INSTALLATION INSTRUCTIONS

CTS400 BY NILAN

Comfort 250 Top / Comfort 250 Top Polar

Version 1.40 - 03.05.2024
M75 Comfort 250 Top_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, 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.

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

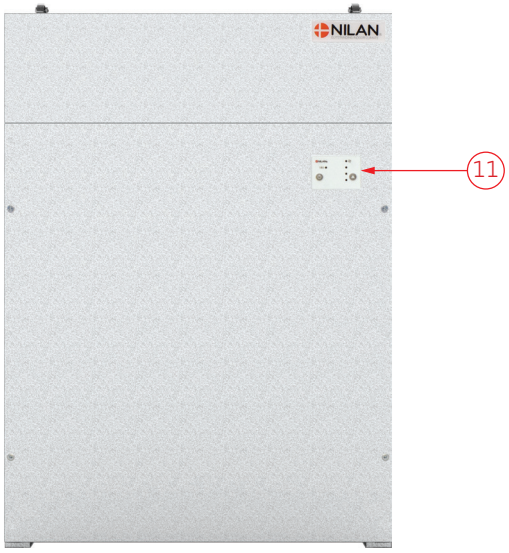
Product description

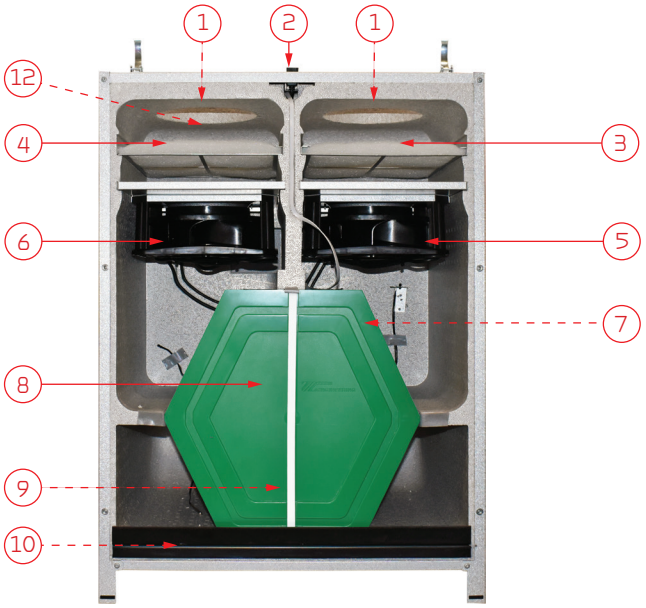
Comfort 250 Top is an energy-efficient ventilation unit with heat recovery for residential and small commercial buildings with a ventilation requirement of up to 250 m³/h.

Comfort 250 Top is a unit with compact dimensions that can be built into a cabinet with a width of 60 cm. The control panel is built into the front of the unit, so no further installation is required.

As standard, the unit is supplied with ISO 16890 Coarse > 75 % (G4) plate filters that serve to protect the unit from dirt. If you require increased filtration of the outdoor air, you can order an ISO 16890 ePM1 55 % (F7) pollen filter as an accessory.

Right version:





1. Duct connections (nozzle for inlet ring)
2. Electrical connections
3. Extract air filter
4. Outdoor air filter / Pollen filter
5. Extract air fan
6. Supply air fan
7. 100 % Bypass damper
8. Counterflow heat exchanger
9. Automation
10. Condensate drain
11. CTS400 control panel
12. Pre-heating element (Polar version)

Dimensional drawing Comfort 250 Top

All listed measurements are in mm.

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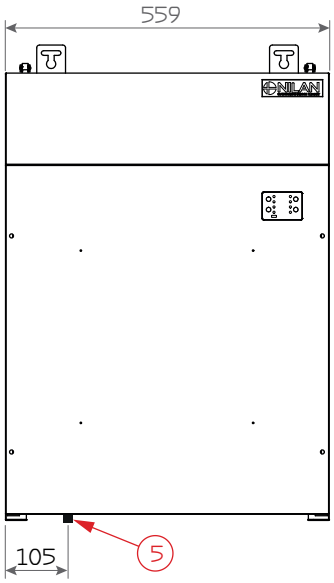

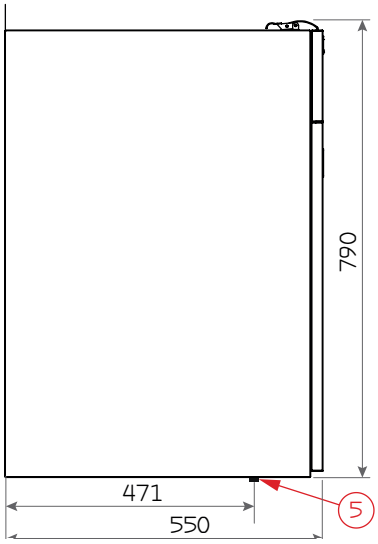

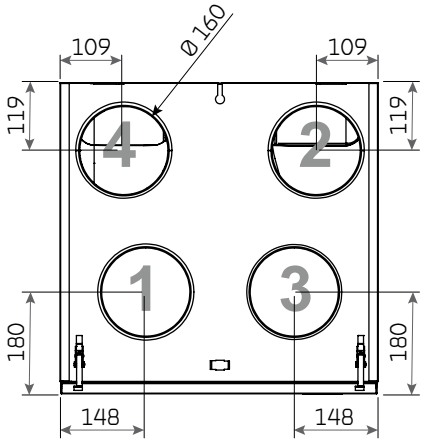

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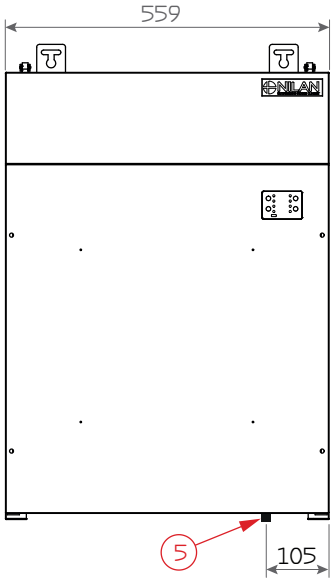

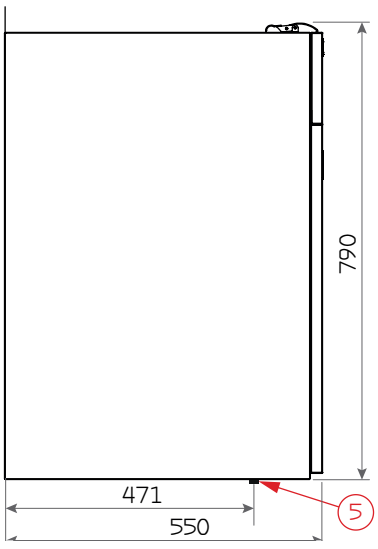

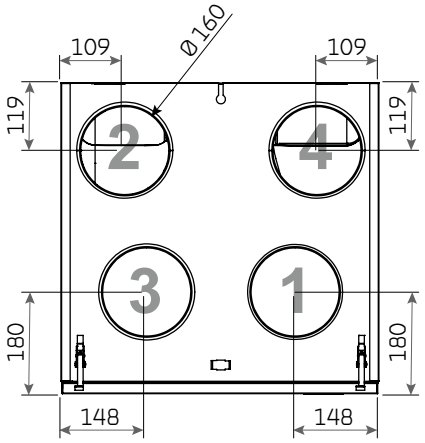

Connections:

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

NB! Connection for inlet ring

Dimensional drawing Comfort 250 Top Polar

All listed measurements are in mm.

