

# pGDx

## INSTRUCTION MANUAL

for

### End-User

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# 1 Introduction

Dear customer,

Thank you for purchasing a MasterTherm heat pump that includes a pGDx touch screen. The pGDx is used for user-friendly control of heat pump, measurement of temperature and humidity in the reference room (if required), connection to the Internet via WiFi or Ethernet, transmission of heat pump operation data and related control via web or mobile applications. We regularly improve the pGDx function and design of the graphical user interface itself in the form of online updates.

Your heat pump can be controlled in several ways:

- Online (web/mobile application)
- Via pGDx touchscreen
- Via pGD (it is an 8-line digital display, pGDx predecessor, now optional equipment on request)
- Control of the required room air temperature via pAD or pADh devices (these devices are used to measure room temperature or temperature and humidity, according to which they can also compensate desired heating water temperature in assigned heating circuits as well, as pGDx can do with the main heating circuit)
- Control superior to the heat pump (ModBus RTU / BACnet)

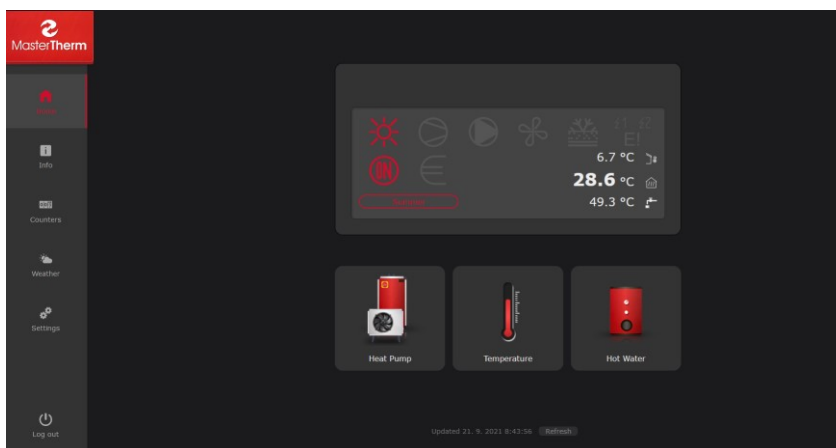
## 1.1 Online heat pump control

The design of the pGDx user interface is adapted to the design of applications for control via the Internet so that it is clear to the user.

Below is a sample web application (available at [www.mastertherm.online](http://www.mastertherm.online)):



Light mode of application



Dark mode of application

## 1.2 Names and descriptions of devices used in this manual

### **pGD (optional equipment)**



Figure 1 - pGD control terminal

8-line partially graphic terminal with a resolution of 132x64 pixels supplied with green or white backlight. It has a keyboard with 6 keys. Previously supplied with almost all types of our heat pumps, now these terminals are optional equipment according to customer requirements. With the help of pGD (or its emulation on pGDx) more advanced settings are possible, which are used mainly by service companies and more experienced users.

**pAD (optional equipment)**



Figure 2 - pAD room terminal

pAD is a room terminal that allows users to interact with the heat pump control unit. The pAD room terminal is used to enter the desired room temperature by user. This terminal allows main heat pump controller to precisely control the room temperature and heating water temperature, which contributes to greater comfort and more efficient operation of the heat pump.

**pGDx (optional equipment)**



Figure 3 – pGDx control panel

pGDx is new main control panel for all Master Therm heat pumps. pGDx offers a touch screen with a diagonal of 4.3 " with a resolution of 480x272 pixels. Enables the room terminal function of main heating circuit. It has 1GHz processor and 512 MB RAM. Of course, there is possibility of connecting to the Internet via Ethernet or WiFi. If required for installation in the reference room, a device with an integrated temperature and humidity sensor is used.

All information regarding the pGDx device can be found in this manual.

## 2 Home screen

Home screen is user's starting point.

After inactivity (no touch), it will automatically return to this home screen after one minute. On this screen, you can find basic information about function and current status of heat pump. At the same time, user is informed about possibility of updating pGDx SW (if new version is available).

Home screen contains buttons for entering heat pump/pGDx settings and displaying more detailed information. If device is connected to the Internet via WiFi, there is also a graphical indication of signal strength.



Figure 4 - Light mode

pGDx also has built-in eye-saving function for darker display at night (or according to the user's choice).

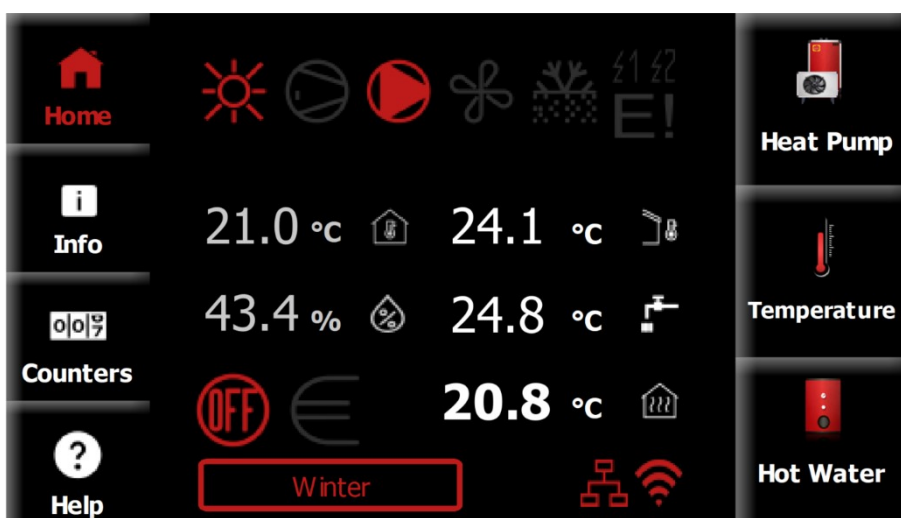


Figure 5 - Dark mode

## 2.1 Description of home screen icons

You can find a graphical descriptive icon next to each value in the middle of the home screen.

