Regulator for Automatic Wood Pellet Boilers

S.Control MK2 (ecoMAX362)

eSTER_x40 *

ecoSTER TOUCH *
eSTER_x80 *

ecoNET *

* not included in the package

REGULATOR OPERATING AND INSTALLATION MANUAL

PROGRAM VERSION:	Panel	v. 7.20.12
	Module A	v. 7.41.36B1

Contents

1 Safety

Safety requirements are specified in the individual sections of this manual.
In addition to them, the following instructions must be observed:

- The regulator may only be used in accordance with this manual.
- Before starting the installation, repair of the regulator, or performing any connection work, it is absolutely necessary to disconnect the mains and ensure that no terminals or electrical conductors are live.
- The risk of electric shock also exists from the connected backup boiler (if it is controlled by the S.Control MK2 regulator). In addition to disconnecting the regulator from the mains, it is also necessary to disconnect the backup boiler from the mains.
- Use additional safety features when installing the boiler, heating circuits, and domestic hot water (DHW) storage tank, which protect against possible consequences of regulator failure or software errors.
- Select the values of the set parameters appropriately according to the specific type of boiler and fuel, while taking into account all operational conditions of the system. Incorrect selection of values may cause an emergency condition of the boiler (for example, its overheating, etc.) or the heating system.
- The regulator is not an intrinsically safe device. This means that in the event of a malfunction, it can be a source of a spark or high temperature, which in an environment of dust and flammable gases may cause a fire or explosion. Therefore, it is necessary to separate the regulator from dust and flammable gases using appropriate shielding.
- The regulator must be installed in accordance with applicable standards and regulations.
- Changes to the set parameters of the regulator may only be made by a person familiar with this manual.
- The regulator can only be used in heating systems that have been designed and executed in accordance with applicable regulations.
- The electrical installation in which the regulator operates must be three-wire and protected by a fuse corresponding to the loads used.
- The regulator must not be used with a damaged cover or electrical wires. It is necessary to check the condition of the cabling and, in case of its damage, to take the regulator out of operation.
- Electrical cables, especially power cables, must not touch or be near hot objects. They must not be mechanically loaded either.
- The regulator must not be subject to vibrations or be exposed to direct sunlight.
- It is forbidden to remove the cover and pull out the regulator module, as there is a risk of electric shock.
- It is forbidden to insert any foreign objects into the regulator's switchboard.
- It is necessary to protect the regulator from water and dust.

- The regulator may only be used indoors.
- Before connecting any peripheral devices, the power supply must be turned off.
- Under no circumstances should any modifications be made to the construction of the regulator.
- Access of children to the regulator and its accessories must be prevented.
- The manufacturer accepts no responsibility for any damage resulting from failure to follow this manual.

2 General information

The S.Control MK2 boiler regulator is an electronic device designed to control solid-fuel boilers and heating systems.
The main module of the regulator has the following inputs and outputs:

- **Binary inputs**
  - Emergency thermostat STB
  - Loading door opening switch
  - Room thermostat
- **Analogue inputs**
  - Boiler temperature sensor
  - Fumes temperature sensor
  - Buffer temperature sensor – upper
  - Buffer temperature sensor – lower
  - Mixer 1 temperature sensor
  - DHW temperature sensor
  - Outdoor temperature sensor
  - Burner temperature sensor
  - Room panel
  - Hall probe
  - Optical sensor
- **Binary outputs**
  - Boiler pump
  - Pump mixer 1
  - DHW tank pump
  - Circulation pump
  - Output H4 (backup boiler, alarm signalling, operational status signalling, bypass pump, ash removal)
  - Fuel feeder
  - Pressure fan in the burner
  - Exhaust fan
  - Burner rotary cleaning drive
- **Analogue outputs**
  - Mixer 1 servo

The S.Control MK2 regulator is a modern electronic device designed to control the operation of a pellet boiler using an optical flame brightness sensor.
The regulator can control the operation of the boiler's primary circuit, the heating of domestic hot water, and also the operation of up to five mixed heating circuits. The preset temperature of the heating circuits can be set based on data from the outdoor sensor.
The option to work with standard room thermostats, separate for each heating circuit, helps maintain a comfortable temperature in the heated rooms.
The regulator can alternatively cooperate with room panels, which serve as a room thermostat and also as remote control from reference rooms. The following are available:

- ecoSTER40 room panel
- ecoSTER90 TOUCH room panel
- eSTER_x40 wireless room panel
- eSTER_x80 wireless room panel

In the case of using the ecoNET internet module, it is possible to perform online monitoring and control of the regulator's operation via a PC or mobile phone.
In addition, the control unit activates the backup boiler (e.g. gas boiler) if necessary.
The regulator can be used in households or in smaller industrial buildings.

3 Information related to documentation

Since this regulator manual is only a supplement to the boiler manual, it is therefore necessary (in addition to the instructions contained in this manual) to also follow the boiler operating manual!
For easier use, the manual is divided into 2 parts:

- for end-user operation
- for service organisations performing boiler installation and commissioning.

All parts contain important information affecting the safety of boiler operation. Therefore, both the regulator user and the technician performing the installation must familiarize themselves with all parts of the manual.

The manufacturer accepts no liability for damages resulting from non-compliance with this manual.

4 Keeping the documentation

Please carefully keep this installation and operation manual for the regulator, as well as all other binding documentation, so that it can be used at any time if needed. In the event of relocation or sale of the equipment, all accompanying documentation must be handed over to the new user/owner.

5 Used symbols

The following graphic symbols are used in the manual:

- *symbol indicating useful information and tips*

- **symbol indicating important information on which damage to property, health hazards, and the safety of people and domestic animals may depend.**

WARNING!
Essential information is marked with symbols to simplify familiarisation with the manual. However, this does not exempt the user from the obligation to familiarize themselves with and comply with instructions not marked by graphic symbols!

6 Directive 2012/19/EU of the European Parliament and of the Council on waste electrical and electronic equipment

- Recycle the packaging and product at the end of the usage period at the appropriate recycling company.
- Do not dispose of the product in the municipal waste bin.
- Do not burn the product.

7 User menu structure

Information
Boiler settings

- Preset boiler temperature
- Outdoor sensor
  - Outdoor sensor correction
- Thermostat selection
  - Off
  - Universal
  - eSTER/ecoSTER [1)]
- Output modulation
  - Maximum burner output
  - Blowing correction for maximum output
  - Hysteresis H2
  - Medium burner output
  - Blowing correction for medium output
  - Hysteresis H1
  - Minimum burner output
  - Blowing correction for minimum output
  - Boiler hysteresis
  - Feeder calibration
  - Feeder efficiency
  - Fuel calorific
- Cleaning level
  - Normal
  - Increased
  - Intensive
- Fuel level
  - Alarm fuel level
  - Calibration of fuel level
- Burner cleaning
- Burner cleaning schedule
  - On/Off
  - Schedule
- Burner work schedule
  - On/Off
  - Schedule
- Boiler night setback
  - On/Off
  - Setback
  - Schedule

DHW settings [1)]

- Preset DHW temperature
- DHW pump working mode
- DHW tank hysteresis
- DHW disinfection
- Night setback of the DHW tank
  - On/Off
  - Setback
  - Schedule
- Night setback of the circulation pump
  - On/Off
  - Schedule

Summer/Winter [1)]

- SUMMER mode
- Temperature of SUMMER mode activation
- Temperature of SUMMER mode deactivation

Settings of mixer 1–4[1)]

- Preset temperature of mixer
- Thermostat selection
  - Off
  - Universal
  - eSTER/ecoSTER [1)]
- Mixer 1 room thermostat
- Weather control of mixer
- Heating curve of mixer
- Parallel movement of curve
- Night setback of mixer

- On/Off
- Setback
- Schedule

General settings

- Clock
- Date
- Brightness
- Sound
- Language
- Software update

Manual control

CHIMNEY SWEEP mode

- CHIMNEY SWEEP mode
- Preset output
- Chimney sweep mode work time

Alarms

Turn regulator On/Off

Service settings

[1)] This setting is not displayed if the corresponding sensor, expansion module is not connected, or the parameter is hidden.

8 Regulator control

All regulator settings are made via the touch display mounted on the top wall of the boiler.

8.1 Main screen

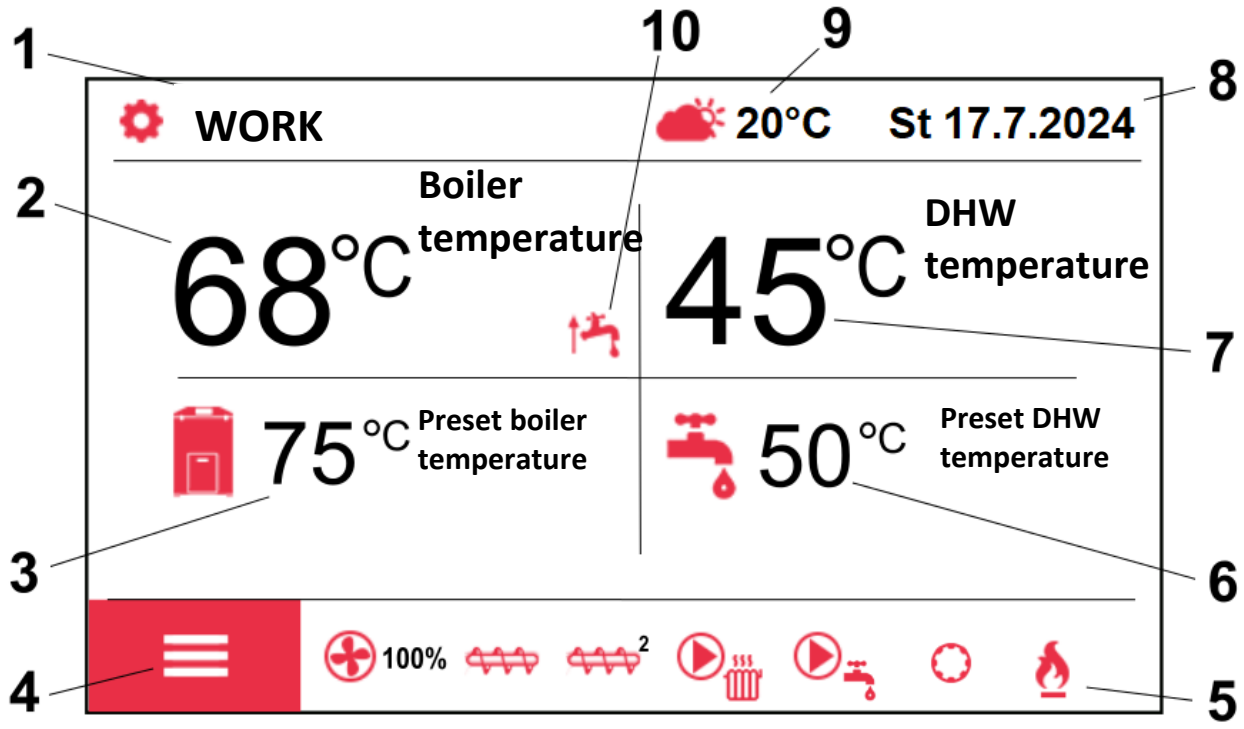


Figure 1. Main screen of the regulator

Legend:

1. Operating modes of the regulator: FIRING-UP, STABILIZATION, WORK, BURNING OFF, CLEANING, SETBACK, STOP, CHIMNEY SWEEP
2. Current boiler temperature value
3. Preset boiler temperature – long-press to change the value
4. Enter MENU
5. Information field for boiler operation. The meaning of individual symbols:

	- fan
	- feeder 1 (from the hopper)
2	- feeder 2 (in the burner)
	- boiler pump
	- DHW pump
	- rotary cleaning
	- igniter

6. Preset DHW temperature – long-press to change the value
7. Current DHW temperature value
8. Current time and day of the week+
9. Current outdoor temperature
10. Information field of functions affecting the preset boiler temperature. The meaning of individual symbols:

	- contacts of the room thermostat are open, the set room temperature has been reached
	- reduction of the preset boiler temperature due to active operating schedule
	- increase of the preset boiler temperature due to charging of the domestic hot water (DHW) storage tank
	- increase of the preset boiler temperature due to charging of the domestic hot water (DHW) storage tank
	- activation of weather control for the boiler circuit
	- increasing the preset boiler temperature in order to charge the buffer

The right and left windows of the main screen can display different information. Touch to change the displayed information regarding the boiler, buffer, mixed heating circuits, DHW, fuel level in the hopper, counters, etc.
This information can also be displayed on the eSTER/ecoSTER room panel.

8.2 Turning the regulator on/off

After connecting to the electrical network (~230V/50 Hz), the regulator is in power-saving STAND BY mode. The current time, date, outdoor temperature and the text "***Boiler off***" are displayed on the screen.
In this state, the pump anti-seizure protection function is active, where, after a certain period, the pumps are rotated. Therefore, it is recommended that even during periods when the boiler is not in operation, the regulator remains connected to the electrical network in STAND BY mode.
Touch anywhere on the screen to display the text „***Boiler on?***"

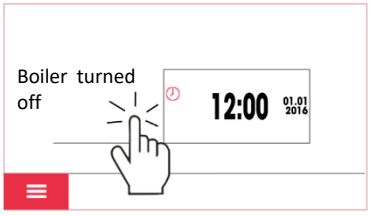


Figure 2. Turning on the regulator

and after confirmation, the boiler is put into operation.
From this moment, the hydraulic part of the installation (pumps, mixer) operates according to the set requirements, and depending on the settings and current temperatures, the regulator will initiate the FIRING-UP mode (heat demand) or remain in STOP mode (no heat demand).

There is also a second way to turn on the boiler. Press the MENU button and then find and press the  button in the rotary menu.

To turn off the regulator and thus also turn off the hydraulic part of the installation, enter the MENU and press the button  . By selecting ***Yes***, the regulator switches to STAND BY mode.

8.3 Feeder calibration

This is a very important activity. Correct and precise measurement and setting of the value *"Feeder efficiency"* into the regulator determines the reliability of the boiler operation. Entering an incorrect value will cause the boiler to malfunction.

Value *Feeder efficiency* defines the amount of fuel that the feeder is capable of delivering to the burner at a given configuration and inclination during continuous operation within 1 hour. It is listed in the menu:

Menu → Boiler settings → Output modulation

For the correct determination of the *Feeder efficiency* value, feeder calibration must be performed. The procedure is as follows:

1) Check the correct installation of the auger feeder from the hopper. The angle of inclination between the feeder from the hopper and the horizontal floor must be in the range of 0 to 45°.
    - Installing the feeder at a smaller incline increases the amount of fuel delivered.
    - Installing the feeder at a steeper angle reduces the amount of fuel delivered.
2) Fill the hopper with the prescribed fuel.
3) Connect the boiler to the electrical network (230V/50Hz) using a cable with a plug.
4) Pull the flexible hose including the connecting elbow out of the upper burner coupling and place it into a suitable container.
5) Using manual control (***Menu → Manual control→ Feeder→ ON***) fill the auger feeder from the fuel hopper. Warning! The auger feeder automatically switches off after 2 minutes for safety reasons, so it is necessary to switch the feeder on several times in succession.
6) Stop filling the auger feeder (***Menu → Manual control→ Feeder → OFF***) at least 30 s after pellets start falling from the feeder into the container. Empty the container with fallen pellets and return it under the disconnected connecting elbow.
7) In the regulator menu, navigate to the line *Feeder calibration* (***Menu → Boiler settings → Output modulation → Feeder calibration***).
8) Press the **START** button to start the feeder calibration test itself. The feeder starts pouring fuel into the container, and the display counts down the time until the end of the test. The test will automatically end after 6 minutes.
9) Weigh the amount of fuel delivered to the container.
10) Enter the detected net weight value in grams for 6 minutes into the boiler control unit in the window *Enter the fuel quantity in the test*, which automatically appears after the completion of calibration.
11) In the following window *Fuel calorific* enter the correct value (in kWh/kg) of the calorific value of the pellets used. This information is stated on the packaging of bagged pellets.
12) In the following window *Maximum burner output*, enter the value (in kW) that the burner will be able to reach during operation. This value must be selected with regard to the heat losses of the heated building.
13) Correctness check of the set *Feeder efficiency* value can be performed in the user menu (***Menu → Boiler settings → Output modulation → Feeder efficiency***), where this data is already displayed automatically

converted in kg/h. This value affects the fuel dosing during boiler operation. Incorrect value will cause improper burner operation. Entering a lower value than the actual value measured in the test causes a larger amount of fuel to be suppliedto the burner during normal boiler operation. Entering a higher value than the actual value measured in the test will cause less fuel to be supplied to the burner during normal boiler operation.

