CONTROLLER

ecoMAX860P4-KT

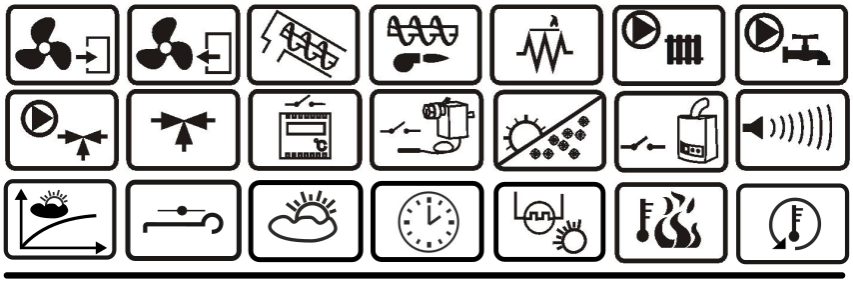
FOR AUTOMATIC SOLID FUEL FIRED BOILERS

eSTER x80*

ecoSTER TOUCH*

eSTER x40*

ecoNET.apk
ecoNET.app
www.econet24.com



Functions available in the additional module B

* device isn't the standard equipment of the controller.

INSTALLATION AND OPERATING MANUAL

ISSUE: 1.2_EN

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ELECTRIC DEVICE UNDER VOLTAGE!

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

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

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

TABLE OF CONTENTS

1 RECOMMENDATIONS REGARDING SAFETY 4

2 GENERAL INFORMATION 5

3 INFORMATION ABOUT DOCUMENTATION 5

4 STORAGE OF DOCUMENTATION 5

5 APPLIED SYMBOLS 5

6 DIRECTIVE WEEE 2012/19/UE 5

USER SETTINGS 7

7 USER MENU 8

8 THE CONTROLLER SUPPORT 9

8.1 OPERATING THE ECOTOUCH PANEL – OPTION 9
8.2 DESCRIPTION OF THE MAIN WINDOW - ECOTOUCH PANEL 9
8.3 OPERATING THE ST4 PANEL 10
8.4 DESCRIPTION OF THE MAIN WINDOW – ST4 PANEL 10
8.5 SWITCHING ON AND OFF THE BOILER 11
8.6 PRESET TEMPERATURE SETTING 11
8.7 FIRE UP 11
8.8 OPERATION 11
8.9 SUPERVISION 12
8.10 BURNING OFF 13
8.11 STOP 13
8.12 GRATE 13
8.13 BURNER AND EXCHANGER CLEANING 13
8.14 HUW SETTINGS 13
8.15 HUW PRESET TEMPERATURE SETTINGS 14
8.16 HYSTERESIS OF HUW 14
8.17 ENABLING THE SUMMER FUNCTION 14
8.18 HUW CONTAINER DISINFECTION 14
8.19 MIXER CIRCLE SETTINGS 14
8.20 WEATHER CONTROLLED OPERATION 15
8.21 NIGHT DECREASE SETTINGS DESCRIPTION 16
8.22 WORKING ACCORDING TO SCHEDULE 16
8.23 FUEL LEVEL CONFIGURATION 16
8.24 FEEDER TEST 17
8.25 INFORMATION 17
8.26 MANUAL CONTROL 17
8.27 MENU FAVORITES 18
8.28 COOPERATION WITH THE ROOM THERMOSTAT AND ROOM PANEL 18
8.29 COOPERATION WITH THE INTERNET MODULE 18

INSTALLATION AND SERVICE SETTINGS 19

9 HYDRAULIC SCHEMES 20

10 TECHNICAL DATA 23

11 CONDITIONS OF STORAGE AND TRANSPORT 23

12 CONTROLLER INSTALLATION 23

12.1 ENVIRONMENTAL CONDITIONS 23
12.2 INSTALLATION REQUIREMENTS 23
12.3 ASSEMBLY OF CONTROL PANEL 23
12.4 MOUNTING OF MODULE 25
12.5 IP PROTECTION RATE 25
12.6 CONNECTING ELECTRICAL SYSTEM 26
12.7 ELECTRIC SCHEME 27
12.8 CONNECTION OF TEMPERATURE SENSORS 29
12.9 CONNECTING WEATHER SENSOR 29
12.10 CONNECTING EXHAUST SENSOR 29
12.11 WEATHER SENSORS CHECKING 30
12.12 OPTICAL SENSOR CONNECTION 30
12.13 MIXERS ROOM TEMPERATURE CONNECTION 31
12.14 BOILER ROOM THERMOSTAT CONNECTION 31
12.15 CONNECTION OF RESERVE BOILER 31
12.16 CONNECTION OF ALARM SIGNALLING 31
12.17 MIXER CONNECTION 31
12.18 CONNECTING TEMPERATURE LIMITER 32
12.19 THERMAL PROTECTION 32
12.20 CONNECTING OF ROOM PANEL 33
12.21 CONNECTING OF WIRELESS ROOM PANEL 33

13 SERVICE MENU 34

14 DESCRIPTION OF SERVICE SETTINGS 36

14.1 BURNER 36
14.2 BOILER 37
14.3 CH AND HUW 38
14.4 BUFFER 39
14.5 MIXER 39
14.6 OTHER PARAMETERS 40

15 ALARMS DESCRIPTIONS 41

15.1 BOILER MAX. TEMP. EXCEEDING 41
15.2 OVERHEATING OF THE BURNER 41
15.3 BOILER TEMP. SENSOR DAMAGE 41
15.4 FEEDER TEMP. SENSOR DAMAGE 41
15.1 FEEDER CONTROL SYSTEM FAILURE 41
15.2 OVERHEATING BOILER, STB OPEN CONTACT 41
15.3 FIRING UP FAILED ATTEMPT 41
15.4 NO COMMUNICATION 42
15.5 BOILER DOOR OPEN 42
15.6 UNSUCCESSFUL ATTEMPT TO LOAD THE TANK 42

16 OTHER 42

16.1 POWER STOPPAGE 42
16.2 ANTIFREEZING PROTECTION 42
16.3 PUMP ANTI STANDSTILL FUNCTION 42
16.4 NETWORK FUSE REPLACEMENT 42
16.5 REPLACEMENT OF CONTROL PANEL 42

17 SOFTWARE UPDATE 43

18 THE CONTROLLER CONFIGURATION BY BOILER PRODUCER 43

19 POSSIBLE FAULTS DESCRIPTION 44

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 Controller is turned off, dangerous voltage still can occur on its terminals.
- The Controller 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 Controller, 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 Controller is intended for boiler manufacturers. Before applying the Controller, a boiler manufacturer should check if the Controller's mating with the given boiler type is proper, and whether it can cause danger.
- The Controller 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 Controller should be separated from flammable dusts and gases, e.g. by means of an appropriate body.
- The Controller 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 Controller operates must be protected by means of a fuse, selected appropriately to the applied loads.
- The Controller cannot be used if its casing is damaged.
- In no circumstances can the design of the Controller be modified.
- Electronic isolation of the connected devices is applied in this Controller.
- The Controller is equipped with internal overcurrent protection, one-polar, which have an impact on the safety of use. The condition of its correct operation is the proper connection of the power cable to the electrical network. It is absolutely necessary to ensure that the L phase wire is not changed with the N neutral wire. Ensure that the polarity of the L and N wires is correct by measuring at their terminals.
- Keep the Controller out of reach of children.

2 General information

The controller ecoMAX860P4, version: KT is a device designed to control the operation of a boiler with automatic feeding of solid fuel with a igniter. Flame detection is performed with the use of an optical flame brightness sensor. It can control the work of central heating and hot water circuits and also control the work of 5 mixing heating circuits. The required temperature of heating circuits can be set on the basis of data obtained from the main sensor. The possibility of cooperation with room thermostats, separate for each heating circuit is beneficial for maintaining comfortable temperature in heating rooms. Moreover, the device turns on the spare boiler (-gas or –oil).

The controller may operate in connection with additional wire room thermostat/panel ecoSTER TOUCH and wireless room thermostat/panel eSTER_x80 or eSTER_x40 installed in rooms and ecoNET300 Internet module. Additionally it cooperates with ecoLAMBDA module and extension modules B/C.

The controller may be used in households and other similar premises and in light industry facilities.

3 Information about documentation

The controller manual is a supplement for the boiler manual. In particular, except for this manual, the boiler manual should also be observed. The controller 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.

USER SETTINGS

ecoMAX860P4-KT

7 User menu

Main menu
Information
Boiler settings
HUW settings*
Summer/Winter
Mixer 1-5 settings*
Night time decrease
• Off, Reduction value, Schedule
Operation with schedule
• Off, Schedule
General settings
Manual control
Alarms
Service settings

Boiler settings
Preset boiler temperature
Boiler weather control *
Boiler heating curve*
Curve shift *
Room temperature factor*
Output modulation
• Maximum boiler output
• Blow-in output - MAX
• Maximum output - Exhaust
• The intermediate power-hysteresis H2
• The intermediate boiler power
• The intermediate power-blow-in
• The intermediate Exhaust power
• Minimum power-hysteresis H1
• Minimum boiler output
• Minimum power - blow-in
• Minimum output - Exhaust
• Minimum power- oxygen*
• Boiler hysteresis
• Minimum boiler output FL
• Maximum boiler output FL
• Feeder efficiency
• Feeder: Feeder efficiency test Efficiency test time Feeder filling Fuel weight
Operation mode *
• Pellet, Grate
Fuel level
• Alarm level
• Fuel level calibration
Cleaning cycle
Exchanger cleaning start*
Exchanger cleaning stop*

HUW settings*
HUW preset temperature
HUW pump mode
• Off, Priority, No priority
HUW cont. hysteresis
HUW disinfection

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

Mixer settings 1-5*
Mixer preset temperature
Room thermostat mixer
Weather control mixer *
Heating curve mixer *
Curve translation*
Room temperature factor *

General settings
Clock
Date
Screen brightness
Screen contrast
Sound
Language
WiFi settings*
Software update*
Weather sensor
• Sensor correction
Radio module settings*
• Pairing mode • Delete paired devices

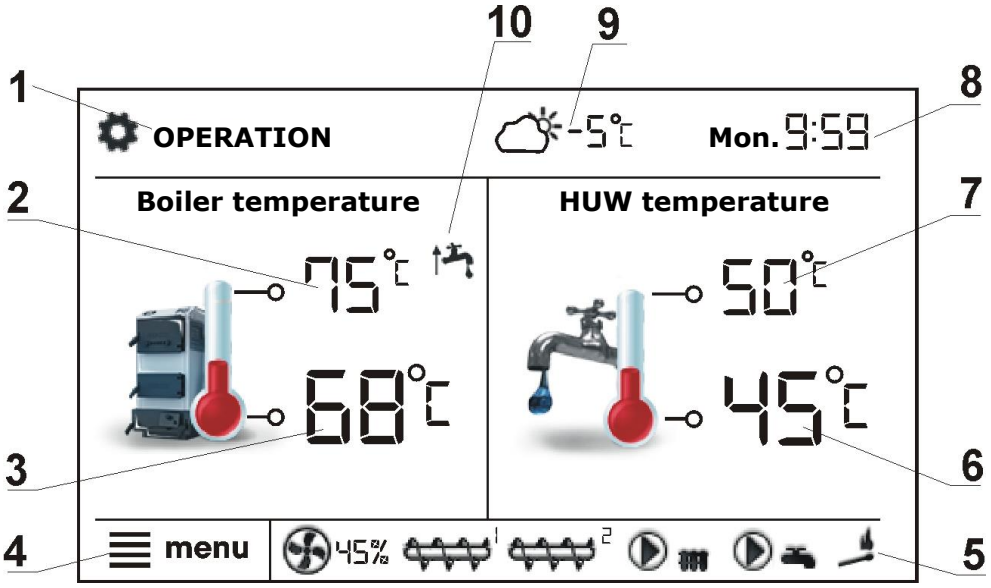
* not available if proper sensor or additional module not connected or the parameter is hidden.

8 The controller support

8.1 Operating the ecoTOUCH panel – option

The controller is operated via a touch screen, which allows to select items from the menu and edit parameters.

8.2 Description of the main window - ecoTOUCH panel



Description:

1. Operating modes: FIRE UP, OPERATION, SUPERVISION, BURNING OFF, CLEANING, STOP
2. boiler preset temperature - holding down for a longer time - the value is edited
3. boiler measured temperature
4. entering the menu list
5. Information fields, work:

- airflow fan

- fuel feeder

- burner feeder

- HUW and CH pump

- igniter

- grate

- reserve boiler.

6. measured temperature of hot water boiler (HUW)
7. preset hot water (HUW) boiler temperature - holding down for a longer time - the value is edited
8. clock and weekday
9. outside temperature value (weather)
10. functions having influence on preset boiler temperature. Following symbols signal respectively:

- preset boiler temperature decrease due to thermostat disconnection,

- preset boiler temperature decrease due to activated time spans,

- boiler preset temperature during loading the hot water boiler (HUW),

- boiler preset temperature increase from mixer circulation,

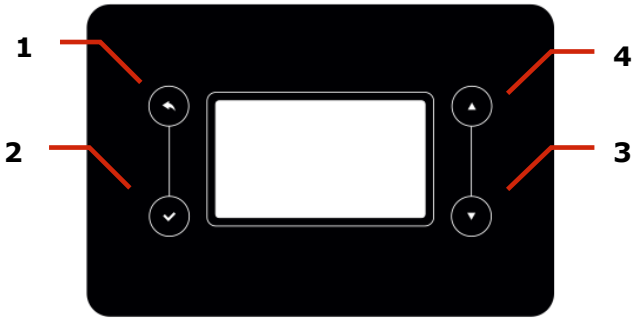
- preset temperature increase to load the buffer,

- active return protection.

Right window on the main screen is configurable, allows on changing information displayed there. It is possible to choose a configuration displaying: mixer circuit (1-5),

info or HUW. Right window on the main screen may also display the fuel level view, providing that this parameter is set correctly. Tip: fuel level may be displayed on ecoSTER TOUCH, eSTER_x80 room panel and eSTERx40 room thermostat.

