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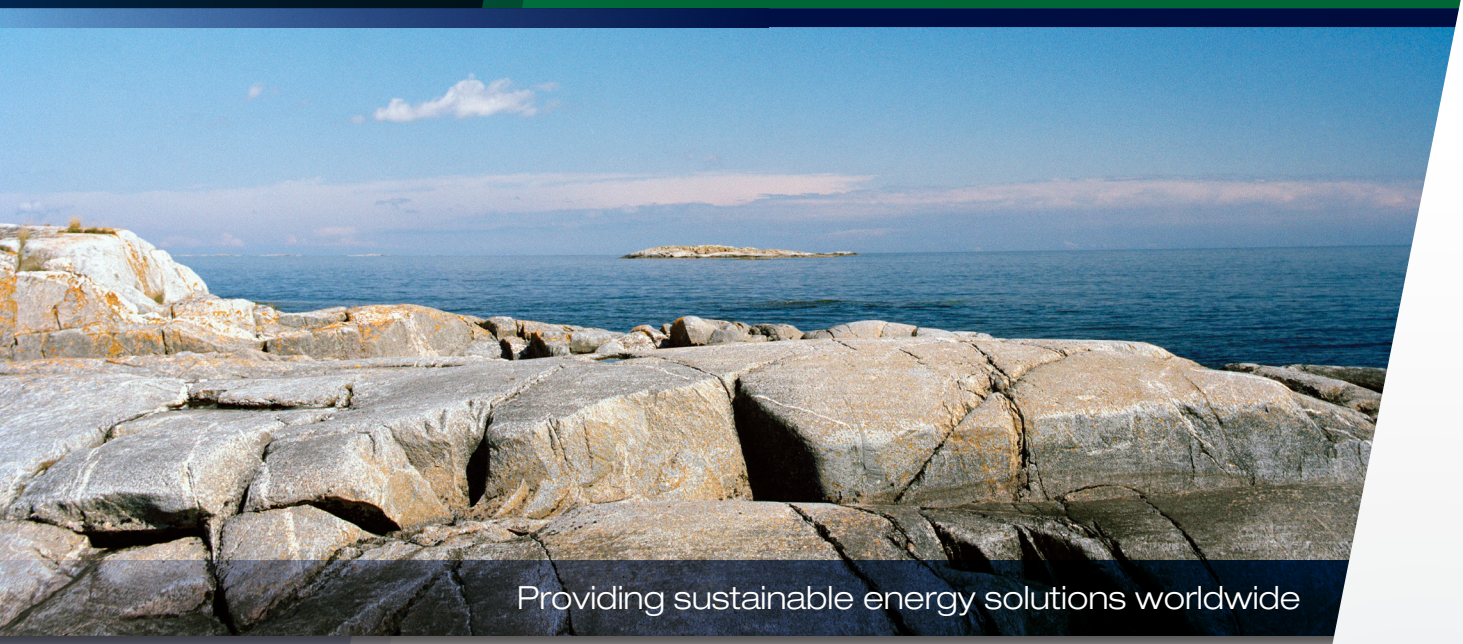

Installation and Maintenance Manual

CTC GSi 12

Modulating ground source heat pump

Enertech Group

Installation and Maintenance Manual

162 105 50-1 2015-08-11

CTC GSi 12

Modulating ground source heat pump

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As your own reminder

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

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

Enertech AB provides the information with reservation for any typing errors and subject to modification.

Congratulations on your new product

You have just bought a CTC GSi 12, which we hope you will be very pleased with. In the following pages you can read about how to operate and maintain your heat pump.

Keep this manual containing the installation and maintenance instructions. If the heat pump is properly maintained, you will be able to enjoy the use of your CTC GSi 12 for many years. This manual will provide all the information you will need.

The complete heat pump

CTC GSi 12 is a complete heat pump which meets your home's heating and hot water requirements. It has a built-in, energy-efficient (A rated) circulation pump for connection to the ground/bedrock circuit, i.e. the cold side. This can be connected to either the left, right or back of the heat pump, whichever suits you best.

CTC GSi 12 has a control system which:

- Monitors all heat pump functions
- Permits individual settings
- Displays desired values, such as temperatures, operation times, energy consumption and fault signals
- Facilitates the setting of values and troubleshooting in a simple and well-structured way

The built-in heat exchanger provides copious amounts of hot water. CTC GSi 12 also has a so-called summer-time basement heating function and a floor heating block, which maximises the temperature supplied to the floor circuits. Using the integrated night reduction function, you can set and change the temperature in the house during the day, from one day to the next.

Its easily accessible electrical components and cooling module, along with effective troubleshooting functions in the control program, make CTC GSi 12 easy to service.

If you want to supplement your CTC GSi 12 with other sources of heating, you can do this easily. We have decided to call this option Energyflex. With Energyflex you can, for example:

- Charge your heating system with solar energy
- Allow a water-jacketed stove to contribute heat
- Connect a pool exchanger to heat up a swimming pool

Checklist

The checklist must be completed by the installer.

- If a service is performed, you may be required to provide this document.
- 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.

The points below should be checked off.

Pipe installation

- ☐ Heat pump filled, positioned and adjusted in the correct manner according to the instructions.
- ☐ The heat pump is positioned so that it can be serviced.
- ☐ The radiator pump's capacity for the required flow.
- ☐ Open radiator valves and other relevant valves.
- ☐ Tightness test.
- ☐ Bleed the system.
- ☐ Safety valve function test.
- ☐ The waste pipe is connected to the floor drain.

Electrical installation

- ☐ Compressor, direction of rotation
- ☐ Power switch
- ☐ Heat pump activated and started
- ☐ Electric power and fuse, adapted for the property, in normal operation and with backup power supply
- ☐ Correct tight wiring
- ☐ Requisite sensors for selected system
- ☐ Outdoor sensor
- ☐ Room sensor (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
- ☐ Check and filling, heating system
- ☐ Trimming information, heat curve
- ☐ Alarm information
- ☐ Mixing valve
- ☐ Safety valve function test
- ☐ Warranty and insurance
- ☐ Information on procedures for reporting faults

_____ _____

Date / Customer Date / Installer

Important to remember!

Check the following in particular on delivery and installation:

- The product 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 product 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 metre in front of the product.
- The product must not be placed below floor level either.
- Avoid placing the heat pump in rooms where the walls are of lightweight design, as people in the adjoining room may be disturbed by the compressor and vibrations.

Safety instructions

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

- Close the safety switch before doing any work on the product.
- The product must not be flushed with water.
- 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 jeopardise safety by removing bolted covers, hoods or similar.
- Never jeopardise safety by deactivating safety equipment.
- Any work done on the product's cooling system should be done by authorised personnel only.
- Safety valve check:
  - The safety valve for the boiler/system and domestic hot water (DHW) must be checked on a regular basis. See the section entitled Operation and maintenance.

! If these instructions are not followed when installing, operating and maintaining the system, Enertech's commitment under the applicable warranty terms is not binding.

Your home's heating installation

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.

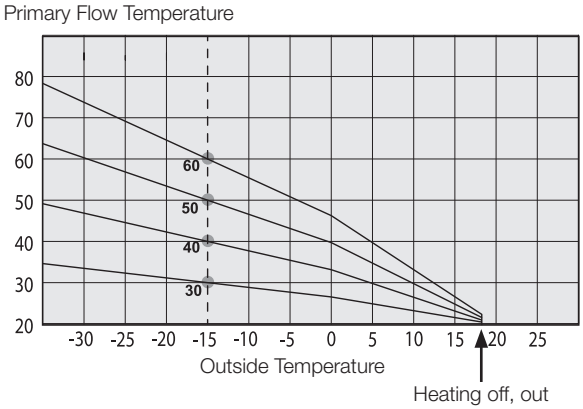
For example:
Inclination 50 means that the temperature of the water supplied to the radiators will be 50 °C when the outdoor temperature is –15 °C (if adjustment is set to 0). If the adjustment is set to +5, the temperature will be 55 °C instead. The curve is increased by 5 °C at all temperatures, i.e.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

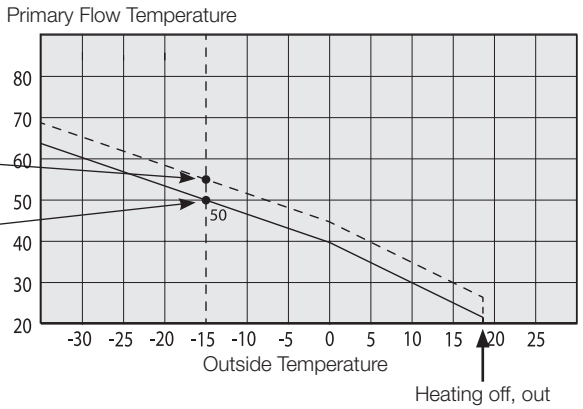


Adjustment

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

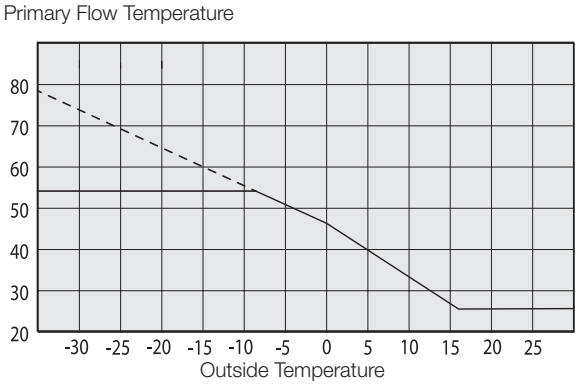
Inclination 50 °C
Adjustment 0 °C



An example

Inclination 60 °C
Adjustment 0 °C

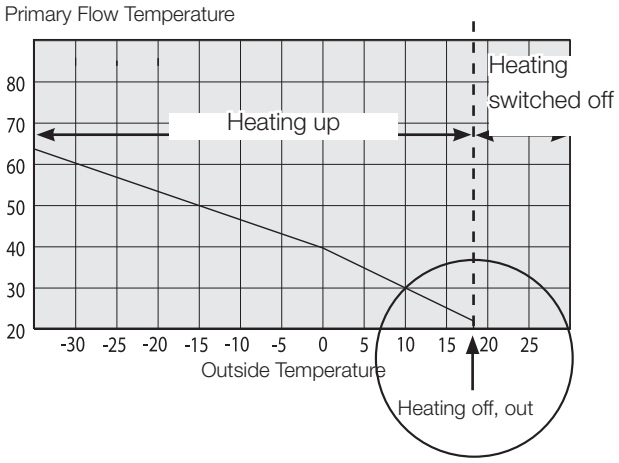
In this example, the maximum outgoing primary flow temperature is set at 55 °C.
The minimum permitted primary flow temperature is 27 °C (e.g. summer-time basement heating or the floor circuits in a bathroom).



Summer-time operation

All properties have internal heat gains (lamps, oven, body 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 value, **"Heating off, outside"**, can be changed in the Advanced/Settings/Heat System menu. When the heat is switched off in this way, the radiator pump stops. The heating starts up automatically when it is required again.



1. Technical data

Electrical data		
Electrical data		400V 3N~ 50 Hz
Rated power	kW	5.8
Immersion heater (steps of 0,3 kW)	kW	9
Max immersion heater output @ fuse size 10 / 16 / 20 / 25 A	kW	0 / 2.1 / 5.2 / 9
Max. operating current Compressor	A	8.4
IP class		IPX1

Operational data for heat pump			
Max output from compressor		kW	11.8
Output from compressor [1]	@ 0/35 | 0/45 | 0/55	kW	6.13 I 5.68 I 5.40 @50 rps
COP [1]	@ 0/35 | 0/45 | 0/55	-	4.84 I 3.68 I 3.01 @50 rps
Output from compressor [1]	@ 5/35 | 5/45 | 5/55	kW	7.10 I 6.65 I 6.36 @50 rps
COP [1]	@ 5/35 | 5/45 | 5/55	-	5.62 I 4.26 I 3.57 @50 rps
SCOP 0/35 Pdesign cold climate [2]			Pdesign = 12 kW, SCOP = 5.5
SCOP 0/55 Pdesign cold climate [2]			Pdesign = 8 kW, SCOP = 4.4
SCOP 0/35 Pdesign average climate [2]			Pdesign = 10 kW, SCOP = 5.4
SCOP 0/55 Pdesign average climate [2]			Pdesign = 7 kW, SCOP = 4.1

[1] EN14511:2011, incl. heat medium pump and brine pump

[2] SCOP according to EN14825

Heating system		
Water volume (V)	l	229
Max. operating pressure boiler (PS)	bar	3.0
Max. temperature boiler (TS)	°C	100
Heating system min. flow Δt=10K	l/s	0.15
Heating system nominal flow [1]	l/s	0.29
Heat pump		Class A circulation pump
Pressure drop		See diagram in chapter Pipe installation

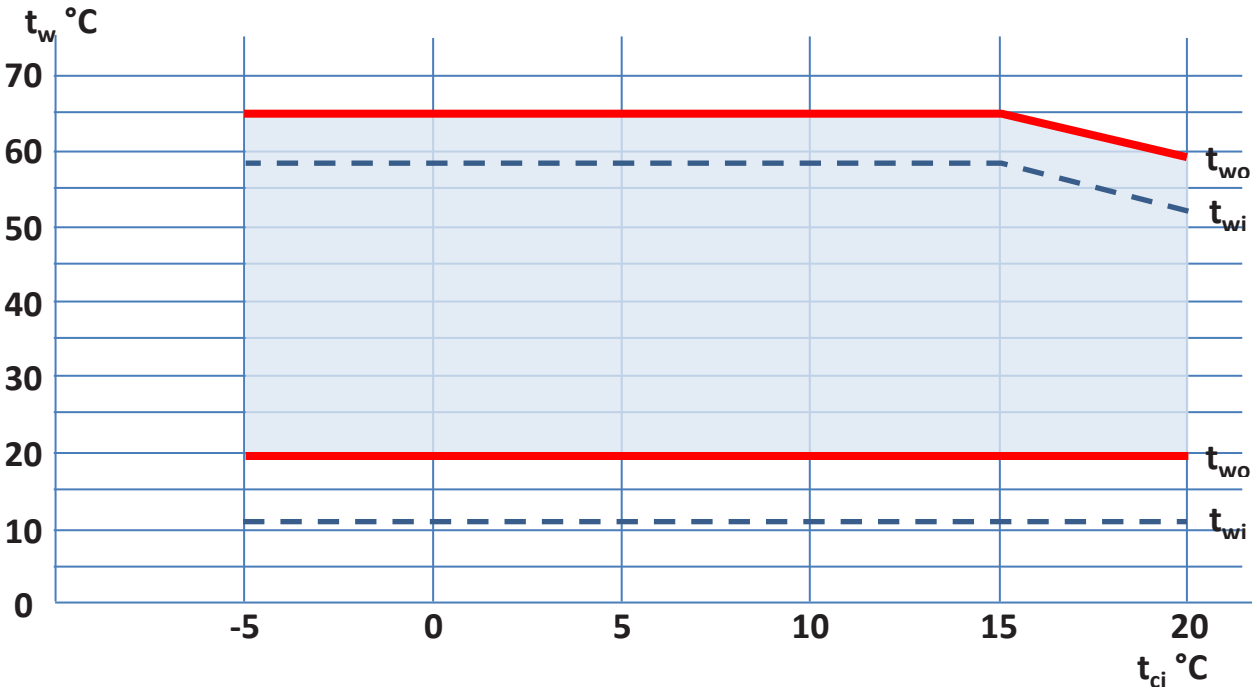
[1] Δt = 5 K and 0/35 °C heat pump operation @ 50 rps

Brine system		
Water volume (V)	l	4.1
Brine system min/max temp (TS)	°C	-5 / +20
Brine system min/max pressure (PS)	bar	0.2/3.0
Brine system min flow	l/s	0.29
Brine system nominal flow, Δt=3 K @50rps	l/s	0.39
Brine pump		Class A circulation pump
Pump capacity		See diagram in chapter Pipe installation

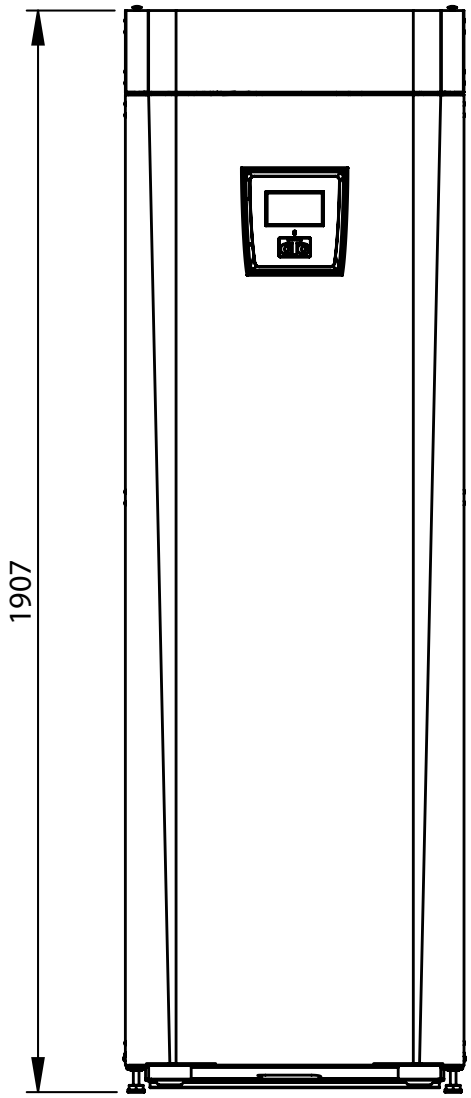
DHW system		
Water volume (V)	l	1.7
Max operating pressure (PS)	bar	10
Max operating temperature (TS)	°C	100

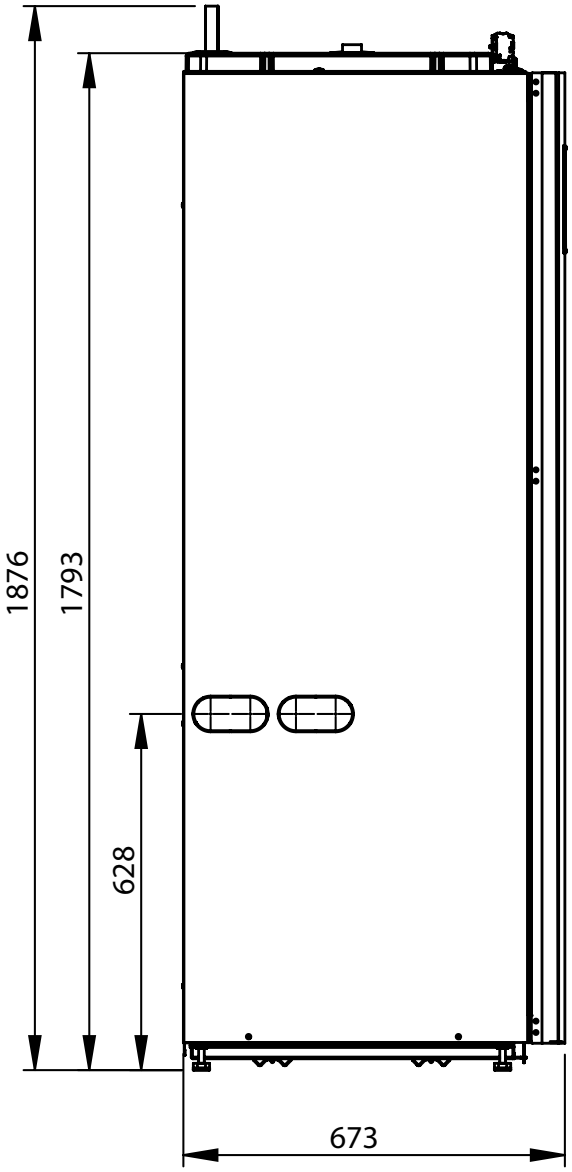
Other data		
Refrigerant quantity (R407C)	kg	2.4
Interrupt value switch HT	MPa	3.1
Weight with/without packaging	kg	270 / 253
Width x Height x Depth	mm	596 x 1907 x 673
Required ceiling height	mm	1910
Noise level (L_{WA}) according to EN 12102 vid 0/35	dB(A)	Min (20 rps): 35 dB(A) Max (100 rps): 48 dB(A)

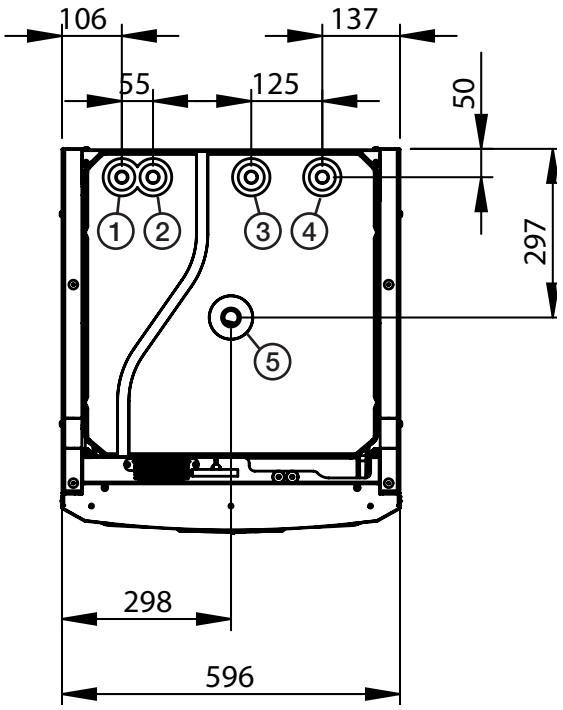
1.1 The envelope CTC GSi 12



*) The envelope is based on standard rating running conditions, and may deviate at actual installation. All values at 50 rps. t_{ci} = temperature cold side inlet.





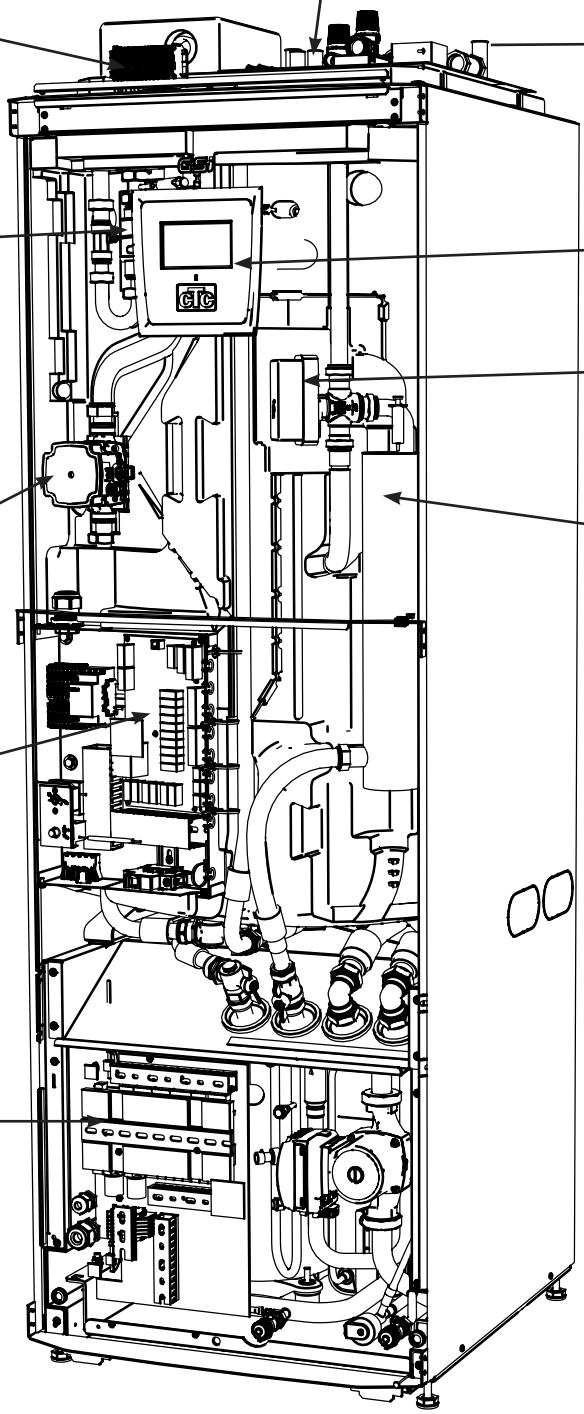


1. Cold water Ø22
2. Hot water Ø22
3. Radiator return Ø22
4. Primary flow Ø22
5. Expansion connection/ Lifting sleeve G 3/4”

2. Design

The picture below shows the fundamental construction of the heat pump.

The energy in the bore hole (bedrock) or ground is drawn up by the cooling system. The compressor then increases the temperature to a usable level. Afterwards it releases the energy for the heating system and hot water.



Tap water connections
The property's tap water connections are connected here.

Terminal block for sensors
The sensor terminal block is wired internally. Outdoor sensors, room sensors and other sensors are connected easily here.

Radiator connections
The property's heating system is connected here.

DHW heat exchanger
The heat pump is equipped with a stainless heat exchanger. Direct heating of hot water minimises the risk of legionella bacteria.

Display

Diverting valve
Directing the hot water.

Flow heater
This contains a 9 kW immersion heater for additional heat.

Tap water pump
Charge pump for domestic hot water

Electrical connection box

Electrical connection box modul

3. Parameter list

Heating circuit	Factory settings	User value
Max primary flow °C	55	
Min primary flow °C	Off	
Heating, mode	Auto	
Heating, mode, ext	Off	
Heating off, out °C	18	
Heating off, time	120	
Inclination °C	50	
Adjustment °C	0	
Night reduction disable °C	5	
Room temp reduced °C	-2	
Primary flow reduced °C	-3	
Alarm room temp °C	5	
Smart low price °C	1	
Smart over capacity °C	2	
Max time heating	40	
Charge pump %	90	
Drying period mode	Off	
Drying period temp °C	25	

Heat pump	Factory settings	User value
Tariff HP	Off	
Smart block HP	Off	
Start at degree minute	-60	
Max RPS	100	
Max RPS silent mode	50	

Electric heater	Factory settings	User value
Max el. heater kW	9.0	
Max el. heater DHW kW	0	
Start at degree minute	-500	
Diff step, degree minute	-50	
Main fuse A	20	
Input voltage	3x400V	
Tariff EL	Off	
Smart block immersion	Off	

DHW tank	Factory settings	User value
Stop temp °C	58	
Start/stop diff upper °C	5	
Max time DHW	20	
DHW °C	58	
Smart low price °C	10	
Smart overcapacity	10	
Runtime DHW-circ.	4	
Time DHW-circ.	15	

Cooling	Factory settings	User value
Common Heating and Cooling	Yes	
Condense Secured?	No	
Room temp cooling	25.0	
Smart low price °C	1	
Smart overcapacity	2	

Diff thermostat function	Factory settings	User value
Charge start diff temp °C	7	
Charge stop diff temp °C	3	
Charge temperature °C	60	

Pool	Factory settings	User value
Pool temp °C	22	
Pool diff °C	1.0	
Max time Pool	20	
Charge pump %	50	
Smart low price °C	1	
Smart overcapacity °C	2	

External heat source	Factory settings	User value
Charge start °C	70	
Start/ stop diff.	5	
Smart block cap.	Off	

This page is only for solar panels settings.