14) Push the flexible hose including the connecting elbow back onto the upper coupling of the burner.

9 Boiler settings

9.1 Preset boiler temperature

Preset boiler temperature is the temperature of the heating water at the boiler outlet that we want the boiler to maintain during its operation. Set in:

Menu → Boiler settings → Preset boiler temperature

The value of this parameter is automatically adjusted by the regulator under certain circumstances. This state is then indicated in the main display view by the corresponding icons – see chapter 8.1, item 10.

Furthermore, the regulator may ignore the *preset boiler temperature* if it is controlled by an external sensor.

9.2 Thermostat selection

The user can select:

Menu → Boiler settings → Thermostat selection

- *Off* – to define the state when the preset boiler temperature is not controlled by any room thermostat or panel, or to disable its influence on the preset boiler temperature.
- *Universal* – to define the state when the preset boiler temperature is controlled by a standard room thermostat T connected to the regulator at terminals 23–24 (see Fig. 8).
- *eSTER/ecoSTER* – to define the state when the preset boiler temperature is controlled by the room panel eSTER or ecoSTER connected to the regulator at terminal G1 (see Fig. 8).

9.3 FIRING-UP mode

The FIRING-UP mode is used for the automatic firing-up of the burner.
Parameters affecting the firing-up process are in the menu:

Service settings → Boiler settings → Firing up

In case of an unsuccessful firing-up attempt in the burner, attempts are repeated and during these attempts, the fuel dose is reduced to 10% compared to the first attempt. Further attempts to ignite are indicated by a number next to the glow plug symbol 

on the display. In the event of three unsuccessful firing-up attempts, the alarm "*failed firing-up attempt*" will be activated. It is not possible to continue igniting the boiler and a service intervention is required.

9.4 WORK mode

During WORK mode, the fan and feeder 2 (in the burner) operate continuously, feeder 1 (from the hopper) operates periodically (see Fig. 6). One cycle consists of the operating time of feeder 1 and the pause time of feeder 1.
Operating time of feeder 1 is calculated automatically depending on the current required burner output and the parameters *Feeder efficiency* and *Fuel calorific*.

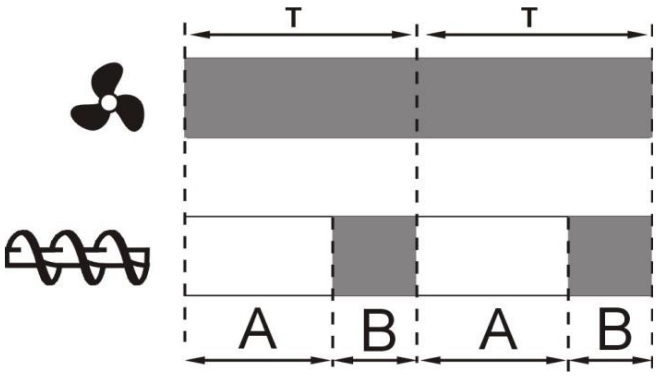


Figure 3. Operating periods of the fan and feeder, where:

T - refuelling period, A - feeder 1 pause time, B - feeder 1 running time

Parameters for setting the exhaust fan performance for individual boiler output levels are configured in:

Menu → Boiler settings → Output modulation

The standard control mode is available for maintaining the set boiler temperature:

Standard mode

If the boiler temperature reaches the set temperature, the regulator switches to the SETBACK mode or (if the SETBACK mode is deactivated) directly to the BURNING OFF mode.
The regulator is equipped with a modulation program for reducing the burner output. It allows the gradual reduction of its output as the instantaneous temperature in the boiler approaches the preset boiler temperature.

There are three output levels defined:

- Maximum burner output
- Medium burner output
- Minimum burner output

Each of these output levels is assigned a separate burner output as well as exhaust fan output. Parameters for defining the individual burner output levels and any exhaust fan corrections are available in the menu:

Menu → Boiler settings → Output modulation

The regulator controls the operation of the burner with which the boiler is working at a given moment, depending on the preset boiler temperature and the defined hysteresis H1 and H2.
If H1 < H2, this defines 3 output levels (Maximum + Medium + Minimum).
If H1 > H2, this defines 2 output levels (Maximum + Minimum).

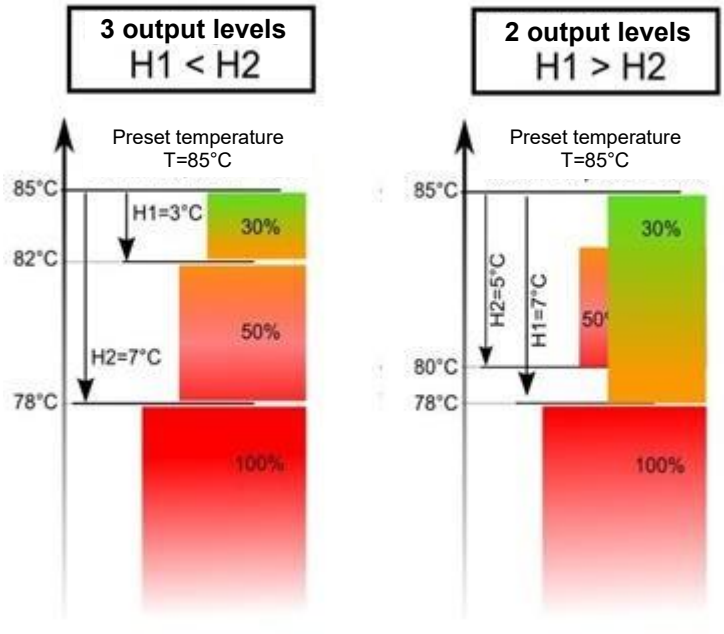


Figure 4. Output modulation hysteresis H1 and H2

The boiler output is displayed on the right side of the screen, or in the tab:

Menu → Boiler settings → Output modulation

It will correspond to reality provided that the values of the parameters Feeder efficiency and Fuel calorific are set correctly.

9.5 SETBACK mode

The regulator automatically (without user intervention) switches to the SETBACK mode:

- in normal mode after reaching the preset boiler temperature

In SETBACK mode, the regulator ensures that the boiler does not go out. Under these conditions, the burner operates at very low output, which, with correctly selected parameters, does not cause a further increase in boiler temperature. Activating this mode helps to reduce the phenomenon of frequent boiler burning off and re-firing-up. All parameters affecting the SETBACK mode are in the menu:

Menu → Service settings → Burner settings → Setback

Parameter *Max. setback time* defines the duration for which the boiler can operate in SETBACK mode. If it is not necessary to restore boiler operation after this time, the regulator will initiate the BURNING OFF process.

When setting the parameter Max. setback time to OFF, the regulator will skip the SETBACK mode and go straight to the BURNING OFF mode.

Parameter *Burner output during setback* must be set so that there is neither burning off of the firebed nor overheating of the boiler.

Parameters in this mode must be set so that the boiler temperature gradually decreases. Otherwise, there is a risk of overheating.

9.6 BURNING OFF mode

In the BURNING OFF mode, the remaining fuel is burning out and the boiler is prepared to switch to STOP mode or to be completely turned off. All parameters affecting the BURNING OFF process are in the menu:

Menu → Service settings → Burner settings → Burning off

The regulator stops the fuel supply in this state, periodically blows through the burner, and controlledly burns off the remaining fuel. After the flame brightness drops below the value given by the service parameter *Blowing stop* or after the time given by the service parameter *Maximum time of burning off* has elapsed, the regulator switches to STOP or OFF mode.

9.7 CLEANING mode

In CLEANING mode, the burner is cleaned of ash generated during boiler operation. For these purposes, the maximum performance of the fan is used. Parameters affecting the CLEANING process are in the menu:

Menu → Service settings → Burner settings → Burner cleaning

Burner cleaning is always performed before activating the FIRING-UP mode and after BURNING OFF (as specified by the parameter *Cleaning time after burning off*).

In cases where the boiler remains in WORK or SETBACK mode for an extended period without shutting down, the burner cleaning is also activated. This function is activated after the time specified by the parameter has elapsed:

Menu → Boiler settings → Burner cleaning

After performing this cleaning, the boiler will return to WORK mode.

9.8 STOP mode

In STOP mode, the boiler is off and waiting for a signal to start operation. This signal can be:

- activation of the eSTER/ecoSTER room panel or room thermostat
- drop in boiler temperature below the set boiler temperature reduced by the parameter *Boiler hysteresis*. This is set in the menu:

Menu → Boiler settings → Output modulation → Boiler hysteresis

- when operating the boiler with a buffer – the upper temperature of the buffer drops below the value of *Temperature of starting buffer charging*. This is set in the menu:

Menu → Boiler settings → Buffer settings

9.9 GRATE mode

BLAZE HARMONY boilers are not designed for the use of this function. In settings:

Menu → Service settings → Burner settings → Grate

the option "NO" must always be selected.

10 DHW settings

10.1 Preset DHW temperature

The regulator can control the heating of water in the DHW tank if a DHW temperature sensor (CWU) is connected to the corresponding terminals on the regulator's switchboard (see Fig. 8, terminals 44-45).
The menu allows you to set the preset temperature in the domestic hot water tank.

Set in:

Menu → DHW settings → Preset DHW temperature

10.2 DHW pump working mode

The method of DHW heating is set in the menu:

Menu → DHW settings → Preset DHW temperature

The user can choose:

- *OFF*- permanently disable DHW heating.
- *Priority* - prioritise DHW heating over the heating circuit. In this state, the boiler pump is switched off and the mixer remains closed until the DHW tank reaches the preset temperature.
- *Without priority* - set simultaneous operation of the boiler pump and the DHW pump.

10.3 DHW tank hysteresis

This parameter specifies the temperature difference (between the actual DHW temperature and the preset DHW temperature) that activates the DHW pump to heat the storage tank.

Set in:

Menu → DHW settings → DHW hysteresis

10.4 DHW disinfection

The regulator has a function for regular automatic heating of the DHW tank to a temperature of 70 °C. This disinfection aims to eliminate bacteria (Legionella Pneumophila).

Set in:

Menu → DHW settings → DHW disinfection

Once a week, on Monday at 2:00 AM, the regulator will increase the temperature in the DHW tank to 70 °C. After 10 minutes, the DHW pump will turn off and DHW heating will return to standard operation.

It is necessary to inform everyone present in the facility about the activation of this disinfection function. There is a risk of scalding with hot water.

It is not advisable to activate the DHW tank disinfection function if the DHW pump mode is set to "Off".

11 Summer/Winter mode

The SUMMER function allows the heating circuits to be switched off during the summer period, maintaining only the DHW tank heating.
Set in:

Menu → Summer/Winter → SUMMER mode

The user can choose:

- *Winter* - permanently select the WINTER mode, i.e. simultaneous heating of the building and DHW.
- *Summer* -permanently select the SUMMER mode, i.e. heating of DHW only.
- *Auto* - set automatic switching of SUMMER/WINTER mode depending on the outside temperature (see Fig. 8, WS sensor). The moment when the transition from one mode to another and vice versa occurs is determined by the parameters *Temperature of SUMMER mode activation* and *Temperature of SUMMER mode deactivation*.

The SUMMER mode must not be activated with a disconnected or damaged DHW pump.

In SUMMER mode, all heat appliances can be turned off, so before activating it, it is necessary to ensure that the boiler does not overheat.

12 Mixer settings

Set in:

Menu → Mixer settings

Mixer settings are not available if the Mixing valve sensor is not connected (see Fig. 8, terminals 45-46) or if mixer operation is disabled in the service settings.

The user can select from the menu:

Menu → Mixer settings → Thermostat selection

- *Off* - to define the state when the mixed heating circuit is not controlled by any room thermostat or panel, or disable its influence on the operation of the mixed heating circuit.
- *Universal* - to define the state when the mixed heating circuit is controlled by a standard room thermostat connected to the regulator at terminals 23-24 (see Fig. 8).
- *eSTER/ecoSTER* - to define the state when the mixed heating circuit is controlled by the room panel eSTER or ecoSTER connected to the regulator at terminal G1 (see Fig. 8).

12.1 Setting the mixer without an outdoor temperature sensor (constant temperature)

The preset water temperature in the heating circuit can be set manually using the parameter *Preset temperature of mixer,* e.g. 50°C. Optimally, this value should be set to maintain the preset room temperature.

After connecting and activating the room thermostat in the menu:

Menu → Mixer settings → Thermostat selection

it is possible to set a reduction in the mixer temperature after reaching the preset room temperature (opening of the room thermostat) by the value specified by the parameter:

Menu → Mixer settings → Mixer room thermostat

This value (e.g. 7°C) should be chosen based on experience. For this purpose, you can use the room panel eSTER or ecoSTER. It is also possible to use a standard room thermostat. If the thermostat is working correctly, the preset mixer temperature will decrease, which with the optimal setting of the parameter *Mixer room thermostat* will cause the room temperature to stabilise.

12.2 Setting the mixer with an outdoor temperature sensor without the eSTER/ecoSTER room panel

The *preset mixer temperature* can be automatically adjusted depending on the current outdoor temperature. With the correct setting of the heating curve according to the type of building, the regulator automatically adjusts the mixer temperature so that the room temperature remains approximately the same, regardless of the outside temperature. For the given mixed heating circuit it is necessary to set:

Menu → Mixer settings → Weather control of mixer → On

and select the appropriate heating curve according to chap. 12.4.1.

Using the parameter *Parallel movement of curve*, set the preset room temperature based on the formula:

Preset room temperature = 20°C + offset of the heating curve

Example: To achieve a room temperature of 25°C, the offset value of the heating curve must be set to 5°C. To achieve a room temperature of 18°C, the offset value of the heating curve must be set to -2°C.

In this configuration, a room thermostat can be connected, which will compensate for the inaccuracy of the heating curve selection in case the chosen value of the heating curve is too high. Under these circumstances, the value of *Mixer room thermostat* must be set, for example, to 2 °C. After the thermostat contacts open, the preset mixer temperature will be lowered, which, with the correct choice of reduction value, will cause the temperature rise in the heated room to stop.

12.3 Setting the mixer with an outdoor temperature sensor and the eSTER/ecoSTER room panel

For the given mixed heating circuit, it is necessary to set:

Menu → Mixer settings → Weather control of mixer → On.

For this combination, it is necessary to set the parameter *Weather control* to "YES" and select the heating curve according to chap. 12.4.1. The eSTER or ecoSTER room panel shifts the heating curve depending on the preset room temperature.
The basic room temperature set for the regulator is 20 °C. For example, for a preset room temperature of 22 °C the regulator shifts the heating curve by 2 °C, for a preset room temperature of 18 °C the regulator shifts the heating curve by -2 °C. In some cases described in chapter 12.4.1, there may be a need for additional adjustment of the heating curve offset.

In this configuration, the room panel can:

- reduce the mixer temperature by a constant value if the preset room temperature is reached, analogously as described in the previous point (not recommended)
- automatically continuously adjust the preset mixer temperature. It is not recommended to use both options simultaneously.

