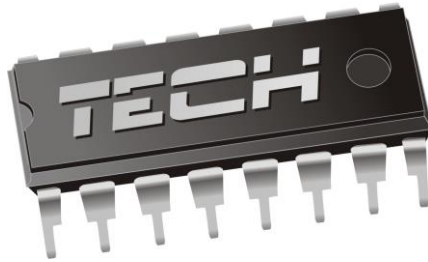# TECH Controllers

USER MANUAL

EL480ZPID

EN

Declaration of Conformity No. 60/2010

Hereby, we declare under sole responsibility that the **ST-480** 230V 50Hz thermoregulator manufactured by TECH, headquartered in Wieprz 1047A, 34-122 Wieprz, is compliant with the Regulation by the Ministry of Economy. (Journal of Laws Dz.U. 155 Item 1089) of July 21, 2007 implementing provisions of the Low Voltage Directive **(LVD) 2006/95/EC** of January 16, 2007.

The **ST-480** controller has been tested for electromagnetic compatibility (EMC) with optimal loads applied.

For compliance assessment, harmonized standards were used:

PN-EN 60730-2-9:2006.

PAWEŁ JURA   JANUSZ MASTER

WŁAŚCICIELE TECH SP.J.

CAUTION!

THE DEVICE MAY BE DAMAGED IF STRUCK BY A LIGHTNING. MAKE SURE IT IS UNPLUGGED DURING STORMS

High voltage!
Make sure the regulator is disconnected
from the mains before working
on the power supply
(cable connections, device installation, etc.)!
All connection works must only be carried
out by qualified electricians.
Before activating the controller,
measure the motor resetting efficiency
and inspect wire insulation.

I. Description

EL–480 temperature controller is intended for use with central heating boilers equipped with feeding screw. It controls water circulation pump, domestic hot water pump, floor heating pump, circulation pump, blower (fan) and fuel feeder. It incorporates a valve control module and can operate with two mixing valves (via additional ST-61 modules), conventional (two-state) room controller or RS-port communication, GSM module or Ethernet module.

The advantage of the controller is the ease of use. The user can change all parameters using the **pulser knob**. Another advantage is the large and easy-to-read display where the current boiler operation parameters are shown.

Exemplary view of the main screen:
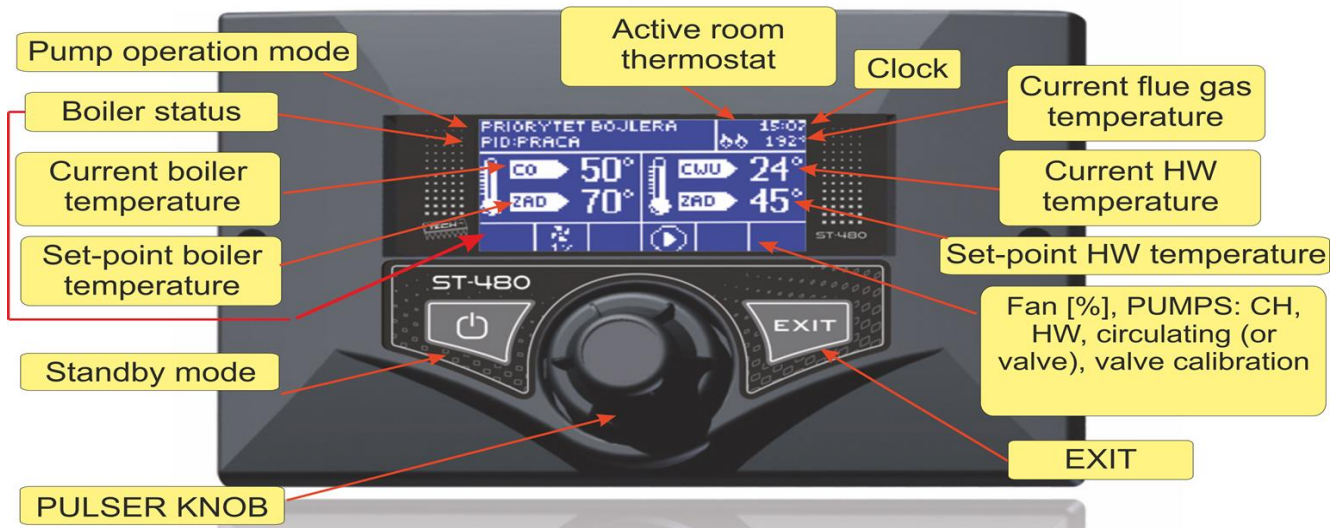
Any remarks regarding the programme should be reported to the boiler manufacturer. Each driver should be adjusted according to individual needs depending on the fuel type used and the boiler type. TECH shall not be held liable for wrong adjustment of the controller.

The EL480zPID controller is a unit with a continuous output signal using a modified **PID control algorithm**. In this type of controller the blowing power is calculated by measuring the boiler temperature and the flue gas temperature as measured at the outlet of the boiler. The fan is run continuously and the blowing power depends directly on the measured temperature of the boiler, the flue gas temperature and the difference between these parameters and their set-points. The advantages of a modified PID controller include the ability to maintain a stable set-point temperature without any unnecessary overshoot or oscillations.

