underside of the intake should be at least 1 m to ensure that warm air is not drawn into the building in the summer. Air intakes should be located 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 from disturbing your surroundings.

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 must draw out more air than it blows in. This will prevent dampness from being forced into the construction of the building.

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