

PRODUCT DATA

COMFORT 600 BY NILAN



Ventilation & passive heat recovery



Domestic



Passive
heat recovery



Ventilation
< 800 m³/h

COMFORT 600

Product description

The Comfort 600 is an energy-efficient ventilation unit with heat recovery for homes and smaller commercial buildings with a ventilation requirement of up to 800 m³/h.

This unit has been thoroughly tested, with improvements being continually made during its manufacture for more than 15 years. These have focused on low energy consumption, easy user operation and maintenance.

The Comfort 600 is a compact unit which can be ordered as a left- or right-handed model.

The Comfort 600 is factory tested and ready for use. Installation and commissioning must be performed by an authorised electrician.

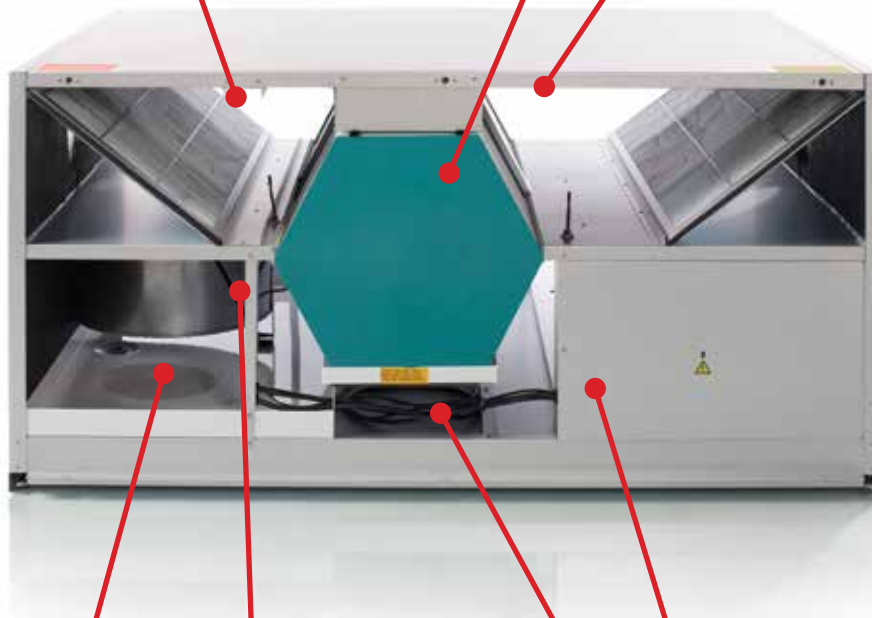


Prepared for an integrated or external water heating element.

Counterflow heat exchanger made of polystyrene, which has a higher temperature efficiency than aluminium exchangers.

Time controlled alarm for filter change.
Easy filter access - the top front panel manually unscrews easily. There is plenty of space to replace filters and vacuum the filter space.
Visual alarm for filter change.

The automatic bypass damper makes the outdoor air bypass the heat exchanger when heat recovery is not required, thereby saving energy.



The powder-coated condensate drain prevents the formation of "acid water" and allows the condensate to be drained away.

The unit comes with a clear and user-friendly HMI touch panel.
The modern CTS 602 control panel runs Modbus communication.

The efficient fans are powered by energy-saving EC motors. They provide a constant air volume with a four-step adjustment.

With built-in humidity control system for ventilation on demand.
Low speed ventilation at low humidity levels and high speed ventilation at high humidity levels (e.g. a bath).



User APP solution via gateway LAN / WiFi

TECHNICAL DATA

Technical specifications

Dimensions (W x D x H)	1200 x 950 x 630 mm
Weight (*1)	101/75 kg
Plate type casing	Aluzinc steel plate
Heat loss casing (*2)	59 W/-59 W
Heat exchanger type	Polyethyleneterephthalat counterflow heat exchanger
Fan type	EC, constant volume
Filter class	ISO Coarse >90% (G4)
Duct connections	Ø 200 mm
Condensate drain	PVC, Ø 20x1,5 mm
External leakage (*3)	< 0.1 %
Internal leakage (*4)	< 3.6 %

Supply voltage	230 V (±10 %), 50/60 HZ
Max. input/power (*5)	1145 W/7.1 A
Tightness class	IP31
Standby power	4 W
Power consumption (*5&6)	1220 kWh/år
Ambient temperature	-20/+40 °C

