

PRODUCT DATA

COMBIS 302 POLAR TOP BY NILAN



Ventilation with passive & active heat recovery



Domestic



Passive
heat recovery



Active
heat recovery



Ventilation
<375 m³/h



Comfort
heating



Comfort
cooling

COMBIS 302 POLAR TOP

Product description

CombiS 302 Polar Top is a ventilation unit that combines two heat recovery technologies.

Passive heat recovery takes place via a counterflow heat exchanger that utilises 83% of the energy in the extracted air. Active heat recovery takes place via a heat pump that utilises the residual energy. The heat pump has a COP >4, which eliminates the need to install a heating coil with an attached mixing circuit. CombiS 302 Polar Top can increase the temperature of the supply air to over 30°C.

The heat pump also makes it possible to cool the supply air in the summer by up to 10°C. Due to the low air exchange, this does not function as an air conditioning system, but cooling the air intake reduces its humidity, giving a more pleasant and comfortable climate inside the home, even when the indoor temperature is high.

CombiS 302 Polar Top is delivered with a built-in pre-heating element, which protects the counterflow heat exchanger against icing. This ensures continuous operation at low outdoor temperatures.



Time-controlled filter change alarm.
Easy filter access by opening the top front panel with the help of two finger screws.

There is plenty of space to replace filters and to vacuum clean the filter space.

Efficient counterflow heat exchanger providing high temperature efficiency and low pressure loss, resulting in good heat recovery and low energy consumption.

Automatic bypass function that carries the air past the counterflow heat exchanger when heat recovery is not required.

The unit comes with a clear and user-friendly HMI touch panel.

The modern CTS 602 control runs Modbus communication.

The hermetically-sealed heat pump utilises the residual energy after the counterflow heat exchanger and ensures a high supply air temperature.

Can also cool the supply air.

8 duct connections.

CombiS 302 Polar Topis supplied as standard with 4 duct connections in the top.

Plates are mounted on the side, which makes it possible to move the ducts from the top to the side as required.

CombiS 302 Polar Tophas a frost-protection heating element.

Can be placed in the duct system.

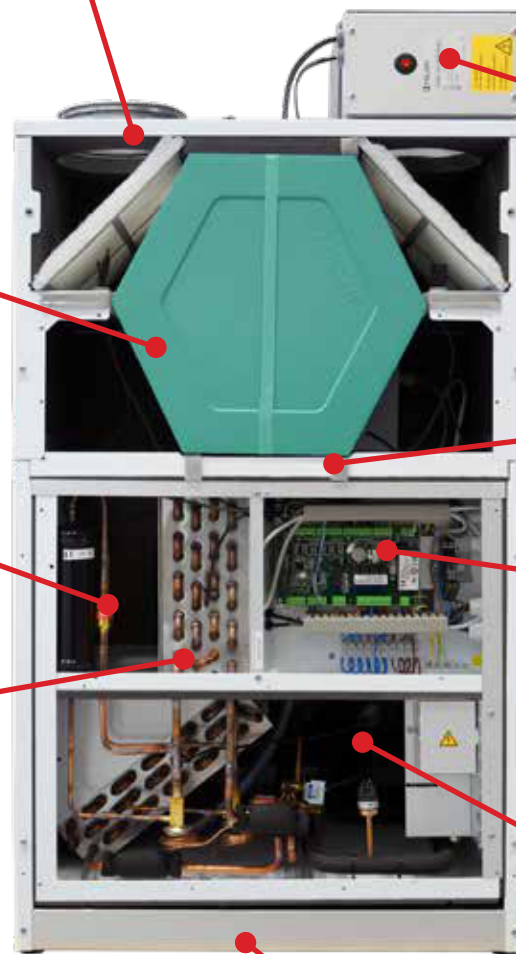
A powder-coated condensation tray prevents the formation of "acidwater", leading out the condensation water.

Intelligent humidity control.
Adapts ventilation to the home's current humidity level.

CO₂-sensor can be purchased, for further demand management.

The efficient fans are powered by energy-saving EC motors.

