

# TECH TECH CONTROLLERS

## USER MANUAL EU-28N zPID

EN





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*ALL IMAGES PUBLISHED SERVE ILLUSTRATION ONLY AND MAY DIFFER FROM THE ACTUAL APPEARANCE.*

Before operating the device please read the following instructions carefully. Failure to observe these instructions may cause personal injuries and damage the device.

To avoid unnecessary errors and accidents, make sure that all persons operating the device are thoroughly familiarized with its operation and safety functions. Please retain the operating manual for future reference and make sure that it stays with the device if it is transferred or sold, so that everyone using it will have sufficient information concerning the operation and safety of the device. For the safety of life and property, take precautions in accordance with the user manual, as the manufacturer is not responsible for damage caused by negligence.



## WARNING

- Live electrical equipment. Before carrying out any operations related to the power supply (connecting cables, installing the device, etc.), make sure that the controller is not connected to the mains.
- Installation should be carried out by a person holding appropriate electrical qualifications.
- Before starting the controller, the ground resistance of electric motors and the insulation resistance of electric wires should be measured.
- The controller is not intended to be operated by children.



## CAUTION

- Atmospheric discharges can damage the controller, so during a thunderstorm, switch it off by unplugging the mains plug.
- The controller may not be used contrary to its intended purpose.
- Before and during the heating season, check the technical condition of the cables. Also check the installation of the controller, clean dust and other soiling.

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There could be changes introduced in the products listed in the present manual, following its last revision of 03.02.2023. The manufacturer reserves the right to introduce design changes. Illustrations may contain optional equipment. Printing technology may affect differences in the presented colours.

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Care for the natural environment is of paramount importance to us. The awareness that we manufacture electronic devices is linked with our obligation to dispose the used electronic parts and devices in a way that is safe for the environment. Therefore, the company received a registration number issued by the Polish Chief Inspector for Environmental Protection. The symbol of the crossed wheeled bin on the product indicates that the product must not be disposed of with municipal waste. By segregating waste for recycling, we help protect the environment. It remains the user's responsibility to hand over used equipment to a designated collection point for recycling electrical and electronic equipment waste.

## 2 DEVICE DESCRIPTION

The EU-28N PID controller is designed for CH boilers. It controls the CH water circulation pump, DHW domestic hot water pump and blowing (fan). If the boiler temperature is lower than the set temperature, the controller is in the operating cycle, in which the blower operates at all times.

If the boiler temperature is equal to or higher than the set temperature, then the controller is in the temperature maintaining cycle, and the controller works by switching on the purges at a frequency depending on the user's settings. The duration of operation and interruptions of purges in the maintaining cycle should be selected according to the type of fuel burned in the boiler.



### CAUTION

Each controller must be set individually, depending on the type of fuel used in the boiler, and also the type of boiler. TECH is not responsible for incorrect controller settings.

In case of voltage loss, the thermoregulator will stop working. After the power supply is reconnected, the controller returns to operation with previously set parameters thanks to its built-in memory. Lack of power supply does not delete the stored thermoregulator parameters.

## 3 INSTALLING THE CONTROLLER

The controller should be installed by a properly qualified person only.



