REGULATOR

ecoMAX860P3-LZ

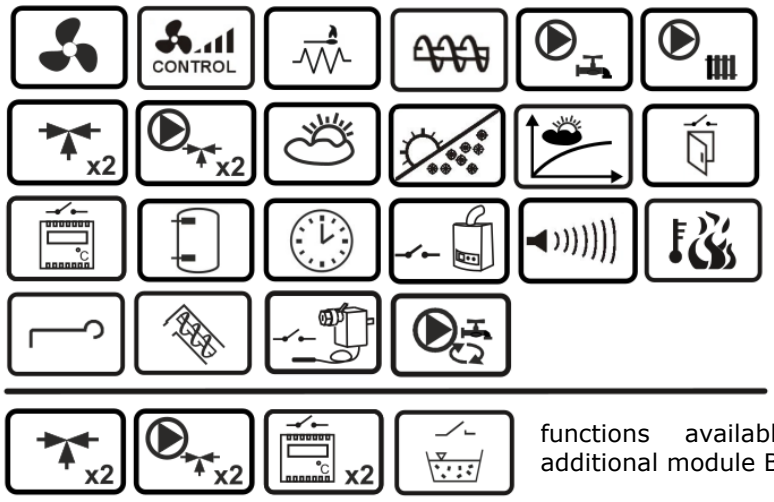
FOR PELLET BOILERS

ecoSTER TOUCH*

ecoSTER200*

ecoNET300*

ecoNET.apk
ecoNET.app
www.econet24.com



functions available in the additional module B

* room panel ecoSTER TOUCH or ecoSTER200 and ecoNET300 internet module isn't the standard equipment of the regulator.

SERVICE AND ASSEMBLY MANUAL

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ELECTRIC DEVICE UNDER VOLTAGE!

Before any action related to the power supply (cables connection, device installation etc.) check if the regulator is not connected to the mains!

Installation should be done by a person with appropriate electrical qualifications. Improper cables connection could result in the regulator damage.

The regulator cannot be used in steam condensation conditions and cannot be exposed to water.

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1 Recommendations regarding safety

Requirements concerning safety are described in detail in individual chapters of this manual. Apart from them, the following requirements should in particular be observed.

- Before starting assembly, repairs or maintenance, as well as during any connection works, please make sure that the mains power supply is disconnected and that terminals and electric wires are devoid of voltage.
- After the regulator is turned off using the keyboard, dangerous voltage still can occur on its terminals.
- The regulator cannot be used at variance with its purpose.
- Additional automatics which protect the boiler, central heating (CH) system, and domestic hot water system against results of malfunction of the regulator, or of errors in its software, should be applied.
- Choose the value of the programmed parameters accordingly to the given type of boiler and fuel, taking into consideration all the operational conditions of the system. Incorrect selection of the parameters can cause malfunction of the boiler (e.g. overheating of the boiler, the flame going back to the fuel feeder, etc.),
- The regulator is intended for boiler manufacturers. Before applying the regulator, a boiler manufacturer should check if the regulator's mating with the given boiler type is proper, and whether it can cause danger.
- The regulator is not an intrinsically safe device, which means that in the case of malfunction it can be the source of a spark or high temperature, which in the presence of flammable dusts or liquids can cause fire or explosion. Thus, the regulator should be separated from flammable dusts and gases, e.g. by means of an appropriate body.
- The regulator must be installed by a boiler manufacturer in accordance with the applicable safety standards.
- The programmed parameters should only be altered by a person familiarized with this manual.
- The device should only be used in heating systems in accordance with the applicable regulations.
- The electric system in which the regulator operates must be protected by means of a fuse, selected appropriately to the applied loads.
- The regulator cannot be used if its casing is damaged.
- In no circumstances can the design of the regulator be modified.
- Electronic isolation of the connected devices is applied in this regulator.
- The regulator consists of two subassemblies. In the case of replacing one subassembly, make sure to maintain compatibility with the other one. More information on that issue can be found in the documentation intended for fitters.
- Keep the regulator out of reach of children.

2 General information

The regulator ecoMAX860P3-LZ is intended to control pellet boiler operation. The regulator it automatically maintains a preset boiler temperature by controlling the fuel combustion process, it controls timing of feeding screw and fan, it automatically stabilizes a preset temperature of the domestic hot water tank, it automatically maintains preset temperature of several independent mixer heating cycles.

The preset temperature of heating cycles and boiler can be set on the basis of a weather sensor readouts.

Possibility of cooperation with room thermostats, separate for each heating cycles, facilitates maintaining comfortable temperature in the heated rooms. Moreover, if need arises, the device enables a reserve boiler (gas- or oil-fired).

The regulator can cooperate with an additional ecoSTER200 and ecoSTER TOUCH room panel situated in living quarters. The regulator cooperates with the ecoNET300 internet module, which makes it possible to control the on-line boiler.

The regulator can be used in a household and similar facilities, as well as in light industrialized facilities.

3 Information about documentation

The regulator manual is a supplement for the boiler manual. In particular, except for this manual, the boiler manual should also be observed. The regulator manual is divided into two parts: for user and fitter. Yet, both parts contain important information, significant for safety issues, hence the user should read both parts of the manual.

We are not responsible for any damages caused by failure to observe these instructions.

4 Storage of documentation

This assembly and operation manual, as well as any other applicable documentation, should be stored diligently, so that it was available at any time. In the case of removal or sale of the device, the attached documentation should be handed over to the new user / owner.

5 Applied symbols

In this manual the following graphic symbols are used:

- useful information and tips,

- important information, failure to observe these can cause damage of property, threat for human and household animal health and life.

Caution: the symbols indicate important information, in order to make the manual more lucid. Yet, this does not exempt the user from the obligation to comply with requirements which are not marked with a graphic symbol.

6 Directive WEEE 2012/19/UE

Purchased product is designed and made of materials of highest quality.

The product meets the requirements of the **Directive 2012/19/EU of 4 July 2012 on waste electrical and electronic equipment (WEEE)**, according to which it is marked by the symbol of crossed-out wheeled bin (like below), meaning that product is subjected to separate collection.

Responsibilities after finishing a period of using product:

- dispose of the packaging and product at the end of their period of use in an appropriate recycling facility,
- do not dispose of the product with other unsorted waste,
- do not burn the product.

By adhering obligations of waste electrical and electronic equipment controlled disposal mentioned above, you avoid harmful.

INSTRUCTION MANUAL

ecoMAX860P3-LZ

7 User menu - structure

Main menu
Information
Boiler settings
HUW settings
Summer/Winter
Mixer 1-4 settings*
Night time decrease
Work acc. schedule**
General settings
Manual control
Schedule of extra feeder*
Chimney sweep mode
⇨ Preset power
⇨ Work time
Alarms
Service settings

Boiler settings
Preset boiler temperature
Weather control
Heating curve*
Curve shift*
Room temp. factor*
Output modulation
Fuel level
⇨ Alarm level
⇨ Fuel level calibration
Burner cleaning
⇨ Max. time without cleaning
Lambda calibration*

Output modulation
Airflow power correction 100%
100% feeder work correction
50% H2 hysteresis
50% Airflow power correction
50% feeder work correction
30% H1 hysteresis
Airflow power correction 30%
30% feeder work correction
Boiler hysteresis
Stabilization time

HUW settings
HUW preset temperature
HUW pump mode
⇨ Off
⇨ Priority
⇨ No priority
HUW cont. hysteresis
HUW disinfection

Summer/Winter
SUMMER mode
⇨ Winter
⇨ Summer
⇨ Auto*
Act. temp. SUMMER
Deact. Temp. SUMMER

Mixer 1-4 settings*
Preset mixer temp.
Mixer room therm.
Mixer out.temp.dep
Mixer heating curve
Curve shift
Room temp.factor

Night time decrease
Boiler: Night time decrease, Schedule
Mixer 1-4: Night time decrease, Decrease, Schedule
HUW container: Night time decrease, Decrease, Schedule
Circulation pump: Night time decrease, Decrease, Schedule

General settings
Clock
Date
Brightness
Contrast
Sound
Language
WiFi*
Update

* the specific menu items may not be visible in the absence of a sensor, module or settings or hidden by the manufacturer.

8 Operating the regulator

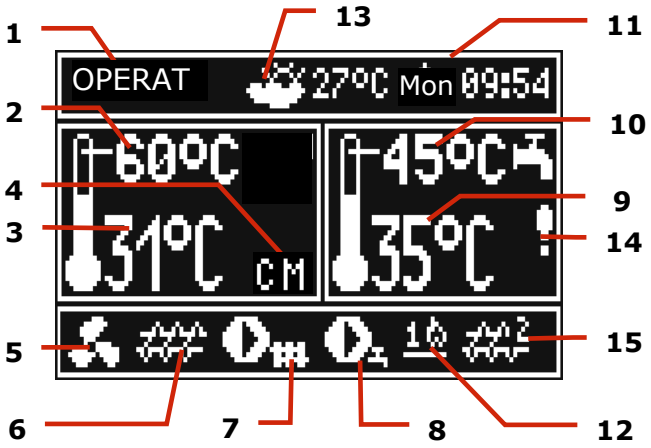
This section briefly describes how the regulator should be operated.

8.1 Description of panel operation

The regulator is operated by touch buttons that allow you to select items from the menu and edit parameters.

1. MENU entry button
2. The parameter selection button from the list, increasing the value of the edited parameter and switching main screen
3. ENTER button
4. EXIT button
5. The parameter selection button from the list, reducing the value of the edited parameter and switching the main screens.

8.2 Description of display main window



1. regulator operation modes: FIRE-UP, STABILIZATION, OPERATION, SUPERVISION, BURNING OFF, STOP, CHIMNEY
2. boiler preset temperature
3. boiler measured temperature
4. functions having influence on preset boiler temperature. Following symbols signal respectively:
   - ,,T" Preset boiler temperature decrease due to thermostat disconnection.
   - ,,S" Preset boiler temperature decrease due to activated time intervals.
   - ,,C" Boiler preset temperature during loading the hot water (HUW).
   - ,,M" Increase of the preset temperature of the boiler from the mixer circuit.
   - ,,P" Weather control switch on for boiler circulation.
   - „B" Preset temperature increase to load the buffer.
5. symbol signalling fan operation
6. symbol signalling main feeder operation
7. symbol signalling central heating (CH) pump operation
8. symbol signalling central heating pump operation (HUW)
9. measured temperature of hot water boiler (HUW)
10. preset hot water (HUW) boiler temperature
11. clock and weekday
12. Part of the screen coshared between two icons:
    "match" – symbolizes operating heater, and the digit next to it stands for a number of Firing-upattempts,
    "poker" – symbolizes activating automatics of furnace cleaning.
13. external (weather) temperature
14. symbol signalling disinfection of the hot water boiler
15. symbol signalling additional feeder operation.

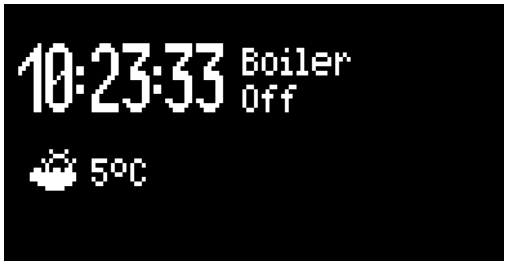
Right window on the main screen is configurable, allows on changing information displayed there. It is possible to choose a configuration displaying.

Right window on the main screen may also display the fuel level view, providing that this parameter is set correctly.

Note: Fuel level can be seen in room panel ecoSTER200 and ecoSTER TOUCH.

8.3 Switching on and off the boiler

After connecting the power the regulator shows the settings put before connecting the electricity. If the regulator has not operated before – it will start up in „Stand-by" mode. In this mode the screen is dimmed, actual time and information: *Boiler Off* is displayed.



In this mode protecting pumps against going stale function is in operation. It is executed by temporary switching them on. Therefore it is advised to keep the electrical power to the controller on when the boiler is not in use. And the regulator should be in "Stand-by" mode. It is possible to start up the boiler (pressing the ✓ button and selecting „Turn On") or setting parameters of its operation (MENU button) without connecting it to the electrical power. After making sure that fuel is in the silo, and the hatch is closed – the boiler can be switched on.

8.4 Setting preset boiler temperature

Preset boiler temperature, just like the preset mixer circuit temperature, can be set in the menu:

Boiler settings → Preset boiler temp.

and

Mixer 1-4 settings → Preset mixer temp.

The value set as *Preset boiler temp.* is ignored by the regulator if the preset boiler temperature is controlled by weather sensor. Regardless of that, the preset boiler temperature is automatically increased in order to fill the hot utility water tank and feed heating mixer cycles.

8.5 FIRE-UP mode

The FIRE-UP mode is used to automatic firing up of boiler furnace. Total time of firing-up depends on the regulator settings (feeder operation time, heater operation time, etc.) and on the boiler conditions before firing up. All parameters, which affect firing-up process are grouped in the menu:

Service settings → Boiler settings → Firing-up

Detailed description of firing-up cycle:

- Fan turns on with the power set in the parameter of *Blowing power- firing up*,
- Small dose of fuel (approx. 20% basic dose) is supplied,
- Conditions of the furnace are checked – i.e. once the exhaust temperature has reached the value of *Ex. temp. at the end of firing-up* or has increased by *Ex. temp. delta* within the time set in the parameter *Ignition test time* elapsed from the fan start, firing-up process stops. It means firing-up has been detected and regulator enters OPERATION mode. In case the criteria of furnace firing-up have not been fulfilled, regulator attempts to clean the furnace and fire it up:
- poker is activated to operate over *Poker cycle time,*
- fuel is supplied over *Feeding time*,
- fan turns on with the power set in the parameter of *Blowing power- firing up*,
- lighter switches on for *Firing-up time.* The regulator checks within this time whether fuel in the burner has been kindled. Fuel is deemed kindled once the temperature increment indicated on exhaust temperature sensor has reached the value of *Ex. temp. delta* or the exhaust temperature has increased above the value set in *Ex. temp. at the end of firing-up.* If firing-up has been successfully completed, lighter turns off and regulator enters OPERATION mode,
- Just upon entry the OPERATION mode, regulator checks whether the exhaust temperature has increased by the value of *Ex. temp. delta 2.* If NOT - regulator returns to firing-up mode. If YES - it remains in OPERATION mode.