Aluzinc steel plate, white powder coating (RAL9016)



TECHNICAL SPECIFICATIONS

CombiS 302 Polar Top

Dimensions (W xD xH)	600 x600 x1015 mm
Weight	87 kg
Plate type casing	Aluzinc steel plate, white powder coatingRAL9016
Heat loss casing (*1)	32 W /-32W
Heat exchangertype	Counterflow heat exchangerin combinationwith a heat pump
Fan type	EC,constant volume
Filter class	ISOCoarse >90% (G4)
Duct connections	Ø160 mm
Condensate drain	PVC, Ø20×1,5 mm
Refrigerant	R134a
Refrigerant filling	2.25 kg

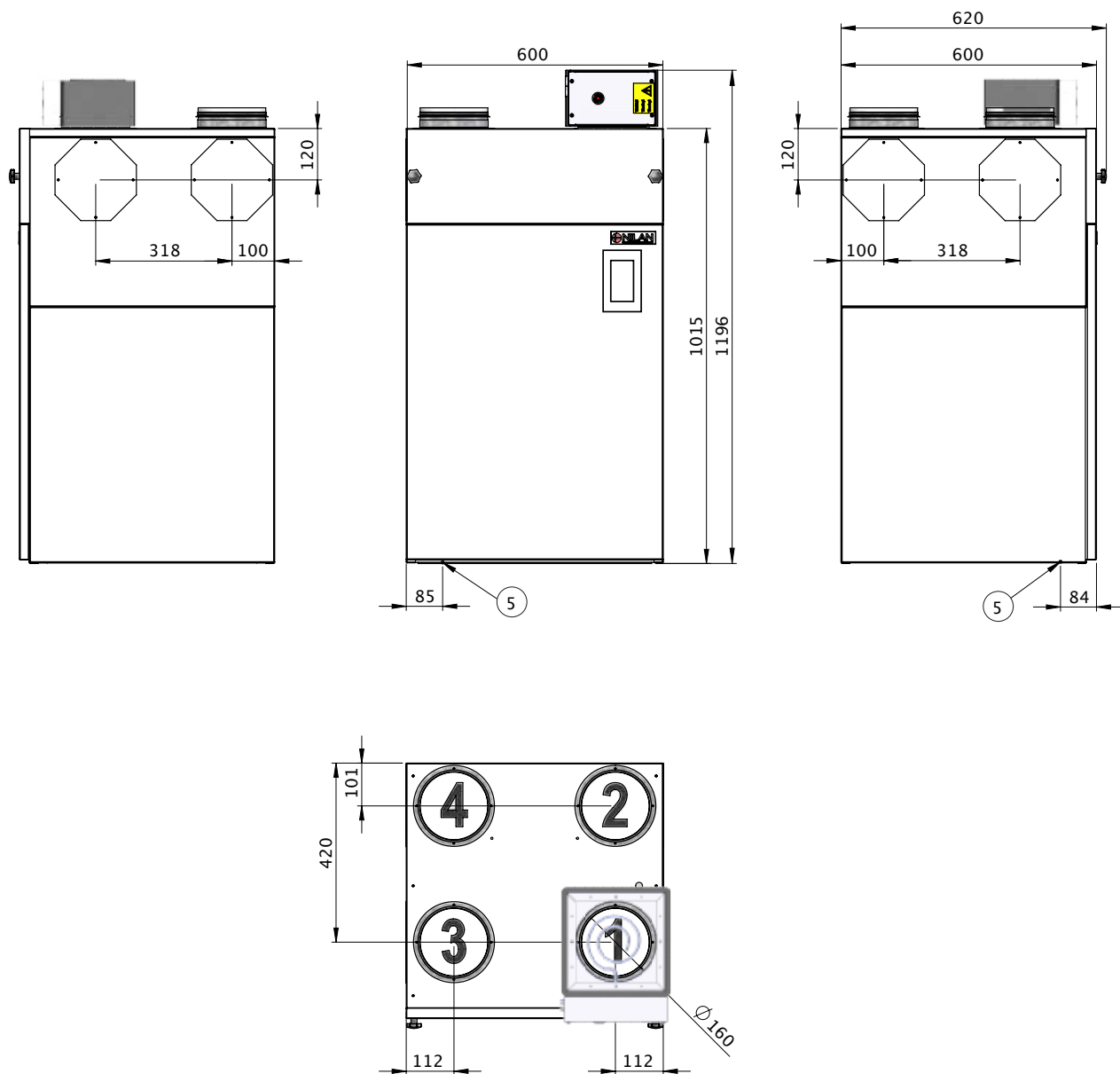
External leakage (*2)	<0.79%
Internal leakage (*3)	<1.47%
Supply voltage	230 V (±10%),50/60 HZ
Max.input/power	2,8 kW/12,2 A
Tightness class	IP31
Standby power	3 W
Power consumption build-in preheating element	600 W
Ambient temperature	-20 / +40°C

*1 32 W: Outdoor air temperature -12°C. Fitting location -12°C.
Extract air temperature 20 °C (room).
-32W: Outdoor air temperature -12°C. Fitting location 20 °C.
Extract air temperature 20 °C (room).

