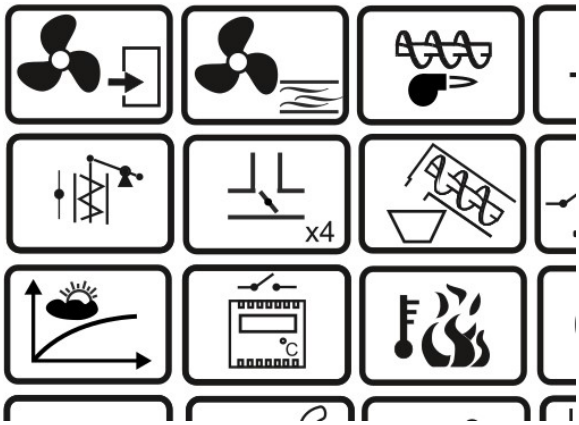
CONTROLER

ecoMAX920P1-CH

FOR BLOWING TYPE BOILER FOR SOLID FUEL

ecoNET300*

ecoNET.apk
ecoNET.app
www.econet24.com



* the device is not a standard equipment of the regulator.

I OPERATING AND INSTALLATION MANUAL

ISSUE: 1.0

09-2020

LIVE ELECTRICAL DEVICE!

Before performing any activities related to power supply (connecting cables, device installation, etc.), make sure that the regulator is not connected to the mains.
Installation should be performed by a person with appropriate electrical qualifications. Incorrect connection of the wires may damage the regulator.
The controller cannot be used in conditions of water vapor condensation and exposed to water.

MAIN PRINCIPLES OF PROPER FUZZY LOGIC FURNISHING.
The controller must be programmed individually for a given type of furnace.
It is not allowed to change the types of fans and other changes in the furnace accessories that affect the combustion process. The accessories should correspond to the factory-installed components by the furnace manufacturer.

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1 Safty advices

Safety requirements are specified in individual sections of this manual. Apart from them, in particular, the following requirements must be observed.

• Before starting assembly, repairs or maintenance and during any connection works, it is absolutely necessary to disconnect the mains power and make sure that the terminals and electric wires are not switched on.

• After the regulator is turned off, dangerous voltage may occur on its terminals.

• The regulator cannot be used contrary to its purpose.

• The controller is designed to be built-up.

• The regulator is intended for the manufacturer of the furnace. Before using the regulator, the manufacturer should check whether the regulator's cooperation with a given type of stove is correct and does not cause any danger.

• The regulator is not an intrinsically safe device, ie in a failure condition it can be a source of a spark or high temperature, which in the presence of flammable dusts or gases may cause a fire or explosion.

• The surroundings of the controller should be kept clean.

• The controller must be installed by the furnace manufacturer in accordance with the applicable standards and regulations.

• Modification of the programmed parameters should be carried out only by a person who read this manual.

• The electrical installation, in which the regulator operates, should be protected with a fuse selected appropriately to the applied loads.

• The regulator cannot be used with a damaged casing.

• The structure of the regulator may not be modified under any circumstances.

• The controller uses electronic disconnection of connected devices (operation type 2Y in accordance with PN-EN 60730-1) and micro-disconnection (operation type 2B in accordance with PN-EN 60730-1).

• Access of unauthorized persons, especially children, to the regulator must be prevented.

2 General Information

The ecoMAX920P1-CH regulator is designed to control the operation of a furnace and a hot air heater with a heat exchanger. The furnace is adapted to burn pellet type fuel, and the flame detection is carried out using an optical flame brightness sensor. The controller controls the operation of the burner, fuel feeder, burner fan and exhaust fan with power modulation, as well as four air supply duct damper actuators, which allow you to control the amount of hot air blown into the rooms (heating zones). The preset temperature of air blowing into the room can be set on the basis of the external (weather) temperature sensor readings. Cooperation with four room thermostats (for each heating zone separately) and the speed of response of the blower system contribute to maintaining the comfort temperature in heated rooms and ensures constant air circulation, and thus effective ventilation. The regulator can cooperate with the ecoNET300 internet module, which enables on-line control of the boiler operation.

The controller can be used in householdand in industrialized buildings.

3 Documentation information

The regulator manual supplements the furnace documentation. In particular, in addition to the provisions in this manual, the furnace documentation should be followed. The regulator manual is divided into two parts: for the user and the installer. Both parts contain important information related to safety, therefore the user should read both parts of the manual. We accept no liability for damage caused by failure to follow the instructions.

4 Record keeping

Please keep this installation and operating manual and all other applicable documentation carefully, so that you can refer to them at any time. In the event of moving or selling the device, hand over the attached documentation to the new user or owner.

5 Graphic symbols used

The following graphic symbols are used in this manual:

- the symbol indicates useful information and tips.

- the symbol indicates important information which may affect property damage, health or life for humans and domestic animals.

Note: important information is marked with symbols to make it easier to read the manual. However, this does not release the user and installer from complying with the requirements not marked with graphic symbols Directive WEEE 2012/19/UE

The purchased product has been designed, made of the highest quality materials and components that are recyclable and can be reused. The product meets the requirements of Directive 2012/19 / EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE), according to which it is marked with the symbol of a crossed-out wheeled waste container (as below), informing that it is subject to selective collection.

Obligations after the end of the product's useful life:

- dispose of the packaging and the product at the end of its useful life in an appropriate recycling company,
- do not dispose of the product with normal waste,
- do not burn the product.

By complying with the above obligations for the controlled disposal of waste electrical and electronic equipment, avoid harmful effects on the environment and human health.

Manual

ecoMAX920P1-CH

2 Main menu - structure

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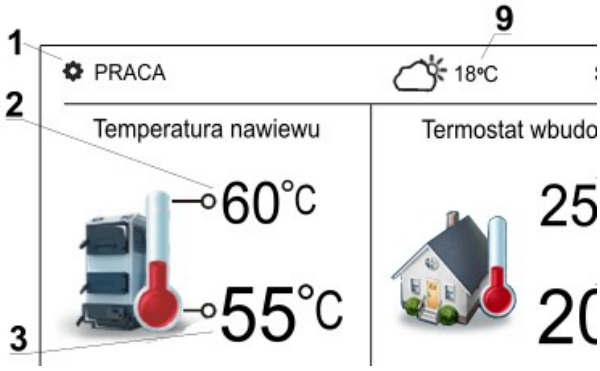
* not available if the appropriate sensor or additional module is not connected or the parameter is hidden.

3 Controler peration

3.1 Decription of main screen



Main menu view.

Legend:

1. Regulator operation modes: FIRING UP, OPERATION, SUPERVISION, BURNING OFF, CLEANING, STANDSTILL, MANUAL.
2. Value of the preset air supply temperature - holding it down longer edits the value.
3. The value of the measured air supply temperature.
4. Enter the menu list.
5. Information field:

- burner fan work;
- main feeder work;
- feeder work;
- igniter work;
- rotavie chamber work;
- work on a reserve boiler.

1. Temperature measured in the room (1st heating zone) by the built-in thermostat.
2. Value of the set temperature in the room of the first heating zone.
3. Clock and day of the week.
4. Value of the external temperature (weather) - available only after connecting the external temperature sensor.

Both the right window and the left window on the main screen can present various information - by touching it is possible to change the information presented.

3.2 Turning the stove on and off

The stove is started by pressing any place the screen with the inscription "Stove off", then the following message will appear: Turn on the regulator?

There is a second method to turn on the stove. Press the menu button and then press the button . To turn off the stove, press the menu button and then press button then the stove will go into the extinguishing process. Only after the end of the blanking, the screen with the text "Stove off" will appear.

Setting the set temperature

The preset air supply temperature to the room is set in the menu:

Device settings → Airflow preset temperature

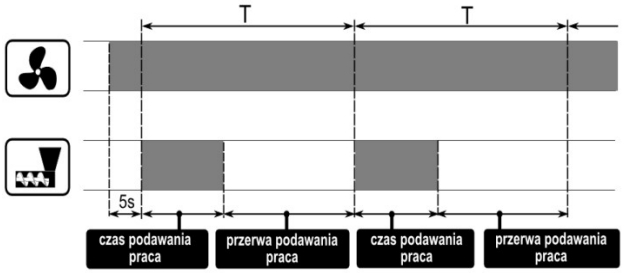
The value of the parameter.