In case the firing up has not been successfully completed, further attempts to fire-up the furnace are carried out with fuel dose reduced to 10% of the dose used in first attempt.

Upon execution of three unsuccessful attempts, the alarm of "Unsuccessful boiler firing-up attempt" is produced. Boiler operation is interrupted and cannot be automatically resumed - operator's intervention is required. Once the causes of firing-up failure have been removed, re-start the boiler.

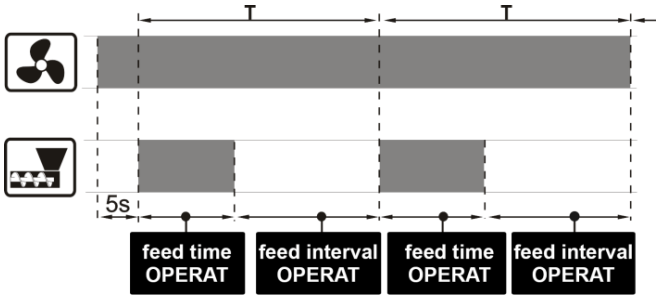
8.6 STABILIZATION mode

The STABILIZATION mode occurs immediately after firing up the furnace and is

aimed at stabilizing the combustion process before switching to the OPERATION mode. The duration of the mode is set in the parameter *Stabilization time*.

8.7 OPERATION mode

In OPERATION mode the fan operates continuously, fuel feeder switches on periodically. The operation cycle is composed of feeder operation time and feeder standstill time.



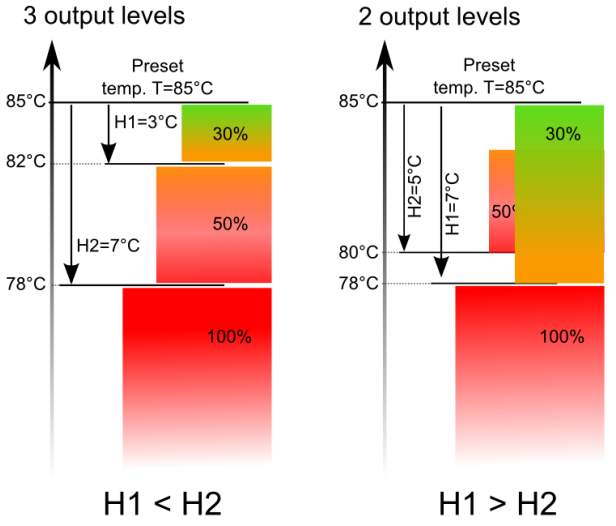
If a HUW container needs to be filled in OPERATION mode at pre-set boiler temperature, which is lower than the value required to its filling, the regulator will automatically increase preset boiler temperature for the time of HUW container filling

Boiler regulator is equipped with boiler output modulation function enabling gradual reduction of boiler output when approaching the preset boiler temperature.

Levels of boiler output are available in menu:

Boiler settings → Output Modulation

Each of the levels (100%, 50% or 30%) may be assigned individual values of fuel feeding time and blow-in output, which determine actual boiler output. Values of hysteresis (H1 and H2) determine when the boiler should work with selected output level. Each of these values is referred to the measured boiler temperature vs. its preset value. H1 and H2 values may be so set-up that the modulation will follow without intermediate level i.e. the boiler output will change directly from 100% to 30%.



Once the actual boiler temperature has reached the preset value, the regulator enters SUPERVISION mode.

8.8 SUPERVISION mode

In the SUPERVISION mode, the regulator supervises the furnace, so that it would not go out. For this purpose, the airflow and the feeder are activated only for a while, rarer than in the OPERATION mode. Without causing further temperature increase.

The airflow does not work continuously, it is activated cyclically together with the fuel feeder, which prevents the flame from going out during boiler standstill.

All parameters regarding boiler setup in the SUPERVISION can be found in the menu:

Service settings → Boiler settings → Supervision

Parameters of the SUPERVISION mode should be set in accordance with boiler manufacturer's recommendations. They should be chosen in such a way, that the furnace did not go out during boiler standstill (at the same time, it should not fire up too intensively, as this will trigger increase in the boiler temperature). Duration of the feeder operation and interval in the SUPERVISION mode are set using parameters: *Feeding time, Feeder interval.*

Parameters should be selected in such a way, that boiler temperature would gradually decrease when this mode is active. Improper settings can cause the boiler to overheat.

Airflow in the SUPERVISION mode operates with power set in the power modulation parameter *30% Airflow power*.
The regulator returns to the OPERATION mode automatically after boiler temperature decreases by the value of *Boiler hysteresis* in relation to the preset temperature.
Maximum boiler operation time in the supervision mode is defined by parameter: *Supervision time*. If after lapse of this time from the moment of the regulator's entering the supervision mode, there is no need to reactivate the boiler, the regulator will commence the process of putting the boiler out.

8.9 BURNING OFF mode

In BURNING OFF mode, rest of pellets is burnt and boiler is being prepared to stop or shut-down.
All parameters, which affect burning-off process are grouped in the menu:
Service settings → Boiler settings → Burning off
Detailed description of burning-off cycle:

- Fuel feeder stops,
- Remaining fuel is burnt – the fan turns on for the time set in *Burning-off time* with the power set in the parameter of *Air flush intensity*,
- The furnace is cleaned - poker switches on.

Upon automatic burning-off, regulator enters STOP mode.

8.10 STOP mode

In the STOP mode, the boiler is put out and awaits signal to resume heating.
A signal to start heating can be:

- decrease in preset boiler temperature below the preset temperature minus the value of boiler hysteresis (*Boiler hysteresis*),
- if the boiler is set to work with a buffer - decrease in upper buffer temperature below the preset value (*Loading start temperature*).

8.11 CHIMNEY mode

The regulator has a special CHIMNEY mode. During the operation of the mode, all possible heat consumers in the used heating installation are started simultaneously and the boiler starts heating up to the preset power in the parameter *Preset power*. The duration of the mode is set in the parameter *Working time*.
The CHIMNEY mode is used to test and regulate boiler operation.

8.12 Domestic how water settings

The device controls temperature of the domestic how water – HUW container, provided that a HUW temperature sensor is connected. If the sensor is disconnected, an information about lack thereof is displayed in the main window. The parameter:
HUW settings → HUW pump mode allows the user to:

- disable filling of the tank, parameter *Off*,
- set HUW priority, using the *Priority* parameter - in this case, the CH pump is deactivated to speed up filling of the HUW container.
- set simultaneous operation of the CH and HUW pump, using parameter *No priority*.

8.13 Setting preset HUW temperature

Preset HUW temperature is defined by parameter:
HUW settings → HUW preset temp.

8.14 DHW container hysteresis

Below temperature *HUW preset temp.* reduced by *HUW hysteresis,* the HUW pump is activated in order to fill the HUW container.


When value of hysteresis is set too low, the HUW pump will start faster after decrease in HUW temperature.

8.15 SUMMER function start up

To activate SUMMER function which allows feeding the silo during summer, without necessity to activate CH installation and mixers periods, it is required to set the:
Summer/Winter → SUMMER mode for *Summer.*


The SUMMER function can't be activated when the CWU sensor is disconnected.


It is not allowed to activate function summer when HUW pump is disconnected or damaged.

Function SUMMER can be activated automatically, on the basis of readings from weather sensor. Use following parameters to activate this function:

Summer/Winter → SUMMER Mode → Auto

If the automatic detection of summer mode is switched on, user can set the parameters: *Activ. temperature SUMMER*, so outdoor temp. above which the summer mode will be switched on and *Deactv. temperature SUMMER*, so outdoor temp. below which the SUMMER mode will be switched off.

8.16 HUW container disinfection

The regulator has a function of automatic, periodic heating of the HUW container to temperature of 70°C. The purpose is to remove bacterial flora from the HUW container.

The household members must definitely be informed about the fact of activating disinfection, as there is a hazard of scalding with hot utility water.

Once a week on Sunday night, at 02:00, the regulator increases the HUW container temperature. After 10 minutes of keeping the tank at 70°C, the HUW pump is deactivated and the boiler resumes normal operation. Do not enable the disinfection function if HUW support is deactivated.

8.17 Mixer circuits settings

Settings for the first mixer circuit can be found in the menu: **Mixer 1 settings**
Settings for other mixers can be accessed in next menu items and they are identical for each circuit.

<u>Settings for mixer without weather sensor</u>

It is necessary to manually set the required water temperature in the heating mixer circuit using parameter *Preset mixer temp.*, e.g. at a value of 50°C. The value should allow to obtain the required room temperature.

After connecting room thermostat, it is necessary to set a value of decrease in preset mixer temperature by thermostat (parameters *Mixer room therm.)* e.g. at 5°C. This value should be selected by trial and error. The room thermostat can be a traditional thermostat (no/nc), or room panel ecoSTER TOUCH. Upon activation of the thermostat, the preset mixer circuit temperature will be decreased, which, if proper decrease value is selected, will stop growth of temperature in the heated room.

<u>Settings for mixer with weather sensor without room panel</u>

Set parameter *Weather contr. mixer* to *On*. Select weather curve. Using parameter *Curve shift*, set preset room temperature following the formula:

Preset room temperature = 20°C + heating curve translation.

Example:

To obtain room temperature of 25°C, value of the heating curve translation must be set at 5°C. To obtain room temperature of 18°C, value of the heating curve translation must be set at -2°C.

In this setup, it is possible to connect a room thermostat which will equalize the inaccuracy of selecting heating curve, if the selected heating curve value is too high. In such case, it is necessary to set the value of preset mixer temperature decrease by thermostat, e.g. at 2°C. After opening of the thermostat contacts, the preset mixer circuit temperature will be decreased, which, if proper decrease value is selected, will stop growth of temperature in the heated room.

<u>Settings for mixer with weather sensor and with room panel</u>

Set parameter *Weather contr. mixer* to *On*. Select weather curve. The ecoSTER TOUCH panel automatically translates the heating curve, depending on the preset room temperature. The regulator relates the setting to 20°C, e.g. for preset room temperature = 22°C, the regulator will translate the heating curve by 2°C, for preset room temperature = 18°C, the regulator will translate the heating curve by -2 °C. In some cases it may be necessary to fine-tune the heating curve translation.

In this setup the ecoSTER TOUCH room panel can:

- decrease the heating cycle temperature by a constant value when the preset room temperature is reached. Analogously, as

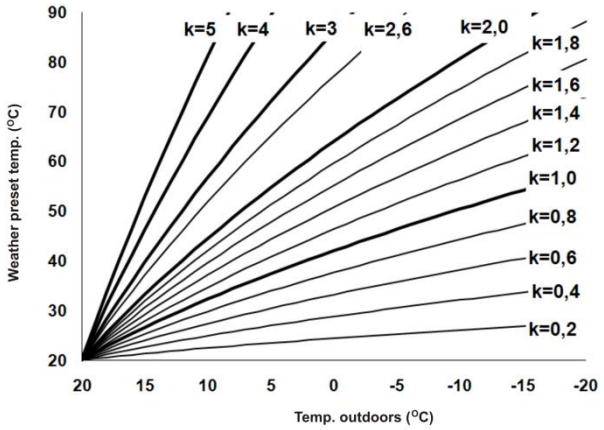
specified in the previous point (not recommended), or
- automatically, continuously correct the heating cycle temperature.
It is not recommended to use both options at the same time.
Automatic correction of room temperature is carried out in accordance with the following formula:
Correction = (Preset room temperature - measured room temperature) x room temperature coefficient /10
Example:
Preset temperature in the heated room (set at ecoSTER TOUCH) = 22°C. Temperature measured in the room (by ecoSTER TOUCH) = 20°C. *Room temp. factor* = 15.
Preset mixer temperature will be increased by (22 °C - 20 °C) x 15/10 = 3 °C.
It is necessary to find appropriate value of the *Room temp. factor.* The higher the coefficient, the greater the correction of preset boiler temperature. If the setting is "0", the preset mixer temperature is not corrected.
Note: setting a value of the room temperature coefficient too high may cause cyclical fluctuations of the room temperature!

8.18 Weather controlled operation

Depending on the temperature measured outside the building, both preset boiler temperature and temperatures of mixer circuits can be controlled automatically. If proper heating curve is selected, the temperature of the circuits is calculated automatically, depending on the outdoor temperature. Thus, if the selected heating curve is appropriate for the given building, the room temperature stays more or less the same, regardless of the temperature outside.
Note: During trial and error selection of appropriate heating curve, it is necessary to exclude influence of the room thermostat on regulator operation (regardless of whether the room thermostat is connected or not), by setting the parameter:
Mixer 1 settings → Mixer room therm. to "0".
If a room panel ecoSTER200/ecoSTER TOUCH is connected, it is also necessary to set the parameter *Room temp. factor* to "0".

Guidelines for proper setting of the heating curve:

- floor heating 0,2 -0,6
- radiator heating 1,0 - 1,6
- boiler 1,8 - 4

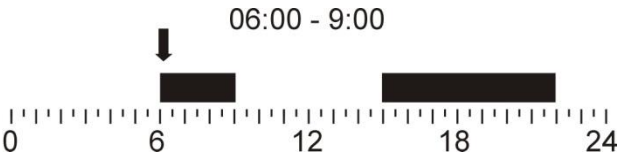


Guidelines for selection of appropriate heating curve:
- if the outdoor temperature drops, and the room temperature increases, the selected heating curve value is too high,
- if the outdoor temperature drops, and the room temperature drops as well, the selected heating curve value is too low,
- if during frosty weather the room temperature is proper, but when it gets warmer - it is too low, it is recommended to increase the *Curve shift* and to select a lower heating curve,
- if during frosty weather the room temperature is too low, and when it gets warmer - it is too high, it is recommended to decrease the *Curve shift* and to select a higher heating curve.
Buildings with poor thermal insulation require higher heating curves, whereas for buildings which have good thermal insulation, the heating curve can have lower value.
The regulator can increase or decrease the preset temperature, calculated in accordance with the heating curve, if it exceeds the temperature range for the given circuit.