### WARNING

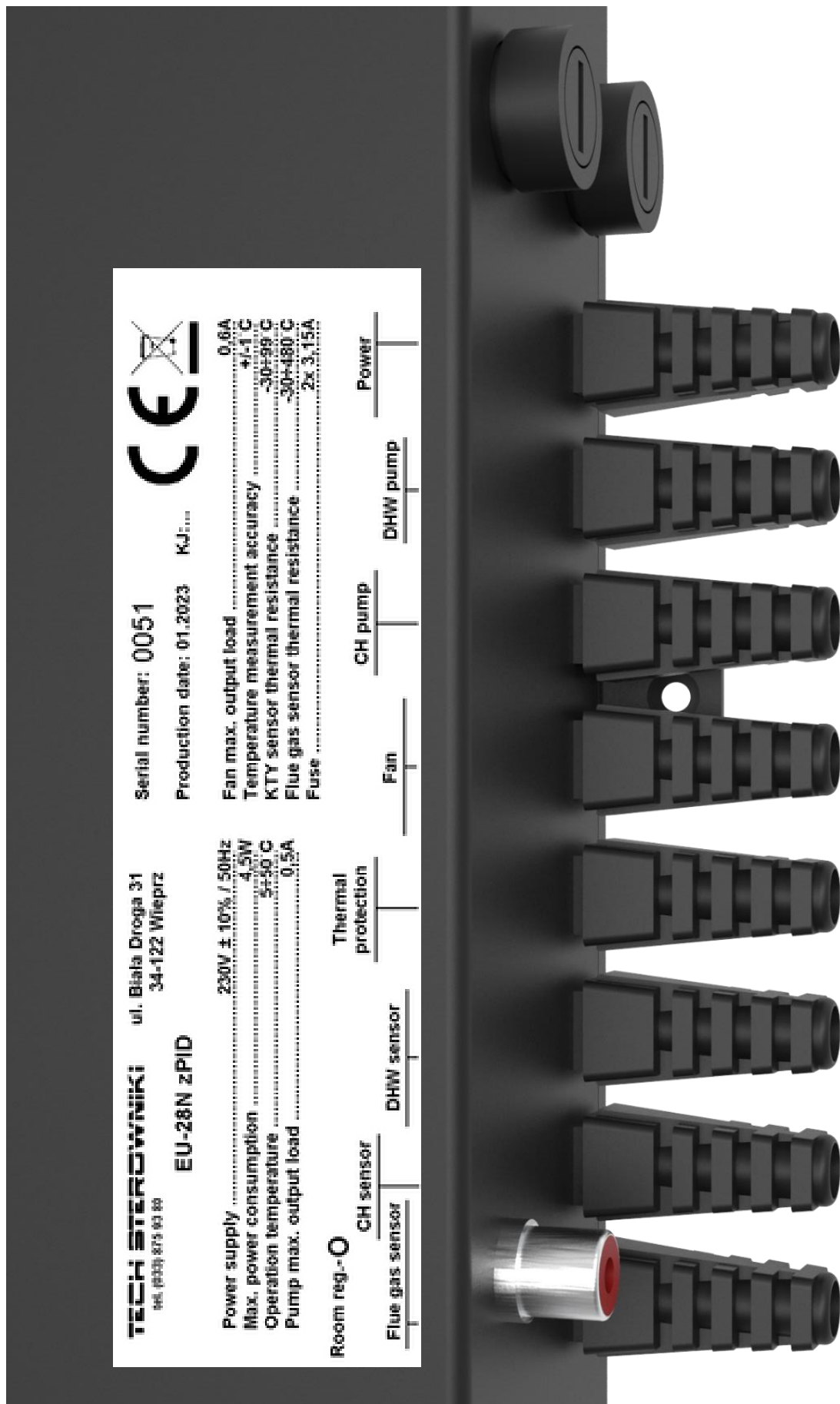
Danger of injury or death due to electric shock on live connections. Before working on the controller, disconnect its power supply and secure it against accidental switching on.



### CAUTION

Incorrect wiring may damage the controller.

In the back of the controller there are connectors to which sensors and devices operated by the controller should be connected:





1. **UP** button - changes the set temperature from the main screen view, after entering the controller menu, this button is used to increase the operating settings.
2. **DOWN** button - changes the set temperature from the main screen view, after entering the controller menu, this button is used to reduce the operating settings.
3. Entering the controller menu, confirming the settings.
4. Power switch.
5. Exit from the controller menu, cancel settings.