FIRING UP mode

The FIRING UP mode is used to automatically fire up the furnace. The total duration of the firing-up process depends on the regulator settings and the state of the furnace before firing up. Parameters influencing the firing up process are grouped in the menu:
Service settings → Burner settings → Firing up
If the furnace has not been ignited, further attempts are made to fire it up, during which the fuel dose is reduced to 10% of the first attempt dose. Successive firing up attempts are signaled on the screen by numbers next to the igniter symbol . After three unsuccessful attempts, the alarm "Unsuccessful attempt to light the furnace" is reported and the furnace operation is stopped. The furnace operation cannot be continued and user intervention is required. After removing the causes of the inability to light the stove, restart it.

3.3 Mode OPERATION

In the OPERATION mode, the burner fan operates continuously, the fuel feeder is activated cyclically, where the cycle consists of the feeder operation time and the fuel feeding pause time.



Burner and feeder fan cycles.

The Cycle time parameter in the OPERATION mode is available in the menu:

Service settings → Burner settings → Operation

The operation time of the fuel feeder is calculated automatically depending on the required current power of the furnace, feeder efficiency and fuel calorific value. The power parameters of the burner blower fan for individual stove power levels are available in the menu:

Oven settings → Power modulation

Regulation modes

You can choose between two control modes responsible for stabilizing the set temperature of the airflow: Standard and Fuzzy Logic. The mode changes in the menu: Oven settings → Regulation mode

- **Working in Standard Mode**

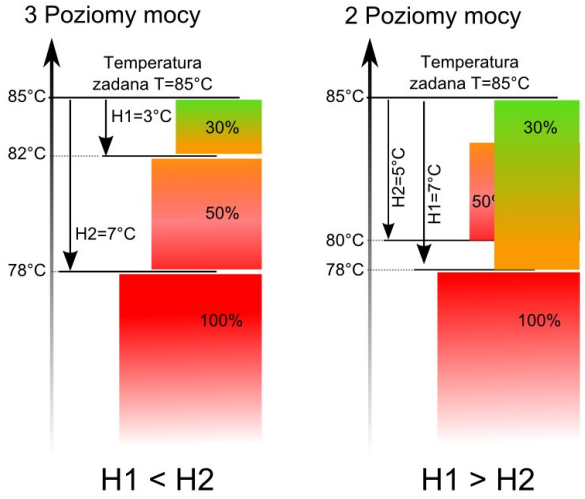
If the airflow temperature reaches the set value, the regulator will switch to the SUPERVISION mode.

The controller has a burner power modulation mechanism that allows to gradually reduce its output as the heat exchanger (supply) temperature approaches the set value. Three burner power levels are defined: maximum, intermediate and minimum. Each level can be assigned a separate burner blower fan power, which translates into the actual burner power level.

The parameters of the burner power levels are available in the menu:

Furnance settings → Power modulation

The controller decides about the power of the burner with which the furnace will work at the moment, depending on the set temperature of the airflow and defined hysteresis: Intermediate power - H2 hysteresis and Minimum power - H1 hysteresis. It is possible to configure the H1 and H2 hysteresis values so that the modulation will take place without an intermediate state, i.e. transition from Max. To Min. Without the Intermediate power.



Power modulation hysteresis.

- **Operation in Fuzzy Logic mode**

In the Fuzzy Logic mode, the controller automatically determines the power of the burner with which the furnace will operate so as to maintain the airflow temperature at the set level. The controller uses the same defined burner power levels as in Standard mode. For this mode, it is not necessary to set parameters: Maximum power - H2 hysteresis and Minimum power - H1 hysteresis. The Fuzzy Logic mode, unlike the Standard mode, does not have the disadvantage in which the preset airflow temperature will not be reached due to incorrect selection of hysteresis H2, H1. Moreover, it enables faster reaching the set temperature. Additionally, the burner power range can be set using the parameters Minimum boiler output FL and Maximum boiler output FL.

After exceeding the preset airflow temperature by 5ºC, the regulator switches to the SUPERVISION mode.

MANUAL mode

In the MANUAL mode, the burner operates at minimum power for the time set in the service parameter Working time with minimum power, and the exhaust fan, regulating the air flow through the exchanger, operates at a constant power set in the service parameter Fan power. heater before heating the exchanger until the value of the service parameter Temp. air to start the airflow, and then the fan starts to work with the power set in the parameter Fan set power or the power set from the fan power level, which is set with the parameter: Fan power. gear 1… Fan power - speed 5 corresponding to the selected burner power point. The parameter is in the menu:

Device settings → Value of fan speeds heater

3.4 SUPERVISION mode

The SUPERVISION mode occurs both in the Standard mode and in the Fuzzy Logic mode. The regulator enters the SUPERVISION mode without user intervention:

- in the case of the Standard regulation mode - after reaching the preset airflow temperature,
- in Fuzzy Logic control - after exceeding the preset airflow temperature by 5 ° C.

In the SUPERVISION mode, the regulator supervises the furnace so that it does not go out. For this purpose, the burner works with very low power, which, with properly selected parameters, does not cause any further temperature increase. Burner power and other SUPERVISION parameters are grouped in the menu:

Service settings → Burner settings → Supervision

The SUPERVISION mode parameters should be set in accordance with the recommendations of the burner manufacturer. They should be selected so that the furnace does not go out during downtime. It should not ignite too much at the same time, as this will increase the temperature of the burner.

The parameters of the SUPERVISION mode must be selected so that the burner temperature in this mode gradually drops. Incorrect settings can lead to overheating.

The maximum burner operation time in the supervision mode is defined in the Supervision time parameter. If, after the expiry of this time, from the moment the regulator enters the SUPERVISION mode, there is no need for the burner to work again, the regulator will start the extinguishing process.

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

3.5 BURNING OFF mode

In the BURNING OFF mode, the remaining fuel is burnt and the burner is prepared for a standstill or shutdown. All parameters influencing the extinguishing process are grouped in the menu:

Service settings → Burner settings → Putting out

The controller stops fuel feeding and performs cyclical blows in order to burn off fuel residues. After the flame brightness decreases or the Maximum Putting Out Time has expired, the regulator switches to the STANDSTILL mode.

STANDSTILL mode

In the Standstill mode, the stove is off and waiting for a signal to start operation. The signal to start operation may be a drop in temperature in the room below the preset airflow temperature minus the value of the furnace hysteresis. In this mode, the burner fan runs continuously.

Burner cleaning service

The regulator enables cleaning the furnace from the ashes generated during the combustion process. For this purpose, the controller uses the burner fan operation with the power set in the Cleaning intensity parameter. In the Burner cleaning parameter in the Furnace settings menu, set the maximum burner operation time without cleaning, after which the furnace will switch to the BURNING OFF mode, in which the

rotary burner cleaning mechanism will be activated and then the burner will fire up again. The furnace is cleaned in the FIRING UP and BURNING OFF mode. Additional parameters responsible for cleaning are grouped in the menu:

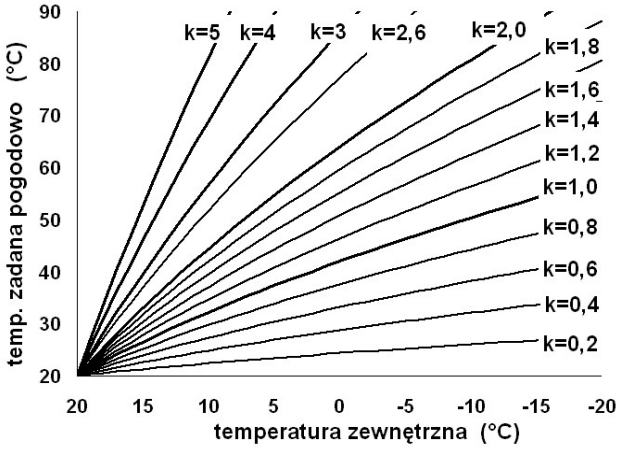
Service settings → Burner settings → Cleaning

3.6 Exchanger cleaning service

The regulator enables cleaning the exchanger from soot and dust deposits. For this purpose, the regulator uses the exhaust fan, which operates for the time set in the parameter Exchanger cleaning time with a break in its operation set in the Exchanger cleaning interval parameter. The exchanger cleaning time can be defined separately for all days of the week in the Schedule setting.

3.7 Weatcher control

In order to adjust the furnace temperature from the temperature outside the building, weather control can be enabled, which requires the connection of an external temperature sensor (weather). The temperature of the furnace is set depending on the temperature outside the building. The colder it is outside, the higher the temperature of the furnace. This relation is expressed in the controller in the form of a heating curve. The heating curve should be selected experimentally by changing it at intervals of several days. With the right selection of the heating curve, the furnace temperature is calculated depending on the value of the outside temperature. Thanks to this, when selecting a heating curve appropriate for a given building, the room temperature (heating zone) will remain approximately constant, regardless of the outside temperature.



Heating curves.

