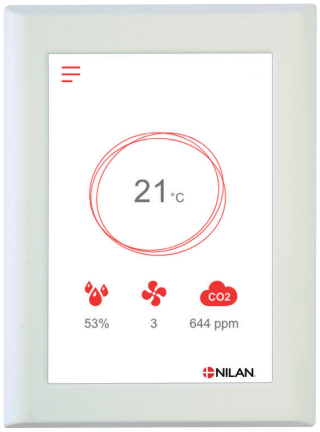
INSTALLATION INSTRUCTIONS

CTS602 LIGHT BY NILAN



Comfort 350 Top / Comfort 350 Top Polar

Version 5.20 - 26.08.2024
M24 Comfort 350 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

The Comfort 350 Top is an energy efficient ventilation unit, offering heat recovery for homes and smaller commercial buildings with ventilation requirements of up to 407 m^3/h.

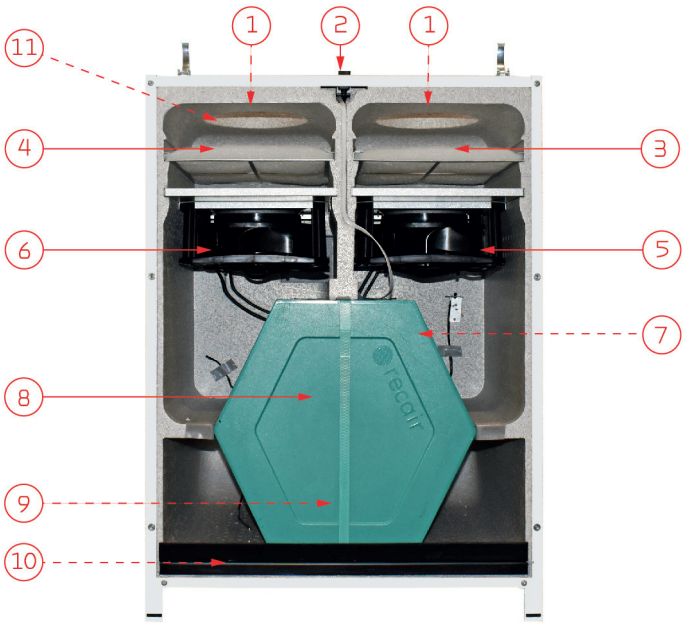
Comfort 350 Top is a system with compact dimensions that can be built into a cabinet with a width of 60 cm. Comfort 350 Top is delivered tested and ready for operation.

The unit is used primarily in residential buildings. Due to its low sound level it is particularly suitable for ventilation in apartments. The unit ventilates the dwelling by drawing out damp and vitiated air through valves placed in, for instance, bathroom, lavatory, kitchen and utility room. It then blows fresh outdoor air in through valves placed in living areas such as sitting room, family room and bedrooms.

The cold outdoor air is heated up by the warm extract air in the high efficiency counterflow heat exchanger. This ensures limited heat loss through ventilation.

As standard, the unit is supplied with Greencycle ISO 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 ePM1 50% (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. Pre-heating element (Polar version)

Dimensional drawing Comfort 350 Top

All listed measurements are in mm.

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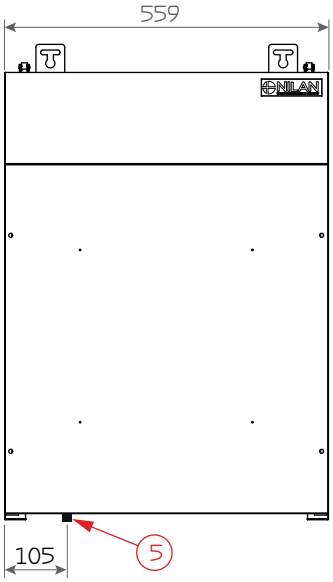

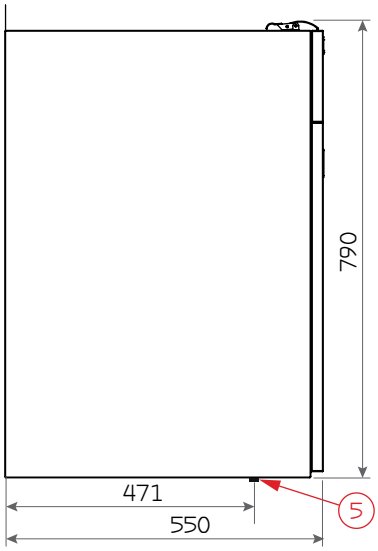

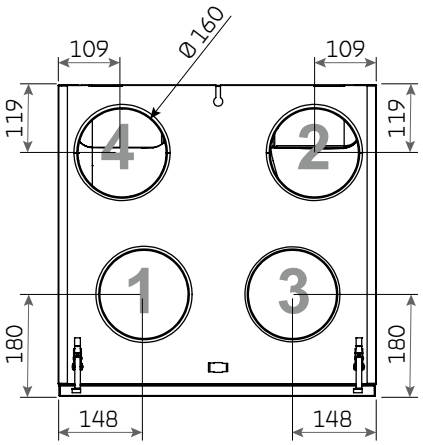

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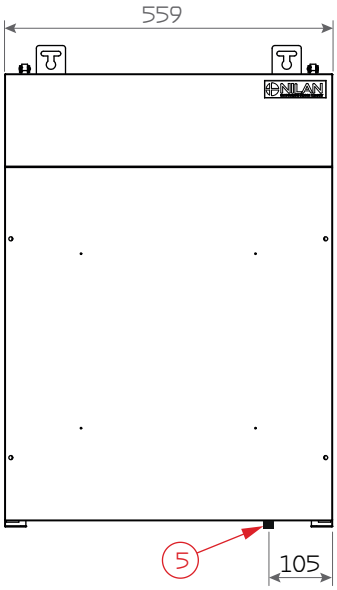

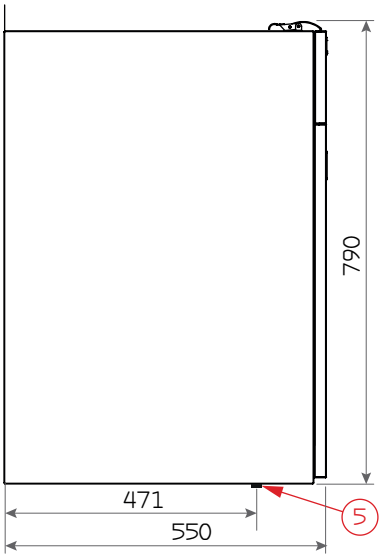

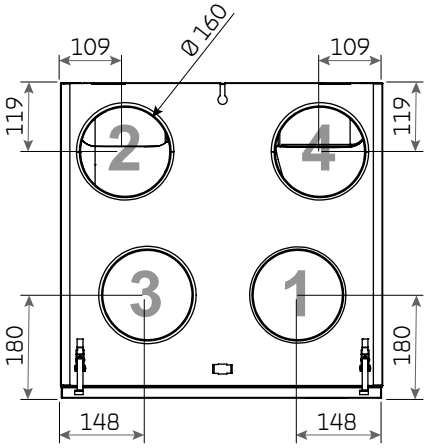

Connections:

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

NB! Spouts for inlet ring

Dimensional drawing Comfort 350 Top Polar

All listed measurements are in mm.