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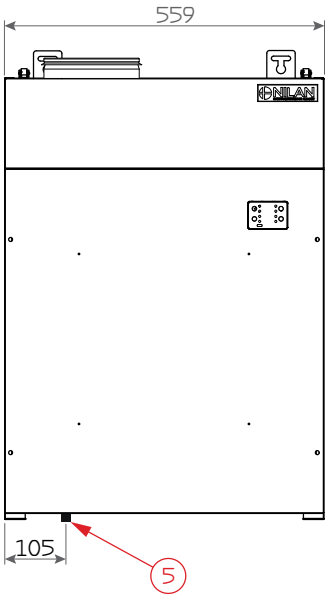

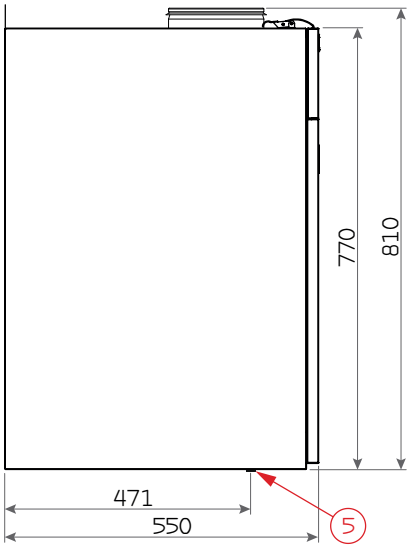

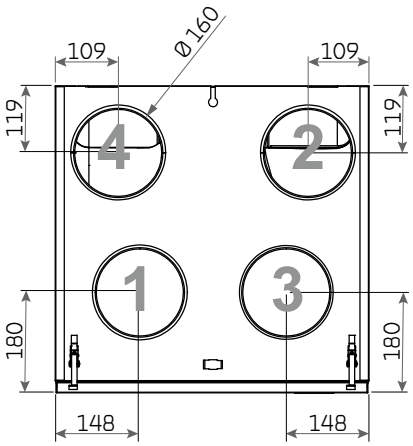

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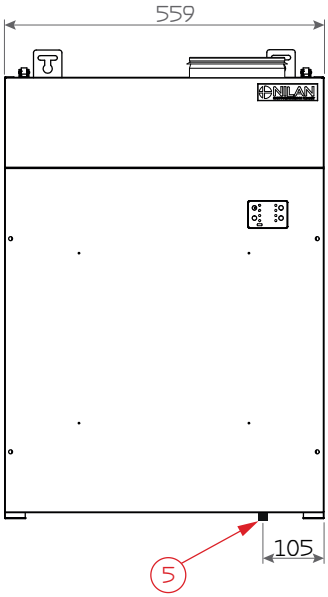
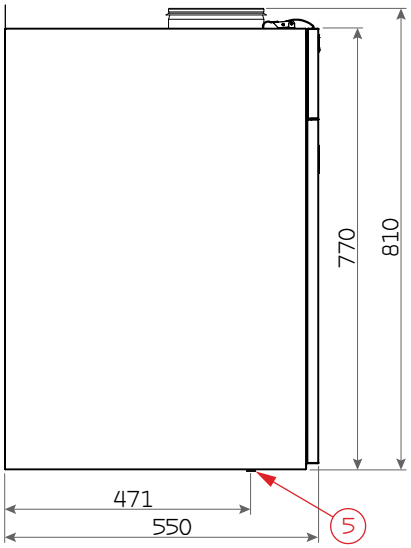
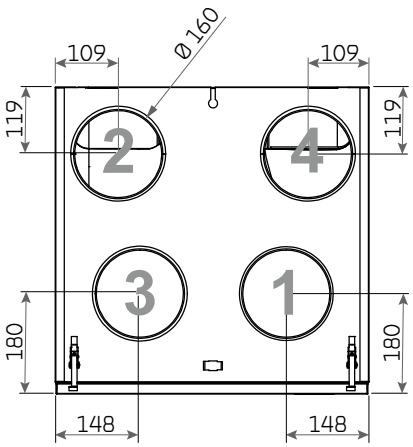




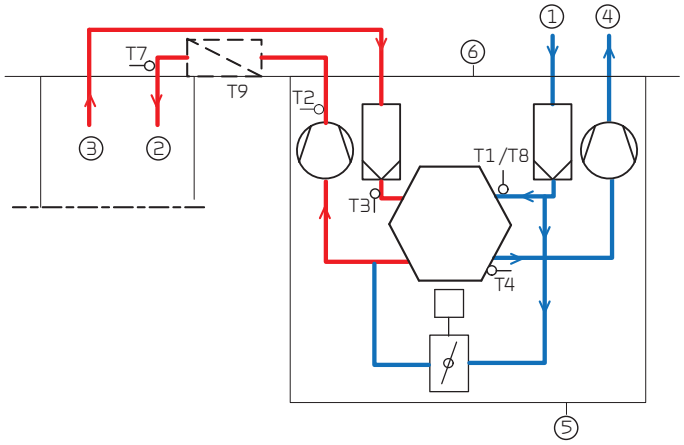


Connections:

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

NB! Connection for inlet ring

Functional block diagram



Connections

1: Outdoor air
2: Supply air
3: Extract air
4: Discharge air
5: Condensate drain
6: Electrical or water after-heating element connection

Automation

T2/T7: Supply air sensor
T3: Extract air sensor
T4: Discharge air- and deicing sensor
T1/T8: Outdoor air sensor
T9: Frost protection water after-heating element sensor

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.

Electrical after-heating element with Connection Box for mounting in duct system

Installing an after-heating element will allow you to control the supply air temperature in the following cases:

- You want to use the air in the ventilation system to heat the dwelling
- You want to control the supply air temperature in order to avoid potential cold draughts from the ventilation system

The electrical after-heating element is for installing in the supply air duct. It would be an advantage to place it within the climate screen. It comes with the necessary sensors and connectors. A Connection Box is also included, which enables you to add additional connections.

Water after-heating element incl. control system for duct installation

Installing an after-heating element will allow you to control the supply air temperature in the following cases:

- You want to use the ventilation air to heat the dwelling
- You want to control the supply air temperature to avoid potential cold draughts and coldness from the ventilation

The water after-heating element is for installation in the supply air duct. It would be an advantage to place it within the climate screen. It comes with the necessary sensors and connectors as well as a two-way regulation valve for the hot water.

A Connection Box is also included, which enables you to add additional connections.

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.

CTS400 Connection Box

The following external functions are connected to the ventilation unit via a Connection Box with a RJ45 connector:

- User selection 1 og 2
- Modbus communcation
- Fire thermostat or external fire automation system

There is a 0.5 meter cable from the box to a RJ45 plug, which is connected directly to the ventilation unit.

Fire Connection Box

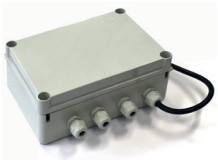
The Comfort ventilation unit has a function in its control system that can control 1-2 fire dampers.

If you want to activate this function, Nilan can supply you with a Fire Connection Box, with the following connection options:

- Connection of 1-2 fire dampers
- Connection of external fire thermostat
- Connection of user selection 1 (cooker hood)
- Connection of Modbus communication to, for instance, CTS unit

You connect the box up with the supplied 1 m cable with RJ45 connector.

Connection box for user selection and EM-box together with fire automation system



If you want to run the cooker hood function simultaneously to the fire automation system, Nilan can supply a separate Connection box that can be connected up to the Nilan Fire Connection Box.

The box comes with a 2 metres power cable.

Heating cable

If you install the ventilation unit outside the climate screen, it is important to protect the condensate drain from frost.

Nilan can supply an external heating cable that you run along the exterior of the condensate drain before insulating it. This way you will have a frost free condensate drain that does not get blocked. The heating cable has an integral thermostat that regulates the level of heating in accordance with the temperature of the surroundings.