8.19 Night decrease settings description

Night time decrease for heating circuits, HUW container and circulation pump.
Time periods allow setting temperature reduction in given time period – i.e. at night or when user leaves the heated room. Thanks to it preset temperature can be

reduced automatically, without loss of heating comfort by reducing fuel consumption.
Decrease of preset temperature in selected time intervals is indicated by the symbol "S" on the main screen.
To activate time intervals, set the parameter *Night time decrease* for the given heating circuit to *ON*. The parameter *Decrease* set the temperature reduction, one for all time intervals.
Night time decreases can be defined separately for every day of the week set *Schedule*.
Select temperature reduction and beginning and end of respective time interval. The time intervals for 24 hours are fixed at 30min.



Time periods.

Night time decrease for boiler
In the setting time intervals the boiler works. Outside of these time intervals, the boiler is turned off.

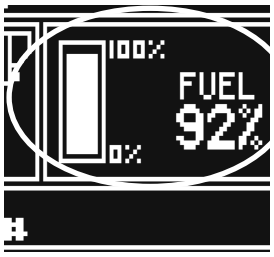
8.20 Circulating pump control

The settings for the circulating pump can be found in the menu:
Night time decrease
and
Service settings → CH and HUW settings
Setting of circulating pump control is analogical to night decrease setting. Circulating pump switches on in selected time intervals. In disregarded time intervals circulating pump will start and remain in operation for the period of time set in *Circulating pump operation time* , then will stop and remain out of operation for the period of time set in *Circulating pump standstill time.*

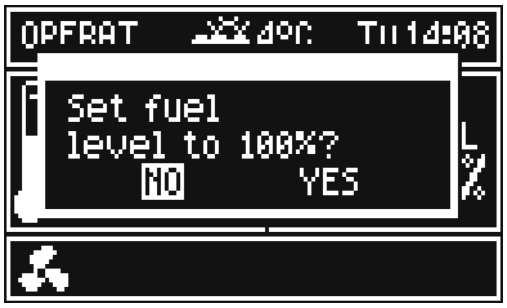
8.21 Fuel level setup

Activating the fuel level gauge
In order to enable display of the fuel level, set value of parameter
Menu → Boiler settings → Fuel level → Alarm level
to a value greater than zero, e.g. 10%.

Tip: fuel level can also be seen in room panel ecoSTER200 and ecoSTER TOUCH.



Operation of fuel level indicator
Any time upon filling fuel tank, press and hold ✓ pressed current fuel level value. Following prompt appears:



Set fuel level at 100% Once selected and confirmed *YES*, fuel level is set at 100%.
Once selected and confirmed *YES*, fuel level is set to 100%.
Note: Fuel may be replenished at any time without a need to wait for complete empty fuel tank. Replenish fuel always to the level corresponding to 100% level of the fuel tank and set 100% level as described above.

Description of operation
The regulator calculates the fuel level basing on the current fuel consumption. Default settings do not always correspond to the actual consumption of fuel by the given boiler, therefore, for proper operation this method requires the regulator user to perform level calibration. No additional fuel level sensors are required.

Calibration
To perform calibration - fill the fuel tank to the level corresponding to its full load and set the parameter:
Boiler settings → Fuel Level → Fuel level calibration → Fuel Level 100%
The indicator in the main window will be set to 100%. On-going calibration process is signalled by flashing fuel level gauge. The gauge will flash until the time of marking the

point corresponding to minimal fuel level. One must systematically control the decreasing level of fuel in the bin. When the level reaches the requested minimum, set the value of the parameter:
Boiler settings → Fuel level → Fuel level calibration → Fuel Level 0%

8.1 Information

Information" menu allows to preview temperatures being measured and to recognize which equipment is currently ON.

Upon connection of mixers' extension module, information windows of additional mixers are displayed.

8.2 Operation with additional feeder

The regulator is adapted to work with fuel charging sensor, which is part of boiler fittings.
On the basis of the settings made in the schedule of additional feeder operation in the menu:
Schedule of extra feeder
and signals received from the fuel level sensor, the regulator controls replenishment of fuel in boiler bin.
Upon activation set by time interval of the schedule, second feeder starts to operate according the algorithm defined by the parameter *Feeder operat time 2*. During operation of additional feeder, signal of bin charging sensor is used.

8.3 Support for poker automation

The regulator supports poker automation, which allows to improve the conditions of burning of inferior quality fuel and cleaning the furnace from ashes.
Cleaning of the hearth is performed by a poker in the FIRE-UP and BURNING OFF mode.
In the case when the boiler stays for a long time in the OPERATION or SUPERVISION mode it is possible to automatically start cleaning the boiler, the parameter *Burner cleaning* is used for this purpose.

8.4 Information

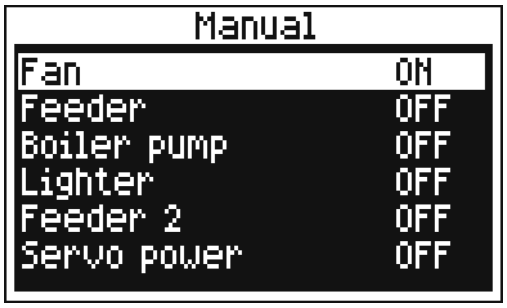
"Information" menu allows to preview temperatures being measured and to recognize which equipment is currently ON.

Upon connection of mixers' extension module, information windows of additional mixers are displayed.

Writing „CAL” in information window of mixer by position valve opening level stands for active process of its calibration. It is necessary to wait until calibration of mixer valve servomotor is completed. Then its current state will be displayed.

8.5 Manual control

Regulator offers possibility to manual start of working equipment such as pump, feeder motor or fan.
This feature enables checking whether the given equipment is fault-free and properly connected. Access to manual control menu is possible only in STOP mode, i.e. when the boiler is OFF.



OFF – equipment is switched OFF, ON – equipment is switched ON.

Long-term operation of the fan, the feeder or other working equipment may lead to occurrence of hazardous conditions.

8.6 Working according to schedule

In the regulator is possible to switch off the boiler at defined intervals. In the absence of demand for heat, e.g. in summer, one can disable the operation of the boiler at a certain time and thus reduce fuel consumption.
Time intervals are entered in the menu:
Work acc. schedule
Note: the menu item may not be available if the boiler manufacturer does not provide such a function in the boiler.

INSTALLATION AND SERVICE SETTINGS

ecoMAX860P3-LZ

9 Hydraulic diagrams

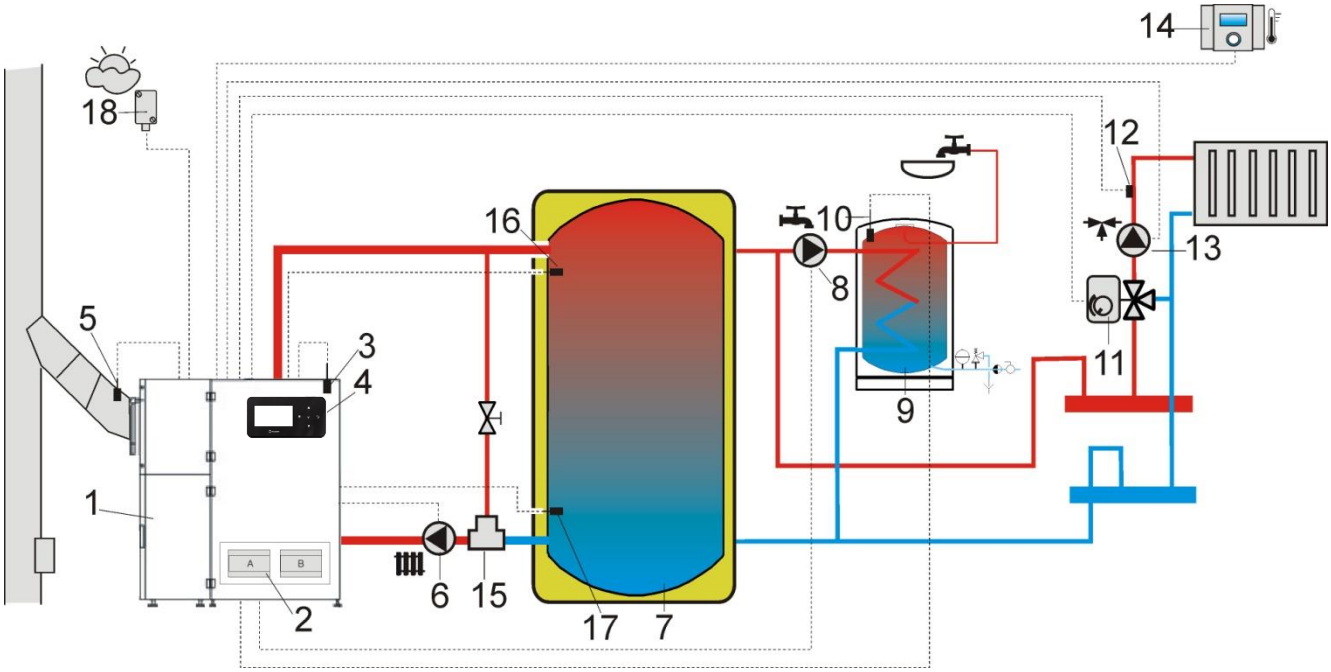


Diagram with a heat buffer [1], where: 1 – boiler, 2 – regulator, 3 – boiler temp. sensor, 4 – control panel, 5 – exhaust temp. sensor, 6 – boiler pump, 7 – buffer, 8 – HUW pump, 9 – HUW container, 10 – HUW temp. sensor, 11 – mixer actuator, 12 – mixer temp. sensor, 13 – mixer pump, 14 – room panel with room thermostat function, 15 – thermostatic three-way valve, 16 – upper buffer temp. sensor, 17 – Lower buffer temp. sensor, 18 – weather temp. sensor.

RECOMMENDED SETTINGS:

Parameter	Setting	MENU
Preset boiler temp.	80°C	boiler settings
Buffer support:	Yes	service settings→buffer
Loading start temperature	45°C	service settings→buffer
Loading end temperature	70°C	service settings→buffer
Mixer 1 support	CH On	service settings→mixer 1 settings
Max. mixer 1 temp.	70°C	service settings→mixer 1 settings
Heating curve. mixer 1	0.8 – 1.4	service settings→mixer 1 settings
Mixer 1 weather control	Off	mixer 1 settings

Short operation description: The boiler pump (6) starts operation after the boiler has exceeded the *CH pump activation temperature*. When the temperature from the sensor (17) reaches the *Loading end temperature*, the regulator switches off the burner and goes into the STOP mode. When the temperature from the sensor (16) drops below the *Loading start temperature* then the regulator ignites the burner and switches to the OPERATION mode. When the water entering the boiler is cold, then the thermostatic valve (15) closes. This causes the boiler water to flow in a short cycle: boiler (1) - throttle valve (15) - thermostatic valve (6) - pump (6). The thermostatic valve (15) opens after the return temperature to the boiler increases, directing the boiler water to the heat buffer.

[1]The presented hydraulic diagram does not replace the central heating system design and is provided solely for the purposes of demonstration!

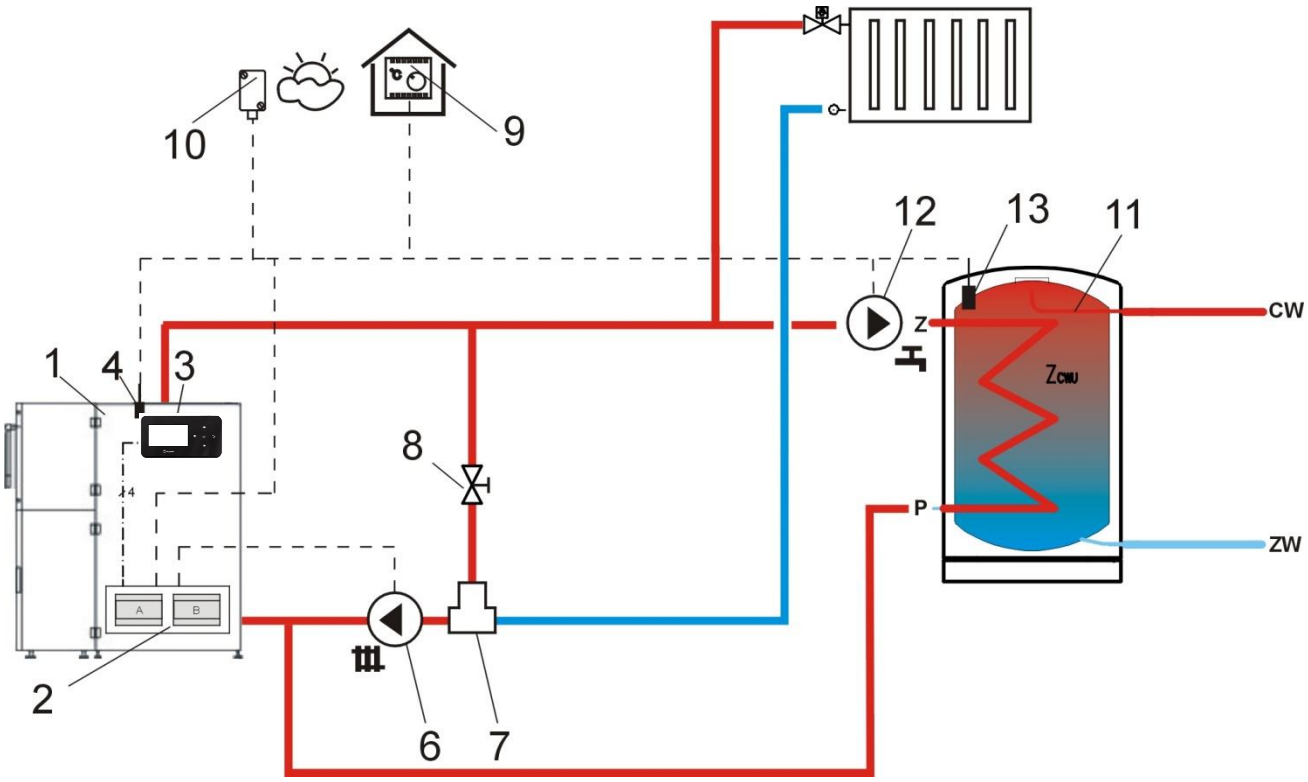


Diagram with thermostatic three-way valve which protects the temperature of return water[2], where: 1 – boiler with feeder, 2 – regulator, 3 –control panel, 4 – boiler temp. sensor, 6 – boiler pump, 7 – thermostatic three-way valve, 8 – throttle (poppet) valve, 9 – room thermostate, 10 – weather temperature sensor, 11 – HUW container, 12 – HUW pump, 13 – HUW temperature sensor.