Automatic correction of room temperature is performed according to the formula:
Correction = [preset room temperature – measured room temperature] x room temperature factor / 10

Example:

- Set temperature of the heated space (set on the eSTER/ecoSTER panel) = 22°C
- Temperature measured in this space (using eSTER/ecoSTER) = 20°C
- Room temperature factor = 15

The preset mixer temperature will be increased by (22°C - 20°C) x 15 / 10 = 3°C.

It is necessary to find the correct value of the parameter *Room temperature factor* (the range is 0 – 50). The higher the factor value, the greater the adjustment of the preset mixer temperature. When set to "0", the preset mixer temperature will not be adjusted.

Too high a room temperature factor value may cause cyclic temperature fluctuations in the heated space.

12.4 Weather control

After correctly selecting the heating curve value, the temperature of the mixed heating circuit is automatically adjusted based on the outdoor temperature. This allows maintaining a constant room temperature regardless of the outdoor temperature. That is why the correct setting of the heating curve value is essential.

When searching for the correct heating curve, turn off the thermostat function (regardless of whether it is connected or not) in the menu:
Service settings → Mixer settings → Thermostat selection → OFF

12.4.1 Setting the heating curve

Underfloor heating: 0.2 – 0.6
Radiator heating: 1.0 – 1.6

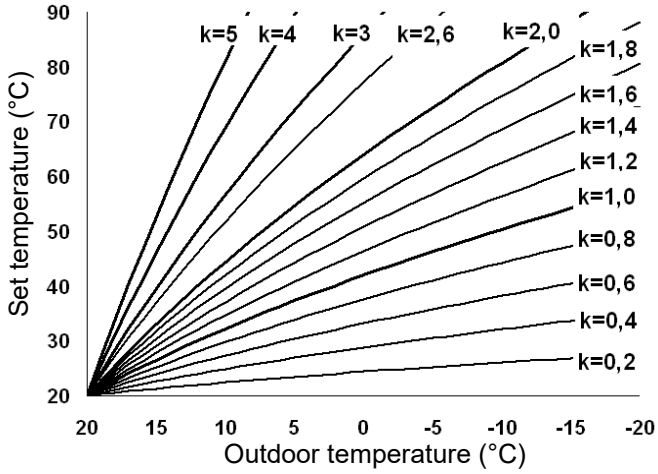


Figure 5. Heating curves

Instructions for selecting the correct heating curve:

- If the room temperature rises when the outdoor temperature decreases, the selected heating curve value is too high.
- Ifthe room temperature drops when the outside temperature decreases, the selected heating curve value is too low.
- If the room temperature is optimal during freezing weather and too low during warming, it is recommended to increase the value of the parameter *Parallel movement of heating curve* and choose a lower heating curve.
- If the room temperature is too low during freezing weather and too high when warming up, it is recommended to reduce the value of the parameter *Parallel movement of heating curve* and select a higher heating curve.

Poorly insulated buildings require setting a higher heating curve value. For well-insulated buildings, the heating curve should have a lower value.
The required mixer temperature calculated according to the heating curve may be decreased or increased by the regulator if it goes outside the temperature restriction range for the given heating circuit

13 Description of night setbacks settings

Schedules for night setbacks can be set in the regulator for:

- boiler temperature — ***Menu → Boiler settings → Boiler night setback***
- mixer temperature — ***Menu → Mixer settings → Night setback of mixer***
- DHW tank temperature — ***Menu → DHW settings → Night setback of the DHW tank***
- circulation pump temperature — ***Menu → DHW settings → Night setback of circulating pump***

Schedules allow setting a reduction of the preset temperature within a specified time interval, for example at night or when the user leaves the heated building. This allows the preset temperature to be lowered automatically without losing thermal comfort and simultaneously reducing fuel consumption. This state is indicated on the display by the symbol .
To activate schedules, it is necessary to set the parameter *Activation* to "YES" . With the parameter *Setback*, set the reduction temperature common to all time intervals.
Night setback can be defined separately for each day of the week in the settings *Schedule*.

Using the symbol you can copy one night setback setting to any days of the week.
It is necessary to set the value of the preset temperature reduction, the start and end of the given time interval.

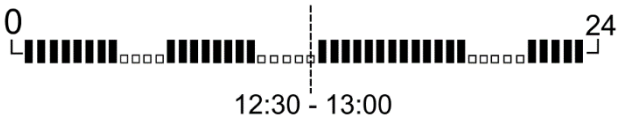


Figure 6. Daily time interval

The time interval is disregarded if the reduction value is set to "0", even if the hour range is set.

14 Operation on schedule

In the regulator, there is an option to turn the burner operation and the operation of the burner rotary cleaning mechanism on and off at specified time intervals. In cases where there is no demand for heat, e.g. in summer, the operation of the boiler can be switched off for a certain period of time, thereby reducing fuel consumption. The burner rotary cleaning mechanism can be switched off, for example at night, to prevent excessive noise.
Activation of time intervals is performed in the menu:

- burner cleaning schedule — ***Menu → Boiler settings → Burner cleaning schedule***
- burner operation schedule — ***Menu → Boiler settings → Burner work schedule***

Turning these elements on and off can be defined separately for each day of the week in the *Schedule* settings. Operation on schedule works analogously to night setbacks.

15 Fuel level configuration

15.1 Turning on the fuel level indicator

If you want to monitor the fuel level indicator in the tank on the display, it is necessary to set the parameter *Min. fuel level* to a non-zero value, e.g. 10%. The parameter is located in the menu:

Menu → Boiler settings → Fuel level

Touching the left or right window on the main screen will bring up the display window with the fuel level indicator.

The fuel level can also be displayed on the eSTER or ecoSTER room panel.

15.2 Operating the fuel level gauge

After each filling of the fuel tank to the required level, the display showing the current fuel level must be pressed and held (for approximately 2 seconds).

Figure 7. Fuel level operation

The following text will be displayed: *Set fuel level to 100%* After selecting and confirming with "YES" , the fuel level will be set to 100%.

Fuel can be added at any time; it is not necessary to wait until the fuel hopper is completely empty. However, the fuel must always be refilled up to the level corresponding to 100% of the hopper capacity and set this level in the regulator by pressing and holding the button with the current fuel level value, as described above.

15.3 Description of the fuel level monitoring function

The regulator calculates the fuel level based on the current fuel consumption. Factory settings may not always correspond to the actual fuel consumption of the given boiler. For proper operation, fuel level calibration may be required by the user.
No additional level sensors are required.

15.4 Hopper calibration

If the parameter values *Fuel quantity in test* and *Capacity of hopper* are set correctly, there is no need to perform the hopper calibration process. The regulator will correctly calculate the fuel level.
If the fuel level is determined inaccurately, it is recommended to perform calibration.
Fill the fuel hopper to its upper edge and set the option *Fuel level 100%*. This is located in the menu:

Menu → Boiler settings → Fuel level → Calibration of fuel level

In the basic display mode, the indicator will be at the value of 100%. The ongoing calibration process is indicated on the display by a flashing fuel level indicator. It is essential to continuously monitor the decreasing fuel level in the hopper. At the moment the fuel level drops to minimum, set the option *Fuel level 0%* in the same menu. Calibration for the specific hopper and specific fuel has been completed.

Changing the value of the service parameter Capacity of hopper cancels the fuel level calibration. It is then calculated again from the values of the parameters Feeder efficiency and Capacity of hopper.

16 General settings

They are accessible at:

Menu → General settings

Clock
Allows setting the current time. This setting is important for the correct operation of time programs and the display of alarm history.

Date
Allows setting the current date. This setting is important for the correct operation of time programs and the display of alarm history.

Brightness
Allows adjusting the brightness of the touch screen.

Sound
Allows turning sound notifications on or off.

Language
Allows changing the menu language. Several language variants of the menu are available.

Software update
Allows updating the regulator software using a microSD card – see chap. 29.

17 Manual control

The regulator offers the option of manual switching of individual outputs (fan/feeder 2, feeder from the hopper, burner cleaning mechanism, firing-up, boiler pump, DHW pump, mixer pump, mixer1 opens, mixer1 closes, output H1). Thanks to this feature, it is possible to verify whether the given device is correctly connected and functional. Manual control of individual outputs is only possible if the boiler is shut down. Manual control of individual outputs is available in the menu:

Menu →Manual control

Long-term activation of any output may cause a hazardous condition. For this reason, it is recommended to test the specific output only for the necessary duration and to return from manual control.

18 CHIMNEY SWEEP mode

The regulator has a special CHIMNEY SWEEP function, which, when activated, simultaneously puts into operation all appliances that are part of the heating system. The boiler heats at the output level (Minimum, Medium, or Maximum) set in the menu:

Menu → Chimney sweep mode → Preset output

The function serves to test and regulate the operation of the boiler.

19 Information

It is accessible in:

Menu → Information

The information menu allows monitoring of individual temperatures and statuses of the boiler and heating system, and simultaneously displays which devices are currently active. Individual pages of the information menu can be browsed using the "right" or "left" arrows.

After connecting additional modules B and C, supplementary information windows will be displayed.

20 FAVOURITES menu

After entering the MENU, an icon is displayed on the bottom bar:  . Clicking opens a menu with favourite items.
Additional items can be added to the FAVOURITES menu by pressing and holding the preset icon from the rotary menu.
To remove an item from the FAVOURITES menu, open the favourites menu, press and hold the icon you want to remove, and confirm its removal.

21 Additional features

In addition to the above functions, the regulator performs a number of other activities.

21.1 Power outage

In the event of a power failure, the regulator will return to the mode it was in before the power outage.

21.2 Frost protection

If the boiler temperature falls below 5°C, the pumps will activate and allow the circulation of heating water. This ensures the slowing down of the water freezing process at low temperatures. This function, however, is not capable of fully protecting the heating system from freezing.

21.3 Protection of pumps and mixer against seizing

The regulator protects the boiler pump, the DHW pump, the mixer pump, and the servo of the mixer valve against seizing. This is done by their regular activation (every 167 hours for a few seconds). This protects the pumps and valve against seizing due to limescale buildup. For this reason, it is necessary for the regulator to be powered by electricity and to be in STAND BY mode during the shutdown period.

21.4 Collaboration with an external feeder

After connecting the additional module B, the regulator can cooperate with the level sensor in the hopper (fuel feeding from the bunker). After the sensor reaction (opening), the regulator will turn on the external feeder for the duration of *External feeder working time* in order to replenish the fuel hopper in the boiler. This parameter is in the menu:

Menu → Service settings → Burner settings → Other

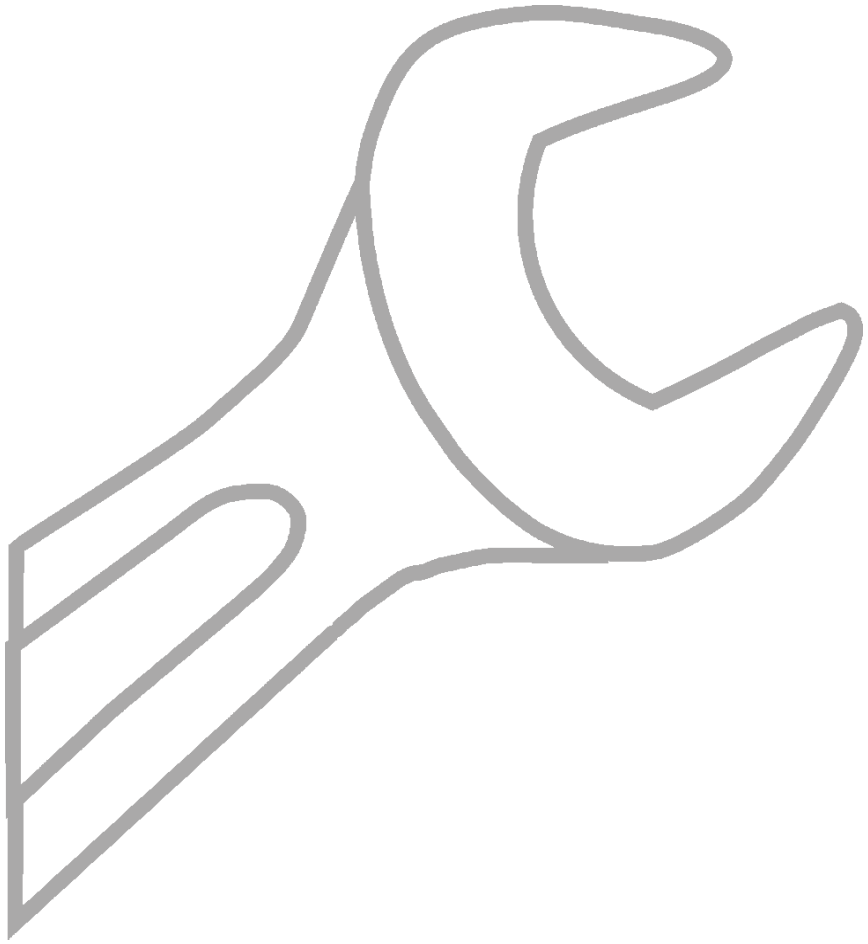
22 Room panel eSTER/ecoSTER

The regulator can cooperate with:

- wireless battery-powered room panel eSTER_x40, via two-way ISM communication
- wireless room panel eSTER_x80 with room thermostat function, via two-way ISM communication
- with the ecoSTER and ecoSTER TOUCH wired room panel featuring the room thermostat function.

The thermostat and room panel simultaneously provide useful information, such as fuel level data, burner operating mode, signal alarms, allow the setting of regulator parameters and its operating modes, and also serve as an additional panel controlling the boiler.

