

Installation- and maintenance instruction

**CTC EcoEI 1x230V**

Modell 1550



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\*) Wiring diagram placed center fould.

*With reservation for typing errors. Subject to alterations in design.*

## For your own memory

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

Product	Manufacturing No
Installer	Telephone No
Date of installation	



## Welcome

*Congratulations! You have just bought a CTC EcoEl, which we hope you will be very pleased with. In the following handbook, you can read about how to operate your electrical boiler. One chapter is written for the property owner and one chapter for the installation contractor.*

*Keep this handbook with the installation and maintenance instructions. The CTC EcoEl is designed to last for many years, and it is here you will find the information you need to operate and maintain the unit correctly and ensure its longevity.*

## The complete electrical boiler

CTC EcoEl is a complete electrical boiler which can provide your detached house's heating and hot water requirements. It is equipped with a motorised mixing valve which ensures correct and even temperatures are supplied to your radiators.

### **CTC EcoEl has a control system which:**

- ▶ *Monitors all functions of the electrical boiler as well as potentially connected CTC EcoAir or CTC EcoPart heat pumps.*
- ▶ *Permits individual settings.*
- ▶ *Displays required values, such as temperatures, operation times, energy consumption, and fault recording.*
- ▶ *In a simple and well structured way, allows settings to be adjusted and fault tracing*

Your CTC EcoEl is equipped with a built in copper coil providing copious amounts of hot water. CTC EcoEl also has a so called summer time cellar heating function and a floor heating block, which maximises the temperature supplied to the floor circuits. Using the built in night time reduction function, you can set and change house temperatures during the day and from day to day in the Week program.

Easily accessible electric components and good fault tracing functions in the control program make CTC EcoEl service friendly. It is supplied with a room sensor as standard, which is equipped with a light diode which flashes in the event of a fault.

The CTC EcoEl is designed for easy connection of the air/water heat pumps CTC EcoAir or the ground source heat pump CTC EcoPart. When connected the complete functions of the heat pump are controlled from the CTC EcoEl control system and menu display.

# Important points!

Upon delivery and installation carefully check the following important points:

- ▶ The EcoEl must be transported and stored standing.
- ▶ When moving the product inside the house it can be temporarily placed on its back.
- ▶ Unpack and check before installation that the product has not been damaged during transport.  
Report eventual transport damage to the transporter.
- ▶ Place the EcoEl on a solid foundation, recommended a concrete bed.  
If the electrical boiler shall be placed on a soft carpet, some type of base plate must be placed under the adjustable feet.
- ▶ For easy access upon service, the area in front of the product must be at least 1 meter.  
The product must also not be placed below floor level.

# Safety instructions

The following safety instructions must be observed upon handling, installation and use of the heat pump:

- ▶ Ensure that the product is currentless before any interventions.
- ▶ Do not flush the heat pump with water.
- ▶ When handling the product with a crane etc., make sure that the lifting equipment, loops etc. are not damaged. Never place yourself under the elevated heat pump.
- ▶ Never risk your safety by dismantling casings, covers etc that are screwed tight.
- ▶ Never risk your safety by setting safety equipment out of function.
- ▶ Interventions in the electric or cooling system must be done only by a qualified person.
- ▶ Safety valve control:

The safety valve for boiler/heating system and DHW must be controlled on a regular basis. See chapter Operation and maintenance.

# Heating curve

The heating curve is a central part of the product's control system. It is the heating curve which determines the temperature requirement for your property at different outdoor temperatures. It is important that the heating curve is correctly adjusted, so that you achieve the best function and economy possible.

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

## Adjustment of heating curve basic values

The heating curve for your property is set using two values in the product control system. This is set in the menu `Installer/Settings/Setting house paramt/Inclination and Adjustment`.

Arriving at the correct heating curve can take some time. The best way to achieve this is to select operation without room sensor in the initial period. The system then operates using outdoor temperatures only.

During the adjustment period it is important that:

- Night reduction function is not selected.
- All radiator thermostat valves are fully open.
- Outdoor temperature is not higher than +5°C. (If the outdoor temperature is higher when the system is installed, use the factory set graph until the outdoor temperature falls to this level.)
- The radiator system functions well and is correctly adjusted for the different circuits.

### Inclination and adjustment

#### Inclination 50:

The value defines 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 set where a radiator system has larger radiator areas (a low temperature system).

*Floor heating systems* require much lower temperatures. An even lower value should therefore be selected.

The value must be increased for *high temperature systems* to achieve high enough indoor temperatures.

#### Adjustment 0:

The *inclination* defines how much the temperature of the water supplied to the radiators should be increased for falling outdoor temperatures. The *adjustment* specifies that the temperature level can be raised or be lowered at specific outdoor temperatures.

#### Example:

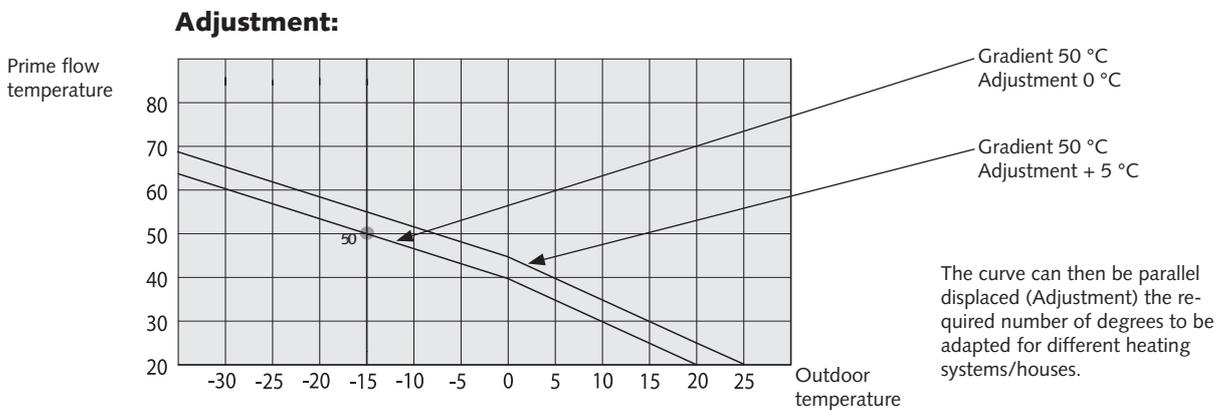
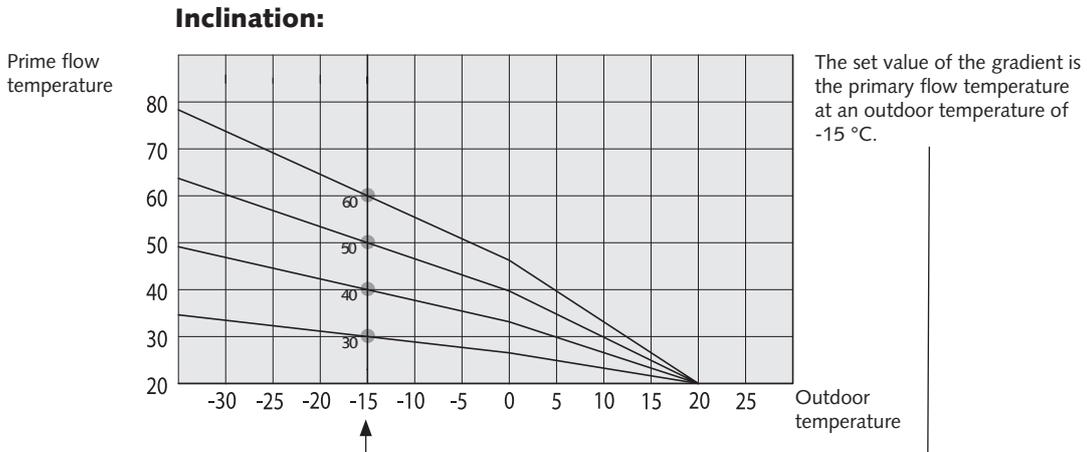
Inclination 50 means that the temperature of the water supplied to the radiators is 50°C when the outdoor temperature is -15°C (*if adjustment is set to 0*). If the adjustment is set to +5, the temperature is instead 55°C.

The graph is increased by 5°C at all temperatures, i.e. the graph is *parallel displaced* by 5°C.

- ! The set heating curve is always prioritised.
- The room sensor can only call on the mixing valve to increase temperatures to a specific level beyond the set heating curve. Where operating without a room sensor, the selected graph determines the temperature supplied to the radiators.

### Examples of heating curves

Below you find three charts where you can see how the heating curve changes by different settings of the *Inclination*. The gradient of the curve shows which temperature the heating system requires at different outdoor temperatures.



### Suitable standard values

At the time of the installation it is seldom possible to instantly set the heating curve exactly. The values to the right may then be a good starting-point before the more accurate adjustment is set.

Radiators with small heat emission surfaces require higher primary flow temperatures.

Menu:	
Installer/Settings/Setting house paramt ---->Inclination	
Floor heating only	Inclination 35
Low temperature system ( <i>well insulated house</i> )	Inclination 40
Standard temperature system ( <i>older house</i> )	Inclination 50
High temperature system ( <i>older house, small radiators, poorly insulated</i> )	Inclination 60

### Adjustment (if the outdoor temperature is lower than 0 degrees)

- ▶ **At to cold indoors:** Increase the value at Inclination a couple of degrees. Wait one day before the next adjustment.
- ▶ **At to warm indoors:** Decrease the value at Inclination a couple of degrees. Wait one day before the next adjustment.

### Adjustment (if the outdoor temperature is higher than 0 degrees)

- ▶ **At to cold indoors:** Increase the value at Adjustment a couple of degrees. Wait one day before the next adjustment.
- ▶ **At to warm indoors:** Decrease the value at Adjustment a couple of degrees. Wait one day before the next adjustment.

! When the standard values are fairly correct adjusted, the curve can be displaced directly in the normal display menu Indoor°C.

! To low adjusted values might imply that the required indoor temperature is not being reached. Then you have to adjust the heating curve according to need.

# Construction EcoEl

The picture below shows the fundamental construction of the product.

**Fresh water connections**  
Here you connect the fresh water connections of the property. The cold water is led down to the lower part of the coil.

**Gilled coil for hot water**  
The product is equipped with a well dimensioned gilled coil in copper. The product is not supplied with any parts which can rust and break. The temperature can be kept low without risk of legionella bacteria.

**Bivalent mixing valve**  
The automatized mixing valve ensures that an even heat reaches the radiator system continuously. The valve has double doors and first collects the hot radiator water from the water heated by the heating pump.

**Upper part**  
In the upper part of the coil the water is heated to the selected hot water temperature.

**Insulation**  
The tank of the boiler is insulated with die cast polyurethane foam for minimal heat losses.

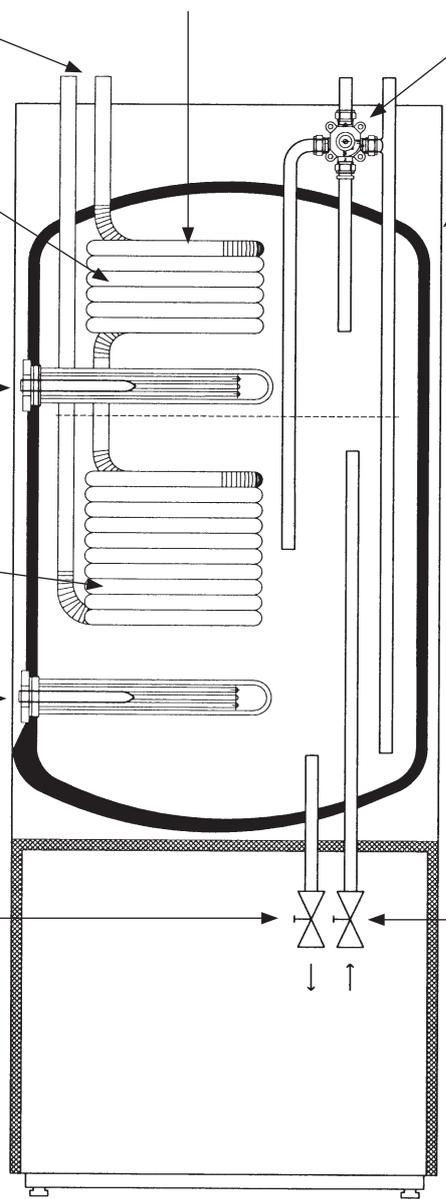
**Immersion heaters**  
A built-in immersion heater functions as peak heat if the effective output is not sufficient along with the rising of the hot water temperature.

**Lower part**  
In the lower part of the coil the water is pre-heated by the heat pump. The major part of the coil is located in this part.

**Immersion heaters**  
Lower immersion heater

**Drainage valve**  
Used for drainage of the product and/or radiator system. When EcoEl connected to heat pump, this would be the flow pipe to the heat pump.

**Connection for heat pump**  
When EcoEl connected to heat pump, this would be the flow pipe from the heat pump.



**!** Note: Do not connect the product according to this construction sketch, see instead the measurements on page 30 and the chapter "Plumbing system".