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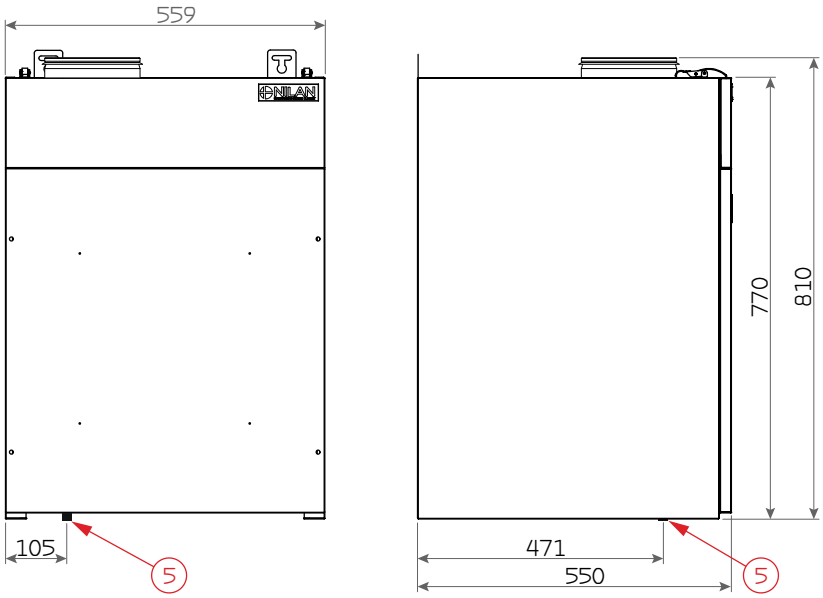

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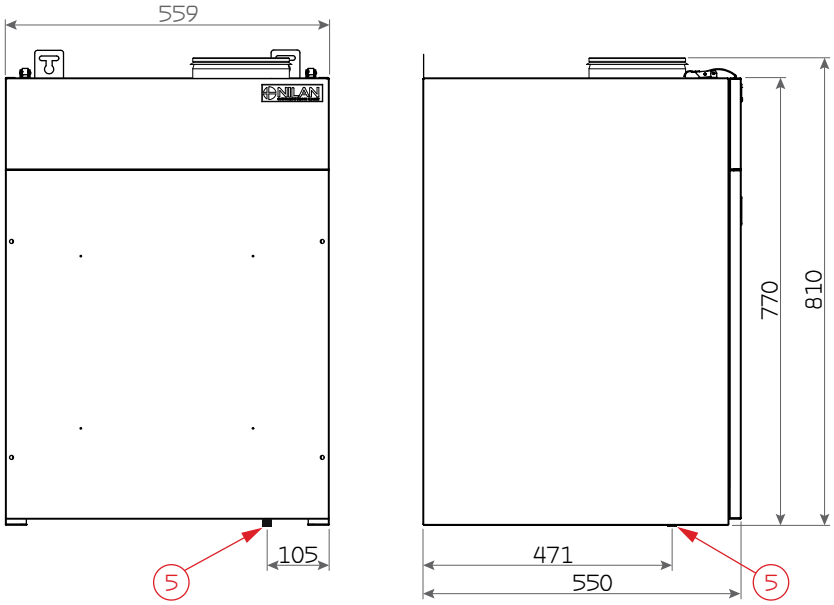
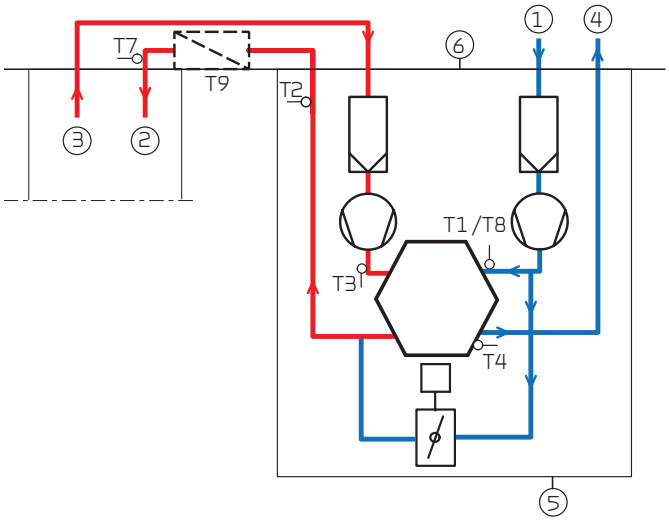


Connections:

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

NB! Spouts 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 connections

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 for duct installation

Installing an after-heating element allows 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 electrical 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.

Water after-heating element 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.

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.

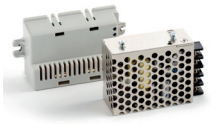
The EM box is fitted with a metal filter that cleans the air in the cooker hood of grease particles efficiently. It thereby protects the ventilation unit.

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.

CO_2 sensor



If you want to adjust the fan speed level in accordance with the level of use of the dwelling/building (amount of people), you can retrofit a CO_2 sensor. Nilan's CO_2 sensors calibrate automatically.

On the control panel, you select the CO_2 level you want. If this level is exceeded, ventilation will automatically increase.

Expansion PCB

An expansion PCB extends the functions in the control system so you can control various accessories.

Under "Electrical connection accessories" you will be able to see which accessories require an expansion PCB.

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.

CTS602 Connection box

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

- User selection 1 and 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.

Water trap with ball

The unit has over pressure in the condensate drain, therefore it is not necessary to install a water trap with a ball, but in some installations it will be advantageous to use this, to avoid any odor nuisance coming up in the system, in the event of a stoppage.

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.

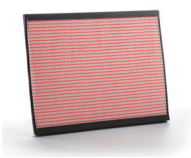
Nilan can supply effective vibration absorbers to place under the ventilation unit. They are sold in packs of 4.

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.

Wall mount brackets

Nilan can supply wall mount brackets with vibration absorbers which will ease the process of mounting ventilation units with top connections.

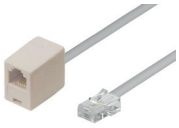
You assemble the wall bracket, mount it on the wall and simply place the ventilation unit into the bracket. There must be room below it for the condensate drain.

Plinth

An elevation plinth that lifts the unit from the floor.

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

Extension cable HMI control panel



The control panel for the ventilation unit is connected up with a short wire so it can be installed close to the unit.

If you place the unit so the control panel is out of sight, for instance in a cupboard or in the loft, you can order a 15 m extension cable with plug. This allows you to place the control panel where it is visible to the user.

It is important that the control panel is visible so the user can see alarms when, for example, filters need replacing.

Functional cable

The following external functions can be connected to the ventilation unit via an RJ45 connector:

- User selection 1 and 2 (cooker hood)
- Modbus communication
- Fire thermostat or external fire automation system

You can adapt an RJ45 connector yourself in line with the instructions. To facilitate installation, Nilan can supply a 10 m LAN cable with the correct RJ45 connector for the three functions.

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.

Gateway with App option

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.

Installation

Placement

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.

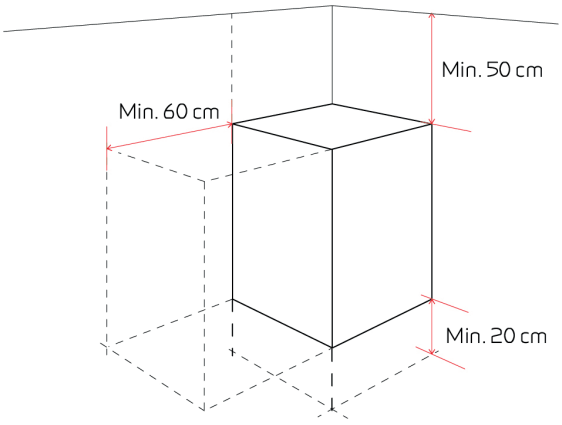
ATTENTION
The unit must be level to enable proper drainage from the condensate tray.