Tips for choosing the right heating curve:

• if the room temperature rises with the falling outside temperature, the value of the selected heating curve is too high,

• if the temperature in the room drops with the falling outside temperature, the value of the selected heating curve is too low,

• if the room temperature is appropriate during freezing weather and it is too low during warming up - it is recommended to increase the Parallel shift of the heating curve parameter and select a lower heating curve,

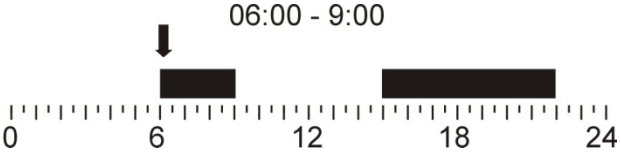
• if the room temperature is too low during freezing weather and it is too high during warming - it is recommended to decrease the Parallel shift of the heating curve parameter and select a higher heating curve.

Buildings that are poorly insulated require setting heating curves with higher values, while for buildings that are well-insulated, the heating curve will have a lower value.

Description of night time decrease settings

The time periods enable the introduction of a reduction in the set airflow temperature in a specific time period, e.g. at night or when the user leaves the heated rooms. As a result, the set temperature can be automatically lowered without losing thermal comfort, while reducing fuel consumption. To activate the time periods, set the parameter Night time decrease to On in the menu:
Device settings → Heater night decrease

Active night-time decreases are signaled on the screen by the symbol ↓🕒.
The Reduction value parameter is used to set the decrease temperature, one for all time intervals. Night time reductions can be defined separately for all days of the week in the Schedule setting. One should choose lowering the preset temperature for a given time period. Time intervals for 24h are set every 30 minutes.



Time intervals.

In the above example, from 00:00 to 06:00 the controller will reduce the preset temperature by the value of the reduction. From 06:00 to 09:00, the regulator will keep the preset temperature at the preset level (without decreases). From 09:00 to 15:00, the regulator will lower the preset temperature by the decrease value. From 15:00 to 22:00, the regulator will again maintain the preset temperature at the preset level (without decreases). From 22:00 to 23:59, the regulator will lower the preset temperature by the decrease value.

☞ The time period is ignored for the setting Reduction value = 0.

3.8 Work according to a schedule

The regulator allows you to turn the furnance on and off at defined time intervals. If there is no demand for heat, e.g. in summer, the stove can be turned off at a certain time, thus reducing fuel consumption. To activate time intervals, set in the menu:

Work on schedule → Turn on to Yes.

Switching the stove on and off in a time period can be defined separately for all days of the week in the Schedule setting.

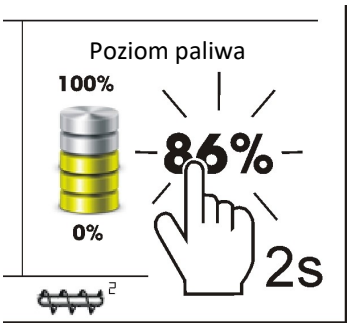
Fuel level configuration

• Activation of the fuel level indicator

To enable display of the fuel level, set the parameter value:
Stove settings → Fuel level → Alarm level to a value greater than zero, e.g. 10%.

• Support for the fuel level indicator

Each time after filling the fuel tank, press and hold the current value of the fuel level, then the prompt "Set the fuel level to 100%" will appear.



Fuel level screen

After selecting and confirming YES, the fuel level will be set to 100%.

Note: fuel can be added at any time, i.e. you do not have to wait until the fuel tank is completely empty. However, fuel should always be added to the level of the container corresponding to 100% and the level should be set to 100% in the regulator as described above.

- A description of the action

The regulator calculates the fuel level based on its current consumption. Factory settings will not always correspond to the actual fuel consumption of a given stove, therefore this method requires level calibration by the user of the regulator to operate correctly.

- Calibration

Fill the fuel tank to the level corresponding to a full load of 100%, and then set the parameter value:

Furnance settings → Fuel level → Fuel levelcalibration → Fuel level 100%

The decreasing fuel level in the fuel tank should be monitored on an ongoing basis. When the level drops to the expected minimum, set the parameter value:

Furnance settings → Fuel level → Fuel level calibration → Fuel level 0%

It is possible to skip the calibration process if the parameters Feeder efficiency and Tank capacity are set correctly.

Built-in thermostat

Settings of operating modes of the built-in thermostat, which is responsible for heating in zone I. Thermostat support should be enabled by setting the Thermostat selection parameter to Built-in in the menu: Device settings.

The operating mode is set in the menu:

Built-in thermostat → Thermostat operation mode

The following modes are available:

• Schedule - the preset airflow temperature is determined in accordance with the set time schedule. The parameter Night (economic) temperature or Day (comfort) temperature is set in the menu: Built-in thermostat.

• Economical - the controller works with a constant economic temperature, set in the parameter Night temperature.

• Comfortable - the regulator works with a constant comfortable temperature, set in the parameter Day temperature.

The built-in thermostat will turn on the heating of the 1st zone when the temperature in this room drops below the preset temperature minus Thermostat hysteresis, and will stop heating when the preset temperature in the room is reached.

Room Panel

The room panel connected to the regulator performs the function of a room thermostat and the furnace control panel and alarm signaling function.

Additionally, 3 room panels for heating zones II, III and IV can be connected to the regulator, while the room panel (built-in thermostat) is available in the regulator module housing and is responsible for the 1st heating zone.

After receiving a signal from the room panel (the temperature set in the room has been reached), the regulator closes the SP1 damper actuator (actuator to the OFF position), and from the next room panel - it closes the SP2 damper and then another SP3 damper. If all the room panels report no heat demand in all heating zones, the stove switches to the BURNING OFF mode, and then to the STAND-BY mode. The last SP4 damper is closed only after the burner is extinguished and the exhaust fan is stopped.

Feeder Test

The controller allows you to test the burner feeder efficiency, which has a significant impact on the operation of the burner. The test is started with the parameter Feeder efficiency test in the menu:

Furnace settings → Power modulation → Feeder

During the test, the necessarily full feeder feeds fuel to the additional container for the time set in the Performance test time. After this time, the fuel should be weighed in an additional container and the value entered into the Fuel weight parameter.

In the event of emptying the main fuel tank and restarting the stove, activate the function of filling the burner feeder with the Feeder filling parameter.

Informations

The Information menu allows you to view the measured temperatures and to check which devices are currently turned on.

Manual Control

The controller allows for manual activation of executive devices, e.g. fan, feeder motor, damper. This allows you to check whether the devices are operational and properly connected.

Access to the manual control menu is possible only when the stove is off.

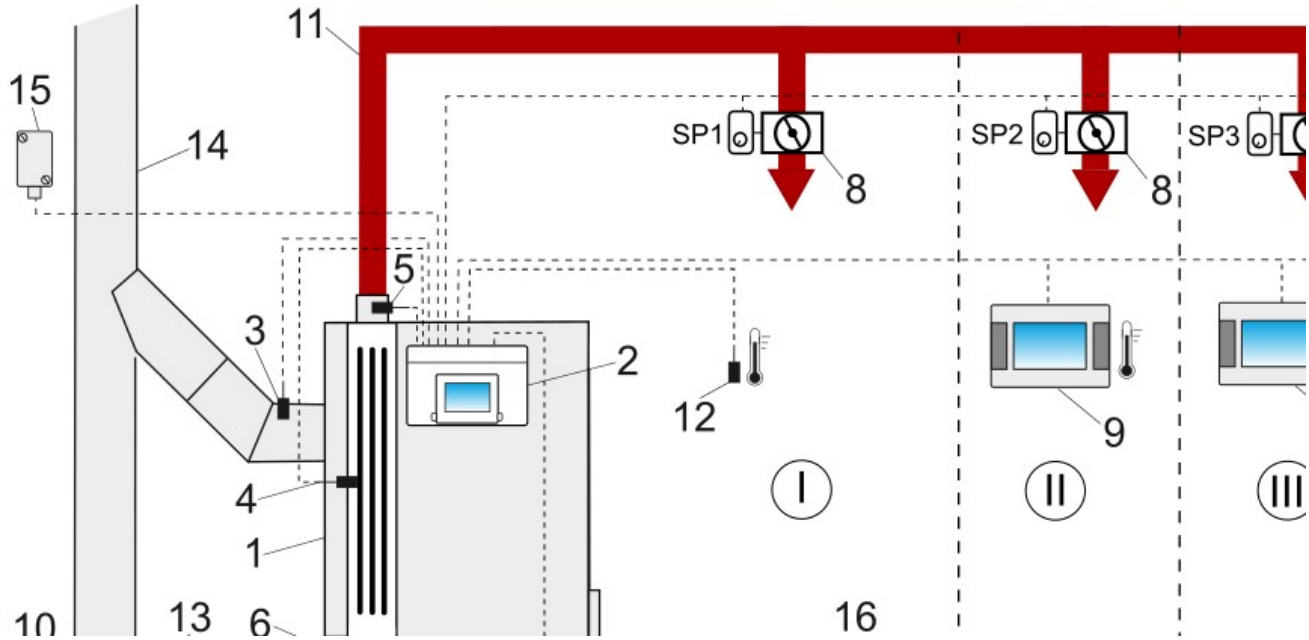
Long-term activation of a fan, feeder or other actuating device may lead to a hazard.