RECOMMENDED SETTINGS:

Parameter	Setting	MENU
Mixer 1 support	Off	service settings →mixer 1 settings

Short operation description: CH pump (6) and and HUW pump (12) start once the boiler temperature has exceeded *CH activation temp.* (usually: 40°C). In case the water, which flows to the boiler is cold, thermostatic valve (7) closes. It causes the flow of boiler water in short circuit: boiler (1) – throttle valve (8) - thermostatic valve (7) – pump (6). Thermostatic valve (7) opens upon increase of boiler return temperature and directs boiler water to CH system. Once the temperature measured by the sensor (13) has dropped to below *HUW preset temp.*, HUW pump (12) starts operation. HUW pump (12) stops upon completed filling of HUW container (11), i.e. when the temperature measured by the sensor (13) is equal to *HUW preset temp.*.

[2]The presented hydraulic diagram does not replace the central heating system design and is provided solely for the purposes of demonstration!

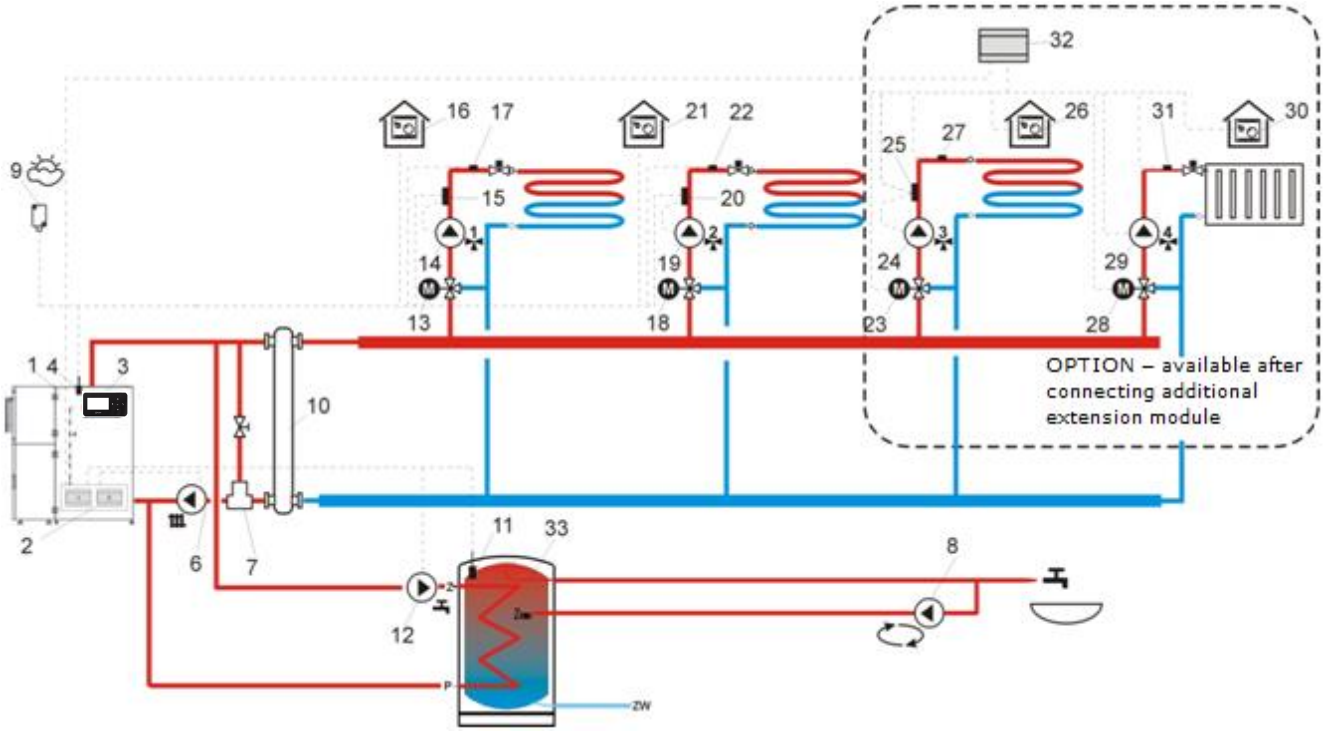


Diagram with thermostatic three-way valve which protects return water temperature, and two three-way valves which feed floor heating, as well as with two additional mixer cycles after connecting an extension module[3], where:1 – boiler, 2 – regulator, 3 – control panel, 4 – boiler temperature sensor, 6- boiler pump, 7 – thermostatic three-way valve (protecting boiler return), 8 – circulating pump, 9 – weather temperature sensor, 10 – fluid coupling (eliminates necessity of balancing the pumps' flows), 11 – HUW temperature sensor, 12 – HUW pump, 13 – mixer servo 1, 14 – mixer 1 pump, 15 – external thermostat protecting floor heating 55ºC (it cuts off electricity supply for mixer pump after exceeding maximum temperature - the thermostat is not included in the regulator), 16 –room thermostat of mixer 1, 17 – mixer temperature sensor 1,18 – mixer servo 2, 19 – mixer pump 2, 20 – external thermostat protecting floor heating 55ºC, 21 – mixer 2 room thermostat, 22 – mixer 2 temperature sensor,23 – mixer servo 3, 24 – mixer 3 pump, 25 – external thermostat protecting floor heating 55ºC, 26– room thermostat of mixer 3, 27 – mixer 3 temperature sensor,28 –mixer 4 servo, 29 – mixer 4 pump, 30 – room thermostat of mixer 4, 31 – mixer 4 temperature sensor, 32 – extension module B, 33 – HUW container.

RECOMMENDED SETTINGS:

Parameter	Setting	MENU
Mixer 1 support	Floor On	service settings→mixer 1 settings
Max. mixer 1 temp.	50°C	service settings→mixer 1 settings
Mixer 1 weather control	On	mixer settings 1,2,3,4
Mixer 1 heating curve	0.2 – 0.6	service settings→mixer 1 settings
Mixer 2 support	Floor On	service settings→mixer 2 settings
Max. mixer 2 temp.	50°C	service settings→mixer 2 settings
Mixer 2 heating curve	0.2 – 0.6	service settings→mixer 2 settings
Mixer 3 support	Floor On	service settings→mixer 3 settings
Max. mixer 3 temp.	50°C	service settings→mixer 3 settings
Mixer 3 heating curve	0.2 – 0.6	service settings→mixer 3 settings
Mixer 4 support	CH On	service settings→mixer 4 settings
Max. mixer 4 temp.	80°C	service settings→mixer 4 settings
Mixer 4 heating curve	0.8 – 1.4	service settings→mixer 4 settings
Boiler weather control	Off	service settings→boiler settings

[3]The presented hydraulic diagram does not replace the central heating system design and is provided solely for the purposes of demonstration!

10 Technical data

Power supply		230V~, 50Hz
Current consumed		0,04 A
Maximum rated current		6 (6) A
Regulator protection rating		IP20
Ambient temperature		0...50°C
Storage temperature		0...65°C
Relative humidity		5…85% without vapour condensation
Measuring range of temperature sensors CT4/CT2S		0...100°C/0..380°C
Measuring range of temperature sensors CT6-P		-35...40°C
Accuracy of temperature measurements with sensors CT4 and CT6-P		2°C
Terminals	network	screw terminals, wire cross-section area 0.75mm^2 through 1.5mm^2, screwing torque 0.4Nm, insulation removed: 6mm
	communication	screw terminals, wire cross-section area up to 0.75mm^2, screwing torque 0.3 Nm, insulation removed: 6mm
Display		Graphics: 128x64pix.
External dimensions		210x115x60mm
Total weight		2kil.
Norms		EN 60730-2-9 EN 60730-1
Software class		A
Protection class		To be built into class I devices

11 Conditions of storage and transport

The regulator cannot be exposed to direct effects of weather, i.e. rain and sunlight. Storage and transport temperature cannot exceed the range of -15…65°C.

During transport, the device cannot be exposed to vibrations greater than those typical of normal road transport.

12 MOUNTING

Basic version of the equipment is composed of three modules: control panel and two working modules. All components are electrically interconnected.

12.1 Environmental conditions

Due to the risk of fire is prohibited to use the controller in explosive gas and dust enviroment (eg coal). Regulator should be separated using appropriate enclosure.

In addition, controller cannot be used in the presence of water vapor condensation and be exposed to water.

12.2 Installation requirements

The regulator should be installed by a qualified and authorised fitter, in accordance with the applicable norms and regulations.

The manufacturer bears no responsibility for damages caused by failure to observe this manual.

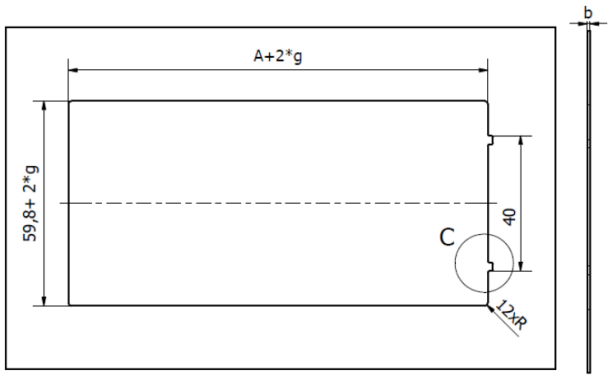
The regulator is to be built-in. The regulator cannot be used as a stand-alone device.

The temperature of the ambient and the fitting surface cannot exceed the range of 0….50°C. In the basic version, the device consists of three modules, including control panel and two executive modules. All parts are electrically interconnected.

12.3 Assembly of control panel

Control panel is designed to be attached to a mounting plate. Provide appropriate heat insulation between hot boiler walls and control panel and cable harness. Space required to assemble the control panel of the regulator is shown in the figure below. When installing follow the instructions given below.

Drill a hole in the boiler mounting plate acc. the below drawing.

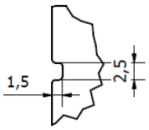


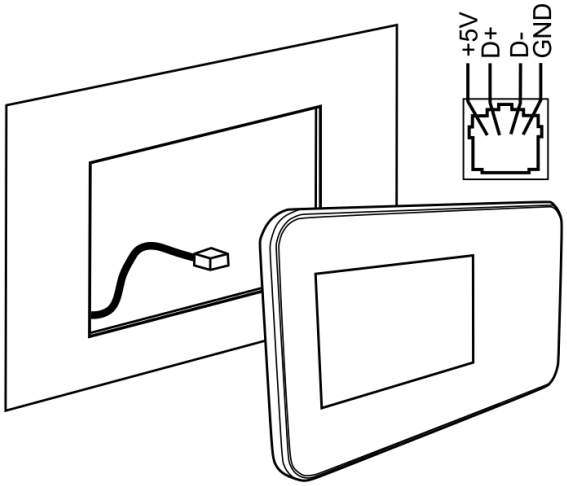
C (2 : 1)

b+2*g	A
1	122,4
0,8	121,8

g = (paint thickness)

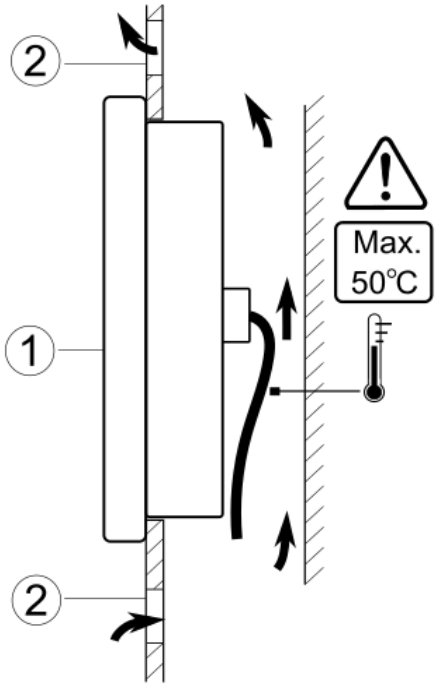
R = 0 - 0,5





Installation of control panel in boiler mounting plate.

The maximum length of the transmission wire should be 5m, with a cross-section of 0,5mm^2.

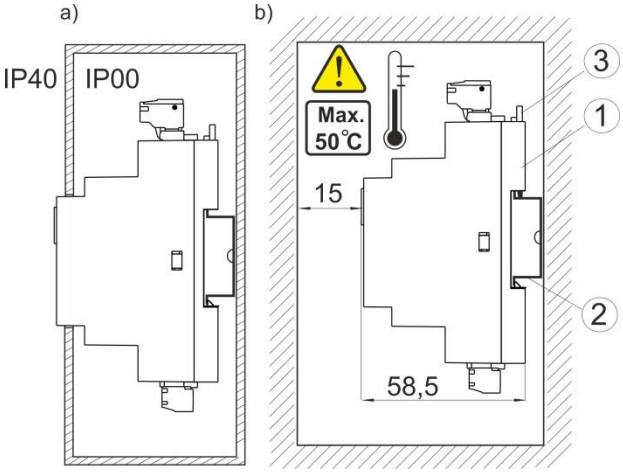


Control panel mounting requirements. 1 – control panel, 2 – vent holes to provide air circulation (Note: the holes may not cause downgrading of required IP panel rating.)

12.4 Assembly of module

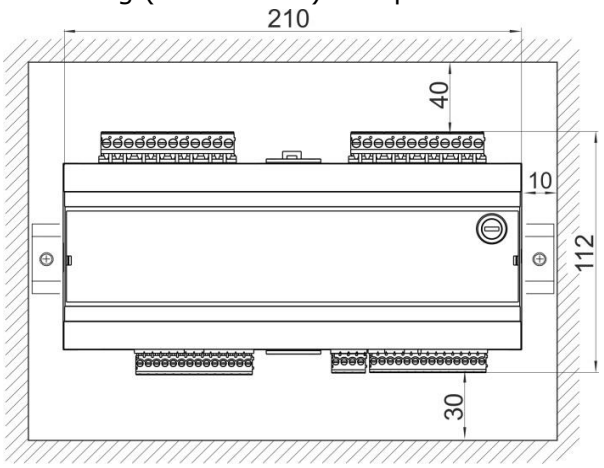
Working module has to be built-into the master equipment. Assembly should assure IP rating appropriate to the environment conditions, in which the regulator will operate. Moreover, access of the user to live parts under hazardous voltage (e.g. terminals) should be prevented. Standard installation housing as shown in below figure may be used. In such case the user will have access to front surface of working module. Housing may be also formed by boiler elements surrounding the whole module. Space required for mounting a working module is shown in below figures. Module housing does not guarantee dust- or-waterproofness. To provide the required protection, appropriate module cover should be provided.