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.

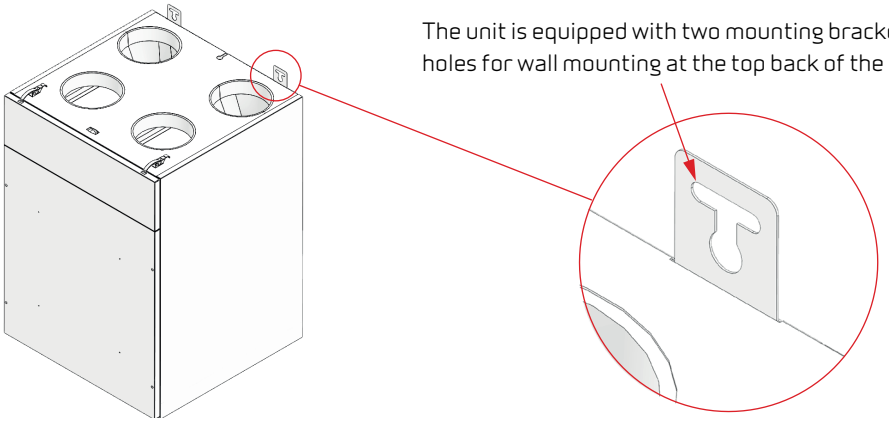
Top unit

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 needs to be fitted (not supplied by Nilan).

1. Use size Ø160mm inlet ring. (The Polar version is delivered with an inletring at the pre-heating element.)

2. Press the inlet rings firmly into the ventilation nozzles.

Electrical installation

Electrical connections

Safety

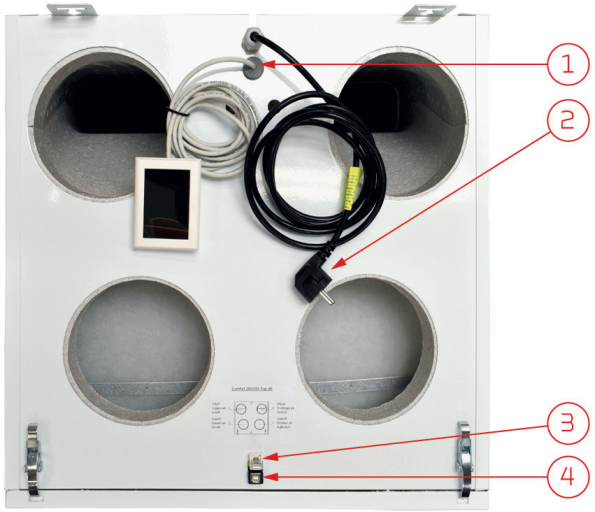
ATTENTION
All work must be carried out by qualified persons and in compliance with existing legislation and regulations.

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.

Connection overview

All connections are placed at the top of the ventilation unit.



1. Connection to control panel.
2. Connection 230V (remember electrical grounding).
3. External connections/accessories via RJ45 splitter plug and patch cable.
4. Connection to PC.

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

User panel

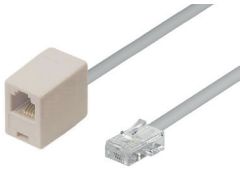
HMI User panel

The user panel comes with 1.5 meter cable.

ATTENTION

If you want a longer cable, use a standard RJ12 shielded cable, max 50 meters.

Nilan offers a 15 meter cable with plugs on both ends.



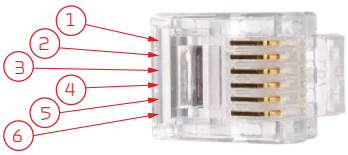
Mounting and placing the control panel

The control panel has a factory-fitted 1.5 m wire for mounting on the wall by the unit. It is important that the control panel is located in a visible place so that the user can follow the unit operation and become aware of any alarms. Therefore, it may be necessary to move the control panel to another location.

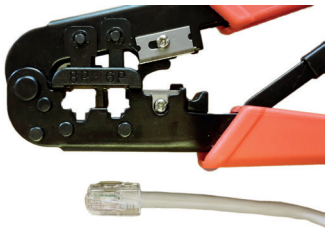
Nilan offers a connection cable with RJ12 plug of 15 m. It is also possible to customize a cable up to 50 m in length. A standard LAN cable is used for this.

The wires from the 8-pin plug, for connection of the HMI control panel, are placed loose in the unit and must be connected to the circuit board (according to the wiring diagram).

Mounting the RJ12 plug

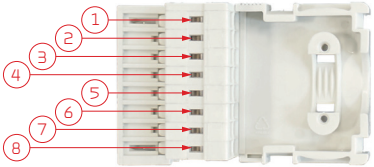


1. Empty
2. Empty
3. Green (A2)
4. Green/white (B2)
5. Brown (12V)
6. Brown/white (GND)



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 selection 1)
5. Empty (User selection 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 then remove it.

Mount the wall bracket on the wall using 2 screws.

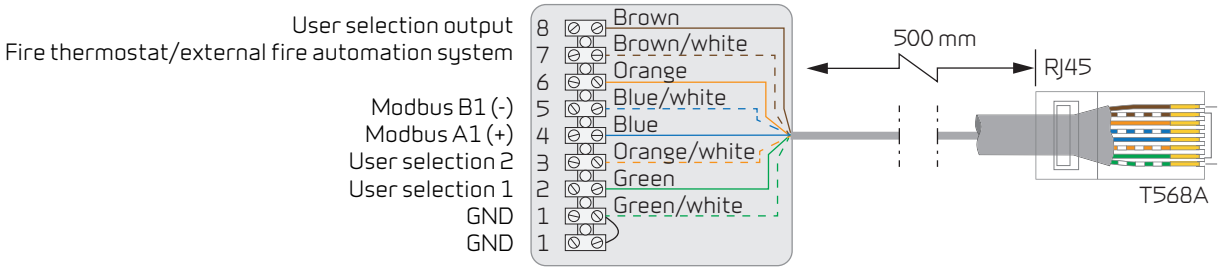
Click the RJ12 plug into place at the bottom of the HMI panel. The wire can run down along the wall, into the wall or through the groove at the back of the panel.

Electrical connections accessories

CTS602 Connection box

You can connect the following external connections via the Connection Box that has 0.5 m wire and an RJ45 plug:

- User selection 1
- User selection 2
- Modbus
- Fire thermostat / external fire automation system



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.

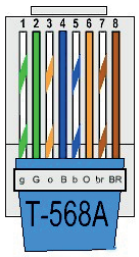
Functional cable

Many of the external connections are made via an RJ45 port that is installed on the ventilation unit. See the connections overview to locate the RJ45 port. From factory, a shunt plug for fire thermostat connection has been plugged into the RJ45 port. This must be removed before the LAN cable is plugged in.