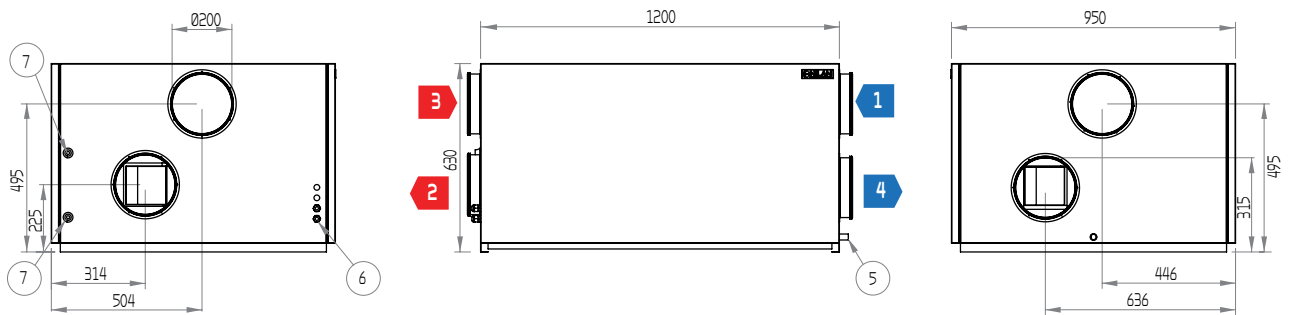
- *1 75 kg is without side plates and exchanger.
 *2 59 W: Outdoor air temperature -12 °C. Fitting location -12 °C. Extract air temperature 20 °C (room).
 -59 W: Outdoor air temperature -12 °C. Fitting location 20 °C. Extract air temperature 20 °C (room).
 *3 At ± 250 Pa and 600 m³/h according EN 308/EN 13141-7.
 *4 At ± 100 Pa and 600 m³/h according EN 308/EN 13141-7.
 *5 Input without heating element (accessory).
 *6 Power consumption on continuous operation for system with SFP value 1000 J/m³ ved 500 m³/h.

Unit data for ecodesign

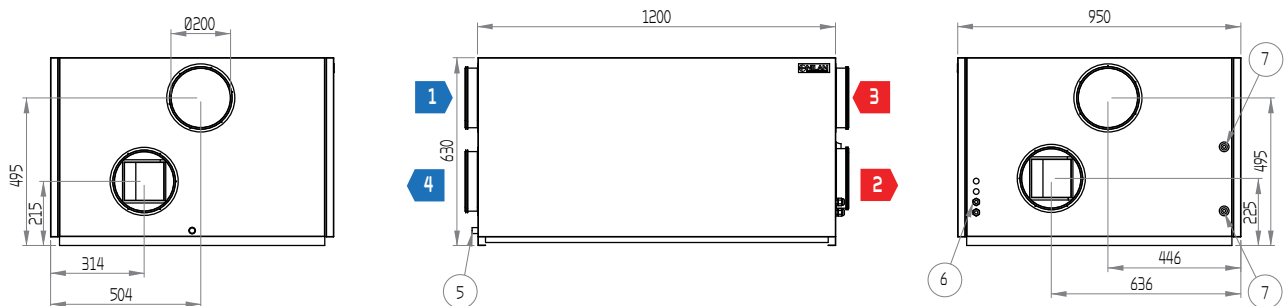
Trade mark	Nilan
Model	Comfort 600
Type	Two-way ventilation unit not for residential
Type of drive	Variable speed drive VSD
Type of heat recovery system	Counterflow heat exchanger
Thermal efficiency of heat recovery	79.6%
Reference flow rate (supply air)	0.1594 m ³ /s
Reference flow rate (extract air)	0.1404 m ³ /s
Effective electric power input (kW) (supply air)	0.209 kW
Effective electric power input (kW) (extract air)	0.214 kW
SFP _{int}	413 W/(m ³ /s)
Velocity at design flow rate	0.022 m/s
Nominal external pressure	250 Pa
Internal pressure drop of ventilation components (supply air)	123 Pa
Internal pressure drop of ventilation components (extract air)	137 Pa
Static efficiency of fans (supply air)	57.4 %
Static efficiency of fans (extract air)	57.4 %
Maximum external leakage rate	1.5 % v/400 Pa
Maximum internal leakage rate	3.6 % v/250 Pa
Energy classification of M5 bag filters (extract air)	E
Energy classification of F7 bag filters (outdoor air)	C
Visual filter warning	An alarm on the user panel appears when filters need changing
Sound power level (LWA)	56 dB(A)

Dimensional drawing

Left model



Right model



All dimensions are in mm

Connections

- | | |
|------------------|----------------------------------|
| 1: Fresh air | 5: Condensate drain |
| 2: Supply air | 6: Electric and water heating |
| 3: Extract air | 7: Primary side (heat exchanger) |
| 4: Discharge air | |

PLANNING DATA

Nilan units are tested in accordance with the valid standards of accredited independent test institutes.