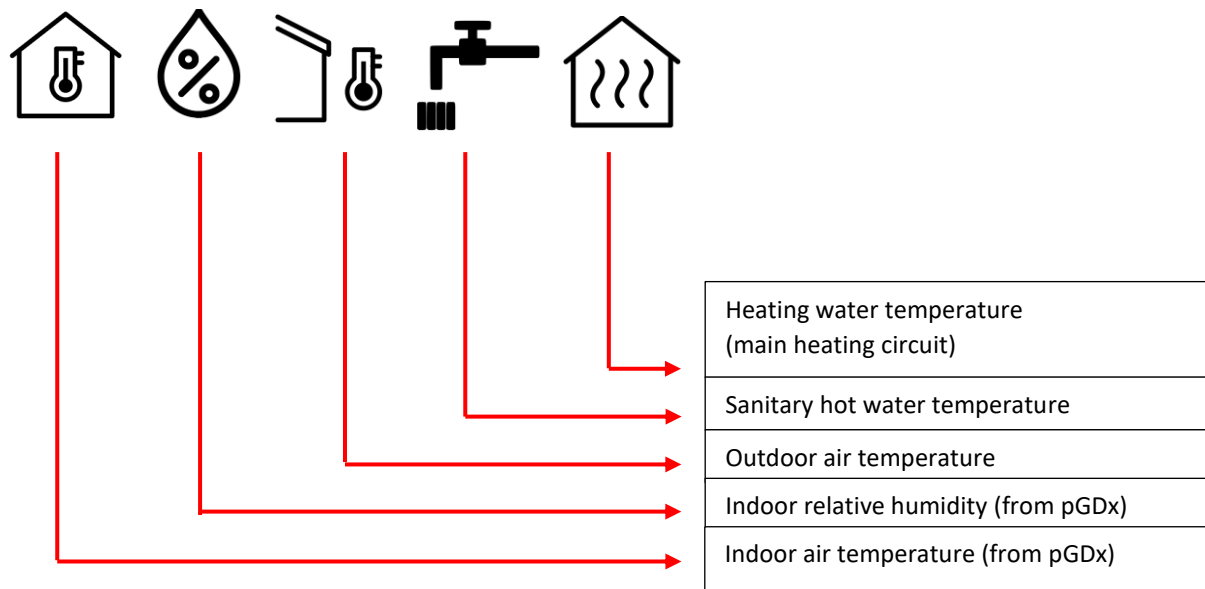


Figure 6 - Description of icons

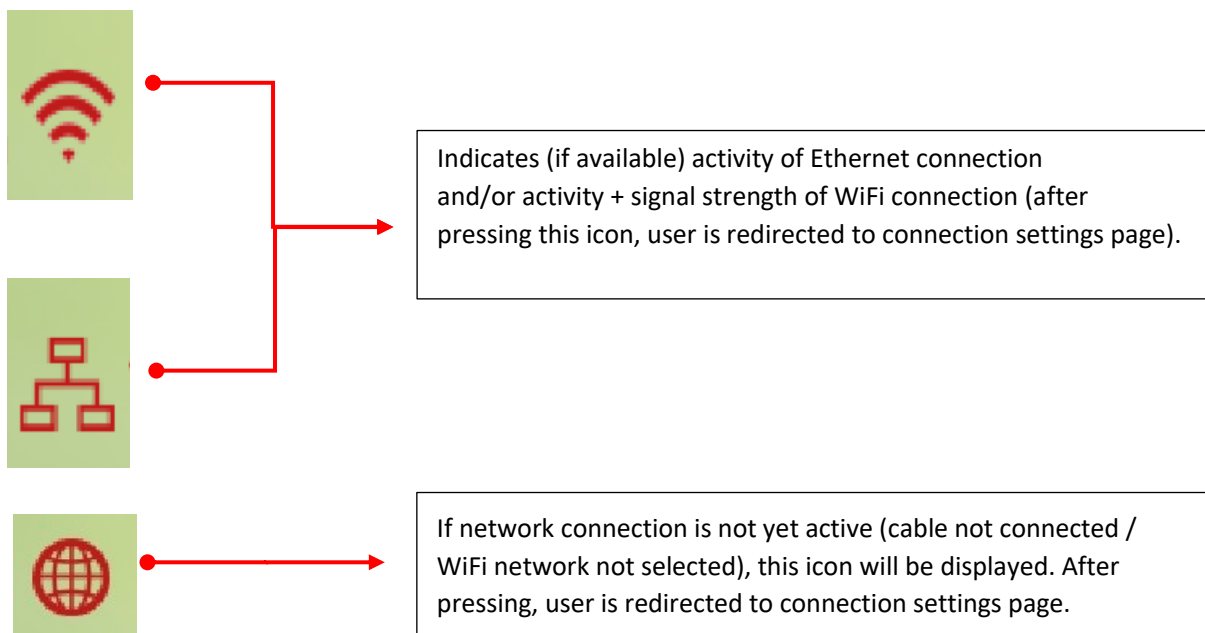
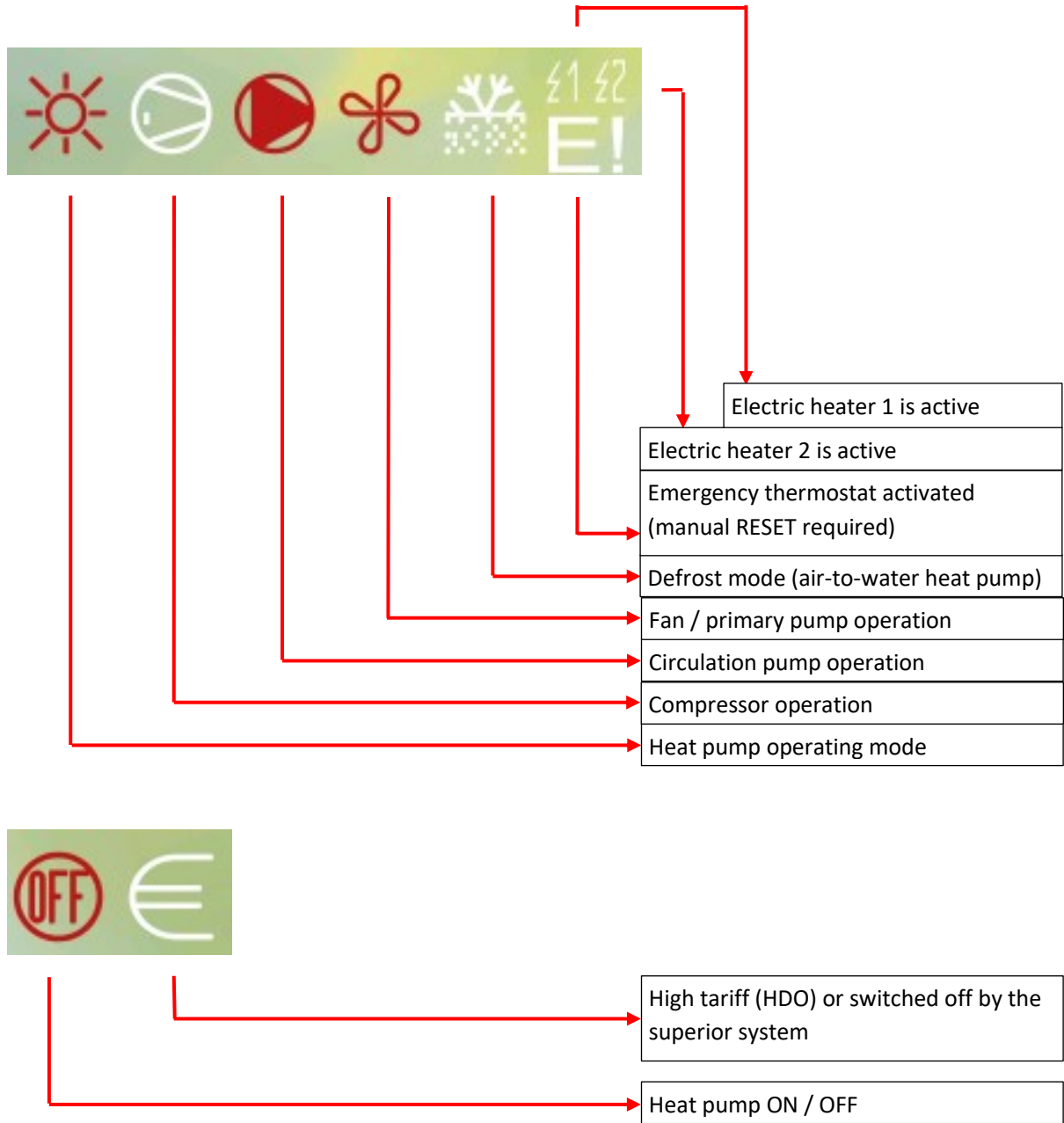


Figure 7 - Network icons

Below you can find status icons well known from pGD. Please see **pGD - FINAL USER'S INSTRUCTION MANUAL** on page 5, chapter 3.1. for detailed description.

Figure 8 - HP status icons



Current heat pump mode is also displayed on the home screen.

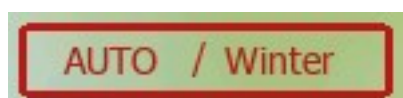








Figure 9 - Current heat pump mode






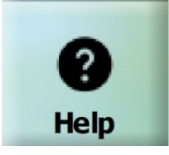
## 2.2 Description of operating mode icons

### **Operating mode (the first icon, if flashing, heat pump is in Summer mode):**

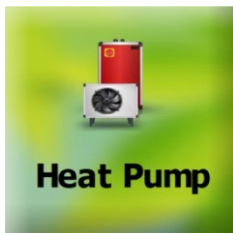
-  Heating
-  Heating – low outdoor temperature (aux. heaters only, compressor OFF)
-  Cooling, or Passive Cooling (Brine/water only)
-  Cooling with Dew Point protection (no humidity condensation possible)
-  Sanitary Hot Water preparation active
-  Swimming Pool heating active (optional)

## 2.3 Description of home screen buttons

There are two groups of buttons on the left and right of the home screen. On the left side, there are mainly buttons for displaying basic information (home screen, counters, info, help) while on the right side there are buttons for heat pump setting (heat pump, temperature, hot water).

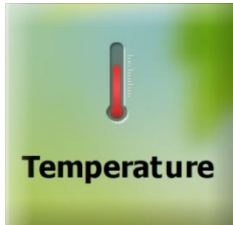
-  ➤ Home screen
-  ➤ Info – user name, language, unit ID, HC names...
-  ➤ Counters – pump & compressor runtime, start counter, electric meters
-  ➤ Help – description of basic icons for users

**Figure 10 - Buttons on the left**



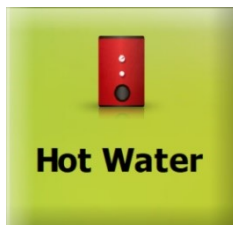
### Heat pump

- Short press = enter basic settings of the heat pump (ON/OFF, Mode, Function, Heating and Cooling curve).
- Long press = enter pGDx settings (Languages, Date & Time, Dark & Light, Advanced access, Restart pGDx) or then further to the advanced settings.



### Temperature

- Temperature settings, heating circuits + equithermal curves
- pAD room terminals (backward compatible)
- Solar, Pool



### Hot Water

- ON/OFF hot water
- Setpoint
- Current sanitary hot water temperature

Figure 11 – Buttons on the right

## 3 Info



Press INFO button from home screen.

This screen contains information about the heat pump (entered on our website) located in the scroll menu. You can find information such as **name, surname, pGDx ID, heating circuits labels etc.**

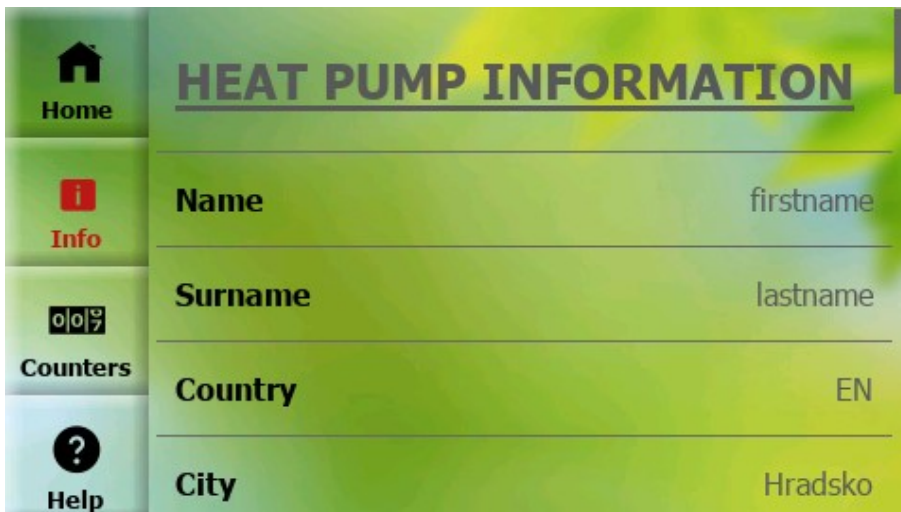


Figure 12 – Info

## 4 Counters



Press COUNTERS button from home screen.

