Boiler controller

ecoMAX860P3-D TOUCH

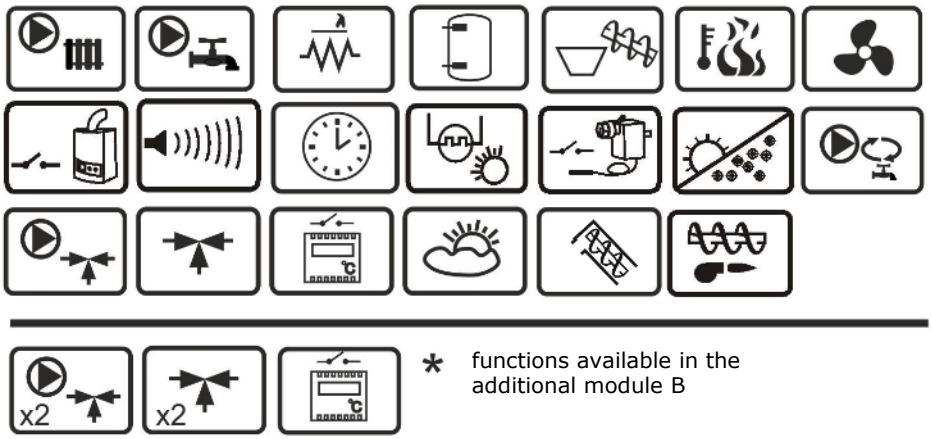
FOR AUTOMATIC SOLID FUEL FIRED BOILERS

ecoSTER TOUCH**

ecoNET300**

ecoNET.apk

www.econet24.com



* functions available in the additional module B

** room panel ecoSTER TOUCH and internet module ecoNET300 - not the standard equipment of the controller.

INSTRUCTION INSTALLATION AND OPERATING MANUAL

ISSUE: 1.0

APPLIES TO SOFTWARE:	MODULE A	PANEL
	v01.XX.XX	v.01.XX.XX

05-2016

CONTENTS

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.
- Keep the regulator out of reach of children.

2 General

The regulator is a modern electronic device designed to control automatic solid fuel fired boilers with ignition.
Flame detection occurs with an optical flame brightness sensor.
It can be used to control the operation of an unregulated central heating circuit, HUW circuit and three regulated heating circuits. Preset temperature of heating circuits may be set on the basis of weather sensor read-out. A possibility to work together with room thermostats helps to maintain comfortable temperature in heated rooms. Moreover, if needed, the equipment switches on gas -or oil fired reserve boiler.
The regulator may operate in connection with additional control panel ecoSTER TOUCH installed in rooms and internet module ecoNET300. Regulator is easy to operate in an intuitive manner. It may be used in households and other similar premises and in light industry 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 2002/96/EG Act on electrical and electronic equipment

- Recycle the product and the packaging at the end of the operational use period in an appropriate manner.
- Do not dispose of the product together with normal waste.
- Do not burn the product.

INSTRUCTION MANUAL

ecoMAX860P3-D TOUCH

7 STRUCTURE – MAIN MENU

Main menu
Information
Boiler settings
HUW settings*
Summer/Winter
Mixer 1-5 settings*
General settings
Manual control
Alarms
Service settings

Boiler settings
Preset boiler temperature
Weather control the boiler*
Boiler heating curve*
Curve shift*
Room temp. factor*
Output modulation
• Feeder operation – max power
• Blow-in output – max power
• Oxygen – max power*
• The intermediate power – hysteresis H2
• Feeder operation - intermediate power
• The intermediate power-blow-in
• The intermediate power-oxygen*
• Minimum power-hysteresis H1
• Feeder operation - min power
• Minimum power - blow-in
• Minimum power- oxygen*
• Boiler hysteresis
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• Reserve boiler
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• Alarm level
• Fuel level calibration
Cleaning
• Burner cleaning
• Cleaning intensity
Lambda calibration*
Night time decrease boiler
• Night time decrease
• Schedule

HUW settings*
HUW preset temperature
HUW pump mode
• Off
• Priority
• No priority
HUW container hysteresis
HUW disinfection
Night time decrease HUW
• Night time decrease
• Reduction value
• Schedule
Night time decrease circulation pump*
• Night time decrease
• Reduction value
• Schedule

Mixer 1-5 settings
Preset mixer temperature
Mixer room thermostat
Mixer weather control*
Heating curve mixer*
Curve translation*
Room temperature factor*
Mixer night time decrease: • Night time decrease • Reduction value • Schedule

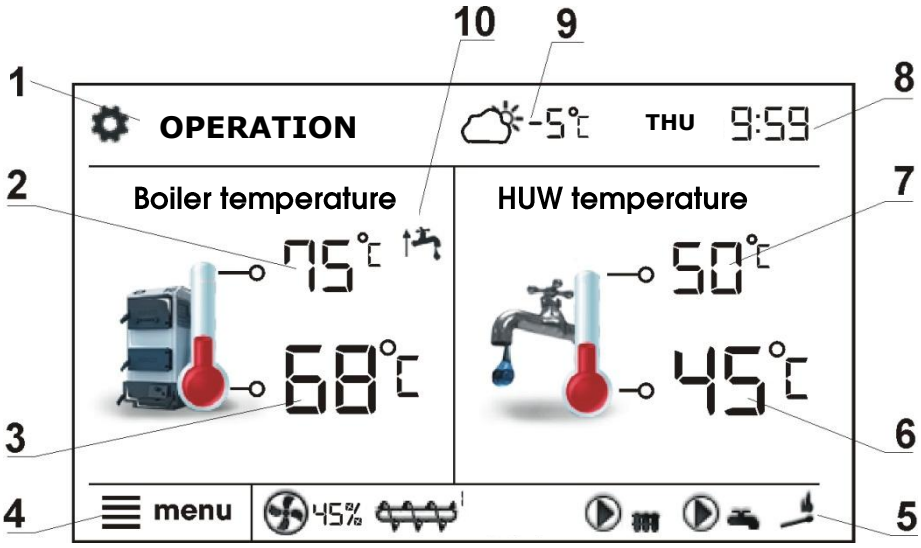
General settings
Clock
Date
Brightness
Sound
Language
Software update*
WiFi settings*

Summer/Winter
SUMMER mode
• Winter
• Summer
• Auto*
SUMMER mode act. temperature
SUMMER mode deact. temperature

* unavailable if no adequate sensor or additional module is connected or the parameter is hidden.

8 Operating the regulator

8.1 Description of display main window



Legend:

1. mode of regulator operation: FIRING-UP, INCANDESCENCE, OPERATION, SUPERVISION, BURNING OFF, CLEANING, STOP
2. preset boiler temperature
3. measured boiler temperature
4. key to enter ''Menu" list
5. Information field:

 fan

 feeder

 pumps

 igniter

6. measured temperature of HUW container
7. preset temperature of HUW container
8. clock time and weekday
9. outside temperature (weather)
10. field of functions, which modify preset temperature -meaning of the symbols:

 - opening of room thermostat contacts – preset room temperature has been reached

 - of preset boiler temperature for active time intervals

 - increase of preset boiler temperature for the time of HUW container filling

 - increase of preset boiler temperature by mixer circuit

 - increase of preset temperature for buffer loading

 - operation mode - grate

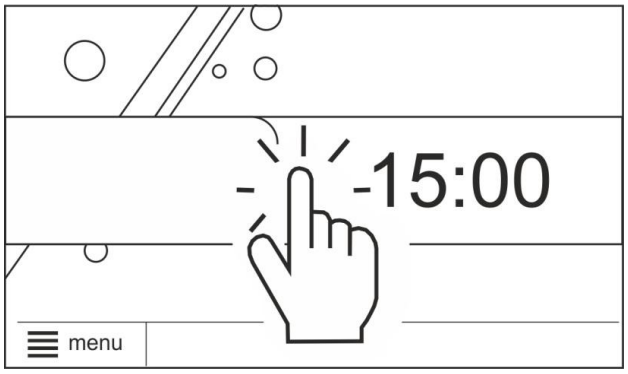
 - work on the reserve boiler (gas- or oil-)

Both, left and right window may display different information. By touching the screen, user may navigate between displayed information: mixer circuits information window, HUW window, fuel level window.

Fuel level may be displayed on ecoSTER TOUCH room control panel.

8.2 Switching on and off the boiler

Make sure fuel is present in the tank and tank hatch is closed. Now boiler may be switched on. To start the boiler - press BURNER OFF? at any place on the screen. The message: *„ACTIVE REGULATOR?"* appears.



Confirm the message. Boiler enters firing-up stage.

There is also another method of boiler start-up. Press MENU button and find and press  button in pie menu.

To stop the boiler - press MENU button, and find and press button  in pie menu.

8.3 Settings preset temperature

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

Boiler settings → Preset boiler temp.
HUW settings → HUW preset temp.
Mixer 1-5 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.

8.4 FIRING-UP

The FIRING-UP mode is used for automatic firing-up of furnace in the boiler.

All parameters which influence the firing-up process can be found in menu:

Service settings → Burner settings → Firing-up

If firing up the furnace fails, further attempts are carried out during which the fuel dose (feeding time) is reduced to 10% of the dose in the first attempt.

Consecutive attempts are visualised by numbers next to the lighter symbol  .

After three unsuccessful attempts, an alarm *Failed firing-up attempt* is reported. In such case, the boiler operation is halted. Boiler operation cannot be continued automatically - service crew must intervene. After removing causes of impossibility to fire-up, the boiler must be restarted.

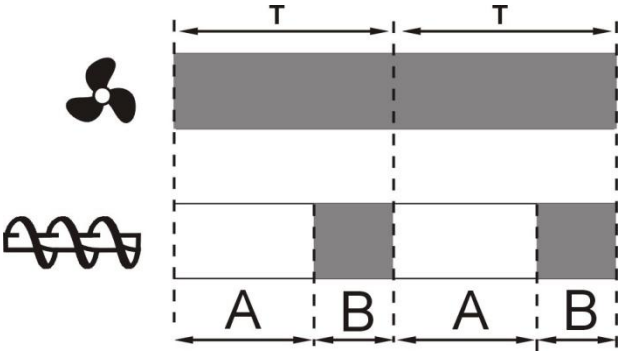
8.5 INCANDESCENCE

After detecting the flame in firing-up phase followed incandescence burner before giving an additional portion of the fuel during the specified *Incandescence time* and increase airflow output. Parameter can be found in menu:

Service settings → Burner settings → Firing-up

8.6 OPERATION

The fan operates continuously. Fuel feeder is activated cyclically. A cycle consists of feeder operation time and duration of feeding interval.



A - feeder interval, B – feeding cycle time.

Parameter *Feeding cycle time* can be found in menu: **Service settings → Burner settings → Operation**

Feeder cycle time is calculated according to the required current power of the burner, capacity of tank and feeder efficiency.

Parameters blow-in output for different power levels of the burner are available in the menu:

Boiler settings → Output modulation

8.7 Regulation mode

There are two regulation modes for stabilizing the set temperature of the boiler: Standard and FuzzyLogic

Boiler settings → Regulation mode

- **Operating in Standard mode**

When the boiler temperature reaches its set value, the regulator switches to SUPERVISION mode.