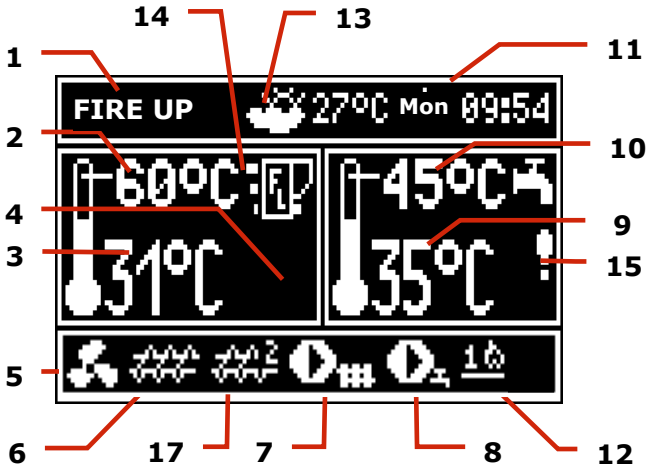
8.3 Operating the ST4 panel



Buttons description:

1. Exit from the currently selected menu level as well as abandoning the set value.
2. Enter the MENU and confirm the setting of the selected parameter.
3. Reduce the edited value.
4. Increase the edited value.

8.4 Description of the main window – ST4 panel



Description:

1. Operating modes: FIRE UP, OPERATION, SUPERVISION, BURNING OFF, CLEANING, STOP
2. boiler preset temperature
3. boiler measured temperature
4. functions having influence on preset boiler temperature:
   - preset boiler temperature decrease due to thermostat disconnection,
   - preset boiler temperature decrease due to activated time spans,
   - boiler preset temperature during loading the hot water boiler (HUW),
   - boiler preset temperature increase from mixer circulation,
   - activation of weather control for the boiler circuit,
5. signaling blowing operation
6. signaling fuel feeder operation,
7. signaling boiler pump (central heating pump) operation
8. signaling central heating pump operation (HUW)
9. measured temperature of hot water tank (HUW)
10. preset hot water (HUW) tank temperature
11. clock and weekday
12. symbolizes operating heater, and the digit next to it stands for a number of Firing-up attempts
13. external (weather) temperature
14. current boiler power level
15. signaling disinfection of the hot water container
16. signaling burner feeder (stoker) operation.

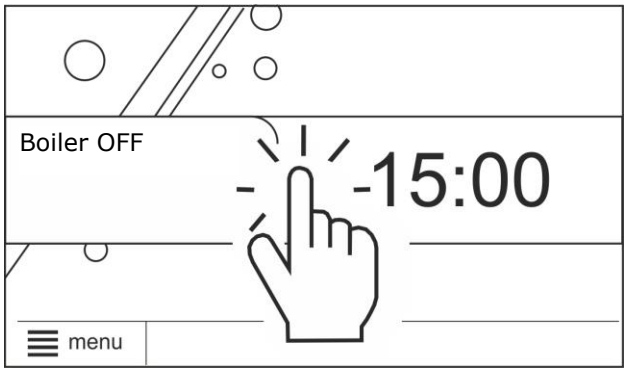
Right window on the main screen is configurable, allows on changing information displayed there. It is possible to choose a configuration displaying by pressing the ▲ or ▼ button.

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

Tip: fuel level may be displayed on ecoSTER TOUCH, eSTER_x80 room panel and eSTERx40 room thermostat.

8.5 Switching On and Off the boiler

Make sure fuel is present in the fuel tank and tank hatch is closed. Now boiler may be switched on. To start the boiler, press "*Burner OFF"* at any place on the ecoTOUCH screen. The message: *Active Controller?* appears?



After accepting the boiler goes into Firing up phase.

In „Stand-by" 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.

There is a second method of integration of the boiler. Press the menu button, then press in the menu button . To turn off the boiler, press the menu button, then press in the menu button , then the controller will go to the process of burning off. Only after burning off completion will be information "*Boiler OFF*".

It is possible to start-up the boiler by pressing the button and selecting the activation, or setting its operating parameters by the or buttons, without having to turn it on. After making sure that fuel is in the fuel silo, and the hatch is closed the boiler can be switched on.

8.6 Preset temperature setting

The preset boiler temperature and preset circuits temperature can be set in the menu:

Boiler settings → Preset boiler temperature

Mixer settings 1-5 → Mixer preset temperature

The parameter value *Preset boiler temperature*, is by controller bypassed when the preset boiler temperature is controlled by weather sensor. Regardless of that, the preset boiler temp. is automatically increased to load the hot user water tank and power heating circuits of mixers.

8.7 FIRE UP

The FIRE UP mode is for automatic firing up of furnace in boiler. Total time of firing up process is dependand on controller's settings and on boiler's condition before firing up. Parameters influencing firing up process are in the menu:

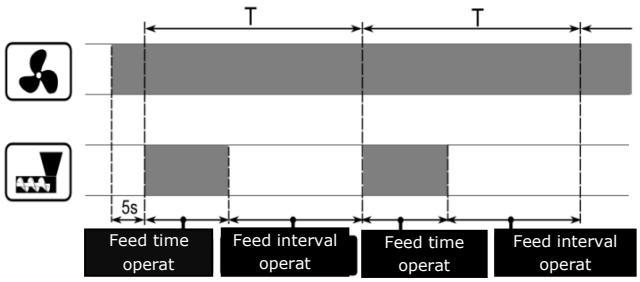
Service settings → Burner settings → Firing up

In case of failed attempt of firing up the furnace, another attempts are taken during which amount of fuel is reduced to 10% of first attempt's dose. Further attempts of firing up are signaled by numbers next to the igniter .

After three failed firing up attempts an alarm "*Failed firing up attempt"* is reported. Boiler's operation is then stopped. It is not possible to automatically continue boiler's operation. Service intervention is required. After finding and solving the cause of firing up failure the boiler should be fired up again.

8.8 OPERATION

In OPERATION mode the burner fan operates constantly. Fuel feeder is engaged periodically. Period consists of feeder operating time and pause in fuel feeding time.



The *Feeding cycle time* parameter is located in the menu:

Service settings → Burner settings → Operation

Feeder operation time is calculated automatically depending on the required current power of the burner, *Feed efficiency* and *Calorific value* of the fuel.

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

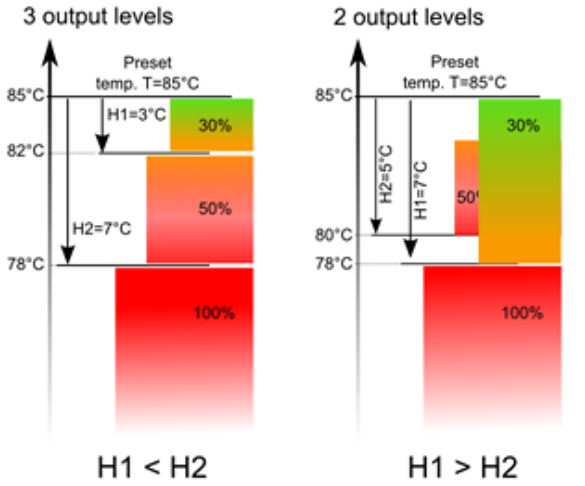
Boiler settings → Output modulation

The controller is equipped with boiler's power modulation mechanism which allows for gradual power reduction when approaching the preset temperature. There are three boiler power levels: Maximum, Intermediate, Minimum. Each level can be allocated with seperate fuel feeding times and Air flush intensity which influence on actual boiler's power level. Power levels parameters are available in the menu:

Boiler settings → Output modulation

The controller regulates burner's power with which it operates depending on preset temperature and defined hysteresis *The Intermediate power-hysteresis H2* and *Minimum power-hysteresis H1*.

It is possible to configure hysteresis volumes H1 and H2 in such a way that modulation is done without intermediate position. That means switching from Max. to Min. with omission of Inter. power.



H1 < H2 H1 > H2

If the boiler temperature reaches the preset, the controller will switch to SUPERVISION mode.

8.9 SUPERVISION

The controller switches to SUPERVISION mode without user intervention after reaching the preset boiler temperature.

In SUPERVISION mode the controller oversees the furnace, keeping it from burning off. To do so, the burner operates with very low power, what together with properly adjusted parameters do not cause further increase in temperature. Burner's power in SUPERVISION mode and other parameters of Supervision are grouped in the menu:

Service settings → Boiler settings → Supervision

Parameters of SUPERVISION mode are to be set in accordance to burner/boiler producer's recommendations. They should be so chosen to prevent the furnace from burning off during boiler's pauses (the furnace should not at the same fire up to too high a temperature, because it will cause too high a temperature of the boiler). Operation and pause time of the feeder in SUPERVISION mode is set using following parameters: *Boiler output in Supervision mode*, *Cycle time* and *Fan output*.

The parameters in this mode must be so chosen as to make the boiler temperature gradually decreasing. Incorrect settings can cause boiler overheating.

Maximum time of boiler's operating in supervision mode is defined in service

parameter *Supervision time*. If after this time (in Supervision mode) there is no need to restart the boiler then the controller starts the process of boiler's burning off.

For setting *Supervision time* = 0 the controller omits SUPERVISION mode and goes directly to BURNING OFF.

8.10 BURNING OFF

In burning off mode the leftovers of pellet are burnt and the boiler is prepared to pause or deactivation. All the parameters influencing burning off process are grouped in the menu:

Service settings → Boiler settings → Burning off

The controller stops feeding fuel and makes periodical blowings to burn off remnants of fuel. After decrease of flame brightness or maximum time of burning off expiration the controller turns into STOP mode.

8.11 STOP

In STOP mode the boiler is being burnt off and awaits the signal to start operation. The following can be a signal to start operation:

- Decrease of preset boiler temperature below preset temperature diminished by boiler hysteresis (*Boiler hysteresis*),
- By boiler operation configuration with the buffer decrease of top buffer temperature below preset value (*Buffer loading start temperature*).

8.12 GRATE

Some boilers have an additional grate to burn other fuels such as wood waste, etc. To activate the grid, move the parameters available in the menu:

Boiler settings → Boiler oper. mode

from "Pellet" to "Grate". In the grate mode fuel feeder is turned off. The combustion process is regulated by the blow-in fan and exhaust fan. Fans power, when working with grate, is set in the menu:

Boiler settings → Burner settings → Grate → Fan output - Grate mode and **Exhaust output - Grate mode**

The values of parameters such as: *Preset boiler temperature, Boiler hysteresis* and **Service settings → Burner settings → Fuel detection time** are individually adjusted for the "grate". This allows you to define different properties of boiler operation for operation modes "Grate" and "Pellet".

When using the grid an alarm "No fuel" can appear. This alarm occurs when a temperature drops below the value of the parameter:

Service settings → CH and HUW settings → CH pump activation temperature and then for a period of 10 minutes there has been no growth.

8.13 Burner and exchanger cleaning

The controller is used for cleaning the furnace of ashes generated in the combustion process. For this purpose, the controller uses the work of the blow-in and exhaust fan. The Cleaning cycle parameter in the Boiler settings menu determines the burner cleaning activation cycle in the SUPERVISION and OPERATION modes, where the cycle consists of the burner cleaning operation time plus the burner cleaning pause time.

In the *Burner cleaning* parameter in the menu: **Service settings → Burner → Cleaning**, set the maximum burner operation time without cleaning after which the boiler will switch to the BURNING OFF mode, in which the step burner cleaning mechanism will be activated and then the burner will be re-lit. Cleaning of the furnace is performed in the FIRE UP and BURNING OFF modes.

Parameter *Cleaning start time* and *Cleaning stop time* in the menu: **Service settings → H Output** set the start and end time of the heat exchanger cleaning.

Additional parameters responsible for cleaning are in the menu:

Service settings → Burner settings → Cleaning

The *Exchanger cleaning start* and *Exchanger cleaning stop* parameters in the menu: **Boiler settings** is used to set the start and end time of the exchanger cleaning.

8.14 HUW settings

The controller regulates temperature of the silo of Hot Water HUW, providing that the temperature sensor is connected. When the sensor is disconnected – the information about it is displayed in the main window. By selecting: **HUW settings → HUW pump mode** the user is able to:

- deactivate feeding the silo, parameter *Deactivated*,
- setting HUW priority, by parameter *Priority* – then CH pump is deactivated to feed the HUW boiler quicker,
- set simultaneous operation of CH and HUW pump with the parameter *No priority*.

8.15 HUW preset temperature settings

Preset temperature HUW is defined by parameter:

HUW settings → HUW preset temperature

8.16 Hysteresis of HUW

Below temperature *HUW preset temp. – HUW hysteresis* the HUW pump will activate to feed the HUW container.

By small hysteresis value HUW pump will activate faster after HUW temperature decrease.

8.17 Enabling the Summer function

To activate SUMMER function which allows feeding the HUW tank during summer, without necessity to activate CH installation and mixers periods, it is required to set the menu:

Summer/Winter → SUMMER mode for *Summer .*

Attention: when boiler operates without heating buffer and the controller is switched into SUMMER mode, than Standard mode operation is recommended.

It is not allowed to activate function summer when HW 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, you can set the parameters: *SUMMER mode act. temperature*, so outdoor temp. above which the summer mode will be switched on and *SUMMER mode deact. temperature*, so outdoor temp. below which the SUMMER mode will be switched off.

8.18 HUW container disinfection

The controller can automatically, periodically make HUW container warm up to 70ºC. It is done to remove bacterial flora.

It is absolutely important to inform all the inmates about activating the disinfection function. There is a danger of scalding with hot water.

Once a week at night, in Monday at 2 a.m. the controller increases temperature of HUW container. After 10minutes of keeping the silo at 70ºC the HUW pump is deactivated and the silo returns to its normal operation. It is not advisable to activate disinfection function while the service of HUW is deactivated.

8.19 Mixer circle 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 temperature*, 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. 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 panel

Set parameter *Mixer weather control* to *On*. Select weather curve as per point 8.20. Using parameter *Curve shift*, set preset room temperature following the formula:

Preset room temperature = 20°C + heating Curve shift.

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 panel

Set parameter *Mixer weather control* to *On*. Select weather curve as per point. 8.20. The room panel automatically translates the heating curve, depending on the preset room temperature. The Controller relates the setting to 20°C, e.g. for preset room temperature = 22°C, the Controller will translate the heating curve by 2°C, for preset room temperature = 18°C, the Controller will translate the heating curve by -2 °C. In some cases described in point. 8.20 it may be necessary to fine-tune the heating Curve shift.

In this setup, the 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 room panel) = 22°C. Temperature measured in the room (by room panel) = 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!

8.20 Weather controlled operation

To control the boiler temperature from the outside temperature, must be weather control activated. Weather control requires connecting an outside (weather) temperature sensor. Weather sensor support should be enabled.

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.

