Installation and maintenance

CTS 700 by Nilan

Compact P

Compact Polar

NILAN®
OUTSTANDING INDOOR CLIMATE

Version: 1.00, 01-01-2015
Software version 1.40.05

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General information before starting installation

Check that the following papers have been supplied with the product:

- Installation and maintenance (this document)
- User manual
- Wiring diagram

Should you have any further questions concerning installation of the product after reading the guide, please contact your nearest Nilan dealer, by visiting www.nilan.dk/dealers

The product is controlled by an CTS 700 control system, which provides a wide range of functions.

Compact P is a heat recovery ventilation system with a capacity of up to 330m^3/h at 100Pa external counter pressure. The system prioritises first the heat pump, second a 180-litre hot water tank and then intet air.

The outdoor AIR 9 heat pump is an air-to-water heat pump, designed for heating homes with low temperature central heating systems with a supply temperature of up to 45 °C.

All necessary permits and approvals must be obtained from the relevant authorities before installing an outdoor air heat pump. Check for any noise limitations which may apply to the outdoor element of the heat pump.

The unit is supplied with integral G4 panel filter and humidity sensor. The unit can also be fitted with a pollen filter (accessory).

This manual might describe functions and facilities that are not present in your system.

IMPORTANT: If the plant is damaged in any way it must be inspected and repaired by an authorized person.

Safety

Always disconnect the main power to the heat pump, if an alarm occurs, which cannot be rectified via the control panel.

If an alarm occurs on the electricity-conducted elements of the pump, always contact an authorised electrical installer to rectify the alarm.

Avoid direct contact with the pump's heating system pipes - they can be very hot!

To protect the heat pump from damage, it is fitted with following safety devices:

- Expansion systems for central heating and heat absorber.
- Safety valve for central heating and heat absorber.
- Low and high pressure switches for the compressor

The heat pump must be serviced regularly in accordance with applicable laws and regulations, such that it is kept in good condition and meets safety and environmental requirements.

The owner/user of the heat pump is responsible for the maintenance.

Compact P

The function

All wiring (power supply, safety circuit breaker, etc.) must only be fitted by a qualified electrician.
The system must be connected in accordance with the accompanying wiring diagram.

The Compact P plant is a complete solution that ventilates the property and ensures a good indoor climate. Furthermore, the Compact P produces hot water.

Unit components (function)
The Compact P consists of a counter flow exchanger followed by a heat pump with a reversible cooling circuit.
The unit draws the warm and humid air from moisture strained spaces, such as bathrooms, kitchens and utility rooms. The heat in the exhaust air flows through the counter flow exchanger, where it heats the fresh air and blows it into the rooms of the property, after. The energy that has not been utilized in the counter flow exchanger is recovered in the heat pump in order to produce hot water. When there is no need for the production of hot water, the heat pump can be used to heat the supply air as needed. During summertime, the heat pump can cool and dehumidify the warm air from outside in order to obtain a comfortable indoor climate.