Instructions for service organisations performing boiler installation and commissioning



23 Electrical wiring diagrams

23.1 Electrical wiring diagram of module A

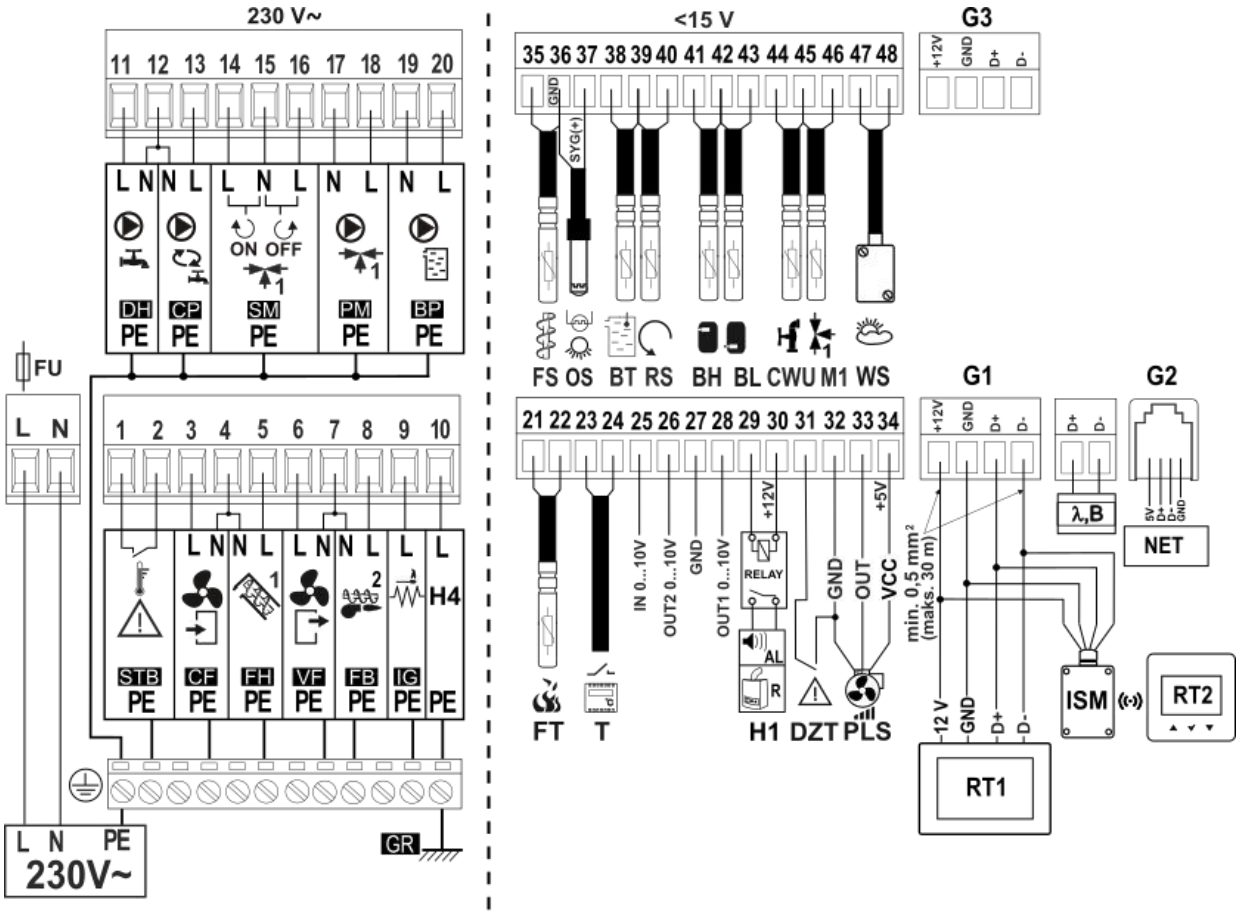


Figure 8. Electrical wiring diagram of module A

Legend:

L N PE – mains power supply 230 V~
FU – mains fuse
STB – emergency thermostat
CF – burner fan
FH – feeder from the hopper
VF – exhaust fan
FB – burner cleaning mechanism
IG – firing-up
DH – DHW pump

CP – circulation pump
SM – mixer servo
PM – mixer pump
BP – boiler pump
FS – burner temperature sensor (CT10)

OS – optical flame brightness sensor (OCP)
BT – boiler temperature sensor (CT10)
RS – return temperature sensor (CT10)

BH – upper temperature sensor of the buffer (CT10)
BL – lower temperature sensor of the buffer (CT10)
CWU – DHW temperature sensor (CT10)
M1 – mixer temperature sensor (CT10)
WS – outdoor temperature sensor (CT6-P)
FT – fumes temperature sensor (CT2S-2)
T – standard room thermostat
H1 and **H4** – universal voltage outputs (H1=12V, H4=230V)

- operation of the backup boiler
- alarms
- signalling of operational states of the regulator
- control of the flow (bypass) pump
- ash removal control

RELAY – relay (12V)
DZT – boiler door limit switch
PLS – fan speed sensor (Hall sensor)
RT1 – room panel with the function of a room thermostat or ISM radio module
RT2 – wireless room thermostat
NET – internet module
B – extension module that allows connection of 2 additional mixed heating circuits and an external feeder
GR – grounding

23.2 Electrical wiring diagram of module B or C

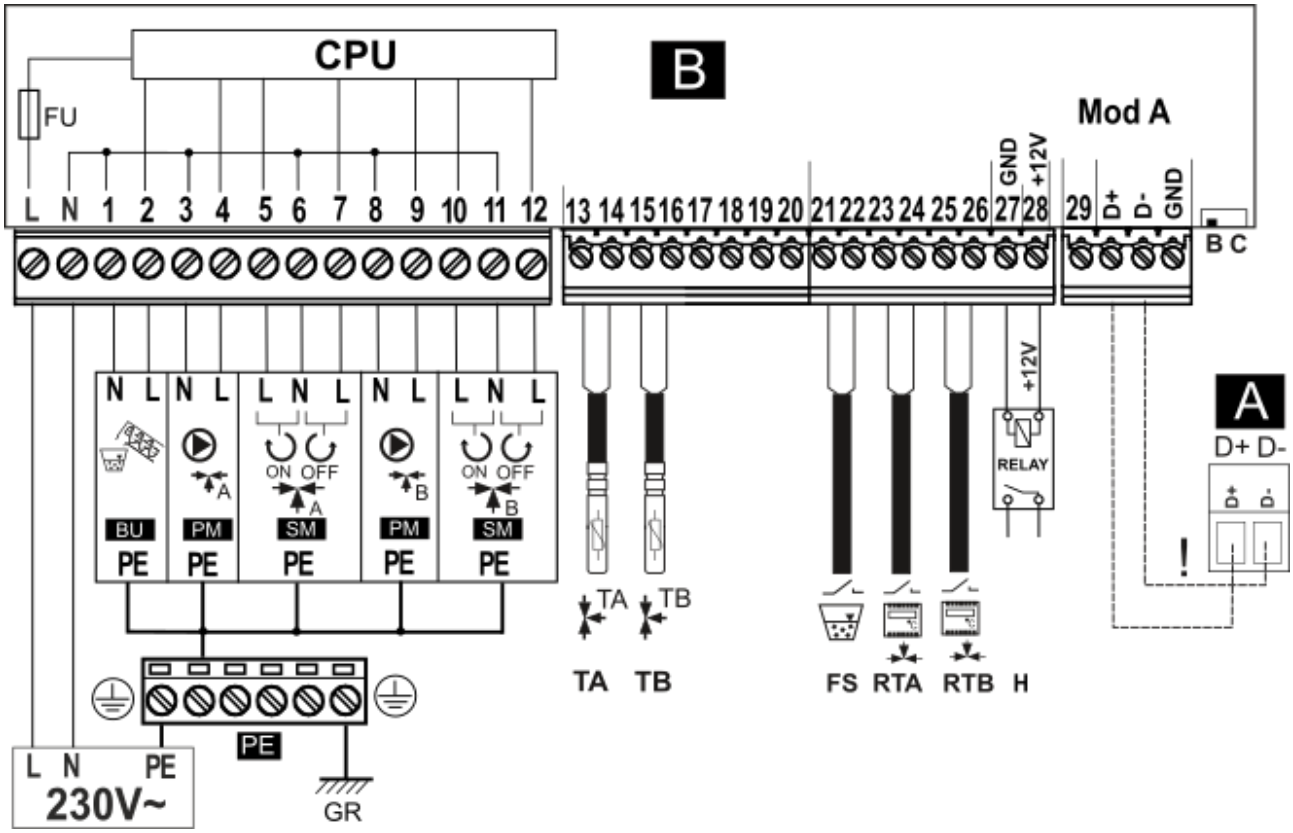


Figure 9. Electrical wiring diagram of module B or C

Legend:

L N PE – mains power supply 230 V~
CPU – control

FU – mains fuse
GR – grounding

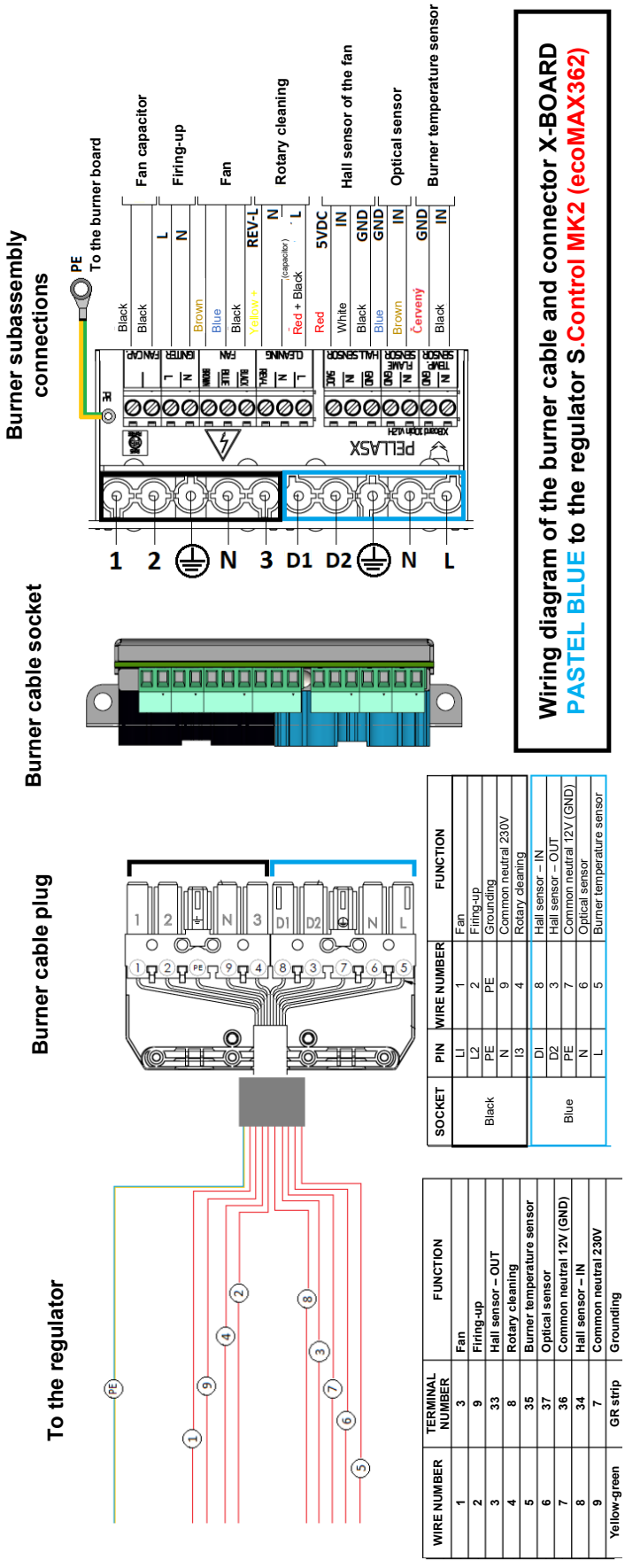
BU – external feeder
PM – pump of mixer 2 and 3

SM – mixer 2 and 3 servo

TA, **TB** – temperature sensor of mixer 2 and 3 (CT10)

FS – level indicator
RTA, **RTB** – standard thermostat for mixer temperature 2 and 3
RELAY – relay (12V)
H – universal output (12V DC) – function depends on module A (max. load 80 mA)
A – main regulator – module A
! – can only be connected with a 2-core conductor (do not connect with a 4-core conductor, risk of damage to module A)
Switch in position **B** – the expansion module is used as module B.
Switch in position **C** – the expansion module is used as module C.

23.3 Electric wiring diagram of the burner cable



SOCKET	PIN	WIRE NUMBER	FUNCTION
Black	LI	1	Fan
	L2	2	Firing-up
	PE	PE	Grounding
	N	9	Common neutral 230V
	I3	4	Rotary cleaning
Blue	DI	8	Hall sensor – IN
	D2	3	Hall sensor – OUT
	PE	7	Common neutral 12V (GND)
	N	6	Optical sensor
	L	5	Burner temperature sensor

WIRE NUMBER	TERMINAL NUMBER	FUNCTION
1	3	Fan
2	9	Firing-up
3	33	Hall sensor – OUT
4	8	Rotary cleaning
5	35	Burner temperature sensor
6	37	Optical sensor
7	36	Common neutral 12V (GND)
8	34	Hall sensor – IN
9	7	Common neutral 230V
Yellow-green	GR strip	Grounding

24 Connection of electrical installation

Before removing the terminal cover, the regulator must be disconnected from the mains power supply.

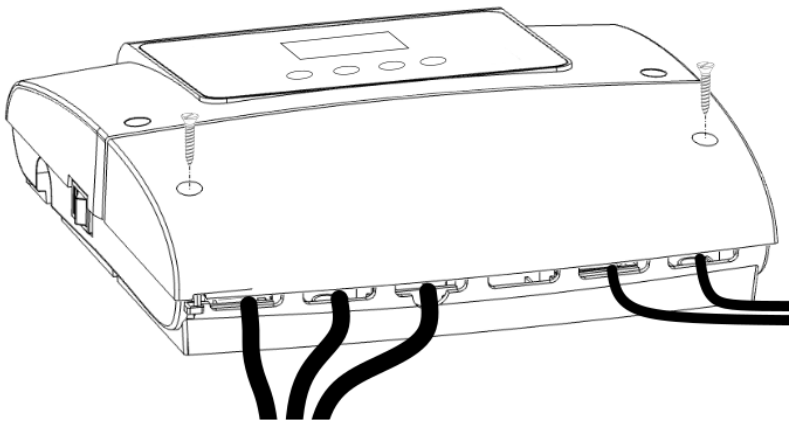


Figure 10. Removal of the regulator terminal cover

The regulator is designed for a power supply of ~230 V / 50Hz. The electrical installation must be:

- three-wire (with protective conductor)
- in accordance with applicable regulations

After turning off the regulator using the control elements, there may still be dangerous voltage at the terminals. Before starting assembly work, it is necessary to disconnect the power cable and ensure that there is no voltage on the terminals.

These connecting conductors must not come into contact with surfaces at temperatures exceeding their rated operating temperature.
Terminals L, N, 1 – 20 are intended only for connecting devices with a voltage of ~230 V.
Terminals 21 – 48 and terminals G1, G2 are intended for connection to low-voltage equipment (max. voltage 15 V).

Connecting the mains voltage ~230 V to terminals 21 – 48 or to the communication terminals G may damage the regulator and pose a risk of electric shock.

For safety reasons, the regulator must be connected to a ~230 V electrical network, observing the correct order of connection of the phase conductor L and the neutral conductor N. Ensure that the L and N conductors have not been swapped in the electrical installation of the building, for example in the socket or junction box.

Ends of connected conductors, especially power supply conductors, must be secured against fraying using insulated ferrules in accordance with Figure 11:

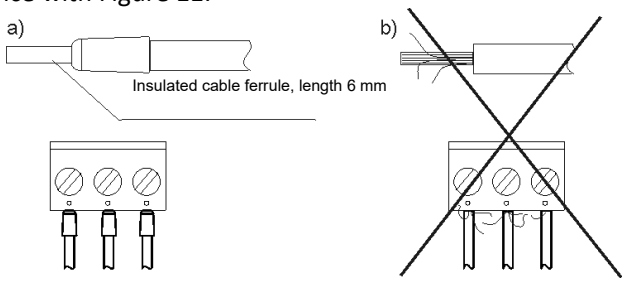


Figure 11. Connection of wires to terminals where: a) correct connection; b) incorrect connection

Connection of any peripheral devices may only be carried out by a qualified person in accordance with local regulations. Examples of such devices include pumps, valve servos, or relays. It is essential to observe safety principles related to protection against electric shock.

The PE of the regulator strip (position 7, figure 12), marked with the symbol ⏚ must be connected to:

- earth conductors of all devices connected to the regulator
- earth conductor of the power cable

Electrical conductors must be separated from the hot surfaces of the boiler, including the fumes paths.

Conductors must be secured against pulling out with cable ties (1). Screws for cable clamps (2) should be tightened with such force that mechanical stresses do not cause them to be pulled out or loosened from the terminals.

In order to maintain the IP20 protection rating, it is necessary to install all cable clamps (1), even if not all are used.

The maximum length for stripping the outer part of the insulation is 50 mm!

Before screwing the cover of the regulator terminals, the wires must be arranged so that their insulation is not damaged due to being cut by the edge of the cover or the screws securing the cover. It is prohibited to coil excess conductors in the space under the terminal cover.