Capacity

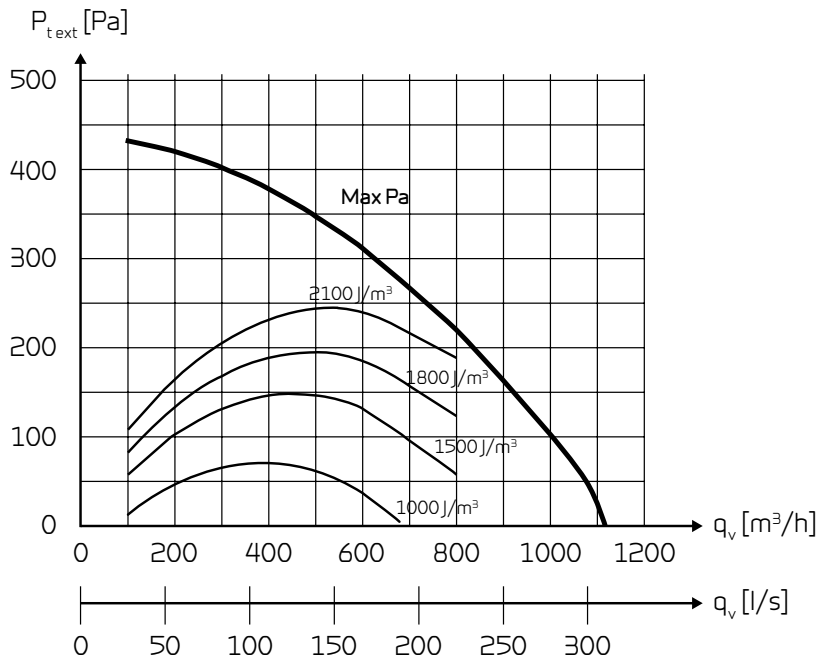
Capacity of standard unit as a function of q_v and $P_{t,ext}$.

SFP values according to EN 13141-7 are for standard units with ISO Coarse >90% (G4) filters and no heating element.

SFP values comprise the unit's total power consumption incl. control.

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

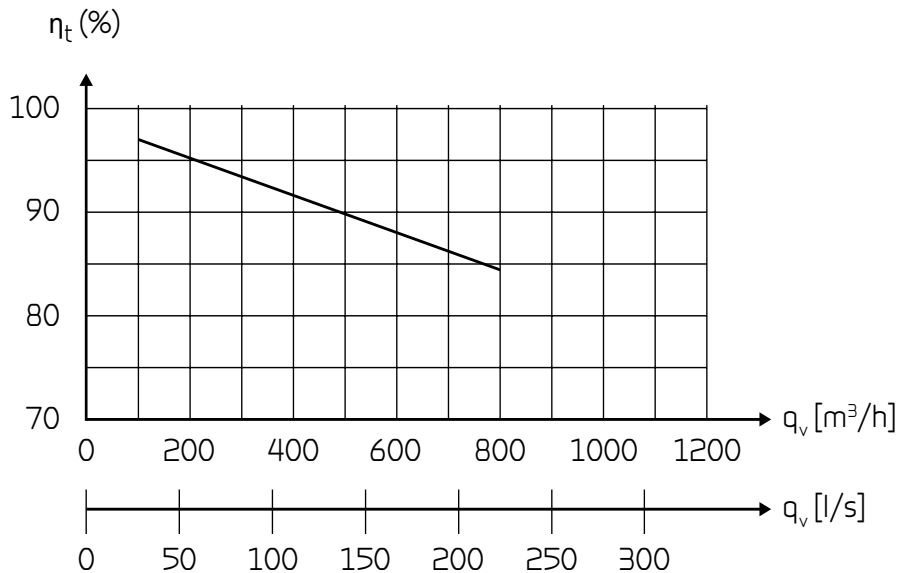
Attention! The SFP values are measured and stated as a total value for both fans.



Temperature efficiency

Temperature efficiency for units with counterflow heat exchanger according to EN308 (dry).

Temperature efficiency EN308: $\eta_t = (t_{supply\ air} - t_{fresh\ air}) / (t_{extract\ air} - t_{fresh\ air})$



Sound data

Sound data for $q_v = 600 \text{ m}^3/\text{h}$ and $P_{t, \text{ext}} = 100 \text{ Pa}$ according to EN 9614-2 for surfaces and EN 5136 for ducts.

Sound output level L_{wA} drops with falling air volume and falling back pressure.

Sound output level L_{pA} at a given distance will depend on acoustic conditions in the place of installation.

Sound output level (L_{wA})

Octave band Hz	Surface dB(A)	Supply air dB(A)	Extract air dB(A)
63	34	58	41
125	43	59	42
250	48	64	47
500	47	65	41
1000	53	67	31
2000	43	63	27
4000	38	60	17
8000	36	59	13
Total ± 2 dB(A)	55	72	50

OPERATION

Intelligent humidity control

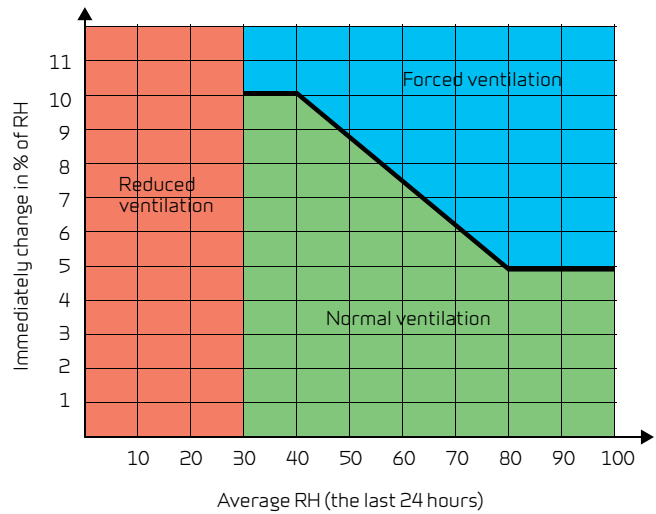
Nilan's humidity control automatically adapts to the needs of the family or the building.