*2 At ±250 Pa and 265 m³/h according to EN 13141-7.

*3 At ±100 Pa and 265 m³/h according to EN 13141-7.

Dimensional drawing



All dimensions are in mm.

Connections

- 1: Fresh air
- 2: Supply air
- 3: Extract air
- 4: Discharge air
- 5: Condensate drain

PLANNING DATA

Capacity

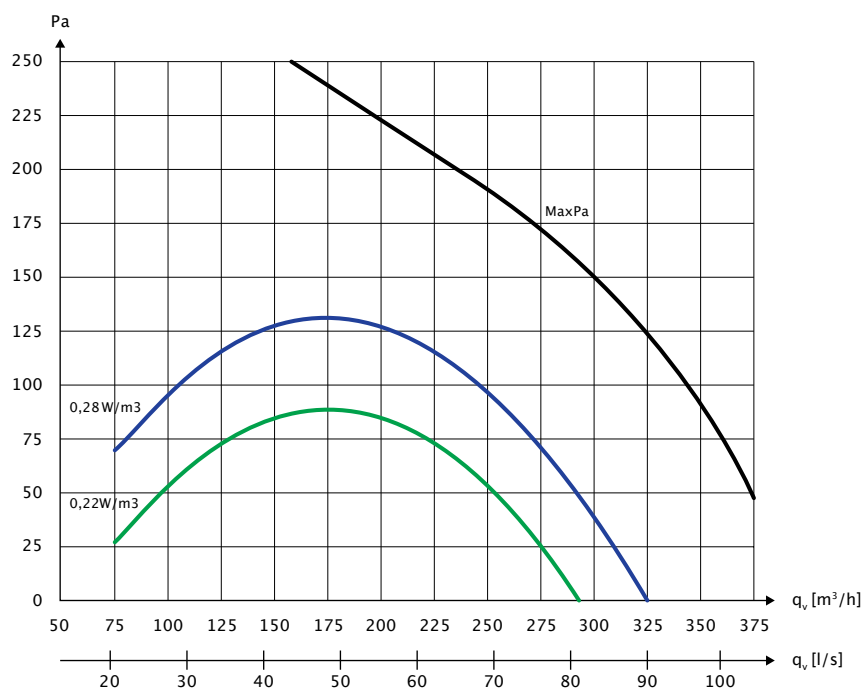
Capacity of standard unit as a function of q_v and $P_{t,ext}$.

SEL values according to EN 13141-7 are for standard units with ISO Coarse >90% (G4) filters and without heating element.

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

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

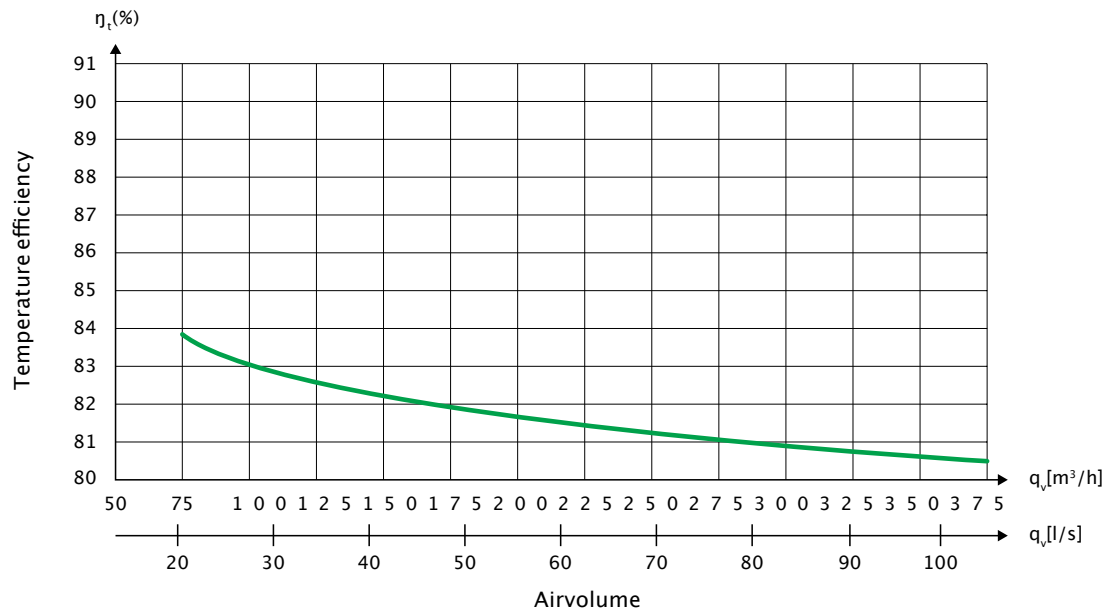
Attention! The SEL values are measured and stated as a total value for both fans.