The cable is available in two lengths: 3 m or 5 m.

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.

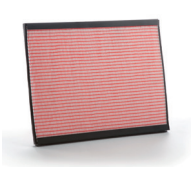
Nilan can supply effective vibration absorbers to place under the ventilation unit. They are sold in packs of 4.

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.

Cooker hood filter box

If the extract air needs extra filtration, Nilan can supply a Cooker hood filter box.

This can provide extra protection of the ventilation unit if you connect a cooker hood that has not got good filters. It can also help air extraction from, for instance, dormitory rooms where cooker hoods are rarely installed.

Gateway med App løsning

You can control your ventilation unit with a smartphone app via a gateway connection.

Connect the Nilan Gateway to a CTS400 or a CTS602 control system. This way, a cloud connection to the unit can be established. The Gateway is available in two different versions - with either a LAN or a WiFi connection to a router.

Plinth

An elevation plinth that lifts the unit from the floor.

The plinth is available in two heights, respectively 400 mm and 600 mm.

Set-up

Mounting

Positioning of the ventilation unit

ATTENTION
When positioning the unit, you should always consider future service and maintenance.
Therefore, we recommend that flexible connections be fitted between the ventilation unit and the duct system so that the unit can be easily removed.

ATTENTION
A free space is recommended in front of the ventilation unit of at least 60 cm.
It must be easy to replace filters, and it must be possible to remove, for instance, the exchanger, and to replace fans or other components.

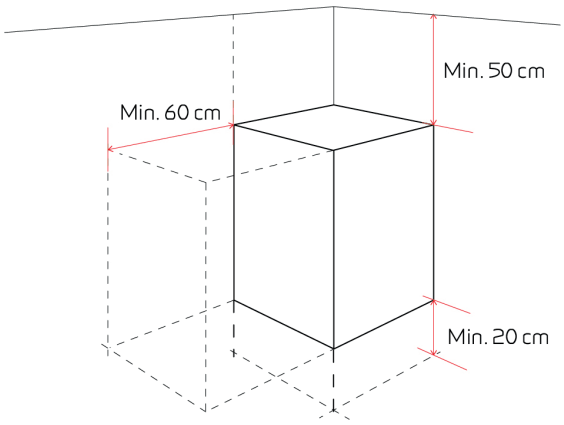
ATTENTION
The unit must be level to enable proper drainage from the condensate tray.

The unit makes little noise and it 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 underlying surface, it is therefore recommended that you fit vibration absorbers under the unit. There should be approx. 10 mm distance to other building components and to permanent fixtures.

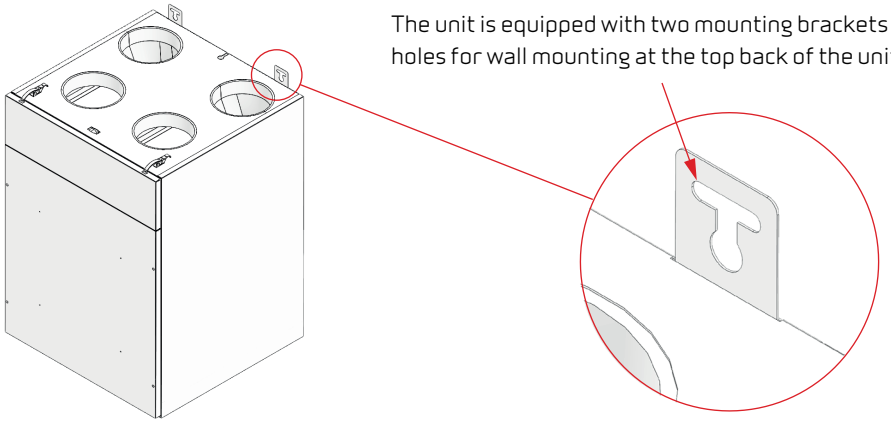
Top unit

ATTENTION
If you fit flashings above the unit, there must be enough space to remove these easily.

Recommended minimum distances to the top, bottom and front of the unit are shown in the drawing.



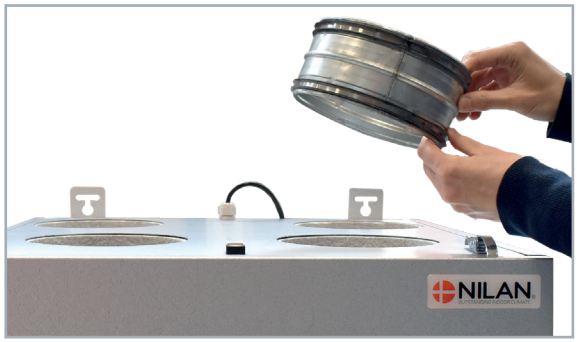
Mounting the ventilation unit



The unit is equipped with two mounting brackets with holes for wall mounting at the top back of the unit.

Duct connections

An inlet ring (nipple) must be connected (not Nilan delivery).



1. Use Ø160mm duct connectors. The Polar version is delivered with an inletring at the pre-heating element.

2. Press the duct connectors well into the ventilation spout.

Electrical installaton

Electrical connections

Safety

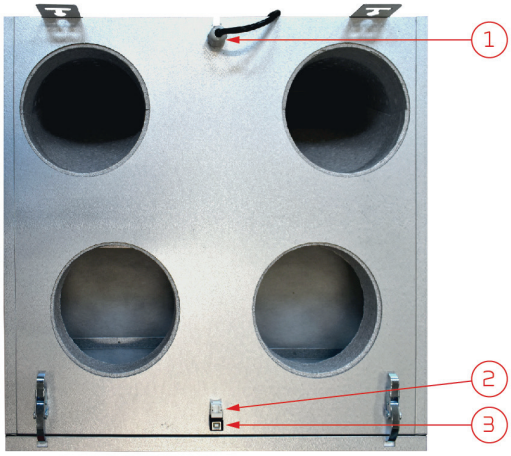
ATTENTION
All work must be carried out by qualified persons and in compliance with existing legislation and regulations.

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

All connections are located on the top of the ventilation unit.



1. Connection 230V (remember electrical grounding)
2. External connections / accessories via RJ45 connector and patch cable
3. Connection to PC Tool via USB connector

Electrical connection unit

Power supply

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

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

This means that if you have not installed a Schuko 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 Schuko plug and then into a socket with earthing.

Schuko socket with side earth

Schuko socket with pin earth

Example of Adapter Schuko plug with pin earth

Electrical connection accessories

Overview of connection options

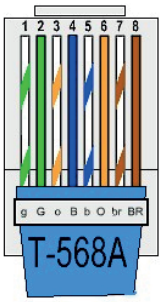
You can connect external accessories to the ventilation unit. However, it is not possible to have all accessories connected up simultaneously.
The following table shows the external connections that are possible in the different settings.

Setting	User selection 1	User selection 2 / Filter monitor	Fire thermostat	VOC / CO_2	Alarm output
Normal	X	X	X	X	X
Water after-heating	X		X		
Electrical after-heating	X		X		
Fire automation system	X		X		

LAN cable type A and B

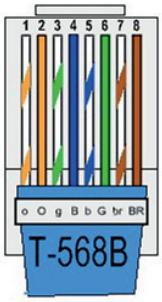
If you connect external accessories and you are using a LAN cable in stead of the CTS400 Connection Box from Nilan you must be aware if you use a type A or B LAN cable, as the wires are situated differently.