## How the control system works

All settings are set on the well structured control panel. The control panel also provides you with information on operation and temperatures. Information is displayed in the *display screen*. All the information you need is easily obtained by a few keystrokes and by making a few selections in the different menus.

### How the buttons are used

Accessing the menus, to display operation information or set your own values, is simple. The button functions are described below.

#### A The display screen

##### 1 Menu name

The name of the menu you are in is displayed here. When you are not in the menu system the product name, day and time (normal display) are displayed.

##### 2 Row marker

You can scroll the cursor up or down the screen to the row you want to select.

The cursor is moved using the increase or reduce button (D).

The cursor becomes filled and black when a row is selected. Press the “undo” button (B) to deselect a row selection.

##### 3 More rows indicator

The arrow shows that there are rows *below* which are not visible in the display.

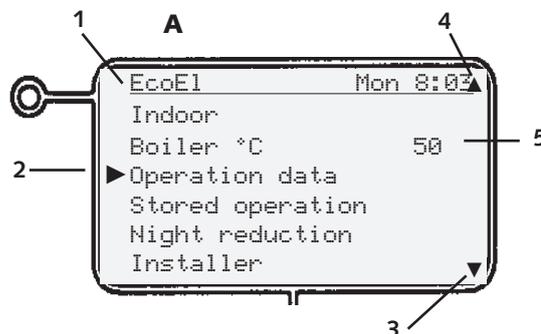
Scroll the cursor downwards to view these rows. The arrow disappears where there are no more rows below.

##### 4 More rows indicator

The arrow shows that there are rows *above* which are not visible in the display. Scroll the cursor upwards to view more rows. The arrow disappears where there are no more rows above.

##### 5 Information area

All information, temperatures, values etc. are displayed here.



**B Button – “step backwards” or “undo”**

Use this button to step backwards in the menu system to the previous menu. You can also use this button to deselect a selected row.

**C Button – “OK”**

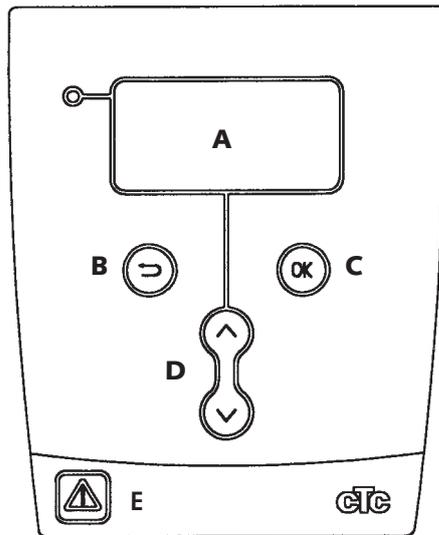
Use this button to approve/confirm a value or a selection.

**D Button – “increase” or “reduce”**

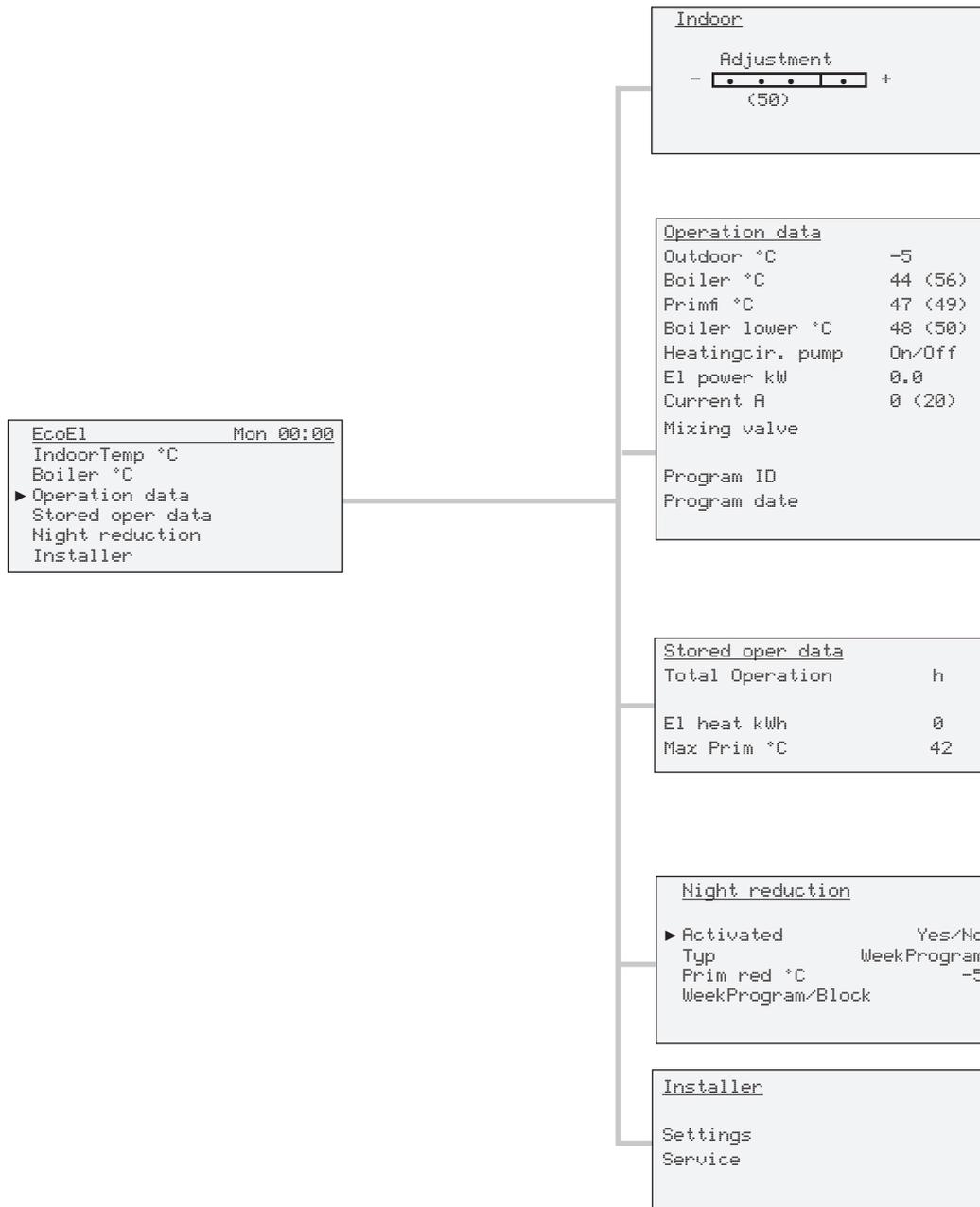
Use the button to increase or reduce a value. The button can also be used to move the *row marker* upwards or downwards.

**E Button – “Reset alarm”**

Use this button to reset the product after an alarm has been triggered. Only displayed where an alarm has been triggered.



# General information **CTC EcoEl menu map**



WeekProgram		
Mon	▲06 ▼-- ▲-- ▼22	
Tue	▲06 ▼-- ▲-- ▼22	
Wed	▲06 ▼-- ▲-- ▼22	
Thu	▲06 ▼-- ▲-- ▼22	
Fri	▲06 ▼-- ▲-- ▼23	
Sat	▲08 ▼-- ▲-- ▼23	
Sun	▲08 ▼-- ▲-- ▼22	

Block		
Decr.	Sun	18:00
Incr.	Fri	16:00
Decr.	--	
Incr.	--	

Setting house paramt	
Max Primf. °C	55
Min Primf. °C	Off
Heating Off °C	16
Heating curve	
Inclination	50
Adjustment	0

Settings	
Lang.	English
Product	EcoE1
Indoor sens	Yes/No
Boiler °C	50
Boiler max kW	1~6
Boiler lower °C	50
Boiler lower kW	6
Main fuse A	20
External Control	NS
Setting house paramt	
Holiday	On/Off
Prim red °C	-2
Save setting	
Load setting	
Load factory setting	

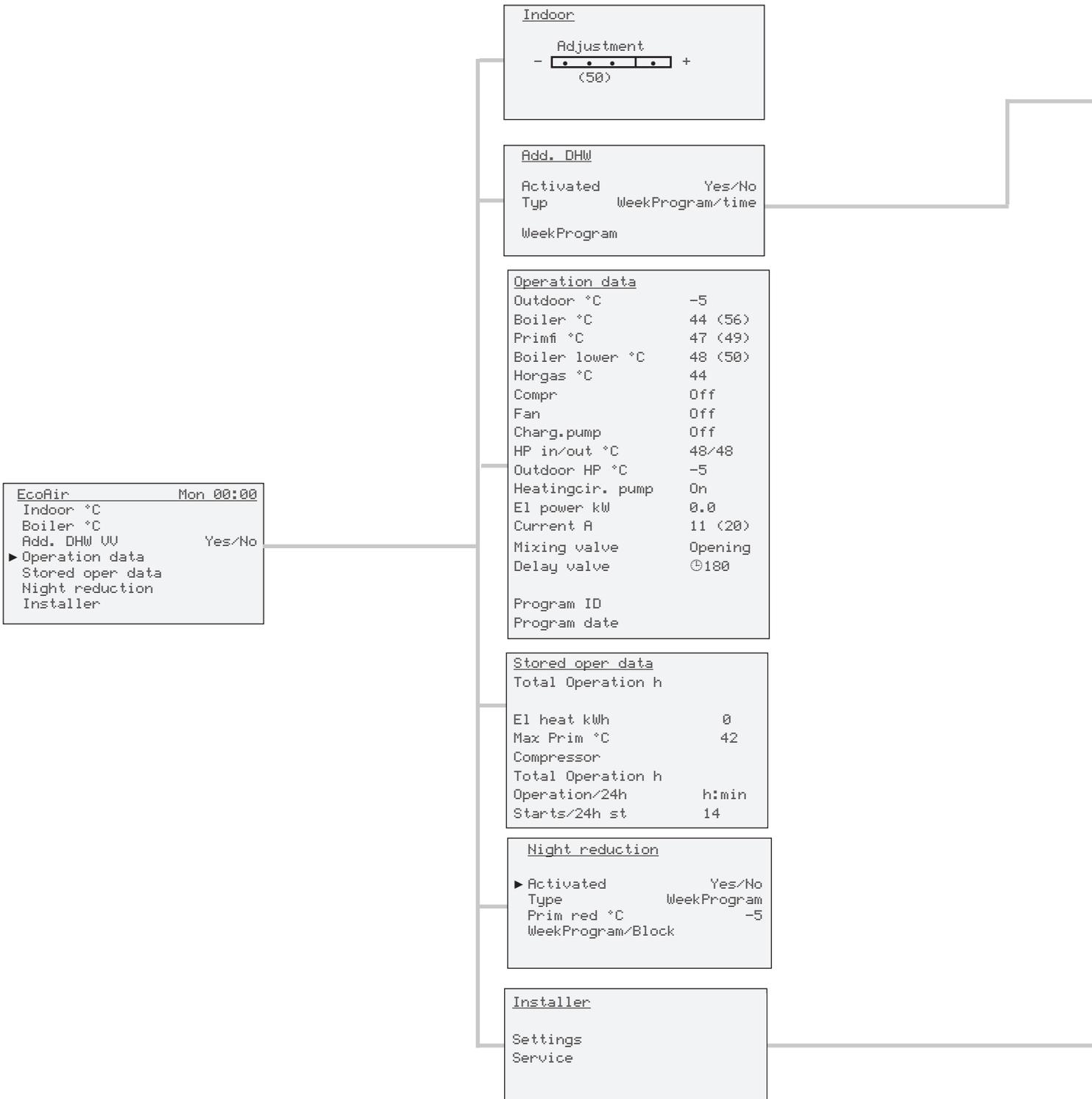
Function test	
ElRelay 2/4 kW	00
ElRelay 2 kW	00
Boiler lower	Off
Charg. pump	Off
Heatingcir. pump	Off
MixingValve	
Diode sensor	Off

Service	
Function test	
Alarm info	

Alarm info	
Latest alarm	-
Stored alarms	-
	-
	-

# CTC EcoEI menu map

With the heat pump CTC EcoAir (or CTC EcoPart) connected.