The working module is designed to be mounted on a standard DIN TS35 rail. Fasten the rail firmly to a rigid surface. Prior to placing the module on the rail, lift up the catch. Now, place the module on the rail and press the catch to bring it to the original position. Make sure the device is firmly fastened and cannot be easily removed from the rail without use of tools.



Methods of module installation: a) – in modular housing with access to front surface, b) – in the cover without access to front surface, 1- working module, 2 – DIN TS35 rail, 3 – catch.

For safety reasons, assure the safe distance between live parts of working module terminals and conductive (metallic) elements of housing (min. 10mm) is kept.



Protect connecting wires from tearing, loosening and tensioning or built them in in such a way that no load is exerted on them.

12.5 IP rating

The housing of working module of the regulator provides various IP ratings, subject to the manner of assembly. Upon assembly carried out in accordance with this drawing, IP20 rating is provided at the front side of working module housing (this rating is specified on the rating plate). The housing has IP00 rating at the side of connecting terminals, therefore, the terminals of working module have to be isolated and access to this section of the housing must be prevented.

To get access to the terminals, disconnect power supply, make sure terminals and wires are free of mains voltage and remove the housing of working module.

12.6 Electric connection

Regulator is suitable to work with power supply of 230VAC, 50Hz. Power supply features: 3-wires (with protective wires PE), compliant with applicable regulations.

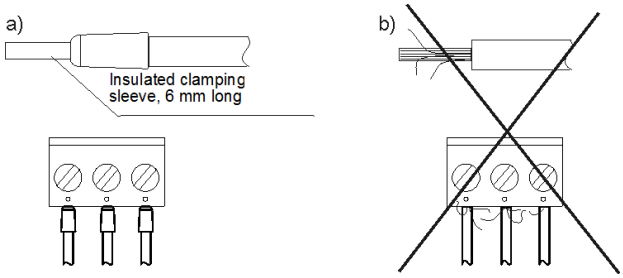
Note: Upon switching-off the regulator, hazardous voltage may be present on its terminals. Before commencement of assembly works, disconnect external power supply and make sure terminals and wires are free of hazardous voltage.

Connecting wires should not contact surfaces temperature of which exceeds their rated operating temperature.

Terminals no.1-21 of each module are designed to connect equipment supplied with 230VAC. Terminals 22–49 are intended to connect LV equipment (supply voltage below 12V).

Connection of external power supply of 230VAC to terminals 22-49 or to data transmission interface G1…G4 will cause damage to the regulator and create risk of electric shock!

Endings of connecting wires (particularly power supply ones) have to be protected from lamination using insulated clamping sleeves shown on the drawing below:



Wire ending protection: a) - correct, b) – incorrect.

Connect power supply wires to terminals indicated with an arrow.

All peripherals (such like: pumps, RE-marked relays and connected recipients) may be connected only by qualified persons in accordance with applicable regulations. Safety precautions to prevent electrocution should be observed.

Regulator should be equipped with a set of pins connected to the 230V AC mains.

12.7 Protective connections

Connect protective wire of power supply cable to ground strip linked with metal boiler housing. Connect coupling to the terminal of the regulator indicated with a sign ⏚ and to earthing terminals of devices connected to the regulator. Mistake! Not possible to find an information cradle.

12.8 Electric scheme

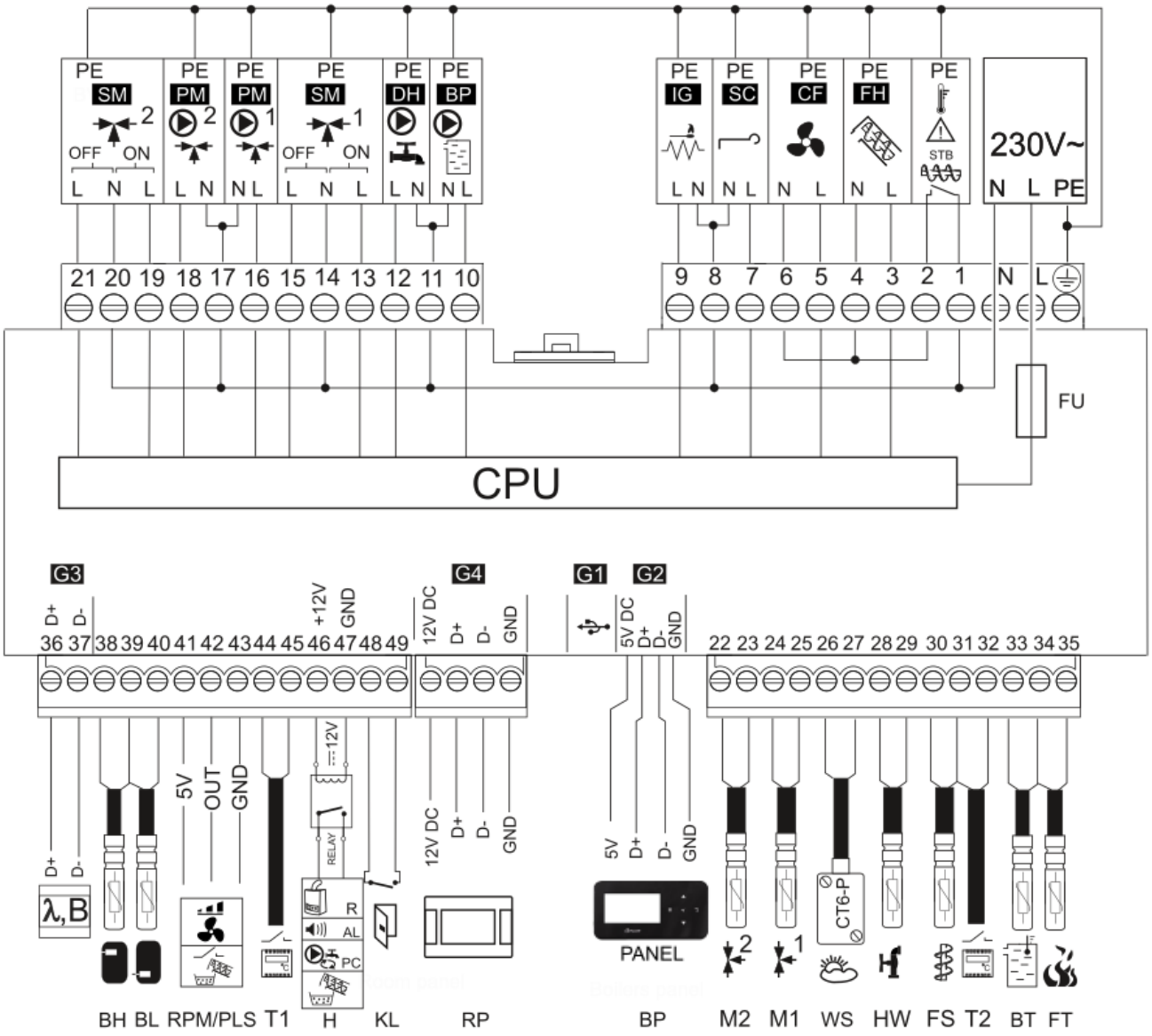


Diagram of electrical connection to the regulator: **λ** – Lambda module, **B** – module B to support additional 3 and 4 heat circuits, **BH** – upper buffer temp. sensor type CT4, **BL** – lower buffer temp. sensor type CT4, **RPM** – fan speed sensor, **PLS** - fuel level sensor, **T1** – standard room thermostat (No-Nc), **H** – voltage output for controlling: reserve boiler (**R**), alarm signaling (**AL)**, HUW circulation pump (**PC**) and additional feeder, **RELAY** – relay 12VDC, **KL** - boiler door-open sensor, **RP** - ecoSTER TOUCH / ecoSTER200 room panel with room thermostat function, **BP** – control panel, **M1** - temperature sensor of the regulated circuit (mixer 1) type CT4, **M2** - temperature sensor of the regulated circuit (mixer 2) type CT4, **WS** – weather temperature sensor type CT6-P, **HW** – HUW temperature sensor type CT4, **FS** – feeder temperature sensor type CT4, **T1** – standard room thermostat (No-Nc), **BT** – boiler temperature sensor type CT4, **FT** – exhaust temperature sensor type CT2S, **L N PE** - power supply 230V~, **STB** – input for STB device, **FH** – main feeder, **CF** – burner fan, **SC** – rotary engine burner cleaning, **IG** – igniter, **BP** – boiler pump, **DH** – HUW pump, **SM** – mixer 1 and 2 servo, **PM** – mixer 1 and 2 pump, 2, **CPU** – controller.

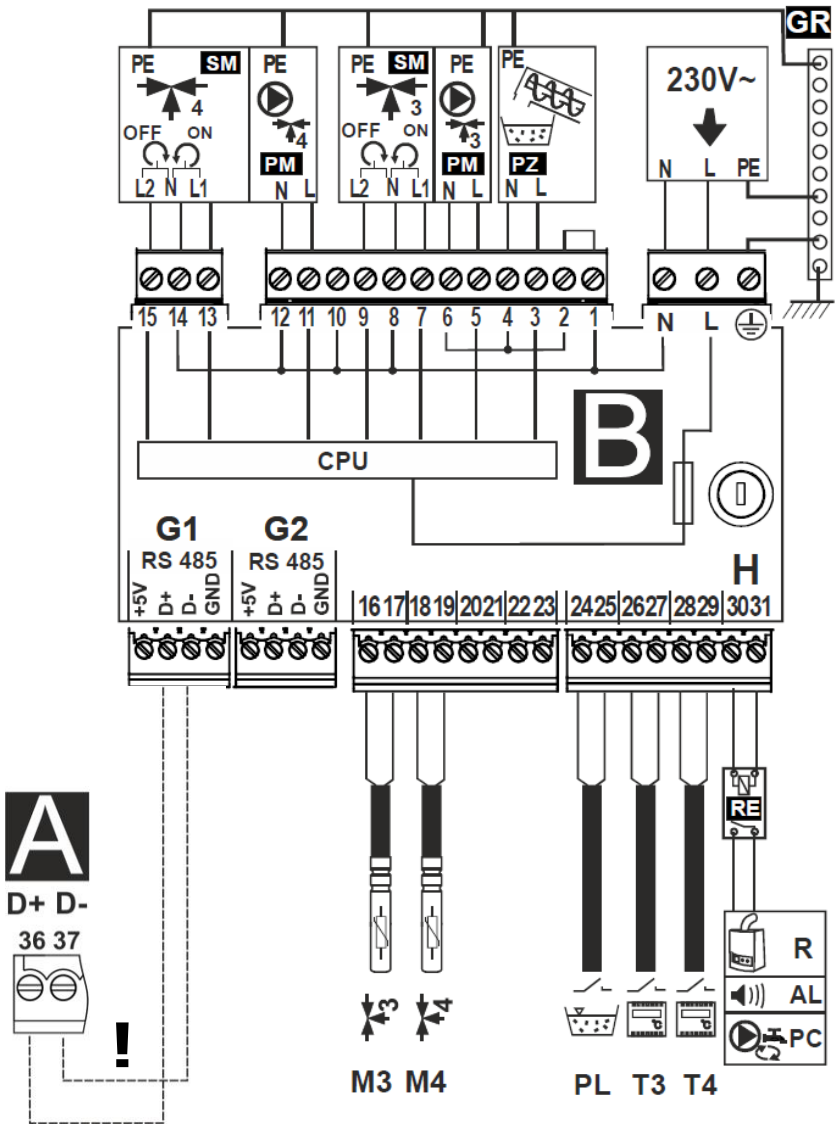


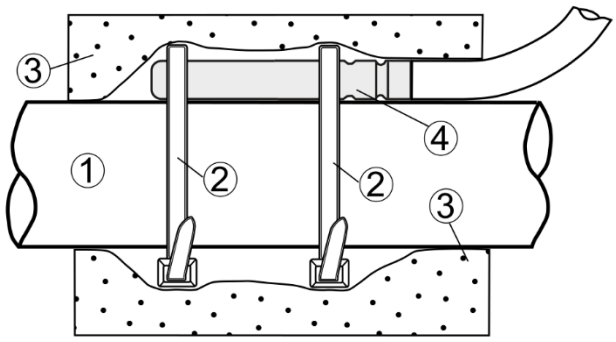
Diagram of electrical connection to the B module: **M3** – regulated circuit (mixer 3) sensor temperature type CT4, **M4** - regulated circuit (mixer 4) sensor temperature type CT4, **PL** – fuel level sensor, **T3** – mixer 3 room thermostat, **T4** – mixer 4 room thermostat, **H** – voltage output for controlling: reserve boiler (**R**), alarm signaling (**AL)**, HUW circulation pump (**PC**), **RELAY** – relay 6VDC, **L N PE** - power supply 230V~, **GR** – grounding bar, **PM** – mixer 3 and 4 pump, **SM** – mixer 3 and 4 servo, **CPU** – controller, **A** – main module, **!** – only connect two-wire (do not connect with four wires, it can damage the regulator).

12.9 Connection of temperature sensors

Regulator works with sensors - type CT4 and CT2S only. Use of other sensors is not allowed.

Sensor wires may be extended using wires of cross-section area not less than 0,5mm^2. Total length of wires of each sensor should not exceed 15m.

Insert boiler temperature sensor into thermometer well fastened to boiler shell. Fasten feeder temperature sensor to the surface of feeder screw tube. Insert temperature sensor of HUW container into thermometer well welded to the container. The best way to mount mixer temperature sensor is to insert it into a sleeve located in the stream of flowing water, however, it is also allowed to fasten the sensor in a contact manner provided that the sensor and the pipe are properly heat-insulated.



