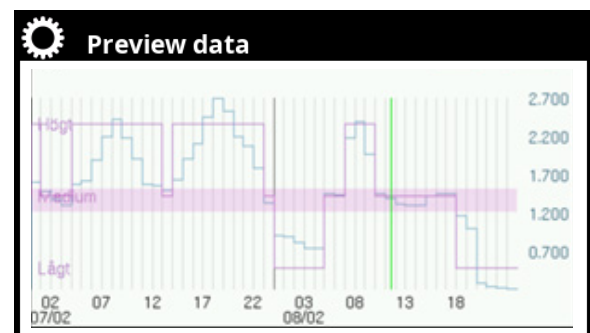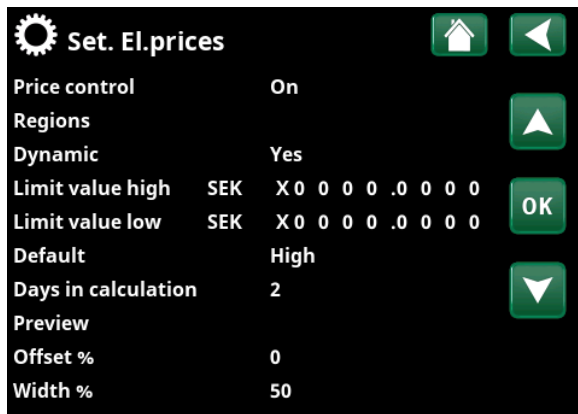# Smart Electricity price control

CTC EcoLogic L/M, CTC EcoPart i600M, CTC EcoPart 400 Pro, CTC EcoZenith i255/i360/i555 Pro, CTC EcoVent i360F, CTC EcoHeat 400, CTC GS/GSi 600

1. Smart electricity price control via myUplink

By connecting the myUplink mobile app to the heat pump, spot prices from the regional electricity exchange can be continuously downloaded to the heat pump.

In the display, the three price categories "High", "Medium" and "Low" can be defined.

When the spot price is above the limit value defined as "High", the function "SmartGrid Blocking" is activated for the subsystems where the function has been set (menu "Settings").

When the price is below the limit value "Low", the function "SmartGrid Low price" is activated for the subsystems where the function has been set.

The "SmartGrid Overcapacity" function is not used for electricity price control.

NOTE!
To get correct electricity spot prices, the country where the plant is installed must first be selected.

1.1 Country setting

Click on the "Country" symbol in the "Installer/Display" menu to display selectable countries and regions. The country that is displayed (highlighted in green) depends on which language has been selected.

"English" is the default language setting, which means that "GB United Kingdom of Great Britain and Northern Ireland" is the default country setting.
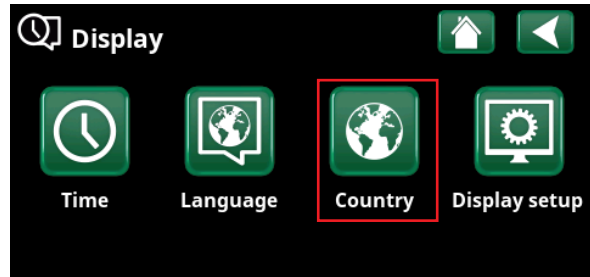
Select the country where the plant is installed to get correct spot prices.

Depending on which country is selected, product-specific factory settings may vary.

If "Country" is not selected, the message "Country not set" is displayed in the settings menu for Electricity price.
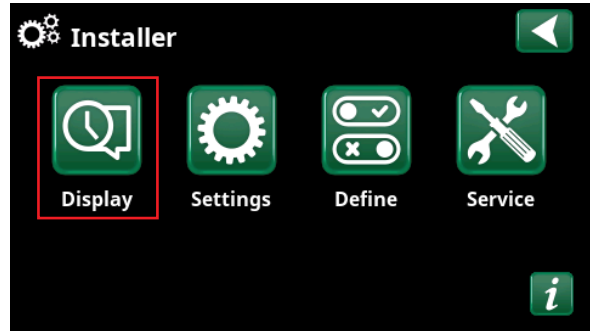
Menu "Installer".

Menu "Installer/Display".

Menu "Installer/Display/Country".

1.2 Define Communication

First define "El.prices" in the menu "Installer/Define/Communication".

El.prices   myUplink/myUplink ext./BMS/No
- Select "myUplink" to connect the heat pump to the myUplink mobile app for electricity price control.
- Select "myUplink ext." to connect via myUplink to an external price control app. This option is not available at the moment.
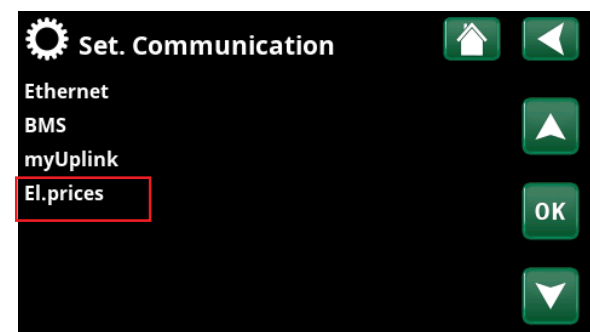- Select "BMS" where control signals are transmitted via the BMS interface.
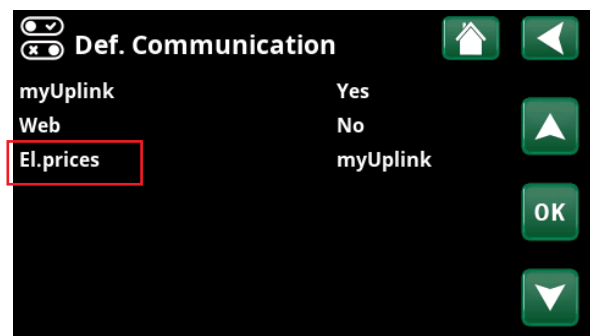
Menu "Installer/Define/Communication".