WeekProgram	
Mon	▲06 ▼-- ▲-- ▼22
Tue	▲06 ▼-- ▲-- ▼22
Wed	▲06 ▼-- ▲-- ▼22
Thu	▲06 ▼-- ▲-- ▼22
Fri	▲06 ▼-- ▲-- ▼23
Sat	▲08 ▼-- ▲-- ▼23
Sun	▲08 ▼-- ▲-- ▼22

Settings	
Lang.	English
Product	EcoAir
Heat pump	Permitted
Indoor sensor	Yes/No
Boiler °C	50
Boiler max kW	1~6
Boiler lower °C	50
Boiler lower kW	6
Delay valve min	180
Main fuse A	20
Add. DHW min	120
Add. DHW boiler °C	60
ExternalControl	NR
Setting house paramet.	
Min outdoor temp. °C	-10
Holiday	On/Off
Save setting	
Load setting	
Load factory setting	

Service	
Function test	
Alarm info	
Factory setting coded	

Setting house paramet.	
Max Primf °C	55
Min Primf °C	Off
Heating off °C	16
Heat curve	
Inclination °C	50
Adjustment °C	0

Function test	
ElRelay el 2/4 kW	
ElRelay el 2 kW	
Boiler lower	Off
Compr	Off
Fan	Off
Charg. pump	Off
Heatingcir. pump	Off
Mixing valve	
Diod sensor	Off

Alarm info	
Latest alarm	-
Stored alarms	-

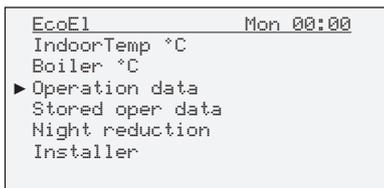
Factory setting code	
Code	0 0 0
Summer oper. °C	16
HP max °C	55
HP min °C	35
Alarm compr. temp °C	120
Diff start/stop	5
Start delay min	10

# Detailed menu description

## Factory set values

The product is supplied with a set factory set values which are suitable for a normal house with a normal radiator system. These values can be changed as required. House parameters should be particularly checked. Ask your installation contractor to determine the correct values. The following basic values are set by the factory:

Night reduction:	off (constant normal temperature)
Temp. boiler upper: Power	50 °C 6 kW
Temp. boiler lower: Power	40°C 6 kW
Indoor sensor:	none
Main fuse:	20A
House parameters:	Inclination 50, Adjustment 0 °C
Night reduction:	No



## Main menu/Normal display menu

This menu is the system's basic menu. The system returns to this menu if no buttons are pressed within a 10 minute period. All other menus can be accessed from this menu.

EcoE1 Mon 00:00

Displays the product selected, the day and the time. Day and time can be set by selecting this row.

IndoorTemp °C

Displays current room temperature. The set temperature is displayed in brackets. Select this row to change set temperature. Can be set in the range 0.0... 35.0°C.

IndoorTemp °C

If a room sensor has not been fitted, temperature is adjusted using the outdoor temperature. Select this row to adjust the temperature of the water supplied to radiators. See the room temperature menu below. If "NS" is displayed, night time lowering of temperature is running.

Boiler °C

The product's maximum temperature is displayed here. The product sensor is positioned at the top of the tank. Display only.

Operation data

Select this menu to view all product current operating data, all current temperatures, active components etc.

Stored operation data

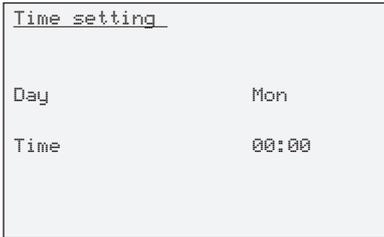
Select this menu to view operating data which has been saved over a longer time period.

Night reduction

You can select here whether you want to activate night time lowering of temperature. Two periods of lower temperatures per day, seven days a week can be programmed. Lowering can also be programmed for blocks of days.

Installer

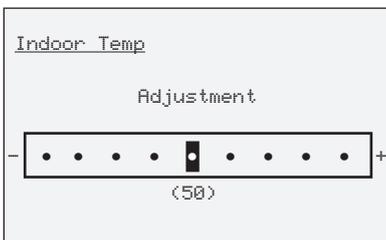
This menu contains two sub menus. One menu is used to set all basic settings and one menu is used by service personnel.



### Menu Time setting (at the top of the normal display menu)

Day and time can be set here. The clock is metered by the mains electricity network frequency (50 Hz). If there is a power cut, reset the clock. The clock restarts at the time immediately before the power cut ± 5 minutes. Summer time/winter time is set manually.

- Day                      Mon                      Set current day (Monday...Sunday).
- Time                     00:00                    Set current time (00:00... 11:59 pm)



### Menu Indoor temperature

**(the menu can be accessed directly from the main menu)**

**(when "operation without room sensor" is selected)**

The room temperature is set in this menu if a room sensor has not been fitted (selected in the settings menu). The house's basic settings are first set in the "house parameters" menu, usually with the help of the installation contractor. Basic settings are then fine tuned using this menu.

If the indoor temperature is experienced as being too low or too high, move the cursor towards + (increase) or – (reduce). Move a little at a time and see what effect this has on indoor temperatures (1 day) before making further changes. Several adjustments may be necessary at different outdoor temperatures. However, a correct setting will be arrived at which will not require further changing. A reference value (for example 50) is displayed under the bar. This value depends on the basic value set. If the bar does not extend far enough to allow the correct indoor temperature to be obtained, the basic setting must be adjusted in the Installer/Settings/Setting house paramet. The cursor is then centred in relation to the new values.

**NOTE: radiator thermostats must be fully open and fully functioning when adjusting the system.**

Operation data	
Outdoor °C	-5
Boiler °C	44 (56)
Primfi °C	47 (49)
Boiler lower °C	48 (50)
Heatingcir. pump	On/Off
El power kW	1~6.0
Current A	11 (20)
Mixing valve	
Program ID	
Program date	

## Menu Operation data (the menu is directly accessed from the main menu)

*This menu displays current product and system temperatures and operating data. Values in brackets are either required values or automatically generated values which the product aims to achieve (expected values).*

Outdoor °C	-5	Displays current outdoor temperature. The product uses this value to determine a number of different operating data.
Boiler °C	47 (56)	Displays the upper boiler section temperature (electric boiler) and the temperature which the boiler aims to achieve. This value automatically increases if a poor radiator system requires higher temperatures.
Primfi °C	47 (49)	Displays the temperature of the water supplied to the house's radiators, and the temperature which the system aims to achieve. This value will vary during operation depending on set parameters and current outdoor temperatures.
Boiler lower °C	48 (50)	Displays the lower boiler section temperature (electric boiler) and the temperature which the boiler aims to achieve.
Heatingcir. pump On/Off		Displays the heating circuit (radiator) pump's operating status. The pump stops in the summer time when there is no heating requirement. The pump is however exercised occasionally to avoid it jamming.
El power kW	1~6.0	Displays auxiliary power of the electric boiler (0...6 kW). The electric boiler connects power in steps of 2 kW (3 connection steps).
Current A	11 (20)	Displays the house's total current consumption on the hardest loaded phase. The house's main fuse size is displayed in brackets. Assumes that the current sensor applied has been fitted to the incoming cables. If the current drawn exceeds the main fuse size, the electric boiler automatically steps down a power step to protect the fuses, for example when several high consumption equipment units in the house are being used. No function of single phase heatpump since the current sensor connection is not used.
Mixing valve		A micro switch in the mixing valve valve's motor ensures that auxiliary heating is not used unnecessarily.
Program ID		Control program identity.
Program date		Control program version date.

```

Stored oper data
Total Operation h      h
EI heat kWh           0
Max prime °C         42
    
```

## Menu Stored operation data

**(the menu can be directly accessed from the main menu)**

*Operation values across longer periods of time are reported in this menu.*

- Total Operation h      Displays the total time the product has been connected to power.
- EI heat kWh              Displays the product's total calculated approximate consumption. This is not a direct energy measurement. The household energy is outside this display.
- Max prim °C 55          Displays the maximum temperature of the water supplied to the radiators. The value can indicate the radiator system/the house's temperature requirement. The lower the value in the winter season, the better the system is adapted to heat pump operation.  
The value can be reset by pressing the "OK" button in this menu.

```

Night reduction
▶ Activated           Yes/No
Typ                  WeekProgram
Prim red °C         -5
WeekProgram/Block
    
```

## Menu Night reduction (the menu can be directly accessed from the main menu)

*Night time lowering of temperatures can be activated and set in this menu. Night time temperature lowering means that the indoor temperature is lowered during scheduled periods, for example at night or when you are at work. Two types of night time temperature lowering can be selected. Week Program is selected to schedule daily lowering of temperatures. Block is selected to schedule night temperature lowering periods which last for several days.*

- Activated Yes/No      Here you can select whether scheduled temperature lowering is active. Where "No" is selected, there is no temperature lowering.
- Typ WeekProgram      The type of lowering is selected here:  
WeekProgram means that periods of lower temperatures can be scheduled for all days of the week, with the option of two periods of lower temperatures per day. The schedule repeats every week.  
Block means that lowering is scheduled for several days of the week, for example Monday to Friday. Two lower temperature periods can be scheduled. The schedule repeats every week.
- Prim red °C -5        Here you can set how many degrees the room temperature is to be lowered during the lower temperature periods. NB: -5 means that the room temperature is lower 5°C below the ordinary temp. If the room sensor is not included in operation, the lowering is applied to the primary flow temperature. Rule of thumb: a 3-4°C lower primary flow temperature gives around 1°C lower room temp in a normal system.
- WeekProgram or Block      Scheduling is set under these menus, see next section.

WeekProgram			
Mon	▲06	▼--	▲-- ▼22
Tue	▲06	▼--	▲-- ▼22
Wed	▲06	▼--	▲-- ▼22
Thu	▲06	▼--	▲-- ▼22
Fri	▲06	▼--	▲-- ▼23
Sat	▲08	▼--	▲-- ▼23
Sun	▲08	▼--	▲-- ▼22

## Menu Week program

(Night reduction/WeekProgram)

Lowering times during days of the week can be scheduled in this menu. The schedule repeats every week. The picture shows the factory values, which can be changed. If further lowering periods are required, intermediate times can be programmed.

▲ = the temperature is raised (to normal temp) at the times specified after the arrow.

▼ = the temperature is lowered the number of degrees specified at the time specified after the arrow

### Ex. 1

Mon ▲06 ▼-- ▲-- ▼22 : On Monday morning at 6.00 am, the temperature is raised to normal and remains normal throughout the day until 10.00 pm when the temperature is lowered.

### Ex. 2

Mon ▲06 ▼12 ▲16 ▼22 : At 6:00 am, the temp is raised to normal, at 12:00 pm the temp is lowered until 4:00 pm. Between 4:00 pm and 10:00 pm the temp is normal, after which the temperature is lowered.

Block		
Decr.	Sun	18:00
Incr.	Fri	16:00
Decr.	--	
Incr.	--	

## Block menu (Night reduction/Block)

Temperature lowering for several days of the week can be set in this menu. For example, if you work somewhere else during the week but are at home at the weekend.

Decr Sunday 18:00

Set the first day and time at which the temperature should be lowered.

Incr Friday 16:00

Set the day and time at which the temperature is to be returned to normal. If two lowering periods are required in the week, they are programmed in chronologic order.

### Ex:

```
Decr Sunday 18:00
Incr Wednesday 16:00
Decr Thursday 21:00
Incr Friday 16:00
```

Installer	
Settings	
Service	

## Menu Installer

(the menu can be accessed directly from the main menu)

This menu contains two sub menus. The Settings menu is used by the installation contractor and the user and the Service menu is used when fault tracing.

Settings

Select this menu to adjust the settings to your own requirements.

Service

This menu is used by service personnel for fault tracing and diagnostics. The menu also contains an encoded section with alarm limits, where manufacturer's settings are stored.

Settings	
Lang.	English
Product	EcoEl
Indoor sens	Yes/No
Boiler °C	50
Boiler max kW	1~6
Boiler lower °C	50
Boiler lower kW	6
Main fuse A	20
External Control	NS
Setting house paramt	
Holiday	On/Off
Prim red °C	-2
Save setting	
Load setting	
Load factory setting	

## Menu Settings (Installer/Settings)

In the menu "Settings", the installer and user make the adjustments to the requirements and demands.

**U = settings made by the user.**  
**I = settings made by the installer.**

! Select Boiler max kW to 1~2/1~4 or ● 1~6 under menu Boiler max kW. Select size of heatpump under menu Size.