Solar panels	Factory settings	User value
Charge start diff temp °C	7	
Charge stop diff temp °C	3	
Charge pump min %	20	
Sensor test active	No	
-Test/Paus, min	4 / 30	
-Winter break	No Nov- Feb	
Prioritize charging	EHS-tank	
Flow l/min	6.0	
Over temp protection panel	No	
-Max panel temp °C	120	
Cool over temp in tank	No	
-Tank cooled down to °C	50	
Antifreeze protection panel	No	
-Active when panel temp °C	-25	
Prioritize protection	EHS-tank	

Settings EHS-tank	Factory settings	User value
Charge temperature ºC	60	
Maximum tank temp ºC	70	

EcoTank	Factory settings	User value
Charge temperature ºC	60	
Maximum tank temp ºC	70	

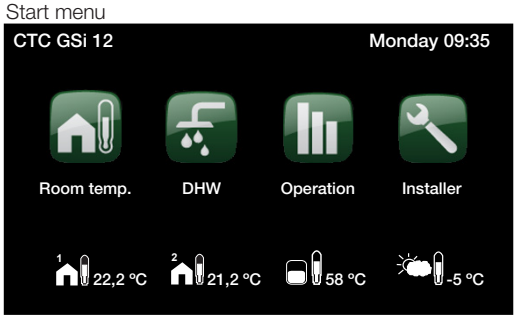
X-volume	Factory settings	User value
Charge temperature ºC	60	
Maximum tank temp ºC	70	

Recharging of bedrock	Factory settings	User value
Recharging active	No	
-Charge start diff temp °C	60	
-Charge stop diff temp °C	30	
-Max brine temperature °C	18	

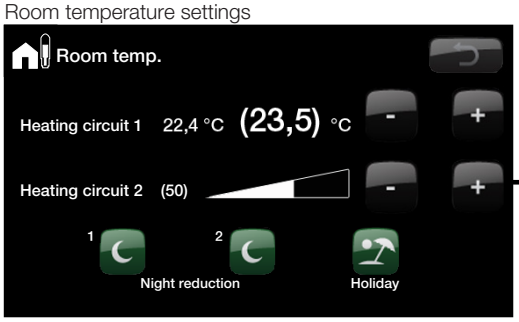
Charging EHS-tank	Factory settings	User value
Charge start diff temp °C	7	
Charge stop diff temp °C	3	
Charge tank temp °C	60	

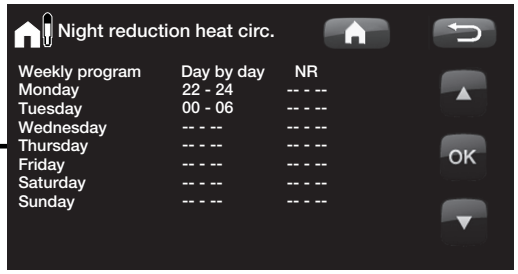
4. Menu overview

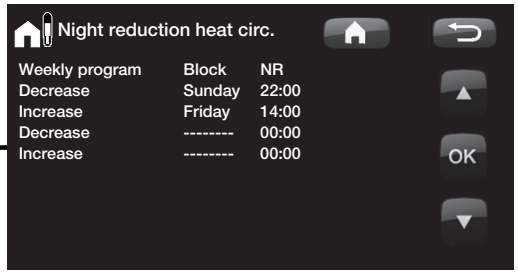
Start menu

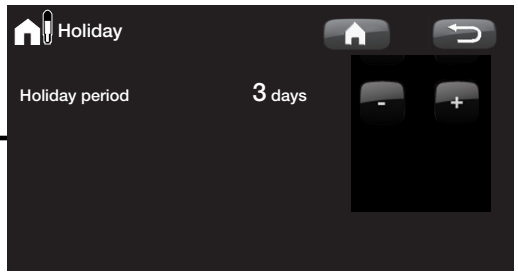


Room temperature settings

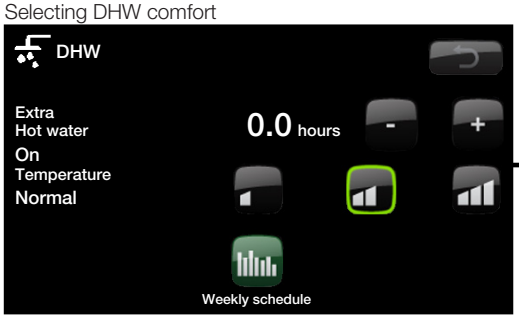


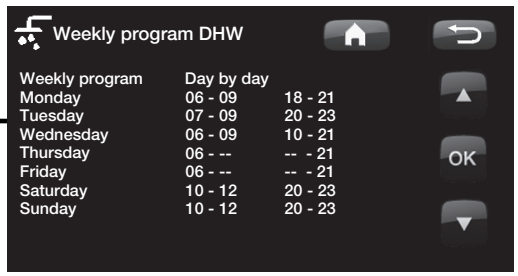




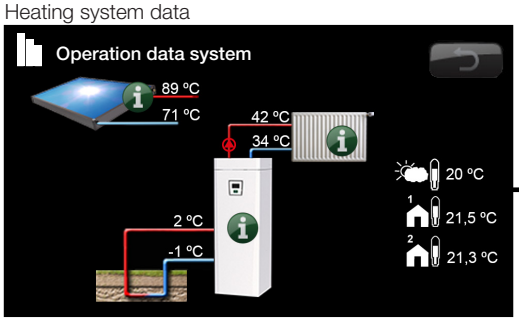


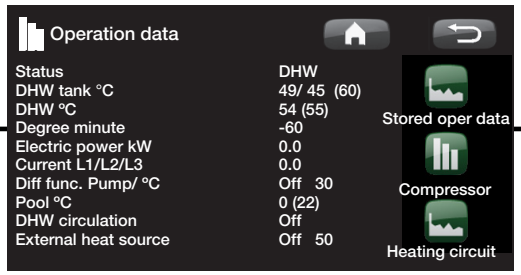
Selecting DHW comfort

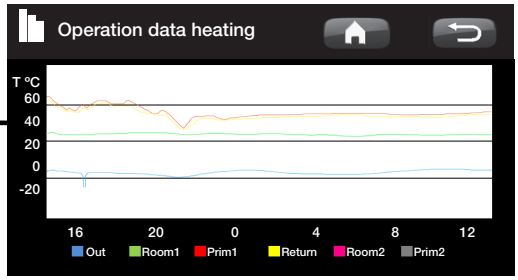




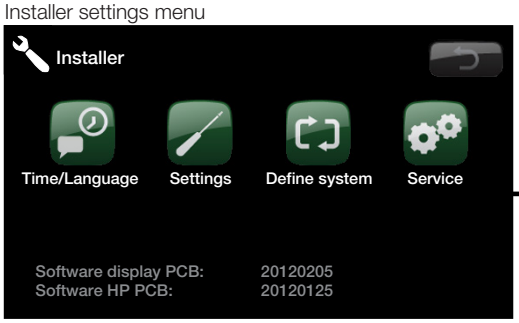
Heating system data

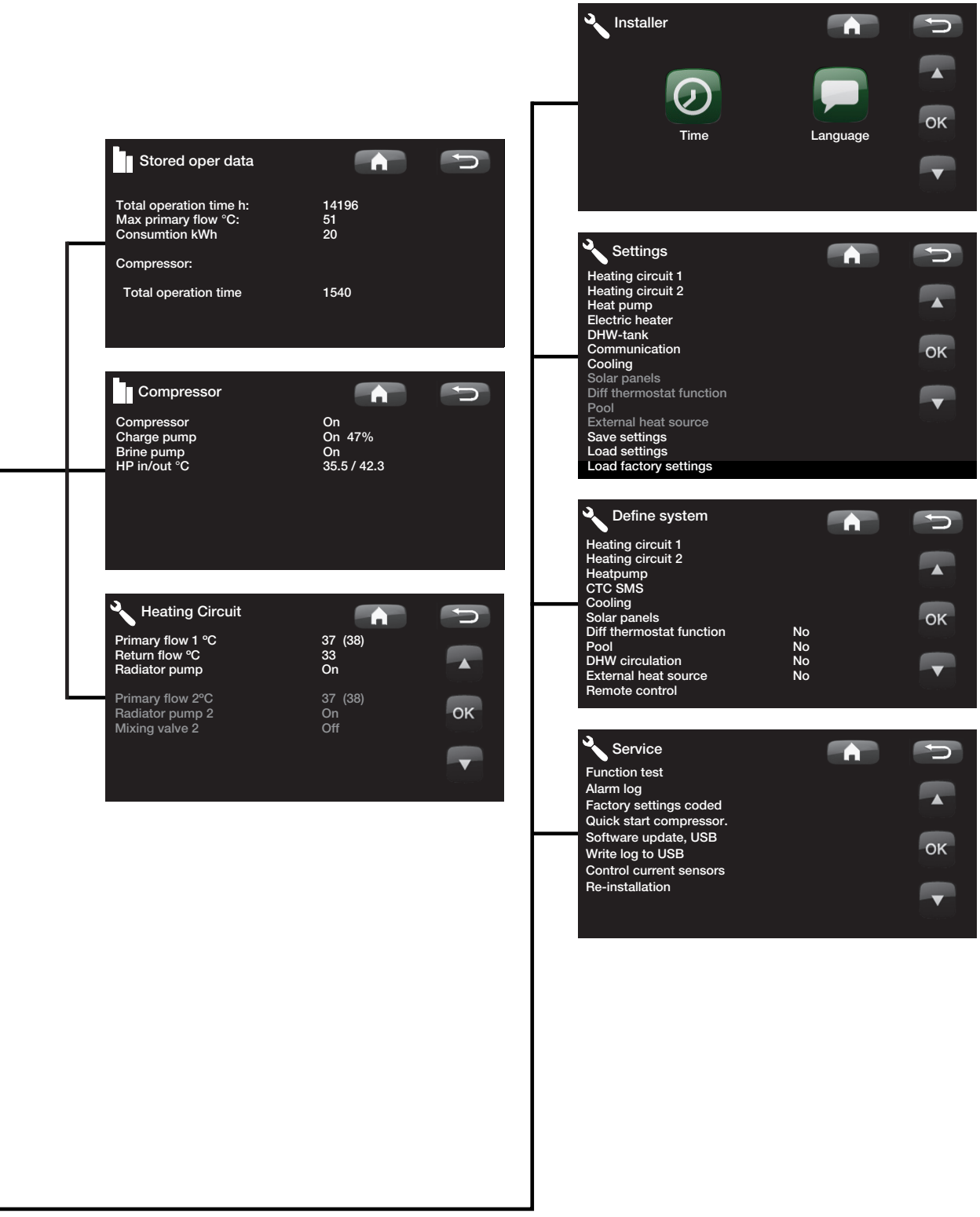






Installer settings menu




Stored oper data
Total operation time h: 14196
Max primary flow °C: 51
Consumtion kWh 20
Compressor:
Total operation time 1540
Compressor
Compressor On
Charge pump On 47%
Brine pump On
HP in/out °C 35.5 / 42.3
Heating Circuit
Primary flow 1 °C 37 (38)
Return flow °C 33
Radiator pump On
Primary flow 2°C 37 (38)
Radiator pump 2 On
Mixing valve 2 Off
OK
Installer
Time
Language
OK
Settings
Heating circuit 1
Heating circuit 2
Heat pump
Electric heater
DHW-tank
Communication
Cooling
Solar panels
Diff thermostat function
Pool
External heat source
Save settings
Load settings
Load factory settings
OK
Define system
Heating circuit 1
Heating circuit 2
Heatpump
CTC SMS
Cooling
Solar panels
Diff thermostat function No
Pool No
DHW circulation No
External heat source No
Remote control
OK
Service
Function test
Alarm log
Factory settings coded
Quick start compressor.
Software update, USB
Write log to USB
Control current sensors
Re-installation
OK

5. Detailed menu descriptions

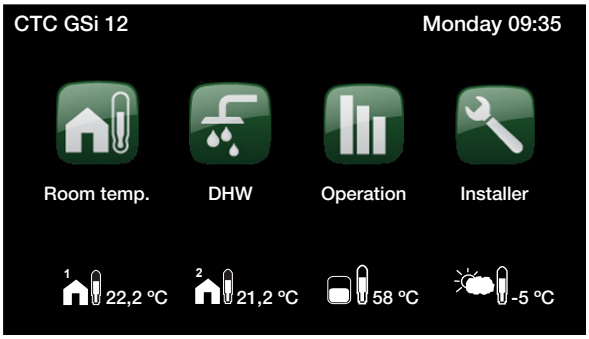
All the settings can be configured directly on screen using the well-structured control panel. The large icons operate as buttons on the touch display.

Operational and temperature information is also displayed here.

5.1 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 10 minutes.



The first figure is the preset factory value, while the values in brackets are the value's range.

Room temperature
Settings for raising or lowering the temperature indoors and also for scheduling temperature changes.

DHW
Settings for DHW production.

Operation
This displays current operational data for both your heating system and your heat pump. Historical operational data is also available.

Installer
This option is used by the installer to configure the settings and servicing for your heating system.

Room temperature heating circuit 1
If heating circuit 1 is defined, the current room temperature is displayed here.

Room temperature heating circuit 2
If heating circuit 2 is defined, the current room temperature is displayed here.

Tank temperature
This displays the current temperature in the upper part of the 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 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
You can use this 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.

Stored operation data
This displays historical data.

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 operating the heat pump and system are usually configured by the installer.

Define system
The heating system's structure can be adjusted/modified using this option.

Service
Advanced settings are configured by the appropriate technical person.

5.2 Room temperature

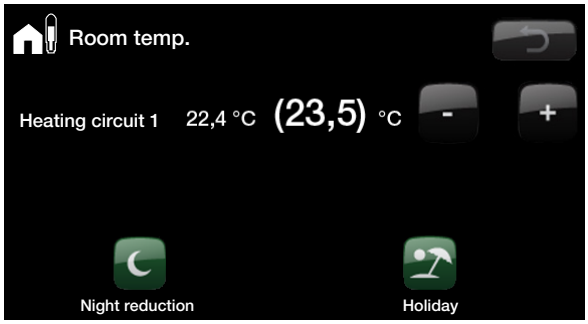
This is used to set the desired room temperature. Use the plus and minus buttons to set the temperature you want. The “setpoint” temperature is given in brackets. You can see the current value next to the brackets.

If two heating circuits are installed, the values for both are displayed here.

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

Room sensor is defined in the Installer/Define system/ Heating circuit menu. Select “Room sensor No” if the room sensor is poorly positioned, if the floor heating system has separate room sensors or if you use a fire place or open stove. The alarm LED on the room sensor still functions as normal.

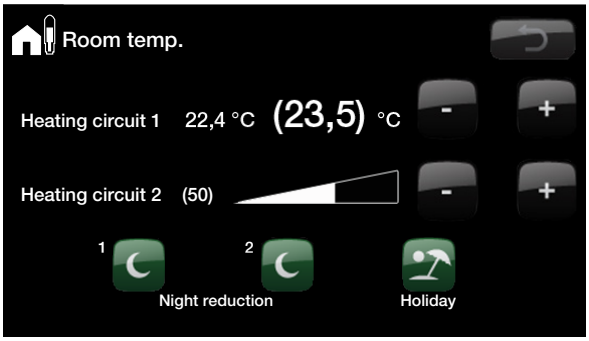
If you use the fire or open stove only occasionally, the firing process can affect the room sensor and reduce the temperature supplied to the radiators. It can then get cold in the rooms in other parts of the house. The room sensor can temporarily be deselected during the firing process. The heat pump 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 example above shows that the room temperature is 22.4°C, but the desired value (setpoint) is 23.5°C.

5.2.1 Setting without a room sensor

If a room sensor has not been installed (selected in the Settings menu), you adjust the room temperature using this option, which displays the setting range as a percentage. If this range is not sufficient, the default setting must be adjusted under the Installer/Settings/ Heating circuit menu.
Change the value in small steps each time (approx. 2 to 3 steps) and wait for the result (approx. one day), as there is a delay in the system responding.
Several adjustments may be necessary at different outdoor temperatures, but you will gradually achieve the right setting that will not need to be changed.



The example above shows how it operates with two heating circuits. Heating circuit 1 with a room sensor and heating circuit 2 without one.

5.2.2 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. The product’s alarm is triggered.

If a fault occurs with a room sensor, the heat pump automatically switches to operating according to the set curve. The product’s alarm is triggered.

! The thermostats of the radiators must always be fully open and operating correctly when the system is tuned.

5.2.3 Night reduction temperature

You use this menu to activate and set a reduction in the temperature at night. A night reduction means that you reduce the temperature indoors during scheduled periods, for example, at night or when you are working.

The value by which the temperature is reduced, Room temp reduced, is set under Installer/Settings/Heating circuit/Factory setting: -2°C.

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

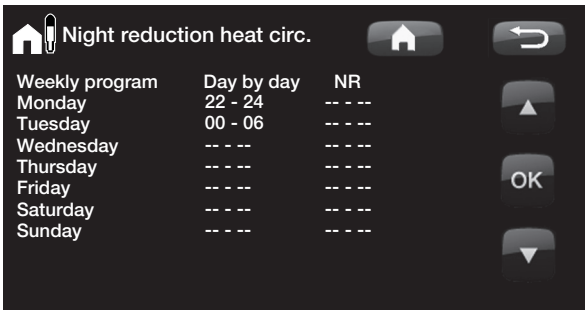
Day by day menu

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

The time set is when you want to have night reduction; the temperature is normal at other times.

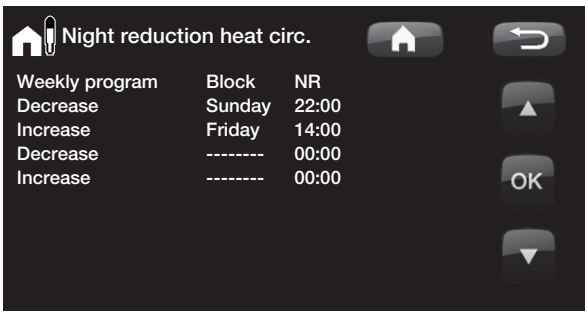
Block

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 are at home at weekends.



Example: On Monday evening at 10 pm the temperature is reduced to the set night reduction temperature. On Tuesday morning at 6 am it is raised to normal temperature.

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



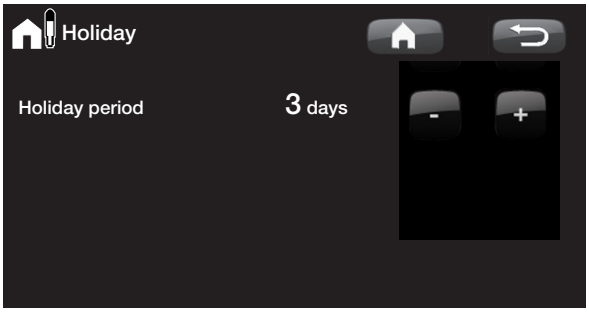
On Sunday at 10 pm the temperature is reduced with the value set for Room temp. being reduced. On Friday at 2 pm the temperature is increased to the set value again.

5.2.4 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 at which you set this parameter.



> **!** The value by which the temperature is reduced, Room temp reduced, is set under Installer/Settings/Heating circuit/Factory setting: -2°C.

5.3 DHW

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

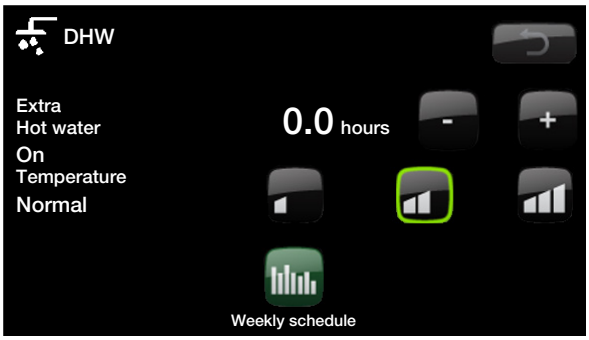
Temperature

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

Economic – Small DHW requirement.

Normal – Normal DHW requirement.

Comfort – Large DHW requirement.

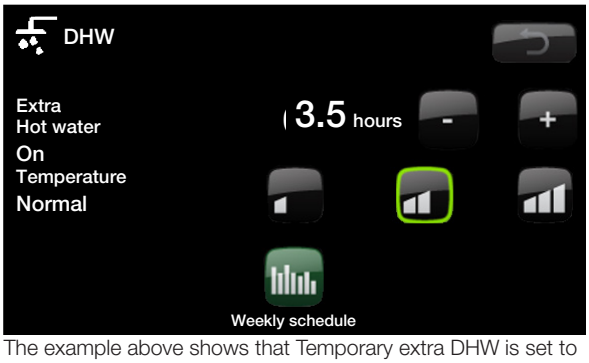


Tip: Start by setting to Economic and if you find that you are not getting enough hot water, increase it to Normal, and so on.

The temperature can also be changed in the menu Installer/Settings/DHW tank/Stop temp. If this is done, the green frame around the icon for this menu disappears.

Temporary extra DHW (On/Off)

You select this option if you want to activate the Temporary extra DHW function. When this function is activated, the heat pump starts producing extra hot water immediately. You also have the option to schedule DHW production for certain times using the Weekly program function, which is recommended.



The example above shows that Temporary extra DHW is set to On for 3.5 hours.

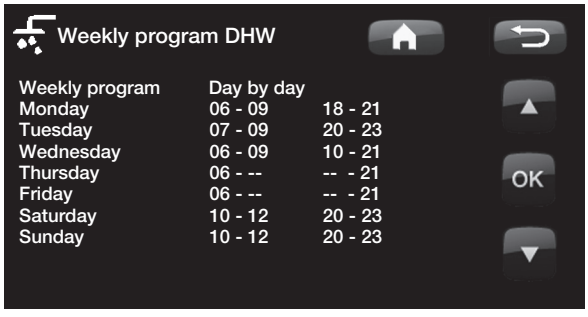
5.3.1 Weekly program DHW

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

The options are Off or Day by day.

Off – No scheduled DHW 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, in the morning and in the evening, for instance.



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 approx. 1 hour earlier than you need the hot water as it takes a while to heat up the water.

5.4 Operation

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

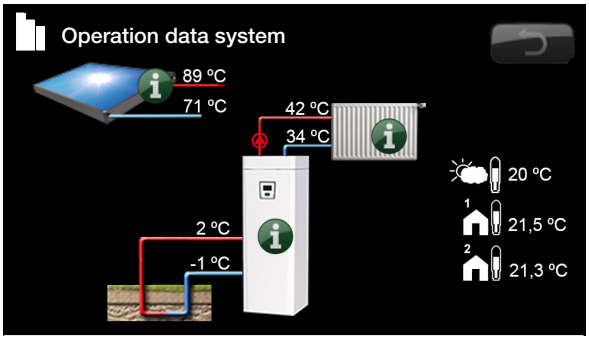
The screen shows the incoming and outgoing temperatures from the heat pump.

Brine in
At the top left of the heat pump (2°C) the brine's current temperature is shown from the collector to the heat pump.

Brine return
The bottom left value (-1°C) is the return temperature of the brine going back into the collector hose. The values vary during the year according to the heat source's capacity and the energy drawn out.

Primary flow radiators
At the right of the heat pump (42°C) the temperature of the primary flow to the house's radiators is shown. This value will vary during the year according to the parameters set and the current outdoor temperature.

Return radiators
At the bottom right (34°C) the return temperature is shown for the radiator water when the heating circuit is being charged, no value is shown otherwise. This value will vary during operation according to the parameters set, the heating system's capacity and the current outdoor temperature.

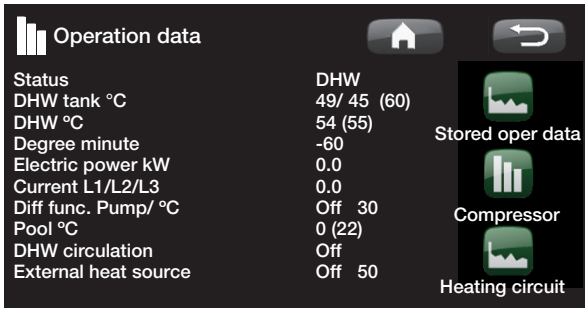


Information
Press the information button to display the operational data for the relevant item.

Current outdoor temperature
Shows the current outdoor temperature.
The product uses this value to calculate the various operational parameters.

Current indoor temperature
Shows the current room temperature (if a room sensor is selected during operation). If two heating circuits are installed, the values for both are displayed.

5.4.1 Operation data CTC GSi 12



This menu displays current temperatures and operational data. The first figure is the actual operational value, with the value in brackets being the setpoint which the heat pump is trying to achieve.

Status
Shows operating status. The various operating statuses are:

-> DHW
Hot water (DHW) is produced.

-> HC
Heat is produced for the heating circuit (HC).

-> Pool
Heat is produced for the pool.

-> Off
No heating takes place.

DHW tank °C **49/ 45 (60)**
Displays hot water temperatures in the tank: upper part and lower part. The value in brackets is the setpoint (stop temp.).

DHW °C **54 (55)**
Displays current temperature of the hot water. If no hot water is drawn then no temperature is shown, just the setpoint.

Degree minute **-60**
Shows current heat loss in degree minutes.

Electric power kW
Shows the output from the immersion heater (0 to 9.0 kW).

Current L1/L2/L3
Shows the system's total current consumption at the various phases L1/L2/L3, provided that three current sensors (accessories) have been fitted to the unit's incoming cables. If the current sensors are not identified, only the phase with the highest load is displayed. If the current exceeds the main fuse size, the boiler automatically switches down a power step to protect the fuses, for example, when several high-consumption appliances are being used in the house.

Diff func. Pump/ °C **Off/On /30**
Differential thermostat function. Shows whether the charge pump from the external tank is turned on. Also displays the temperature in the external tank.

Pool ºC **19 (22)**
Displays pool temperature and setpoint (in brackets).

DHW circulation **Off/On**
Shows whether the DHW circulation pump is turned on.

External heat source **Off/On /55**
Shows whether the external heat source is supplying heat. Also displays the temperature in the external tank.

5.4.2 Stored operation data

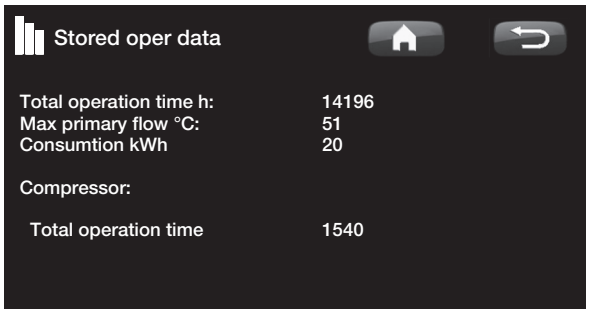
This menu shows the operational values for the heat pump over a long period.

Total operation time h
Shows the total time during which the product has been on.

Max primary flow °C
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 heat pump operation.

Consumption kWh
Shows how much electrical energy the product has used.

Total operation time
Displays the total operating time of the compressor.



5.4.3 Operation data, compressor

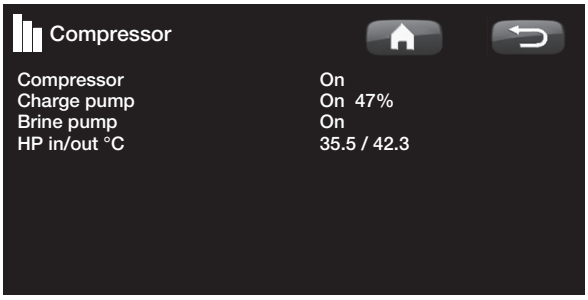
This menu is intended for servicing and advanced troubleshooting.

Compressor **(On/Off /65 rps)**
Shows whether the compressor is operating or not, as well as showing the compressor speed in rps (revolutions per second).

