162 105 20-2 2013-10-02

Installation and Maintenance Manual

CTC EcoZenith i550 Pro

Enertech Group

Installation and Maintenance Manual

CTC EcoZenith i550 Pro

162 105 20-2 2013-10-02

Table of Contents

Quick reference

Fill in the information below. It may come in useful if anything should happen.

Product:	Manufacturing number:
Installer:	Name:
Date:	Tel. no.:
Electrical installer:	Name:
Date:	Tel. no.:

Congratulations on buying your new product

You have just bought a CTC EcoZenith i550 Pro, which we hope you will be very pleased with. In the following pages you can read about how to operate and maintain your product. One part contains general information and one part has been written for the installer. Keep this manual containing the installation and maintenance instructions. You will be able to enjoy the benefits of your EcoZenith for many years, and this manual provides all the information you will need.

The Complete System

The CTC EcoZenith i550 Pro is a complete system which meets your home's heating and hot water requirements. It is equipped with a unique control system that monitors and controls your entire heating system regardless of how you choose to tailor it.

The CTC EcoZenith i550 Pro has a control system that:

- monitors all hot water and heating system functions;
- monitors and controls your heat pump, solar panels, additional heat, buffer tank, pool, etc.;
- allows for individual settings;
- indicates desired values, for instance, temperatures and energy consumption;
- facilitates settings in a simple and structured manner.

Your CTC EcoZenith i550 Pro has built-in finned copper coils which provide plenty of hot water and another finned copper coil to handle the heat from solar panels. The product also has a so-called cellar heat feature during the summer and a floor feature which maximizes the primary flow temperature.

Using the integrated night reduction function, you can set and change the temperature in the property during a 24-hour period, day by day, in blocks or as a vacation function.

Service-friendly

Easily accessible electrical components, along with effective troubleshooting functions in the control program, make the EcoZenith easy to service. It is supplied with a room sensor as standard, which is equipped with LED lights that flash in the event of a fault.

The EcoZenith is fully designed to work with the CTC EcoAir 400 series outdoor air heat pump, the CTC EcoPart 400 series bedrock/ground source heat pump, solar panels, water-jacketed stove and an additional boiler where present. The EcoZenith can control a number of combinations and provide you with an extremely flexible, eco-friendly and energy-saving heating system.

Check list

The check list must be completed by the installer.

- In the event of a service, this information may be called for.
- Installation must always be done according to the installation and maintenance instructions.
- Installation must always be carried out in a professional manner.
- Following installation, the unit should be inspected and checked for functionality.

Following installation, the unit must be inspected and functional checks performed as indicated below:

Pipe installation

- ☐ EcoZenith filled, positioned and adjusted in the correct manner according to the instructions.
- ☐ EcoZenith positioned so that it can be serviced.
- ☐ Capacity of the charge/radiator pump (depending on type of system) for the flow required.
- ☐ Open radiator valves and other relevant valves.
- ☐ Tightness test.
- ☐ Bleed the system.
- ☐ Safety valve function test.
- ☐ The waste pipe is connected to the draining gutter.

Electrical installation

- ☐ Compressor, direction of rotation (if heat pump installed).
- ☐ Power switch
- ☐ Correct tight wiring
- ☐ Requisite sensors for applicable system
- ☐ Outdoor sensor
- ☐ Room sensors (optional)
- ☐ Accessories

Information for the customer (adapted to current installation)

- ☐ Start-up with customer/installer.
- ☐ Menus/controls for selected system
- ☐ Installation and maintenance manual supplied to the customer
- ☐ Checks and filling, heating system
- ☐ Trimming information, heat curve
- ☐ Alarm information
- ☐ Mixing valve
- ☐ Safety valve function test
- ☐ Warranty conditions
- ☐ Information on procedures for fault registration

_____ _____

Date / Customer Date / Installer

Important to remember!

Check the following points in particular at the time of delivery and installation:

- The CTC EcoZenith i550 Pro must be transported and stored in an upright position. When moving the product, it can be placed temporarily on its back.
- Remove the packaging and check before installation that the product has not been damaged in transit. Report any transport damage to the carrier.
- Place the CTC EcoZenith i550 Pro on a solid foundation, preferably made of concrete. If the product needs to be placed on a soft carpet, base plates must be placed under the adjustable feet.
- Remember to leave a service area of at least 1 m in front of the product. Space is also needed around the product for installation of insulation and plastic top cover. See the chapter on Transportation, unpacking and installation in the section for the installer. The CTC EcoZenith i550 Pro must not be lowered beneath floor level.
- Check for missing parts.
- The product must not be installed where the ambient temperature is higher than 60°C.

Safety Instructions

The following safety instructions must be observed when handling, installing and using the heat pump:

- All installation must be carried out by a qualified person in accordance with applicable regulations.
- The product is only intended for vertical installation.
- Close the safety switch before doing any work on the product.
- Do not soak the product with water or any other liquid.
- When handling the product with a hoist ring or similar device, make sure that the lifting equipment, eyebolts etc. are not damaged. Never stand under the hoisted product.
- Never jeopardize safety by removing bolted covers, hoods or similar.
- Never jeopardize safety by deactivating safety equipment.
- Any work on the product should be done by authorised personnel only.
- Safety valve check:
  - The safety valve for the boiler/system and hot tap water must be checked on a regular basis. See the chapter on Operation and maintenance.

Scope of delivery

Standard delivery

- Multitank CTC EcoZenith i550 Pro
- Additional package with:
  - Installation and Maintenance Manual
  - Outdoor sensor
  - Room sensor
  - Safety valve 9 bar (tap water)
  - Safety valve 2.5 bar (radiator system)
  - Drainage valve
  - Adapter between the drainage valve and the connection sleeve
  - Sensor, 2 off (to and from pipes)
  - Current sensor, 3 off
  - Cover washer for connections, upper and lower tank, 8 off
  - Cover washer for solar coil connections, 2 off
  - Insulation for connection sleeves that are not used
  - Sensor labelling
  - Screw 4.2 x 14 graphite grey, 25 off + 2 extra
  - Screw 4.2 x 14 zinc grey, 4 off + 2 extra
- Additional package with rear insulation sections and plastic top

1. CTC EcoZenith i550 Pro design

This chapter illustrates the main components and describes the subsystems which, in different configurations, form part of the main system. For more information about the EcoZenith configurations, refer to the “Pipe connections” chapter.

1.1 Main components

Fresh Water Connections
Here you connect the property’s fresh water connections. The cold water is fed down to the lower part of the coiling, where it is preheated.

Bivalent Mixing Valve
The automated mixing valve ensures that an even heat is continuously supplied to the radiator system. The valve has double ports and takes the warm radiator water from the solar and heat pump heated water in the lower part of the tank first.

Top Connection
For connection of expansion vessel and/or safety valve.

Upper tank
In the upper part of the tank, the warm water in the coil is heated up to the desired temperature.

Control System
The EcoZenith is equipped with an intelligent control system which controls and monitors all parts of the heating system. The EcoZenith ensures that the most economical way of heating the house and the hot water is prioritised.

Upper Tank Connections
The upper part of the tank, the additional part, can be heated by heat pump and connected to heat sources such as electric, gas, oil and pellet boilers. Heat from a wood boiler is delivered to this part. Connections are placed symmetrically on both sides of the tank.

Finned Coil for Hot Water
The EcoZenith is equipped with a well dimensioned finned copper coil and does not contain any heater which can rust. A low temperature can be maintained without the risk of legionella bacteria.

Heat Distribution Pipes
The heat distribution pipes ensure that heat from the solar coil is directed to the upper tank and that, after hot water is drawn off, cooled water is directed to the lower part of the tank to be heated again by solar energy or heat pump.

Immersion heaters in Upper Part of Tank
Built-in upper immersion heater. When connected to a heat pump, the immersion heater acts as additional heat.
(The uppermost immersion heater is an accessory).

Insulated tank divider
Between the tank’s upper and lower tank is an insulated tank divider. This provides high temperatures in the upper tank for good hot water capacity and low temperatures in the lower tank for best operating economy.

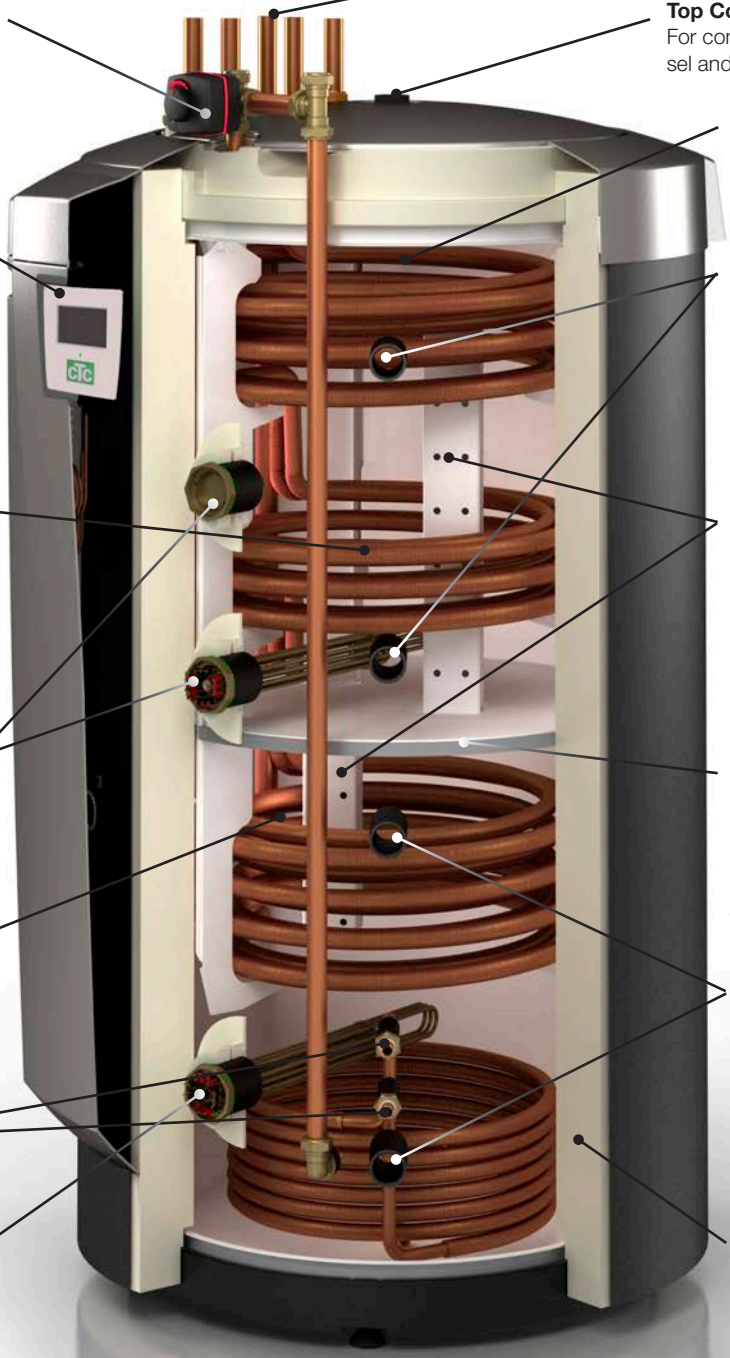
Lower tank
In the lower part of the tank, hot water is preheated in the coil by the solar- or heat pump-heated water.

Lower Tank Connections
The heat pump and solar system are connected to the lower tank. Water to be heated by wood boiler is taken from here, and heat which is to be stored in a buffer tank is also taken from this part. Connections are placed symmetrically on both sides of the tank.

Solar Coil Connections
The well dimensioned, 10 m long, finned coil can be connected directly to the solar panels.

Insulation
The tank is insulated by 90-mm-thick molded polyurethane foam for minimum heat loss.

Lower immersion heater
Built-in lower immersion heater.



2. CTC EcoZenith i550 Pro function

The CTC EcoZenith i550 Pro is a multi-tank with almost unlimited possibilities.

The EcoZenith is intended for houses and properties with water-borne heat. The multi-tank features include intelligent control, a water volume of 540 litres, bivalent mixing valve, two hot water coils, a solar coil and two 9 kW immersion heaters giving a total of 18 kW. You can easily add another immersion heater as an accessory to provide total power of 27 kW, controlled by the EcoZenith.

The control is specially adapted to simultaneously control up to three of CTC's heat pumps, but it will also control and optimise the following:

- Pool
- Energy storage in buffer tanks
- Three heating circuits simultaneously
- Solar panels and bore hole recharging
- Cooling (passive cooling), floor or fan convector
- Hot water circulation with time control
- Charging of extra domestic hot water tank
- Connected wood boiler, gas/oil boiler and pellets

The CTC EcoZenith is well-insulated with 90 mm PUR and is well provided with connection options on both sides, ensuring clean and easy pipe installations. It also provides for extensions and additions to the system in the future.

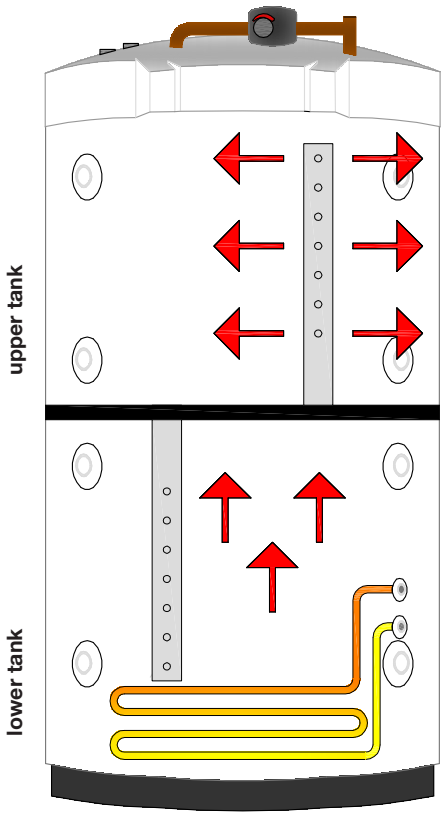
The CTC EcoZenith i550 Pro is divided into two tanks which are isolated from each other in order to be able to hold different temperatures in the two tanks. This provides for optimal function and operating economy.

The upper and the lower tanks are connected by heat distribution pipes which are especially developed for the solar energy to be able to form layers optimally in the entire volume of the tank and act as flow-through of the tank on wood operation, for instance. See figure.

See also Immersion heaters Menu in the Detail Description Menus chapter ("Installer/Settings/Electric heaters")

See also Lower tank Menu in the Detail Description Menus chapter: "Installer/Settings/Lower tank"

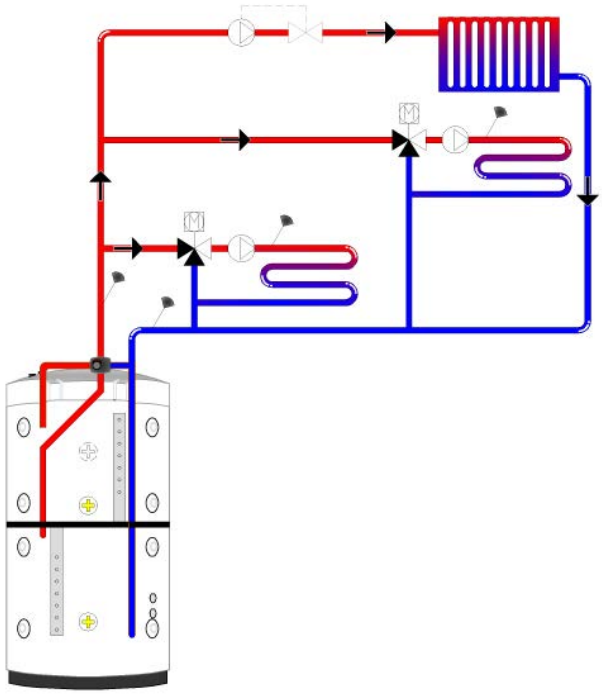
Remember that menus which have not been defined cannot be seen.



2.1 Heating System

The EcoZenith is equipped with a bivalent mixing valve, which always delivers an even temperature, without variation, to the heating system. The bivalent mixing valve is controlled by an outdoor sensor and, optionally, by a room sensor.

When operating with outdoor sensor alone, the desired curve inclination and adjustment are set. These values differ from home to home and should be adjusted to suit your needs.



A room sensor that is correctly positioned provides more comfort and more heating system savings. The room sensor picks up the current indoor temperature and adjusts the heat, for example when it is windy outside and the house is losing heat, which the outdoor sensor is unable to register. During solar insolation, or other instances when heat builds inside the house, the room sensor can also reduce the heat, thus saving energy. Another way to save energy is to use the night reduction function, which reduces the indoor house temperature at certain times or periods, for example during the night or when you are away on holiday.

The EcoZenith can control up to three heating systems, each with its own room sensor. For instance, one radiator circuit plus two floor heating circuits. The bivalent mixing valve always attempts to use the energy from the lower tank first; this is especially important when a heat pump or solar panel is connected to the EcoZenith. This ensures the system delivers good operating economy and that the upper tank stays warm to provide an abundance of hot water.

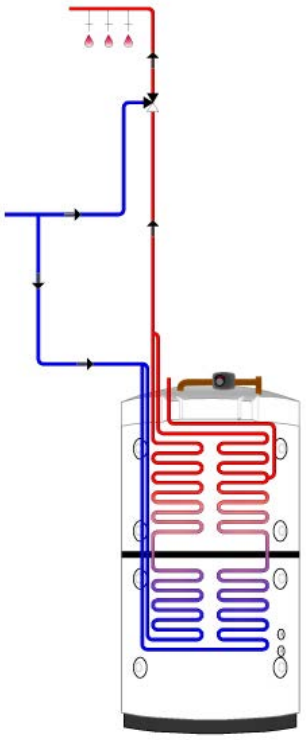
See also Heating system Menu in the Detail Description Menus chapter (Installer/Settings/Heating circuit 1-3).
See also Room temperature Menu in the Detail Description Menus chapter. You access the menu directly from the main menu.

2.2 DHW

The final heating of the hot water takes place in the upper tank. It also acts as additional heating for the heating system when the lower tank is not sufficient.

The hot water is heated using two finned copper tube coils of approx. 40 metres connected in parallel. The coils preheat the water in the lower tank and the water reaches maximum temperature in the upper tank. The low inner volume and high rate of water turnover in the copper coil prevents build-up of bacteria.

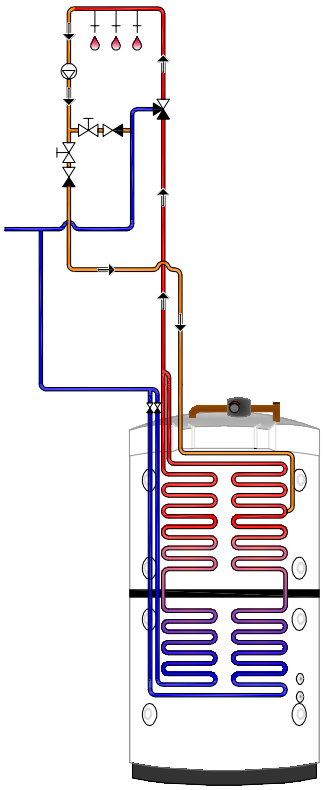
With double coils, high draw-off flows can be obtained, as the heat conduction area is finned, on the inside as well as the outside. For more information on settings and tips, please see the DHW chapter.



2.2.1 Hot Water Circulation

The hot water coil has a connection for hot water charging, which can be used to heat an external cold water tank when greater tap capacity of DHW is required, and allows connection of hot water circulation. This means that hot water is always available at the tap. To save energy the HWC pump can be time controlled from the EcoZenith.

See also Upper tank Menu in the Detail Description Menus chapter (Installer/Settings/Upper tank).



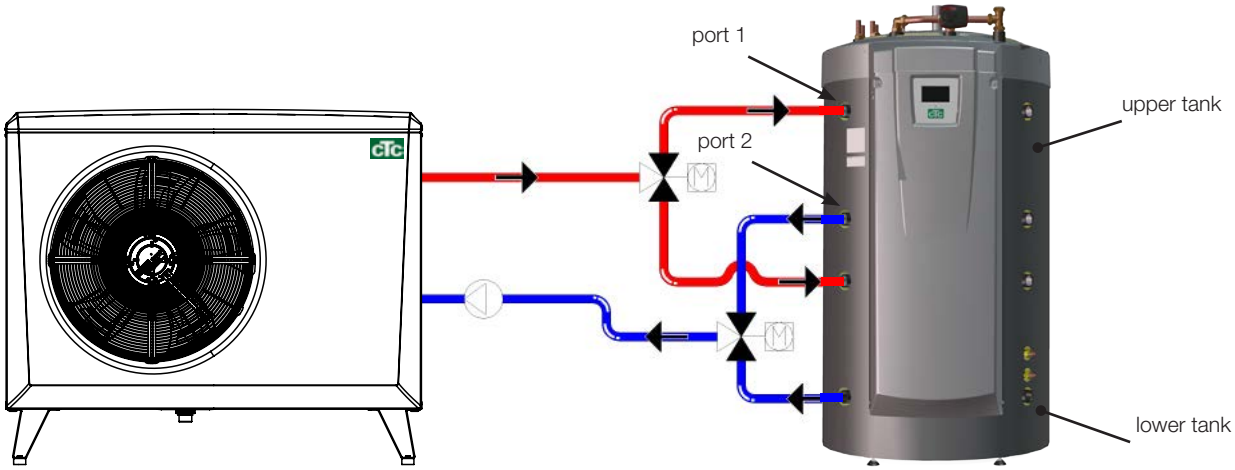
2.3 Heat pump

The EcoZenith is designed with two parts in order to ensure the heat pump operates to maximum possible economy.

The heat pump is connected via two diverting valves to the EcoZenith and ensures that the heat is directed into the upper and lower tanks, respectively. For instance, when the heat pump pumps towards the upper tank, the diverting valves send the flow to the two uppermost connections, so that the flow enters port 1 and exits through port 2.

The heat pump operates in two different ways, depending on whether it is the upper tank or the lower tank being charged.

2.3.1 Upper tank



The final hot water heating takes place in the upper tank. This means that, with a high upper tank temperature, an ample hot water supply is obtained.

The upper tank has a factory-set stop temperature of 55°C, which means that the heat pump will work to achieve this temperature in the upper tank. When hot water is being drawn off and the temperature in the upper tank falls to 5°C below the stop temperature, the heat pump starts up and raises the temperature towards the set stop temperature.

The stop temperature can be adapted to hot water needs and to the heat pump model installed.

When there is also a need for heat in the house, the diverting valves will automatically reverse direction and the heat pump continues to heat the lower tank as soon as the stop temperature 55°C in the upper tank has been reached. If the upper tank has not reached the stop temperature 55°C within the factory-set 20 minutes of charging, the diverting valves reverse the direction and the heat pump charges the lower tank. This is to prevent loss of temperature in the heating system.

See also Upper tank Menu in the Detail Description Menus chapter (Installer/Settings/Upper tank)

2.3.2 Lower tank

In the lower tank the heat pump operates to provide heat to the heating system. Heat pump operation is of so-called floating condensation type. However, the lower tank never drops below the set lowest temperature.

Floating condensation operation is where the heat pump heats to the temperature required by the heating system. This temperature varies depending on the outdoor temperature and which set inclination and adjustment (the heat curve for the house) has been chosen. If a room sensor is installed, this will affect the temperature required in the system. During spring and autumn, when it is not so cold outside, a lower temperature is needed for the heating system, but during winter a higher temperature is needed to maintain the desired indoor temperature.

Savings from a heat pump are directly linked to the COP value. COP means the output divided by the supplied power. COP 4 therefore means, for instance, that the heat pump delivers 4 kW and uses 1 kW $(\frac{4}{1} = 4)$

The lower the temperature the heat pump needs to deliver, the higher the COP value obtained from the heat pump, as this will involve the compressor working to better advantage.
Therefore, the heat pump heats only to the lower tank temperature the heating system requires. This saves compressor life and maximizes operating economy. The immersion heater, which is factory installed in the lower tank, is blocked as long as the heat pump is operating.

The immersion heater is only brought into use if the heat pump is blocked for any reason.

See also Lower tank Menu in the Detail Description Menus chapter (Installer/Settings/Lower tank) and the DHW chapter.

2.3.3 More Than One Heat Pump.

If more than one heat pump is installed, heat pumps two and three are connected to the lower tank only.

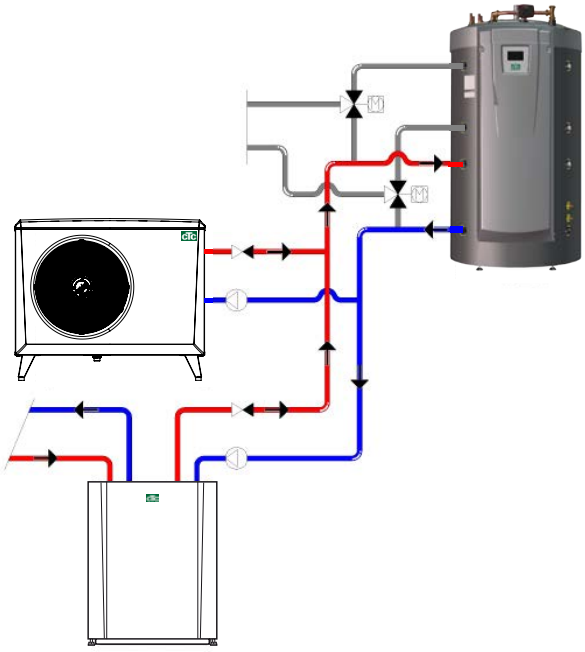
Only one of the heat pumps alternates between DHW and heating operation.

The Ecozenith's controller equalises the operating time between the heat pumps so as to maximise heat output and minimise the load on them.

If the heat pump which starts first does not manage to get the temperature up to the desired value, the second starts after a factory-set period of 30 minutes, and then the third after another 30 minutes.

See also Heat pump Menu in the Detail Description Menus chapter (Installer/Settings/Heat pump A1-A3)

2.3.4 Different Heat Pumps



The EcoZenith can control different types of heat pumps, the CTC EcoAir (outdoor air heat pump) and the CTC EcoPart (bedrock/ground source heat pump). The desired outdoor temperature at which the CTC EcoAir is prioritised over the CTC EcoPart is set in the "Installer/Settings/Heat pumps 1, 2, 3" menu under "Prio EcoAir/EcoPart". This means that the operating economy can be maximised, as at a high outdoor temperature a greater energy yield is obtained from the CTC EcoAir than from the CTC EcoPart. This combination is excellent in installations where, for example, bedrock/ground source heat pumps are designed with too much focus on "saving" etc. An air/water heat pump may then be used to allow the bedrock more time to "recover" and to provide increased output of the installation.

Remember that only one heat pump can be connected via the diverting valves and charge hot water in the upper tank.

See also Heat pump Menu in the Detail Description Menus chapter (Installer/Settings/Heat pump A1-A3)

2.3.5 Speed-controlled charge pump
(accessory from CTC)

Each heat pump should be provided with a separate charge pump that is controlled in tandem with its respective heat pump. If a speed-controlled PVM charge pump (accessory from CTC) is connected to the heat pump and controlled from the EcoZenith, the flow will be automatically set without any adjustment needed via the control valve. In the upper tank the speed of the charge pump will be controlled so that the heat pump always delivers its highest possible temperature into the top of the EcoZenith. This provides for quick access to hot water when the heat pump starts.

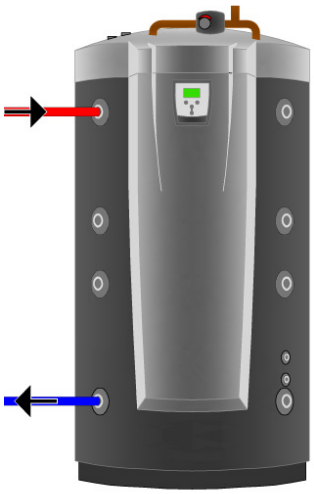
Towards the lower tank the speed-controlled charge pump will work for a fixed difference between flow and return from the heat pump.

If a speed-controlled charge pump is not installed, the flow has to be adjusted manually, and the difference between incoming and outgoing water from the heat pump will vary, depending on the operation conditions during the year.

In cases where an air/water heat pump is installed and the outdoor temperature is less than +2°C, the charge pumps are started in order to protect against frost. If a speed-controlled charge pump is installed, the pump will only work at 25% of its maximum capacity. This provides for increased savings on the charge pump's operating economy, and the heat losses in the EcoZenith are reduced compared to a conventional on/off charge pump.

See also Heat pump Menu in the Detail Description Menus chapter (Installer/Settings/Heat pump A1-A3)

2.4 Wood Boiler



The EcoZenith can be connected to a wood boiler, such as the CTC V40. The primary flow from the wood boiler is connected to the top of the EcoZenith and the return flow to the wood boiler is connected to the lowest connection on the lower tank.

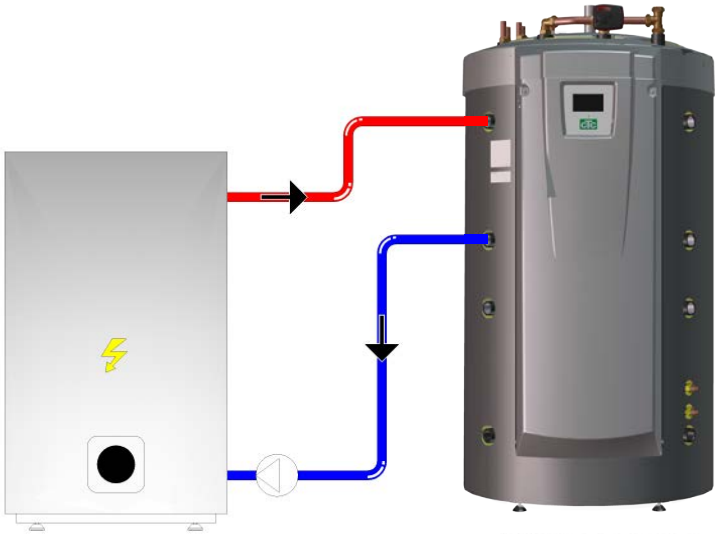
When firing is started and the flue gas sensor reaches a set value (menu "Installer/Settings/Wood boiler" factory-set "100°C"), the control goes into wood operation status when the temperature of the lower tank is above or equal to its reference value (setpoint). When wood operation is active, a heat pump or additional heat are not used for heating the EcoZenith. When the flue gas sensor is below the set value, wood operation status is interrupted.

It is recommended the wood boiler be provided with a charge system. A charge system such as Laddomat 21 is recommended for optimum performance. The charge pump in the charging system has to be controlled from the wood boiler. In special cases, such as operation with a water-jacketed stove, the charge pump may be controlled from the EcoZenith without installing a charge system.

See also Wood Boiler Menu in the Detail Description Menus chapter (Installer/Settings/Wood boiler)

2.5 Additional boiler (pellets, oil, gas, electricity)

The EcoZenith can control an external additional boiler (pellets, oil, gas, electricity). The additional boiler is connected to the upper tank. Use the menu to select whether the external additional boiler should have high or low priority. If high priority is selected, the external additional boiler is activated before the immersion heater(s); when low priority is selected, the immersion heater(s) is/are activated first.



After a certain delay, which is factory set at 120 minutes, the unit with low priority is also started and helps the heat source with high priority.

If the immersion heater(s) has low priority, the following requirement has to be met before they are allowed to start: the temperature inside the upper tank has to fall 4°C below the set point. If the external boiler has the low priority, the following requirement has to be met before the external boiler is allowed to start: the temperature inside the upper tank shall fall 3°C below the set point of the additional heating source and the immersion heater(s); should reached the desired value (100% of the set value), or to reached 6 kW the first 2 hours after a power failure.

The charge pump between the external boiler and EcoZenith is controlled by CTC EcoZenith.

The charge pump will start when the external boiler is needed. If the external boiler temperature sensor is installed and the external boiler is defined, the charge pump starts when the external boiler reaches its set temperature (factory set 30°C).The charge pump will stop when there is no need of external boiler. A stop delay of the charge pump can be set; making the charge pump running a while after the external boiler has been stopped.

See also External Boiler Menu in the Detail Description Menus chapter (Installer/Settings/Ext boiler)

2.6 Solar Energy

The EcoZenith contains a 10 m long 18 mm finned and internally grooved solar coil which manages approx. 10 m² of solar panel. On larger solar panel installations, the solar energy is connected via an external heat exchanger (see figure 2). The heat exchanger is connected to the upper and lower connections on the lower part of the CTC EcoZenith (either side is possible). If a greater number of panels is connected, one or more buffer tanks can also be installed in the system. More information on function and control of buffer tanks can be found in the Extra Buffer Tank section.

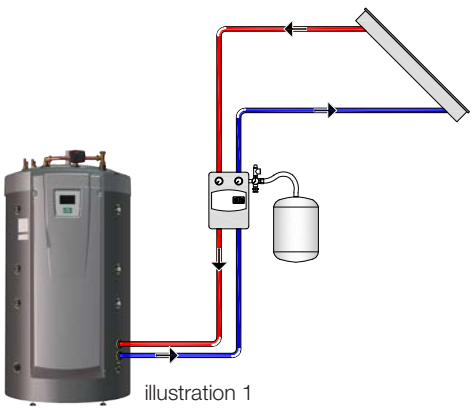


illustration 1

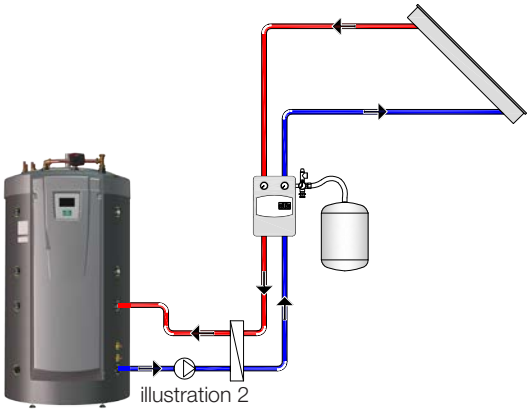
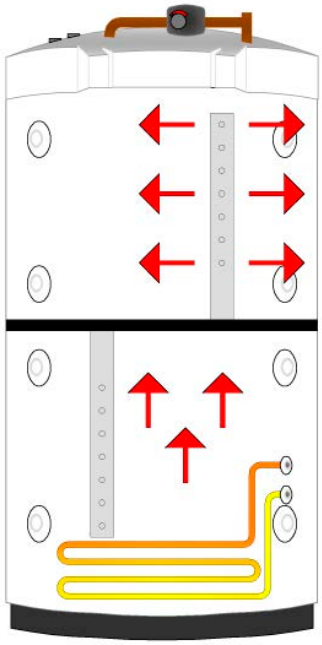


illustration 2

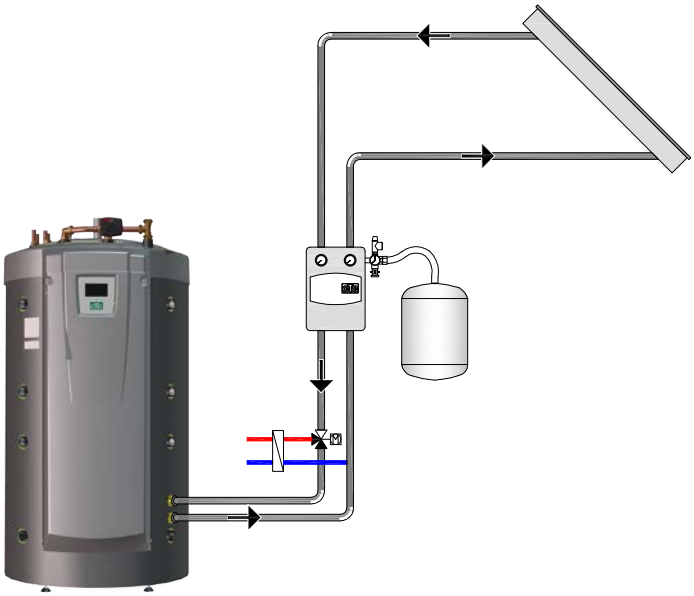
If the solar panels produce a temperature which is more than 7 degrees (factory-set) higher that the sensor (B32/B33), the charge pump starts and transfers the solar energy to the lower tank. The speed-controlled PVM pump controls the flow so that it always delivers a temperature which is 7°C higher. This means that if solar panel output rises, the charge pump will increase the flow, and if solar panel output decreases, the charge pump will reduce the flow. When the temperature in the lower tank increases or the solar panel loses temperature, and the difference between the temperature in the solar panel and the lower tank is below 3 degrees (adjustable), charging stops. Charging will not restart until the solar panel is again 7 degrees warmer than the lower tank.



When the temperature in the lower tank rises and becomes warmer than the upper tank, by the laws of physics, heat will rise into the heat distribution pipe and layer itself into the right temperature level in the upper tank through perforated holes in the distribution pipes. The colder temperature in the upper tank will, in the same way, sink down and distribute itself in its temperature zone in the lower tank through the distribution pipe which descends into the lower tank. Based on the factory setting, the sun will heat the lower tank in the EcoZenith to 85°C before the charging is stopped.

See also Solar Panels Menu in the Detail Description Menus chapter (Installer/Settings/Solar panels)

2.7 Recharging Bedrock/Ground



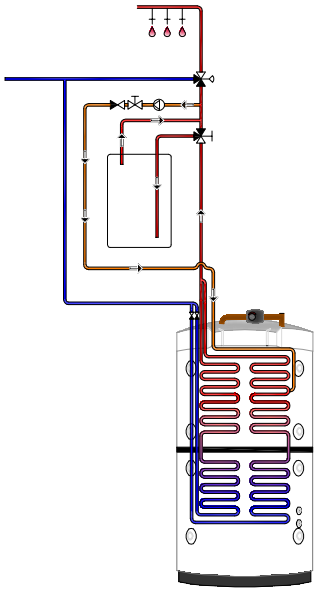
If a liquid-water heat pump is connected, a diverting valve can be installed on the solar circuit and connected to the brine circuit (the loop in the bore hole or the ground heat loop) to charge the bedrock/ground when the EcoZenith is fully charged (factory set 85°C).

The solar panel temperature should be factory set at 60°C warmer than the brine temperature in order for charging to start. When the difference between the temperature in the solar panel and the brine circuit falls to 30°C, charging is stopped. If the brine circuit becomes warmer than the factory-set value of 18°C, recharging will also be interrupted, as the temperature then becomes too high for the heat pump to work.

Safety measures for the collector/solar system are available.

See also Protection Collector Menu in the Detail Description Menus chapter (“Installer/Settings/Solar panels/Protection collector”) and also Winter Mode Menu in the Detail Description Menus chapter (“Installer/Settings/Solar panels/Winter mode”)

2.8 External Hot Water Tank



An external water heater can be connected to the EcoZenith. This results in a greater stored hot water volume, which contributes to higher hot water capacity.

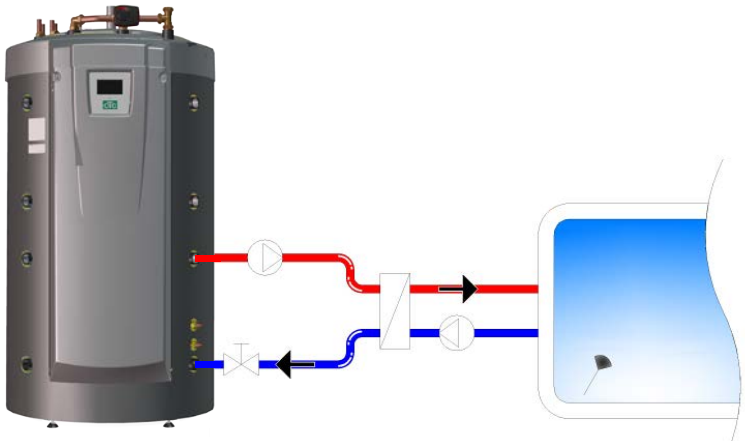
The incoming cold water first passes through the EcoZenith where it is heated before it flows into the hot water tank and out to the property's taps. This means that, when the temperature from the EcoZenith is no longer sufficient, the entire volume of the hot water tank is still there to be used.