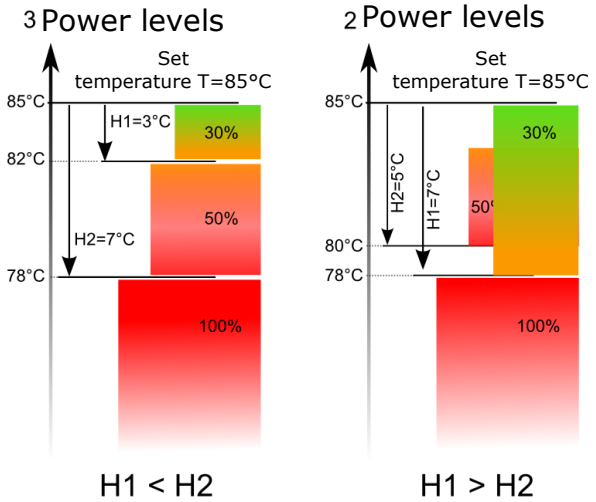
The regulator has a boiler output modulation mechanism allowing it to gradually reduce the output as the boiler temperature nears its set value.

Three boiler output levels can be set: maximum, medium, and minimum. Each level can be additionally adjusted with individual fuel feeding times and fan speeds, affecting the actual output of the boiler. The output level parameters are accessible through the menu:

Boiler Settings → Output modulation

The regulator sets the current output of the burner depending on the set temperature of the boiler and H1 and H2 hysteresis settings.

It is possible configure the value H1 and H2 that modulation will take place without the intermediate power - transition from *Max.* to *Min.* without *Intermediate* power.



- **Operating in Fuzzy Logic mode**

In FuzzyLogic mode, the regulator automatically sets the output of the burner in order to maintain the set boiler temperature. The regulator uses the output settings predefined in Standard mode. This mode does not require setting the H1 and H2 hysteresis.

If only the HUW is heated (summer mode), it is recommended to set the regulator to Standard mode.

After the set temperature is exceeded by 5ºC, the boiler switches to SUPERVISION mode.

8.8 SUPERVISION

SUPERVISION mode is available for both modes of regulation: with manual and automatic settings (*Fuzzy Logic)*. Regulator automatically enters SUPERVISION mode without any user's intervention, namely:

- in case of *Standard* mode of regulation– upon achievement of boiler preset temperature,
- in case of *Fuzzy logic* – once actual temperature has exceeded the boiler preset temperature by 5°C.

In the SUPERVISION mode, the regulator supervises the fire in the furnace so that it does not burn off. To achieve that, the burner power is kept low which together with correctly adjusted parameters prevents any increase of the temperature. Burner power in the SUPERVISION mode and other SUPERVISION parameters can be found in:

Service Settings → Burner Settings → Supervision

SUPERVISION parameters should be set in accordance with the recommendations of the boiler or burner manufacturer. They should be such values so that the fire in the furnace does not burn off during boiler standstills (and it should not burn too intensely as the boiler temperature may increase).

Parameters should be so selected that the boiler temperature in this mode gradually drops. Incorrect settings may lead to boiler overheating.

The maximum boiler operation time in the SUPERVISION mode is defined by *Supervision time*. If, after this time, the boiler does not have to operate again after it entered the SUPERVISION mode, the regulator initiates boiler burn-off.

The controller exits the Supervision mode without user intervention after exceeding the preset boiler temperature of 10 ° C.

For the setting *Supervision time* = 0, the regulator skips the SUPERVISION mode and enters the BURNING-OFF mode.

8.9 BURNING OFF

In the BURNING OFF mode, remains of the pellet are burnt out and the boiler is prepared for standstill or deactivation.

All parameters which influence the process of putting out can be found in menu:

Service settings → Burner settings → Burning off

The regulator stops fuel feeding and performs periodical air flushes to burn fuel residues. When the flame brightness decreases or the maximum burning-off time elapses, the regulator enters the STOP mode.

8.10 CLEANING

The controller enables cleaning the burner from the ashes generated in the combustion process. For this purpose, the controller uses a fan. The parameters affecting the cleaning are on the menu: **Boiler settings**

and

Service settings → Burner settings → Cleaning

Cleaning the burner is mode during Firing-up and Burning off. In the event that the boiler stays for a long time in Operation mode or SUPERVISION mode it is possible to start cleaning the firebox with adjustable intensity parameter *Cleaning intensity*.

Parameter *Cleaning burner* is set max. burner running time without cleaning. This is the time of the burner after which it will automatically burning off and then cleaning and re-ignite the burner.

8.11 STOP

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*).

8.12 GRATE

The controller has the function of grate where fuel loading is done manually, fuel feeder is switched off while the combustion process is controlled by fan. Switching between the work on the burner - where fuel is "Pellet" and work on the grate - where fuel is "Wood", can be made in:

Boiler settings → Operation mode

The values of parameters, such as: *Preset boiler temperature*, *Boiler hysteresis*, *Fuel shortage detection time* are individually set for the grate mode. This allows to define different properties of the boiler operation for operation modes "grate" and "pellets". The parameters affecting the operation on the grate are in:

Service settings → Burner settings → Grate

The operation of the grate can be an alarm "*No fuel*".

Switching from grate on burner can it can be made by the ecoNET300 internet module, but only after burning the entire fuel loaded manually. To switch, user must to turn off then turn on the regulator by clicking on *Operation mode* in: *Current data*.

8.13 Domestic how water settings

The device controls temperature of the domestic how water - HUW – tank, 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 tank.
- set simultaneous operation of the CH and HUW pump, using parameter *no priority*,

8.14 Setting HUW preset temperature

Preset HUW temperature is defined by parameter:

HUW settings → HUW preset temp.

Below *HUW preset temp. – HUW container hysteresis* starts HUW pump to load the HUW container.

After setting a low hysteresis value, HUW pump will run faster when HUW temperature falls.

8.15 Enabling the SUMMER function

In order to activate the SUMMER function, which enables to load the HUW tank in the summer, without the need for activating the CH system and mixer cycles, set the parameter *SUMMER mode* to *Summer.*

Summer/Winter → SUMMER mode

In Summer mode, all heat receivers may be shut off, so before enabling it please make sure that the boiler does not overheat.

If the weather sensor is connected SUMMER function can be activated automatically with the *Auto* parameter including settings for SUMMER mode act. Temperature, SUMMER mode deact. temperature.

8.16 Disinfection HUW container

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

Keep the tenants informed of activating the disinfection function as there is risk of being burnt with hot usable water.

The regulator increases the HUW container temperature once a week, at 2:00 a.m. Monday. After 10 minutes of maintaining the temperature at 70°C, the HUW pump is switched off and the boiler returns to normal operation. Do not activate the disinfection function when the HUW support is off.

8.17 HUW circulation

The settings can be found in:

HUW Settings → Circulation pumps 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*.

8.18 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.

- **Settings for mixer without weather sensor**

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.

- **Settings for mixer with weather sensor without room thermostat ecoSTER TOUCH**

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

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

Example:

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.

- **Settings for mixer with weather sensor and with room thermostat**

Set parameter *Weather contr.mixer* to *On*. Select weather curve.

The room 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 described in point. 8.19 it may be necessary to fine-tune the heating curve translation.

In this setup, the ecoSTER TOUCH room thermostat 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 ecoSTER200) = 22 °C. Temperature measured in the room (by ecoSTER200) = 20 °C. *Room temp. coeff.* = 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. coeff.* Range: 0…50. 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!

8.19 Weather controlled

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.

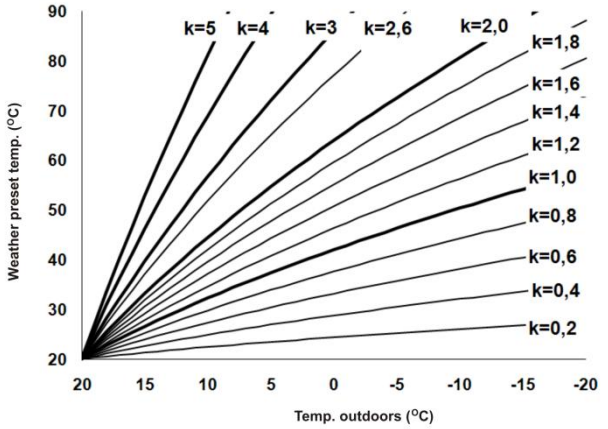
Note: during trial and error selection of appropriate heating curve, it is necessary to exclude influence of the room thermostat on regulator operation (regardless of whether the room thermostat is connected or not), by setting the parameter:

Mixer 1 settings → Mixer room therm. = 0.

If a room panel is connected, it is also necessary to set the parameter *Room temperature factor* = 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 translation* 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 translation* 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.

8.20 Description of night time decrease settings

- **Boiler night time decreases**

The boiler operates in selected time intervals. Outside of the selected intervals, the boiler is burned off.

- **Night time decreases for heating circuits, HUW container and circulation pump operation.**

The intervals can be used to define time periods at which lower preset temperature may be set e.g. for a night time or when the user is not at home (e.g. he/she left for a work/school). This feature enables automatic reduction of preset temperature without compromising the heat comfort and reduces fuel consumption.

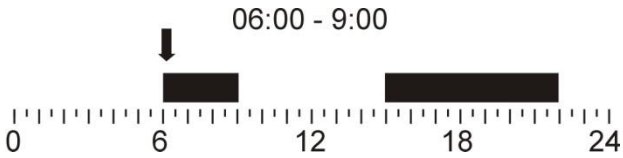
Decrease of preset temperature in selected time intervals is indicated by the symbol:  on the main screen.

To activate time intervals, set the parameter: *Night time decrease* for the given heating circuit to *ON*.

The parameter *Reduction value* set the temperature reduction, one for all time intervals.

Night time decreases can be defined separately for every day of the week set *Schedule*.

Set the start and end of the time interval for a reduction value in the range 1..24 hours.



8.21 Fuel level setup

To operate the fuel level in the fuel tank regulator uses the fuel level sensor. After burning the fuel below the minimum level (set in the sensor by the manufacturer of the boiler) the regulator displayed in the screen: "*WARNING !!! Low fuel level*" and will continue to be fed fuel. If user not control the feeding of fuel then regulator burning off all the fuel in the tank and turn off the boiler.

Note: When there is no fuel level sensor, fuel level service will take place as described below.

- **Activating the fuel level gauge**

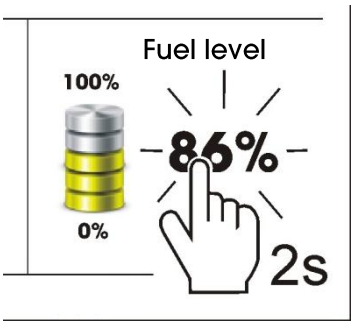
In order to enable display of the fuel level, set value of parameter

Boiler settings → Fuel level → Alarm level to a value greater than zero, e.g. 10%

One must touch left or right main window on the screen, in to open the fuel level window.

- **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%

Calibration can be skipped if the *Feeder efficiency* and *Tank capacity*.

8.22 Feeder efficiency test

It is possible to carry out the *Feeder efficiency test* and set the duration of this test on *Efficiency test time*. With the data obtained make it easier to set the parameters associated with the feeding of fuel. After efficiency test time, user should weigh given fuel and set the parameter: *Fuel weight*.

8.23 Operation with additional feeder

The regulator may be used with low tank fuel level sensor. After the sensor is activated (contacts open) the regulator activates the additional tank for the *Operation time of external feeder* to refill the main fuel tank. This parameter can be found in: **Service settings → Burner settings**

If the *Operation time of external feeder* is set to "0", the additional tank is switched off.

8.24 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.

8.25 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 the STAND-BY mode, i.e. when the boiler is OFF.