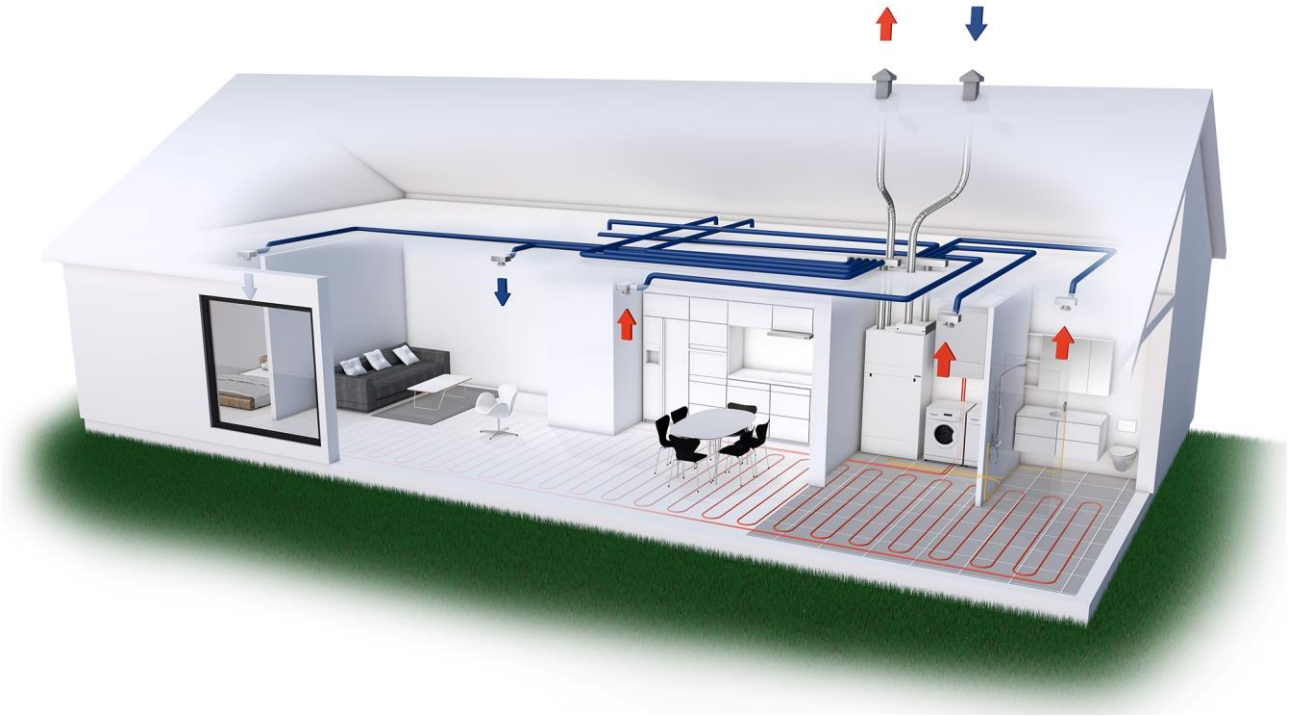


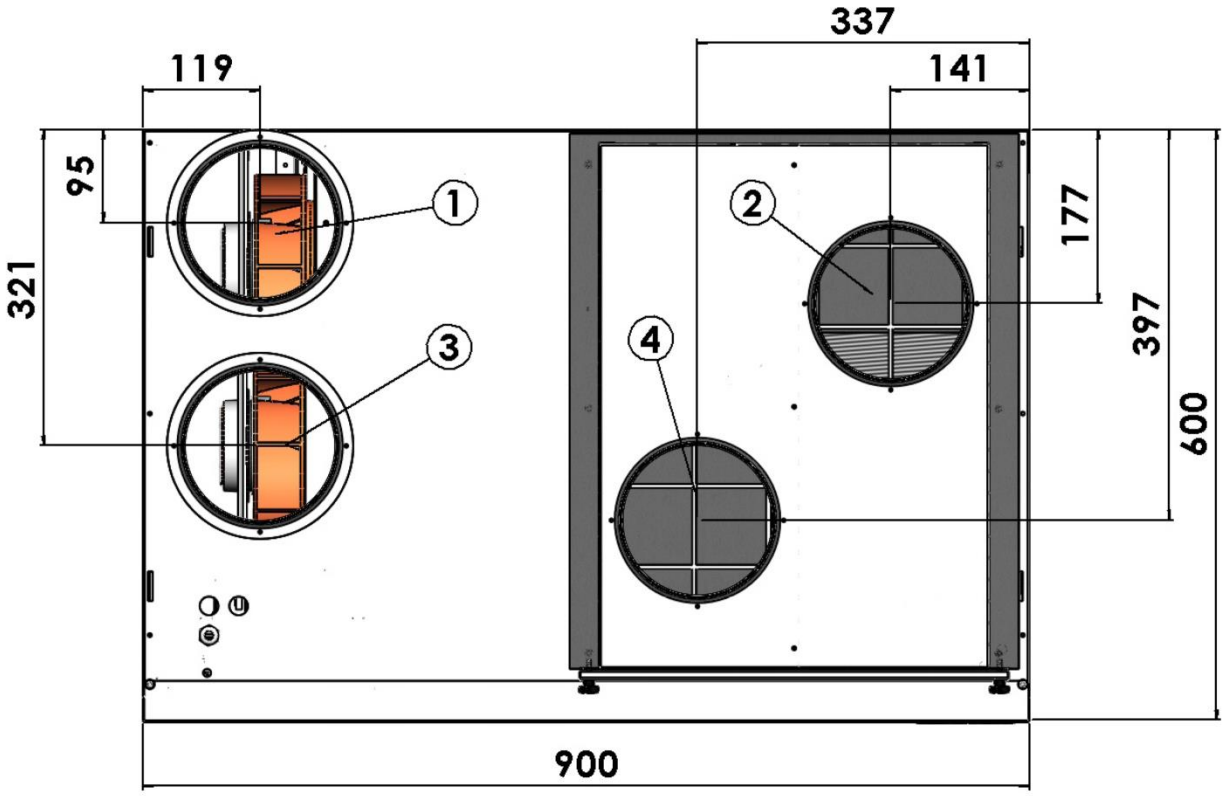
Figure 1: System build-up

Installing Compact P

When installing the unit, it is important to take future service and maintenance into account. There should be a minimum clearance of 60 cm in front of the unit, measured from the Compact P front panel.

When lifting the unit with straps it is important that the straps have an angle of maximum 45°C off perpendicular.

Individual connectors have been marked out at the factory to facilitate installation. Please note the attached labels. The connectors should be connected to the duct system using flexible adapters (flex tube, soundproofed flex tube or similar).



