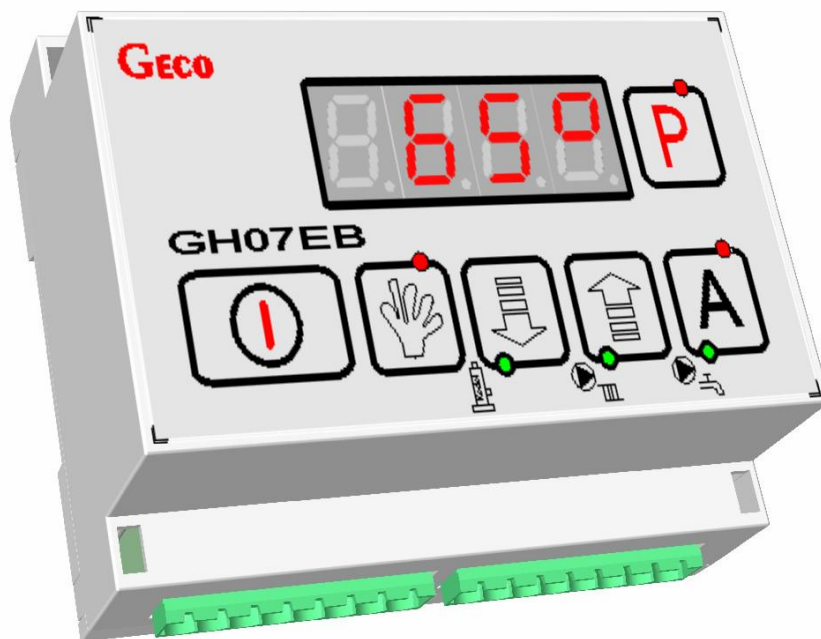


The GECO logo is displayed in white text on a red rectangular background.

Heating controller GH07EB For electrode (ion) boilers User manual

Attention

We strongly recommend that you familiarise yourself fully with the contents of this manual before installing and using any of our devices. If you have any questions, please contact us between 08:00 and 16:00. At the bottom of every page is the date of latest publication. Please always use the latest version of the instructions, which you can obtain, post free, upon request.

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1. Description of controller.

The GH07EB controller is a device used to control water heating installations using electrode furnaces. The GH07EB controller is a microprocessor-based device manufactured using Surface Mount Technology (SMT).

This controller controls the domestic hot water (DHW circuit), and provides support for the main heating circuit (CO). Control parameters can be adjusted to match operating conditions and boiler power. The controller is equipped with a protection system against power failure and different kinds of interference. With a one-piece housing, the controller can be installed in a safe place.

The driver provides support for automatic installation of three different heating programmes that fully meet the requirements of the installer. The device is equipped with a total of three temperature sensor inputs, an additional input for the room thermostat and the GECO GA01HC room panel, and three outputs for external devices.

The GH07EB controller is equipped with:

- Inputs:

1. Returning temperature sensor (NTC 2.2k)
2. Output temperature sensor/Room sensor (NTC 2.2k)
3. DHW temperature sensor (NTC 2.2k)
4. Room thermostat
5. GECO GA01HC room panel

- Outputs:

1. Central heating (CH) pump
2. DHW pump
3. Electrode boiler

2. Technical details.

Power supply	230V ~ +10% -15%
Operating temperature	od +5°C do +40°C
Humidity	od 20% do 80% RH
Sensor type	NTC 2.2kΩ
Temperature sensor operating range	NTC: 0°C÷100°C

Output	Maximum continuous load	
DHW pump	1A	250W
CH pump	1A	250W
Electrode boiler	1A	250W

Resistance characteristics of NTC sensor	
Temp. °C	Resistance Ω
0	7174.89
10	4374.83
20	2747.10
30	1774.91
40	1172.09
50	795.08
60	547.95
70	384.62
80	275.86
90	202.37
100	149.16

3. Requirements for electrical installation

Warning

Only a person with a valid licence to carry out electrical installation work can install the controller wiring and connected devices. It is recommended that the work is carried out by a qualified installation engineer. The following are the basic requirements for the electrical power supply for this particular controller:

1. Repairs, maintenance and other work on the system can be carried out only after disconnecting the main power supply.
2. The room in which the controller is to be installed should be equipped with 230V/50Hz electrical system in accordance with the applicable regulations.
3. The controller should be supplied from a dedicated circuit 230VAC/50Hz grid, protected by a circuit breaker.
4. The controller power cable should have a cross section minimum mechanical strength of 2.5 [mm²]
5. The cable must be protected from mechanical damage, by keeping it in a duct or housing