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

8.26 Favourite menu

In Touch version in the menu bar at the bottom of the screen there is a button:  . Upon activation of this key, a quick selection menu appears. To add new item to this menu - hold respective icon pressed in pie menu for a while.

To remove selected item from favourite menu - hold corresponding icon pressed and confirm REMOVE.

8.27 Room panel ecoSTER TOUCH

The controller can work together with ecoSTER TOUCH remote control device, which have a built-in room thermostat. This room panel shows useful information such as: fuel level, alarm indication etc.

8.28 Internet module

The controller can work together with ecoNET300 internet module. It enables online control and supervision over the controller for the help of the website **www.econet24.com**. You can use the convenient mobile application **ecoNET.apk**. Mobile application can be downloaded free of charge from the website:

9 DESCRIPTION OF ALARMS

9.1 Exceeding max. boiler temp.

There is a two-stage safety precaution for boiler overheating. First of all, i.e. after exceeding *Boiler cooling temperature* the controller is trying to lower the temperature by directing overheated water to the HUW tank and also by opening mixer actuators (only when *Mixer support = CH On*). When the temperature, measured by HUW sensor, will exceed the value of *Maximum HUW temperature* than the HUW pump will be shut down in order to protect the users against scalding. If the boiler temperature drops down, so the controller will return to its normal operation. However if the temperature will continue to increase (and it will reach 95°C) so the constant alarm of boiler overheating and corresponding signaling sound will be activated.

Installation of temperature sensor outside boiler water mantle, e.g. on the exhaust pipe is potentially dangerous, because it can lead to a delay in boiler overheating detection!.

9.2 Malfunction of boiler temp. sensor

An alarm occurs with the malfunction of boiler temperature sensor as well with exceeding measurement range of this sensor. It is necessary to check the sensor and eventually replace it with a new one.

For description of checking temperature sensor procedure please see p. 12.9

9.3 Exceeding max. burner temp.

This alarm will occur after the feeder temperature exceeds the service parameter: **Service setting → Burner settings → Max. feeder temp.**

In such cases, the regulator will attempt to push out the burning fuel from the feeder by switching it on for a short time. If three consecutive attempts to switch the feeder on do not reduce the temperature, the feeder will be switched on for a a longer time and report a constant alarm. Before returning to regular operation, remove the excess fuel from the combustion chamber.

The flame return protection function will not work if there is no power supply to the regulator.

The regulator cannot be used as the only flame return protection. Use additional automatic protection.

9.4 Boiler temperature sensor damage

The alarm occurs when damage to the boiler temperature sensor, and after exceeding its measuring range. Check the sensor, and possibly replace.

9.5 Burner temperature sensor damage

The alarm occurs when damage to the burner temperature sensor, and after exceeding its measuring range.

9.6 Feeder control system failuer

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, 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!

Note: 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).

9.7 Unsuccessful firing attempt

An alarm occurs after the third unsuccessful automatic furnace firing attempt. The reason behind this alarm occurrence can be among other things: malfunctioning igniter or ventilator, malfunction of fuel feeder system, incorrect parameter setting, insufficient fuel quality or lack of fuel in the container.

9.1 Boiler overheating STB open contact

An alarm occurs after activation of independent safety thermostat that secures the boiler against overheating. The burner will then be deactivated. After the boiler temperature will drop down it is required to unscrew an oval STB lid and then press the Reset button.

9.2 Lack of communication

The control panel is being linked with the rest of the electronics with RS485 digital communication link. In case a cable of this link will be damaged, an alarm will occur on the screen with the information *"Attention! No communication".*
The controller doesn't stop to operate and works normally with before preset parameters. It is required to check the connection cable between control panel and the module and replaced it with a new one or repair it.

9.3 Unsuccessful attempt of buffer loading

It is a silent alarm, which informs about unsuccessful attempt of adding fuel from additional fuel container to boiler container. In case, when during preset time of container loading, a sensor in this container will not detect the increase of fuel level, this alarm will occur. This signalisation does not shut down boiler automatic operation.

10 OTHERS

10.1 Power supply decay

In the cases of power supply failure, the regulator will resume the operation mode in which it was before the failure.

10.2 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.

Note: This function must not be the only anti-freezing protective measure! Apply other methods too. Regulator manufacturer is not liable for anti-freezing related damages.

10.3 Function of protecting pumps against stagnation

The regulator protects the CH, HUW and mixer circuit pumps against stagnation. It does so by activating them periodically (every 167 h for several seconds). This protects the pumps against immobilization due to sedimentation of boiler scale. For this reason, the regulator power supply should be connected also when in the boiler is not in use. This function can be enabled also when the regulator is turned off, via keyboard (regulator in STAND-BY).

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

10.5 Replacement of control panel

It is not recommended to replace only the control panel as the software in the panel must be compatible with the software in the rest of the regulator.

10.6 Lambda sensor

Burner efficiency can be increased by connecting additional Lambda sensor module. Connect the module according to electric scheme. Lambda sensor is to be activated in:

Service settings → Burner settings → Lambda sensor

If parameter *Operation with Lambda sensor* is set on *ON* then the controller will operate using Lambda sensor readings. The amount of air provided to the furnace will be automatically set in such a way to obtain preset amount of air in fumes. If this parameter is set on *OFF* then Lambda sensor readings will not have influence on controller's operation. Amounts of air for given burner power are set in:

Boiler settings → Output modulation

Periodical calibration of Lambda sensor readings can be necessary. To conduct Lambda sensor calibration it is necessary to extinguish the boiler. To make a successful calibration the furnace in boiler must be completely extinguished. To start up the calibration use the parameter:

Boiler settings → Lambda calibration

Calibration process lasts approximately 8 minutes.

INSTALLATION AND SERVICE SETTINGS

ecoMAX860P3-D TOUCH

11 Hydraulic diagrams

11.1 Diagram 1

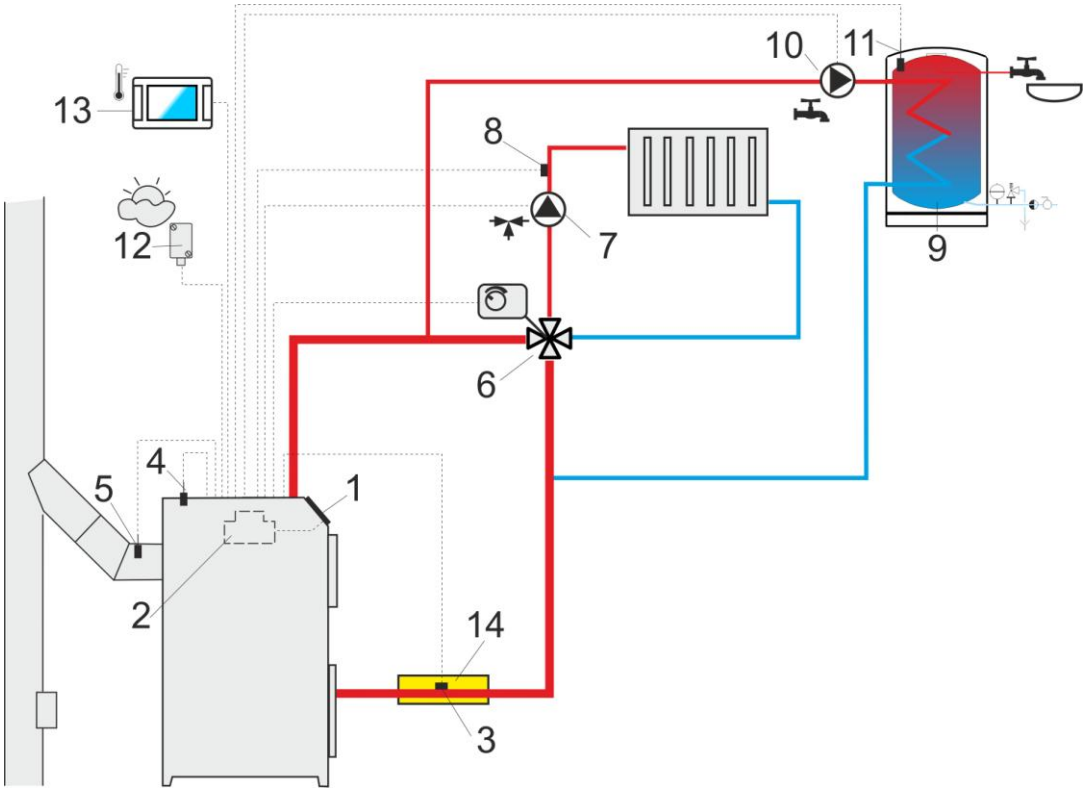


Diagram with 4-way control valve for central heating circuit[1], where: 1 – boiler, 2 – controller, 3 - water temperature sensor returning to the boiler CT4, 4 – boiler temperature sensor CT4, 5 – exhaust temperature sensor CT2S (temperature monitoring only), 6 – 4-way valve servo, 7 – mixer circuit pump, 8 – mixer circuit temperature sensor, 9 – HUW container, 10 – hot utility water pump, 11 – HUW sensor, 12 – out-door temperature (weather) sensor CT6-P, 13 – standard control panel/ecoSTER TOUCH room control panel or standard room thermostat, 14 – return temperature sensor (not necessary for the operation of the system).

⚠	To improve water circulation in gravitational circuit of the boiler (the circuit is indicated on the diagram with a bold line) it is necessary to: use pipes and 4-way valve of large DN value, avoid using excessive number of elbows and cross section reductions, and apply other rules of gravitational circuit construction - e.g. keeping of gradients, etc. In case the return temperature sensor is of contact type -provide the sensor with heat insulation to isolate it from the environment and improve its thermal contact with a pipe by application of thermal paste. Set the preset boiler temperature at so high a value that heat output required for the mixer circuit and to heat-up return water to the boiler is guaranteed.

RECOMMENDED SETTINGS:

Parameter	Setting	MENU
Preset boiler temperature	75-80°C	menu→ BOILER SETTINGS
Min. preset boiler temperature	65°C	menu→Service Settings→ Boiler Settings
Increasing of preset boiler temp.	5-20°C	menu→Service Settings→ CH and HUW Settings
Mix1 support	CH On	menu→Service Settings→Mixer 1 settings
Max. preset temperature of mixer 1	70°	menu→Service Settings→Mixer 1 settings
Heating curve, mixer 1	0.8 – 1.4	menu→Mixer 1 settings
Mixer 1 weather control	ON	menu→Mixer 1 settings
Mixer 1 thermostat selection	ecoSTER T1	menu→Service Settings→Mixer 1 settings

[1]The presented hydraulic diagram does not replace central heating engineering design and may be used for information purposes only!