1.3 Settings Communication

Make sure that "myUplink" is selected in menu "Def. Communication".

- Select "El.prices" to get to menu "Installer/Settings/Communication/El.prices".

Menu "Installer/Settings/Communication".

⚙ 1.3.1 Settings El.prices

Price control   **On/Off**

Select "On" to show the other menu lines of display menu "Set. El-prices".

Regions   **SE01/SE02/SE03/SE04**

Click on "Regions". If "Regions" are defined for the selected country, price regions are shown here. Otherwise, the text "No regions available" is displayed. In this example, Swedish price regions are displayed.

Dynamic   **Yes/No**

"Yes" means that the electricity prices are calculated according to price algorithms that define the price categories ("High", "Medium" and "Low").

Click on "Preview" to display a graph with calculated electricity prices over the selected time interval ("Days in calculation").

The graph can also be displayed by clicking on the "El. prices icon" in the "Operation" main menu (see section "Operation").

Limit value high

Set the limit value above which the electricity price is defined as "High" (in the exemple the limit value is SEK 3.50). Can be used together with dynamic price calculation.

Prices defined as "High" activate the "SmartGrid Blocking" function.

Limit value low

Set the limit value below which the electricity price is defined as "Low" (in the exemple the limit value is SEK 1.50). Can be used together with dynamic price calculation.

Prices defined as "Low" activate the "SmartGrid Low price" function.

**Default**   **High/Medium/Low**

Select price category if the prices cannot be retrieved.

**Days in calculation**   **1...10**

Select the number of days on which the dynamic calculation of the electricity price will be based. Since the dynamic calculation is based on the average price per day, more days in calculation result in a more stable and reliable value.

Preview

Click on "Preview" to graphically show electricity prices during the selected period.
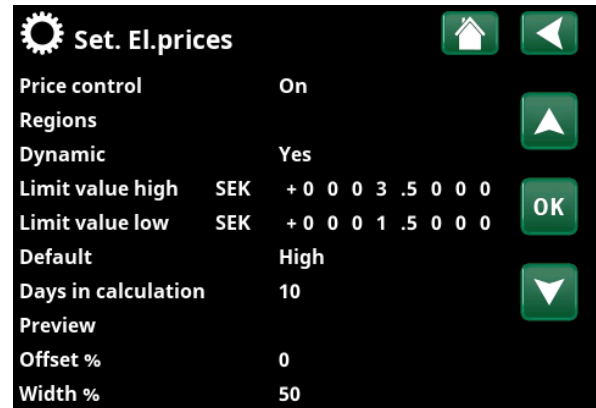
Menu "Installer/Settings/Communication/El.prices" when selecting "Installer/Define/Communication/myUplink:Yes".
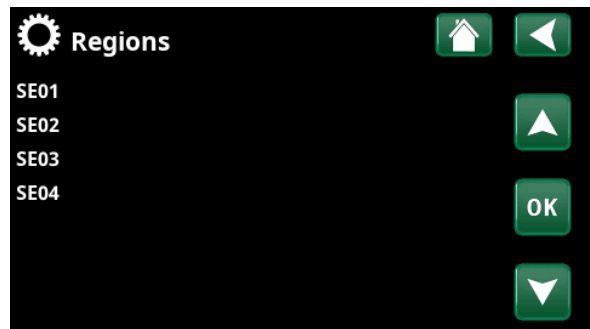
Menu "Installer/Settings/Communication/El.prices/Regions" when selecting "Installer/Define/Communication/myUplink:Yes".

Example, Electricity price calculation with and without limit value settings

You can select whether or not to use dynamic calculation of prices.

In the example below is shown what settings with dynamic calculation in combination with and without limit values mean for determining the electricity price categories "High", "Medium" and "Low":
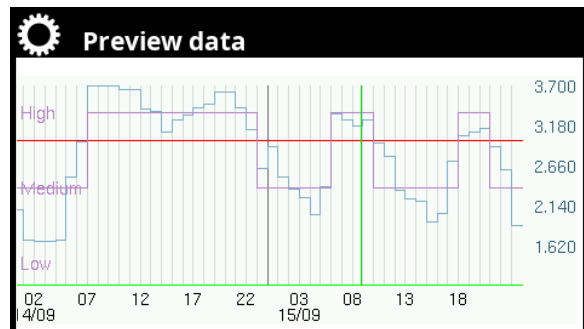
Limit values entered

In this example, limit values are entered and dynamic calculation is selected.

Limit value High: SEK 3.50 (Floor for this electricity price category)

Limit value Low: SEK 1.50 (means that the electricity price category "Low" price is defined with the limit value as a ceiling during the entire period).

Menu "Installer/Settings/Communication/El.prices".
Dynamisk calculation <u>with</u> limit values.

Menu "Installer/Settings/Communication/El.prices/Preview".
Dynamic calculation <u>with</u> limit values.

No limit values entered

In the example, no limit values are entered and dynamic calculation is selected. The electricity price categories are defined by the calculation algorithms.

Menu "Installer/Settings/Communication/El.prices".
Dynamic calculation <u>without</u> limit values.
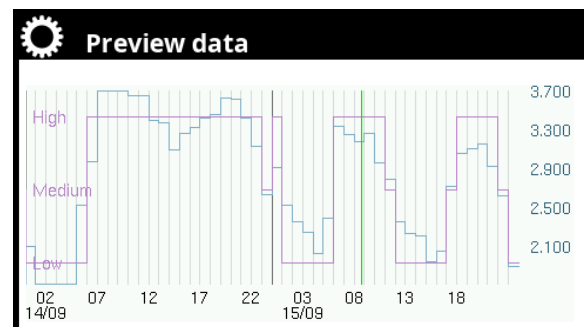
Menu "Installer/Settings/Communication/El.prices/Preview".
Dynamic calculation <u>without</u> set limit values.