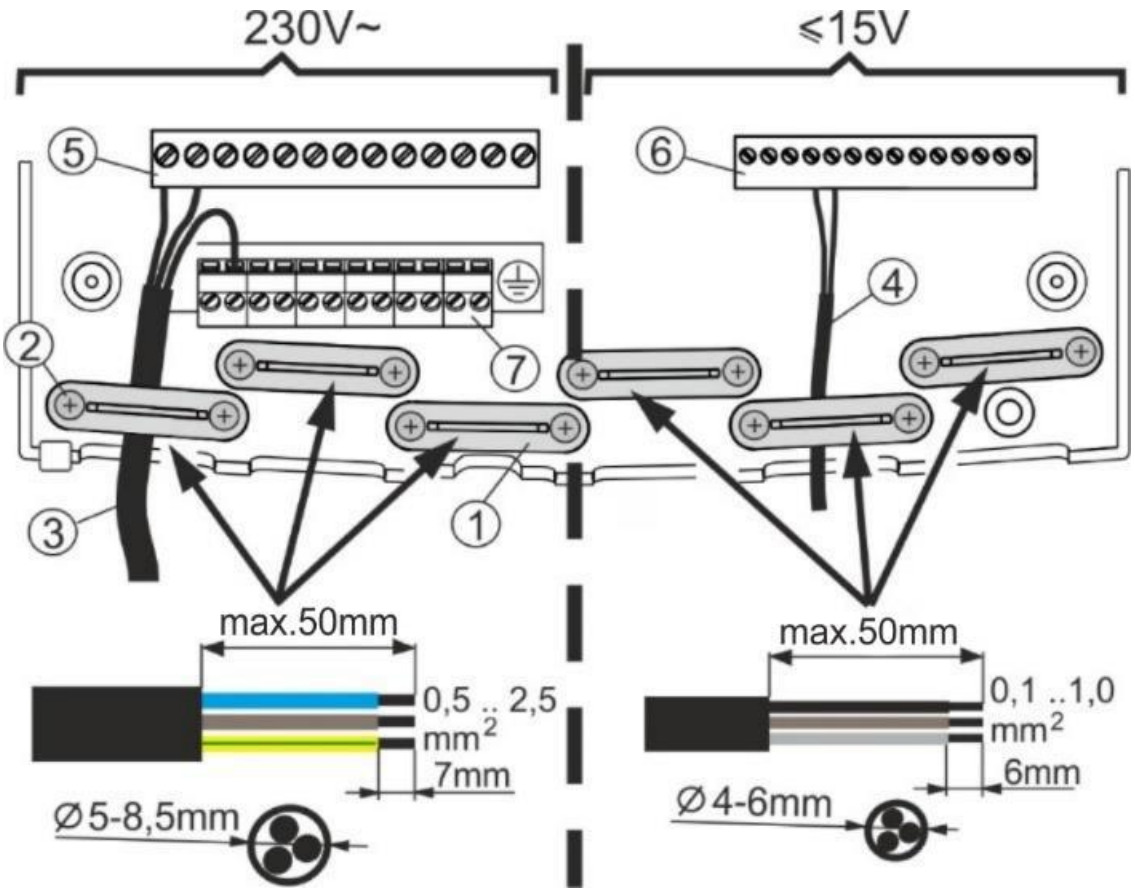


Figure 12. Connection of wires in the regulator, where:

1 – cable clamps

2 – screws for cable clamps

3 – hazardous voltage conductors (mains, ~230V)

4 – safe voltage conductors (signal, up to 15V)

5 – terminal block for mains voltage (~230V)

6 – signal voltage terminal block

7 – PE strip

When replacing the emergency thermostat STB, its capillary tube (2) must be routed out of the internal distributor through the latch (1) – see figure 13.

WARNING! Do not squeeze or bend the capillary tube of the emergency thermostat at a sharp angle!

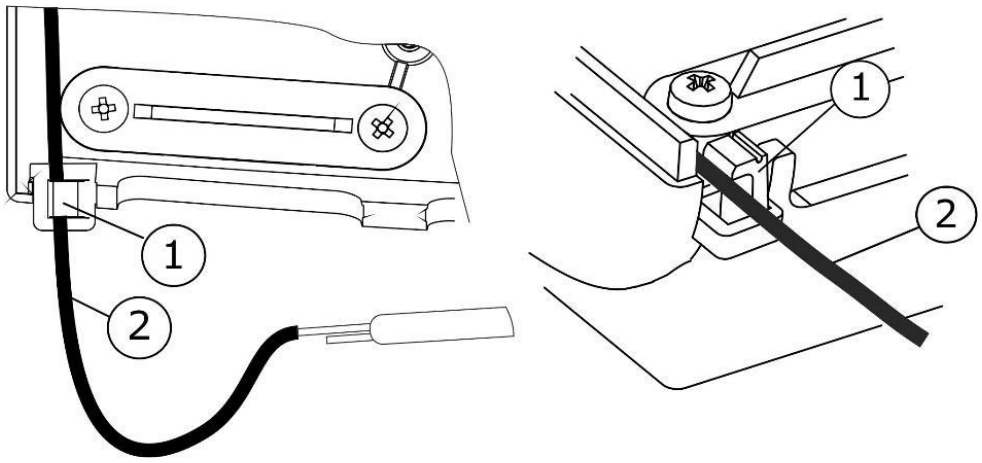


Figure 13. Outlet of the capillary tube of the emergency thermostat STB from the regulator distributor, where:

1 – latch

2 – emergency thermostat STB capillary tube

25 Sensor connection

25.1 Connection of temperature sensors

The regulator works with CT10 type temperature sensors, except for the outdoor sensor (type CT6-P) and the fumes temperature sensor (type CT2S-2).
Connect the sensor to the corresponding terminals on the regulator according to Figure 8 or 9, and place the measuring device at the desired location in the heating system. The sensor cable must not be in contact with hot surfaces of the boiler or heating system and must be secured against pulling out.
Sensor cables can be extended with conductors having a cross-section of at least 0.5 mm^2. The total length of the conductors of individual sensors must not exceed 15 m. The boiler temperature sensor is located in the temperature well at the top part of the boiler body. The DHW temperature sensor is placed in the temperature well in the DHW tank. The most suitable location for the mixer temperature sensor is in the temperature well placed in the flowing water stream inside the pipe; alternatively, it can also be mounted on the pipe surface and thoroughly insulated, see Figure 14.

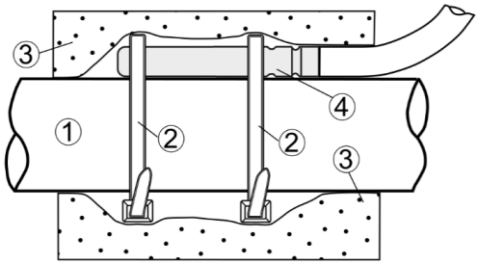


Figure 14. Installation of the temperature sensor on the pipe, where: 1 - pipe, 2 - clamp, 3 - thermal insulation, 4 - temperature sensor

Sensors must be secured against detachment from the measured surfaces.

There must be good thermal contact between the sensors and the measured surfaces. You can use thermal conductive paste for this purpose. It is forbidden to pour oil or water on the sensors.
Sensor cabling must be separated from power cables. Otherwise, errors may occur in temperature measurement. The minimum distance between these cables is 10 cm. The sensor cables must not be in contact with hot parts of the boiler and heating system. Temperature sensor cables are resistant to temperatures up to 80°C.

25.2 Connection of the fumes temperature sensor

The fumes temperature sensor (type CT2S) is factory-mounted on the rear wall of the boiler near the fumes outlet of the boiler.
Replacement of the fumes temperature sensor may only be carried out by a qualified person in compliance with electrical standards. It is connected to the regulator at terminals 21-22 (see Fig. 8). The cable of the fumes sensor must not be in contact with hot parts of the boiler.

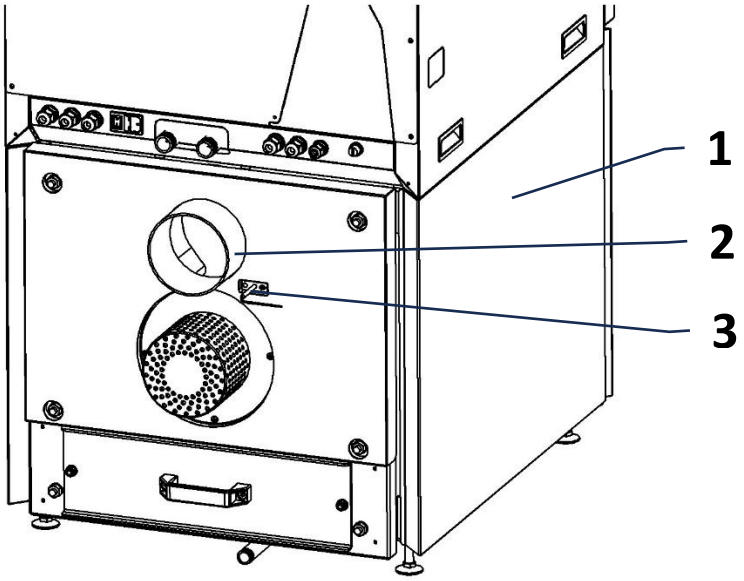


Figure 15. Installation of the fumes temperature sensor on the boiler,

where: 1 - boiler RPC, 2 - flue pipe, 3 - fumes temperature sensor (type CT2S)

25.3 Connecting the outdoor sensor

The outdoor sensor (not included in the standard boiler equipment) must be of type CT6-P (PT1000). The sensor should be mounted on the coldest part of the building, usually on the north wall of the building under the roof. The sensor should not be exposed to direct sunlight and rain. The sensor must be installed at least 2 m above the ground, away from windows, chimneys and other sources of heat that could affect the temperature measurement (at least 1.5 m).
The sensor is to be connected using a cable with a minimum cross-section of 0.5 mm^2, maximum length 25 m. The polarity of the conductors is not important. Connect the free end of the cable to terminals 47-48 (see Fig. 8) in the regulator.
Attach the sensor to the wall using the mounting screws. To access the openings for the base screws, unscrew the sensor cover.

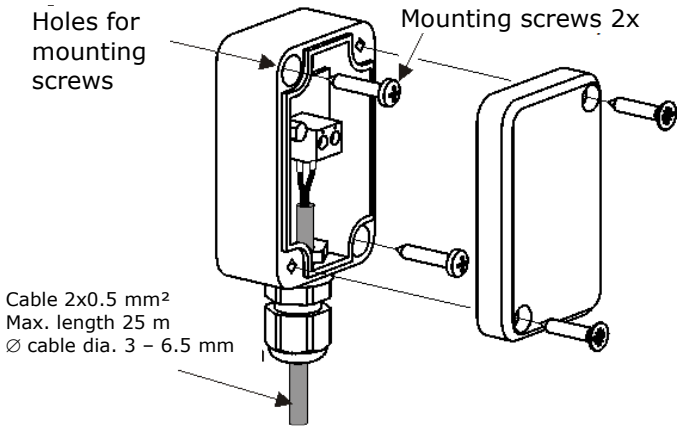


Figure 16. Connection of outdoor sensor CT6-P

25.4 Connecting the optical sensor

The optical sensor (type OCP) is connected in the regulator to terminals 36-37 (see Fig. 8) while maintaining the polarity of the sensor signals SYG(+) and GND (-). The data from the optical sensor is displayed on the right side of the screen, or in the Information section.

Incorrect connection of the optical sensor does not cause damage to the regulator or the sensor itself, but it results in an incorrect reading of the flame brightness values, which may cause unreliable boiler operation.

25.5 Temperature sensor check

Temperature sensors can be checked by measuring their resistance at a given temperature. If a significant difference is found between the measured resistance value and the values listed in the following table, the sensor must be replaced.

CT10 (NTC10K)	
Temperature [°C]	Nom. [Ω]
0	**33620**
10	**20174**
20	**12535**
30	**8037**
40	**5301**
50	**3588**
60	**2486**
70	**1759**
80	**1270**
90	**933**
100	**697**
110	**529**
120	**407**

CT2-S (Pt1000) - fumes temperature sensor			
Temperature [°C]	Min. [Ω]	Nom. [Ω]	Max. [Ω]
0	999.7	**1000.0**	1000.3
25	1096.9	**1097.3**	1097.7
50	1193.4	**1194.0**	1194.6
100	1384.2	**1385.0**	1385.8
125	1478.5	**1479.4**	1480.3
150	1572.0	**1573.1**	1574.2

CT6-P (Pt1000) - outdoor sensor			
Temperature [°C]	Min. [Ω]	Nom. [Ω]	Max. [Ω]
-25	901.6	**901.9**	902.2
-20	921.3	**921.6**	921.9
-10	960.6	**960.9**	961.2
0	999.7	**1000.0**	1000.3
25	1096.9	**1097.3**	1097.7
50	1193.4	**1194.0**	1194.6
100	1384.2	**1385.0**	1385.8
125	1478.5	**1479.4**	1480.3
150	1572.0	**1573.1**	1574.2

26 Connecting additional devices to the regulator

26.1 Connection of the mixer room thermostat

Connect the room thermostat to terminals 23-24 (see fig. 8) on the regulator. After installation, it is necessary to enable the room thermostat for controlling mixed heating circuits in the menu:

Service settings → Mixer settings → Thermostat selection → Universal

After the contacts open, the room thermostat begins to lower the temperature of the mixed circuit according to the parameter *Temperature reduction from thermostat*. Under normal circumstances, the mixer pump is not switched off by opening the contact (unless otherwise set in the service menu). Set the value of the parameter *Temperature reduction from thermostat* so that after the room thermostat contacts open, the room temperature begins to gradually decrease.

26.2 Connection of the boiler room thermostat

The room thermostat for the boiler's primary circuit can switch off the boiler or the boiler pump.

To have the room thermostat switch off the boiler, it is necessary to set the parameter:

Menu → Boiler settings → Thermostat selection

to „*Universal*“ or „*eSTER/ecoSTER*“ (if a room panel is connected).

To have the room thermostat switch off the boiler pump without turning off the boiler, it is necessary to set the parameter:

Service settings → Boiler settings → Boiler thermostat function

to "*Pump off*".

26.3 Connection of a backup boiler

The regulator can control the operation of a backup (e.g. gas) boiler. It is then not necessary to manually turn this boiler on and off. The backup boiler is activated in case of a drop in the temperature of the pellet boiler (or in the buffer) and switches off when the pellet boiler reaches the appropriate temperature.

Before removing the regulator switchboard cover, disconnect the mains power supply. Risk of electric shock! Installation must be carried out by a qualified person in accordance with local regulations and the technical documentation of this boiler.

The backup boiler is connected to the regulator at terminals 29-30 (see figs. 8 and 17) using a 12V relay.

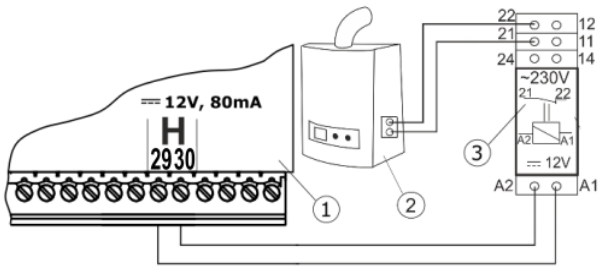


Figure 17. Electrical connection of the backup boiler:

1 - regulator, 2 - backup boiler, 3 - 12V DC relay (RM 84-2012-35-1012 and GZT80 RELPOL socket)

The relay is not part of the boiler's standard equipment; it can be ordered from the boiler manufacturer.

To enable the control of the backup boiler, you must activate the function in the menu:

Service settings → Output H1 →Backup boiler

To activate the control of the backup boiler, it is necessary to set the temperature at which, if fallen below, the backup boiler will be put into operation. This temperature is set in the menu:

Service settings → Boiler settings → Backup boiler

If this value is set to "0", the control of the backup boiler will be switched off.

The output of the reserve boiler control is shared with the alarm output. Disabling the control of the backup boiler will cause this output to be monitored by the alarm control module.

When the pellet boiler is put into operation and its temperature exceeds the set value, e.g. 25°C, the backup boiler switches off (a permanent 12V voltage appears on terminals 29-30). This causes the relay coil to be powered and its working contacts to open. After the pellet boiler temperature drops below the value given by the parameter

Backup boiler shutdown temperature, the regulator will interrupt the power supply to terminals 29-30, which will cause the backup boiler to turn on.