Temperature efficiency

Temperature efficiency for units with counterflow heat exchanger according to EN13141-7

NB! Temperature efficiency is only for the counter flow heat exchanger (without heat pump operation)



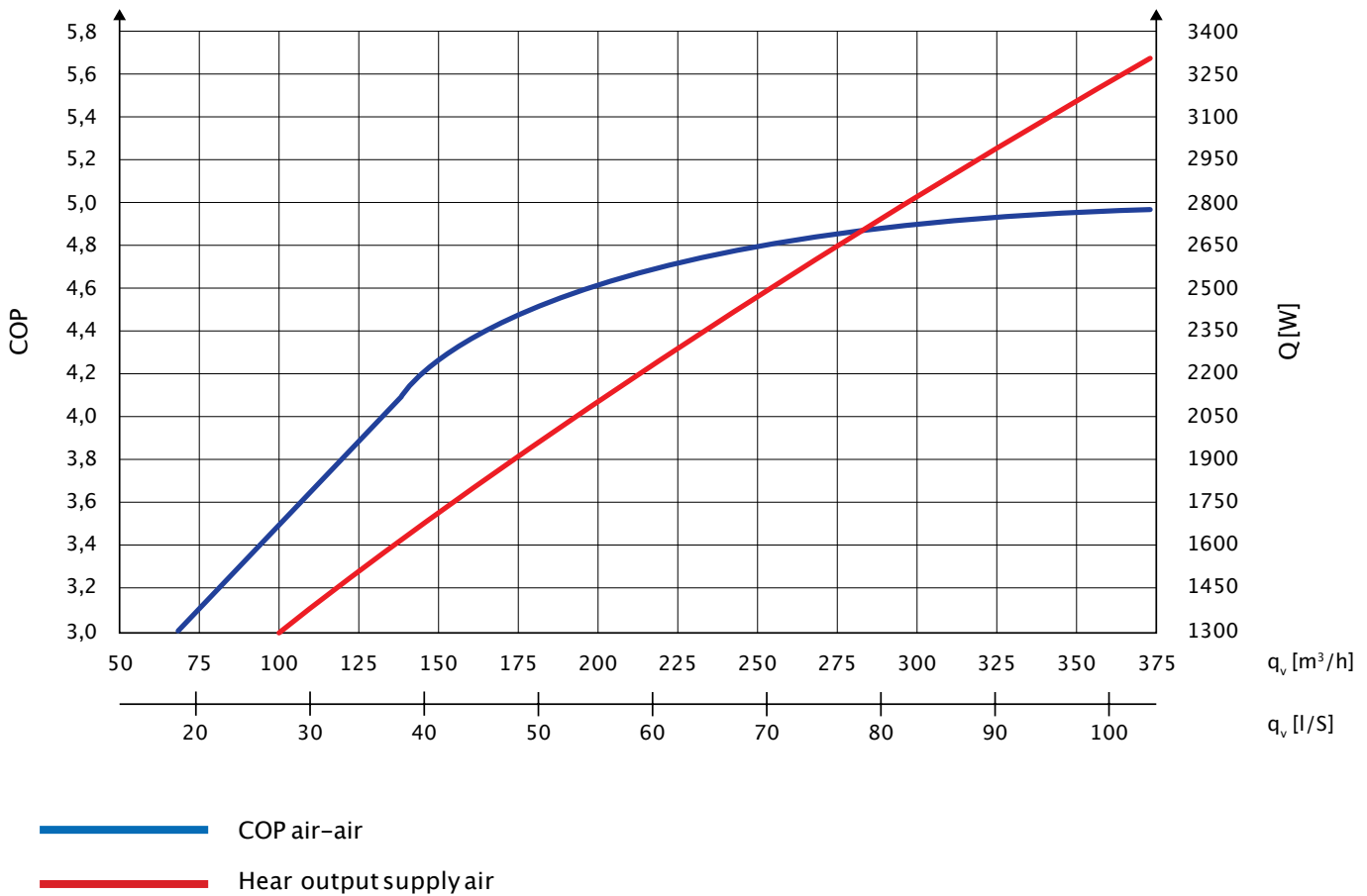
Heat output supply air

Heat output Q_c [W] as a function of q_v [m^3/h] and outdoor air temperature t_{21} [$^{\circ}\text{C}$]. In accordance with EN 14511, $t_{11}=21^{\circ}\text{C}$ (extract air)
 Heat output is the contribution to room heating added to the fresh air via CombiS 302 Polar Topto the supply air.
 The ventilation loss is the heat output that is lost without heat recovery at the given volume flow air.

COP (air-air)

Heat output factor COP [-] supply air as a function of outdoor temperature t_{21} [$^{\circ}\text{C}$] and volume flow q_v [m^3/h] in accordance with EN14511 at a room temperature $t_{11}=21^{\circ}\text{C}$

COP according EN14511 is calculated for the heat pump and counter flow heat exchanger combined.



Sound data