The LAN cable enables the following functions:

- User selection 1
- User selection 2
- Modbus
- Fire thermostat / external fire automation system

Connections in relation to the function cable that has an RJ45 connector in one end and loose wires in the other:



1.	Green/white	GND
2.	Green	User selection 1
3.	Orange/white	User selection 2
4.	Blue	Modbus A1 (+)
5.	Blue/white	Modbus B1 (-)
6.	Orange	Not used
7.	Brown/white	Fire thermostat / external fire automation system
8.	Brown	User selection output (Cookerhood function)

The length of the LAN cable is 10 m.

ATTENTION

If you adapt an RJ45 cable yourself, be aware that wire 8 (Brown) can become live with 12V and must not be short circuited.

In Nilan's LAN cable the wires that are not used are not connected up to the RJ45 connector. With Nilan's LAN cable there is therefore no risk of short circuits.

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. 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.

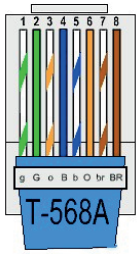
Fireplace/wood burning stove: Normally, the ventilation is balanced with a small negative pressure in the home, so that no moisture is forced into the building's construction. It is a disadvantage if you light up your fireplace / wood stove, as the smoke will then enter the home instead of out of the 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.

Connection via Nilan Functional cable



1. Green/white GND
2. Green User selection 1
3. Orange/white User selection 2
4. Blue
5. Blue/white
6. Orange
7. Brown/white Fire thermostat / external fire automation system
8. Brown User selection output (Cookerhood function)

Connection of User selection 1

A potential-free signal is connected to User selection 1 via the following:

1. Green/white
2. Green

NB: If fire thermostat/external fire automation system is not connected up, make a shunt between:

1. Green/white
7. Brown/white

Connection of User selection 2 (overriding the operation)

A potential-free signal is connected to User selection 2 via the following:

1. Green/white
2. Orange/white

NB: If fire thermostat/external fire automation system is not connected up, make a shunt between:

1. Green/white
7. Brown/white

ATTENTION

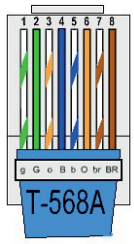
If you are not using the Cooker hood setting in User selection, you will be able to use any RJ45 cable. In that case, wire 8 Brown will not carry 12V.

Modbus

The CTS602Light 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.

Connection via Nilan Functional cable



1. Green/white GND
2. Green
3. Orange/white
4. Blue Modbus A1 (+)
5. Blue/white Modbus B1 (-)
6. Orange
7. Brown/white Fire thermostat / external fire automation system
8. Brown

Connection of Modbus communication

Establish the Modbus connection via the following:

1. Green/white
4. Blue (+)
5. Blue/white (-)

NB: If fire thermostat/external fire automation system is not connected up, make a shunt between:

1. Green/white
7. Brown/white

ATTENTION

If you are not using the Cooker hood setting in User selection, you will be able to use any RJ45 cable. In that case, wire 8 Brown will not carry 12V.

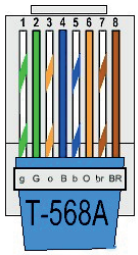
Fire thermostat / external fire automation system

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.

Connection via Nilan Functional cable:



1. Green/white GND
2. Green
3. Orange/white
4. Blue
5. Blue/white
6. Orange
7. Brown/white Fire thermostat / external fire automation system
8. Brown

Connection of fire thermostat or external fire automation system

Establish the connection via the following:

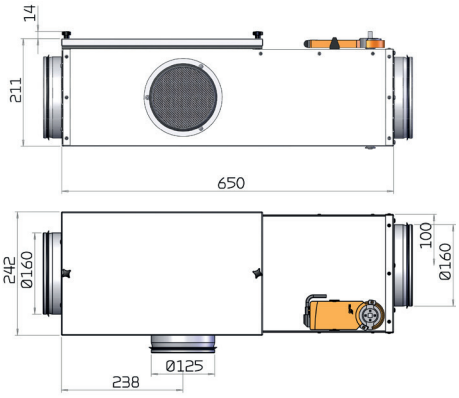
1. Green/white
7. Brown/white

ATTENTION

If you are not using the Cooker hood setting in User selection, you will be able to use any RJ45 cable. In that case, wire 8 Brown will not carry 12V.

EM Box (damper option)

Dimensional drawing:



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.

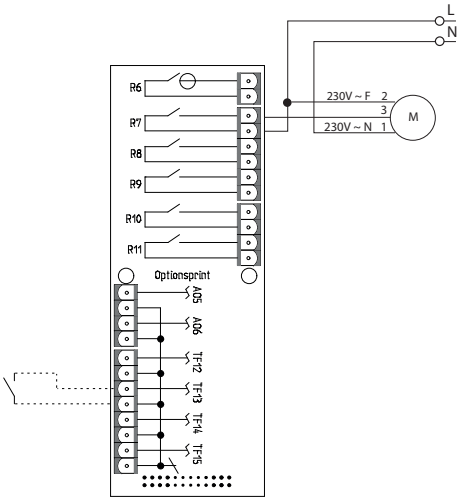
With an EM box installed and when the cooker hood is in operation, you can regulate the extraction so that less air is extracted out of the other rooms, e.g. bathroom and utility room so that there is enough air for the cooker hood to extract sufficiently.

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.

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 option)

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.

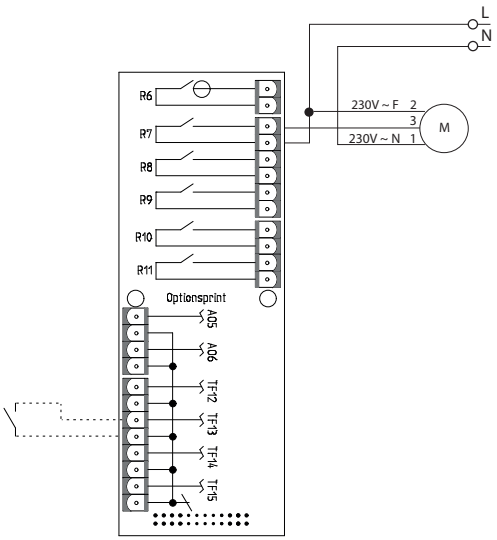
To solve that challenge, an EM-box solution can be used. However, if there is not enough space in the installation for an EM box, you can alternatively connect a DTBU damper in the duct system, which has the same function, except that it does not have a built-in dirt filter. However, a filter box with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

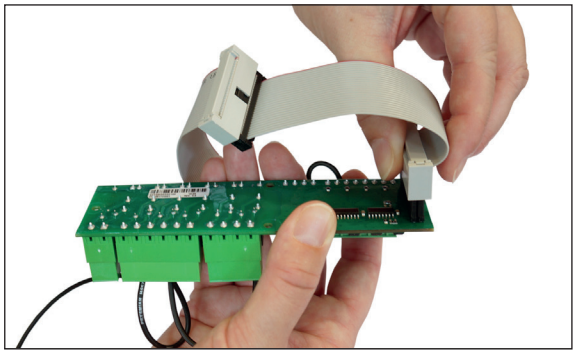
The DTBU damper is connected to the PCB board via the electrical diagram.