Type A



1. Green/white
2. Green
3. Orange/white
4. Blue
5. Blue/white
6. Orange
7. Brown/white
8. Brown

Type B



1. Orange/white
2. Orange
3. Green/white
4. Blue
5. Blue/white
6. Green
7. Brown/white
8. Brown

ATTENTION

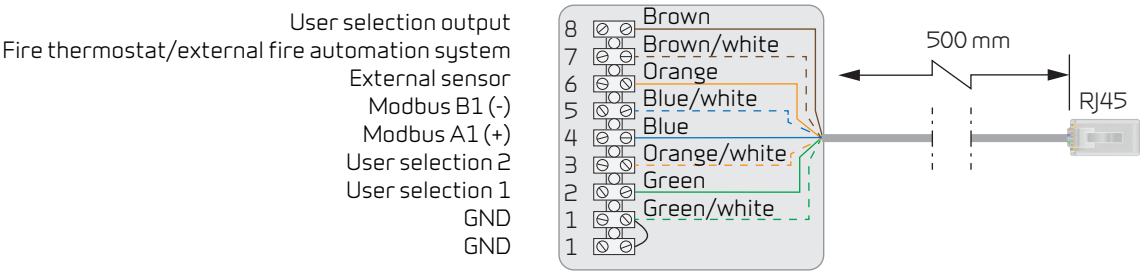
The CTS400 Connection Box from Nilan has been delivered with a LAN cable type A. If you use a LAN cable type B, you must be aware that the wires have been switched.

Overview of connection boxes

You can connect up external connections via 4 connection boxes, depending on which settings you have selected in the Software.

Normal setting

A CTS400 Connection Box allows you to connect up the following functions:

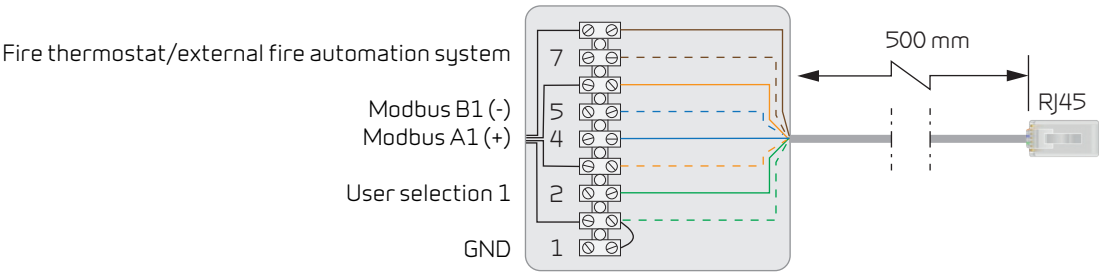


ATTENTION

If you are only connecting 1 function, we recommend that you purchase a LAN cable, type A, of the length required. Plug either end of the cable into the RJ45 port on the unit. Cut off the connector at the other end of the cable and connect the wires that are required. The colours for different connections in the connection box are listed above.

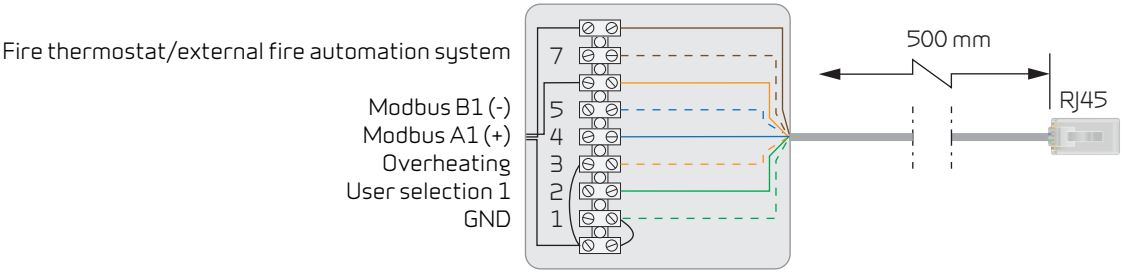
Water after-heating

If you connect up a water after-heating element, it will include a box that enables you to add other connections too:



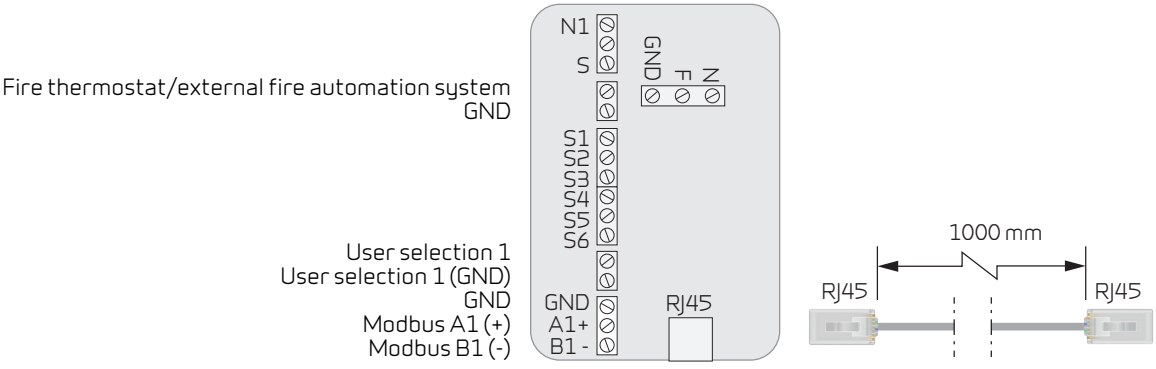
Electrical after-heating

If you connect up an electrical after-heating element, it will include a box that enables you to add other connections too:



Fire automation system

The Fire Connection Box enables you to connect the following functions:



User selection 1 and 2 (cooker hood)

If the fire automation system has not been activated in the software, you will have access to both User selection 1 and User selection 2.

ATTENTION

If the fire automation system has been activated, you will only have access to User selection 1.

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.

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.

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.

ATTENTION

Information on connecting User selection 1 and GND, and User selection 2 and GND can be found under: Overview of connection boxes.

Modbus

The CTS400 control system has open Modbus RS485 communication that allows you to communicate with and control the ventilation unit via external control systems.

Please consult the software instructions and the Modbus protocol for further information on settings and registers.

ATTENTION

Information on connecting Modbus A1(+), Modbus B1(-) and GND can be found under: Overview of connection boxes.

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.

ATTENTION

The setting of which signal to send is made in the PC Tool program.

ATTENTION

Connections of external sensor and GND can be seen under: Overview of connection boxes.

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 registers a broken input signal as fire, and stops. It will only restart once connection to the fire thermostat has been reestablished or the external fire automation system starts signalling again. This must be done manually through the PC Tool program.

When you connect up an external fire automation system, the ventilation unit will have to restart automatically. You can set it to do so in the PC Tool program. Please consult the software instructions for further information.

ATTENTION

Connection to the fire automation system is set up in the PC Tool program under "Settings/ Fire automation system: Fire input priority NO (Normally Open) or NC (Normally Closed).

ATTENTION

Information on connecting fire thermostat / external fire automation system and GND can be found under: Overview of connection boxes.

EM-box (damper option)

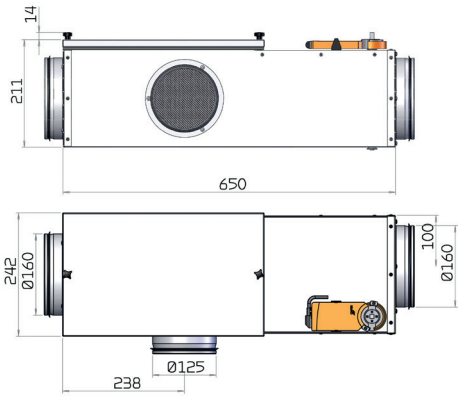
If you want to run the cooker hood via the ventilation unit, you may find the air volume to be insufficient for cooker hood extraction.

ATTENTION

The EM-box solution cannot be used if the fire automation system has been activated in the software.