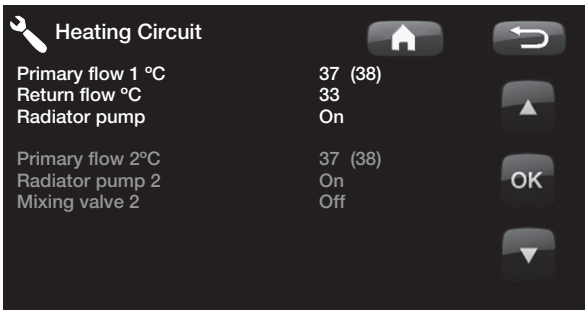
Charge pump **(On/Off /47%)**
Shows the charge pump's operating status and flow as a percentage.

Brine pump **(On/Off)**
Shows whether the brine pump is operating or not.

HP in/out °C
Shows the heat pump's return and primary flow temperatures.



5.4.4 Heating circuit



Primary flow °C
Shows the temperature supplied to the system's radiators, along with the temperature which the system is trying to achieve. This value will vary during the year according to the parameters set and the current outdoor temperature.

Return flow °C
Shows the temperature of the water returning from the heating circuit to the heat pump.

Radiator pump
Shows the radiator pump's operating status.

Accessories:

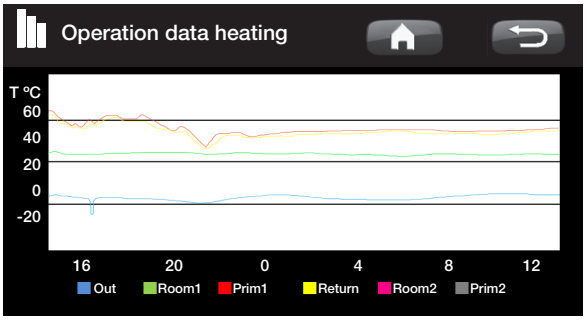
Primary flow 2 °C

Shows the temperature supplied to heating circuit 2, if it is installed.

Radiator pump 2
Shows the radiator pump's operating status.

Mixing valve 2
This indicates whether the mixing valve increases (opens) or reduces (closes) the heat supplied to heating circuit 2.

5.4.5 Operation data heating system



This displays the heating circuit's operation data 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 shows the current outdoor temperature.

The green/ pink curve shows room temperature 1 and 2 respectively.

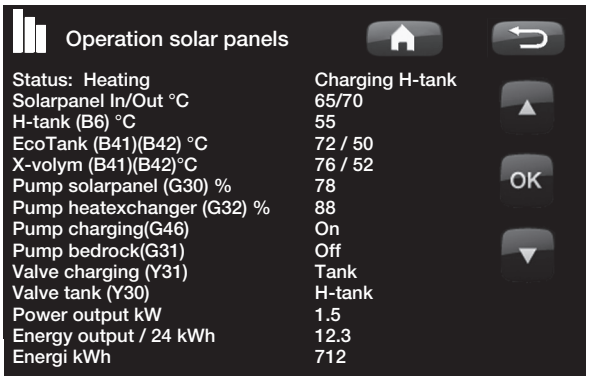
The red curve shows the primary flow temperature of the heated water.

The gray curve shows the primary flow temperature of heating system 2, if installed.

The yellow curve shows the return temperature from the heating systems.

5.4.6 Operation data, solar panels

This menu displays current temperatures and operating data for your solar collectors. The menu is only shown if solar collectors are defined.



Status

The operating status of the solar controls is shown here. The different operating modes that can be shown are: heating, not heating, charging EHS-tank, charging X-volume, charging bore hole, cooling panel, cooling tank, pre-cooling tank, sensor test and frost protect panel.

Solar panel In/Out °C
Shows the solar panel's incoming and outgoing temperatures.

EHS-tank (B47) ºC
Shows the setpoint and current temperature in the external heat source tank.

EcoTank (B41)(B42) °C
Shows EcoTank's top temperature, the setpoint and the tank's bottom temperature.

X-volume (B41)(B42) °C
Shows the X-volume tank's top temperature, the setpoint and the tank's bottom temperature.

Pump solar panel (G30) %
The speed of the solar panel's charge pump is shown here (or Off).

Pump heat exchanger (G32) %
If the intermediate heat exchanger is used, the speed of the charge pump between the intermediate exchanger and tank is shown here (or Off).

Pump charging (G46)
Whether the charge pump is in operation during transfer is shown here.

Pump bedrock
Whether the charge pump is in operation during bore hole charging is shown here.

Valve charging (Y31)
Shows whether charging is to tank or bore hole.

Valve tank (Y30)
When two tanks are being charged by solar power, the position of the diverting valve between the tanks is shown here.

Power output kW
Shows the panel's output.

Energy output / 24 kWh
Shows the amount of energy absorbed in the last 24 hours. If heat is taken from the tanks (e.g. if a panel is being protected against frost), negative energy is calculated. During bore hole recharging no useful energy is calculated. The value is updated at the end of the day (00:00).

Energy kWh
Shows accumulated amount of energy absorbed in kWh.

Negative values are displayed if energy is taken from the tank, e.g. when sensors are being checked and panels are being protected against frost.

The panel output is displayed during bore hole recharging but the energy is not classed as accumulated.

Status:

Heating/Not heating
Status: Shows whether the solar collector is heating or not.

Charging EHS-tank/Charging EcoTank/Charging X-volume/Charging bore hole
Status: Shows whether EHS-tank, EcoTank, X-volume and/or bore hole is being charged.

Sensor test
Status: Displays “sensor test” when circulation pump is running, to check whether solar panel can heat up.

(Charging bore hole)
Status: Shows whether circulation pump is stopped to check whether panel can charge tank.

Cooling panel/Cooling tank/Pre-cooling tank/Frost protect panel
Status: Displayed when any protection function has been activated.

5.5 Installer

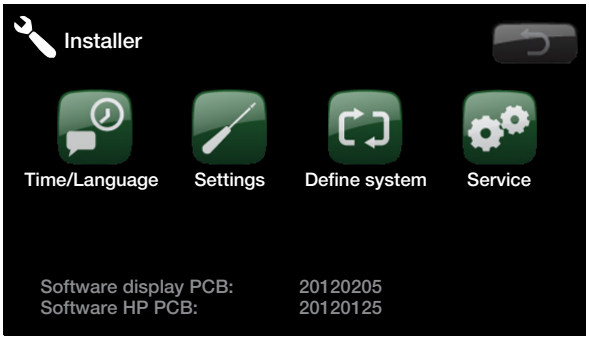
This menu contains four sub-menus. Time/Language, Settings, Define system and Service.

Time/Language includes time and language settings for your CTC GSi 12.

Settings are used both by the installer and users for installing the system.

Define system is used by the installer to define your heating system.

Service is used for troubleshooting and diagnosis. You will find here the options Function test, Alarm history, Factory settings code, Quick start compressor and Software update.



5.5.1 Time/Language

You use this to set the date and time. The clock saves the settings in the event of a power cut. Summer/winter time (daylight saving) is changed automatically.

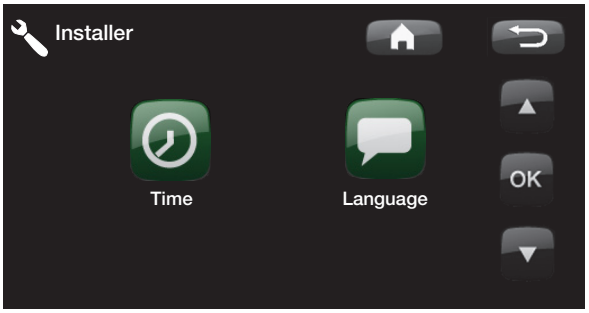
Setting the time

When a green box appears around the time, press OK and the first value is selected. Use the arrows to set the correct value.

When you press OK, the next value is highlighted.

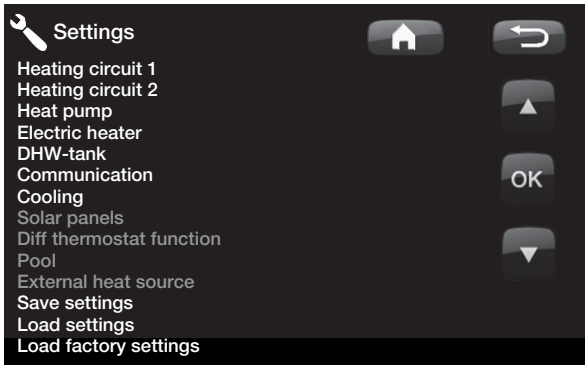
Setting the language

The current language has a green circle around it.



5.5.2 Settings

This menu 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.



Heating circuit 1 (or 2)

Max primary flow **55**

The maximum permitted temperature supplied to the radiators. This functions as an electronic limiter to protect the floor coils in underfloor heating systems. Heating circuit 2 can only give the same temperature as heating circuit 1 or a lower temperature.

Min primary flow **Off (Off, 15 to 65)**

You can use this option to set the minimum permitted temperature if you want a specific level of background heating during the summer in the basement or underfloor heating coils, e.g. in the bathroom. The heating in other parts of your property should then be switched off using thermostatic radiator valves or shut-off valves. Note that the radiator pump will then operate for the whole summer. This means that the temperature supplied to the radiators does not fall below a selected temperature, for example +27°C.

"Off" means that the function is turned off.

Heating mode **Auto/On/Off**

Switching of heating season or summer season can take place automatically (auto) or a selection can be made here to set the heating to be on or off.

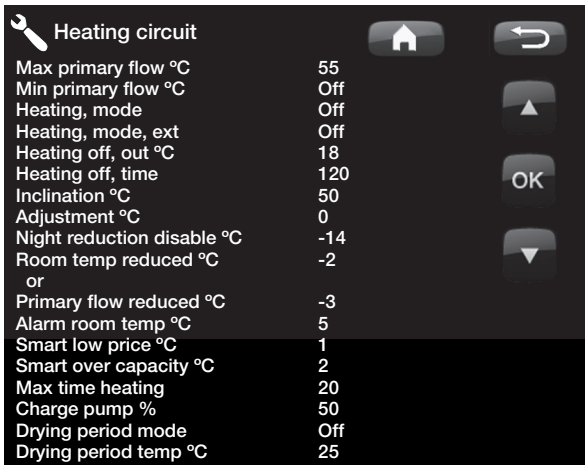
Auto = the switch between heating season (On) and (Off) (also known as summer mode) takes place automatically.

On = continuous heating season, the radiator pump circulates constantly.

Off = there is no heating, the radiator pump does not run (is turned over).

Heating mode, ext **--/Auto/On/Off**

Switching between heating and summer mode can be controlled remotely. Find out more in the section entitled "Define/Remote control".



Tip: Read more about these settings in the section entitled "Your home's heating settings".

Heating off, out **18 (10 to 30)**
Outdoor temperature limit at which the house no longer requires heating. The radiator pump stops . The radiator pump is activated daily for a short period to reduce the risk of jamming. The system restarts automatically when heating is required.

Heating off, time **120 (30 to 240)**
The delay period before the radiator pump stops as described above.

Inclination (default setting) **50 (25 to 85)**
Inclination means the temperature your property needs at different outdoor temperatures. See more detailed information about this in the section entitled “Your home’s heating settings”. The value set corresponds to the temperature of the radiators when the outdoor temperature is -15ºC. After this default setting, fine adjustment takes place in the “Room temperature” menu.

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.

Adjustment **0 (-20 to 20)**
Adjustment means that the temperature level can generally be raised or lowered at all outdoor temperatures. After this default setting, fine adjustment takes place in the “Room temperature” menu.

Night reduction disable ºC **5 (-40 to 40)**
When the outdoor temperature is lower than this, the night reduction stops as too much energy is consumed and it takes a long time to increase the temperature. This menu overrides remote control.

Room temp reduced **-2 (0 to -40)**
“Room temp reduced” is displayed if a room sensor is installed.
This is where it is defined how many degrees the room temperature will be reduced by during the various scheduled reduction periods, e.g. Night reduction, Holiday, etc.

Example:
Room temp reduced -2 means that the room temperature is reduced by 2°C from its normal temperature.

Primary flow reduced **-3 (0 to -40)**
If there is no room sensor installed, “Primary flow reduced” is displayed instead.

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

Alarm room temp ºC **5**
When the room temperature is too low, the message “Low room temperature alarm” is sent to CTC SMS. The room sensor must be connected and activated. NB: For more information on the SMS function, see the “CTC SMS” manual.

Smart low price ºC **1**
Setting to increase adjustment at low energy price, via Smart Grid. Find out more in the section entitled “Define/Remote control/Smart Grid”.

Smart over capacity ºC **2**
Setting to increase adjustment at over capacity energy price, via Smart Grid. Find out more in the section entitled “Define/Remote control/Smart Grid”.

Max time heating **40 (10 to 120)**
This is the maximum time spent by the heat pump charging the heating circuit if heat is needed in the DHW tank.

Charge pump % **100 (Off/1 to 100)**
Setting for speed of charge pump, when charging the heating circuit.

Floor function mode **Off (Off/1/2/3)**

Floor drying function for newly-built properties.

The function limits the calculation of primary flow temperature (setpoint) for “Your home’s heating settings” to the schedule below.

Mode 1

Floor drying function for 8 days.

The (setpoint) for the heating circuit is set to 25ºC for 4 days.

2. On Days 5–8, the value set in “Floor function temp ºC” is used.

(From Day 9 onwards the value is calculated automatically according to “Your home’s heating settings”.)

Mode 2

Floor drying function for 10 days + stepped increase and decrease.

1. Stepped increase start. The (setpoint) for the heating circuit is set to 25ºC. The (setpoint) is then raised by 5ºC each day until it is equal to the “Floor function temp ºC”.

The final step may be less than 5ºC.

3. Stepped decrease. After the stepped increase and 10 days at an even temperature, the temperature (setpoint) is reduced to 25ºC in daily 5ºC stages.

The final step may be less than 5ºC.

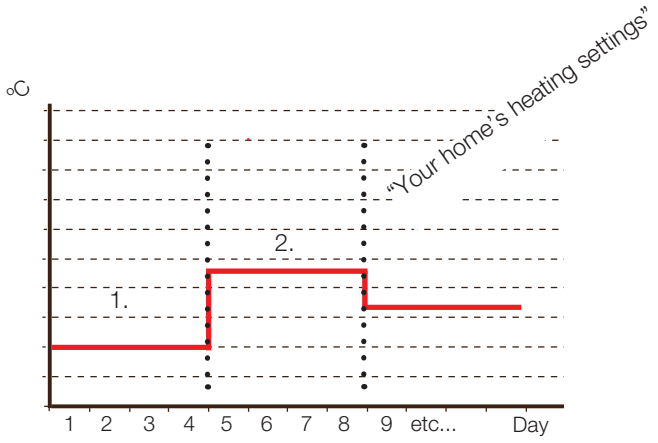
(Following the stepped decrease and one day at the (setpoint) of 25ºC the value is calculated automatically according to “Your home’s heating settings”.)

Mode 3

This mode starts with Mode 1, followed by Mode 2 and finally by “Your home’s heating settings”.

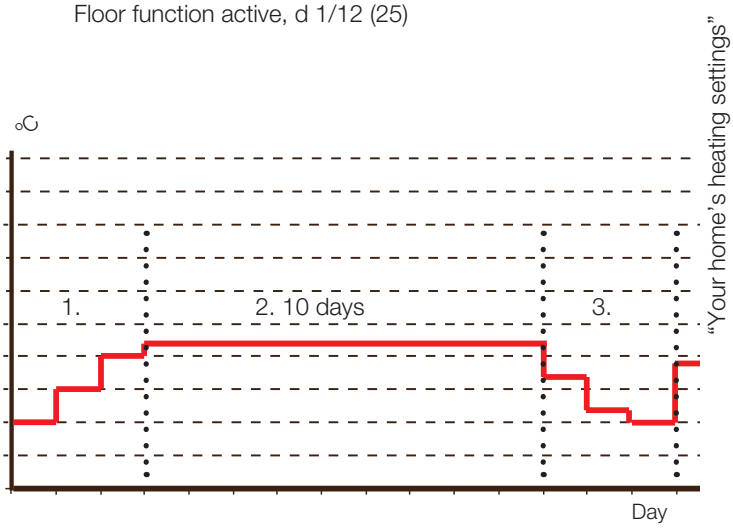
Floor function temp ºC **25 (25 to 55)**

Here you set the temperature for 2 as shown above.

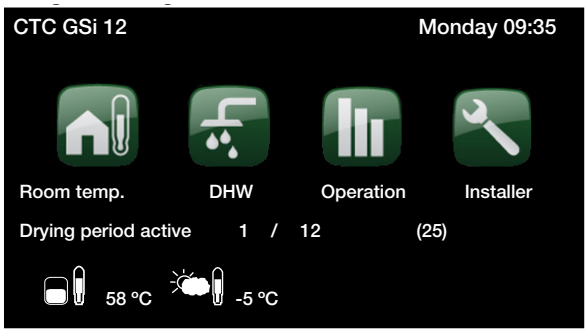


Example of Mode 1 with “Floor function temp ºC” of 38ºC.

Floor function active, d 1/12 (25)



Example of Mode 2 with “Floor function temp ºC” of 37ºC.



Example of operation data for Mode 2, Day 1 of 12 with current setpoint (25) ºC.

5.6 Heat pump

Compressor **Permitted/Blocked**

The product is supplied with a blocked compressor. Since the compressor is blocked, the product operates like an electric boiler with full functionality. Permitted means that the compressor is allowed to operate.

Brine pump on **Auto/10d/On**

After installation is complete, you can choose to run the brine pump constantly for 10 days to remove air from the system. The pump then returns to auto mode.

“On” means that the brine pump will operate continuously.

“Auto” means that the circulation pump will operate at the same time as the compressor.

Tariff HP **Off (On/Off)**

Find out more in the section entitled “Define/Remote control”.

Smart block HP **Off (On/Off)**

Find out more in the section entitled “Define/Remote control/Smart Grid”.

Start at degree minute **-60 (-900 to -30)**

This states at which degree minute the heat pump will start.

Max RPS **100 (50 to 100)**

Sets the maximum permitted compressor speed.

Max RPS silent mode **50 (49 to 120)**

Maximum RPS when noise is limited. The compressor’s maximum speed when noise limitation is active.

NB: You should note that the maximum output of the heat pump will fall and the need to add heat may increase.

Timer Silent mode

This menu shows scheduled weekday periods when silent mode (noise reduction) should be activated. This schedule is repeated every week.

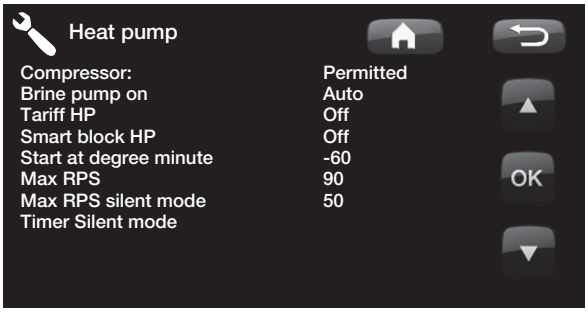
Silent mode **Off/On**

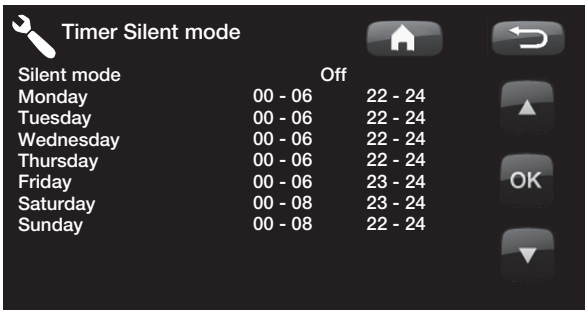
It is possible to start a schedule, e.g. at night time, with limited compressor speed to reduce the sound image when required.

Example:

Monday 06–09 18–21

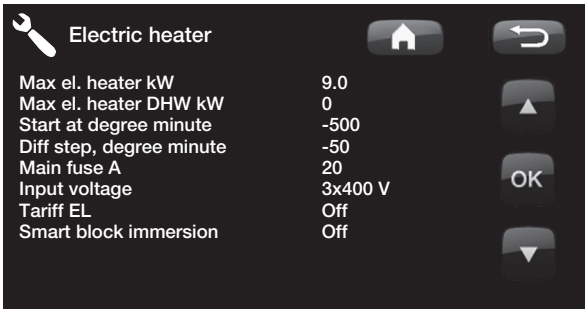
On Monday the noise is reduced between 6 am and 9 am and between 6 pm and 9 pm; normal operation applies apart from these times.





The time on the left must be lower than the time on the right for the interval to be valid.

5.7 Electric heater



Max el. heater kW **9.0 (0 to 9.0)**
Maximum permitted output from electric immersion heater.

Max el. heater DHW kW **0 (0 to 9.0)**
Maximum permitted output from the immersion heater when charging hot water. Adjustable between 0 and 9.0 kW in steps of 0.3 kW.

Start at degree minute **-500 (-900 to -30)**
This states at which degree minute the electric immersion heater will start.

Diff step, degree minute **-50 (-20 to -300)**
This states the difference in degree minutes between the increments of output for the immersion heater. The output of the immersion heater is Max el. heater kW divided into 10 increments.

Main fuse A **20 (10 to 35)**
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.

Input voltage **3x400 V**
The value is set here to indicate whether the product is connected at 3x400 V, 1x230 V or 3x230 V.

Tariff EL **Off (On/Off)**
Find out more in the section entitled "Define/Remote control".

Smart block immersion **Off (On/Off)**
Find out more in the section entitled "Define/Remote control/Smart Grid".

5.8 DHW tank

Stop temp °C **58 (40 to 65)**
At this temperature charging of the DHW tank stops.

Start/stop diff upper °C **5 (3 to 10)**
Hysteresis before the heat pump and the immersion heater start or stop the charging.

Max time DHW **20 (10 to 60)**
This is the maximum time that the heat pump charges the hot water tank, if this is needed for the heating system.

DHW °C **55 (38 to 65)**
The temperature of outgoing hot tap water.

Charge pump % **100 (Off/1 to 100)**
Setting for speed of charge pump, when charging the hot water.

Smart low price ºC **10 (5 to 30)**
Find out more in the section entitled “Define/Remote control/Smart Grid”.

Smart over capacity ºC **10 (5 to 30)**
Find out more in the section entitled “Define/Remote control/Smart Grid”.

DHW circulation (accessory)

The settings for hot water circulation require the installation of an expansion card accessory.

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

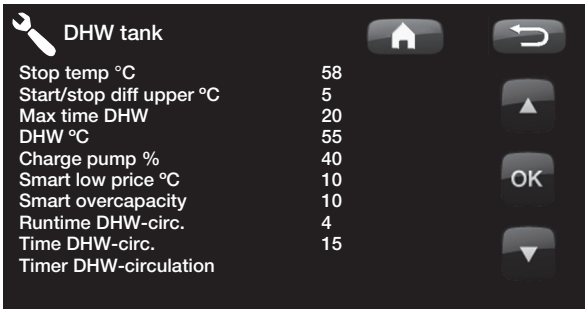
Time DHW-circ. **15 (5 to 90)**
The time during which domestic hot water circulation takes place. DHW circulation must have been defined in the Installer/Defined system menu.

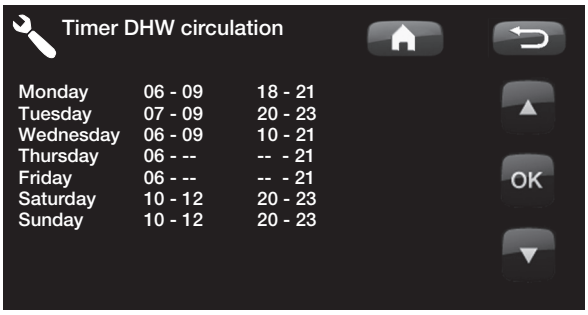
Timer DHW circulation
This menu displays the scheduled weekday periods when the DHW circulation pump is to run. This schedule is repeated every week.

Example:

Monday 06–09 18–21

On Monday hot water circulation takes place between 6 am and 9 am and between 6 pm and 9 pm; normal operation applies apart from these times.





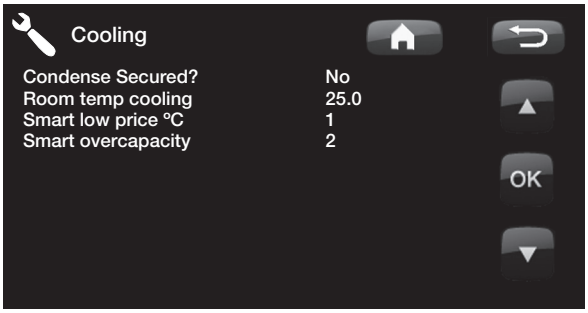
The time on the left must be lower than the time on the right for the interval to be valid.

5.9 Communication

These settings are activated for the accessory's superior systems and are not used in normal operation. They are not described in these instructions.

Cooling

Cooling is adjusted using primary flow sensor 2 (B2), which means that heating circuit 2 and cooling cannot be used simultaneously.



Condense Secured? No (No/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.

(No) means a setting range for room temperature of 18–30ºC and (Yes) means a setting range of 10–30ºC

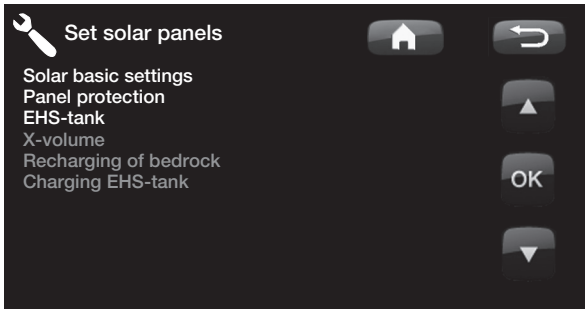
Room temp cooling 25 (10 or 18 to 30)
This is used to set the desired room temperature for cooling.

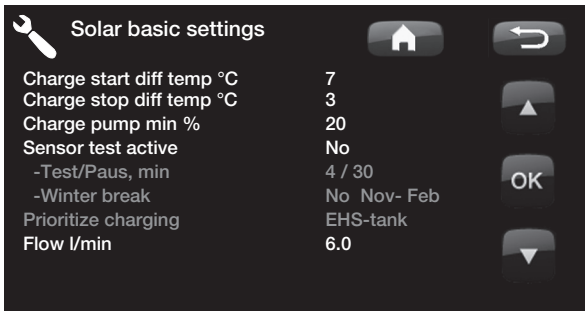
Smart low price ºC 1 (Off, 1 to 5)
Find out more in "Define/Remote control/Smart Grid".

Smart overcapacity ºC 1 (Off, 1 to 5)
Find out more in "Define/Remote control/Smart Grid".

5.10 Solar panels (accessories)

The settings needed for the solar heating system to function optimally are entered here. It is important that this default setting is adjusted for your heating system. Incorrectly set values may lead to the intended energy saving being lower. The menu names that are shown in grey are not active and do not show in white until they are activated. Activation takes place in the “Define system” menu.





Solar basic settings

Charge start diff temp °C **7 (3 to 30)**
Here you can set the temperature difference at which charging of solar energy should start. The solar panel must be this many degrees warmer than the tank temperature for charging to start.

Charge stop diff temp °C **3 (3 to 30)**
Here you can set the temperature difference at which charging of solar energy should stop. When the temperature difference between the solar panel and the tank falls below this set value, the charging stops.

Charge pump min % **20 (20 to 100)**
The lowest permitted speed of the charge pump (G30, G32) is indicated here.

Sensor test active **No (No/Yes)**
Whether or not the solar sensor should be activated is indicated here. If the solar panel sensor cannot can be installed in such a way that the actual panel temperature can be detected, the charge pump needs to run for a while for the panel’s fluid to have an effect on the sensor.

