

# TECH TECH CONTROLLERS

USER MANUAL

EU-28 SIGMA

EN



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## EU DECLARATION OF CONFORMITY

Hereby, we declare under our sole responsibility that **EU-28 SIGMA** 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.**

Paweł Jura

Janusz Master

Prezesa firmy

Wieprz, 29.03.2022

## Safety

Before using the device for the first time the user should read the following regulations carefully. Not obeying the rules included in this manual may lead to personal injuries or controller damage. The user's manual should be stored in a safe place for further reference. In order to avoid accidents and errors it should be ensured that every person using the device has familiarized themselves with the principle of operation as well as security functions of the controller. If the device is to be sold or put in a different place, make sure that the user's manual is there with the device so that any potential user has access to essential information about the device.

The manufacturer does not accept responsibility for any injuries or damage resulting from negligence; therefore, users are obliged to take the necessary safety measures listed in this manual to protect their lives and property.



### WARNING

- High voltage! Make sure the regulator is disconnected from the mains before performing any activities involving the power supply (plugging cables, installing the device etc.)
- The device should be installed by a qualified electrician.
- Before starting the controller, the user should measure earthing resistance of the electric motors as well as the insulation resistance of the cables.
- The regulator should not be operated by children.



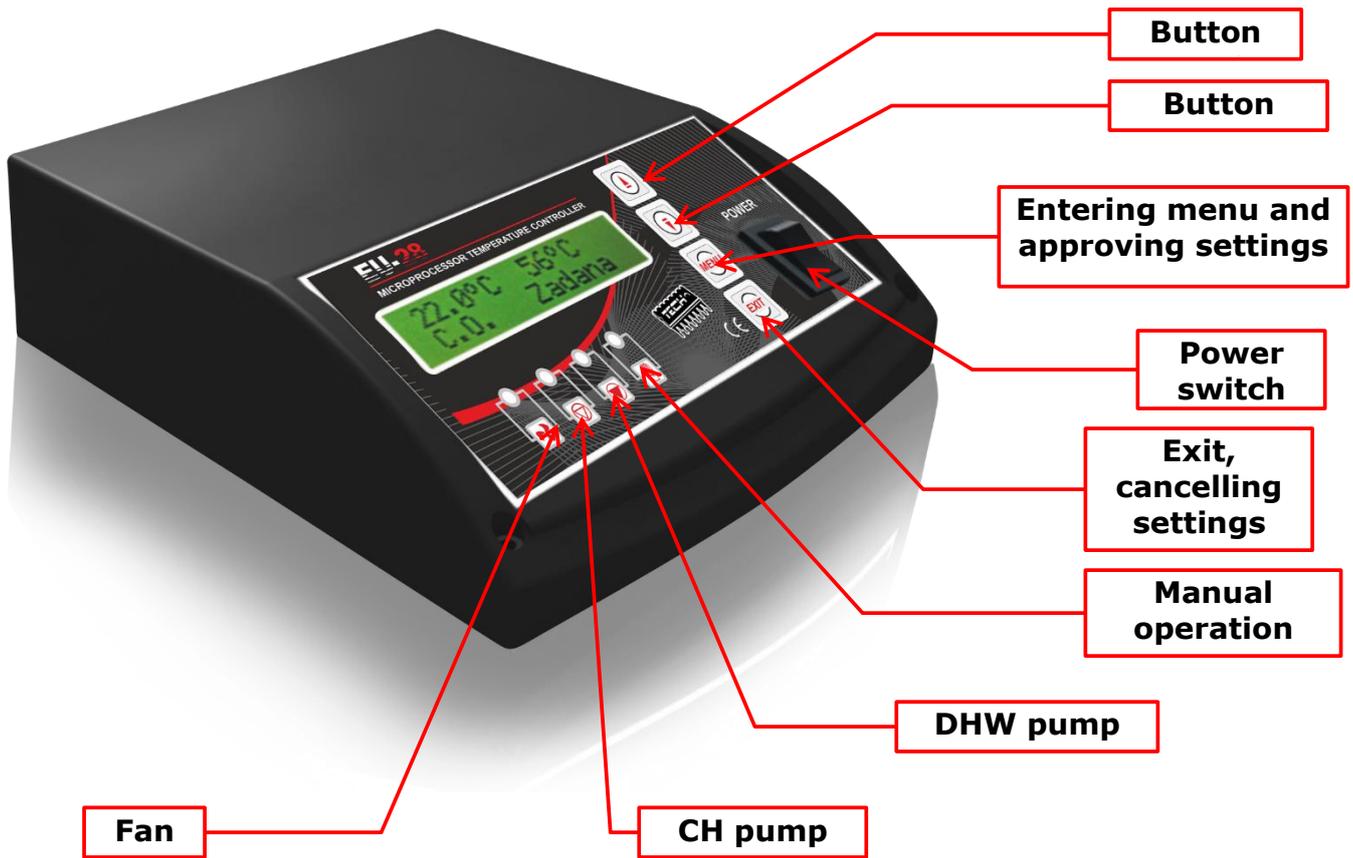
### WARNING

- The device may be damaged if struck by a lightning. Make sure the plug is disconnected from the power supply during storm.
- Any use other than specified by the manufacturer is forbidden.
- Before and during the heating season, the controller should be checked for condition of its cables. The user should also check if the controller is properly mounted and clean it if dusty or dirty.

Changes in the merchandise described in the manual may have been introduced subsequent to its completion on 29.03.2022. The manufacturer retains the right to introduce changes to the structure. The illustrations may include additional equipment. Print technology may result in differences in colours shown.



We are committed to protecting the environment. Manufacturing electronic devices imposes an obligation of providing for environmentally safe disposal of used electronic components and devices. Hence, we have been entered into a register kept by the Inspection For Environmental Protection. The crossed-out bin symbol on a product means that the product may not be disposed of to household waste containers. Recycling of wastes helps to protect the environment. The user is obliged to transfer their used equipment to a collection point where all electric and electronic components will be recycled.



## I. Description

EU-28 SIGMA regulator is intended for CH boilers. It controls the CH pump, domestic hot water pump (DHW) and the blow (fan).