The intelligent CTS 602 control unit does not need to have a set level input for air humidity (RH) to control the air exchange. By using the integrated humidity sensor, the control unit calculates the average level itself for the last 24 hours. The average level provides a basis for deciding whether to change the air exchange if the air humidity fluctuates.

This ensures that the unit always runs at its most efficient, based on the actual air humidity level and not on a theoretical one.

This helps save energy because it automatically adapts to the requirements in the home. Whether a large family or a single person is living in the building has a considerable influence on how much humidity is produced.

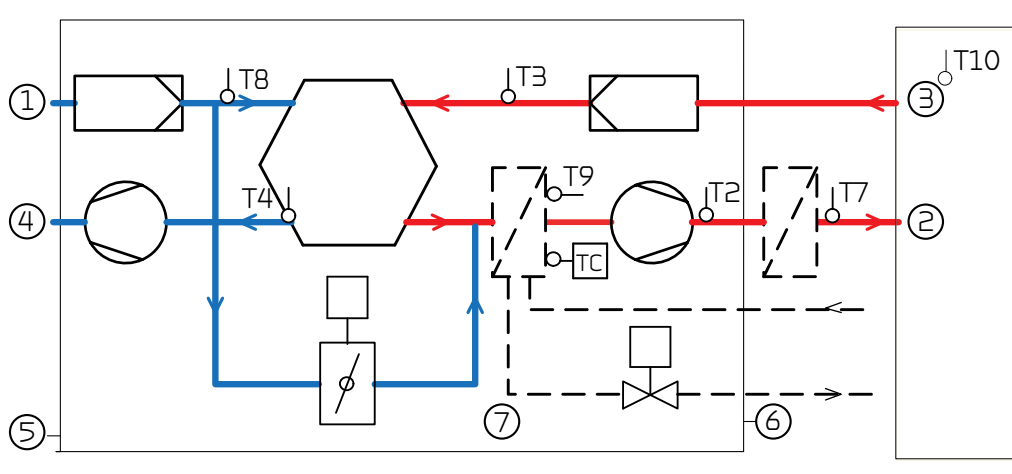
The unit also adjusts automatically to summer and winter level.



If the air humidity changes by more than 5-10% in relation to the average level, the unit responds with a higher rate of air exchange accordingly.

At an air humidity below 30% is reduced ventilation stp activated (adjustable between 15 and 45%)

Functional diagram



Connections

- 1: Fresh air
- 2: Supply air
- 3: Extract air
- 4: Discharge air
- 5: Condensate drain
- 6: Electric and water heating

Automation

- T2/T7: Supply air sensor
- T9/TC: Heating element frost protection
- T3: Extract air sensor
- T4: Discharge air and defrost sensor
- T8: Fresh air sensor

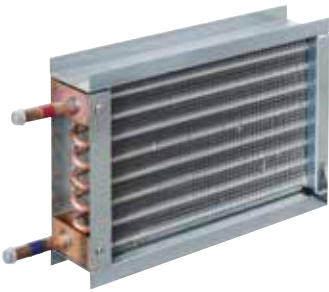
Capacity - Heating element (accessory)



Electrical heating element

The electrical heating element is fitted in the air inlet duct at a distance of min. 2 x duct diameter from the system's fresh air inlet connection pipe (normally min 400 mm.) and connected to the CTS 602 control panel and 230 V supply.

The electrical heating element can supply up to 3,0 kW of heat.



Water heating element for internal fitting

The water heating element is designed to be built into the system and must be connected to the primary heating supply and the CTS 602 control. The water heating element includes copper pipes and aluminium fins.

Capacities can be seen in the table below.