11.2 Diagram 2

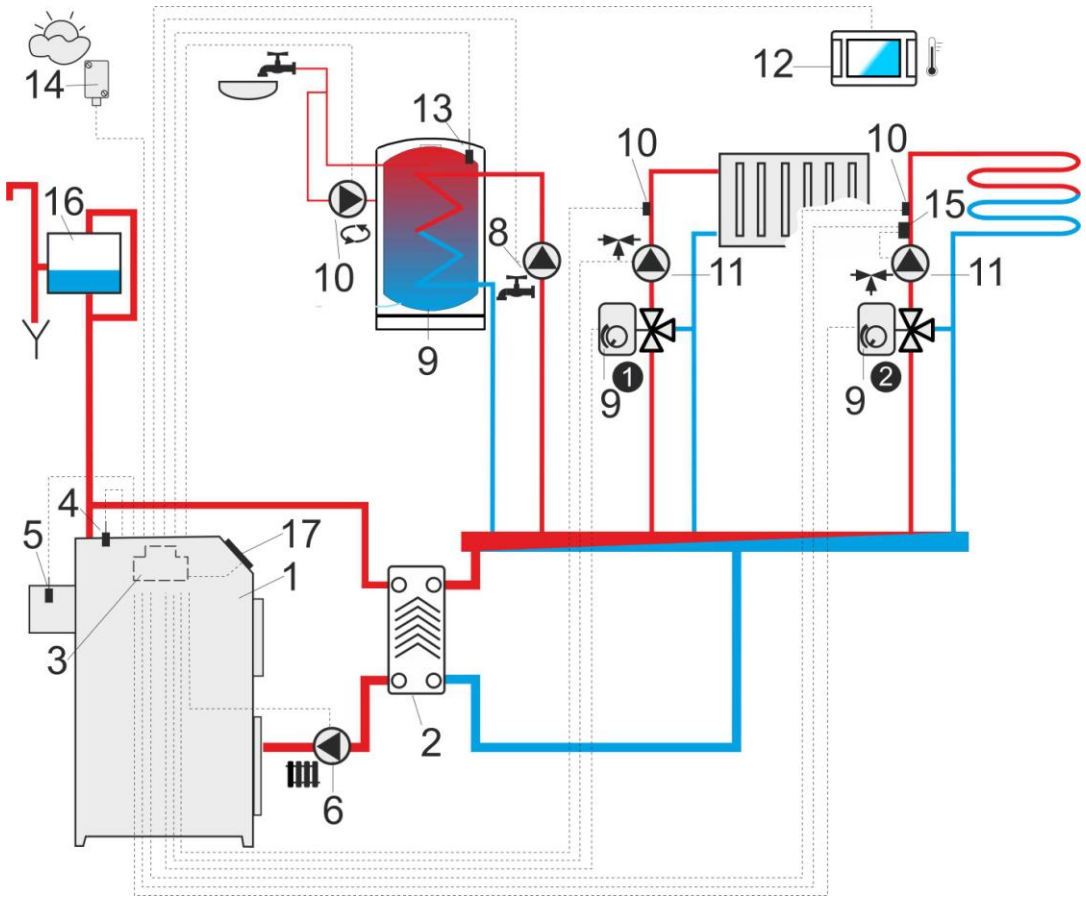


Diagram with two adjustable heating circuits and the HUW container[2], where:1 – boiler, 2 – heat exchanger, 3 – controller, 4 – boiler temperature sensor, 5 – exhaust temperature sensor (temperature monitoring only), 6 – boiler pump, 8 – HUW pump, 9 – HUW container, 10 – HUW temperature sensor, 11 – mixer pump, 12 – ecoSTER TOUCH room control panel with room thermostat feature , 13 – HUW container temperature sensor CT4, 14 - out-door temperature (weather) sensor CT6-P, 15 - safety thermostat off the underfloor heating pump, 16 - expansion tank, 17 – panel controller.

RECOMMENDED SETTINGS:

Parameter	Setting	MENU
Preset boiler temperature	80°C	menu→Boiler Settings
Min. preset boiler temperature	75°C	menu→Service Settings→ Boiler Settings
CH Pump Activation Temperature	55°C	menu→Service Settings→ CH and HUW Settings
Activate operation (buffer support)	ON	menu→Service Settings→ Buffer Settings
Buffer loading start temp.	50	menu→Service Settings→ Buffer Settings
Buffer loading end temp.	75	menu→Service Settings→ Buffer Settings
Mix1 support	CH ON	menu→Service Settings→Mixer 1 settings
Max. preset temperature of mixer 1	70°	menu→Service Settings→Mixer 1 settings
Max. preset temperature of mixer 2	45°	menu→Service Settings→Mixer 2 settings
Heating curve, mixer 1	0.8 – 1.4	menu→Mixer 1 settings
Heating curve, mixer 2	0.3 – 0.8	menu→Mixer 1 settings
Mixer 1 weather control	ON	menu→Mixer 1 settings
Mixer 1 thermostat selection	ecoSTER T1	menu→Service Settings→Mixer 1 settings

[2] The presented hydraulic diagram does not replace central heating engineering design and may be used for information purposes only!

11.3 Diagram 3

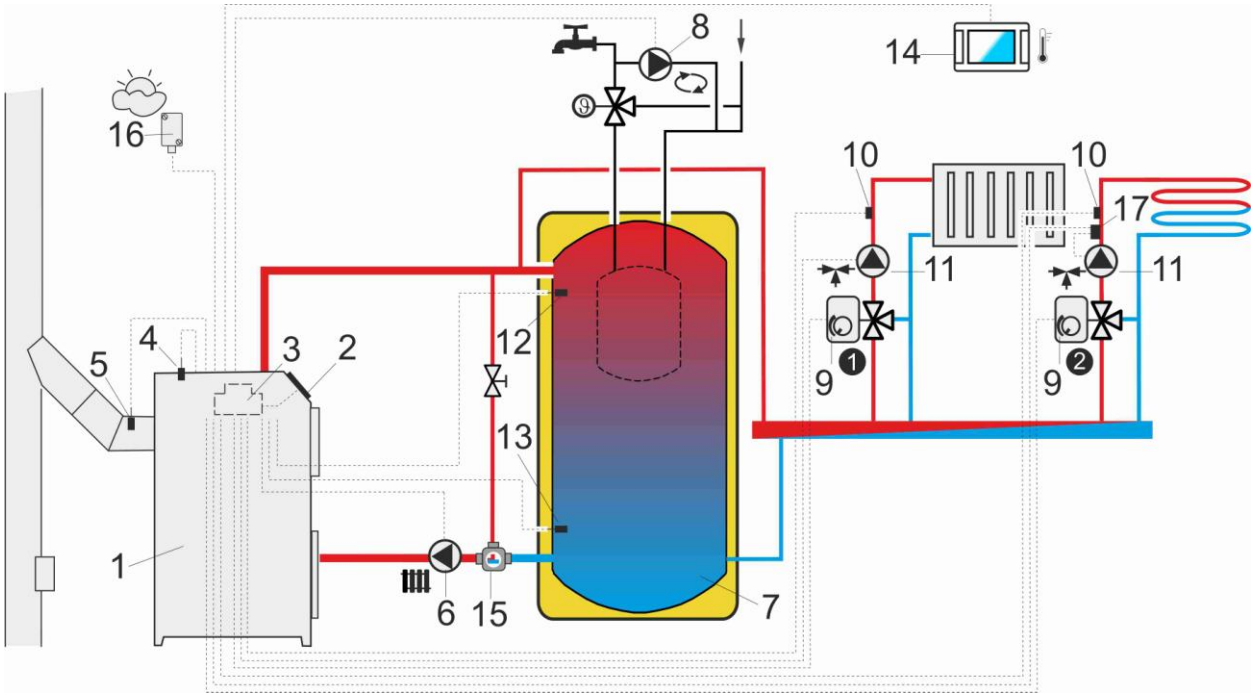


Diagram with heat buffer[3], where:1 – boiler, 2 – panel controller, 3 – controller, 4 – boiler temperature sensor CT4, 5 – exhaust temperature sensor CT2S, 6 – boiler pump, 7 – heat buffer, 8 – HUW pump , 9 - mixing valve actuator, 10 - mixer temperature sensor CT4, 11 - mixer pump, 12 - upper sensor of buffer temperature CT4, 13 - lower sensor of buffer temperature CT4, 14 - ecoSTER200/ecoSTER TOUCH room control panel, 15 - thermostatic three-way valve to the return protection, 16 - out-door temperature (weather) sensor CT6-P, 17 - thermostat to turn off the pump.

RECOMMENDED SETTINGS:

Parameter	Setting	MENU
Preset boiler temperature	80°C	menu→Boiler Settings
Min. preset boiler temperature	75°C	menu→Service Settings→ Boiler Settings
CH Pump Activation Temperature	55°C	menu→Service Settings→ CH and HUW Settings
Activate operation (buffer support)	ON	menu→Service Settings→ Buffer Settings
Buffer loading start temp.	50	menu→Service Settings→ Buffer Settings
Buffer loading end temp.	75	menu→Service Settings→ Buffer Settings
Mix 1 support	CH ON	menu→Service Settings→Mixer 1 settings
Max. preset temperature of mixer 1	70°	menu→Service Settings→Mixer 1 settings
Max. preset temperature of mixer 2	45°	menu→Service Settings→Mixer 2 settings
Heating curve, mixer 1	0.8 – 1.4	menu→Mixer 1 settings
Heating curve, mixer 2	0.3 – 0.8	menu→Mixer 2 settings
Mixer 1 weather control	ON	menu→Mixer 1 settings
Mixer 1 thermostat selection	ecoSTER T1	menu→Service Settings→Mixer 1 settings
Mixer 2 thermostat selection	ecoSTER T2	menu→Service Settings→Mixer 2 settings
Mixer 3 thermostat selection	ecoSTER T3	menu→Service Settings→Mixer 3 settings

[3]The presented hydraulic diagram does not replace central heating engineering design and may be used for information purposes only.

12 Technical data

Voltage		230V~; 50Hz;
Current consumed by regulator		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 steam condensation
Measuring range of temperature sensors CT4		0...100 °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 0.75 mm^2 through 1.5mm^2, screwing torque 0.4Nm, insulation removed:
	communication	screw terminals, wire cross-section area up to 0.75mm^2 , screwing torque 0.3 Nm, insulation removed: 6 mm
Display		Display 480x272 pix. with touch panel
External dimensions		210x115x60 mm
Total weight		2 kg
Standards		PN-EN 60730-2-9 PN-EN 60730-1
Software class		A
Protection class		Suitable to build into Class I devices
Pollution degree		2nd pollution degree acc. to PN-EN 60730-1

13 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.

14 REGULATOR INSTALLATION

14.1 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.

14.2 Installation requirements

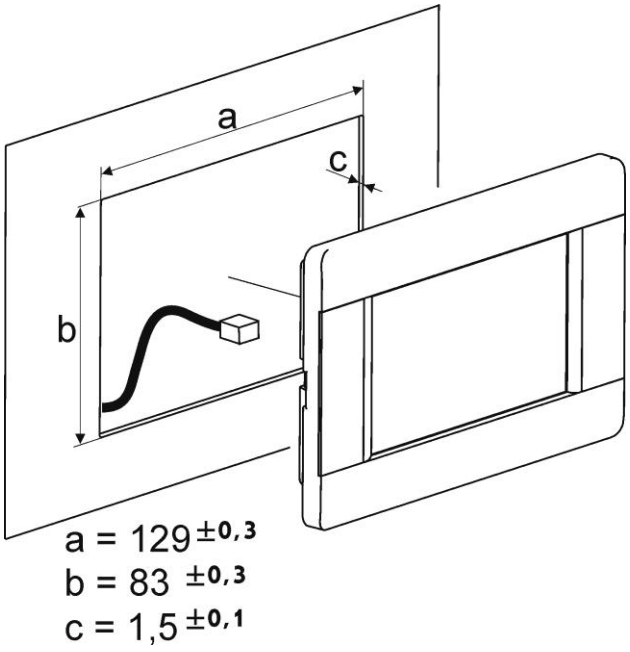
The regulator should be installed by a qualified and authorised fitter, in accordance with the applicable norms and regulations.