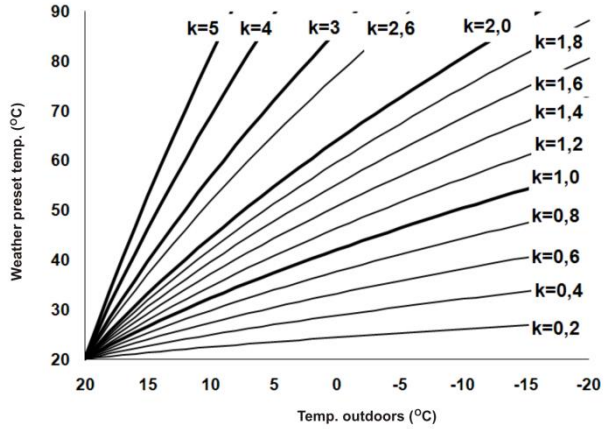
Note: during trial and error selection of appropriate heating curve, it is necessary to exclude influence of the room thermostat on controller operation (regardless of whether the room thermostat is connected or not), by setting the parameter:

Service settings → **Boiler settings** → **Thermostat select. =** *Off*

If a room panel 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



Heating curves.

Guidelines for selection of appropriate heating curve:

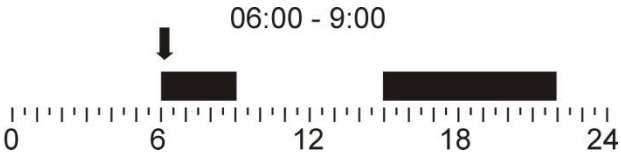
- if the outdoor temperature drops, and the room temperature increases, the selected heating curve value is too high,
- if the outdoor temperature drops, and the room temperature drops as well, the selected heating curve value is too low,
- if during frosty weather the room temperature is proper, but 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 controller can increase or decrease the preset temperature, calculated in accordance with the heating curve, if it exceeds the temperature range for the given circuit.

8.21 Night decrease settings description

In the controller it is possible to set time periods of silo temperature reduction, heating cycles, hot water tank, circular 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. 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*. Select temperature reduction and beginning and end of respective time interval. The time intervals for 24 hours are fixed at 30 min.



Time periods

Above are examples of night-time decrease the preset temperature lasting from 22:00 till 06:00 and the reduction from 09:00 to 15:00.

Attention, defining time periods during one day must be started at 00:00!

Time period is omitted by setting period reduction for value "0" even if scope of hours is set in it.

8.22 Working according to schedule

In the controller is possible to switch on and 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.

To activate the time intervals must set the parameter Off, in the menu: **Operation with schedule** at *YES*.

Switching on and off the boiler in the time interval can be set for all on separate days of the week in the *Schedule*.

Work according to the schedule is the same as that night time decrease.

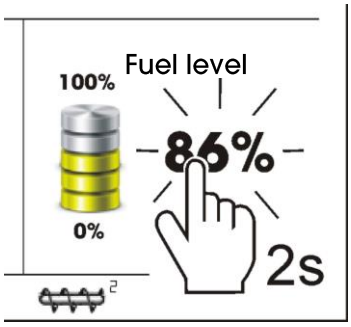
8.23 Fuel level configuration

- **Operation of fuel level indicator**

To activate displaying fuel level following parameters are to be set:
Boiler setting → Fuel level → Alarm level on value bigger than "0", i.e. 10%.
By pressing on the left or right window of the ecoTOUCH main window panel you can select the fuel level indicator.
Pressing ▲ or ▼ button in the ST4 panel fuel level is displayed in main window.

- **Fuel level indicator service**

Each time when fuel silo is filled to required level it is necessary to press and keep the knob in main window. Following info will appear:



„Set fuel level to 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 controller 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 Controller 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 signaled 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%
Calibrations can be skipped if the *Feeder efficiency test* and *Fuel weight* parameters.

8.24 Feeder test

The controller allows you to test the efficiency of the burner feeder, which has a significant impact on the operation of the burner. The test is started with the *Feeder efficiency test* parameter in the menu:
Boiler settings → Feeder
During the test, a necessarily filled feeder feeds fuel to an additional container for the time set in the *Efficiency test time*. After this time, weigh the fuel in an additional container and enter the value obtained in the parameter *Fuel dose from test*.
In case of emptying the main fuel tank and restarting the boiler / burner, the filling function of the burner feeder should be enabled by the parameter *Feeder filling*.
The *Feeder efficiency* parameter determines the fuel feeding speed through the main feeder in Kg/h.

8.25 Information

The **Information** menu enables view to measured temperatures and allows to check which of devices are currently activated.

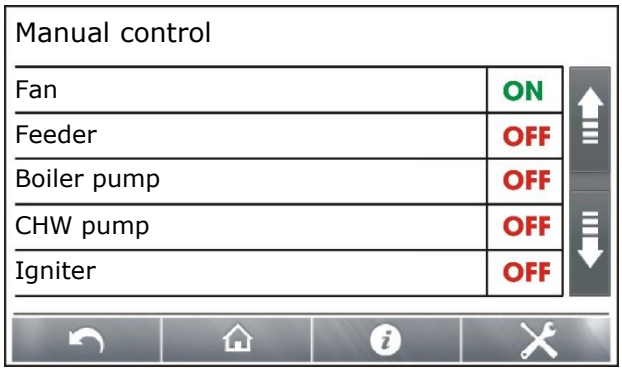
☞ After connecting extension module of mixers information about auxiliary mixers are displayed.

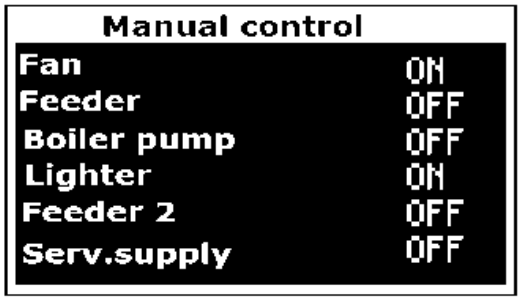
8.26 Manual control

In the controller it is possible to manual activate devices like i.e. pumps, feeder engine, or blower engine. It enables to check if the device is operating correctly and if it is connected properly.

☞ Entering manual control is possible only in "Stand-by" mode, when silo

is switched off.





OFF – the device is turned off, ON – the device is turned on.

Attention: long lasting activating of fan, feeder or other device may cause danger.

8.27 Menu favorites

In the menu bar at the bottom of the screen is visible button (only ecoTOUCH panel). After its selecting appears quick selection menu. Elements of this menu is added by hold for a moment the appropriate icon in the rotary menu.

To remove an item from the menu favorites being in the favorites menu hold the selected icon and then confirm the deletion.

8.28 Cooperation with the room thermostat and room panel

The controller can cooperate with:

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

The thermostat and room panel simultaneously provides useful information, among others, such as: information about the fuel level, burner operation status, signals alarms, allows to set the controller parameters, its modes of operation, also serves as an additional boiler control panel.

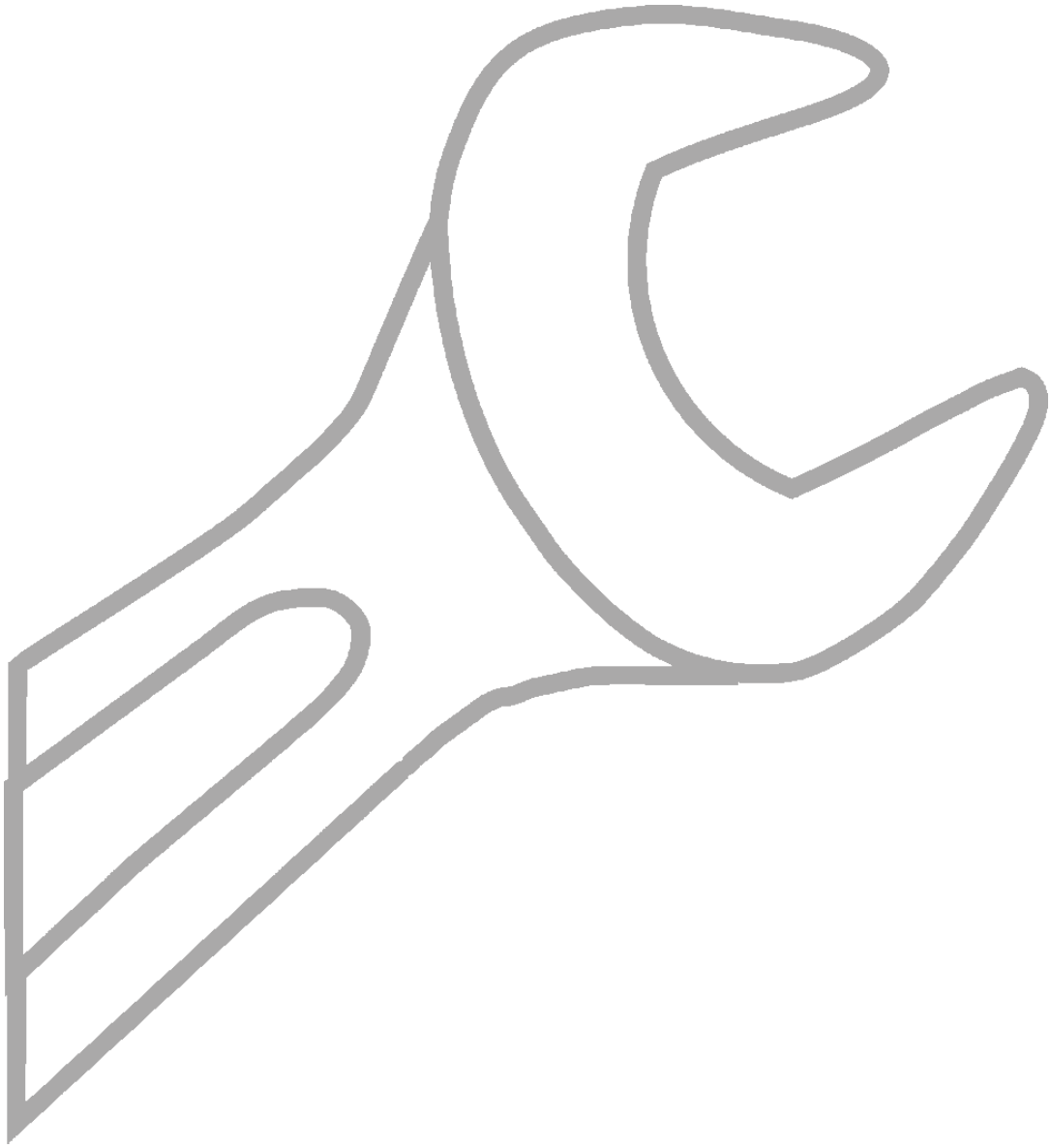
8.29 Cooperation with the Internet module

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**

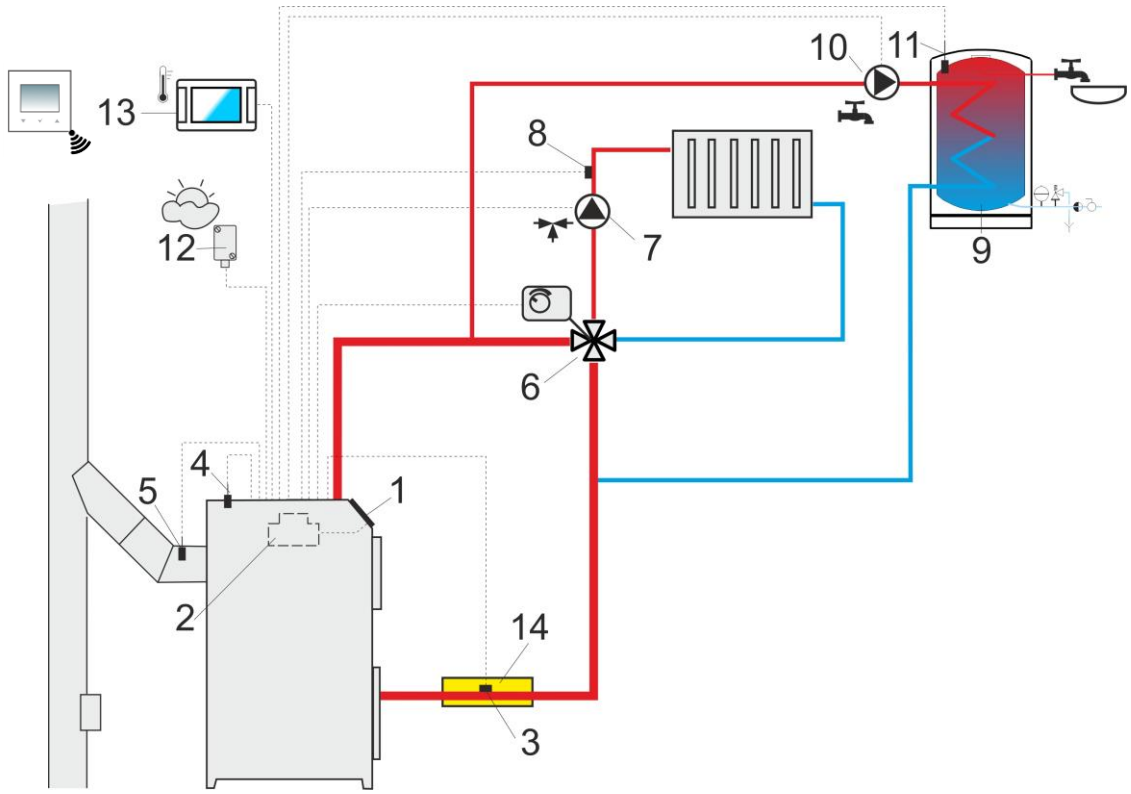
You can use the convenient ecoNET mobile application. Mobile application can be downloaded free of charge from the website:

(Android)

(iOS)