3.9 Cooperation with the internet module

The regulator can cooperate with the ecoNET300 internet module. It enables online monitoring and control of the regulator via Wi-Fi or LAN via the www.econet24.com website via a web browser or a convenient application for mobile devices.ecoNET.apk

ecoNET.app

4 Hydraulic diagram



Hydraulic diagram of the heating system for hot air supply: 1 - furance, 2 - controller, 3 - exhaust gas temperature sensor, 4 - exchanger temperature sensor, 5 - supply temperature sensor, 6 - exhaust fan, 7 - burner fan and burner feeder, 8 - air damper actuator, 9 - room panel with a room thermostat function, 10 - external air intake, 11 - air supply duct, 12 - internal temperature sensor, 13 - intake filter, 14 - chimney installation, 15 - external temperature sensor, I ... IV - heating zones (rooms), 16 - internal intake.

5 Technical data

Regulator power supply	230 V~, 50 Hz
Current consumed by the regulator	0,04 A[1]
Maximum rated current	6 (6) A
The degree of protection of the regulator	IP20
Ambient temperature	0...50°C
Storage temperature	0...65°C
Relative humidity	5…85%, without condensation of steam
Temperature measuring range of sensors CT4	0..100°C
Temperature measuring range of CT2S sensors	0..300°C
Temperature measuring range of the CT6-P sensor	-35..+40°C
Accuracy of temperature measurements with sensors CT4, CT6-P	±2°C
Connections	Screw terminals on the mains voltage side of 2.5 mm2 Screw terminals on the control side 1.5 mm2
Display	Colorful, graphic 480x272 pix. with a touch panel
External dimensions	EcoTOUCH3 control panel: 144x97x17 mm EcoTOUCH control panel: 148x97x23 mm Controller module: 340x225x60 mm
Mass	2 kg
Standards	PN-EN 60730-2-9 PN-EN 60730-1
Software class	A
Protection class	To be built into class I devices
The degree of pollution	2nd degree

Warehouse conditions. and transportation

5.1

The controller cannot be exposed to direct influence of weather conditions, i.e. rain and sun rays. Storage and transport temperature should not exceed the range -15… + 65 ° C. During transport, the regulator must not be exposed to vibrations greater than those corresponding to typical conditions of wheel transport.

IP protection class

The casing of the regulator provides IP20 protection. The casing on the side of the terminal cover has the IP00 protection degree, therefore the terminals must be absolutely covered with this cover. If there is a need to gain access to the parts with terminals, first disconnect the mains power and make sure that there is no mains voltage on the terminals and wires.

Connecting the electrical installation The regulator is designed to be supplied with ~ 230 V, 50 Hz. The electrical installation should be:

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

After the regulator is turned off, dangerous voltage may occur on its terminals. Before starting assembly works, you must disconnect the mains power and make sure that there is no dangerous voltage on the terminals and leads.

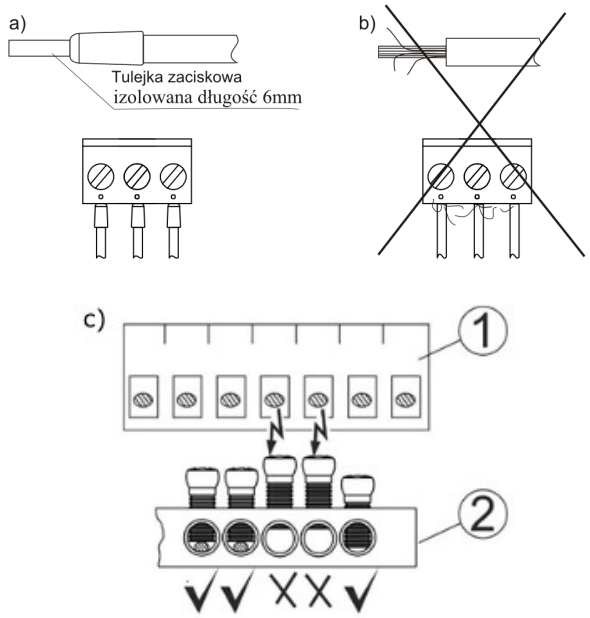
The connection cables should not have contact with surfaces with a temperature exceeding the nominal temperature of their operation. Terminals 1-22 are intended for connecting devices with ~ 230 V mains supply. Terminals 23-48 are intended for cooperation with low-voltage devices (below 12 V).

Connecting the ~ 230 V mains voltage to terminals 23-48 and G transmission connectors damages the regulator and creates a risk of electric shock.

The ends of the connected wires, especially those with mains voltage, must be secured against splitting, e.g. with clamping sleeves,

[1] Jest to prąd pobierany przez sam regulator. Całkowity pobór prądu zależy od podłączonych do regulatora urządzeń.

while the terminals of the protective strip must be tightened, even if there is no wire connected to the terminal.



Cable protection: a) - correct, b) - incorrect, c) - the requirement to tighten the screws of the protective strip, 1 - the connector, 2 - the protective strip.

Tighten all screws of the protective strip terminals and make sure that no wire stranded into the terminals has an electrical contact with the metal protective strip.

It must be absolutely checked that no strand of the stripped wire or the wire itself has electrical contact with the metal grounding bar of the regulator located close to its voltage terminals.

The power cord should be connected to the terminals marked with an arrow ⬆.

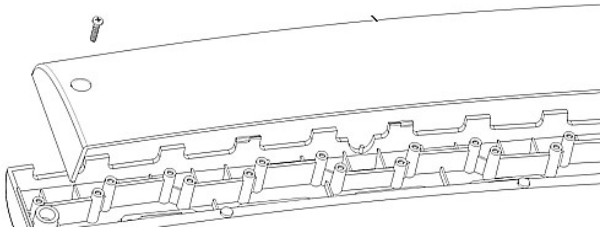
For safety reasons, the controller must be absolutely connected to the ~ 230 V power grid, observing the sequence of connecting the L and neutral N conductors. !!

The connection of any peripheral devices may only be performed by a qualified person in accordance with applicable regulations. An example of such a device is the relay marked as "RE" and the receivers connected to it. You should remember about the safety rules related to electric shock. The regulator must be equipped with a set of plugs inserted into the connectors for supplying ~ 230V devices.

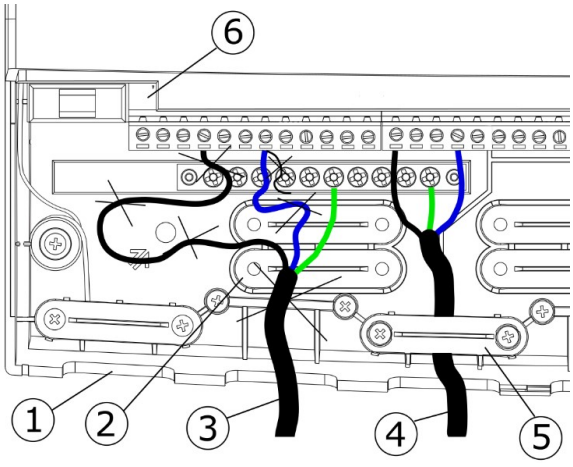
With a metal zero strip marked with the symbol ⏚ should be combined:

- protective conductors of devices connected to the regulator,
- protective conductor of the power cable,
- metal mounting surface on which the controller is mounted.

Before connecting, remove the cover in the controller housing, as shown in the figure below.



The cables, secured against splitting, should be connected to the screw terminals of the connector (6). The cables should be led through the cable openings of the housing (1) and secured against tearing out and loosening by means of clamps (5), which should be broken out of the housing. The insulation length of the outer tire of the cables should be as short as possible, max. 60 mm. If it is necessary to insulate the cable tires for a longer time, the isolated wires should be connected with each other or with other wires near the connector, so that in the event of a single wire falling out of the connector, it does not come into contact with hazardous parts. It is also forbidden to bundle excess wires or leave unconnected wires inside the regulator.