When using this type of controller equipped with a flue gas outlet sensor fuel savings can be achieved from a few percent up to around 15 percent with the output water temperature kept at a very stable label, resulting in longer life of the exchanger (boiler). As the flue gas temperature at the boiler outlet is controlled this results in low emissions of dust and gases that are harmful to the environment. The thermal energy of the flue gas is not wasted and released into the chimney, but is instead used for heating.

Below we present the results of tests conducted with the use of the   Tech controller with PID control:
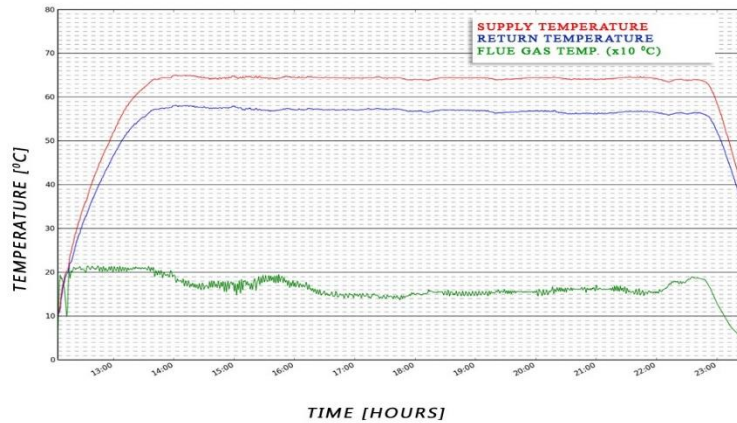
and the same controller without PID control:
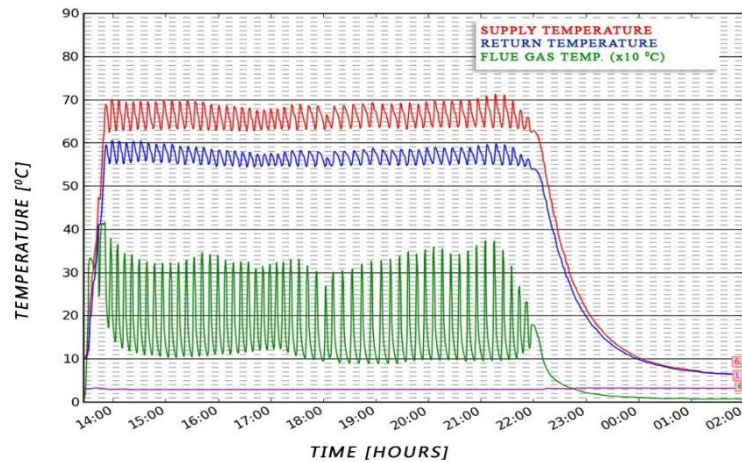
Basic terms

Operation– once activated the controllers enters the *operation mode* and a *"WORKING"* message appears on the display. It is the basic state of the controller where the blower is operating continuously and the feeder operation time is set by the user (both operation time and pause time can be set).

Sustain mode– the mode is entered automatically if the temperature is higher than or equal to the preset temperature. In such a case the controller feeds the fuel slowly to reduce the temperature smoothly and a "SUSTAIN" message appears on the display. Both pause time and operation time in sustain mode have to be configured for the temperature to be reduced properly.

II. Functions of the controller

This chapter describes the controller functions, methods of changing the settings and use of the menu with the **pulser** (knob). The main controller screen displays boiler operating parameters. Operation mode and a number of other settings can be selected by the user according to the individual needs.

II.a) Main page

Main page is displayed on the **graphic** display during normal operation of the controller. Other main screens are displayed according the operation mode.

Once the **pulser knob** is pressed the first level menu appears. The display shows three initial menu options. Further options are available after turning the knob. An option can be selected

by pressing the knob. Similar procedure is followed when changing the parameters. In order for the changes to be input they need to be confirmed by pressing the pulser after the "**CONFIRM**" message appears. If the user does not intend to make any changes in a function the pulser should be pressed after the "**CANCEL**" message is displayed. Select "**EXIT**" in the menu or use **EXIT** button to exit the menu.

Stand-by mode button located on the controller housing allows disabling all operating units quickly, if necessary. It serves as an additional emergency protection to cut-off power supply to all operating units of the controller (feeder, fan, pumps).

**ATTENTION**: Power supply to the controller is not cut-off in the stand-by mode.

II.b) Screen view

The user can select one of three main screens of the temperature controller operation using that function. They include:

❾ central heating screen (displays current boiler operation mode) valve (displays working parameters of the valve)
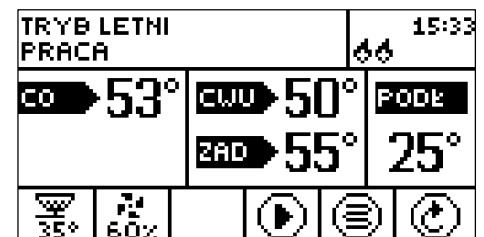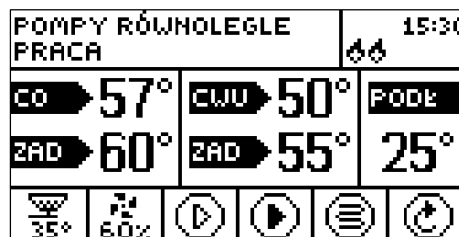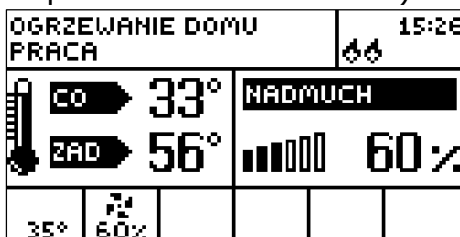
❾ valve 1 (displays working parameters of the first valve).
❾ valve 2 (displays working parameters of the second valve).
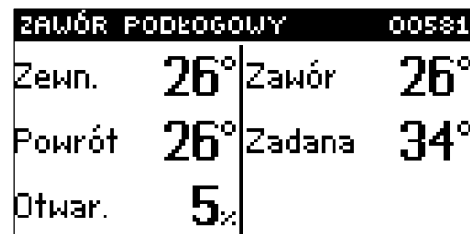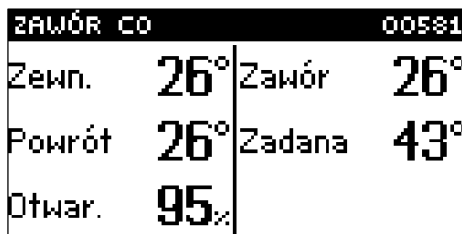
NOTE The valve parameter views are available only if the valves have been properly preinstalled and configured by a technician.

II.c) Preset temperature of the central heating system
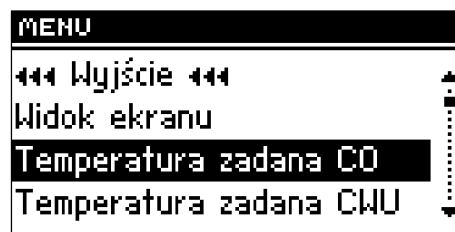
The option is used to set the boiler temperature. The user can change the boiler temperature within the range of 45°C to 80°C. The preset central heating system temperature can also be changed directly in the main screen of the controller by turning the pulser knob.

Additionally, the preset central heating system temperature can be adjusted using the *room temperature reduction* function (see Item II.15) and the weekly control function. The preset temperature is a sum of all those values but it may not exceed the range of 45°C to 80°C.

## II.d) Preset temperature of hot domestic water
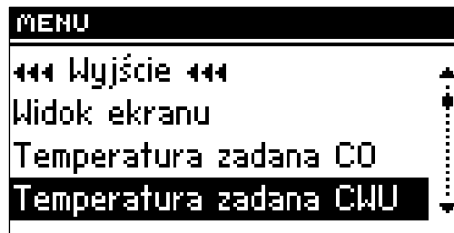
The option is used to set the temperature of hot domestic water. The temperature is adjustable within the range between 40°C and 75°C.

II.e) Manual operation
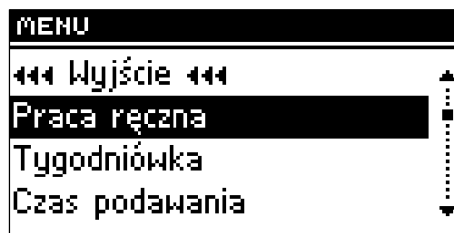
For your convenience the controller is equipped with a **_Manual operation_** module. When this function is active each actuator (blowing, central heating pump, hot water pump, additional circulating or valve pump) can be switched on or off independently and each active mixing valve can be closed, opened or stopped.
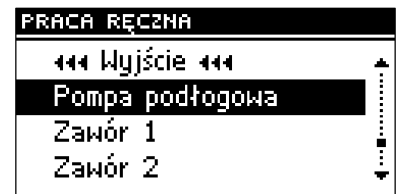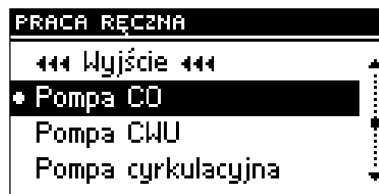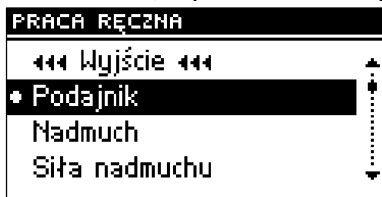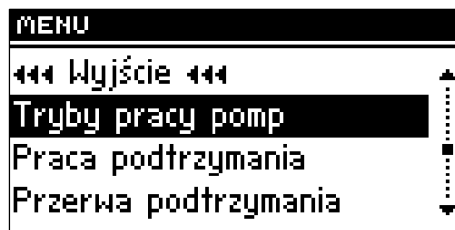

You can start the motor of your selected device by pressing the **pulser**. The device will remain activated until the **pulser** is pressed again.