9 Hydraulic schemes



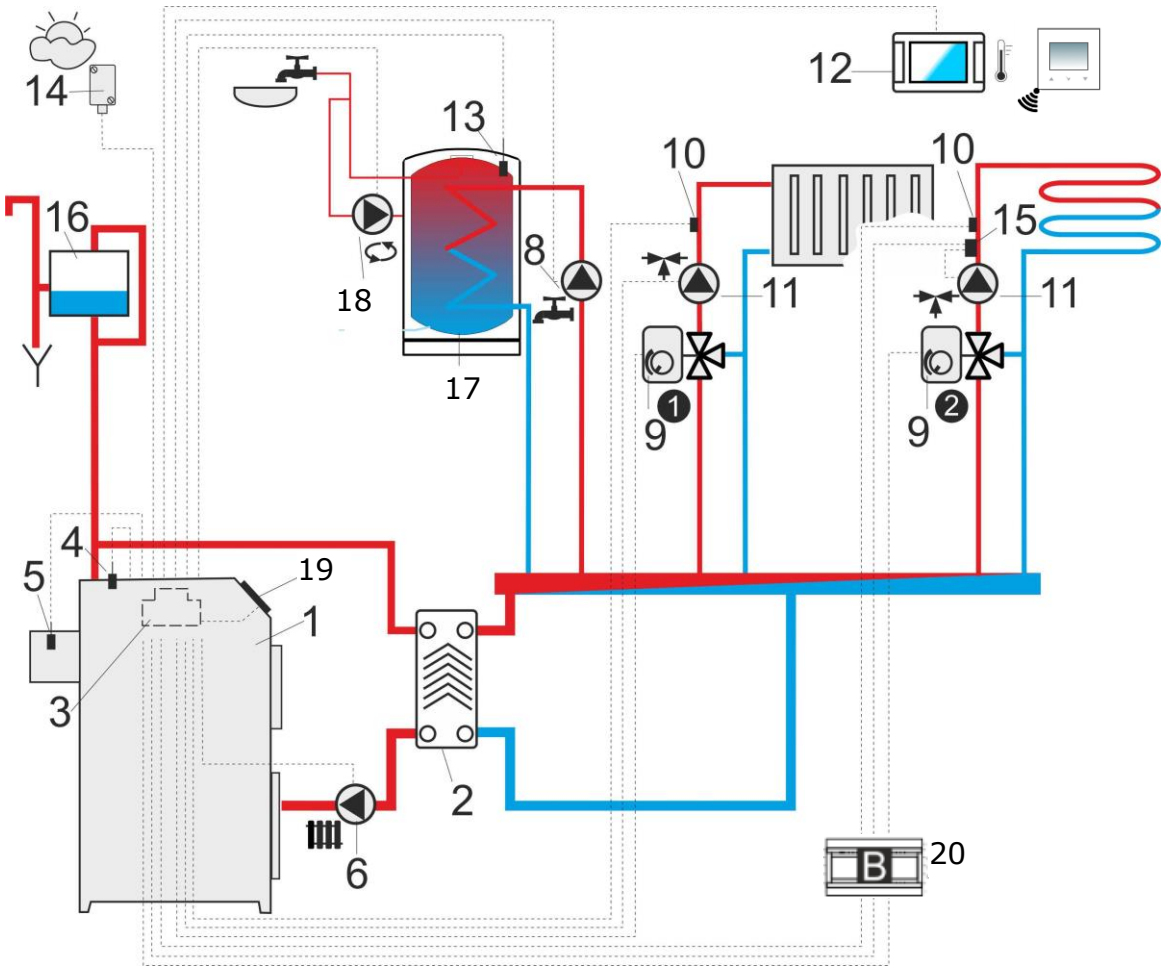
Scheme with 4 way steering valve controlling central heating circuit[1]: 1 – boiler with control panel, 2 – Controller, 3 – return temperature sensor, 4 – boiler temperature sensor, 5 – exhaust temperature sensor, 6 – servomotor of 4-way valve, 7 – mixer cycle pump, 8 – mixer cycle temperature sensor, 9 – HUW container, 10 – HUW pump, 11 – HUW temp. sensor, 12 – weather temperature sensor, 13 – standard room thermostat or ecoSTER TOUCH room panel, eSTER_x40 room thermostat, 14 – thermal insulation.

⚠	In order for the valve (6) to be able to effectively increase the return water temperature, set a high set temperature of the boiler. In order to improve the water circulation in natural systems (highlighted circuit in the figure): use large nominal diameter pipes and four-way valve, avoid unnecessary angles and reductions, maintain a min. 2° horizontal pipe slope, etc. If the sensor (3) is attached to the pipe, isolate it with foam surrounding the pipe and sensor.

RECOMMENDED SETTINGS:

Parameter	Setting	MENU
Preset boiler temp.	75-80°C	Boiler settings
Min. boiler temp.	65°C	Service settings→ Boiler settings
Boiler inc. by HUW and Mixer	5-20°C	Service settings→ CH and HUW settings
Mixer 1 support	CH ON	Service settings→ Mixer 1 settings
Max. mixer 1 preset temp.	70°C	Service settings→ Mixer 1 settings
Mixer 1 heating curve	0.8 – 1.4	Mixer 1 setting
Mixer 1 weather control	ON	Mixer 1 setting
Mixer 1 room thermostat	ecoSTER T1 eSTER T1	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!

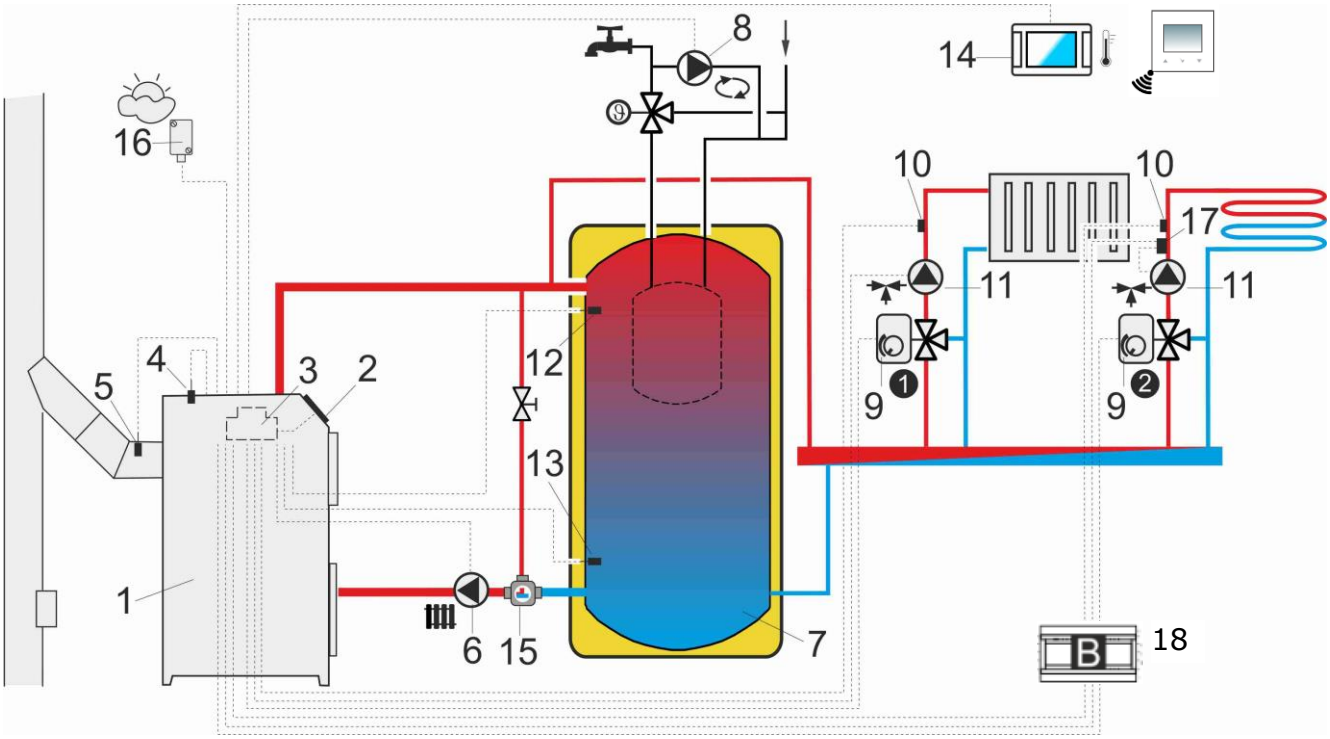


Scheme with two adjustable heating circuits and the HUW container[2]: 1 – boiler, 2 – heat exchanger, 3 – Controller, 4 – boiler temperature sensor, 5 – exhaust temperature sensor, 6 – boiler pump, 8 – HUW pump, 9 - mixer valve actuator, 10 – mixer temperature sensor, 11 – mixer pump, 12 – standard room thermostat or ecoSTER TOUCH room panel, eSTER_x40 room thermostat, 13 – HUW temperature sensor, 14 - weather temperature sensor, 15 – safety thermostat off the underfloor heating pump, 16 – expansion tank, 17 – HUW container, 19 – control panel, 18 - circulation pump, 20 – additional B module.

RECOMMENDED SETTINGS:

Parameter	Setting	MENU
CH pump activation temperature	55°C	Service settings → CH and HUW settings
Boiler pump	YES	Service settings → CH and HUW settings
Mixer 1 support	CH ON	Service settings → Mixer 1 settings
Max. mixer 1 temp.	70°C	Service settings → Mixer 1 settings
Mixer 1 heating curve	0.8 – 1.4	Mixer 1 settings
Mixer 1 weather control	ON	Mixer 1 settings
Wybór termostatu mieszacza 1*	ecoSTER T1	Service settings → Mixer 1 settings
Mixer 2 support	Floor on	Service settings → Mixer 2 settings
Max. mixer 2 temp.	45°C	Service settings → Mixer 2 settings
Mixer 2 heating curve	0.3 – 0.8	Mixer 2 settings
Mixer 2 weather control	ON	Mixer 2 settings
Mixer 1 room thermostat	ecoSTER T1 eSTER T1	Service settings → Mixer 2 settings

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



Scheme with heat buffer[3]: 1 – boiler, 2 – burner, 3 –Controller, 4 – boiler temperature sensor, 5 – exhaust temperature sensor, 6 – boiler pump, 7 – heating buffer, 8 – HUW pump, 9 - mixer valve actuator, 10 – mixer temperature sensor, 11 – mixer pump, 12 – upper buffer temperature sensor, 13 – lower buffer temperature sensor, 14 – standard room thermostat or ecoSTER TOUCH room panel, eSTER_x40 room thermostat, 15 – thermostatic 3-way valve for return protection, 16 – weather temperature sensor, 17 – thermostat to turn off the pump, 18 – additional B module.

RECOMMENDED SETTINGS:

Parameter	Setting	MENU
Preset boiler temperature	80°C	Boiler settings
Minimum boiler temperature	75°C	Service settings → Boiler settings
CH pump activation temperature	55°C	Service settings → CH and HUW settings
Buffer support	ON	Service settings → Buffer settings
Buffor loading start temperature	50°C	Service settings → Buffer settings
Buffor loading end temperature	75°C	Service settings → Buffer settings
Mixer 1 support	CH ON	Service settings → Mixer 1 settings
Max. mixer 1 temp.	70°C	Service settings → Mixer 1 settings
Mixer 1 heating curve	0.8 – 1.4	Mixer 1 settings
Mixer 1 weather control	ON	Mixer 1 settings
Wybór termostatu mieszacza 1*	ecoSTER T1	Service settings → Mixer 1 settings
Mixer 2 support	Floor on	Service settings → Mixer 2 settings
Max. mixer 2 temp.	45°C	Service settings → Mixer 2 settings
Mixer 2 heating curve	0.3 – 0.8	Mixer 2 settings
Mixer 2 weather control	ON	Mixer 2 settings
Mixer 2 room thermostat *	ecoSTER T1 eSTER T1	Service settings → Mixer 2 settings

* when a standard room thermostat with ON-OFF contacts is connected instead of the room panel, select the option for the thermostat=*Universal* or, if the setting is hidden, do not need to select any option for the thermostat.

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

10 Technical data

Power supply		230 VAC, 50 Hz
Current consumed		0.04[4] A
Maximum rated current		6 (6) A
Protection rating		IP 20
Ambient temperature		0...50°C
Storage temperature		0...65°C
Relative humidity		5…85% without steam condensation
Measuring range of temperature sensors CT4 (only B/C module)		0..100°C
Measuring range of temperature sensors CT2S		0..300°C
Measuring range of temperature sensors CT10		-40..+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 0.75mm^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
ecoTOUCH display		Color display with touch screen: 480x272pix.
ST4 display		Monochromatyczny, graficzny 128x64 pix.
Dimensions		Main module: 210x115x60mm ecoTOUCH panel: 148x97x23mm ST4 panel: 144x97x17mm
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

11 Conditions of storage and transport

The controller 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 Controller installation

12.1 Environmental conditions

Due to the risk of fire is prohibited to use the controller in explosive gas and dust enviroment (e.g. coal). Controller 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 controller 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 controller is to be built-in. The Controller 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.

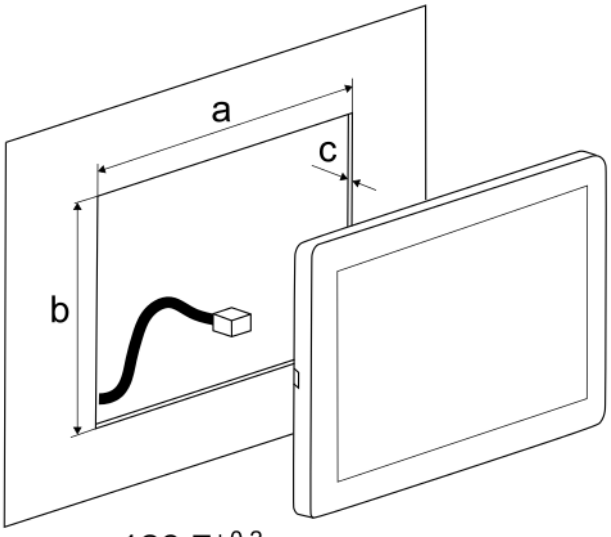
12.3 Assembly of control panel

Control panel is designed to be attached to boiler mounting plate.

Provide appropriate heat insulation between hot boiler walls and control panel and cable harness. The maximum permissible ambient temperature around of the control panel, i.e. 50ºC, can't be exceeded.

Assembly of ST4 or ecoTOUCH control panel: Drill a hole in the boiler mounting plate acc. the below drawing.

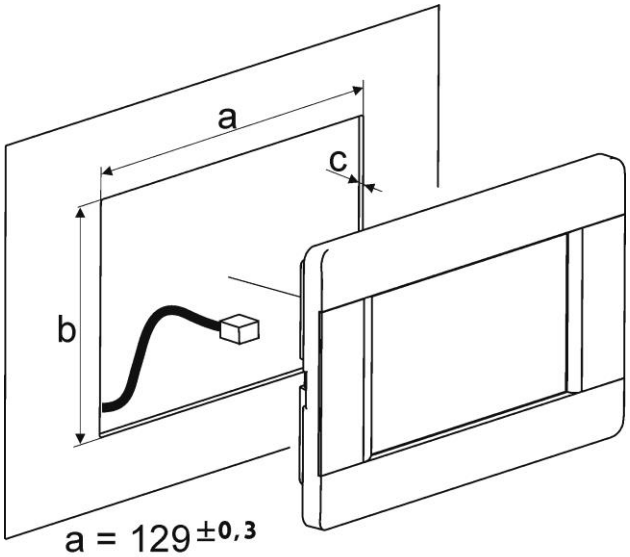
[4] This is the current consumed by the Controller itself. The total current consumption depends on the devices connected to the Controller.