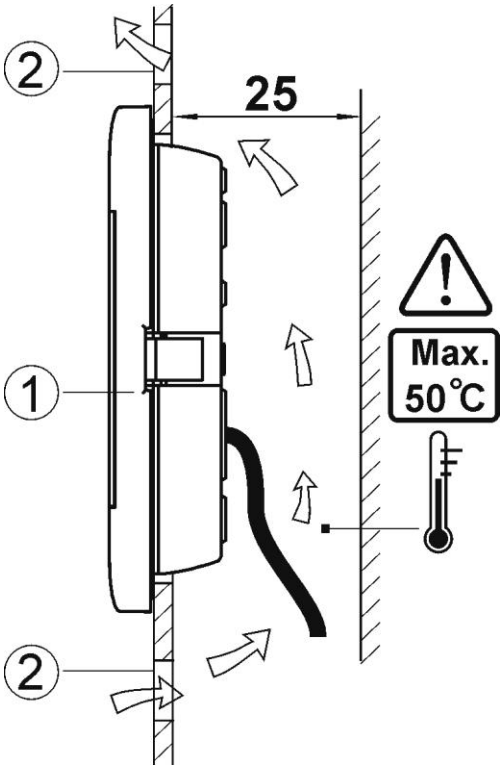
The manufacturer bears no responsibility for damages caused by failure to observe this manual. The regulator is to be built-in. The regulator cannot be used as a stand-alone device. The temperature of the ambient and the fitting surface cannot exceed the range of 0 - 50°C. The device consists of two modules: control panel and working module. Both elements are connected with electric wire.

14.3 Assembly 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.

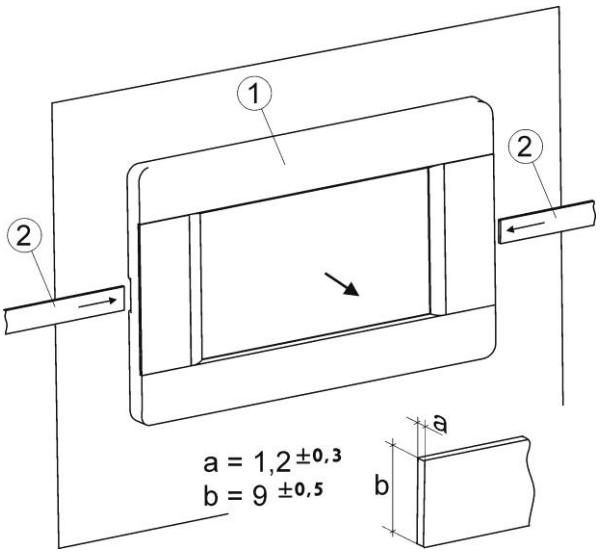
Drill a hole in the mounting plate acc. the below drawing.





Control panel mounting requirements. 1 – control panel, 2 – vent holes to provide air circulation (note: the holes may not cause downgrading of required IP rating. They are not required if permitted ambient temperature around the control panel is not exceeded.)

Disassembly of control panel:



To remove the control panel (1) from the housing - insert flat elements (2) into indicated slots to release housing catches and remove the panel (1).

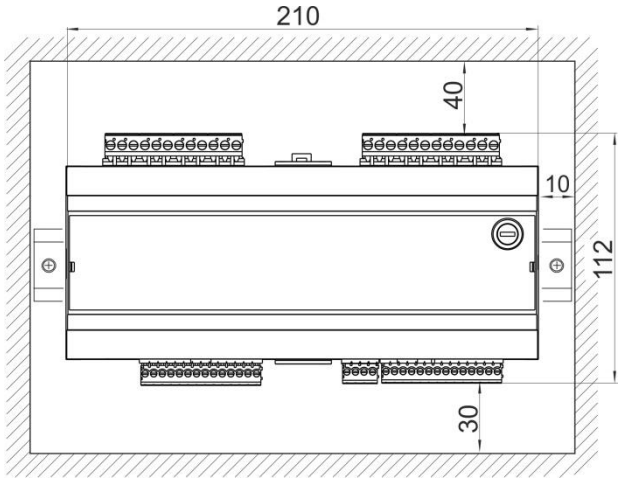
14.4 Mounting of working module

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. 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. Module housing does not guarantee dust- or-waterproofness. To provide the required protection, appropriate module cover should be provided.

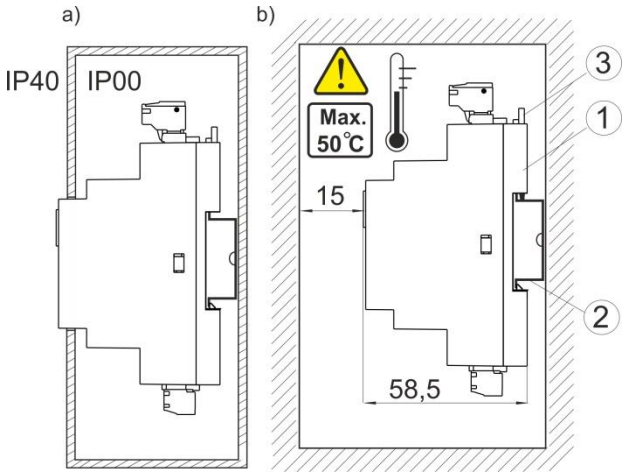
The working module is designed to be mounted on a standard DIN TS35 rail. Fasten the rail firmly to a rigid surface. Prior to placing the module on the rail (2), lift up the catch (3). Now, place the module on the rail and press the catch (3) to bring it to the original position. Make sure the device is firmly fastened and cannot be easily removed from the rail without use of tools.

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.



Space requirements for working module mounting.



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.

14.5 IP protection rate

Enclosure of the regulator's executive module provides various IP protection rates, depending on the method of installation. provides and explanation. After enclosing in accordance with this drawing, the device has protection rate IP 20 from the front side of the executive module enclosure (specified on the rating plate). From the side of the terminals, the casing has protection rate IP00, thus the terminals of the executive module must unconditionally be enclosed, in order to prevent access to this part of the casing.

If it is necessary to access the part with the terminals, disconnect the mains supply, make sure that there is no voltage on terminals and leads, and remove the executive module enclosure.

14.6 Connecting electrical system

Regulator is designed to be fed with 230V~, 50Hz voltage. The electrical system should be:

- three core (with protective wire),
- in accordance with applicable regulations.

Caution: After the regulator is turned off using the keyboard, dangerous voltage can occur on the terminals. Before starting any assembly works, you must disconnect the mains supply and make sure that there is no dangerous voltage on the terminals and the leads.

The connection wires should not have contact with surfaces of temperature exceeding the nominal temperature of their operation.
Terminals number 1-21 are intended only for connecting devices with mains supply 230V~.
Terminals 22-49 are intended for cooperation with low voltage devices (below 12 V).

Connecting mains supply 230V~ to terminals 22-49 and to transmission connectors G1-G4 will damage the regulator and creates risk of an electric shock!

Tips of the connected wires, especially power leads, must be secured against splitting by means of insulated clamp sleeves.

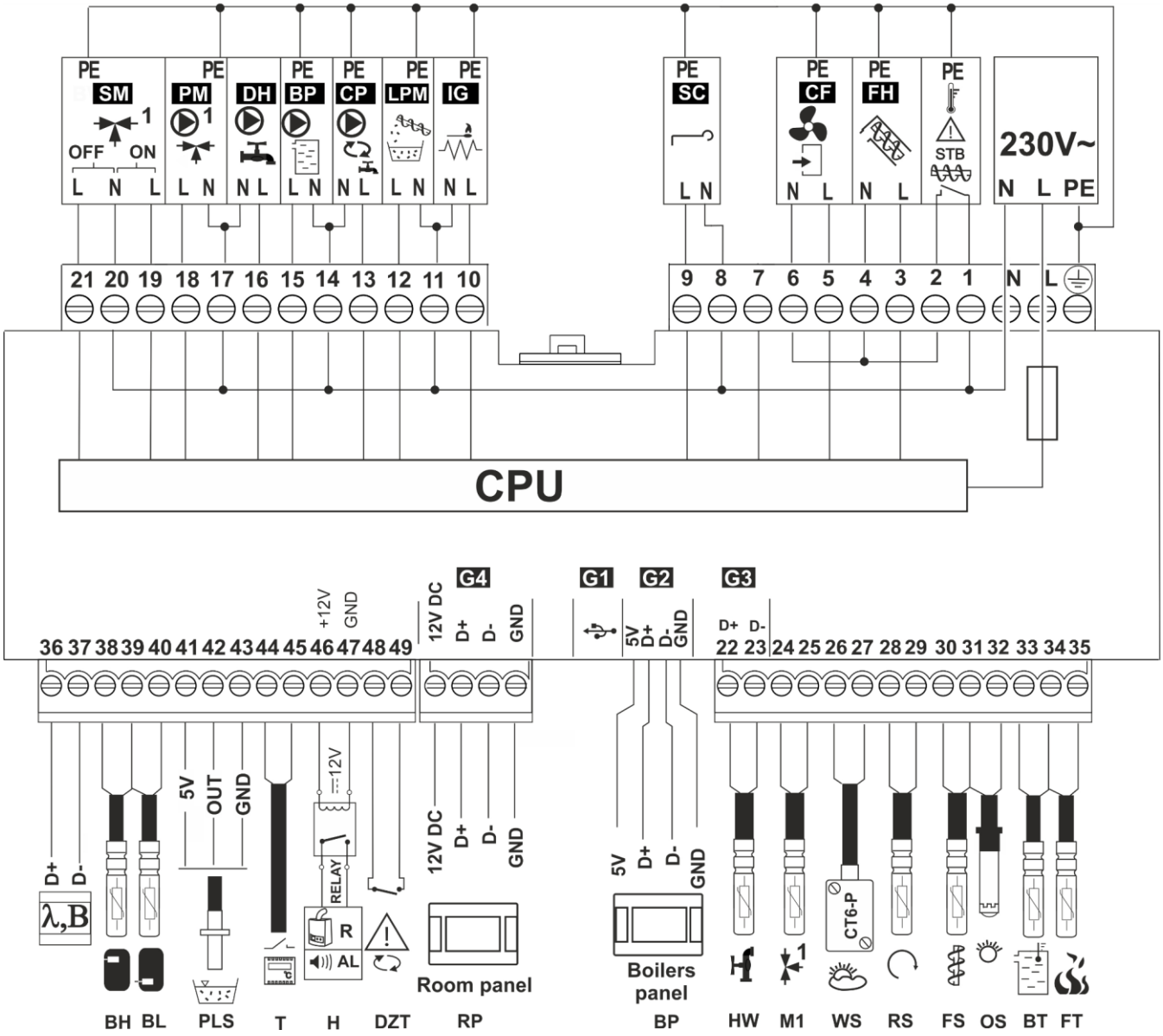
Connect power supply wires to terminals indicated with an arrow.

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.