Additionally, an option to control the _blowing power_ is available where you can set any fan speed in manual mode.
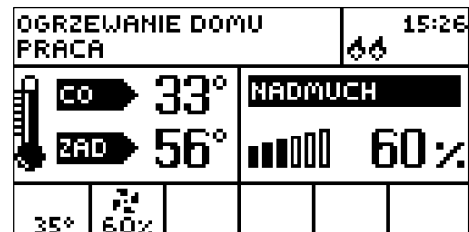

II.f) Pump operation modes

This function allows you to select one of the following four boiler operation modes:

II.f.1) House heating

When you select this option the controller switches over to a mode where heating is provided only to heat the central heating circuit. The central heating pump begins to run above the pump activation temperature (factory set at 38°C - see Section III.g). The pump will turn off below this temperature (minus a hysteresis of 2°C).

II.f.2)   Boiler tank priority

In this mode, the boiler tank (hot water) pump will be switched on first to run until the set-point temperature is reached (see Section II.e), after which the pump will be turned off and the CH circulating pump will be enabled.
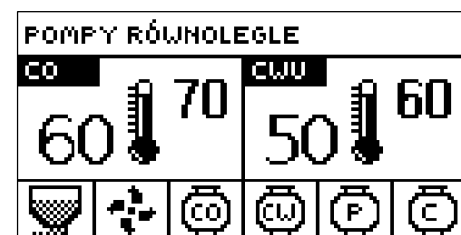
The central heating pump will run all the time until the boiler tank temperature drops below its set-point by the hot water hysteresis value. At that moment the CH pump will turn off and the HW pump will turn on (both pumps operating alternately).

In this mode the fan and the feeder are run only up to 62°C as measured at the boiler (instantaneous set-point) so as to prevent overheating of the boiler.
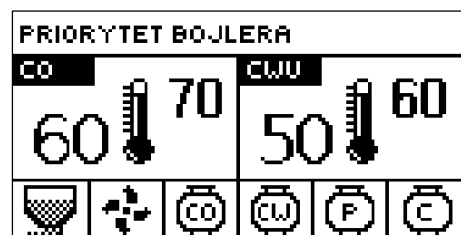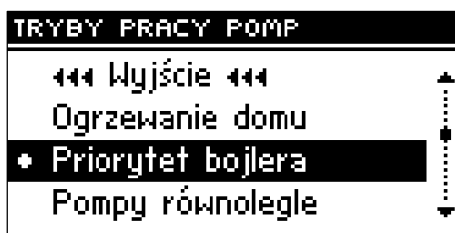
NOTE: The boiler must be fitted with check valves on the central heating and hot water pump circuits. The valve mounted on the hot water pump is to prevent drawing hot water from the boiler tank.

II.f.3)   Pumps in parallel

In this mode both pumps begin to run together (in parallel) above the pump activation temperature. However, these temperatures may vary for each pump, depending on your settings (see Sections III.g-h). When this is so one of the pumps will switch on earlier than the other one, but after both thresholds are crossed both pumps will run together. The central heating pump will run all the time while the hot water pump will turn off when the boiler tank set-point temperature is reached. It will turn on again when the temperature drops by the preset HW hysteresis value below its set-point.

II.f.4) Summer mode
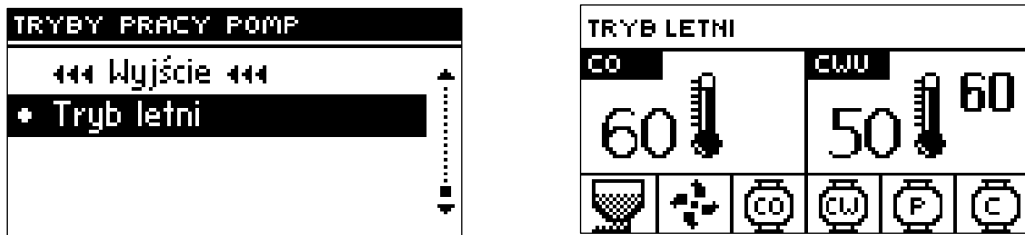
Once this function is activated the central heating pump will be off and the DHW pump will turn on above the preset activation temperature (see Section III.h) and will work continuously until the temperature drops below the activation temperature by the hot water hysteresis value or until the following conditions are met:
(boiler temperature) + 2°C ≤ (boiler tank temperature)
In summer mode you only enter the set-point temperature of the boiler, which is also understood to mean the set-point temperature of the boiler tank.

II.g) Weekly control

The function is used to programme daily changes in the boiler temperature. The preset temperature deviations are within the range of +/-100C.
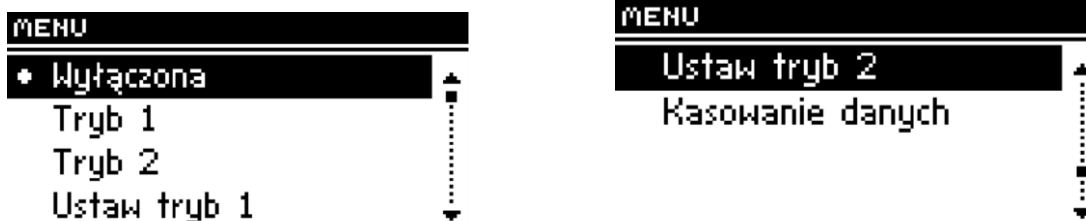
Step #1:
The user needs to set current time and date first (Installer menu > Clock).
Step #2:
The user sets temperature values for individual days of the week (Set mode 1):
Monday– Sunday
Select specific hours and required deviations from the preset temperature (how many degrees the temperature should rise or drop) for each day of the week. Additionally, the preset values can be copied to facilitate the operation.