$a = 128{,}7^{+0{,}2}_{-0{,}0}$

$b = 82{,}4^{+0{,}2}_{-0{,}0}$

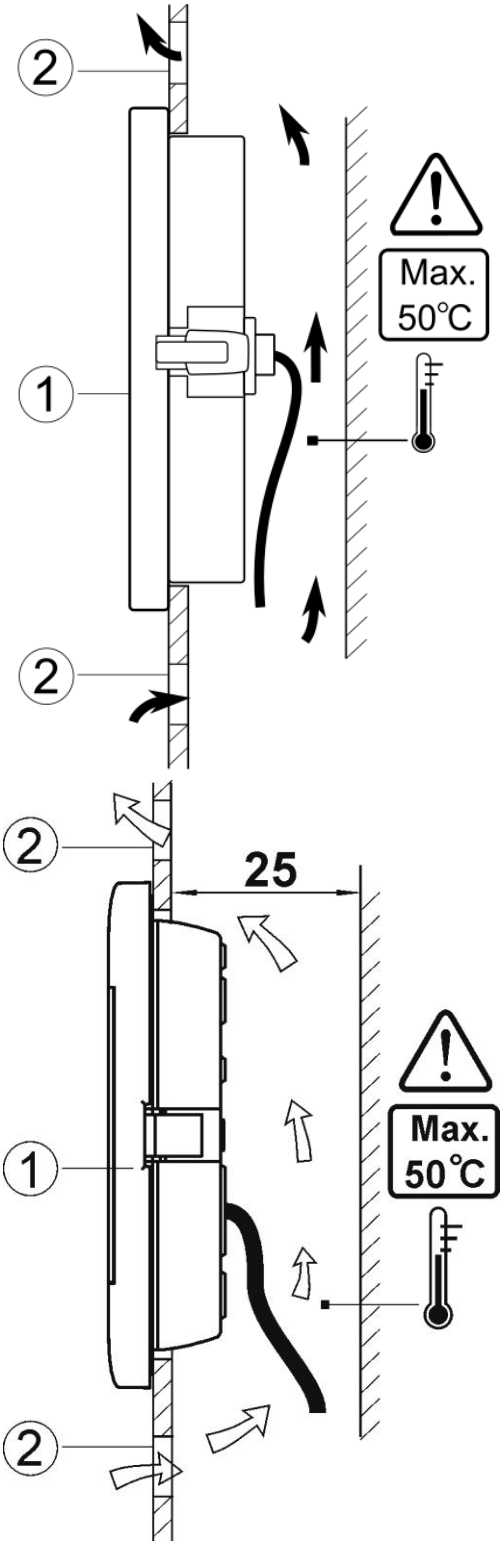
$c = 0{,}8\text{-}1{,}5$ (with paint thickness)



$a = 129^{\pm 0{,}3}$

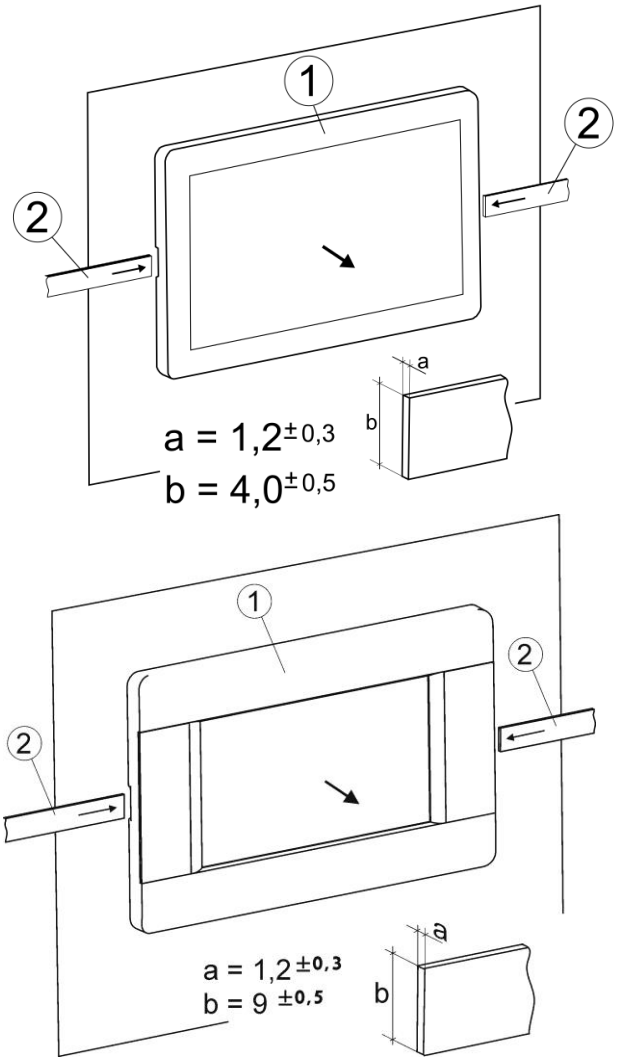
$b = 83^{\pm 0{,}3}$

$c = 1{,}5^{\pm 0{,}1}$



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)

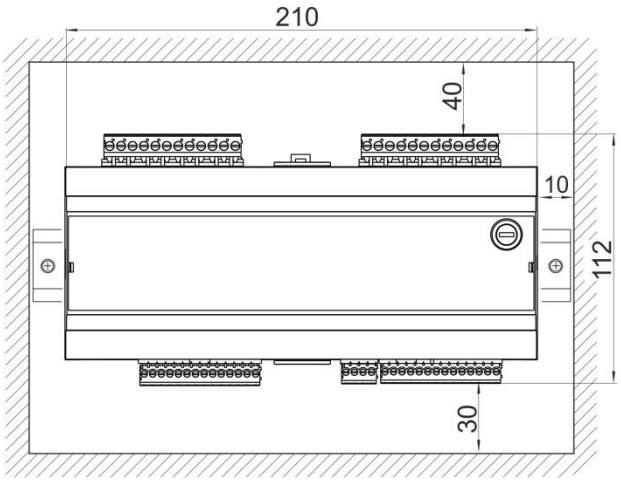
12.4 Mounting of module

Working module has to be built-into the master equipment. Assembly should assure IP rating appropriate to the environment conditions, in which the Controller 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.

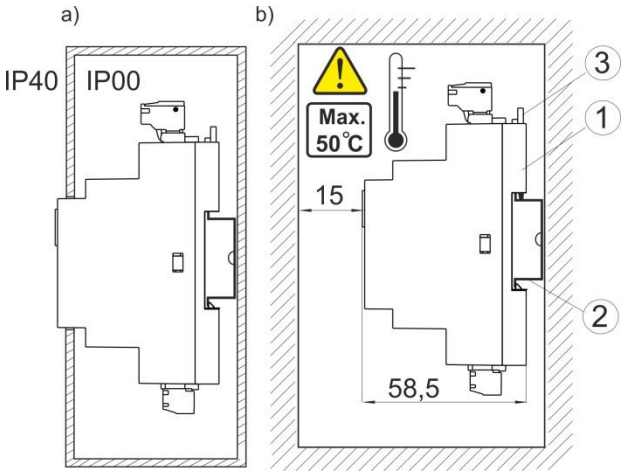
The working module is designed to be mounted on a standard DIN TS35 rail. Fasten the rail firmly to a rigid surface. Prior to placing the module on the rail, lift up the catch. Now, place the module on the rail and press the catch to bring it to the original position. Make sure the device is firmly fastened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

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

12.5 IP protection rate

Enclosure of the Controller's executive module provides various IP protection rates, depending on the method of installation. After enclosing in accordance with this drawing, the device has protection rate IP20 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.

12.6 Connecting electrical system

Controller is designed to be fed with 230 VAC, 50 Hz voltage.
The electrical system should be:

- three core, with protective wire PE,
- in accordance with applicable regulations,
- equipped with a residual current protection device (RCD) with inrush current IΔn≤30 mA, protecting against the effects of electric shock and limiting damage to the Controller, including protection against fire.

After deactivating the controller, there still can be a dangerous voltage on the connections. Before starting assembly works it is obligatory to disconnect the electrical power and make sure that there is no danger electrical power on claps and wires.

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 230 VAC. Terminals 22-49 are intended for cooperation with low voltage devices (below 12 VDC).

Connecting mains supply 230 VAC to terminals 22-49 and to transmission connectors will damage the Controller and creates risk of an electric shock!

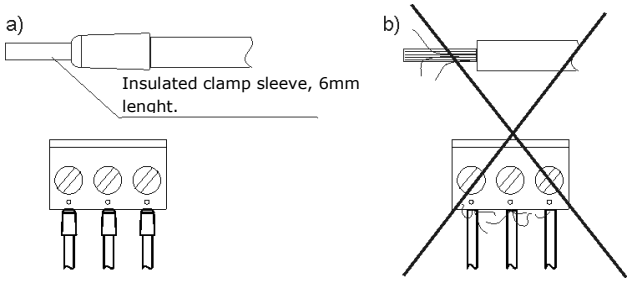
Connect power supply wires to terminals indicated with an arrow ⬆.

For safety reasons, the controller must be absolutely connected to the 230 VAC power grid, with the sequence of connecting the phase (L) and neutral (N) wires. Make sure that the L and N conductors are not exchanged within the building's electrical system, e.g. in an electrical socket or in an electrical socket junction box!

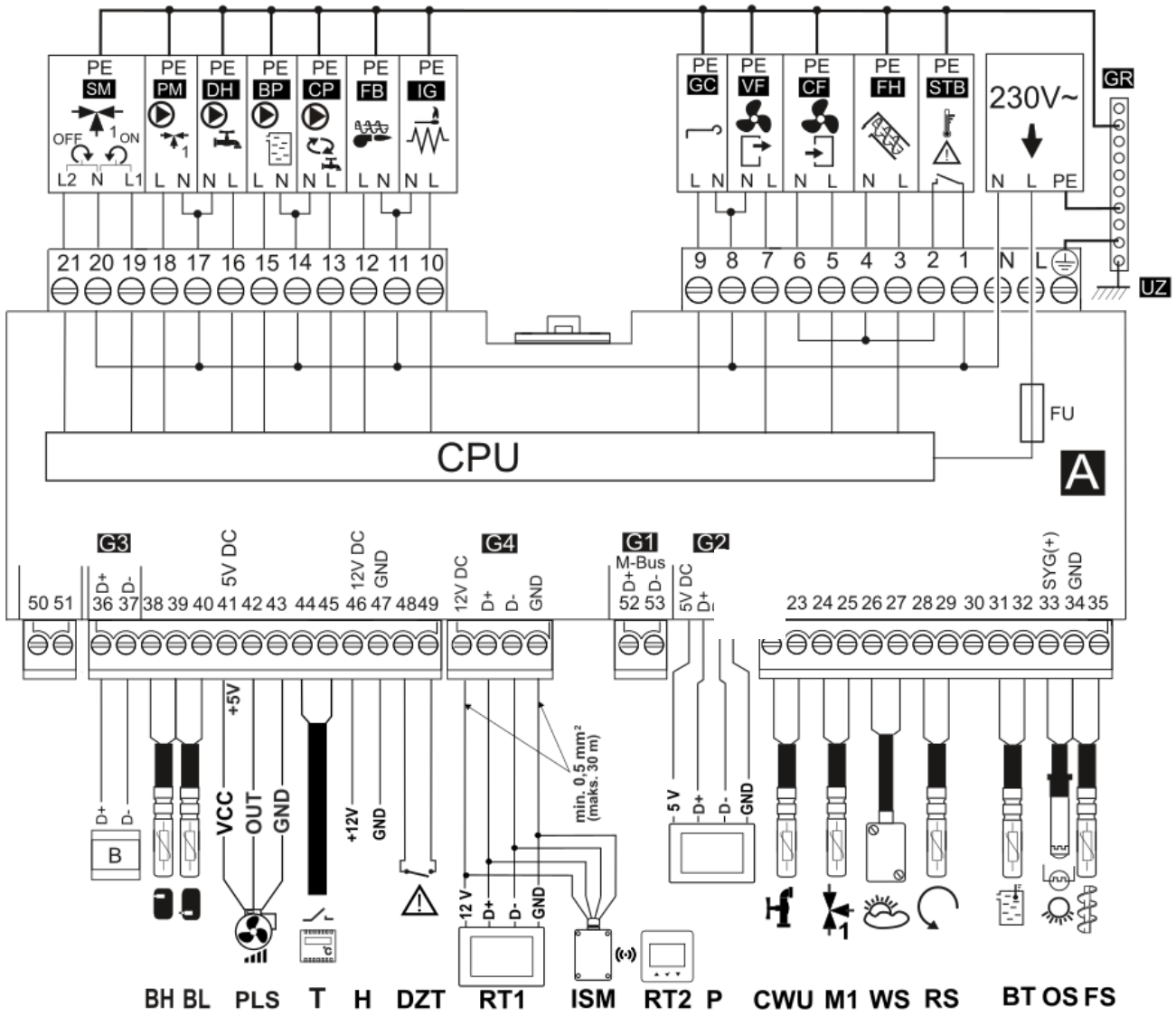
All peripherals (such like: pumps, RE-marked relays and connected recipients) may be connected only by qualified persons in accordance with applicable regulations. Safety precautions to prevent electrocution should be observed.