If you install an EM-box, you can regulate the extract air when the cooker hood is on, 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 efficiently.

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



The system works as follows:

When you turn on the cooker hood, user selection 1 or 2 will be activated. The ventilation unit increases ventilation and sends an output signal to the EM-box that it is to close the damper for extraction from other rooms. However, the damper does not close completely and a reduced level of air extraction from other rooms will still take place.

When balancing, the small stop blocks on the damper should be placed so basic ventilation of the other rooms is maintained.

ATTENTION

Information on connecting User selection output and GND can be found under: Overview of connection boxes.
NB: Wire (230V power supply) for the EM-box damper is not included.

DTBU (damper option)

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

ATTENTION

DTBU-spjæld løsningen kan ikke anvendes, hvis brandautomatikken er aktiveret i softwaren.

An EM-box solution can solve this. However, if there is insufficient space in the installation for an EM-box, the alternative may by to connect up a DTBU damper in the duct system. It has the same function except from having no integral particle filter. You can, however, purchase a filter box with a steel filter that you can install in the duct system.

The DTBU damper regulates extraction so that less air is drawn from, for instance, the bathroom or the utility room. This will allow enough air for the cooker hood to extract sufficiently.

The system works as follows:

When you switch on the cooker hood, User selection 1 or 2 will be activated. The ventilation unit increases ventilation and sends an output signal to the DTBU damper that it is to close for extraction from other rooms. However, the damper does not close completely and a reduced level of air extraction from other rooms will still take place.

ATTENTION

Connections of User selection output and GND can be seen under: The overview of connection boxes.

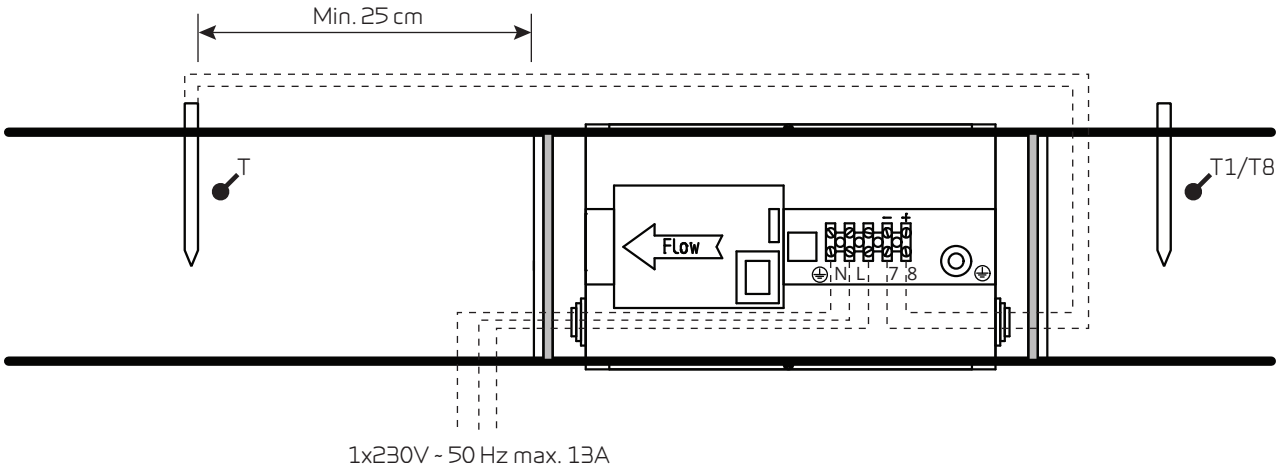
NB! Cable for 230V supply for EM-box damper is not included.

External electrical pre-heating element

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

The electrical pre-heating 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 pre-heating element.



It is important that the sensor is placed at least 25 cm from the pre-heating element to achieve correct regulation.

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

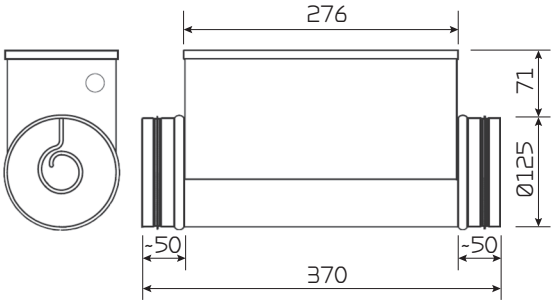
1. An operating thermostat regulates the heating and ensures that the supply air temperature does not fall below -1 °C.
2. Should the temperature exceed 50 °C, a max. thermostat switches off the pre-heating element. (If installed vertically with downward airflow, the pre-heating element switches off 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 Ø125: 70 m³/h.

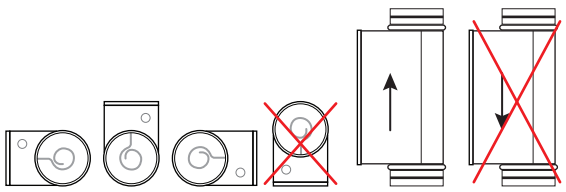
ATTENTION

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:



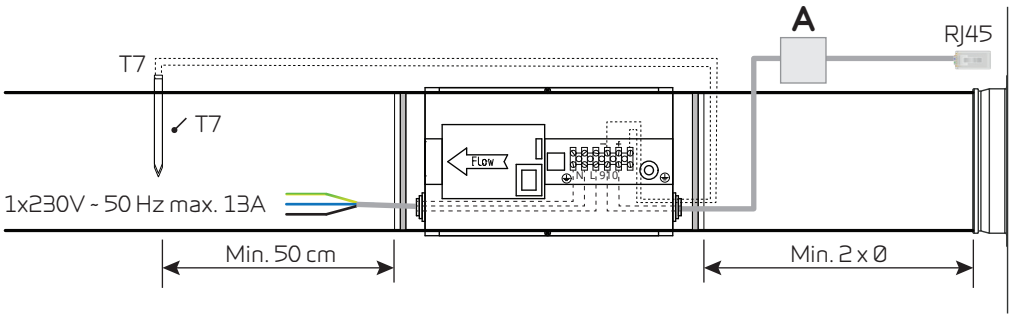
Electrical after-heating element

If you want to control the supply air temperature, you will need an after-heating element.

You can purchase an electrical after-heating element for installation in the supply air duct. It comes with the required sensor, Connection Box and connection to the ventilation unit. The wire running from the heating element to the Connection Box (A) is 2 metres long. The distance from the box to the RJ45 port is 0.5 metres.

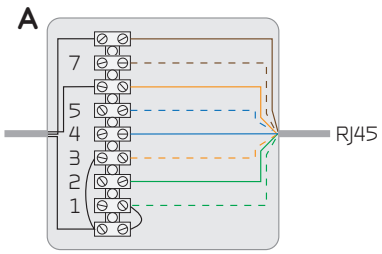
ATTENTION

The T7 temperature sensor has been mounted after the heating element.



It is not necessary to purchase a CTS400 Connection Box, as the electric heating element is supplied with a Connection Box (A), where there are options for other connections:

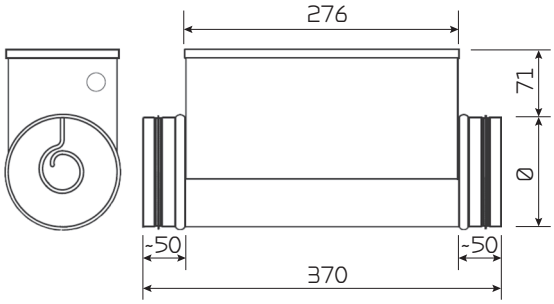
7. Fire input signal
5. Modbus B1 (-)
4. Modbus A1 (+)
3. Overheat protection
2. User selection 1
1. GND



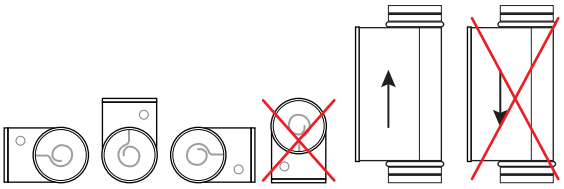
ATTENTION

You must ensure that the heating element is insulated with a fire retardant insulation material. The cover of the Connection Box, however, must not be insulated.