-Test/Pause, min 4 (1 to 20) /30 (80 to 180)
Test (4): This is where you indicate the duration of the sensor test so that awkwardly positioned sensors have enough time to detect the correct temperature. The length of the sensor test should be as short as possible to prevent heat being taken from the tank unnecessarily in situations when the solar panel cannot charge.

Pause (30): The time between the sensor tests is indicated here. A new sensor test will start after the pause.

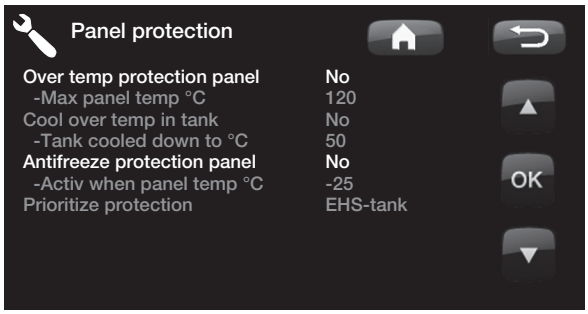
-Winter break **No (No/Yes) Nov–Feb**
The months during which there will not be a sensor test are indicated here. During the winter, when the panel (as a rule) cannot heat the tank, there is no need to carry out sensor tests. A sensor test carried out at that time of year can lead to some tank heat being dumped in the solar panel, which should be avoided.

Prioritise charging of: **EHS/ X-volume**
This is where you indicate whether the tank for the external heat source or the X-volume (acc. tank) should be prioritised when charging (shown only if alternate charging has been defined).

Flow l/min **6.0 (0.1 to 50.0)**
The flow circulating through the solar collectors should be indicated here. (This can be read from the flow meter in the system unit.) The flow must be read when the solar panel pump is running at 100%. NB: The flow is used as the basis for calculating the power and cumulative energy. Incorrect flows will therefore produce incorrect values for these parameters. The pump can be set manually to 100% flow in the menu: Installer/ Service/Function test to take a reading.

Panel protection functions

This is where you set the functions that protect the solar panels from over temperatures and the risk of freezing.



Over temp protection panel **No (Yes/No)**
The protection function is activated here to protect the solar panel against over temperatures. This is done by cooling the solar panel.

-Max panel temp °C **120 (100 to 150)**
The maximum temperature that the panel may reach is indicated here; the cooling function starts after it is reached. When cooling is active, heat is dumped 1) in the bore hole if there is bore hole recharging and 2) then in the tanks up to their maximum permitted temperature.

When the temperature in the solar panel goes above 120ºC, the circulation pump will start and the text “cooling panel” will be displayed in operation data.

When the temperature in the solar panel drops, but remains high in the tank: The circulation pump will continue to run and the text “cooling tank” will be displayed in operating data. This will continue until the tank has reached 60ºC.
(Charge temperature, factory setting.)

Cool over temp in tank **No (No/Yes)**
If energy has been transferred to the tank in order to cool the panel, the function to cool the tank by conveying energy to the panel is activated here. This is to enable the system to receive panel cooling (e.g. on the next day).

-Tank cooled down to °C **70 (50 to 80)**
This is where it is indicated what temperature the tank is to be cooled to once it has reached over temperature. When this happens, “extra cooling” will be displayed in operation data.

Antifreeze protection panel **No (No/Yes)**
Winter time; at extremely cold outdoor temperatures there is a risk of the panels freezing (despite antifreeze fluid). The function to take heat from the tank to the panel is activated here.

-Active when panel temp °C **-25 (-30 to -7)**
This is where the temperature in the solar collector at which the frost protection starts is indicated. When the panel sensor shows a temperature below the frost protection limit, the charge pump starts until the sensor temperature is 2 degrees warmer than the limit value (hysteresis 2ºC).

Prioritise protection **EHS-tank / X-volume**
This is where the specific tank that the protection functions should protect is indicated.

This is only applicable if system 3/X-volume is activated.

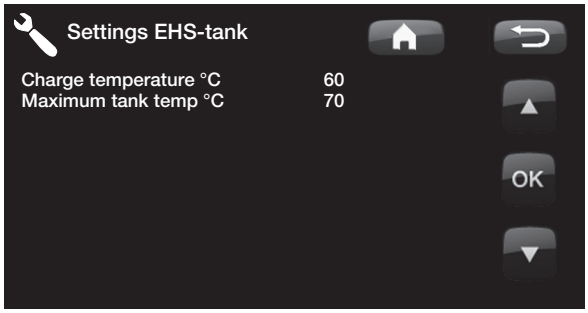
5.11 Settings EHS-tank

Settings applicable only when EHS-tank is activated. (Systems 1 and 3 only.)

Charge temperature °C **60 (10 to 95)**
Setting for the maximum permitted temperature in the EHS-tank. Charging stops once the set temperature has been reached.

Maximum tank temp °C **70 (60 to 125)**
If the solar panel temperature exceeds “max. panel temp”, energy is allowed to be transferred to the panel up to this set tank temperature.

Check that the protection function “Over temp protection panel” is activated.

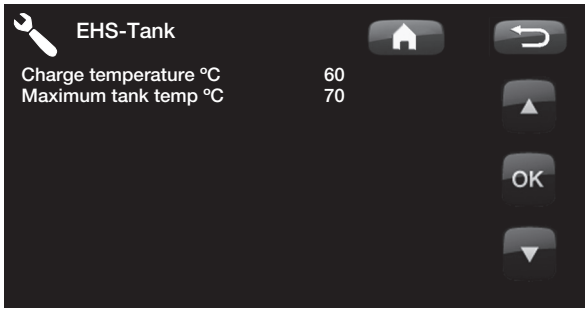


Settings EcoTank

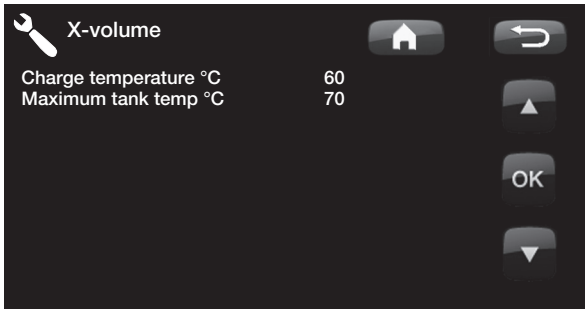
Settings applicable when EcoTank is activated. This is also called system 2.

Charge temperature °C **60 (10 to 70)**
Setting for the maximum permitted temperature in the EcoTank. Charging stops once the set temperature has been reached.

Maximum tank temp °C **70 (60 to 80)**
If the solar panel temperature exceeds its maximum set temperature, energy is permitted to be transferred to the tank up to this set tank temperature.
Check that the protection function “Over temp protection panel” is activated.



5.12 Settings X-volume



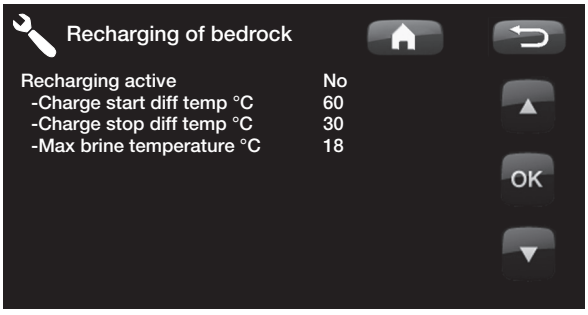
Settings applicable when X-volume is activated.

This is also called system 3.

Charge temperature °C **60 (10 to 95)**
Setting for the maximum permitted temperature in the X-volume. Charging stops once the set temperature has been reached.

Maximum tank temp °C **70 (60 to 125)**
If the solar panel temperature exceeds its maximum set temperature, energy is permitted to be transferred to the tank up to this set tank temperature.
Check that the protection function “Over temp protection panel” is activated.

Settings Recharging of bedrock



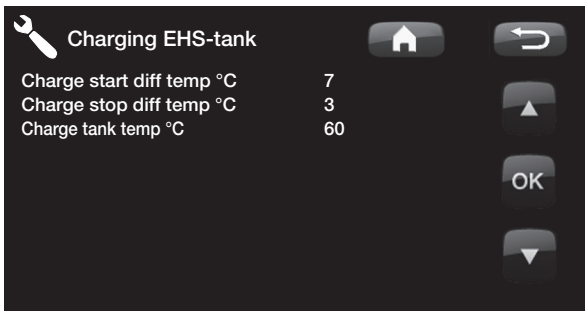
Recharging active **No (No/Yes)**
The “recharging of bore hole” function is activated here. The function is designed to protect the solar panel against over temperatures, but it can also charge the bore hole with energy.

-Charge start diff temp °C **60 (3 to 120)**
Here you can set the temperature difference at which charging of the bore hole should start. The solar panel must be this many degrees warmer than the brine in the bore hole for charging to start. If the panel is charging or can charge the tank, tank charging is prioritised.

-Charge stop diff temp °C **30 (1 to 118)**
Here you can set the temperature difference at which charging of the bore hole should stop. When the temperature difference between the solar panel and the brine falls below this set value, the charging stops.

-Max brine temp °C **18 (1 to 30)**
Setting for the maximum permitted brine temperature. Charging of the bore hole ceases when this value has been reached.

Charging EHS-tank



This function concerns charging conditions between EcoTank and EHS-tank in solar system 2.
This function CANNOT be combined with the “Diff thermostat function”.

Charge start diff temp °C **7 (3 to 30)**
Here you can set the temperature difference determining when charging to the EHS-tank should start. The EcoTank in system 2 must be this many degrees warmer than the EHS-tank for charging to start.

Charge stop diff temp °C **3 (2 to 20)**
Here you can set the temperature difference determining when charging to the EHS-tank should stop. When the temperature difference between the EcoTank and the EHS-tank falls below this set value, charging stops.

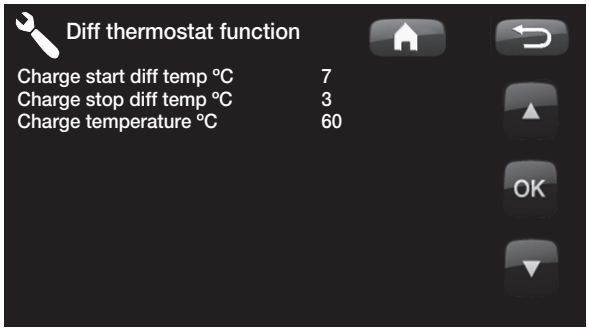
Charge tank temp °C **60 (10 to 80)**
Setting for the maximum permitted temperature in the EHS-tank. Transfer stops once the set temperature has been reached.

5.13 Diff thermostat function

The diff thermostat function is used if you want to transfer heat from a tank with the sensor (B46) to a tank with the sensor (B47).

The function compares the temperatures in the tanks and when it is warmer in the first tank (B46), charging starts to the second tank (B47).

However, this function cannot be combined with the same function in a solar heating system (when e.g. an EcoTank is connected). This is because the same outlets and sensors are used for both functions.



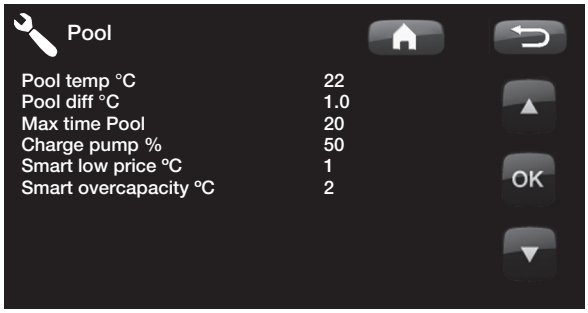
Charge start diff temp °C **7 (3 to 30)**
Here you can set the temperature difference determining when charging to the EHS-tank should start; the temperature must be this many degrees warmer than the EHS tank for charging to start.

Charge stop diff temp °C **3 (2 to 20)**
Here you can set the temperature difference determining when charging to the EHS-tank should stop. When the temperature difference falls below this set value, charging stops.

Maximum tank temp °C **80 (10 to 95)**
Setting for the maximum permitted temperature in the EHS-tank. Transfer stops once the set temperature has been reached.

! Ensure a high flow on the pump (G46) so that a low temperature difference of approx. 5–10°C is achieved over the EHS tank during charging.

5.14 Pool (accessory)



Pool temp ºC **22 (10 to 58)**
The pool temperature is set in this menu.

Pool diff ºC **1.0 (0.2 to 5.0)**
The permitted difference between the start and stop temperature in the pool is specified here.

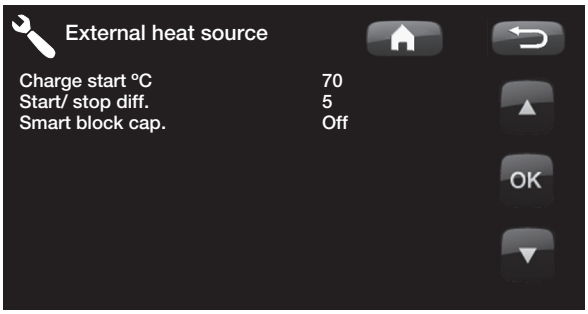
Max time Pool **20 (10 to 150)**
When there is a need for pool heating and heating/hot water, the maximum time for pool heating is shown here.

Charge pump % **50 (0 to 100)**
The charge pump speed is set here.

Smart low price ºC **1**
Find out more in “Define/Remote control/Smart Grid”.

Smart overcapacity ºC **2**
Find out more in “Define/Remote control/Smart Grid”.

5.15 External heat source (EHS)



Charge start °C **70**
This is the minimum temperature required in the external heat source tank (B47) for the mixing valve to open and emit heat to the system.

Start/stop diff **5**
Hysteresis before charging to the extra heat source starts or stops.

Smart block cap. **Off (On/Off)**
Blocks the tank from charging when there is an overcapacity of electricity.
Find out more in “Define/Remote control/Smart Grid”

Save settings

Here your own settings can be stored; confirm with the “OK” button.

Load settings

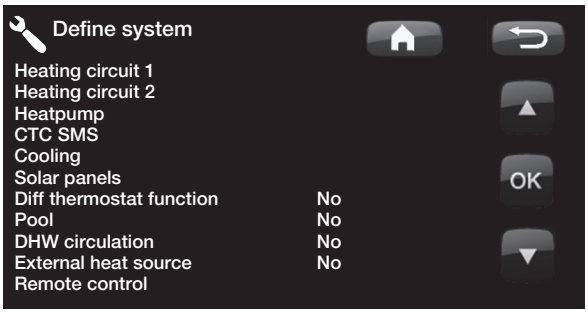
The saved settings can be reloaded using this option.

Load factory settings

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

5.16 Define system

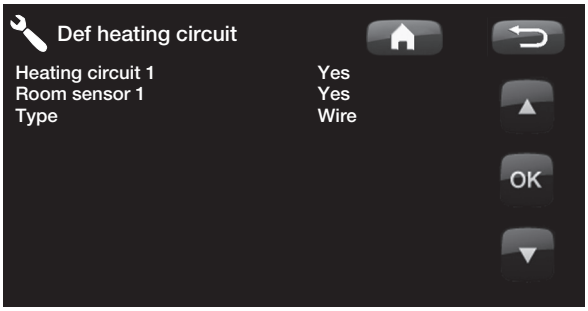
You can use this option to define your heating circuit and how it is controlled, with or without a room sensor. The heat pump's flow switch is defined.



Def. heating circuit 1 and/or 2

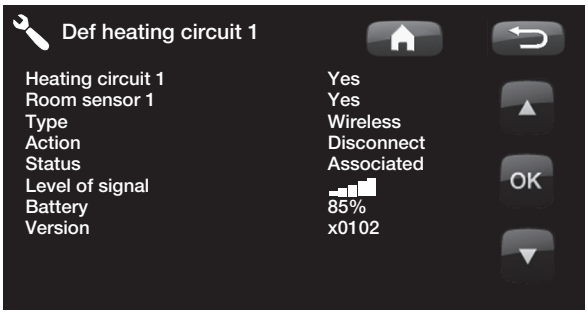
Specify whether the room sensor should be connected to the system.

Select whether the room sensor for the heating circuit is permanently connected or wireless. Wired/Wireless



If a wireless room sensor has been installed, scroll down to "Room sensor: Connect" and press "OK". The cursor moves to the word "Connect". Press "OK" again. The system now waits for the room sensor to communicate with the heat pump.

See the manual for the wireless room sensor for more information.



5.16.1 Def. heat pump

Specify whether or which type of level switch is installed in the system.

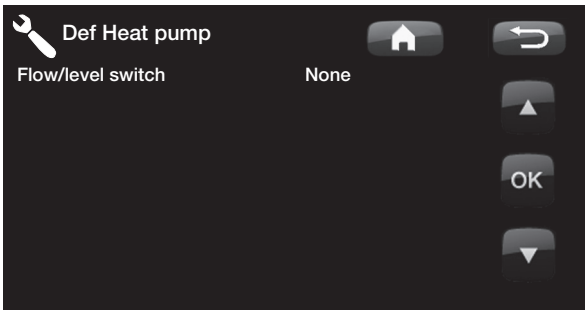
Choose between:

None

NC (Normally Closed)

NO (Normally Open).

Flow/level switch must also be set under the section entitled "Remote control".



NB: If the expansion card has not been installed and an accessory has been defined, the product will emit an alarm: **Comm. error expansion card**.

5.16.2 Define SMS (accessory)

This is for defining whether SMS control is installed (accessory).

Activate **Yes (Yes/No)**

If “Yes”, the menus below will be displayed.

Level of signal

The signal strength of the 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.

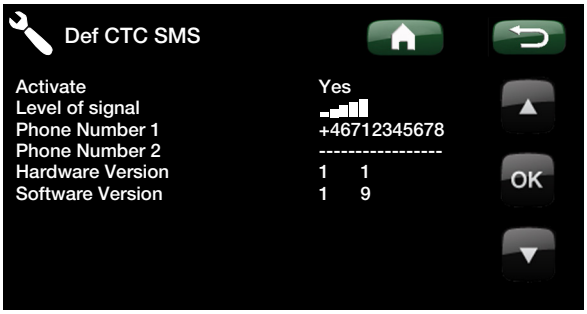
Hardware Version

The hardware version of the SMS accessory is shown here.

Software version

The software version of the SMS accessory is shown here.

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



5.16.3 Define cooling (accessory)

The cooling function is adjusted using primary flow sensor 2 (B2), which means that heating circuit 2 and cooling cannot be used simultaneously.

Cooling **No (No/Yes)**

This is for selecting whether cooling is installed.

See the CTC EcoComfort manual for more information.

5.16.4 Def. Solar panels (accessory)

Solar panels used **No (No/Yes)**

Specify here whether solar panels are used.

Recharge bedrock **No (No/Yes)**

Specify here whether recharging to bedrock (bore hole) or ground coil is installed (only possible for ground source heat pumps).

Alternate charging **No (No/Yes)**

This function activates system 3.

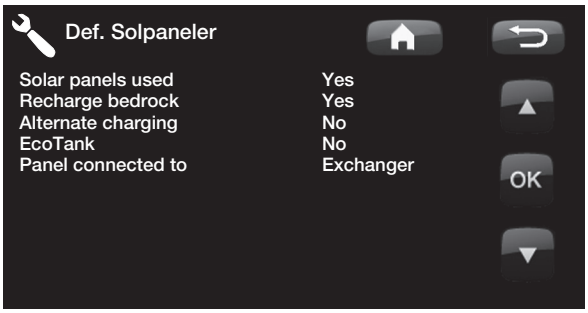
The function lets you choose to prioritise charging of the external heat source (EHS) or X-volume.

EcoTank **No (No/Yes)**

This function activates system 2 with EcoTank buffer tank (or equivalent).

Panel connected to **exchanger (coil/exchanger)**

Specify here whether there is a solar coil in the EcoTank or an intermediate exchanger is installed.



5.16.5 Define Diff thermostat function

Specify here whether the diff thermostat function is to be used in the system.

Diff thermostat function **No (No/Yes)**

Define Pool (accessory)

Specify here whether Pool should be connected to the heating circuit.

The expansion card accessory needs to be installed for this function.

Pool **No (No/Yes)**

Define DHW circulation (accessory)

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

Set this if hot water circulation with circulation pump G40 is to be used.

The expansion card accessory needs to be installed for this function.

Define External heat source (EHS)

Specify here whether an external heat source is connected to the heating circuit.

External heating source **No (Yes/No)**

6. Define Remote control

The remote control function in CTC's products provides a wide range of opportunities to adjust the heating externally. This section covers the remote control. There are four programmable inputs that can activate the following functions:

- Heat pump tariff
- Immersion heater tariff
- Night reduction
- Ripple control
- Additional domestic hot water
- Flow/level switch
- Heating from HS1
- Heating from HS2
- Smart A
- Smart B

Terminal blocks – inputs

There are two programmable 230V inputs and two low-voltage ports on the relay card (A2).

Open terminal block = no external effect. (Normal NO).

Closed terminal block = function activated externally.

Designation	Terminal block name	Connection type
K22	A14 & A25	230 V
K23	A24 & A25	230 V
K24	G33 & G34	Low voltage
K25	G73 & G74	Low voltage

Example:

Night reduction is normally activated on terminal block K24.

Open terminal block K24 = "normal heating"

Closed terminal block K24 = Temperature reduction in accordance with night reduction

The function is activated when pole positions G33 and G34 on the PCB are short-circuited

NB: Enertech AB is NOT responsible for the required heat being produced if the remote control has blocked the heating over a long period.

6.1 Remote control procedure

Assign input

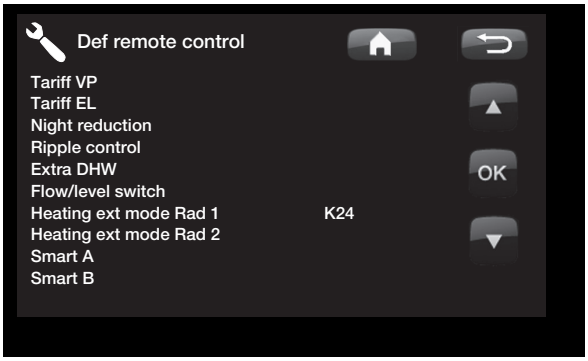
First of all, an input is assigned to the function or functions to be controlled remotely.

This is done in "Define Remote Control".

Example

In the example, there is manual control of whether the heating is to be on or off in Heating System 1 (HS1).

First of all, "Heating from HS1" is assigned input K24.



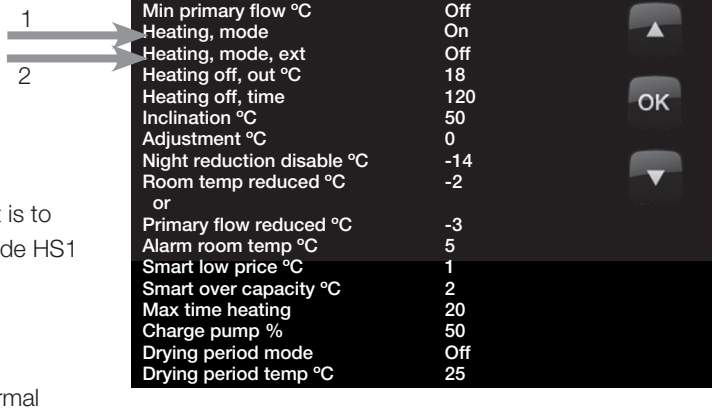
Example in which "Heating, ext. mode HS1" has been assigned terminal block "K24" for remote control.

NB: Enertech AB is NOT responsible for the required heat being produced if the remote control has blocked the heating over a long period.

Activate/select function.

When an input is assigned, the function must be activated or set in the Settings menu.

In the example with remote controlled "Heating, ext. mode", K24 is assigned. A selection is then made of what is normal mode (arrow 1).
Normal mode was selected here as:
Heating, mode (On)



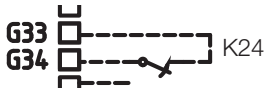
Example in which "Heating mode" is normally "On" in the heating season, but when terminal block K24 is closed "Off" is activated and the heating is switched off.

When this has been done, you programme what is to happen at Remote Control/Heating, external mode HS1 (closed input, arrow 2).

Arrow 2 indicates the selection "Off".

So in this example the heating is always on. (Normal mode)

But when terminal block K24 is closed “Off” is activated and the heating is switched off. The heating remains switched off until you choose to start heating up by opening K24.



Open terminal block = "On" (in this example)

Closed terminal block = "Off" (in this example)

NB: Enertech AB is NOT responsible for the required heat being produced if the remote control has blocked the heating over a long period.

The functions in remote control.

HP tariff

When electricity suppliers use a differentiated tariff, you have the opportunity to block the heat pump when the electricity tariff is high.
NB: If both the heat pump and the immersion heater are blocked, the building may be without heating for a long time. It is therefore recommended that you only block the electric heater with the tariff.

Electricity tariff.

When electricity suppliers use a differentiated tariff, you have the opportunity to block the immersion heater when the electricity tariff is high.

Night reduction

Night reduction means that you reduce the temperature indoors during scheduled periods, for example at night or when you are at work.

Ripple control

Disconnecting the compressor and immersion heater during a certain period which is defined by the electricity supplier (special equipment).

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.

Additional Domestic Hot Water

Select this option if you want to activate the *Extra DHW* function.

NB: Enertech AB is NOT responsible for the required heat being produced if the remote control has blocked the heating over a long period.

Flow/level switch
In some cases, extra protection is required due to local requirements or provisions. For example, the requirement in some areas is for the system to be installed within a water catchment area. The pressure/level switch is defined in the Advanced/Define system/Def. Heat pump menu. If there is a leak, the compressor and brine pump stop and the Flow/level switch alarm appears on the display.

Heating, ext. mode HS1

Heating, ext. mode HS2
With remote controlled "Heating, etc. mode", "On" is selected if the heating is to be on or "Off" if the heating is to be switched off. "Auto" mode can also be selected.

Read more in the section entitled "Your home's heating curve".

Smart A

Smart B
Smart Grid offers an opportunity to control from the outside whether heating is to be calculated as normal price, low price or overcapacity. The heat pump and immersion heater can also be blocked in a way similar to "Ripple control".

NB: Enertech AB is NOT responsible for the required heat being produced if the remote control has blocked the heating over a long period.

6.2 Smart Grid

The "Smart Grid" function selects different heating options depending on the price of energy using accessories from the energy supplier.

Smart Grid is based on the energy price being calculated as

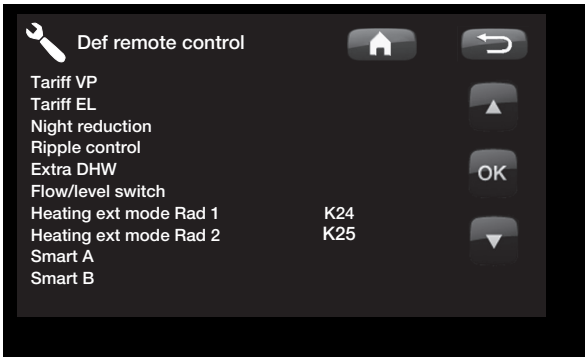
- Normal price
- Low price
- Overcapacity
- Blocking

Room temperature, pool temperature and hot water temperature, etc. are given different heating temperatures depending on the energy price.

Procedure:
First of all, Smart A and Smart B are assigned a separate input in the Advanced/Define/Define Remote Control menu.

Activation then takes place based on the terminal blocks' closure and settings for each function.