Example
Monday
preset: 3 00 , temp. -10°C (temperature change– 10°C)
preset: 4 00 , temp. -10°C (temperature change – 10°C)
preset: 5 00 , temp. -10°C (temperature change – 10°C)
      In such a case, if the temperature preset on the boiler is 60ºC, it will drop 10ºC to 50ºC between 3 a.m. and 6 a.m. on Monday.
As an alternative to the temperatures being preset separately for individual days, the temperatures can also be set collectively, in the second mode, for the working days (from Monday to Friday) and the weekend (Saturday and Sunday) separately - Set mode 2.

Monday - Friday; Saturday - Sunday
Similarly to the previous mode it is necessary to select specific times and required deviations from the temperature preset for the working days (Monday - Friday) and the weekend

(Saturday, Sunday).

Example
Monday - Friday
preset: 3 00 , temp. -10°C (temperature change – 10°C)
preset: 4 00 , temp. -10°C (temperature change – 10°C)
preset: 5 00 , temp. -10°C (temperature change – 10°C)
Saturday - Sunday
preset: 16 00 , temp. 5°C (temperature change +5°C)
preset: 17 00 , temp. 5°C (temperature change +5°C)
preset: 18 00 , temp. 5°C (temperature change +5°C)
In this case, if the preset boiler temperature is 60ºC, the temperature will drop 10ºC to 50ºC between 3 a.m. and 6 a.m. on each day from Monday to Friday. However, the temperature will rise 5ºC to 65ºC during weekend (Saturday, Sunday) between 4 p.m. and 7 p.m.

Step #3:
The user enables one of two preset modes (Mode1, Mode2) or disables the weekly control option.
Once the mode is enabled the value of the deviation currently set is displayed on the main page of the controller next to the preset central heating system temperature. This, additionally, indicates that the weekly control is active.
        Data deletion function is a simple method to remove all previously saved weekly programme settings to enter new settings.

II.i) Fuel selection
This function is used to choose one of two fuel: coal or lignite. For each fuel there is suitable blow force and fuel feeding frequency programmed.

II.j) Room temperature reduction
        After the room controller reaches the preset temperature, the preset boiler temperature (set in the installer menu - see Item III.16) will drop by the value set there. The reduced temperature will not be lower however than the minimum preset central heating temperature.
        Example: Temperature preset on the boiler: 55ºC
        Room temperature reduction: 15ºC
   Minimum temperature set on the boiler: 45ºC (factory setting)
Once the preset room temperature is reached (signalled by the room controller) the temperature preset on the boiler will drop to 45ºC i.e. only by 10ºC although the room temperature reduction is 15ºC. At the same time a message reading "!-10º" will be shown in the main display next to the preset boiler temperature.

II.k) Factory settings
The controller is pre-configured for operation. However, it should be adapted to individual needs. Factory settings can be restored at any time. Selection of "factory settings" option will result in all boiler settings (saved in user's menu) being lost and reset to boiler manufacturer's settings. Individual boiler parameters can be set at that point again.

ATTENTION: Restoration of factory settings will not cause the changes in service settings to be deleted.

II.l) Information about the programme
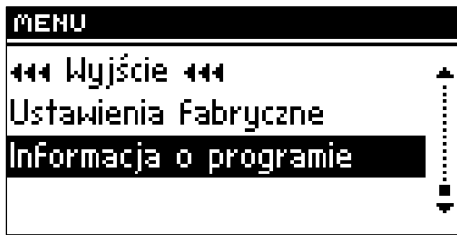
This function allows the user to check the controller programme version.

III. Installation menu

The functions of the installation menu should be set by the person installing the boiler or service personnel of the manufacturer.

III.a) Fan coefficient

This function is used to adjust the fan power. If the blow force is too low/high, the coefficient should be adequately increased/decreased in order to ensure efficiency.

The most common cause of inadequate fan operation is the considerable difference in voltage supply for different recipients which has a significant impact on the fan functioning.

III.b) CH boiler power coefficient

CH boiler power coefficient serves to optimize the feeder operation so that it supplies an appropriate amount of fuel. With this function the user may increase or decrease the amount of fuel fed to the CH boiler (the amount is given in percentages).

After the CH boiler power is defined initially in the main menu, the CH boiler coefficient enables the user to choose precisely the optimum amount of fuel, on the basis of the calorific value of a given fuel type.

III.c) Room regulator

A room controller can be connected to ST-480 controller. This function allows to configure the controller by selecting "ON" option. Additionally, the user may check the programme version of the room controller.

After connection of TECH controller the user may check and change the preset temperature of the central heating system, hot domestic water and the mixing valve. Additionally all boiler controller alarms are displayed. When the operation involves the mixing valve the user may preview the current external temperature while viewing the main screen with the valve parameters .