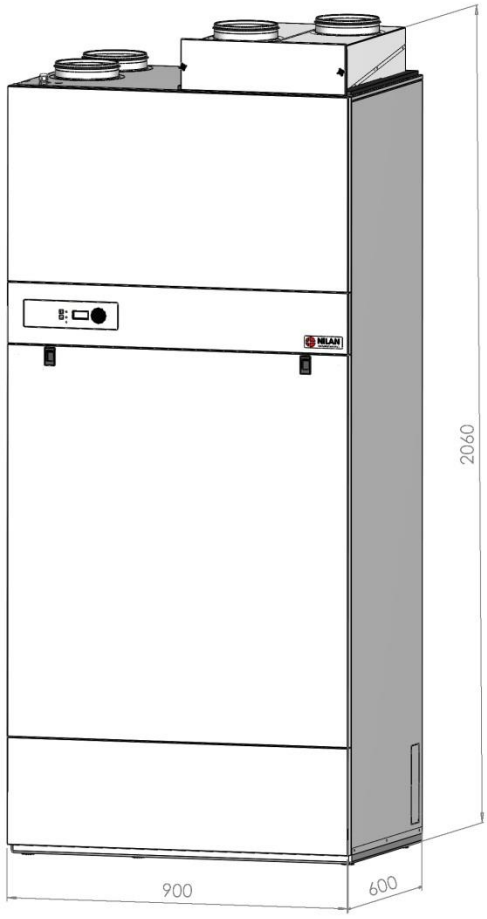
Figur 2: Duct Connections

1. **Ø160**
   Afkastluft
   Fortluft
   Discharge air
   Air extrait

2. **Ø160**
   Fraluft
   Abluft
   Exhaust air
   Air repris

3. **Ø160**
   Tilluft
   Zuluft
   Inlet air
   Air pulsè

4. **Ø160**
   Udeluft
   Aussenluft
   Fresh air
   Air frais

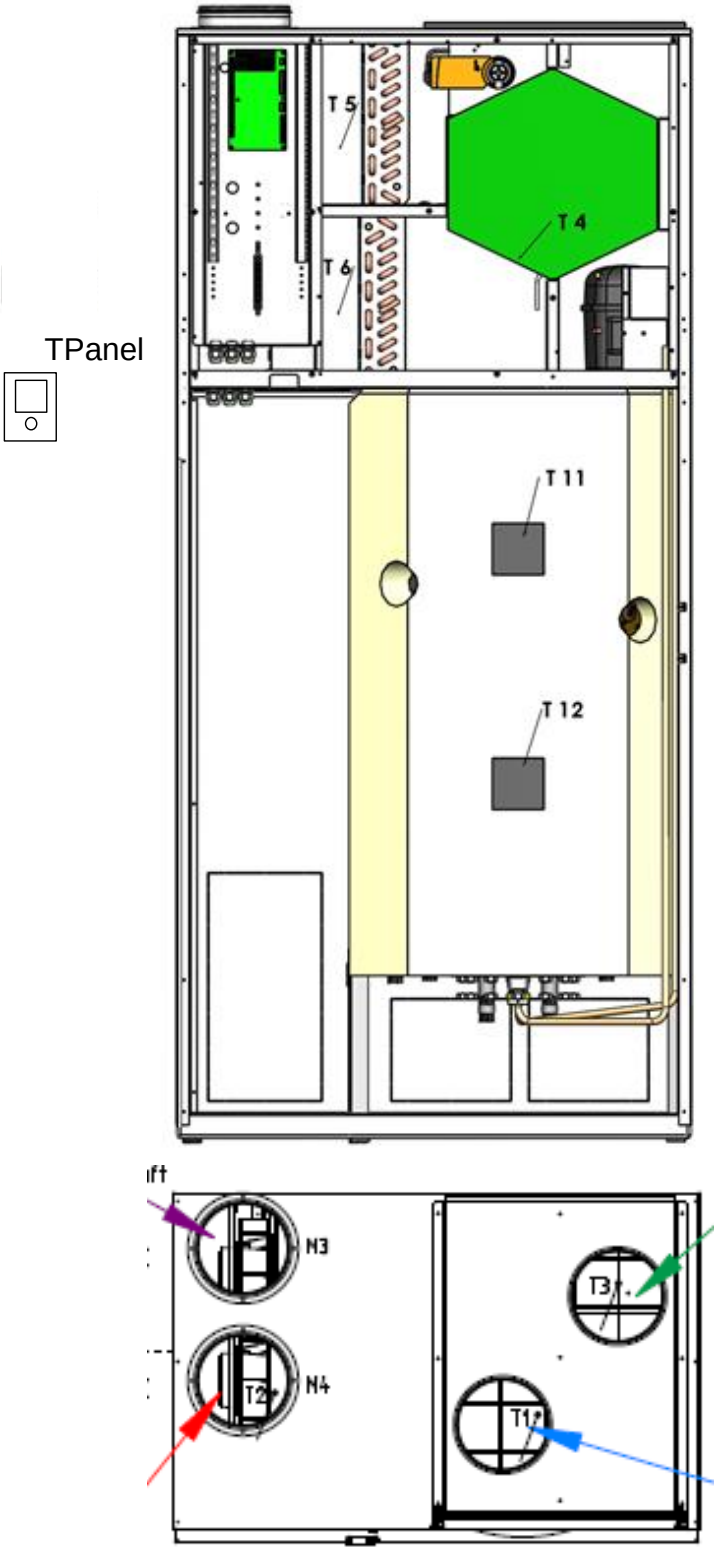


Figur 3: Sketch of Compact P

The unit must be installed and leveled on a firm, vibration-free surface. There should be at least 10mm clearance to walls or other permanent installations. Although the unit itself is practically noise and vibration free, care must be taken to prevent any vibration from being propagated to adjoining parts of the building.
The rear angular slide bar of the base frame of the Compact P can be removed in order to make it possible to push the unit towards the wall to hide water connections etc.

It is important that the condensation outlet of the Compact P be connected to a drain. The unit is supplied complete with water trap. The outlet should be led frost-free with steady decline to the nearest drain. The safety valve overflow must also be led to a visible drain.

If Compact P is enclosed by any covering, it must be possible to remove the covering easily.



T1: Outdoor air
T2: Inlet air
T3: Extract
T4: Yield
T5: Condenser
T6: Evaporator
T7: Supply air (after residual heating surface)
T8: Supply air (before preheating surface)
T9: On residual heat surface
T11: Top of container
T12: Bottom of container
TPanel: CTS700 control panel

Figur 4: Location of temperature sensors

Condensation drain/water trap

Compact P is supplied with 20mm condensation outlet (PVC, GF fittings). The unit is also equipped with built-in water trap.

The condensation outlet must be led frost-free with a steady decline of at least 1 cm/m to the nearest drain. The safety valve overflow must also be led to a visible drain.

In order to prevent ice formation, it may be necessary to equip the condensation outlet with a heating cable where frost is possible Protecting the condensation outlet from frost is the responsibility of the fitter.