The left part of the display shows the temperature of the boiler. In the middle the user may see the flue gas temperature. The right part shows the fan power. Press EXIT in order to return to the main menu.

The controller is equipped with a range of safeguards to ensure failure-free boiler operation:

**SIGMA** – this function controls the fan operation in the CH boiler operation mode. For example, when the set temperature is 60°C, the CH boiler temperature is 45°C and it is increasing, the fan slows down every 1°C. After the set temperature has been reached, the fan stops and operates according to the preset operation and pause cycle of the blow-by (in sustain mode).

**Anti-stop** – the controller has an anti-stop function which prevents too long periods of the pump operation standstill. Outside the heating season the pumps are switched on once every 10 days.

**Anti-freeze** – this function activates all the pumps if the temperature of the circulating water drops below the set value (6°C), in order to prevent the water in the installation from freezing.

### I.a) Basic terms

**Fire-up** – The cycle begins when you activate the *fire up* function in the controller menu and it remains active until the CH boiler temperature reaches 40°C (the default *fire-up threshold*), on condition that the temperature does not drop below this value for 2 minutes (the default *fire-up time*). If these conditions are met, the regulator switches to the *operation mode* and the *manual operation symbol* on the casing will go off. If the controller fails to reach the parameters required for entering the *operation mode* within 30 minutes from activation of the

*fire-up* function, the following message appears on the display: **"Fire-up failed"**. In such a case, the fire-up cycle needs to be restarted.

**Operation** – After the *fire-up cycle* is completed, the regulator enters the *operation mode*. It is the primary mode of the controller operation in which the fan works automatically, oscillating around the temperature set by the user. Instead of the *fire-up* function, the user's menu presents *fan* option. The fan may be disabled if needed (e.g. when adding fuel). If the temperature rises unexpectedly by more than 5°C above the set value, the so-called *supervision mode* is activated.

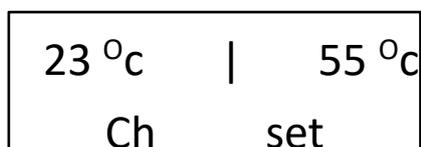
**Damping** – if the CH boiler temperature drops 2°C below the *damping threshold* and does not rise above this value within 60 minutes (preset *damping time*), the regulator enters *damping mode*. After this time the fan is disabled and the display shows the following message: **"Damping"**

In the case of voltage failure, the thermoregulator stops working. After the power supply has been reestablished, the operation mode is restored according to the previously set parameters (owing to the built-in memory). The thermoregulator parameters remain stored even on voltage failure.

## II. Functions of the regulator

This section includes the description of the regulator functions, and provides information on how to adjust the settings and navigate in the menu structure.