4. Graphic and text description of controller installation

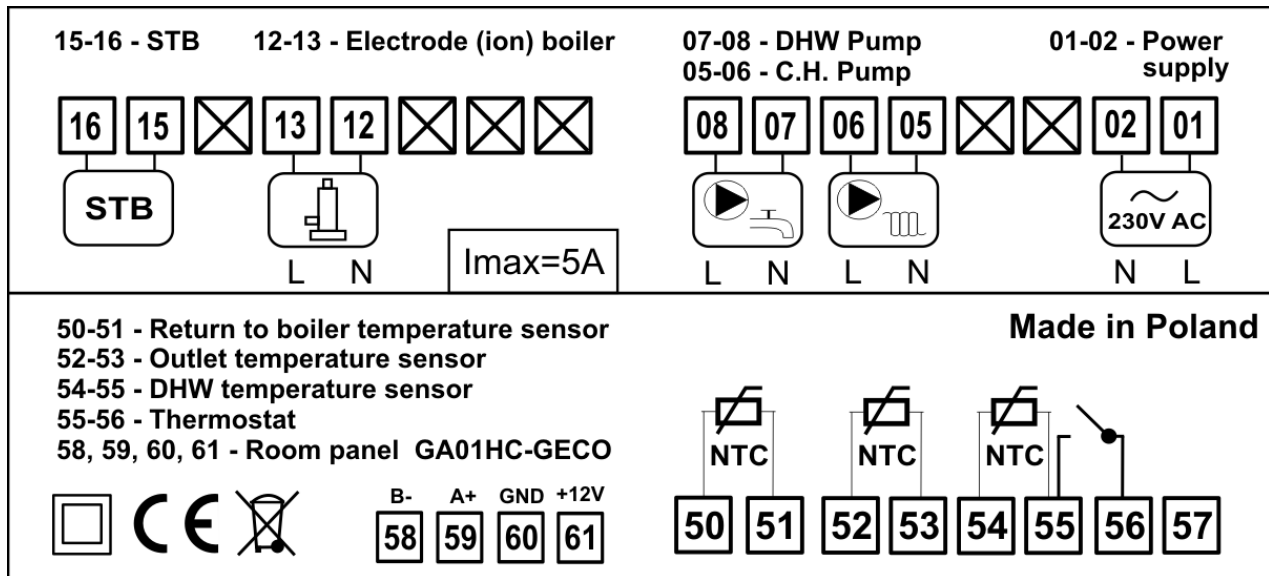
When the cable has been prepared, you will be ready to connect the power to the controller and temperature sensors, thermostats and other devices:

- The 230 V power supply should be connected to the controller using the terminals marked “L” and “N”.
- The NTC 2.2k temperature sensor must be connected to the inputs in accordance with the instructions set out in the tables in section 8, System Installation, according to the selected installation. Please note that the number of sensors supported depends on the type of installation, and unused sensors do not have to be connected to inputs.
- The room thermostat and room panel must be connected to separate inputs, as described.
- Technological equipment (pumps/boiler) should be connected to the outputs, as described in the tables in section 8, System Installation and according to the selected installation.

Descriptions of input parameters are shown in the following tables:

Description of controller inputs – temperature sensors		
Temperature sensor	Type of input	Controller designation
Water returning to the boiler	NTC2.2k	50-51
Water leaving the boiler/Room sensor	NTC2.2k	52-53
DHW	NTC2.2k	54-55
Description of controller inputs – room thermostat		
Type of room thermostat	Type of input	Controller designation
GECO-GA01HC room panel dedicated for GH07EB	RS485	58-59-60-61
Standard thermostat	Relay	55-56
Description of controller outputs – technological equipment		
Installed equipment	Type of output	Controller designation
Electrode boiler	Relay	12-13
CH pump	Relay	05-06
DHW pump	Relay	07-08

Schematic diagram for controller installation:



ONLY A QUALIFIED WIRING TECHNICIAN MAY
CONNECT DEVICES TO THE GH07EB CONTROLLER

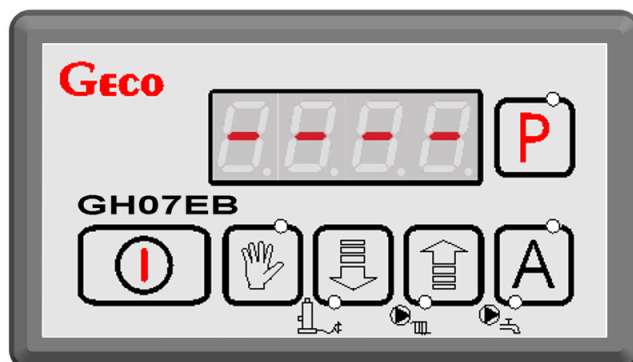
5. Controller modes



This controller can operate in four modes:

- **Standby** – the controller returns to the state it was in before the loss of power supply. The control algorithm is not implemented, and the previous settings and chosen installation are stored.
- **Automatic** – The controller algorithm for the selected installation is implemented.
- **Manual** – This mode is only used for validating whether individual attached devices are on/off, so remember to return to automatic mode when testing is complete.
- **Alarm** – an alarm prevents further operation of the system. When the fault is corrected, the controller returns to the state it was in before the alarm. If the alarm is AL12 (overheating boiler) and the temperature falls below a value of F17 - 4°C, the controller returns to automatic operation.

5.1. Standby mode.

After installation as described in the previous chapter, the GH07EB controller goes into standby mode. In this mode the screen displays four lit dashes.