Water connection

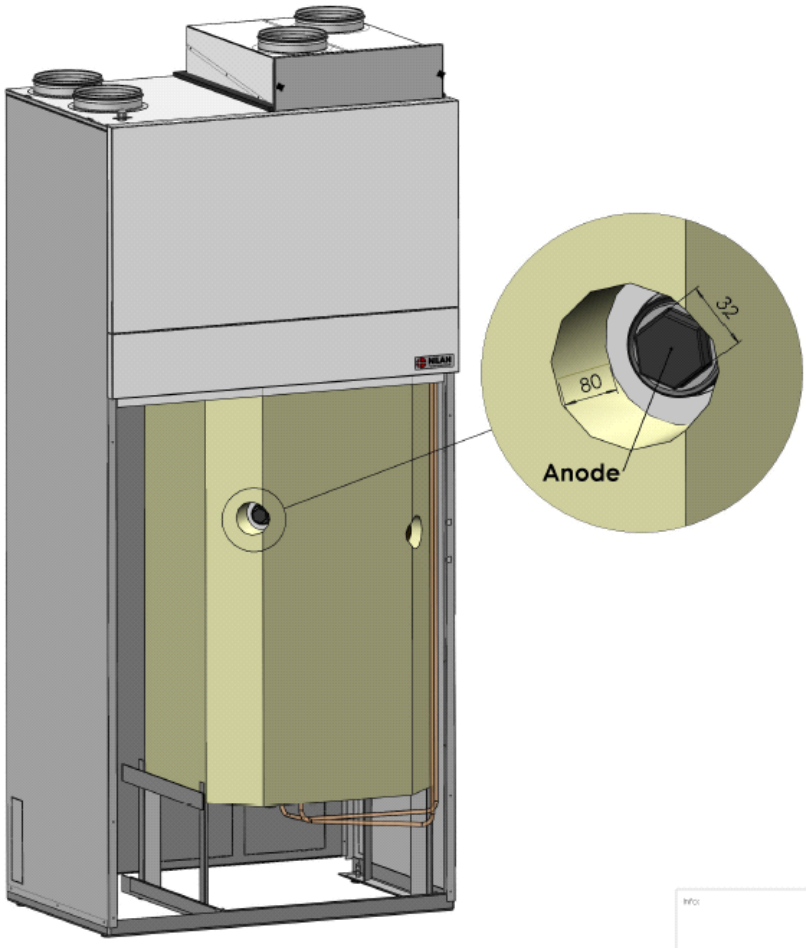
The inner tank surface is enamelled and the tank is equipped with a sacrificial anode.

All connectors have 3/4” threads, with the exception of the anode access which is a 5/4” sleeve. All water pipes are connected to the bottom of the unit.

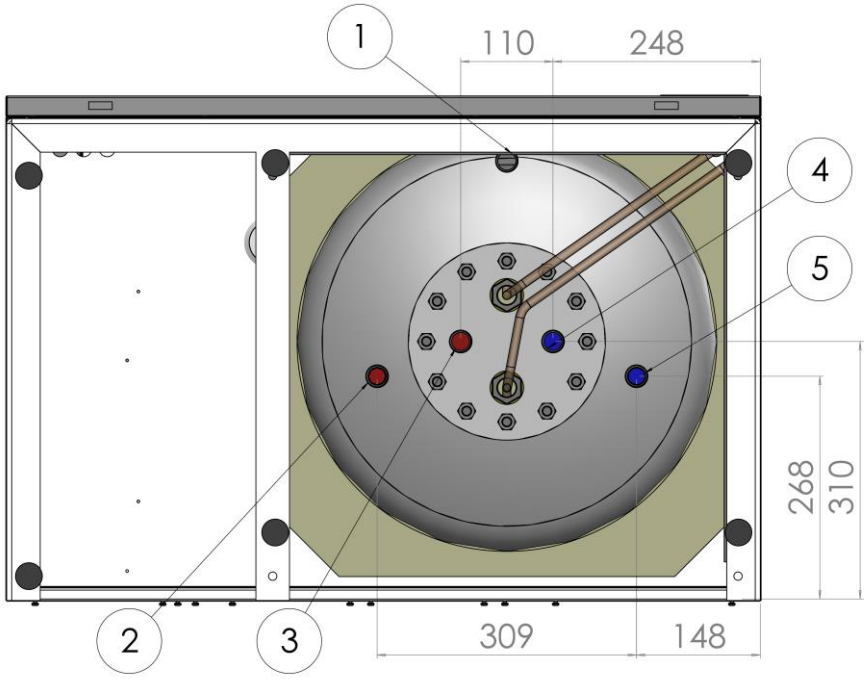
If you wish, you can establish a hot water circulation system. Simply fit a return valve to the tank's circulation connector.

If hot water circulation is not required, the connector and fitted blanking plug should be left untouched.