Lang. English	I/B. Setting the language.
Product EcoEl	I. The control unit contains control systems to several product types: Eco Heat, EcoPart, EcoEl and EcoAir. The correct product is set by the factory. If EcoEl is supplemented with EcoPart or EcoAir, the product type must be changed.
Indoor sens. Yes/No	I. Select here whether an indoor sensor is to be included in operation. An indoor sensor can be temporarily deselected, for example when a fire place is being used.
Boiler °C 50	I/B. The electric unit's temperature is set here. A low setting is recommended. The electric unit is also responsible for peak heating. If the house requires a higher temperature than that selected, the control system compensates by automatically raising the temperature.
Boiler max kW 1~6	I. Setting determining the electric unit's maximum permitted power. 0 to 6 kW with steps of 2 kW. Use 1~2, 1~4, 1~6 for single phase EcoEl. For 3 phase EcoEl, use 0.1 / 3 / 4.5 / 6 / 7.5 / 9.
Boiler lower °C 50	I. Setting the temperatur of the lower part of boiler.
Boiler lower kW 6	I. Setting the lower part of the boilers maximum permitted power. 0 to 6 kW.
Main fuse A 20	I. The house's main fuse size is set here. This setting and the fitted current sensors ensure the fuses are protected when using equipment which generates temporary power peaks, for example cookers, ovens, engine heaters etc. The product temporarily reduces power drawn where this type of equipment is being used. No function of single phase heatpump, since the current sensor connection is not used.
External control NS	I. Selection of remote control type. NR = remote controlled temperature lowering, for example via the minicall system. SO = electricity supplier control. Disconnection of compressor and electric cartridge for specific periods of time as determined by the electricity supplier (special equipment is required).
Setting house	I/B. When this is selected, a sub menu will be displayed in which the house's temperature Paramet. requirement (heating curve) is set, see the "House parameters" menu.
Holiday D On/Off	B. Where you require constant night time lowering of temperatures (for example when on holiday), the number of days (holiday) can be set here. Up to 250 days can be set. Off = not activated.
Prim red °C -2	B. Here you can set how many degrees the room temperature is to be lowered during the lower temperature periods. NB: -5 means that the room temperature is lowered 5°C below the ordinary temp. If the room sensor is not included in operation, the lowering is applied to the primary flow temperature. Rule of thumb: a 3-4°C lower primary flow temperature gives around 1°C lower room temp in a normal system.
Save setting	I/B. Your own settings can be saved here. Confirm using the "OK" button.
Load setting	I/B. Saved settings can be retrieved here. Can be useful if you test new settings, which are subsequently shown to not be satisfactory and want to restore the old settings.
Load factory setting	I/B. The product is supplied with factory settings. These can be restored by using this function. Confirm using "OK". Language, product and product size are however not reset.

```
Service
Function test
Alarm info
```

## Menu Service (Installer/Service)

There are three sub menus in the service menu:

Function test

The product components can be tested using this sub menu. The menu is intended for fault tracing the product.

Alarm info

Information on the last alarm triggered is provided in this menu.

## Menu Function test

(Installer/Service/Function test)

```
Function test
E1Relay 2/4 kW
E1Relay 2 kW
Boiler lower           Off
Charg. pump            Off
Heatingcir. pump       Off
```

This menu is used to test product component function. It is therefore used by qualified service personnel. When the menu is activated, all product functions stop. Each component can then be tested separately or together. All control functions are shut off. The only protection against incorrect operation are the pressure sensors and the electric cartridge overheating protection. If no button is pressed within a 10 minute period, the product automatically returns to normal operation. Except where only the brine pump is started, which can be operated for long periods of time. It is used together with the external filling pump in installation.

E1 Relay 2/4 kW

The electric cartridge's 4 kW unit is activated. First relay 1a (2 kW), then relay 1b (4 kW). The connected power is displayed.

E1 Relay 2 kW

The electric cartridge's 6 kW unit is activated. First relay 2a (2 kW). Connected power is displayed.

Boiler lower Off

Activation of lower electrical elements in boiler.

Charg. pump Off

Activation of the charge pump.

Heatingcir. pump Off

Activation of radiator pump.

```
Alarm info
Latest alarm
-
Stored alarms:
-
-
```

## Menu Alarm info (Installer/Service/Alarm info)

Alarm history can be read here.  
The four last alarms are reported.

Latest alarm

Displays the last alarm in text form.

Stored alarm

Displays the three previous alarms. If all four alarms are of the same alarm type, this can indicate an intermittent fault, for example a bad contact.

Setting house paramt	
Max Primf. °C	55
Min Primf. °C	Off
Heating Off °C	16
Heating curve	
Inclination	50
Adjustment	0

## Menu Setting House Parameters

(Installer/Settings/Setting house paramt)

The house's heating requirement (the heating curve) is set in this menu. It is important that this basic setting is correct for your house. Incorrectly set values can result in insufficient heating, or that unnecessarily high levels of energy are used to heat your house. Particularly great emphasis should be focussed on determining the "Inclination" and "Adjustment" values.

Max Prim fl. °C 55

Maximum permitted temperature of the water supplied to the radiators. This functions as an "electronic" lock to protect floor circuits in floor heating systems.

Min Prim fl. °C Off

Adjustable from 15–65. If, in the summer months, you want cellar or floor circuits (e.g. bathrooms) to have a specific level of background heating, a minimum permitted temperature can be set here. Other sections of the house should be shut off using thermostat valves or shut off valves.

Heating off °C 16

Outdoor temperature at which the house no longer requires heating. The radiator pump stops and the mixing valve valve remains closed. The radiator pump is exercised daily for a short period so that it does not jam. The system starts automatically when heating is required.

Heating curve

Collective name for the house's heating curve. The house graph consists of an "inclination" and an "adjustment", which together define the temperature the house requires at different outdoor temperatures.

Inclination °C 50

This value is the temperature of the water supplied to the radiators at an outdoor temperature of  $-15^{\circ}\text{C}$ . A lower value is set for radiator systems with larger radiator surface areas (a low temperature system). *Floor heating systems* require much lower temperatures. An even lower value should therefore be selected. The value is increased for high temperature systems, so that sufficient indoor temperatures are achieved. *High temperature systems* are not optimised for heat pump operation and savings will therefore be lower.

Adjustment °C 0

The *inclination* defines how much the temperature of the water supplied to the radiators should be increased where outdoor temperatures fall. The *adjustment* specifies that the temperature level can be raised or be lowered at a specific outdoor temperature.

**Example:** Inclination 50 specifies that the temperature of the water supplied to the radiators is  $50^{\circ}\text{C}$  when the outdoor temperature is  $-15^{\circ}\text{C}$ , if the *adjustment* is set to 0. If the adjustment is set to +5, the temperature is  $55^{\circ}\text{C}$ . The graph is increased by  $5^{\circ}\text{C}$  at all outdoor temperatures, i.e. the graph is parallel displaced by  $5^{\circ}\text{C}$ .

# Other information

## CTC EcoEl operating temperatures

CTC EcoEl operates in the temperature range up to 80°C. When connected with a CTC heat pump, the operation temperature would be 35-55°C, depending on the current heating requirement on the supply line. This is completely normal and is monitored by the control system, which continuously ensures that you are provided with optimal function

## Indoor sensor

You can select “Indoor sens No” in the Installer/Settings menu. This can be necessary if the room sensor is poorly positioned, if you have several apartments, if the floor heating system has a separate room sensor or if you use a fire place or open stove. The alarm diode on the room sensor functions however as normal.

If you use the fire or open stove only occasionally, the firing can affect the room sensor and reduce the temperature supplied to the radiators. Other rooms in the house can therefore become cold. The room sensor can temporarily be deselected during firing. EcoEl then provides heating to the radiators using the set heating curve.

The radiator thermostats reduce the heating supplied to the section of the house in which you are using wood firing.

## Where there is a fault on the Outdoor sensor/indoor sensor

If a fault occurs on the outdoor sensor, an outdoor temperature of -5°C is simulated so that the house does not become cold. The alarm is triggered.

If a fault occurs on a room sensor, EcoEl automatically switches to operation using the set graph. The alarm is triggered.

## Summer basement heating

Background heating is often wanted in basements/recreation rooms/bathrooms in the summer months, to avoid damp air. Your EcoEl can provide this by you setting a “minimum permitted supply line temperature” at a suitable temperature (15-65°C).

See the Installer/Settings/Setting house paramt

This means that the temperature of the water supplied to the radiators does not fall below a selected temperature, for example +27°C.

Functioning radiator thermostats or shut off valves in the rest of the house are required to achieve this. These shut off heating to the rest of the property. The function can also be used for bathroom floor heating, for summer floor heating.