1.4   New Settings

This section shows the setting options in the display menu "Advanced/Settings/Communication/Electricity prices" that are added in software release "2023-03-01".

1.4.1   Offset %

Coded settings

By entering code '4003' in menu "Advanced/Service/Coded settings/Code", the menu lines "Offset %" and "Width %" are displayed at the bottom of the display menu "Set. El.prices".

Offset %   **0 (0...100)**

"Offset" specifies the limit between "High" price and "Medium" price electricity and is based on the average price for the selected number of days used in the calculation.

Example

By increasing the "Offset %"-value, the limit between "Medium"- and "High" price is moved upwards.

See the "Preview data" display menus (A) and (B) below. The graphs reflect the settings in menu "Set. El.prices".

In menu "Preview data" (A), "Offset %" has been set to '0' (factory setting) while in menu "Preview data" (B), "Offset %" has been set to '100'.

Note that at "Offset %" : '100', the electricity price is determined to be "High" for shorter periods of time than at "Offset %" : '0'.
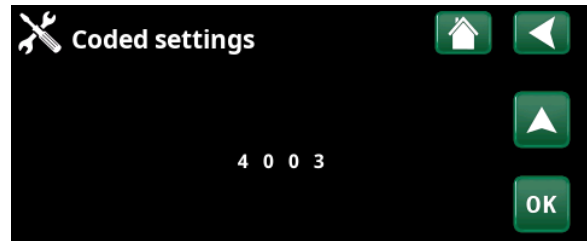
Menu "Installer/Service/Coded settings/Code".

Menu "Installer/Service/Communication/Electricity prices".
Offset % = 0.
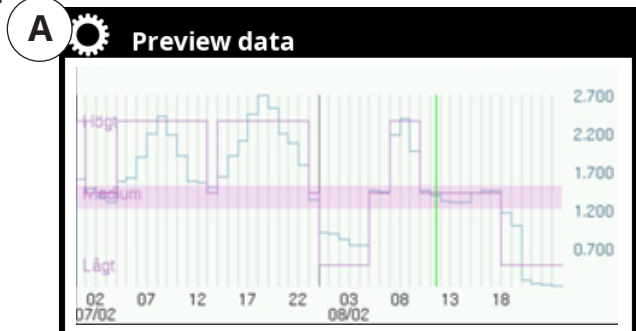
Menu "Installer/Service/Communication/Electricity prices/Preview".
Offset % = 0.

Menu "Installer/Service/Communication/Electricity prices/Preview".
Offset %= 100.

1.4.2   Width %

Width %   **50 (0...200)**

"Width" specifies the price range where the electricity price is considered "Medium". To decrease or increase this range, the "Width %" can be changed from factory setting '50' to a value between '0-200'.
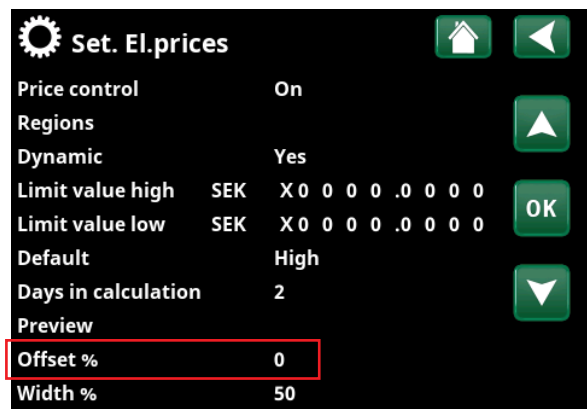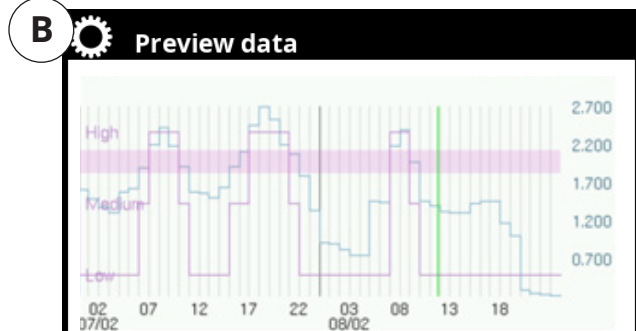
Example

See the "Preview data" display menus (A) and (B) below. The graphs reflect the settings in menu "Set. El.prices".

Display menu "Preview data" (A) shows that the "Medium" price range becomes very large when both "Offset %" and "Width %" are set to maximum values. Most of the time electricity will then be considered "Medium" price.

In display menu "Preview data" (B), the "Width" has been set to '0', which means that the "Medium" price range disappears and the electricity price is only considered to be "High" or "Low" depending on the average electricity price.