# MAIN MENU

Ignition/ Extinguishing
Screen View
Temperature settings
Work Setting*
Manual operation
Pump operating mode
Time settings
Date settings
Weekly schedule control
Installer Menu
Service menu
Language selection
Factory defaults
Software info

\* Parameter visible when working with the zPID algorithm disabled



## 5.1 FIRING UP/ EXTINGUISHING

After the initial ignition of the boiler, the *Ignition* function must be activated. In this mode, the fan will start working to facilitate ignition (in a still cold boiler). Once the CH temperature rises to 30°C (the so-called fan threshold), the *Fan On/ Off* function will appear on the display instead of the *Ignition* option and the *Manual Operation* diode will turn off and the boiler will enter the operating mode. Using the *Fan On/ Off* function, the fan can be switched on or off (e.g. when adding fuel). Turning off the fan is indicated by an asterisk on the main screen in the lower right corner of the display. This function allows for safe operation of the boiler. Never open the furnace door with the fan on. If the boiler reaches a temperature of 35°C, the pump (or both pumps depending on the operating mode) will start.

## 5.2 SCREEN VIEW

In this function, the user can select one of the available main screens of the thermoregulator operation. These are:

- CH screen (the current boiler operating mode is displayed)
- Service screen (allows you to view the parameters available in the service menu)

## 5.3 TEMPERATURE SETTINGS

### 5.3.1 CH SET TEMPERATURE

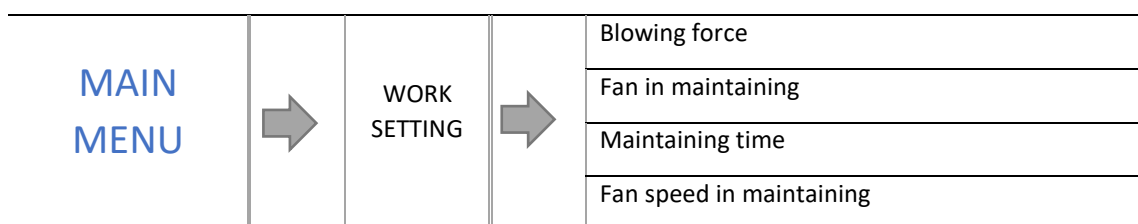
This option is used to set the boiler temperature. The user can change the boiler temperature range from 40°C to 80°C. The set CH can also be changed directly from the main screen of the controller.

### 5.3.2 DHW SET TEMPERATURE

This option is used to set the set temperature of domestic hot water. The user can adjust this temperature in the range from 35°C to 60°C.

## 5.4 WORK SETTING\*

After disabling the PID adjustment function, the controller will work as a regular two-state controller, and the following additional functions will appear in the main menu.



### 5.4.1 BLOWING FORCE

This function controls the fan speed. The adjustment range is from 1 to 100%, (it can be assumed that these are fan speeds). The higher the speed, the faster the fan works, where 1% is the minimum fan speed and 100% is the maximum.

### 5.4.2 FAN IN MAINTAINING

In this function, the user sets the running time and the fan pause time during the operation in the temperature maintaining cycle.

### 5.4.3 MAINTAINING TIME

This option is used to set the fan idle time during the maintaining period.

**CAUTION**

Incorrect setting of this option may cause a constant increase in temperature! The maintaining interval should not be too short.

**5.4.4 FAN SPEED IN MAINTAINING**

This option allows you to select the appropriate fan speed (blowing power) in maintaining cycle.

**5.5 MANUAL OPERATION**

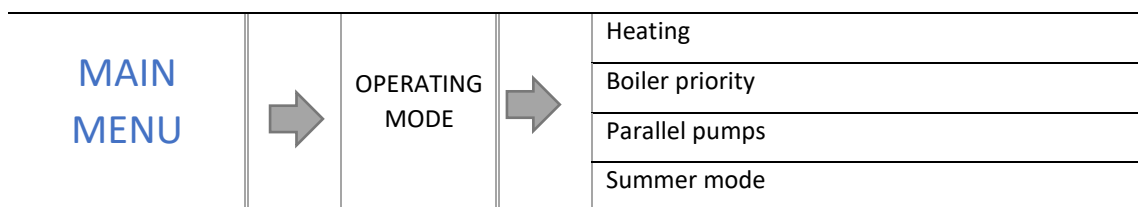
For the convenience of the user, the controller has been equipped with a **Manual Operation** module. In this function, each actuator (fan, CH pump, DHW pump) is switched on and off independently of the others.

Pressing the **OPTIONS** button starts the motor of the selected device. This device remains running until the **OPTIONS** button is pressed again.