Turning off the pellet boiler activates the backup boiler.

It is possible to connect a three-way switching valve that separates the heating circuit and DHW from the pellet boiler to prevent its heating – see figures 18 and 19.

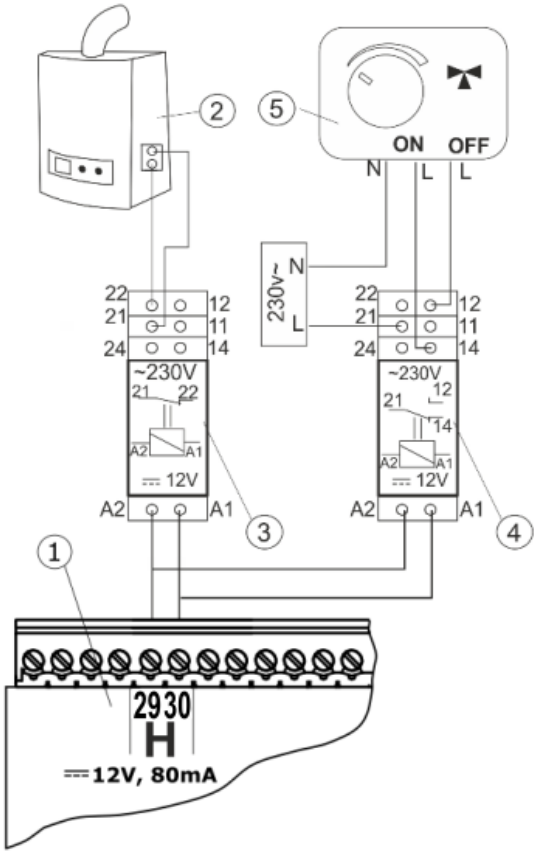


Figure 18. Electrical connection of the backup boiler and switching valve, where:

1 - regulator

2 - backup boiler

3 - relay

5 - servo of the switching valve

Note: terminals 21, 22, 24 must be galvanically isolated from terminals 12, 11, 14.

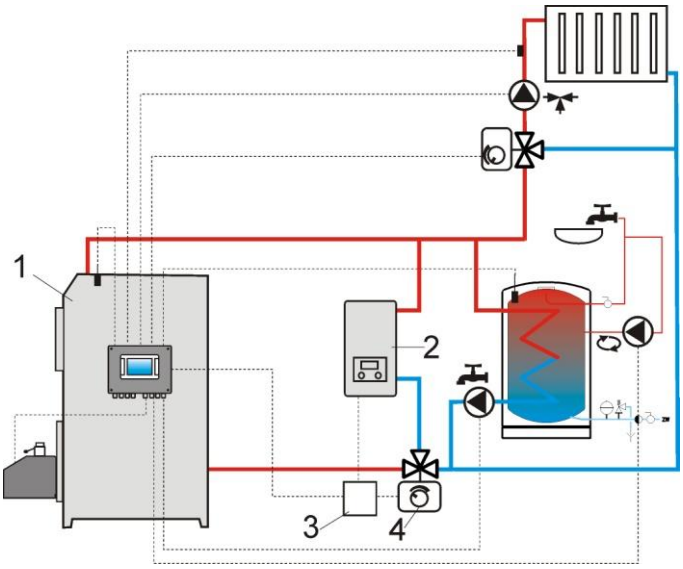


Figure 19. Example of a hydraulic connection with a backup boiler (2), relay (3), and switching valve (4)

Risk of electric shock from the connected backup boiler. When disconnecting the regulator from the electrical network, it is also necessary to disconnect the backup boiler (if it is controlled by the S.Control MK2 unit) and ensure that there is no dangerous voltage on the terminals. Protect yourself from electric shock.

26.4 Connection of alarm signalling

After connecting an external device such as a bell or a GSM module for sending short text messages (SMS), the regulator can signal alarm states.
Connect external devices for alarm state signalling via relay to terminals 29-30 (see figs. 8 and 20). Alarm signalling must be activated in the menu:

Service settings → Output H1 → Alarms

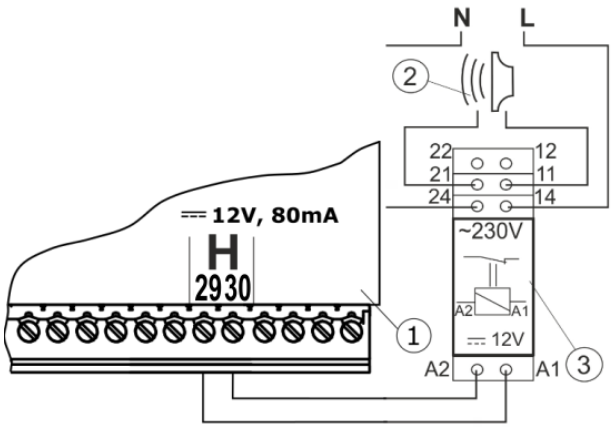


Figure 20. Connection of an external device for alarm signalling, where: 1 - regulator, 2 - external device for alarm signalling, 3 - relay

For proper operation, it is necessary to subsequently set the alarm output to be activated when one or several selected alarms (AL.1 to AL13) are triggered. This is done in the menu:

Service settings → Boiler settings → Alarms

26.5 Connection of the circulation pump

There is an option to connect and control the DHW circulation pump with the regulator - terminals 12-13 (see fig. 8).

The operation of the circulation pump is then controlled based on the following parameters:

Service settings → HC and DHW settings → Circulation pump pause time
Service settings → HC and DHW settings → Circulation pump work time

The circulation pump can also be connected to the output H of module B, terminals 27-28 (see fig. 9).

26.6 Connection of the mixing valve (mixer)

The regulator works only with drives equipped with limit switches. The use of other drives is prohibited. You can use drives with an opening time in the range of 30 to 255 seconds.

Description of mixer connection and settings:

- connect the mixer temperature sensor
- in the menu: ***Service settings → Mixer settings*** select the heating method from the menu, i.e. *HC on* or *Floor on*
- in the menu: ***Service settings → Mixer settings → Valve opening time*** enter the correct value (the time is indicated on the drive's nameplate, e.g. 120 s)
- disconnect the power supply to the regulator and determine the direction in which the drive opens/closes. For this purpose, switch the button to manual control and find the position where the temperature in the mixed heating circuit is at its maximum (in the regulator this corresponds to the 100% ON position) and also the position where the temperature is at its minimum (in the regulator this corresponds to the 0% OFF position).
- connect the mixer pump (terminals 17-18, see fig. 8) according to the pump manufacturer's technical documentation
- connect the mixer servo with the regulator (terminals 14-15-16, see fig. 8) according to the technical documentation of the servo manufacturer. Be careful to correctly identify the wires for opening and closing the valve.
- connect power to the regulator
- check the correct direction of opening and closing of the mixer servo. Enter the menu: ***Main menu → Manual control*** and open the mixer using the option *Mixer opens = ON*. The temperature on the mixer sensor should increase when opening the valve. If this is not the case, turn off the power to the regulator and swap the power wires. Note: another cause may be incorrect mechanical connection of the valve! Check if it is connected in accordance with the manufacturer's documentation.

26.7 Connection of the boiler pump and DHW pump

The regulator also controls the boiler pump and the heating of the DHW storage tank according to the set parameters. Boiler pump (terminals 19-20) and DHW pump (terminals 11-12) connect according to the diagram in fig. 8.

26.8 Connecting the pump group

A pump group (optional accessory) can be connected to the controller, which facilitates and speeds up the connection of the boiler to the heating system. This group is equipped with a boiler pump, a switching valve for DHW heating, a safety valve, a thermostatic valve for return protection, and a pressure gauge.

The pump group is connected according to the diagram in Figure 21.

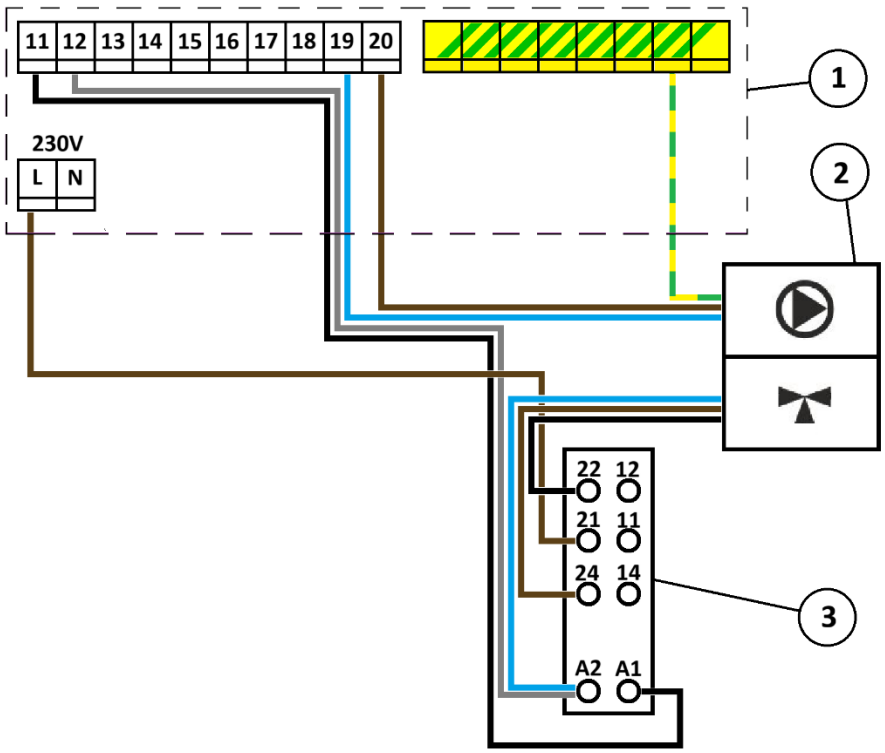


Figure 21. Connection of the pump group, where: 1- controller, 2 – pump group, 3 - relay

26.9 Connection of the ecoSTER TOUCH room panel

A room panel ecoSTER TOUCH can be connected to the regulator, which can serve as:

- room thermostat
- boiler control panel
- alarm signalling at the installation site
- indication of fuel in the boiler

The cross-section of the conductors for connecting the ecoSTER TOUCH room panel must be 0.5 mm^2. The maximum conductor length must not exceed 30 metres. When using conductors with a diameter greater than 0.5 mm^2 it is possible to use a longer cable.

Four-wire connection

It is necessary to correctly connect the VCC power cable of the room panel to the G1 terminal of the regulator – see fig. 8.

Two-wire connection

For two-wire connection, it is necessary to use an external 5V or 12V DC power supply with a minimum current of 400mA (not included with the boiler). Connect the GND and +12V terminals to the external power adapter. Connect the D+ and D- terminals to the regulator - see fig. 8.

26.10 Wireless connection of the room panel

Wireless connection of the eSTER_x80 panel and the eSTER_x40 thermostat to the regulator requires the connection of the ISM radio module – see fig. 8. Subsequently, it is necessary to pair the panel/thermostat with the ISM radio module. For this purpose, enter the menu:

General settings → Radio module settings → Pairing method

and select "YES" to activate the pairing function.

A detailed description of the connection and operation of the wireless panel and thermostat is provided in the separate manual for these devices.

26.11 Access to regulator parameters via the internet

By using the additional ecoNET internet module, the device enables remote online access to data in the regulator via LAN or Wi-Fi network (preview, parameter changes, operation history, etc.). Under these circumstances, the regulator can be operated via a standard web browser at the address: www.econet24.com or through the mobile application **ecoNET.apk** and **ecoNET.app**, which can be installed free of charge using this QR code:

Android	iOS

Connection of the internet module and configuration of the regulator for cooperation with Wi-Fi is described in the ecoNET module manual.

27 Service settings

27.1 Service setting structure

Burner settings

- Firing-up
  - Firing up test time
  - Flame detection
  - Blowing when firing up
  - Time of firing up
  - Blowing after firing up
  - Blowing time after firing up
  - Igniter heating up time
  - Operation time with minimum output
  - Correction of starting dose
  - Fumes exhaust fan power
- Work
  - Regulation mode
  - Work mode ON/OFF
  - Capacity of hopper
- Burning off
  - Maximum time of burning off
  - Minimum time of burning off
  - Blowing power
  - Blowing time
  - Blowing pause
  - Blowing start
  - Blowing stop
  - Fumes exhaust fan power
- Burner cleaning
  - Cleaning time after burning off
  - Cleaning blowing
  - Fumes exhaust fan power
- Setback
  - Burner output in setback
  - Max. setback time
- Grate
  - GRATE mode
- Other
  - Minimum blowing power
  - Fuel detection time
  - Maximum burner temperature
  - Maximum temperature of fumes
  - External feeder working time
  - Exhaust fan
    - Exhaust fan
    - Minimum power of fumes exhaust fan
    - 15% fumes exhaust fan power
    - 40% fumes exhaust fan power
    - 60% fumes exhaust fan power
    - 80% fumes exhaust fan power
    - 100% fumes exhaust fan power
    - Vacuum sensor

Boiler settings

- Minimum boiler temperature
- Maximum boiler temperature
- Backup boiler [1)]
- Alarms [1)]
- Temperature of cooling the boiler
- Boiler thermostat function
  - Turn off the pump
  - Turn off the burner and the pump
- Boiler efficiency

- Method of calculating heat yield
    - Missing
    - Heat meter
    - Exhaust
- Ash removal pause
- Ash removal time

HC and DHW settings

- Temperature of activating the HC pump
- HC pump pause during DHW charging
- Minimum temperature of DHW [1)]
- Maximum temperature of DHW [1)]
- Increase of boiler temperature from DHW and mixer [1)]
- Prolongation of DHW work [1)]
- Circulation pump pause time [1)]
- Circulation pump work time [1)]
- Boiler pump mode

Buffer settings

- Buffer work
- Temperature of starting buffer charging
- Buffer charging finish temperature
- Start heat installation

Mixer settings[1)]

- Mixer settings
    - Off
    - Heating circuit
    - Underfloor heating
    - Pump only
- Minimum mixer temperature
- Maximum mixer temperature
- Range of proportionality
- Constant integration time
- Valve opening time
- Thermostat pump deactivation
- Indifference of mixer

Output H4

- Backup boiler
- Alarms
- Signaling of operation
- Shunt pump
- Ash remover

Display advanced

- No
- Yes

Display orientation

- Normal
- Rotated

Restore the default settings

Service disabling

[1)] This setting is not displayed if the corresponding sensor, expansion module is not connected, or the parameter is hidden.