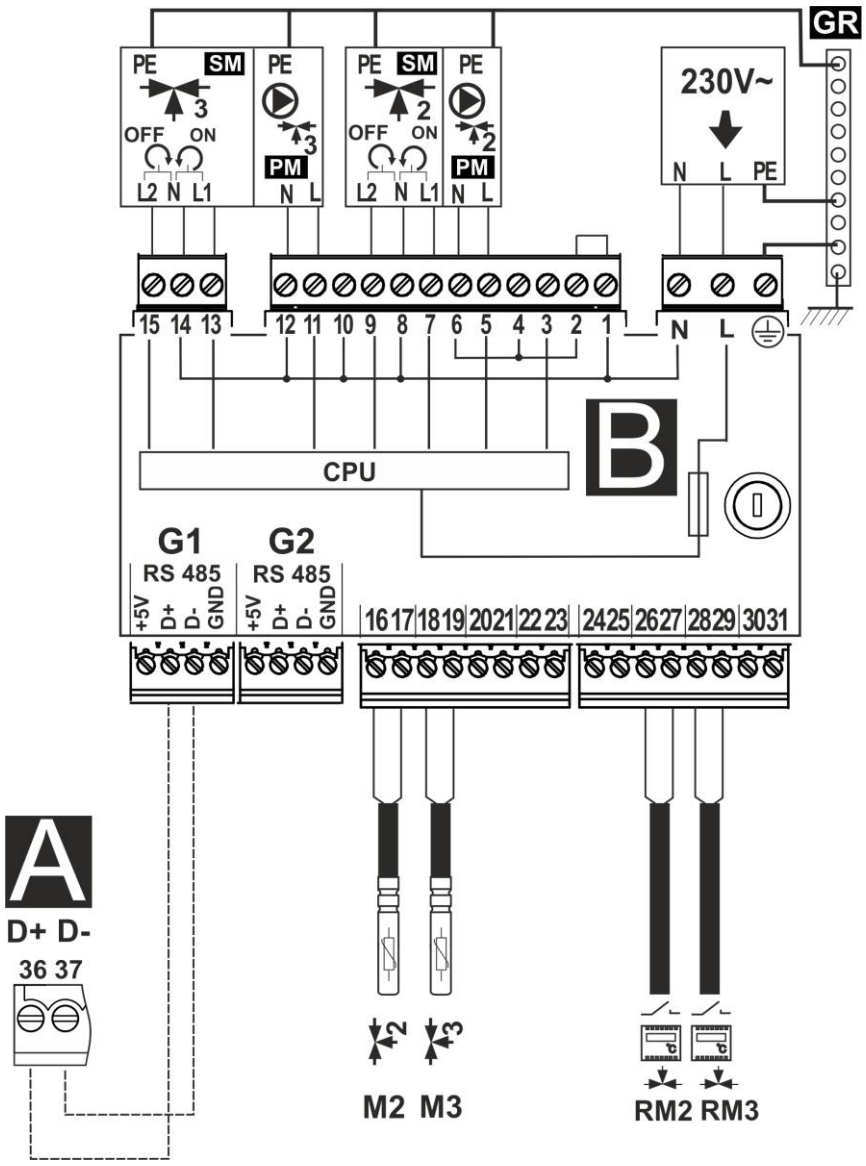
Connect protective wire of power supply cable to ground strip linked with metal boiler housing. Connect coupling to the terminal of the regulator indicated with a sign ⏚ and to earthing terminals of devices connected to the regulator. Mistake! Not possible to find an information cradle.

14.7 Electric scheme



Wiring diagram controller ecoMAX860P3-D TOUCH: **λ** – Lambda sensor module, **B** – B module to support additional heat circuits, **BH** – upper buffer temperature sensor type CT4, **BL** – lower buffer temperature sensor type CT4, **PLS** – fuel level sensor, **T** – standard room thermostat, **H** – output for alarm device or reserve boiler, **RELAY** – relay 12V, **DZT** – open boiler door sensor, **RP** – room panel ecoSTER TOUCH with room thermostat function, **BP** – control panel ecoTOUCH, **HW** – HUW temperature sensor type CT4, **M1** - regulated circuit (mixer 1) sensor temperature type CT4, **WS** – weather temperature sensor type CT6-P, **RS** - sensor temperature of the water returning to the boiler type CT4, **FS** – feeder temperature sensor type CT4, **OS** – optical flame sensor, **BT** – boiler temperature sensor type CT4, **FT** – exhaust temp. sensor type CT2S.

L N PE - power supply 230V~, **CPU** – controller, **STB** – input for STB device, **FH** – main feeder, **CF**- blowing burner fan, **SC** – rotary engine burner cleaning, **IG** – igniter, **LPM** – external feeder, **CP** – HUW circulation pump, **BP** – boiler pump, **DH** – HUW pump, **PM** – mixer pump, **SM** – mixer servo.



Wiring diagram – additional B module: **M1** – regulated circuit (mixer 2) sensor temperature type CT4, **M2** – regulated circuit (mixer 3) sensor temperature type CT4, **RM2** – mixer 2 room thermostat, **RM3** – mixer 3 room thermostat.
L N PE - power supply 230V~, **GR** – grounding bar, **PM2/PM3** – mixer 2/3 pump, **SM2/SM3** – mixer 2/3 servo, **CPU** – controller, **A** – ecoMAX860P3-D TOUCH regulator module A.

14.8 Connection of temperature sensors

Sensor wires may be extended using wires of cross-section area not less than 0.5 mm^2. Total length of wires of each sensor should not exceed 15 m.

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.

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 10 cm.

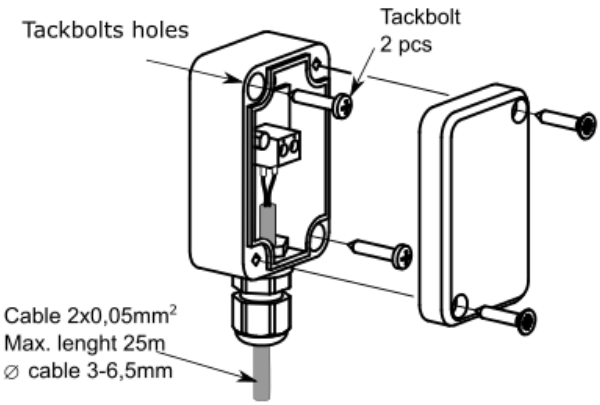
Do not allow sensor wires to contact hot parts of the boiler and heating system. Wires of temperature sensors are heat resistant to the temperature not exceeding 100°C.

14.9 Connecting weather sensor

The regulator cooperates only with a weather sensor of the CT6-P type. The sensor should be installed on the coldest wall of the building, usually this is the northern wall, under a roof. The sensor should not be exposed to direct sunlight and rain. The sensor should be fitted at least 2 m above the ground, far from windows, chimneys and other heat sources which could disturb the temperature measurement (at least 1,5 m).

Connect the sensor using cable of 0,5 mm^2 cross-section, up to 25 m long. Polarity of the leads is insignificant. Connect the other end of the cable to the regulator.

Attach the sensor to the wall using tackbolts. To access the tackbolts holes, unscrew the sensor lid.



14.10 Checking temperature sensors

Temperature sensors CT4/CT6-P/CT2S can be checked by measuring their resistance at the given temperature. In the case of finding significant differences between the value of measured resistance and the values presented in the table below, the sensor must be changed.

CT4			
Ambient temp. °C	Min. Ω	Rated 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

CT2S-2 (exhaust)			
Temp. °C	Min. Ω	Rated Ω	Max. Ω
0	999.7	**1000.0**	1000.3
25	1096.9	**1097.3**	1097.7
50	1193.4	**1194.0**	1194.6
100	1384.2	**1385.0**	1385.8
125	1478.5	**1479.4**	1480.3
150	1572.0	**1573.1**	1574.2
CT6-P (weathers)			
Temp.	Min.	Nom.	Max.

°C	Ω	Ω	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

14.11 Connection of mixers room thermostat

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

Mixer 1-5 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 ecoSTER TOUCH room control panel, make sure the *Thermostat select* parameter is set to a correct value.

Service Settings → Mixer 1-5 settings → Thermostat select

14.12 Connection of boiler's room thermostat

Boiler circuit room thermostat may activate the burner or deactivate CH boiler pump. In order for the room thermostat to control boiler operation, set the *Thermostat select.* value to *standard* or *ecoSTER T1* (if the ecoSTER TOUCH room control panel is connected)

Service Settings → Boiler Settings → Thermostat select

In order for the room thermostat to control CH pump operation (without deactivating the boiler), set the *Off by therm.* value to *YES*.

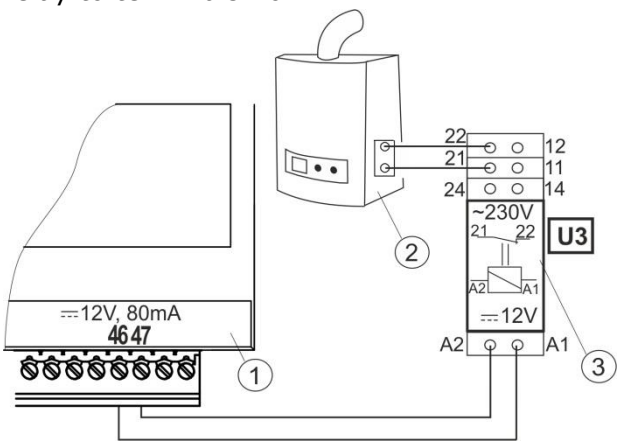
Service Settings → Boiler Settings → Off by therm.

14.13 Connection of reserve boiler

The regulator can control a reserve boiler (gas- or oil-), eliminating the necessity of enabling or disabling this boiler manually.

Connection to a reserve boiler, should only be made by a qualified fitter, in accordance with the technical documentation of this boiler.

The reserve boiler should be connected via relay to terminals 46-47.



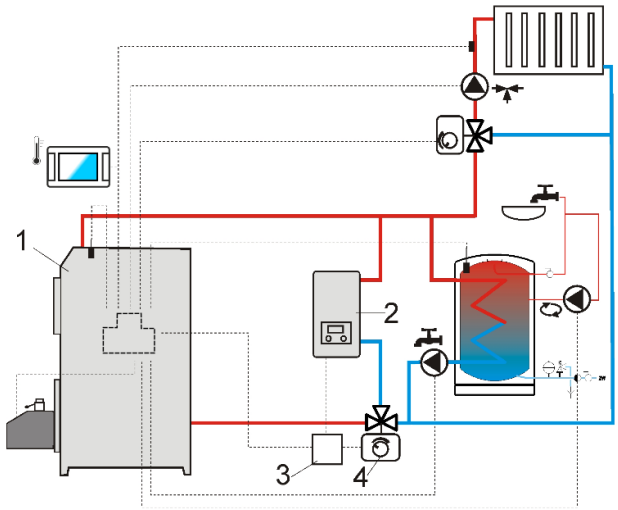
Model diagram of layout for connecting a reserve boiler to the regulator: 1- regulator, 2 – reserve boiler (gas- or oil-), 3 – relay RM 84-2012-35-1012 and base GZT80 RELPOL.

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

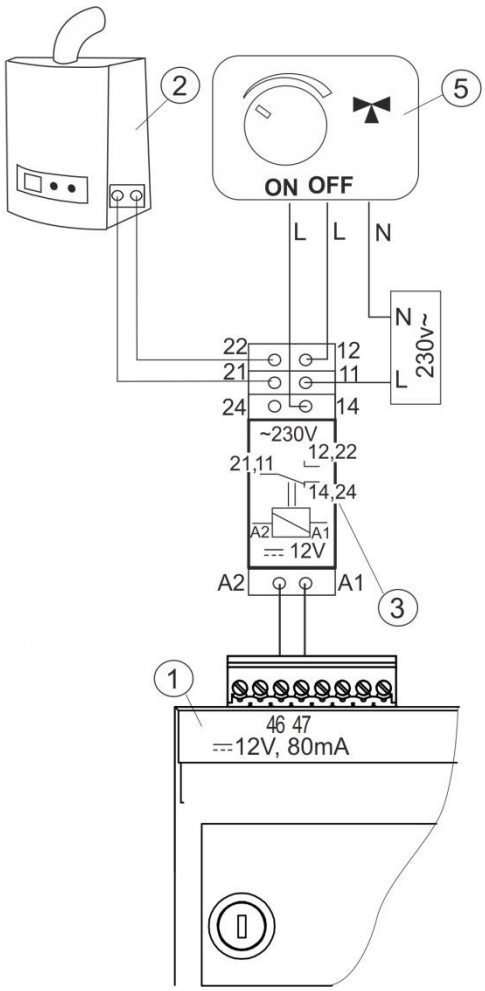
Reserve boiler control is switched off upon setting the *Output H* (*Output H mod B/C*) function to the *Reserve boiler*.