Hot water circulation may result in considerable heat loss within the piping system. A large proportion of heat pump output may therefore be lost. To prevent heat loss, circulation and hot water pipes must be insulated with at least 30mm of mineral wool or other type of pipe insulating material.



Figur 5: Location of sacrificial anode



Figur 6: Water connections

1. **Tilslutning for cirkulationsrør ¾”**
   Anschluss für zirkulationrohr ¾”
   Circulation pipe connection ¾”
   Branchement à tuyeau de circulation ¾”

2. **Fremløb suppleringsspiral ¾”**
   Vorlauf Sol ¾”
   Inlet supplementary coil ¾”
   Alimenration échangeur supplémentaire ¾”

3. **Varmtvandsudtag ¾”**
   Warm Wasser ¾”
   Hot water connection ¾”
   Sortie eau chaude ¾”

4. **Koldt vandsindtag ¾”**
   Kalt wasser ¾”
   Cold water connection ¾”
   Alimentation eau froide ¾”

5. **Retur suppleringsspiral ¾”**
   Rücklauf Sol ¾”
   Return supplementary coil ¾”
   Retour échangeur supplémentaire¾”

Supplementary coil is standard only in the Compact P Sun and Compact P Cool Sun unit type.

Power supply

Power supply including safety switch must be installed by an authorized electrician.
The Comfort-unit must be connected according to the attached electrical chart.

The unit is delivered with 3 m test cable for the CTS 700 panel. The panel should be connected to the CTS 700 control in the unit with cable type cat 5e twisted in pairs. (Maximum length 20m).

The CTS 700 panel must be placed dry and frost-proof. The panels' integrated feeler prevents further cooling of the building if the primary heat-supply stops by stopping the ventilation if the panel feeler gets below a specific value. (Factory setting is 10°C; the value can be set from 1-20°C.)

Figure 7: CTS 700 control

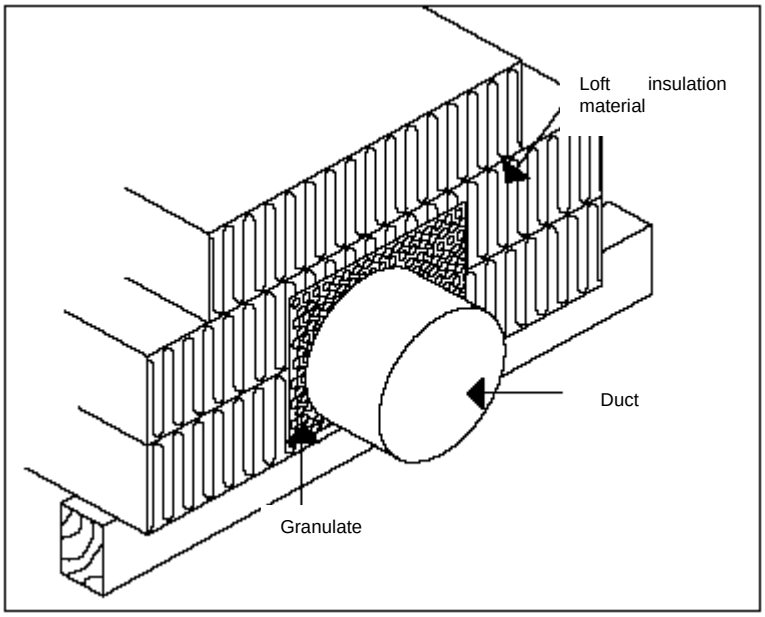
If a water heating element is installed in the system, the regulation vent must be connected electrically as described in the enclosed wiring diagrams.

Duct connection

Ducting and fittings with rubber seals of tightness class B are recommended. It is also advisable that all duct connections to Compact P be made with approx. 1m of soundproofed flex tube in order to dampen sound emission.

Ducting should be cut to length using a hacksaw or angle grinder and laid in accordance with the design drawing. Ducting is usually either attached to rafter feet using perforated strip or suspended in fitting strip. Avoid pinching the ducting in any way and any unnecessary bends.

The ducting must be insulated. Sometimes, standard loft insulation can be used for the purpose. All ducting should be insulated with mineral wool to prevent heat loss and condensation. Such insulation requirements also apply to soundproofed flex tubing. It is recommended that two layers of 50mm insulating material be used. If ducting is installed in an unheated room, it is inadvisable to switch the system off for prolonged periods as air from heated rooms will rise into the ducting and condensate, thus possibly causing moisture problems.