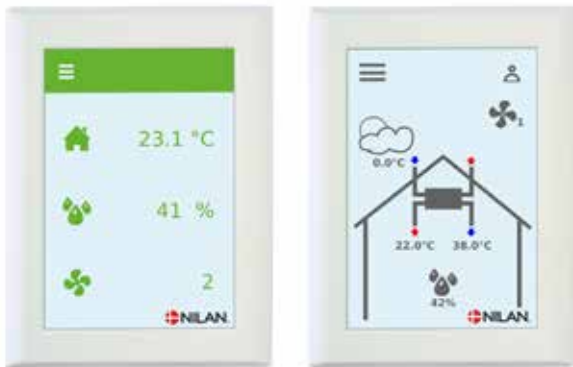
Capacity water heating element

Temperature input/output [°C]	Water side			Air side			
	Flow [m³/h]	Pressure drop [kPa]	Output [kW]	Flow [m³/h]	Temperature before WHE* [°C]	Temperature after WHE* [°C]	Pressure drop over WHE* [Pa]
40/30	0.1	0.74	1.1	200	16	32.2	2
	0.12	1.11	1.4	270	16	30.9	3
	0.16	2.1	1.9	420	16	29.2	4
	0.21	3.2	2.5	620	16	27.7	8
60/40	0.09	0.6	2	200	16	45.4	2
	0.11	0.9	2.5	270	16	43.1	3
	0.15	1.6	3.4	420	16	40	4
	0.2	2.5	4.5	620	16	37.2	8
70/40	0.07	0.36	2.3	200	16	49.4	2
	0.08	0.53	2.8	270	16	46.6	3
	0.11	0.92	3.9	420	16	42.9	4
	0.14	1.47	5	620	16	39.6	8

* Water heating element.

AUTOMATION CTS602

CTS602 Control



The CTS602 HMI touch panel is featuring a wide range of functions, e.g., menu-controlled operation, weekly programme settings, filter monitor with timer, fan speed adjustment, summer bypass (free cooling), supply-heating element control, error messages etc.

The CTS602 comes with factory settings, including a default setting which can be customised to operational requirements to achieve optimum operation and utilisation of the system.

There is an option for selecting between 2 front page images for the main screen.

Operating instructions for the CTS 602 can be found in a separate user manual supplied with the unit.

Nilan User APP

A Nilan gateway is fitted as standard on the Comfort 600, where the user can gain access to the unit via a Nilan User APP. The APP enables the user to access and monitor the current operation, also from the outside of the property.

The APP allows you to adjust the default settings of, for instance, room temperature, fan speed level and the humidity control system.

The APP shows when filter change is next due. This is an important function, and you are automatically notified when filters need changing or an alarm is triggered.

It also provides you with useful trend curves so you can follow the operation of the unit for the previous week with regards to, for instance, room temperature or humidity level.

Using a LAN connector, you connect the gateway to the Modbus of the unit and then to the user's internet router via a LAN or a WiFi connection. This creates a secure cloud connection between the unit and the smartphone.



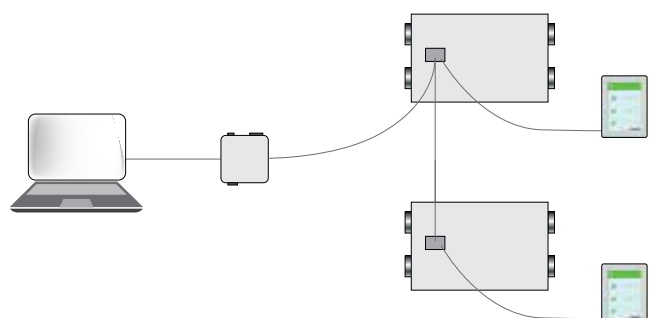
External communication

The CTS602 control unit communicates by default with Modbus RTU RS485 communication. A CTS system using this form of communication can easily be connected to the unit.

Nilan units have an open Modbus communication, i.e. not only can the unit be monitored, but its operation can also be set in the same way as it can via the operating panel.

The protocol is by default set up for a Modbus RTU30 address; however, values can be set between 1 and 247.

A Modbus converter allows you to connect one or more units to a computer to monitor and control the unit.