The *blowing speed* option is also available, enabling the user to set any fan speed in manual operation.

**5.6 PUMP OPERATING MODE**

In this function, the user selects one of the available boiler operation modes.

**5.6.1 HEATING**

After selecting this option, the controller enters the "only heating" state. The CH pump will start operating above the CH pump start-up temperature. Below this temperature (minus the hysteresis value) the pump stops working.

**5.6.2 BOILER PRIORITY**

In this mode, the DHW pump operates until the boiler is heated (the valves close to the maximum and the valve pumps are switched off). At the moment of obtaining the set temperature on the boiler, the previously operating pump will be switched off, while the CH pump will be switched on and the mixing valves will be switched on. The moment the boiler temperature drops below the set point temperature by the hysteresis value, the DHW pump will switch on again and the valves will stop working.

**CAUTION**

The boiler should have check valves installed in the CH and DHW pump circuits. The valve mounted on the DHW pump prevents the extraction of hot water from the boiler. The valve mounted on the circuit of the CH pump does not let the hot water that heats the boiler to the home heating system.

**5.6.3 PARALLEL PUMPS**

Mode in which the CH pump operates above the pump start-up threshold. The DHW pump switches on in parallel and reheats the boiler, while after reheating the DHW, the pump switches off. The pump will restart after the temperature drops by the DHW hysteresis value.

**CAUTION**

If the boiler's current temperature is lower than the current temperature on the boiler, the DHW pump will not switch on to protect against cooling of the boiler water.

**5.6.4 SUMMER MODE**

When this function is activated, the CH pump is switched off and the DHW pump is switched on above the pump switch-on threshold. When the threshold temperature is exceeded, the DHW pump operates all the time until the boiler temperature drops

below the pump start-up threshold (by DHW hysteresis value). In the summer function, only the set temperature of the DHW vessel is set, which is also the set temperature of the boiler.

## 5.7 TIME SETTINGS

Time settings are used to set the current time.

## 5.8 DATE SETTINGS

Used to set the current date.

## 5.9 WEEKLY SCHEDULE CONTROL

The function allows you to program deviations of the boiler set temperature (submenu *Boiler week*) on individual days of the week at specific times.



### CAUTION

For the correct operation of this function it is necessary to set the current date and time.

To enable weekly control, select and check Mode 1 or Mode 2. Detailed settings of these modes can be found in the following sections of the submenu: Set Mode 1 and Set Mode 2.

When one of the modes is activated, a digit with the value of the currently set deviation will be displayed on the main page of the controller, below the set temperature (alternatively with the inscription *Set*) (at the same time informing about the active weekly control).

### Changing weekly control settings:

In the EU-28N PID controller, you can program the weekly control in two different modes:

MODE 1 - in this mode it is possible to program deviations of the set temperature for each day of the week separately.

MODE 2 – in this mode, the user programs temperature deviations for weekdays (Monday – Friday) and for the weekend (Saturday – Sunday).

#### Mode 1 programming:

To program mode 1, the user starts the *Set mode 1* parameter – a screen with individual days of the week appears on the display.

After selecting the day of the week the settings of which we wish to change, the edit screen appears: the current deviation setting is displayed in the upper line and the lower displays the time interval. Use the **UP/DOWN** buttons to navigate to the next time frame. To edit a setting, click **OPTIONS**, and then click **Change**.

To copy the settings for the subsequent hours, set the parameter, and then select the *Copy* function.

#### Example

Monday

settings: 3<sup>00</sup>, temp -10°C (weekly control setting: -10°C)

settings: 4<sup>00</sup>, temp -10°C (weekly control setting: -10°C)

settings: 5<sup>00</sup>, temp -10°C (weekly control setting: -10°C)

In this case, if the setpoint temperature on the boiler is 60°C, then from 3<sup>00</sup> hours on Monday to 6<sup>00</sup> hours the setpoint temperature on the boiler will drop by 10°C, i.e. it will be 50°C.

### Mode 2 programming:

To program mode 2, the user starts the *Set mode 2* parameter – the display shows a screen with two intervals for days of the week: Monday – Friday and Saturday - Sunday. After selecting the interval that we want to change, we go to their editing – a procedure such as in the mode 1 programming.