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

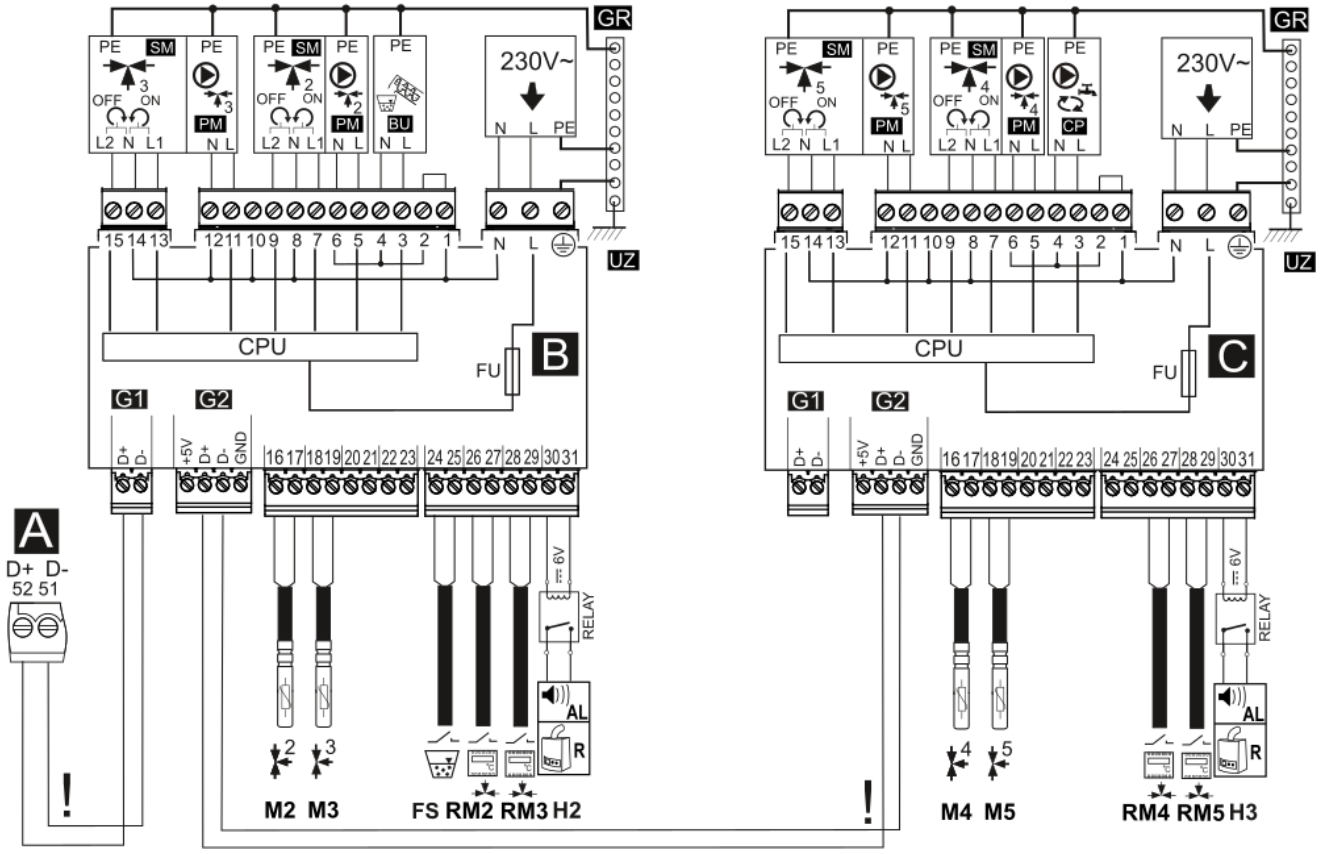
Connect protective wire of power supply cable to ground strip linked with metal boiler housing. Connect coupling to the terminal of the Controller indicated with a sign ⏚ and to earthing terminals of devices connected to the Controller. Mistake! Not possible to find an information cradle.
Tips of connection cables, especially mains voltage cables should be secured from splitting by e. g. insulated clamp sleeves in accordance with the picture below: a) – properly secured, b) – improperly secured.



12.7 Electric scheme



L N PE - 230 VAC, 50 Hz mains power supply,
UZ - grounding,
GR - neutral strip,
FU - main mains fuse, item 17.1
STB - input to safety temperature limiter,
FH - main fuel feeder,
CF - burner blower fan,
VF - boiler exhaust fan,
GC - burner cleaning,
IG - igniter,
FB - burner feeder (depending on burner type),
CP - shunt pump,
BP - boiler pump,
DH - DHW pump,
PM - mixer pump 1,
SM - mixer actuator 1,
B - additional B module extends the support for two additional mixer circuits,
BH - upper buffer temperature sensor type CT10,
BL - lower buffer temperature sensor type CT10,
PLS - fan speed sensor,
T - standard (NO-NC) boiler thermostat,
H - voltage output 12 VDC (max. load 80 mA),
DZT – boiler door opening sensor,
RT1 – room panel with room thermostat function or ISM radio module,
RT2 – wireless room thermostat,
P – ST4 or ecoTOUCH control panel and ecoNET300 internet module,
CWU – HUW temperature sensor type CT10,
M1 – temperature sensor of the regulated mixer 1 circuit type CT10,
WS – outdoor (weather) temperature sensor type CT6-P,
RS - return temperature sensor type CT10,
BT – boiler temperature sensor type CT10,
OS – optical flame brightness sensor type OCP-4,
FS – feeder temperature sensor type CT10.



Electric scheme for additional B/C module.

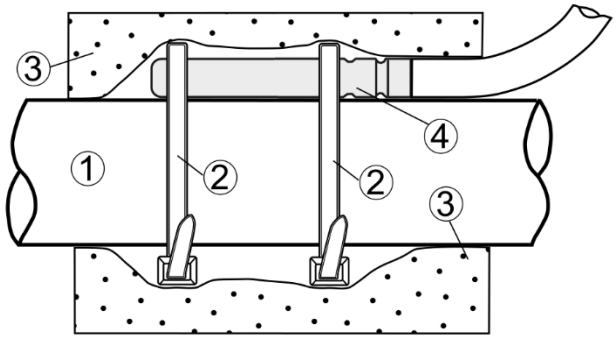
L N PE - mains power supply 230 V~, 50 Hz,
M2, M3, M4, M5 - temperature sensor of the regulated mixer circuit 2, 3, 4, 5 type CT4,
FS - fuel level sensor,
RM2, RM3, RM4. RM5 - standard (NO-NC) room thermostat of mixer 2, 3, 4, 5
RELAY - relay 6 VDC (max. load 80 mA),
FU - main mains fuse, item. 17.1
GR – neutral strip,
PM2, PM3, PM4, PM5 – mixer pump 2, 3, 4, 5
SM2, SM3, SM4, SM5 – mixer actuator 2, 3, 4, 5
BU – additional, external fuel feeder,
CP – HUW circulation pump,
CPU – control,
UZ – grounding,
A – main module of the controller,
! – should be connected only with two wires (a four-wire connection may damage the controller).

12.8 Connection of temperature sensors

The controller only works with CT4, CT10 type sensors. The use of other types of sensors is prohibited.

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.



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.

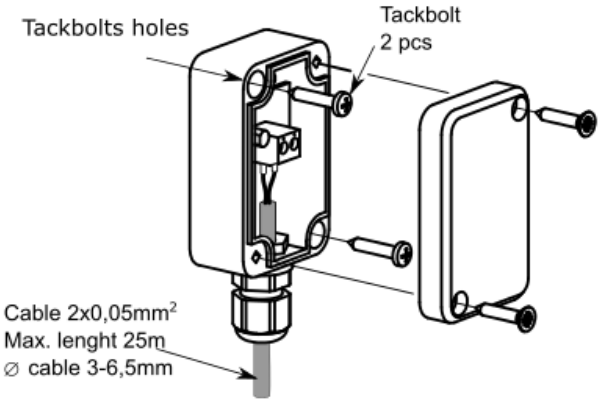
Do not allow sensor wires to contact hot parts of the boiler and heating system. Wires of temperature sensors are heat resistant to the temperature not exceeding 100°C.

12.9 Connecting weather sensor

The Controller cooperates only with a weather sensor of the CT6-P type. The sensor should be installed on the coolest wall of the building. Usually it is the northern wall, under the roof. The sensor should not be exposed to direct sunrays and rain. The sensor should be installed at least 2 m above the ground far away from windows, chimneys and other sources of heat which could disturb the temperature measurement.

To connect use wire with diameter at least 0,5 mm^2 up to 25 m long. Polarization of wires is not essential. Second end should be connected to terminals of controller or properly to used kind of controller.

The sensor should be screw to the wall. Access to assembly holes is possible after unscrewing the cover of the sensor.

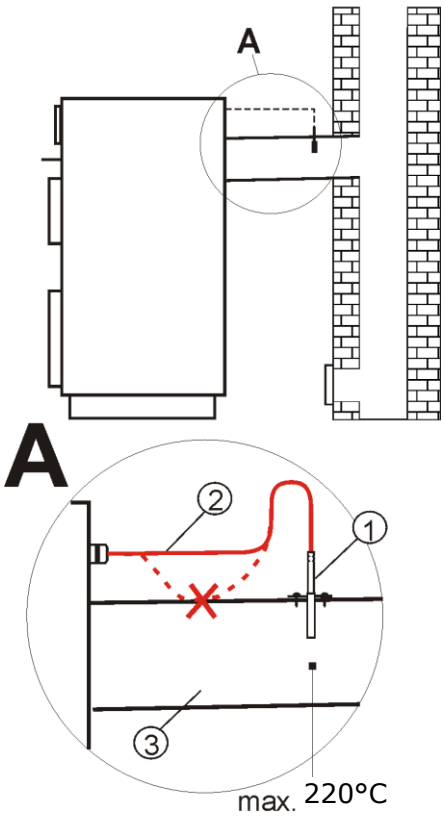


It is possible to additionally set the weather sensor readings correction. To do this, measure the outside temperature using a thermometer and enter the obtained temperature difference between the measured and the one indicated by the weather sensor in the menu:

General settings → Weather sensor → Sensor correction

12.10 Connecting exhaust sensor

The exhaust temperature 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 220°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.

12.11 Weather sensors checking

Temperature sensors can be checked by measuring their resistance in given temperature. In case of big differences between measured resistance value and values in table below, the sensor should be replaced with a new one.

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

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

12.12 Optical sensor connection

The optical sensor should be connected in accordance with electric scheme, be sure to observe the polarization of the (+) and (-) sensor signals. Readings of data from optical sensor is possible in the menu:

Information → Flame

Incorrect connection of the optical sensor will not damage the controller or the sensor itself, but the burner flame detection will be incorrect.

12.13 Mixers room temperature connection

Room thermostat after disconnecting wires reduces preset temperature of the value of reduction the preset temperature of the mixer from the thermostat. Parameter is in the menu:

Mixer settings 1-5 → Mixer room temperature

Value of parameter should be chosen in such a way that after activating room thermostat, temperature in the room should decrease.

In case of room panel make sure that this parameter *Thermostat select.* is correctly chosen in the menu:

Service settings → Mixer settings 1-5

12.14 Boiler room thermostat connection

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* or *eSTER T1* (if the ecoSTER TOUCH or eSTER_x80 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 *Turn off boiler pump from thermostat* value to *YES* in the menu:

Service settings → Boiler settings

12.15 Connection of reserve boiler

The Controller can control a reserve boiler (gas- or oil-fired), eliminating the necessity of enabling or disabling this boiler manually. Connection to a reserve boiler, e.g. oil-fired one, 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 30-31 in the additional B module.

Assembly of relay should be done by a person with proper qualifications. According to valid norms and regulations.

To enable the control of reserve boiler, set the H output to operate the reserve boiler in the menu:

Service settings → Output H (mod)

and then set the parameter *Reserve boiler deactivation temperature* on value different than zero, in the menu:

Service settings → Boiler settings → Reserve boiler

Deactivating control over additional boiler is done after setting zero value of switching off for this parameter.

Controlling extension of the boiler is coshared with alarm extension. Deactivating additional boiler control will cause that this extension will be controlled by module of controlling alarms.

When pellet boiler is fired-up, and its temperature exceedes preset value i.e. 25ºC, then controller switches off additional boiler (it will give constant voltage 6 VDC for terminals 30-31) It will power the coil of transmitter and disconnecting its joints. After decreasing boiler temperature below parameter temperature of additional boiler switching off the controller stops giving voltage to joints 30-31 which should activate the additional boiler.

Switching the controller into "STAND-BY" mode causes deactivating the additional boiler.

12.16 Connection of alarm signalling

The controller can report alarms by activating external devices like ring or GSM device to short messages SMS sending. Alarm signaling device must be connected through a relay. On the matter that output is shared with reserve boiler control output, in order to activate the H output (mod) for alarm function, you must first disable the reserve boiler control. To do this you should in the menu: **Service settings → Output H (mod) → Reserve boiler**

set zero value of its deactivating temperature and then set the H output (mod B) to alarm in the menu:

Service settings → Output H (mod)

12.17 Mixer connection

During assembly works for mixer servomotor pay attention not to overheat the boiler. This may happen when there is a limited flow of water from the boiler. It is recommended to check the location of valve in maximum opening before starting work, to ascertain heat acceptance from the boiler by opening the valve to maximum.

The controller cooperates only with servomotors of mixing valves equipped with end switchers. Using other servomotors is forbidden. Servomotors with full circle scope of 30 to 255 sec. can be used.

Connecting mixer description:

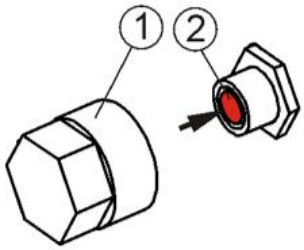
- Connect mixer temperature sensor
- Connect electrical mixer pump
- Activate the controller and select in service menu proper *Mixer support:* **Service settings → Mixer 1 settings**
- set in mixer service settings proper time of valve opening (time should be written on data plate of servomotor, i.e. 120 sec.).
- connect electrical power of the controller and activate it so the mixer pump is working,
- choose the direction in which servomotor opens and closes. To do so, switch the button to manual control and find position in which temperature in mixer circuit is maximal (in controller it is position 100% ON) and value position when temperature of mixer circuit is minimal (in controller it is position 0% OFF). Remember the position in order to later verification of proper connection,
- disconnect the electrical power to the controller
- connect electrical power to mixer servomotor with the controller and value servomotor producer's documentation. Do not confuse opening direction with closing direction,
- connect electrical power to the controller and switch it into STAND-BY mode
- check if wires for mixer opening and closing are not swapped. Go into: **Menu → Manual control** and open mixer by selecting *Mixer 1 Opening = ON*. By opening servomotor temperature on the mixer sensor should increase. If not, disconnect the power and swap wires. (attention: another cause may be incorrectly connected valve! – check the producer's documentation if it is properly connected),
- set other parameters of the mixer.

12.18 Connecting temperature limiter

The external safety temperature limiter can only be connected in the STB controller version. The STB version has a built-in safety temperature limiter. If the controller is not factory equipped with a safety temperature limiter, it should be connected to terminals 1-2 of the controller as an external device.