This page shows status of the basic counters and if the unit is equipped with an electric meter then button for entering its menu is displayed here.

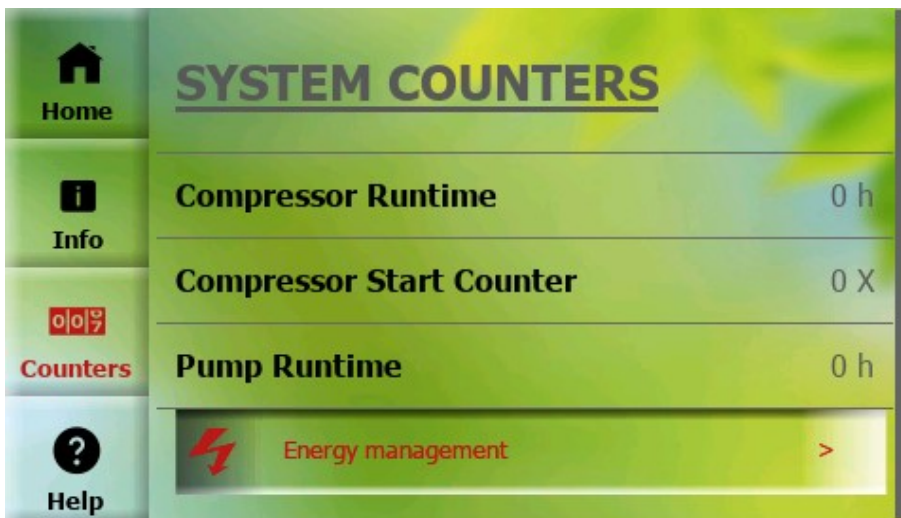


Figure 13 - Counters

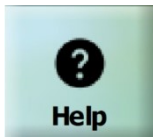
### 4.1 Counters – Energy management

This page shows status of (1-phase / 3-phase) electric meter counters.



Figure 14 - Energy Management

## 5 Help



Press HELP button from home screen.

Description of basic icons for end-users. There are approximately 20 icons with descriptions. Help section will gradually expand in future SW updates.

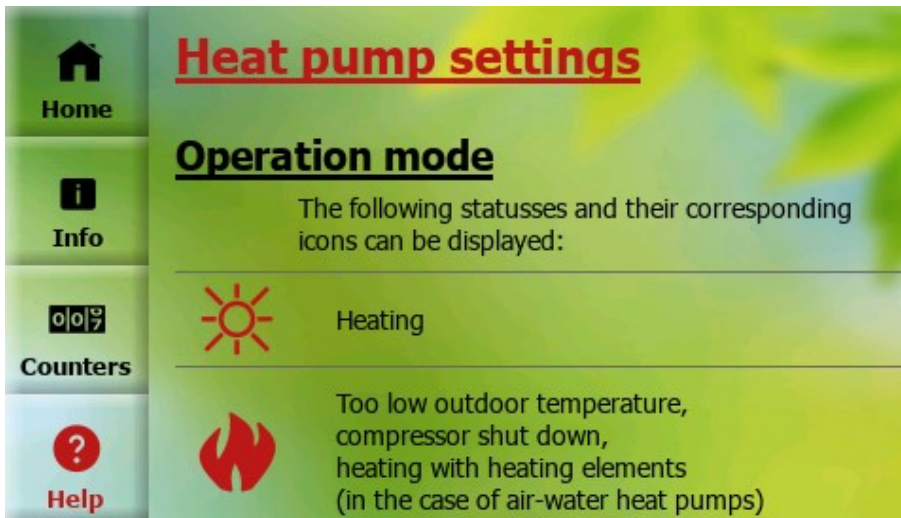


Figure 15 - Help 01

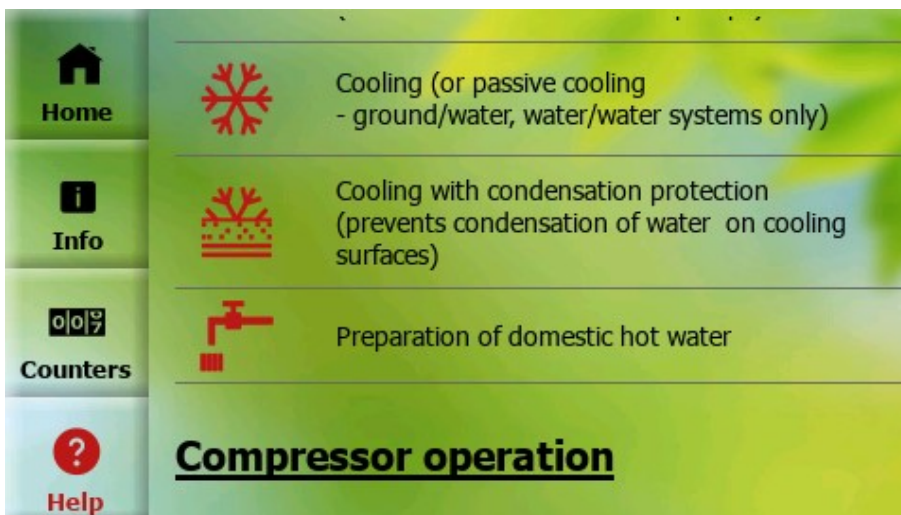


Figure 16 - Help 02

## 6 Settings



**SHORT Press** HEAT PUMP button from home screen.

Here it is possible to turn ON / OFF the heat pump and enter other submenus such as:  
**Mode, Function, Heating + Cooling curve**

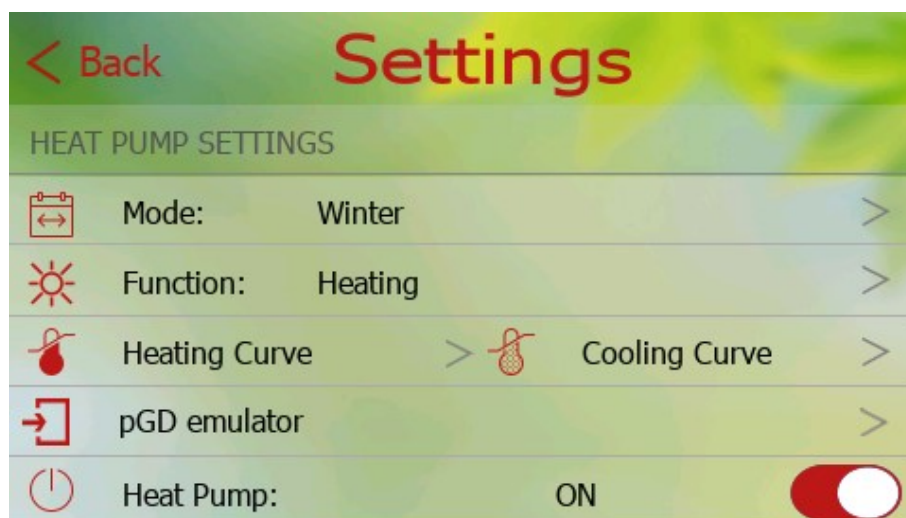


Figure 17 - Settings

### 6.1 Mode

(enter from settings)

Please use this page to set heat pump mode.

If "**Auto**" mode is selected, it is possible to adjust temperatures for automatic mode switching.

To confirm changes, it is necessary to press "**Save**" button at the top right.

In the Summer mode, only sanitary hot water heating is active, or pool heating (if activated).

Cooling can be active in Summer mode (option).

Auto mode automatically switches between Winter and Summer mode according to the set outdoor temperature. The preset temperatures for switching to Winter are below 13 ° C and in Summer above 17 ° C. The mode is then displayed as Auto Summer or Auto Winter.



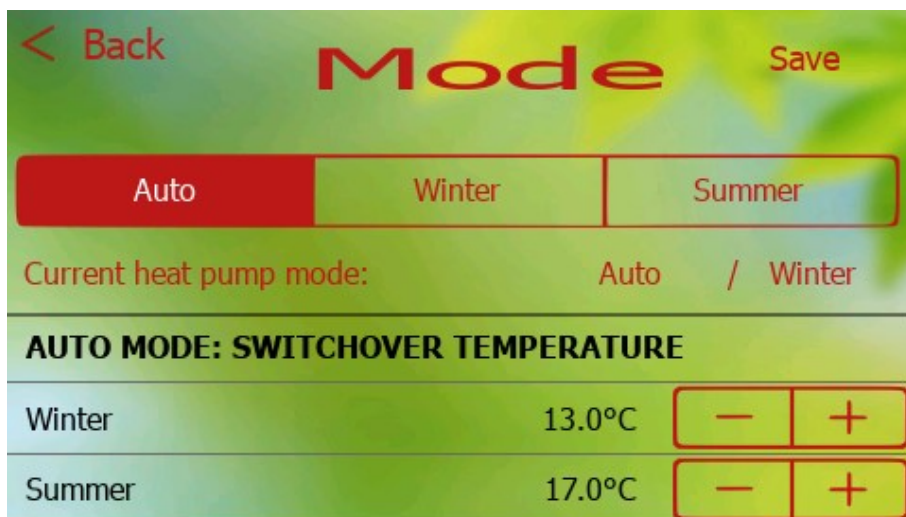


Figure 18 - Mode

## 6.2 Function

(enter from settings)

On this page, you can change function of the heat pump (only if unit is equipped with a cooling function).