Mounting temperature sensor: 1 - pipe, 2 – clamps, 3 - thermal insulation, 4 - temperature sensor.

Sensors shall be protected against loosening from surfaces they are mounted to.

Make sure thermal contact between the sensors and the surface which temperature is measured is good. Apply thermal paste to improve the contact. Pouring sensors with oil or water is not allowed.

Sensor wires should be separated from power supply wires. Otherwise, temperature indications may be erroneous. Min. distance between these wires should be 100mm.

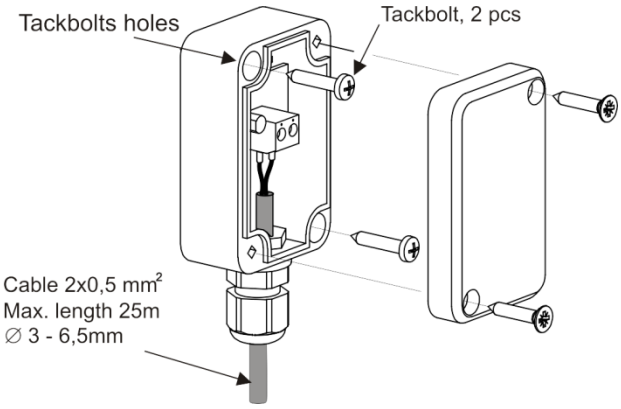
Do not allow sensor wires to contact hot parts of the boiler and heating system. Wires of temperature sensors are heat resistant to the temperature not exceeding 100°C.

12.10 Connection of weather sensor

Regulator works with weather sensors type CT6-P only. Fasten the weather sensor on the coldest wall of the building - usually it is a roofed area of north wall. The sensor should not be exposed to direct sunlight or rainfall. Install the sensor at the height of min. 2m above ground level in the location away from windows, chimneys and other heat sources, which may interfere temperature measurements (min. distance: 1,5m).

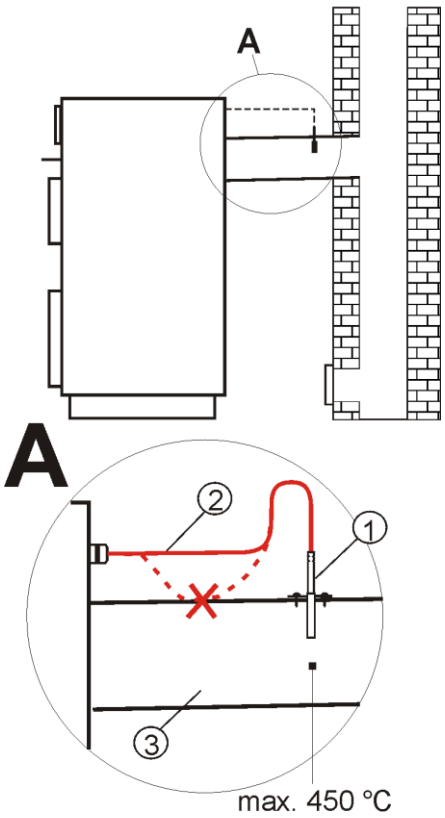
Use cable of wire with cross section area of min. 0,5mm^2 and length of up-to 25m to connect the sensor. Wire polarization is irrelevant. Connect other cable end to regulator terminals.

Bolt the sensor to the wall using erection bolts. Holes for bolts are accessible upon removal of sensor housing lid.



12.11 Connecting exhaust sensor

The exhaust sensor should be fitted in the boiler flue. The gap between the sensor and the flue should be sealed. The sensor should be installed by a qualified fitter, while observing regulations applicable for chimney systems. The emission sensor should be connected to the sensor terminals acc. to The emission sensor lead cannot touch hot elements of the boiler and the flue, the temperature of which exceeds 350°C. The emission sensor should be installed in such distance from the boiler at which it is not directly exposed to flames, and where the emission temperature does not exceed 450°C.



Connecting emission sensor: 1 – exhaust temp. sensor type CT2S, 2 – sensor lead, 3 – flue.

Caution: Opening the boiler door can cause the emission temperature to exceed the sensor's thermal resistance, which can burn the sensor out.

12.12 Checking of temperature sensors

The temperature sensors may be tested by measuring their resistance at the given temperature. In case of significant differences between the measured resistance and the values indicated in the table below - replace the sensor.

To test CT2S sensor use very accurate multimeter – otherwise, only very rough testing is possible.

CT4			
Temp. °C	Min. Ω	Nom. Ω	Max. Ω
0	802	**815**	828
10	874	**886**	898
20	950	**961**	972
25	990	**1000**	1010
30	1029	**1040**	1051
40	1108	**1122**	1136
50	1192	**1209**	1225
60	1278	**1299**	1319
70	1369	**1392**	1416
80	1462	**1490**	1518
90	1559	**1591**	1623
100	1659	**1696**	1733

CT6-P (weather)			
Temp. °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

CT2S-2 (exhaust)			
Temp. °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

12.13 Connection of mixers room thermostat

Room thermostat with open contacts reduces preset temperature of mixer circuit by the decrement set in the menu:

Mixer 1-4 settings → Mixer room thermostat

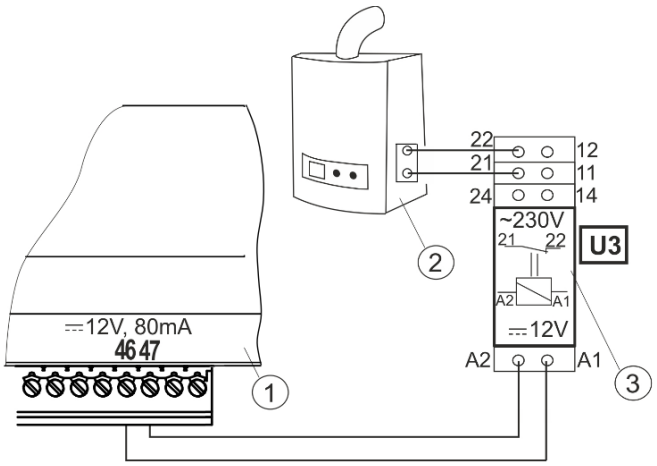
Select the value of this parameter so that once the room thermostat has responded (its contacts have opened), the temperature in the room drops. When connecting the ecoSTER200 or ecoSTER TOUCH room control panel, make sure the *Thermostat select* parameter is set to a correct value.

Service settings → Mixer 1-4 settings

12.14 Connection of reserve boiler

Regulator may control reserve oil or gas fired boiler. In such case, manual start and stop of reserve boiler is not necessary. Reserve boiler starts once the temperature of pellet fired boiler has dropped and stops it has reached a proper value. Reserve (e.g. gas fired) boiler should be connected by qualified technician in accordance with technical documentation of this boiler.

Reserve boiler should be electrically connected through relay to terminals 46-47 of the regulator.



Example: connection of reserve boiler to regulator: 1- regulator, 2 – reserve boiler (gas- or oil-fired), 3 – RM 84-2012-35-1012 relay and GZT80 RELPOL base plate.

Standard version of the regulator is not equipped with a relay.

Reserve boiler control is switched off upon setting the *Output H1* (*Output H2*) function to the *Reserve boiler*.

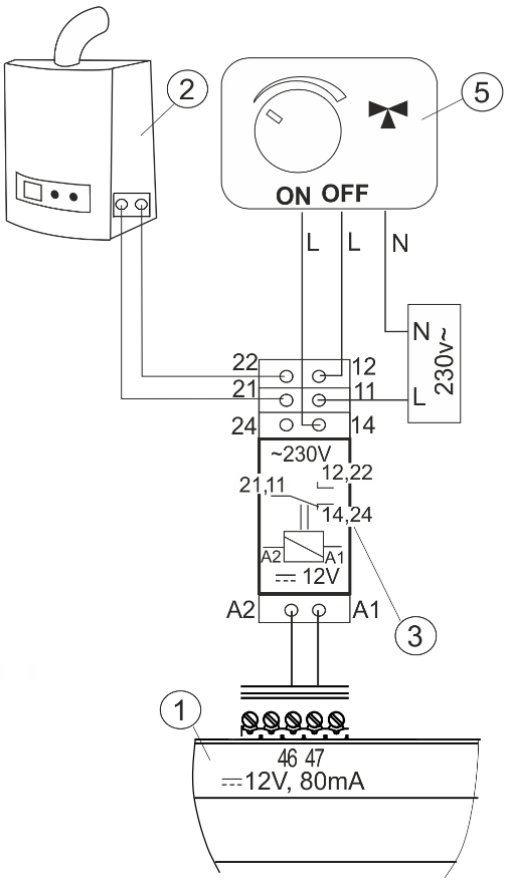
Service settings → Output H → Output H1 → Reserve boiler

and then set the *Temperature of reserve boiler activation* to a value different from zero. Switching off the reserve boiler control is performed after setting the zero value of this parameter.

Once the boiler has been fired up, and its temperature has exceeded the preset value (e.g. 25ºC), regulator switches off the reserve boiler and applies voltage 12VDC at output H, which causes release of coil of relay and opening its contacts. Once the boiler temperature has dropped below the value set in the parameter of *Temperature of reserve boiler activation,* the regulator stops to supply voltage to the output H, and the reserve boiler switches on.

Entry of regulator to "Stand-by" mode causes the reserve boiler switches on.

It is recommended to change-over regulator to "Stand-by" mode once the pellet boiler has failed and there is a need to use reserve boiler. In "Stand-by" mode, control of CH system is disabled (mixer, HUW and boiler pumps and mixer control are inactive).



Example: wiring diagram of control of switching valve in reserve boiler. 1 – regulator, 2 – reserve boiler, 3 – relay, 5 – switching valve servo (with limit switches). Note: terminals 22,21,24 have to be galvanically insulated from terminals 12,11,14.

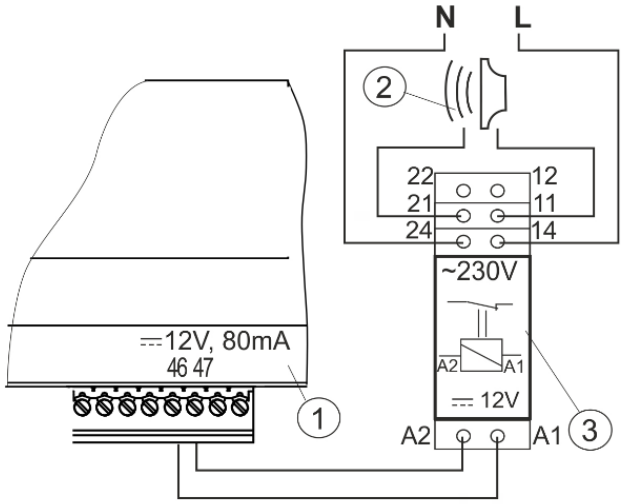
12.15 Connection of alarm signalling

Regulator may announce alarm conditions by activating an external device (e.g. a bell or GSM device to send a text message). Connect alarm annunciator as shown in below fig. through the relay. Due to the fact that this output H is shared with the control output of the reserve boiler, in order to activate the alarm functions on this output, it is necessary to first switch off the reserve boiler control. To do this, please in the menu:

Service settings → Output H → Output H1 → Reserve boiler

set the temperature value of its deactivation to zero and then alarm signalling may be activated by setting the *Output H* function to *Alarms*.

Service settings → Output H



Example: connection of external alarm annunciator. 1- regulator, 2 – external alarm annunciator, 3 – relay (e.g. RM 84-2012-35-1012 RELPOL) with GZT80 RELPOL base plate.

12.16 Connection of mixer servo

When connecting mixer servo, take due care to prevent boiler overheating, which may occur when the flow of boiler water is limited. You are advised to get familiar with the position of the valve corresponding to its maximum opening before commencement of work so that you may ensure heat collection from the boiler at any time it is required by opening it completely.

The regulator works only with mixing valve servos equipped with limit switches. Use of other servos is not allowed. The servos of full turn time from 30 to 255 s may be used.

Description of mixer connection:

- connect mixer temperature sensor, - connect mixer pump wiring,
- switch on the regulator and select proper *Mixer support* in the service menu:

Service settings → Mixer 1 settings

- enter the proper *Valve opening time* in (this time should be indicated on servo rating plate e.g. 120 s).
- connect power supply to the regulator and switch on the regulator to start the mixer pump,
- determine direction of servo closing/ opening. For this purpose, set the selector located on the housing of the servo to manual control and find the positions in which the temperature in mixer circuit is maximum and minimum (it corresponds to the setting of the regulator of "100% ON" and "0% OFF, respectively). Note the position to verify the connections later,
- disconnect power supply to the regulator,
- connect mixer servo and regulator wiring according to valve servo manufacturer's technical documentation. Do not mistake direction of valve opening with its closing,
- connect regulator power supply and put it in the "Stand-by" mode,
- check whether wires to mixer closing and opening are not interchanged. To do this, enter the menu: **Manual control** and open the mixer by selecting *Mix1 Open = ON*. When opening the servo, the temperature on mixer sensor should increase. If not, disconnect regulator power supply and switch the wires. Note: Other reason may be incorrect mechanical connection of the valve! – refer to the documentation of valve manufacturer and check whether the valve is properly connected.

12.17 Connection of circulating pump

The circulation pump should be connected via a relay to terminals 46-47 of the executive module.

To enable the circulation pump control, set the *Output H* to operate the pump in the menu:

Service settings → Output H → Output H1

12.18 Connection of STB temperature limiter

To avoid boiler overheating in case of regulator failure, STB or other safety temperature limiter proper for the given boiler has to be provided.

Connect STB limiter to terminals 1-2 of the regulator. Once the limiter has tripped, fan and fuel feeder motor are OFF.

Safety temperature limiter should be suitable to operate at rated voltage min. 230VAC and hold required certificates of approval.

In case the limiter is not installed- bridge the terminals 1-2 using insulated wire of cross-section area of min. 0,75mm^2 with insulation enough thick to meet safety requirements for the boiler.

Acc. recent regulations, use of safety temperature limiters is mandatory.

12.19 Connection of room panel

Regulator may be equipped with ecoSTER200 and ecoSTER TOUCH room control panel, which may perform following functions: room thermostat, boiler control panel alarm annunciator, fuel level indicator.