After TECH Controller option is enabled a letter "P" appears in the upper part of the display in the main screen of the controller. A flashing letter "P" indicates that the temperature in the room is too low. As soon as the required room temperature is reached the letter "P" stops flashing and stays on.

ATTENTION: No external voltage can be connected to the room controller output.
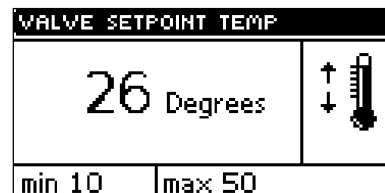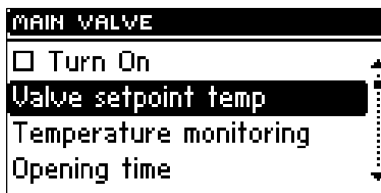
III.d Main valve
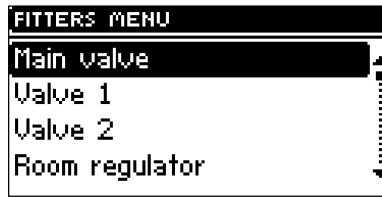


III.a.1 Switch on
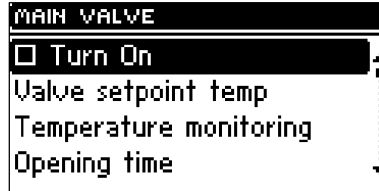
This feature allows you to temporarily make the valve inactive.

III.a.2) Set-point valve temperature

This setting is used to set the circuit temperature to be maintained by the mixing valve. This is the main temperature based on which the *room thermostat reduction* function is to be run (see Section III.a.10). The *room thermostat reduction* function is set separately for the CH system (setting in the user menu) and separately for each of the valves.

III.a.3) Temperature control
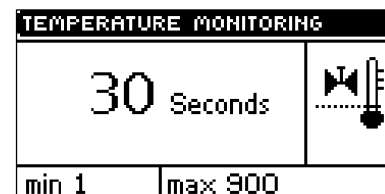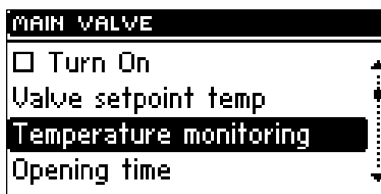
This parameter determines the sampling (control) frequency of the water temperature downstream of the valve for the central heating or hot water system. If the sensor indicates a change in temperature (deviation from set-point), then the solenoid will open or close partially by a preset step to restore the set-point temperature.

III.a.4) Opening time
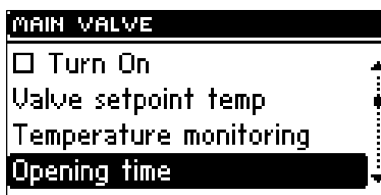
You can use this function to set the time for the full opening of the valve, that is to say, how long it takes to open the valve to 100%. This time should be selected according to your valve actuator (shown on the nameplate).

III.a.5) Single step

MAIN VALVE
Single stroke
Min opening
Valve type
Weather sensor

SINGLE STROKE
5 Percent
min 1   max 99
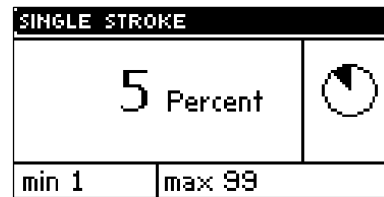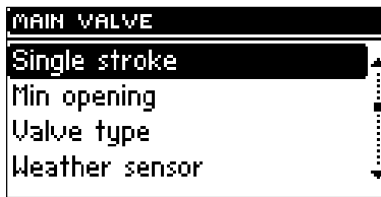
You can use this function to set a percentage value for a single step in the operation of valve opening, that is to say the maximum perce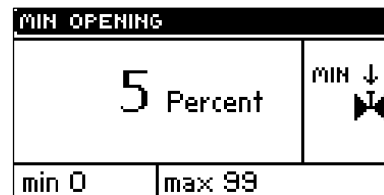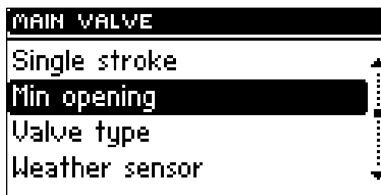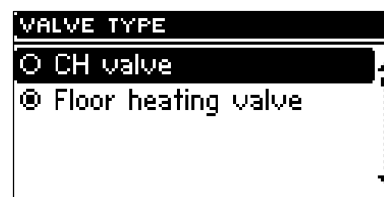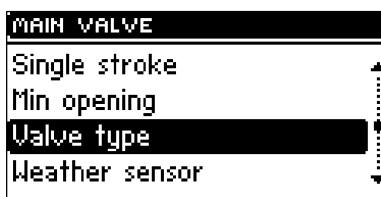ntage value of opening or closing that the valve can move in a single step (maximum movement of the valve in one measurement cycle).
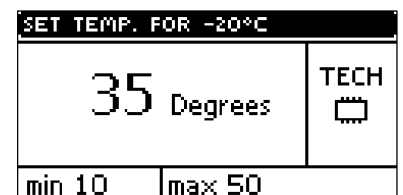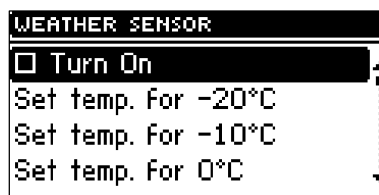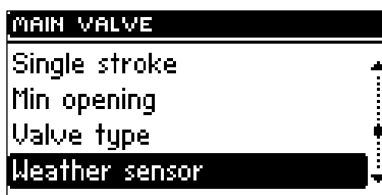
III.a.6) Minimum opening