To confirm changes, it is necessary to press "Save" button at the top right.



Figure 19 – Function 01

With the **Heating** function, heat pump only allows heating. According to the next setting, the heating and hot water circuits are active.

During **Cooling**, heat pump primarily cools. The cooling circuits are active. DHW and pool heating remains on (if activated).

The **Auto** mode automatically switches between the Heating and Cooling functions according to the outdoor temperature according to the switching between the Winter and Summer modes.

If the unit is switched on, following message is displayed, notifying that the heat pump must be switched off before making the change. Subsequently, it is possible to make the change and turn on the heat pump again.

If the unit is turned on, this screen (below) will appear, prompting us to turn it off.



Figure 20 - Function 02

### 6.3 Heating curve

(enter from settings)

On this page, you can change values of equithermal curve for heating function. Values also change for text fields in image on the right. To confirm changes, it is necessary to press the "Save" button at the top right. The upper part also shows the current outdoor temperature and required water temperature according to curve settings.

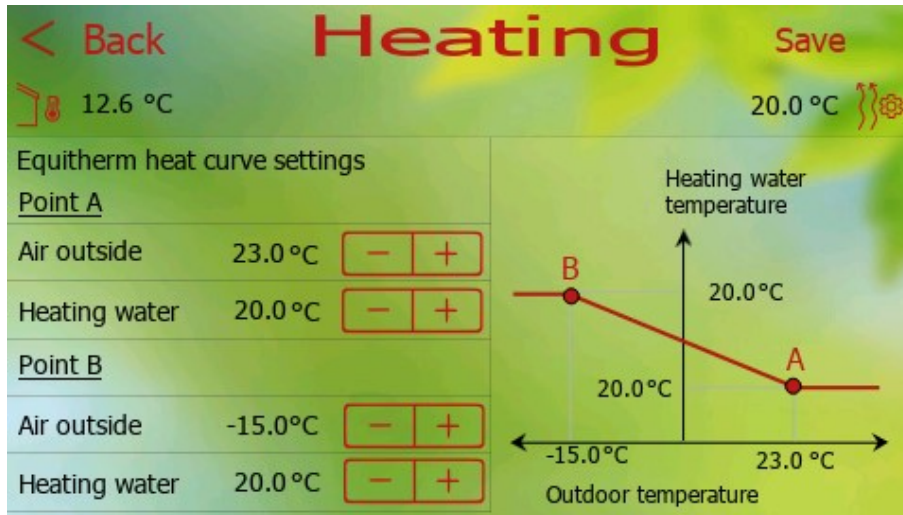


Figure 21 - Heating curve

### 6.4 Cooling curve

(enter from settings)

This page is only available if the unit is equipped with a cooling function. On this page you can change the values of the equithermal curve for the cooling function. The values also change for the text fields in the image on the right. To confirm the changes, it is necessary to press the "Save" button at the top right. The upper part also shows the current outdoor temperature and the required water temperature according to the curve settings.

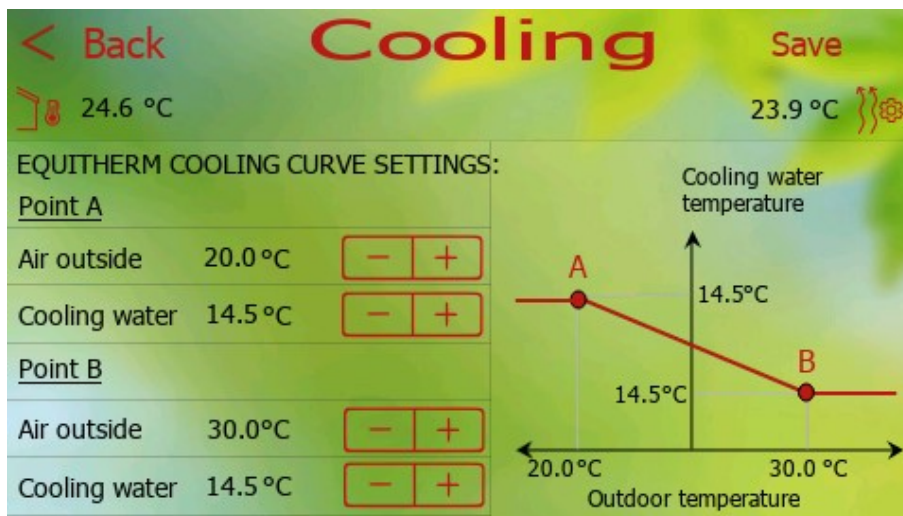


Figure 22 - Cooling curve



## 6.5 pGD Emulator

pGDx supports virtual display of pGD display, which enables service and advanced settings. pGD emulator is application with the same setting possibilities as for classic pGD. Functions at the top are available for pressing / long pressing multiple buttons at once and change of pLAN address.



Figure 23 - pGD emulator

A detailed manual describing all available settings can be found in the documentation supplied with your heat pump:

**FINAL USER'S INSTRUCTION MANUAL - pCO5/pGD DIGITAL CONTROLLER**

## 7 Temperature



Press **TEMPERATURE** button from home screen.

This page allows normal settings of the heating circuits (including circuits equipped with pAD) and the corresponding equithermal curves, main heating circuit (if no other is active or there is room terminal for main heating circuit enabled), pool and solar. The button for selecting required circuit is only displayed if this function is enabled (for example HC 1 = enabled) in primary setting of heat pump. This button is automatically aligned so that there is no empty space between buttons if it is possible. Currently selected heating circuit (or pool / solar system) is highlighted by a red frame.

### 7.1 Heating circuits



If you select a button with this icon information about the currently selected heating circuit is displayed.

Figure 24 –HC icon

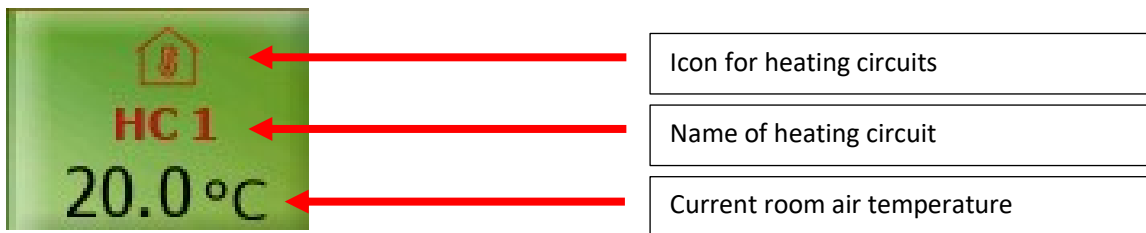


Figure 25 – Description of HC button

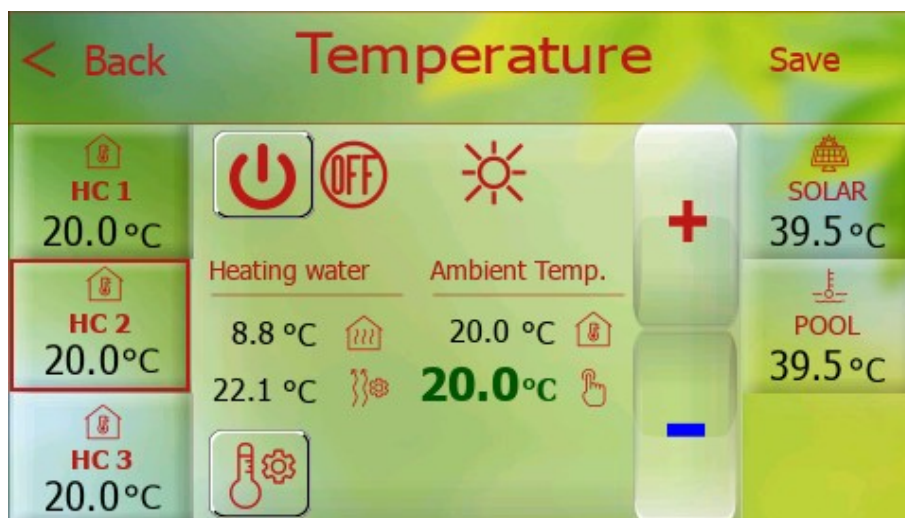


Figure 26 - HC selected

If name of heating circuit is modified in the controller settings, new name is also visible here.

Different objects (icons, buttons, labels ...) are used for different functions (for example. HC1 vs. SOLAR).