Dimensional drawing: Ø125/Ø160/Ø200



Positioning options:



ATTENTION

The after-heating element must be activated in the Software under "Basic settings".

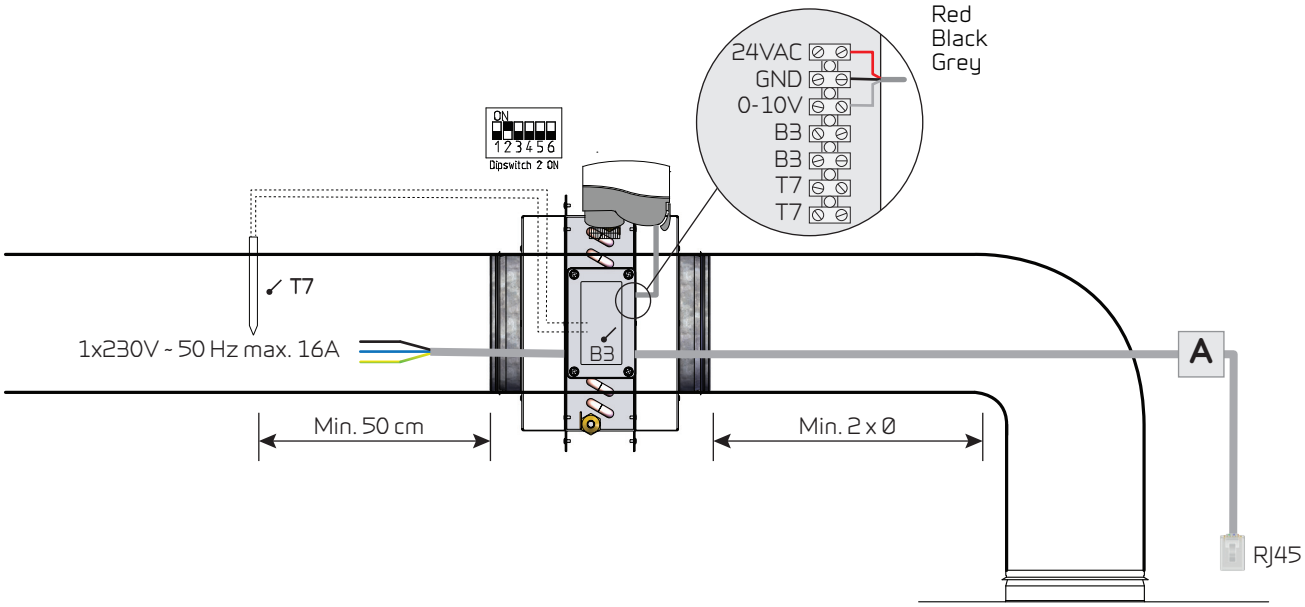
Water after-heating element

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

The water after-heating element can be purchased for installation in the supply air duct and the necessary sensor, connection box and connection to the ventilation unit are included. The wire from the heating element to the connection box (A) is 2 meters long and from the box to the RJ45 plug there is 0.5 meter.

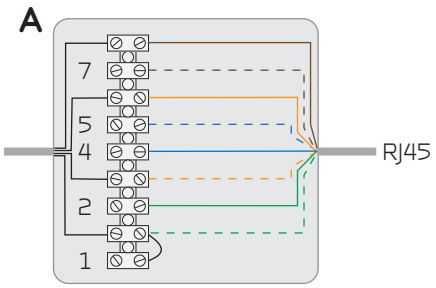
ATTENTION

The temperature sensor T7 is mounted after the heating element.

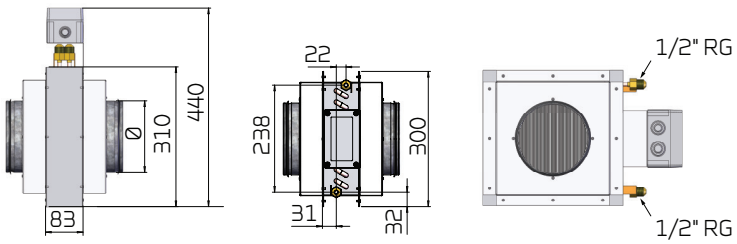


It is not necessary to purchase a CTS400 connection box, as the electric heating element is supplied with a connection box (A), where there are options for other connections:

7. Fire input signal
5. Modbus B1 (-)
4. Modbus A1 (+)
2. User selection 1
1. GND



Dimensional drawing Ø125/Ø160/Ø200:



ATTENTION

The after-heating element must be activated in the Software under Basic settings.

Plumbing installation

Condensate drain

Connection of water trap

It is important that the water trap complies with the measurements below. If the water trap is placed outside the climate screen, it should be protected against frost.

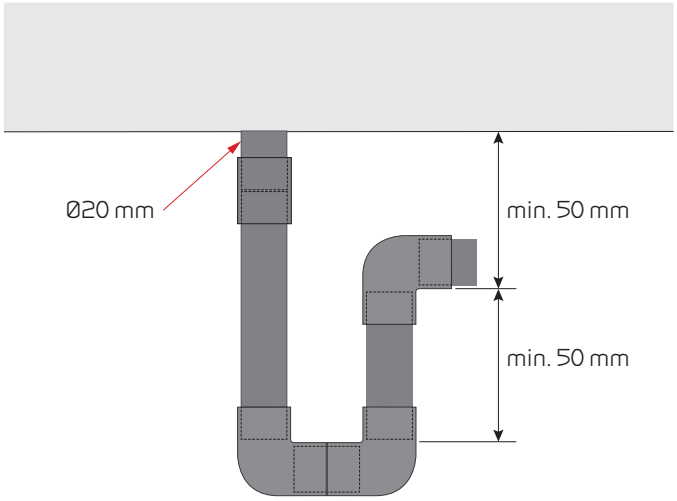


Illustration of connection at the bottom of the unit

ATTENTION

There is positive pressure in the condensate drain in the ventilation unit and it is therefore not necessary to install a water trap with a ball. In some installations a water trap can still be beneficial, however, because it prevents potentially bad smells from entering the unit if operation should stop.

Plumbing connections accessories

Water after-heating element - duct installation

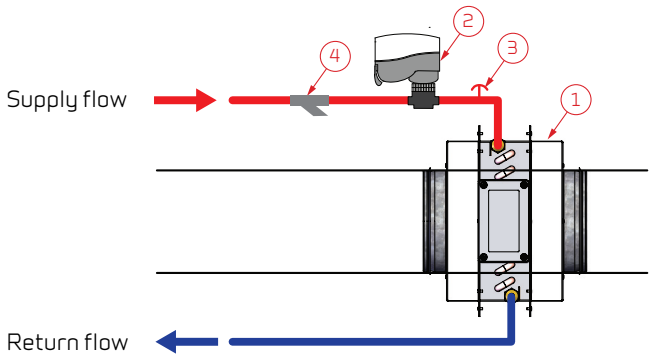
WARNING
The water after-heating element must be installed by a certified plumber.

WARNING
If you install the water after-heating element outside the climate screen of the building, it must be protected against frost.

The water heating element is for duct connection and it cannot be integrated into the ventilation unit.

Connect up the system, air it, and check for potential leaks. You can now start the unit.

Following adequate flushing of the system, check and clean the sediment trap.