When the temperature in the upper tank of the EcoZenith is factory set 5°C warmer than in the external hot water tank, the charge pump starts. The heat from the upper tank charges the hot water tank until the increase in temperature in the latter does not exceed one degree per three minutes.

When hot water is stored below 60°C, heating of the hot water tank at regular intervals is necessary to eliminate the risk of Legionella. This function is built into the EcoZenith. First the upper tank is heated as far as possible using the heat pump. For the water heater to reach 65°C during 1 hour, the immersion heater is allowed to engage to raise the temperature over the final degrees. The factory setting for this is every fourteen days.

See also Upper tank Menu in the Detail Description Menus chapter (Installer/Settings/Upper tank)

2.9 Pool



A pool is connected to the EcoZenith's lower tank. Between the EcoZenith and the pool, a heat exchanger is installed to separate the liquids.

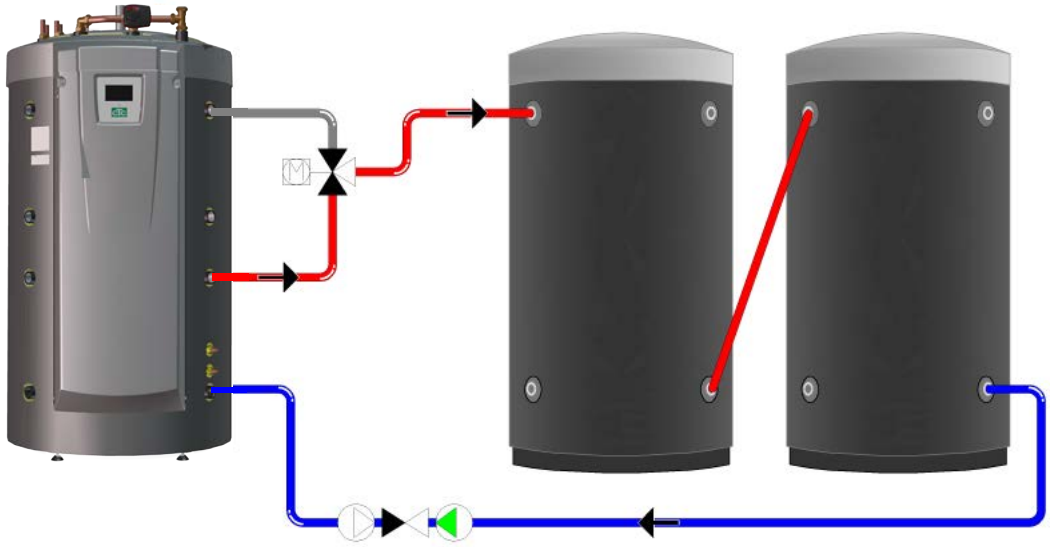
A sensor in the pool starts and stops the pool's charge pumps in order to maintain the set temperature in the pool (factory set at 22°C), and the temperature is allowed to fall by one degree before the charge pump starts again. It is also possible to set the pool priority to high or low, which determines whether or not additional heat can be used for heating the pool.

See also Pool Menu in the Detail Description Menus chapter (Installer/Settings/Pool)

2.10 External Buffer Tank

The EcoZenith can be connected to one or more buffer tanks. This is mainly used when connecting wood and solar energy systems where the volume in the EcoZenith is not sufficient. Via the accessory “Charging External Storage Tank”, warm water can be sent both from the lower tank to the buffer tank(s) and from the buffer tank(s) back to the EcoZenith. In other words, both charging and recharging of the energy are possible.

See also External Storage Tank Menu in the Detail Description Menus chapter (Installer/Settings/Ext storage tank) and HP Charging Menu in the Detail Description Menus chapter (Installer/Settings/Ext storage tank/HP charging).



2.10.1 Solar Operation Control

When solar energy is activated, the transfer to the buffer tank(s) is performed in two ways depending on whether heating is needed for the heating system.

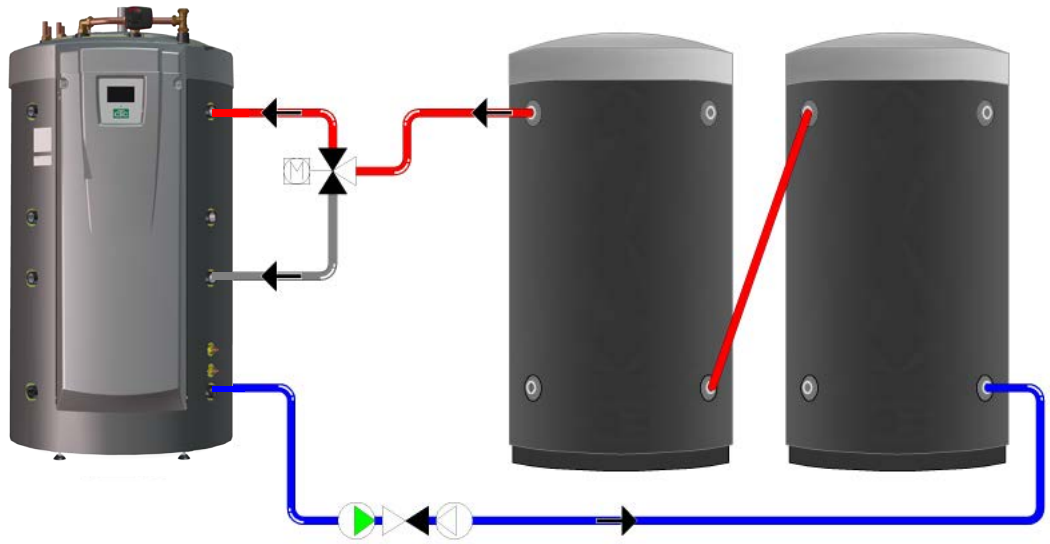
When heating is not needed for the heating system, the sun charges the EcoZenith in order to achieve a high temperature and a large quantity of hot water. The solar panels charge the EcoZenith until the sensor of the lower tank reaches the factory-set 80°C before the circulating pump starts up and transfers hot water from the EcoZenith connection in the lower tank into the top of the first buffer tank. Charging continues until the sensor in the lower tank has fallen 3 degrees (transfer starts at 80 degrees and stops at 77 degrees). The lower tank must be at least 7 degrees warmer than the buffer tank for charging to be allowed to start. This applies independently of whether there is a need for heating or not.

When there is a need to heat the house, the transfer will be controlled by the reference value (setpoint) in the lower tank. When the sun has heated the lower tank to 7 degrees above the reference value, the transfer starts, provided that the lower tank is also 7 degrees warmer than the buffer tank. Efficiency of the solar panels increases when they work towards a low water temperature, which is the case in spring and autumn, as there is no great need for heating during either of these seasons. The temperature levels stated above can be adjusted.

2.10.2 Wood Operation Control

The wood boiler charges the EcoZenith until the sensor of the lower tank reaches the factory-set 80°C, before the charge pump starts up and transfers hot water from the lower tank into the top of the first buffer tank. Charging continues until the sensor in the lower tank has fallen 3 degrees (transfer starts at 80 degrees and stops at 77 degrees). The lower tank must be at least 7 degrees warmer than the buffer tank for charging to be allowed to start, based on the factory-set values.

2.10.3 Recharging from Buffer Tank to EcoZenith



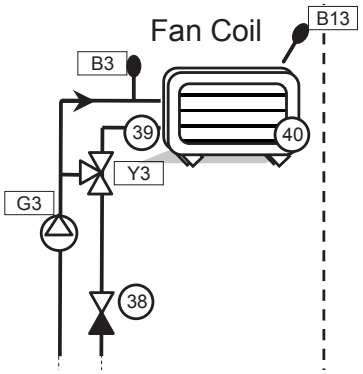
Recharging from Buffer Tank to the EcoZenith is always performed to the upper tank, if possible. If charging to the EcoZenith's upper tank is not possible due to too low a temperature difference, the controller checks if charging to the lower tank is possible. The condition for recharging is a 7 degree temperature difference.

Charging from the buffer tank to both the upper and the lower tanks in the EcoZenith is stopped when the temperature difference has fallen to a difference of 3 degrees. The temperature levels stated above can be adjusted.

2.11 Cooling CTC EcoComfort

CTC EcoComfort is an accessory which utilises the cool temperatures of the bore hole to create a cool indoor climate in summer. The extent to which you can cool a property depends on several factors, such as the rock temperature available for the case in point, the size of the house, the capacity of the fan convectors, the living area layout, etc.

NOTE: Remember to insulate pipes and connections against condensation.



Separate heating/radiator system and cooling system (fan convector)

EcoZenith simultaneously manages a radiator system for heating and a separate system for cooling. This can be relevant if you want to cool a part of a property using e.g. a fan convector at the same time as need to heat another part.

Desired room temperature

The desired room temperature is set on the EcoZenith display. The water mix is automatically adjusted to achieve the right temperature for the amount of cooling needed (room sensor deviation). The greater the deviation, the colder the water fed into the system. Depending on the system in question, temperatures are not permitted to become too cold (as this can result in damage due to damp).

NOTE: For cooling it is recommended that the room temperature be set a few degrees higher than the set temperature for heating operation. Given that the room temperature tends to increase as the outdoor temperature increases, the cooling function will cut in.

Note too that cooling capacity depends, among other things, on bore hole temperature, bore hole length, flows and fan convector capacity, and will vary during the warm part of the year.

See CTC EcoComfort manual for more information.

See also Cooling Menu in the Detail Description Menus chapter (Installer/Define system/Cooling)

3. The House Heating Curve

The House Heating Curve

The heating curve is the central part of the product's control system. It is the heating curve which determines the compensated flow temperature requirements for your property dependent upon the outdoor temperatures. It is important that the heating curve is correctly adjusted, so that you achieve the best operation and economy possible.

One property requires a radiator temperature of 30 °C when the outdoor temperature is 0 °C, whilst a different property requires 40 °C. The difference between different properties is determined by the radiator surface area, the number of radiators and how well insulated the house is.

> **!** The set heating curve is always given priority. The room sensor can only increase or decrease the compensated flow temperature to a certain extent above the set heating curve. Where operating without a room sensor, the selected heating curve determines the flow temperature supplied to the radiators purely from the outside temperature reading.

Adjustment of Default Values for the Heating Curve

You define the heating curve yourself for your property by setting two values in the product control system. This is achieved by selecting the options Inclination or Adjustment under the Installer/Settings/Radiator system menu. Ask your installer to help you set these values.

It is extremely important to set the heating curve and, in some cases, unfortunately, this process may take several weeks. The best way of doing this, upon the initial start-up, is to select operation without any room sensor. The system then operates using the outdoor temperature reading and the property's heating curve only.

During the adjustment period it is important that:

- the night reduction function is not selected.
- all thermostat valves on the radiators be fully opened.
- the outdoor temperature is not higher than +5 °C. (If the outdoor temperature is higher when the system is installed, use the factory set curve until the outdoor temperature falls to a suitable level.)
- the radiator system is operational and correctly adjusted between different circuits.

Appropriate Default Values

During installation you can seldom achieve a precise setting for the heating curve instantly. In this case, the values given below may provide a good starting point. Radiators with small heat-emission surfaces require a higher primary flow temperature. You can adjust the gradient (heating curve gradient) for your heating system under the Installer/Settings/Radiator system menu.
Recommended values are:

Floor heating only	Inclination 35
Low temperature system (well insulated houses)	Inclination 40
Normal temperature system (factory setting)	Inclination 50
High temperature system (older houses, small radiators, poorly insulated)	Inclination 60

Adjusting the heating curve

The method described below can be used to adjust the heating curve correctly.

Adjustment if it is too cold indoors

- If the outdoor temperature is **lower** than 0 degrees:
  Increase the Inclination value by a couple of degrees.
  Wait 24 hours to see if any further adjustment is required.
- If the outdoor temperature is **higher** than 0 degrees:
  Increase the Adjustment value by a couple of degrees.
  Wait 24 hours to see if any further adjustment is required.

Adjustment if it is too warm indoors

- If the outdoor temperature is **lower** than 0 degrees:
  Decrease the Inclination value by a couple of degrees.
  Wait 24 hours to see if any further adjustment is required.
- If the outdoor temperature is **higher** than 0 degrees:
  Decrease the Adjustment value by a couple of degrees.
  Wait 24 hours to see if any further adjustment is required.

If the values set are too low, this may mean that the desired room temperature is not being reached. You then need to adjust the heating curve, as necessary, following the method shown above.
When the basic values have been set more or less correctly, the curve can be finely adjusted directly using the Room temp. shown on the home menu screen.

Description of inclination and adjustment

Inclination 50:
The value set is the outgoing temperature of the water supplied to the radiators at an outdoor temperature of –15 °C, e.g. 50 °C. A lower value is selected where a radiator system has large radiator areas (a low temperature system). Floor heating systems require low temperatures. A low value should therefore be selected. The value must be increased for high temperature systems to achieve a high enough indoor temperature.

Adjustment 0:
The adjustment means that the flow temperature can be raised or lowered at a specific outdoor temperature.
Adjustment 0 means 50 °C primary flow when the outside temperature is -15 °C.
Adjustment -5 means 45 °C primary flow when the outside temperature is -15 °C.

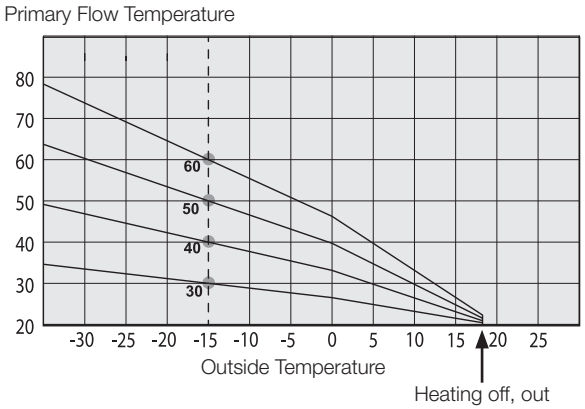
For example:
Inclination 50 means that the temperature of the water supplied to the radiators will be 50 °C when the outdoor temperature is –15 °C (if adjustment is set to 0). If the adjustment is set to +5, the temperature will be 55 °C instead. The curve is increased by 5 °C at all temperatures, i.e. it is parallel displaced by 5 °C.

Examples of Heating Curves

You can see in the diagram below how the heating curve changes with different Inclination settings. The gradient of the curve shows the temperatures that the radiators require at different outdoor temperatures.

Curve Inclination

The inclination value which is set is the primary flow temperature when the outside temperature is –15 °C.

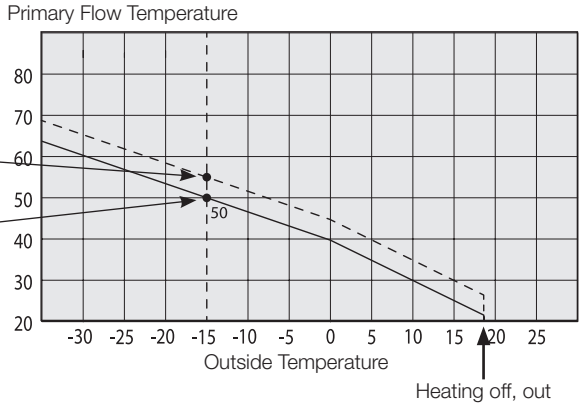


Adjustment

The curve can be parallel displaced (adjusted) by the desired number of degrees to adapt to different systems/houses.

Inclination 50 °C
Adjustment +5 °C

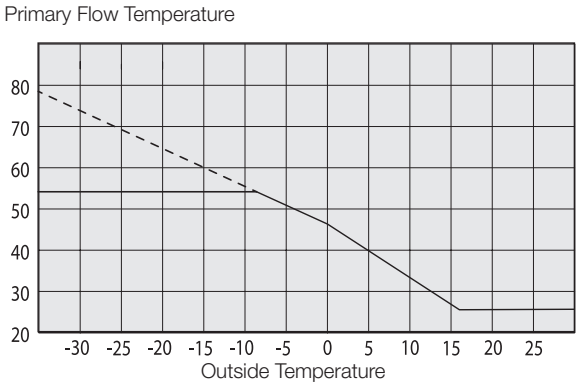
Inclination 50 °C
Adjustment 0 °C



An example

Inclination 60 °C
Adjustment 0 °C

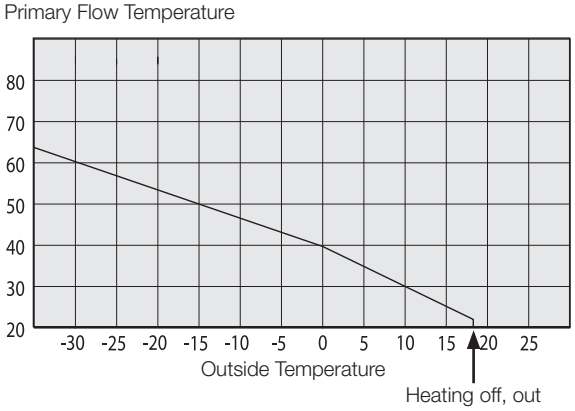
In this example, the maximum outgoing primary flow temperature is set at 55 °C.
The minimum permitted primary flow temperature is 27 °C (e.g. summer-time basement heating or the floor circuits in a bathroom).



Summer-time operation

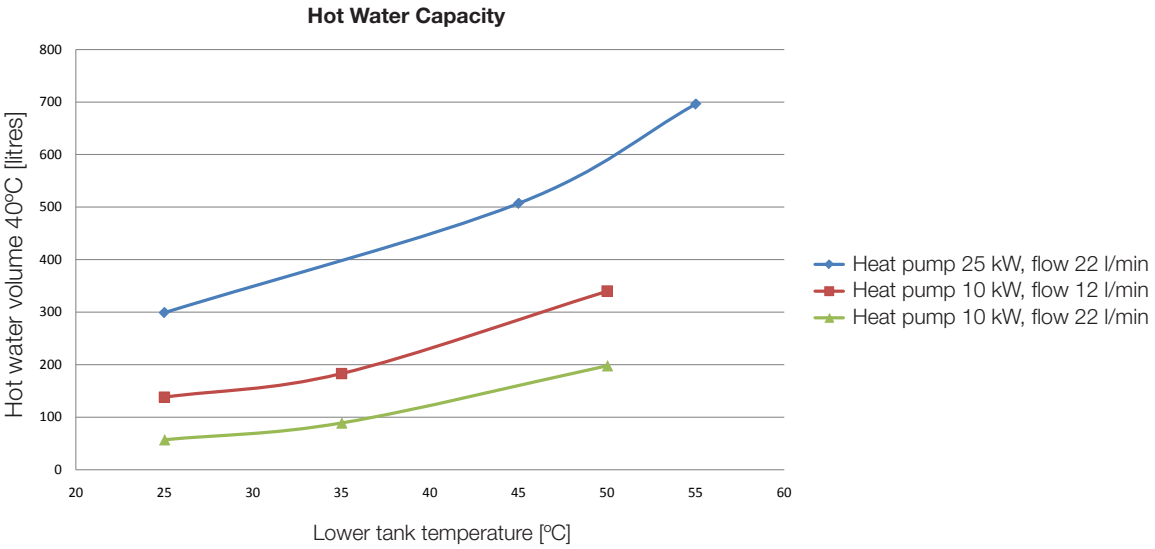
All properties have internal heat gains (lamps, oven, personal heat etc.), which means that the heating can be switched off when the outdoor temperature is lower than the desired room temperature. The better insulated the house is, the earlier the heating from the heat pump can be switched off.

The example shows the product set at the default value of 18 °C. This Heating off value can be changed under the Installer/Settings/Radiator system menu.
When the heat is switched off in this way, the radiator pump stops and the mixing valve is shut down. The heating starts up automatically when it is required again.



4. DHW

The CTC EcoZenith i550 Pro has a total of approx. 40 m finned copper coils for the heating of hot water. These coils preheat the water in the lower tank and the water then runs through the upper tank for the final temperature increase. These two coils running parallel through the EcoZenith allow high flows with low pressure differential, creating excellent conditions for good hot water capacity and comfort.



Operating Economy

Many want to gain maximum benefit from the heat pump's low operating costs. Many people want to utilize the low operating cost of the heat pump to a maximum. If the EcoZenith is allowed to run on lower temperatures, this results in lower hot water capacity but greater savings.

A heat pump is more efficient (has a higher COP value) when it produces lower temperatures. For the sake of operating economy, this means that the lower tank of the EcoZenith, which services the needs of the radiators, should have as low a temperature as possible. A floor heating system uses low temperatures, which benefits heat pump operation.

Solar energy operation also gives the best yield at lower temperatures. For example, on a cloudy day the solar panels do not heat up to the same extent, but still deliver their energy to the lower part of the tank, as the temperature in there is low.

The EcoZenith is designed so that the temperature can be low in the lower tank where the preheating of the hot water takes place, and higher in the upper tank in order to further raise the temperature of the hot water. The need for hot water controls the temperature in the upper tank first. For best operating economy, start with a low temperature setting, for instance, the factory setting, and increase the temperature progressively if there is not enough hot water. Remember that setting the temperature higher than a temperature the heat pump can produce means that the immersion heater(s) will kick in and heat instead. This has an adverse effect on operating economy.

For higher hot water demands, it can be more economical to set a higher temperature in the lower tank instead of exceeding the temperature limit for the heat pump in the upper tank. However, this is less beneficial to heat pump operation for the radiator requirement because of the higher operating temperature. Furthermore, where solar panels have been installed, some of the solar energy will not be exchanged in the lower tank.

Additional Domestic Hot Water

There is a possibility of increasing the product's hot water capacity at certain periods, with or without the help of the immersion heater(s). You can either select extra domestic hot water immediately or schedule selection on a weekly basis. When the function is activated, the product starts producing extra hot water. The hot water is produced by the compressor working at maximum temperature, known as full condensation. In the "Installer/Settings/Upper tank" menu you can also select the immersion heater(s) to help to produce extra hot water. Remember that the function "extra hot water" means that more energy is consumed, especially if the immersion heater(s) is/are used. See also in the "Installer/Settings/Lower tank/Timer lower tank" menu.

Extra Domestic Hot Water Tank

Another way of improving the hot water capacity is to install an extra hot water tank. The EcoZenith is prepared for controlling this, which provides the possibility of utilising heat pump energy to heat the extra domestic hot water tank. This means that there is a large buffer with hot water, heated by the heat pump, while the benefits in terms of operating economy using low temperature in the lower tank are maintained.

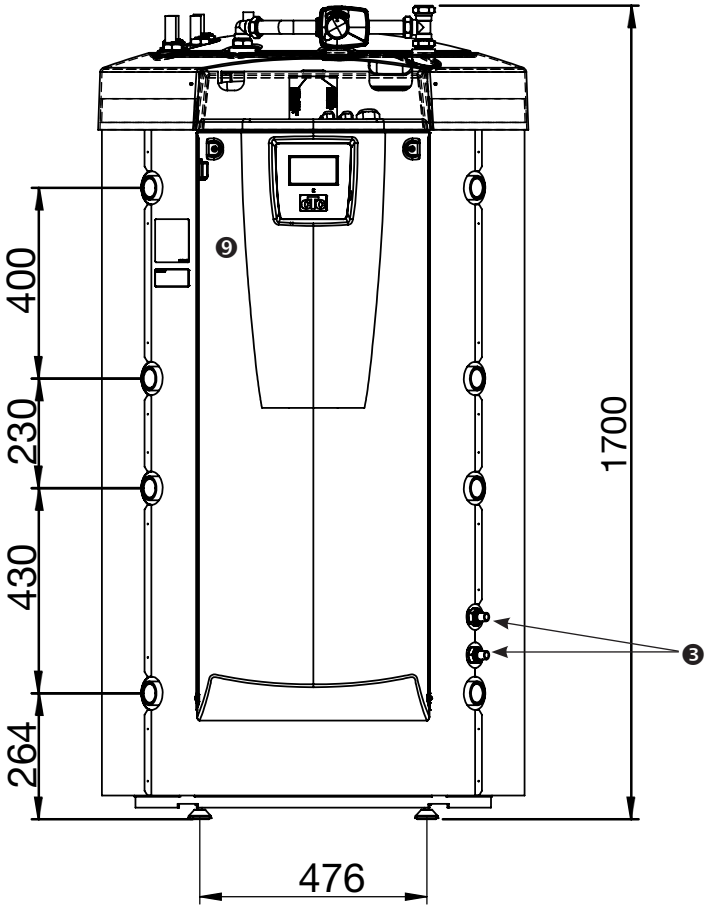
Important to remember:

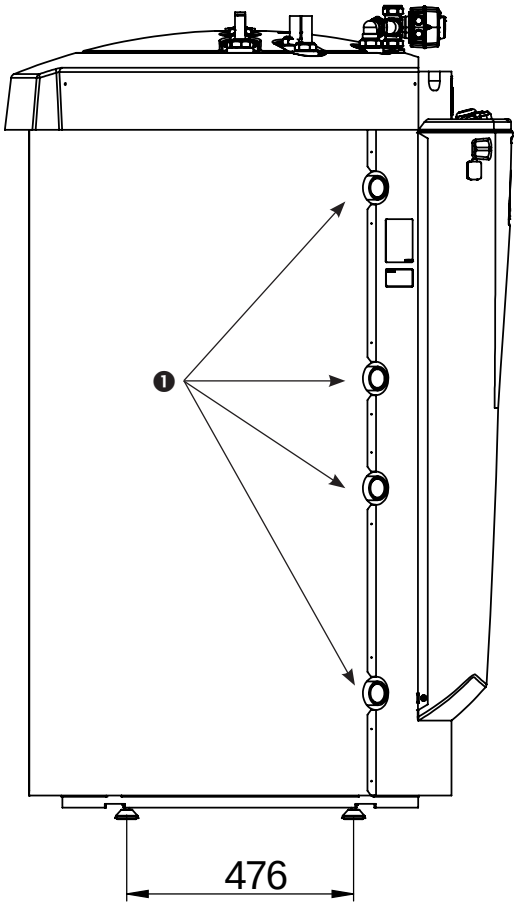
- Avoid running hot water at the highest flow capacity. If you run a bath at a rather slower rate instead, you will get a higher temperature.
- Remember that a poor mixing valve or a poor shower mixer can affect the hot water temperature.

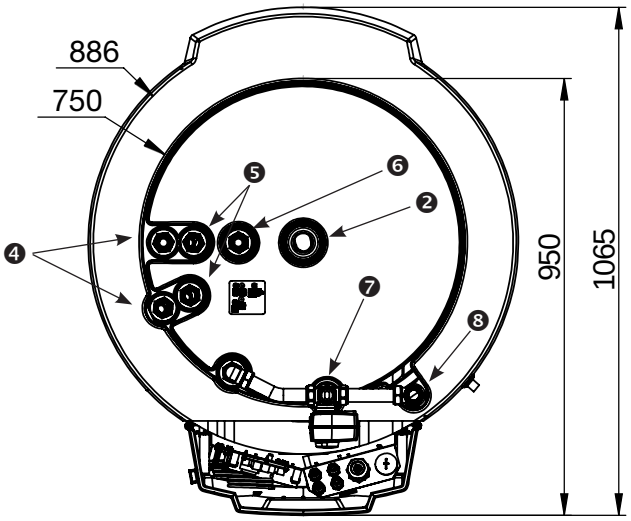
5. Technical data

CTC EcoZenith i550 Pro		3x400V	1x230V
Main dimensions on delivery	mm	750x950x1700	
Main dimensions when installed	mm	886 x 1067 x 1700	
Weight	kg	256	
IP class		IPX1	
Insulation (polyurethane, PUR)	mm	90	
Kvs value mixing valve 17-28kW (option mixing valve 27-45kW)	m3/h	6,3 (10)	
Temperature thermostat overheating protector device	°C	92-98	
Domestic hot water capacity (40°C, 22 l/min) Tank temp 55°C, HP (Heat pump 25 kW) allowed Tank temp 65/55°C, electric power 24kW allowed	 l l	 >600 523	
Pressure differential at flow 40l/min	bar	0.7	
Volume tank	l	540	
Volume domestic hot water coil	l	11.4	
Max operating pressure tank	bar	2.5	
Max operating pressure domestic hot water coil	bar	9	
Domestic hot water coil (finned)	m	2x18,6	
Domestic hot water coil circulation (finned)	m	0.6	
Solar coil (finned)	m	10	
Electrical data		400V 3N~	230V 1N~
Power immersion heaters (option)	kW	9+9 (+9)	9
Power limitation, immersion heaters		3 kW/step + 0.3 kW/step	3 kW/step
Display Memory Back-up batteries Clock		4.3 inches, colour, touch Maintains the memory in the event of a power failure Not needed Realtime controlled	
Current monitor, built-in		Yes	
Current draw at different powers of immersion heaters			
3 kW	A	4.4	13
6 kW	A	8.7	27
9 kW	A	13.0	40
12 kW	A	17.4	-
15 kW	A	21.7	-
18 kW	A	26.1	-
21 kW	A	30.4	-
24 kW	A	34.8	-
27 kW	A	39.1	-

6. Measurements

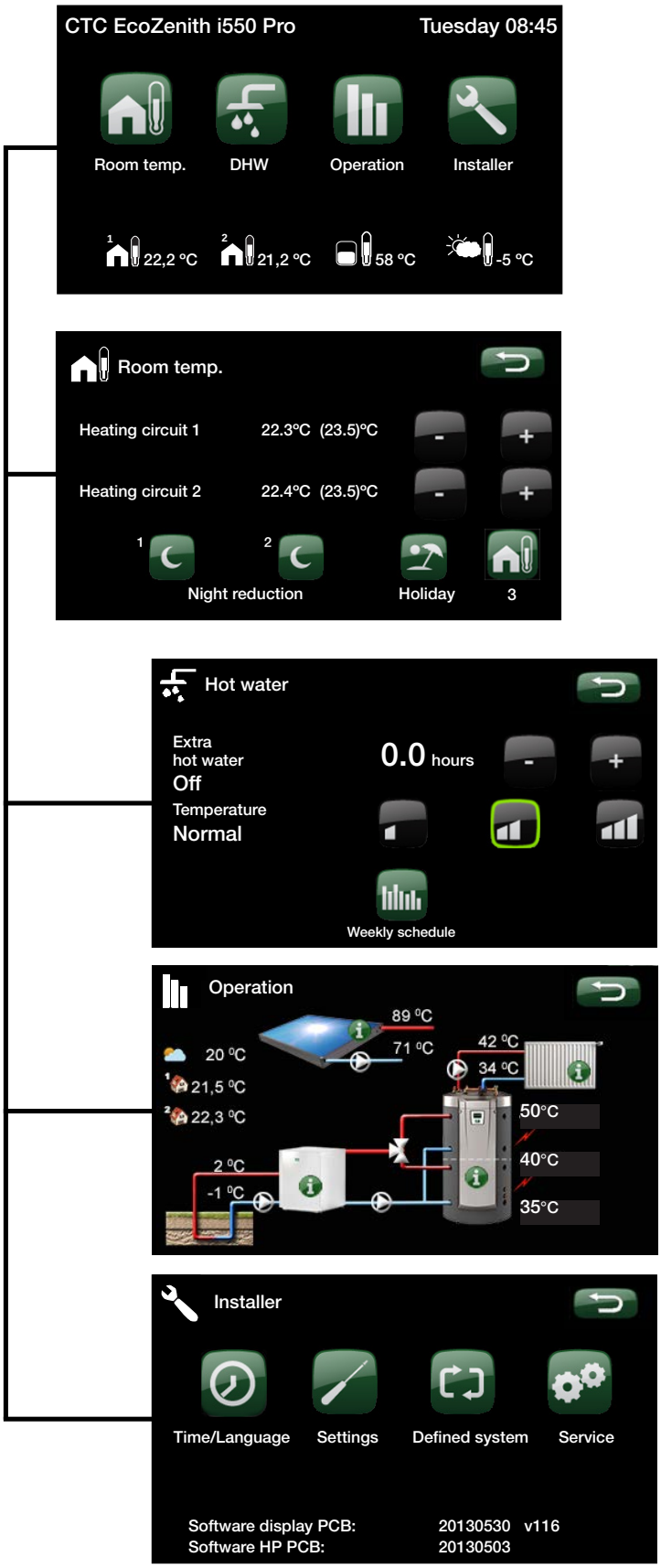






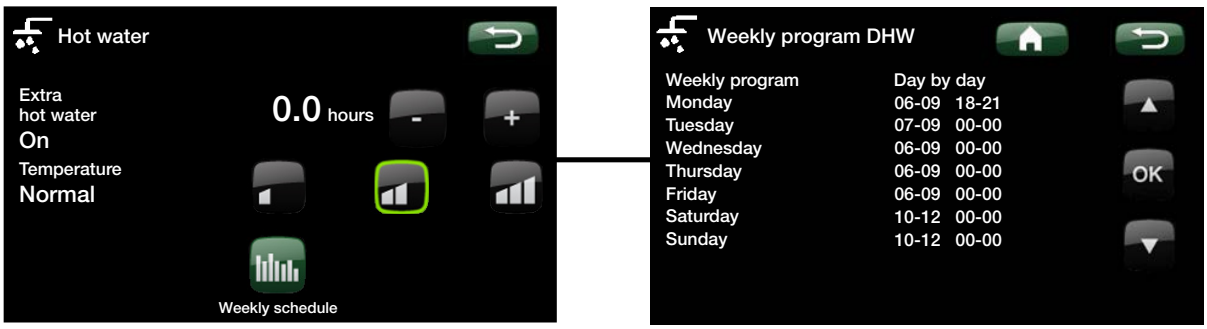
1. Connection heating, G 1 1/4” inside
2. Expansion vessel/Top con/Lifting socket, G 1 1/4” inside
3. Solar coil, Ø18mm
4. Cold water, Ø22mm
5. Domestic hot water, Ø22mm
6. Domestic hot water circulation, Ø22mm
7. Radiator primary flow, spring clip 28mm
8. Radiator return, spring clip 28mm
9. Connection elecric (behind the front)

7. Menu overview

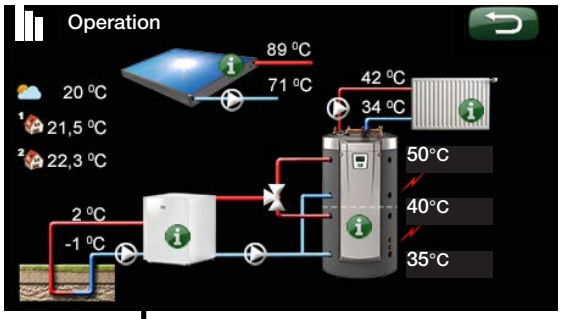


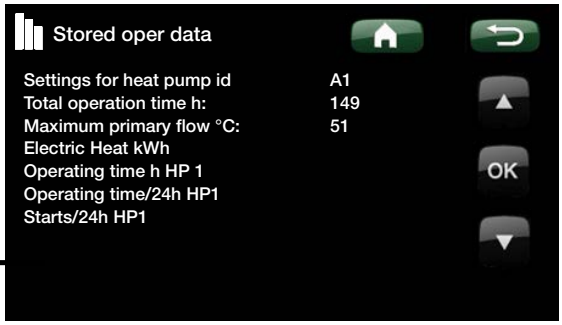
7.1 Room temp.