Cross-section area of wires used to connect ecoSTER200/ecoSTER TOUCH control panel should be of min. 0.75mm^2 and its max. length should not exceed 30m.

This length may be longer if the wires used have cross-section area larger than 0.75mm^2

4-wire connection

Connect in accordance with the electric wiring diagram.

2-wire connection

For two-wire connection, power supply of 5VDC or 12VDC and rated current of min. 400mA is required. Points to supply: GND and VCC to external source of supply. Connect lines D+ and D- acc. electric wiring diagram.

12.20 Cooperation with the web module

The regulator can work together with ecoNET300 web module. It enables online control and supervision over the regulator for the help of the website **www.econet24.com**. Can use the convenient mobile application ecoNET.apk and ecoNET.app.

Mobile application can be downloaded free of charge from the website:

ecoNET.app ecoNET.apk

13 Service menu - structure

Service settings
Boiler settings
CH and HUW settings
Buffer settings*
Mixer 1-4 settings*
Output H
Show advenced setup
Restore defaults settings
Advanced settings

Boiler settings
Firing-up
Output modulation
Burning off
Supervision
Lambda sensor*
Thermostat selection*
Min boiler temperature
Max boiler temperature
Minimum airflow output
No fuel detection time
Ex.temp.w.no fuel
Max. feeder temp.
Poker cycle time
Feeder 2 work*
Feeder 2 interval*
Thermostat lock

Firing-up
Firing-up airflow
Ignition test time
Ignition test time 2
Feeding time
Firing-up time
Ex. temp. delta
Ex. temp. delta 2
Ex.temp.at the end of fired-up
Test dose

Output modulation
100% Blow-in output
100% Feeder operation
100% Feeder interval
100% Oxygen*
50% Blow-in output
50% Feeder operation
50% Feeder interwal
50% Oxygen*
30% Blow-in output
30% Feeder operation
30% Feeder interval
30% Oxygen*

Burning off
Buring off time
Air flush intensity

Supervision
Supervision time
Feed time
Feed interval
Airflow oper. extend

Lambda sensor*
Operation with Lambda sensor
Airflow correction range
Feed lock
Fuel detection - oxygen
Fuel detection - time

CH and HUW settings
CH activation temp.
CH standstill when load. HUW
Min. HUW temp.
Max. HUW temp.
Boiler inc. by HUW, Mixer
Extending HUW operation time
Circulation standstill time*
Circulation operation time*
Boiler pump lock

Buffer settings
Buffer support
Loading start temp.
Loading end temp.

Mixer 1-4 settings *
Mixer support
Thermostat selection
Min. mixer temp.
Max. mixer temp.
Proportional range
Integr. time const.
Valve opening time
Pump off by therm.
Mixer dead zone

Output H
Output H1
⇨ Reserve boiler
Temperature of reserve boiler activation
⇨ Alarms
⇨ Circulation pump
⇨ Additional feeder
Output H2
⇨ Reserve boiler, Alarms, Circulating pump

* not available if proper sensor not attached, extension module or parameter is hidden.

14 Service settings - description

14.1 Boiler

Firing-up	
• Firing-up airflow	Airflow output durning the firing-up. Too high value slows the firing-up or causes unsuccessful attempt to fire up.
• Ignition test time	Process of checking whether the furnace is already burning. Only the fan is running. If the appropriate exhaust gas temperature is reached, then it switches to the OPERATION mode without the FIRE UP mode.
• Ignition test time 2	Process of cheching whether the furnace is burning; this process starts when the controller proceeds to OPERATION mode.
• Feeding time	Fuel dose feeding time during the firing-up. Refers to the first attempt to fire up. In another attempts the fuel dose is reduced.
• Firing-up time	Time of a signle attempt to fire up. After this time, controller proceeds to another attempt to fire up. After the failure of all attempts to fire up, the alarm: "Failed to fire up" is reported.
• Ex. temp. delta	Parameter defines how much the exhaust temperature must rise during the firing-up so that the firing-up of the furnace is detected. Description in point 8.4
• Ex. temp. delta 2	Parameter defines how much the exhaust temperature must rise during the test to fire up conducted when the controller proceeds to OPERATION mode, so that the furnance is considered fired up. Description in point 8.4
• Ex.temp.at the end of fired-up	Ex. temp. above which the furnace is considered to be fired up durnig the ignition test or firing-up. Description in point 8.4
• Test dose	Fuel dose (feeding time) that is going to be fed during the ignition test before proceeding to FIRIE-UP mode.
Output modulation	Menu includes settings of burner for different output levels.
Burning off	
• Buring off time	After this time, will be enter the STOP mode even though the exhaust temperature sensor indicates the presence of a flame.
• Air flush intensity	Blow-in output during burning off.
Supervision	
• Supervision time	It is the max. time over which the regulator remains in SUPERVISION mode. If there is no need to start heating again within this period of time, the regulator automatically proceeds to burning-off mode. Setting this parameter at „0” disables SUPERVISION mode, and regulator proceeds directly from OPERATION to BURNING OFF mode.
• Feed time	It is the time of fuel feeding and fan operation in SUPERVISION mode. Setting this parameter at „0” causes that only fan will be ON in SUPERVISION mode. Value of this parameter may not be too high because it may lead to boiler overheating in SUPERVISION mode. In SUPERVISION mode, boiler temperature must slowly drop.
• Feed interval	It is the time of fuel feeding interruption in SUPERVISION mode. Value of this parameter may not be too small because it may lead to boiler overheating in SUPERVISION mode. In SUPERVISION mode, boiler temperature must slowly drop.
• Airflow oper. Extend.	In SUPERVISION mode of boiler operation, once the fuel dose has been supplied and the feeder stopped, the fan remains in operation for a time set in *Airflow oper. extend.* to fire-up the fuel dose supplied. Setting this parameter at "0” causes the fan to be OFF in SUPERVISION mode. Value of this parameter may not be too high because it may lead to boiler overheating in SUPERVISION mode. In SUPERVISION mode, boiler temperature must slowly drop.
Lambda sensor	Description in point 18
• Operation with Lambda sensor	Turns off and on the operation of Lambda sensor.
• Airflow correction range	Defines the acceptable airflow range variation during the operation using Lambda sensor.
• Feed lock	Description in point 18
• Fuel detection - oxygen	Description in point 18

• Fuel detection - time	Description in point 18
Thermostat selection	Parameter allows for room therm. select. for direct heating circuit.: *OFF* - turns off thermostat operation, *Universal* - refers to stand. thermostat, *ecoSTER 1,2,3* - thermostat signal is retrieved form ecoSTER TOUCH and ecoSTER200 panel.
Min. boiler temp.	Min. present boiler temperature that can be set by the user in menu and min. temperature that can be set by the controller, for example, from night time decreases, weather control, etc.
Max. boiler temp.	Max. present boiler temperature that can be set by the user in menu and max. temperature that can be set by the controller, for example, form weather control, etc.
Minimum airflow output	Min. airflow output that the user can set. It is used only to reduce the aval. pow. range of the cont. It should be as small as possible but allow the fan to rotate slowly and freely.
No fuel detection time **Ex.temp.w.no fuel**	Lack of fuel in main boiler bin may be detected by the regulator basing upon exhaust temperature. In case the exhaust temperature has been lower than the value set in the parameter *Ex.temp.w.no fuel* over the time longer than the value set in the parameter *No fuel detection time* the regulator proceeds from OPERATION do FIRE-UP. If there is no fuel in the bin, FIRE-UP process will be concluded with a message "Furnace fire-up is impossible"
Max. feeder temp.	It is the temperature at which the protection against flashback to fuel feeder trips. Setting *Max. feeder temp.* at "0" enables disconnection of feeder sensor and regulator operation without this sensor. Nevertheless, this setting is not recommended because flashback prevention function is disabled.
Poker cycle time	This parameter determines the time required to move away the poker only. Full poker cycle time is twice so long, because the poker has to return to its home position upon completion of work.
Feeder 2 work **Feeder 2 interval**	During the addition of fuel from the additional feeder, the motor of this feeder operates in a cyclical. It is switched on for the time defined in the parameter *Feeder 2 work*, and then the feeder operation is suspended for the time defined in the parameter *Feeder 2 interval*.
Boiler cooling temperature	The temperature at which preventive boiler cooling will start. It is recommended to set *Boiler cooling temp.* at the value below the value at which safety temperature limiter will trip to avoid interruptions of boiler operation caused by overheating.
Thermostat lock	If the parameter is turned off, the boiler operation will be stopped, when the contact of the room thermostat will be opened.

14.2 CH and HUW

CH activation temp.	Parameters determines the temperature at which CH boiler pump is activated. It protects the boiler against watering due to cooling off with cold water returning from installation. Attention: Deactivating boiler pump only does not guarantee boiler protection against watering and consequently corrosion. Additional automatics should be used, i.e. 4 way valve or 3 way thermostatic valve.
CH standstill when load. HUW	Available after connecting HUW sensor. Prolonged feeding of HUW silo during priority HUW deactivated may cause to overcooling of the CH installation, because CH pump is deactivated. Parameter CH pump pause during feeding HUW prevents against periodical activating CH pump during feeding HUW silo. CH pump after this time will activate on constant, programmed time of 30s.
Min. HUW temp.	Available after CH sensor connecting. It is a parameter by which it can be reduced setting too low preset HUW temperature.
Max. HUW temp.	Available after connecting HUW sensor. Parameter determines to what maximum temperature HUW container will be heated during cooling the boiler in alarm situations. It is a very important parameter, because setting too high value of it may cause risk of scalding with HUW. Too low value of parameter will cause that during boiler overheating it will not be possible to cool off the boiler to the HUW container. During design of HUW installation, it is necessary to take into account risk of damaging the controller. Due to breakdown of the controller water in the container can heat up to dangerous temperature. It is necessary to use additional protection in the form of thermostatic valves.
Boiler inc. by HUW, Mixer	Parameter determines how high the boiler temperature will be increased to load HUW container, buffer and mixer cycle. Temperature increase is only realizing when it is necessary. When preset boiler temperature is at sufficient level then controller will not change it due to the fact of feeding the HUW container, buffer or mixer cycle. Increasing preset boiler temperature during feeding HUW container is signaled with letter “C” in main window of displayer.
Extending HUW operation time	Available after connecting HUW sensor. After feeding HUW container and deactivating HUW pump may be a risk of boiler overheating. It happens in case when preset HW temperature was higher than boiler preset temperature. This issue is exceptionally important in HUW pump operation in SUMMER mode,

	when pump is deactivated. To cool off the boiler HUW pump operation can be prolonged by *Extending HUW operation time*.
Circulation standstill time	Pausing time between periods of circulation pump operation is defined with value of parameter *Circulation standstill time* (recommended setting 15-40 min.) Circular pump operates constantly during *Circulation operation time* (recommended setting 60-120s).
Circulation operation time	
Boiler pump lock	If the parameter is on, the boiler pump will be stopped when the room thermostat contact are open (present room temp. is reached).

14.3 Buffer

Buffer support	Menu includes settings related to thermal buffer.
Loading start temp.	Parameter defines buffor max. temp., below which the process of buffor loading will start. Process of buffor loading ends, when the buffor min. temp. reaches the temp. of L*oading end temp*. parameter.
Loading end temp.	Parameter defines buffor min. temp., above which the process of buffor loading will end. Process of buffor loading starts again, when the buffor max. temp. falls below the *Loading start temp*.

14.4 Mixer

Mixer support	
• Off	Mixer servomotor and pump are not active.
• CH ON	Applicable when mixer cycle powers heating installation of CH. Maximum temperature of mixer cycle is not limited, mixer is fully opened during alarms i.e. boiler overheating. Attention: do not activate this option when installation is made of pipes sensitive to high temperature. In such situations it is recommended to set mixer service on Floor.
• Floor on	Is used when mixer cycle powers floor installation. Maximum power of mixer cycle is limited to value of parameter max preset mixer temperature. Attention: After choosing option Floor, it is necessary to set parameter max mixer preset temperature on such a value to not damage the floor and avoid scalding risk.
• Pump only	When mixer cycle temperature exceeds value set in parameter mixer preset temperature, feeding of mixer pump is stopped. After decreasing temperature of circuit by 2ºC – pump is reactivated. This option is normally used to control floor heating pump in situation when it cooperates with thermostatic valve without servomotor. By such action is not recommended. It is recommended to use standard heating cycle in floor heating, which consists of valve, servomotor and mixer pump.
Thermostat select.	Parameter available only after connecting to room panel. This option allows change of room thermostat for mixer cycle. Options available: • *Universal* – standard thermostat (No-Nc) connected to terminals 28-30 for mixer 1 (for mixers 2,3,4,5 use proper terminals in additional modules). • *ecoSTER T1* – thermostat 1 in ecoSTER200, • *ecoSTER T2* – thermostat 1 in ecoSTER200, • *ecoSTER T3* – thermostat 1 in ecoSTER200, If ecoSTER200 or ecoSTER TOUCH is not connected then the controller cooperates with standard room thermostat.
Min. mixer temp.	Using this parameter it is possible to restrict Chance of setting to low preset mixer circuit temperature. Automatic control (i.e. periodical temperature reduction) also will not cause reduction in preset temperature below value set in this parameter.
Max. mixer temp.	Parameter serves two functions: - allows restricting setting too high mixer preset temperature. Automatic control also will not cause exceeding preset temperature above value set in this parameter. - with parameter *Mixer support = Floor ON* is also limit temperature of mixer sensor when mixer pump is deactivated. For floor heating set the value below 45º…50ºC or other if producer of materials used for floor or CH installation designer state differently.
Proportional range	The higher the value, the faster the mixer reaches the present temperature. Too high parameter value causes temperature overshoot and unnecessary movements of the actuator.
Integr. time const.	The lower the value, the faster the mixer reaches the present temperature. Too low parameter value causes temperature overshoot and unnecessary movements of the actuator.
Valve opening time	Set full valve opening time given at the plate of valve servomotor, i.e. 140s.
Pump off by therm.	Setting the parameter on *YES* value causes closing of mixer servomotor and deactivating mixer pump after disconnecting joints of room thermostat. This is not recommended because the heated room can be too cool.