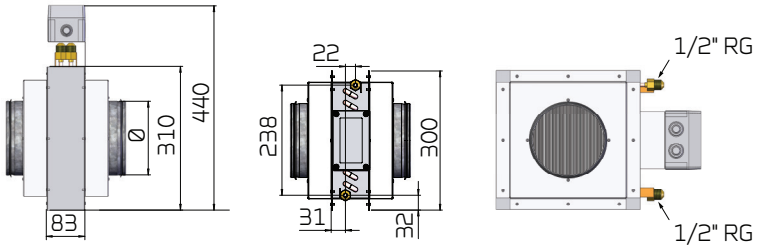
The water heating element is supplied as an accessory consisting of:

1. Water heating element with frost thermostat B3
2. Actuator and regulation valve
   Danfoss AME 140/24V 0-10V signal,
   2-way valve VZ2 Kv 0.4 (Nilan supply), the Kvs value must be checked against the power supply.
   Differential pressure: 0.1 - 0.6 bar.
   With a flow temperature of 60 °C and at maximum heat output, the temperature is estimated to fall with 20 °C over the heating element.
3. Bleed valve (not supplied by Nilan)
4. Sediment trap (not supplied by Nilan)

IMPORTANT regarding Danfoss actuator type AME 140
Reinstallation of the actuator must be done as follows:

1. Disconnect the power supply and remove the cover from the actuator
2. Release the gear by pressing and holding the button at the bottom of the casing, while turning the spindle fully (anticlockwise)
3. Install the actuator and connect up the power supply
4. Move DIP-switch no. 1 to ON, and then to OFF
5. It calibrates automatically for up to 6 minutes. (The diode flashes during calibration. After completion, it stays on)
6. Put the cover on the actuator

Dimensional drawing Ø125/Ø160/Ø200:



ATTENTION
The after-heating element must be activated in the Software under Basic settings.

Fire automation system

General oplysninger

Safety

ATTENTION

All work must be carried out by suitably 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 ventilation unit.

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

Usage

Nilan's fire automation system is used to monitor, test and check the fire protection components of the ventilation system:

- Fire and smoke damper, and fire thermostat

Important functions:

- Monitors the fire protection system and ensures that dampers and detectors are in fully working order
- Tests dampers every 7th day - set for Mondays 10.00 a.m.
- If fire is detected, fire and smoke dampers will close and the ventilation unit will stop
- If the ventilation unit stops, fire and smoke dampers will close

Dampers that are connected up to the system must have a 24V or 230V fire damper motor.

The fire automation system is for indoor installation. The automation system can be used within a temperature range of -20 °C to +40 °C. The protection level for fire and smoke dampers must be IP65.

WARNING

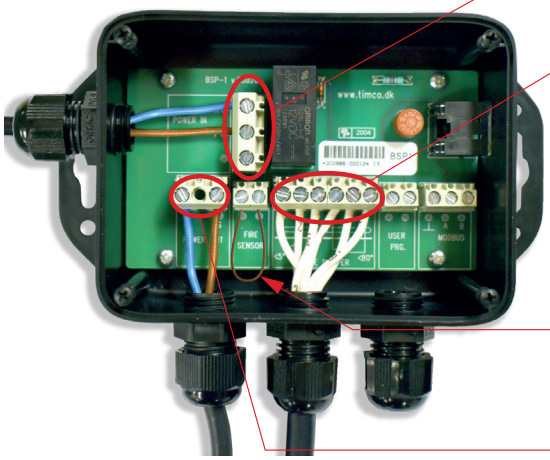
Must not be used as a fire alarm system.

Electrical connection fire automation system

Connection of fire damper

As an optional extra you can purchase Nilan's Fire Connection Box for connection of fire dampers.
The fire automation system is integrated into the control system.

Belimo fire damper



Connection to the wiring harness 24/230V AC
Connect up neutral (blue) in N
Connect up phase (brown) in F

Connection of signal cable from fire automation system
Connect S1 (white) to screw terminal S1 (GND)
Connect S2 (white) to screw terminal S2 (Damper closed, signal)
Connect S3 (white) to screw terminal S3
Connect S4 (white) to screw terminal S4 (GND)
Connect S5 (white) to screw terminal S5
Connect S6 (white) to screw terminal S6 (Damper open, signal)

Connection from external fire thermostat
If you want to connect up an external fire/smoke thermostat, remove the shunt from the screw terminal row. In its place connect up the external fire/smoke thermostat.

Connection from fire automation system 24/230V AC
Connect up N (blue) in N1
Connect up L1 (brown) in S

Green LED for active damper

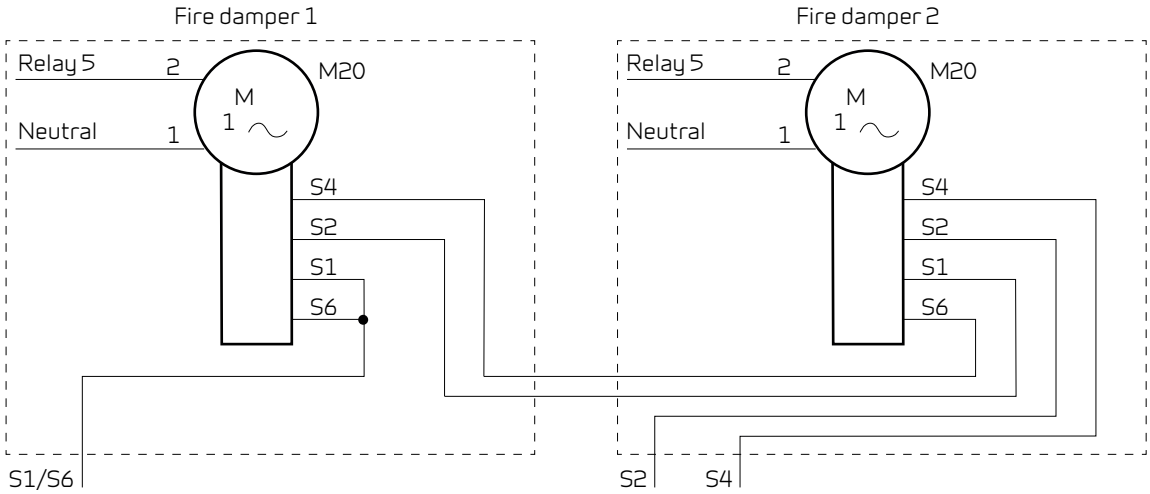
RJ45 connection to Nilan's ventilation unit

Connecting two fire dampers

You can connect two fire dampers. When connecting two fire dampers, the contact functions must be connected in series as outlined below. Note that the two extra wires from dampers (S3 and S5) are not used. Connect the supply voltage from Neutral and relay 5 in a parallel circuit.

Mount junctions in an external junction box (not supplied by Nilan).