Menu "Installer/Service/Communication/Electricity prices".
Width % = 200, Offset % = 100.
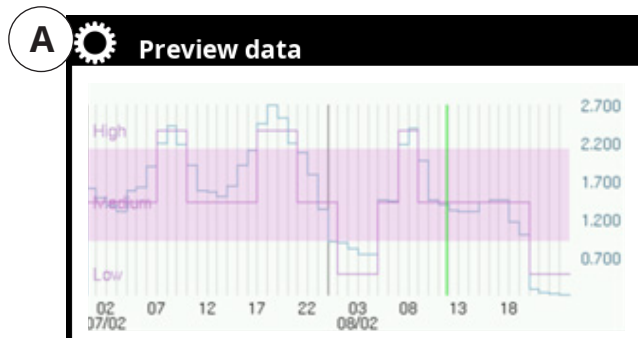
Menu "Installer/Service/Communication/Electricity prices/Preview".
Width % = 200, Offset % = 100.
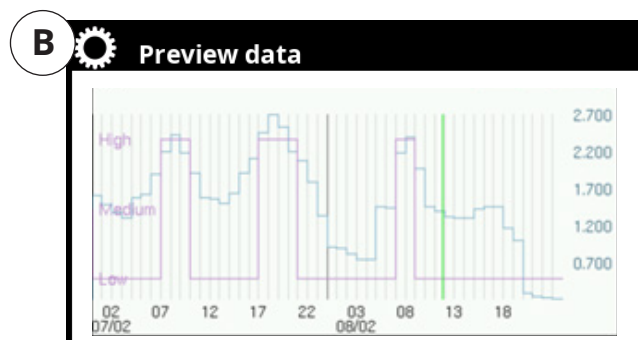
Menu "Installer/Service/Communication/Electricity prices/Preview".
Width %= 0.
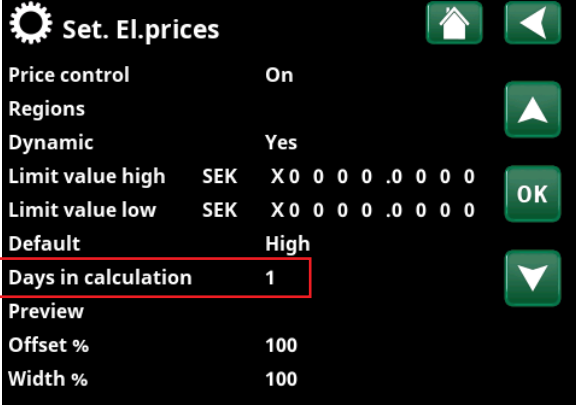
Days in calculation   1 (1...10)

It is possible to set the number of "days in calculation" to 1-10 days instead of previously 2-10 days.

Example

Below is illustrated that the average price is renewed and based on the average price every single day.

Menu "Installer/Service/Communication/Electricity prices".
 Days in calculation = 1.
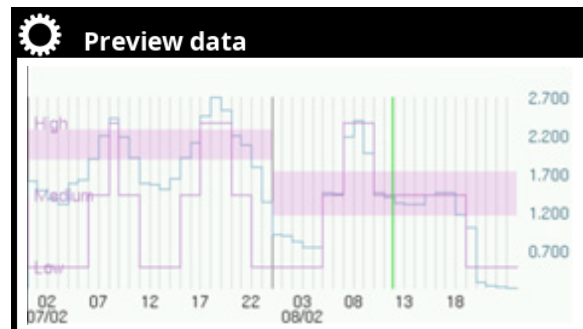
Menu "Installer/Service/Communication/Electricity prices/Preview".
 Days in calculation = 1.

1.5   Operation

To see the "Electricity prices" Operation menu, click on the electricity prices icon in the icon bar in the "Operation" main menu.

In the menu "El. prices", the current price category and electricity price/kWh (and currency) are displayed.

You can also see the graph with the calculated prices described above by clicking on the "Graph icon" at the bottom left of the menu screen.

The status of the SmartGrid functions for each subsystem is shown in "Operation" submenus.

1.5.1   El.prices

The menu is displayed if "El.prices" has been defined in the "Installer/Define/Communication" menu.

El.price mode **High**

Shows current price category (High, Medium or Low).

El-Price/kWh **SEK 7.5**

Shows current el.price (currency shown before the value).

Show the "Preview data" graph by clicking on the icon at the lower left corner of the display menu.

Menu "Operation" (CTC EcoLogic L).

Menu "Operation/El.prices".

2.   Enabling SmartGrid functions

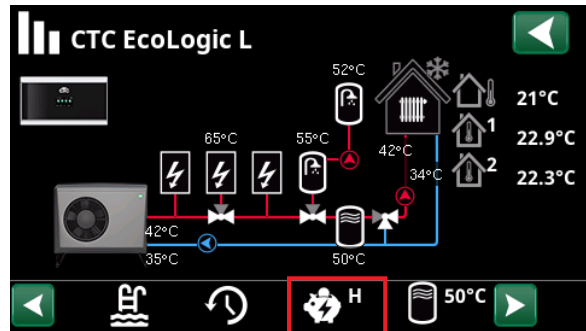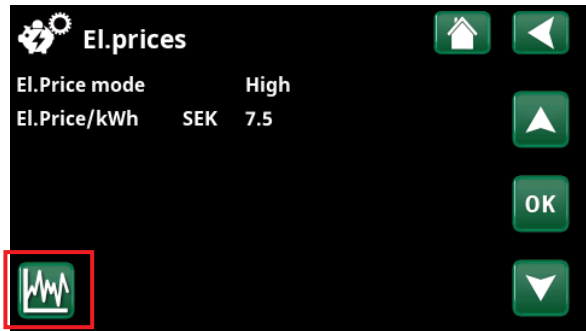The SmartGrid functions are useful for, for example, increasing the temperature in the room or in the hot water tank (DHW tank) when the electricity price is low ("SmartGrid Low price"), or alternatively for lowering the setpoint in the pool or blocking the additional heat when the electricity price is high ("SmartGrid Blocking"). This is achieved by both activating/defining current SmartGrid functions (as described in this chapter) as well as making SmartGrid settings for the respective subsystem (the heating circuit(s), the DHW tank, the pool, etc.) in the "Setting" menus described in chapter 3. "Settings - SmartGrid functions ".

SmartGrid can be activated, in order of priority (normal mode):

A.   Via digital inputs on the relay card.

B.   Setting of weekly schedules where you specify when the different SmartGrid functions will be active.

C.   Smart electricity price control via app.

A.   Digital in

For digital input signals, the following can be defined:

- •   Terminal blocks K22-K25
- •   A wireless accessory in the SmartControl series
- •   BMS digital input 0-7

First assign a digital input (Pin) to "SmartGrid A" ("SG A") and "SmartGrid B" ("SG B") in the menu "Installer/Define/Remote control".

In the example, "SmartGrid A" has been assigned input "K22" and "SmartGrid B" has been assigned input "K23".

To achieve the SmartGrid function "SG Low price", input "K23" ("SG B") must be activated (be closed) while input "K22" ("SG A") remains unchanged (open).