- Normal price: (Smart A: Open, Smart B: Open). No effect on the system.
- Low price mode: (Smart A: Open, Smart B: Closed).
- Overcapacity mode: (Smart A: Closed, Smart B: Closed).
- Blocking mode: (Smart A: Closed, Smart B: Open)



Example in which Smart A has been assigned low voltage input K24 and Smart B has been assigned low voltage input K25.

NB: Enertech AB is NOT responsible for the required heat being produced if the remote control has blocked the heating over a long period.

In each function that can be controlled there is a choice of temperature change for low price mode and overcapacity mode.

E.g Factory setting for low price is 1ºC increase* in temperature.

E.g Factory setting for overcapacity is 2ºC increase* in temperature.

The following can be controlled:

- Room temperature heating systems 1-2
- Primary flow temperature heating systems 1-2
- DHW tank
- Pool
- Cooling
- EHS-tank

Comment re. cooling
When active cooling = setpoint has not been reached.

E.g. 26.0 (25.0)

In these cases Smart Grid "Normal mode" is activated for the heating systems. (Smart low price or smart overcapacity is not activated).

The reason for this is to avoid a conflict between heating and cooling. For example, if there is a standard 2 ºC difference between heating and cooling, you do not want to heat and cool at the same time.

Smart low price ºC	1(Från, 1-5*)
Smart over capacity ºC	2(Från, 1-5*)

DHV tank have range of settings from 1-30

* With cooling, the setpoint is reduced to room cooling.

NB: Enertech AB is NOT responsible for the required heat being produced if the remote control has blocked the heating over a long period.

Low price mode: (A: Open, B: Closed).

- With room sensor: Room temp. (setpoint) increased by 1ºC (Factory setting, Smart low price ºC)
- Without room sensor: Primary flow (setpoint) increased by 1ºC (Factory setting, Smart low price ºC)
- DHV tank: Setpoint increased by 10ºC (Factory setting, Smart low price ºC)
- Pool: Pool temp. increased by 1ºC (Factory setting, Smart low price ºC)
- Cooling. Room temperature is reduced by 1ºC (Factory setting, Smart low price ºC)

Blocking mode: (A: Closed, B: Open).

- The heat pump and immersion heater can be blocked in accordance with the settings in heat pump and immersion heater.
- **Smart blocking hp** **No (Yes/No)**
  Blocks heat pump
  Advanced/Settings/Heat pump
- **Smart blocking immersion heater**
  No (Yes/No)
  Blocks immersion heater
  Advanced/Settings/Immersion heater
- EHS. Can be blocked in
  Installer/Settings/External heat source

NB: Enertech AB is NOT responsible for the required heat being produced if the remote control has blocked the heating over a long period.

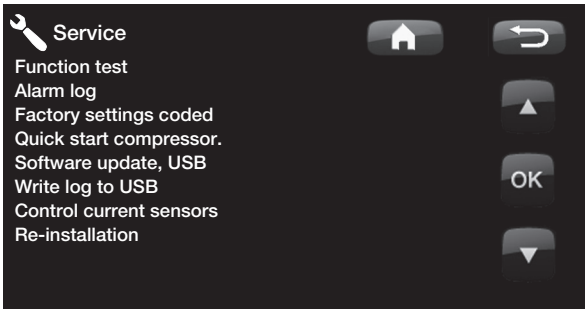
Overcapacity mode: (A: Closed, B: Closed).

- With room sensor: Room temp. (setpoint) is increased by 2ºC (Factory setting, Smart overcap. ºC)
- Without room sensor: Primary flow (setpoint) is increased by 2ºC (Factory setting, Smart overcap. ºC)
- DHW tank: Immersion heater
  Setpoint is increased by 10ºC The immersion heater is permitted to run in parallel with the heat pump. (Factory setting, Smart overcap. ºC)
- Pool: Pool temp. is increased by 2ºC (Factory setting, Smart overcap. ºC)
- Cooling. Room temperature is reduced by 2ºC
- EHS. Can be blocked in Installer/Settings/External heat source

NB: Enertech AB is NOT responsible for the required heat being produced if the remote control has blocked the heating over a long period.

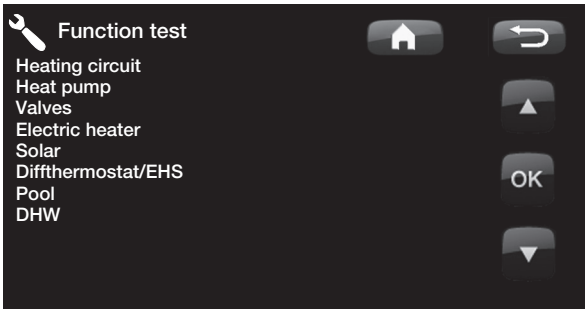
7. Service

NB: This menu is intended for the installer only.



7.2.1 Function test

This menu is intended to test the function of the various components in the product. When the menu is activated, all the product's functions stop. Each component can then be tested separately or together. All control functions are shut off. The only protection against incorrect operation are pressure sensors and the immersion heater's superheat protection. When you exit the menu, the heat pump returns to normal operation. If no button is pressed for 10 minutes, the product automatically returns to normal operation.



When you exit the menu, the heat pump returns to the start menu.

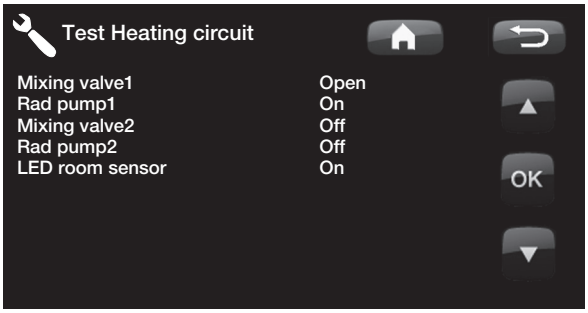
7.2.2 Test Heating circuit

Tests for heating circuit 2, if one is installed.

Mixing valve 2
Opens and closes the mixing valve.

Rad pump 2
Starts and stops the radiator pump.

LED room sensor
The room sensor alarm function can be controlled from here. When activated, the room sensor's red LED comes on steady.



7.2.3 Test Heat pump

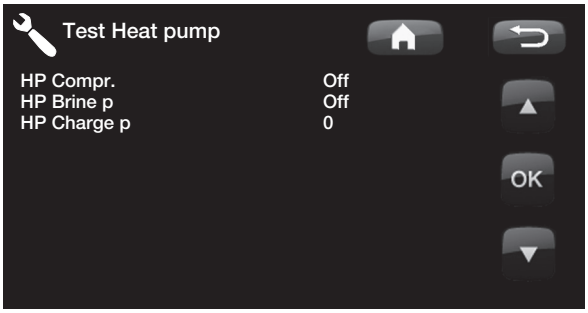
Function test carried out on the heat pump.

HP Compr.
Compressor On/Off. This is where the function test is carried out on the compressor. The brine pump and charge pump are also operating so that the compressor will not trigger its pressure switches.

HP Brine p
Brine pump On/Off.

Hp Charge p

Function test 0–100%.

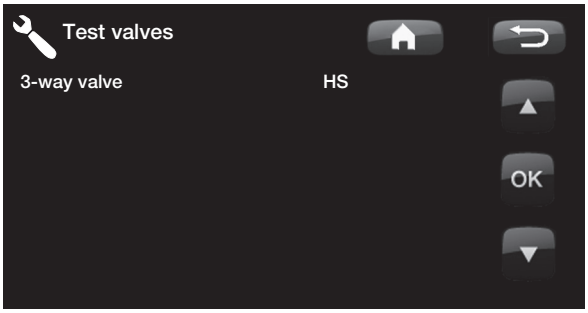


Test Valves

Function test carried out on the flow conditioner. Test of flow to hot water or to the heating circuit.

HC = Heating Circuit

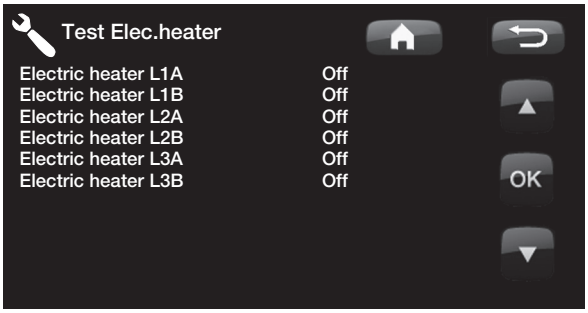
DHW = Domestic Hot Water



7.2.4 Test Elec.heater

You use this function to test the immersion heater's various phases L1, L2 and L3.

The modes available are Off/Low/High/Low+High.



7.2.5 Test Solar (accessory)

This function will only work if an expansion card accessory is connected to the product.

Solar panel pump (G30) % **0 (0 to 100)**
Function test of circulation pump to solar panel 1.

Heat exchanger pump (G32) % **0 (0 to 100)**
Function test of circulation pump to intermediate exchanger.

Bedrock (Y31/G31) **Tank (Tank/Bedrock)**
Function test of diverting valve and circulation pump to bore hole charging. When “Bedrock” is selected, the flow should go to the bore hole, and the circulation pump (G31) should start. When “Tank” is selected, (G31) should be closed.

Valve 2 tanks (Y30) **(EHS-tank/X-volume)**
Function test of diverting valve between the tanks.

Pump EHS-tank G46) **(Off/On)**
Function test of circulation pump to tank transfer.

Temperatures
This displays current temperatures.

Solar panels in (B30)

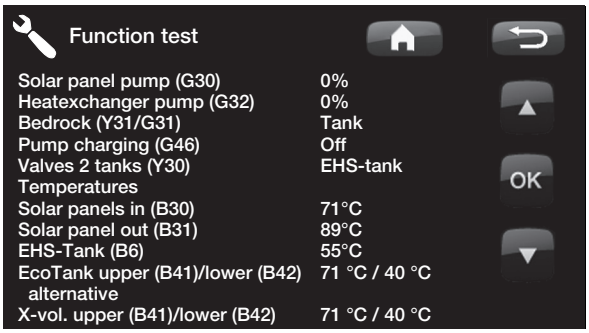
Solar panels out (B31)

EHS-tank (B47)

EcoTank upper (B41) / lower (B42)

or:

X-vol. upper (B41) / lower (B42)



7.2.6 Test Diff thermostat/EHS

Pump EHS (G46) **(On/Off)**
Charge pump function test.

Mixing valve (Y41) **(On/Off)**

Temperatures
This displays current temperatures.

EHS-tank ºC (B47)

Diff thermostat ºC (B46)

Test Pool (accessory)

Pool pump/Valve (G51)/(Y50) **(On/Off)**
Test of pool pump and valve.

Temperatures
This displays current temperatures.

Pool (B50)
Displays current pool temperature.

Test DHW

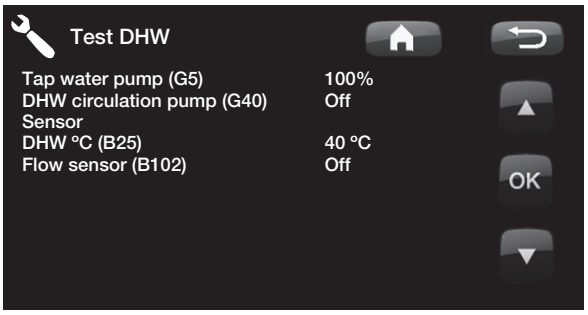
Tap water pump (G5) **0% (0 to 100)**
Function test of the tap water pump for hot water.

DHW circulation pump (G40) **(On/Off)**
Test of hot water circulation pump.

Sensor

DHW ºC (B25)
Displays current hot tap water temperature.

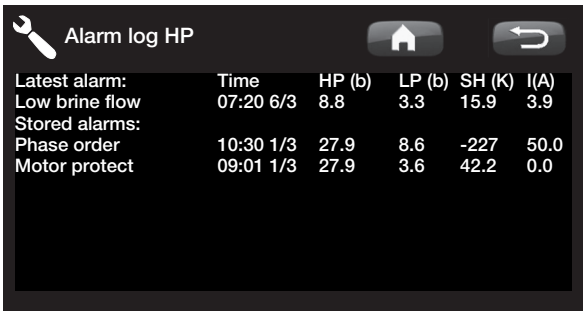
Flow sensor (B102) **(On/Off)**
Shows whether there is a flow in the DHW pipe.



7.2.7 Alarm log HP

You can use this to read information about the latest alarms. The latest alarm is displayed at the top and the four latest alarms are shown under Stored alarms.

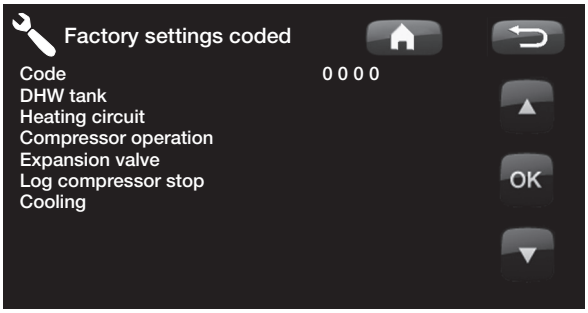
An alarm which reoccurs within an hour is ignored so as not to fill up the log. If all the alarms are the same, this can indicate that there is an intermittent fault, e.g. a loose contact.



8. Factory settings coded

NB: Only an authorised service engineer is allowed to log into 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.

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.



Quick start compressor

When starting up the product, the compressor's start is delayed by 10 minutes. This function speeds up this process.

Software update, 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.

Write log to USB

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

Control current sensors

This is for identifying which current sensor is connected to the relevant phase.

All three currents (L1, L2 and L3) will appear in the current operation data when the heat pump has identified the current transformers' relevant phases.

In this situation it is important that you have switched off any major consumers of electricity in the house. Also make sure that the backup thermostat is turned off.

Re-installation

This command re-launches the installation sequence. See the section entitled "First start".

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

! NB: Turn off the power and always restart the product after the software update! Several minutes may pass before the display communicates clearly after restart.

9. Installation

This section is aimed at anyone responsible for one or more of the installations required to ensure that the product works the way the property owner wants.

Take your time going through functions and settings with the property owner and answer any questions. Both you and the heat pump benefit from a user who has completely understood how the system operates and should be maintained.

9.1 Transportation

Transport the unit to the installation site before removing the packaging. Handle the product in the following manner:

- Forklift
- Lifting eye that has been fitted to the lifting sleeve on top of the heat pump in the expansion connection.
- Lifting band around the pallet. **NB:** Can only be used with the packaging on.

Remember that the heat pump has a high centre of gravity and should be handled with caution.

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

9.2 Unpacking

Unpack the heat pump when it is placed next to its installation site. Check that the product has not been damaged in transit. Report any transport damage to the carrier. Also check that the delivery is complete according to the list below.

! As the cooling module is removable, there must be a free space of at least one metre in front of the product and it must not be placed below floor level either.

Standard delivery

- Heat pump CTC GSi 12
- Filler manifold
- Room sensor
- Outdoor sensor
- 2 x brine hoses
- Installation and Maintenance Manual
- Safety valve for heating system, 2.5 bar
- Safety valve for cold side, 3 bar
- 2 x cable ties
- 2 x support sleeves
- 2 x compression ring couplings for the brine hoses.
- Brine level vessel
- Filter ball valve for the heating system’s return line
- Dirt filter for cold tap water

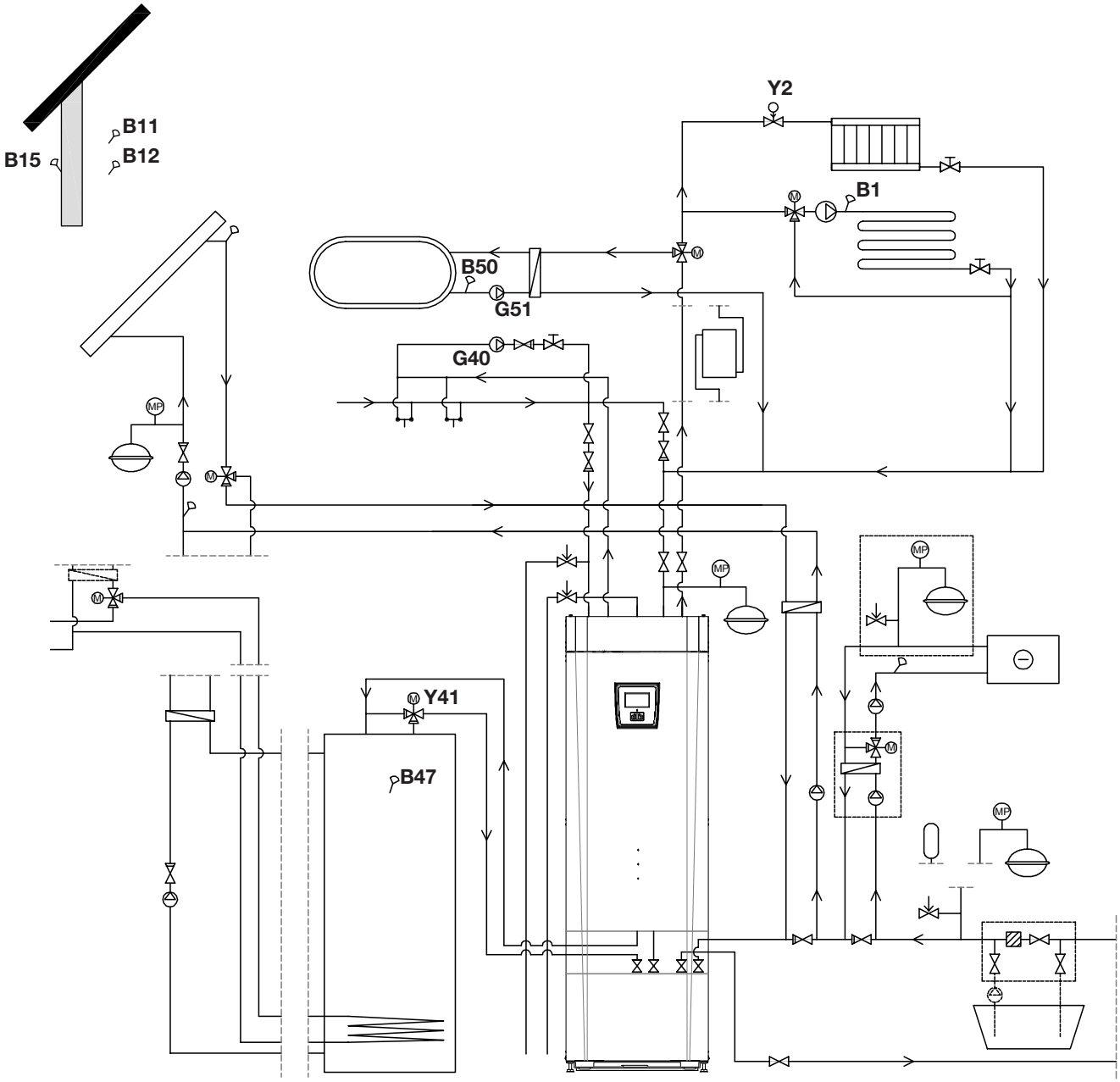
10. Pipe installation

The installation must be carried out in accordance with current standards and regulations. Refer to MIS 3005 and associated building regs Part L, F & G. The product must be connected to an expansion vessel in an open or closed system. **Do not forget to flush the heating system clean before connection.** Apply all the installation settings based on the description in the section entitled “First start”.

10.1 Schematic diagram

This shows the main connection between the heat pump and the property's heating and water supply system. Different installations and systems may look different, such as a one- or two-pipe system, which means that the finished installation may be different. To find out about connecting the cold side, see the section entitled “Connecting the brine system”.

! Heating circuit 2 can only give the same temperature as heating circuit 1 or a lower temperature.



10.1.1 Filling valve, heating circuit

Fit a filling valve between the cold water connection and the heating circuit's return line, or between the cold water pipe and the expansion pipe.

10.1.2 Non-return valve

Fit the non-return valve to the incoming cold water connection.

10.1.3 Shut-off valves

It is important to fit a shut-off valve (94) to the primary flow.

The filter ball valve provided should be fitted to the heating circuit's return line.

10.1.4 Safety valve

The heat pump's safety valve (2.5 bar) for the heating circuit must be fitted in accordance with applicable regulations. Connect the waste pipe to the waste system directly to the floor drain or, if the distance is more than two metres, to a funnel. The waste pipe must slope towards the waste system, be installed frost-free and left open to the atmosphere/without pressure.

NB: The waste pipe must be fitted to the waste system.

10.1.5 Manometer system pressure (accessory)

Fit a manometer to the expansion pipe or the heating circuit's return line.

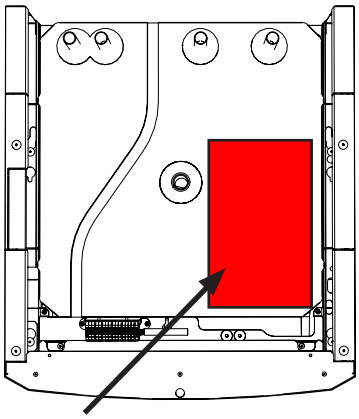
10.1.6 Expansion vessel connection (accessory)

The heat pump is best connected to a closed expansion vessel. The heat pump is ready to be fitted to an 18 l closed expansion vessel, positioned on top of the product. The expansion vessel with the required angle connection is available as an accessory.

If you use an open system, the distance between the expansion vessel and the highest placed radiator must not be below 2.5 m in order to avoid introducing oxygen into the system.

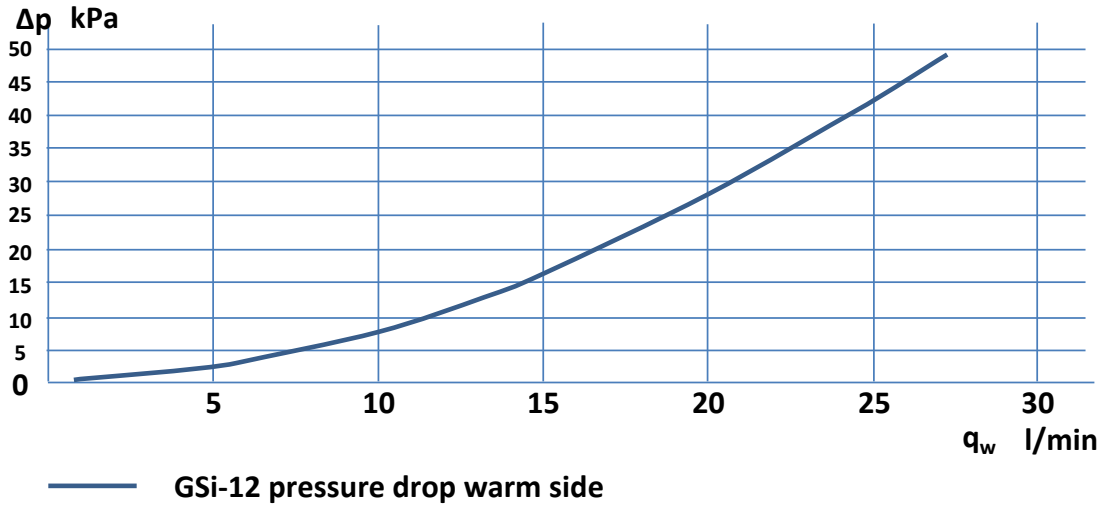
Note that no hot water circulation may be connected as it affects the function of the heat pump and the system. If the heat pump is connected together with another heat source, e.g. an existing boiler, the installations must have separate expansion vessels.

NB: It is important to fit shut-off valves to both the primary and return flows.



Position of expansion vessel.

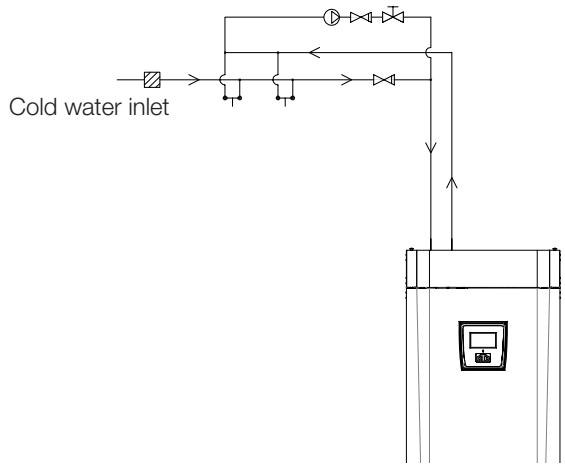
10.1.7 Pressure drop graph CTC GSi 12 - warm side



10.1.8 DHW circulation (accessory)

The settings for hot water circulation require the installation of an expansion card accessory.

DHW circulation should be connected as illustrated in the schematic diagram below. Pump G40 is used to circulate the hot water.



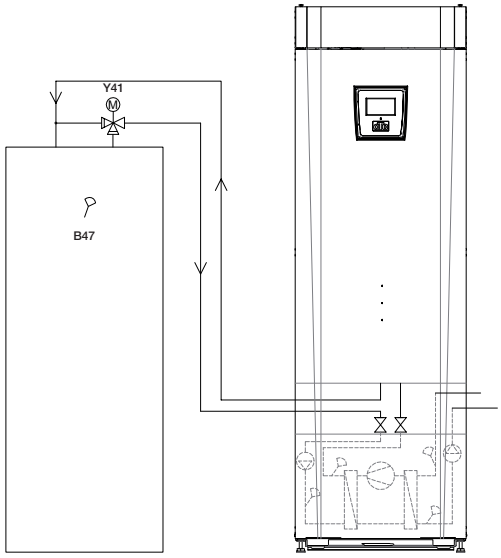
10.1.9 External heat source (EHS)

This function is used to connect additional heat sources to the heating circuit, e.g. water-jacketed stove, solar heat.

The heat from the external heat source is diverted into the system when the set temperature in the external tank is reached, and is at least 5ºC higher than the setpoint. This stops when the temperature is 3ºC higher. The compressor and immersion heater stay idle for as long as there is sufficient energy in the external heat source. Heat is diverted to both the heating circuit and to hot water.

This comes to an end when one of the following alarms occur: Primary flow sensor 1, HP in-sensor, Comm. error HP or if Primary flow sensor 1 is hotter than 80ºC.

Enter settings under Settings/External heat source.



10.1.10 Diff thermostat function

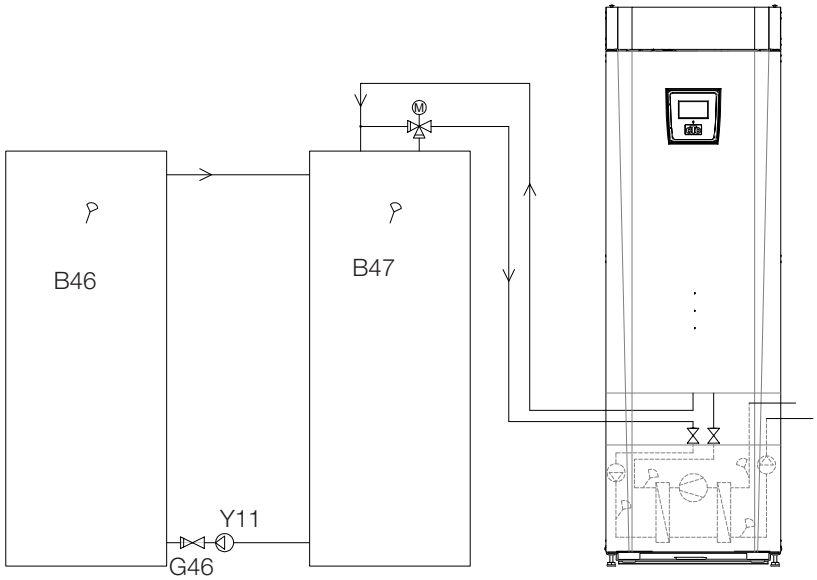
The diff thermostat function is used if you want to transfer heat from a tank with the sensor (B46) to a tank with the sensor (B47).