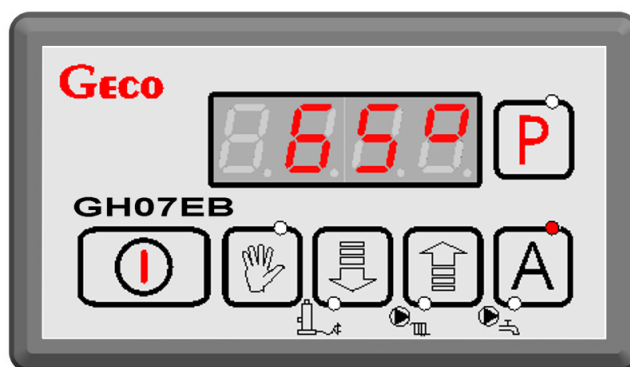



When the controller is in standby mode, it is possible to go to manual mode using button . During normal operation the controller can at any time be put into standby mode by pressing .

In standby mode, all outputs are disabled and the alarm signal sounds. When the controller is put into automatic mode, the screen displays the returning to boiler temperature.

5.2. Automatic mode.

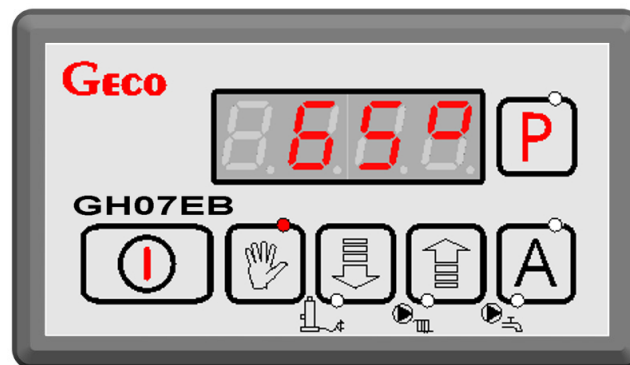
In automatic mode, the controller initialises the algorithm for the selected heating programme. The main screen displays the heating system temperature




When the controller is operating in automatic mode, this is indicated by a green light in the top part of the button .

5.3. Manual mode.

In manual mode, the controller does not activate the algorithm, and the number and type of attached devices are dependent on the user, who takes responsibility for the correct operation of the equipment. The system temperature is displayed on the main screen.



On entering manual mode, all connected devices are stopped automatically. When the controller is operating in manual mode, this is indicated by a red light in the top part of the button .

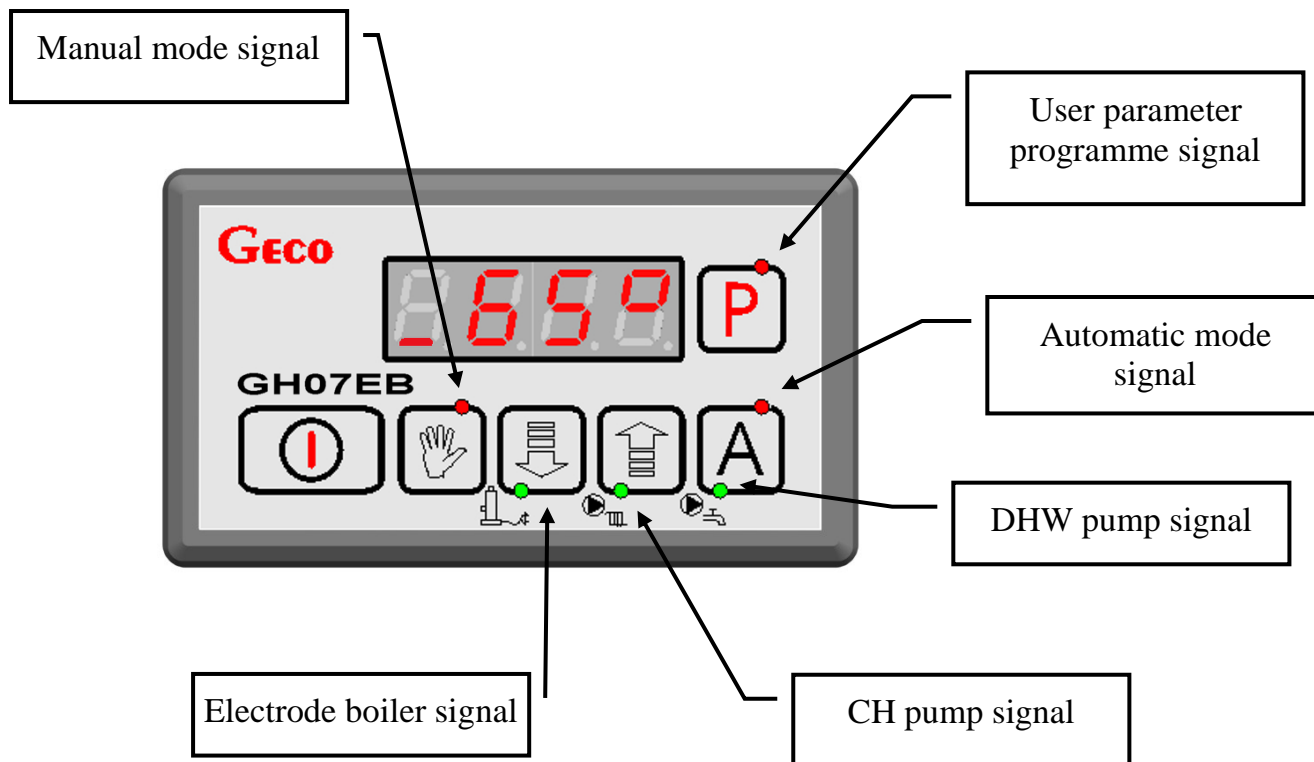
5.4. Alarm mode.