K22 (SG A)	K23 (SG B)	Function
Open	Open	Normal
Open	Closed	SmartGrid Low price
Closed	Closed	SmartGrid Overcapacity
Closed	Open	SmartGrid Blocking

B.   SmartGrid schedule

In order for the "SmartGrid schedule" menu line to appear in the "Installer/Settings" menu, SmartGrid A must first be assigned a schedule (1-30) in the "Installer/Define/Remote control" menu.

In the "SmartGrid schedule" menu can be selected when the respective SmartGrid function will be active.

In this example, the "SmartGrid Blocking" function has been set to be active on weekdays between 07:30 and 21:00.

For more information on setting schedules, see chapter "Weekly program" in the "Installation and maintenance manual".

> **i** In addition to being activated (defined), the SmartGrid functions must also be set in the respective subsystem's "Setting" menus, see chapter 3. "Settings - SmartGrid-functions".

1.
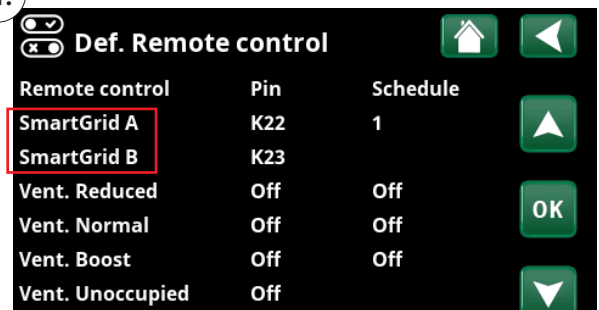
Menu "Installer/Define/Remote control".

2.
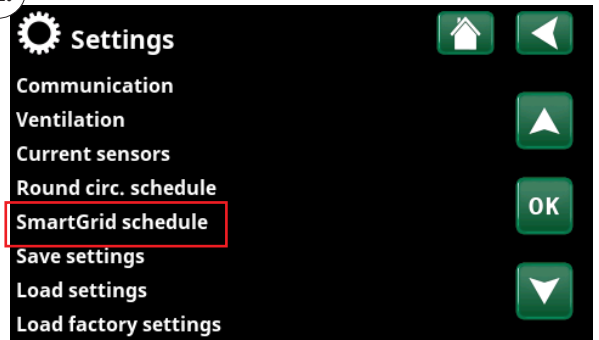
Part of menu "Installer/Settings".
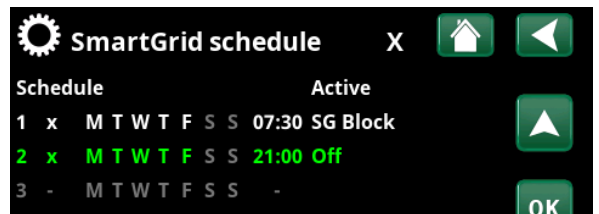
Menu "Installer/Settings/SmartGrid schedule".

3.   Settings - SmartGrid functions

In the "Setting" menus ("Installer/Settings/...") for the subsystems* Heating circuit(s), Heat pump(s), Additional heat, DHW tank, Pool, Cooling, Buffer tank, Upper and Lower tank, what will happen when the SmartGrid functions for the subsystem are active (see chapter 2."Enabling SmartGrid functions").

Below are listed the SmartGrid settings/setting ranges used for Smart price control; "SmartGrid Blocking" and "SmartGrid Low price". The factory value is underlined.

Heating circuit
- SmartGrid Low price °C   <u>Off</u>/1...5 °C
  (room temperature -if room sensor is installed- or primary flow temperature)

    Heating program

    Comfort:
    - SmartGrid Low price   <u>Off</u>/On

    Custom:
    - SmartGrid Low price   <u>Off</u>/On
   - SmartGrid Block   <u>Off</u>/On

    Economy:
    - SmartGrid Block   <u>Off</u>/On

Heat pump
- SmartGrid Block HP   <u>Nej</u>/Ja

Additional heat
- SmartGrid Block EL   <u>No</u>/Yes

DHW tank/Lower tank/Upper tank
- SmartGrid Block °C   <u>Off</u>/−1...−50 °C
- SmartGrid Low price °C   <u>Off</u>/1...30 °C

Buffer tank
- SmartGrid Low price °C   <u>Off</u>/1...30 °C

Pool
- SmartGrid Block   °C   <u>Off</u>/−1...−50 °C
- SmartGrid Low price °C   <u>Off</u>/1...50 °C

Cooling
- SmartGrid Low price °C   <u>Off</u>/1...5 °C
  (room temperature)

> **i** *Definable subsystems depends on the system configuration/heat pump model.
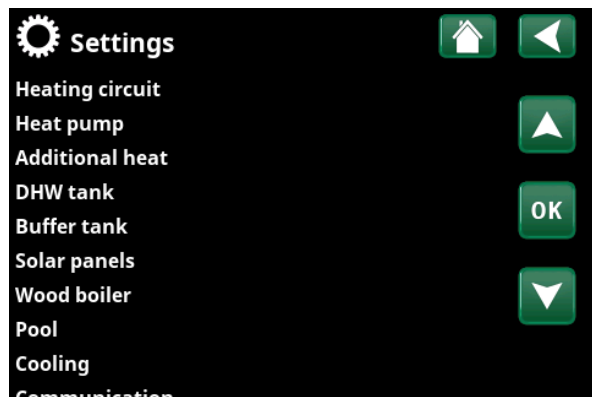
Part of menu "Installer/Settings" (CTC EcoLogic L)

3.1 Exemple, settings - SmartGrid functions

In this example, the pool heating setpoint will be increased by 5 ºC when the electricity price is low (when the function "SmartGrid Low price" is active) and the setpoint will be decreased by 10 ºC when the electricity price is high (when the function "SmartGrid Blocking" is active).
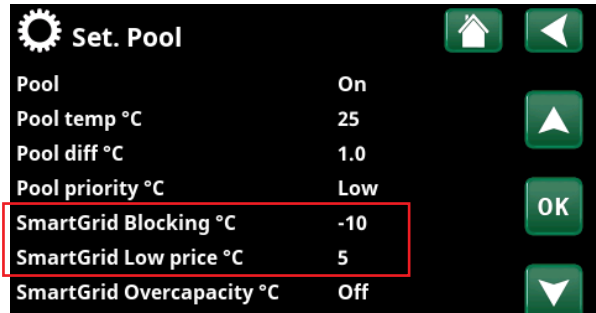
Part of menu "Installer/Settings/Pool".