Sound data is for $q_v = 210 \text{ m}^3/\text{h}$ and $P_{t,\text{ext}} = 100 \text{ Pa}$ in accordance with EN 9614-2 for surface and EN 5136 for ducts.

Sound output level L_{WA} drops with falling air volumes and falling back-pressure.

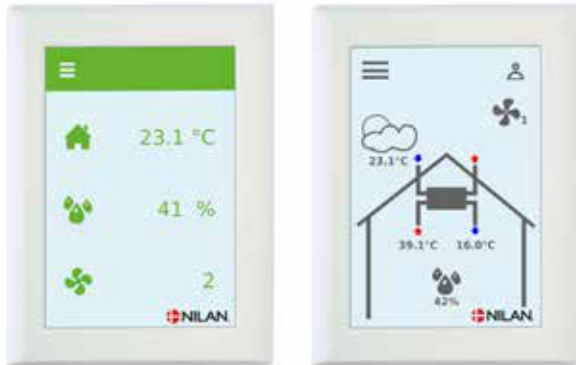
At a given distance, the sound pressure level L_{pA} will depend on the acoustic conditions at the installation site.

Sound output level (L_{WA})

Octave band Hz	Surface dB(A)	Supply air dB(A)	Extract air dB(A)
63	-	51	38
125	-	59	46
250	-	66	51
500	-	61	41
1.000	-	56	31
2.000	-	54	28
4.000	-	47	20
8.000	-	40	13
Total ± 2	57	69	53

AUTOMATION

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, supply-heatingelement control, error messages etc.

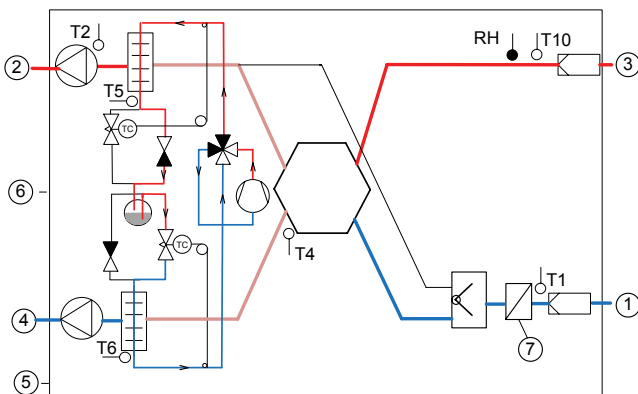
The CTS602 comes with factory settings, including a default setting which can be customised to operational requirements to achieve optimum operation and utilisation of the system.

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

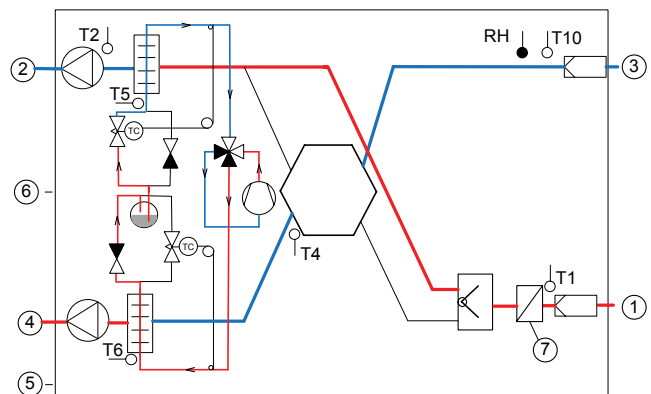
Operating instructions for the CTS 602 can be found in a separate user manual supplied with the unit.