27.2 Description of service parameters

27.2.1 Burner settings

FIRING-UP	
• Firing up test time	The period during which the regulator checks whether there is a flame in the burner. Only the fan is working. If the flame has sufficient brightness, the boiler transitions directly to WORK mode, without the firing-up mode.
• Flame detection	Minimum flame brightness value in %, at which the regulator determines that the firebox is already burning. It is also used for detecting fuel shortage and the end of burning off.
• Blowing when firing up	Specifies the fan power in % during firing up. Too high a value prolongs the firing-up process or causes a failed attempt to ignite.
• Time of firing up	Specifies the time duration the firing-up attempt will take. After this time has elapsed, the regulator initiates another firing-up attempt (a total of 3 attempts). In the event of failed firing-up, the alarm will be activated: Failed firing-up attempt.
• Blowing after firing up	Fan power after successful firing-up, i.e. after the flame brightness increases above the value given by the parameter *Flame detection*.
• Blowing time after firing up	Specifies the running time of the fan with the performance *Blowing after firing up*. Allows for better firing-up of the firebox.
• Igniter heating up time	Specifies the igniter heating up time before the exhaust fan starts. It should not be too long to avoid damaging the igniter. After this time has elapsed, the igniter continues to glow until the flame is detected or the firing-up time expires.
• Operation time with minimum output	Specifies the time during which the burner operates at minimum output after firing-up. Allows stabilization of the burning process after firing-up. This status is indicated on the display by the STABILIZATION mode.
• Correction of starting dose	This parameter allows you to increase or decrease the amount of fuel (within a range of ± 30% compared to the factory setting) delivered to the burner during the first firing-up attempt.
• Fumes exhaust fan power	Determines the fumes extraction performance in % during the FIRING-UP mode.
WORK	
• Regulation mode	Determines the boiler power modulation method (see chap. 9.4.) in WORK mode. The following mode is available: • **Standard** – three-stage boiler output modulation
• Work mode ON/OFF	Setting the option to YES switches the burner to the THERMOSTAT mode, for example, for operation in a bakery. Under these conditions, the burner operates at maximum output without modulation. The burner switches off at the moment the contacts of thermostat 23-24 open. The boiler temperature sensor does not affect the burner operation.
• Capacity of hopper	This parameter is used to calculate the fuel level in the tank. If the correct value is set, the user does not need to perform the fuel tank level calibration procedure. If fuel level calibration has been performed (see chapter 15.4), the regulator does not use this value.
BURNING OFF	
• Maximum time of burning off	After this time elapses during burning off, the boiler switches to STOP mode, even if the optical sensor still detects a flame in the firebox.
• Minimum time of burning off	The burning off last for at least this time, even if the optical sensor no longer detects a flame in the firebox.

• Blowing power	Fan performance during burner purges in the course of burning off.
• Blowing time	Duration of burner purges when fuel is burning out in the course of burning off.
• Blowing pause	Pause between purges when fuel is burning out in the course of burning off.
• Blowing start	Flame brightness at which purging is initiated when fuel is burning out in the course of burning off.
• Blowing stop	Flame brightness at which purging is stopped when fuel is burning out in the course of burning off.
• Fumes exhaust fan power	Fumes extraction performance in the BURNING OFF mode.
BURNER CLEANING	
• Cleaning time after burning off	Fan running time during firebox cleaning while burning off. Used for removing fuel residues and ash from the burning chamber.
• Cleaning blowing	Burner fan performance during CLEANING mode.
• Fumes exhaust fan power	Fumes extraction performance during CLEANING mode.
SETBACK	
• Burner output in setback.	Specifies the burner output during the SETBACK mode. The value of this parameter must be sufficiently small to only maintain the flame. Too high a value may cause the boiler to overheat.
• Max. setback time	After this time elapses during the SETBACK mode, the boiler will automatically start the burner BURNING OFF process. If the parameter *Max. setback time = 0*, this function is disabled.
GRATE	
• GRATE mode	BLAZE HARMONY boilers are not designed for the use of this feature. The option "NE" (no) must always be set here.
OTHER	
• Minimum blowing power	Minimum fan power in %, selectable by the user. Used only to limit the available range of the fan power. It must be set to ensure reliable start-up and operation of the exhaust fan.
• Fuel detection time	It is the time counted after the flame brightness drops below the value of *Flame detection* in %. After this time has elapsed, the regulator initiates firing-up attempts. After 3 unsuccessful attempts, the alarm "Firing-up attempt failure" will be triggered.
• Maximum burner temperature	Specifies the temperature at the burner sensor (FS – see Fig. 8), upon exceeding which the regulator will trigger the alarm "Max temperature of burner exceeded".
• Maximum temperature of fumes	Specifies the temperature at the fumes temperature sensor (FT – see Fig. 8), upon exceeding which the regulator will trigger the alarm "Max temp of fumes exceeded". The alarm is activated if the temperature remains above the set value for more than 1 minute. If set to "0", the alarm is inactive.
• External feeder working time	Determines the running time of the external feeder (from the bunker) after detecting a low fuel level in the hopper (opening of the sensor contacts). The external feeder and the fuel level sensor are connected to the additional module B.
• Exhaust fan	Allows the exhaust fan operation to be enabled.
• % Fumes exhaust fan power	Parameters define the performance of the exhaust fan during the operation of the pellet boiler. These are analogous parameters to those of the exhaust fan in the burner. We recommend not changing the default values.
• Vacuum sensor	Enables the activation of the vacuum sensor operation.

27.2.2 Boiler settings

Minimum boiler temperature	It is the minimum value of *Preset boiler temperature* that can be set: • by the user in the main menu • by the regulator automatically, for example during night setback, weather control, etc. Operating the boiler at excessively low temperatures may cause damage, corrosion, tar deposits, etc.
Maximum boiler temperature	It is the maximum value of *Preset boiler temperature* that can be set: • by the user in the main menu • by the regulator automatically, for example during night setback, weather control, etc.
Backup boiler	see chap. 26.3.
Alarms	Configuration of the alarm output so that when the specified alarm is triggered, these alarms are displayed on the screen. • Al 1 Max temp of fumes exceeded • Al 2 Max temp of boiler exceeded • Al 3 Max temperature of burner exceeded • Al 4 Boiler sensor damage • Al 5 Burner sensor damage • Al 6 Firing-up attempt failure • Al 7 Fan damaged • Al 8 Minimum vacuum exceeded • Al 9 Maximum vacuum exceeded • Al 10 No communication with ecoPRESS • Al 11 No communication with inverter • Al 12 Broken feeder fuel system • Al 13 STB activated
Temperature of cooling the boiler	Specifies the temperature at which the forced heat extraction function from the boiler is activated (activation of the mixer and DHW pumps and opening of the mixed circuits) - see chapter 30.2.
Boiler thermostat function	Available options: • **NO** (*Burner and pump off*) – after the room thermostat is disconnected, the boiler pump does not turn off. The burner goes out and the boiler does not maintain the required boiler temperature. The burner reignites after the room thermostat is activated. • **YES** (*Pump off*) – after the room thermostat is opened, the boiler pump turns off. Burner goes out only after exceeding the boiler setpoint by 5°C. The burner reignites when the boiler temperature drops by the value of *Boiler hysteresis*.
Boiler efficiency	Determination of boiler efficiency in %. The value affects the display of the boiler's instantaneous output.
Method of calculating heat yield	BLAZE HARMONY boilers are not designed for the use of this feature. The option "None" must always be set here.
Ash removal pause	It is the amount of fuel in kg, after burning which the ash remover is activated.
Ash removal time	This is the operating time of the ash remover after it is switched on.

27.2.3 HC and DHW settings

Temperature of activating the HC pump	The parameter specifies the temperature at which the boiler pump switches on.

HC pump pause during DHW charging	The parameter allows periodic switching on of the boiler pump during charging of the DHW tank with priority. The boiler pump will turn on for the preset time of 30 seconds after this period. If set to "0", this function is inactive.
Minimum temperature of DHW	The parameter is available after connecting the DHW sensor. Parameter that prevents the user from setting the value *Preset DHW temperature* value too low.
Maximum temperature of DHW	The parameter is available after connecting the DHW sensor. This parameter sets the maximum temperature to which the DHW tank is heated during the removal of excess heat from the boiler or buffer in an emergency overheating situation. This is a very important parameter, as setting the temperature too high can cause scalding to the user. The parameter value being too low will result in no possibility of diverting excess heat to the DHW tank during boiler overheating. When designing the installation of the DHW storage tank, it is necessary to take into account that the regulator may be damaged. As a result of such a malfunction, the water in the DHW tank may heat up to a high temperature, which can cause scalding to the user. Therefore, it is necessary to install an additional thermostatic valve.
Increase of boiler temperature from DHW and mixer	Parameter specifies by how many °C the *preset boiler temperature* will increase to heat the DHW tank, buffer, or mixed circuit. Temperature increase occurs only when necessary. If the *required boiler temperature* is sufficiently high, the regulator will not increase it under these circumstances.
Prolongation of DHW work	The parameter is available after connecting the DHW sensor. After the DHW tank is charged and the DHW pump is switched off, there is a risk of the boiler overheating. This risk arises when the parameter *Preset DHW temperature* is set higher than *Preset boiler temperature.* The issue primarily concerns the operation of the DHW pump in SUMMER mode, when the boiler pump is switched off. In order to cool the boiler, the operation of the DHW pump is extended by the value of *Prolongation of DHW work*.
Circulation pump pause time	The parameter specifies how long the DHW circulation pump should be turned off after the elapse of the parameter *Circulation pump work time.*
Circulation pump work time	This parameter specifies how long the DHW circulation pump should operate after reaching the activation temperature in the DHW storage tank.
Boiler pump mode	This parameter is available after setting the option *Display advanced – YES)*. The following options can be set: • **Normal** – with this option, the boiler pump operates in standard mode. • **Heat exchanger** – this option can only be used for hydraulic installations with a heat exchanger between the open and closed circuit. The boiler pump in the primary circuit "boiler – heat exchanger" operates continuously. It is not turned off, for example, by the SUMMER function or the DHW priority. • **Pump group** – this option is used in cases where the boiler is equipped with a pump group (see the separate boiler operating and installation manual).

27.2.4 Buffer settings

Activation of the hydraulic system	This parameter is used to enable/disable operation with the buffer. It is available after connecting the temperature sensors of the buffer.

Temperature of starting buffer charging	The parameter defines the upper temperature in the buffer at which charging is started.
Buffer charging finish temperature	The parameter defines the lower temperature in the buffer at which charging is terminated.
Start heat installation	The parameter defines the upper temperature in the buffer, above which the heating of the heating circuits is switched off.
• Boiler pump stop hysteresis	

27.2.5 Settings of mixer 1-4

Mixer settings	**OFF** – the mixer servo and the mixer pump are not operating. **HC on** – used if the mixed heating circuit is connected to radiators. The maximum temperature of the mixing circuit is not limited. During heat removal from the boiler (in case of boiler overheating), the mixer is fully open. Warning: Do not enable this option if the installation is made from pipes that do not withstand high temperatures. In such a case, it is recommended to select the option *Floor on* in the mixer settings. **Floor on –** is used when the mixed heating circuit is connected to the underfloor installation. Maximum temperature of the mixed circuit is limited by the parameter *Maximum mixer temperature*. Warning: When selecting the mode *Floor on*, it is necessary to set the parameter *Maximum mixer temperature* so that thermal damage to the floor installation does not occur and there is no risk of burns. **Only pump –** as soon as the mixer temperature (M1) exceeds the value of the parameter *Preset temperature of mixer*, the mixer pump switches off. After the mixer temperature drops by 2°C, the pump will turn on again. This option is usually used to control the underfloor heating pump in situations where it works together with a thermostatic valve without an servo. This solution is not recommended. For floor heating, it is recommended to use a standard heating circuit (mixer with servo and mixer pump).
Minimum mixer temperature	Parameter that allows preventing the user from setting a value that is too low for *Preset temperature of mixer*. Automatic control (e.g. timed temperature reduction) will not cause the preset mixer temperature to drop below the value specified by this parameter.
Maximum mixer temperature	The parameter has two functions: • allows preventing the user from setting a value that is too high for *Preset temperature of mixer*. Automatic control (e.g. weather control) will not cause the mixer preset temperature to exceed the value specified by this parameter. • When selecting the Underfloor Heating mode, the boundary temperature of the mixer, at which the mixer pump switches off, is set simultaneously. For underfloor heating, this temperature must be set to a value not exceeding 45 to 50°C (or another value if specified by the manufacturer of the underfloor heating installation material or the heating system designer).
Range of proportionality	The parameter affects the size of the mixer servo movement. Increasing this parameter causes the mixer temperature (M1) to reach the *Preset temperature of mixer* more quickly, but too high a value causes temperature overshoot and unnecessary movements of the mixer servo.

Constant integration time	The parameter affects the movement speed of the mixer servo. The greater this value, the slower the servo's response to temperature deviations. Setting values too low may cause unnecessary movements of the mixer servo. Too high a value prolongs the time to find the value of *Preset temperature of mixer*.
Valve opening time	Enter the full valve opening time. It is indicated on the valve servo nameplate, e.g. 140 s.
Thermostat pump deactivation	The following options can be set: • **No** – the mixer pump does not switch off at the moment the room thermostat is turned off • **Yes** – the mixer pump switches off at the moment the room thermostat opens
Indifference of mixer	Parameter that determines the value of the mixer temperature indifference (so-called dead zone). The regulator controls the mixer in such a way that the instantaneous value of the mixer temperature (M1) is equal to the *Preset temperature of mixer*. To prevent too frequent movements of the servo, which could negatively affect its lifespan, regulation only occurs when the instantaneous temperature of the mixer (M1) is higher or lower than the *Preset temperature of mixer* by the value of *Indifference of mixer*.
27.2.6 Output H4	The following options can be set: • **Backup boiler** – the H4 output switches the backup boiler on/off. • **Alarms** – when the alarm is activated, the output on output H4 is switched. It is necessary to select the alarm(s) to which the output should respond. • **Signaling of operation** – voltage is continuously supplied to terminals H4 in all operating modes of the regulator. The power supply is interrupted only after turning off the regulator. • **Shunt pump** – the H4 output controls the operation of the flow (bypass) pump for boiler return protection. • **Ash removal** – the H4 output controls the operation of the ash remover. The activation intensity of the ash remover is determined by the parameters *Ash removal pause* and *Ash removal time* in the service menu *Boiler settings*.
27.2.7 Display advanced	• **Yes** – displays advanced parameters, whose display is not recommended under normal circumstances • **No** – hides advanced parameters
27.2.8 Display orientation	Allows setting the display orientation to normal or inverted position.
27.2.9 Restore the default settings	Resets the regulator to factory settings.
27.2.10 Service disabling	This is a service intervention where the burner is immediately shut off without performing the BURNING OFF and CLEANING mode. This method of burner shutdown can only be performed by a trained technician from an authorised service centre. During normal boiler operation, switching off the burner in this manner is prohibited.

28 Replacement of spare parts and components

When ordering spare parts and components, it is necessary to provide the essential information found on the regulator's nameplate, ideally the regulator's serial number. If the serial number is missing, please provide the model, regulator type, and year of manufacture.

The serial number of the regulator is located on the regulator's switchboard and the power module. The control panel number is not the regulator's serial number.

29 Software update

Software updates are most commonly performed using a memory card, type microSDHC (max. 32 GB, FAT32 format). The new software must be stored on the memory card as 2 files:

- program file for **module A** (in *.pfi format)
- program file for the **control panel** (in *.pfc format)

New software must be saved directly on the memory card, not in any folder.

Software updates may only be performed by an authorised person in compliance with all safety regulations associated with the risk of electric shock.

Procedure for software update:

- disconnect the boiler from the electrical supply
- remove the regulator panel from the boiler
- Carefully insert the memory card into the appropriate slot on the panel – see Fig. 22

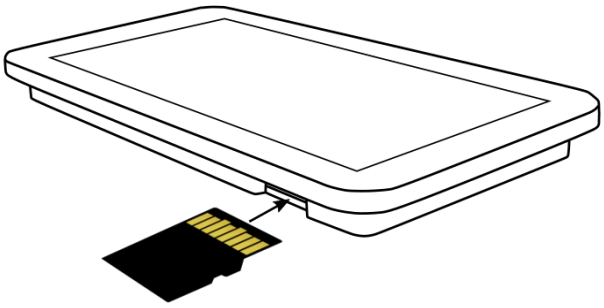


Figure 22. Inserting a memory card into the regulator panel

- Reinstall the panel into the boiler and connect the boiler to the electrical network
- enter menu:

General settings → Software update

- confirm the dialogue box *Start the program update?* with ✓
- cancel the dialogue box *Keep the factory settings?* with the “cross” button
- cancel the dialogue box *Keep current settings?* with the “cross” button
- load new software first in the main module A of the regulator, then in the control panel and other modules

- successful completion of the software update is indicated by the text *Update finished successfully. Remove SD card.*
- disconnect the boiler from the electrical supply
- remove the regulator panel from the boiler
- with a light press, the card will pop up from the slot in the panel
- remove the memory card from the slot in the panel
- Reinstall the panel into the boiler and connect the boiler to the electrical network

30 Alarms

Alarm numbers displayed by the regulator and the eSTER/ecoSTER room panel.