In the menu "Settings Additional heat", it is specified that the additional heat will be blocked when the electricity price is high (when the "SmartGrid Blocking" function is active).
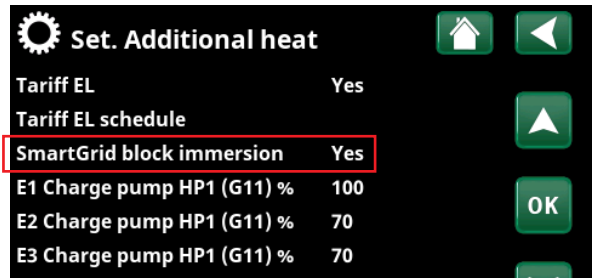
Part of menu "Installer/Settings/Additional heat".

*Total Max. and min. temperatures are limited by the software.

⚙ 3.2 "Settings" menus

"Settings" for subsystems are found in "Installer/Settings" submenus.

The "SmartGrid Overcapacity" function is not used in electricity price control, but is described in the menus below.

See also chapter 1. "Smart electricity price control via myUplink".

3.2.1 Set. Heating circuit

Select "Heating circuit" in the menu "Installer/Settings".

In the menu "Set. Heating circuit 1", select by how many degrees the heating circuit setpoint will be increased when the functions "SmartGrid Low price" and/or "SmartGrid Overcapacity" are active.

SmartGrid Low price ºC   1 (Off, 1...5)

Setting to increase (ºC) the room temperature (room sensor installed) or primary flow temperature at energy price "Low price".

SmartGrid Overcapacity °C   2 (Off, 1...5)

Setting to increase (ºC) the room temperature (room sensor installed) or primary flow temperature at energy price "Overcapacity".

The function is not used for electricity price control.

SmartGrid Blocking   Off (Off/On)

"On" means that the heating system is blocked via SmartGrid when electricity price is "High".

If the outside temperature falls below "Night reduction down to °C", the function is not activated. .

Program

Select "Program" in the "Set.Heating circuit" menu to make settings for the "Economy", "Comfort" and "Custom" heating programs. The selected program is marked with "X".

The following SmartGrid functions can be set for the heating programs:

SmartGrid Blocking   Off (Off/On)

Can be set for heating program "Economy" and "Custom".

"On" means that the heating program is activated when "SmartGrid Blocking" is active.

SmartGrid Low price*   Off (Off/On)

Can be set for heating program "Comfort" and "Custom".

"On" means that the room temperature is increased according to the setting for "SmartGrid Low price °C" when "SmartGrid Low price" is active.

SmartGrid Overcapacity*   Off (Off/On)

Can be set for heating program "Comfort" and "Custom".

"On" means that the room temperature is increased according to the setting for "SmartGrid Overcapacity °C" when "SmartGrid Overcapacity" is active.

The function is not used for electricity price control.
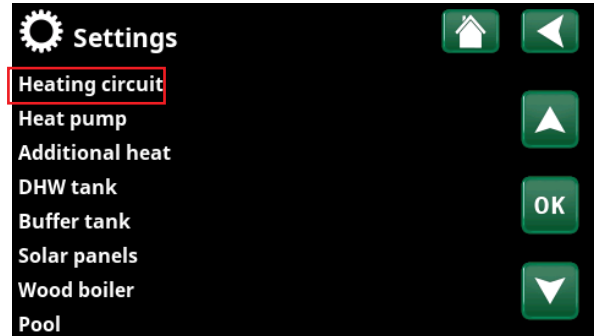
Part of menu "Installer/Settings" (CTC EcoLogic L).
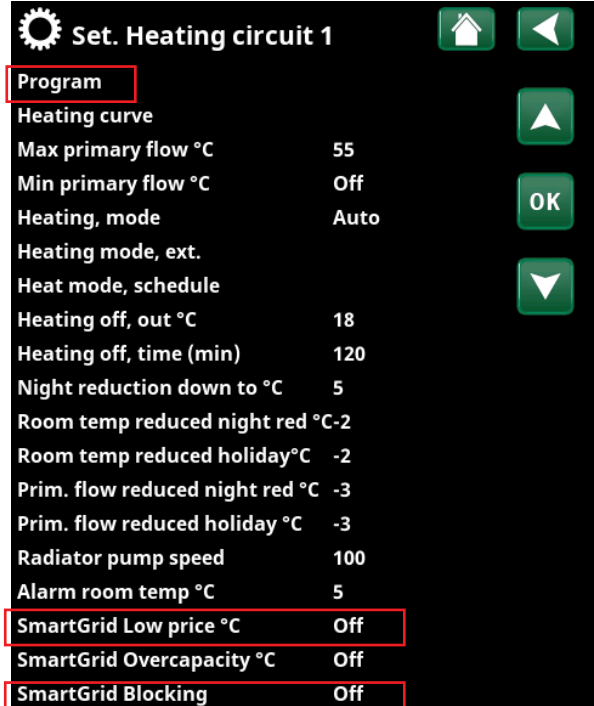
Part of menu "Installer/Settings/Heating circuit/Heating circuit 1".
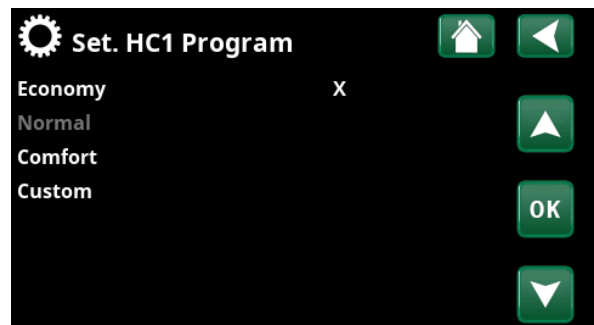
Menu "Installer/Settings/Heating circuit/Heating circuit 1/Program".
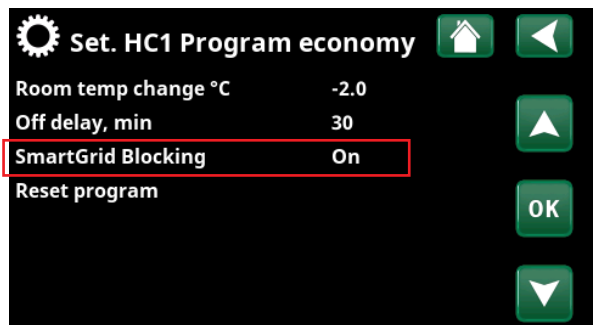
Menu "Installer/Settings/Heating circuit/Heating circuit 1/Program/economy".