### **Example**

Monday-Friday

settings: 3<sup>00</sup>, temp -10°C (weekly control setting: -10°C)

settings: 4<sup>00</sup>, temp -10°C (weekly control setting: -10°C)

settings: 5<sup>00</sup>, temp -10°C (weekly control setting: -10°C)

Saturday-Sunday

settings: 16<sup>00</sup>, temp 5°C (weekly control setting: +5°C)

settings: 17<sup>00</sup>, temp 5°C (weekly control setting: +5°C)

settings: 18<sup>00</sup>, temp 5°C (weekly control setting: +5°C)

In this case, if the setpoint temperature on the boiler is 60°C, then from 3<sup>00</sup> hours to 6<sup>00</sup> hours from Monday to Friday the setpoint temperature on the boiler will drop by 10°C, i.e. it will be 50°C. On the other hand, during the weekend (Saturday, Sunday) from 16<sup>00</sup> to 19<sup>00</sup>, the set temperature on the boiler will increase by 5°C, i.e. it will be 65°C.

## 5.10 INSTALLER MENU

*The installer menu* is intended for use by people with appropriate qualifications and is mainly used for setting additional controller functions. Detailed parameters found in the *Installer Menu* are described later in the manual.

## 5.11 SERVICE MENU

To enter the service functions of the EU-28N PID controller, enter the four-digit code. This code is owned by Tech.

## 5.12 LANGUAGE SELECTION

Function that enables the user to select their preferred language version. This change is also possible using the flag button located on the controller.

## 5.13 FACTORY DEFAULTS

The controller is pre-configured for operation. However, it needs to be adapted to the needs of the user. It is possible to return to the factory settings at any time. By enabling the factory settings options, all the boiler's own settings (stored in the user menu) are deleted and the manufacturer's settings are restored. From now on, you can set your own boiler parameters again.

## 5.14 SOFTWARE INFO

The option allows you to view the controller software version number – this information is necessary when contacting the service technician.

The installer menu is intended for use by suitably qualified persons and is mainly used for setting additional controller functions such as boiler parameters, additional valves, additional pumps, etc., and for adjusting the basic functions in detail.

# INSTALLER MENU

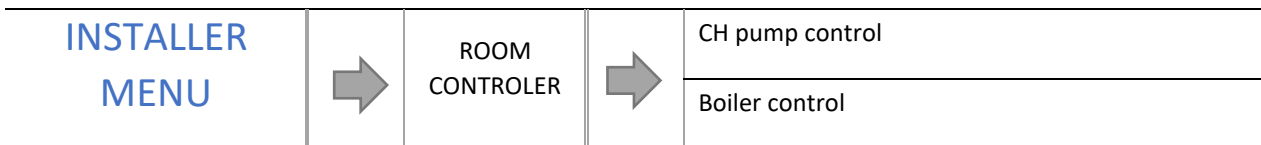
Reduction by the room controller
Room controller
Operating algorithm
Pump switch-on temperature
DHW hysteresis
Disinfection of the boiler
Anti-stop for pumps
Antifreeze temperature
Boiler hysteresis*
Screen setup
Display contrast
Factory defaults

\* Parameter visible when working with the *Standard* algorithm enabled

## 6.1 REDUCTION BY THE ROOM CONTROLLER

In this function, set the value by which the controller will lower the set CH temperature when the temperature set for the room controller is reached (room heated).

## 6.2 ROOM CONTROLLER



This function allows to indicate the type of controller connected to the EU-28N PID controller, and to program the operation of the room controller.

### 6.2.1 CH PUMP CONTROL

The function enables activation of the control of the room regulator over the operation of the CH pump. After activation of this function, the CH pump will be switched off when the room regulator reports reaching the heating temperature of the room.

- **Standard regulator** – check this option if the valve is to be controlled by a two-state room regulator.

## 6.2.2 BOILER CONTROL

The room controller will reduce the value of the boiler setpoint by the parameter *Reduction by room controller* in the *Installer menu*.