Functional diagram

Heating



Cooling



Connections

- 1: Fresh air
- 2: Supply air
- 3: Extract air
- 4: Discharge air
- 5: Condensate drain
- 6: Electrical connection
- 7: Pre-heating element (frost protection)

Automation

- T1: Fresh air sensor
- T2: Supply air sensor
- T4: Discharge air and defrost sensor
- T10: Room sensor/Extract air sensor
- RH: Humidity sensor

Functional overview		+Standard -Accessories
3 levels	The control function is divided into 3 levels:User/Service/Factory with various options at each level	+
Weekly plan	The unit has 3 weekly programmes (with a factory setting of "off") <ul style="list-style-type: none"> •Programme 1: for working families •Programme 2: for stay-at-home families •Programme 3: for businesses There is also an option for you to set your own weekly programme.	+
User option 1	This allows you to override the operating mode in the main menu via an external potential-free contact or PIR sensor.	+
User option 2	With expansionPCB: <ul style="list-style-type: none"> •User option 2 overrides User option 1 (e.g. connecting an EM box) •Up to 500 W direct •Can give the signal for external heating if the defrost function is used •Switching the central heating system on/off 	
Alarms	Alarm log featuring the last 16 alarms.	+
Filter monitor	Filter monitor with timer (factory setting of 90 days).Adjustable to 30/90/180/360days.	+
Bypass	Bypassing the outdoor air reduces heat recovery, enabling the desired supply air temperature to be maintained spring, summer and autumn.	+
Air quality	Allows you to choose whether to switch humidity sensors and/or CO ₂ sensors on and off.	+/-
Humidity control	Allows you to set a higher or lower ventilation step in the case of high/lowair humidity.	+
CO ₂ control	Allows you to set a higher or lower ventilation step in the case of a high/lowCO ₂ level.	-
Air exchange	Allows you to select a low ventilation step in the case of low outside temperatures and air humidity.	+
Temperature control	Allows you to select the temperature sensor which will control the unit. <ul style="list-style-type: none"> •T10 EXHAUST(extract air) 	+
Room low	Stops the unit at a low room temperature. Hereby is cooling of the home avoided in case of a failing central heating system. Standard set to OFF. Can be set from 1 to 20 degrees and is controlled by: <ul style="list-style-type: none"> •T10 EXHAUST(extract air) 	+
Room control	Allows you to set the regulator to control the room temperature.	+
Air volume	Allows you to set four ventilation steps. Supply air and extract air are set individually. Step 1 <25% - Step 2 <45% - Step 3 <70% - Step 4 <100%	+
Fire alarm	This allows you to connect fire-detecting thermostats, smoke detectors and other fire alarm contacts. In case of an alarm, smoke dampers are closed and the unit stops.	+
Joint alarm	Outlet for joint alarm	+
Constant pressure control	Allows control from both the extract air and supply air side.	-
Cooling	The heat pump has a reversible cooling circuit, which means that the cooling circuit can be reversed, with the unit cooling instead of heating the supply air.	+
Intake air control	Allows you to set the regulator to control the intake air temperature/supply air (only available if the control unit has been configured for a supply-heating element).	+
Delayed start-up	There is a possibility for a delayed start-up by the fans, when a closing damper is installed.	+
Reset	Allows you to restore the factory settings.	+
Manual test	Allows you to test the unit's functions manually.	+
Language	Option for setting the relevant language (Danish/Finnish/Norwegian/Swedish/German/English/French).	+

COMMUNICATION

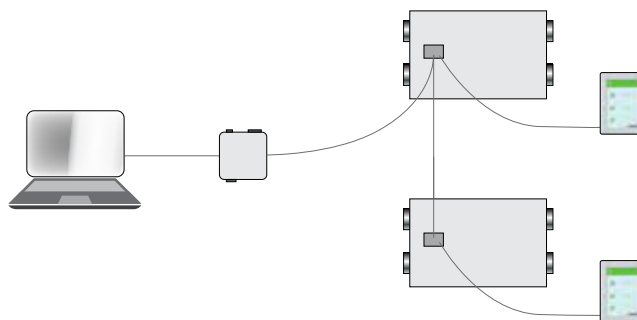
External communication

The CTS 602 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 set up by default for a Modbus RTU 30 address, but can be set to a value between 1 and 247.