*Total Max. and min. temperatures are limited by the software.

3.2.2 Set. Heat pump

SmartGrid block HP   No (No/Yes)

"Yes" means that the heat pump is blocked when "SmartGrid Blocking" is active.

The Tariff function can also be used to block the heat pump (via remote control or scheduled). See the "Installation and maintenance manual" for more information.

Set. Heat pump	
Start at degree minute	-60
Start at degree minute cooling	0
Max primary HP diff°C	10
Max primary HP Add. heat diff °C	14
Diff between comp.	-60
Diff between comp. cooling	0
Delay between comp.	30
Prio A/W °C	7
Prio DHW A/W °C	0
SmartGrid block HP	Yes
Heat pump 1	

Menu "Installer/Settings/Heat pump".

3.2.3 Set. Additional heat

SmartGrid block Add. heat   No (No/Yes)

"Yes" means that the additional heat is blocked when "SmartGrid Blocking" is active.

The Tariff function can also be used to block the additional heat (via remote control and weekly schedule). See the "Installation and maintenance manual" for more information.

Set. Additional heat	
Tariff EL	Yes
Tariff EL schedule	
SmartGrid block immersion	Yes
E1 Charge pump HP1 (G11) %	100
E2 Charge pump HP1 (G11) %	70
E3 Charge pump HP1 (G11) %	70

Part of menu "Installer/Settings/Additional heat".

3.2.4 Set. DHW tank

SmartGrid Blocking °C*   Off (Off/-1...-50)

The setpoint for DHW tank heating is decreased by the value set in this menu when "SmartGrid Blocking" is active.

SmartGrid Low price °C*   Off (Off/1...30)

The setpoint for DHW tank heating is increased by the value set in this menu when "SmartGrid Low price" is active.
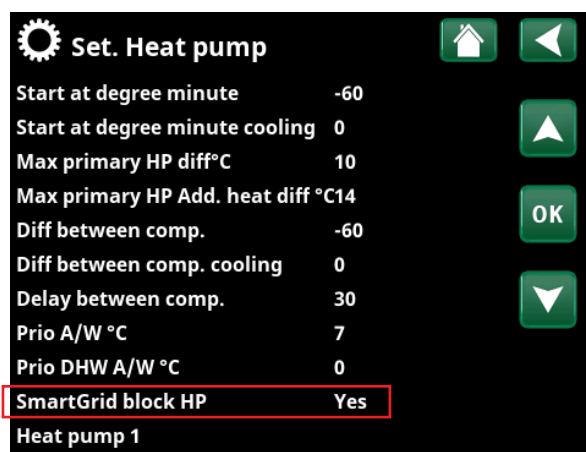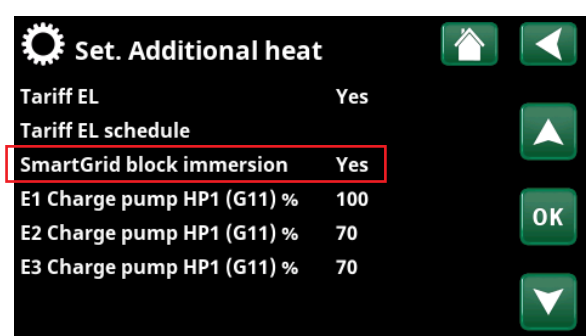
SmartGrid Overcapacity °C*   Off (Off/1...30)

The setpoint for DHW tank heating is increased by the value set in this menu when "SmartGrid Overcapacity" is active.

The function is not used for electricity price control.

SmartGrid Overcapacity block HP   No (No/Yes)

"Yes" means that DHW tank heating with the heat pump is blocked when "SmartGrid Overcapacity" is active.

The function is not used for electricity price control.

Set. DHW tank	
Time DHW circ (min)	15
Diff start ext DHW tank	5
DHW circ. schedule	
SmartGrid Blocking °C	Off
SmartGrid Low price °C	Off
SmartGrid Overcapacity °C	Off
SmartGrid Overcapacity block HP	No
Time ExtraDHW Remote Contr.	0.0

Part of menu "Installer/Settings/DHW tank".

*Total Max. and min. temperatures are limited by the software.

3.2.5   Set. Buffer tank

This menu only applies to systems with a buffer tank ("CTC EcoLogic System Type" 4-6) if a buffer tank has been defined.

SmartGrid Low price °C*   Off (Off/1...30)

The setpoint for buffer tank heating is increased by the value set in this menu when "SmartGrid Low price" is active.