Functions overview		+ Standard - Accessories
Alarms	Description of errors indicated with alarms. Alarm log displaying the latest 16 alarms.	+
Joint alarm	The CTS602 control system has an output signal that is activated in the case of an alarm. It can be connected to, for example, external automation.	
Filter monitor	Filter alarm with timer that can be set to 30/90/180/360 days.	+
Data display	An overview of the current operation with regards to temperatures, fan speed level etc.	+
Week program	The CTS602 control system has 3 week programs that can be set individually (the default setting is "off").	+
Humidity control system	Enables a higher or lower degree of ventilation at a high/low level of humidity.	+
Air quality	Enables you to adjust the degree of ventilation depending on the CO ₂ level in the air.	-
Winter low	You can prevent a low level of humidity in the dwelling by activating low ventilation at low outdoor temperatures.	+
Temperature regulation	Enables you to control the operation of the unit in accordance with the room temperature.	+
Summer/winter mode	You can set the unit to operate in summer or winter mode.	
Language	You can choose from more than 10 languages in the control panel.	+
User levels	The menu in the control panel is divided into 3 user levels: User/Installer/Factory.	+
User selection 1	Enables you to override the operating mode via an external potential free signal.	+
User selection 2	Enables you to override the operating mode as well as user selection 1 via an external potential free signal.	-
Electrical after-heating element	An electrical after-heating element allows you to control the supply air temperature. In this way the unit can help heat the dwelling.	-
Water after-heating element	A water after-heating element allows you to control the supply air temperature. In this way the unit can help heat the dwelling.	-
Frost protection	In order to protect a potential water after-heating element against frost damage, the unit will stop and display an alarm if the temperature in the water after-heating element becomes too low.	-
Air exchange	Stepless setting of four fan speed levels. The supply air and the extract air can be set individually.	+
De-icing	Based on temperature, this automatic function de-ices the counterflow heat exchanger if ice has formed within it.	+
Room low	Safety function that will cause the ventilation unit to stop if the heating system for the dwelling fails. This will prevent the unit from cooling the dwelling even further.	+
External heating	The ventilation unit can control an external heat supply in accordance with the current room temperature.	+
External fire automation system	You can connect the ventilation unit to an external fire automation system or to a fire thermostat. This will signal to the unit whether to stop or continue operation.	+
Integral fire automation system	The ventilation unit is available with an integral fire automation system that can control fire and smoke dampers.	-
Pressure sustaining regulator	You can install a pressure sustaining regulator on the side of both the extract air and the supply air.	-
Delayed start-up	You can activate a delayed start-up of the fans if you install, for instance, a shut-off damper.	+
Restore settings	You can save the current settings and subsequently restore them if, for instance, the user has altered the settings on the unit. You can also reinstall the default settings.	+
Manual operation	Different functions can be tested manually.	+
Energy saving function	You can activate a power saving function of the operation.	+
Modbus	You can set the Modbus address of the unit. The default setting is 30.	+
Data logging	It is possible to log the operational data of the unit every 1 - 120 min. Alarms are logged when they occur.	+
Control panel	You can choose from 2 different images for the main screen.	+

You can find further information about all the functions in the Software and Installation instructions for the unit.

ACCESSORIES



Electrical pre-heating element (Frost protection)

An electrical pre-heating element heats up the outdoor air before it enters the unit. This avoids having to defrost the unit, resulting in a loss of power.

There are temperature sensors supplied to be fitted in the ducts.



EM-box

An EM-box allows heat recovery from the air from the range hood and thereby helps to heat the supply air. The EM-box is equipped with a special filter which efficiently cleans the range hood air of fat particles and thereby protects the system.



Pollen filter ISO ePM1 50-65% (F7)

A pollen filter in class ISO ePM1 50-65% (F7) can be fitted in the unit. The pollen filter is fitted with the plate filter ISO Coarse >90% (G4).



Water trap

To prevent "false" air being sucked into the system via the condensate drain, the system must be fitted with a water trap. While there is water in the condensate drain, the water trap works well. However, during the summer months when there is no condensation of extract air, the water trap will dry out (and therefore cease to prevent "false" air intake). A Nilan water trap with ball prevents "false" air flow all year round.



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.



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.



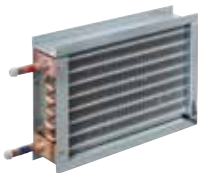
Electrical heating element incl. regulation

When you fit an electrical heating element, you can raise the fresh air temperature to the desired level at any time. The electrical heating element is supplied ready to fit into the fresh air duct and, for easy fitting, the device is pre-fitted with all the required sensors.



Water heating element incl. regulation

The supply temperature can always be raised to the required level using a water heating element. The water heating element is designed to be built into the duct and must be connected to the primary heating supply. Supplied with two-way adjustment valve, temperature sensor and frost thermostat.



Water heating element incl. regulation

The supply temperature can always be raised to the required level using a water heating element. The water heating element is designed to be built into the unit and must be connected to the primary heating supply. Supplied with two-way adjustment valve, temperature sensor and frost thermostat.



Expansion PCB

The expansion PCB provides additional functions for the CTS 602 control unit.



CO₂-sensor

With a CO₂-sensor installed, the ventilation speed can be pre-programmed with CTS602 to run at a higher ventilation steps when CO₂ reaches high level in the extract air. CO₂-level is programmable (*expansion PCB required*).

OPERATION

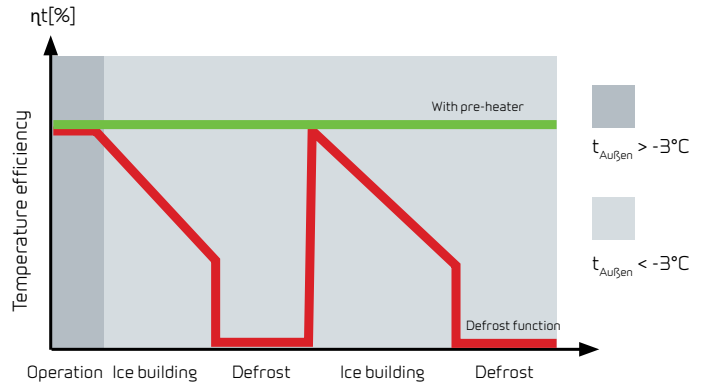
Frost protection

All ventilation units with a counterflow heat exchanger will ice up if the outdoor temperature is below freezing for a prolonged period.