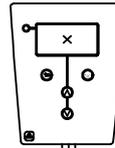
# Wiring diagram

CTC EcoEI 1x230V

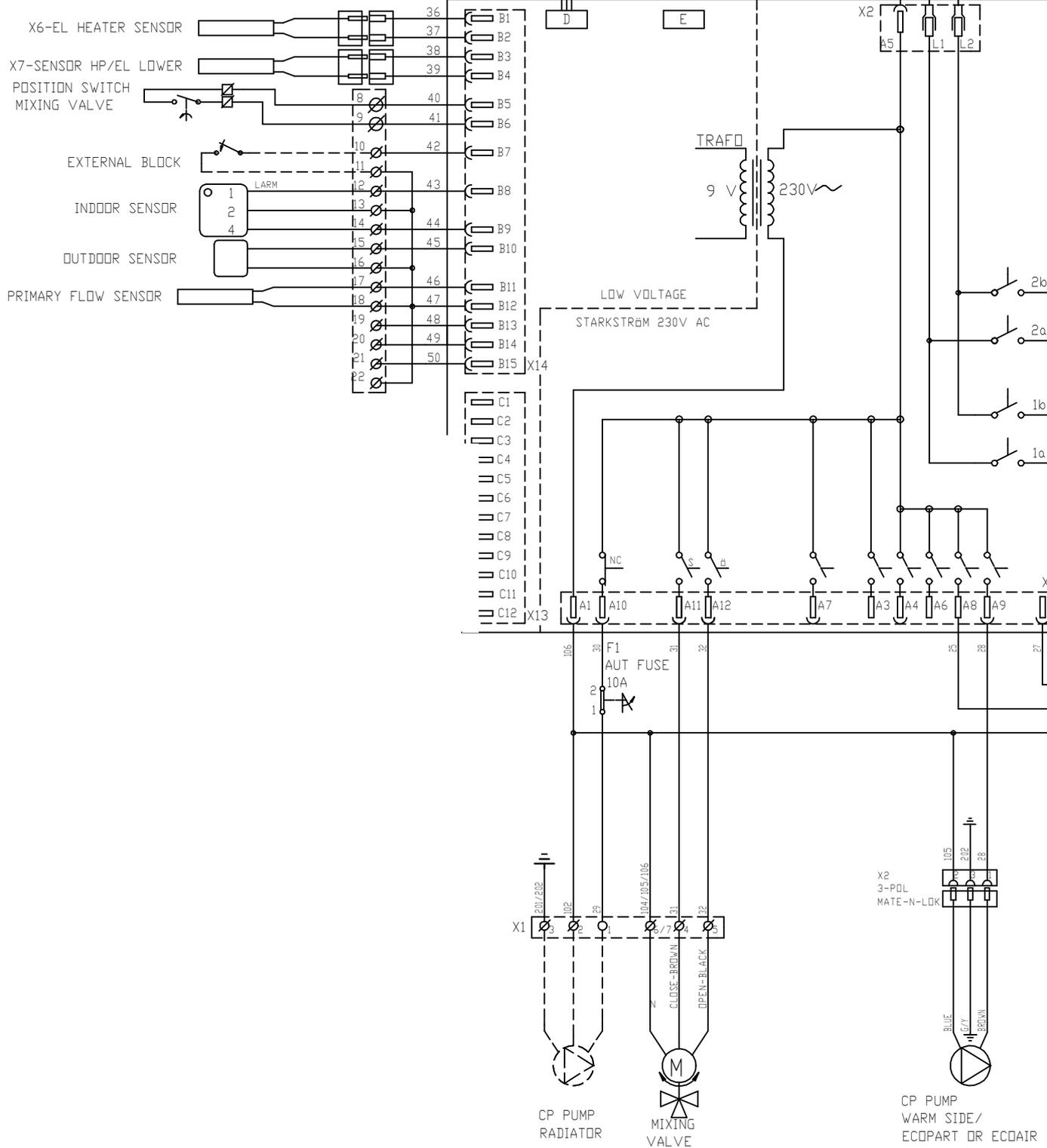
A1-DISPLAY PCB

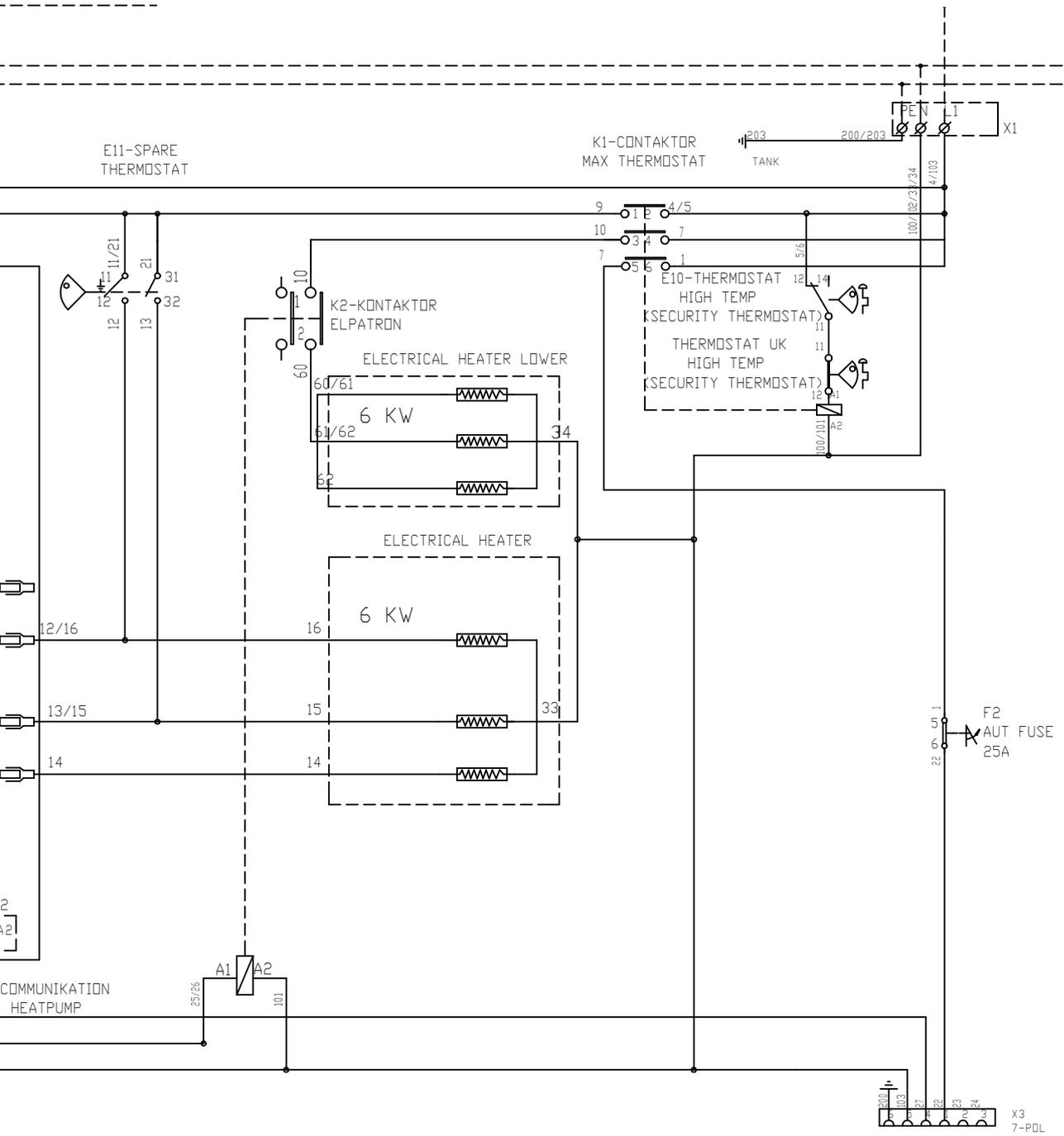
L1 --- NET 230V 1N ~

N ---  
PE ---



A2-RELAY / MAIN PCB





# Operation and maintenance

When the installation contractor installs your new heat pump, you should together with the contractor check that the system is satisfactorily set up. Ensure the installation contractor demonstrates the switches, controls and fuses, so you know how the system works and how it should be operated. Bleed the radiators after around three days of operation and top up with water if required.

## Boiler and radiator system safety valves

Around four times a year, check valve function through manually turning the operation levers. Check that water runs from the waste line.

### Mixing valve

The mixing valve valve is operated automatically from the control system and ensures that the radiators achieve the correct temperature, independent of season. You can however, where a fault occurs, operate the valve through pulling out the wheel on the motor in and turning it clockwise to reduce the temperature or anti-clockwise to increase the temperature.

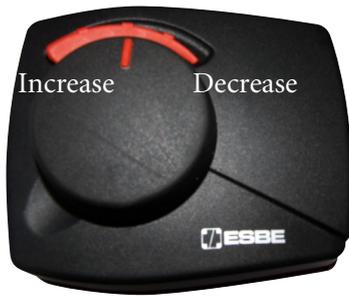
### Drainage

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 valve should be fully open, i.e. turned anticlockwise as far as it will go. Air must be supplied to closed systems.

### Operation stops

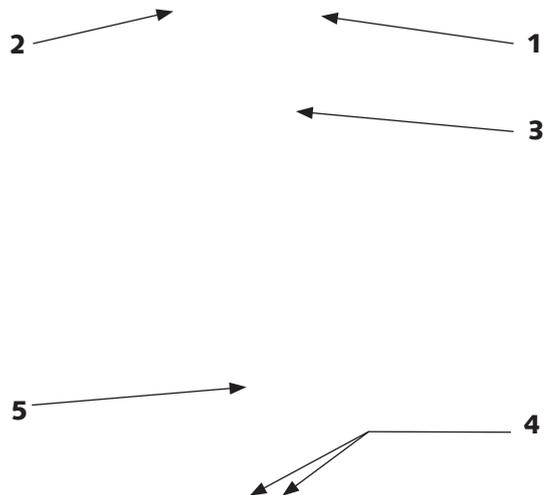
The heat pump is shut down using the operating switch. If there is a risk that the water can freeze, all water should be drained from the boiler and the radiator system. The hot water circuit, which contains around five litres, is emptied by inserting a hose at the bottom of the cold water connection and then draining out by siphoning.



! Do not forget to reset the mixing valve to automatic position.

## Component positions

1. Setting wheel for mixing valve valve.
2. Safety valve for boiler and radiator system.
3. Control panel.
4. Valves  
In use when connected to CTC EcoAir or CTC EcoPart. For drainage of product and radiator system, use the left valve
5. Front panel.  
To dismount - release the two screws at the top and pull forward.



# Fault tracing/suitable measures

CTC EcoEl is designed to provide reliable operation and high levels of comfort and in addition have a long lifetime. Below are a number of suggestions and guidelines which can be useful in the event of malfunction.

If a fault occurs, you should always contact the installation contractor who installed your unit. If the contractor believes the malfunction is due to a materials or design fault, the installation contractor will contact us to check and rectify the fault. Always provide the product's production number.

## DHW (Domestic hot water)

Many want to utilise the heat pump's low operating costs to the maximum. The electric cartridge's temperature setting affects the temperature of the hot water which the heat pump provides. Lower settings give lower temperatures, but also larger savings. Set the temperature so that your requirements are met. Start at a low temperature, for example 47°C, and increase gradually if the water is not hot enough.

## The heating system

A room sensor, which should always be fitted, ensures that the temperature in the room is correct and steady. 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.

Always adjust the system with all radiator thermostats fully open. The thermostats can be individually adjusted after a few days in the other rooms.

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

- ▶ *That the radiator system is correctly adjusted and is functioning normally. That radiator thermostats are open and that the radiators are equally warm all over. Feel the entire radiator surface. Bleed the radiators. The heat pump's economical operation requires that the radiator system functions well, if good savings levels are to be achieved.*
- ▶ *That the heat pump is in operation and no error messages are displayed.*
- ▶ *That sufficient electrical power output has been installed. Increase where necessary.*
- ▶ *That the products "Max permitted primary flow temperature" is not too low in the menu Max Primfl.°C.*
- ▶ *That "Primary flow (Inclination) temperature at -15°C outdoor temperature" is set sufficiently high. Increase where necessary. More can be read about this and heating curves on page 5.*
- ▶ *That temperature lowering is not incorrectly set.*
- ▶ *That the mixing valve is not in the manual position.*

### If heating is uneven, check:

- ▶ *That the room sensor position is representative for the whole house.*
- ▶ *That radiator thermostats are not affecting the room sensor.*
- ▶ *That no secondary heat source/cold source is affecting the room sensor.*
- ▶ *That the mixing valve is not in the manual position.*

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

## Reset where alarm triggered (red alarm diode flashes)

Reset the alarm by pressing the reset button on the panel. If several alarms are triggered, these are displayed sequentially. A fault cannot be reset without it first being rectified. Some alarms are reset automatically if the fault ceases.

! Do not forget that the radiators may also need to be bled.

### Load monitor

EcoEl has a load monitor. If the supplied current sensor is fitted, the house's main fuses are continuously monitored to ensure they are not overloaded. If the fuses are overloaded, an electrical step is disconnected from EcoEl. The heat pump can be limited where high heating requirement levels are combined with (for example) single phase engine heaters, cookers, washing machines or tumble dryers. This can result in inadequate heating or hot water temperatures.

If the heat pump is limited, High electrical output, reduced electrical power (X A) is displayed in text in the display.

Consult an electrician to determine whether the fuse size is correct.

### Air problem

If a chafing sound is heard from the heat pump, check that it is fully bled. Turn the boiler safety valve so that any air can be evacuated. Add water where required, so that the correct pressure is achieved. If this occurs repeatedly, call a technician to check the system.

## Information and alarm texts

### Information texts

Water filled?  
Confirm with "OK"

This text will be displayed in the first operation hour of the product and each time the voltage is switched on. No functions start before you confirm that water has been filled. If the system and the product have been filled with water, confirm by pressing the "OK" button.

Information  
Factory setting

Shows that the product resets to the pre-programmed factory values (can be selected in the "Installer/Settings/Load factory settings" menu).

Information  
High EI consumption  
EI power red A xx

The house's main fuses are overloaded due to (for example) several power demanding equipment units being used at the same time. The product reduces electric cartridge power during these periods.

Information  
House heating off  
Outdoor XX°C

Displays that no heating is required in the house. The radiator pump is shut down and the mixing valve valve remains closed. The pump is exercised daily for a short period, so that it does not jam. Current outdoor temperature is also displayed.

Information  
External shut off

Shows that electricity supplier control is active. Electricity supplier control is a piece of equipment which an electricity supplier can install to disconnect power demanding electrical equipment for shorter periods of time by district. Compressors and electrical power are blocked when this function is activated.

Information  
Compressor blocked

The compressor is set as being shut off, for example before drilling or excavation of collector circuits has been carried out. The product is supplied with the compressor shut off. The selection is made in the "Installer/Settings/Heat pump menu.

Information  
Compressor delay start

The compressor has not been stationary for minimum 10 minutes after a stop. Starts when this period has expired.

### Alarm texts

Alarm  
Sensor (hot gas, supply line, outdoor, room, brine in, brine out, heat pump, boiler)

An alarm is triggered where there is a fault on a sensor. The compressor stops if the sensor is important in compressor operation. The alarm must be reset manually after the fault is rectified. For other sensors, the alarm is automatically reset after rectification.

The LED at the EMERSON softstarter is indicating the following operating conditions:	
Ready to accept a start command	a double blink every 5 seconds
3 minute cycle delay	1 flash per second
Fault mode	slow flash per second
Fault mode	slow flash, 5 sec on, 5 sec off
Low voltage	fast flash, 10 per second

### Alarm texts

Alarm  
D Phase sequence

The compressor motor in the product must rotate in the correct direction. When power is connected, check that the hot gas pipe heats when the compressor is run. If this does not occur, the compressor is running in the incorrect direction. Switch the compressor wires marked 2 and 3 in the compressor. The power supply to the system must be shut off when rectifying this fault. The fault generally only occurs during installation. The D phase sequence alarm will also show at the first start after the compressor is blocked by the soft starter. This can be a result of supply voltage below 195 V.

Alarm  
Sensor (hot gas, prim, outdoor, room, brine in, brine out, heat pump, boiler)

An alarm is triggered where there is a fault on a sensor. The compressor stops if the sensor is important in compressor operation. The alarm must be reset manually after the fault is rectified. For other sensors, the alarm is automatically reset after rectification.

Alarm  
High pres

Brine system high pressure pressure switch is triggered. Press reset and check whether the alarm recurs. If the fault recurs – contact your installation contractor.

Alarm  
low pres

Brine system low pressure pressure switch is triggered. Press reset and check whether the alarm recurs. If the fault recurs – contact your installation contractor. The fault is often due to poor circulation in the collector hoses, for example due to air in the system after installation.

Alarm  
Compr. temp

The compressor supplies abnormally high hot gas temperatures. Press reset and check whether the alarm recurs. If the fault recurs – contact your installation contractor.

Alarm  
Low brine temp in

Incoming brine temperatures from borehole/ground circuits are too low. Press reset and check whether the alarm recurs. If the fault recurs – contact your installation contractor to check dimensioning. Only for EcoEl connected to EcoPart.

Alarm  
High brine temp in

Incoming brine temperatures from borehole/ground circuits are too high. Press reset and check whether the alarm recurs. If the fault recurs – contact your installation contractor to check the heat source. Long term high brine circuit temperatures can damage the compressor. Only for EcoEl connected to EcoPart.

Alarm  
Low brine flow

Low brine flow is usually due to air in the collector system, particularly directly 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. If the fault recurs – contact your installation contractor. Only for EcoEl connected to EcoPart.

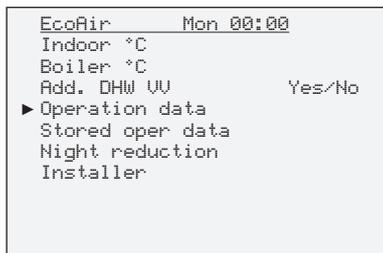
Alarm  
Motor Protec  
Compressor

The motor protection in the softstarter is triggered. It can be caused by over-voltage, overcurrent or undervoltage. Press reset and check whether the alarm recurs. If the fault recurs – contact your installation contractor.

# Connected to a CTC heat pump

The CTC EcoEl is design for easy connection to the CTC EcoAir or the CTC EcoPart heat pumps. The functions for control these combined systems are incorporated in the control system of the EcoEl.  
 The following pages describe the operation and maintenance of these installations.  
 Menu settings different from the EcoEl stand alone installations are considered in this Chapter.