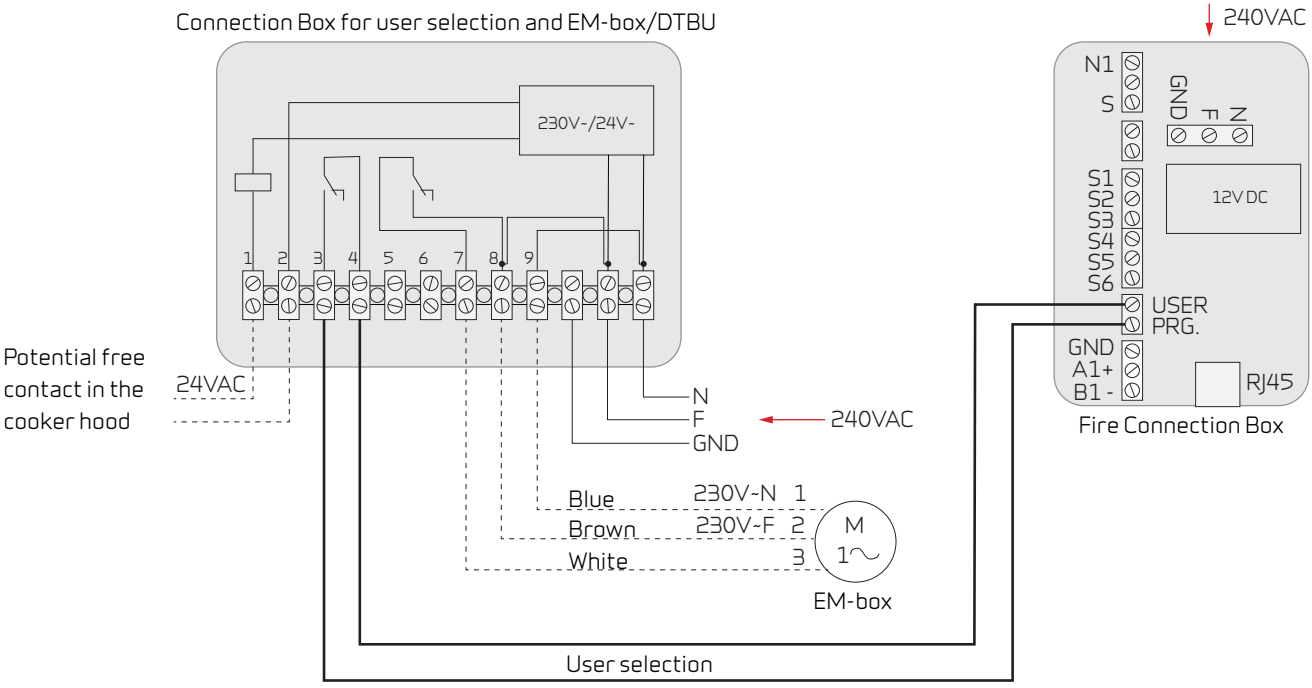
Connect up S1-S6 to Nilan's Fire Connection Box as shown under "Connecting fire dampers".



Connection Box for user selection and EM-box/DTBU simultaneous with fire automation system

If the Fire automation system has been activated in the software, and you want to run cooker hood extraction in combination with an EM-box/DTBU damper, Nilan can supply a Connection Box for connecting up the EM-box/DTBU damper.

You can connect up the Connection Box to the Nilan Fire Connection Box (as illustrated). The fire damper is also connected up here.



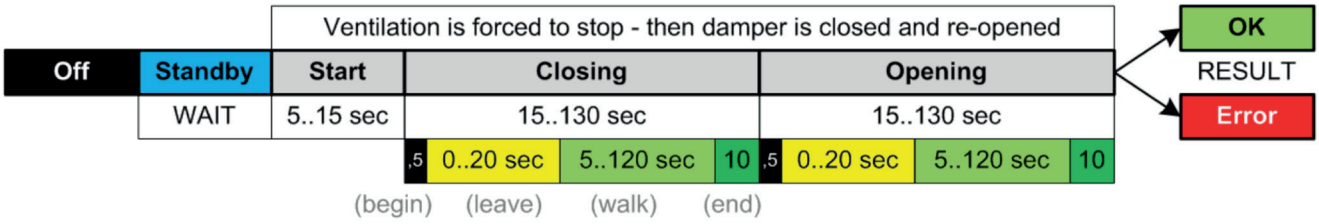
Alarm code

Set an alarm 96 - "Damper test" if a position (open / closed) has not been fulfilled within the maximum moving time of 120 seconds.

The test will fail if:

- Current starting position (open) is incorrect.
- Current position (open and closed) has not altered within the first 12 seconds of moving in each direction.
- The measured moving time does not range between 15 and 130 seconds.

Automatic test sequence



Start-up and annual testing

It is necessary to carry out a complete test of functions after installation of the fire protection automation system. If everything has been installed in accordance with the guidelines and regulations, and the test reveals no errors, the display will show "OK".

If the test fails, the display will show "ERROR". The fault must then be rectified. The ventilation unit will shut down as in case of fire. The test must be performed again until "OK" is displayed in the menu.

For the overall system, all requirements in DS 428 must be met before a delivery can be made.

Manual test of fire and smoke dampers

You should checked that all dampers change position physically. See the supplier's instructions.

Connect the fire damper switches for, respectively, open and closed position to two digital inputs on the circuit board (see wiring diagram).

Fire thermostat

Temperature sensor is warmed up with fan heater. See the supplier's instructions.

Release-signal to ventilation unit

During a fire the ventilation unit will shut down and the fire and smoke dampers will close. Following that, the alarm can only be cancelled manually on the control panel. You will then be able to restart the unit.

Operating signal from ventilation unit

An active signal should cause all dampers to activate (open) if there are no alarms. If there is no signal, the unit will act as in case of fire and all dampers will close.

Schedule for functional testing

ATTENTION

DS428 requires written documentation of the annual test of the Fire automatic system.

Date:	Comments:	Tested by:

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.

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

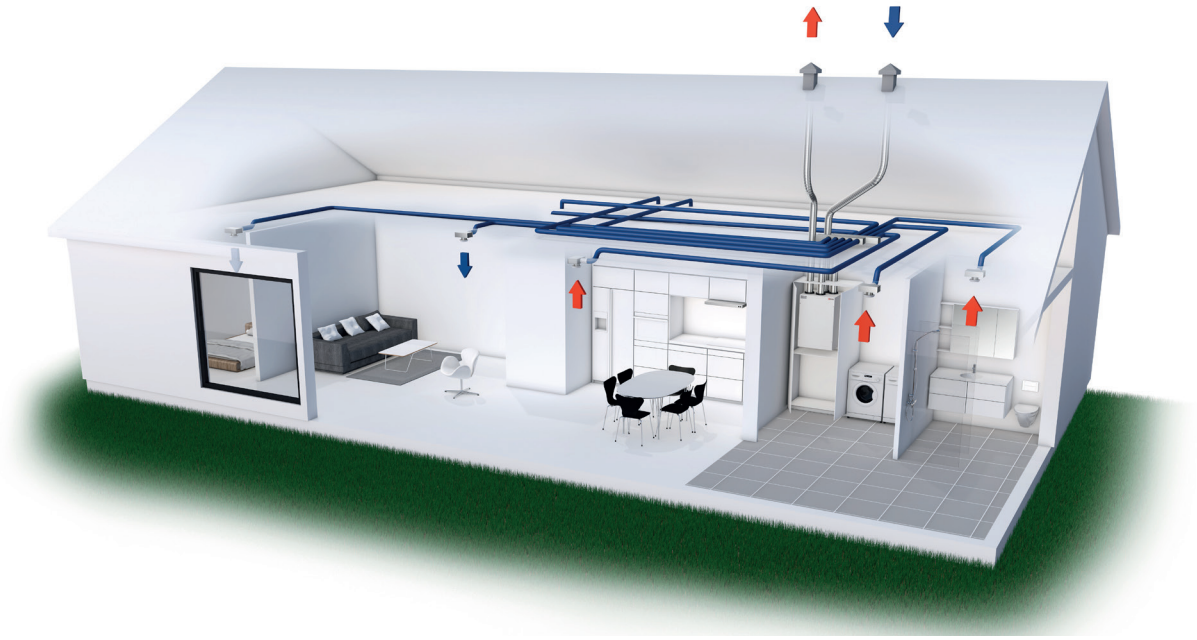
The position and design of air intake and air discharge should limit pressure oscillations in the ventilation unit caused by wind. Their position should also prevent birds and other animals from getting in. Finally, the position and design should ensure that air intake and the connected duct system are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

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