The function compares the temperatures in the tanks and when it is warmer in the first tank (B46), charging starts to the second tank (B47).

NB: For certain heat sources, e.g. solid fuel boilers, automatic chargers are recommended, among other things to counteract condensation in the fire box.

However, this function cannot be combined with solar system 2 with EcoTank. This is because the same circulation pump (G46) is used.

Operation data displays the information “Ext. tank pump/ºC".



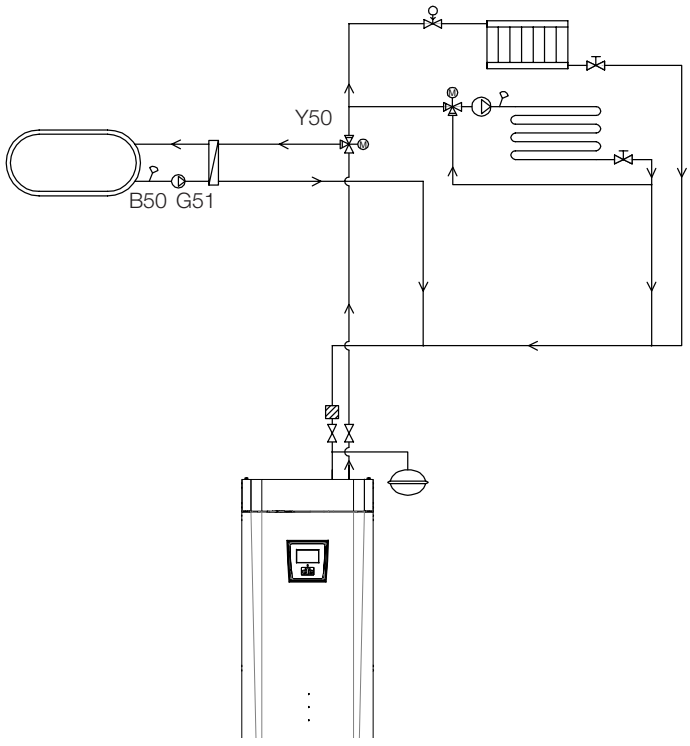
10.1.11 Pool (accessory)

A pool can be connected to the system using a mixing valve. A heat exchanger should be fitted to separate the liquids.

A sensor in the pool starts and stops the charge pump in order to maintain the set temperature (factory set at 22°C), and the temperature is allowed to fall by one degree before the charge pump starts again.

The immersion heater is never used to heat the pool.

The expansion card accessory is required to connect pool heating to your heating circuit.



10.1.12 Solar (accessory)

Solar heat is connected to the system through an external heat source tank (EHS-tank).

The number of solar panels which can be connected depends on the volume of water in the product/tanks to which the solar panels are to be connected.

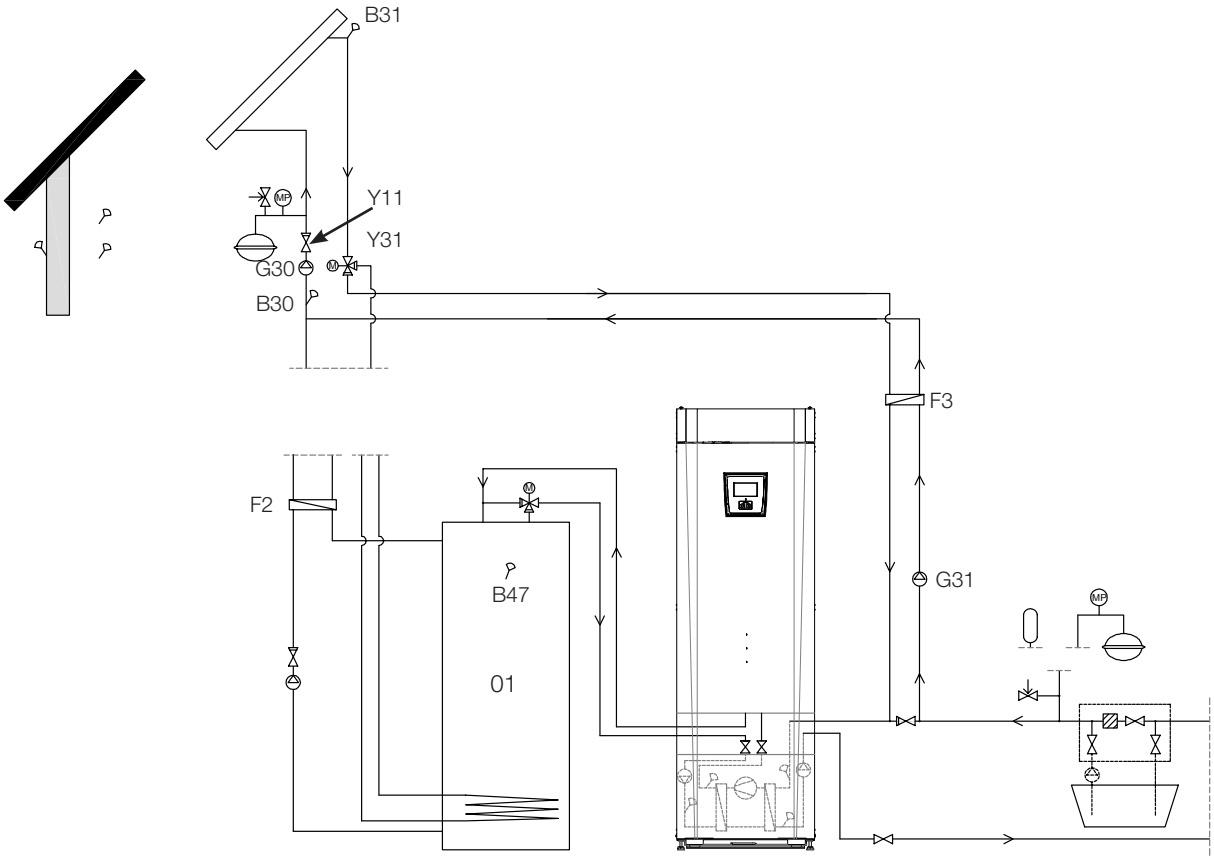
System 1

System 1 is a system structure with solar heat going directly to an external heat source tank (EHS-tank).

Charging conditions (main conditions, factory settings)

Charging starts when B31 is 7ºC warmer than B6.
Charging stops when there is a difference of 3ºC between B31/B30 or when the charge temperature is reached.

The external heat source tank (01) may also have a solar coil; this means that the heat exchanger (F2), pump (G32) or non-return valve (Y11) is not required.



Schematic diagram only The installation engineer fits expansion tank, safety valves, bleeders, etc. and sizes the system.

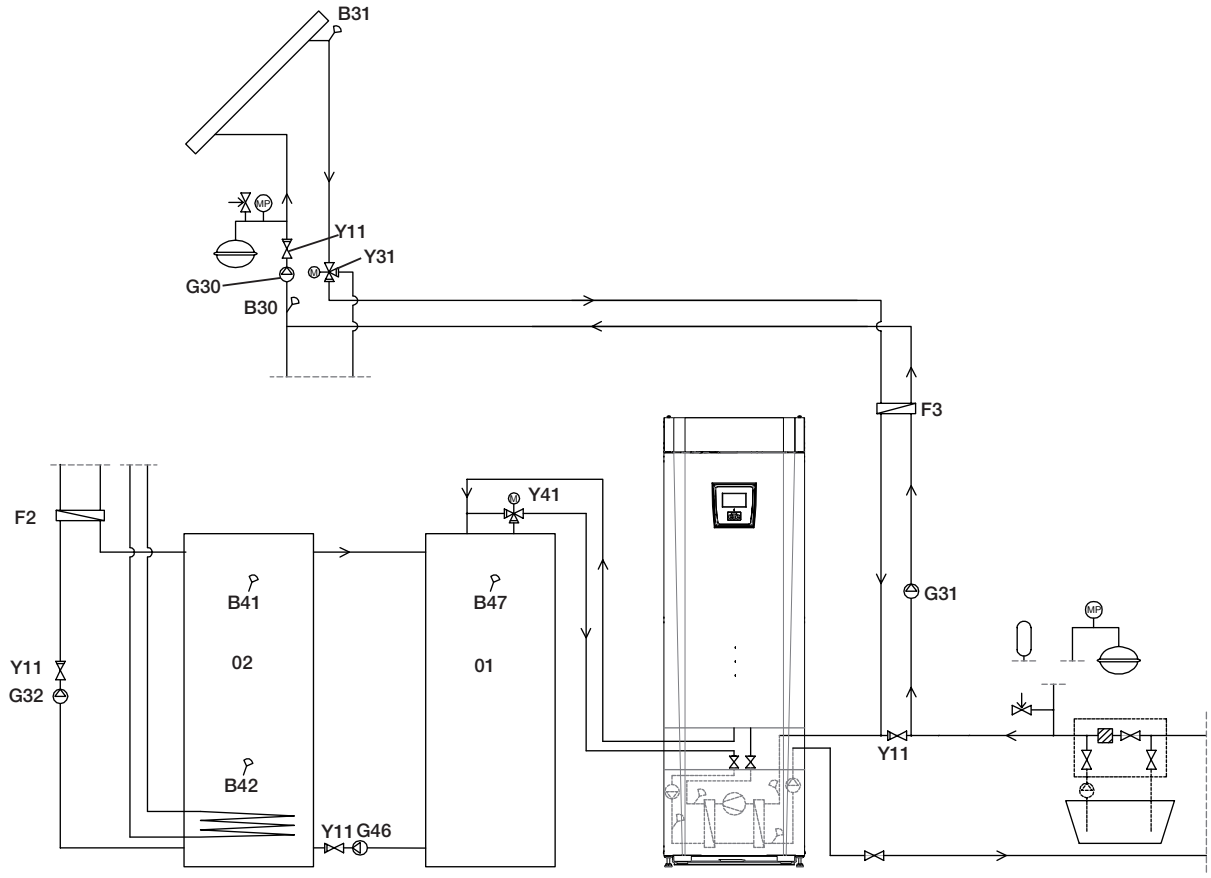
System 2

System 2 is a system structure with solar heat connected to an external heat source tank (EHS-tank) and an extra buffer tank (CTC EcoTank for example). The system allows for a larger solar collector surface since it carries a greater volume of water.

Charging conditions

Charging starts when B31 is 7ºC warmer than B42.
Buffer tank **without** coil:
Charging stops when there is a difference of 3ºC between B31/B30 or when the charge temperature is reached.
Buffer tank **with** coil:
For a tank with a solar coil, the charging stops instead when B31 is 3ºC warmer than B42.
Charging of the EHS tank compares sensor B41 to sensor B47.

The buffer tank (02) may also have a solar coil; this means that the heat exchanger (F2), pump (G32) or non-return valve (Y11) is not required.



Schematic diagram only The installation engineer fits expansion tank, safety valves, bleeders, etc. and sizes the system.

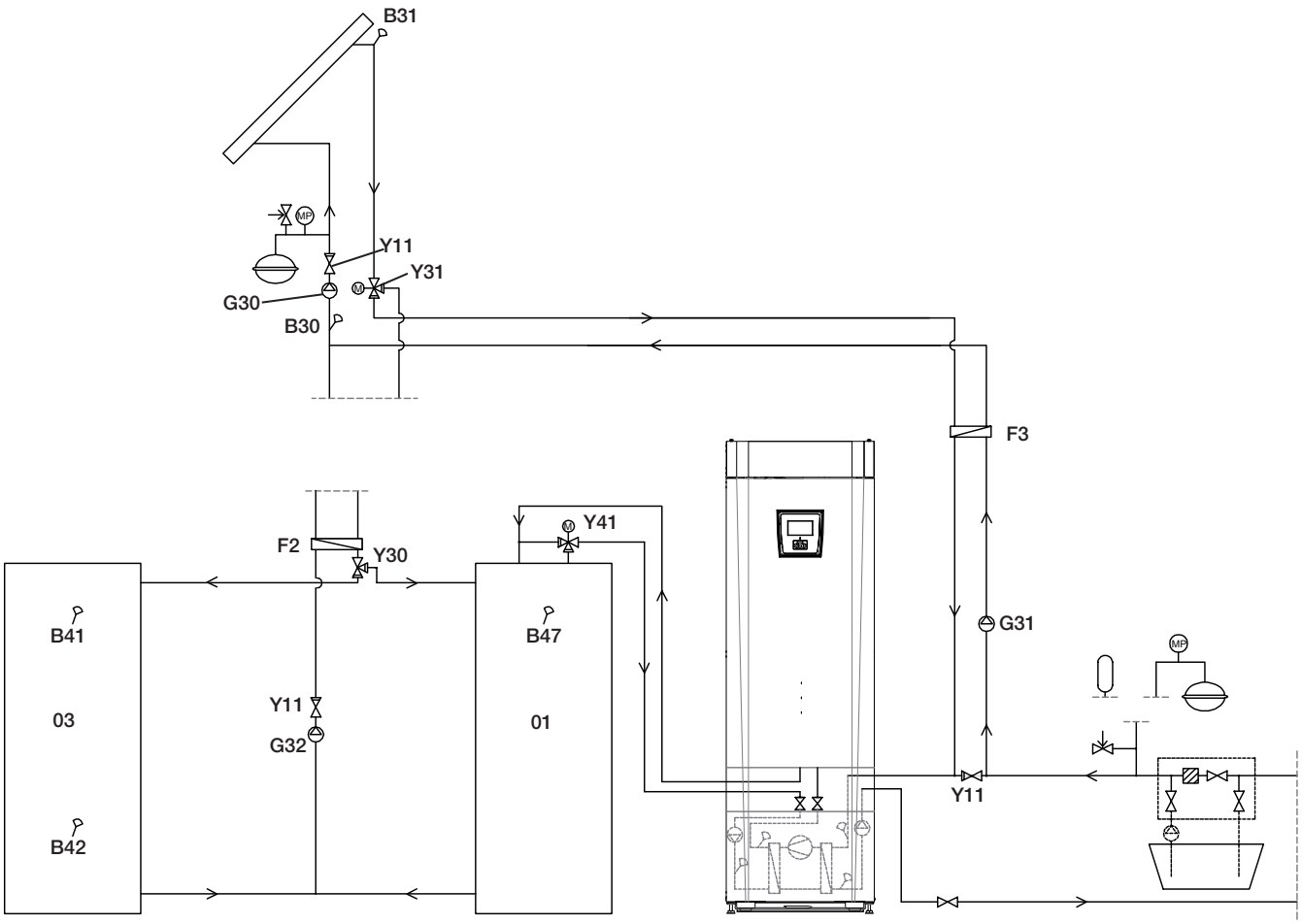
System 3

System 3 is a system structure with an extra volume called 03; this can be a large extra tank or a pool. The greater the volume of water, the greater the solar collector surface.

Solar heat is connected to an external heat source tank (EHS-tank) and an extra buffer tank (CTC EcoTank for example). The system allows for a larger solar collector surface since it carries a greater volume of water.

Charging conditions

Charging starts when B31 is 7ºC warmer than B42 or B47.
Charging stops when there is a difference of 3ºC between B31/B30 or when the charge temperature is reached.



Schematic diagram only The installation engineer fits expansion tank, safety valves, bleeders, etc. and sizes the system.

11. Connecting the brine system

The brine system, i.e. the ground collector loop, must be assembled and connected by a qualified tradesman in accordance with current regulations and design guidelines.

Care must be taken to ensure that no dirt gets on the collector hoses, which must be washed clean before being connected. The protective caps must remain in place at all times while work is in progress.

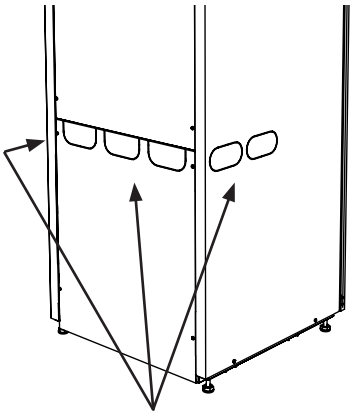
The temperature in the brine system can go below 0°C. This is why it is important **not** to use any water-based lubricant etc. during installation. It is also important that all the components are insulated against condensation to prevent the build-up of ice.

11.1 Connections

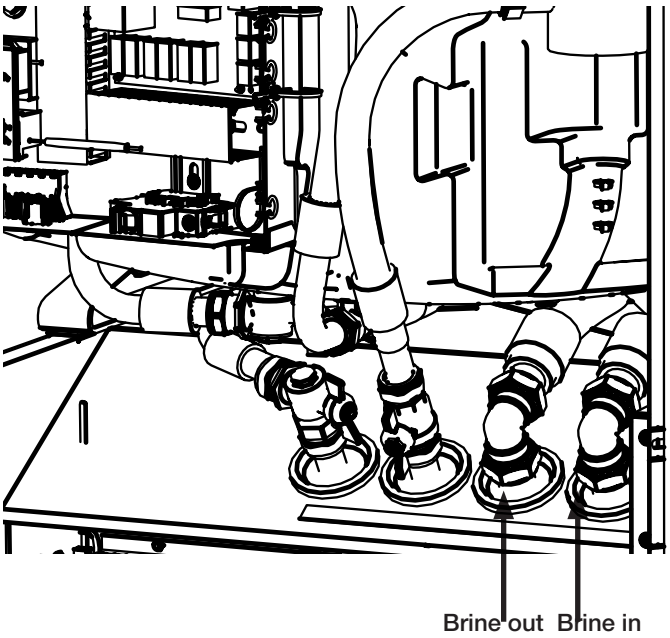
The brine system may be connected to the right, left or back of the heat pump. Cut away the cover plate on the side where the brine system is to be connected. The insulation on the inside of the cover plate has been grooved to enable an opening to be cut for the brine hoses provided. When the opening has been made through both the insulation and cover plate, carry out the installation as follows:

1. In order to protect the brine hoses, fasten the protective edging provided around the edge of the opening in the insulation plate. Adjust the length of the protective edging to suit the opening as required.
2. Attach the provided compression couplers to the cooling module connector pipes. To facilitate attachment, the upper brine pump connection may be loosened and rotated if necessary.
3. Pass the brine hoses through the opening in the side cover plates and connect them to the compression couplers. Ensure that the connections are well insulated to avoid the build-up of ice and condensation.
4. Install the collector system after this according to the schematic diagram.

You can also connect the primary flow on one side and the return on the other. See the section entitled “Measurement details for measurements and dimensions”. The pipe between the heat pump and collector loop should have an internal diameter of no less than Ø28 mm.



For easier mounting of the brine hoses we recommend to use these openings.



11.1.1 Valves

Ft the valves as shown in the schematic diagram on the next page. To facilitate servicing of the cooling unit, shut-off valves should be fitted to both the incoming and outgoing connections. Fit bifurcated valves so that it is possible to fill and bleed the collector circuit later on.

11.1.2 Insulation against condensation

All pipes in the brine system must be insulated against condensation to prevent the possibility of severe build-up of ice and condensation.

11.1.3 Filling and venting

The collector coil should not contain any air as even the smallest amount of air can jeopardise the heat pump's operation.

Mix water and antifreeze solution in an open vessel. Connect hoses to the shut-off valves (98a and 98b) as shown in the figure. NB: The hoses must have a minimum diameter of 3/4". Connect a powerful external pump (101) for refilling and bleeding. Then reset the three-way valve (100) and open the valves (98a and 98b) so that the brine passes through the mixing container (102). Also make sure that the valve (98d) is open.

If the heat pump is connected to the power supply, start the brine pump (103) as follows:

- Go to the menu Installer/Service/Function test.
- Select the Brine pump option and activate it. The brine pump runs until it is manually stopped.

Allow the brine to circulate in the system for a long period of time until it is completely free of air. There could still be air in the system, even though no air accompanies the liquid out. Reset the 3-way valve (100) so that any remaining air can come out.

Bleed the level vessel (96) by loosening the plug on the top of the level vessel.

Now close the valve (98a) while the filling pump continues to run. The filling pump (101) now pressurises the system. Also close the valve (98b) and shut off the filling pump.
If the level in the level vessel is too low, close the valves (98c) and (98d). Unscrew the plug and fill the vessel to around 2/3 full. Screw the plug back in and open the valves (98c) and (98d).

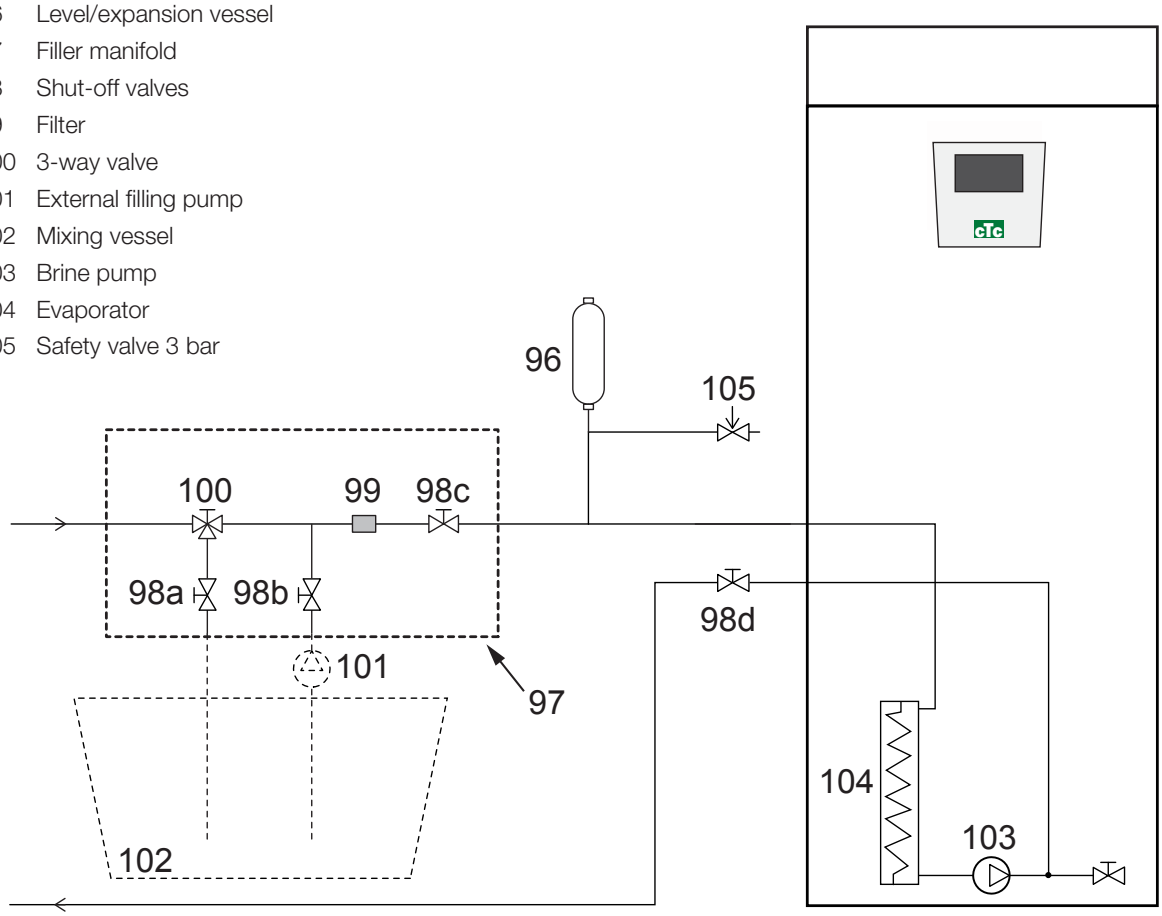
11.1.4 Pressure/level switch

In some cases, extra protection is required due to local requirements or provisions. For example, the requirement in some areas is for the system to be installed within a water catchment area. If there is a leak, the compressor and brine pump stop and the Flow/level switch alarm appears on the display. For connection, see the section entitled "Electrical installation".

! Use the Brine pump on 10 days function to bleed the system properly.

11.2 Brine system schematic diagram

96 Level/expansion vessel
97 Filler manifold
98 Shut-off valves
99 Filter
100 3-way valve
101 External filling pump
102 Mixing vessel
103 Brine pump
104 Evaporator
105 Safety valve 3 bar



The diagram shows the main connection for the brine system. The filling equipment is represented by the parts displayed with dashes. NB: Collector hoses must have a bleeding facility as air pockets can occur. Always check the filter (99) when filling and bleeding the brine system.

11.1.5 Post-installation check on brine system

After a few days, you must check the fluid level in the vessel. Fill if necessary and close the valves (98c and 98d) when filling.

11.1.6 Level/expansion vessel (96)

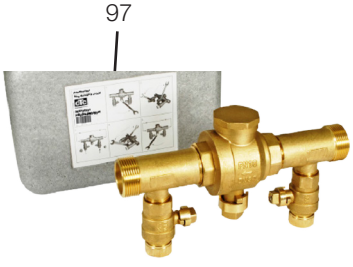
The level vessel should be fitted to the incoming line from the borehole or ground loop, at the system's highest point. Bear in mind that the tank can produce condensate on its exterior. Fit the safety valve (105) as shown in the schematic diagram and fit a suitable plug to the top of the vessel.

If the vessel cannot be fitted at the highest point, a closed expansion vessel can be fitted.

11.1.7 Filler manifold with dirt filter

A filler manifold for topping up, adding and filtering brine. Arrows on the valve housing indicate the flow direction. Close valves (98c and 100) when cleaning the filter. Unscrew the filter cap and flush the filter clean. When refitting, the pin under the filter holder should be fed into the designated hole in the filter housing. Top up with a little brine, if necessary, before fitting the cap. The filter should be checked and cleaned after a short period of operation.

! The mixing vessel and pump must be of a good size.



11.2.1 Brine

The brine circulates in a closed system. The fluid consists of water and antifreeze solution. Sentinel R500 & R500C are recommended for use in the brine circuit. The glycol is mixed at a concentration of slightly less than 30%, which is equivalent to fire risk class 2b and a freezing point of around -15°C.

It is a CTC recommendation that around 1 litre of brine/glycol is required per metre of collector hose, i.e. around 0.3 litres of antifreeze solution will be needed per metre of hose, for an (external) hose diameter of 40 mm.

11.2.2 Air pockets

To avoid air pockets, make sure that the collector hoses constantly rise towards the heat pump. If this is not possible, it must be possible to bleed the system at the high points. The filling pump usually manages smaller local height discrepancies.

11.2.3 Checking brine difference

When the heat pump is running, regularly check that the temperature difference between incoming and outgoing brine temperatures is not too large. If there is a large difference, one of the causes may be due to air in the system or a blocked filter. If this is the case, the heat pump triggers the alarm.

The alarm factory setting is 7°C, but 9°C is permitted for the first 72 hours while the compressor is running, as microbubbles in the system can reduce brine flow.

11.2.4 Groundwater heating

Groundwater can also be used as a heat source for CTC's heat pumps. The groundwater is pumped up to an intermediate heat exchanger that transfers the energy to the brine liquid. It is important that an intermediate heat exchanger is installed in the system. The intermediate heat exchanger prevents the product's evaporator from becoming damaged due to deposits from groundwater particles and minerals, which could otherwise involve expensive work on the product's refrigerant system. Water requirements analysis should always be undertaken for intermediate heat exchangers. Local regulations and permit requirements must be taken into account.

The return water is discharged elsewhere, to a drilled return flow well or similar.

The brine pump (G20) and groundwater pump (G21) must be connected to run simultaneously in order to avoid the risk of freezing.