The extracted air condenses when it is cooled down during heat recovery. The high temperature efficiency will slowly turn the condensate to ice, which will block up the counterflow heat exchanger unless action is taken to remedy this.

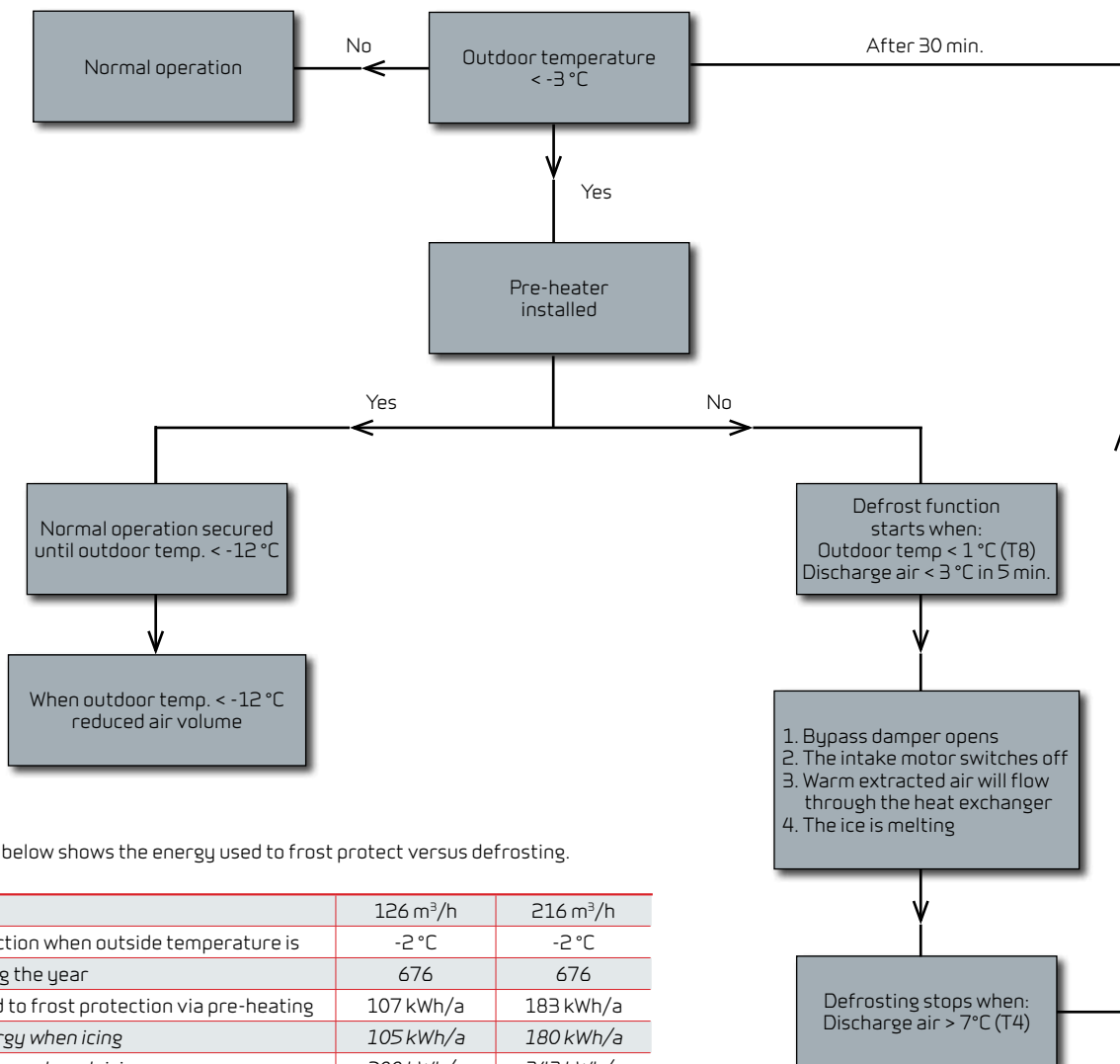
Consideration must be given to whether the unit's operation can be protected during a lengthy period of frost or whether it is acceptable to decrease its operation.

In homes which are occupied at night, it would be advisable to protect the unit against frost when the outdoor temperature is coldest by using a pre-heating element. On the other hand, if the ventilation is for an office, it may be acceptable to decrease the operating level at night.



The energy used for the preheating is not wasted, as it ensures a constant high temperature efficiency

Frost protection



The example below shows the energy used to frost protect versus defrosting.

Air volume	126 m ³ /h	216 m ³ /h
Frost protection when outside temperature is	-2 °C	-2 °C
Hours during the year	676	676
Energy used to frost protection via pre-heating	107 kWh/a	183 kWh/a
Loss of energy when icing	105 kWh/a	180 kWh/a
Loss of energy when deicing	200 kWh/a	343 kWh/a
Energy savings by using frost protection	198 kWh/a	340 kWh/a

Average calculation by Danish dry weather data.