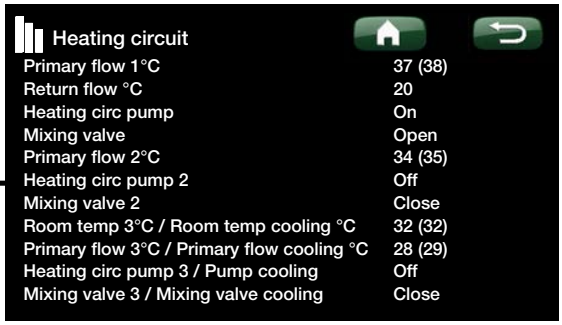
7.2 DHW

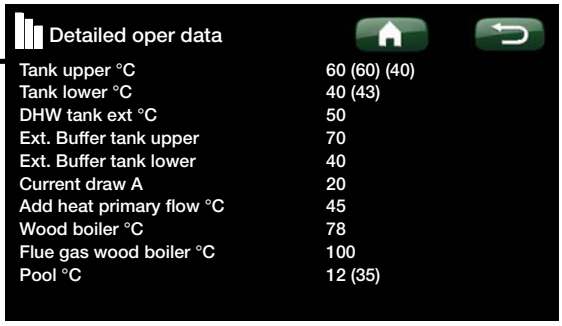


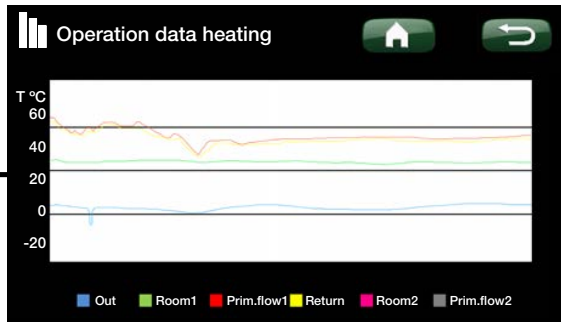
7.3 Operation

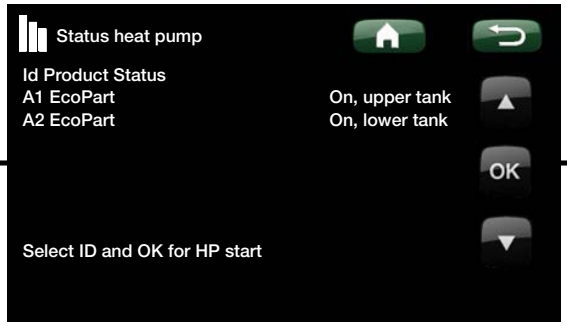


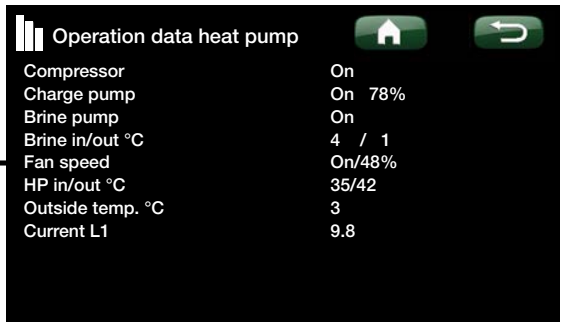


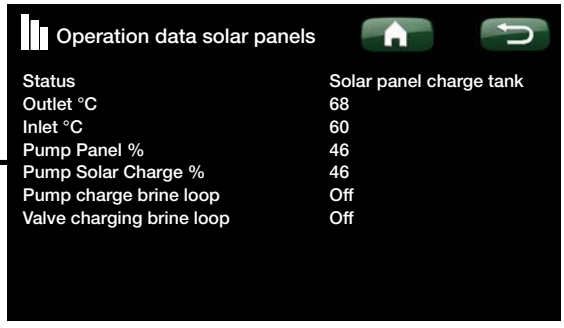




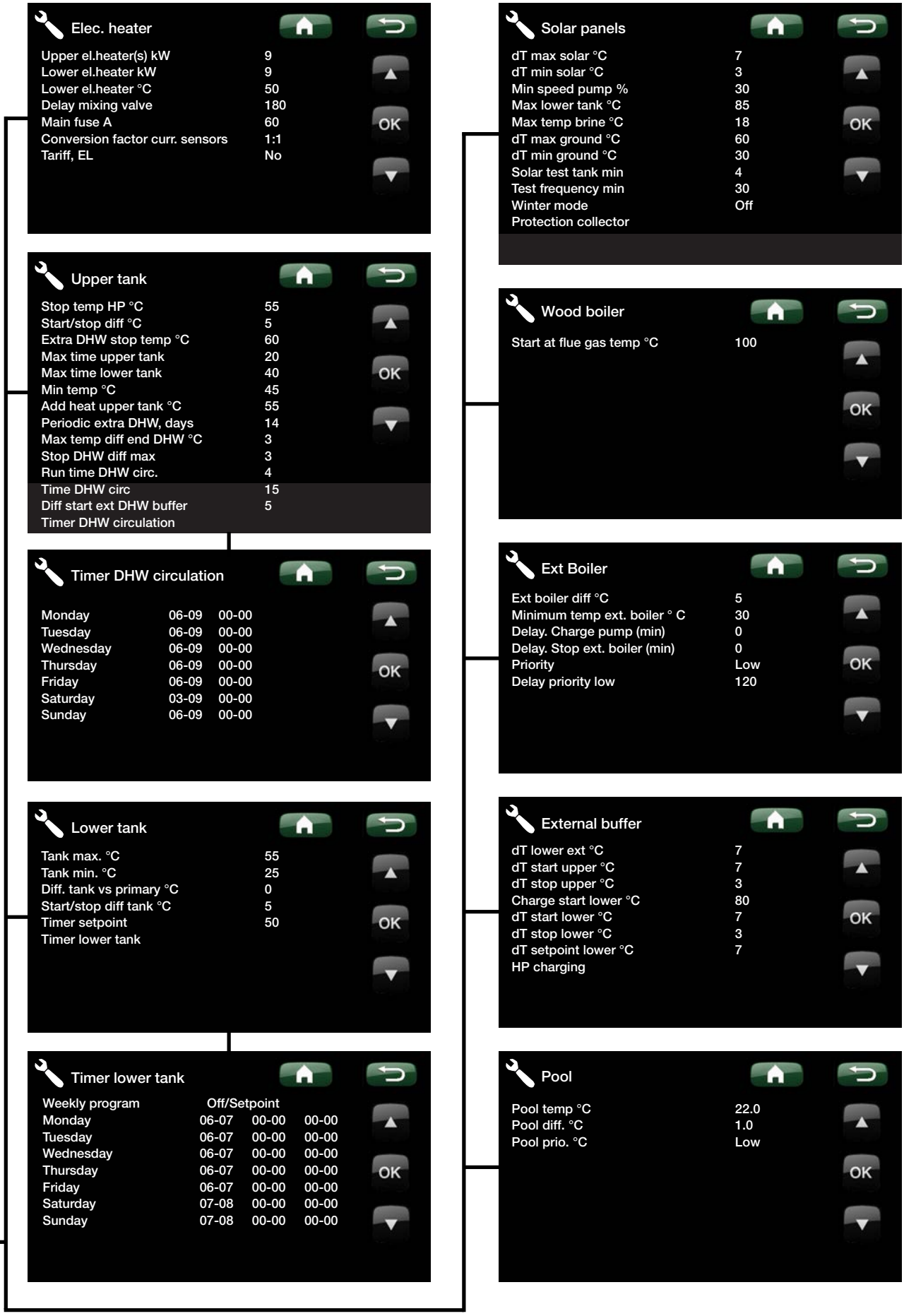




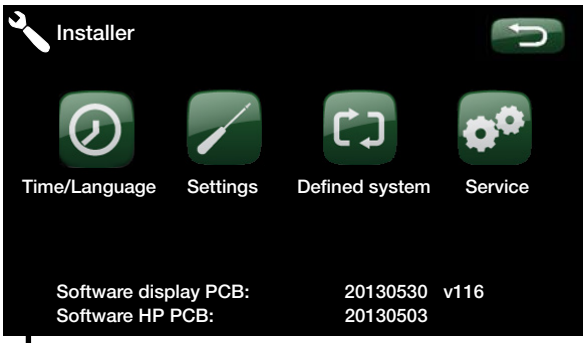


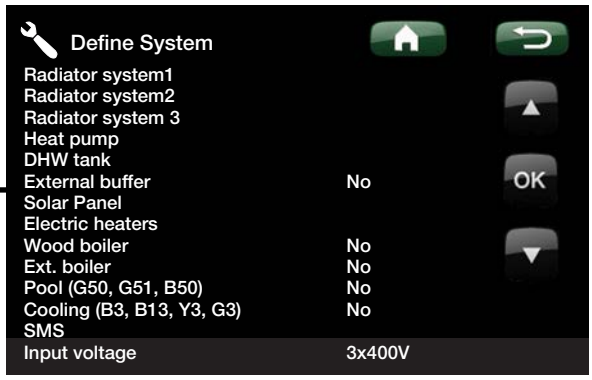


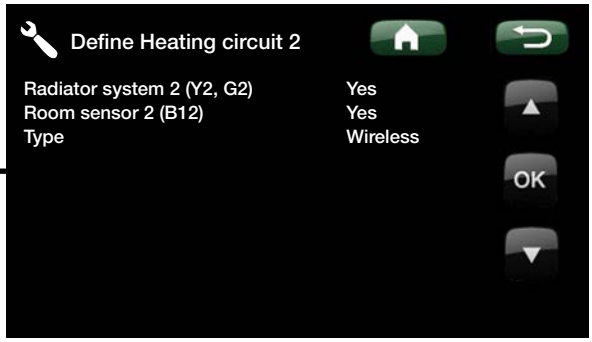
7.4 Installer (Time/Language – Settings)

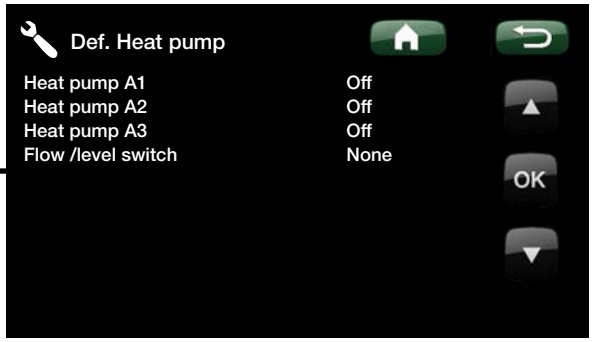

Elec. heater
Upper el.heater(s) kW 9
Lower el.heater kW 9
Lower el.heater °C 50
Delay mixing valve 180
Main fuse A 60
Conversion factor curr. sensors 1:1
Tariff, EL No
OK
Upper tank
Stop temp HP °C 55
Start/stop diff °C 5
Extra DHW stop temp °C 60
Max time upper tank 20
Max time lower tank 40
Min temp °C 45
Add heat upper tank °C 55
Periodic extra DHW, days 14
Max temp diff end DHW °C 3
Stop DHW diff max 3
Run time DHW circ. 4
Time DHW circ 15
Diff start ext DHW buffer 5
Timer DHW circulation
OK
Timer DHW circulation
Monday 06-09 00-00
Tuesday 06-09 00-00
Wednesday 06-09 00-00
Thursday 06-09 00-00
Friday 06-09 00-00
Saturday 03-09 00-00
Sunday 06-09 00-00
OK
Lower tank
Tank max. °C 55
Tank min. °C 25
Diff. tank vs primary °C 0
Start/stop diff tank °C 5
Timer setpoint 50
Timer lower tank
OK
Timer lower tank
Weekly program Off/Setpoint
Monday 06-07 00-00 00-00
Tuesday 06-07 00-00 00-00
Wednesday 06-07 00-00 00-00
Thursday 06-07 00-00 00-00
Friday 06-07 00-00 00-00
Saturday 07-08 00-00 00-00
Sunday 07-08 00-00 00-00
OK
Solar panels
dT max solar °C 7
dT min solar °C 3
Min speed pump % 30
Max lower tank °C 85
Max temp brine °C 18
dT max ground °C 60
dT min ground °C 30
Solar test tank min 4
Test frequency min 30
Winter mode Off
Protection collector
OK
Wood boiler
Start at flue gas temp °C 100
OK
Ext Boiler
Ext boiler diff °C 5
Minimum temp ext. boiler ° C 30
Delay. Charge pump (min) 0
Delay. Stop ext. boiler (min) 0
Priority Low
Delay priority low 120
OK
External buffer
dT lower ext °C 7
dT start upper °C 7
dT stop upper °C 3
Charge start lower °C 80
dT start lower °C 7
dT stop lower °C 3
dT setpoint lower °C 7
HP charging
OK
Pool
Pool temp °C 22.0
Pool diff. °C 1.0
Pool prio. °C Low
OK

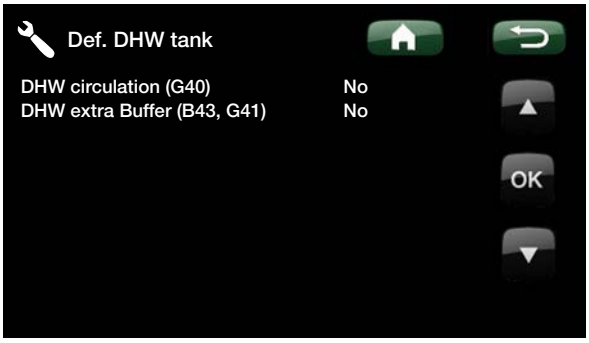
7.5 Installer (Define system)



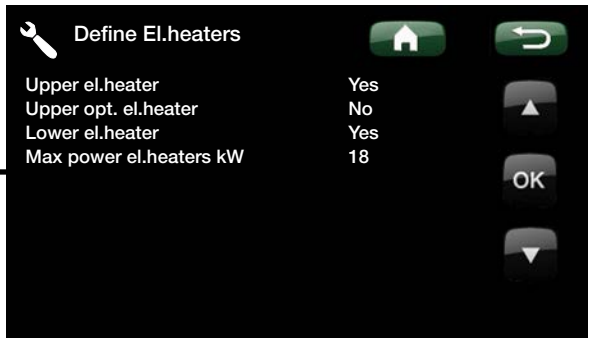




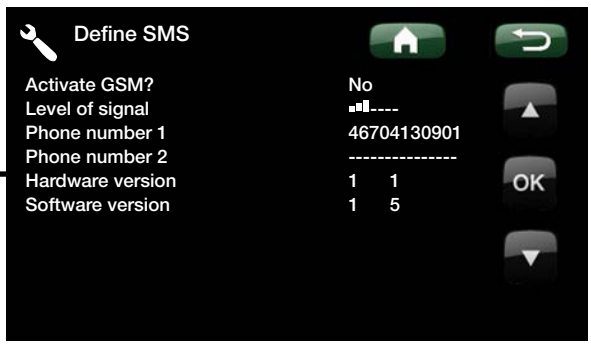




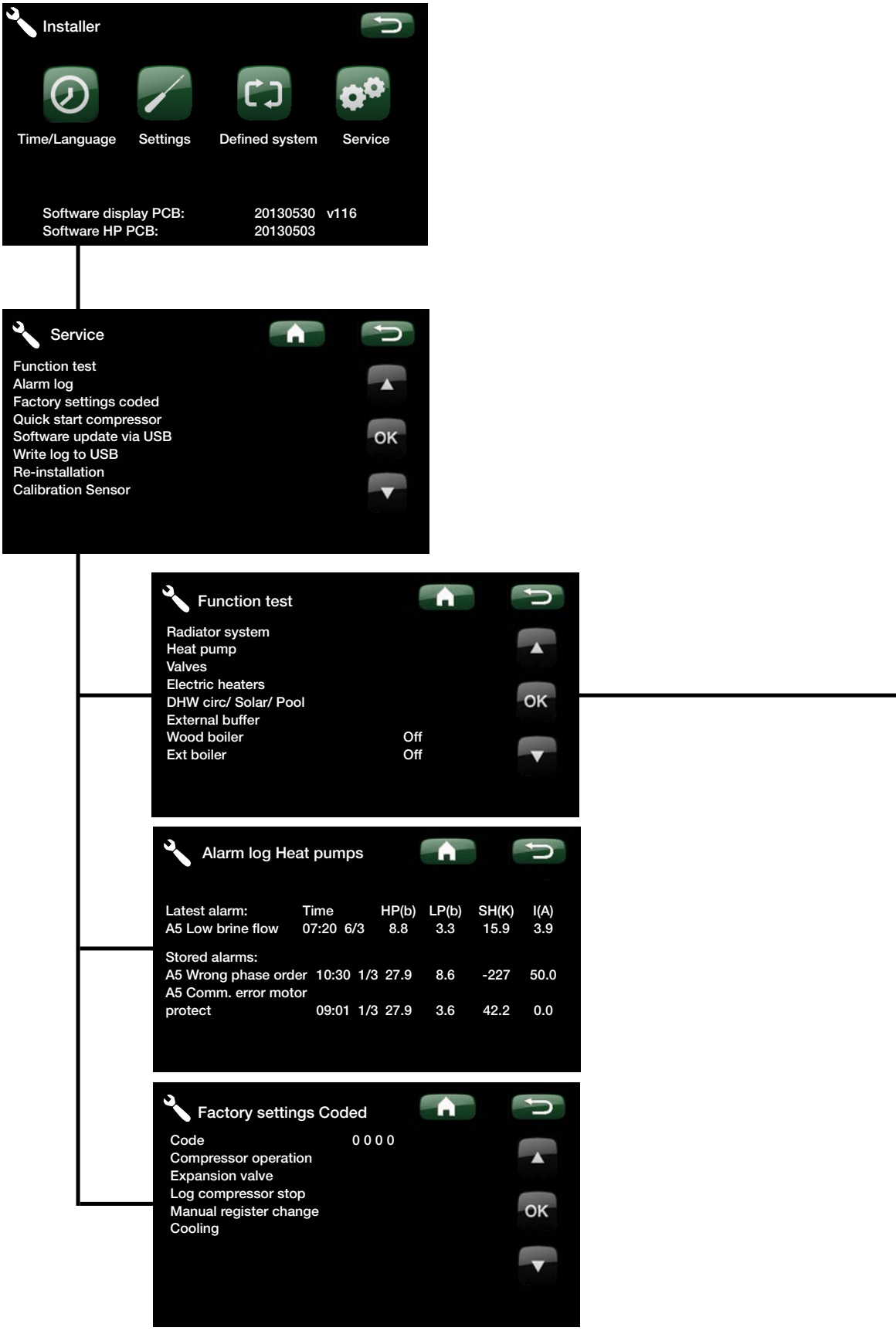

Def. Solar Panels
Solar Panels (G30, B30, B31) No
Type Coil
Vacuum No
Bore hole recharge (Y31, G31) No
OK


Define El.heaters
Upper el.heater Yes
Upper opt. el.heater No
Lower el.heater Yes
Max power el.heaters kW 18
OK


Define Cooling
Cooling No
Condense pipe secured Yes
Room temp. cooling 25
OK


Define SMS
Activate GSM? No
Level of signal
Phone number 1 46704130901
Phone number 2 ----------
Hardware version 1 1
Software version 1 5
OK

7.6 Installer (Service)




Heating circuit
Mixing valve1 Closes
Rad.pump1 Off
Mixing valve2 Off
Rad.pump2 Off
Mixing valve3 Off
Rad pump3 Off
LED room sensor Off
OK
Test el.heaters
Upper el.heater L1 Off
Upper el.heater L2 Off
Upper el.heater L3 Off
Upper opt. el.heater Off
Lower el.heater Off
OK
Heat pump to test
Heat pump to test 1
Go to menu test
OK
Test DHW circ/ Solar/ Pool
DHW circulation pump (G40) On
Solar panel pump (G30) 0
Solar heat exchanger pump (G32) 0
Solar charge borehole (Y31/G31) Off
Pool pumps and valve (G50/G51) Off
OK
Test heat pump
HP Compr. Off
HP Brine p./Fan Off
HP Charge p 0
Manual defrosting Off
Compressor heater Off
Heating condenser bowl Off
Heating cabel Off
4-way valve (Y11) Off
OK
Test external buffer
Pump to tank (G43) Off
Pump from tank (G45) Off
3-way valve (Y40) Upper tank
OK
Test valves
3-way valve (Y21) Down
OK

8. Parameter list

Heating System	Factory setting	User (set) value
Max primary flow °C	55	
Min primary flow °C	Off	
Heating off, out °C	18	
Heating off, time	120	
Inclination °C	50	
Adjustment °C	0	
Room temp red	-2	
Primary flow reduced	-3	

Heat pump		
Delay between comp.	30	
Prio A/W °C	7	
Cont. brine pump on	No	
Compressor stop at brine °C	-5	

Elec. heater	Factory setting	User (set) value
Electric heater(s)	9	
El.heater lower kW	9	
El.heater lower °C	50	
Delay mixing valve	180	
Main fuse A	20	
Conversion factor curr. sensors	1	

Upper tank	Factory setting	User (set) value
Stop temp HP °C	55	
Start/stop diff °C	5	
Extra DHW stop temp °C	60	
Max time upper tank	20	
Max time lower tank	40	
Additional heat upper tank °C	55	
Min temp °C	45	
Periodic increase DHW, days	14	
Max temp diff end DHW °C	3	
Stop DHW diff max	3	
Run time DHW circ.	4	
Cyclic time DHW circ.	15	
Diff start ext DHW buffer	5	

Heating buffer tank	Factory setting	User (set) value
Tank max °C	55	
Tank min °C	25	
Diff tank vs. prim. flow °C	0	
Start/Stop diff tank °C	5	
Timer setpoint	50	

Solar panels	Factory setting	User (set) value
dT max solar °C	7	
dT min solar °C	3	
Min rpm pump %	30	
Max lower tank °C	85	
Max brine °C	18	
dT max ground °C	60	
dT min ground °C	30	
Solar test tank min	4	
Test frequency min	30	
Winter mode	Off	

Protection function	Factory setting	User (set) value
Max temp °C	120	
Cooling	Yes	
Re-cooling	No	
Recooling to temp °C	70	
Frost protect.	No	
Anti-freeze °C	-25	

Wood Boiler	Factory setting	User (set) value
Start at flue gas °C	100	

Ext Boiler	Factory setting	User (set) value
Ext boiler diff °C	5	
Minimum temp ext. boiler	30	
Delay. charge pump (min	0	
Delay. Stop ext. boiler (min	0	
Priority	Low	
Delay priority low	120	

External Buffer Tank	Factory setting	User (set) value
dT lower ext °C	7	
dT start upper°C	7	
dT stop upper °C	3	
Charge start lower °C	80	
dT start lower °C	7	
dT stop lower °C	3	
dT setpoint lower °C	7	
HP charging	Off	

Pool	Factory setting	User (set) value
Pool temp ºC	22.0	
Pool diff ºC	1.0	
Pool priority ºC	Low	

Define system	Factory setting	User (set) value
External buffer	No	
Wood boiler)	No	
Ext Boiler	No	
pool	No	
Input voltage	3x400V	

Def heating circuit	Factory setting	User (set) value
Define heating system 1		
Room sensor 1 (B11)		
Wire or wireless		
Define heating system 2		
Heating circuit 2 (Y2, G2)		
Room sensor 2 (B12)		
Wire or wireless		
Define heating system 3		
Heating circuit 3 (Y3, G3)		
Room sensor 3 (B13)		
Wire or wireless		

Def. heat pump	Factory setting	User (set) value
Flow/level switch	None	

Define external boiler	Factory setting	User (set) value
Ext Boiler (04)	No	
Sensor ext boiler	No	

Def. DHW tank	Factory setting	User (set) value
DHW circulation (G40)	No	
External DHW tank (B43, G41)	No	

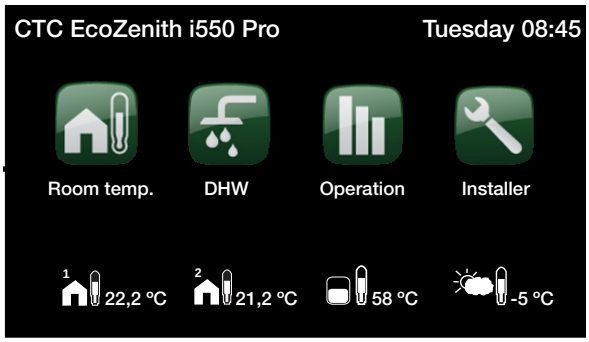
Def Solar panels	Factory setting	User (set) value
Solar panels (G30, B30, B31)	No	
Type	Only DHW	
Vacuum	No	
Bore hole recharge (Y31, G31)	No	

Define el.heaters	Factory setting	User (set) value
Upper el.heater	Yes	
Upper opt. el.heater	No	
Lower el.heater	Yes	
Max power el.heater kW	18	

Def cooling	Factory setting	User (set) value
Cooling	No	
Room temp. cooling ºC	25	
Condense pipe secured	Yes	

9. Detail Description Menus

All settings can be configured directly on screen using the straightforward control unit. The large icons operate as buttons on the touch display.
Operational and temperature information is also displayed here. You can easily enter the different menus to find information on the operation or to set your own values.



9.1 Start menu

This menu is the system's start menu. This provides an overview of the current operational data. The system returns to this menu if no buttons are pressed within ten minutes. All other menus can be accessed from this menu. The display switches to screensaver mode after approx. ten minutes. Touch the screen to wake it up.

Room temp.
Heating system settings for raising or lowering the temperature indoors and for scheduling temperature changes.

DHW
Settings for DHW production.

Operation
This shows current and historical operational data for the system.

Installer
This is where the installer configures the settings and service for your system.

Room temperature heating system 1
If room sensor 1 is defined, the room temperature in question is displayed here.

Room temperature heating system 2
If room sensor 2 is defined, the room temperature in question is displayed here.

Tank temperature
This shows the current water temperature in the upper tank.

Outdoor temperature
This displays the current outdoor temperature.

Home
The Home button takes you back to the Start menu.

Return
The Return button takes you back to the previous menu level.

OK
The OK button is used to mark and confirm text and options in the menus.

Night reduction
This schedules a temperature reduction at night if selected.

Holiday
This is used to reduce the room temperature permanently, e.g. during holidays when the house is unoccupied.

Weekly program
This is used to reduce the temperature for a few days, for instance if you commute every week.

Time/Language
This is used to set the date, time and the language you want the menu to be displayed in.

Settings
The settings for all heat pumps and operation of the system are usually configured by the installer.

Define system
This is used to adjust/modify the system's structure.

Service
Installer settings. These are configured by the appropriate technical person.

9.2 Room temp.

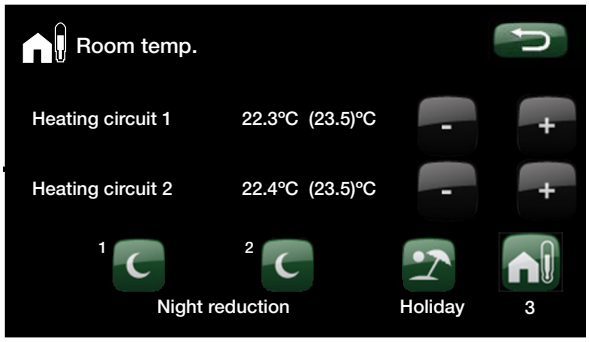
This is used to set the desired room temperature. The plus and minus buttons are used to set the desired temperature, displaying the so-called “setpoint” temperature in brackets. The actual value is shown in front of the brackets.

If heating circuit 3 or cooling is installed, the symbol for room temperature is displayed with the text “3” at the bottom right of the menu.

If you want to schedule a temperature reduction, you can continue to the Night reduction or Holiday submenus.

You can select *Room sensor No* in the *Installer/Define system/Heating system* menu. This can be done for each heating system if it is difficult to find a position for the room sensor, if the floor heating system has separate room sensors, or if you use a fireplace or open stove. The alarm LED on the room sensor still functions as normal.

If you use the fire or open stove only occasionally, the firing process can affect the room sensor and reduce the temperature supplied to the radiators. It can then get cold in other parts of the house. The room sensor can temporarily be deselected during the firing process. The EcoZenith then provides heating to the radiators using the set heating curve. The radiator thermostats reduce the heating supplied to the section of the house where a fire is burning.

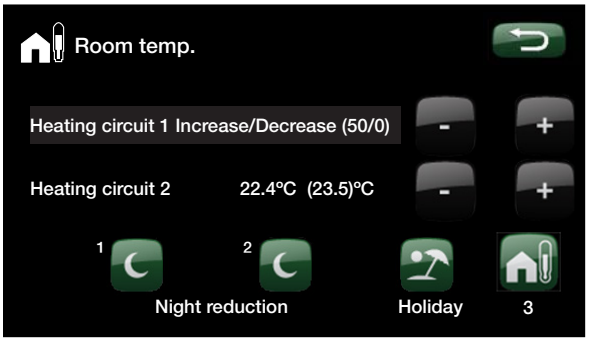


> **!** The thermostats of the radiators must be fully open and well operating when the system is tuned.

9.2.1 Setting without a room sensor

If a room sensor has not been installed (this can be selected from the Installer/Define system/Heating circuit menu), the room temperature is adjusted by changing the house’s temperature needs to match differing outdoor temperatures.
Proceed as follows:

- Increase or decrease heating circuit 1 by a few steps
- Wait 24 hours before making the next adjustment (if the indoor temperature is still not correct).
- NOTE: The value displayed is the ratio between curve inclination and curve adjustment and has a breakpoint at an outdoor temperature of 0°C.



The above menu shows heating circuit 1 without a room sensor (top line) and heating circuit 2 with a room sensor (bottom line). On adjustment of heating circuit 1 (top line), the water temperature to the radiators is changed in relation to the outdoor temperature. The changes automatically take the heating circuit characteristics into account.

9.2.2 Outdoor Sensor/Room Sensor Faults

If a fault occurs with an outdoor sensor, an outdoor temperature of -5°C is simulated so that the house does not get cold, and the product emits an alarm.
If a fault occurs with a room sensor, the EcoZenith automatically switches to operating according to the set curve, and the product emits an alarm.

9.2.3 Night reduction temperature

This menu is used to activate and set a night reduction temperature for each defined heating system. Night reduction means that you reduce the temperature indoors during scheduled periods, for example at night or when you are at work.

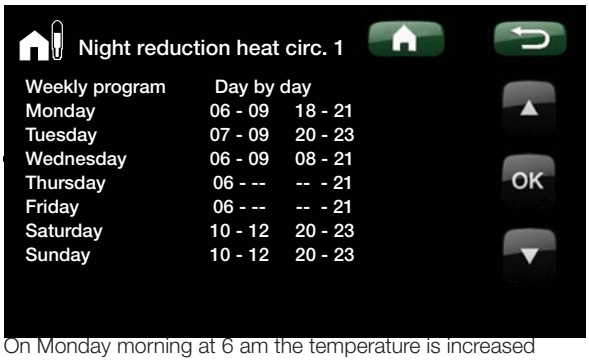
The value by which the temperature is reduced – *Room temp. reduced* – can be set in the *Installer/Settings/Heater system* menu. The factory set value is -2°C.

The options in the night reduction menu are *Off, Day by day* or *Block*. If you select *Off*, no reduction is made at all.

Day by day menu
You use this menu to schedule a reduction on the days of the week. This schedule is repeated every week.

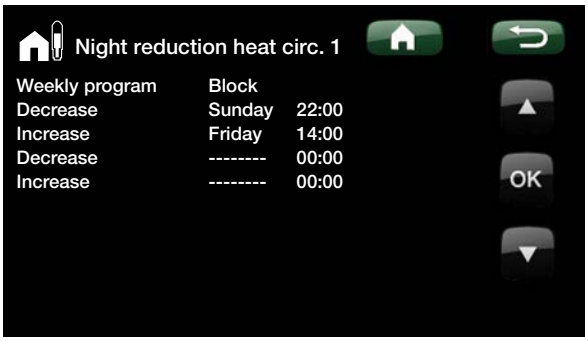
The set time is the period in which the temperature is normal. The night reduction function is activated during the rest of the time.

Block
This menu allows you to set a reduction for a few days during the week, for example, if you are working elsewhere on weekdays and at home at weekends.



On Monday morning at 6 am the temperature is increased to normal; at 9 am it is reduced to the set night reduction temperature. At 6 pm the temperature is raised again until 9 pm, when the night reduction function lowers it once again.

> **!** Reducing a heat pump's temperature at night is a comfort setting which generally does not reduce energy consumption.



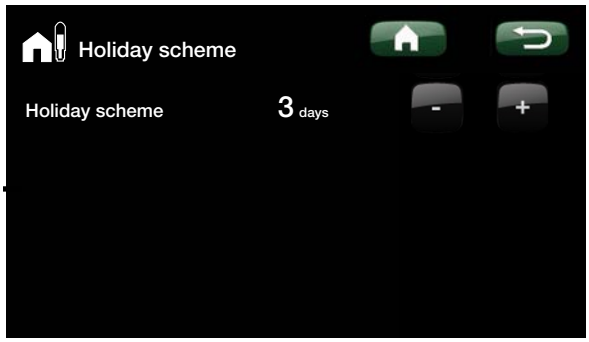
On Sunday at 10 pm, the temperature is lowered by the set value in the *Room temp. reduced* menu (in the *Installer/Settings* menu). On Friday at 2 pm the temperature is increased to the set value again.

9.2.4 Holiday

You use this option to set the number of days that you want the set night reduction temperature to be constantly reduced. For example, if you want to go on holiday.

You can apply this setting for up to 300 days.

The period starts from the time for which the setting has been made.



> **!** The value by which the temperature is reduced – *Room temp. reduced* – can be set in the *Installer/Settings/Heating system* menu. The factory set value is -2°C.

9.3 DHW

You use this to set the DHW comfort level you want and extra DHW.

Temperature

You set the values for this option which apply to the heat pump's normal operation. There are three modes:

Economic – Small hot water requirement. (Factory-set DHW tank temperature: 50°C)

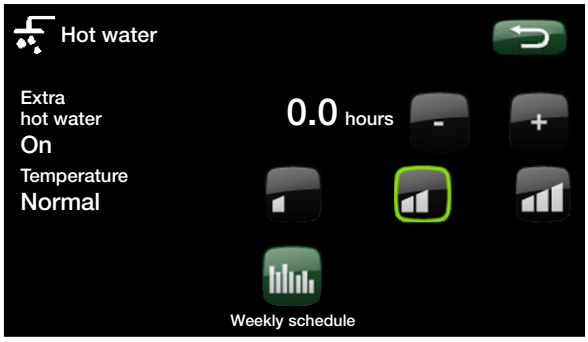
Normal – Normal hot water requirement. (Factory-set DHW tank temperature: 55°C)

Comfort - Large DHW requirement. (Factory-set DHW tank temperature: 60°C)

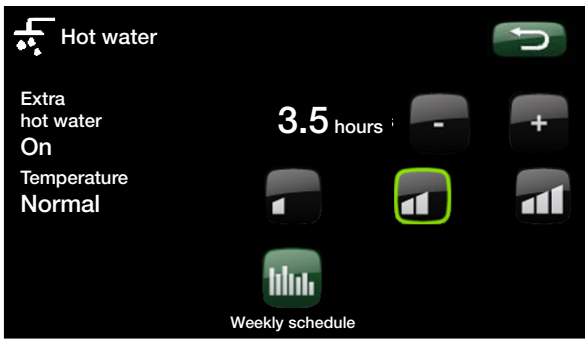
Extra hot water

Select this option if you want to activate the *Extra DHW* function. When the function is activated (by setting the number of hours) the heat pump immediately starts to produce extra DHW. You also have the option to schedule hot water production for certain times using the *Weekly program* function (recommended).

The temperature is also determined by how the setting has been performed in the Installer/Settings/Upper tank/ Extra DHW stop temp °C menu.



Tip: Start by setting the *Economic* mode and if you find that you are not getting enough hot water, increase it to *Normal*, and so on.



The example above shows that *Extra DHW* is *On* for 3.5 hours.

9.3.1 Weekly program DHW

You can use this menu to schedule periods during weekdays when you want extra hot water. This schedule is repeated every week. The picture shows factory settings that can be changed. If you want an additional period some day, e.g. in the evening, you can program recurring times.

Options for the weekly program are *Off* or *Day by day*.

Off

No scheduled hot water production.

Day by day

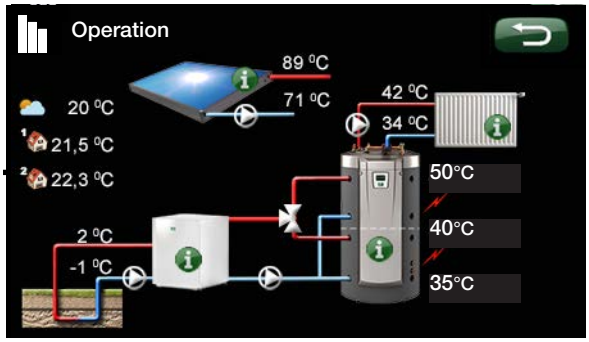
A weekly schedule which you program yourself. This is used if you always know when you repeatedly need extra hot water, for instance in the morning and evening.

On Monday morning at 6 am the system starts producing more hot water until 9 am when the temperature returns to normal again. There is a further increase between 6 pm and 9 pm.

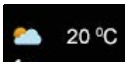
Tip: Set the time about one hour earlier than when you need the hot water as it may take some time to heat.

9.4 Operation

This menu displays current temperatures and the operational data for your heating system.

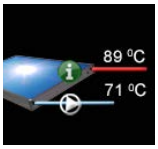


Information
Press the information button to display the operational data for the relevant item.

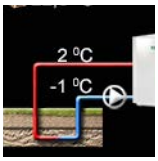


Outside Temperature
Shows the outdoor temperature.

Indoor temperature.
Shows the room temperature for room sensors 1 and 2, if these have been defined.



Temperature of solar panels
The current temperatures for the solar panel's primary (89°C) and return (71°C) flow are shown next to this symbol.



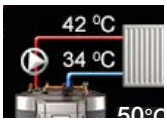
Brine temperature
This symbol is shown if one or more CTC EcoPart heat pumps are connected to the system. The current temperature (2°C) of the coolant from the collector in the heat pump and return temperature (-1°C) of the coolant back in the collector hose are shown next to this symbol.

CTC EcoZenith i550 Pro
The current temperature (50°C) in the upper tank, the current temperature (40°C) in the lower tank and the current temperature in the solar coil (35°C) are shown next to this symbol.

Immersion heater
This symbol shows immersion heater´s operation in the upper or lower tank, respectively.

Heat pump, EcoAir
The symbol is displayed if only the CTC EcoAir heat pump(s) is/are connected to the system.

Heat pump, EcoPart
The symbol is displayed if only the CTC EcoPart heat pump(s) is/are connected to the system.



Primary flow radiators
The current primary flow temperature (42°C) supplied to the house's radiators is shown to the left of the symbol.

Return radiators
The current return flow temperatures (34°C) of the radiator water is shown under the primary flow temperature.

9.4.1 Operation EcoZenith

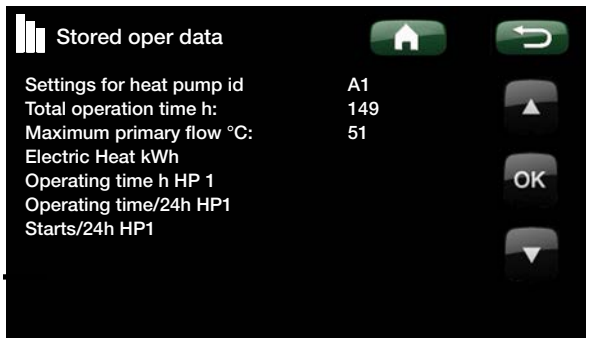
This is where the operating status and current temperatures in your heating system are displayed.

Units which are currently emitting heat.
Displays the various heat sources.
- White text: the unit is currently emitting/producing heat.
- Greyed out text: the unit is **not** currently emitting/producing heat.

- **Heat pump, nbr of** **(0...3)**
  Displays the number of heat pumps in operation.
- **Electric heater, kW**
  Displays the current electric heater power.
- **Solar**
  Indicates whether solar panels are supplying heat.
- **Wood**
  Indicates whether a wood boiler is supplying heat.
- **Add heat**
  Indicates whether an external boiler is supplying heat
- **Cooling**
  Indicates whether cooling is in fact cooling the system.

> The first figure indicates the current operational value, and the value in brackets indicates the setpoint which the heat pump is trying to achieve.

9.4.1.1 Stored operation data



This menu shows the previous operating values for the system.

Total operation time h: **14196**
Shows the total time the product has been powered.

Maximum primary flow °C: **51**
Shows the highest temperature supplied to the radiators. The value may indicate the temperature requirements of the heating system/house. The lower the value during the winter period, the more suitable it is for the heat pump's operation.

Electric Heat kWh
Shows the total energy consumed by the product's electric heaters This is an indirect energy measurement, based on the operating periods of the immersion heaters.

Operating time h HP 1-3
Indicates the total time the heat pump compressor has been operating.

Operating time/24h HP 1-3
Indicates the compressor's operating time for the last 24 hours. A new value is saved/displayed once every 24 hours. After first start, the value is not shown until 24 hours have elapsed.

Starts/24h HP 1-3
Shows the number of starts the compressor has performed during the last 24 hours. A new value is saved/displayed once every 24 hours. After first start, the value is not shown until 24 hours have elapsed.

9.4.1.2 Operation data Heating circuits 1-3

This menu displays current temperatures and the operation data for the selected circuits.

The first figure indicates the current temperature, and the value in brackets indicates the setpoint which the heat pump is trying to achieve.

Primary flow 1°C **37 (38)**
This shows the temperature supplied to heating circuit 1 (sensor B1) and the temperature that the circuit is trying to achieve. This value will vary during the year according to the parameters set and the current outdoor temperature.

Return flow °C **20**
This shows the temperature (sensor B7) of the water that comes back from the heating circuit(s).

Heating circ pump 1 **(On/Off)**
Shows the operating status of the radiator pump (G1).

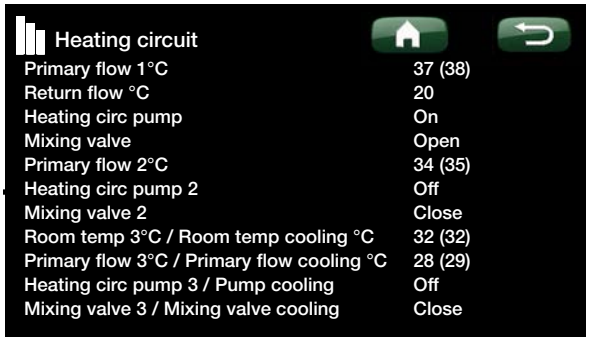
Mixing valve **(Open/Close)**
Indicates whether the mixing valve (Y1) increases (opens) or reduces (closes). Once the correct temperature has been reached, the mixing valve's motor then shuts down.

Primary flow 2°C **37 (38)**
This shows the temperature supplied to heating circuit 2 (sensor B2) and the temperature that the circuit is trying to achieve.

Heating circ pump 2 **(On/Off)**
Shows the operating status of the radiator pump (G2).

Mixing valve 2 **(Open/Close)**
This indicates whether the mixing valve (Y2) increases (opens) or reduces (closes) the heat supplied to heating circuit 2. Once the correct temperature has been reached, the mixing valve's motor then shuts down.

Room temp 3°C / Room temp cooling °C21.9 (23.0)
Depending on whether radiator circuit 3 or cooling is activated, this indicates the room temperature for heating circuit 3/cooling (Room sensor B13). It does not indicate whether combined heating/cooling has been selected.