The controller will go into alarm mode when one of the sensors fails, the cable is broken or a sensor is disconnected - in which case the controller will indicate that such a sensor is required. During an alarm, all pumps are switched off (with the exception of the boiler overheating alarm AL6). When the fault is repaired the controller returns to the mode it was in before. The controller will not go to alarm mode when a sensor fault is repaired. Any changes to components should be performed while power to the controller is disconnected. The controller exits alarm mode automatically when the alarm is AL12 (overheating of the boiler) and the outlet temperature drops below the 'F17' value - 4 °C.

6. Operating the controller


This chapter describes how to use the controller: turning it on, using the keyboard, previewing system operation measurements using LEDs on the display, and editing the parameters customisable by the user.


6.1. Controller fascia panel.



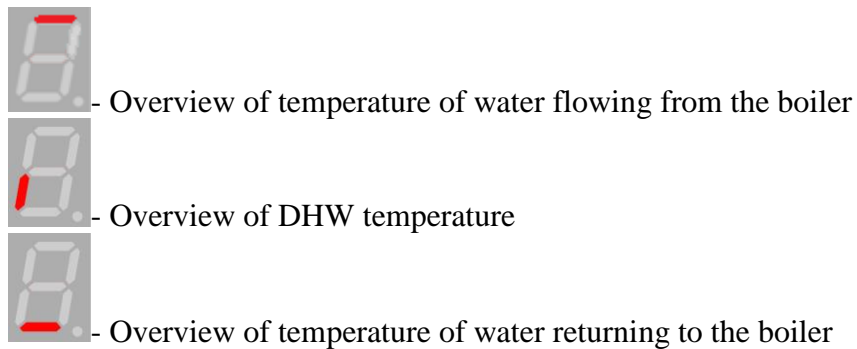
Button	Description	action
	Controller on/off	Temperature is shown on the main screen
	This button is used in automatic mode to switch to manual mode	All devices are turned off. Manual mode is indicated by an LED
	Lower parameter value	Parameter value is lowered by one step
	Raise parameter value The temperature is displayed on the main screen	Value is raised by one step. The screen displays one of three available temperatures
	This button is used in manual mode to switch to automatic mode	Automatic mode is indicated by an LED. The controller algorithm is activated
	Function button allowing the user to edit controller parameters	The display shows the individual parameters for customisation

6.2. Overview of temperature settings


On pressing button  the display shows the temperature of the water returning to the boiler. It is also possible to see the temperature of the water flowing from the boiler. Previewing DHW temperature is possible, providing additional hot water pumping is activated (⇒ Service Parameters p.13).










Viewing all temperatures is possible both in automatic and manual modes. To switch the temperature shown on the screen, press the button  on the panel. Press the button again to view the next temperature.

Preview of a specific temperature is signalled in the first segment of the display. Individual lines are illuminated on the display, to indicate the type of temperature shown – returning to the boiler, flowing from the boiler, and DHW temperature. See figure below:



6.3. Manual mode – connected devices.

Pressing the button  switches from automatic mode to manual mode. The controller immediately stops the boiler and the pump. In this mode, the user can start and stop the electrode boiler, DHW pump and CH pump, manually and independently of each other. To do so, follow the steps below:

Controller operating in manual mode		
 and 	 and 	 and 
<p>Electrode boiler</p> <p>Green LED is lit at the bottom of button .</p> <p>Pressing the button switches off the boiler and extinguishes the light</p>	<p>CH pump</p> <p>Green LED is lit at the bottom of the button .</p> <p>Pressing the button switches off the pump and extinguishes the light</p>	<p>DHW pump</p> <p>Green LED is lit at the bottom of button .</p> <p>Pressing the button switches off the pump and extinguishes the light</p>



The hot water pump is only accessible if it has been selected for use in the service parameters (⇒ Ch.13, P.21)