01	Max temp of fumes exceeded
02	Max temp of boiler exceeded
03	Max temperature of burner exceeded
04	Boiler sensor damage
05	Burner sensor damage
06	Firing-up attempt failure
07	Fan damaged
08	Minimum vacuum exceeded
09	Maximum vacuum exceeded
10	No communication with ecoPRESS
11	No communication with inverter
12	Broken feeder control system
13	STB activated

30.1 Max temp of fumes exceeded

The alarm activates after exceeding the maximum fumes temperature. It causes the exhaust fan to switch off. The goal is to protect the fumes temperature sensor from damage caused by exposure to temperatures exceeding the sensor's tolerance. After the temperature drop, the regulator returns to normal operation.

30.2 Max temp of boiler exceeded

The boiler overheating protection has three stages.

- First phase: When the boiler temperature exceeds 80 °C, the boiler pump always switches on. If the boiler temperature (BT) drops, the regulator will return to normal operation.
- Second phase: After exceeding the value of *Temperature of cooling the boiler* the regulator attempts to reduce the boiler temperature (BT) by additionally switching on the mixer pump, the DHW pump and opening the mixer servo (only if the option *HC on* is selected in *Mixer settings*). If in this situation the DHW temperature exceeds the value *Max. DHW temperature*, the DHW pump will switch off. It protects the user from scalding with hot water. If the boiler temperature (BT) drops, the regulator will return to normal operation.
- Third phase: If, however, the boiler temperature (BT) continues to rise (reaches 95 °C), the boiler will be shut down (extinguished). At the same time, a permanent alarm "Max. temp of boiler exceeded" is

activated with an audible signal. Alarm reset can be performed after the boiler has cooled down by pressing the ✓ button or by turning the regulator off and on again.

If the regulator is in SUMMER mode, it will first try to lower the boiler temperature (BT) by charging the DHW tank. The DHW pump will switch off if the DHW temperature exceeds the value of *Max. DHW temperature.*

30.3 Max temperature of burner exceeded

Alarm *Max. temperature of burner exceeded)* activates after reaching the temperature on the burner temperature sensor (FS) given by the parameter:

Menu → Service settings → Burner settings → Other→ Max. burner temperature

In this condition, the regulator will initiate the BURNING OFF mode. The alarm is automatically deactivated after the burner temperature decreases by 10°C.

The fuel firing-up protection function for the feeder does not work if the feeder sensor
is disconnected or damaged, or if the regulator is not powered.

30.4 Boiler sensor damage

This alarm is activated when the boiler temperature (BT) sensor is damaged or when its measurement range is exceeded.
After the alarm is activated, the regulator will initiate the BURNING OFF mode. Resetting the alarm is done by pressing the ✓ button or by turning the regulator off and then on again. It is necessary to check the sensor and replace it if necessary.

Boiler temperature sensor check is described in chapter 25. 5.

30.5 Burner sensor damage

This alarm is activated when the burner temperature (FS) sensor is damaged or when its measuring range is exceeded.
After the alarm is activated, the regulator will initiate the BURNING OFF mode. Resetting the alarm is done by pressing the ✓ button or by turning the regulator off and then on again. It is necessary to check the sensor and replace it if necessary.

The burner temperature sensor check is described in chapter 25. 5.

The regulator can operate with a disconnected burner temperature sensor if the maximum burner temperature parameter is set to "0". However, such operation is not recommended because it involves disabling the burner's protective function against fuel firing-up in the hopper.

30.6 Firing-up attempt failure

This alarm is activated after the third unsuccessful attempt to automatically ignite the firebox. After this alarm is activated, all pumps will be shut down to prevent unnecessary cooling of the boiler. Resetting the alarm is done by pressing the ✓ button or by turning the regulator off and then on again.
The reason for activating this alarm may be, for example, faulty glowing, lack of fuel in the hopper, feeder blockage, and others.

30.7 Fan damaged

This alarm is activated when the fan speed sensor (Hall sensor) or the exhaust fan itself is damaged based on the voltage load at the output controlling the fan. The regulator switches off the fan.

30.8 Minimum vacuum exceeded

This alarm is activated after exceeding the set vacuum values in the burning chamber of the boiler and when the vacuum sensor function is enabled.
Resetting the alarm is done by pressing the ✓ button or by turning the regulator off and then on again.

BLAZE HARMONY boilers are not designed for the use of this feature.

30.9 No communication

The control panel is connected to the power module via an RS485 communication line. If this cable is damaged, the display will show the alarm "No communication".
The regulator does not disable regulation and operates normally based on the programmed parameters. It is necessary to check the communication line and repair or replace it if needed.

30.10 Broken feeder control system

The regulator includes an auxiliary electrical circuit that prevents the continuous operation of the fuel feeder. Through this safety feature, the user is informed on the display about a fault in the electrical system controlling the fuel feeder. In the event of activation of such an alarm, the regulator is operational; however, it is an emergency condition and repair or replacement of the regulator must be arranged immediately.
When starting operation in an emergency condition, it is necessary to check whether a larger amount of unburned fuel has accumulated in the burner. If yes, it is necessary to remove the excess fuel. Firing-up with excess fuel can cause an explosion of accumulated fumes.

Operation in an emergency state is permitted only under user supervision until the contracted service organisation rectifies the fault. If supervision by the user is not possible, the boiler must be taken out of operation.

During operation in an emergency state, it is necessary to prevent the consequences of irregular operation of the fuel feeder (continuous operation or absence of feeder operation).

30.11 Emergency thermostat contact open

This alarm is activated when the contacts of the independent emergency thermostat STB are opened, as the temperature in the boiler reaches approximately 98°C. It serves to protect the boiler from overheating. Power to the fan and fuel feeder drive will be shut off. The hydraulic part of the installation (pumps, mixing circuit) is operating normally.
To restore functionality, it is necessary to allow the boiler to cool down by approximately 20-30°C, then unscrew the black cap (1) on the body of the regulator and press the coloured button (2) with a suitable object. Finally, screw the cap back on.

To prevent unwanted activation of the emergency thermostat due to the boiler's thermal inertia, it is recommended to operate the boiler at output heating water temperatures up to 80 °C.
In the event of repeated shutdown of the emergency thermostat, the boiler must be taken out of operation and the cause of the repeated overheating of the boiler must be determined.

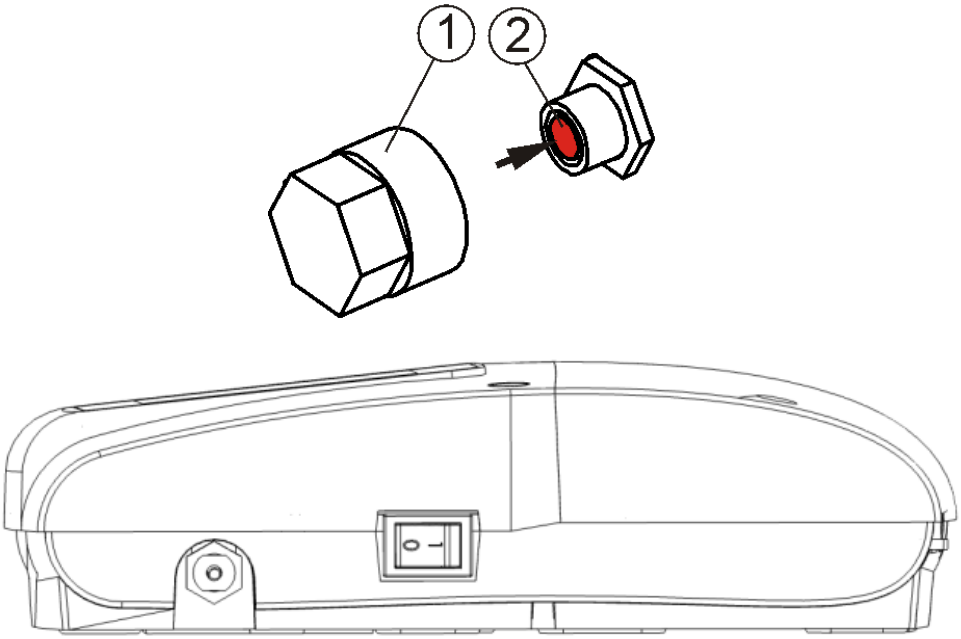


Figure 23. Resetting the emergency thermostat,

where: 1 – cover of the emergency thermostat, 2 - button

31 Additional functions of the regulator

31.1 Power outage

In the event of a power failure, the regulator will return to the mode it was in before the power outage.

31.2 Frost protection

If the boiler temperature (BT) falls below 5 °C, the boiler pump will activate and cause circulation of the heating water. This will slow down the water freezing process; however, in the case of severe frosts or power outages, the heating system will not be protected from freezing. Similarly, the DHW pump and the mixer pump are switched on.

31.3 Pump protection against seizing

The regulator protects the boiler pump, the DHW pump, and the mixer pumps against seizing. This is done by their regular activation (every 167 hours for a few seconds). This protects the pumps against seizing due to limescale buildup. For this reason, it is necessary that the regulator is powered by electricity during the shutdown and is in STAND BY mode ("*Boiler off*").

31.4 Collaboration with an external feeder

After connecting the additional module B, the regulator can cooperate with the level sensor in the hopper (fuel feeding from the bunker). After the sensor reaction (opening), the regulator will turn on the external feeder for the duration of *External feeder working time* in order to replenish the fuel hopper in the boiler. This parameter is in the menu:

Menu → Service settings → Burner settings → Other

32 Replacement of spare parts and components

32.1 Control panel replacement

To replace the control panel (1), the panel must be removed from the boiler shell by inserting suitable flat objects (2) into the illustrated slots as shown in figure 20. This will cause the panel latches to disengage and allow it to be removed.

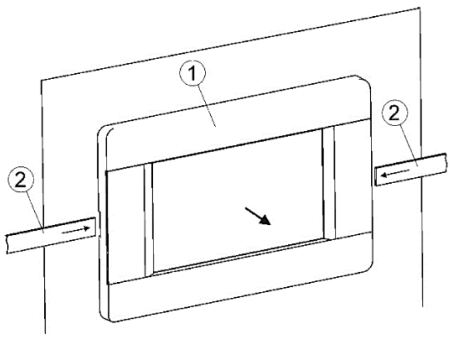


Figure 24. Control panel removal

In the event of replacing the control panel (display), it is necessary to check the compatibility of the new control panel's program with the power module's program. Compatibility is maintained if the first program number on the control panel and on the power module is identical. Below is an example of numbering programs that are identical.

Figure 25. Program number examples

Program numbers can be found on the nameplates of individual assemblies or on the display in "Main menu – Information".

32.2 Replacing the mains fuse

The mains fuse is located inside the regulator's internal switchboard on the power module. It protects the regulator from damage. The fuse may only be changed by a person with the appropriate qualifications after disconnecting the mains power supply. Use only slow, porcelain fuses with a delay, 5x20 mm, rated for a breaking current of 6.3A.

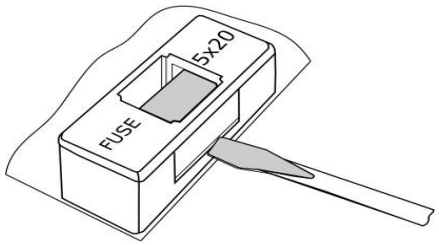


Figure 26. Replacing the mains fuse

To remove the fuse, use a flat screwdriver to lift the fuse holder and carefully take out the fuse.

33 Description of possible faults

Description	Instructions
The display shows nothing, even though the regulator is connected to the mains.	Check: • whether the fuse is blown, and replace it if necessary. • whether the cable for connecting the unit's control panel is properly connected and not damaged.
The text "Initialization" will appear on the panel display or room panel, followed by a screen reset.	Check: • whether the conductors have the appropriate cross-section. The event indicates a drop in the supply voltage below the critical value.
The boiler setpoint temperature displayed is different from the programmed value.	Check: • that the DHW tank is not currently being heated and the set DHW temperature is higher than the boiler set temperature. If yes, the difference disappears after charging the DHW tank or lowering the set DHW temperature. • In case a room thermostat is connected, set the service parameter *Temperature reduction from thermostat* to "0" (if available). • if time programs are active, disable the boiler time programs (if available).
The boiler pump is not working.	Check: • whether the boiler has reached the value given by the parameter *Temperature of activating the HC pump* and whether the pump is not blocked by the settings of the buffer parameters. • whether the pump is correctly connected, not damaged or blocked.
The fan is not working.	Check: • whether the emergency thermostat STB has activated. If yes, it must be unlocked manually by unscrewing its cover after the boiler has cooled down and pressing the reset switch. • the correctness of the connector wiring and whether it is properly inserted into the connector on the exhaust fan. • check and, if necessary, replace the fan.
The fuel feeder is not working.	• Check: • whether the feeder wires are connected correctly. • the correctness of the connector wiring and whether it is properly inserted into the connector on the exhaust fan. • check and, if necessary, replace the fan.
There are pieces of unburned pellets in the ash pit, a large amount of smoke is produced, the burner is going out.	Check: • the settings in the menu *Boiler modulation*.

The temperature is not measured correctly.	Check: • whether there is good thermal contact between the temperature sensor and the measured surface. • whether the feeder was shut down due to the emergency thermostat STB tripping. • whether the feeder drive is damaged. • In the event that the drive can be heard but fuel is not being delivered to the burner, check the auger feeder – see the separate boiler operating manual.
In the SUMMER DHW pump mode, the radiators are warm, the boiler is overheating.	• Increase the value of the parameter *Prolongation of DHW work* to cool down the boiler.
The percentage indicator in the mixer information does not match the current valve position.	• Wait for the mixer to calibrate itself or calibrate it manually.

34 Technical data

Electric voltage	~230V / 50Hz
Current drawn by the regulator	0.04 A
Maximum rated current	6 (6) A
Degree of protection of the	IP20
Ambient temperature	0...50 °C
Storage temperature	0...65°C
Relative humidity	5 - 85%, without condensation vapours
Measuring range of temperature sensors CT2S	0...300°C
Measuring rangeof temperature sensorsCT6-P	-35...40°C
Measuring rangeof temperature sensorsCT10	0...100°C
Accuracyof temperature measurement with sensors	±2°C
Terminals	Power: screw terminals, cross-section 2.5 mm^2, tightening torque 0.4 Nm, stripped conductor length 6 mm Signal: screw terminals, cross-section 1mm^2, tightening torque 0.3 Nm, stripped wire length 6 mm
Panel T4	Colour graphic 480 x 272 pixels with touchscreen
Panel T5	Colour graphic 800 x 480 pixels with touchscreen
External dimensions	Regulator module: 234 x 225 x 64 mm Panel T4 and T5: 144.4 x 97.5 x 13.3 mm
Weight	1 kg
Standards	EN 60730-2-9 EN 60730-1
Software class	A
Protection class	for installation in Class I equipment
Type of disconnection according to EN 60730-2-9	Type 2Y electronic disconnection, terminals: 3-4, 4-5 Type 2B micro disconnection, terminals: 6-7, 7-8, 9-7, 10-7, 11-12, 12-13
Pollution level	2nd stage according to EN 60730-2-9

35 Conditions for storage and transport

The regulator cannot be exposed to direct weather conditions, i.e. rain and sunlight. Storage and transportation temperature must not exceed the range of -15°C to +65°C. During transportation, the device must not be exposed to vibrations greater than those typical of standard transport.

36 Notes

BLAZE HARMONY s.r.o.

Trnávka 37, 751 31 Lipník nad Bečvou

Czech Republic

E-mail: info@blazeharmony.com, www.blazeharmony.com

Date of last revision: 2026-01-26