Heating circuit 1 is always the hottest, and other circuits are mixed down to lower temperatures.

Primary flow 3°C / Primary flow cooling 32 (32)

This shows the temperature (sensor B3) supplied to heating circuit 3, or the temperature supplied to the fan convector if cooling has been activated. The value in brackets is the temperature the circuit is trying to achieve. It does not indicate whether combined heating/cooling has been selected.

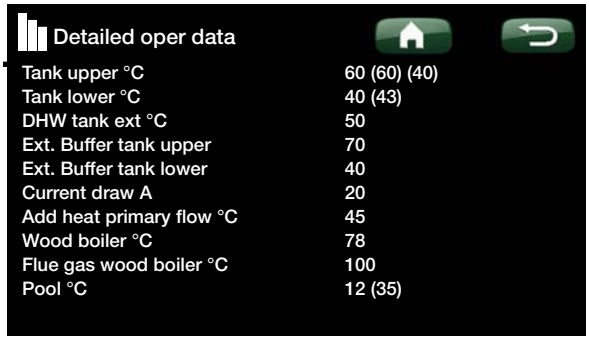
Heating circ pump 3 / Pump cooling (On/Off)

Shows the pump's (G3) operating conditions.

Mixing valve 3 / Mixing valve cooling(Open/Close)

Indicates whether the mixing valve (Y3) increases (opens) or reduces (closes). Once the correct temperature has been reached, the mixing valve's motor then shuts down.

9.4.1.3 Detailed operation data



Tank upper °C 60 (60)(40)

The first value shows the current temperature inside the tank. Bracket 1 show the desired temperature. For an air/water heat pump, the value may vary due to the outdoor temperature. Bracket 2 shows the temperature the desired electric heater temperature.

Tank lower °C 40 (43)

Indicates the current temperature in the lower tank, plus the temperature the system is trying to achieve.

External DHW tank °C 50

Indicates the current temperature in the external DHW tank, plus the temperature the system is trying to achieve.

Ext. buffer tank upper 70

Displays the current temperature in the upper part of the buffer tank.

Ext. buffer tank upper 40

Displays the current temperature in the lower part of the buffer tank.

Current draw A 20

Indicates the value of current in amps for the phase with the greatest load (the house phase).

Add heat primary flow °C 45

Indicates the current temperature supplied by the external boiler.

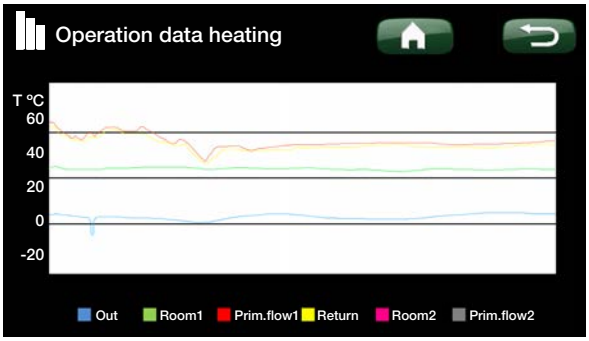
Wood boiler °C 78

Indicates the current temperature supplied by the wood boiler.

Flue gas wood boiler °C **100**
Displays current flue gas temperature in the connected wood boiler.

Pool °C **24 (28)**
Indicates the current temperature in the pool, plus the temperature the system is trying to achieve.

9.4.2 Operation data heating system



This shows operation data for heating systems 1 and 2 for the last 24 hours. The furthest point to the right is the present, while the data for the last 24 hours is displayed to the left. The time “rolls” forward.

The blue curve is the current outdoor temperature.

The green and pink curves are room temperatures 1 and 2, respectively.

The red and grey curves are primary flow temperatures 1 and 2, respectively.

The yellow curve is the radiator circuit’s/circuits’ return temperature.

9.4.2.1 Heat pump status

This menu shows the current status of defined heat pumps. Heat pumps A1-A3 (EcoAir or EcoPart) can have the following statuses:

Blocked in menu
The heat pump's compressor is not permitted in the *Installer/Settings/Heat pump* menu.

Communication error HP
The EcoZenith cannot communicate with the heat pump.

On, upper tank
The heat pump is heating the upper tank.

Off, start delay
The heat pump's compressor is not running and is prevented from starting due to the start delay.

Off, ready to start
The heat pump's compressor is not running and is ready to start.

Flow on
The heat pump and fan are started before the compressor. Shown for EcoAir heat pumps.

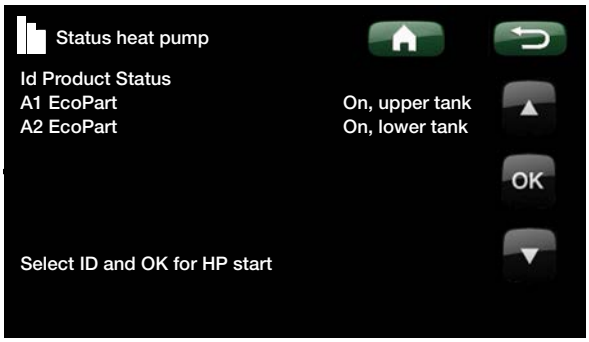
On, lower tank
The heat pump is supplying heat.

Defrosting
The heat pump defrosts. Shown for EcoAir heat pumps.

Blocked
The heat pump has stopped due to a temperature or pressure that has reached its maximum value.

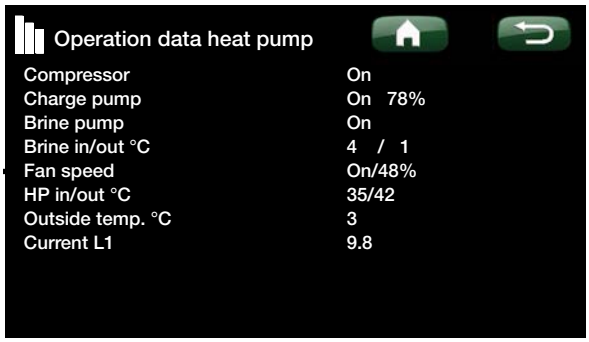
Off, alarm
The heat pump is off and is emitting an alarm signal.

Function test
The compressor is function tested.



The illustration above shows an example of the status for two defined heat pumps.

9.4.2.2 Operation data heat pump



This menu is intended for servicing and advanced troubleshooting, and displays information about the heat pump that has been selected from the previous menu ("Heat pump status").

Compressor **On (On/Off)**
Shows whether the compressor is operating or not.

Charge pump **On/78% (On/Off/0 to 100)**
Shows the charge pump's operational status and flow as a percentage.

Brine pump **On (On/Off)**
Indicates whether the brine pump is on or off. Shown for EcoPart heat pumps.

Brine in/out °C **4/1 (-99...99)**
This shows the brine pump's incoming and outgoing temperatures. Shown for EcoPart heat pumps.

Fan speed **On/48% (On/Off/0 to 100)**
This shows the heat pump's operational status and the fan speed as a percentage. Shown for EcoAir heat pumps.

HP in/out °C **35/42 (0 to 99/0 to 99)**
This shows the heat pump's return and primary flow temperatures.

Outside Temp °C **3 (-50...50)**
Shows the outside temperature (sensor B15). Shown for EcoAir heat pumps.

Current L1 **9.8 (0.0 to 50.0)**
Show the current for phase L1 to the compressor. Phases 2 and 3 are not measured in the product.

9.4.3 Operation data solar panels

This menu shows information about solar panels (if defined in the *Installer/Define system/Solar panels* menu).

Status **Solar panel charge tank**

Shows status for solar panels:

- **Off**
  Solar panels are in operating mode Off.
- **Solar panel charge tank**
  The solar panels are charging the Ecozenith's tank
- **Solar panel update. Vacuum**
  The solar panels are charging the hot water system.
- **Solar panel charge ground source**
  The solar panels are charging the ground source.

From solar panels °C **68 (-99...99)**

This shows the temperature of the flow supplied from the solar panels (sensor B31).

To solar panels °C **60 (-99...99)**

This shows the temperature of the flow supplied to the solar panels (sensors B30).

Pump Panel % **46 (0...100)**

This shows the current charge as a percentage of maximum capacity for the pump (G30).

Pump Solar Charge % **46 (0...100)**

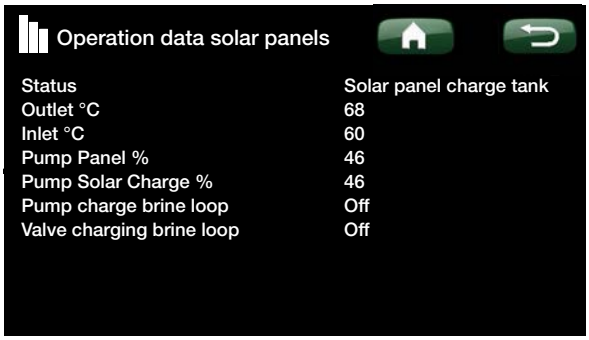
This shows the current charge as a percentage of maximum capacity for the pump (G32). Only displayed if the solar panel is connected via a heat exchanger to the EcoZenith.

Pump charge brine loop **(On /Off)**

This shows the operating mode for the pump (G31) for recharging the bedrock.

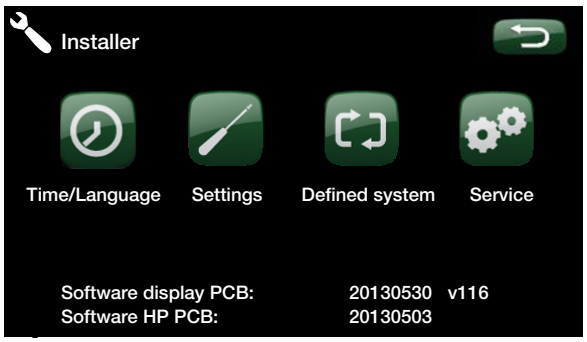
Valve charging Brine loop **(On /Off)**

This shows the mode for the valve (Y31) for recharging the bedrock.



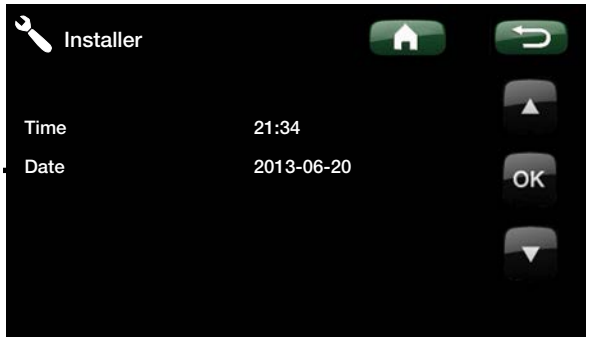
9.5 Installer

This menu includes four submenus: Time/Language, Settings, Defined system, and Service.



9.5.1 Time/Language

This is used to set the time, date and language. The clock saves the settings in the event of a power cut. Summer/winter time is changed automatically.

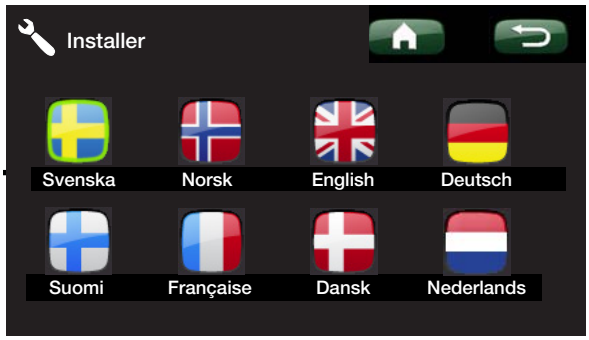


Time and date settings

Click on the time symbol.
Press “OK” to highlight the first value and use the arrows to set the correct value.

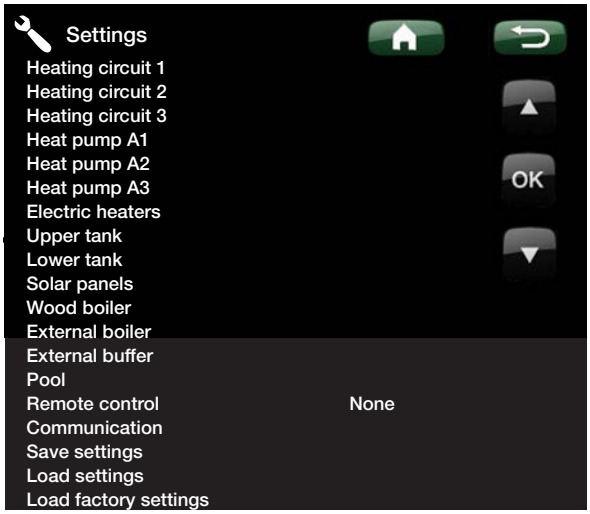
Setting the language

Click on the language symbol.
Select the language you want by clicking on the screen.
The language selected is highlighted by a green ring.



9.5.2 Settings

This is used to set the parameters for your home's heating requirements. It is important that this basic setting is right for your home. Values which are set incorrectly may mean that your property is not warm enough or that an unnecessarily large amount of energy is being used to heat your property.



9.5.2.1 Heating circuits 1-3

Max. primary flow °C **55 (30 to 80)**
Maximum permitted temperature supplied to the respective heating system.

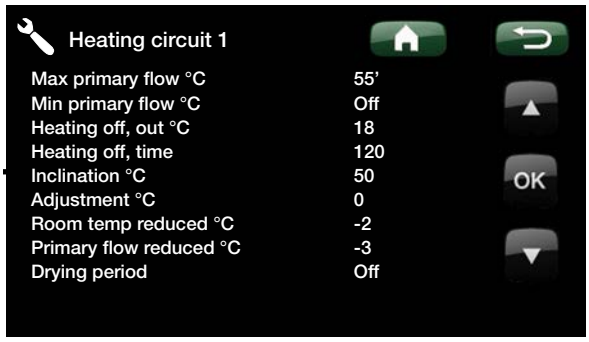
Min. primary flow °C **Off (Off/15 to 65)**
Minimum permitted temperature supplied to the respective heating system.

Heating off, outside °C **18 (10 to 30)**
Outside temperature limit (B15) at which the house no longer requires heating. The radiator pump stops, and the mixing valve remains closed. The radiator pump is activated daily for a short period to prevent it from jamming. The system restarts automatically when heating is required.

Heating off, time **120 (30 to 240)**
When the outside temperature (sensor B15) falls to the limit at which heating is required again, "*Heating off, out °C*" must remain this low or lower for this many minutes before heating the house is permitted again.

Inclination **50 (25 to 85)**
Inclination means the temperature your property needs at different outdoor temperatures. See more detailed information in the "Your home's heating installation" chapter. The value set is the outgoing flow temperature to radiators when the outdoor temperature is -15 °C.

Curve adjustment **0 (-20 to 20)**
The adjustment means that the temperature level can be raised or lowered at a specific outdoor temperature.



Tip: Find out more about these settings in the "Your home's heating settings" chapter.

For example:
"Inclination 50" means that the temperature of the water supplied to the radiators will be 50°C when the outdoor temperature is -15°C, if the adjustment is set to 0. If the adjustment is set to +5, the temperature will be 55°C instead. The curve is increased by 5°C at all outdoor temperatures, i.e. the curve is parallel offset by 5°C.

Room temp. reduced °C **-2 (0 to -30)**
The menu is displayed if room sensors for the respective heating circuit **are installed**. You define here by how many degrees the room temperature is to be reduced during the various scheduled reduction periods, e.g. Night reduction, Holiday etc.

Primary flow reduced °C **-3 (0 to -30)**
The menu is displayed if room sensors for the respective heating circuit **are not installed**. This is used to set the number of degrees by which the primary flow temperature for the respective heating system will be reduced during the various scheduled reduction periods.

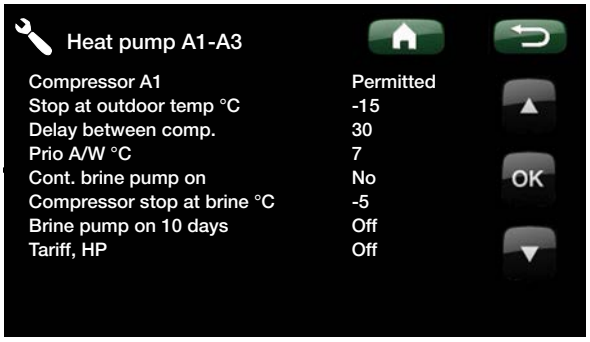
Drying period **Off (Off/Type1/Type2).**
Is activated to limit the flow temperature in connection with construction/installation. The setting automatically passes to “Off” after completed cycle.

Type 1
Constant primary flow temperature of 25 °C during the first day and the subsequent three days. During the next four days the primary flow temperature is set according to the “Max Primary Flow” menu. However, it cannot be higher than 55 °C.

Type 2
25 °C primary flow temperature during the first day. The temperature is raised by 5 degrees per day until the set temperature in the “Max primary flow” menu is obtained. During the next 10 days the flow temperature is constant according to the “Max primary flow” menu. Thereafter the primary flow is reduced by 5 degrees per day again until the temperature is down to 25 °C.

Example:
As a general rule, a *Primary flow reduced* value of 3 to 4°C is equivalent to a reduction of approximately 1°C in room temperature in a normal system.

9.5.2.2 Heat pump A1-A3



In the “Heat pump” menu you make settings for the heat pumps which have been defined.

Compressor A1 Blocked (Blocked /Permitted)
The heat pump is supplied with a blocked compressor. *Permitted* means that the compressor is allowed to operate.

Stop at outdoor temp °C -15 (-22...10)
This menu appears if the heat pump is a CTC EcoAir. At this temperature the compressor is no longer permitted to operate. The heat pump re-starts 2 ° C warmer than the set value. The lowest outdoor re-start temperature is -18 ° C.

Delay between HP 30 (5 to 180)
This is used to set the delay time before the second heat pump in the system is allowed to start, when the first heat pump is already operating. This value is also valid for the amount of time that will pass before the third heat pump is allowed to start, when the first and second heat pumps are operating, and so on.
NOTE: Only indicated for heat pump A1.

Prio. EcoAir/EcoPart °C 7 (-20 to 15)
This temperature setting controls the prioritisation between the EcoAir air/water heat pump and the EcoPart liquid/water heat pump, if both of these are connected to the EcoZenith. The factory value is 7°C; this means that the EcoAir is prioritised for outside temperatures from 7°C and warmer.
NOTE: Only indicated for heat pump A1.

Cont. brine pump on No (No/Yes)
Setting for whether the brine pump is permitted to run all the time or permitted to start and stop.
Applies to EcoPart heat pumps only.

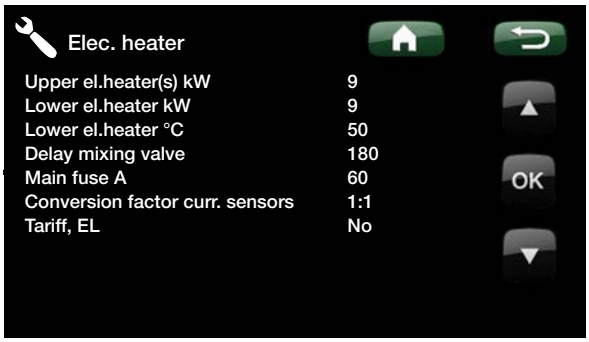
Compressor stop at brine °C -5 (-7 to -5)
This menu defines the brine temperature at which the compressor will be stopped.
Applies to EcoPart heat pumps only.

Brine pump on 10 days Off (Off/On)
After installation is complete, you can choose to run the brine pump constantly for 10 days to remove air from the system.
Applies to EcoPart heat pumps only.

Tariff HP Off (Off/On)
This is used when a dual tariff is used with lower energy costs at set hours of the day. The heat pump can then take advantage of reduced primary energy costs. It must be set to *Off*.
NOTE: Only indicated for heat pump A1.

9.5.2.3 Elec. heater

In the “Elec. heater” menu you can make settings affecting the operation of the immersion heaters.



El.heater upper kW **9 (0,3...18**

Here you select the power that the upper immersion heaters are allowed to emit.

El.heater lower kW **9 (0,3...9)**

Here you select the power that the upper immersion heaters are allowed to emit

El.heater lower °C **50(30...60)**

Setting of temperature for the lower immersion heater. The lower immersion heater is only allowed to operate when the heat pump is blocked for some reason.

Delay mixing valve **180(30...240)**

This is where the mixing valve delay is set - the period before it draws energy from the upper part of the tank. The mixing valve can be blocked so that it never retrieves energy from the upper part of the tank.

Main fuse A **20 (16...100)**

The property’s main fuse size is set here. This setting and the fitted current sensors ensure the fuses are protected when using appliances which generate temporary power peaks, for example, cookers, ovens, engine heaters etc. The product temporarily reduces power drawn where this type of equipment is being used.

Conversion factor curr. sensors **1:1 (1...10)**

This menu contains the factor the current sensor are to use. This setting is only performed if the connection has been installed for a current sensor for higher currents.

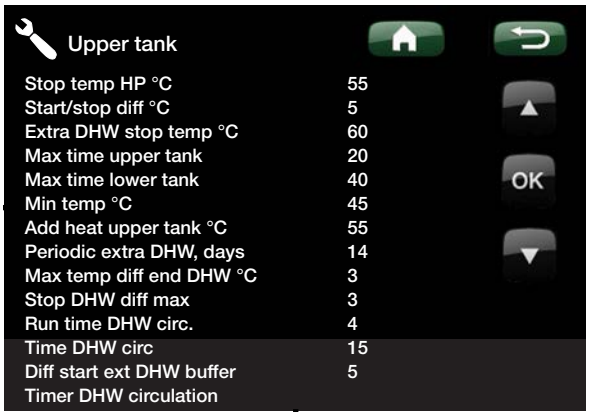
Example: User (set) value 2 => 16 A will be 32 A.

Tariff El **Off (Off/On)**

This indicates whether the product is connected to tariff-controlled electricity.

9.5.2.4 Upper tank

In the “Upper Tank” menu you make settings which affect the operation of the upper part of the tank.



Stop temp. HP °C **55 (20 to 60)**

At the selected temperature, the heat pump stops charging the upper tank.

Start/stop diff °C **5 (1 to 7)**

Hysteresis before the heat pump starts or stops charging the upper tank.

Extra DHW stop temp. °C **60 (20 to 62)**

This menu is used to specify the setpoint for the heat pump to charge hot water.

Max time upper tank **20 (5...60)**

This is the maximum time spent by the heat pump charging the upper tank if it is needed in the lower tank.

Max time lower tank **40 (10...120)**

This is the maximum time spent by the heat pump charging the lower tank if it is needed in the upper tank.

Min. temp. °C **45 (35 to 55)**

This menu is used to specify the lowest permitted temperature in the upper tank.

Add heat upper tank °C **55 (45...80)**

Stop temperature for additional heat from immersion heater/external boiler. Used when the EcoZenith is in additional heating status, when no heat from the heat pump is available.

Periodic extra DHW, days **14 (0 to 30)**

The menu defines the interval for the periodic increase of the hot water tank (at 65°C to protect against legionella).

Max. temp. diff. interrupted DHW °C **3 (2 to 7)**

If there is a heating requirement, hot water charging is interrupted earlier than the time at which the maximum temperature has been reached, in order to avoid the compressor stopping while hot water is swapped for heating.

Stop DHW diff. max. **3 (2 to 10)**

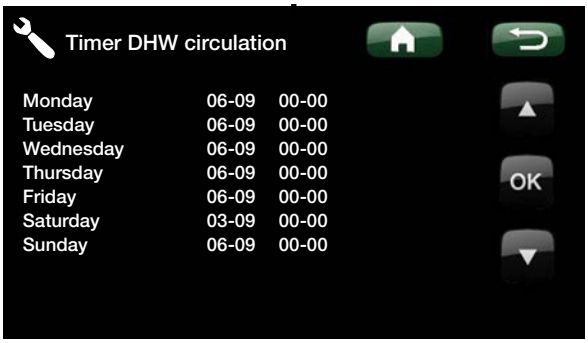
Hot water charging is normally interrupted in the hot water sensor, but this can also occur in the condensation temperature which is calculated based on the heat pump’s internal pressure sensor. The condensation temperature is significantly increased during hot water charging. This menu relates to the value from the maximum permitted condensation temperature that interrupts hot water charging. If there is a heating requirement, the system then diverts to charging the heating system.

Run time DHW circ. **4 (1 to 90)**
The operating time the domestic hot water circulation should take place during each period. Applies if DHW circulation has been defined in the *Installer/Defined system/DHW tank* menu.

Cyclic time DHW circ. **15 (5 to 90)**
The cyclic time for domestic hot water circulation. DHW circulation must have been defined in the *Installer/Defined system/DHW tank* menu.

Diff start ext DHW buffer **5 (3...15)**
This menu is used to select the temperature difference at which the charging of the external DHW tank is required to start. The difference is specified against the setpoint that is set in the *Stop temp. HP °C* menu.

Timer DHW circulation
This menu displays the scheduled weekday periods when the DHW circulation pump is to run. This schedule is repeated every week.



The circulation pump for hot water is set in the above menu to run on Mondays between 6 am and 9 am and between 9 pm and 11 pm.

9.5.2.5 Lower tank

In the “lower tank” menu you make settings which affect the operation of the lower part of the tank.

Tank max. °C **55 (20 to 70)**
This menu is used to set the highest temperature required for the lower tank.

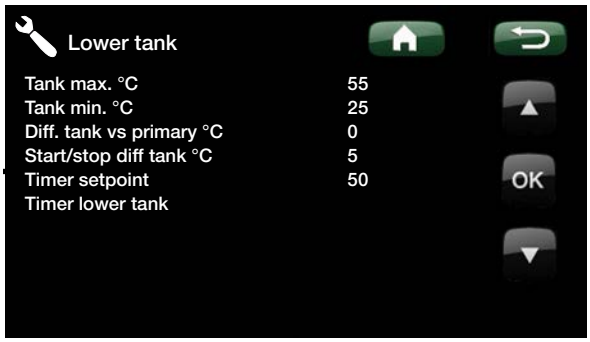
Tank min. °C **25 (20 to 60)**
This menu is used to set the lowest temperature required for the lower tank.

Diff. tank and prim. flow °C **0 (0 to 15)**
This menu is used to set the difference between the temperature in the tank and the outgoing primary flow temperature to the heating system, if required.

Start/Stop diff. tank °C **5 (3 to 10)**
The hysteresis between the heat pump’s start and stop conditions in charging the lower tank.

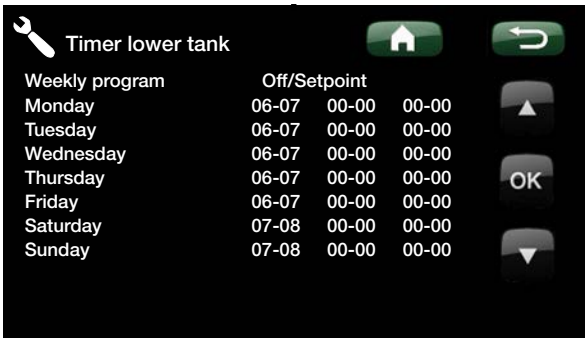
Timer setpoint **50 (20 to 60)**
This menu is used to specify the setpoint that is active during the period of time set by the timer.

Timer lower tank
See the chapter “Timer lower tank” below.

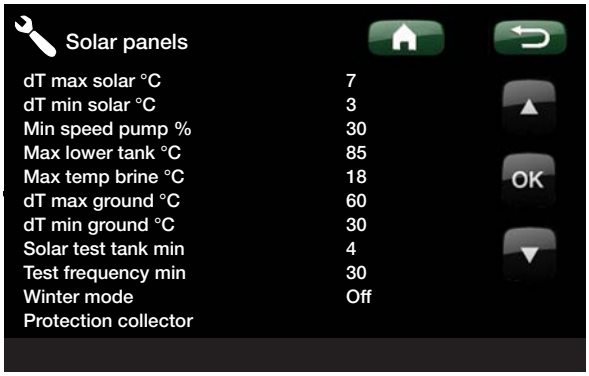


9.5.2.6 Timer lower tank

This menu is used to schedule the weekday periods you require the lower tank to be heated. This schedule is repeated every week. The illustration shows factory settings, which can be modified.



9.5.2.7 Solar panels



dT max. solar °C **7 (3 to 30)**

Here you can set the temperature difference determining when charging of solar energy is started.

Type defined as “Coil”. When the solar panel is this many degrees warmer than the solar coil in the EcoZenith, the solar panels’ circulation pump (G30) starts.

Type defined as “Heat exchanger”. When the solar panel is this many degrees warmer than the lower tank in the EcoZenith, the solar panels’ circulation pumps (G30) start.

Solar is always charged primarily in the lower tank. If enough solar energy and temperature are present, they are transferred to the upper tank via the heat distribution pipes.

dT min. solar °C **3 (2 to 20)**

When the temperature difference above falls to this set value, the circulating pump (G30) for the solar panels stops and the solar energy charge to the lower tank is terminated.

Min. speed pump % **30 (30 to 100)**

Here you set the minimum permissible rpm, in percentage, for the solar panels’ circulating pump.

Max lower tank °C **85 (10...95)**

The maximum permitted temperature in the lower tank. Charging of the lower tank ceases once the set temperature has been reached.

Max. brine °C **18 (1 to 30)**

Setting for maximum permitted brine temperature. This menu shows if the function “recharge the bore hole” has been selected in the “Def Solar Energy” menu. Solar charging of the bore hole ceases when this value has been reached.

dT max. bedrock °C **60 (3 to 120)**

Setting for start conditions for solar charging of bedrock. Specifies the temperature difference (solar panels–bedrock) at which charging begins.

dT min. bedrock °C **30 (1 to 118)**

Setting for stop conditions for solar charging of bedrock. Specifies the temperature difference (solar panels–bedrock) at which charging stops.

Solar test tank min. **4 (1 to 20)**

(Only if vacuum solar panels is defined) When recharging the bedrock, switching to tank charging is performed once every 30 minutes to check whether tank charging is possible (factory setting). The test is carried out at the set time interval. If sufficient temperature is obtained, tank charging continues; otherwise the system switches to charging the bedrock again.

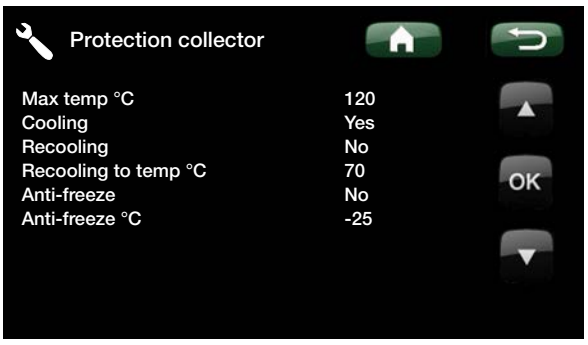
Test frequency min. **30 (0 to 180)**
Specifies the frequency at which the Solar Test function should perform. If set value is 0 the solar test is constant.

Winter mode **Off (Off/On)**
Winter mode is a setting which does not permit the EcoZenith to check whether charging of solar energy to the lower tank is possible.
In winter, the EcoZenith normally retains a higher temperature and the sun emits less energy and lower temperatures. To check whether charging of solar energy to the tank is possible, water must circulate in the system and the temperatures must be compared. If the check indicates that charging is not possible, energy will have been used unnecessarily by having the water circulate. The winter mode setting prevents this check
“Off” Deactivates the Solar Test Tank function. Charging is carried out to the bore hole only.
“No” Permits the Solar Test Tank function, and charging of the EcoZenith is possible.

Protection Collector

Max. temp. °C **120 (110 to 150)**
Protects the solar panels from high temperatures by allowing circulation in the solar panels even though the maximum temperature has been reached in the respective tank. For safety reasons, the temperature in the EcoZenith is never allowed to exceed 95°C.

Cooling **No (Yes/No)**
Permits circulation to the EcoZenith as well as the bore hole. This is in order to prevent excessively high temperatures in the solar panels. Applies once the maximum permitted temperature has been reached. For safety reasons, the temperature in the EcoZenith is never allowed to exceed 95°C.



Re-cooling **No (Yes/No)**

This option may be activated when the cooling function has been activated. The function means that the system endeavours reduce the temperature in the hot water and buffer tank to the set setpoint (set in the *Re-cooling to temp.* menu). This means that the solar panels are used as cooling elements for a short period of time.

Re-cooling to temp. °C **70 (50 to 80)**
This option may be activated when the *Re-cooling* function has been activated. The function means that the system endeavours reduce the temperature in the hot water tank and buffer tank to the set setpoint.

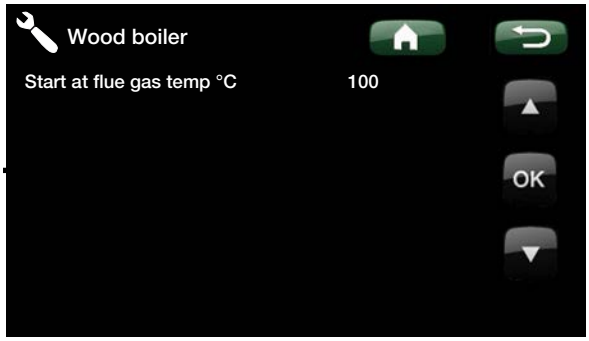
Anti-freeze **No (No/Yes)**
As there is a risk of blocks of ice forming in the solar panels, circulation may be started to reduce the risk of frost damage.

Anti-freeze temp °C **-25 (-30...-7)**
Specifies the temperature at which frost protection should be activated. The menu is displayed when the *Anti-freeze* function has been activated.

9.5.2.8 Wood Boiler

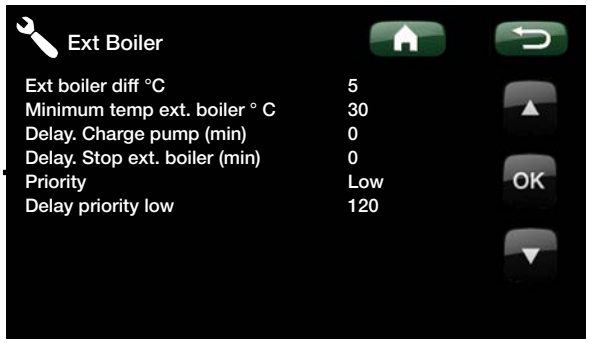
Start at flue gas temp °C **100 (70...250)**
This menu is used to define the flue gas temperature (sensor B8) at which the system is required to enter wood operation status and the heat pump(s) is required to be stopped.

Wood operation is activated when the flue gas temperature exceeds the set value in this menu and the temperature in the EcoZenith's lower tank is equal to or above its reference value (setpoint). When wood operation is active, the heat pump or additional heat are not used for heating the EcoZenith. Wood operation is deactivated when the flue gas temperature drops below the set value in this menu.



9.5.2.9 Ext Boiler

In this menu settings for the external additional boiler are made.



Ext boiler diff °C **5 (3...20)**
Here you set how much the temperature is allowed to drop below the stop temperature before the external boiler starts again.

Minimum temp ext. boiler ° C **30 (10 ... 80)**
Start temperature for the external boiler charge pump. Displayed only when the temperature sensor in the external boiler is installed and defined.

Delay. Charge pump (min) **0 (0 ... 20)**
This function will delay the stop of the charge pump. The charge pump continues to circulate water during the set time, after the external boiler has been shut down. Only applicable for boilers with very small internal volume of water to prevent overheating.

Tariff ext boiler **Off (Off...On)**
This indicates whether the product is connected to tariff-controlled electricity. When the heat pump is turned off by the grid, the external boiler should activate.

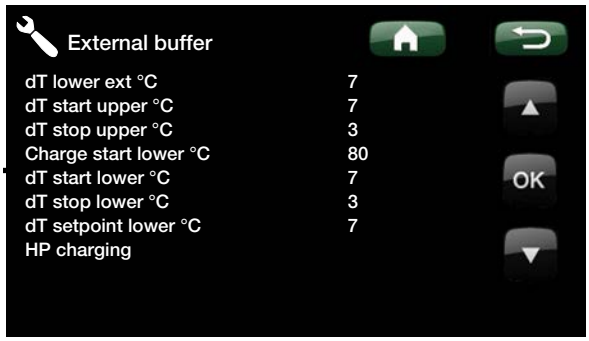
Delay. Stop ext. boiler (min) **0 (0 ... 240)**
The stop (shut down) of the external boiler can be delayed when it's no longer needed. This is used to avoid short operating times (risk of corrosion). The boiler is kept warm during the delay time.

Priority **Low (Low...High)**
"Low" The external boiler is prioritized after the immersion heater(s).

"High" The external boiler is prioritized over the electric heater(s) if both heat sources are defined in the system.

Delay priority low **120(30...240)**
Delay of the heat source which has been given "low" priority. For instance, if the external boiler has the priority "High", the immersion heater(s) then get(s) the priority "Low" and is/are delayed the set number of minutes before being permitted to engage and assist in operation. NOTE: Irrespective of the setting, the immersion heater in the upper tank is used for extra domestic hot water increase.

9.5.2.10 External buffer



Settings for the external buffer tank are made in this menu.

The buffer tank is charged from the lower tank of the EcoZenith but can be recharged in both the upper and the lower tanks.

dT lower ext °C **7 (3...30)**
The temperature difference between the lower tank of the EcoZenith and the lower part of the external buffer tank which controls the conditions for starting the transfer from the EcoZenith to the external buffer tank. This setting applies to charging of solar energy when a heating need is present on the radiator system.

dT start upper °C **7 (3...30)**
The temperature difference between the upper tank of the EcoZenith and the upper part of the external buffer tank which controls the conditions for starting the recharging from the external buffer tank to the upper tank in the EcoZenith.

dT stop upper °C **3 (1...30)**
The temperature difference between the upper tank of the EcoZenith and the upper part of the external buffer tank which controls the conditions for stopping the recharging from the external buffer tank to the upper tank in the EcoZenith.

Charge start lower °C **80 (60...90)**
The temperature in the lower tank of the EcoZenith at which transfer to the external buffer tank should start. This menu applies to wood operation or to solar charging when no heating need is present on the radiator system.

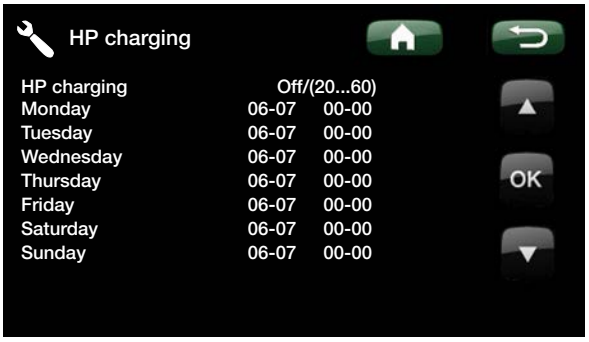
dT start lower °C **7 (3...30)**
The temperature difference between the lower tank of the EcoZenith and the external buffer tank which controls the conditions for starting the recharging from the external buffer tank to the lower tank in the EcoZenith.

dT stop lower °C **3 (1...30)**
The temperature difference between the lower tank of the EcoZenith and the external buffer tank which controls the conditions for stopping the recharging from the external buffer tank to the lower tank in the EcoZenith.

dT setpoint lower °C **7 (2...50)**
Setting of the number of degrees by which the lower tank of the EcoZenith must exceed its reference value to start transfer to the external buffer tank. This setting applies to charging of solar energy when a heating need is present on the radiator system.

HP charging **Off (20...60)**

Charging an external buffer tank with heat from a heat pump is mainly of relevance when there are different tariffs for electricity over a 24 hour period. In such an instance, the buffer tank(s) can be charged when the tariff is low. The lower tank of the EcoZenith will work towards the set temperature during those periods which are scheduled in the menu and then transfer heated radiator water to the buffer tank(s), provided that the latter has/have a lower temperature.