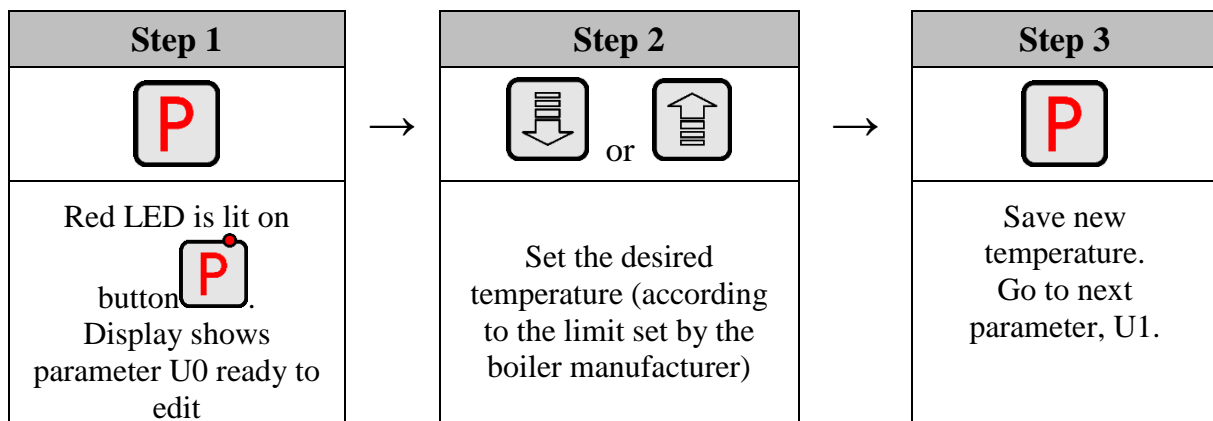
When in manual mode the controller can work for a limited time with the electrode boiler and pump turned off, to protect against the risk of boiler temperature rising.


6.4. Edit user parameters.

The user can set six parameters:




Parameter	Description of parameter	Factory setting
U0	User-designated output temperature	60°C
U1	User-designated return temperature	50°C
U7	User-designated DHW temperature	40°C
U8	DHW priority (0 – off, 1 – on)	0
U9	Summer mode (0 – off, 1 – on)	0
U10	Anti-legionella function (0 – off, 1 – on)	0

The user can change boiler parameters by following the steps below



Exit parameter customisation after changing a setting using the button , going through all parameter settings to the main screen. Alternatively, wait 30 seconds and the controller will return automatically to the main screen. Returning automatically means the last edited parameter will not be saved.



If when setting a new parameter, one of the buttons , , , is not pressed within 30 seconds, the new temperature will not be saved and the controller will return to the programmed mode.

7. Description of additional functions

7.1. DHW priority

The GH07EB controller allows DHW to be set as priority mode. In this mode of operation, heating hot water becomes priority and CH takes a secondary position. This is available only in the second heating configuration. To enable, set the value „1” in user parameter **U8**.

7.2. Summer mode.

The GH07EB controller is equipped with a summer mode, turning off the heating in the summer and using the boiler only to heat water. This function requires an installation supporting the DHW pump. This is available only in the second heating configuration. To enable, set the value „1” in parameter **U9**.

7.3. Anti-legionella function

The controller is equipped with an anti-legionella function, intended to limit the growth of bacteria of the genus legionella pneumophila in domestic hot water.

Legionella bacteria develop in aqueous environments, and the optimum temperature for their growth is from 38-42 C. These bacteria also contribute to blockages in hot water systems, hot water heaters and tanks. Legionella bacteria cause a non-specific variant of pneumonia known as Legionnaires' disease, or legionellosis. Legionellosis has been officially recognised by the Ministry of Health as an infectious disease.

The anti-legionella function performed by the GH07EB controller creates unfavourable living conditions for legionella bacteria, in the domestic hot water tank.

To enable, set the value „1” in parameter **U10**.

When this function is enabled, and for the duration of its operation, a flashing letter ‘L’ will appear on the left side of the display, before the temperature display.



- Signals that the anti-legionella function is active.

This function is available only in the second heating configuration.

The anti-legionella function takes priority over all others, meaning that it is performed by the controller first. When this function is enabled, the temperature of the water in the boiler is raised to 70°C and this temperature is maintained for ten minutes.

The controller reports an anti-legionella function error if, within 240 minutes of the function being activated, the temperature in the hot water tank does not reach 70 ° C. The following error message appears on the display.



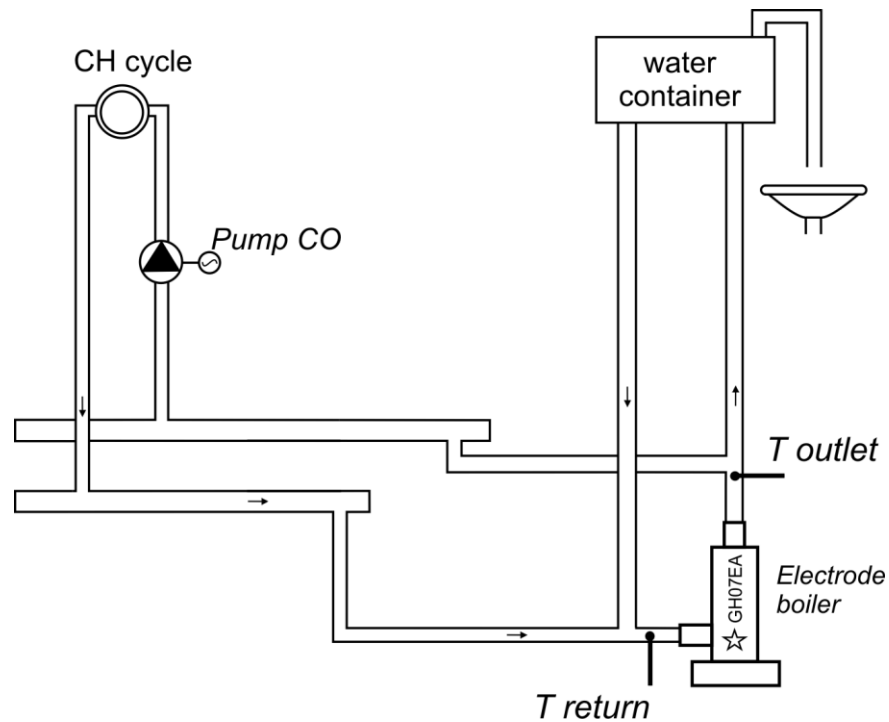
- Signals anti-legionella function error