### II. a) Main page



During standard regulator operation, the LCD display shows the main page with the following information:

**CH boiler temperature** (to the left)

**Set temperature** (to the right)

The *set temperature* may be easily adjusted using **PLUS** and **MINUS** buttons. By pressing **OPTIONS** button, the user enters the first level menu. The display shows the first two lines of the menu. Each menu may be navigated using **PLUS** and **MINUS** buttons. Pressing **OPTIONS** button moves the user to a further submenu or activates the selected option. **EXIT** button moves the user back to the main menu.

### II. b) Fire-up

This function enables easy fire-up of the CH boiler. After the fire is initiated by the user, an automatic fire-up cycle is activated. Next, the CH boiler smoothly enters the operation mode, owing to optimal parameters. If the CH boiler reaches the temperature of *the damping threshold*, the *Fan ON/OFF* function appears instead of *the fire-up* function. It enables the user to switch off the fan at any time (e.g. when adding fuel)

If the CH boiler fails to reach the temperature of 40°C (preset damping threshold) within 30 minutes when in the fire-up mode, the display shows the following alarm message:



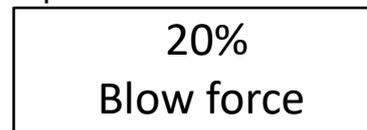
In order to restore the CH boiler operation, the controller should be set to **0** position and then again to **1** position. After the controller logs in, the fire-up function should be activated again and the controller will renew the fire-up process.

## II. c) Manual operation



For the user's comfort, the regulator offers **Manual mode** function. In this mode, each element of the system – the fan, the CH pump, the DHW pump and the alarm – may be switched on and off independently of the others. Additionally, **Blow force** function has been added in this mode.

This function enables the user to adjust the fan power in **Manual mode**



- Pressing **OPTIONS** button enables the fan. The fan remains active until **OPTIONS** button is pressed again.
  - Pressing **MENU** button enables / disables the fan
  - Pressing **MENU** button enables / disables the CH pump
  - Pressing **MENU** button enables / disables the DHW pump (of the water boiler)
- Pressing **MENU** button enables / disables the alarm.

## II. d) Sigma

### II.1.7 Degrees before the set temperature

In this function the user may choose when the fan should start slowing down. (from 1°C to 20°C before the set temperature is reached).

### II.1.8 The fan minimum

This function allows the user to set the lowest speed of the fan ( from 1% to 100%) which it will slow down to after the set temperature has been reached.

### II.1.9 The fan maximum

This function allows the user to set the highest speed of the fan ( from 1% to 100%) which will be reached when SIGMA function is activated.

## II. e) Operation in sustain mode

The function is used to set the operation time of the fan in the sustain mode.

## II. f) Pause in sustain mode

This function is used to set the pause time of the blow in the sustain mode.

The last two functions are used to regulate the CH boiler operation in the **sustain mode**. It prevents the CH boiler from damping when its temperature remains above *the set value*.

**ATTENTION:** Incorrect setting of these functions may lead to constant increase in temperature! The user should especially ensure that the pause time in the sustain mode is not too short and

the operation time in the sustain mode is not too long.

## II. g) Blow-by power

This function is used to set the fan speed during the blow-by. The setting range is from 1% to 100% (it may be regarded as fan gears). The higher the gear is, the faster the fan works. 1% gear is the minimum fan speed whereas 100% is the maximum fan speed.

## II. h) CH boiler hysteresis

This option can be used to set the hysteresis of **the set CH temperature**. It is the difference between the temperature of entering the sustain mode and the temperature of restoring the operation mode (e.g. when value of **the set temperature** is 60°C and the hysteresis is 2°C, entering the sustain mode will take place at 60°C, whereas the operation mode will be restored at 58°C. The setting range for the hysteresis is from 1°C to 20°C.

## II. i) DHW Hysteresis

This option can be used to set the hysteresis of the water boiler set temperature (DHW). It is the difference between the set temperature (which is the preset water boiler temperature at which the DHW pump is disabled) and the temperature at which the DHW pump operation is restored. For example, if the DHW set temperature is 55°C, and the hysteresis is 5°C, after the set temperature (55°C) is reached, the DHW pump will switch off. The DHW pump operation will be restored when the temperature drops to 50°C.