Description of the top icon bar

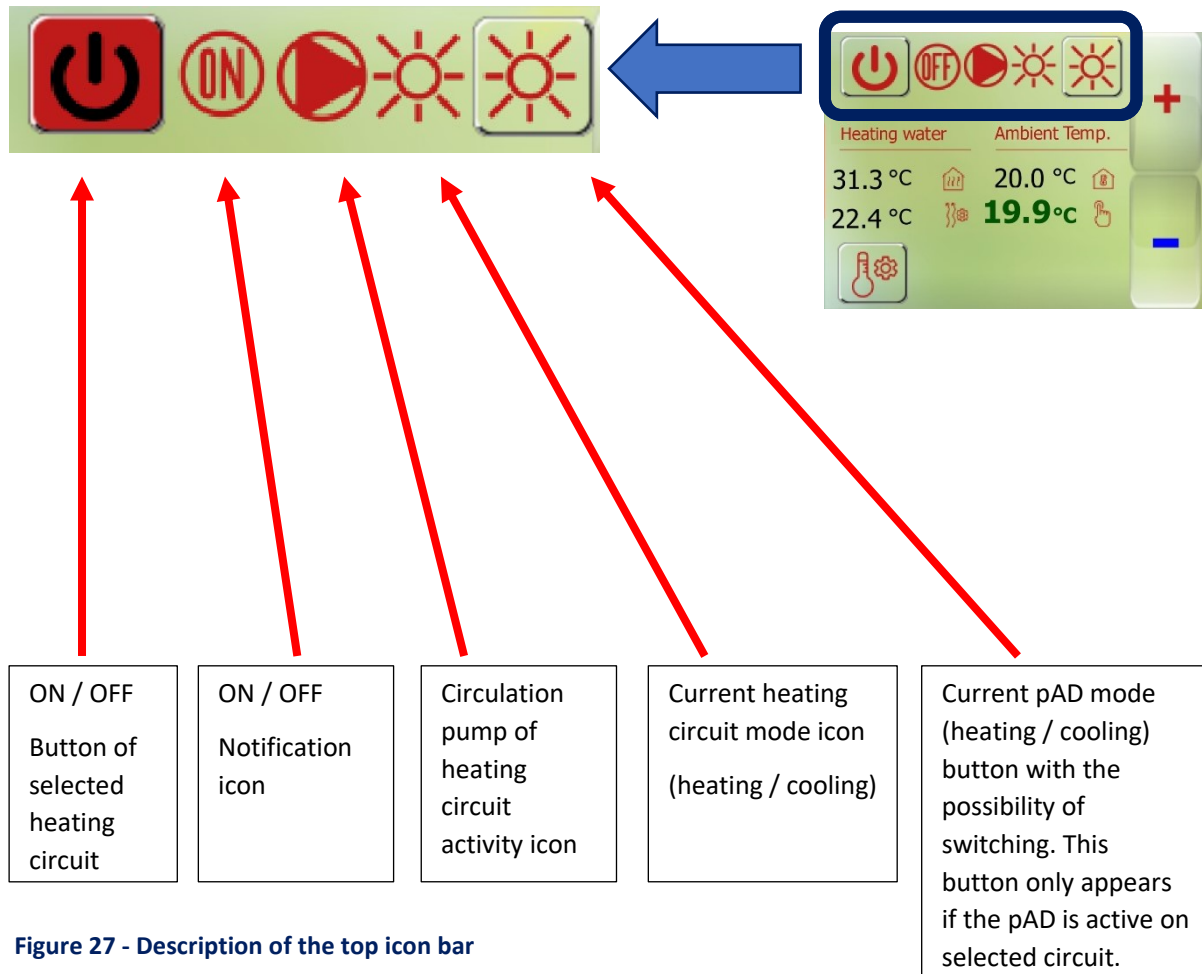


Figure 27 - Description of the top icon bar

How to save changes

After any change of values, the border of "SAVE" button will start flashing in the upper right and it is possible to save changes after press (this will lead to a secure write to heat pump controller).



Figure 28 - How to save changes

Equitherm curve setting for heating circuits

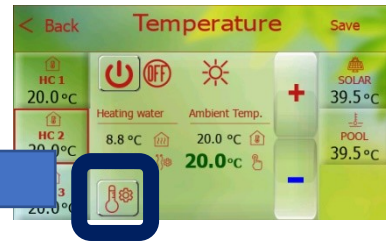


After pressing this button, menu with option to select heating curve or cooling curve (only if cooling function is available) will be expanded



Heating curve

Cooling curve



**Figure 29 - HC eq. curve setting**

Description of icons in the middle of screen



Real heating / cooling water temperature



Requested heating / cooling water temperature



Real ambient air temperature



Required ambient air temperature (can be adjusted using the + / - buttons.)

**Figure 30 - Description of icons in the middle of screen**

7.2 Pool



If "Pool" function is enabled, button with this icon will be displayed.

**Figure 31 - Pool icon**

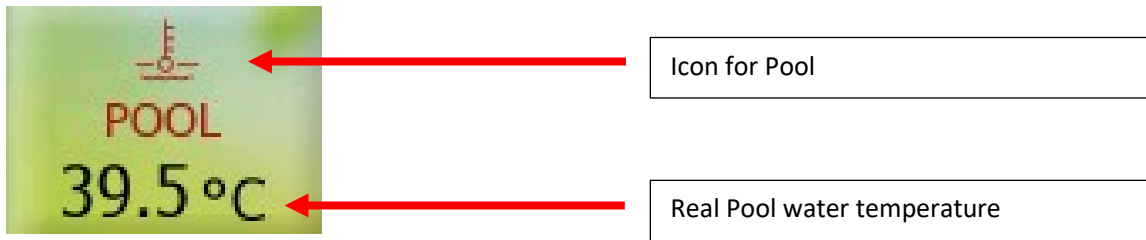


Figure 32 - Description of POOL button

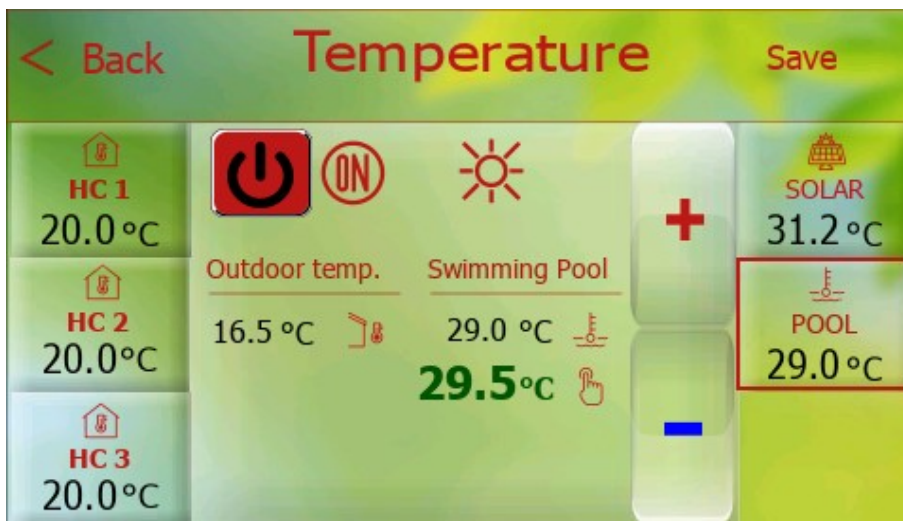


Figure 33 - Pool selected

Description of icons in the middle of screen



Real pool water temperature



Pool water temperature setpoint

Here it is possible to adjust pool water temperature setpoint using the + / - buttons and also to switch the pool heating function on / off

### 7.3 Solar



If "Solar" function is enabled, button with this icon will be displayed.

Figure 34 - Solar icon

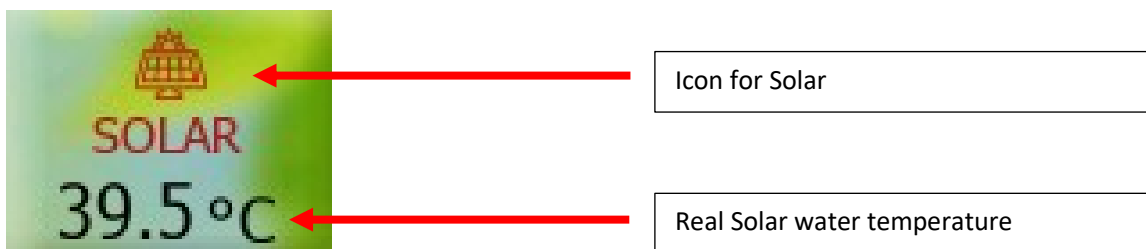


Figure 35 - Description of SOLAR button

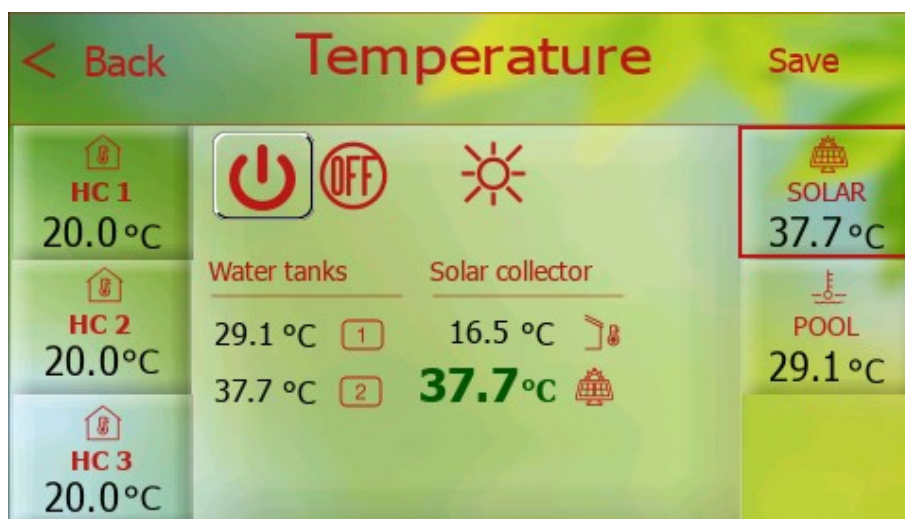


Figure 36 - Solar selected

#### Description of icons in the middle of screen



Real Solar Panel temperature



Real Storage Tank water temperature charged by Solar Thermal system.