Figur 8: Insulation of ducting

The discharge duct leads the exhaust air (from which the system has recovered the energy it contained) to the outside through the roof or outer wall. It is important that the roof stack or wall grille has at least the same area as the duct immediately ahead of the stack or grille. Any contraction will cause unnecessary pressure drop, which may reduce ventilation capacity.

Holes for inlet and exhaust valves should be cut to fit the frame of the valve concerned. Secure the valve frame in position using screws and then attach the valve. Where the valves should be positioned depends on room design and use. It is, for example, inadvisable to install inlet valves immediately above where people usually sit as inlet air may sometimes be perceived as a draught.

Supplementary heating element DHW

The hot water tank has a supplementary heating element of 1,5kW. The heating element can be activated and de-activated via the CTS 700 control, see the "Settings → Compac → DHW settings" menu.
The temperature, at which the heating element should be active (T11), can be set in the "Settings → Compac → DHW settings" menu, see "Directions for use of the CTS 700 control

Fault finding

If problems arise during operation, please check the following before calling the service centre.

Check that the alarm mark on the CTS 700 panel is displayed. If so, investigate the cause of the alarm and remedy the fault. If necessary, contact your local service centre. For details of alarms and how to reset them, please refer to the operating instructions for the CTS 700 controls.

- **Compact P is operating but with reduced output.**
  Check that sufficient air is being supplied to Compact P. Check filters for excessive dirt accumulation. Check that valves are sufficiently open. In 98% of cases, the fault is caused by clogged filters. If necessary, increase the ventilation step. Any dampers to the open air should be shut at outdoor temperatures lower than 6°C.

- **Compact P is operating but there is no hot water.**
  Check whether the tank has been emptied of hot water. If the system is equipped with a circulation pump but the circulation circuit has not been insulated, considerable heat loss may result, significantly reducing Compact P capacity.

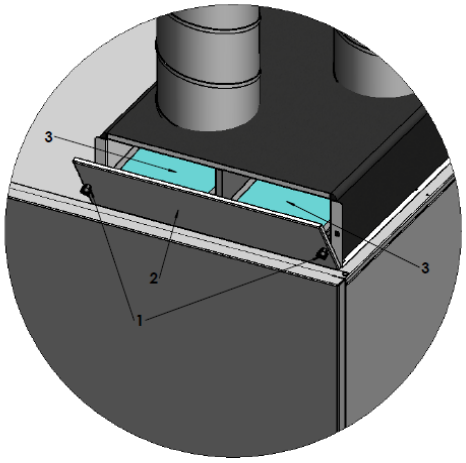
  Has the required water temperature (T12) been set correctly in the CTS controls? Usually, water temperature should be set to between 40–50°C. Please refer to the CTS 700 operating instructions for details on checking and setting water temperature.

  Is the air supplied too cold or the quantity supplied too low? Check filters and valves. Check whether duct insulation is sufficient and complete.

- **Compact P is not operating.**
  Check whether a fuse has blown. Check whether the hot water safety thermostat has cut out. If it has, press the button and the thermostat will cut in again once the water temperature has dropped 10-15°C. If the thermostat continues to cut out, contact your local service centre.

Operation and maintenance

At least every 3 months:
The filters should be cleaned and renewed when needed. Usually the filters need to be renewed once every 3 month. The filter guard in the CTS 700 control can be used in order to make sure that the filters are checked. The filters can be cleaned by vacuuming or shaking them.