9.5.2.11 Pool

Pool temp °C **22.0 (20.0 to 58.0)**

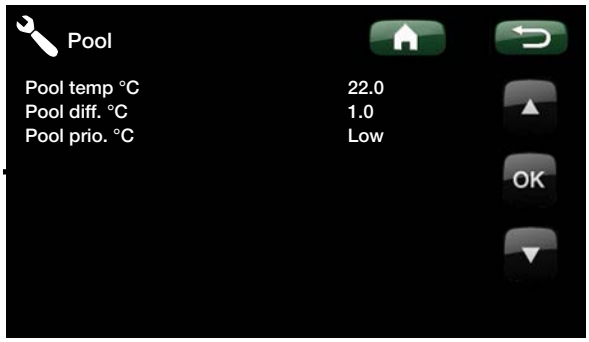
The required pool temperature is set in this menu.

Pool diff. °C **1.0 (0.2 to 5.0)**

The permitted difference between the stop and start temperature in the pool is specified here.

Pool prio. °C **Low (Low/High)**

The priority between pool heating and the heating system is specified here. If the Low setting is selected, the pool is not charged when additional heating is being used.



9.5.2.12 Remote control

Shows the type of remote control selected.

None = no remote control

“NR” = Remote night reduction, e.g. via the minicall system.

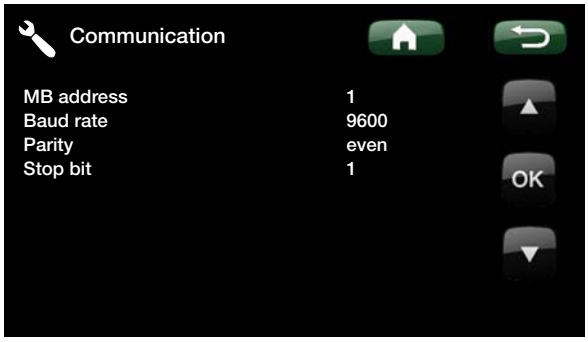
SO=ripple control. Not used in the UK at present. (Disconnection of compressor and electric heater during a certain period defined by the electricity supplier (special equipment).

DHW = Extra hot water, used along with the Extra DHW button (accessory).

9.5.2.13 Communication

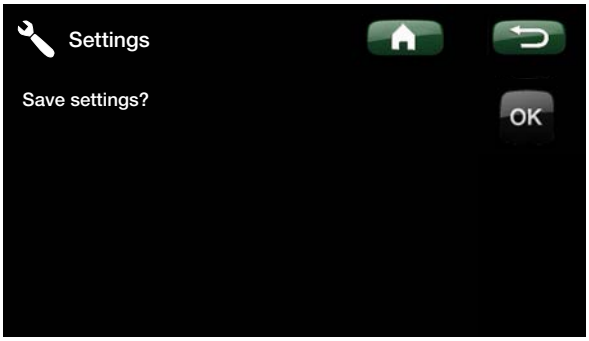
These settings are not used during normal operation and are not described in these instructions.

- MB address
- Baudrate
- Parity
- Stop bit



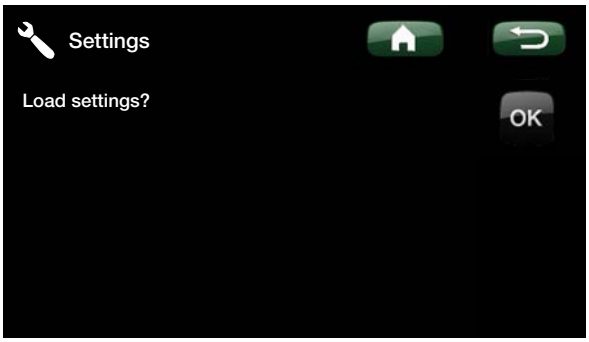
9.5.2.14 Save settings

Here you can save your own settings. Confirm using the “OK” button.



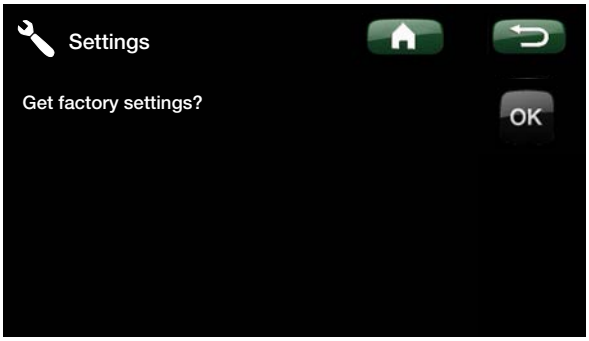
9.5.2.15 Load settings

The saved settings can be reloaded.



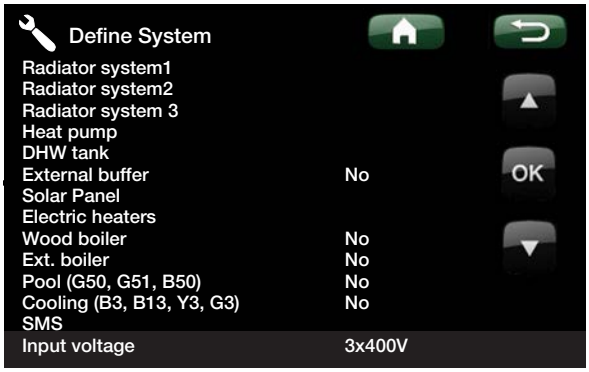
9.5.2.16 Load factory settings

The product is supplied with the factory values set. They can be restored by activating this function. Press OK to confirm. However, the language and product are retained.



9.5.3 Define System

The menus are used to specify to the EcoZenith the components and subsystems which make up the heating system.



9.5.3.1 Def heating circuit 1

Room sensor 1 (B11) **No (Yes/No)**

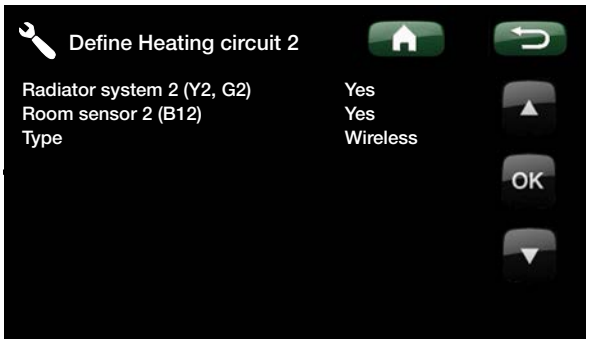
Specify whether the room sensor (B11) should be connected to the system.

Wired or wireless **Wired/Wireless**

Select whether the room sensor for heating system 1 is permanently connected (wired) or wireless.

9.5.3.2 Def heating circuit 2 (3)

If heating circuit 3 has been defined, there is no cooling.



Heating circuit 2 (Y2, G2) **No (Yes/No)**

Select whether or not further heating systems should be connected.

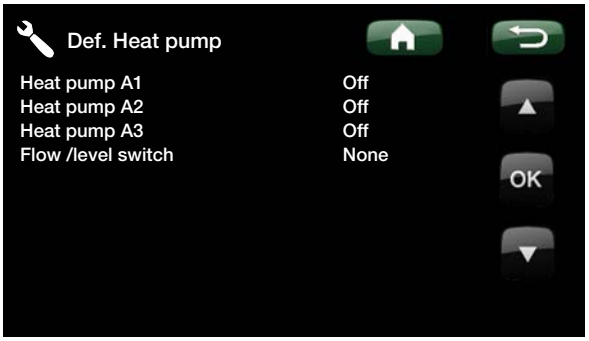
Room sensor 2 (B12) **No (Yes/No)**

Select whether the room sensor for heating system 2 (3 and 4) should be connected to the system. Displayed if the heating circuit in question has been defined.

Wire or wireless Wireless (Wire/Wireless)

Select whether the room sensor for the respective heating system 1 is permanently connected (wired) or wireless.

9.5.3.3 Def. heat pump



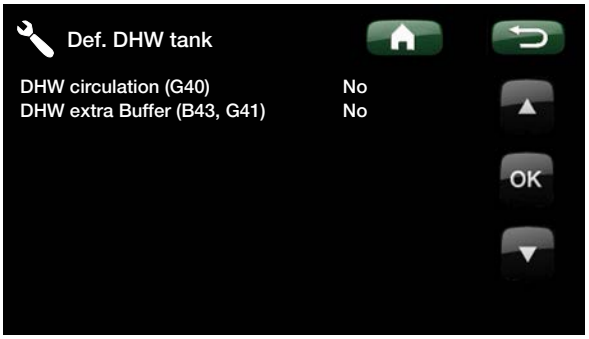
Heat pump A1-A3 **Off (On/Off**

Select the heat pumps to connect to the system.

Flow/level switch **None (None/NC/NO)**

Select the type of level switch installed in the system. “NC” and “NO” stand for Normally Closed and Normally Open, respectively.

9.5.3.4 Def. DHW tank



DHW circulation (G40) **No (Yes/No)**

Specify whether the circulation pump (G40) is connected to the hot water system.

External DHW tank (G41, B43) **No (Yes/No)**

Specify whether the circulation pump (G41) and sensor (B43) are connected to the hot water system.

9.5.3.5 Def. external buffer tank

Selected if an external buffer tank with charge pumps (G43) and (G45) and sensors (B41) and (B42) has been connected to the system.

9.5.3.6 Def. Solar Panels

Solar panels (G30, B30, B31) **No (Yes/No)**
Specify whether the circulation pump (G30) and sensors (B30 and B31) are connected to the system.

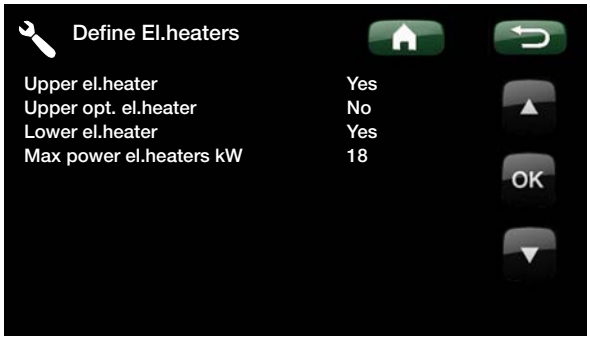
Type **Coil (Coil/Heat exchanger)**

- "Coil" Heat exchange occurs via the built-in coil in the EcoZenith.
- "Heat exchanger" Heat exchange occurs via an external heat exchanger in larger solar energy systems.

Vacuum collector **No (No/Yes)**
Specify whether the solar panels are vacuum or flat solar panels.

Bore hole recharge (Y31, G31) **No (No/Yes)**
There is an option of recharging the bore hole using energy from the solar panels when the ordinary heating and domestic hot water needs have been met. Specify whether diverting valve Y31 and circulation pump G31 have been connected to the system.

9.5.3.7 Define el.heaters



Upper el.heater **Yes (No/Yes)**
This is for selecting whether the upper immersion heater (EL 1-3 a/b) should be involved in operation.

Upper opt. el.heater **No (No/Yes)**
This is for selecting whether the upper optional immersion heater (E5) should be involved in operation (accessory).

Lower el.heater **Yes (No/Yes)**
This is for selecting whether the lower immersion heater (E1/E4) should be involved in operation.

Max power el.heaters kW **18 (0...27)**
This is for selecting the maximum power which all immersion heaters are to emit together.

9.5.3.9 Define wood boiler

Wood boiler (03) **No (No/Yes)**
This is for selecting whether a wood boiler is installed in the system.

9.5.3.10 Define external boiler

Ext boiler (04) **No (No/Yes)**
Selected if an external boiler (04) has been connected to the system.

Sensor ext boiler **No (No/Yes)**
Selected if a sensor in an external boiler has been connected to the system.

Def. Pool

Pool (G50, G51, B50) **No (No/yes)**
Selected if a pool with circulation pumps (G50) and (G51) and sensors (B50) has been connected to the system.

9.5.3.8 Def cooling

If cooling has been defined there is no heating circuit 3.

Cooling **No (No/Yes)**
This is for selecting whether cooling has been installed.

Condense pipe secured **Yes (Yes)**
If a condense pipe for the system has been secured, significantly lower temperatures are permitted at various points in the system. WARNING Build-up of condensation in the house structure can lead to damp and damage from mildew. In the event of doubt, contact an expert surveyor for an assessment.

Room temp. cooling **25 (10...30)**
This is where the desired room temperature for cooling is set.

See CTC EcoComfort manual for more information.

A room sensor must always be used in that part of the property which is to be cooled, as it is the room sensor which determines/controls cooling capacity.

9.5.3.11 Def. SMS

Activate GSM? **No (No/ Yes)**
If *"Yes"*, the menus below will be displayed.

Level of signal
The level of signal of the GSM reception is shown here.

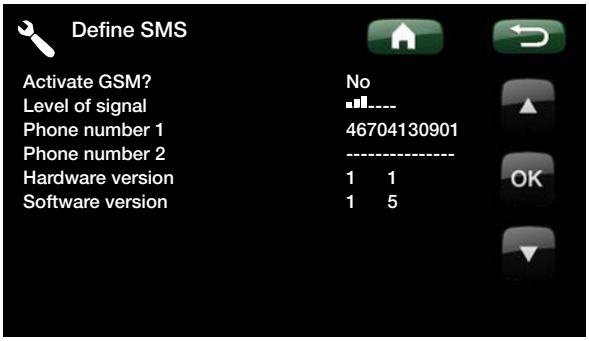
Phone Number 1
The first activated phone number is shown here.

Phone Number 2
The second activated phone number is shown here.

Hardware Version
The hardware version of the GSM equipment is shown here.

Software version
The software version of the GSM equipment is shown here.

NB: For more information on the SMS function, see the "CTC SMS" manual.

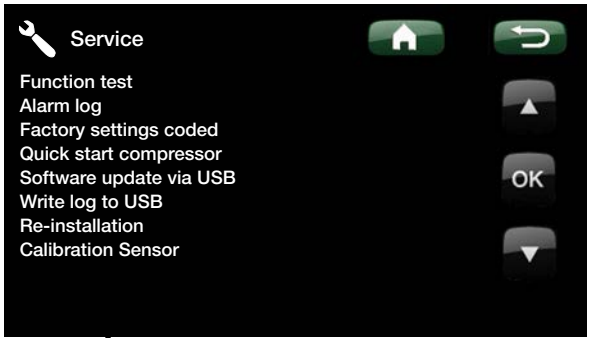


9.5.3.12 Input voltage

Input voltage **3x400V**
The value is set here to indicate whether the heat pump is connected at 3x400V, 1x230V or 3x230V. 3x400V and 1x230V are valid for the UK.

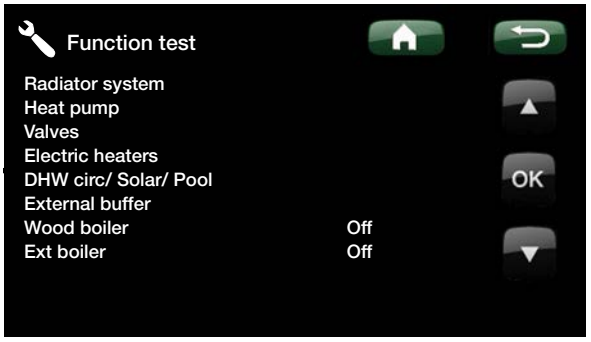
9.5.4 Service

NB: This menu is only for the installer to use.



9.5.4.1 Function test

From this menu, the installer can test the connection and function of separate components of the heating system. When this menu is activated, all control functions are stopped. The only protection against incorrect operation are the pressure sensors and the electric heater's overheating protection device. When you exit the menu, the heat pump returns to normal operation. A return to normal operation follows after 10 minutes' inactivity.
The exception is if only the brine pump is started. It can be operated for long periods of time. It is used together with the external filling pump during installation.



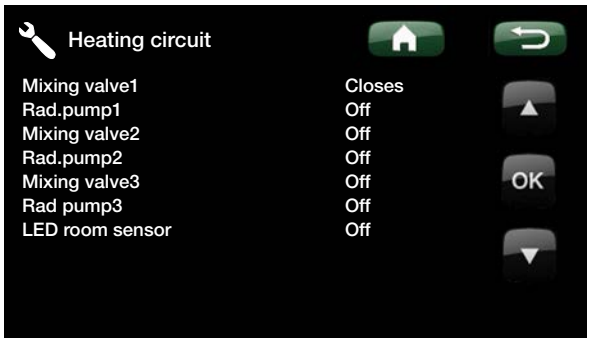
When you exit the menu, the heat pump returns to normal operation.

Heating System

Mixing valve (1-3) **Closes/Opens**
Opens and closes the respective mixing valve.

Rad.pump (1-3) **Off /On**
Starts and stops the respective radiator pump.

LED room sensor **Off /On**
The room sensor alarm functions can be controlled from here. When activated, the respective room sensor's red LED comes on steady.



Heat pump to test

Select which heat pump is to be tested.

Heat pump to test **1 (2/3)**

Go to menu test

Test Heat pump

HP Compr **Off (Off/On)**

When the compressor is being function tested, the brine and charge pump are also operating so that the compressor does not trigger its pressure switches.

HP Brine p. /Fan **Off (Off/On)**

Function test brine pump.

HP Charge p. **0 (0...100)**

Function test charge pump 0-100%.

Manual defrosting **Off (Off/On)**

When testing the function of the ”Manual Defrosting”, a defrost cycle will be conducted on the CTC EcoAir product. Defrosting can not be stopped when it is started, and will conduct a full defrosting cycle.

Compressor heater **Off (Off/On)**

Function test compressor heater.

Heating condenser bowl **Off (Off/On)**

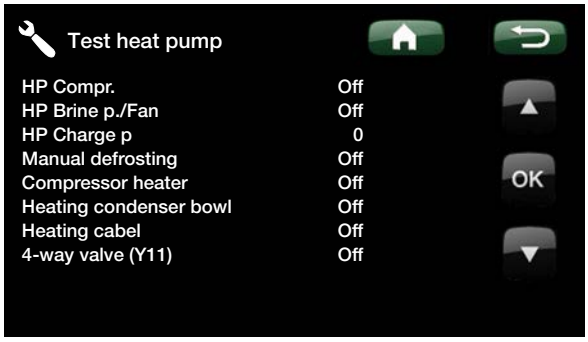
Function test of the heater in the condense bowl.

Heating cable **Off (Off/On)**

Function test heating cable.

4-way valve (Y11) **Off (Off/On)**

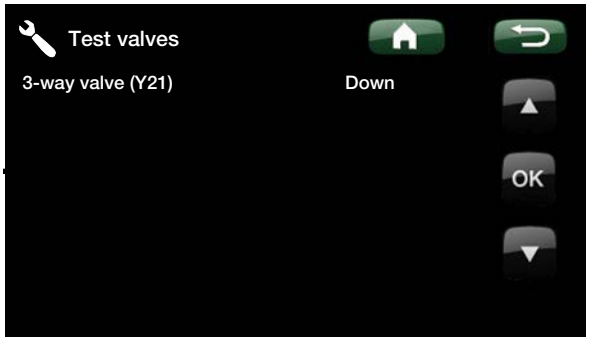
Function test 4-way valve (Y11), mounted on the CTC EcoAir.



Test Valves

The following valves are function tested from this menu:

3-way valve (Y21) **Down/Up**



Test Elec.heater

This is where connected electric heaters are tested by switching them on and off.

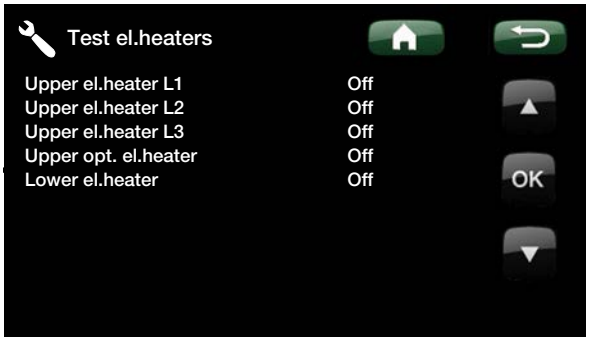
Upper el.heater L1 Off (Off/Low/High/Low+High)

Upper el.heater L2 Off (Off/Low/High/Low+High)

Upper el.heater L3 Off (Off/Low/High/Low+High)

Upper opt. el.heater Off (Off /On)

Lower el.heater Off (Off/Low/High/Low+High)



Test DHW circulation/Solar/Pool

The following pumps/valves are function tested from this menu:

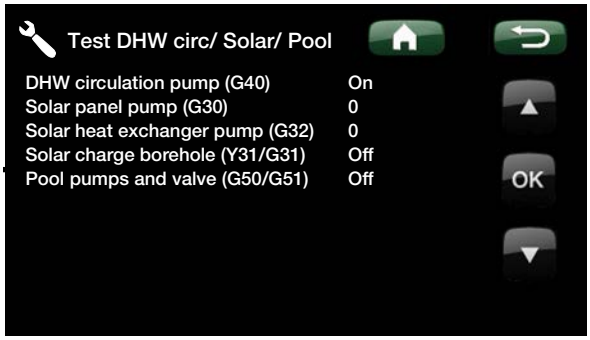
DHW circulation pump (G40) On (Off/On)
Switches the circulation pump on and off.

Solar panel pump (G30) 0 (0...100)
Tests the circulation pump to to full speed (rpm).

Solar heat exchanger pump (G32) 0 (0...100)
Tests the solar heat exchanger pump up to full speed (rpm).

Solar charge borehole (Y31, G31) Off (Off/On)
Tests the diverting valve (Y31) and solar heat exchanger pump (G31).

Pool pumps and valve (G50, G51) Off (Off/On)
Tests the pool pumps and valve (G50, G51).



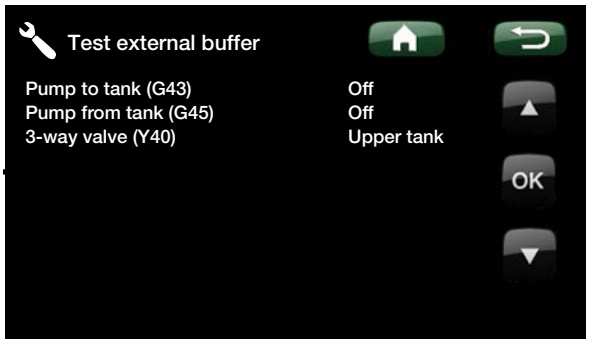
Test external buffer

The external buffer tank is function tested from this menu.

Pump to tank (G43) Off (Off/On)
Switches the circulation pump on and off.

Pump from tank (G45) Off (Off/On)
Switches the circulation pump on and off.

3-way valve (Y40) Upper tank/Lower tank
Tests the exchange function between the upper and lower tank.



Test wood boiler

The wood boiler is function tested from this menu.

Wood boiler Off (Off/On)
Switches the wood boiler on and off.

Test ext. boiler

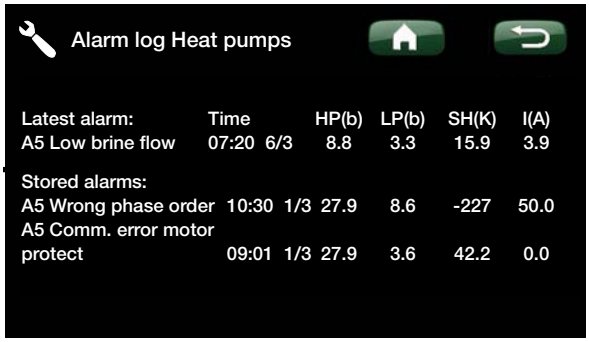
An external boiler is function tested from this menu.

Ext boiler Off (Off/On)
Switches the external boiler on and off.

9.5.4.2 Alarm log Heat pumps

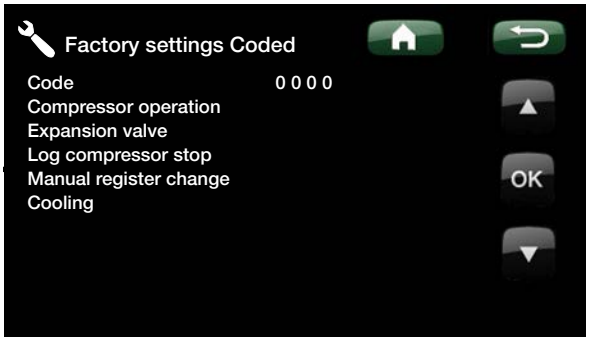
Here you can read information about the latest alarms from the heat pump that sounded the alarm. The latest alarm is displayed at the top and the four latest alarms are shown under *Stored alarms.*

An alarm which reoccurs within an hour is ignored so as not to fill up the log. If all the alarms are the same, this can indicate that there is an intermittent fault, e.g. a loose contact.



9.5.4.3 Factory settings Coded

This menu is intended to set the manufacturer's operational and alarm limits. A 4-digit code must be specified to be able to amend these limits. However, you can also take a look without any code to see what options feature in the menu.



NB: Only an authorised service engineer is allowed to log in to the Factory settings coded option. Severe operational problems and faults may occur affecting the product if values are amended without authorisation. Note that in such cases the warranty terms do not apply.

9.5.4.4 Quick start Compressor

The delay normally prevents compressor start earlier than 10 min. after compressor stop. The delay is also activated in the event of a power failure, or the first time after production is started. This function speeds up this process.

Software update via USB

This is only for service engineers. This option can be used to update the software in the display via USB. The software update process is complete when the start menu appears.

> ! NB: The power to the product must not be interrupted, under any circumstances, during the update process.

9.5.4.5 Write log to USB

This is only for service engineers. This function can be used to save logged values to a USB memory stick.

9.5.4.6 Re-installation

This command re-launches the installation sequence. See the chapter on “First start”.

9.5.4.7 Calibration Sensor

Primary flow VS 1°C (B1) **0.0 (-3.0 to 3.0)**
Correction of primary flow sensor B1.

Primary flow VS 2°C (B2) **0.0 (-3.0 to 3.0)**
Correction of primary flow sensor B2.

Room temperature 1°C (B11) **0.0 (-3.0 to 3.0)**
Correction of room sensor B12.

Room temperature 2°C (B12) **0.0 (-3.0 to 3.0)**
Correction of room sensor B12.

Outdoor temperature °C (B15) **0.0 (-3.0 to 3.0)**
Correction of outdoor sensor (B15).

Out from solar panels °C (B31) **0.0 (-3.0 to 3.0)**
Correction of temperature sensor on solar panels for outgoing temperature.

Into solar panels °C (B30) **0.0 (-3.0 to 3.0)**
Correction of temperature sensor on solar panels for incoming temperature.

10. Operation and Maintenance

Once your new EcoZenith has been installed, you and your installer should together check that the system is in perfect operating condition. Let the installer show you where the switches, controls, fuses etc. are, so that you know how the system works and how it should be maintained. Bleed the radiators after around three days of operation and top up with water if required.

CTC EcoZenith i550 Pro

The EcoZenith is prepared for connection to a CTC heat pump, wood boiler, other additional boiler, solar energy, passive cooling, bore hole charging and pool. The EcoZenith operates fully automatically. The control system turns on additional heat when needed, adapts to wood burning when this occurs, switches to summer mode, etc. A more detailed description on how the EcoZenith is built and works can be found in the “EcoZenith’s function” chapter.

Safety Valve for Tank and Radiator System

Check regularly that the valve is working properly by manually turning the valve knob. Check that water is coming out of the safety valve discharge. The overflow pipe outlet must always be open. Warning Hot water can drip from the safety valve.

Draining the tank

The tank should be disconnected from the power source when it is being drained. The drain valve is packaged separately and can be connected directly onto one of the lower connections, if one is free, or to a low lying pipe. When draining the whole system, the mixing valve should be fully open, i.e. turned anticlockwise as far as it will go. Air must be supplied to the closed system.

Operation Stop

The product is turned off with the safety switch. If there is a risk of the water freezing, all the water should be drained from the tank and the radiator system. The domestic hot water coils, which contain about eleven litres, are emptied by feeding a hose all the way down the cold water connections and then siphoning out the water.

Current Monitor

The EcoZenith has a current monitor which measures current up to 100 A. If the system is fitted with a current sensor, the property’s main fuses are continuously monitored to ensure they are not overloaded. If this should happen, electric stages are disconnected from the immersion heater(s).

Mixing Valve

The mixing valve is operated automatically from the control system, so that the correct temperature, irrespective of the season, reaches the heating system. However, where a fault occurs, you can operate the valve yourself by pulling out the knob on the motor and turning it anticlockwise to increase the temperature or clockwise to reduce it.

! Remember to reset the mixing valve to automatic mode.

Room Sensor

A room sensor, which should always be fitted (up to three room sensors can be connected), ensures that the temperature in the room is always suitable and stable. For the sensor to provide the correct signals to the control unit, radiator thermostats should always be fully open in the area where the room sensor is located. When adjusting the system, always do so with all radiator thermostats fully open. The thermostats can be individually adjusted after a few days in the various rooms.

You can select operation without room sensors in the menu “Installer/Define system /Heating circuit 1, 2 and 3/Room sensor No”. This can be done if it is difficult to find a location for the room sensor, if you have several apartments, if the floor heating system has separate room sensors, or when using a fire place or open stove. The alarm LED on the room sensor still functions as normal. If you use the fire or open stove only occasionally, the firing process can affect the room sensor and reduce the temperature supplied to the radiators. It can then get cold in the rooms in other parts of the house. The room sensor can temporarily be deselected during the firing process. The EcoZenith then provides heating to the radiators using the set heating curve. Refer to the chapter on the “House heating curve”. The radiator thermostats are closed in the section of the house where a fire is burning.

“Summer Cellar Heat”

You will often want some background heating in basements/recreation rooms/bathrooms in the summer months, to avoid raw, damp air. The EcoZenith takes care of this by setting the minimum permitted primary flow temperature to a suitable temperature (15 to 65°C). See under the menu “Installer/Settings/heating circuit 1, 2 and 3/Min primary flow °C”. This means that the temperature supplied to the radiators does not fall below a selected temperature, for example 30°C. Functional radiator thermostats or shut-off valves are required in the rest of the house in order for this to work. These shut off the heating in the rest of the house. The function can also be used for floor heating in the bathroom where a warm floor is required during the summer.

Night reduction

With night reduction you have the option of automatically varying the temperature in the house throughout the day, every day of the week. More information can be found in the chapter “Detail description menus/Night reduction”.

11. Troubleshooting/measures

The CTC EcoZenith i550 Pro is designed to provide reliable operation and high levels of comfort, as well as have a long service life. Various tips are given below which may be helpful and guide you in the event of an operational malfunction.

If a fault occurs, you should always contact the installer who installed your unit. If the installer believes the malfunction is due to a material or design fault, then they will contact Enertech/CTC to check and rectify the issue. Always provide the product's serial number.

The Heating System

If the set room temperature is not obtained, check:

- that the radiator system is correctly adjusted and is functioning normally. that radiator thermostats are open and the radiators are equally warm all over. Touch the entire radiator surface. Bleed the radiators.
- that the EcoZenith i550 Pro is in operation and that no error messages are displayed.
- that there is sufficient electrical power available. Increase if necessary.
- that the product is not set to the "Max. allowed primary flow temperature" mode with a too low value.
- that "Inclination" has been set high enough. Increase as required. You can find out more on this in the "House Heating Curve" chapter. See also the "Installer/Settings/Heating circuit 1, 2 and 3" menu.
- that the temperature set back is not maladjusted.
- that the mixing valve on the EcoZenith is not in the manual position.

If the heat is not even, check

- that the placement of the room sensors is appropriate for the house.
- that the radiator thermostats don't interfere with the room sensor.
- that no other heat sources/cold sources interfere with the room sensor.
- that the mixing valve on the EcoZenith is not in the manual position.

Outdoor Sensor/Room Sensor Faults

If a fault occurs with an outdoor sensor, an outdoor temperature of -5°C is simulated so that the house does not get cold. An alarm appears in the display window. If a fault occurs with a room sensor, the EcoZenith automatically switches to operating according to the set curve. An alarm appears in the display window.

Resetting after Alarm

You reset the alarm by pressing the reset button on the panel. If several alarms are triggered, they are displayed one after the other. An outstanding fault cannot be reset without being rectified first. Some alarms are reset automatically if the fault disappears.

! If you do not have radiator thermostats on the upper floor, you may need to install them.

! Avoid placing the room sensor close to the stairway due to the uneven air circulation.

Current Monitor (protection for main fuses)

The CTC EcoZenith i550 Pro has a built-in current monitor. If the system is installed with current sensors (included), there is constant monitoring to prevent overload of the main fuses of the house. If this should happen, electric stages are disconnected from the EcoZenith. The product's immersion heaters may be restricted where high heating requirement levels are combined with, for example, single-phase engine heaters, cookers, washing machines or tumble dryers. This may result in inadequate heating or hot water temperatures.

If immersion heaters in the EcoZenith are restricted, this is shown in plain text on the display. Ask the electrician if the fuse size in the house is correct.

Sound Problems

Sudden pressure changes in the tap water system may cause noise. This is due to pressure surges which occur when, for instance, an older type of instant closing mixer is turned off quickly. The fault is not in the EcoZenith, and the problem can be easily rectified by replacing the mixer with a soft-closing one. If an unusual sound comes from hard-closing dishwasher and washing machines, this can be remedied using a shock arrestor. A shock arrestor can also be an alternative to soft-closing water taps. Minimizing pressure surges benefits the whole of the tap water system throughout the property.

If you hear a rasping sound from the product, check that it has been properly bled. Bleed via the product's safety valve or specially fitted bleed valve, so that any air can be evacuated. Top up with water where required, so that the correct pressure is achieved. If this noise recurs, call a technician to check the cause.

! Don't forget that the radiators may also need bleeding.

! If you have no radiator thermostats on the first floor, you may need to install some.

11.1 Information messages

Information messages are displayed when appropriate and are intended to inform users about various operational situations.

Start delay
The compressor is not allowed to start too quickly when it has stopped. The delay is usually at least 10 minutes.

Heating off, radiator sys
Shows for each heating system that the product is operating in summer mode when only hot water is required, not heating.

Ripple control
Shows that ripple control is active. Ripple control is a device which an electricity supplier can fit with the aim of disconnecting high current draw equipment for a short period of time. The compressor and electrical power are blocked when ripple control is active.

Tariff, HP off.

Shows that Tariff HP is not active. Should always be “Off”.

Tariff, EL, off.

This is used when a dual tariff is used with lower energy costs at set hours of the day. The heat pump can then take advantage of reduced primary energy costs. Should always be “Off”.

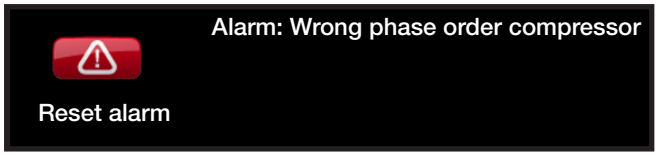
Compressor blocked

The compressor is set to be shut down, e.g. before drilling or digging has been carried out for the collector loops. The product comes with the compressor switched off. This option is selected under the *Installer/Settings/ Heat pump 1, 2 and 3* menu.

High current, reduced electricity (xA)

The property’s main fuses are overloaded due to the fact, for instance, that several appliances requiring power are being used simultaneously. The product reduces the electric heaters’ electrical output over time.

11.2 Alarm messages



If a fault occurs with a sensor, for instance, an alarm is triggered. A message appears on the display informing about the fault.

You reset the alarm by pressing the “Reset alarm” button on the display. If several alarms are triggered, they are displayed one after the other. An outstanding fault cannot be reset without being rectified first. Some alarms are reset automatically if the fault disappears.

<table>
<tr><th>Alarm Text</th><th>Description</th></tr>
<tr><td>Wrong phase order compressor</td><td>The compressor motor in the connected heat pump must rotate in the right direction. The heat pump checks that the phases are connected correctly; otherwise, an alarm is triggered. In this case, two of the phases to the heat pump need to be changed. The power supply to the heat pump must be switched off when rectifying this fault. This fault generally only occurs during installation.</td></tr>
<tr><td>Alarm sensor</td><td>An alarm is displayed if a fault occurs with a sensor that is not connected or has short-circuited and if the value is outside the sensor’s range of measurement. If this sensor is significant to the system’s operation, the compressor of the heat pump stops. In this case, the alarm is reset manually after the fault has been rectified. For the sensors below, the alarm is reset automatically after correction:

<table>
<tr><td>B1</td><td>Primary flow sensor 1</td><td>B15</td><td>Outdoor sensor</td></tr>
<tr><td>B2</td><td>Primary flow sensor 2</td><td>B17</td><td>Sensor external boiler</td></tr>
<tr><td>B3</td><td>Primary flow sensor 3</td><td>B30</td><td>Sensor in to solar panels</td></tr>
<tr><td>B5</td><td>Sensor upper tank</td><td>B31</td><td>Sensor out from solar panels</td></tr>
<tr><td>B6</td><td>Sensor lower tank</td><td>B32</td><td>Sensor solar panel, charging</td></tr>
<tr><td>B7</td><td>Sensor radiator return</td><td>B33</td><td>Sensor solar coil tank</td></tr>
<tr><td>B8</td><td>Sensor flue gas</td><td>B41</td><td>Sensor extra buffer tank upper</td></tr>
<tr><td>B9</td><td>Sensor external boiler</td><td>B42</td><td>Sensor extra buffer tank lower</td></tr>
<tr><td>B11</td><td>Room sensor 1</td><td>B43</td><td>Sensor external hot water tank</td></tr>
<tr><td>B12</td><td>Room sensor 2</td><td>B50</td><td>Sensor pool</td></tr>
<tr><td>B13</td><td>Room sensor 3</td><td></td><td></td></tr>
</table>
and for heat pumps 1-3:

<table>
<tr><td>Sensor brine out</td><td>Sensor brine in</td></tr>
<tr><td>Sensor HPin</td><td>Sensor HPout</td></tr>
<tr><td>Sensor discharge</td><td>Sensor suction gas</td></tr>
<tr><td>Sensor high pressure</td><td>Sensor low pressure</td></tr>
</table></td></tr>
<tr><td>Motor protect compressor</td><td>High/low current has been detected to the compressor. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.</td></tr>
<tr><td>High pressure switch</td><td>The refrigerant’s high pressure switch has been triggered. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.</td></tr>
<tr><td>High brine temp</td><td>Incoming brine temperatures from borehole/ground circuits are too high. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer to check the heat source. Excessively high brine circuit temperatures over a long period can damage the compressor.</td></tr>
</table>

Alarm Text	Description
Low brine temp	Incoming brine temperatures from borehole/ground loop are too low. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer to check the dimensions of the cold side.
Low brine flow	Low brine flow is very often due to air in the collector system, particularly just after installation. Collectors which are too long can also be a cause. Check also that the brine pump is set to the correct speed. Press reset and check whether the alarm recurs. Also check the brine filter that has been installed. If the fault recurs, contact your installer.
Communication error PCB, Communication error HP, Communication error motor protect	This message is displayed when the display card cannot communicate with the relay card. This message is displayed when the display card cannot communicate with the HP control card. This message is displayed when the HP control card cannot communicate with the motor protection.
High compr.temp	This message appears when the compressor temperature is high. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
Low evaporation	This message appears when the evaporation temperature is low. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
High evaporation	This message appears when the evaporation temperature is high. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
Low suct gas exp. valve	This message appears when the suction gas temperature is low. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
Low evapor exp. valve	This message appears when the expansion valve's evaporation temperature is low. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
High evapor exp. valve	This message appears when the expansion valve's evaporation temperature is high. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
Low superheat exp. valve	This message appears when the expansion valve's superheat temperature is low. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
EVO off	This message appears when there is a fault with the expansion valve control. Contact your installer.
Phase missing	This message appears in the event of a phase failure. Check the product's fuses. If this does not help, the installation should be checked by an authorised person.
Compressor type?	This message appears if there is no information about the compressor type. Contact your installer.
Heat pump alarm	This message appears if the heat pump is in alarm mode. Contact your installer.
Max thermostat	If the heat pump has been stored in an extremely cold place, the max thermostat may have been triggered. You reset it by pressing in the button on the electrical switchboard behind the front panel. Always check that the max thermostat has not been triggered during installation.