Real Storage Tank no.2, or additional demand side water temperature charged by Solar Thermal system. This value is shown only, when Storage Tank no.2 or additional demand side is configured (an example Swimming Pool)

## 8 Sanitary hot water



Press HOT WATER from main screen



Figure 37 - Hot water

This page allows graphical display of SHW values (setpoint, real temperature, ON/OFF state). The lower left and right part (+ / -) is used to set requested temperature.

Setpoint (requested) and real (actual) temperature is graphically displayed on centrally located indicator. In the left part, we can turn ON / OFF SHW function. Values are saved after pressing "SAVE" button.

## 9 pGDx settings



Long press HEAT PUMP from main screen

On this page, it is possible to change basic settings of pGDx device, restart pGDx runtime and enter "Advanced access" section (if you enter password for secure access).

The current SW of the pGDx device (for example SW 1109) is displayed at the top right.





Figure 38 - pGDx settings

### 9.1 Languages

On this page, it is possible to change language.

Currently, graphical user interface (GUI) is available in English, Czech, German and French.

If you are interested in adding other languages or have comments on current translations, please contact us and requirement may be implemented in future SW versions. In this case, we will probably need to help with translation from you.

After selecting language as required, user is redirected to main screen. This completes language change.



Figure 39 - Languages



## 9.2 Date & Time

Here you can change current time zone.

Time zone is used for accurate online time synchronization. This is necessary when transferring data between server and pGDx to verify validity of communication and data.

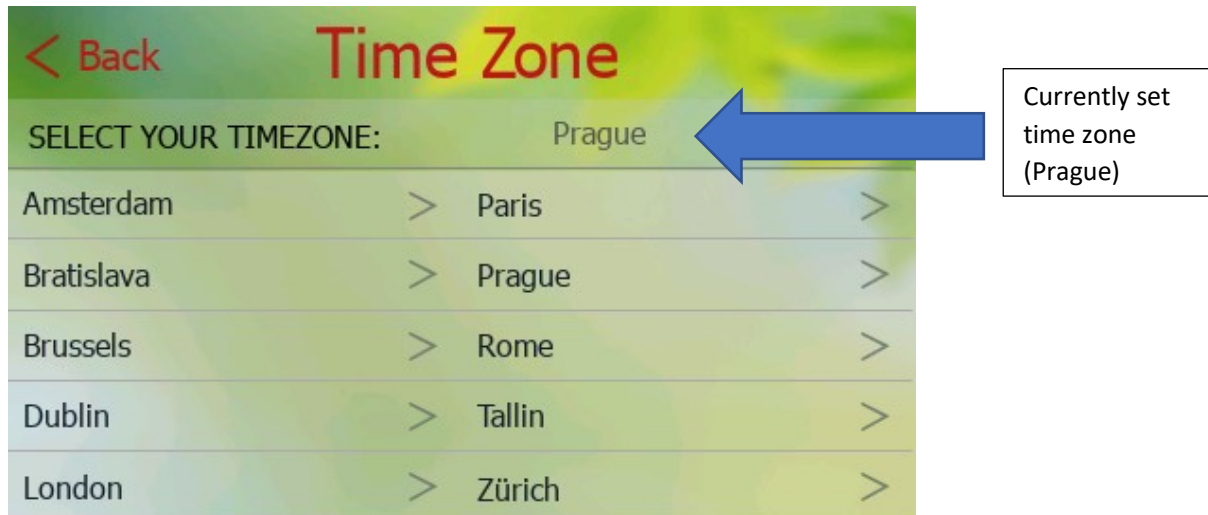


Figure 40 - Time zone

## 9.3 Dark & Light mode

On this page, it is possible to set change of colour composition of whole user interface to "Dark", "Light" or "AUTO" automatically (according to required time) switched mode. Default mode is AUTO.



Figure 41 - AUTO selected



Figure 42 - Dark selected

#### 9.4 Restart pGDx

It allows restart pGDx.

After pressing "Restart pGDx" button, a dialog will be displayed to confirm whether you really want to restart pGDx. If you confirm pGDx will be restarted.



Figure 43 - Restart pGDx

## 9.5 Advanced access

This menu is for advanced service settings for which a certified service company is responsible.



**Figure 44 - Advanced access**

This menu is protected by a service password and settings should only be made by a qualified person, as they may affect the stability of this device.

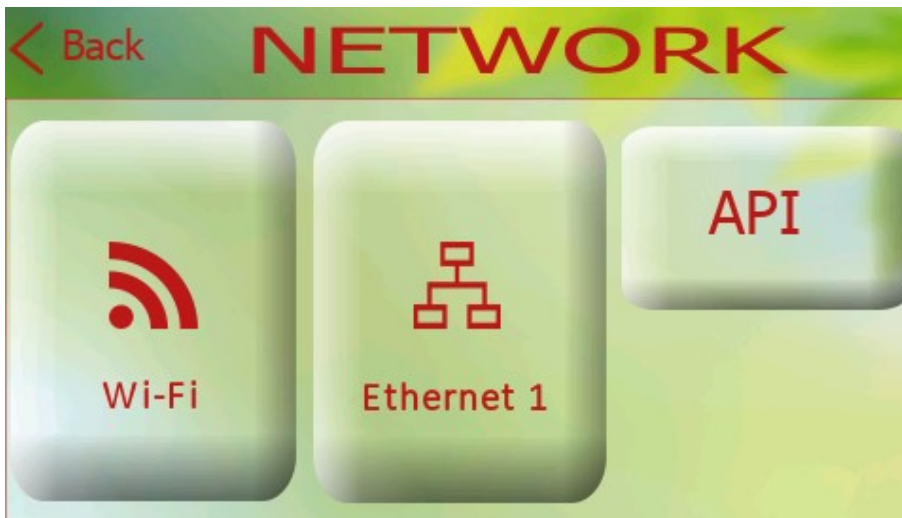
## 10 Network

On this page, it is possible to set up an Internet connection and manage APIs (applications for communication with remote servers).

- This page is accessible from Home screen by pressing one of the connection icons:



**Figure 45 - Icons on main screen to enter this page**



**Figure 46 - Network menu**

As you can see on the screen above, there are three buttons to choose from to enter each submenu:

- **Wi-Fi**  
Wi-Fi basic and / or advanced screen for Wi-Fi network connection is available
- **Ethernet 1**  
Ethernet connection settings
- **API**  
Applications for communication with remote servers such as latest SW updates, Octopus smart grid application (UK), Weather API for remote outdoor temperature according to GPS location. Applications under development or in testing phase...

## 10.1 Wi-Fi connection

On this page, it is possible to connect to a WiFi network.



Figure 47 - WiFi connection

Follow these instructions to connect:

- 1) **Select (press) required WiFi network** to connection from list on right  
(If WiFi network is not displayed, you can use refresh button to refresh WiFi list)
- 2) **Enter password** (press password text field to display graphic keyboard)
- 3) **Press Confirm** and wait until "WiFi state" at the bottom left changes to "**Connected**"

If advanced settings are needed then please press advanced WiFi settings button on the top right. Following screen will be displayed:



Figure 48 - Advanced settings

## 10.2 Ethernet connection

If you are using Internet connection via Ethernet cable and DHCP, just connect eth. cable and everything should work.

On main screen ethernet icon will be displayed:



If you want to configure ethernet connection manually press Ethernet button in Network menu. (after disabling DHCP, it will be possible to enter the parameters manually)

Following screen will be displayed:

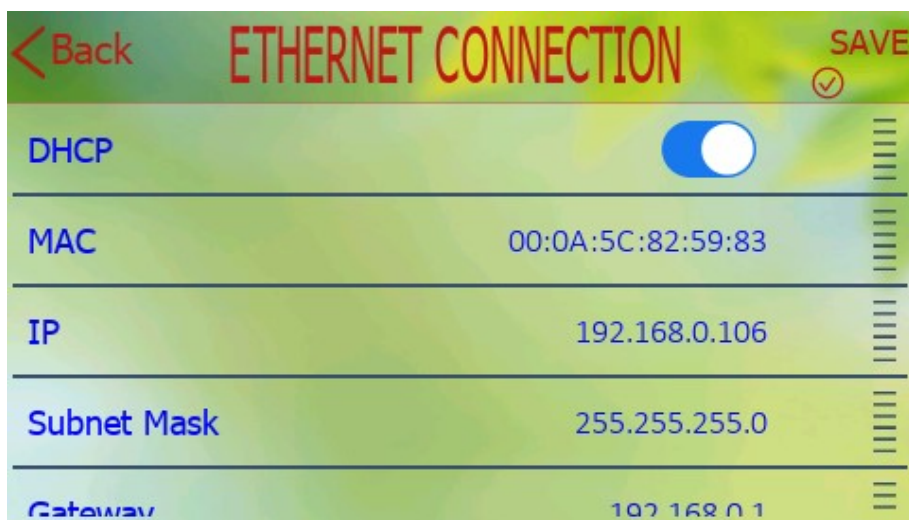


Figure 49 - Ethernet connection

## 10.3 API

Applications for communication with remote servers such as latest SW updates, Octopus smart grid application (UK), Weather API for remote outdoor temperature according to GPS location. Applications under development or in testing phase...