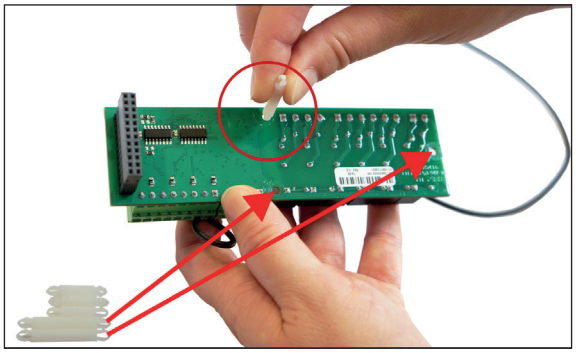
Installation of expansion PCB on CTS602 Light circuit board

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

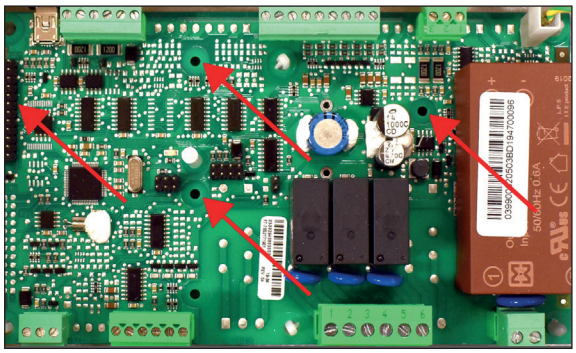
You can connect a CO_2-sensor, a joint alarm and an after-heating element (expansion PCB is included with the heating element).



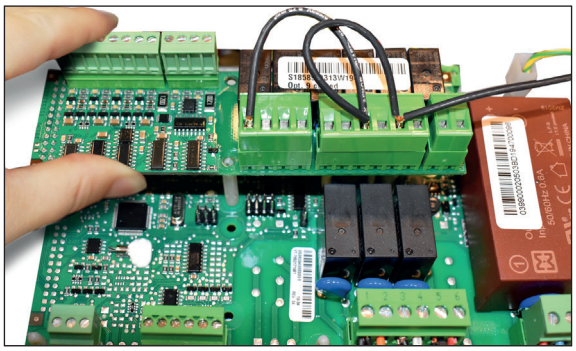
1. Demount the shown bus cable from the expansion PCB.



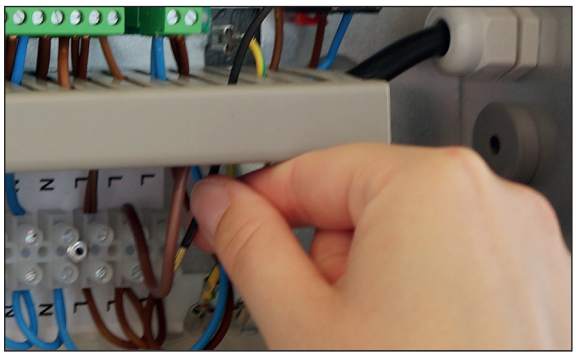
2. Mount the large circuit board supports in the 3 holes on the expansion PCB.



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.

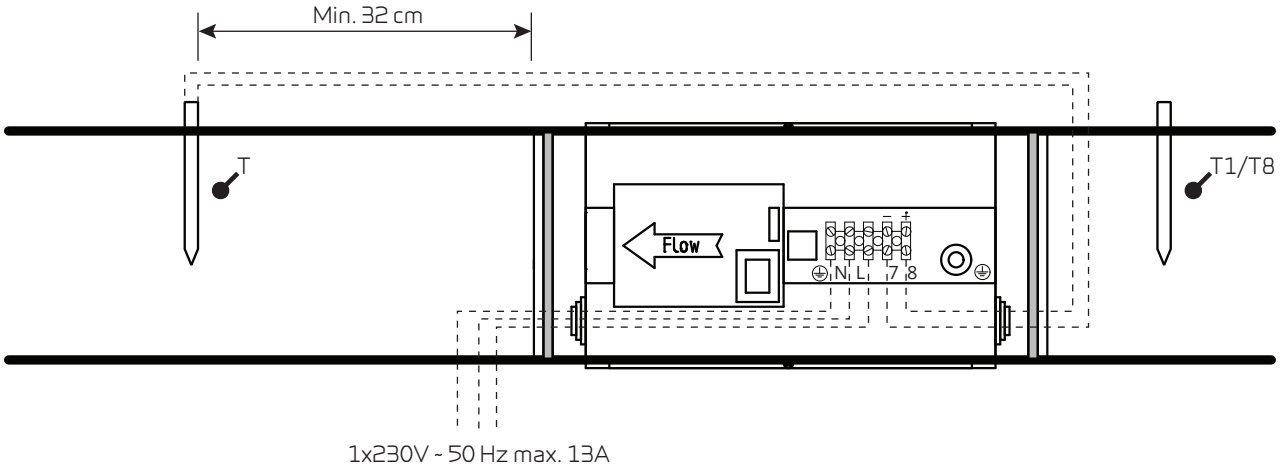
The expansion PCB is an accessory for the CTS602 circuit board. Nilan does not supply external components.

External 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 32 cm from the pre-heating element to achieve correct regulation.

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

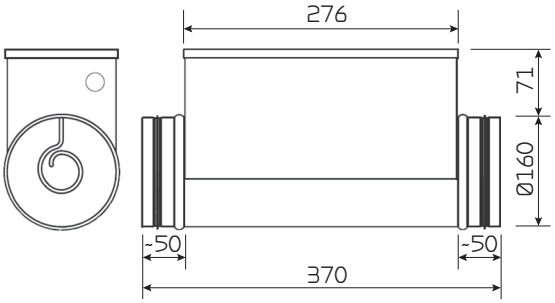
1. An operating thermostat regulates the heating and ensures that the supply air temperature does not fall below -1 °C.
2. Should the temperature exceed 50 °C, a max. thermostat switches off the pre-heating element. (If installed vertically with downward airflow, the pre-heating element switches off 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 Ø160: 110 m^3/h.

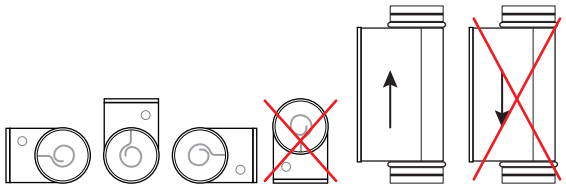
ATTENTION

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:



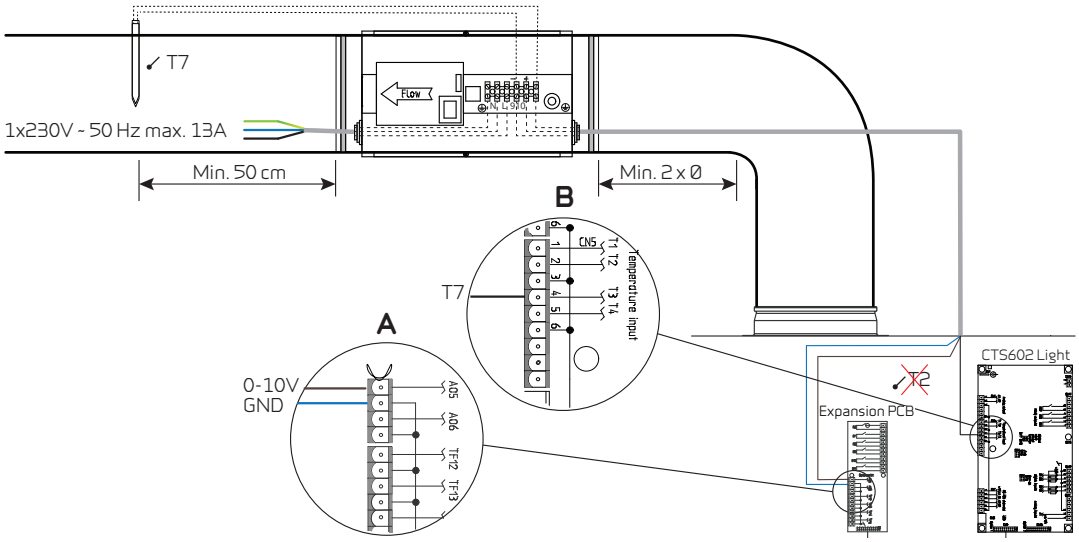
Electrical after-heating element

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, Expansion PCB and connectors to the ventilation unit are included.