Activating the anti-legionella function raises the water temperature to 70 ° C. Use hot water with extreme caution, as this may result in scalding.

8. Operating system installations.

8.1 Heating installation nr 1

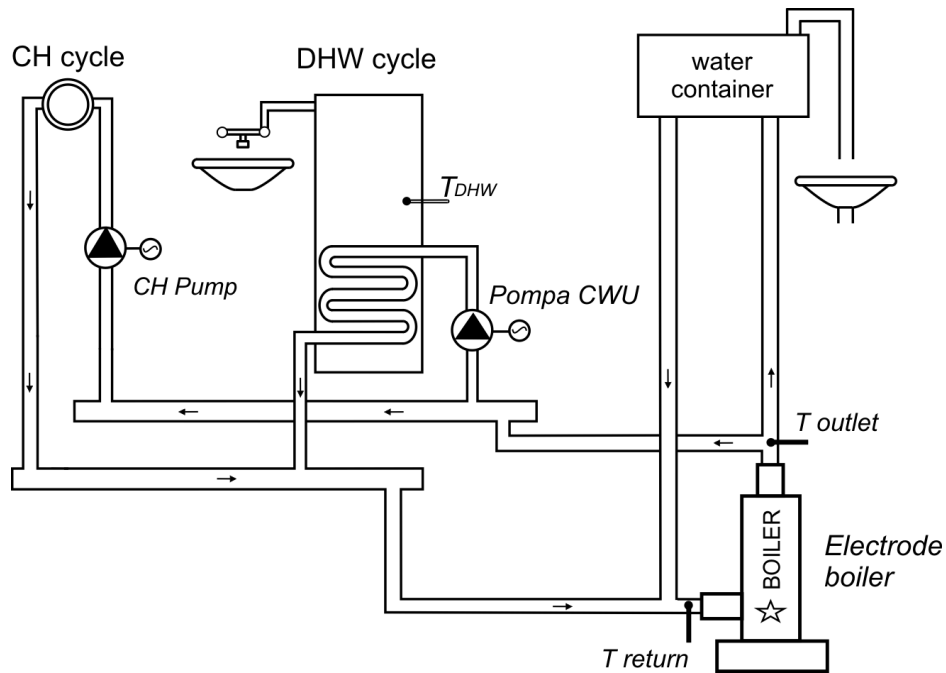


The following is a list specifying the parameters available to the user, and the assignment of outputs to attached devices and inputs for temperature sensors.

Installation nr 1 - Parameters available to the user		
Parameter	Range	Factory setting
U0	30 (F03) ÷ 85 (F04)	60°C
U1	25 ÷ 85	50°C

Installation nr 1 - Assignment of controller outputs	
Output	Connected device
12-13	Electrode boiler
05-06	CH pump
07-08	---
Installation nr 1 - Assignment of inputs	
Input	Description
50-51	Temperature sensor - water returning to boiler
52-53	Temperature sensor - water flowing from boiler/Room temperature
54-55	---
55-56	Room temperature
58-59-60-61	GA01HC - GECO room panel dedicated for GH07EB