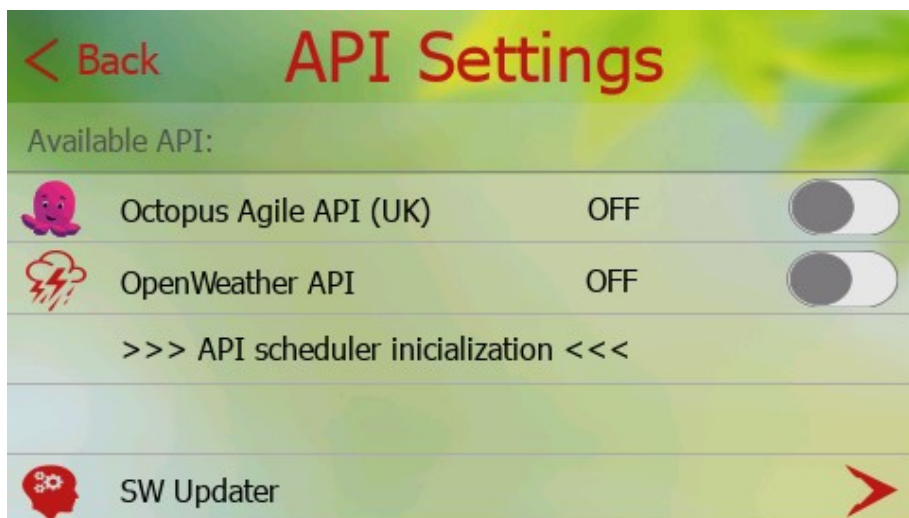


Figure 50 – API settings

On this page, it is possible to enable / disable API (Octopus Agile, OpenWeather) and also to back up user's settings. There is also the option to restore the scheduled startup of allowed APIs in case of problems.



### 10.3.1 Octopus Agile API (UK)

Application is in development phase for testing stability of communication with a remote server. Every day, query is made to remote server and then data (electricity tariff price list) is processed for 30 hours. Data can then be displayed from GUI (price list browsing), current tariff price is displayed on main screen according to time, etc. If function is enabled and data updated, it is possible to see current price of tariff on main screen and after pressing it, go to a more detailed API setting.

API screens are shown below:



Figure 51 - Octopus Agile 01

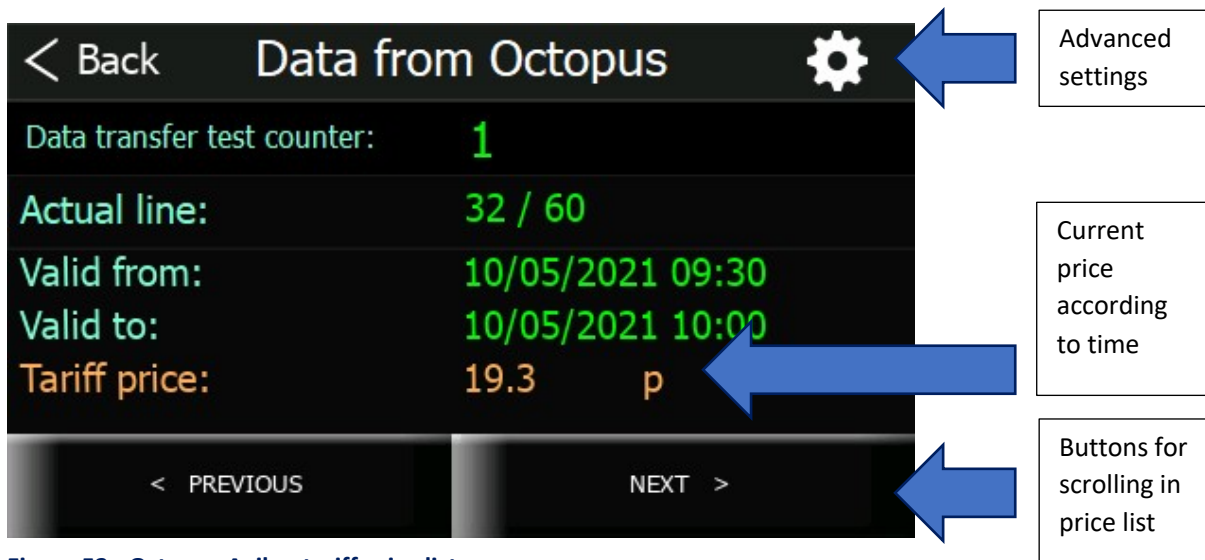
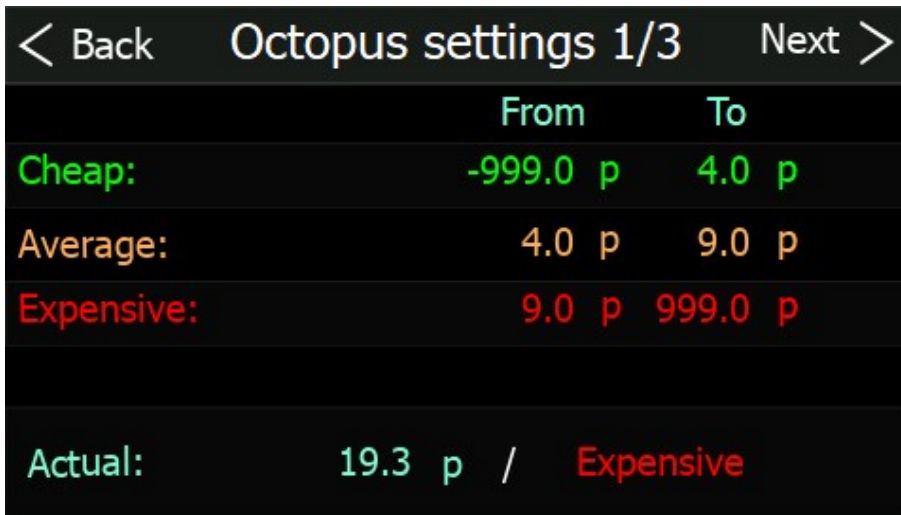


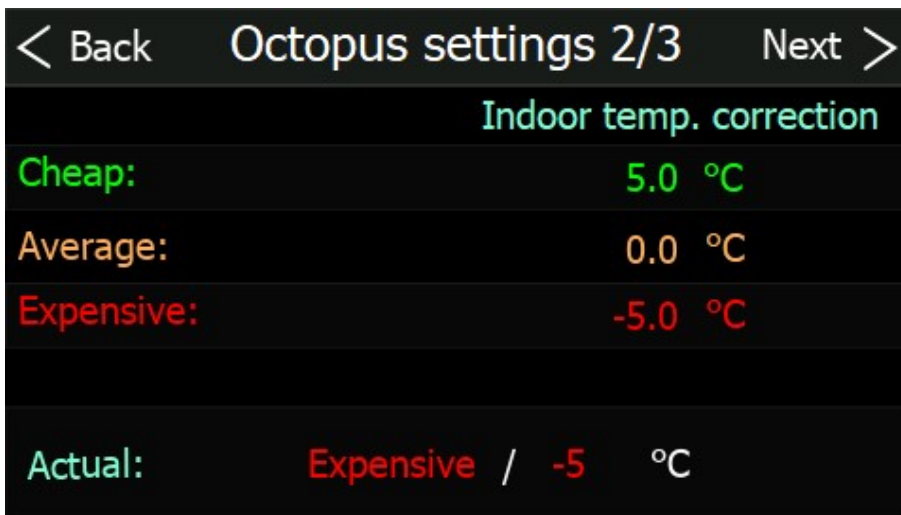
Figure 52 - Octopus Agile - tariff price list

This page provides user with an overview of current, past and future electricity tariff prices using a regularly updated price list. After pressing "Advanced settings" button in the upper right corner of screen, we are redirected to more detailed settings.



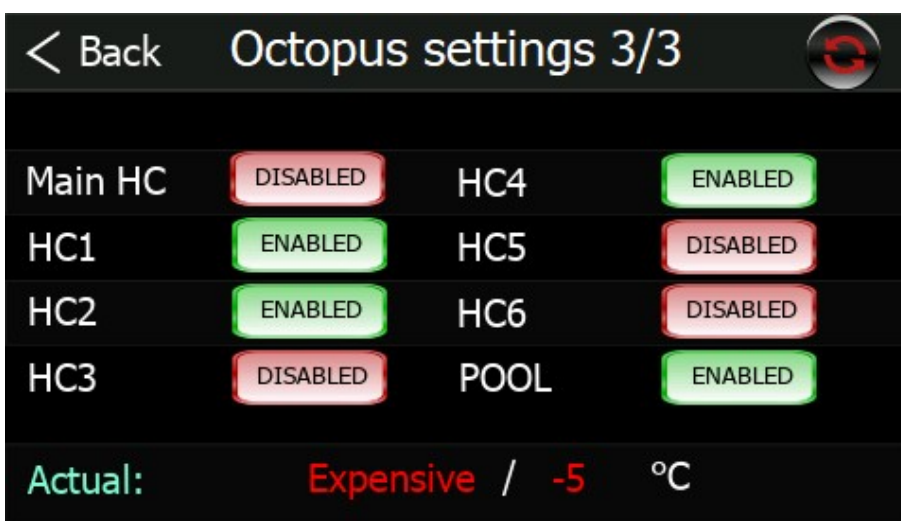
This page is used to identify what price of tariff is expensive, average or cheap according to user's choice. Price ranges can be changed when pressed.

Figure 53 - Octopus Agile - settings 1/3



This page is used to determine air temperature offset according to tariff price. Values can be adjusted as required. Offsets have not yet been transferred to the controller - comments from testing are needed before SW development is finalized.