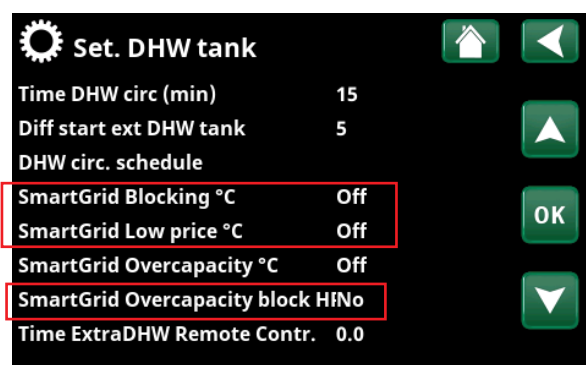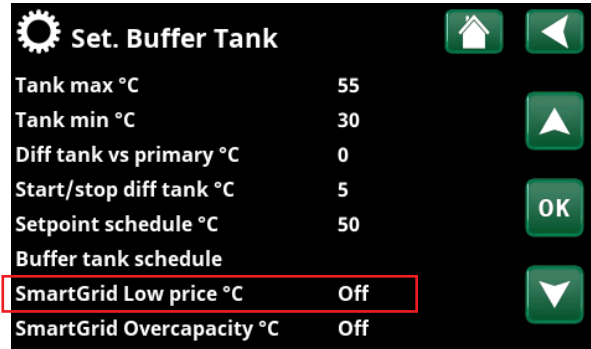**SmartGrid Overcapacity °C***   Off (Off/1...30)

The setpoint for buffer tank heating is increased by the value set in this menu when "SmartGrid Overcapacity" is active.

The function is not used for electricity price control.

⚙ Set. Buffer Tank	🏠 ◀
Tank max °C	55
Tank min °C	30
Diff tank vs primary °C	0
Start/stop diff tank °C	5
Setpoint schedule °C	50
Buffer tank schedule	
SmartGrid Low price °C	Off
SmartGrid Overcapacity °C	Off

Menu "Installer/Settings/Buffer tank".

3.2.6   Set. Pool

SmartGrid Blocking °C*   Off (Off/-1...-50)

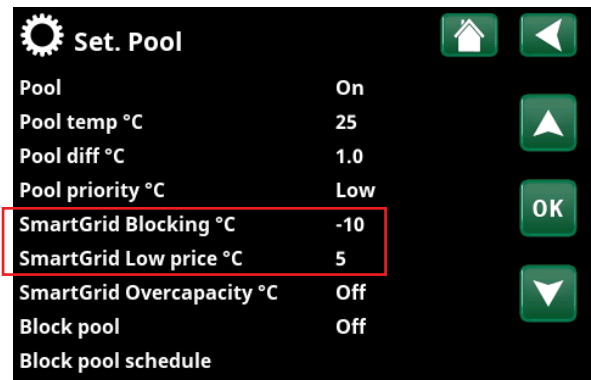The setpoint for pool heating is decreased by the value set in this menu when "SmartGrid Blocking" is active.

SmartGrid Low price °C*   Off (Off/1...50)

The setpoint for pool heating is increased by the value set in this menu when "SmartGrid Low price" is active.

SmartGrid Overcapacity °C*   Off (Off/1...50)

The setpoint for pool heating is increased by the value set in this menu when "SmartGrid Overcapacity" is active.

The function is not used for electricity price control.

⚙ Set. Pool	🏠 ◀
Pool	On
Pool temp °C	25
Pool diff °C	1.0
Pool priority °C	Low
SmartGrid Blocking °C	-10
SmartGrid Low price °C	5
SmartGrid Overcapacity °C	Off
Block pool	Off
Block pool schedule	

Menu "Installer/Settings/Pool".
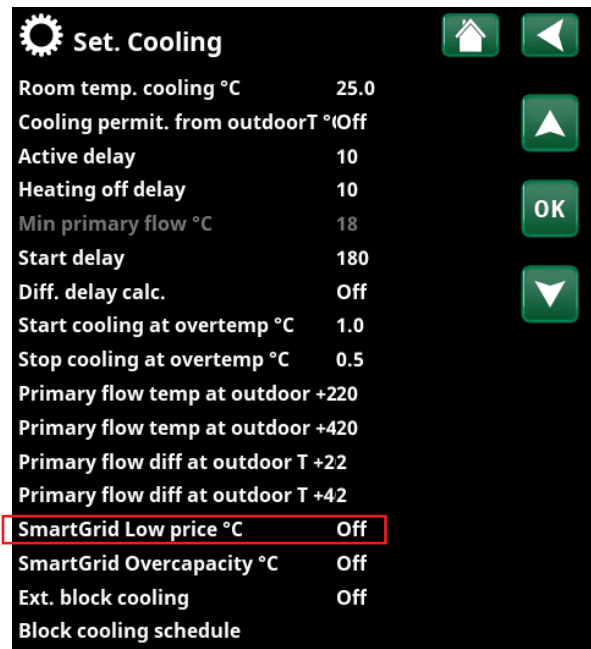
3.2.7   Set. Cooling

SmartGrid Low price °C*   Off (Off/1...5)

The setpoint for cooling is increased by the value set in this menu when "SmartGrid Low price" is active.

SmartGrid Overcapacity °C*   Off (Off/1...5)

The setpoint for cooling is increased by the value set in this menu when "SmartGrid Overcapacity" is active.

The function is not used for electricity price control.

⚙ Set. Cooling	🏠 ◀
Room temp. cooling °C	25.0
Cooling permit. from outdoorT °C	Off
Active delay	10
Heating off delay	10
Min primary flow °C	18
Start delay	180
Diff. delay calc.	Off
Start cooling at overtemp °C	1.0
Stop cooling at overtemp °C	0.5
Primary flow temp at outdoor +2	20
Primary flow temp at outdoor +4	20
Primary flow diff at outdoor T +2	2
Primary flow diff at outdoor T +4	2
SmartGrid Low price °C	Off
SmartGrid Overcapacity °C	Off
Ext. block cooling	Off
Block cooling schedule	

Menu "Installer/Settings/Cooling".

*Total Max. and min. temperatures are limited by the software.