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



OPERATION

Intelligent humidity control

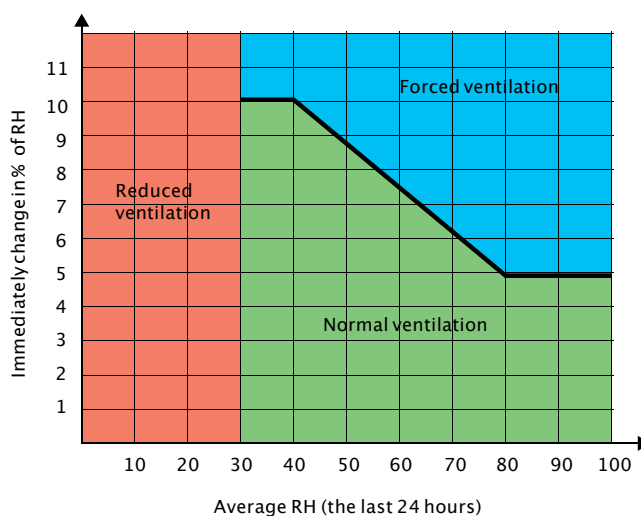
Nilan's humidity control feature automatically adapts to the needs of the family or the building.

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 step activated (adjustable between 15 and 45%)

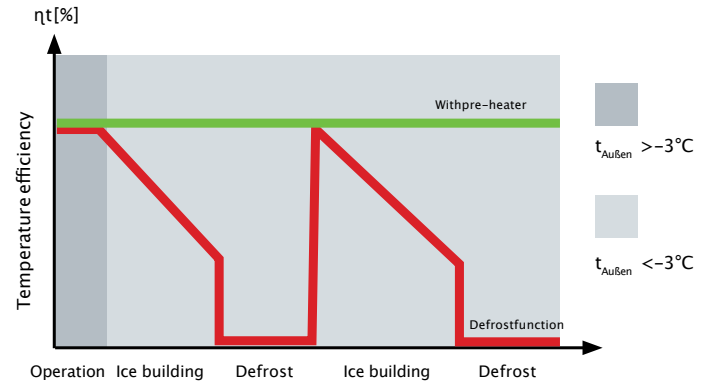
Frost protection

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.