Figure 54 - Octopus Agile - settings 2/3



Here it will be possible to choose which heating circuits will be enabled for this function (after SW development).

Figure 55 - Octopus Agile - settings 3/3



### 10.3.2 OpenWeather API

This API queries outdoor temperature information from openweathermap.org according to the entered GPS coordinates and user key obtained from the server during registration. A default key from MasterTherm should be entered in each device (it can be changed if necessary). After enabling this function, outdoor air temperature value will be retrieved periodically (every hour) from server and transmitted to HP controller. After enabling this function, it is possible to go to more detailed setting by pressing outdoor temperature value on main screen as shown in the screen below.

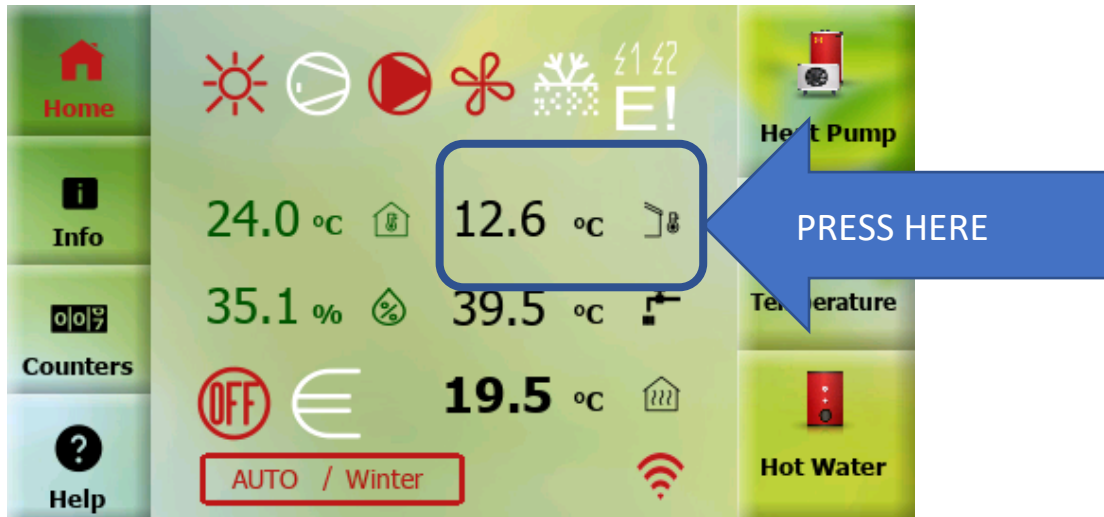
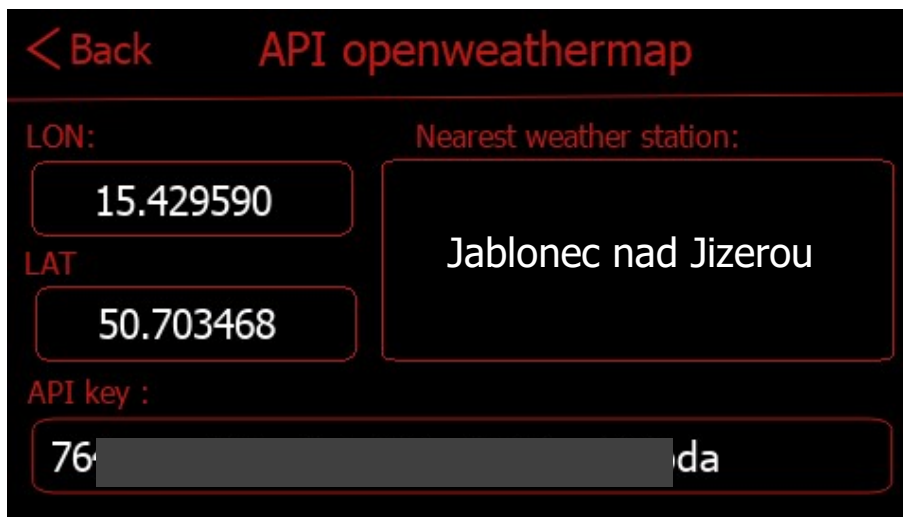


Figure 56 - OpenWeather – main screen

Following screen will be displayed:



Please enter GPS coordinates (LON, LAT) in **same format WITH SIX DECIMAL PLACES!!!**

After the first temperature update from server, location will be displayed here according to entered GPS coordinates (Nearest weather station).

Figure 57 - OpenWeather - settings

### 10.3.3 SW Updater

Due to possibility of SW Update to a newer version it is possible to include new features and improvements in the future. pGDx periodically asks Cloud server if a newer SW version is available. If so, it will automatically start download, check downloaded package and offer SW upgrade to end-user (it is also possible to perform a forced upgrade - for example, if it is a security update necessary for proper functioning of device, etc.). Installation takes about 1-2 minutes.

When SW update is ready, following icon will appear in notification area of main screen.

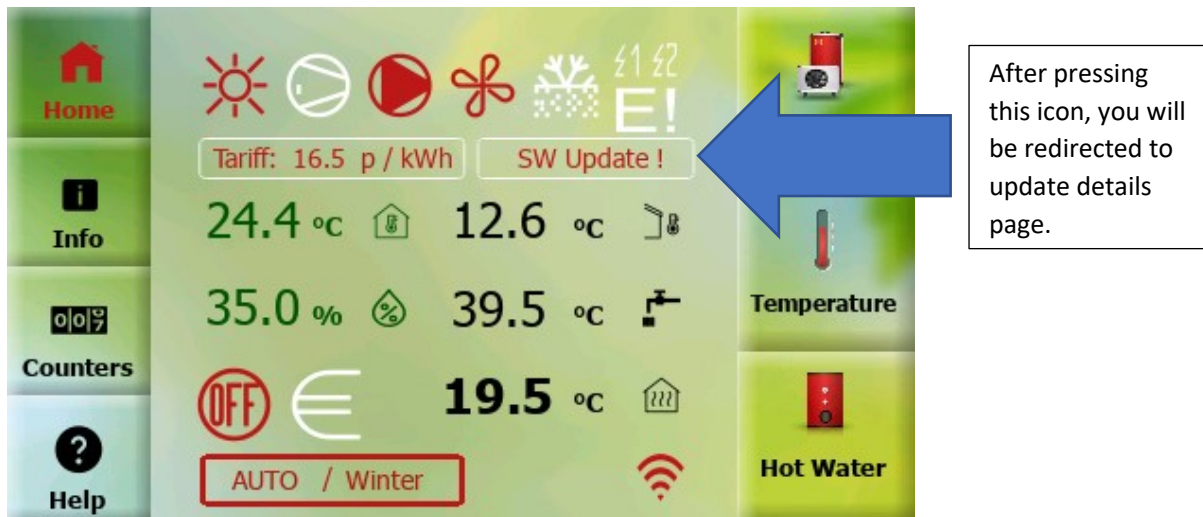


Figure 58 - SW Updater - main screen

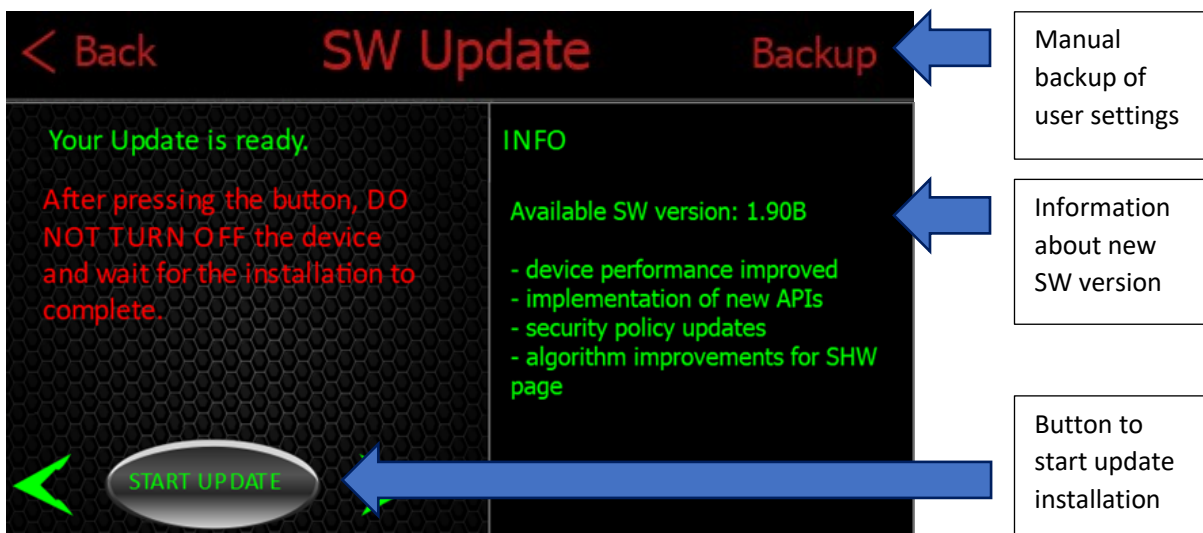


Figure 59 - SW Updater - Update

User data are backed up automatically after pressing "START UPDATE" button. Of course, manual backup can also be performed. SW Update is performed automatically after pressing button and after upgrade system will return to main screen.

In case of problems during this process (eg: power failure of pGDx) system will start with the last known functional SW version before this upgrade.