MAIN VALVE
Single stroke
Min opening
Valve type
Weather sensor

MIN OPENING
5 Percent   MIN ↓
min 0   max 99

Use this function to set the minimum value for valve opening. Below this value, the valve will not close shut.

III.a.7) Type of valve

MAIN VALVE
Single stroke
Min opening
Valve type
Weather sensor

VALVE TYPE
○ CH valve
◉ Floor heating valve

You can use this option to select the type of valve: central heating or floor type.

III.a.8) Weather program (weekly valve program)

MAIN VALVE
Single stroke
Min opening
Valve type
Weather sensor

WEATHER SENSOR
□ Turn On
Set temp. for -20°C
Set temp. for -10°C
Set temp. for 0°C

SET TEMP. FOR -20°C
35 Degrees   TECH
min 10   max 50

In order to enable the weather function an outdoor sensor should be installed in a place not exposed directly to sunlight or weather conditions. After installing and connecting the sensor the Weather program function must be enabled in the controller menu.

For the valve to work properly enter set-point temperatures (downstream of the valve) for the following four intermediate outside temperatures:

TEMP. FOR -20

TEMP. FOR -10

TEMP. FOR 0

TEMP. FOR 10

Heating curve - curve which is used to determine the set-point temperature of the controller based on the outside temperature. In our controller this curve is established based on four temperature set-points selected for their respective outside temperatures. Set-point temperatures must be provided for the following outside temperatures: -20ºC, -10ºC, 0ºC and 10ºC.

USER MANUAL

The more points there are available for constructing the curve, the greater is its accuracy, which allows you to determine its shape in a flexible way. In our case, four points seem to be a very good compromise between accuracy and ease of setting its shape.
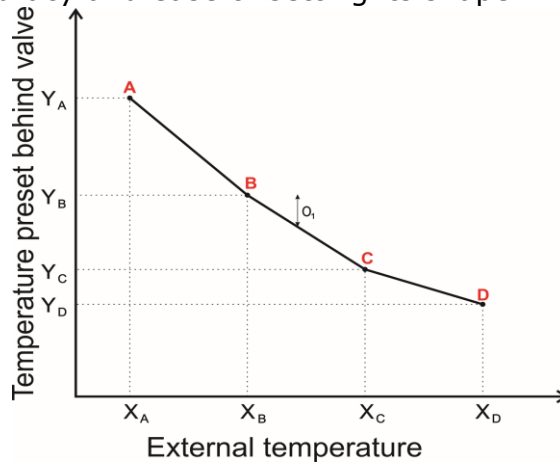
Where in our controller:

X_A = -20ºC, $\qquad$ X_C = 0ºC,

X_B = -10ºC, $\qquad$ X_D = 10ºC,

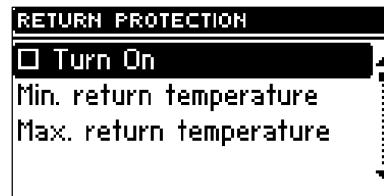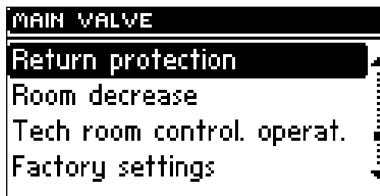Y_A, Y_B, Y_C, Y_D – set-point valve temperatures for their corresponding outside temperatures: X_A, X_B, X_C, X_D

After *weather control* is enabled the *valve set-point* parameter is calculated based on the heating curve. By changing this parameter you can decrease or increase all the weather control settings.

III.a.9) Return protection

This feature allows you to enable protection for the boiler from excessively cold water returning from the main circuit, which could cause the boiler to suffer from low-temperature corrosion. The return protection function works to ensure that when the temperature is too low the valve will close partially until the short circuit of the boiler reaches the desired temperature. This feature also protects the boiler from a dangerously high return temperature to prevent water from boiling.

When this function is enabled you need to set the minimum and maximum return temperatures.

III.a.10) Room thermostat reduction
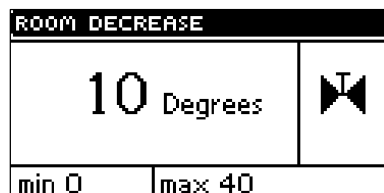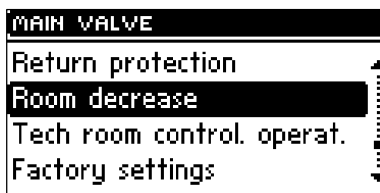
This function is active only when the unit is operated with a (standard or TECH) room thermostat. When the room thermostat reaches the desired temperature in the house/flat (reports heated up condition), the valve will close to such an extent so that the temperature downstream of the valve drops by the *<room thermostat reduction>* temperature.