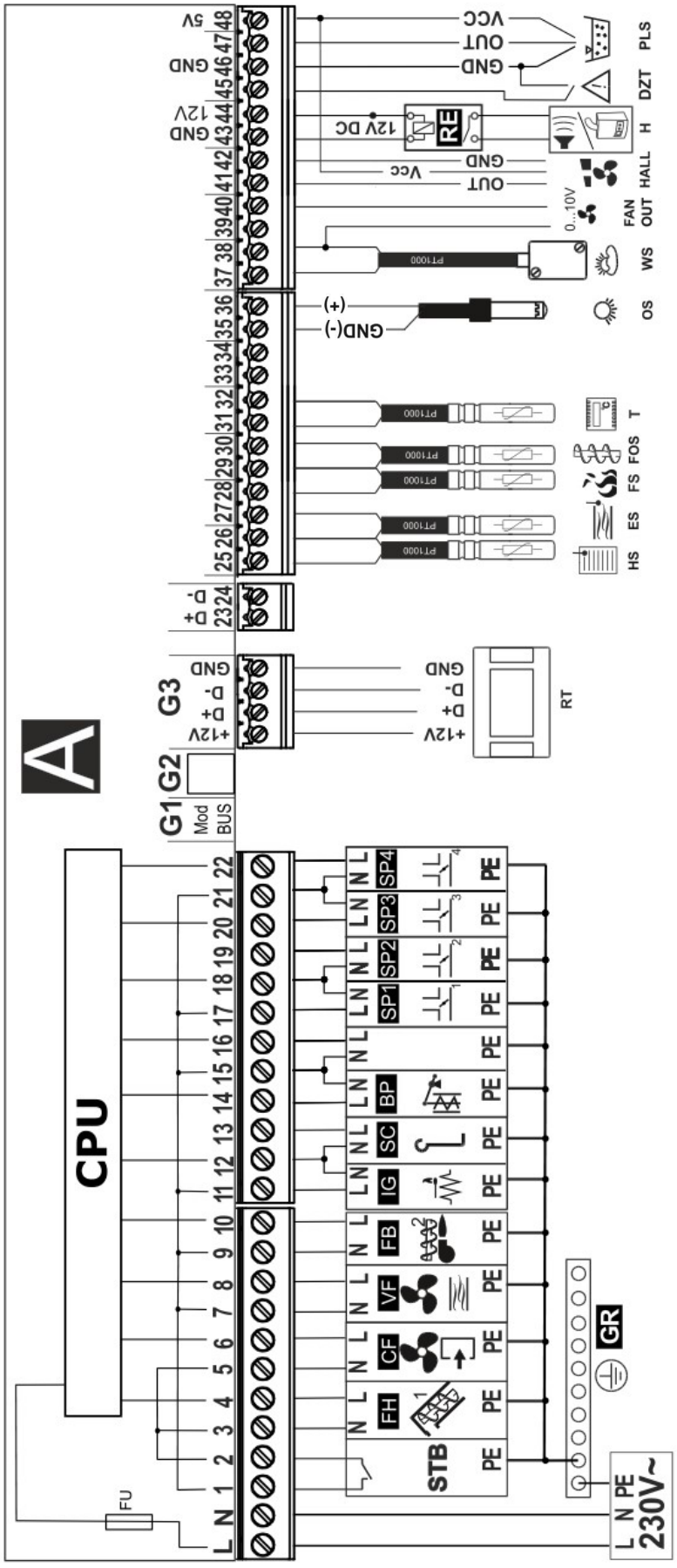
Connecting the cables to the controller: 1 - cable openings, 2 - placing clamps (they must be broken off), 3 - incorrectly connected cable (it is forbidden to wind excess cables inside the device and leave wires without wires), 4 - correctly connected cable, 5 - cable clamp , 6 - connector.

Separate electrical wiring from hot stove components, especially flue pipes.

After connecting the wires, it is absolutely necessary to put the cover back in its place.

Always screw the terminal cover to the housing. Apart from ensuring the safety of the user, the cover additionally protects the interior of the regulator against hazardous environmental conditions, ensuring an appropriate IP protection degree.

5.2 Electrical diagram



Electric connection diagram of the controller: LN PE - 230V ~ mains supply, CPU - control, FU - fuse, STB - safety temperature limiter input, FH - main feeder, CF - burner blower fan, VF - exhaust fan, FB - burner feeder, IG - igniter, SC - burner cleaning rotary motor, BP - main fuel feeder, SP1... SP4 - ON / OFF type single-phase damper actuator, RT - room panel with a room thermostat function, HS - heater (exchanger) temperature sensor, CT4, ES type - supply temperature sensor type CT4, FS - exhaust gas temperature sensor type CT2-S, FOS - feeder temperature sensor type CT4, T - thermostat (internal temperature sensor) type CT4, OS - optical flame brightness sensor, WS - external temperature sensor (weather) type CT6-P, FAN OUT - voltage output (0-10V) controlling the supply fan, HALL - hall sensor of the exhaust fan, H - voltage output for controlling the boiler rez R or for signaling alarms AL, RELAY - 12VDC relay, DZT - furnace door opening sensor, PLS - supply fan speed sensor.

5.3 Connecting temperature sensors

The regulator cooperates with sensors of the CT4 type. The use of other types of sensors is prohibited.

The sensor cables may be extended with cables with a cross-section of not less than 0.5 mm2. The total length of each sensor cable should not exceed 15 m, however. Sensor cables should be separated from mains cables. Otherwise, the temperature may not be displayed correctly. The minimum distance between these wires should be 100 mm.

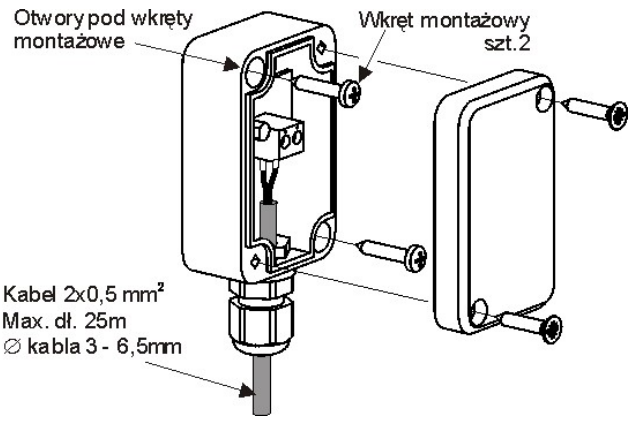
The internal temperature sensor, type CT4, should be installed inside the room, marked as the 1st heating zone. Recommended installation above the heater, usually 100… 200 mm from the point on the ceiling that marks the center of the heater.

☞ Do not install the internal temperature sensor closer than 1000 mm from the air outlet to the room, so as not to cause its heating and erroneous temperature measurement.

Good thermal contact between the sensors and the measured surface should be ensured. It is not allowed to flood the sensors with oil or water. The sensors must also be secured against loosening from the surfaces to which they are attached. Do not allow sensor cables to come into contact with hot elements of the furnace. Temperature sensor cables are resistant to temperature not exceeding 100 ° C..

5.4 Connecting weather sensor

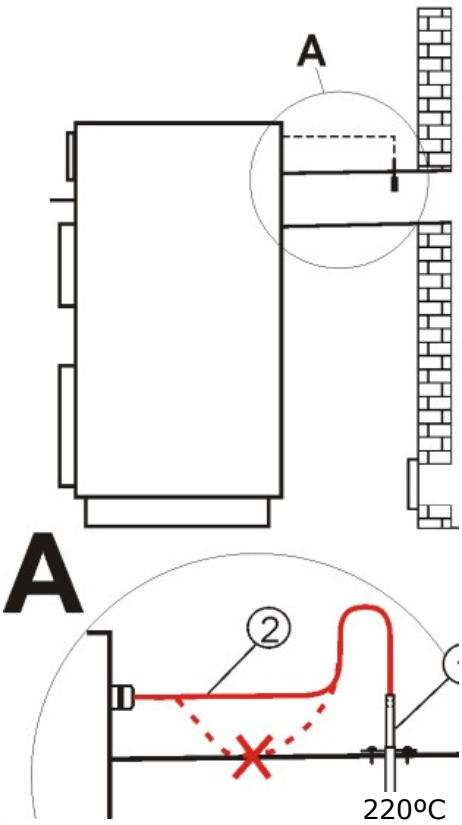
The regulator cooperates only with a weather sensor of the CT6-P type. The sensor should be installed on the coldest wall of the building, usually it is the northern side, in a roofed place. The sensor should not be exposed to direct sunlight and rain. Install the sensor at a height of at least 2 m above the ground, away from windows, chimneys and other heat sources that may interfere with the temperature measurement (at least 1.5 m). Use a wire with a cross-section of at least 0.5 mm2 and a length of up to 25 m for the connection. The polarity of the wires is not important. Connect the other end to the regulator terminals. The sensor should be screwed to the wall with mounting screws. Access to the holes for mounting screws is obtained after unscrewing the cover of the sensor housing.