12. Transportation, unpacking and installation

This section is intended for the technician responsible for one or more of the installations necessary for the CTC EcoZenith i550 Pro to perform according to the property owner's wishes. Take your time going through functions and settings with the property owner and answer any questions. Both you and the EcoZenith i550 Pro benefit from a user who has completely understood how the system operates and should be maintained.

12.1 Transportation

Transport the unit to the installation site before removing the packaging.

Handle the CTC EcoZenith i550 Pro in one of the following ways:

- Forklift
- Lifting eye which is fitted in the socket in the middle of the top of the CTC EcoZenith i550 Pro.
- Lifting band around the pallet. NB: Can only be used with the packaging on.
- Remember that the product has a high centre of gravity and should be handled with caution.

! The product must be transported and stored in an upright position.

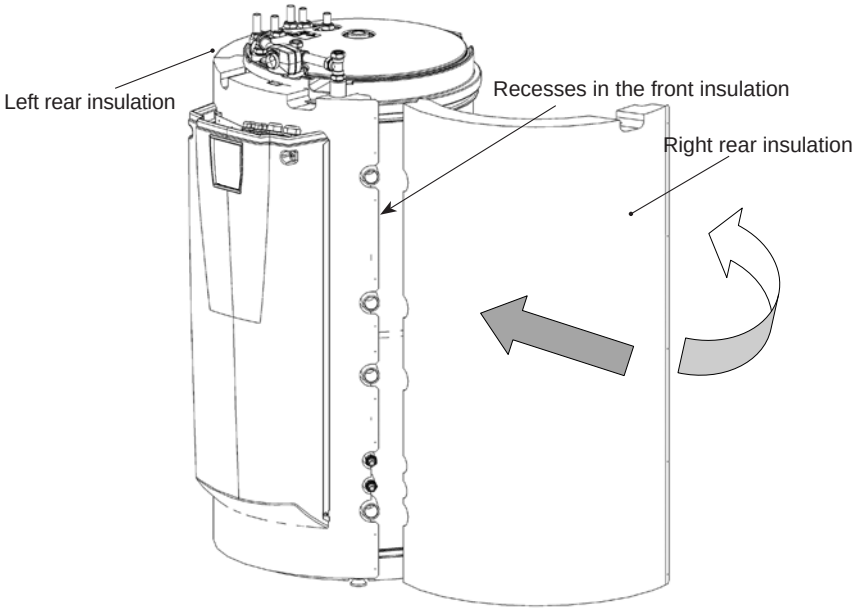
12.2 Unpacking

When the CTC EcoZenith i550 Pro has been placed at the installation site, the packaging can be removed. Check that the product has not been damaged in transit. Report any transport damage to the carrier.

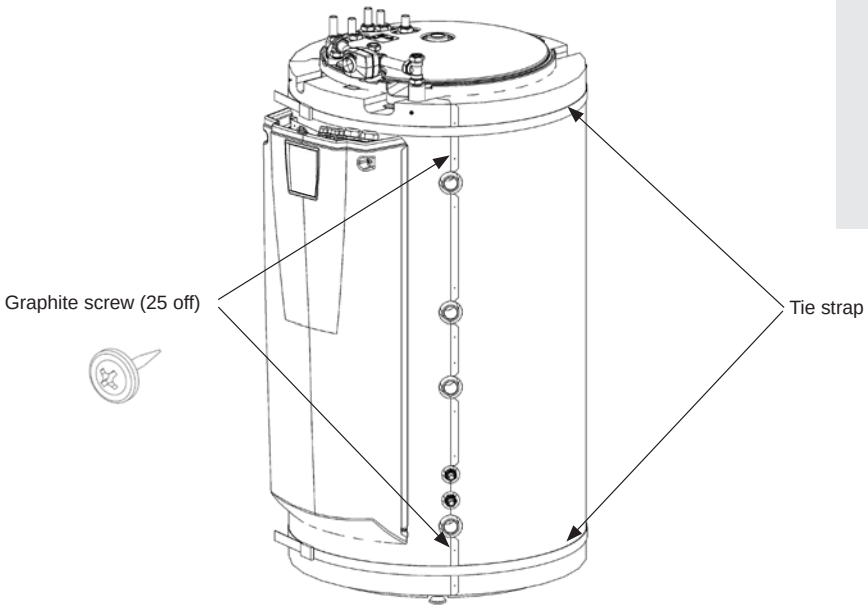
12.3 Fitting rear insulation and plastic top cover

The rear insulation sections and top cover should be fitted before the CTC EcoZenith i550 Pro is placed against a wall or in a corner for pipe and electrical connection. These parts are delivered separately and they are easier to fit if there is space around the unit.

Begin with the left rear insulation. Turn out the insulation, locate it in the recesses in the front insulation and then turn it in against the tank. Repeat this procedure for the right rear insulation. Note that the right rear insulation needs to be turned out quite a lot for it to locate easily in the recesses.

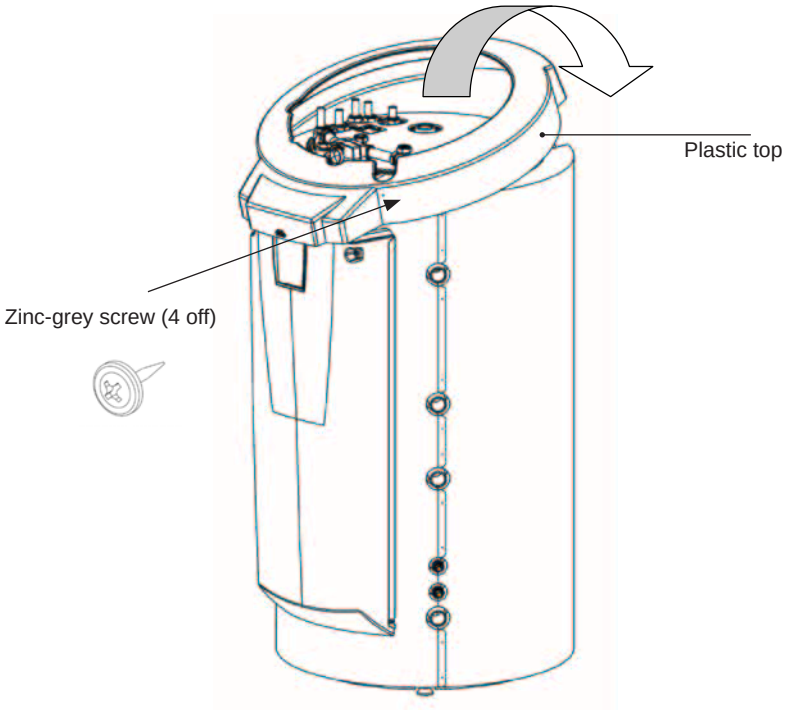


When the rear insulation is in place, tension bands can be used to hold it firmly against the tank. Attach the insulation sections to each other using the 25 graphite-grey screws provided. The screw positions have been pre-drilled.



! The tension bands can scratch the surface of the insulation. Use a piece of cardboard or similar to protect it.

Fit the plastic top at the front and tip it backwards to locate it under the mixing valve actuator. Fit the 4 zinc-grey screws provided in the pre-drilled holes. Ensure that the plastic top cover is correctly aligned with the front.



13. Pipe installation

The installation must be carried out in accordance with current heating and hot water standards. See BBR (Boverkets Byggregler) and Warm and Hot Water Recommendations (Varm- och hetvattenanvisningar (VVA 1993)). The product must be connected to an expansion vessel in an open or closed system. Do not forget to flush the radiator system clean before connection. Perform all the installation settings based on the description in the chapter on “First start”. See the chapter on the EcoZenith’s functions in the section for the property owner for more information on the function of the various parts of the system.

This chapter contains the main connections for the EcoZenith, plus additional installations such as heat pumps, tanks, solar energy, pool, passive cooling, bore hole charging, DHW circulation and external gas, oil or pellet boiler. The instructions for the relevant additional product should be followed.

Refer also to the “Electrical installation” chapter.

Connections, placement and dimensions

See Technical data in the section for the property owner.

Pipe connections on the unit

Connect the pipes as shown in the schematic diagram for pipe connections. Also refer to Technical data in the section for the property owner for connection dimensions and placement. If annealed copper pipe is used, fit support sleeves.

Circulation pumps - radiator system

The circulation pumps are fitted to the primary flow piping from the EcoZenith to the respective radiator systems and receive their power supply from the EcoZenith, see chapter on Electrical installation.

Mixing valve

Install a mixing valve where there is outgoing hot tap water in order to avoid the risk of scalding at the property’s hot tap water points.

Safety valves

The EcoZenith safety valves for the tap water circuit and boiler are packaged separately. Connect the waste pipes to the waste system directly to the floor gully or, if the distance is more than two metres, to a funnel. Water can drip from a connected waste pipe. The waste pipe must incorporate a fall towards the floor gully, be installed so that there is no risk of freezing and be left open to the atmosphere/without pressure. The length of the waste pipe may not exceed two metres, unless in these cases it exits into a funnel.

Filling valve – radiator system

Fit a filling valve between the cold water connection and the radiator return pipe, or between the cold water pipe and the expansion pipe. The filling valve must be provided with a non-return valve (to prevent backflow).

Drainage valve

Fit the drain valve (separate package) to one of the EcoZenith's lower connections. The adapter for this is provided in the package. The drain valve can also be fitted into a low lying pipe.

Manometer – system pressure

Fit a manometer to the expansion pipe or radiator return pipe.

Expansion vessel connection

The EcoZenith is best connected to a closed expansion vessel. If an open system is used, the distance between the expansion vessel and the highest placed radiator must not exceed 2.5 m, in order to avoid introducing oxygen into the system.

Insulation

To ensure best efficiency, make sure that after installation you insulate all pipe parts, pipe unions and used and unused plugged connections. Use the insulation parts provided, and supplement these with insulation of Armaflex type having minimum 10-15 mm thickness, or equivalent. Make sure the insulation at the connections reaches all the way to the EcoZenith's own insulation and that it has no gaps, so as to prevent any loss of heat.

13.3.1 CTC EcoZenith i550 Pro - Radiator system

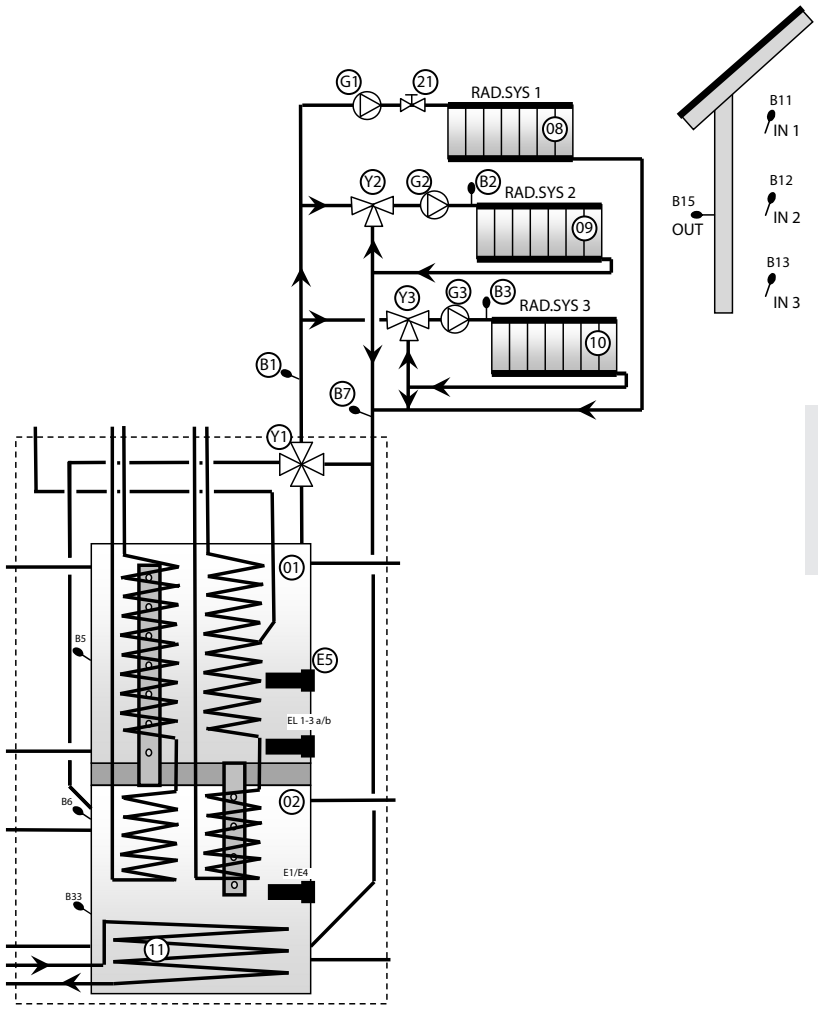
The CTC EcoZenith i550 Pro can be connected to three different radiator systems (heating circuits) with separate room sensors.

Mixing valve (Y1) is the main mixing valve and feeds radiator system 1. Mixing valves (Y2) and (Y3) for radiator systems 2 and 3 are sub-mixers. This means that mixing valve (Y1) controls the maximum temperature to mixers (Y2) and (Y3).

For one or two sub-mixing valves (radiator systems 2 and 3) to be operative when radiator system 1 is not operative, valve (21) must be connected to radiator pump (G1) so that the valve closes when the radiator pump for radiator system 1 is not operative. This is useful, for example, if floor heating in a bathroom is preferred during the summer.

Note that the expansion vessel and safety valve for the heating system are not included in the schematic diagram.

See also Heating circuit Menu in the Detail Description Menus chapter. (Installer/Settings/Heating circuit 1-3)



Valve 21 must be connected if radiator system 2 or 3 is used.

13.3.2 CTC EcoZenith i550 Pro - Heat pump

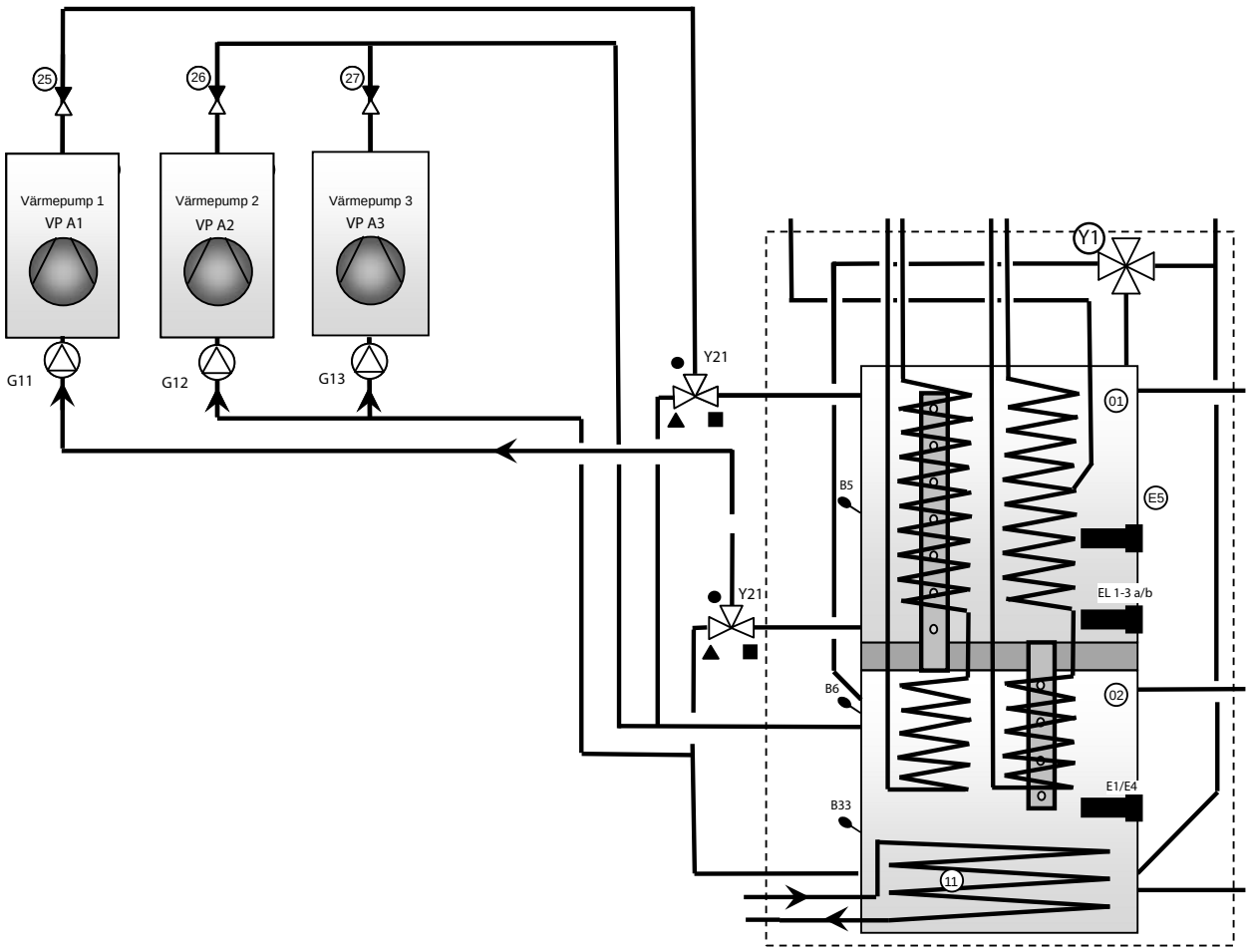
Heat pump 1 is connected to diverting valves for changing between the upper and lower tanks. Heat pumps 2 and 3 are connected directly to the lower tank for supplying radiators.

Ensure that the ports on the diverting valves (Y21) are set as in the schematic diagram. The ports ● must always be connected to heat pump 1.
If it is necessary to swap ports (■ and ▲), two jumpers in the actuator must be reconnected. See the chapter on Electrical installation for more information.

Note that when connected in series, the last heat pump must be in terminated position. I.e., on the last heat pump, dipswitch 2 must be in the ON position. On the other heat pumps it should be in the OFF position For more information, refer to the Installation and Maintenance instructions of the respective heat pump.

The diverting valves (Y21) and the circulation pumps (G11), (G12) and (G13) are CTC accessories.

See also Heat pump Menu in the Detail Description Menus chapter. (Installer/Settings/Heat pump A1-A3)



13.3.3 CTC EcoZenith i550 Pro - Solar energy

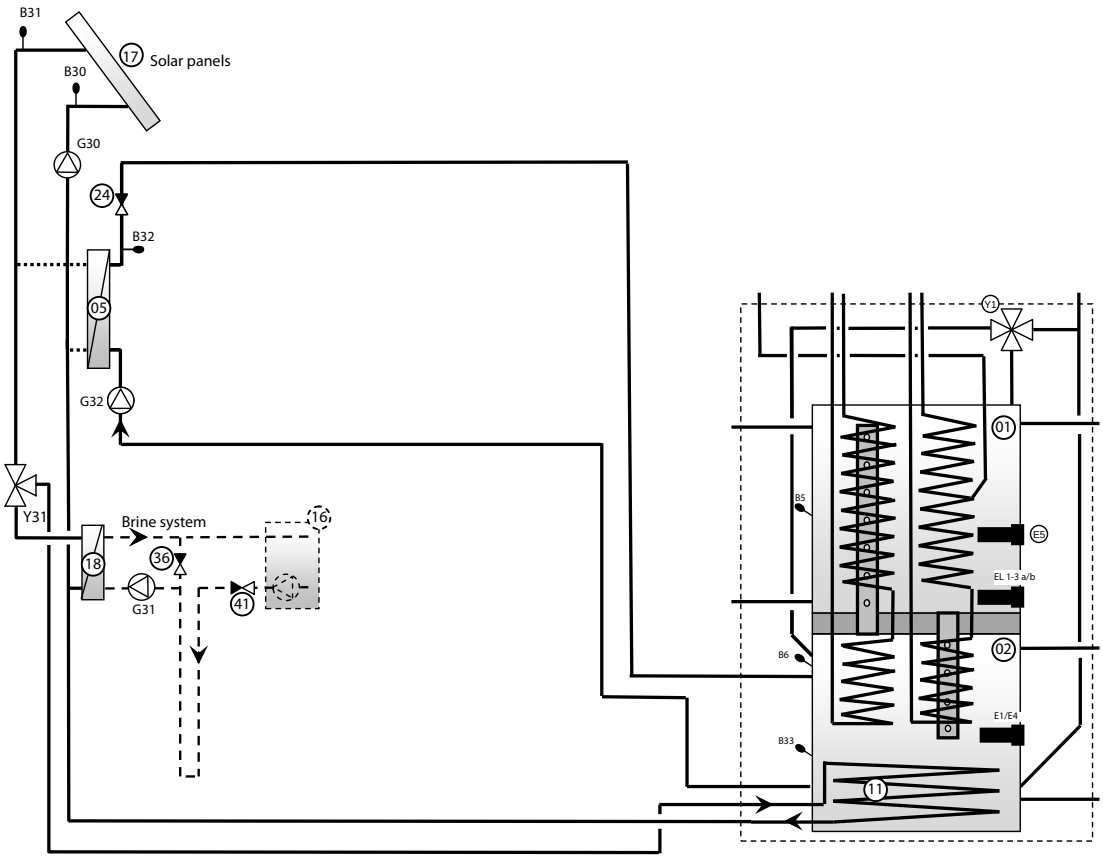
Solar panels (17) can be connected directly to the EcoZenith's inbuilt solar coil (11).

The solar coil is the finned type. The fluid is pumped from the coil by a speed controlled solar pump (G30). In a larger system with several panels of more than about 10m², the panels are connected to an intermediate heat exchanger (05) and the changing solar energy is pumped to the EcoZenith's lower tank by a speed controlled pump (G32). The pumps are powered by a separate source and their speed is controlled by the EcoZenith. See the chapter on Electrical installation for more information.

The diverting valve (Y31, plate heat exchanger (18), charge pump for recharging bore holes (G31) and non-return valves (36) and (41) are used for recharging bore holes/energy wells with solar energy. The EcoZenith also starts the brine pump in the fluid/water heat pump (CTC EcoPart) when recharging is taking place. This means that the charge pump for recharging the bore hole (G31) is then needed to compensate for the pressure drop across the plate heat exchanger (18), thus ensuring, in combination with the brine pump, sufficient flow through the heat collector and exchanger.

Speed controlled pumps (G30), (G31) and (G32), diverting valve (Y31) and plate heat exchanger (05), (18) are CTC accessories.

See also Solar panels Menu in the Detail Description Menus chapter. (Installer/Settings/Solar panels)



13.3.4 CTC EcoZenith i550 Pro - Domestic hot water

Figure 1 Shows how domestic hot water circulation can be connected to the EcoZenith. The domestic hot water is circulated by pump (G40). New domestic hot water from the finned coil is mixed in by the mixing valve (32), and cooled water is released down to the coil for reheating. Only a part of one coil in the upper tank is used for circulation. The non-return valves (22), (23), (33) and (34) are needed to ensure that circulation proceeds as intended. The control valves (28) and (29) make it possible to set the correct flow rate in the circuit.

Figure 2 Shows how an external DHW tank is connected. The manual diverting valve (31) is set to allow domestic hot water to pass via the external DHW tank. The sensor (B43) detects when the temperature drops in the external DHW tank and starts the pump (G41). Cooled domestic hot water is pumped via the non-return valve (35) and control valve (30) down to the part of the coil used for circulation. The water is heated in the coil and is stored in the external DHW tank. When the sensor (B43) reaches its setpoint, the pump stops. The manual diverting valve is used to include or exclude the external tank, as desired, in operation. When drawn off, the domestic hot water passes through the entire coil and then via the external DHW tank. The non-return valves (22), (23) and (35) are needed to ensure that circulation proceeds as intended. The control valve (30) allows the desired flow of the circuit to be adjusted.

See also Upper tank Menu in the Detail Description Menus chapter. (Installer/Settings/Upper Tank)

Note that the safety valves for the tap water system are not entered in the schematic diagrams.

Figure 1 Hot Water Circulation

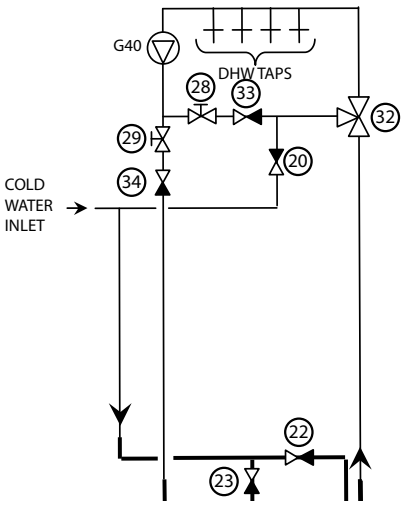
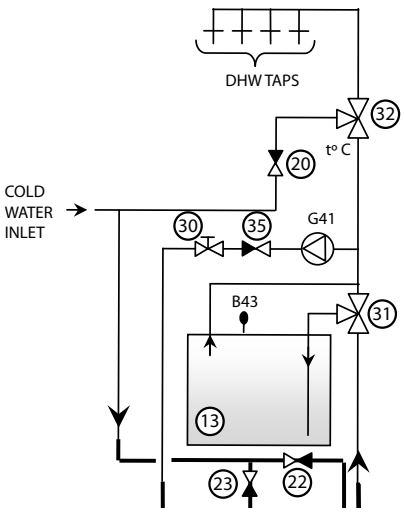


Figure 2 External DHW tank



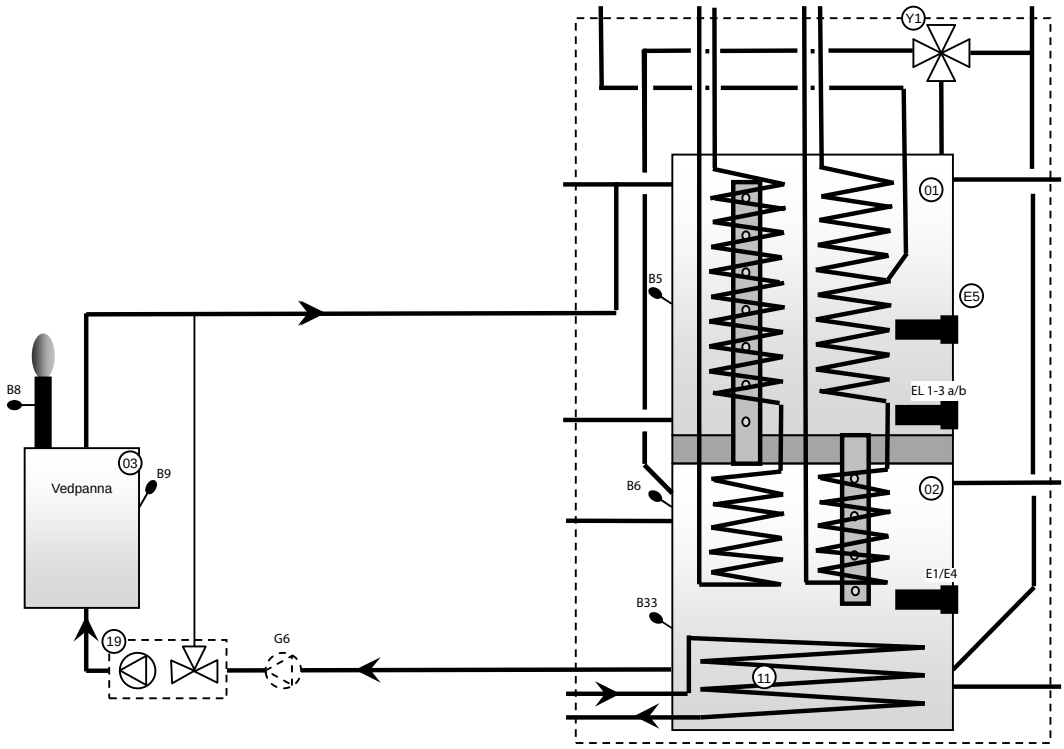
13.3.5 CTC EcoZenith i550 Pro - Wood boiler

The upper and lower connections are used for connecting a wood boiler to the EcoZenith. This means that the flow from the wood boiler passes through the entire EcoZenith. The flue gas sensor (B8) signals to the EcoZenith's control system that the wood is burning. Charging from the wood boiler is controlled from the EcoZenith via a charge pump or by external charge equipment, such as Laddomat 21. The charge pump in Laddomat 21 shall be controlled from the wood boiler.

See also Wood Boiler Menu in the Detail Description Menus chapter. (Installer/Settings/Wood boiler)

13.3.5.1 Pump controlled by flue gas temperature

The pump (G4) is controlled by the flue gas temperature, which is sensed by the flue gas sensor. This pump can be used if, for example, a water-jacketed stove or older combi-boiler with limited water volume is to be connected to the EcoZenith. The pump starts when the flue gas sensor senses the set temperature for wood boiler/stove operation. The pump has no on/off delay, which means that if the water volume around the stove or boiler in question is excessive, the circulation may initially cool down the EcoZenith.



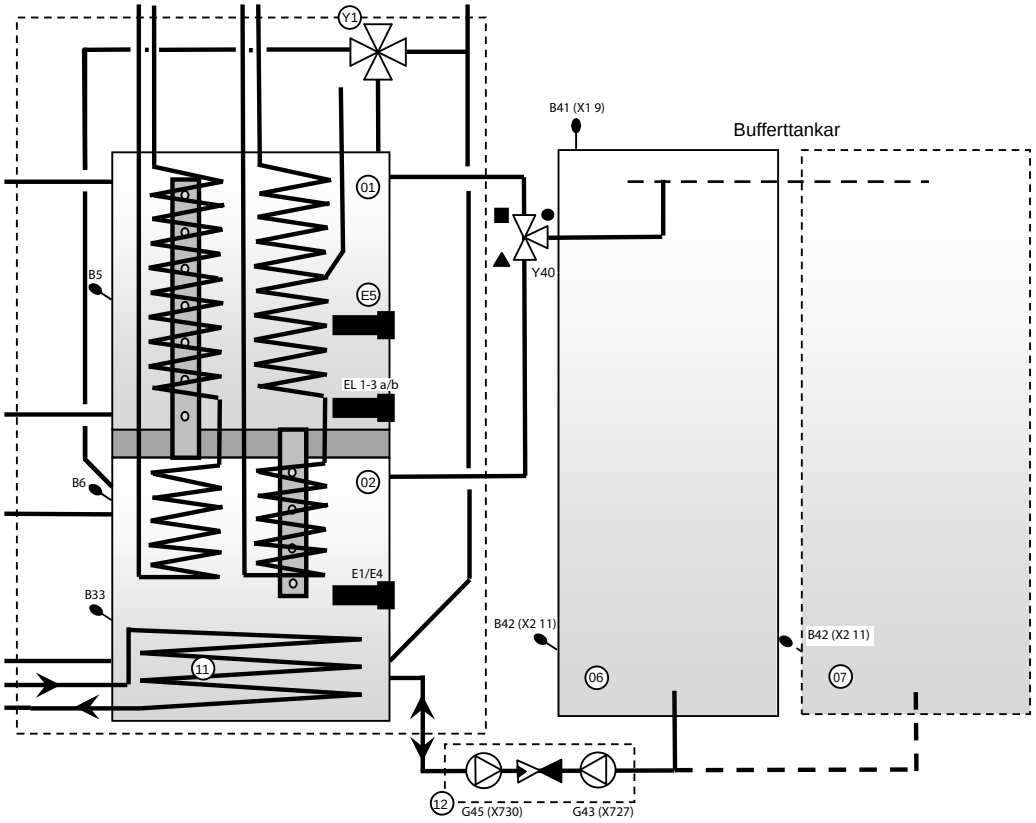
! NB: This type of connection does not prevent condensation forming and the risk of corrosion in the hearth.

13.3.6 CTC EcoZenith i550 Pro - Storage tanks (buffer tanks)

One or more storage tanks can be connected to increase the water volume; this is done most commonly in connection with wood or solar energy operation.

The 3-way valve (Y40) is connected to the upper connection from both the EcoZenith's upper and lower tanks and then to the top of the first storage tank. Ensure that the ports on the diverting valve (Y40) are set as in the schematic diagram. If it is necessary to swap ports (■ and ▲), two jumpers in the actuator must be reconnected. See the chapter on Electrical installation for more information. If several storage tanks are used, they must be connected in series. The return from the storage tanks goes to the lower connection on the EcoZenith's lower tank via the charge equipment (12). The charge equipment and diverting valve are "External tank charging" accessories. The sensors (B41) and (B41) are used to control the charging and discharging of the storage tanks.

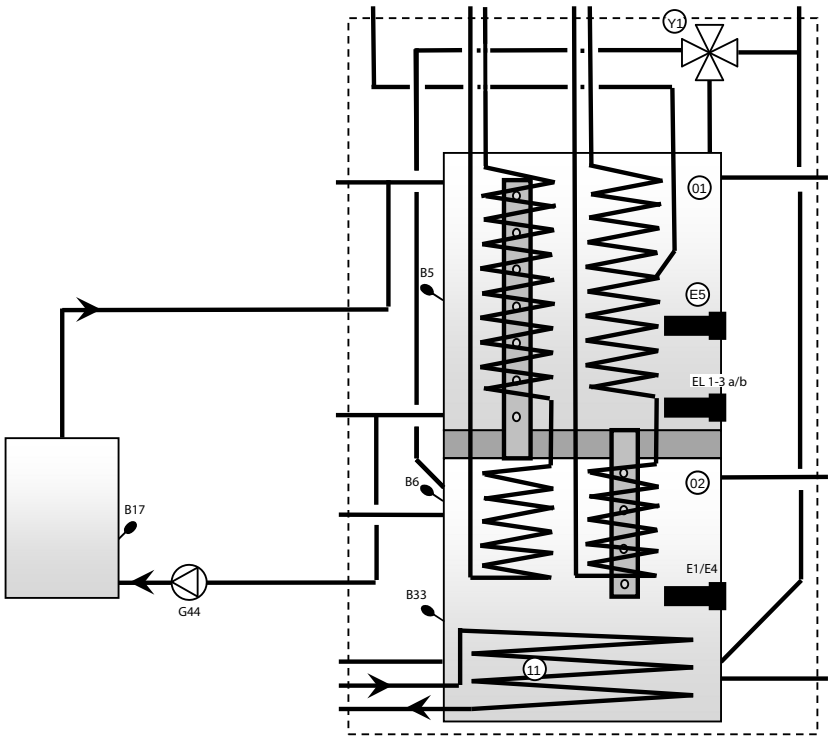
See also External buffer Menu in the Detail Description Menus chapter. (Installer/Settings/External buffer)



13.3.7 CTC EcoZenith i550 Pro - External boiler

An external boiler (oil, pellets, electric or gas) is connected to the EcoZenith's upper tank connections. Circulation is undertaken by the pump (G44), which is controlled by the EcoZenith. The sensor (B17) senses the temperature in the external boiler.

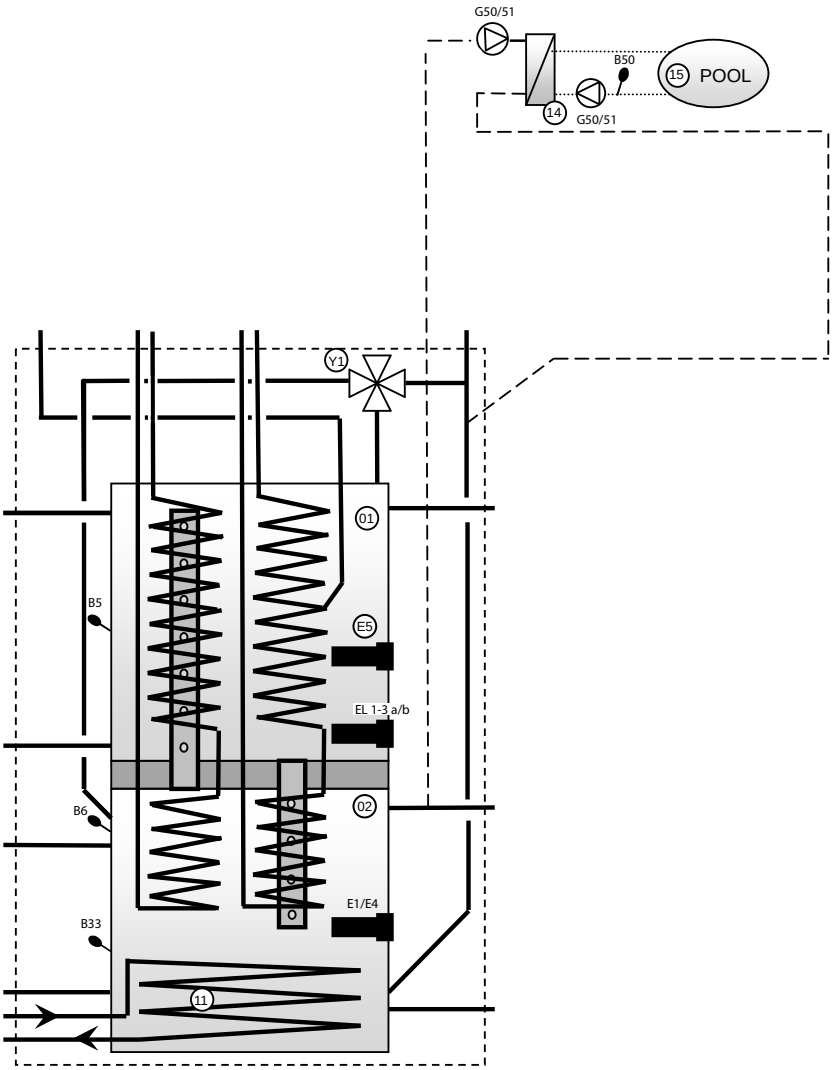
See also External Boiler Menu in the Detail Description Menus chapter (Installer/Settings/Ext boiler).
For electrical connections see the Electrical installation and Installation of external boiler chapters.



13.3.8 CTC EcoZenith i550 Pro - Pool

A pool is connected to the EcoZenith's lower tank. This means that the pool is heated by the same energy source as the radiator system prioritises, for example, heat pump or solar panel. One pump (G50/G51, at the top of the drawing) circulates radiator water from the upper connection on the EcoZenith's lower tank (02) to the pool heat exchanger (14), on to the radiator system's return pipe and back to the EcoZenith's lower tank. One pump (G50/G51, the lower one in the drawing) circulates pool water between the heat exchanger (14) and the pool (15). The sensor (B50) senses the pool temperature and starts the circulation pumps at the setpoint.

See also Pool Menu in the Detail Description Menus chapter. (Installer/Settings/Pool)



13.3.9 EcoZenith - CTC EcoComfort (Cooling)

CTC EcoComfort is an accessory which utilises the cool temperatures of the bore hole to create a cool indoor climate in summer. By connecting EcoComfort to separate fan convectors, its water is cooled using the bedrock's cooler collector water. The heat in the house is supplied to the bore hole in the bedrock.

CTC EcoComfort comes supplied pre-connected from the factory and is easy to connect to the system.

The circulation pump integrated in EcoComfort is of low energy type and is adapted for the new stringent Ecodesign requirements which will apply from 2015.