## Main menu / Normal display menu



Add DHW UU Yes/No

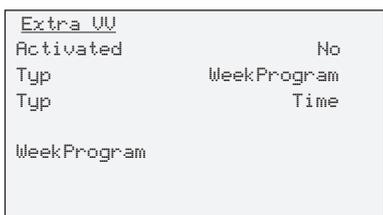
If additional hot water comfort is required, the times for this are selected in this row.

Scheduled times or immediate timered hot water comfort can be selected in the sub menu. Times and comfort hot water temperatures can be set in the Advanced/Settings menu.

No: Extra DHW are not produced  
 Yes: Extra DHW are produced.

---

## Menu Additional DHW (additional hot water)



This provides the option to increase the product's hot water capacity at specific times, with or without the assistance of an electric cartridge. You can select whether you want additional hot water immediately, or you can schedule this on a weekly basis. When the function is activated, the product begins to produce additional hot water. The additional hot water is produced by the compressor operating at high temperatures. You can also set in the "Settings" menu whether the electric cartridge should be used to generate additional hot water. Bear in mind that additional hot water (high temperature) means that more energy is used in the production of hot water, particularly if the electric cartridge is used.

Activated No

Select here whether you want to activate the additional hot water function.

Yes = additional hot water is supplied as specified in the schedule or immediately

for a set time period.

No = deactivates the function, no additional hot water is produced

Typ WeekProgram  
 Time

Select here the type of scheduling you want to use:

As specified in a weekly schedule, which you program as described in the

bottom row. Is used if you always know when you will require additional hot water.

Time: additional hot water starts being produced for the period set in the "Settings menu", for example for 120 minutes. Is selected when you have an immediate need for hot water.

WeekProgram			
Mon	▲06 ▼07	▲-- ▼--	
Tue	▲06 ▼07	▲-- ▼--	
Wed	▲06 ▼07	▲-- ▼--	
Thu	▲06 ▼07	▲-- ▼--	
Fri	▲06 ▼07	▲-- ▼--	
Sat	▲08 ▼07	▲-- ▼--	
Sun	▲07 ▼08	▲-- ▼--	

## Menu Week program (Add DHW / WeekProgram)

In this menu, you can schedule the periods for each day of the week when you require additional hot water. The schedule repeats every week. The picture shows the factory values. These can be changed. If additional periods are required on specific days, for example in the evening, the additional times are programmed.

- ▲ = Hot water temperature is increased at the time specified after the arrow.
- ▼ = Temperature is lowered to normal temperature at the time specified after the arrow.

Ex 1. Mon▲06 ▼07 ▲- - ▼- - On Monday morning at 6:00 am, the product starts producing additional hot water up to 7:00 am, when the temperature returns to the normal temperature.

Ex 2. Mon▲06 ▼07 ▲16 ▼17 At 6:00 am, additional hot water is produced up to 7:00 am. A further increase is set between 4:00 pm and 5:00 pm.

Operation data	
Outdoor °C	-5
Boiler °C	44 (56)
Primi °C	47 (49)
Boiler lower °C	48 (50)
Hotgas °C	44
Compr	Off
Fan	Off
Charg.pump	Off
HP in/out °C	48/48
Outdoor HP °C	-5
Heatingcir. pump	On
El power kW	0,0
Current A	11 (20)
Mixing valve	Opening
Delay valve	⊕180
Program ID	
Program date	

## Menu Operation data (the menu is directly accessed from the main menu)

This menu displays current product and system temperatures and operating data. Values in brackets are either required values or automatically generated values which the product aims to achieve (expected values).

Boiler lower 48(50) Displays the temperature of the lower part of the boiler. Desired temperature in brackets.

Hot gas °C 44 Displays the compressor's hot gas temperature. The temperature varies during operation.

El power kW 0,0 Displays auxiliary power of the electric boiler (0...6 kW). The electric boiler connects power in steps of 2 kW (3 connection steps).

Delay valve 180 min A micro switch in the mixing valve valve's motor ensures that auxiliary heating is not used unnecessarily. The mixing valve delays the time period selected before heating is taken from the electrical unit in the product. If the control system requests auxiliary electrical heating, a countdown to zero is run, and only when the countdown reaches zero is the auxiliary electrical energy added to the heating system. The mixing valve can be blocked so that it never adds auxiliary peak electrical heating.

Stored op data	
Total operation h	
Elheat kWh	42
Max prim °C	
Compressor:	
Total operation h	
Operation/24 h:min	h:min
Starts/24h st	14

## Menu Stored operation data

**(the menu can be directly accessed from the main menu)**

*Operation values across longer periods of time are reported in this menu.*

Compressor:  
Total Operation h  
  
Starts/24 h:min 14

Displays the total time the product has been connected to power.

Displays the number of compressor starts in the last 24 hours. A new value is saved/displayed once a day.

The first value is displayed 24 hours after initial start up.

Settings	
Lang.	English
Product	EcoAir
Heat pump	Permitted
Indoor sensor	Yes/No
Boiler °C	50
Boiler max kW	1~6
Boiler lower °C	50
Boiler lower kW	6
Delay valve min	180
Main fuse A	20
Add. DHW min	120
Add. DHW boiler °C	60
ExternalControl	NR
Setting house paramet.	
Min outdoortemp. °C	-10
Holiday	On/Off
Save setting	
Load setting	
Load factory setting	

## Menu Settings (Installer/Settings)

*In the menu "Settings", the installer and user make the adjustments to the requirements and demands.*

**U = settings made by the user.**

**I = settings made by the installer.**

Product	EcoAir	<b>I.</b> The control unit contains control systems to several product types: EcoHeat, EcoPart, EcoEl and EcoAir. The correct product is set by the factory. If EcoEl is supplemented with EcoPart or EcoAir, the product type must be changed.
Heat pump	Permitted	<b>I.</b> The compressor can be blocked here. The product is supplied with the compressor blocked. The product operates as an electric boiler where the compressor is blocked. All other functions operate as normal.
Indoor sens.	Yes/No	<b>I.</b> Select here whether an indoor sensor is to be included in operation. An indoor sensor can be temporarily deselected, for example when a fire place is being used.
Boiler °C	50	<b>I/B.</b> The electric unit's temperature is set here. A low setting is recommended. The electric unit is also responsible for peak heating. If the house requires a higher temperature than that selected, the control system compensates by automatically raising the temperature.
Boiler max kW	1~6	<b>I.</b> Setting determining the electric unit's maximum permitted power. 0 to 6 kW with steps of 2 kW. Use 1~2, 1~4, 1~6 for single phase EcoEl. For 3 phase EcoEl, use 0.1 / 3 / 4.5 / 6 / 7.5 / 9.
Boiler lower °C	50	<b>I/U.</b> Setting of the desired temperature of the lower part of the boiler. Only engaged when heat pump is not in operation.
Boiler lower kW	6	<b>I.</b> The maximum power output of the lower immersion heat of the boiler. Settings from 0 to 6 kW. Only engaged when heat pump is not in operation.

Delay valve min	180	I.	The mixing valve delay, the time period before it draws energy from the electric unit, is set here. Adjustable from 0 to 240 minutes. If a value of more than 240 min is set, the mixing valve will never open towards the electric boiler.
Add DHW min	120	U.	Selection of the time period in which additional hot water is to be produced. Activated in the main menu.
Add DHW boiler °C	60	U.	Here it is determined whether electric cartridges are to be used to assist the production of additional hot water. Set the temperature which is required when additional hot water is activated on the electric unit.
Min outdoor temp. °C-10	-10	I/U.	For EcoAir only. Lowest outdoor temperature for the heat pump to be operational. At lower temperatures, the compressor is blocked and the lower immersion heater is engaged.

```
Service
Function test
Alarm info
Factory setting code
```

### Menu Service (Installer/Service)

Factory setting code      The product's alarm limits are set in this menu. A code is required to make changes to the values. You can, however, view the contents of the menu without a code.

```
Function test
ElRelay el 2/4 kW
ElRelay el 2 kW
Boiler lower           Off
Compr                  Off
Fan                    Off
Charg. pump            Off
Heatingcir. pump       Off
Mixing valve
Diod sensor            Off
```

### Menu Function test (Installer/Service/Function test)

*This menu is used to test product component function. It is therefore used by qualified service personnel. When the menu is activated, all product functions stop. Each component can then be tested separately or together. All control functions are shut off. The only protection against incorrect operation are the pressure sensors and the electric cartridge overheating protection. If no button is pressed within a 10 minute period, the product automatically returns to normal operation. Except where only the brine pump is started, which can be operated for long periods of time. It is used together with the external filling pump in installation.*

Compr                      Off      Compressor test running is controlled from here. The brine pump and charge pump are also in operation to prevent the compressor triggering its pressure switches.

Charg. pump                Off      Activation of the charge pump.

```
Factory setting code
Code                   000
Summer operat°C       16
HP max°C               55
HP min°C               35
Alarm compr.temp°C    120
Diff start/stop°C     5
Startdelay min         10
```

### Menu Factory setting coded

(Installer/Service/Factory setting coded)

*Encoded menu. Intended for the manufacturer's operation/alarm limits. A 3 digit code must be entered to change limits.*

HP max°C                      55      Maximum permitted temperature which the compressor is permitted to supply.

HP min°C                      35      Lowest temperature the compressor supplies to the product's water storage to maintain hot water comfort.

Alarm compr.temp°C          120      Maximum hot gas temperature which the compressor is permitted to supply.

Diff start/stop°C            5      Temperature difference between compressor start and stop.

Startdelay min                10      Shortest period of time the compressor must rest after a stop.  
The delay is activated if there is a power cut or the first time the product is started.

# Installation

*This chapter turns to you who are responsible for the necessary installations in order to give the EcoEl such an operation as the house owner demands.*

*Take time going through functions, controls, knobs and settings together with the end user and answer eventual questions. Both you and the heat pump benefits from a well informed end user regarding operation and maintenance of the heat pump.*

## Transport

To avoid transport damages, do not unpack the product until it has been transported to its installation site in the product room. The EcoEl can be handled and lifted in the following way:

- ▶ Fork truck.
- ▶ Lifting eye to be fitted to the lifting sleeve on top of the product (extra sleeve can be found on top of the product in the center under the insulation).
- ▶ Lifting band around the pallet. Note! Only with the wrapping on.  
Consider that the heat pump has a high gravity, handle with caution.

! The product must be vertically positioned ● when transported and kept in stock.

## Unpacking

Unpack the heat pump when it is placed next to its installation site. Check that the product has not been damaged during transport. Report eventual damages to the forwarding agent. Also check that the delivery is complete according to the list below.

## Standard delivery

- ▶ Electrical boiler CTC EcoEl (concerning the CTC EcoEl 1550 the heat carrier pump is being delivered factory mounted)
- ▶ Enclosed bag with:
  - indoor sensor
  - primary flow sensor
  - outdoor sensor
  - installation and maintenance instructions
  - safety valve for DHW, 9 bar
  - safety valve for the brine system, 3 bar

---

# Hydraulic installation

*The installation must be carried out in accordance with existing engineering standards and building regulations. The product must be connected to an expansion vessel in an open or closed system. Do not forget to flush the radiator system clean before connection. Do all installation-adjustments according to the description in chapter First start.*

## Connections, placement and dimensions

See Measurements.