## II. j) CH pump activation

This option is used to set the temperature of CH pump activation (the temperature is measured at the CH boiler). When the temperature (e.g. 40°C) is exceeded, the pump is activated and works according to the selected mode of operation. The pump is disabled when the CH boiler temperature drops below the activation temperature minus 3°C. In the example given, the pump switches off at the temperature of 37°C.

## II. k) DHW pump activation

This option is used to set the temperature of DHW pump activation (the temperature is measured at the CH boiler). When the temperature (e.g. 40°C) is exceeded, the pump is activated and works according to the selected mode of operation. The pump is disabled when the CH boiler temperature drops below the activation temperature minus 3°C. In the example given, the pump switches off at the temperature of 37°C.

## II. l) Operation modes

This function allows the user to choose on of the following modes of CH boiler operation:

### II.l.1 House heating

If this option is selected, the regulator switches to the house heating mode. The CH pump is activated when the pump activation temperature is exceeded. Below this temperature (minus fixed hysteresis value of 20C), the pump is disabled.

### II.l.2 DHW priority

In this mode, the DHW pump is activated and works until the set temperature is reached. Then, it is disabled and the CH circulation pump is activated (the pumps work alternately). CH pump operates until the water boiler temperature drops below the set value minus hysteresis. Then, the CH pump is disabled, and the DHW pump is activated. In this mode, the fan operation is

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limited to the temperature of 62°C on the CH boiler in order to prevent the CH boiler overheating.

The CH pump operates until the water boiler temperature drops below the set value (3°C). Then, the CH pump is disabled and the DHW pump is activated.

DHW priority function involves heating domestic water prior to heating the water in radiators.

**CAUTION:** Return valves should be installed on the circuits of the CH and DHW pumps. The valve on DHW pump prevents hot water from being sucked out of the water boiler. The valve on the CH pump circuit prevents the hot water heating the boiler to pass to the house heating installation.

### II.1.3 Parallel pumps

In this mode, operation of the pumps begins simultaneously above the set temperature of pump activation (see: *Pump activation temperature*). The CH pump works continuously whereas the DHW pump is disabled when the set temperature of the water boiler is reached. The DHW pump operation is restored when the set temperature drops by the value of DHW hysteresis.

### II.1.4 Summer mode

After this function is activated, only DHW pump remains active and its task is to heat the water boiler. The pump is activated above the switch-on threshold (see: *pump activation temperature*) and works until the set temperature is reached. The pump operation is restored when the temperature drops below the set value minus hysteresis. In summer mode, the user chooses only the set temperature of the CH boiler which heats the water in the water boiler (the set temperature of the CH boiler is also the set temperature of the water boiler).

### II.m) Room temperature regulator

53 °c	55 °c	Operation mode	Switch on *
Ch	set	Room regulator	off

The room regulator is connected to the controller using the twisted-pair cable (the input labelled: ROOM REGULATOR) After the regulator has been properly connected to the controller, it should be activated in the controller menu.

The room regulator operates by opening the contact of the wires when the set room temperature has been reached. When the need for reheating the room is signalled to the CH boiler controller, it automatically enters the sustain mode, regardless of the CH boiler set temperature.

**Attention:** If the set temperature of the controller installed on the CH boiler is too low, the regulator may not reach the set room temperature.

After the Room regulator option is activated in the controller menu, the upper part of the main screen shows the letter <p>. If the letter is flashing, the room is insufficiently heated (the set room temperature has not been reached). If <p> is not flashing, the set room temperature has been reached (the room is sufficiently heated)

**CAUTION:** No external voltage may be connected to the room regulator input

### II. n) Language

This option enables the user to choose the language version of the controller.

### II. o) Factory settings

The regulator is pre-configured for operation. However, the settings should be customized to

the user's needs. Return to factory settings is possible at any time. When the factory settings option is activated, all customized settings of the controller are lost and replaced with the manufacturer's settings. Then, the boiler parameters may be customized anew.

### III. Safeguards

In order to ensure safe and failure-free operation, the regulator has been equipped with a range of safeguards. In the case of alarm, a sound signal is activated and the display shows an a suitable message. To restore the controller operation, press MENU button. In the case of the following alarm : "CH temperature too high", the user must wait for a while until the temperature drops below the alarm value.