8.2 Heating installation nr 2

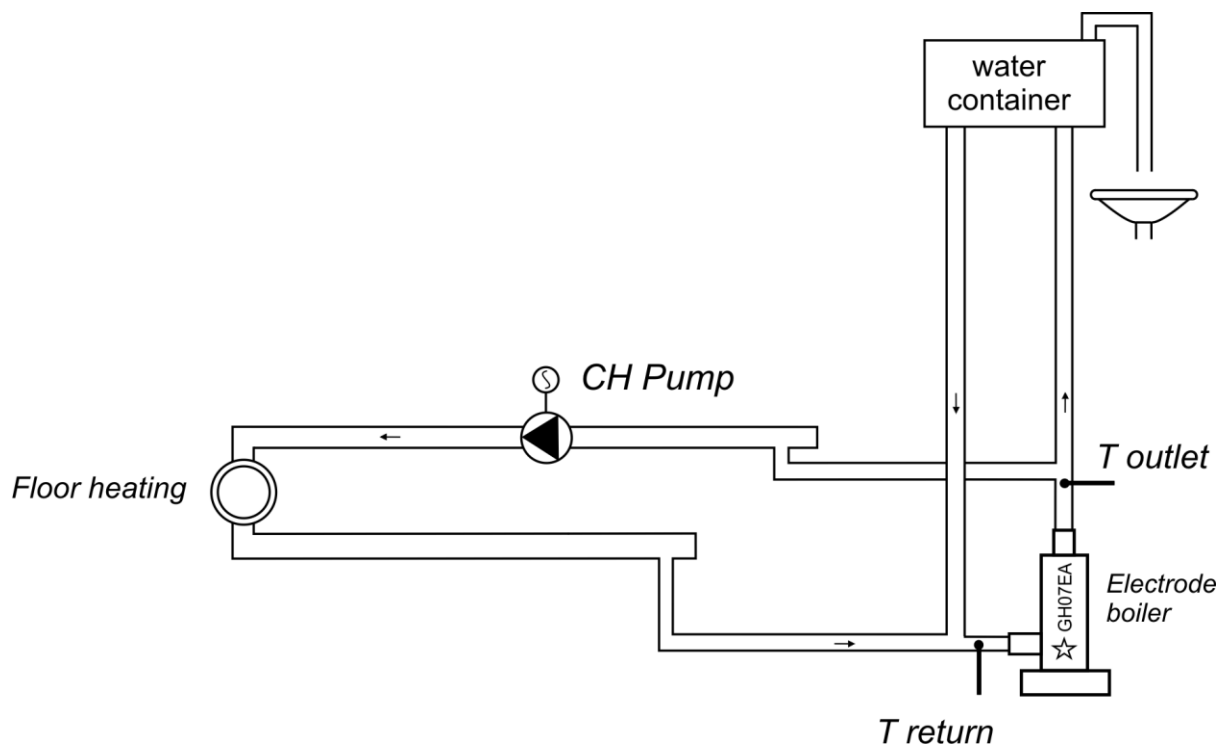


The following is a list specifying the parameters available to the user, and the assignment of outputs to attached devices and inputs for temperature sensors.

Installation nr 2 - Parameters available to the user		
Parameter	Range	Factory setting
U0	30 (F03) ÷ 85 (F04)	60°C
U1	25 ÷ 85	50°C
U7	5 ÷ 65	40°C
U8	0 ÷ 1	0
U9	0 ÷ 1	0
U10	0 ÷ 1	0

Installation nr 2 - Assignment of controller outputs	
Output	Connected device
12-13	Electrode boiler
05-06	CH pump
07-08	DHW pump
Installation nr 2 - Assignment of inputs	
Input	Description
50-51	Temperature sensor - water returning to boiler
52-53	Temperature sensor - water flowing from boiler/Room temperature
54-55	DHW temperature sensor
55-56	Room thermostat
58-59-60-61	GA01HC - GECO room panel dedicated for GH07EB

8.3 Heating installation nr 3




The following is a list specifying the parameters available to the user, and the assignment of outputs to attached devices and inputs for temperature sensors.

Installation nr 3 - Parameters available to the user		
Parameter	Range	Factory setting
U0	25 ÷ 35	35°C
U1	25 ÷ 85	50°C

Installation nr 3 - Assignment of controller outputs	
Output	Connected device
12-13	Electrode boiler
05-06	CH pump
07-08	---
Installation nr 3 - Assignment of inputs	
Wejście	Description
50-51	Temperature sensor - water returning to boiler
52-53	Temperature sensor - water flowing from boiler/Room temperature
54-55	---
55-56	Room thermostat
58-59-60-61	GA01HC - GECO room panel dedicated for GH07EB

9. Alarms.

The controller distinguishes four alarms. For each alarm, a number is displayed, and an audible signal sounds. In the case of simultaneous occurrence of several alarms, their numbers are displayed cyclically. Exiting the alarm mode is only possible by pressing . The exception is alarm AL12 (overheating boiler) in which case the boiler automatically exits alarm mode when the temperature falls below the value 'F17' - 4°C.

Types of alarm:

- **AL2** → Damage to the sensor for water temperature leaving the boiler
- **AL3** → Damage to the sensor for water temperature returning to the boiler
- **AL4** → Damage to the DHW temperature sensor
- **AL12** → Overheating boiler

When the controller reports a sensor alarm, check that the sensors are properly installed and connected only after disconnecting the controller from the power supply.

10. Temperature limiter (STB).

An additional independent temperature limiter (STB) can be connected to the GH07EB controller, via terminals 15-16 (⇒ p.6). This provides additional mechanical protection against excessive temperature rises in the heating system. If the temperature limiter disconnects the contacts due to rising temperature from the boiler, disconnect the electrode boiler from the power supply.

The use of a limiter is an optional extra. When a temperature limiter is not used, terminals 15-16 must not be used!

Return to normal operation occurs when the temperature drops to a value that allows the further work of the heating system.

Some models of temperature limiters require manual reset before they are ready for operation.



Liquid in the temperature limiter indicates a breakage or breach of the capillary indicates a leakage, causing the limiter to malfunction.

In this case, remove the temperature limiter from the controller, and install a new device.