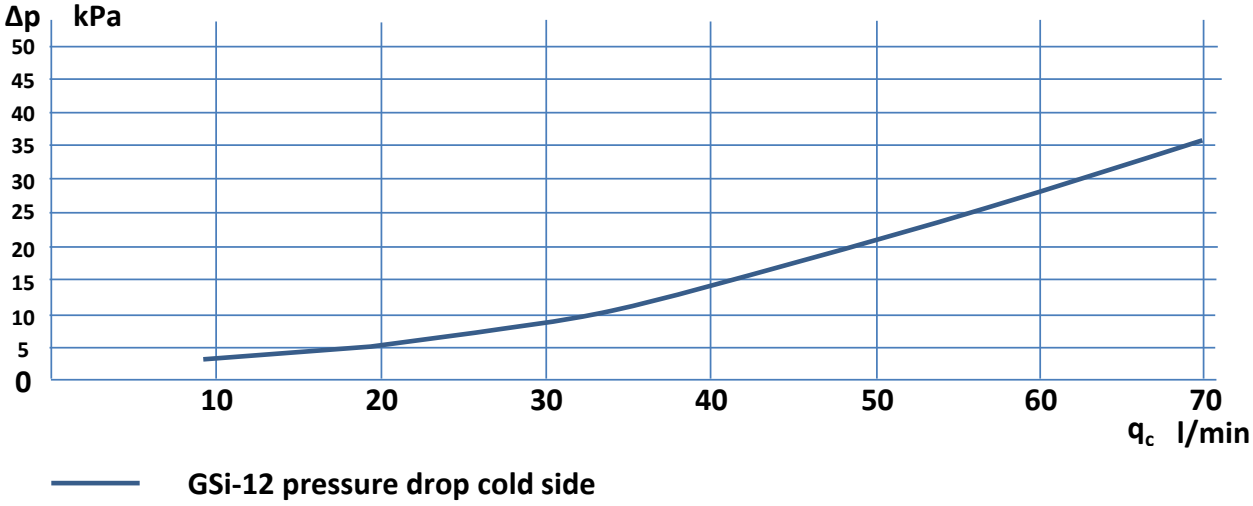
For connection, see the section entitled "Electrical installation".

! Check the dirt filter after bleeding has been completed.

! The fluid must be thoroughly mixed before the heat pump is started.

! Check the dirt filter in the brine system after a few days' operation.

11.2.5 Pressure drop graph CTC GSi 12 - cold side

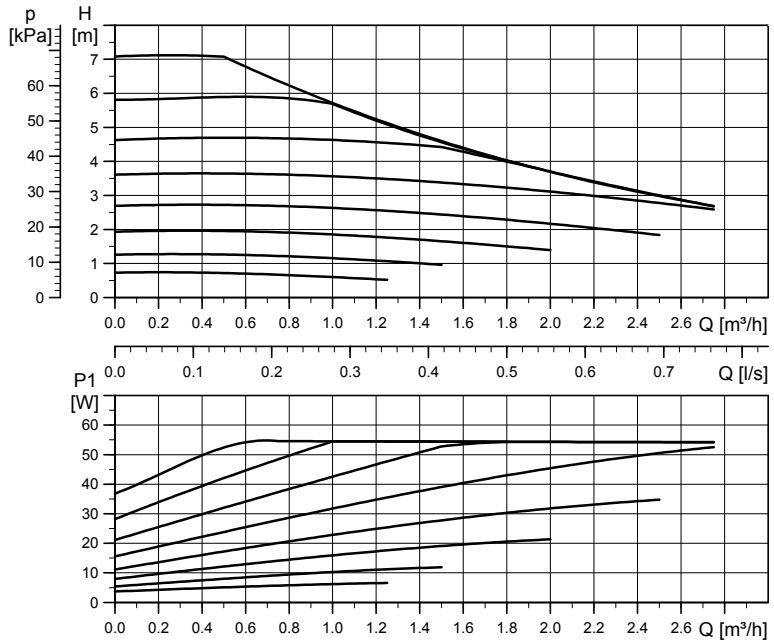


11.3 Brine pump

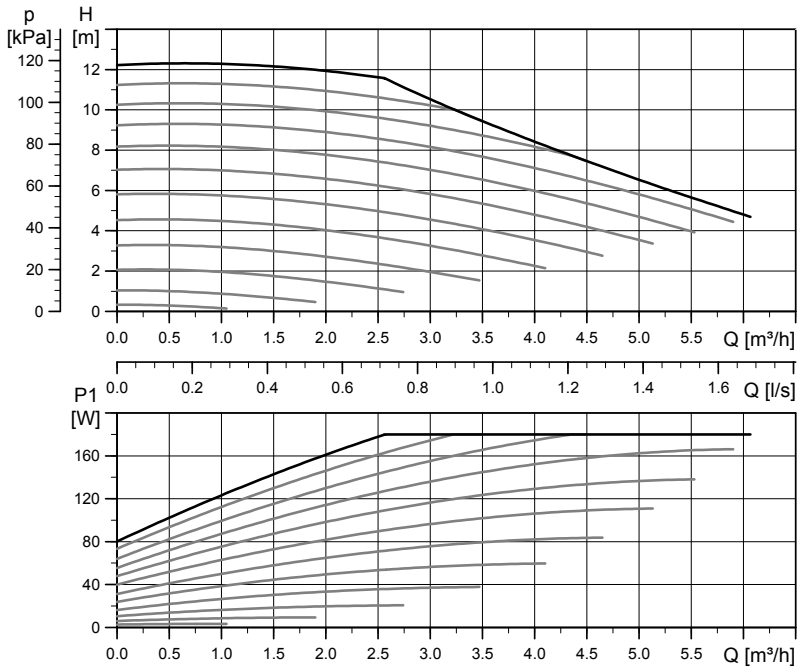
The circulation pumps in CTCs products are of the energy efficiency class A.

- CTC EcoHeat/EcoPart 406-408 has pump UPM2K 25-70 180.
- CTC EcoHeat/EcoPart 410-417 & CTC GSi 12 has pump UPMXL GEO 25-125 180.

UPM2K 25-70 180, 1 x 230 V, 50/60 Hz



UPMXL GEO 25-125 180 PWM, 1 x 230 V, 50/60 Hz



12. Electrical installation

The installation and heat pump connection must be performed by an authorised electrician. All wiring must be installed according to applicable provisions. The product is internally connected by the factory and set for a 5.5 kW power output.

To open the front panel, undo the screws on the top (2 screws), then bend out and put the front to one side.

Supply

The heat pump should be connected to 400 V 3N ~ 50 Hz and protective earth.

The group fuse size is specified in the “Technical data” section.

Omnipolar safety switch

The installation should be preceded by an omnipolar safety switch according to overvoltage category III, which ensures disconnection from all electric power sources.

Residual-current device

The product must be installed with a separate Residual-current device (RCD) with short time delay.

Max. thermostat

If the product 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 on installation that the max. thermostat has not tripped.

Symbol for max. thermostat:

Extra low voltage protection

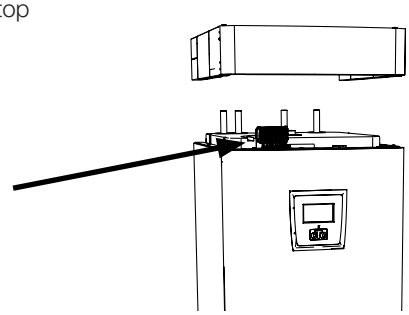
The following outputs and inputs have extra low voltage protection: current transformer, outdoor sensor, room sensor, primary flow sensor, return sensor, NR/SO.

Expansion card accessory

For certain system options the product must be supplemented with the expansion card accessory. See the manual provided for how to install the card. Settings which are entered after installation are found in this manual.

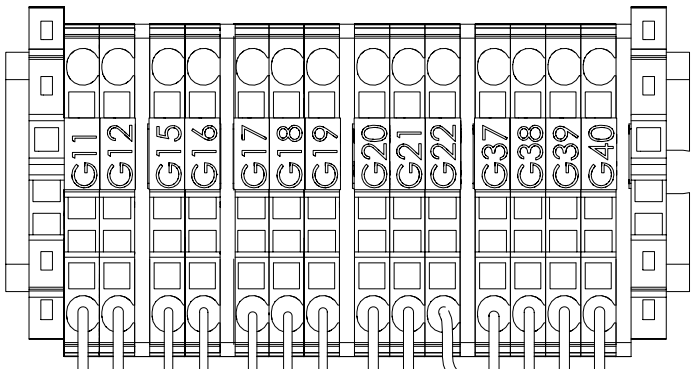
12.1 Sensor connection

Sensors should be connected on the top cover, behind the product's top trim.



Connect the sensors on the top cover of the product, behind the top trim.

Sensor terminal block



Connection of outdoor sensor (B15)

The outdoor sensor is connected to G11–G12 on the sensor terminal block.

The sensor should be set up on the house's northwest or north side, so that it is not exposed to morning and evening sun. If there is a risk of the sensor being affected by the sun's rays, it must be protected by a screen.

Place the sensor at around 2/3 of the height of the facade near a corner, but not under a roof projection or other form of wind protection. Do not place it either above ventilation ducts, doors or windows where the sensor may be affected by factors other than the actual outdoor temperature.

Connection of room sensors (B11 and B12)

Connect room sensor 1 to G17–G19.

Connect room sensor 2 to G20–G22.

The room sensor is fitted at a central point in the house, in the most open position possible, ideally in a hall between several rooms. This is the best position for the sensor to record an average temperature for the house.

Feed a three-conductor cable (minimum 0.5 mm^2) between the heat pump and room sensor. Then attach the room sensor securely in a position at roughly two thirds of the way up the wall. Connect the cable to the room sensor and heat pump.

When connecting a wireless room sensor (accessory), refer to the Wireless room sensor manual.

Check room sensor connection

- Go to the menu: Installer/Service/Function test/Heating system.
- Go down and select the option LED room sensor and press OK.
- Select On using the + button and press OK.
  Check that the room sensor LED lights up. If not, check the cables and connection.
- Select Off using the - button and press OK. If the OK LED goes off, the check is complete.
- Return to start menu by pressing the Home button.

12.2 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.

12.3 Pressure/level switch

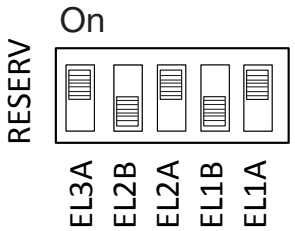
The pressure/level switch is connected to blocks G73 and G74 and then defined under the Advanced/Define system/Def Heat pump menu.

12.4 Installing a backup power supply

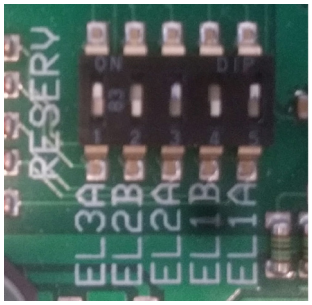
The DIP switch on the relay card (A2) is used to set the backup power supply. The DIP switch is marked “RESERV” (BACKUP).

When the switch is set to ON, the step is actively operating in backup heating mode.

Factory-set value 2.1 kW divided across 3x400 V. Set the value according to the requirements and capacity of the property.



Example for 1.2+0.6+0.3 = 2.1 kW. (Factory-set value)

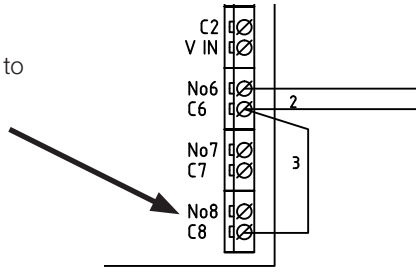


3x400 V

Relay	EL3A	EL2B	EL2A	EL1B	EL1A
Factory setting	ON	OFF	ON	OFF	ON
Current	5.2 A	10 A	2.6 A	10 A	1.3 A
Power	1.2 kW	2.3 kW	0.6 kW	2.3 kW	0.3 kW

12.5 Groundwater heating

The groundwater pump (G21) and brine pump (G20) must be connected to run simultaneously in order to avoid the risk of freezing. The groundwater pump is therefore connected on terminal block No8. See figure.



12.6 Pump Diff thermostat function (G46) on/off

230 V 1N~

Sensor (B46) is connected to the relay card (A2) at terminal block G65–G66. Circulation pump G46 is connected to the following terminal blocks:

Phase:	brown	Terminal block A:11
Zero:	blue	
Earth:	yellow/green	

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

12.7 Heating circuit 2

Primary flow sensor 2 (B2) is connected to terminal blocks G15–G16 on the sensor terminal block.

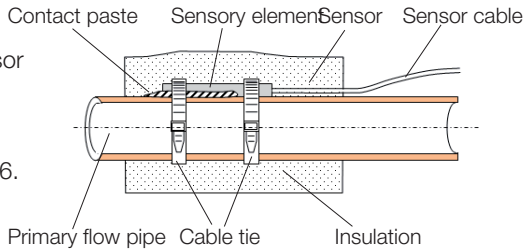
Mixing value 2 is connected as follows:

Black cable	Open	Terminal block A15
Brown cable	Close	Terminal block A16
Blue cable	Zero	Terminal block A17

Fit the primary flow sensor to the primary flow pipe, ideally after the circulation pump.

The sensing part is towards the end of the sensor (see sketch).

- Attach the sensor using the cable tie provided.
- Ensure that the sensor makes good contact with the pipe. Apply contact paste to the front part of the sensor between the sensor and the pipe if good contact is otherwise difficult to obtain.
- **Important!** Insulate the sensor using pipe insulation.
- Connect the cables to the sensor terminal block at position G15–G16.



12.8 Pool (accessory)

The sensor (B50) that measures the pool temperature is connected to the expansion card at terminal block X3: 15-16.

The circulation pump (G51) is connected to the expansion card as follows:

Phase:	brown	Terminal block X: 33
Earth:	yellow/green	Terminal block X: 34
Zero:	blue	Terminal block X: 35

The mixing value (Y50) is connected as follows:

Black cable	Open	Terminal block ---
Brown cable	Close	Terminal block ---
Blue cable	Zero	Terminal block ---

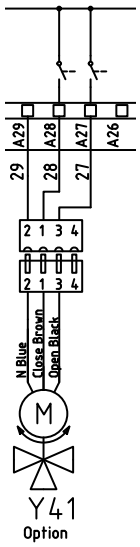
Check the function by test running the pump in menu “Installer/Service/ Function test”.

12.9 External heat source - EHS

The sensor (B47) from the external heat source is connected to the relay card (A2) at terminal block G67–68.

Connection for controlling the mixing valve (Y41) is done as follows:

Black cable	Open	Terminal block A27
Brown cable	Close	Terminal block A28
Blue cable	Zero	Terminal block A29



12.10 Solar (accessory)

Pump solar panel (G30) PWM

230 V 1N~

Circulation pump G30 is powered separately (not from this unit). The PWM control signal is connected to the following terminal blocks:

Expansion card X5:
Note the cable colours!

PWM+:	white	Terminal block X5: 1
GND:	brown	Terminal block X5: 2

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

Pump intermediate heat exchanger solar panels (G32) PWM

230 V 1N~

Pump G32 is powered separately (not from this unit). The PWM control signal is connected to the following terminal blocks:

Expansion card X5:
Note the cable colours!

PWM+:	blue	Terminal block X5:3
GND:	brown	Terminal block X5:4

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

Pump bedrock (G31) on/off

230 V 1N~

Circulation pump G31 is connected at the following terminal blocks:
Expansion card X6:
Note the cable colours!

Phase:	brown	Terminal block X6:8
Zero:	blue	Terminal block X6:11
Earth:	yellow/green	Terminal block X6:10

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

Valve 2 tanks (Y30)

230 V 1N~

Diverting valve Y30 is connected at the following terminal blocks:
Expansion card X6:

Control voltage:	black	Terminal block X6:4
Phase:	brown	Terminal block X6:5
Zero:	blue	Terminal block X6:7

Valve bedrock (Y31)

230 V 1N~

Diverting valve Y31 is connected to pump G31 at the following terminal blocks:

Expansion card X6:

Control voltage:	black	Terminal block X6:8
Phase:	brown	Terminal block X6:9
Zero:	blue	Terminal block X6:11

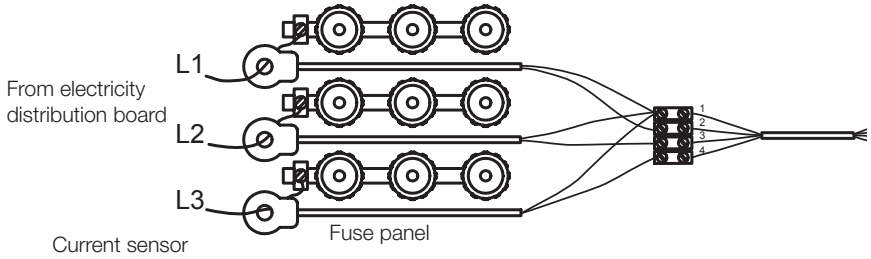
12.11 Current sensor connection (accessory)

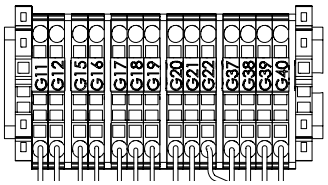
The current sensors are connected at G37–G40 on the sensor terminal block.

The three current sensors, one for each phase, are fitted on the fuse panel. Each phase from the electricity distribution board supplying the product is channelled through a current sensor before termination at the relevant terminal. 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 on the immersion heater. If this is insufficient, the heat pump is also limited. When the power drops back to the set value, the heat pump and immersion heater are reconnected. 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.

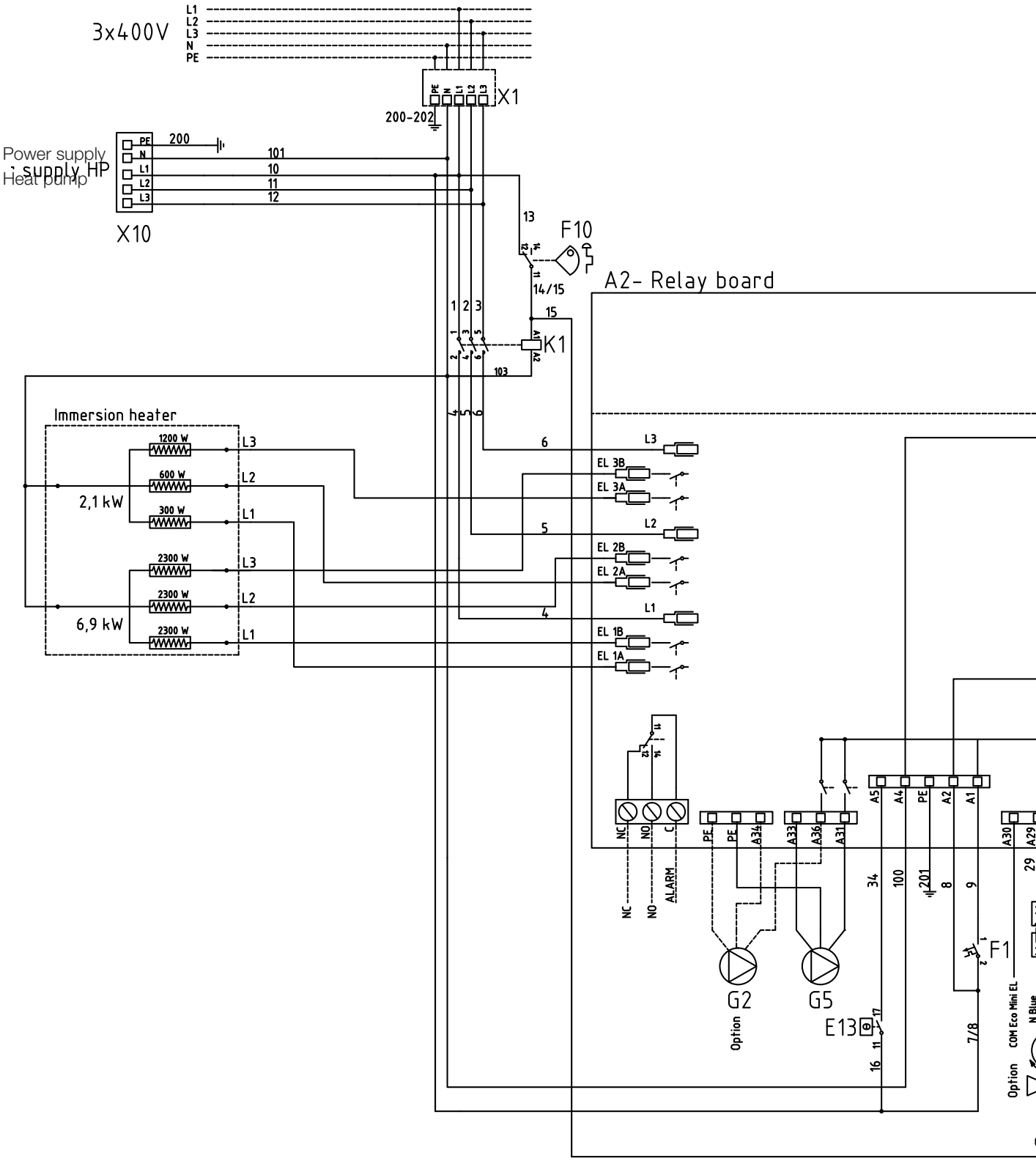
The current sensor connection has no alarm, but the current value can be read in the Operation data menu. Note that the tolerance/accuracy is very low with small current values.

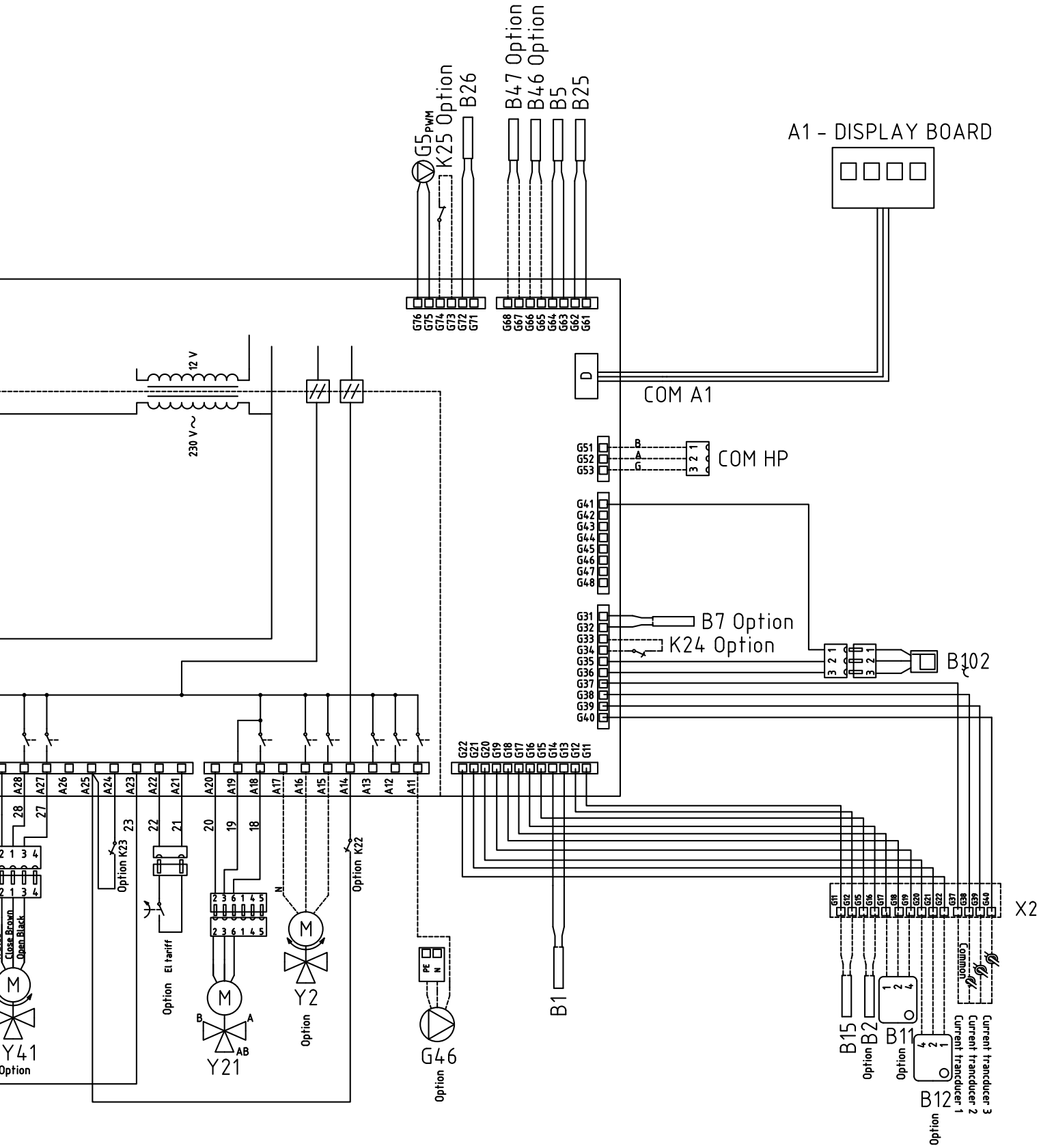




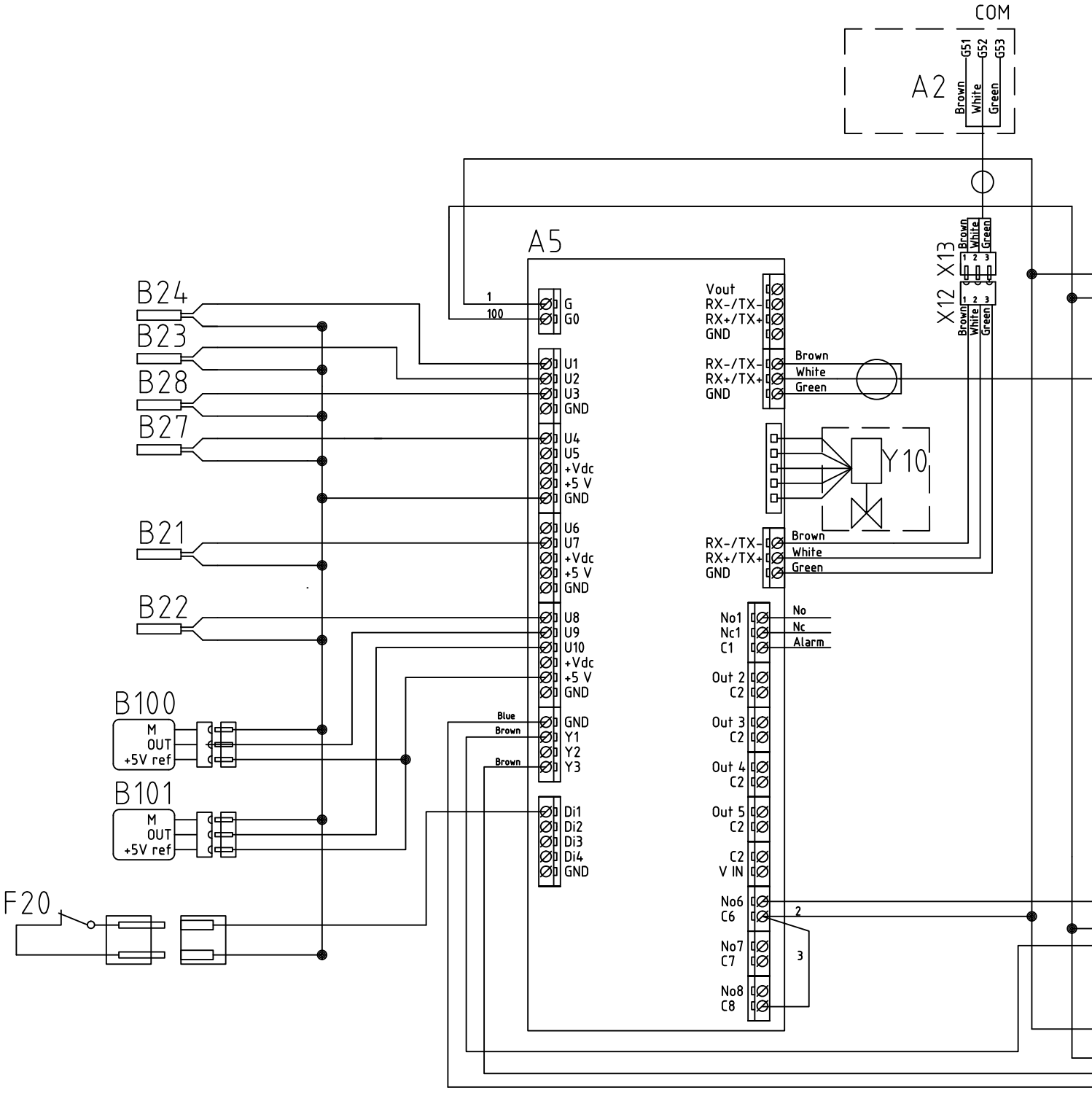
Connect to G37–G40 on the sensor terminal block. Use at least 0.5 mm^2 cable.