Figur 9: Air Filter change

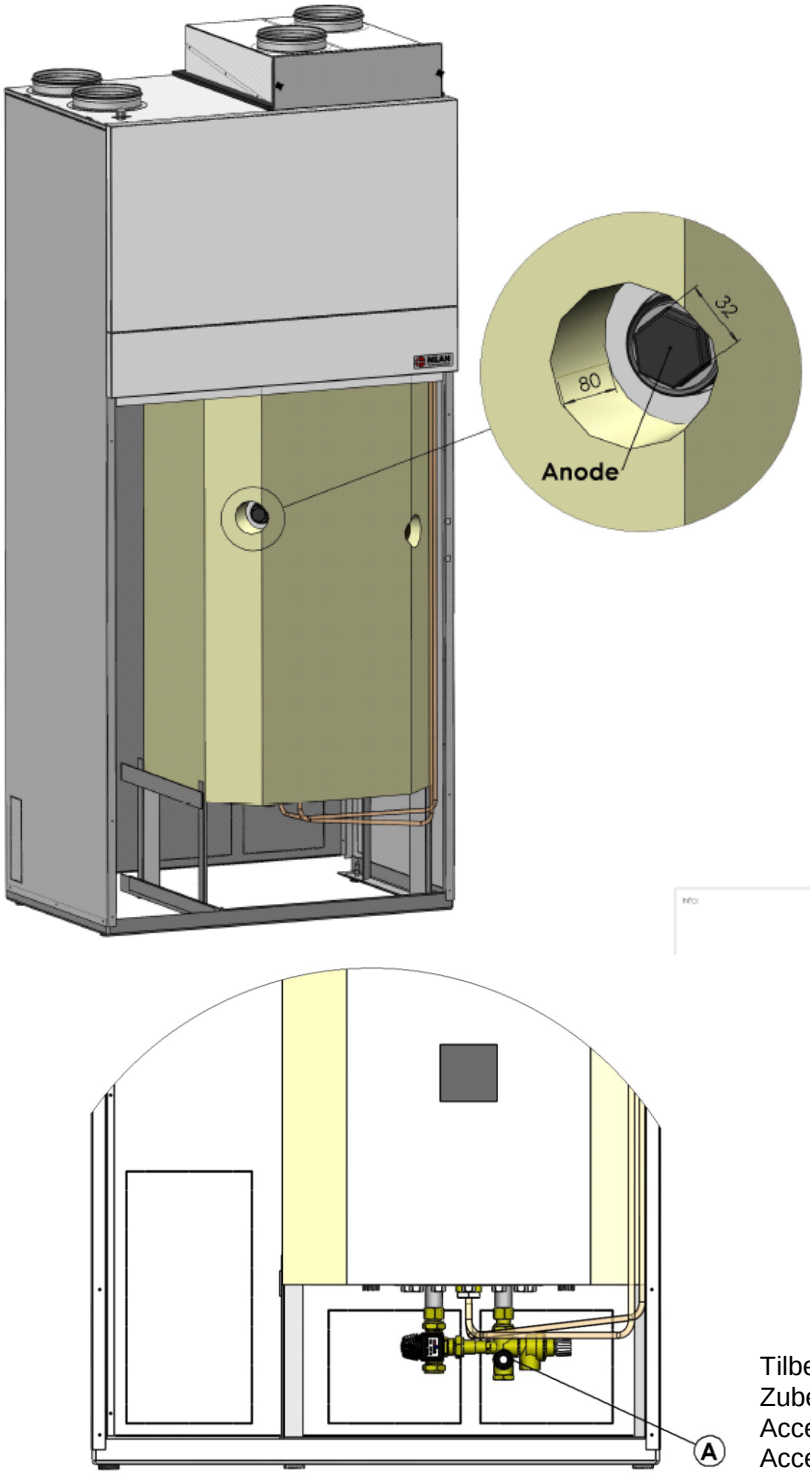
Changing filters:

1. Loosen screws
2. Remove the filter hatch
3. Pull out the two filter frames for change/vacuuming

Once a year:

- The sacrificial anode must be checked to ensure that monitoring of the anode is intact.
  - The wire “yellow/green” is dismantled at the anode.
    This produces the “Anode fail”
  - The wire “yellow/green” is reassembled at the anode.
    Delete the alarm in the event log (reset). Delete is only for installation contractors.

  The hot-water tank can corrode if the anode is left unchanged.
- The intake should be inspected and any uncleanness should be removed.
- The evaporator should be inspected and cleaned.
- It should be checked that the condensate has free passage through the water seal and the condensation drain.
- The safety switch for the hot water tank should be controlled.
- It is recommended to take out a subscription for service.



Figur 10: Safety Switch

Energy-saving tips for the optimal operation

- The auxiliary heating element should be cut off and only be used at very large hot-water demands. Please see CTS 700 directions
- The ventilation speed should not be set higher than necessary.
- Avoid hot-water circulation.
- Spread out the bathing times as the Compact P needs 6-7 hours to heat the 180L water.
- Insulate the ducting as prescribed.
- Do not cool during winter time.

Accessories / spare parts

Filters		
Type	Antal	Nilan varenummer
Filter G4	1	39167
Pollen filter F7	1	39545

Figur 11: Accessories/spare parts