The cooling function is controlled entirely from your EcoZenith where you can also perform your own settings as to when and how you want cooling to take place.

See also Cooling Menu in the Detail Description Menus chapter. (Installer/Define system/Cooling)

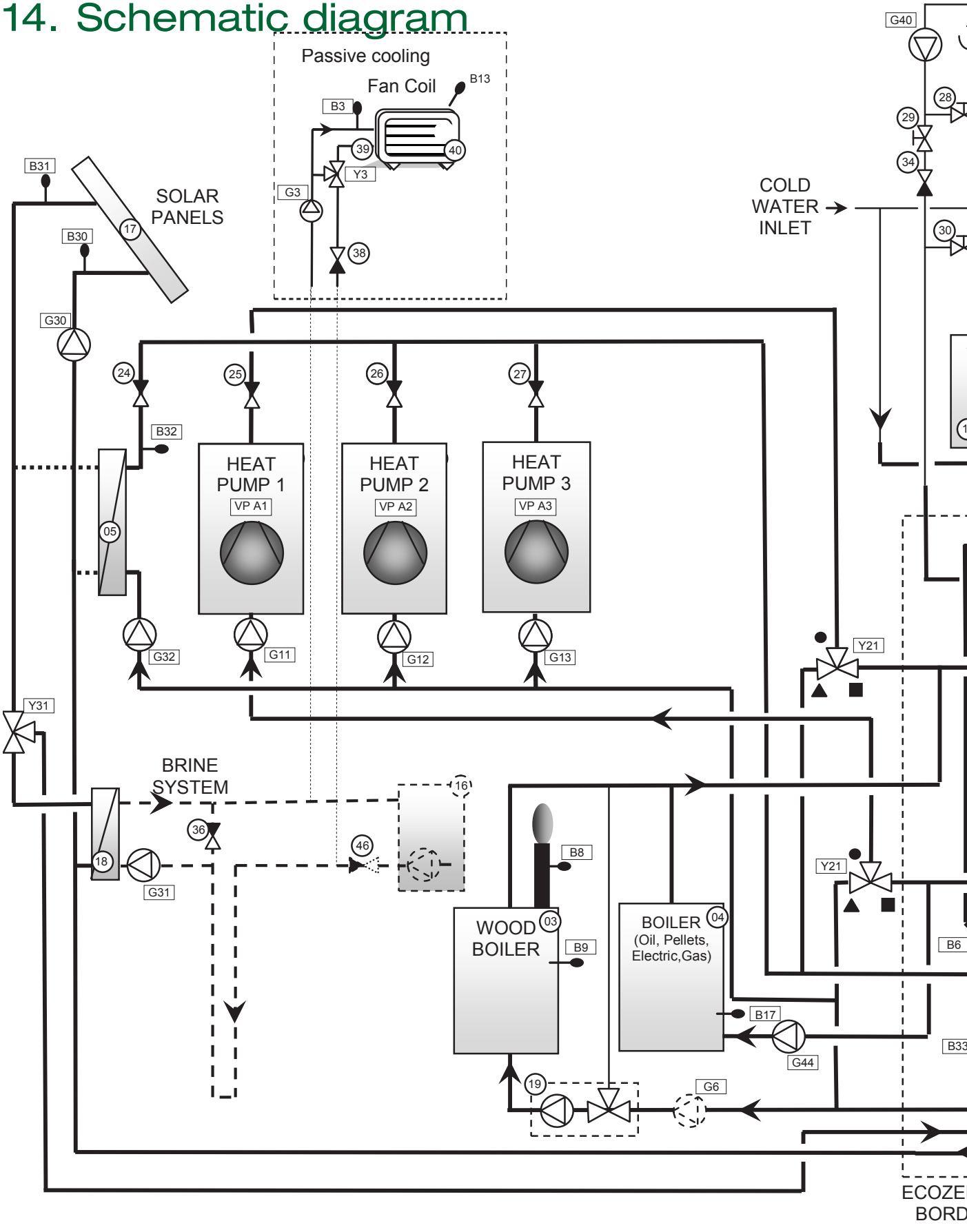
This type of cooling function is energy efficient, as only circulation pumps circulate the cool water. The capacity is however slightly lower compared to what is known as active cooling where the compressor, which requires more energy, is operated to generate cooling.

The system can be connected to separate fan convectors.

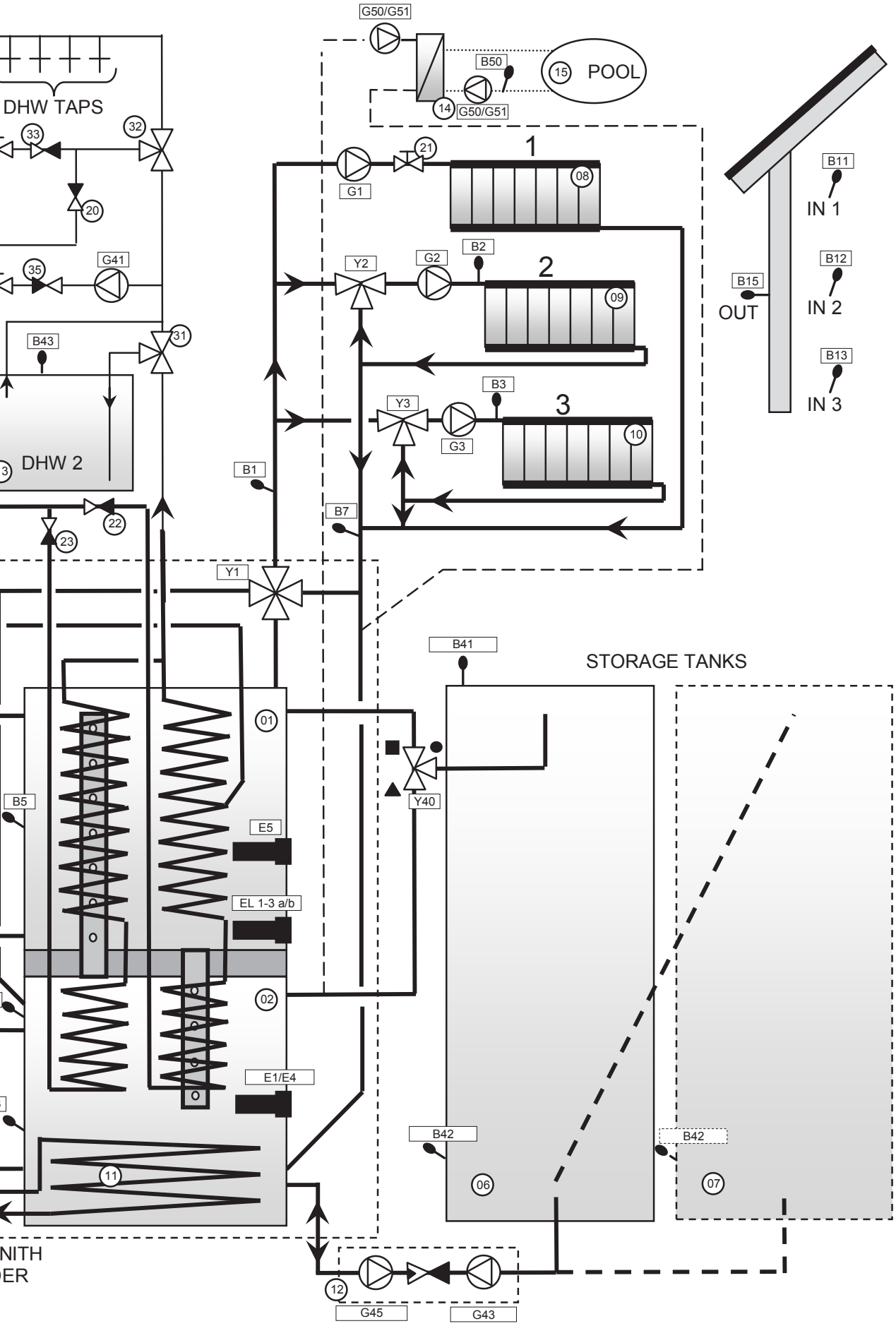
If separate fan convectors are connected, provided the system is insulated against condensation and there is a condensate collector in the fan convectors, much lower temperatures may be permitted.

See CTC EcoComfort manual for more information.

14. Schematic diagram



This is only a schematic diagram. The system in question must be designed in accordance with current standards.


G50/G51
B50
15
POOL
14
G50/G51
DHW TAPS
33
32
21
1
08
G1
20
B11
IN 1
G41
35
Y2
G2
B2
2
B12
B15
OUT
IN 2
09
B43
31
B3
Y3
3
B13
IN 3
G3
10
DHW 2
B1
B7
22
23
Y1
B41
STORAGE TANKS
01
B5
Y40
E5
EL 1-3 a/b
02
E1/E4
B42
B42
11
06
07
12
G45
G43

15. Parts list

01. CTC EcoZenith i550 Pro upper tank	26. Non-return valve, heat pump 2
02. CTC EcoZenith i550 Pro lower tank	27. Non-return valve, heat pump 3
03. Wood Boiler	28. Control valve, DHW system
04. External boiler (pellets, oil, gas, electricity, other)	29. Control valve, DHW system
05. Plate heat exchanger – solar heat	30. Control valve, DHW system
06. Storage tank 1	31. Diverting valve - manual, external DHW tank
07. Storage tank 2	32. Mixing valve, DHW system
08. Radiator system 1	34. Non-return valve, DHW system
09. Radiator system 2	35. Non-return valve, DHW system
10. Radiator system 3	36. Non-return valve, brine system
11. Finned coil – solar heat	37. Heat exchanger passive cooling (CTC EcoComfort)
12. Charge equipment - external storage tank	38. Non-return valve passive cooling
13. External DHW tank	39. Pipe for floor cooling/fan convector
14. Plate heat exchanger - pool	40. Fan convector
15. Pool	41. Non-return valve, low pressure drop (only for passive cooling)
16. Fluid/water heat pump (CTC EcoPart)	HP A1. Heat pump 1
17. Solar collector (flat panel or vacuum tube)	HP A2. Heat pump 2
18. Plate heat exchanger – recharging bore hole	HP A3. Heat pump 3
19. Charge equipment, such as Laddomat 21	E1/E4. Immersion heater - lower tank
20. Non-return valve, DHW system	EL 1-3 a/b. Immersion heater - upper tank 1
21. Electric shut-off valve, radiator system 1	E5. Immersion heater - upper tank 2
22. Non-return valve, DHW system	B1. Sensor, primary flow to radiator system 1
23. Non-return valve, DHW system	B2. Sensor, primary flow to radiator system 2
24. Non-return valve, solar heat	B3. Sensor, primary flow to radiator system 3 Option: Sensor, primary flow CTC EcoComfort (Cooling)
25. Non-return valve, heat pump 1	B5. Sensor, tank upper

B6. Sensor, lower tank	G30. Circulation pump, solar panel
B7. Sensor, radiator return	G31. Circulation pump, recharging bore hole
B8. Sensor, flue gas wood boiler	G32. Circulation pump, plate heat exchanger – solar heat
B9. Sensor, wood boiler	G32. Circulation pump, plate heat exchanger – solar heat
B11. Room sensor 1	G41. Circulation pump, external DHW tank
B12. Room sensor 2	G43. Cirkulation pump, external storage tank charging
B13. Room sensor 3 Option: Room sensor, CTC EcoComfort (passive cooling)	G44. Circulation pump, external boiler
B15. Sensor, outside	G45. Circulation pump, external storage tank discharging
B17. Sensor, external boiler	
B30. Sensor, solar collector return	G50/G51. Circulation pump, pool and pool charging
B31. Sensor, primary flow solar collector	Y1. Mixing valve, radiator system 1
B32. Sensor, solar energy charging	Y2. Mixing valve, radiator system 2
B33. Sensor, solar coil	Y3. Mixing valve, radiator system 3
B41. Sensor, external storage tank upper	Y21. Diverting valve, heat pump - in
B42. Sensor, external storage tank lower	Y22. Diverting valve, heat pump - out
B43. Sensor, external DHW tank	Y31. Diverting valve, recharging bore hole
B50. Sensor, pool	Y40. Diverting, charging/discharging storage
G1. Circulation pump, radiator system 1	
G2. Circulation pump, radiator system 2	
G3. Circulation pump, radiator system 3 Option: Circulation pump, CTC EcoComfort	
G6. Circulation pump, flue gas controlled	
G11. Circulation pump, heat pump A1	
G12. Circulation pump, heat pump A2	
G13. Circulation pump, heat pump A3	
G14. Circulation pump integrated in the accessory CTC EcoComfort (passive cooling)	

16. Electrical installation

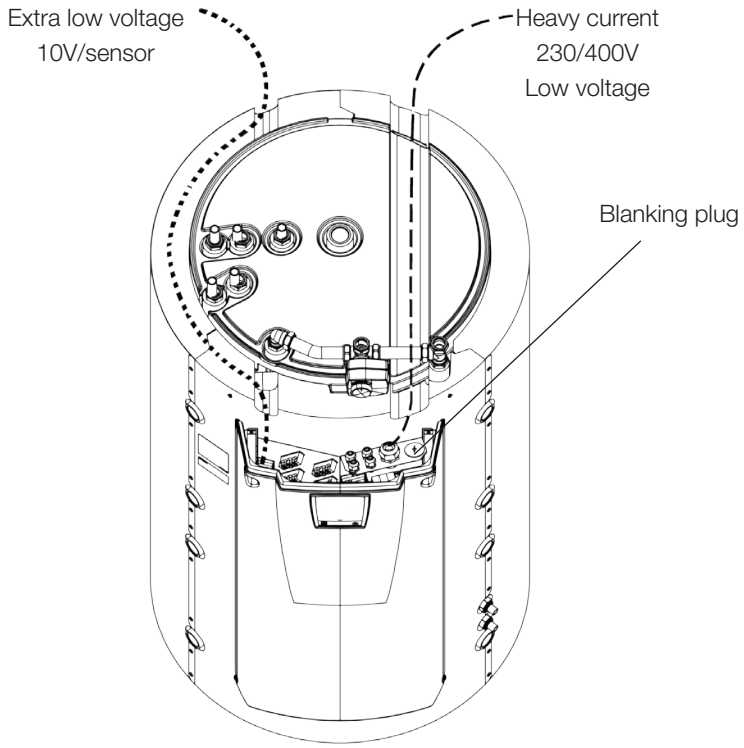
This chapter describes how the various electrical components are connected in line with the designations reproduced in schematic diagrams and wiring diagrams.

Installation and connection in the EcoZenith must be undertaken by an authorised electrician. All wiring must be installed according to applicable regulations. An omnipolar safety switch should be installed. The EcoZenith is factory set to (3 + 6) + (3 + 6) kW power output.
An additional 9 kW electric heater is available as an accessory. Electrical connections are made behind the product's front panel. Undo the screws on the front (4 screws), bend out and put the front to one side (disconnect any network cables on the front printed circuit card for easier access). The terminal blocks and the earth, neutral and phase terminals are located on the circuit card. Connection cables are inserted in the cable ducts on the unit's top cover, which exit at the same height as the bottom of the electrical connections box.

It is important to keep heavy current and extra low voltage cables apart in order to avoid interference problems; this applies outside the product also.

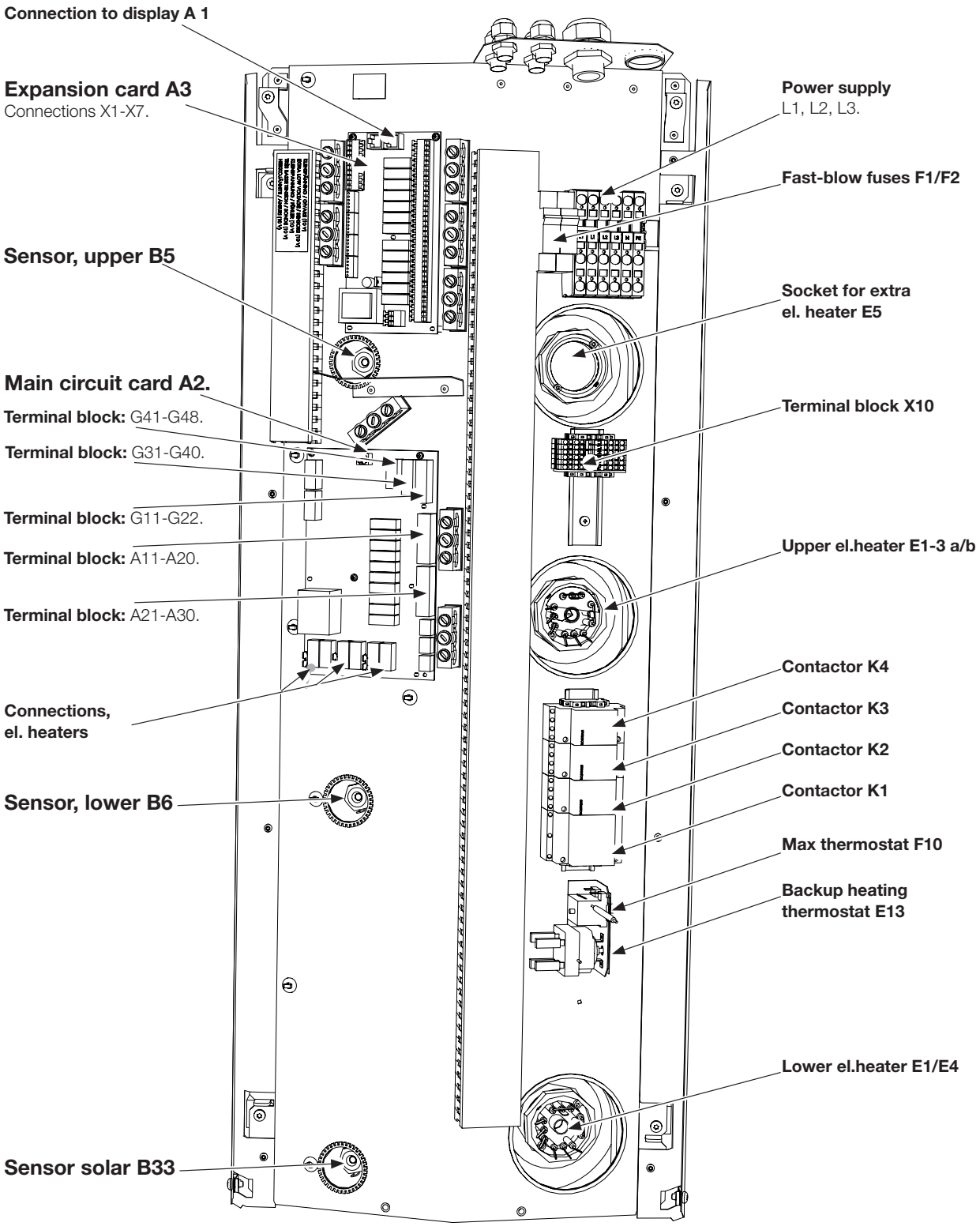
- Heavy current power cables must be routed in the cable duct in the insulation on the top of the unit and on the right side of the unit in the space between the side insulation and the top insulation (marked with broken lines).
- Extra low voltage cables are to be routed on the left side of the unit in the space between the side insulation and the top insulation (marked by a dotted line).

For higher currents and thicker cables, replace the blanking plug (see drawing) with an appropriate cable gland with strain relief.



! It is important to keep heavy current and extra low voltage cables apart in order to avoid interference problems; this applies outside the product also.

16.1 Positioning of electrical components

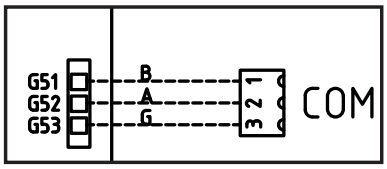


16.2 Heat pump power supply

NB: The heat pump is powered separately.
Not from the CTC EcoZenith i550 Pro.

16.3 Communication between the EcoZenith and CTC EcoAir/ CTC EcoPart

The communication cable used is an LiYCY (TP) which is 4-conductor shielded cable, where the communication-bearing conductors are of twisted pair type. This should be installed between the terminal blocks in the EcoZenith: G51 (Brown), G52 (White), G53 (Green) and heat pump A1, from which the other heat pumps can be connected in series.



Detailed illustration from wiring diagram

16.4 Low voltage 230V /400V (Heavy current)

Supply

400 V 3N ~ 50 Hz and protective earth
The size of the group fuse is given in the Technical data chapter in the section for the property owner.
Connected to the blocks marked L1, L2, L3, N, PE

Max thermostat

If the heat pump has been stored in an extremely cold place, the max thermostat may have been triggered. It is reset by pressing in the button on the thermostat behind the front panel.
Always check on installation that the max thermostat has not tripped.

Alarm 1-pole alternating relay (Output for alarm to an external unit)
230 V 1N ~
Connected to the circuit card:
ALARM
NC
NO

(G1) Circulation pump, radiator system 1

230V 1N ~

Connected on the circuit card/ block:

Phase:	pole A31
Zero:	pole A33
Earth:	pole PE

Check that the pump is correctly connected by test running it in menu *Installer/Service/Function test* in the control system.

(G2) Circulation pump, radiator system 2

230V 1N ~

Connected on the circuit card/ block:

Phase:	pole A36
Zero:	pole A34
Earth:	pole PE

Check that the pump is correctly connected by test running it in menu *Installer/Service/Function test* in the control system.

(G3) Circulation pump, radiator system 3 / Alternatively circulation pump for CTC EcoComfort (Cooling), accessory

230V 1N ~

Connected to the expansion card X6/terminal block:

Phase:	X6 pole 15
Zero:	X6 pole 17
Earth:	X6 pole 16

Check that the pump is correctly connected by test running it in menu *Installer/Service/Function test* in the control system.

(G6) Circulation pump, flue gas controlled

230V 1N ~

Connected to the expansion card X7/terminal block:

Phase:	X7 pole 21
Zero:	X7 pole 23
Earth:	X7 pole 22

Check that the pump is correctly connected by test running it in menu *Installer/Service/Function test* in the control system.

(G11, G12, G13) Charge pumps, VPA1, VPA2 and VP A3

230 V 1N~

The charge pumps can be controlled by the EcoZenith.

NOTE: The colours of the cables when connecting the charge pumps to the terminal block vary depending on the pump model.

The charge pumps can be connected to the circuit card/terminal block:

(G11) Charge pump 1

WILO Stratos TEC

Relay output 8 A		A12
PWM+:	blue	G46
GND:	brown	G45

GRUNDFOS UPM GEO 25-85

Relay output 8 A		A12
PWM+:	brown	G46
GND:	blue	G45

(G12) Charge pump 2

WILO Stratos TEC

PWM+:	blue	G48
GND:	brown	G47

GRUNDFOS UPM GEO 25-85

PWM+:	brown	G48
GND:	blue	G47

(G13) Charge pump 3

WILO Stratos TEC

PWM+:	blue	G75
GND:	brown	G76

GRUNDFOS UPM GEO 25-85

PWM+:	brown	G75
GND:	blue	G76

Check that the pump is correctly connected by test running it in menu *"Installer/Service/Function test"* in the control system.

(G30, G32) Solar pumps

The solar PWM pumps (G30 and G32) of model WILO Stratos PARA differ from the other PWM pumps. If the PWM control signal is interrupted, the solar pumps stop, whereas the other PWM pumps work at 100% power if the signal is interrupted.

(G30) Circulation pump, solar collector

230 V 1N~
The circulation pump is connected to the following terminal blocks:
(G30) Circulation pump, expansion card X5:
Note the cable colours!

PWM+:	white	X5 pole 1
GND:	brown	X5 pole 2

Check the function by test running the pump in menu *"Installer/Service/ Function test"* in the control system.

(G32) Circulation pump, plate heat exchanger – solar energy

230 V 1N~
The heat exchanger pump is connected to the following terminal blocks:
(G32) Pump, expansion card X5:
Note the cable colours!

PWM+:	white	X5 pole 3
GND:	brown	X5 pole 4

Check the function by test running the pump in menu *"Installer/Service/ Function test"* in the control system.

Solar recharging borehole, charge pump (G31) and diverting valve solar (Y31/)

230V 1N~

NB: It is important to connect the phase voltage to L (pole 9); refer to the wiring diagram.

The diverting valve is connected to the following terminal blocks:

(Y31) Diverting valve, expansion card X6:

Relay output 8 A:	Open to bore hole	X6 pole 8	also controls Charge pump – recharging bore hole (G31)
Phase:	Open Tank	X6 pole 9	
Zero:		X6 pole 11	

Pole 8 is connected to an external connection box which distributes voltage to the solar diverting valve (Y31) and the Recharge Bore Hole charge pump (G31). Refer to the wiring diagram.

Check the function by test running the pump in menu *"Installer/Service/ Function test"* in the control system.

(G40) Circulation pump for DHW

230 V 1N~

The circulation pump is connected to the following terminal blocks: (G40) Circulation pump, expansion card X6:

Phase:	X6 pole 1
Zero:	X6 pole 3
Earth:	X6 pole 2

Check that the pump is correctly connected by test running it in menu *"Installer/Service/Function test"* in the control system.

(G41) Circulation pump external DHW tank

230 V 1N~

The pump is connected to the following terminal blocks:

(G41) Charge pump, expansion card (X7):

Phase:	X7 pole 19
Zero:	X7 pole 20
Earth:	X7 pole 21

Check that the pump is correctly connected by test running it in menu *"Installer/Service/Function test"* in the control system.

(G43) Circulation pump, external storage tank charging

230 V 1N~

The circulation pump is connected to the following terminal blocks: (G43) circulation pump, expansion card X7:

Phase:	X7 pole 27
Zero:	X7 pole 29
Earth:	X7 pole 28

Check that the pump is correctly connected by test running it in menu *"Installer/Service/Function test"* in the control system.

(G45) Circulation pump, external storage tank discharging

230 V 1N~

The circulation pump is connected to the following terminal blocks: (G43) circulation pump, expansion card X7:

Phase:	X7 pole 30
Zero:	X7 pole 32
Earth:	X7 pole 31

Check that the pump is correctly connected by test running it in menu *"Installer/Service/Function test"* in the control system.

(G44) Circulation pump, external boiler

230 V 1N~

The circulation pump is connected to the following terminal blocks: (G44) Circulation pump, expansion card X7:

Phase:	X7 pole 25
Zero:	X7 pole 26
Relay output	X7 pole 24

Check that the pump is correctly connected by test running it in menu *"Installer/Service/Function test"* in the control system.

(G50) and (G51) Circulation pumps, pool

230 V 1N~

Both pumps (G50) & (G51) are connected to the following terminal blocks:

Pumps pool (G50) and (G51), expansion card X7:

Phase:	pole 33
Zero:	pole 35
Earth:	pole 34

Pole 33 is connected to an external connection box which distributes voltage to the charge pump (G50) and circulation pump (G51).

Check the function by test running the pump in menu *"Installer/Service/Function test"* in the control system.

(Y1) Mixing valve, bivalent, radiator system 1

230V 1N ~.

1.5 m cable 1.5 mm², neutral, open, close.

Connected on the circuit card/block:

Black cable	Open:	pole A27
Brown cable	Close:	pole A28
Blue cable	Zero:	pole A29
Red cable	Limit position:	pole A22
White cable	Limit position:	pole A21

Check that the open and close signals are correctly connected by testing the motor in menu *"Installer/Service/Function test"* in the control system.

(Y2, Y3) Mixing valves, radiator systems 2-3. (Y3) Optional mixing valve for CTC EcoComfort (cooling).

230V 1N~

1.5 m cable 1.5 mm², neutral, open, close.

The mixing valve motors are connected to the PCB/terminal block.

(Y2) Mixing valve 2

Open:	pole A15
Close:	pole A16
Zero:	pole A17

(Y3) Mixing valve 3 / Optional Mixing valve 2 in CTC EcoComfort.

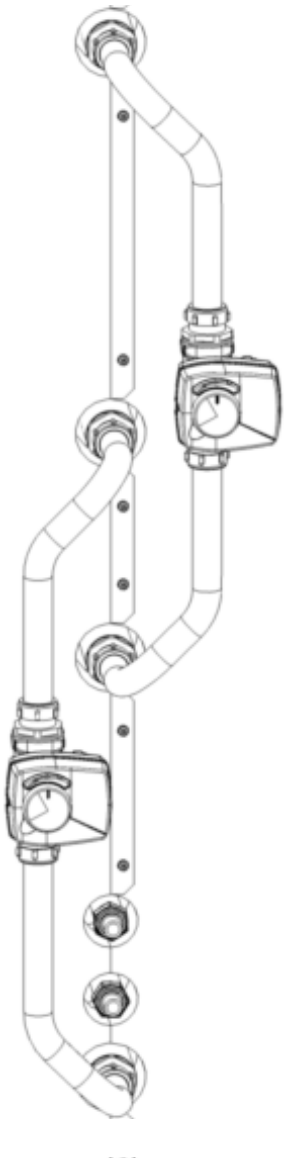
Expansion card X6

Open:	X6 pole 12
Close:	X6 pole 13
Zero:	X6 pole 14

Check that the open and close signals are correctly connected by testing the motor in menu *"Installer/Service/Function test"* in the control system.

(Y21) Diverting valves, DHW

230 V 1N~.
2.5 m cable 1.5 mm²
When relay output A18 is supplied with power, flow should be to the upper tank for hot water charging. When it is not supplied with power, flow should be to the lower tank



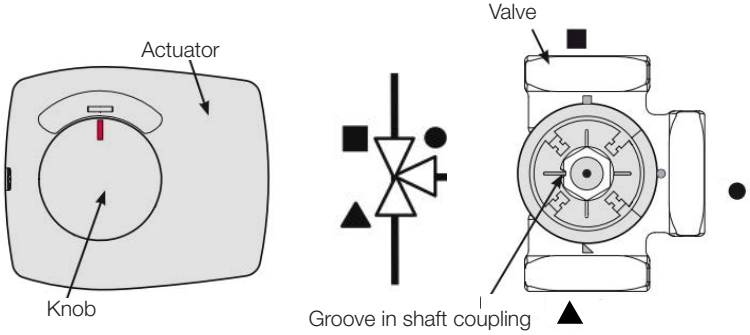
The diverting valves are connected to the following terminal blocks:
(Y21) Diverting valves, DHW

Relay output	pole A18
Phase	pole A19
Zero:	pole A20

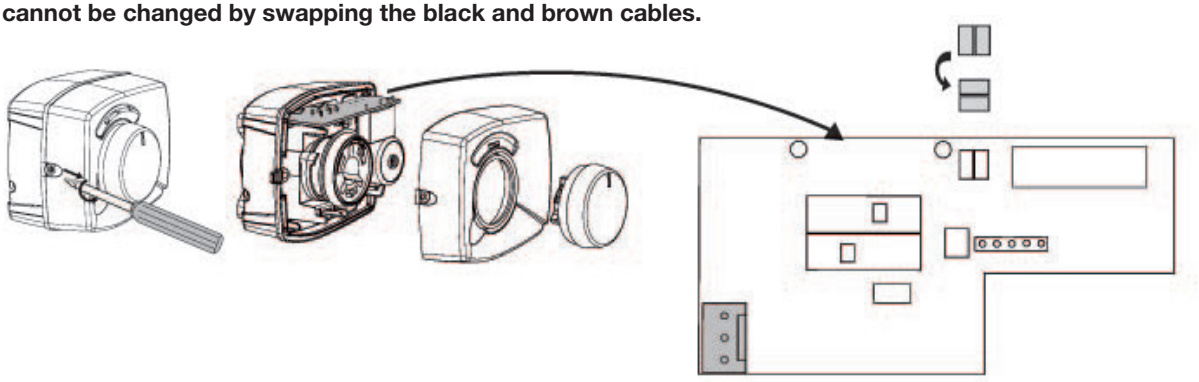
Check the function by test running the diverting valve in menu *"Installer/ Service/Function test"* in the control system.

In the "DOWN" position on the function menu, port ▲ should be open (turn the knob on the motor clockwise, CW). In the "UP" position, port ■ should be open (turn the knob on the motor counterclockwise, CCW).
The motor is fitted to the diverting valve by a screw. To unfasten the motor: remove the knob by pulling it off, unfasten the screw and remove the motor. To prevent faults, turn the actuator and diverting valve to the starting position for fitting as shown in the figures. Pull out the knob on the actuator and turn to the central position.

Port ● should be completely open; ports ■ and ▲ should be partially open. Ensure that the groove in the white shaft coupling is in position as shown in the figure. The diverting valve and actuator can then be fitted together as shown in the figure, or turned in 90-degree steps relative to each other.



If ports ▲ and ■ have been shifted during the hydraulics connection, the motor can be reconnected to change its direction of rotation. This is done using two jumpers inside the motor. **NOTE: the direction of rotation cannot be changed by swapping the black and brown cables.**



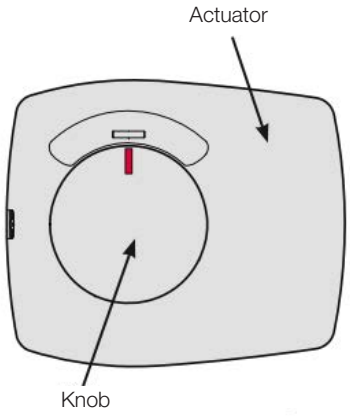
(Y40) Diverting valve external storage tank

230 V 1N~.
2.5 m cable 1.5 mm²
The diverting valve is connected to the following terminal blocks: (Y40) diverting valve, expansion card X6:

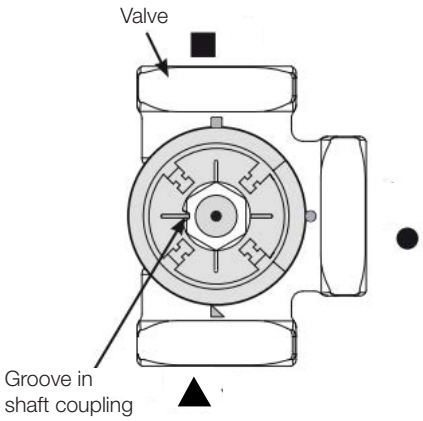
(Y40) Diverting valve, charging/discharging buffer storage

Relay output	X6 pole 4
Phase	X6 pole 5
Zero:	X6 pole 7

Check the function by test running the diverting valve in menu *"Installer/ Service/Function test"* in the control system.



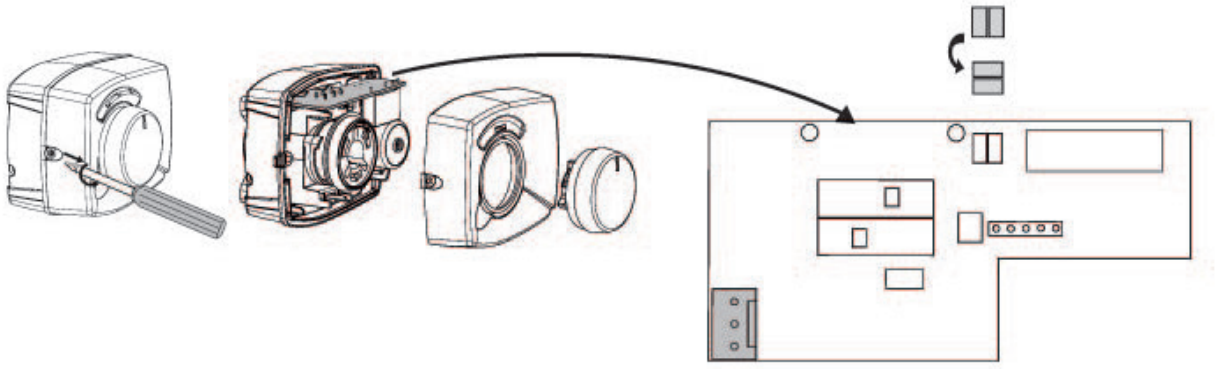
In the "DOWN" position on the function menu, port ▲ should be open (turn the knob on the motor clockwise, CW). In the "UP" position, port ■ should be open (turn the knob on the motor counterclockwise, CCW).
The motor is fitted to the diverting valve by a screw. To unfasten the motor: remove the knob by pulling it off, unfasten the screw and remove the motor. To prevent faults, turn the actuator and diverting valve to the starting position for fitting as shown in the figures. Pull out the knob on the actuator and turn to the central position.



Port ● should be completely open; ports ■ and ▲ should be partially open. Ensure that the groove in the white shaft coupling is in position as shown in the figure. The diverting valve and actuator can then be fitted together as shown in the figure, or turned in 90-degree steps relative to each other.

If ports ▲ and ■ have been shifted during the hydraulics connection, the motor can be reconnected to change its direction of rotation. This is done using two jumpers inside the motor.

NOTE: the direction of rotation is not changed by shifting the black and brown cables.



16.5 Sensor (Safety Extra-Low Voltage (SELV))

The sensors that form part of each system solution should be fitted to the circuit card/terminal block as follows: All sensors are temperature sensors.

Room sensors (B11, B12, B13)
(B13) Optional room sensor for CTC EcoComfort (Cooling).

Room sensors should be installed at head height in open areas of the property with good air flow and where a representative temperature can be expected (not close to sources of heat or cold). If you are unsure of where to place a sensor, hang it by a loose cable and test different positions.

Connection: 3-conductor cable, min. 0.5 mm², between sensor and control box. The cables are connected as shown in the table above.

On start-up, an alarm is given if the sensor is incorrectly connected. Test the alarm sensor LED by testing the function in menu *Installer/Service/Function test*.

In the control system you can select whether or not to have the room sensor operational. If the room sensor is deselected, the heating level is controlled by the outdoor sensor/primary flow sensor. The alarm lamp on the room sensor still functions as normal. A room sensor does not, however, need to be installed if the function is deselected.

Room sensor cable connection:

(B11) Room sensor 1

block no.	G17	alarm output
block no.	G18	GND
block no.	G19	input

(B12) Room sensor 2
Optional room sensor for CTC EcoComfort (cooling), accessory.

block no.	G20	alarm output
block no.	G21	GND
block no.	G22	input

(B13) Room sensor 3, expansion card X4

block no.	19	alarm output
block no.	20	input
block no.	21	GND

Outdoor sensor (B15)

The outdoor sensor should be fitted to the outer wall of the house, preferably in a north-northeastern or north-northwestern direction. The sensor should be placed out of direct sunlight. However, where this is difficult to achieve it can also be shielded from the sun by a screen. Remember that the sun rises and sets at different points at different times of the year.

The sensor should be placed about three-quarters of the way up the wall so that it senses the correct outdoor temperature and so that it is not affected by a heat source such as a window, infra-heating, air ventilation outlet, etc.

Connection: 2-conductor cable (min. 0.5 mm^2) between the sensor and control box.
The sensor is connected to terminal blocks G11 and G12 of the control module. Connect to the outdoor sensor at the arrows.

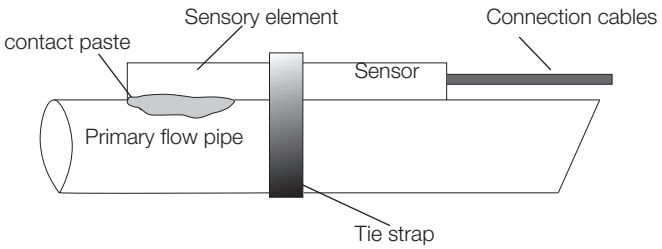
NB: Strip the wire ends and fold them double if light cable is used.
It is important that the contact in the connections is good.

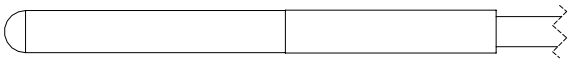
16.5.1 Sensor connection

Mount the sensor on the pipe. The sensing part is towards the end of the sensor.