Mixer dead zone	Setting parameter determining value of temperature dead zone for mixer controlling circuit. The controller regulates mixer in such a way to keep the temperature of mixer cycle equal to preset value. However, avoid too frequent movements of servomotor, which can shorten its long-life usage. Regulation is undertaken only when measured temperature of mixer cycle will be higher or lower than preset value by the value bigger than *Mixer dead zone*.

14.5 Other parameters

Show advanced setup	Options available: • *YES* - displays hidden parameters which edition is not recommended, • *NO* - hides hidden parameters.
Restore defaults settings	Restoring service settings settings from main menu are restored.
Output H	The menu includes the settings about output H1 (module A), output H2 (module B). Options available: • *Alarm* - when an alarm occurs, the output is switched on. • *Reserve boiler* - the output controls the reserve boiler. • *Circulation pump* - output controls the circulating pump,. • *Additional feeder* – output controls the additional feeder.
Advanced settings	Choosing *YES* will trigger additional parameters in the menu, previously hidden.

15 ALARM DESCRIPTION

15.1 Exhaust temperature sensor damage

This alarm occurs in case of damage of exhaust temperature sensor and excess of its measurement range. Upon alarm occurrence, boiler operation is automatically stopped, and only CH pump remains in operation.
To reset the alarm - confirm it or switch off and on the regulator. Check the sensor and replace, if necessary.


How to check temperature sensor - see 12.12

15.2 Excess of max. boiler temperature

Protection against boiler overheating comprises two stages. In first instance i.e. once the *Boiler cooling temperature* has been exceeded, the regulator attempts to reduce the boiler temperature by discharge of excessive heat to HUW container and by opening the mixer servos (only in case the mixer support = *CH On*).
Once the temperature measured by HUW temperature sensor has exceeded the value set in *Max. HUW temp.*, HUW pump stops in order to protect the user from burning with hot utility water. Has the temperature dropped - the regulator returns to normal operation. In case the temperature is still increasing (and has reached 95°C), power supply to the fuel feeder and the fan is off and permanent boiler overheating alarm with sound signal is produced.
To reset the alarm - switch the power supply to the regulator off and on.


Note: arrangement of temperature sensor outside the boiler water jacket (e.g. at the outlet pipe) is not recommended because boiler overheating may be detected with delay.

15.3 Excess of max. feeder temperature

This alarm is produced once the feeder temperature has exceeded the value set in the service parameter *Max. feeder temp.*
If the feeder temperature exceeds this value, the regulator activates the feeder for a fixed, set time and the poker. The fan stops and the pumps start. Once the fuel has been "pushed out", the regulator stops the feeder and does not activate it again even though the feeder temperature remains high.
Alarm may be reset only upon drop of feeder temperature. To reset the alarm - switch off and on power supply to the regulator.


Flashback protection function is inactive when the feeder sensor is disconnected or damaged.


Flashback protection function is disabled when power supply to the regulator is disconnected.


The regulator may not be used as the only flashback protection of the boiler. Additional automatic safety devices should be used.

15.4 Boiler temperature sensor damage

This alarm occurs in case of boiler temperature sensor damage and excess of its measurement range. Upon occurrence of this alarm, CH, HUW and mixer pumps start to possibly cool down the boiler.
To reset this alarm - confirm it or switch off and on power supply to the regulator. Check the sensor and replace, if necessary


How to check temperature sensor - see 12.12

15.5 Feeder temperature sensor damage

This alarm occurs in case of damage of fuel feeder temperature sensor and excess of its measurement range. Upon occurrence of this alarm, CH and HUW pumps start to possibly cool down the boiler.
To reset this alarm - confirm it or switch off and on power supply to the regulator. Check the sensor and replace, if necessary.


How to check temperature sensor - see 12.12


Upon setting of *Max. feeder temp.* at '"0", the regulator may operate without connected feeder temperature sensor. However, it is not a recommended manner of operation because protection of the

boiler from flashback is disabled.

15.6 Feeder control system failure

The regulator has an additional protection preventing it from feeding fuel constantly. This informs the user about failures in the electrical system controlling the fuel feeder. In case of alarm, stop the boiler and repair the regulator as soon as possible.
It is also possible to continue operation in emergency mode. Before continuing operation, make sure that the combustion chamber does not contain excessive unburnt fuel. If so, remove the excess fuel. Ignition with excessive fuel may lead to explosion of combustion gasses!

Operating in emergency mode is allowed only under user supervision and until the arrival of the service team to remove the failure. If user supervision is not possible, extinguish the boiler. When operating in emergency mode, prevent the consequences of improper feeder work (feeder working constantly or not at all).

15.7 Boiler overheating, STB limiter open

This alarm occurs when the independent safety thermostat protecting STB the boiler from being overheated is activated. The burner is switched off. After the boiler's temperature drops, unscrew the round cover of the temperature limiter and press the reset button.

15.8 No communication

Control panel is connected with working module by means of digital interface RS485. In case connecting cable to this interface is damaged, a message *"Warning! No communication"* is displayed.
Regulator does not go off and works normally with previously preset parameter values, and in case of alarm occurrence it takes action related to respective alarm
Check the cable, which connects the control panel with the module and repair or replace, if necessary.

15.9 Unsuccessful boiler firing-up attempt

This alarm is produced after third unsuccessful attempt of automatic furnace firing-up. Upon occurrence of this alarm, all pumps stop to avoid excessive boiler cooling.
To reset the alarm - confirm it or switch off and on the regulator. The reason of this alarm may be, among others, faulty heater or lack of fuel in the bin.

15.10 Unsuccessful attempt of container loading

It is so called "silent alarm prompt". It occurs after unsuccessful attempt to charge the fuel from additional bin (bunker). In case the attempts to fill the boiler bin have been unsuccessfully made within one full hour of second feeder operation, this prompt is displayed. It does not stop automatic boiler operation, only warning message appears on the control panel.
To reset this alarm - confirm it or switch off and on power supply to the regulator.

15.11 Fan damage

In case of fan damage, a prompt *"Damaged fan"* is displayed. Burner operation stops.
Note: the function of fan rotation detection has to be enabled by the boiler manufacturer.

16 OTHERS

16.1 Power failture

In case of power failure, the regulator returns to the operation mode in which it was before the failure.

16.2 Anti-freezing protection

In case the boiler temperature has fallen below 5°C, CH pump is activated to force boiler water circulation. It delays water freezing process, but in case of very low temperature or lack of power it may not be sufficient to protect the equipment from freezing.

16.3 Protection of pumps against clogging

The regulator performs the function of CH, HUW and mixer pump protection from clogging caused by scale deposits. For this

purpose, these components are periodically (every 167h) switched on for a few seconds. In this way the pumps are protected from immobilization caused by scale deposits. For this reason, power supply should be connected to the regulator during boiler standstill. This function is also active when the regulator was switched off using the keyboard (set at STOP mode).

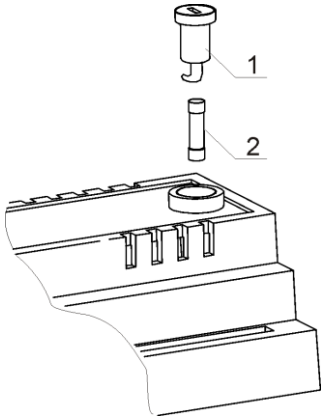
17 REPLACEMENT OF PARTS AND COMPONENTS

When ordering spare parts and components, necessary information taken from the rating plates should be provided. In case of regulator – let us know its serial number, or, if you are unable to provide it, specify regulator model, version and year of manufacture.

Serial number of the regulator is quoted on rating plate of each working module.

17.1 Replacement of mains fuse

Mains fuses are located in each working module. They protect the regulator and other connected equipment. In case of replacement, use 6.3 A, 5x20mm ceramic time fuse.



Fuse replacement 1 – fuse, 2 – fuse holder.

To remove the fuse, press down fuse holder using flat screwdriver and turn it in CCW direction.

17.2 Replacement of control panel

In case of required replacement of control panel only - make sure the software used in new panel is compatible with the software of working module. Compatibility is guaranteed if first component of software ID number of the panel and of the working module is the same.

Software ID number may be taken from the rating plate of respective component or from menu **Information**.

Incompatibility of control panel and working module may cause incorrect operation of the regulator.

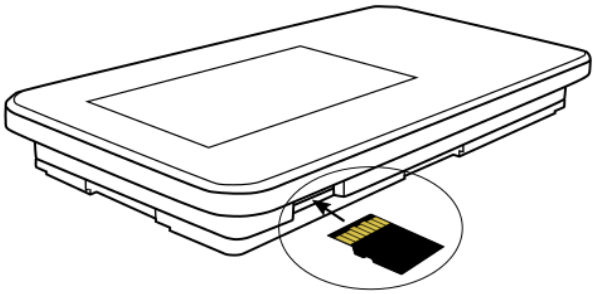
17.3 Replacement of working module

The requirements are the same as for the replacement of control panel.

17.4 Software update

To update the software - use only microSDHC memory card.

To update the software - disconnect power supply to the regulator. Insert memory card into indicated slot.



Memory card should contain new software in *.pfc format (two files - one with software for control panel and the other one with software for module "A" of the regulator). Upload new software directly to memory card. Do not nest data in sub-directory. Reinstall the control panel in regulator housing and connect power supply. Enter to the menu:

General settings → Update

and update the software at first in module A of the regulator, and next in the control panel.

18 Lambda sensor

Burner efficiency may be increased by connection of additional Lambda sensor. Configure Lambda sensor operation in the menu:

Service settings → Boiler settings → Lambda sensor

If the parameter *Operation with Lambda sensor* is set at *On*, the regulator will work using lambda sensor indications. The amount of air supplied to the furnace will be set

automatically to obtain the set value of oxygen concentration in exhaust. If this parameter is set at *Off* - lambda sensor indications will have no effect on regulator operation. Desired values of oxygen concentration are set in the menu:

Service settings → Boiler settings → Output modulation

Description of other parameters related to lambda sensor:

Airflow correction range - determines permitted range of blowing power variation for operation with lambda sensor. Note: do not set too high values because it may adversely affect regulation process.

Fuel detection-oxygen **-** this parameter enables detection of fuel lack on the basis of Lambda sensor indications. If the oxygen level has been in excess of *Fuel lack detection threshold - oxygen* longer than the time set in *No fuel detection time* - regulator attempts again to fire- up the furnace, and if unsuccessfully - lack of fuel alarm will be produced.

Feeder lock – this parameter determines the oxygen concentration in exhaust below which the feeder operation will be stopped until another increase of this value.

After longer period of sensor operation, its periodic calibration may be required. Before calibration, the boiler has to be burnt-off. Proper calibration requires complete burning off the boiler furnace. To start calibration, use the following parameter:

Boiler settings → Lambda calibration

Calibration takes approx. 8 min.

19 Troubleshooting

Faults	Hints
The display is blank despite connection to power supply.	Check: ▪ if the main fuse is burnt-out, replace if so, ▪ if the lead connecting the panel with the module is properly plugged in, and if it's not damaged.
Preset CH temperature on the display is different than the programmed one.	Check: ▪ if the HUW tank is not being filled, and if the HUW preset temperature is set higher than the boiler preset temperature; if so, the difference in readings will disappear after filling the HUW tank alternatively - decrease the HUW preset temperature, ▪ if the time periods are on – disable Night-time decreases.
CH pump is inoperative.	Check: ▪ whether the boiler temperature exceeded the parameter *CH activation temp.* – wait or decrease the *CH activation temp.* ▪ if the HUW priority, which blocks the central heating pump, is enabled – disable the priority by setting the *HUW mode* to *No priority*, ▪ whether the central heating pump is not damaged or clogged.
The fan is inoperative.	▪ increase the fan speed (parameters for blow-in output), ▪ check if the safety temperature limiter STB jumper is on terminals 1-2 (the jumper should be placed only if no proper STB temperature limiter is connected), ▪ if the boiler manufacturer equipped it with a temperature limiter STB with manual return to its initial position, unlock it by removing the lid and pushing the button, in accordance with the documentation provided by the boiler manufacturer, ▪ check the fan and replace it if necessary.
Fuel feeder inoperative/ fails to feed.	▪ Check if the feeder leads are properly connected to terminals ▪ If temperature limiter STB is connected to terminals 1-2, check if the circuit is not cut off due to boiler overheating, ▪ Check if the feeder motor is in working order, ▪ If you can hear the motor running, but the fuel is not fed, check the feeder in accordance with the boiler manual.
When the Individual Fuzzy Logic mode is on, the fuel is not completely burned, there are unburned particles of fuel in the ash.	▪ See if the unburned fuel comes from operation in the SUPERVISION mode - adjust the SUPERVISION mode parameters, ▪ Check if the unburned fuel is caused by frequent switching from SUPERVISION to OPERATION mode, ▪ Make sure if correct type of boiler is selected, ▪ Open the fan flap and/or fan return flap to the maximum, ▪ Check the ducts which feed air into the furnace, ▪ Unseal the window in the boiler room to provide sufficient amounts of air.
When the Individual Fuzzy Logic mode is on, the fuel burns out too intensively.	▪ See if the excessive burning of fuel comes from operation in the SUPERVISION mode - adjust the SUPERVISION mode. ▪ Make sure if correct type of boiler is selected.
The temperature is measured incorrectly.	▪ Check if there is good thermal contact between the temperature sensor and the measured surface, ▪ Whether the sensor lead is not placed too close to the mains cable, ▪ If the sensor is connected to the terminal, ▪ Whether the sensor is not damaged.
in the HUW=SUMMER function, the radiators are hot and the boiler overheats.	▪ Increase the parameter *HUW operation extend.* in order to cool down the boiler.
the HUW pump is active even if the HUW tank has been filled.	▪ Set the parameter *HUW operation extend* to *"0"*.
The boiler overheats despite disabled airflow.	▪ The reason can be faulty chimney installation (no protection against excessive chimney draught).
In a hydraulic system with a mixing valve and servo - the mixer fails to open.	▪ The reason can be that the HUW tank is being filled with *HUW priority* enabled. Wait until the HUW is filled, or disable the *HUW priority*. ▪ The reason can be active SUMMER function. ▪ The reason can be an on-going calibration of the mixer valve, wait until the calibration is complete. Active calibration is signalled with a "CAL" message in the menu: Information – mixer info.

Register changes:

v1.1 – 10-2018 - other location in the electrical scheme of socket G3

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