ATTENTION

The T7 temperature sensor is mounted after the heating element. The T2 sensor must be disconnected from the circuit board, and the T7 sensor must then be connected to where the T2 sensor was previously connected.



A
Connection CTS602 Expansion PCB:
0-10V (Brown) - GND (Blue)

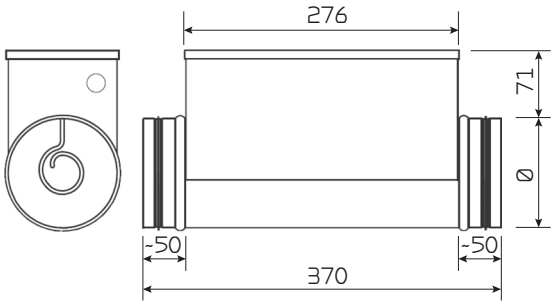
B
Connection CTS602 Light circuit board:
T7: Temperature sensor (Black)

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.

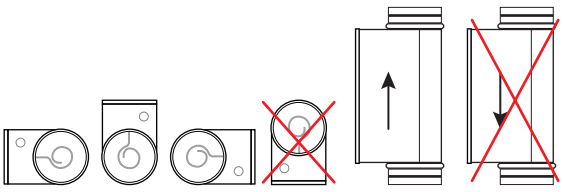
ATTENTION

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 heating element must be activated in the Software under "Service".

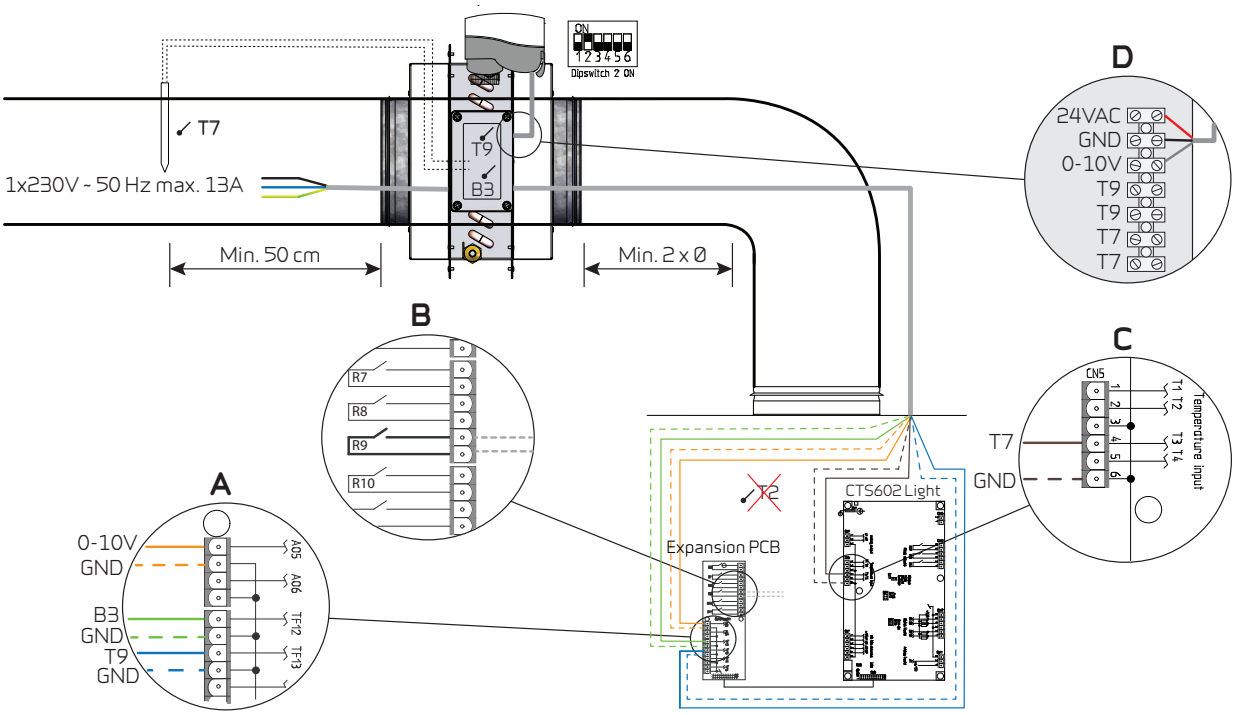
Water after-heating element

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. The required sensors, Expansions PCB and connectors to the ventilation unit are included..

ATTENTION

The T7 temperature sensor is mounted after the heating element. The T2 sensor must disconnected from the circuit board, and the T7 sensor must then be connected to where T2 sensor was previously connected.



A
CTS602 Expansion PCB:
0-10V (Orange) - GND (Orange/white)
B3: Frost protect. (Green) - GND (Green/white)
T9: Temp. sensor (Blue) - GND (Blue/white)

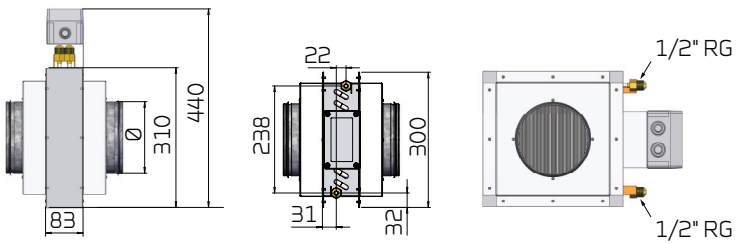
B
CTS602 Expansion PCB:
It is possible to connect a possible external circulation pump in Relay 9 (See wiring diagram)

C
CTS602 Light circuit board:
T7: Temp. sensor (Brown) - GND (Brown/white)

D
Regulation valve:
24VAC (Red)
GND (Black)
0-10V (Grey)

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 Ø125/Ø160/Ø200:



ATTENTION

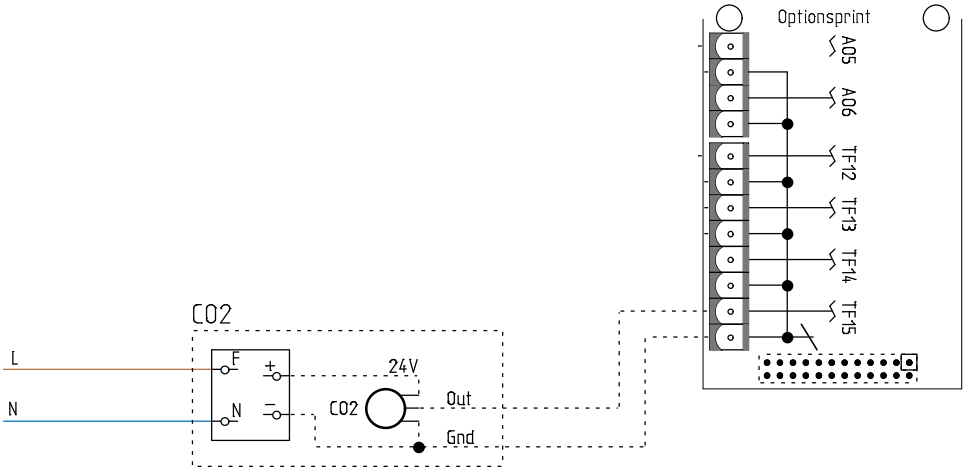
The heating element must be activated in the Software under Service.