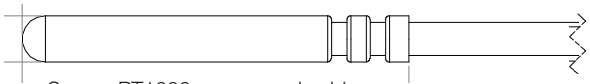
- Attach the sensor using the tie strap provided.
- Ensure that the sensor makes good contact with the pipe.
- **NOTE:** Apply contact paste to the end part of the sensor between the sensor and the pipe to ensure good contact.
- **NOTE:** Insulate the sensor using pipe insulation, for example. This prevents the measurement from being affected by the ambient temperature.
- Connect the cables to the CTC EcoLogic's connection block. If the cable is too short, join extra length to it.

! Insulate the sensor using pipe insulation, for example. Do not attach the sensor cable permanently until you have tested where the best location is.





Sensor NTC 22k, white cable



Sensor PT1000, grey or red cable

Primary flow sensor (B1, B2, B3). (B3) Optional primary flow sensor for CTC EcoComfort (cooling).

The sensors sense the outgoing temperature to the radiators. Each sensor is equipped with a 2 metre connecting cable. If the cable is too short, extra length can be joined to it.
Secure the primary flow sensor to the pipe using straps or similar. Most important is the position of the tip of the sensor as this is the part that detects the temperature. The sensor must be insulated to prevent the ambient temperature from affecting the measurement. For optimum function, use contact paste.

(B1) Sensor, primary flow to radiator system 1
Position: on the primary flow to heating system 1.
The sensor is connected to the PCB in positions G13 and G14.
Sensor type: NTC 22k

(B2) Sensor, primary flow to radiator system 2. Optional primary flow sensor for CTC EcoComfort (cooling), accessory.

Position: on the primary flow to heating system 2 after radiator pump G2.
For cooling, on the primary flow
The sensor is connected to the circuit card in positions G15 and G16.
Sensor type: NTC 22k

(B3) Sensor, primary flow to radiator system 3

Position: on the primary flow to heating system 3 after radiator pump G3.
The sensor is connected to expansion card X3 in positions 13 and 14.
Sensor type: NTC 22k

Other sensors

(B5) Sensor, upper tank(factory fitted)

Placement: in the tank's uppermost sensor pipe.
The sensor is connected to the circuit card in positions G63 and G64
Sensor type: NTC 22k

(B6) Sensor, lower tank(factory fitted)

Placement: in the tank's middle sensor pipe.
The sensor is connected to the circuit card in positions G65 and G66
Sensor type: NTC 22k

(B7) Return sensor heating system

Position: on the return pipe from the heating system.
The sensor is connected to the PCB in positions G31 and G32.
Sensor type: NTC 22k

(B8) Flue gas sensor

Position: in a sensor pipe or on the flue gas jacket surface on the wood boiler.
The sensor is connected to the PCB in positions G35 and G36.
Sensor type: NTC 3.3k

(B9) Sensor, wood boiler

Position: in a sensor pipe or jacket surface on the wood boiler.
The sensor is connected to the PCB in positions G61 and G62.
Sensor type: NTC 22k

(B17) Sensor, external boiler

Position: in a sensor pipe or jacket surface on the boiler.
The sensor is connected to the PCB in positions G71 and G72.

(B30) Sensor in to solar panels

Position: on the return pipe into the solar panels.

The sensor is connected to expansion card X1 in positions 3 and 4.

Sensor type: PT1000

(B31) Sensor, primary flow solar collector

Position: on the pipe out from the solar collectors, in a sensor pipe or very close to the solar panel. The sensor is connected to expansion card X1 in positions 1 and 2.

Sensor type: PT1000, red cable (>150°C)

(B33) Sensor, solar coil (factory fitted)

Placement: in the tank's lowest sensor pipe.

The sensor is connected to the circuit card in positions G67 and G68

Sensor type: NTC 22k

(B41) Sensor, external storage tank upper

Position: in the sensor pipe or jacket surface on the upper part of the tank

The sensor is connected to the circuit card in positions X3 9 and X3 10

Sensor type: NTC 22k

(B42) Sensor, external storage tank lower

Position: in the sensor pipe or jacket surface on the lower part of the tank

The sensor is connected to the circuit card in positions X3 11 and X3 12

Sensor type: NTC 22k

(B43) Sensor, external DHW tank

Position: in the sensor pipe or jacket surface on the external DHW tank.

The sensor is connected to the circuit card in positions X3 7 and X3 8

Sensor type: NTC 22k

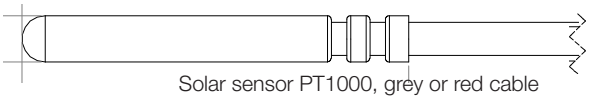
(B50) Sensor, pool

Position: on the return pipe between the pool pump and pool.

The sensor is connected to expansion card X3 in positions 15 and 16.

Sensor type: NTC 22k

Sensor NTC 22k, white cable



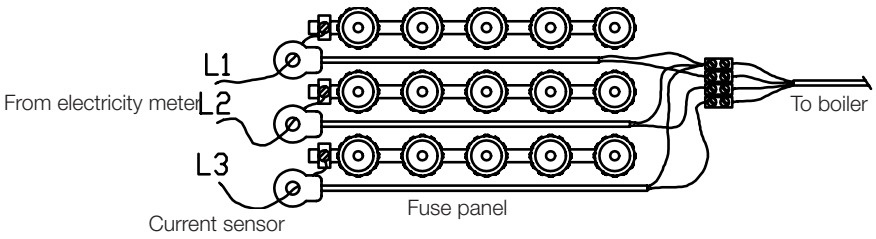
Solar sensor PT1000, grey or red cable

16.6 Night reduction/ripple control

In the menu *Installer/Settings/Remote control,* select “NR” for night reduction, “SO” for ripple control, “DHW” for additional hot water depending on the desired function. When “SO” is selected, both the compressor and additional heating are blocked; when “NR” is selected, primary flow temperature/room temperature is reduced in line with the set value. Select “DHW” to generate extra domestic hot water for the period set in “Add DHW/time”. The function is activated when the poles on the PCB, positions G33 and G34, are short-circuited.

16.7 Current sensor connection

The three current sensors, one for each phase, are fitted on the fuse panel in the following manner.
Each phase from the electricity distribution board supplying the EcoHeat is channelled through a current sensor before termination at the relevant terminal. Then connect to the boiler based on the terminal board diagram. This allows the phase current to be sensed all the time and compared with the value set for the heat pump’s load switch. If the current is higher, the control unit drops to a lower heat output. If it is still too high, further reduction in output takes place. When the current has dropped below the set value again, the output will increase.
This means that the current sensors, along with the electronics, prevent more power being supplied than the main fuses can tolerate. The current sensors’ holes for cables are 11 mm in diameter.



16.8 Settings made by the installation electrician

The following settings shall be made by the installation electrician after installation:

- Select main fuse size
- Select effect limitation
- Check room sensor connection
- Check that the sensors connected indicate reasonable values.
- Carry out the following checks:

Check room sensor connection

1. Scroll down and select the option*LED room sensor* in menu *"Installer/ Service/Function test/Heating circuit"*.
2. Select "On". Check that the room sensor LED lights up. If not, check the cables and connection.
3. Select "Off". If the LED goes off, the check is complete.

Check connected sensors

If any sensor is incorrectly connected, a message will appear on the display, e.g. "Alarm sensor out". If several sensors are incorrectly connected, the different alarms are displayed on different rows. If no alarm is displayed, the sensors are connected correctly. Note the the alarm function of the room sensor (LED) cannot be detected on the display. It must be checked on the room sensor. The current sensor connection has no alarm, but the current value can be read in the "Operation data" menu.

17. Installation of optional immersion heater

The CTC EcoZenith i550 Pro has two 9 kW immersion heaters, both factory installed. A third 9 kW immersion heater can also be installed thus giving total installed heating power of 27 kW. The third immersion heater is a CTC accessory and is connected as follows:

1. Disconnect the electrical supply to the EcoZenith.
2. Drain the EcoZenith of water if required.
3. Remove the four screws holding the plastic front, two at the top and two at the bottom, and then remove the plastic front. Ensure that the display cable is disconnected before removing the front completely. The cable is disconnected by pressing in the pin on the connector and pulling the cable downwards.
4. Remove the 2” plug from where the upper immersion heater (15) shall be installed.
5. Install the immersion heater using a new, greased flat gasket. Recommended tightening torque - 220 Nm.
6. The cabling for the heater is coiled and strapped. Remove the strapping and connect the white cables marked 6 kW to the brown end cable sleeve on the heater, and connect the black cables marked 3 kW to the black end cable sleeve on the heater.
7. Fill the EcoZenith with water and ensure that there are no leaks.
8. Fit the front.
9. Switch on the electricity supply.
10. Define the immersion heater in the menu
    Installer/Define system/Def El. heaters/upper el.heater 15
11. Test the immersion heater connections in the menu
    Installer/Service/Function test/Test el.heaters
12. Set immersion heater operation in the menu
    Installer/Settings/Electric heaters
13. The upper immersion heater (15) is now ready for use.

18. Installation of additional boiler

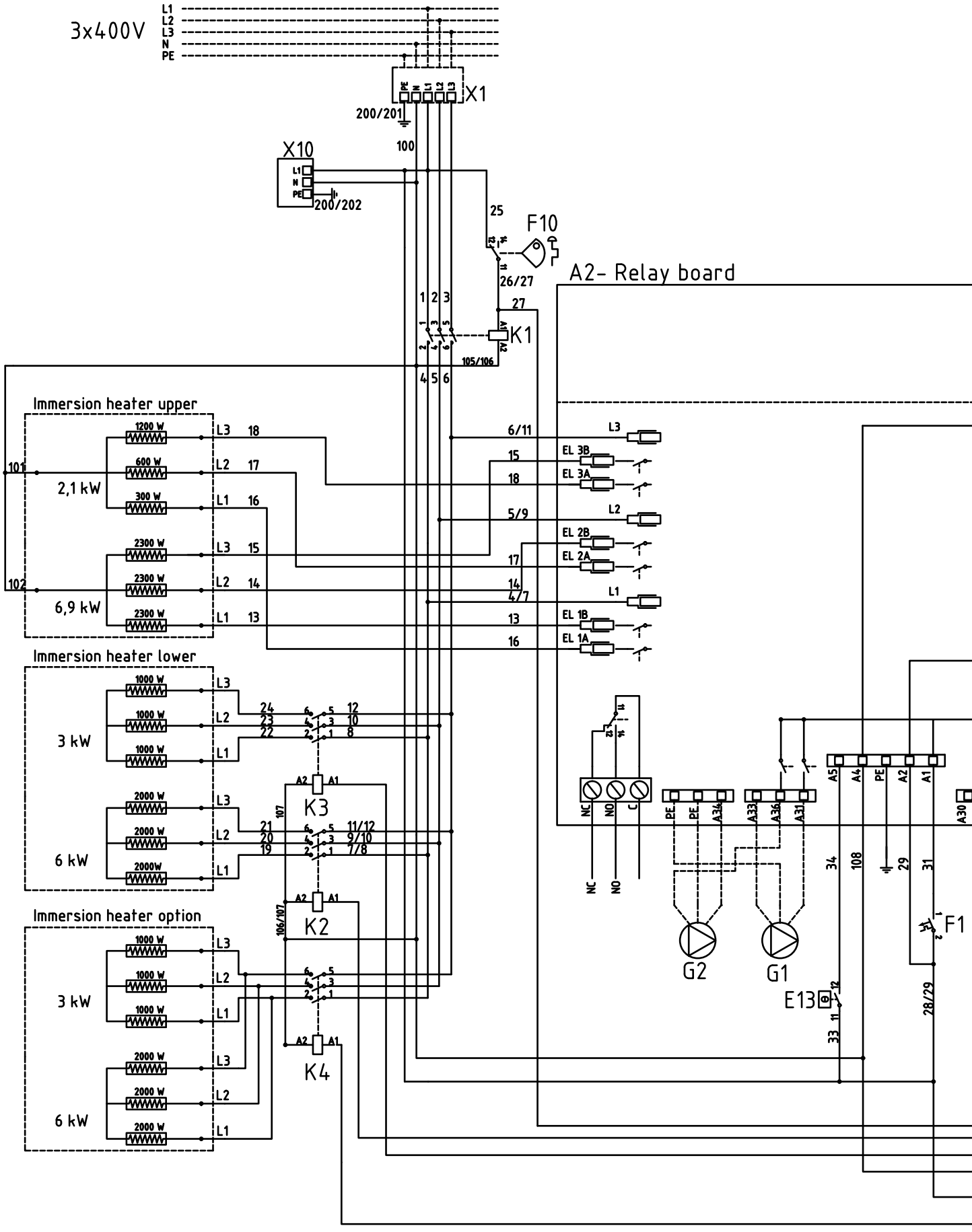
The CTC EcoZenith i550 Pro is able to control either a third immersion heater or an external additional boiler. Under no circumstance may these be connected at the same time. To connect an additional boiler, the electrical reconnection must be undertaken in the EcoZenith's wiring. Please note that all electrical reconnection and installation in the EcoZenith must be performed by an authorised electrician. All wiring must be installed according to applicable regulations.

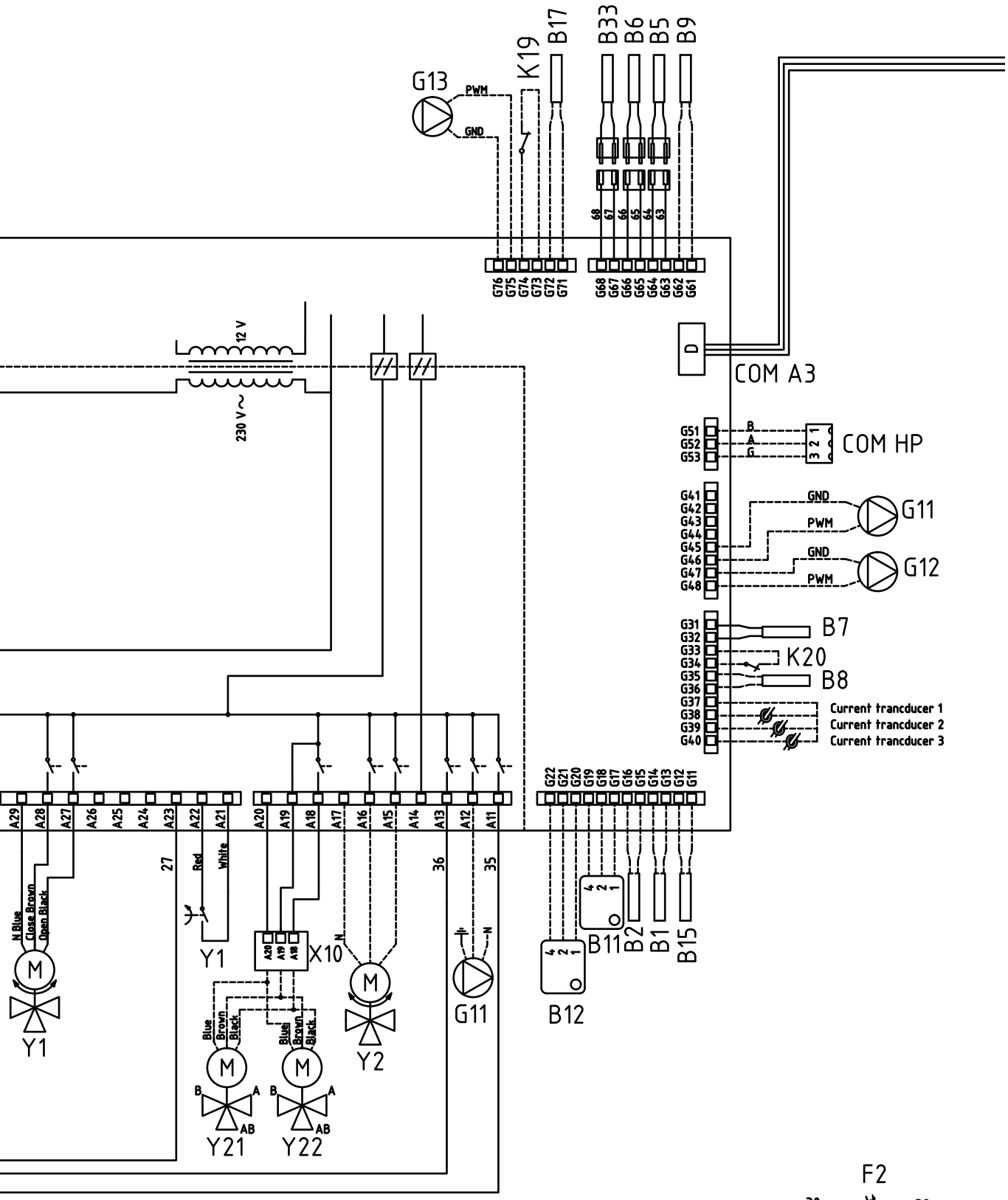
1. Disconnect the electrical supply to the EcoZenith.
2. Make the hydraulic connections for the additional boiler and pump.
3. Remove the four screws holding the plastic front, two at the top and two at the bottom, and then remove the plastic front. Ensure that the display cable is disconnected before removing the front completely. The cable is disconnected by pressing in the pin on the connector and pulling the cable downwards.
4. Make the electrical connections for the pump and sensor as indicated in the wiring diagram.
5. Disconnect the cable from output X7 18. Make sure the cable cannot possibly come into contact with live parts and thereby cause a fault. The cable end must be provided with an end cap or similar anti-touch blanking, or else the cable can be completely removed.
6. Connect a relay for starting the additional boiler to output X7 18. Refer to the wiring diagram for details.
7. Fit the front.
8. Switch on the electricity supply.
9. Define the additional boiler in the Installer/External boiler menu
10. The additional boiler (03) is now ready for use.

19. Parts list Wiring diagram

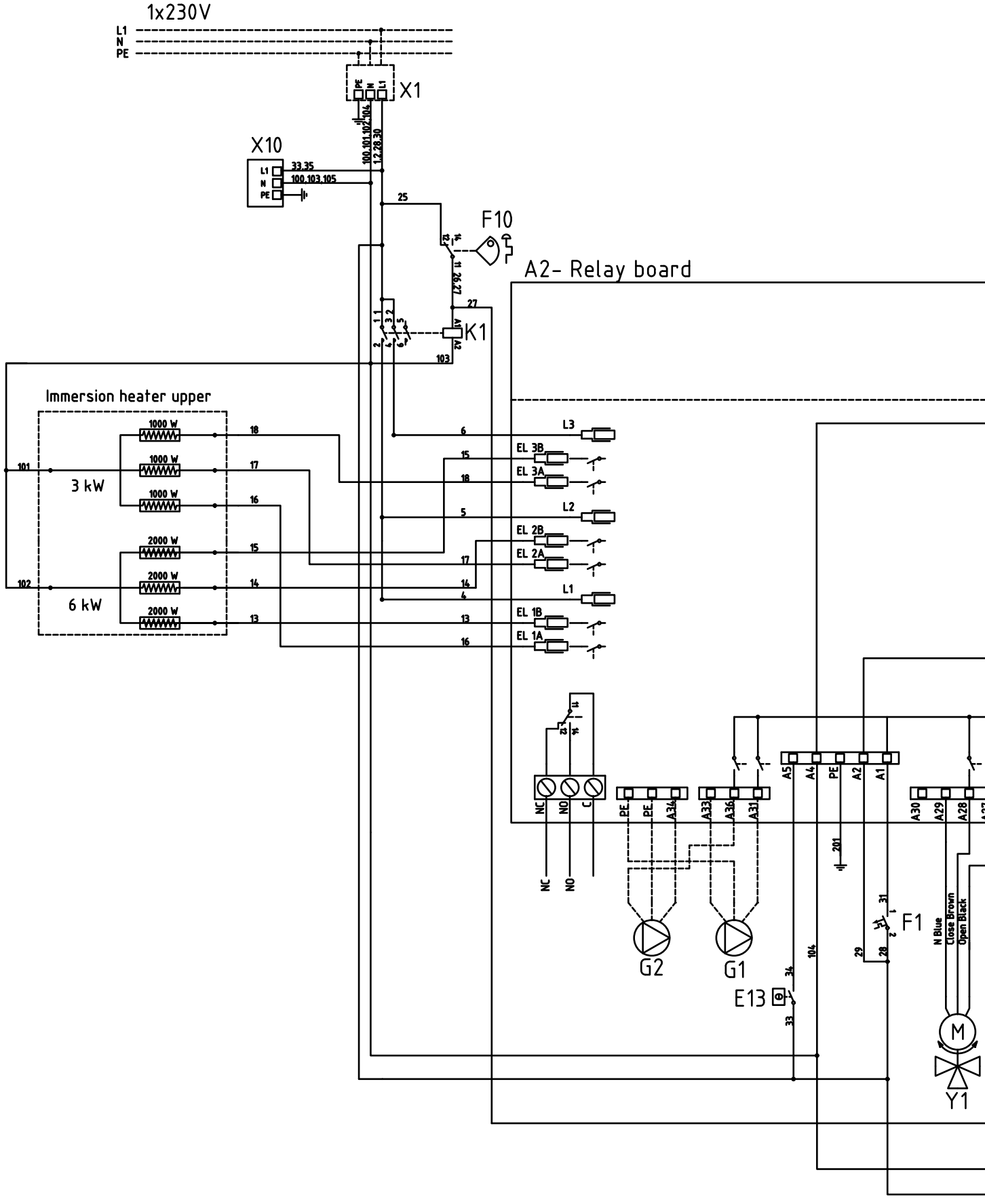
A1	Display
A2	Relay/main card
A3	Expansion card
B1	Primary flow sensor 1
B2	Primary flow sensor 2
B3	Primary flow sensor 3
B5	Temp Upper tank sensor
B6	Temp Lower tank sensor
B7	Return sensor
B8	Flue gas sensor
B9	Sensor wood boiler
B11	Inner sensor 1
B12	Inner sensor 2
B13	Inner sensor 3
B15	Outdoor sensors
B17	Sensor external boiler
B30	Solar panel sensor In
B31	Solar panel sensor Out
B32	Solar panel sensor charging
B33	Temp solar coil tank
B41	Sensor, external storage tank upper
B42	Sensor, external storage tank lower
B43	Sensor external hot water tank
B50	Sensor pool
E13	Backup heating thermostat E13
F1	Automatic circuit breaker
F2	Automatic circuit breaker
F10	Max thermostat
G1	Radiator pump 1
G2	Radiator pump 2
G3	Radiator pump 3
G6	Circulation pump flue gas
G11	Charge pump 1
G12	Charge pump 2
G13	Charge pump 3
G30	Circulation pump, solar collector
G31	Pump, recharging bore hole
G32	Pump, plate heat exchanger – solar energy
G40	Circulation pump for hot water coil
G41	Circulation pump external DHW tank
G43	Circulation pump, external storage tank charging
G44	Circulation pump, external boiler
G45	Circulation pump, external storage tank discharging
G50/G51	Circulation pump, pool heating
K1	Contactor 1
K2	Contactor 2
K3	Contactor 3
K4	Contactor 4
K20	Night red/circulation/extra DHW
X1	Terminal block
X10	Terminal block
Y1	Mixing valve 1
Y2	Mixing valve 2
Y3	Mixing valve 3
Y21	Diverting valve, heat pump in/out
Y31	Diverting valve solar
Y40	Diverting valve external buffer tank

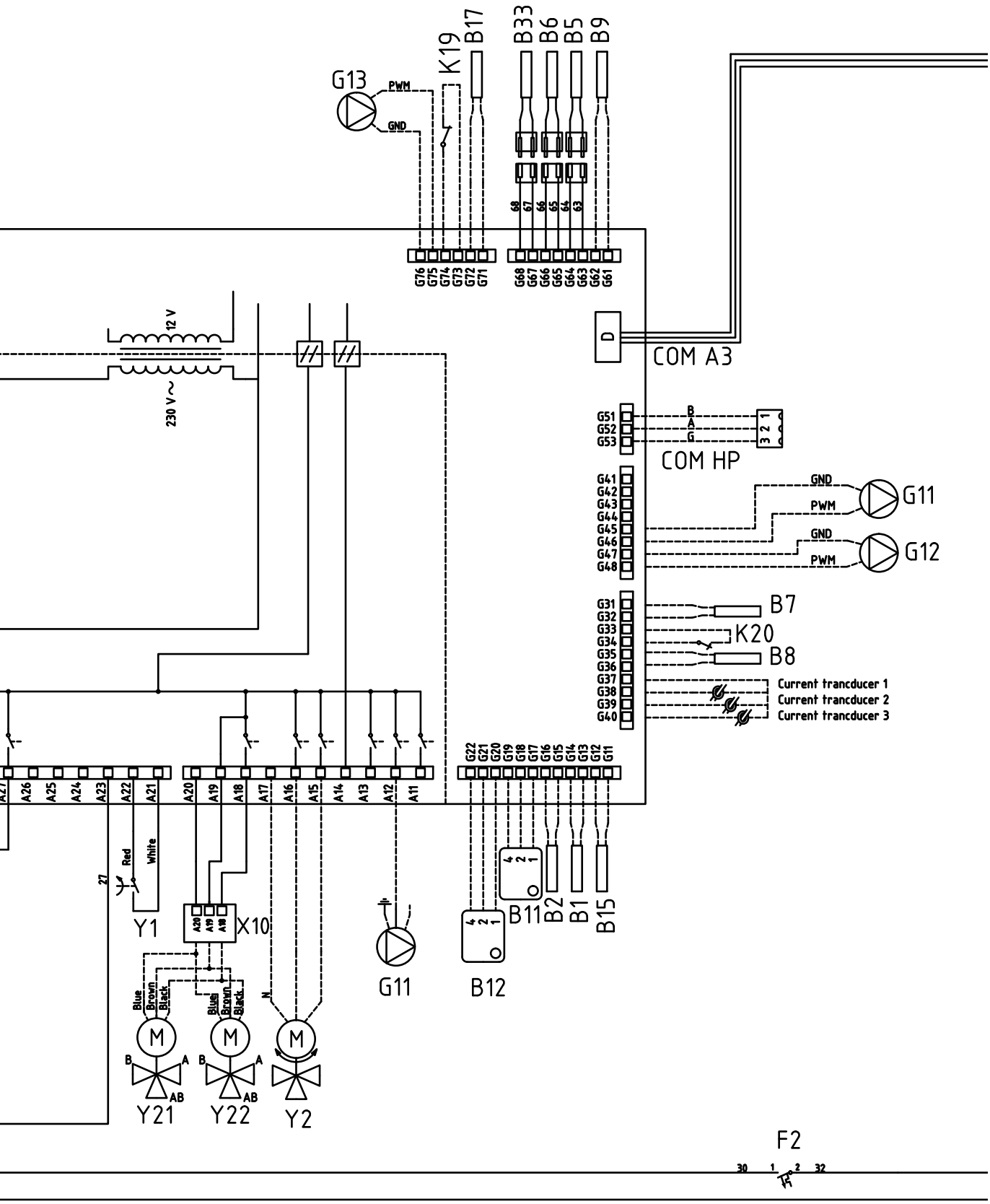
20. Wiring diagram main card 3x400V



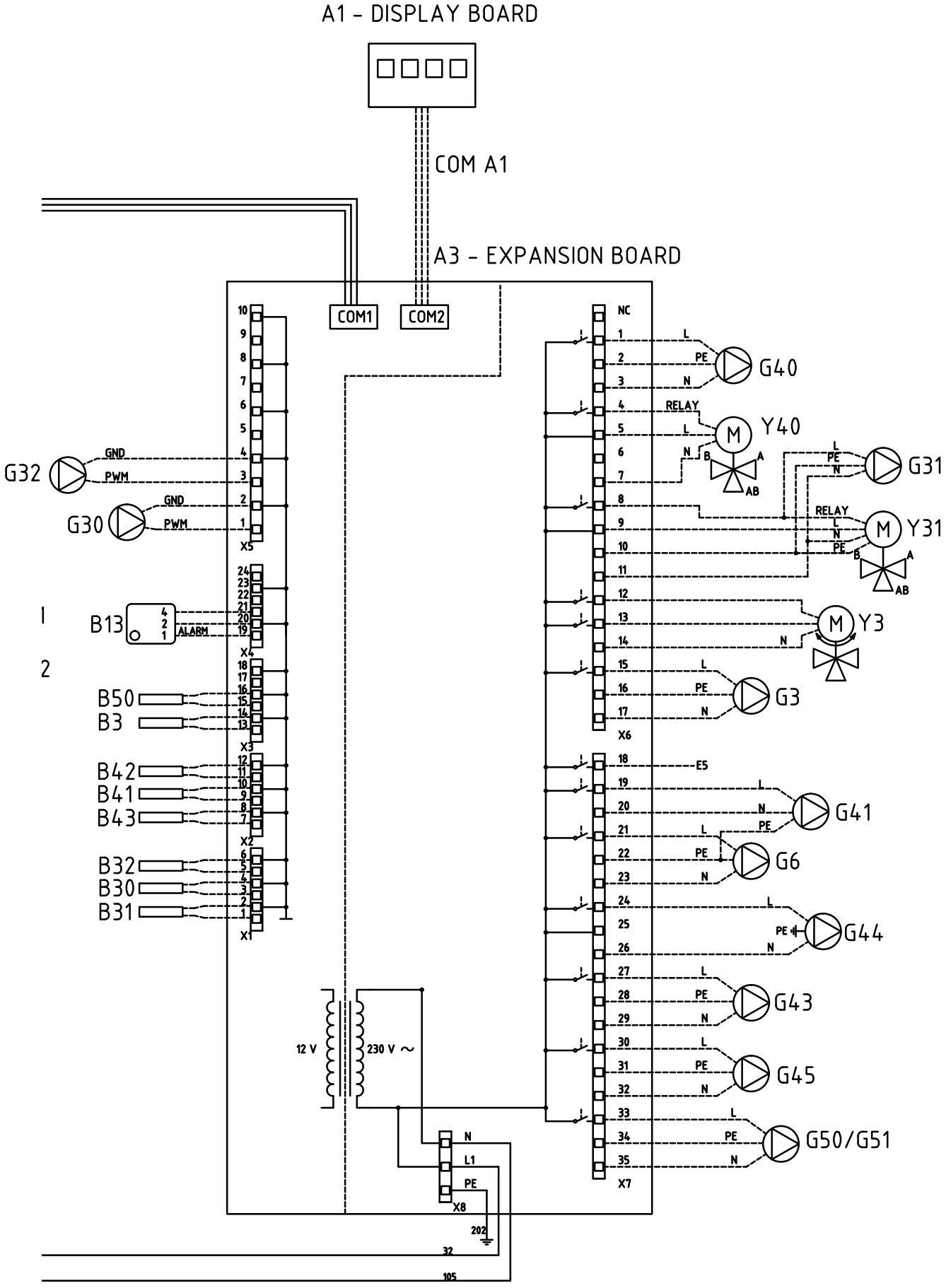

G13
PWM
GND
K19
B17
B33
B6
B5
B9
G76 G75 G74 G73 G72 G71
G68 G67 G66 G65 G64 G63 G62 G61
12 V
230 V
D
COM A3
G51 G52 G53
B A G
3 2 1
COM HP
G41 G42 G43 G44 G45 G46 G47 G48
GND
PWM
G11
GND
PWM
G12
G31 G32 G33 G34 G35 G36 G37 G38 G39 G40
B7
K20
B8
Current trancducer 1
Current trancducer 2
Current trancducer 3
G22 G21 G20 G19 G18 G17 G16 G15 G14 G13 G12 G11
A29 A28 A27 A26 A25 A24 A23 A22 A21 A20 A19 A18 A17 A16 A15 A14 A13 A12 A11
27
Red
White
36
35
N Blue
Close Brown
Open Black
Y1
X10
A20 A19 A18
N
Blue
Brown
Black
Y2
G11
B11
B2
B1
B15
B12
Y21
Y22
B
A
AB
F2
30
2
1
32

21. Wiring diagram main card 1x230V




G13
PWM
GND
K19
B17
B33
B6
B5
B9
G76 G75 G74 G73 G72 G71
G68 G67 G66 G65 G64 G63 G62 G61
12 V
230 V ~
D
COM A3
G51 G52 G53
B A G
3 2 1
COM HP
G41 G42 G43 G44 G45 G46 G47 G48
GND
PWM
G11
GND
PWM
G12
G31 G32 G33 G34 G35 G36 G37 G38 G39 G40
B7
K20
B8
Current trancducer 1
Current trancducer 2
Current trancducer 3
A27 A26 A25 A24 A23 A22 A21 A20 A19 A18 A17 A16 A15 A14 A13 A12 A11
G22 G21 G20 G19 G18 G17 G16 G15 G14 G13 G12 G11
27
Red
White
Y1
A20 A19 A18
X10
Blue
Brown
Black
N
M
B
A
AB
Y21
Y22
Y2
G11
B12
B11
B2
B1
B15
F2
30 1 2 32

22. Wiring diagram for expansion card



23. Resistances for sensors

NTC 3.3K NTC 22K NTC 150

Temperature °C	Flue gas sensor Resistance Ω	Temperature °C	Brine, HP, El. boiler, Primary flow, Room sensor Resistance Ω	Temperature °C	Outdoor sensor Resistance Ω
300	64	130	800	70	32
290	74	125	906	65	37
280	85	120	1027	60	43
270	98	115	1167	55	51
260	113	110	1330	50	60
250	132	105	1522	45	72
240	168	100	1746	40	85
230	183	95	2010	35	102
220	217	90	2320	30	123
210	259	85	2690	25	150
200	312	80	3130	20	182
190	379	75	3650	15	224
180	463	70	4280	10	276
170	571	65	5045	5	342
160	710	60	5960	0	428
150	892	55	7080	-5	538
140	1132	50	8450	-10	681
130	1452	45	10130	-15	868
120	1885	40	12200	-20	1115
110	2477	35	14770	-25	1443
100	3300	30	18000	-30	1883
90	4459	25	22000	-35	2478
80	6119	20	27100	-40	3289
70	8741	15	33540		
60	12140	10	41800		
50	17598	5	52400		
40	26064				
30	39517				
20	61465				

PT1000

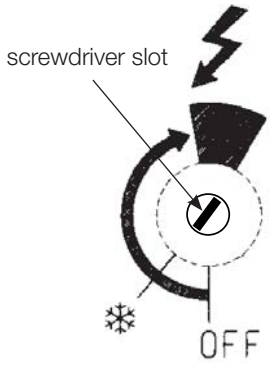
Temperature °C	Resistance Ω	Temperature °C	Resistance Ω
-10	960	60	1232
0	1000	70	1271
10	1039	80	1309
20	1077	90	1347
30	1116	100	1385
40	1155	120	1461
50	1194	140	1535

24. First start

The CTC EcoZenith I 550 can be started without a room sensor being installed; the heating will instead be controlled by the heat curve set for the property. The room sensor can however always be fitted for the alarm LED function. In this case, deselect the room sensor in the menu *Installer/Define system*.

24.1 Before first start

1. Check that the system is filled with water, has been bled and has the correct pressure, and that there are no leaks. Air in the system (poor circulation) can mean that the heat pump is tripped by its high pressure protection, for example.
2. Check that all connections are tight.
3. Check that all the valves in the system are correctly connected and set.
4. Check that all electric cables, sensors and circulation pumps are correctly installed and connected. See the “Electrical installation” chapter.
5. Check that the unit is correctly fused (fuse panel).
6. Check that the backup heating thermostat is in frost protection mode. The backup heating thermostat is located in the lower part of the cabling, behind the front panel. In order to set the backup heating thermostat in frost protection mode, turn anti-clockwise as far as possible so that the screw driver slot is vertical (off position), then turn clockwise until the slot aligns with the frost protection symbol (about 1/8 turn). Frost protection setting, about +7 °C
7. Check that any heat pump circuit breaker installed is in the ON position. Note that when connected in series, the last heat pump must be in terminated position. I.e., on the last heat pump, dipswitch 2 must be in the ON position. On the other heat pumps it should be in the OFF position.
8. See the Installation and Maintenance Manual for the heat pump. If there is already a boiler in place, check that its temperature is set at normal boiler temperature, for example, 70 °C.



24.2 First start

Switch on the power using the safety switch. The display will come on and the operating lamp will start to light up. Factory-set values will apply, so for instance, the connected heat pumps' compressors are blocked. The first time the EcoZenith is started up or if it is restarted within 24 hours after start-up, items 1-3 are displayed.

1. Select language – English – and confirm with OK.
2. Specify the maximum electric heater power. Choose between 0.0 and 9.0 kW in steps of 0.3 kW.
3. Confirm that the system is filled with water with the OK button.
4. Define system. This menu is shown automatically on first start. It also occurs under: Installer/Define system See the chapter: Define system Menu.
   - The EcoZenith senses whether primary flow sensors 1 and 2 and room sensors 1 and 2 are connected and if so automatically defines radiator systems 1 and 2 "Yes" with the associated room sensor "Yes".
   - Scroll further down in the menu and select the connected systems with "Yes". The immersion heaters are factory set to "Yes".
   - For heat pump operation, the pumps in question are defined 1, 2 and 3 by selecting "Yes". For the relevant heat pump, the type of heat pump must then be selected, EcoPart or EcoAir, followed finally by selection of relay-controlled or speed-controlled (PWM) charge pump.
5. Settings.
   - Set the inclination and adjustment for each defined radiator system in the menu: Installer/Settings/Heating circuit 1, 2, 3. See the Radiator System Menu chapter.
   - Allow the compressor in menu Installer/Settings/Heat pump 1, 2, 3 see section Menu Heat pumps.
   - Set the size of the main fuse, and check that the rated power of the immersion heater(s) matches the capacity of the fuse panel.
6. Current operation information.
   - Check whether heat is needed in the upper and lower tank Heat is needed when the temperature in the upper or lower tank is 5°C below the setpoint in brackets. When this occurs, start-up of the compressor should be delayed 10 minutes. Information on this is available in the main menu. Return to the main menu to check.
7. The EcoZenith is now up and running and the product is working using it factory settings. See the chapter "Detail Description Menus" for other settings.

! Save these settings in the menu: *Installer/Settings/Save settings*

Försäkran om överensstämmelse
Déclaration de conformité
Declaration of conformity
Konformitätserklärung

Enertech AB
Box 313
S-341 26 LJUNGBY

försäkrar under eget ansvar att produkten
confirme sous sa responsabilité exclusive que le produit,
declare under our sole responsibility that the product,
erklären in alleiniger Verantwortung, dass das Produkt,

EZ550 C2 3x400V E18/

EZ550 C2 1x230V E9/ EZ550 C2 3x230V E14

som omfattas av denna försäkran är i överensstämmelse med följande direktiv,
auquel cette déclaration se rapporte est en conformité avec les exigences des normes suivantes,
to which this declaration relates is in conformity with requirements of the following directive,
auf das sich diese Erklärung bezieht, konform ist mit den Anforderungen der Richtlinie,

EC directive on:
Pressure Equipment Directive 97/23/EC, § 3.3
(AFS 1999:4, § 8)
Electromagnetic Compatibility (EMC) EN 2004/108/EC
Low Voltage Directive (LVD) EN 2006/95/EC

Överensstämmelsen är kontrollerad i enlighet med följande EN-standarder,
La conformité a été contrôlée conformément aux normes EN,
The conformity was checked in accordance with the following EN-standards,
Die Konformität wurde überprüft nach den EN-normen,

EN 55014-1 /-2
EN 61 000-3-2/3-3/4-2,-3,-4,-5,-6,-11
EN 60335-1, 2-21
EN 62233

Ljungby 2013-05-22

Marcus Miller
Director R&D

Notes

161 421 50 10-01

Enertech AB. P.O Box 309 SE-341 26 Ljungby Sweden.
www.ctc.se, www.ctc-heating.com

Enertech Group