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

In the version of the controller with STB, after exceeding the boiler water temperature above 95°C, the feeder and fan power supply is cut off. Restarting fan and feeder power supply requires resetting the STB limiter. To do this, press the reset button (1). The button can be pressed only after the boiler water temperature drops.



Resetting the STB safety temperature limiter: 1 - protection nut, 2 - reset button.

Dangerous voltage exists at terminals 1-2.

12.19 Thermal protection

The controller equipped with additional thermal protection (APT), type DZT-1. It cuts off the fan and feeder power supply. Sensor of the additional thermal protection, which operates on low safe voltage, should be placed in the thermometric pipe of the water jacket. You should provide good thermal

contact of the DZT-1 sensor, and secure it against coming loose from the measured surface. If the boiler temperature exceeds the DZT-1 sensor activation temperature (85°C or 90°C±5 depending on the DZT-10 type), the fan and feeder power supply is cut off. The fan and feeder power supply will be automatically restored after the boiler temperature drops several degrees Celsius.

The thermal protection cannot be used instead of the mandatory STB safety temperature limiter.

12.20 Connecting of room panel

The controller can be equipped with ecoSTER TOUCH room panel, which can serve as: room thermostat (supporting up to 3 thermostats), boiler control panel, alarm signalling device and fuel level indicator.

Cross-section area of wires used to connect room panel should be 0.75 mm^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 0.75 mm^2.

Four-wire connection - according to the electric scheme.

Two-wire connection - power supply of 12 VDC and rated current of min. 400 mA is required. Points to supply ecoSTER TOUCH: Connect GND and 12 VDC to external source of supply. Connect lines D+ and D- acc. electric scheme.

12.21 Connecting of wireless room panel

The controller can be equipped with wireless room thermostat eSTER x80 or eSTER x40. Wireless radio connection of the room panel requires connection to the ISM xSMART radio module controller according to the electric scheme and perform pairing between the thermostat and the radio module. To do this, go to the menu:

General settings → Radio module settings → Pairing mode and confirm *YES* to start the pairing function.

The description of the wireless thermostats operation is given in the appropriate operating manual dedicated to these devices.

13 Service menu

Entering the menu requires entering the service password.

Service settings
Burner settings
Boiler settings
CH and HUW settings
Buffer settings*
Mixer settings 1-5*
Output H
Show advanced setup
Service disabling
Restore service settings
Save serv.set.
Log out
Calibration of the touch panel**

Burner settings
Firing-up
• Ignition test time
• Fuel dose
• Flame detection
• Firing-up airflow
• Firing-up exhaust fan
• Firing-up time
• Blow-in intensity after inflame
• Exhaust fan after inflame
• Blow-in period after inflame
• Igniter period
• Worktime with minimal power
• Fan modulation
Operation setup
• Thermostat mode
• Cycle time OPERAT.
• Energy density
• Tank capacity
• Feeder 2 extended operation*
• Cleaning operating time
• Rotary cleaning work*
• ecoPRESS service
Burning off
• Burning off max. time
• Burning off min. time
• Air flush intensity
• Exhaust fan intensity
• Air flush period
• Air flush interval
• Air flush start
• Air flush stop
Cleaning
• Cleaning before inflame
• Cleaning air flow
• Cleaning exhaust fan
• Cleaning burning off
• Burner cleaning
Supervision
• Supervision time
• Boiler output in Supervision mode
• Blow-in output
• Exhaust fan output
• Cycle time
Grate*
• Grate mode
• Flush time Supervision
• Flush period Supervision
• Automatic switch to pellet
• Fuel detection time
Fan configuration
• Exhaust only
• Supply and Exhaust
• Supply only
Minimum airflow output
Min. Exhaust fan output
Fuel detection time
Maximum burner temperature
Additional feeder operating time

Boiler settings
Thermostat
• OFF
• Universal
• ecoSTER T1..T3, eSTER T1…T3
Stop from hydraulic
Return protection*
• Operation mode
• Min. return temp.
• Return temp. hyst.
• Valve closing
Minimum preset boiler temperature
Maximum preset boiler temperature
Boiler cooling temperature
Boiler thermostat function
Burning off hysteresis
Heat exchanger cleaning alarm*

CH and HUW settings
CH pump activation temperature
Pump hysteresis
Antifreeze temperature
CH standstill when loading HUW *
Minimum HUW preset temp.*
Maximum HUW preset temp.*
Boiler inc. by HUW, mixer
HUW operation extension*
HUW heat source
Circulating pump standstill time*
Circulating pump operation time*
Circulation pump activation temperature*
Heat exchanger*

Shunt pump

Buffer settings*
Activate operation
Buffor loading start temperature
Buffor loading end temperature

Mixer settings 1-5*
Mixer support
• Off
• CH on
• Floor on
• Pump only
Thermostat selection*
• OFF
• Universal
• ecoSTER T1..T3, eSTER T1…T3
Minimum mixer temperature
Maximum mixer temperature
Proportional range
Integration time constant
Valve full opening time
Pump off by thermostat
Mixer input dead zone *

Output H, Output H (mod)
OFF
Exchanger cleaning
• Cleaning pause
• Cleaning time
Alarm
Reserve boiler
• Reserve boiler deactivation temperature
Additional feeder

* not available if proper sensor not attached, extension module or parameter is hidden.
** parameter available only when the ecoTOUCH control panel is connected.

Advanced settings***
Clear counters
Clear alarms
Type of claning
• Rotational
• Stepped
Flow-in - grate

*** menu available after entering a special manufacturer password.

14 Description of service settings

14.1 Burner

Parameter	Description
Firing-up	
• Ignition test time	Time to check whether the burner is already firing up. Only fan is operating. If the flame has sufficient brightness, it switches to the OERATION mode without the BURNING OFF mode.
• Fuel dose	Fuel dose during firing up. Concerns first testing firing up. Next tests fuel dose is reduced.
• 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 airflow when firing up. Too big value prolongs the firing up process or causes failed attempt of firing up.
• Firing-up exhaust fan	% of exhaust when firing up. Too big value prolongs the firing up process or causes failed attempt of firing up.
• Firing-up time	The time of a single fire-up attempt. After this time the controller goes to the next ignition attempt. After unsuccessful attempts of ignition, an alarm is given *Failed firing up attempt*.
• Blow-in intensity after inflame	% of blowing fan after flame detection.
• Exhaust fan after inflame	% of exhaust fan after flame detection.
• Blow-in period after inflame	Blow-in period time after firing-up. When the flame is detected during the firing-up phase, the furnace lights up before giving an additional portion of fuel within the time specified by the *Blow-in period after inflame* parameter and increasing the blowing power.
• Igniter period	Igniter warming up time before engaging the blow fan. It should not be too long as to not damage the heater. After this time the heater works still until detecting the flame.
• Worktime with min. power	Burner operation time with minimum power after firing up. Power is determined by parameter *Minimum power - blow-in*.
• Fan modulation	After selecting *OFF* the *Modulation range* parameter is displayed, which allows to set the modulation range of the blower fan during ignition.
Operation setup	
• 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.
• Cycle time OPERAT.	Time of whole fuel feeding cycle in OPERATION mode, where: *Cycle time OPERAT.* = feeding time + feeder pause time in OPERATION mode. The work of the burner feeder is always extended compared to the work of the main fuel feeder.
• Energy density	Fuel calorific in kWh/kg.
• Tank capacity	Fuel tank capacity for counting fuel level. When correct amount is put, the user is not obliged to calibrate fuel level. The controller process this data if calibration process of fuel level was not done. After successful calibration of fuel level the controller does not process this value.
• Feeder 2 extended operation	Extension of the burner feeder operation time for the time of the feeder of the fuel hopper.
• Cleaning operation time	Burner cleaning operation time when step cleaning is selected.
• Rotary cleaning work	Burner cleaning operation time when rotational cleaning selected.
• ecoPRESS service	Enabling or disabling the vacuum sensor support. When the support is enabled, there are additional parameters: *Negative pressure MAX, Negative pressure MED., Negative pressure MIN.*
Burning off	
• Burning off max. time	After this time the controller goes to STOP mode, in spite of the fact that the controller detects flame.
• Burning off min. time	Burning off will last at least this time in spite of the fact that flame sensor indicated lack of flame.
• Air flush intensity	Blow fan power during blowing while burning off.
• Exhaust fan intensity	Exhaust fan power while burning off.
• Air flush period	Duration of blowing when burning off fuel and burning off.
• Air flush interval	Break between airflows while burning off the fuel in burning off process.
• Air flush start	Flame brightness with which airflow starts while burning off the fuel.

• Air flush stop	Flame brightness with which airflow starts when burning off the fuel in burning off process
Cleaning	
• Cleaning before inflame	Fan operation time during cleaning the furnace while firing up.
• Cleaning air flow	Blowing fan power during furnace cleaning in firing up and after burning off.
• Cleaning exhaust fan	Exhaust fan power during furnace cleaning in firing up and after burning off.
• Cleaning burning off	Fan operation time after burner off.
• Burner cleaning	Time after which burner cleaning is forced (burner is burned off and is cleaned).
Supervision	
• Supervision time	It is the maximum time of the controller residence in the SUPERVISION mode. After this time, when the controller is in SUPERVISION mode, the controller automatically starts burner burning off. By settings *Supervision time*= 0, the SUPERVISION mode is deactivated. By settings *Supervision time*= 255, the SUPERVISION mode is not deactivated.
• Boiler output in Supervision mode	Boiler power in Supervision mode.
• Blow-in output	Blowing fan power during operation in Supervision mode. Adjust value in such a way to burn feeding fuel in Supervision mode with low fumes emission.
• Exhaust fan output	Exhaust fan power during operation in Supervision mode. Adjust value in such a way to burn feeding fuel in Supervision mode with low fumes emission.
• Cycle time	Feeder operation time in SUPERVISION mode. *Cycle time* = feeding time + feeder pause in Supervision mode.
Grate	In this mode automatic fuel feeding is off.
• Grate mode	Turn on the Grate operating mode.
• Flush time Supervision	The duration of the fan blow in the supervision in grate mode. The value should not be too high so as not to cause excessive water heating in the boiler.
• Flush period Supervision	Interval between blows in the supervision in grate mode. The value should not be too high so as not to cause excessive water heating in the boiler.
• Automatic switch to pellet	After burning the fuel on the grate, the temperature of the water in the boiler's circulation will drop. When this drop is detected, below the preset temperature there will be an automatic transition from “grate” to “pellet” mode. Note: the transition to the "pellet" mode will be possible only with the cleaned burner from the ash formed after burning on the grate.
• Fuel detection time	Fuel shortage detection time after the exhaust gas temperature drops, when operating in grate mode. After the time has been counted down, the airflow operation is stopped and the controller reports the “No fuel” alarm. For the setting = 0, the no of fuel detection is turned off.
Fan configuration	Fan operation configuration. Choices: *Exhaust only*, *Supply and Exhaust*, *Supply only*.
Minimum airflow output	Minimum airflow fan power which can be chosen by the user. It is only used to limit the accessible scope of fan power. It is not used in algorithm of controlling the fan. It should be possibly small to allow the fan to rotate slowly, without buzzing.
Min. Exhaust fan output	Minimum exhaust fan power which can be chosen by the user. It is only used to limit the accessible scope of fan power. It is not used in algorithm of controlling the fan. It should be possibly small to allow the fan to rotate slowly, without buzzing.
Fuel detection time	Time is measured after decrease in brightness of flame below value *Flame detection*. After deducting this time the controller switches into firing up attempt. After another failed attempts, it reports alarm: “*Failed firing up attempt*”
Max. burner temp.	Max temperature of the burner by which the alarm of exceeding the max. temp of burner will be switched on.
Additional feeder operating time	The time it takes to fill the additional fuel tank.

14.2 Boiler

Parameter	Description
Thermostat	Options to choose from: • *Off* - deactivates room thermostat influence on boiler operation, • *Universal* - activates room thermostat for boiler, • *ecoSTER T1* - option available after connecting room panel, boiler operation is dependant on room thermostat No1 in ecoSTER TOUCH/ecoSTER40, • *ecoSTER T2* - option available after connecting room panel, boiler operation is dependant on room thermostat No 2 in ecoSTER TOUCH/ecoSTER40, • *ecoSTER T3* - option available after connecting room panel, boiler operation is dependant on room thermostat No3 in ecoSTER TOUCH/ecoSTER40, • *eSTER T1…T3* - option available after connecting wireless room panel, boiler operation is dependant on wireless room thermostat.

Stop from hydraulic	If the parameter is enabled and all heat receivers in the hydraulic system report no heat demand, the boiler will be turned off even if the preset temperature has not been reached. The parameter for mixer circuits is used if these circuits are controlled by thermostats.
Return protection	Group of parameters available after connecting return sensor, responsible for protection of boiler return in hydraulic installation with 4 way valve equipped in mixer servomotor. It is not advised to activate functions of return protection because it may cause frequent stops in power of mixer cycle. Instead this it is recommended to use bigger preset temperatures of boiler (70…75ºC) what in combination with installation with 4 way valve (with servomotor) it will cause automatic increase return temperature.
Minimum preset boiler temperature	Minimum preset boiler temperature which can be set in user menu and minimum temp. which can be set automatically by controller, i.e. from night reductions etc.
Maximum preset boiler temperature	Maximum preset boiler temperature which can be set in user menu and minimum temp. which can be set automatically by controller, i.e. from night reductions etc.
Boiler cooling temperature	Temperature of boiler cooling off. Above this temperature the controller activates HUW pump and opens mixer cycles to allow boiler cooling off. The controller activates HUW pump if this temperature exceeds maximum value. The controller will not open mixer cycle when *Mixer support = Floor ON*.
Boiler thermostat function	Options available: • *Off burner* - the burner will be turned off when the room thermostat of the boiler operates, without switching off the boiler pump, • *Off pump* - the boiler pump will be turned off when the room thermostat of the boiler operates, without switching the boiler off, • *Off burner and pump* - the boiler and boiler pump will be switched off when the room thermostat of the boiler is activated.
Burning off hysteresis	The parameter decides how much above the preset temperature the boiler turns off or goes into supervision mode.
Heat exchanger cleaning alarm	The parameter determines after what amount of fuel burned will be prompted to *Clear exchanger*.