### Pipe connections of the product

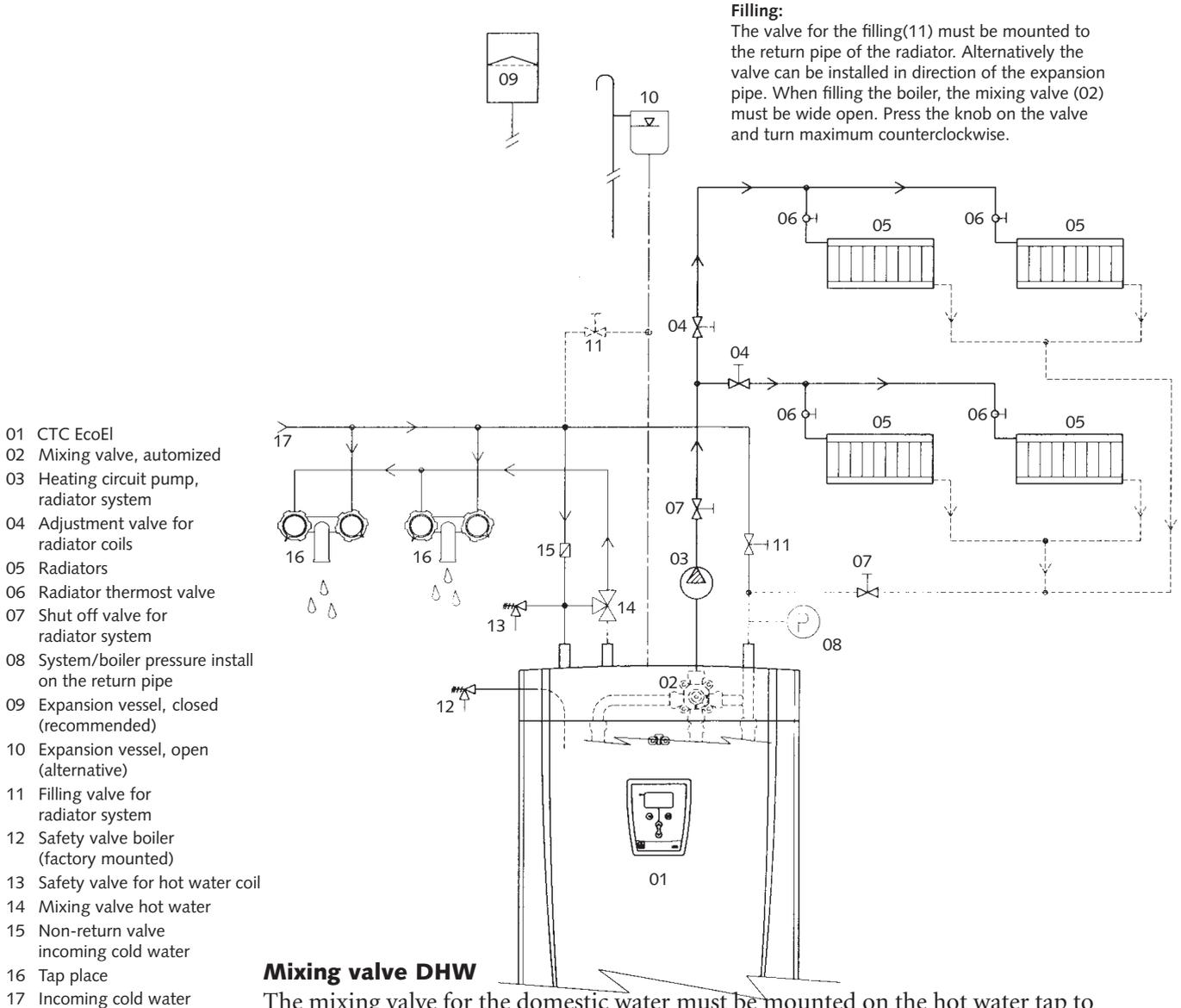
Connect the pipes according to the principle sketch for pipe connection on the following page. See also Measurements on page for placements and dimensions of the connections.

### Circulation pump radiator system

The circulation pump is to be fitted on the primary flow pipe to the radiator system, The pump is to get its power supply from the CTC EcoEl, see Wiring diagram.

## Principal sketch for pipe connection

Here the principal connection of the heat pump to the heating- and DHW-system of the house is shown. Different facilities and systems may look different e.g. single or double pipe systems, which may make the completed installation look different.



### Filling:

The valve for the filling(11) must be mounted to the return pipe of the radiator. Alternatively the valve can be installed in direction of the expansion pipe. When filling the boiler, the mixing valve (02) must be wide open. Press the knob on the valve and turn maximum counterclockwise.

- 01 CTC EcoEl
- 02 Mixing valve, automatized
- 03 Heating circuit pump, radiator system
- 04 Adjustment valve for radiator coils
- 05 Radiators
- 06 Radiator thermostat valve
- 07 Shut off valve for radiator system
- 08 System/boiler pressure install on the return pipe
- 09 Expansion vessel, closed (recommended)
- 10 Expansion vessel, open (alternative)
- 11 Filling valve for radiator system
- 12 Safety valve boiler (factory mounted)
- 13 Safety valve for hot water coil
- 14 Mixing valve hot water
- 15 Non-return valve incoming cold water
- 16 Tap place
- 17 Incoming cold water

### Mixing valve DHW

The mixing valve for the domestic water must be mounted on the hot water tap to avoid the risk of scalding.

### Safety valve DHW

Mount the enclosed valve to the incoming cold water connection. The waste pipe must be connected to the draining gutter directly, or if the distance is more than 2 m, to the waste funnel. Water may drip from the waste pipe. Therefore this pipe must lean towards the draining gutter, be installed frost free and left open to the atmosphere/without pressure.

### Non-return valve and safety valve

Mount the non-return valve to the incoming cold water connection. The safety valve of the boiler is mounted by the manufacturer. The waste pipe must be connected to the draining gutter directly, or if the distance is more than 2 m, to the waste funnel. Water may drip from the waste pipe. Therefore this pipe must lean towards the draining gutter, be installed frost free and left open to the atmosphere/without pressure.

**Filling valve heating system**

Must be mounted between the cold water connection and the radiator return pipe, alternative: between the cold water and the expansion connection.

**Manometer – system pressure**

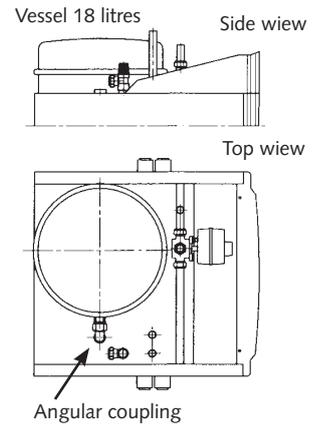
The manometer must be mounted on the expansion pipe or on the radiator return pipe.

**Connection of the expansion vessel**

It is recommended to connect the EcoEl to a closed expansion vessel. The EcoEl is ready for the assembly to an 18 l closed vessel, placed compact on top of the product. The expansion vessel with required angle connection is available as accessory. Then connect the system manometer to the return pipe of the radiator.

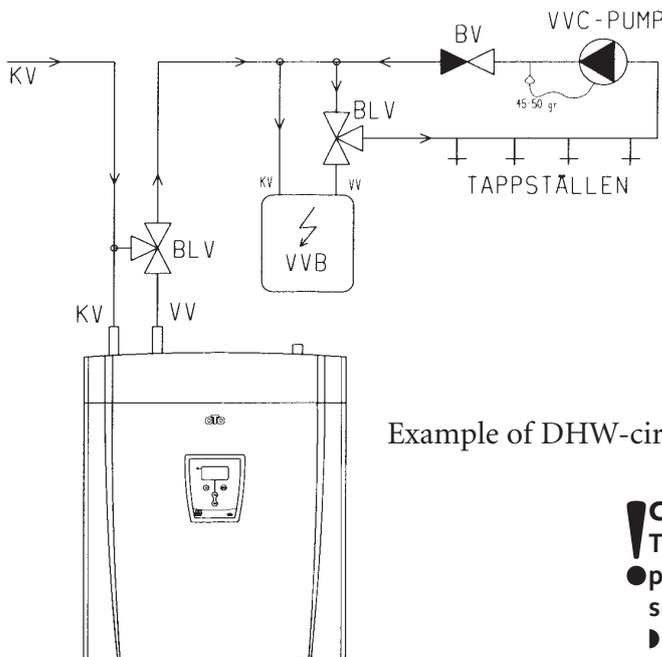
If another expansion vessel is chosen, the manometer is often included. With an open system, the height between the highest placed radiator and the expansion vessel must not exceed 2.5 m in order to avoid oxygen feed of the system.

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 heating source, e.g. an existing boiler, the installations must have separate expansion vessels.



**DHW-system**

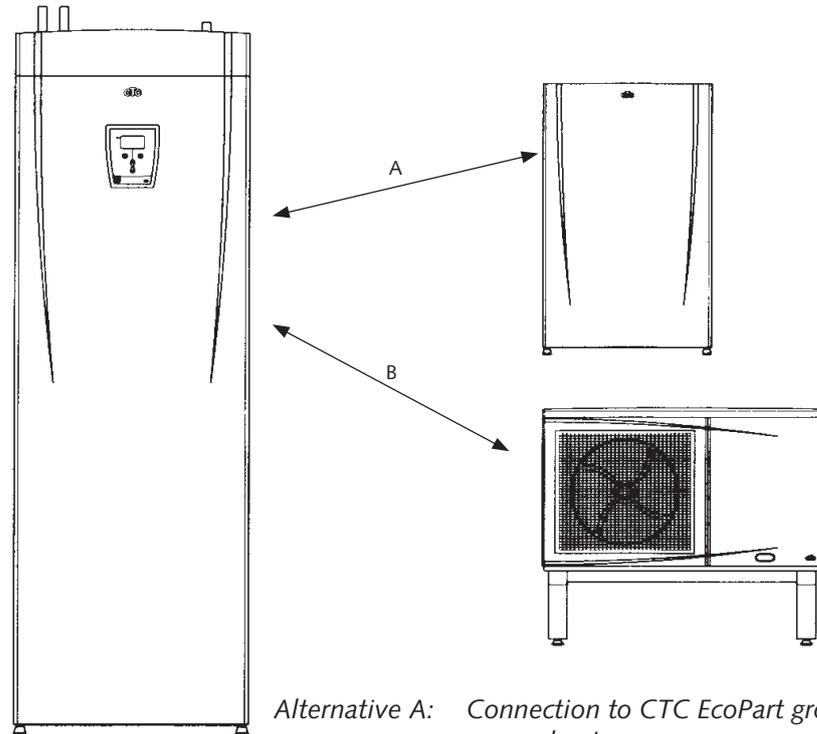
It is possible to connect an external domestic hot water system. An example of such a connection is shown below.



Example of DHW-circulation.

- ! **Connection to water mains/filling with water**
- This product must be installed with a back flow prevention device which complies with the water supply (water fittings).
- ▶ Regulation 1999.

## Connection to CTC heat pump



*Alternative A: Connection to CTC EcoPart ground source heat pump.*

*Alternative B: Connection to CTC EcoAir air/water heat pump*

Copper pipes of minimum  $\text{Ø} 22 \text{ mm}$  must be mounted by the connection between the CTC EcoEl and the heat pump. On the CTC EcoEl 1550 an adapted circulation pump is factory mounted on the left connection (front view).

**N.B.** Where the circulation pump is being after-mounted, a pump with minimum 6 m pressure head must be installed. The circulation pump shall pump the water from the CTC EcoEl to the heat pump.

# Electrical installation

Installation and change over of the EcoEl should be carried out by a qualified electrician. All wiring should be installed in accordance with relevant regulations. The boiler is internally connected by the factory and set for 6+6 kW electrical power output. Electrical connections are behind the front of the product. Undo the screws on the top (2 screws), bend out and set the front to one side (undo any network cables on the front printed circuit card for better accessibility). The connection blocks are located behind the electrical connection box cover. Connection cables are laid in the cable ducts on the roof of the product. These exit at the same height as the bottom of the electrical connections box.

## Power supply

EcoEl should be connected to 230V 1N~ and protective earth. Group fuse size is specified in the technical data.

## Multi-pole circuit breaker

A multi-pole circuit breaker should be installed.

## Connection heating circuit pump

The heating circuit pump electrical connections are made on the connection block as shown in the picture on the previous page. Electrical data 230 V 1 1N~. Internal fuse 10A.

## Safety limit thermostat

If the boiler has been stored under extremely cold conditions, the safety limit thermostat may have been triggered. This is reset by pressing in the button on the electrical connection box behind the front. Always check that the safety limit thermostat has not been triggered when installing.

## Second safety limit thermostat

A second temperature switch acts as a high cut-off isolating power to the immersion heater and the compressor. This has a set point higher than the above.

## Safety extra low voltage

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

## Connection of outdoor sensor

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 that the sensor is affected by the sun, the sensor should be protected by a screen.

Place the sensor at height of around  $\frac{2}{3}$  on the facade near a corner, but not under a roof projection or other wind protection. Do not locate above ventilation ducts, doors or windows where the sensor can be affected by other radiators than the actual outdoor temperature.

## Connection of indoor sensor

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

Lead a three conductor cable (minimum 0.5 mm<sup>2</sup>) between the heat pump and room sensor.

Then mount the indoor sensor at approx two thirds wall height.

Connect the cable to the indoor sensor and the heat pump.

Important! The wires must be correctly connected for the sensor to function.

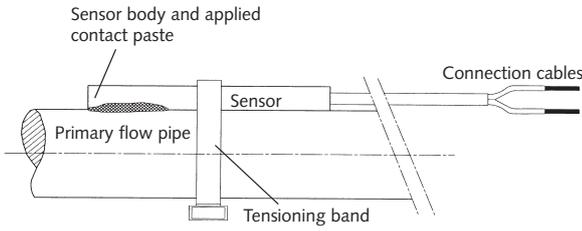
Symbol for Safety limit thermostat:



! Do not permanently mount the sensor cable before you have tested and found the best position.

### Connecting the primary flow sensor

Fit the sensor to the primary flow pipe, ideally after the circulation pump. The sensor is at the front of the sensor unit, see diagram.



- Tighten the sensor into position using the enclosed tensioning band.
- Ensure that the sensor has good contact with the pipe. Where require, apply contact paste to the front of the sensor, between the sensor and pipe, if good contact is difficult to achieve.
- **Important!**  
Isolate the sensor, for example using pipe insulation.
- Connect the cables to the heat pump connection block.

### Remote controlled night reduction of temperature

Night reduction of temperature can be activated by a closed function on the electricity remote control input, pin 10 and 11 on the terminal block.

The function can be remote controlled using, for example, “Minicall”.

When the input is short circuited, the night time temperature is activated, regardless of other night reduction of temperature settings. When the short circuit ceases, the product returns to ordinary night reduction of temperatures.

Number of degrees lowered is set in the “Night reduction of temperatures” menu.