- **Standard regulator** – check this option if the valve is to be controlled by a two-state room regulator.

## 6.3 OPERATING ALGORITHM

### 6.3.1 STANDARD

When the *Standard* adjustment function is switched on, the controller will work like a regular two-state controller, and an additional option – *Operation settings* – will appear in the main menu.

A detailed description of the parameters of the *Operating Settings* can be found in item 5.4

The fan operation depends on the user settings and the current boiler temperature. If the current temperature is much lower than the set temperature (e.g. after the ignition is completed), the fan operates according to user-defined settings.

### 6.3.2 PID

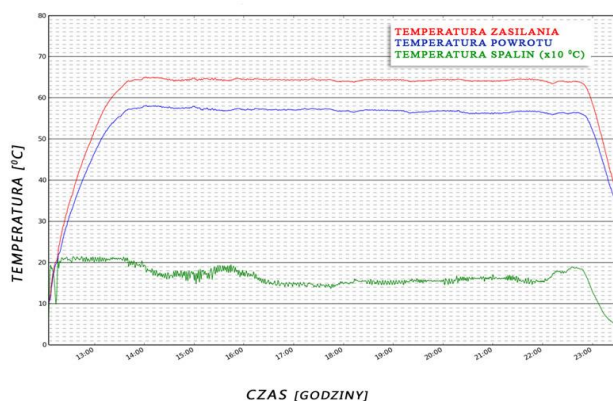
The EU-28N PID controller is a continuous output controller applying a **PID control algorithm**. In this type of controller, the blowing power is calculated on the basis of measuring the boiler temperature and the flue gas temperature measured at the boiler exhaust. The fan operation is carried out continuously over time, and the blowing power directly depends on the measured boiler temperature, flue gas temperature and the difference between these parameters and their set points. Stable maintenance of the set temperature without unnecessary overregulation and oscillation are the advantages of the zPID controller.

The zPID control is additionally supported by readings from the air flow sensor mounted on the fan. The controller uses the data from the flow sensor for additional correction of its operation.

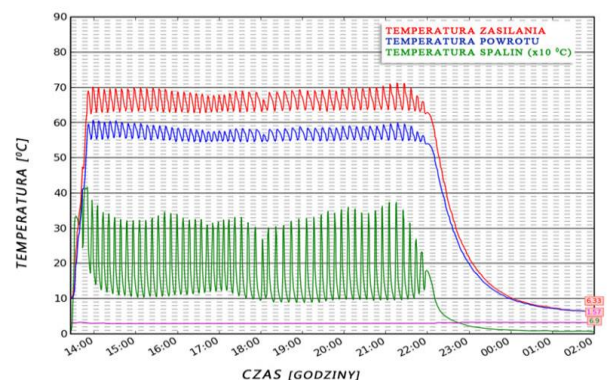
Using this type of controller with an exhaust gas sensor, fuel savings can range from a few to a dozen or so percent; the outlet water temperature is very stable, which in turn affects the longer service life of the heat exchanger (boiler). Exhaust gas temperature control at the boiler exhausts lowers the emissions of dusts and gases harmful to the environment. Thermal energy from exhaust gases is not wasted, i.e. released into the chimney, but used for heating.

Below we present the results of tests carried out with

the use of the **Tech controller with PID control:**



and the same controller **without PID control:**



Any comments regarding the program should be reported to the boiler manufacturer. Each controller must be set individually, depending on the type of fuel used in the boiler, and also the type of boiler. TECH is not responsible for incorrect controller settings.

## 6.4 PUMP SWITCH-ON TEMPERATURE

This option is used to set the switch-on temperature of the pumps (this is the temperature measured on the boiler). Below the set temperature, the pumps do not operate, and above this temperature, the pumps are switched on, but operate depending on the mode of operation.

## 6.5 DHW HYSTERESIS

This option is used to set the boiler set point hysteresis. This is the difference between the set temperature (i.e. the desired temperature on the boiler) and the return to operation temperature (for example: when the set temperature is 55°C and hysteresis is 5°C, then once the set temperature is reached, i.e. 55°C, the DHW pump switches off. The DHW pump will be switched on again after the temperature has dropped to 50°C).