CO_2 sensor

If the extent to which a dwelling/building is used varies considerably, you will benefit from installing a CO_2-sensor to control the air exchange. The CO_2-sensor measures the CO_2-level in the extract air. It then regulates the fan speed level accordingly.

ATTENTION

In order to be able to connect up a CO_2-sensor, the ventilation unit must have an expansion PCB. This must be purchased separately, but if you have ordered an after-heating element, an expansion PCB is included.



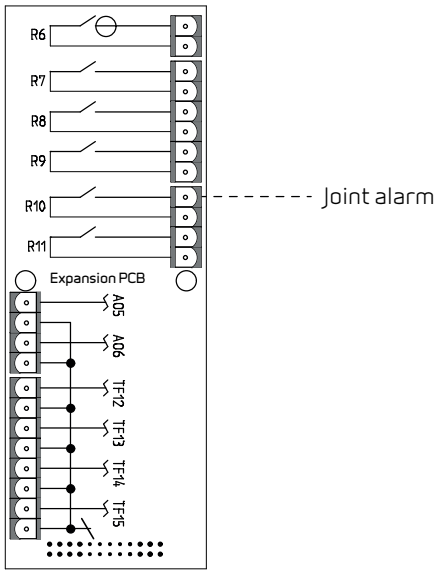
Connect the power supply 230V to the circuit board.

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.

The Joint alarm is connected to the expansion PBC (accessory) via relay R10.



Plumbing installation

Condensate drain

Important information

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

ATTENTION

The condensate drain must be fitted with a water trap to ensure that condensate water can drain away.

ATTENTION

If the unit is installed outside the climate screen, it is important to secure the condensate drain and the water trap against frost insulating it well. If deemed necessary, it is possible to supplement with a heating cable. The installer carries the responsibility of frost-proofing the installation.

When the ventilation unit is in operation, negative pressure of up to 500 Pa can be created. This happens in the part where the condensate drain is situated and corresponds to a 50 mm water column. The water trap should therefore be installed as shown to prevent it from drying out and to stop a potential return flow of condensate water.

The connection of the water trap must be airtight. Otherwise air will be drawn into the ventilation unit and it will prevent condensate water from draining away. It could cause water damage if the condensate tray were to overflow and condensate water were to leak from the ventilation unit.

After you have installed the water trap, test its function in the following way (the unit must be connected to the duct system): Fill the condensate tray with water, close the unit door and start the ventilation unit at the highest fan speed level. Allow it to run for several minutes. Open the door and check that the water has drained from the condensate tray.

The water trap can dry out in the summer. Negative pressure in the chamber will then cause air to be drawn into the ventilation unit and this will prevent condensate water from draining away. You should therefore check the water trap regularly and top up with water when necessary, especially in the autumn.

USEFUL INFORMATION

As an accessory, Nilan can supply a water trap with ball. When the water trap dries out, the ball closes it off and ensures that air cannot be drawn into the ventilation unit. When condensate water is formed again, it will lift the ball, and the water will be able to drain away without problems.

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.

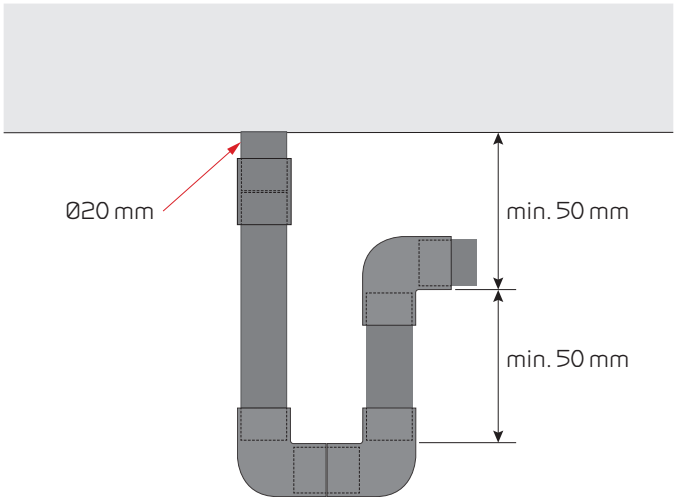


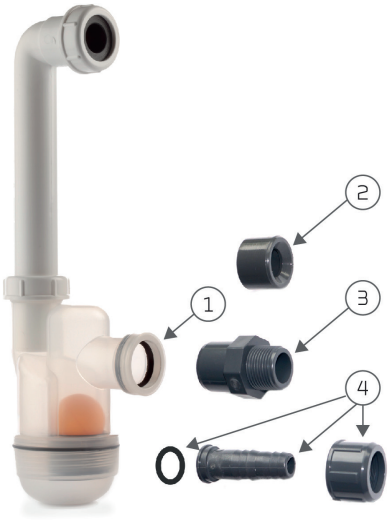
Illustration of connection at the bottom of the unit

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.

Connection of water trap with ball

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.



Water trap and accessories:

1. Water trap with Ø32 mm reducing fitting
2. Reducing fitting for Ø20 mm
3. Reducing fitting for $^{3}/_{4}$"
4. Reducing fitting for $^{1}/_{2}$" tube

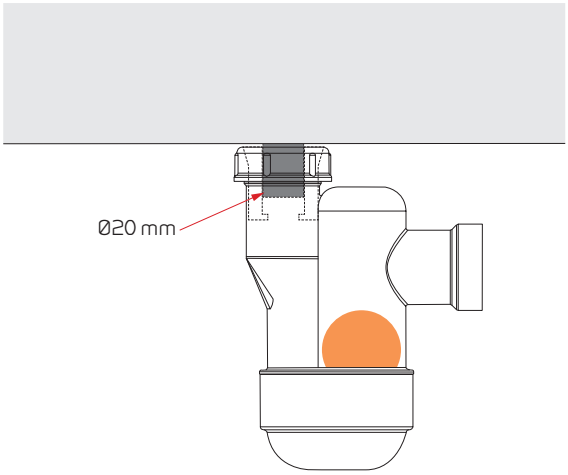
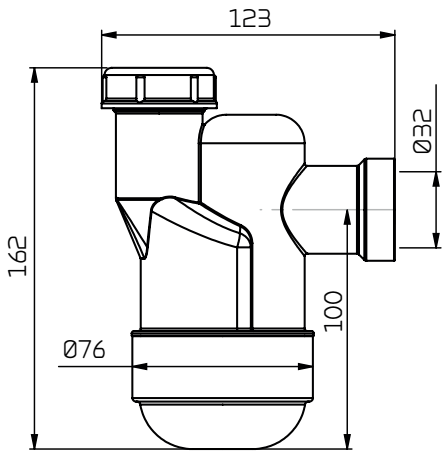


Illustration of connection at the bottom of the unit .



Dimensional drawing (all measurements are in mm).