It is possible to additionally adjust the weather sensor indications. To do this, measure the value of the outside temperature with a thermometer and enter the obtained value of the temperature difference between the measured and indicated by the weather sensor in the menu: Main settings - Sensor correctionPodłączenie czujnika temperatury spalin

The regulator cooperates with a CT2S sensor. The use of any other type of sensor is prohibited.The flue gas temperature sensor should be installed in the stove's flue. The gap between the sensor and the flue should be sealed. The sensor should be installed by a qualified installer, in accordance with the regulations for chimney installations. The flue gas sensor cable must not touch the hot elements of the stove and the flue. The sensor should be installed at such a distance from the burner that it will not be exposed directly to the flames of the burner fire and the temperature of the exhaust gases doe

not exceed 220 °C.



Connecting the exhaust gas temperature sensor: 1 - exhaust gas temperature sensor, CT2S type, 2 - sensor lead, 3 - flue.

Opening the furnace door may cause the exhaust gas temperature to rise above the thermal resistance of the sensor, it may burn out the sensor.

5.5 Checking temperature sensors

Temperature sensors can be checked by measuring their resistance at a given temperature. In case of significant differences between the measured resistance value and the values from the table below, the sensor should be replaced.

A very accurate multimeter should be used to check the CT2S sensor, otherwise the sensor can only be checked roughly.

CT4			
External 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)			
External 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 (fumes)			
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

5.6 Connecting the optical sensor

Optical sensor asking according to the diagram with the polarity of the SYG (+) and GND (-) invitation. Reading the indications from the optical flame system is in the menu item:

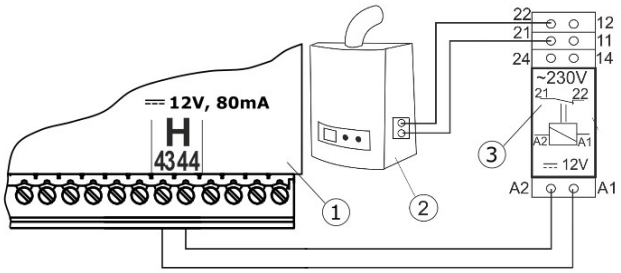
Information → Flame

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

5.7 Connecting a reserve boiler

The regulator can control the operation of a reserve boiler (gas or oil). Connection to a reserve boiler should be made by a qualified installer, in accordance with the technical documentation of this boiler. The reserve boiler should be connected via a relay to

terminals 43-44 of the regulator.



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

As standard, the controller is not equipped with a relay.

Installation of the relay should be entrusted to a person with appropriate qualifications, in accordance with applicable regulations.

To enable control of a reserve boiler, set H outputs to support a reserve boiler in the menu:

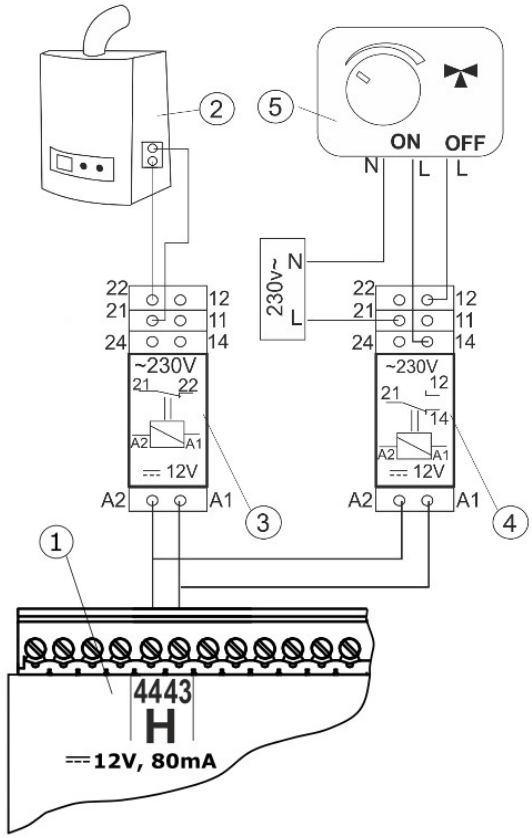
Service settings → Output H

and then set the parameter Additional boiler activation temperature to a value other than zero. The reserve boiler control is disabled after setting this parameter to zero.

The control output of the backup boiler is also shared with the alarm output. Disabling control of a reserve boiler will cause the H output to be controlled by the alarm control module.

When the furnace temperature exceeds the set value, e.g. 25C, the regulator will turn off the reserve boiler - it will supply 12V DC to terminals 43-44. After the furnace temperature drops below the parameter Reserve boiler activation temperature, the regulator will stop supplying voltage to contacts 43-44, which should activate the reserve boiler.

Switching the regulator to the "Stove off" state turns on the reserve boiler.

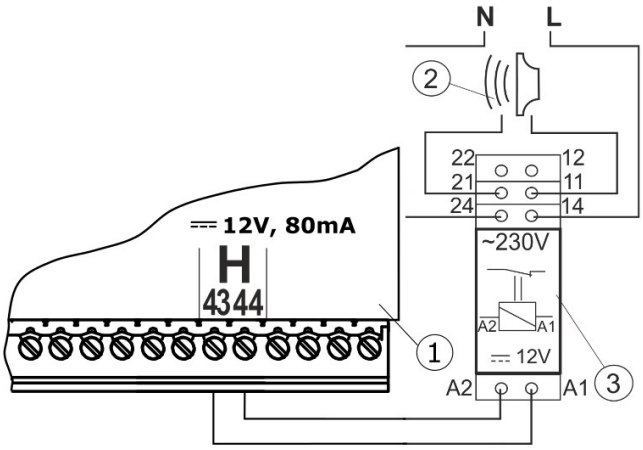


An exemplary wiring diagram for controlling the switching valve of a reserve boiler: 1 - regulator, 2 - reserve boiler, 3 - relay, 5 - switching valve actuator (with limit switches), note: terminals 22, 21, 24 must be galvanically separated from terminals 12, 11 , 14.

Connection of alarm signaling

The regulator can signal alarm states by switching on an external device, e.g. a bell or GSM device for sending SMS. The device for alarm signaling should be connected via a relay to terminals 43-44 of the controller. Due to the fact that the H output is shared with the auxiliary boiler control output, in order to activate the alarm functions on this output, you must first disable the auxiliary boiler control. To do this, set the value of the parameter Reserve boiler activation temperature to zero, and then set the H output to service alarms in the menu:

Service settings → Output H



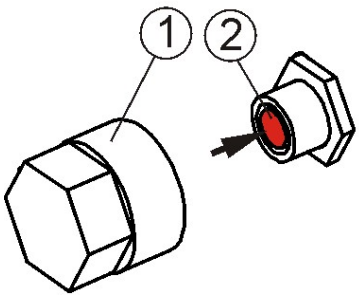
Example of connecting an external alarm device: 1 - regulator, 2 - external alarm device, 3 - relay RM 84-2012-35-1012.

5.8 Connecting the damper actuator

The air damper actuators are connected in accordance with the electric diagram. The regulator cooperates only with single-phase air damper actuators of the open / close type (ON-OFF).

5.9 Connecting the STB temperature limiter

If the furnace temperature exceeds 95 ° C, the power supply to the fuel feeder and the burner fan is cut off by the safety temperature limiter. Restarting requires resetting the limiter. To do this, unscrew the nut (1) covering the reset button (2) and press the button.



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

The button can be pressed only after the furnance temperature drops below 95 ° C. The fan and fuel feeder power will be restored.

If the regulator is not factory-equipped with a safety temperature limiter, it should be connected to the regulator terminals 1-2 as an external device.

The safety temperature limiter must have a rated operating voltage of at least ~ 230 V and should have the applicable approvals.

Dangerous voltage is present on terminals 1-2.

If the STB is not installed on terminals 1-2 of the regulator, a bridge must be used, which should be made with an insulated wire with a cross-section of at least 0.75 mm2, with insulation thick enough to meet the safety requirements for the boiler.

The regulations require the use of the STB limiter.

5.10 Connecting the room panel

The maximum length of the wires connecting the room panel (room thermostats) with the regulator should not exceed 30 m. This length can be longer, when wires with a cross-section greater than the recommended 0.5 mm2 are used.

Przekrój przewodów 12 V oraz GND do podłączenia panelu pokojowego powinien wynosić co najmniej 0,5 mm^2.

● Four-wire connection

Connect according to the electric diagram.

● Two-wire connection

Two-wire connection requires a 5… 12 VDC power supply with a minimum current of 200 mA. Power supply points: GND and VCC connect to an external power supply, which is not a standard regulator equipment. Connect the D + and D- lines as shown in the electric diagram.

Service menu - structure

Entering the menu requires entering the service password.

Service Settings
Burner stettings
Device settings
Output H
Display advanced
Restore defaults settings
Save Defaults Settings
Service shutdown
Touch screen calibration
Log out

Burner Settings
Firing-up
• Ignition test time
• Fuel dose
• Flame Detection
• Firing-up airflow 1
• Firing-up time
• Blowing after firing-up
• Heating time
• Heating up time
• Worktime with minimal power
Operation
• Feeding cycle time OPERATION
• Fuel Caloric
• Capacity of tank
• Extending operation of feeder 2
• Fan operation detection
• Fan speed multipier
Burning off
• Max. time of burning off
• Min. time of burning off
• Blowing power
• Blowing time
• Blowing pause
• Blowing start
• Blowing stop
Cleaning
• Cleaning time firing-up
• Cleaning time burning off
• Blow-in cleaning
• Rotary cleaning cycle
Supervision
• Supervision time
• Heater power in supervision mode
• Cycle time
• Fan power
Minimum blowing power
Fuel shortage detection time
Maximum burner temperature

Device Settings
Excchanger sensor
Shutdown hysteresis
Heater fan start temp
Blowing alarm temp
Fan Power heater before the exchanger warms up
Heater alarem hystersis

Output H
OFF
Alarms
Reserve boiler
• Switch-on temperature of the reserve boiler

* unavailable if the appropriate sensor is not connected or the parameter is hidden.

6 Description of service parameters

6.1 Burner

Parametr	Description
Setting a fire	
• Ignition test time	Time to check if the furnace is already fired. Only the fan is running. If the flame is bright enough, it enters the OPERATION mode, skipping the FIRING UP mode.
• Fuel dose	Fuel dose when firing up. It concerns the first attempt to light up. In subsequent tests, the fuel dose is smaller.
• Flame detection	Flame detection threshold in% of light at which the regulator recognizes that the furnace is already fired. It is also used to detect fuel shortage and the end of burning off.
• Firing up blow 1	Pre-blowing power during ignition. Too high value extends the firing up process or causes an unsuccessful firing up attempt.
• Firing up time	Time of a single firing up attempt. After this time, the regulator starts another firing up attempt. After all ignition attempts are unsuccessful, the alarm Failed ignition attempt is reported.
• Airflow after firing up	% of fan blow after flame detection.
• Glow time	The furnace glow time after firing up. After detecting the flame in the ignition phase, the furnace ignites before feeding an additional portion of fuel within the time specified by the Glow-up time parameter and the airflow power is increased.
• Warm-up time	Igniter heating time before switching on the blower fan. It should not be too long so as not to damage the heater. After this time, the heater continues to work until a flame is detected.
• Working time at minimum power	Burner operation time with minimum power after firing up. The power is determined by the parameter Minimum power - airflow.
job	
• Thermostat mode	Switches the burner into Thermostat mode, where the burner works with maximum power and without power modulation. The burner turns off when the thermostat contacts are opened.
• Cycle time in OPERATION mode	Time of the entire fuel feeding cycle at WORK. Cycle time in OPERATION mode = feeding time + feeder standstill time at OPERATION.
• Fuel calorific value	Fuel calorific value in kWh / kg.
	Fuel tank capacity for calculating the fuel level. Entering the correct value releases the user from the need to perform the fuel level calibration procedure. The regulator uses this data if the fuel level calibration has not been performed. After a successful calibration of the fuel level, the regulator does not use this value.
• Extending the feeder 2 operation	Time of extending the operation of the burner feeder in relation to the operation time of the fuel container feeder.
• Detection of fan operation	Blow fan operation detection threshold, below which the fan failure alarm is reported.
• Fan revolutions multiplier	By how much will the value of the blower fan speed setting be multiplied.
• Power reduction start threshold	If, during the operation of the flame brightness regulator, it drops below the setting of this parameter, the algorithm of burner power reduction is activated.
Putting out	
• Maximum blanking time	After this time, it will switch to the STANDBY mode, even though the flame sensor indicates the presence of a flame.
• Minimum blanking time	Extinguishing will continue for at least this time, despite the fact that the flame sensor indicated no flame.

• Blow-off power	Blow-in fan power during blowing while burning off.
• Purge time	Duration of air blow when burning fuel in burning off.
• Purge break	Pause between blowing when burning off fuel in burning off.
• Purge start	The brightness of the flame at which airflow starts, with fuel burnout in extinguishing.
• Purge stop	The brightness of the flame, at which the fan is turned off, when burning fuel in extinguishing.
Cleaning	
• Cleaning time firing up	Fan operation time while cleaning the furnace while firing up.
• Burnout cleaning time	Fan operation time during furnace shutdown.
• Blow cleaning	The power of the burner blower fan during cleaning the furnace in burning off and firing up.
• Rotary cleaning cycle	Time of operation of the burner rotary purge output and pause time of the rotary purge of the burner.
Supervision	
• Supervision time	It is the time of the regulator's maximum stay in the SUPERVISION mode. After this time, from the moment the regulator switches to the SUPERVISION mode, the burner is automatically switched off. With the Supervision time = 0 setting, Supervision mode is completely disabled, with Supervision time = 255 Supervision mode is not disabled.
• Furnace power in Supervision mode	Furnace power in Supervision mode.
• Cycle time	Feeder cycle time in Supervision. Cycle time = feeding time + feeder standstill time in Supervision.
• Blow-in power	The power of the burner blower fan during work in Supervision. Select a value that allows you to burn the fuel supplied in Supervision with low emissions.
Minimum blowing power	Minimal power of the burner blower fan that can be selected by the user of the regulator. It is only used to limit the available fan power range. It is not used for the fan control algorithm. It should be as small as possible so that the fan rotates slowly and freely without "hum".
Fuel shortage detection time	The time is counted down after the flame brightness drops below the value of Flame detection. After the countdown of this time, the controller starts trying to fire up the burner, and after unsuccessful attempts, it outputs the alarm Ignition failed attempt.
Maximum burner temperature	Defines the maximum burner temperature at which the burner overheating alarm will be issued.

6.2 Heater

Parametr	Description
Exchanger sensor	Enabling or disabling support for the heat exchanger temperature sensor.
Blanking hysteresis	The parameter decides by how much above the set temperature the burner is put out (or goes to supervision).
Temp. air to start blowing	The temperature value of the air blown into the room at which the exhaust fan will be turned on.
Temp. alarm blower	Maximum temperature of air blown into the room, above which the alarm "Exceeded max. Heater temperature" will be reported.
Fan power heater before heating the exchanger	The power of the exhaust fan before heating the heat exchanger.
Airflow alarm temperature hysteresis	If the value of the temperature of air blowing into the room exceeds the value of Temp. alarm of the airflow by the hysteresis value in this parameter, the alarm "Exceeded max. temperature of the heater" will

	be reported.
Parameter A, B, C FL	Parameter related to automatic modulation of the burner power with stabilization of the set burner temperature. Increasing the value increases the speed of the burner power increase. Too high a value may cause instability in maintaining the preset burner temperature.

6.3 Other parametrs

Parametr	Description
Show advanced	• Options available:
Restore default settings	• YES - displays hidden parameters, editing of which is not recommended.
Record setting	• NO - hides advanced parameters.
Log out	Restoring the service settings will also restore the settings from the main (user) menu.
Exit H.	• Selecting Yes saves all service settings after changing parameters in the service menu.
Touch panel calibration	Setting it to YES exits the mechanism of temporary entry to the service menu without using the service code.
Service shutdown	The menu contains settings related to the H output configuration. The options are: • OFF - disabling the H. • Alarm - when an alarm occurs, the H output is activated. • Reserve boiler - output H controls the reserve boiler. Description in point 12.13 This parameter is used to set the precision of the touch response to the selected place on the screen. Forcing the stove to shut down.

7 Description of alarms

The maximum temperature of the fuser has been exceeded

If the furnace temperature exceeds 95ºC, the permanent heater overheating alarm will be triggered. The controller will start the burner shutdown procedure. Check the cause of the alarm. If the furnace temperature drops below 95ºC, the controller resumes normal operation.

The alarm can be reset by acknowledging the alarm on the screen or only and powering up the regulator.