### Example:

<i>DHW set temperature</i>	55°C
<i>Hysteresis</i>	5°C
<i>Pump shutdown</i>	55°C
<i>Switching the pump on again</i>	50°C

*When the preset temperature is 55°C and the hysteresis is 5°C, the device will be switched off when the temperature reaches 55°C, while the return to the operating cycle will occur when the temperature drops to 50°C).*

## 6.6 DISINFECTION OF THE BOILER

Thermal disinfection consists in raising the temperature to the required disinfection temperature of min. 60°C in the entire DHW circuit. The new regulations impose the obligation to adapt the DHW installation to periodic thermal disinfection carried out at a water temperature not lower than 60°C (the recommended temperature is 70°). Wires, fittings and technological system of hot water preparation must meet this condition.

Disinfection of DHW is aimed at eliminating Legionella pneumophila bacteria, which cause a decrease in the cellular immunity of the body. This bacterium often multiplies in vessels with standing hot water (optimum temperature 35°C), which often takes place, for example, in boilers.

When this function is activated (only possible in Boiler Priority mode), the boiler heats up to 70°C (factory setting) and maintains this temperature for 10 minutes (factory setting) and then returns to normal operation mode.

From the moment of disinfection, the temperature of 70°C must be reached for not more than 60 minutes (factory setting), otherwise this function will automatically deactivate.

## 6.7 ANTI-STOP FOR PUMPS

After enabling this option, the pump will switch on depending on the user's settings every 1-20 days for a set time (min. 30, max. 180 seconds). This prevents water from fouling the installation outside the heating season.

## 6.8 ANTIFREEZE TEMPERATURE

This option allows you to enable the antifreeze function, which is designed to protect the installation against freezing. After the temperature on the boiler or tank sensor drops below the specified value, the pump is switched on permanently. Its shutdown will only occur once the temperature in the circuit rises.

## 6.9 BOILER HYSTERESIS\*

When the zPID function is deactivated, the *Boiler Hysteresis* function will appear in the *Installer Menu*.

This option is used to set the hysteresis of the set CH temperature. This is the difference between the temperature of entry into the temperature maintaining cycle and the temperature of return to the operating cycle (e.g. when the set temperature is 60°C and the hysteresis is 3°C, the transition to the maintaining cycle will occur after the temperature is reached 60°C, while the return to the operating cycle will occur after the temperature drops to 57°C).

## 6.10 SCREEN SETUP

The option allows the user to set screen parameters such as: screen brightness, screen fading and fading time according to their needs and preferences.

## 6.11 DISPLAY CONTRAST

This function allows you to change the contrast settings of the display.

## 6.12 FACTORY DEFAULTS

The controller is delivered pre-configured for operation. However, it needs to be adapted to the needs of the user. It is possible to return to the factory settings at any time. Enabling the factory defaults option will delete all user settings of the boiler (as stored in the user menu), replacing them with default values set by the boiler manufacturer. From now on, you can set your own boiler parameters again.

# 7 PROTECTIONS

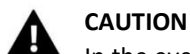
In order to ensure maximally safe and seamless operation, the controller has a number of safeguards. In the event of an alarm, an acoustic signal is activated and a message will appear on the display.

## 7.1 TEMPERATURE ALERT

This protection is activated only in the **operating** mode (if the boiler temperature is lower than the *set temperature*). If the boiler temperature failed to rise within the time specified by the user, this alert is triggered, the blower is switched off and an acoustic signal is activated. The following message is displayed on the display: **“Temperature is not rising”**. Pressing the **OPTIONS** button will disable this alert. The controller will return to the last set operating mode.

## 7.2 THERMAL PROTECTION

It is an additional mini bimetallic sensor (located next to the boiler temperature sensor – or on the supply pipe as close as possible to the boiler), disconnecting the fan in case of exceeding the alarm temperature –about 85±90°C. Its operation prevents boiling of water in the installation, in case of overheating of the boiler or damage to the controller. When this protection is activated, once the temperature drops to a safe value, the sensor will unlock itself. If this sensor is damaged or overheated, the fan will be disconnected.