Service Settings → Output H

The reserve boiler is switched on when there is no voltage on terminals 46-47. The reserve boiler is switched off when there is voltage on terminals 46-47.



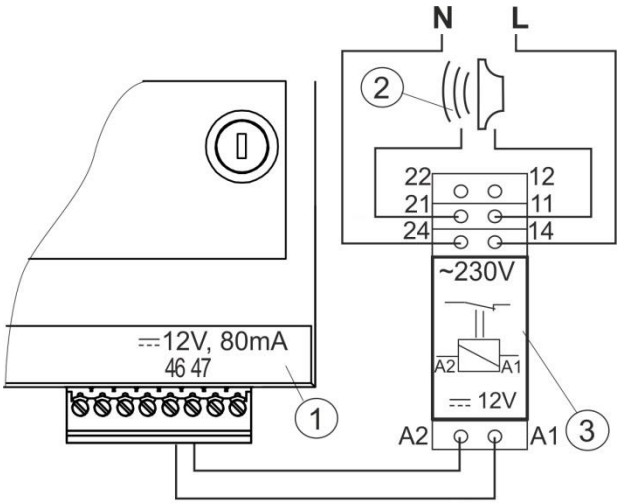
Hydraulic diagram with reserve boiler: 1 – regulator, 2 – reserve boiler, 3 – relay, 4 – switching valve (with limit switches).



Wiring diagram of control of the switching valve in the 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.

14.14 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.
Alarm signalling may be deactivated by setting the *Output H* function to *Alarms*.
Service Settings → Output H



Connection of an external alarm annunciator. 1- regulator , 2 – external alarm annunciator, 3 – relay.

14.15 Connection of mixer

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 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.

14.16 Connecting temperature limiter STB

In order to prevent the boiler from overheating due to the regulator malfunction, an STB safety temperature limiter, or any other appropriate for the given boiler and heating system, should be fitted. When the STB is activated, the fan and fuel feeder motors are disabled.

The STB must have nominal operating voltage of at least ~230V, and have the applicable certifications.

14.17 Connecting room panel

The regulator can be equipped with room panel ecoSTER TOUCH, which can serve as:
- room thermostat,
- boiler control panel,
- alarm signalling device,
- fuel level indicator.

Cross-section area of wires used to connect ecoSTER TOUCH control panel should be 0,5mm^2.

Max. length of wires should not exceed 30 m. This length may be longer if the wires used have cross-section area larger than 0,5mm^2.

- **Four-wire connection**

Connection – see Electric scheme.

- **Two-wire connection**

For two-wire connection apply power supply of 5 V or 12V DC and rated current of min. 400 mA. GND and VCC connect to external source of supply. Connect lines D+ and D- - acc. Electric scheme.

15 Service menu

Service settings
Burner settings
Boiler settings
CH and HUW settings
Buffer settings*
Mixer 1-5 settings*
Output H
Output H mod B/C*
Show advanced setup
Service information
Restore default settings
Touch screen calibration

Burner settings
Firing-up
• Ignition test time
• Fuel dose
• Flame detection
• Firing-up airflow
• Firing-up time
• Blowing after firing up
• Incandescence time
• Worktime with minimal power
Operation
• Thermostat mode
• Feeding cycle time
• Fuel calorific
• Feeder efficiency
• Capacity of tank
Burning off
• Maximum time of burning off
• Minimum time of burning off
• Air flush intensity
• Blowing time
• Blowing pause
• Blowing start
• Blowing stop
Cleaning
• Cleaning time Firing-up
• Cleaning time burning off
Supervision
• Supervision time
• Boiler power in supervision mode
• Cycle time
• Fan output
Grate*
• Blowing power - supervision
• Blowing pause - supervision
• Fuel shortage detection time
Lambda sensor*
• Operation with Lambda sensor
• Airflow correction range
• Parameter A,B,C Lambda
Minimum airflow output
Fuel shortage detection time
Max. burner temperature
Operation time of external feeder

Boiler settings
Thermostat select
• Off
• Universal
• ecoSTER T1-T3*
Return protection
• Return protection 4D
• Min. return temperature
• Histeresis return
• Closing the valve
Min. preset boiler temperature
Max. preset bolier temperatrure
Boiler cooling temperature
Off by thermostat

CH and HUW settings
CH pump activation temperature
CH pump standstill when loading HUW*
Minimum HUW temperature*
Maximum HUW temperature*
Boil. inc. by HUW, Mixer
Extending HUW pump operation time
HUW Operation Ext.*
Circulating pump standstill time*
Circulating pump operation time*
Exchanger*

Buffer settings*
Buffer support
Loading start temperature
Loading stop temperature

Mixer 1-5 settings*
Mixer support
• Off
• CH on
• Floor on
• Pump only
Thermostat select*
Minimum mixer temperature
Maximum mixer temperature
Proportional range*
Integration time constant*
Valve full opening time
Off by Thermostat
Mixer input dead zone*

Output H Output H mod B/C

• Reserve Boiler
• Alarms

* unavailable if no adequate sensor or additional module is connected or the parameter is hidden.

16 SERVICE SETTINGS

16.1 BURNER

Firing-up	
• Ignition test time	It is a verification time to check, if the furnace is burning or not. In this time only ventilator is working.
• Fuel dose	The basic amount of fuel that will supply feeder at the first attempt firing-up.
• Flame detection	Threshold of flame detection in % of light, when the controller deems the furnace as hot. It is also used for detection of lack of fuel and end of burning off.
• Firing-up airflow	% of blowing when firing up. Too big value prolongs the firing up process or causes failed attempt of firing up.
• Firing-up time	It is a time for additional firing attempts. After this time the controller goes to another firing attempt (there is max. 3 such attempts).
• Blowing after firing up	% of fan blowing after flame detection.
• Incandescence time	The incandescence time after the flame is detected in the firing-up phase.
• Worktime with minimal power	Burner operation time with minimum power after firing up. Power is determined by parameter *Minimum airflow output*.
Operation	
• Thermostat mode	Switches the burner into THERMOSTAT mode, i.e. for working in bakery. The burner operates with maximum power without modulation of power. The burner deactivates with disconnecting thermostat joints. Boiler temperature sensor does not influence feeder operation.
• Feeding cycle time	Time of whole fuel feeding cycle in Operation mode. *Feeding cycle time* = feeding time + feeder interval.
• Fuel calorific	Fuel calorific value in kWh/kg
• Feeder efficiency	Efficiency of the fuel feeder in kg/h. Entered a measured amount of fuel in constant feed (feeder working constantly). The parameter does not affect the work of the burner and is used for calculating the fuel level and current boiler output.
• Capacity of tank	Fuel tank capacity used for calculation of fuel level. Setting the right value releases the user from necessity of carry out a fuel calibration procedure. The controller is using the data if the calibration process was not being done. After successful fuel level calibration the controller is no longer using this value.
Burning off	Burning off mode does not occur when coal is the fuel!
• Maximum burning off time	After this time the controller goes into PAUSE mode although the flame sensor is detecting the flame.
• Minimum burning off time	The burning off mode will durate at least for this time although the flame sensor will be detecting anymore flame.
• Air flush intensity	Fan power during blowing while burning off in %.
• Blowing time	Blowing time in burning off. Air flushes time during fuel burnout Burning off.
• Blowing pause	Blowing pause in burning off. Pause between blowings while burning up fuel in Burning off.
• Blowing start	Flame brightness by which blowings start while burning up fuel in Burning off.
• Blowing stop	Flame brightness by which blowings stop by burning up fuel in Burning off.
Cleaning	
• Cleaning time Firing-up	Fan operation time during cleaning the furnace while firing up.
• Cleaning time burning off	Fan operation time during furnace burning off.
Supervision	
• Supervision time	When the time of supervision will pass by, the controller then goes into BURNING OFF mode and then into PAUSE mode. When the parameter

	Supervision time = 0, then the controller skip the SUPERVISION mode and goes directly to BURNING OFF mode. When the parameter *Supervision time = 255*, then the controller stays in SUPERVISION mode until the boiler temperature drops down up to the level, by which the controller returns to OPARATION mode.
• Boiler power in supervision mode	It influences the boiler power in Supervision mode. Note: the value should be as low as possible just to maintain the flame. Too high a value can lead to overheating the boiler.
• Cycle time	Feeder operation time in SUPERVISION mode. *Cycle time OPERATION = Feeding time OPERATION + Feeder standstill time.*
• Fan output	Airflow output in % during operation in SUPERVISION mode. Adjust value in such a way to burn feeding fuel in Supervision mode with low fumes emission.
Grate	
• Blowing power - supervision	Blowing time in supervision in grate mode. Fan blowing time in SUPERVISION while work in grate mode. The value should not be too big in order not to cause water overheating in boiler.
• Blowing pause - supervision	Blowing pause time in supervision in grate mode. Pause time between blowings in SUPERVISION mode, during work in grate mode. The value should not be too small in order not to cause water overheating in boiler.
Lambda sensor	
• Operation with Lambda sensor	When the parameter will be set on *ON* then the controller will operate using the Lambda sensor measurements. The air quantity delivered to the furnace will be automatically set on in order to get a preset value of oxygen inside the fumes. When this parameter will be set on *OFF*, then the Lambda sensor readings will have no influence on controller operation.
• Airflow correction range	Established an acceptable level of variation of airflow power when the Lambda sensor is in operation.
• Parameter A,B,C Lambda	Affects the adjustment speed of oxygen value present in exhaust to present oxygen value; it also affects the stability to keep the oxygen in exhaust. It is not recommended to change this value.
Minimum airflow output	Minimum airflow output in % selectable by the controller user. It is used only to limit the available airflow output range. It is not used for the airflow control algorithm and should be as low as possible to ensure slow and smooth airflow rotation without "buzzing".
Fuel shortage detection time	The time countdown starts after the flame brightness has dropped below the value of the *Flame detection* parameter. After the countdown is finished, the controller attempts to ignite the burner and should it fail three times, an alarm message of “ignition failure" is indicated.
Max. burner temperature	Defines the maximum burner temperature. Should the value be exceeded, the "maximum burner temperature exceeded" alarm is generated.
Operation time of external feeder	Defines the external feeder operation time. After that time, the external feeder operation is stopped despite the fuel level sensor contacts are open.