Water after-heating element - duct installation

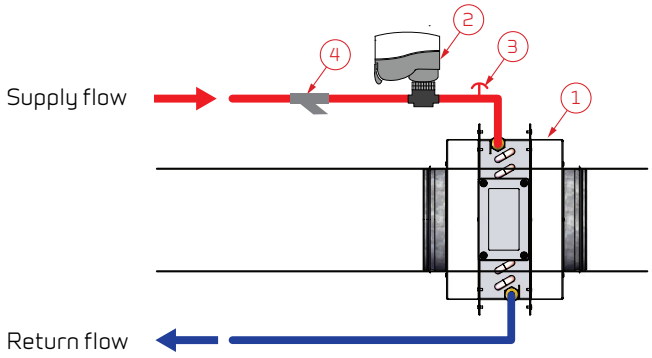
WARNING
The water after-heating element must be installed by a certified plumber.

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.



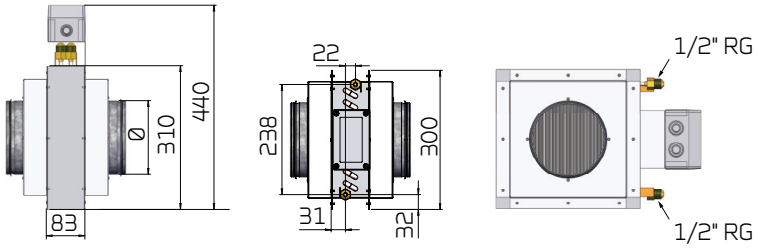
The water heating element is supplied as an accessory consisting of:

1. Water heating element with T9 temperature sensor and 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 information

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.

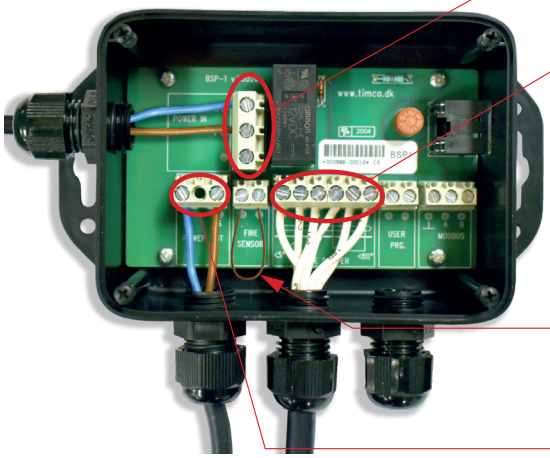
WARNING
Must not be used as a fire alarm system.

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

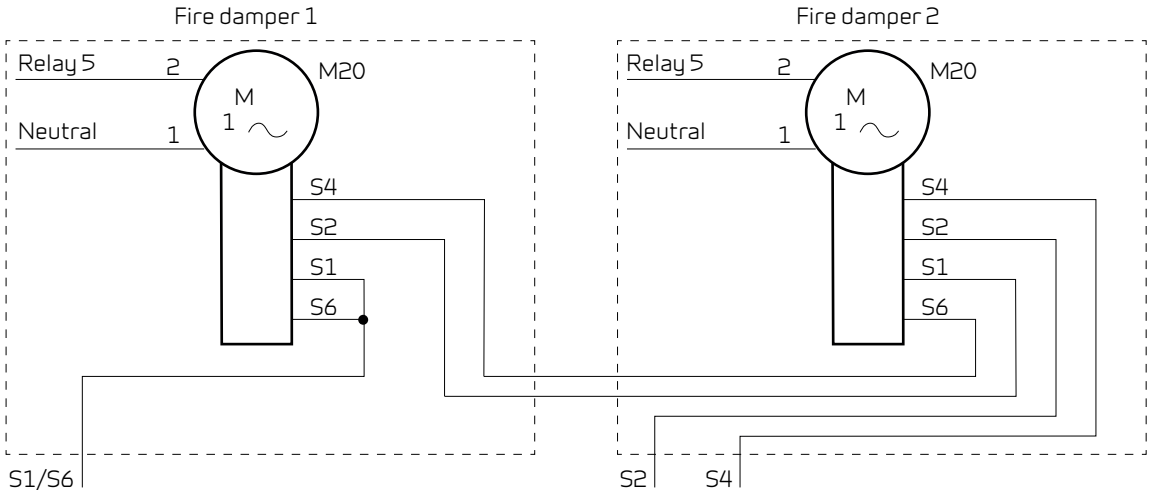
RJ45 connection to Nilan's ventilation unit

Connecting 2 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".



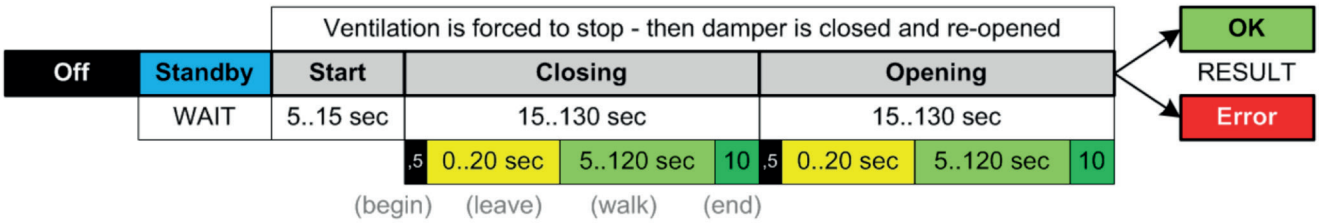
Alarm code

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

DS 428 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.

Balancing

Imortant 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 holes

The ventilation unit has been equipped with balancing holes for measuring the volumes of the supply air and the extract air. You can measure the volume through a ball pump valve, which you insert into the 4 holes.

Using the curve chart, you can set, approximately, the main air volume at dry operation without condensation.

At the side with the extract air, measure the pressure difference dP3-4 [Pa] between the holes marked 3 and 4. Read the air volume qv [m^3/h] on the curve chart.

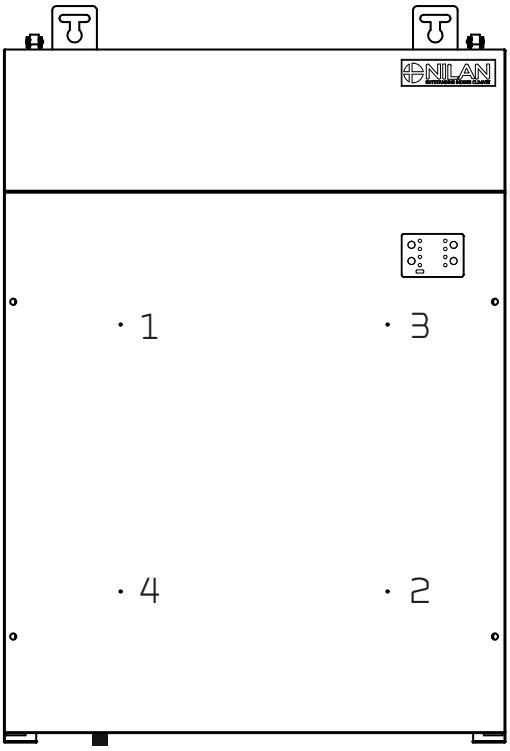
At the side with the supply air, measure the pressure difference dP1-2 [Pa] between the holes marked 1 and 2. Read the air volume qv [m^3/h] on the curve chart.

Once you have carried out the measurements, cover the 4 holes with the round stickers provided.

ATTENTION

The capacity in the pressure loss diagram is based on a dry exchanger.

Right version:



Left version: