GECO®

MANUAL
OF CONTROLLER

GH09NB

FOR CONTROLLING
CENTRAL HEATING BOILERS
WITH AIR BLOW

Program version 01

USER MANUAL

We request that users carefully study applicable Instructions before connecting and starting up any of our products.

Should any doubts arise, please contact our Company between 8 a.m. and 4 p.m.

Attention !!! At the bottom of each page you will find last document's update date. Please, always use the most recent version of the Instructions, which is available free of charge and will be mailed to you if ordered.

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1. INTRODUCTION

1.1. Graphic symbols

Symbols intended to indicate and at the same time emphasise the importance of text containing information that warns against dangerous situation have the following graphic forms:

Warning

This symbol is used when it is necessary in described instructions to follow the sequence of carried out operations. The unit may be damaged or destroyed in case of any error or proceeding in discord with the description.

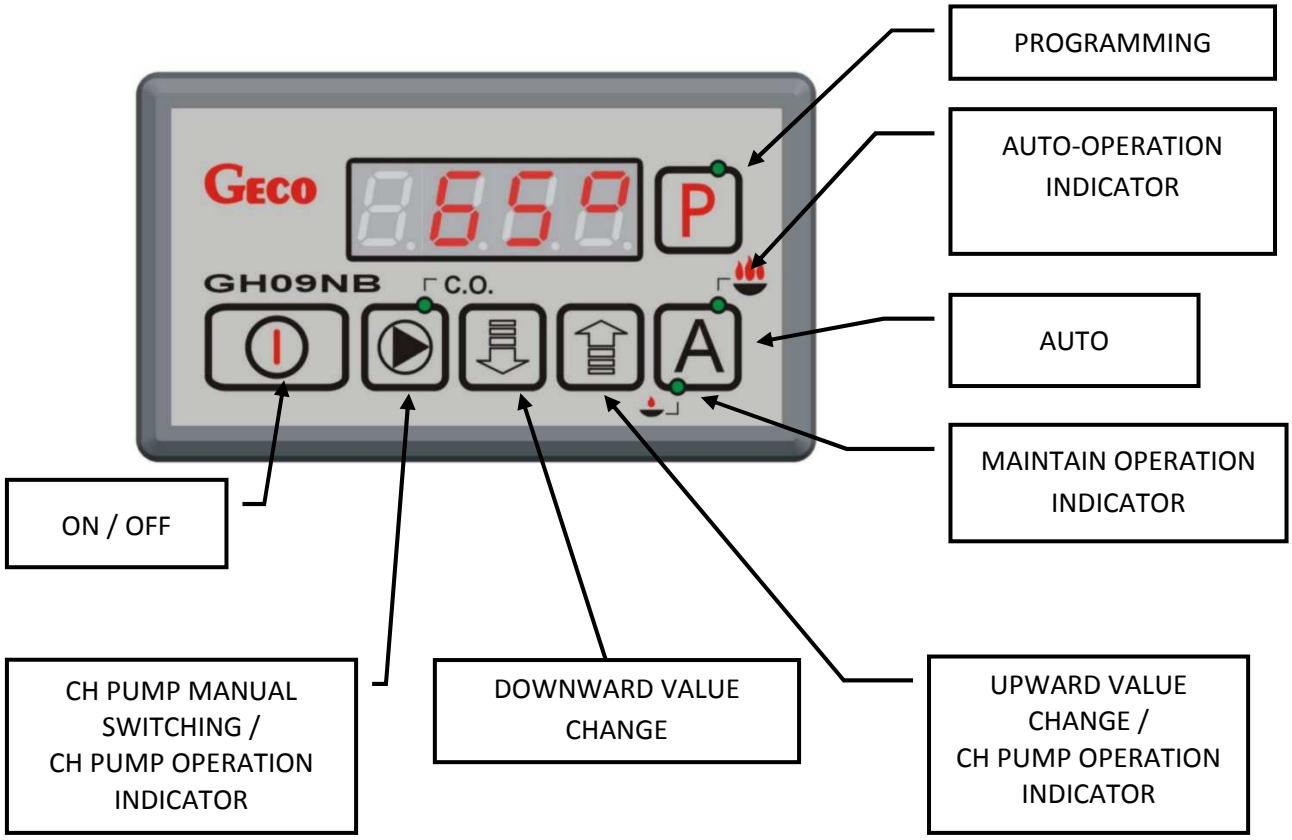
Important!

This symbol indicates information of particular importance.

Reference

This symbol indicates occurrence of additional information in a chapter.

1.2. Keyboard and Function Keys



2. GENERAL FEATURES

The GH09NB Controller is a microprocessor-based device manufactured using the Surface Mount Technology (SMT).

It is designed to control the processes of Central Heating (CH) water circuit. Control parameters can be adjusted to the current operating conditions and boiler type. The Controller includes a system protecting from power outages and other different disturbances.

The GH09NB Controller is fitted with:

input:

1. boiler output water temperature measurement (NTC sensor),

It also contains three outputs allowing direct connection of 230 V AC devices, i.e.: fan, CH pump.

ALWAYS DISCONNECT THE CONTROLLER FROM POWER DURING THUNDERSTORMS

3. TECHNICAL DATA

Power supply	230V AC +10% -15%
Operating temperature range	+5°C to +40°C
Humidity	20% to 80% RH
Fan protection	3.15A
Sensor type	NTC 2.2kΩ
Sensor operating temperature range	0°C÷100°C

Output	Maximum continuous load	
CH pump	1A	200W
Fan	1A	200W

NTC sensor resistance characteristics	
Temperature °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

4. ELECTRICAL SYSTEM AND CONNECTION GUIDELINES

Boiler room should be equipped with 230V/50Hz electrical system according to applicable regulations.

Electrical system (regardless of its type) should end with a plug-in socket equipped with protective contact. **Using a socket without connected protective contact may result in electric shock !!!**

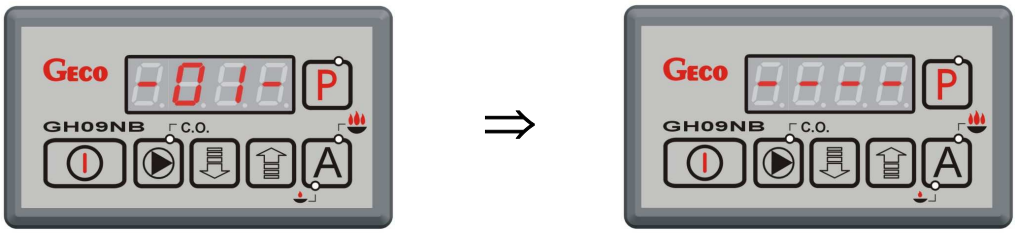
The controller needs to be connected to a separate power supply line protected with a properly selected quick fuse and differential current switch (anti-electric shock). **It is forbidden to connect any other equipment to this line !!!**

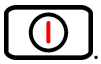
THE CONTROLLER IS POWERED FROM 230V/50HZ MAINS
ANY REPAIRS MAY BE CARRIED OUT ONLY WITH POWER SUPPLY CUT OFF AT THE FUSE

5. QUICK START

Carry out the following operations in order to activate the GH09NB controller quickly:

1. Connect the unit to the mains (plug in power supply cable).



2. Switch on the controller using push-button  . The following screen will appear:

3. Press push-button A. The following screen will appear:

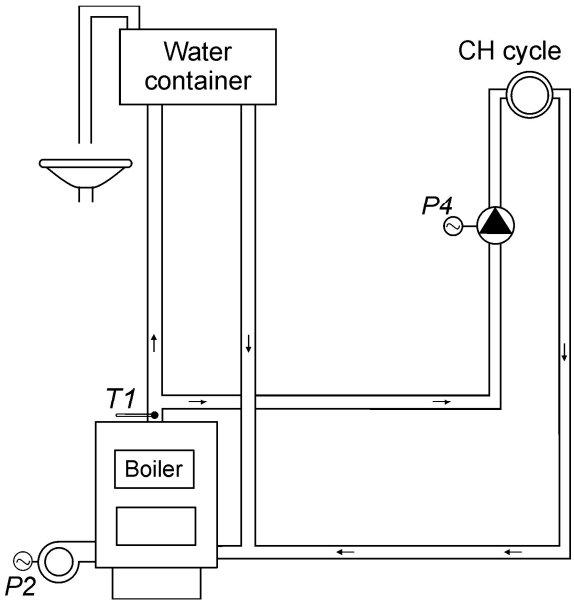
and the controller will start automatic operation based on preset factory parameters.

Table 1. **Factory settings**

User parameter	Description	Factory settings
U00	Boiler preset temperature	60 ^{0}C
U01	Fan speed	5

6. OPERATION OF THE GH09NB

6.1. System configuration



INPUT	OUTPUT
T1 – boiler temperature	P2 – fan
	P4 – CH pump

6.2. Automatic operation mode

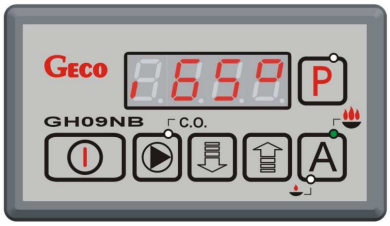
By pressing A, you can enable the automatic operation mode – the Controller lights up the **upper** indicator on A ( ).

6.2.1. Fan

In the fan runs continuously until the boiler temperature reaches the value set by the user in the *U00* setting.

The fan starts with minimal speed (gear 1) and increase its speed according to ***F31*** parameter until getting to speed set in *U01* parameter (⇒ Table 1and the controller will start automatic operation based on preset factory parameters.

Table 1 page.6).



Activation and operation of the fan is indicated by means of a **vertical** line on the left side of the display, in the **lower** sign segment, on the Controller main display screen.

6.2.2. CH pump

In the AUTO mode, the CH pump starts when the temperature of the boiler water is higher or equal to the value set in the **F06** service setting (factory setting is 40°C).

Turning the CH pump on and its operation is indicated by the **upper** indicator on  .

The Controller turns off the pump when the water temperature drops to the activation temperature minus 4°C. (If the CH pump start temperature is 40°C, then the CH pump stop temperature is 36°C).

6.2.3. MAINTAIN operation mode

The Controller gets into that mode when the boiler temperature reaches the value set by the user in the *U00* setting.

This mode of operation is indicated by lighting the **lower** indicator on  ().

When set temperature is reached and **F32**=0, the fan will be turned on only for periodical blows. The duration of blow is consistent with the value set in parameter **F26**, and the fan works with maximum speed. The air blows take place at the time set in parameter **F27.**

When **F32** > 0 and the outlet water temperature does not exceed the value equal to the *U00* + **F33**, the fan works with speed set in **F32** parameter.

The Controller will exit the MAINTAIN mode and return to the AUTO mode if the boiler temperature drops to the value equal to the *U00* – **F05.**

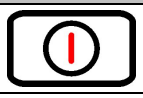
The CH pump operates identically as in the AUTO mode

6.3. Manual operation mode

Pressing  causes the Controller to switch from automatic to manual mode, and immediately deactivates the fan, and the pump.

In this mode, you can manually and independently activate and deactivate the CH pump.

To do this, follow the scheme below:

STEP 1		STEP 2
	→	 and
Controller indicates water temperature measured on the boiler.		CH pump **Upper**  key indicator lights up. Press the key again to deactivate the pump and the indicator.

6.4. Viewing temperatures

After pressing  , the display shows water temperature at the boiler outlet.

6.5. Alarms

The Controller uses 4 different alarms. In each alarm condition, the Controller displays the alarm number and activates the alarm sound output. In case of several alarm conditions occurring simultaneously, their numbers are displayed in sequence. You can exit an alarm condition only by pressing  .

Alarms:

- **AL1** → STB activated or fuse blown
- **AL2** → Boiler water outlet temperature sensor failure
- **AL12** → Boiler overheating
- **AL13** → Boiler burnout

6.6. Power failure

After power failure the Controller resumes operation according to the condition it was in before the power failure. The Controller waits 1 minute for the mains power parameters to stabilize, and then resumes operation with the previously entered settings.

During the waiting period, the display shows time in seconds remaining until the end of the period, together with indication of its condition before the power outage:

- blinking “A” for AUTO mode,
- blinking “P” for MAINTAIN mode,
- blinking “r” for MANUAL mode.

Respective indicators (AUTO  or MAINTAIN ) are blinking together with the letters.

6.7. Boiler burnout detection

6.7.1. No fuel

If during automatic operation the boiler outlet water temperature remains below the **F08** setting for a period of time set in the **F09** setting, then the Controller considers the boiler as “burned out” and enters the *AL13* alarm condition.

6.7.2. Sudden Drop of Outlet Water Temperature

If during automatic operation the boiler outlet water temperature drops by 10°C, and during that dropping period the temperature does not rise by 4°C, then the CH pump is switched off, and the Controller goes into the burnout detection mode.

The Controller waits for the period of time set in the **F10** setting, during which it checks whether a rise of 4°C occurs.

If YES, then the burnout detection condition is stopped, and the CH pump (if necessary) is started.

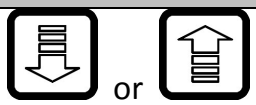
If NOT, this means that the furnace is burned out – the Controller enters the *AL13* alarm condition.

STOPPING CH PUMP OPERATION IN BURNOUT DETECTION IS INDICATED BY BLINKING THE UPPER INDICATOR ON  .

7. USER SETTINGS

7.1. Boiler preset temperature (*U00*)

You can change the boiler temperature setting applying the following procedure:

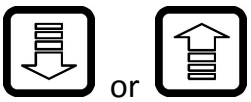
STEP 1	→	STEP 2	→	STEP 3
				
The green LED lights up on the key. The display shows current temperature setting.		Set the new desired temperature within the range permitted by the boiler manufacturer.		Save the new temperature setting. Move to the *U01* setting.

If during setting the new temperature none of the following keys  is pressed for 15 s, the new temperature will not be saved and the Controller will exit the programming mode.

7.2. Fan speed (*U01*)

This setting determines the fan rotation speed, and thus the amount of air delivered. It allows adjusting the fan speed according to the type and quality of the fuel used.
This setting can be set within the range of 1÷10, where “1” denotes the minimum speed, and “10” the maximum speed.

You can change the setting using the following procedure:

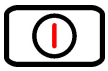
STEP 1	→	STEP 2	→	STEP 3	→	STEP 4
						
The green LED lights up on the key. The display shows *U00* parameter current setting.		Go to *U01* parameter		Set the new desired value.		Save the new temperature setting.

8. TEMPERATURE LIMITER (STB)

The GH09NB Controller can be equipped with an additional independent temperature limiter STB via terminals 5 and 6.

WHEN THE TEMPERATURE LIMITER IS NOT USED, TERMINALS 5 AND 6 SHOULD BE SHORTED.

If due to boiler temperature rise the temperature limiter is activated and opens its terminals, it will disable fan power supply in order to stop air delivery do the boiler. After approximately 5s from limiter activation the Controller indicates the AL1 alarm.
Return to normal boiler operation is possible when the boiler temperature drops to a level enabling limiter reset (temperature level depends on the limiter model used).
For safety reasons the Controller does not resume automatic operation on its own.

For the Controller to resume operation you have to, after resetting the limiter, press  twice:

– pressing  for the first time cancels the alarm and disables the Controller,

– pressing  for the second time reactivates the Controller,

– pressing  causes the Controller to switch to automatic operation mode.

CAPILLARY TUBE PUNCTURE OR BREAKAGE INDICATES THAT TEMPERATURE LIMITER FILLED WITH LIQUID LEAKS, WHICH RESULTS IN ABNORMAL OPERATION OF THE GH09NB CONTROLLER.

IN CASE IF THE ABOVE-MENTIONED DEFECT IS FOUND, IT WILL BE NECESSARY TO DISCONNECT TEMPERATURE LIMITER FROM THE GH09NB CONTROLLER, REMOVE IT AND REPLACE WITH A NEW DEVICE

9. CONNECTING DEVICES TO THE GH09NB CONTROLLER

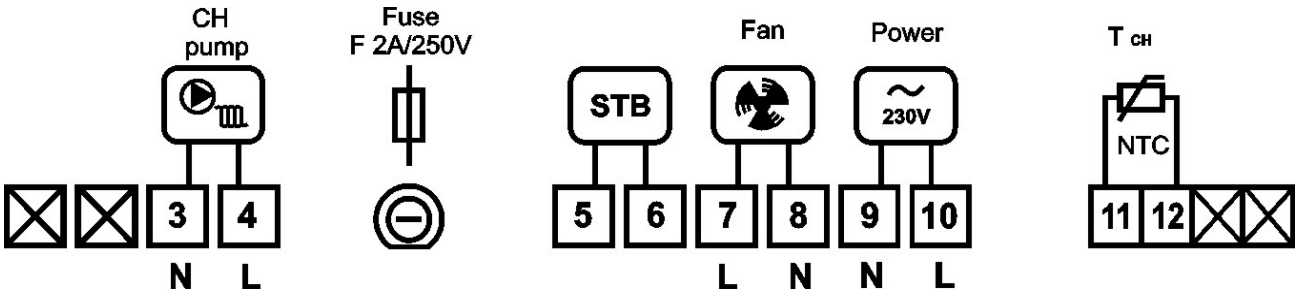
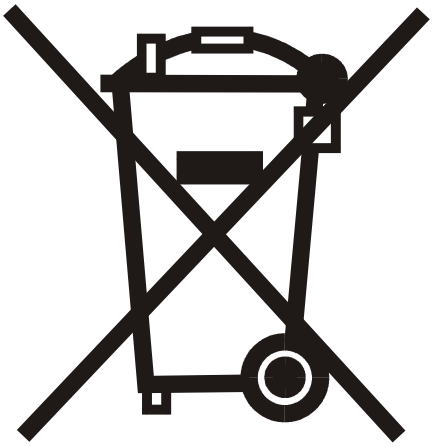


Fig. 1 Diagram of connections between equipment, sensors and the GH09NB controller

ANY ADDITIONAL EQUIPMENT MAY BE CONNECTED TO THE GH09NB CONTROLLER ONLY BY PERSON LICENSED TO PERFORM ELECTRICAL INSTALLATION WORKS.

10. INFORMATION ON LABELLING AND COLLECTION OF WORN OUT ELECTRICAL AND ELECTRONIC EQUIPMENT



CAUTION!

This symbol placed on the product or its packaging indicates the need for selective collection of worn out electrical and electronic equipment. It means that this product should not be disposed of with other household wastes. Proper disposal of aged and worn out electrical and electronic equipment will help to avoid potentially adverse effects for environment and human health.

It is the user's responsibility to collect worn out equipment separately, and to return it to an authorized disposal company.

11. NOTES

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