16.2 BOILER

Thermostat select	The following options are available: • Off - deactivates the effect of the room thermostat on the boiler’s operation. • Universal - enables the No-Nc room thermostat to the boiler. • ecoSTER T1-T3 - this option is available when the ecoSTER TOUCH room panel is connected, the signals on the status of the thermostat are sent from the room panel.
Return protection	
Return protection 4D	This parameter turns on/off the boiler return protection function, which is being done by mixing valve together with electric actuator. Attention: do not activate this function when there is no actuator installed on the valve!
Histeresis return	The electric actuator will return to its normal operation with *return temperature ≥ min. return temperature + return hysteresis.*

Min. return temperature	The boiler return temperature below which the electric actuator will close the mixing valve.
Closing the valve	It is a value for opening the mixing valve during active return protection function. This value is given in percentage. This value should be set in such way, that the return temperature can raise. Attention: the return protection function will work only in case when the set boiler temperature will be set on sufficiently high value, otherwise there will be too many lock ups of the actuator. Attention: The valve is locking up with the +-1% of precision.
Min. preset boiler temperature	Minimal set temperature for the boiler, that can be edited by the user in user menu and also a minimal temperature, that can be automatically set by a controller e.g. from night decrease, weather control etc.
Max. preset bolier temperatrure	Maximal set temperature for the boiler, that can be edited by the user in user menu and also a maximal temperature, that can be automatically set by a controller e.g. from night decrease, weather control etc.
Boiler cooling temperature	Preventive boiler cooldown temperature. When this temperature is exceeded, the regulator switches on the hot usable water pump and opens the mixer circuits in order to cool the boiler down. The regulator will turn the hot usable water pump when the temperature of this water exceeds the maximum value. The regulator will not open the mixer circuit when *mixer control = Floor on*.
Off by thermostat	Available options: • No - the CH boiler pump is not switched off when the room thermostat is activated. • YES - the CH boiler pump is switched off when the room thermostat is activated.

16.3CH and HUW

CH Pump activation temperature	This parameter decides on the temperature of boiler pump activation. It secures the boiler against retting, that can occur when the boiler is being cooled down with cold water from the installation. Attention: deactivation of boiler pump doesn't guaranteed, that the boiler is secure against retting and therefore corrosion. It is recommended to apply additional automatics e.g. 4-way valve or 3-way thermostatic valve.
CH pump standstill when loading HUW	It requires a HUW sensor to be plugged in. A prolonged HUW tank loading can, with HUW priority activated, lead to excessive cooling down of CH installation, because with these kind of settings the CH pump is switched off. The parameter of pause time of CH pump preventing this by periodic operation of CH pump while HUW tank loading. The CH pump will after this time activate for fixed set time of 30s.
Min. HUW temperature	It requires a HUW sensor to be plugged in. This parameter can be used for limitation of possibility to choose too low value of HUW set temperature.
Max. HUW temperature	It requires a HUW sensor to be plugged in. This parameter decides on which maximum temperature will the HUW tank be heated during dropping down excessive heat in alarm states. It is a crucial parameter because setting this for too high value can lead to the risk of users scalding with utility water. On the other hand, too low value of this parameter can lead to a situation, when during boiler overheating there will be no possibility to drop down excessive heat into the HUW tank. When projecting the HUW installation, there should be an assumption of controller malfunction. This situation can lead to dangerous level of HUW temperature, leading to user scalding. It is advised to use additional security precautions in form of thermostatic values.
Boil. inc. by HUW, Mixer	This parameter specifies how much grads Celsius will the buffer set temperature be raised in order to load the HUW tank. Buffer and mixer circuit. The temperature raising is being only made when it is indeed needed. When the boiler set temperature is on expected level, than the

	controller will not change this temperature with the necessity of loading the HUW tank, buffer or mixer circuit.
Extending HUW pump operation time	Allows for removal of heat from boiler by HUW feed. directly after the HUW feed. is load. In order to cool the boiler, the oper. of HUW pump can be extended by a period of extended oper. of HUW pump.
HUW operation extension	Available after connecting a HUW sensor. When the HUW tank is fully loaded and the HUW pump is switched off, the boiler may be in danger of overheating. This occurs when the set HUW temperature is higher than the set boiler temperature. The problem is particularly prominent when the HUW pump works in “SUMMER” mode and the CH pump is deactivated. In order to cool the boiler down, the HUW pump operation can be extended by the *HUW operation time time* value.
Circulation pump standstill time	It is the time between periods of circulation pump operation and it is defined by the parameter *circulation standstill time* (recommended setting is between 15-40 min.) The circulation pump is operating in cycles for the time of *circulation operation time* (recommended setting is between 60 and 120s.)
Circulation pump operation time	
Exchanger	It comes only for hydraulic installations with heat exchanger between open and closed circuit. Available options are: • YES (the boiler pump is operating constantly in short circuit boiler – heat exchanger, it is not excluded e.g. from “SUMMER” function or HUW priority) • NO (standard operation of boiler pump)

16.4 BUFFER

Buffer support	This parameter is used for enabling buffer operation.
Loading start temperature	The parameter *Loading Start temperature* defines the upper buffer temperature below which the process of buffer loading is being started. This process will then be finish when the bottom buffer temperature will reach defined temperature in the parameter *Loading stop temperature.*
Loading stop temperature	

16.5 MIXER

Mixer support	
• Off	The mixer actuator and pump are not in operation.
• CH On	It is being used when a mixing circuit is loading a heat installation of CH. The maximum mixing circuit temperature is not being limited, the mixer is fully opened during alarms e.g. with boiler overheating. Attention: do not use this option when the heat installation is made with pipes not resistant for high temperatures. In such cases it is recommended to set the mixer operation for FLOOR switched on.
• Floor On	It is being used when the mixer circuit is loading floor heating installation. The maximum mixer circuit temperature is limited to the value of max. mixer set temperature. Attention: after choosing the option – FLOOR switched on the parameter of max. mixer set temperature should be so edited, that the floor heating will be not damaged and there would be no danger of scalding.
• Pump Only	By the moment when the mixer circuit temperature exceeds the set temperature in the parameter mixer set temperature, the mixer pump supply will be shut down. When the circuit temperature will drop by 2˚C then the pump will again be switched on. This option is usually be used for control of floor heating pump in situation, when this pump is operating together with thermostatic valve without actuator.
Thermostat select*	This parameter is available only when the room panel. This option

	allows you to select room thermostat for mixer. Options to choose from: • OFF - disables the thermostat. • Universal - standard thermostat, connected to terminals 44-45 for mixer 1, for 2-5 mixers are suitable terminals in additional modules. • ecoSTER T1-T3 - thermostat in the room panel ecoSTER TOUCH. If the room panel series ecoSTER is not connected to the controller only works with standard thermostat.
Minimum Mixer temperature	It is the parameter used for limitation of choosing too low value of set mixer circuit temperature by the user. Automatic regulation (e.g. periodic temperature reduction) also does not cause the reduction of set temperature value below the value given in this parameter.
Maximum Mixer temperature	This parameter has two functions: • it enables the limitation of choosing too high value of set mixer temperature by the user. Automatic regulation (correction upon heating curve, that comes from outside temperature) also does not cause crossing the set temperature above the value given for this parameter. • when the *Mixer support* = *Floor on*, then the mixer pump will shut down by max. mixer temperature, which protects the floor against destruction. For the floor heating it should be set for the value below 45-50 ˚C or even lower, when the thermal resistance of this floor is lower. Attention: setting too lower value of this parameter can lead to unnecessary shut down of the pump.
Valve full opening time	The time of valve full opening should be entered – this time can be read from the nameplate of valve actuator, e.g. 140s.
Off by thermostat	Setting this parameter for *YES* value lead to close the mixer actuator and shutting down the mixer pump after thermostat contacts divergence (the room is being heated). This activity is however not recommended, because a heated room can be significantly cooled down.
Mixer input dead zone	A set value of this parameter determines the temperature insensitivity (dead zone) for the mixer control system. The controller operates the mixer in such way, that the value of measured temperature (from the mixer circuit sensor) will be the same as set value. However in order to avoid too many actuator moves, leading to unnecessary cutting down its longevity, the regulation is being used only when the measured mixer circuit temperature will be higher or lower from set value increased by the mixer insensitivity.
Proportional range	This parameter has the influence upon the scale of movement of the mixer actuator. Raising the value of this parameter leads to faster mixer reaction thus leading to faster reaching of set mixer temperature. Too high value of this parameter leads however to temperature overregulation and unnecessary actuator movements. The right value is being edited according to research results. It is recommended to set this value between 2 and 6 [3].
Integration time constant	The greater the value of this parameter, the slower is the actuator reaction for temperature deviation. Setting too lower values can lead to unnecessary actuator movements, too high value extending the time needed to find set value of the temperature. The right value is being edited according to research results. It is recommended to set this parameter value between 100 and 180 [160].

16.6 H OUTPUT

Output H **Output H mod B/C**	Functions performed at the module regulator, output 46-47 and output 30-31 additional module. There are option to choose from: • Reserve boiler – output H controls the reserve boiler. • Alarms – when an alarm occurs, output H is being activated.

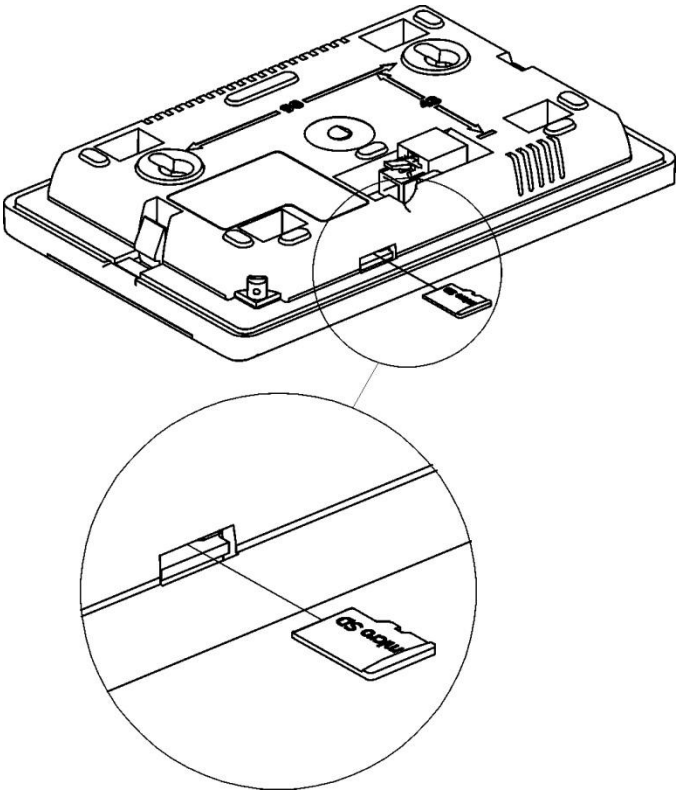
	Operation alarms when the parameter *Reserve boiler* set to zero.

16.7 OTHTRS

Show advanced setup	Available options: • YES - shows hidden parameters, which edition is not recommended. • NO - hides hidden parameters.
Restore default settings	Restoring service settings will also restore the settings from the main menu (the user).
Touch screen calibration	Setting the proper reaction of the program to the desired position on the touch panel screen.

17 SOFTWARE UPGRADE

To upgrade the version software use only **microSDHC** memory card.



Note: Software may be upgraded by authorised personnel only. All electric shock preventive measures must be applied!

To upgrade the software, disconnect power supply of the regulator and remove ecoTOUCH control panel from the regulator housing. Insert memory card into indicated slot. Memory card should contain new software stored in the *.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 the memory card. Do not nest data in sub-directory. Re-install the control panel in regulator housing and connect power supply.

Enter:
General Settings → **Software Upgrade** and upgrade the software: first in the A module, then in regulator's control panel.

Registry changes:

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