#### III. a) Thermal protection

The controller is equipped with a bimetallic mini-sensor (placed next to CH boiler sensor or on the supply pipe), which automatically disconnects the fan from the power supply when the alarm temperature of about 85°C is exceeded. It prevents the water in the installation from boiling in the case of boiler overheating or controller damage. This type of thermal protection restores the initial automatic mode. In the case when this sensor is damaged, the fan does not operate either in manual mode or in automatic mode.

#### III. b) Automatic sensor check

If there is no CH temperature sensor or if it is broken, an alarm is activated and the display shows the information about the fault, for example:

**alarm**  
**sensor damage**

The fan is disabled. CH pump and DHW pump are enabled regardless of the current temperature.  button should be pressed (it applies to DHW sensor – then the alarm is deactivated and single-pump operation mode is restored) If the CH sensor is damaged, the alarm is active until a new sensor is installed.

#### III. c) Temperature protection

The regulator is equipped with additional protection in case of bimetallic sensor damage. After the temperature of 85°C is exceeded, an alarm is activated and the following message is shown on the display:

Current temperature is read from the electronic sensor and it is processed by the regulator. In the case when the alarm temperature is exceeded, the fan is disconnected and both pumps work simultaneously in order to spread hot water through the installation.

**alarm**  
**temp too high**

#### III. d) CH water anti-boil protection

This protection applies only to the boiler priority mode, when the water boiler temperature is too low. Then the water boiler temperature is set at 55°C, and the CH boiler temperature increases to 62°C (so-called *priority temperature*), the controller switches off the fan. If the CH boiler temperature increases to 80°C, the CH pump is enabled. If the temperature is still increasing, an alarm is activated when the value of 85°C is reached. It may happen if the water boiler is damaged, the sensor is installed incorrectly or the pump is damaged. When the

temperature starts decreasing, at the threshold of 60°C the controller activates the fan and remains in operation mode until the temperature of 62°C is reached.

### **III. e) Fuse**

The regulator is equipped with two 3,15A fuses as a network protection.

**Caution:** A higher amperage fuse should not be used as it may damage the controller.

### **IV. Maintenance**

Before and during the heating season, the **EU-28 SIGMA** controller should be checked for condition of its cables. You should also check if the controller is properly mounted and clean it if dusty or dirty. Moreover, the earthing parameters of the motors ( of the CH pump, DHW pump and the fan) should be measured.

Power supply	230V ±10% /50Hz
Maximum power consumption	3,5W
Ambient temperature	5÷50
Pump max. output load	0,5A
Fan max. output load	0,6A
Temperature measurement accuracy	1°C
Sensor thermal resistance	-30÷99°C
Fuse	2x 3,15A

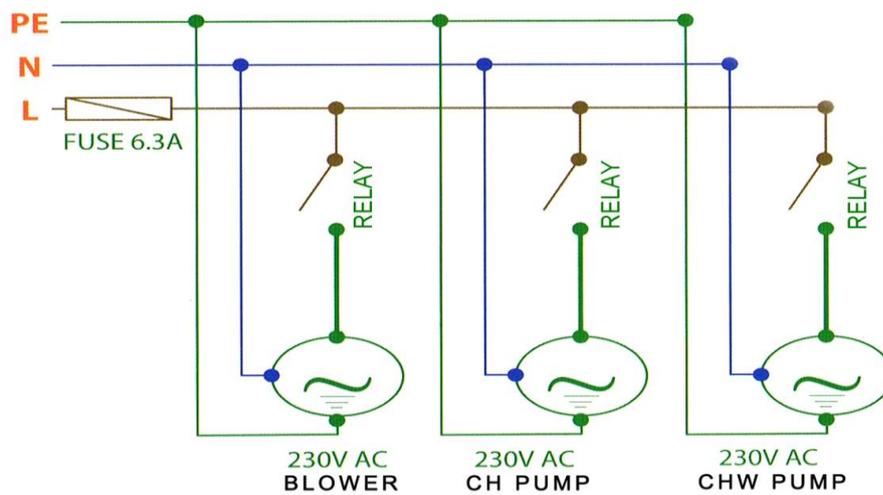
### **V. Installation**

**Caution:** The device should be installed by a qualified person. During installation the device **mustn't** be powered! (make sure the plug is disconnected from the power supply!)

**Caution: Incorrect connection of the wires may damage the regulator!**

## V. a) Controller wiring diagram

Particular attention should be paid when connecting the controller cables to the correct connection of the earthing wires.



PE - GROUNDING (YELLOW-GREEN)  
N - NEUTRAL (BLUE)  
L - PHASE (BROWN)

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