11. Power failure.

After a power failure, the controller will start operations according to the state it was in before the power failure. The controller will wait for one minute to allow the power supply to stabilise, and will then continue to operate according to pre-programmed parameter values. While waiting, the display shows the time in seconds remaining until operations with pre-programmed parameter values begin again.

12. Room thermostat.

12.1 GA01HC room panel.


The GH07EB controller is designed for full communication with the GECO GA01HC room panel, which allows monitoring of the boiler from the comfort of your apartment.

Connecting the GH07EB controller to the GA01HC room panel allows:

- Changing the boiler output temperature
- Changing the temperature of water returning to the boiler
- Changing the DHW temperature
- Display of all alarms in text form
- Overview of boiler operations
- Overview of operations of connected devices (electrode boiler, CH pump, DHW pump)
- Overview of all temperature measurements



Correct connection with the controller is signalled by a lit LED behind the  icon on the GA01HC room panel

If the GH07EB electrode boiler controller is connected to the GA01HC-01 room panel, this will be detected automatically by the controller and activation does not require any additional steps or settings from the user. Once connected, the boiler controller operates according to the room panel settings. Disconnection or damage to the cable connecting the panel and the controller will result in the light behind the icon  on the GA01HC room panel going out.

In order to connect the GH07EB controller to the GA01HC room panel:

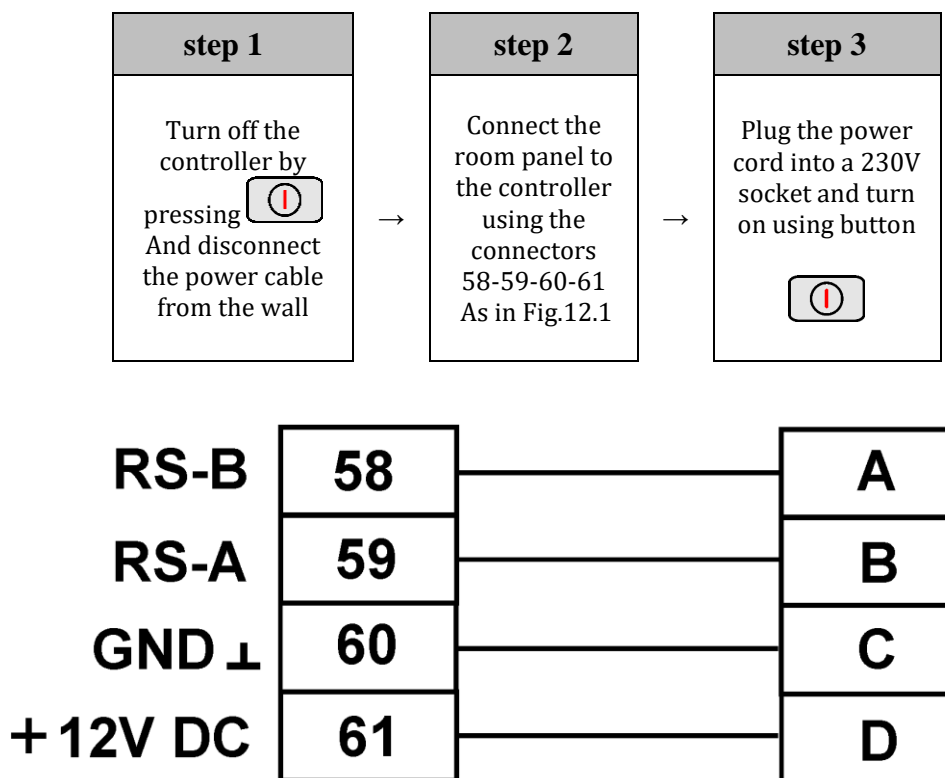
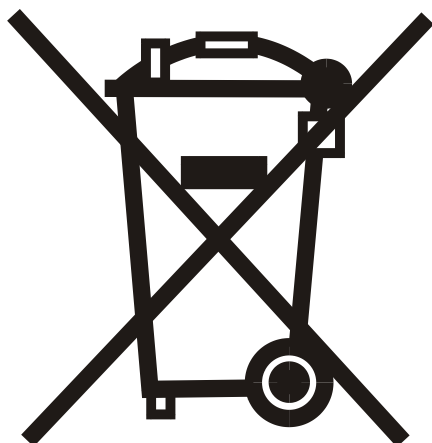


Fig. 12.1 Schematic diagram for connecting the GA01HC room panel to the GH07EB controller

12.2 Room thermostat.

It is possible to connect an external thermostat to the GH07EB controller (⇒ p.6), which, when activated, will close output contacts and lock the boiler. The room thermostat can lock the boiler by overriding the driver input that supports the thermostat (when the thermostat is active).

13. Information regarding the labeling and disposal of waste electrical and electronic equipment



Warning!

This symbol on the product or on its packaging indicates separate collection of waste electrical and electronic equipment. This means that the product should not be disposed of with other household waste. Proper disposal of old and used electrical and electronic equipment will help prevent potential negative effects on the environment and on human health. The user is obliged to arrange the separation and disposal of equipment, which should be given to a collector of used equipment.



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