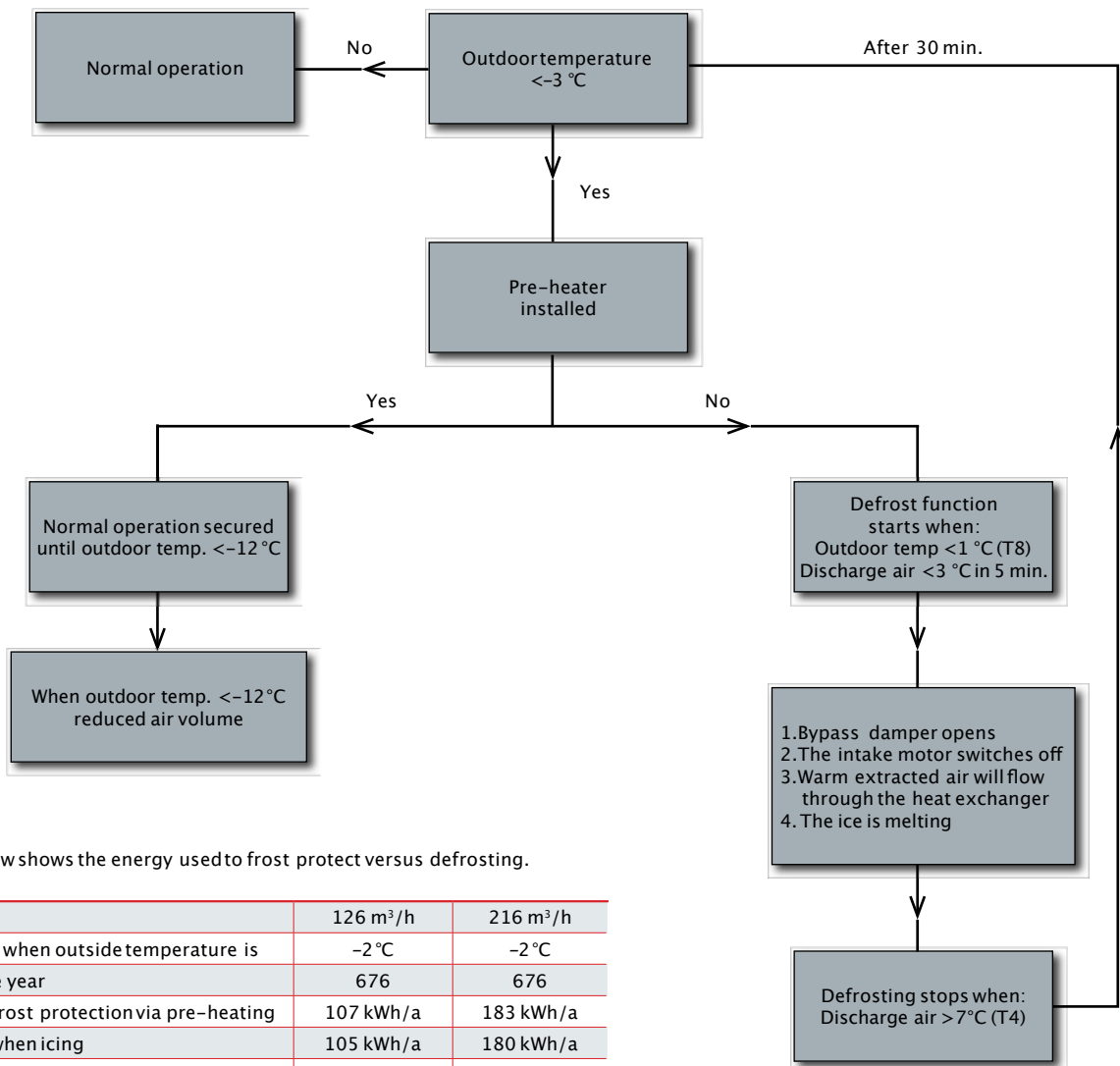
Consideration must be given to whether the unit's operation can be protected during a lengthy period of frost or whether it is acceptable to decrease its operation.

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.

ACCESSORIES



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 steel filter which efficiently cleans the range hood air of fat particles and thereby protects the system.



Pollen filter ISO ePM1 65–80% (F7)

A pollen filter class ISO ePM1 65–80% (F7) can be fitted in the unit.



DBTU damper

If there is not enough space to fit an EM-box, Nilan offers a DBTU damper, which can be fitted between kitchen and bathroom. The damper functions precisely like the EM-box but requires longer cables.



Expansion PCB

The expansion PCB provides additional functions for the CTS 602 control unit, e.g., controlling the EM box.



Noise-attenuating flexible hose

For easy fitting and excellent noise attenuation between the system and the distribution box and/or between the system and roof vents.

DELIVERY AND HANDLING

Transport and storage

CombiS 302 Polar Top comes in factory packaging that protects it during transport and storage.

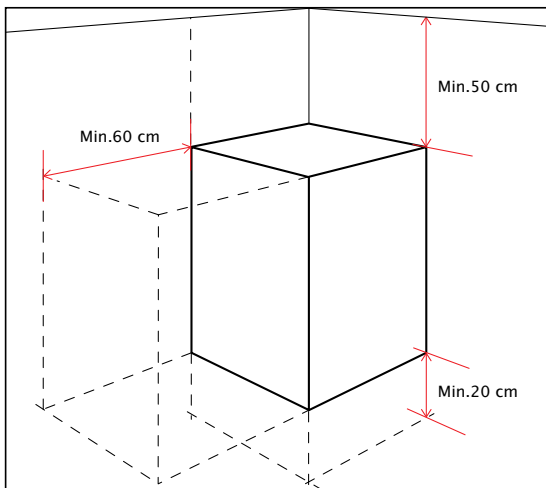
CombiS 302 Polar Top must be stored in a dry place in its original packaging until installation.

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 space 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.



CombiS 302 Polar Top

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.



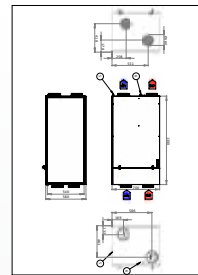
Product data
Technical information to ensure correct choice of solution.



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.