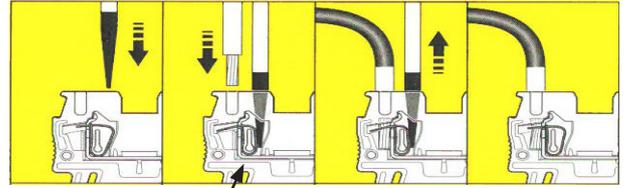
Note: the input function is selectable in accordance with the following:

NR = night reduction of temperature (time controlled temperature lowering).

SO (Shut off) = electricity supplier control. (Block of compressor and electrical power by the electricity supplier.)

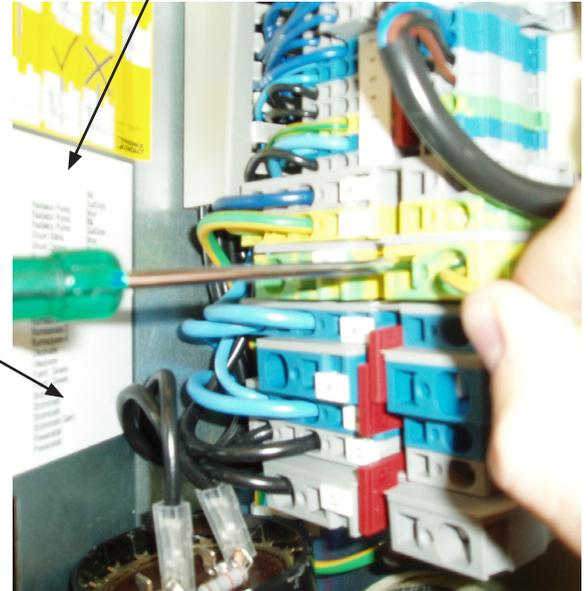
**The function is made available by selecting NR in the Settings menu.**

**Handling instruction for spring-loaded terminal block**



**Terminal block**

Nr	Description	Colour	Comments
L1	Phase		230V 1N~
N	Earthed neutral	Blue	
PE	Earth	Yellow-Green	
1	Radiator pump	Brown	230V 1N~
2	Radiator pump	Blue	
3	Radiator pump	Yellow-Green	
4	Mixing valve close	Brown	230V 1N~
5	Mixing valve open	Black	
6	N	Blue	230V 1N~
7	N	Blue	
8	Position switch mixing valve motor	Black	
9	Position switch mixing valve motor	Black	
10	Remote control		
11	Remote control		
12	Indoor sensor 1		
13	Indoor sensor 2		
14	Indoor sensor 4		
15	Outdoor sensor		
16	Outdoor sensor		
17	Primary flow sensor		
18	Primary flow sensor		
19	Current transformer	No function	
20	Current transformer		
21	Current transformer		
22	Current transformer common		



**!** Open the spring contact with a screwdriver before the cable is attached, otherwise there is a risk for lack of contact.

**Settings to be carried out by an electrician**

After connection, the following settings should be set by the electrician:

- ▶ Selection of main fuse size.
- ▶ Selection of power limit.
- ▶ Check of indoor sensor connection.
- ▶ Check that connected sensors register reasonable values.

Carry out the check as described below.

**Setting main fuse and power limitation**

See the *Initial start up* section.

### Check of indoor sensor connection

- ▶ Go to the Installer/Service/Function test menu.
- ▶ Step down to Diode Sensor and press "OK".
- ▶ Go to the Installer/Service/Function test menu.
- ▶ Step down to Diode Sensor and press "OK".
- ▶ Select "On" using the "increase" button and press "OK".  
Check that the indoor sensor diode comes on. If not, check cables and connection.
- ▶ Select "Off" using the "decrease" button and press "OK". If the "OK" diode goes out, the check is successful.
- ▶ Return to the normal display by pressing the "step backwards"/"undo" button.

### Check of connected sensors

If any sensor is incorrectly connected, text will appear in 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 correctly connected.

Note that the indoor sensor alarm function (the diode) cannot be shown in the display but must be checked as described in the previous section. The current sensor connection has no alarm, but the current value can be read in the Operation data menu.

## Electrical connection of heat pump

### General

CTC EcoAir and EcoPart heat pumps are supplied with electricity from EcoEl. The fuse sizes and cables used to connect EcoEl to the electricity system should be dimensioned for both products.

The 4 conductor cable supplied with the heat pump should be used to connect EcoEl to the heat pump.

Communication takes place between CTC EcoEl and the CTC heat pumps. Other makes of heat pump cannot therefore be controlled from EcoEl.

**The cable between EcoEl and EcoPart/Air** heat pump carries 230V 1N~ and earth.

A cable for this purpose is supplied with the heat pump. The 4 conductor cable has a connector at one end which fits the equivalent connector on EcoEl. The other end of the cable is connected to the heat pump as specified in the heat pump manual.

Note: excess cable is not to be rolled into a coil (can cause overheating). It is to be cut to the correct length.

### Communication

EcoEl and the heat pump communicate with each other (230V~). This takes place via the 2nd conductor in the cable between the products.

### Servicing the heat pump

The heat pump safety switches fitted before EcoEl are to be switched to the off position before any service of any kind is carried out.

### On starting

Check that all connectors are securely connected, that water is topped up and that the system is bled. EcoEl must be set to heat pump operation to start. This is set in the menu Advanced/Settings. Select the row 'Product EcoEl' and set to EcoAir (or EcoPart).

More on first start: see next section.

# First start

EcoEl can be installed and be started before the brine circuit is brought on line. Deselect the room sensor in the Settings menu. The sensor can however always be fitted to provide the alarm diode function.

## Before first start up

1. Check that the electrical boiler and system are full of water and have been bled. (EcoEl is bled through the safety valve on the top.)
2. Ensure that the brine system is filled with water and anti-freeze and that it is bled, or ensure that the compressor is blocked.
3. Check that all connections are tight.
4. Check that sensors and radiator pump are connected to the power source.
5. Set the backup heating thermostat in the off position. The backup heating thermostat is reset on the electrical switchboard behind the front. It is in the off position when it is turned anticlockwise as far as it will go (the screwdriver slot should be vertical).  
\* = Anti-freeze setting, around +7°C.

Symbol for back-up heating thermostat:



## Initial start up

1. Switch on the power using the safety switch. The display comes on.
2. The electrical boiler asks whether the system and the boiler are filled with water. Confirm by pressing "OK". The electrical boiler then starts.
3. Now the heat pump is ready to be brought into operation, but settings still need to be set.

## System settings

The installation contractor should set settings on the heat pump during installation. The settings are set in the installation menu `Installer/Settings`. For a review of the control panel, see page 9.

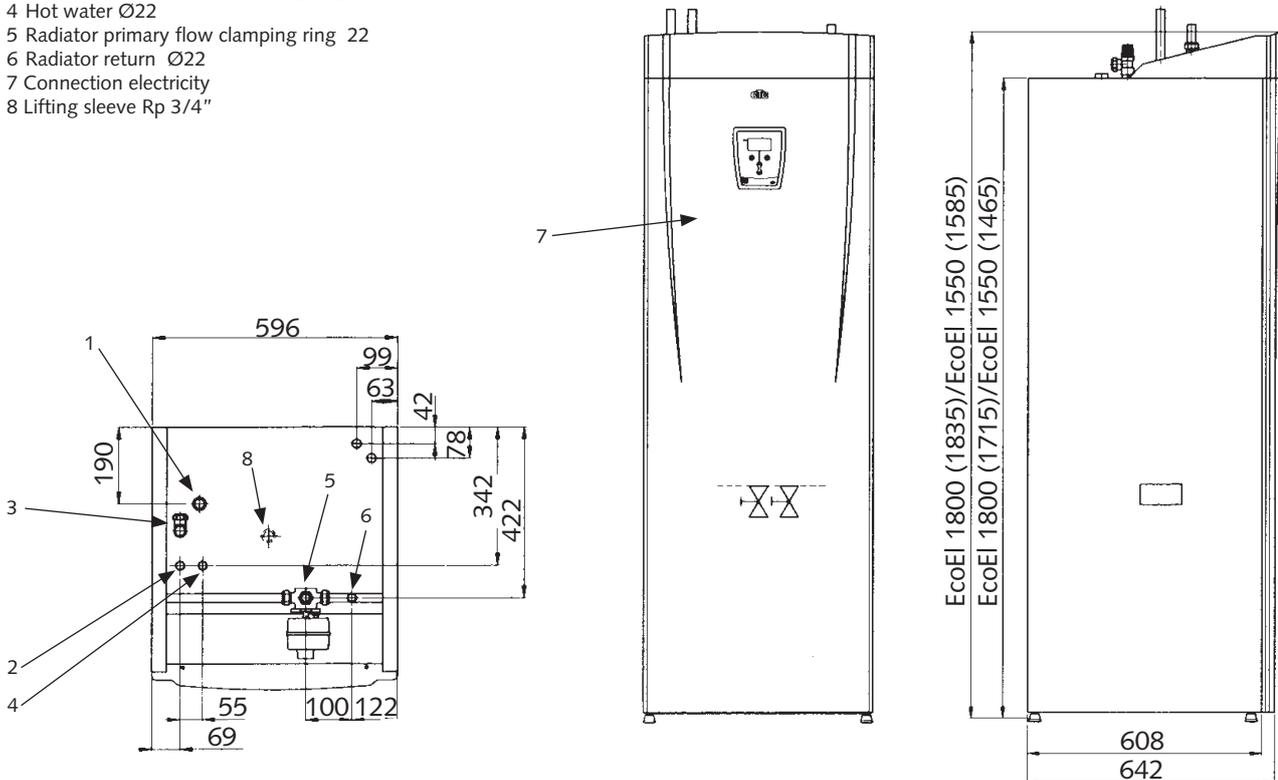
When the system is warm, check that all connections are tight, that the various systems are bled, that heat comes out of the system and that hot water comes out of the tapping point. Go through the settings with the user.

# Technical data

Electrical data		230V 1N~ 50Hz
Weight	kg	155
Water volume boiler	litre	223
DHW	type/volume l	Fin/5,7
Max pressure/temp boiler	Bar/°C	2.5/100
Max operation pressure/ temp coil	Bar/°C	9/100
Nominal output power	kW	12
Power limits, upper immersion heater		2 kW/step
Internal charge control		No
<b>Power consumption, when set at:</b>		
2 kW A		8,7
4 kW A		17,4
6 kW A		26,1
8 kW A		34,8
10 kW		43,5
12 kW A		52,2

# Measurements and connections

- 1 Expansion connection Rp 3/4"
- 2 Cold water connection Ø22
- 3 Connection waste pipe clamping ring 22
- 4 Hot water Ø22
- 5 Radiator primary flow clamping ring 22
- 6 Radiator return Ø22
- 7 Connection electricity
- 8 Lifting sleeve Rp 3/4"





Enertech Group

**Försäkran om överensstämmelse**  
**Déclaration de conformité**  
**Declaration of conformity**  
**Konformitätserklärung**

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**Enertech AB**  
**Box 313**  
**S-341 26 LJUNGBY**

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**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,**

**CTC EcoEI**

---

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

**EC directive on:**

**Pressure Equipment Directive 97/23/EC, § 3.3**  
**(AFS 1999:4, § 8) Electromagnetic Compatibility (EMC) 89/336/EEC**  
**Low Voltage Directive (LVD) 73/23 EEC, 93/68/EEC**

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

EN 719	EN 55014-1 /-2
EN 729-2	EN 55104
EN 288-3	EN 61 000-3-2
EN 1418	EN 60335-1
EN 287-1	EN 50165
EN 10 204, 3.1B	
EN 10 025, S 235 Jr-G2	

Ljungby 2006-05-12

\*CE Marked Relief valve  
(LK Armatur model 510)

Kent Karlsson  
Technical Manager

## DECLARATION OF CONFORMITY

LK Armatur AB, Garnisonsgatan, 49 SE-25466 Helsingborg - Sweden

### DECLARES

that the following safety valves:

model 514 15 x 15	Nom. Press. setting 1.5 – 2.0 - 2.5 - 3.0 - 4.0 - 6.0 - 7.0 - 9.0 - 10 bar
model 510 G3/4" x 22	Nominal pressure setting 1.5 - 2.5 - 6.0 - 9.0 bar
model 510 G3/4" x G3/4"	Nominal pressure setting 1.5 - 2.5 - 6.0 - 9.0 bar
model 512 22 x 22	Nominal pressure setting 1.5 - 2.5 - 6.0 - 9.0 bar

### COMPLY

with the Pressure Equipment Directive PED 97/23.

### CONFIRM also that

- category of the devices IV
- conformity assessment procedure: B+D;
- the inspection was carried out by the notified body "Pascal", Via Giardino, 4 20123 Milano Italy (identify number 1115);
- the EC type examination certificate has protocol number PA041 dated 02.05.07.

The following standards are applied:  
EN 12165:99, EN10204:92

Helsingborg June 26, 2003



Magnus Eriksson  
Managing Director

CE

Notified body 1115

LK Armatur AB

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