14.3 CH and HUW

Parameter	Description
CH activation temperature	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.
Pump hysteresis	Hysteresis prevents pumps from constantly turning on and off, thus extending their service life.
Antifreeze temperature	The parameter is used during a long absence from home or outside the heating season and is intended to prevent freezing of water in the central heating system. The Controller switches on the CH pump or mixer pump when the temperature on the boiler or the temperature measured on the mixer drops below the *Antifreeze temperature*.
CH standstill when loading 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.
Minimum HUW preset temp.	Available after CH sensor connecting. It is a parameter by which it can be reduced setting too low preset HUW temperature.
Maximum HUW preset 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 in main window.
HUW operation extension	Available after connecting HUW temp. 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 pump operation time*.
HUW heat source	Specifies the source of energy for HUW container: *Boiler* or *Buffer*.
Circulating pump standstill time	Parameters available after connecting additional module C. Pausing time between periods of circulation pump operation is defined with value of parameter *Circulation pump standstill time* (recommended setting 15-40 min.) Circular pump operates constantly during *Circulation pump operation time* (recommended setting 60-120s).
Circulating pump operation time	
Circulation pump activation temperature	The temperature of the HUW tank, below which the circulation pump will start in order to force water circulation in the HUW circuit.
Heat exchanger	It only refers to hydraulic installation with heat exchanger between open and closed circuit. Available options: • *YES* - boiler pump operates constantly in short circuit boiler – exchanger, it is not excluded i.e. from SUMMER function or HUW priority, • *NO* - boiler pump operates normally.
Shunt pump	A pump used to prevent condensation and corrosion in the boiler. Maintains the appropriate return temperature of the heating water.

14.4 Buffer

Parameter	Description
Activate operation	Parameter serves to activating buffer operating mode. Available after connecting additional module B and buffer temperature sensors.
Buffor loading start temperature	Parameter *Buffer* l*oading start temperature* defines high temperature below which buffer feeding starts. Buffer feeding process is finished when low temperature reaches value defined in parameter *Buffer loading end temperature.*
Buffor loading end temperature	

14.5 Mixer

Parameter	Description
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 thermostat/panel. This option allows change of room thermostat for mixer cycle. Options available: • *Universal* – standard thermostat (NO-NC), • *ecoSTER T1…T3* – thermostat 1 in ecoSTER200 or ecoSTER TOUCH, • *eSTER T1…T3* – thermostat 1 in eSTER_x40 or eSTER_x80, If room panel is not connected then the controller cooperates with standard room thermostat.
Minimum 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.
Maximum 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	This parameter affects the movement of the mixer actuator. Increasing this value

	results in the mixer reaching the set temperature faster. Setting this parameter to excessive values causes deregulation of the temperature and unnecessary actuator movement. The proper values is set experimentally. It is recommended to set this parameter in the range of 2..6.
Integr. time const.	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.
Valve opening time	Set full valve opening time given at the plate of valve servomotor, i.e. 140s.
Pump off by thermostat	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*.

14.6 Other parameters

Parameter	Description
Show advanced setup	Options available: • *YES* - displays hidden parameters which edition is not recommended, • *NO* - hides hidden parameters.
Service disabling	It immediately turns off the boiler without extinguishing the burner, regardless of the current operating mode of the controller.
Save serv.set.	Selecting YES saves all service settings after changing the parameters in the service menu.
Log out	Setting to YES will exit the time mechanism of entering the service menu without using the service password.
Output H (mod B)	The menu contains settings related to the configuration of output H for additional B module. Options available: • *Exchanger cleaning* - operation of the heat exchanger cleaning mechanism. Cleaning will be turned on by *Cleaning time* with a cleaning break in *Cleaning pause*. • *Alarm* - when an alarm occurs, the output H (mod B) is switched on. • *Reserve boiler* - the output H (mod B) controls the reserve boiler.
Calibration of the touch panel	This parameter only applies to ecoTOUCH panels connected and is used to set the precision of the touch response to a selected location on the screen.

15 Alarms descriptions

Alarm numbers displayed on the eSTER_x40 wireless room thermostat.

01	Boiler max. temp. exceeding
02	Overheating of the burner
03	Boiler temp. sensor damage
04	Feeder temp. sensor damage
05	Feeder control system failure
06	Overheating boiler, STB open contact
07	Firing up failed attempt
08	Open boiler door

15.1 Boiler max. temp. exceeding

Protection against boiler overheating is done in 2 steps. In the first step , after exceeding *Boiler cooling temperature,* the controller tries to reduce boiler temperature by dropping excess of heat to the HUW tank and by opening mixer servomotors (only when *Mixer support = CH ON*). If temperature measured by HW sensor exceeds value *Max. HUW temp.* then HUW pump is deactivated, what is done to protect users against scalding. If boiler temperature decreases, then the controller returns to normal operation. If the temperature will still increase (reaches 95ºC) then constant alarm will be activated of boiler overheating joined with sound signal. The alarm can be deleted by activating and deactivating power to the controller.

Locating temperature sensor outside water coat of burner i.e. on exhaust pipe is not beneficial, because it may cause delay in detecting boiler overheating state!

15.2 Overheating of the burner

Alarm appears after exceeding feeder temperature above service parameter *Max. burner temperature*. If the burner temperature increases above this value the controller will begin burning off procedure. The alarm can be deleted by activating and deactivating power to the controller.

15.3 Boiler temp. sensor damage

Alarm appears by boiler sensor damage and by exceeding measuring scope of this sensor. When alarm appears the boiler is activated. The sensor is to be checked and replaced if necessary. The alarm can be deleted by activating and deactivating power to the controller.

Checking the temperature sensor is described in point 12.11

15.4 Feeder temp. sensor damage

Alarm appears when feeder sensor is damaged or by exceeding measuring scope of this sensor. After alarm the boiler is burnt off. It is necessary to check the sensor and replace it if necessary. The alarm can be deleted by activating and deactivating power to the controller.

Checking the temperature sensor is described in point 12.11

15.1 Feeder control system failure

The Controller 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 Controller 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.

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).

15.2 Overheating boiler, STB open contact

This 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.

15.3 Firing up failed attempt

Alarm will appear after third failed attempt of automatic furnace firing up. In case of alarm all pumps are deactivated in order to not cause excessive cooling of the boiler. Deleting is done by activating or deactivating the controller. The cause of these alarms can be broken igniter or lack of fuel in the tank.

15.4 No 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.

15.5 Boiler door open

This is a so called silent alarm monitor, which will occur in case of activation of the boiler door opening sensor. Cancellation takes place by closing the boiler door or touching the screen.

15.6 Unsuccessful attempt to load the tank

This is so called silent alarm reminder. It will take place by failed attempt of feeding fuel from additional fuel tank. In case when through configured time of feeding the silo, installed sensor not detects increase of fuel the reminder is displayed. This signalization does not cause activating automatic boiler operation, there is only a warning displayed. Deleting is done by activating or deactivating power to the controller.

16 Other

16.1 Power stoppage

In case of power stoppage the controller returns to operation mode in which it was before stoppage.

16.2 Antifreezing protection

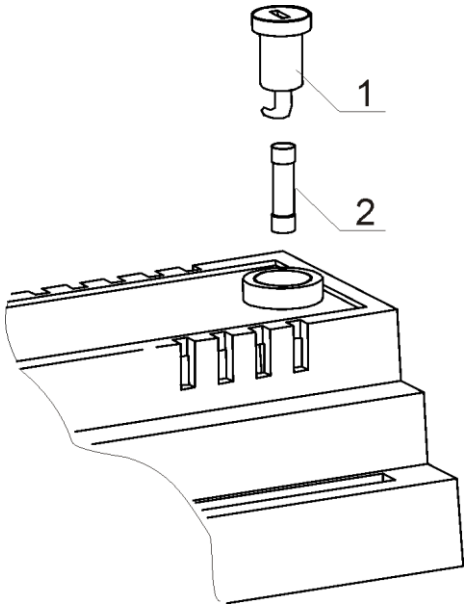
When temperature of the boiler decreases below 5ºC CH pump will be activated enforcing circulation of boiler water. It will delay the process of freezing water, however in case of very low temperatures or by lack of electrical power it may not protect the installation against freezing.

16.3 Pump anti standstill function

The controller does the function of CH, HUW and Mixer pumps protection against getting stale. It consists of a periodic switching on (each 167h for several seconds). This protects the pump against immobilization due to scaling. Therefore, during a break in the use of the boiler, the Controller power supply should be connected. This is accomplished even when turned off using the keyboard controller (controller in the "*Boiler OFF*" state).

16.4 Network fuse replacement

Mains fuses are located in each working module. They protect the Controller and other connected equipment. In case of replacement, use 6.3 A, 5x20 mm ceramic time fuse. To remove the fuse, press down fuse holder using flat screwdriver and turn it in CCW direction.



Replacing the fuse: 1 - fuse holder, 2 - fuse.

16.5 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 controller.

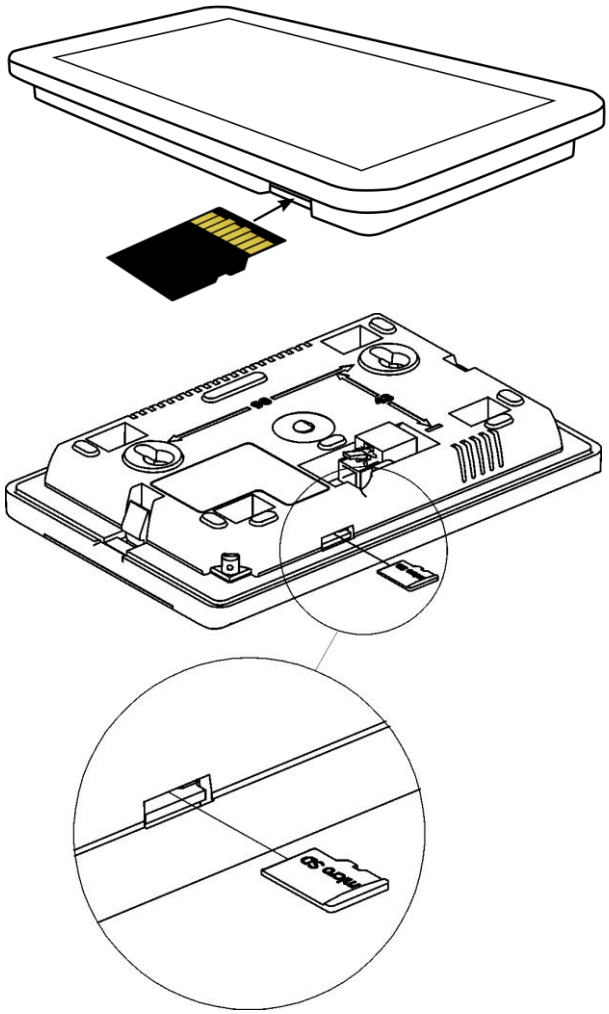
17 Software update

Simultaneous update of the Controller and panel software can be done using memory card only type microSD HC (FAT 32 files format, max. 32 GB).

Software update can be performed only by a qualified person. Precautions to prevent electrocution should be observed!

To update the software:

- disconnect power supply of the controller.
- insert memory card (other types of memory cards are not supported) to a socket in the movable casing of the panel shown above. On the memory card there should be written new software in the *.pfc format as a 2 files: a file with the panel software and a file with the module software.



- software files should be placed directly on the memory card, do not place them in any subdirectory, then connect power supply of the Controller and go to the menu: **General settings → Software update** and perform the update firstly in the main module, then in the control panel and in the end in other devices.

18 The controller configuration by boiler producer

The producer of boiler / burner should adjust program parameters in controller to given type and power of the burner. The most important parameters are those related to Firing up, Operation and Burning off. The controller is able to change the default settings depending on power and type of the burner. Default settings for given boilers / burners should be consulted with Company Plum Sp. z o. o. In order to load new parameters go to:

Service settings → [special password] and choose proper boiler/burner. Default settings can also be loaded by special software provided by Plum company.

19 Possible faults description

Symptoms	Tips
There are no signs of operation of device despite connection to the network.	Check: ▪ If line fuses are not blown, replace if necessary ▪ If the wire connecting panel with the executive module is plugged correctly and if module is not damaged.
Preset boiler temperature on the display is different from the required one.	Check: ▪ If in this time the HUW container is not loaded and if preset temperature is set above the preset boiler temperature. If so then the difference in readings will disappear after heating the HW container or reduce the preset HUW temperature. ▪ If time periods are activated – then deactivate time periods.
CH pump is not working.	Check: ▪ If boiler exceeded temperature above parameter *CH pump activating temp.* – wait or reduce value of this parameter. ▪ If *HUW priority* is activated which blochs CH pump – deactivate priority be setting *HUW operation mode* on *No priority,* ▪ If CH pump is damaged or blocked.
Fan does is not working.	▪ Check if plug jumper is installed for the limiter of safety temperature STB on terminals 1-2, (the jumper should only be installed only in case when temperature limiter is not connected). ▪ If producer of the boiler has equipped it with temperature limiter STB with manual return to original position, it should be unlocked by untwisting the cover and twisting the button according to documentation of boiler producer, ▪ Check the fan and replace it if necessary.
Fuel feeder is not working / does not provide fuel	▪ Check if feeder wires are correctly connected to terminals, ▪ If temperature limiter STB is connected to terminals 1-2, then check if the circuit is not cut off due to boiler overheating, ▪ Check if feeder engine is not broken or damaged, ▪ In case when engine work can be heard and fuel is not provided check the feeder with its user manual.
Fuel is not burnt off completely, there are not burnt remnants in ashes. Fuel burns with big amount of smoke, burner fades	▪ Check settings *Output modulation*.
Temperature is not measured correctly.	▪ Check if there is a good thermo contact between the temperature sensor and measured surface, ▪ Check if sensor wire not goes too closely to network wire, ▪ Check if sensor is connected to terminal, ▪ Check if sensor is not broken.
In HUW pumps mode = SUMMER heaters are hot, boiler is overheated.	▪ Increase value of parameter *Extending HUW pump operation time* to cool off the boiler.
HUW pump is not working, even if HUW container is loaded	▪ Set the parameter *Extending HUW pump operation time = 0*
In hydraulic installation with mixing valve and servomotor – mixer is not opening.	▪ The cause may be HW silo loading when HW priority is activated. Wait until HUW container loaded or activate the HUW priority. ▪ The cause may be active function SUMMER. ▪ The cause may be activation of function return protection. If function return protection is activated – check if return sensor of water return to silo is isolated thermically from surroundings. By usage thermoleading paste improve thermal contact of the sensor with pipe. Improve preset temperature of the boiler to ensure power for heating returning water. Check if hydraulic installation is correctly made, after closing the valve, return temperature must increase above value of parameter *Minimum return temperature*.

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