### CAUTION

In the event of damage to the thermal switch, the fan will not work both in manual operation and in automatic operation mode.



### 7.3 AUTOMATIC SENSOR CONTROL

If the CH, DHW or screw temperature sensor or fuel reservoir is damaged, an audible alarm is activated, additionally signalling the relevant fault on the display, e.g.: "**CH sensor damaged**". **The blower is switched off. The pump operates independently of the current temperature.**

### 7.4 BOILER BOILING WATER PROTECTION

This protection applies only to the boiler priority operating mode, in case the tank is underheated. Namely, when the boiler temperature is set, e.g.: 55°C, and the actual temperature on the boiler rises to 62°C (this is the so-called priority temperature), then the controller turns off the fan. If the temperature on the boiler rises to 80°C, the CH pump will switch on. When the temperature continues to rise, an alarm will sound at 85°C. Most often, such a state can occur when the boiler is damaged, the sensor is incorrectly fixed, or the pump is damaged. However, once the temperature decreases, at the 60°C threshold, the controller will turn on the blower and will operate in the operating mode until the temperature reaches 62°C.

### 7.5 TEMPERATURE PROTECTION

The controller has additional mechanical protection against dangerous temperature increase. If the alarm temperature (80°C) is exceeded, the fan is disconnected. When the temperature of 85°C is exceeded, an alarm is activated and a message appears on the display reading: "**Temperature too high**". Once the temperature drops to a safe value, after pressing the **OPTIONS** button, the alarm will be turned off and the controller will return to the last set operating mode.

### 7.6 FUSE

The controller has a 3.15A WT glass tube fuse insert, which protects the network.



**CAUTION:**

Using a higher rating fuse may cause damage to the controller.

## 8 TECHNICAL SPECIFICATIONS

In the **EU-28N PID** Controller, one should check the technical condition of the wiring before and during the heating season. Also check the mounting of the controller, clean it from dust and soiling, and measure the grounding of the motors (CH pump, DHW pump, blower).

No.	Specification	
1	Power supply	230V ±10% /50Hz
2	Max. power consumption	4.5W
3	Operating temperature	5÷50°C
4	Max. pump output load	0.5A
5	Max fan output load	0.6A
6	Temperature measurement accuracy	±1°C
7	KTY sensor temp resistance	-30÷99°C
8	Exhaust gas sensor temperature resistance	-30÷480°C
9	Fuse	2x 3.15 A



## EU DECLARATION OF CONFORMITY

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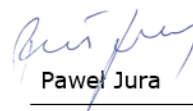
Hereby, we declare under our sole responsibility that **EU-28N PID** manufactured by TECH STEROWNIKI, head-quartered in Wieprz Biała Droga 31, 34-122 Wieprz, is compliant with Directive **2014/35/EU** of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of Member States relating to **the making available on the market of electrical equipment designed for use within certain voltage limits** (EU OJ L 96, of 29.03.2014, p. 357), Directive **2014/30/EU** of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of Member States relating to **electromagnetic compatibility** (EU OJ L 96 of 29.03.2014, p.79), Directive **2009/125/EC** establishing a framework for the setting of ecodesign requirements for energy-related products as well as the regulation by the MINISTRY OF ENTREPRENEURSHIP AND TECHNOLOGY of 24 June 2019 amending the regulation concerning the essential requirements as regards the restriction of the use of certain hazardous substances in electrical and electronic equipment, implementing provisions of Directive (EU) 2017/2102 of the European Parliament and of the Council of 15 November 2017 amending Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (OJ L 305, 21.11.2017, p. 8).

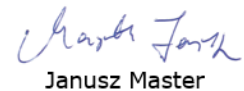
For compliance assessment, harmonized standards were used:

**PN-EN IEC 60730-2-9:2019-06,**

**PN-EN 60730-1:2016-10,**

**EN IEC 63000:2018 RoHS.**

  
Paweł Jura

  
Janusz Master

Prezesa firmy

**Wieprz, 03.02.2023**



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