DELIVERY AND HANDLING

Transport and storage

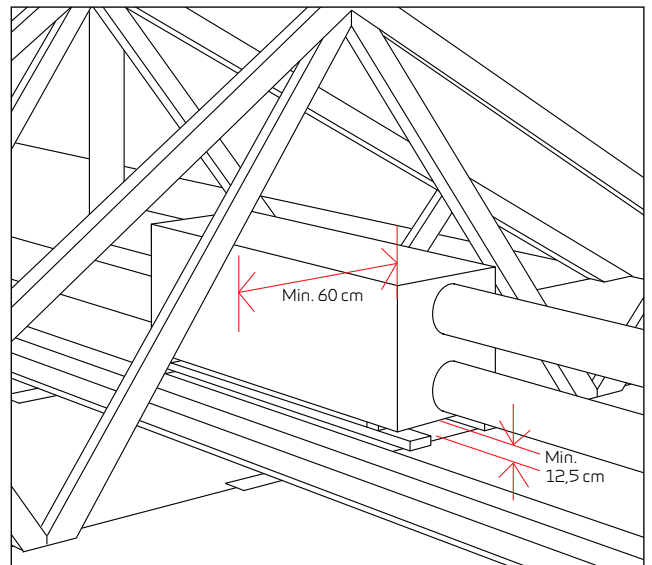
Comfort 600 comes in factory packaging that protects it during transport and storage. Comfort 600 must be stored in a dry place in its original packaging until installation.

The packaging should only be removed immediately prior to installation.

Installation conditions

During installation, future service and maintenance should be taken into account. We recommend a minimum gap in front of the unit of 60 cm.

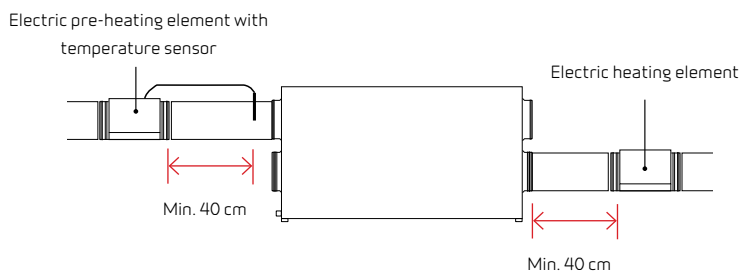
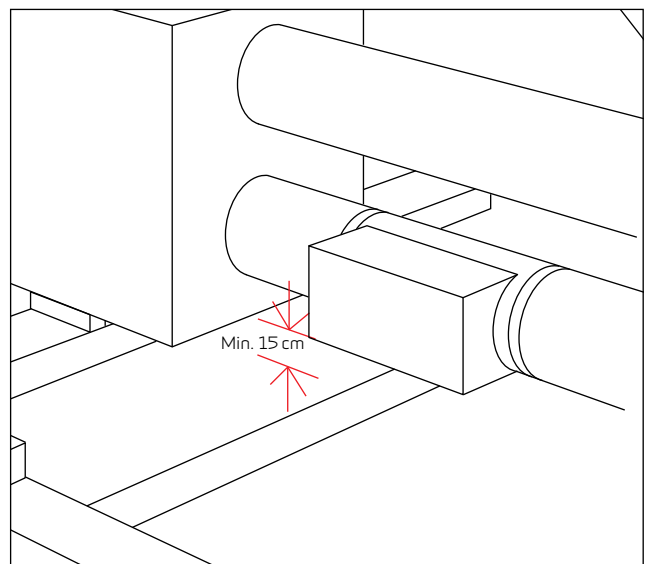
The unit must be installed level for the sake of the condensate drain. The condensate drain requires clearance of min. 12,5 cm under the drain nozzle.



Installation of electric heating element

Electric heating elements (accessories) are fitted in the duct. The heating element must be insulated using fire-resistant insulation material.

The electric heating element must be connected by an authorised electrician.



INFORMATION FROM A TO Z

Nilan develops and manufactures premium-quality, energy-saving ventilation and heat pump solutions that provide a healthy indoor climate and low-level energy consumption with the greatest consideration for the environment. In order to facilitate each step in the construction process - from choosing the solution through to planning, installation and maintenance - we have created a series of information material which is available for download at www.nilan.dk.



Brochure
General information about the solution and its benefits.



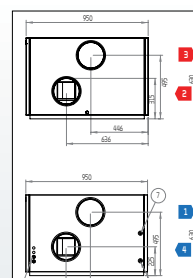
Product data
Technical information to ensure correct choice of solution.



Installation instructions
Detailed guide for installation and initial adjustment of the solution.



User manual
Detailed guide for regulation of the solution to ensure optimum day-to-day operation.



Drawings
Tender documents and 3D drawings are available to download for planning purposes.

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