Burner overheating

The alarm will occur after the burner temperature exceeds the parameter Maximum burner temperature. If the burner temperature rises above this value, the controller will start the extinguishing procedure.
The alarm can be reset by acknowledging the alarm on the screen or only and powering up the regulator.

6.4 Damage of the heater temperature sensor

The alarm occurs when the exchanger (heater) temperature sensor is damaged and the measuring range of this sensor is exceeded. The stove is put out of operation when the alarm occurs. Check the sensor and replace if necessary.
The alarm can be cancelled by acknowledging the alarm screen or only and turning on the controller power supply.

☞ Checking the temperature sensor is described in point 12.11

6.4 Burner temperature sensor failure

The alarm will occur when the burner temperature sensor is damaged and when its measuring range is exceeded. After an alarm, the heater is turned off. Check the sensor and replace if necessary.
The alarm can be reset by acknowledging the alarm on the screen or only and powering up the regulator.

☞ Checking the temperature sensor is described in point 12.11

6.4 Unsuccessful firing up attempt

The alarm will occur after the third unsuccessful attempt to automatically fire up the furnace. This alarm may be caused by a faulty igniter or a lack of fuel.
The alarm can be cancelled by acknowledging the alarm screen or only and turning on the controller power supply.

6.4 Overheating of the furnace, STB contact open

The alarm will occur after the activation of an independent safety thermostat which protects the furnace against overheating. The burner is shut down. After the furnace temperature drops, unscrew the round cover of the limiter and press the reset button, as described in point 12.16

The alarm can be cancelled only by switching on the controller power supply.

Damaged feeder control system

The regulator has an additional protection that prevents the constant feeding of fuel. Thanks to this protection, the user is informed about the failure of the electric system controlling the fuel feeder. In the event of an alarm, stop the stove and repair the regulator immediately. However, it is possible to continue the regulator operation in emergency mode. Before continuing work, check the combustion chamber for accumulation of a large amount of unburned fuel. If so, remove excess fuel. Firing up with excess fuel may cause flammable gases to explode!

Work on the emergency system is allowed only under the user's supervision and until the arrival of the service and removal of the fault. If user supervision is not possible, the stove should be shut down. When operating in emergency mode, prevent the effects of incorrect operation of the fuel feeder (continuous operation or no operation of the feeder).

6.5 Damage to the fan or the rotation sensor

The alarm occurs when the fan speed sensor or the fan itself is damaged, based on the voltage capacity on the fan control output. The controller turns off the fan.

The alarm can be reset by acknowledging the alarm on the screen or only and powering up the regulator.

The furnace door is open

This is called a silent alarm prompt that will occur when the furnace door opening sensor is triggered. The alarm is reset by closing the door or confirming the alarm on the screen.

Other functions of the regulator

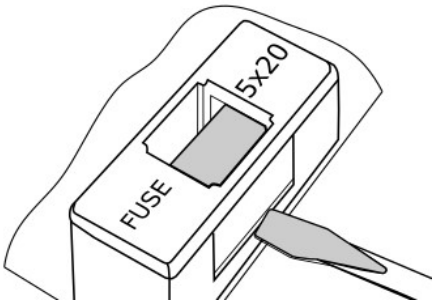
6.6 Power failure

7 In the event of a power failure, the regulator will return to the operating mode in which it was before its disappearance.

7.1 Replacement of parts and components

7.2 Replacing the mains fuse

The mains fuse is located inside the controller housing. The fuse may only be replaced by a suitably qualified person after disconnecting the mains supply. Use time-delay fuses, porcelain, 5x20 mm, with a nominal burnout current of 6.3 A and a voltage of 230



V.

In order to remove the fuse, use a flat-blade screwdriver to lift the fuse holder and pull out the fuse.

Replacing the control panel

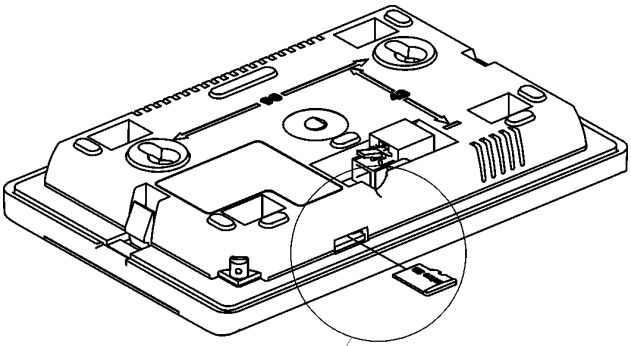
It is not recommended to replace the control panel itself because the program in the panel must be compatible with the program in the rest of the regulator.

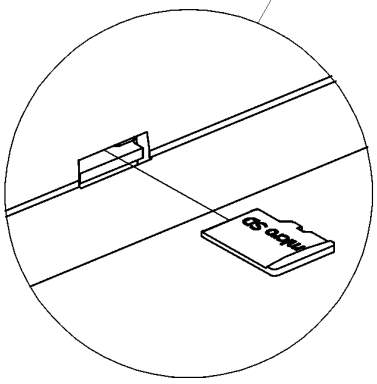
Sodtware update

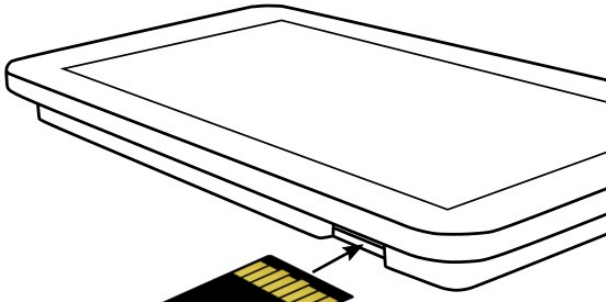
The program replacement can be performed with a microSDHC memory card only (FAT32 format, max. 32 GB).

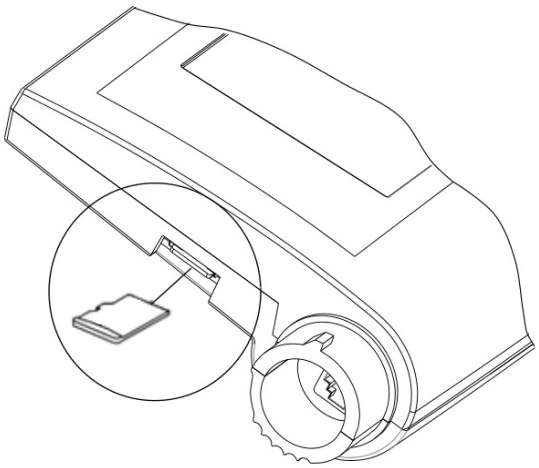
The software may only be replaced by an authorized person, observing all precautions against electric shock!

To replace the program, disconnect the power supply to the controller and insert the memory card into the indicated panel slot.









The new software should be saved on the memory card in the * .pfc format in the form of two files: the file with the panel program and the file with the program for the controller A module. Place the new software directly on the memory card and do not put the data in a subdirectory. Then reinstall the panel in the controller housing and connect the power supply. Enter the menu:
8 General settings → Software update
and replace the program first in the A module of the regulator and then in the regulator's panel.

Description of possible faults

Malfunction symptoms	Tips
The display shows no signs of operation of the device despite connecting to the network.	Check if the mains fuses have not been blown and replace if necessary - point 7.1
Burner fan is not working.	Check if the STB safety temperature limiter input jumper is on terminals 1-2, (the jumper should be installed only if the temperature limiter is not connected) If the STB temperature limiter is reset to the starting position manually, the limiter should be unlocked - point Check the burner fan and replace if necessary.
The exhaust fan is not working.	Check if the mains fuse of the exhaust fan is not blown and replace if necessary. Check whether the hall sensor has not been damaged. Check the exhaust fan and replace if necessary.
The fuel feeder does not work / does not feed.	Check that the feeder wires are properly connected to the terminals. If the STB temperature limiter is connected to terminals 1-2, check that the circuit has not been cut off due to overheating of the furnace. Check if the feeder motor is not damaged. If you can hear the engine running and the fuel is not fed, check the feeder in accordance with the furnace manual.
Fuel is not burned out. There are unburned fuel particles in the ash. Fuel burns up with a lot of smoke or the burner goes out.	Check user settings for Power modulation.
Temperature is not being measured correctly.	Check: is there a good thermal contact between the temperature sensor and the measured surface, that the sensor cable does not run too close to the network cable, whether the sensor is properly connected to the terminal, whether the sensor is not damaged

Change log:

ul. Obornicka 71
62-002 Suchy Las
Polska
Tel. 61 811 70 37
biuro@kipi.pl
www.kipi.pl
BDO: 000179569