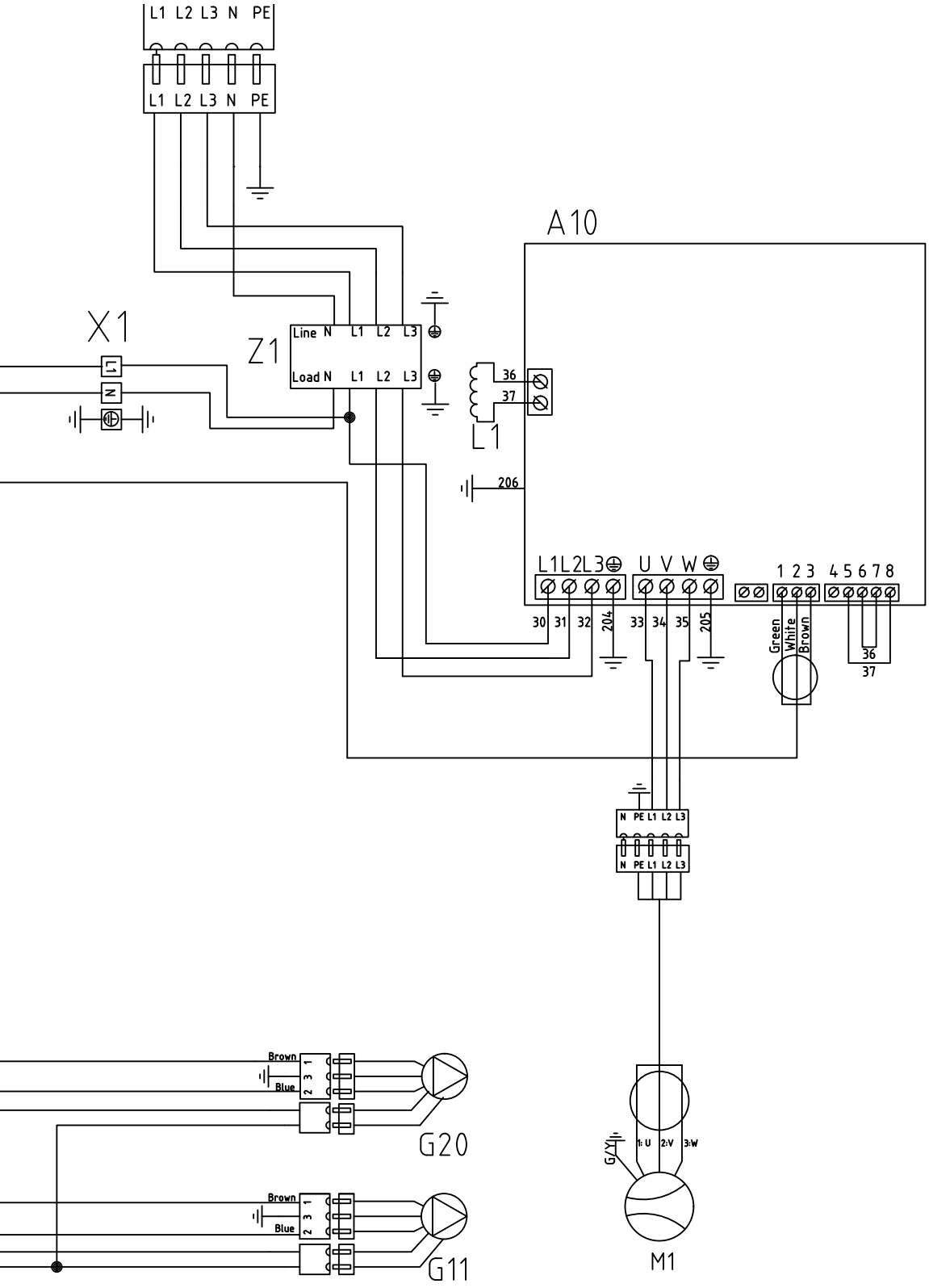
12.12 Tank schematic diagram (A2)



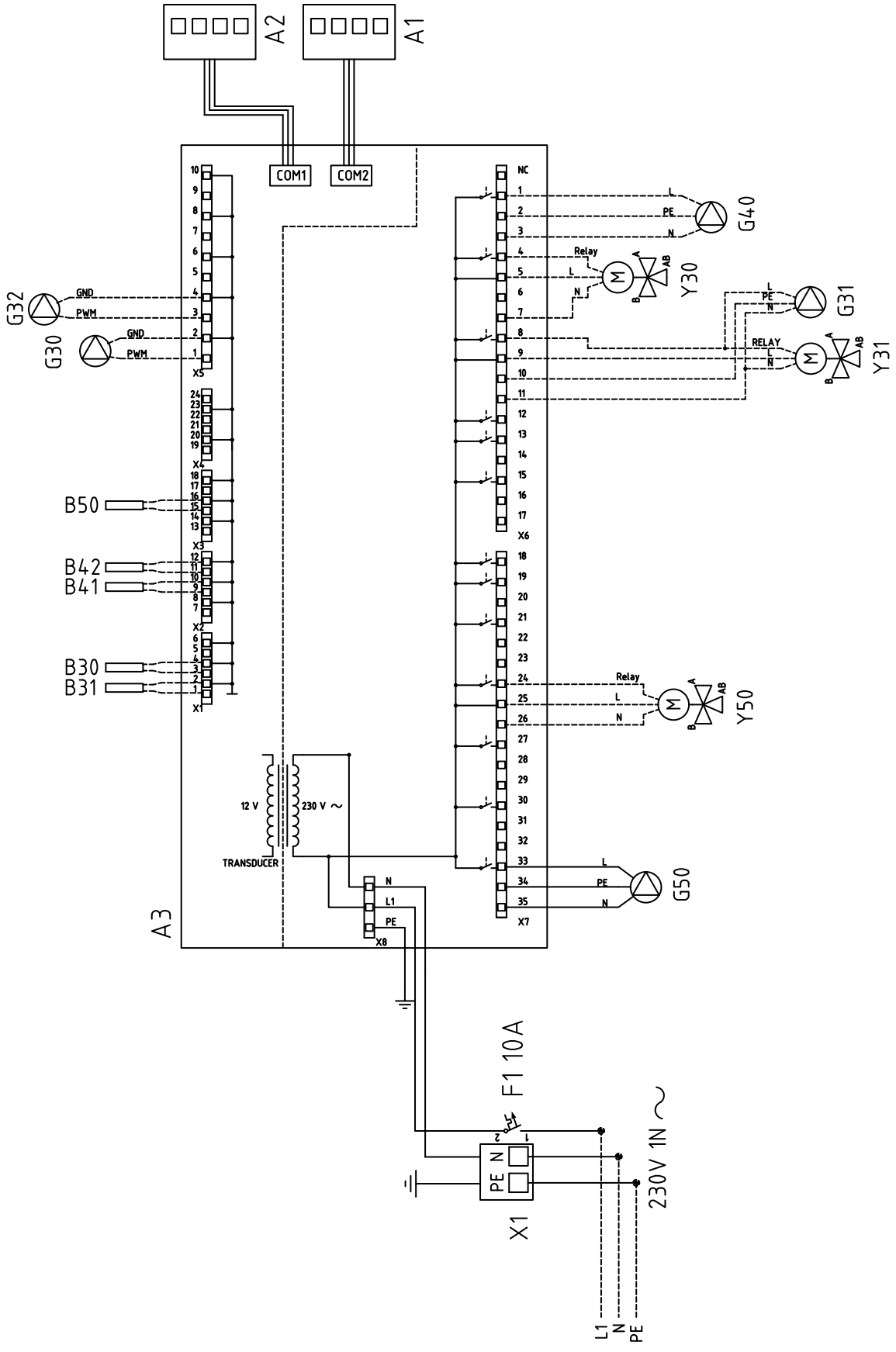

A1 - DISPLAY BOARD
B47 Option
B46 Option
B5
B25
G5 PWM
K25 Option
B26
COM A1
COM HP
B7 Option
K24 Option
B102
X2
B1
B15
B2
B11
B12
Option
Y41
Y21
Y2
G46
Option K23
Option K22
El tariff
Close Brown
Open Black
Common
Current trancducer 1
Current trancducer 2
Current trancducer 3
12 V
230 V

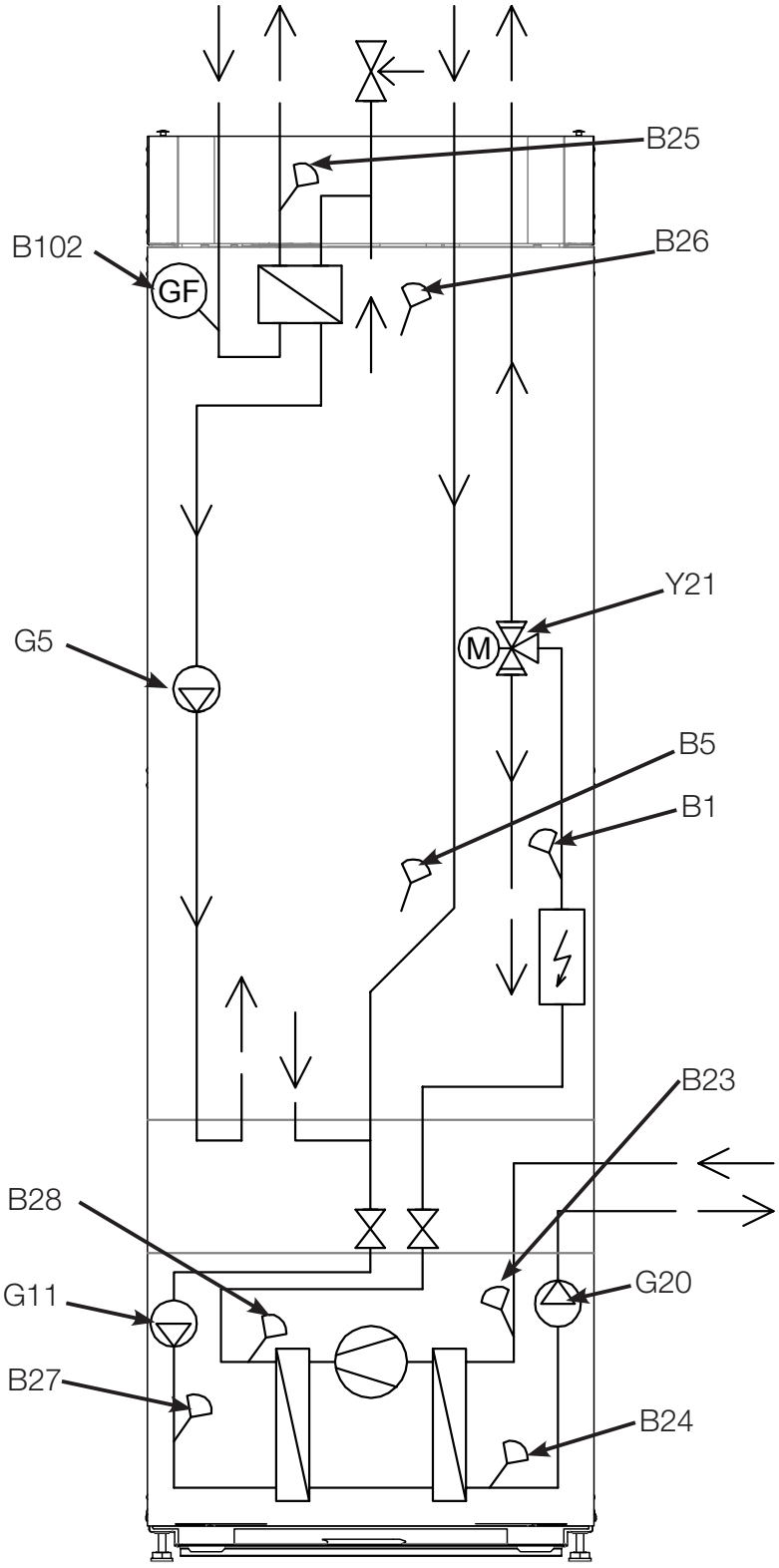
12.13 HP cooling module schematic diagram (A5)




L1 L2 L3 N PE
L1 L2 L3 N PE
A10
X1
Z1
Line N L1 L2 L3
Load N L1 L2 L3
36
37
L1
206
L1L2L3
U V W
1 2 3 4 5 6 7 8
30 31 32 204 33 34 35 205
Green
White
Brown
36
37
N PE L1 L2 L3
N PE L1 L2 L3
Brown
Blue
G20
Brown
Blue
G11
G/Y
1:U 2:V 3:W
M1

12.14 Expansion card (accessory) schematic diagram (A3)




B25
B102
GF
B26
Y21
G5
M
B5
B1
B23
B28
G11
G20
B27
B24

12.15 Parts list

A1	Display
A2	Relay/main card
A3	Expansion card
A5	HP control card
A10	Driver
B1	Primary flow sensor 1
B2	Primary flow sensor 2
B5	Sensor, hot water tank
B7	Return sensor
B11	Room sensor 1
B12	Room sensor 2
B15	Outdoor sensor
B21	Temperature sensor Discharge
B22	Temperature sensor Suction gas
B23	Brine in
B24	Brine out
B25	DHW
B26	Sensor, hot water tank upper
B27	HP in
B28	HP out
B30	Solar panel sensor in
B31	Solar panel sensor out
B41	External tank upper
B42	External tank lower
B46	Sensor diff thermostat
B47	External heat source tank
B50	Pool temp
B100	High pressure sensor
B101	Low pressure sensor
B102	Flow switch
F1	Fuses
F10	Max. thermostat
F20	High pressure switch
G2	Circulation pump 2
G5	Circulation pump for DHW heat exchanger
G11	Charge pump HP1
G20	Brine pump
G30	Circulation pump, solar panel
G31	Pump, bedrock (recharging bore hole)
G32	Pump, plate heat exchanger – solar energy
G40	DHW circ-pump
G46	Circulation pump, diff thermostat
G50	Charge pump pool heating
K1	Contactor 1
K22–K25	Flexible remote control/Smart Grid
K26	Thermostat input (optional)
L1	Induction coil
M1	Compressor
X1	Terminal board
X10	Extra terminal board
Y2	Mixing valve 2
Y10	Expansion valve
Y21	Diverting valve DHW 1
Y30	Solar 2-step valve external buffer tank
Y31	Solar 2-step valve
Y41	External heat source tank
Y50	Diverting valve pool
Z1	EMC filter

12.16 Resistances for sensors

NTC 22k

Temperatur °C	NTC 22 kΩ Resistans Ω
130	800
125	906
120	1027
115	1167
110	1330
105	1522
100	1746
95	2010
90	2320
85	2690
80	3130
75	3650
70	4280
65	5045
60	5960
55	7080
50	8450
45	10130
40	12200
35	14770
30	18000
25	22000
20	27100
15	33540
10	41800
5	52400
0	66200
-5	84750
-10	108000
-15	139000
-20	181000
-25	238000

NTC 150

Temperatur °C	Utegivare Resistans Ω
70	32
65	37
60	43
55	51
50	60
45	72
40	85
35	102
30	123
25	150
20	182
15	224
10	276
5	342
0	428
-5	538
-10	681
-15	868
-20	1115
-25	1443
-30	1883
-35	2478
-40	3289

13. First start

When the heat pump is delivered, the compressor is blocked to avoid it being unintentionally started. The heat pump can be installed and started before the brine circuit is put into operation.

The heat pump can also be started without a room sensor being fitted as the curve which has been set then regulates the heating. The sensor can however always be fitted for the alarm LED function.

Before first start

1. Check that the heating boiler and system are full of water and have been bled.
2. Ensure that the brine system is filled with water and antifreeze and that it is bled, or ensure that the compressor is blocked.
3. Check that all connections are tight.
4. Check that all sensors are connected to the electrical supply.
5. Check that the connections behind the insulating covers are tight. Remove the two insulating covers by pulling gently at the points marked.
6. The backup heating thermostat has OFF as its factory setting. The recommended position is ❄ = Antifreeze setting, around +7°C. The backup heating thermostat is reset on the electrical switchboard behind the front panel. It is in the OFF position when it is turned anticlockwise as far as it will go (the screwdriver slot should be vertical).

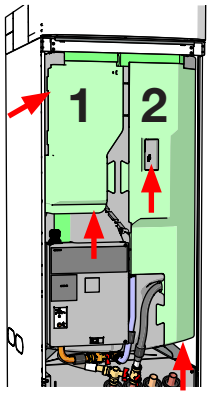
At the end of the installation, check the current transformers' connection. In this situation it is important that you have switched off any major consumers of electricity in the house. Also make sure that the backup thermostat is turned off.

Symbol for backup heating thermostat:

First start

Switch on the power using the safety switch. The display comes on. The heat pump now asks the following:

1. Select the language and press "OK".
2. Confirm that the system is filled with water and press OK.
3. Size of main fuse Choose between 10 and 35 A.
4. Specify the maximum electric heater power. Choose between 0.0 and 9.0 kW in steps of 0.3 kW.
5. Select the option permitting the compressor to operate (if the collector system is ready). When the compressor is started for the first time, it is automatically checked that it is running in the correct direction.
6. Brine pump on 10 days
7. Specify the max primary flow °C for heating circuit 1.
8. Specify the inclination for heating circuit 1.
9. Specify the adjustment for heating circuit 1.
   If the primary flow sensor for heating circuit 2 is installed, repeat steps 7 to 9 for heating circuit 2.
10. The heat pump then starts and the start menu appears.



Check connections

! Save these settings under: Installer/ Settings/Save settings

14. Operation and Maintenance

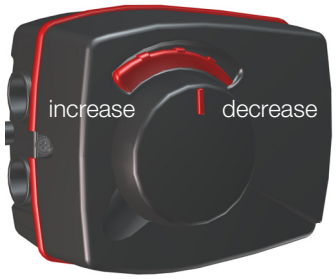
When the installer has installed your new heat pump, you should check along with the installer that the system is in perfect operating condition. Let the installer show you where the switches, controls and fuses are so that you know how the system works and how it should be maintained. Bleed the radiators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

Bleeding / safety valve for boiler and heating system

Check approximately four times a year that the valve is working properly by manually turning the control. Check that water, not air, comes out of the drain pipe. If so the tank must be bled.

Mixing valve (accessory)

The mixing valve is operated automatically from the control system, ensuring that the radiators reach the correct temperature, no matter what season it is. However, where a fault occurs, you can operate the valve by pulling out the knob on the motor and turning it clockwise to reduce the temperature or anticlockwise to increase it.



! Do not forget to re-set the mixing valve to automatic mode.

Draining the tank

The heat pump should be disconnected from the power source when it is being drained. The drainage valve is positioned at the bottom left of the unit when viewed from the front, behind the front of the heat pump. 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 heat pump is shut down using the operating switch. If there is a risk of the water freezing, all the water should be drained from the heat pump and the heating circuit. The DHW circuit, which contains around five litres, is emptied by inserting a hose at the bottom of the cold water connection and then siphoning it off.

15. Troubleshooting/appropriate measures

The heat pump is designed to provide reliable operation and high levels of comfort, and to 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 materials or design fault, then they will contact us to check and rectify the issue. Always provide the product's serial number.

DHW

Many people want to gain maximum benefit from the heat pump's low operating costs.

The control system is equipped with three comfort levels for hot water. We recommend starting at the lowest level and if there is not enough hot water, increase it to the next level. We also recommend that you operate a regular hot water pattern.

Check that the hot water temperature is not being affected by a poor mixing valve, whether at the heat pump or possibly the shower mixer.

! 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.

The heating system

A room sensor, which should be fitted when possible, 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.

A correctly operating heating circuit is of significant importance to the heat pump's operation and affects energy savings.

When adjusting the system, always do so with all radiator thermostats fully open.

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

If you do not achieve the set room temperature, check:

- That the heating circuit 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. In order for the heat pump to run economically, the heating circuit must function well in order to provide good savings.
- That the heat pump is operating and no error messages are displayed.
- That there is sufficient electrical power available. Increase if necessary. Also check that the electric power output is not limited due to excessively high electricity loads in the property (load monitor).
- That the product is not set to the "Max. permitted primary flow temperature" mode with a too low value.
- That "Primary flow temperature at -15°C outdoor temperature" is set sufficiently high. Increase if necessary. More can be read about this in the section entitled "The property's heating curve". However, always check the other points first.
- That the temperature reduction is set correctly. See Settings/Heating circuit.

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

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.

Current monitor

The heat pump has an integrated current monitor. 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 heat pump. The heat pump 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 the heat pump is limited, "High current, elpower redu (X A)" appears in text form in the display. Consult an electrician to determine whether the fuse size is correct or the three phases in the house are evenly loaded.

Ground loop

Faults can occur in the cooling unit if the ground loop has not been installed correctly, if it has not been bled sufficiently, if it contains too little antifreeze or is not designed to an adequate size. Poor or insufficient circulation can result in the heat pump triggering an alarm in the case of low evaporation. If the temperature difference between the ingoing and outgoing temperature is too large, the product triggers an alarm and "Low brine flow" is displayed. The probable cause is that there is still air in the brine circuit. Bleed thoroughly, which may in some cases take up to a day. Also check the ground loop. See also the section entitled "Connecting the brine system". Reset the Low evaporation alarm on the display. Where a malfunction repeatedly occurs, call in a technician to investigate and rectify the fault.

If the text "Low brine temp" is displayed, the ground loop may not be large enough or there may be a fault with the sensor. Check the brine circuit temperature in the Operation data menu. If the incoming temperature falls below -5°C during operation, call in a technician to inspect the brine circuit.

Air problems

If you hear a rasping sound from the heat pump, check that it is properly bled. Top up with water where required, so that the correct pressure is achieved. If this noise recurs, call a technician to check the cause.

Unusual noise when shutting off DHW

In some cases, unusual noises may be produced by the cold water, pipe work and heat pump due to the jolts which occur when the flow is quickly interrupted. There is no fault with the product, but the noise may occur when older types of instant closing mixers are used. More recent types are often fitted with a soft-closing mechanism. 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.

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

Motor protection

The heat pump constantly monitors the compressor's operating current and an alarm is triggered if the compressor is using an unusually high current. When a fault occurs the message "Motor protect high current" is displayed.

The cause of the fault may be as follows:

- Phase failure or mains interruption. Check the fuses, which are the most common cause.
- Compressor overload. Call out a service engineer.
- Faulty compressor. Call out a service engineer.
- Circulation too poor between the cooling circuit and cylinder. Check the heat medium pump (left pump).
- Abnormally high temperature in the brine circuit. Call out a service engineer.

15.1 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 that the product is operating in summer-time 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 provider can fit with the aim of disconnecting high current draw equipment requiring power for a short period of time. Not currently in use in the UK. The compressor and electrical power are blocked when ripple control is active.

High current
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 immersion heaters' electrical output over time.

Tariff, HP off.

Shows that tariff has switched off the heat pump.

Tariff, EL, off.

Shows that tariff has switched off the immersion heater element.

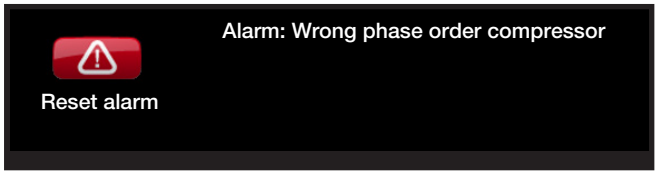
Compressor blocked

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 shut off. This option is selected under the Installer/Settings/Heat pump menu.

Heating, ext. mode HC 1
The remote control affects whether the heating is to be on or off. If the heating is switched off, the information "Heating from heating circuit 1/2" is also shown.

Smart: low price/overcap./blocking
The product is operated on the basis of "Smart Grid". See also "Define system/ Remote control/Smart Grid".

15.2 Alarm texts



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

Alarm text	Description
Wrong phase order compressor	The product's compressor motor must rotate in the right direction. The product checks that the phases are connected correctly; otherwise, an alarm is triggered. In this case, two of the phases to the product need to be changed. The power supply to the system must be shut off when rectifying this fault. This fault generally only occurs during installation.
Alarm sensor	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. If this sensor is important to the system's operation, the compressor stops. In this case, the alarm is reset manually after the fault has been rectified. For these sensors the alarm is reset automatically after correction: Sensor upper tank (B5), Sensor EHS-tank (B6), Sensor primary flow 1 (B1), Sensor primary flow 2 (B2), Sensor out (B15), Room sensor 1 (B11), Room sensor 2 (B12), Sensor brine out, Sensor brine in, Sensor HPin, Sensor HPout, Sensor discharge, Sensor suction gas, Sensor high pressure, Sensor low pressure.
Motor protect compressor	High/low current has been detected to the compressor. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
High pressure switch	The refrigerant's high pressure switch has been triggered. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer.
Low brine temp	Incoming brine temperatures from bore hole/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.
High brine temp	Incoming brine temperatures from bore hole/ground loop 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.
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 speed 3. Press reset and check whether the alarm recurs. Also check the brine filter that has been installed. If the fault recurs, contact your installer.

Alarm text	Description
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 on installation that the max. thermostat has not tripped.
Communication error relay card, 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.
Fuses	This message appears when the fuse has been triggered.
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.
Phase missing	This message appears in the event of a phase failure.
Compressor type?	This message appears if there is no information about the compressor type.
Heat pump alarm	This message appears if the heat pump is in alarm mode.
Driver	Driver fault. Press reset and check whether the alarm recurs. If the fault recurs, contact your installer and tell them the error code number where applicable.
Driver: Offline	Communication error. The electrical connection box and driver of the heat pump are not communicating.

Enertech Group

CE

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,

GSi 12

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, Module A

Electromagnetic Compatibility (EMC)EN2004/108/EC

Low Voltage Directive (LVD) EN2006/95/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,

EN60335-1: 2002, A1:2005, A2:2006, A11:2004, A12:2006, A13:2009, A14:2010, A15:2011.
EN60335-2-21:2003, A1:2005, A2:2009
EN60335-2-40:2003, A2:2009, A11:2004, A12:2005, A13:2012
EN62233:2008
EN55014-1:2007, A1:2009, A2:2011
EN55014-2:1997, A1:2001, A2:2008
EN61000-3-12:2011, -11:2000
EN61000-4-2, -3, -4, -5, -6, -11

Ljungby 2015-06-02

Joachim Carlsson

Technical Manager

161 421 50 10-01

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

Enertech Group