NOTE: If the installation includes a TECH room thermostat with RS communication (four-wire cable), you may choose an option providing dynamic control for the mixing valve (see Section III.a.11)

III.a.11) Operation of TECH thermostat

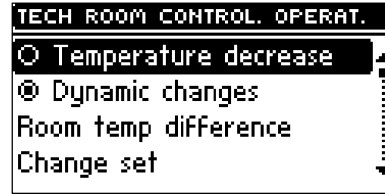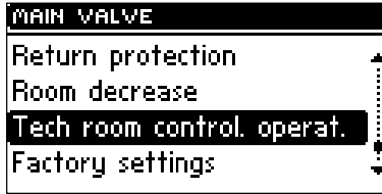This setting is active only if the controller is connected with a TECH room thermostat (with RS communication) and allows a choice in how the thermostat is to work together with the mixing valve:

➔ **temperature reduction** – when you select this mode after heating up the house/flat to your required temperature set-point temperature the TECH room thermostat will lower the set-point temperature of the valve by the pre-set *room thermostat reduction* value (see Section II.a.10);

➔ **dynamic changes** - when you select this mode after heating up the house/flat to the set-point temperature the TECH room thermostat will work as per the following settings:

➢ *Change in valve set-point.* This setting determines by how many degrees the valve temperature is to increase or decrease with a single unit change in room temperature. This function is closely related to the *Room temperature difference* parameter.

➢ *Room temperature difference.* This setting is used to define the single unit change in the current room temperature (accurate to 0.1°C) at which there is to occur a specific change in the set-point temperature of the valve.

Example:
- **setting: *Room temperature difference* 0.5ºC**
- **setting: Change in set-point valve temperature 1ºC**
- **setting: Set-point valve temperature   40ºC**
- **setting: *Set-point room thermostat* temperature 23ºC**

Case 1. If the room temperature rises to 23.5ºC (by 0.5ºC) the valve will close to such an extent as to have 39ºC as a set-point (by 1ºC).

Case 2. If the room temperature drops to 22ºC (by 1ºC) the valve will open to such an extent as to have 42ºC as a set-point (by 2ºC).

III.a.12) Factory settings
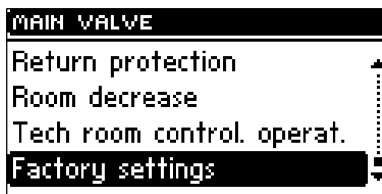
This parameter allows you to restore the mixing valve settings saved by the manufacturer. By restoring the factory settings you will not change the valve type setting (central heating or floor type).

III.b) Valve 1

NOTE: Control with an additional valve (1 or 2) is only possible after you purchase and connect the controller to an additional control module (ST-61), which is not provided as standard equipment with the controller. In order to control two valves you need to connect two ST-61 modules.

The options presented in this chapter are used to adjust the operating settings of an additional mixing valve. In order for the valve to work properly and meet your expectations it should be configured with its parameters set like in the case of the main valve.
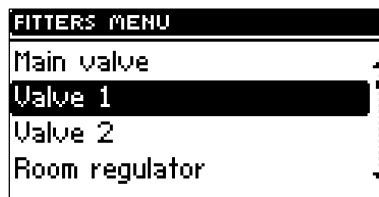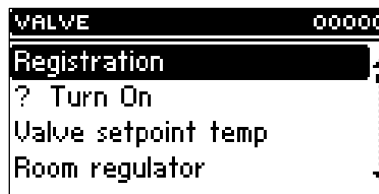
III.b.1) Registration.

To register an additional valve enter the serial number of the control module of the ST-61 mixing valve servo (look for the five-digit number on the cover of this module). Without this number the valve cannot be activated.

III.b.2) Switch on (setting as for the main valve - see Section III.a.1).

III.b.3) Set-point valve temperature (setting as for the main valve – see Section II.a.2)

III.b.4) Room thermostat
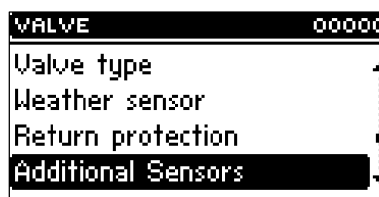
If the valve is to be operated with a room thermostat, you should select its type:
➜   module controller (traditional two-state type – "from the module"),
➜   standard or TECH controller (traditional two-state type – "from the controller"),
➜   TECH algorithm controller (RS communication),
✓   _room temperature difference_ (setting as for the main valve – see Section III.a.11),
✓   _set-point change_ (setting as for the main valve – see Section III.a.11).

III.b.5) Temperature control (Setting as for the main valve – see Section III.a.3).

III.b.6) Opening time (Setting as for the main valve – see Section III.a.4)

III.b.7) Single step (Setting as for the main valve – see Section III.a.5).

III.b.8) Minimum opening (Setting as for the main valve – see Section III.a.6).

III.b.9) Type of valve (Setting as for the main valve – see Section III.a.7).

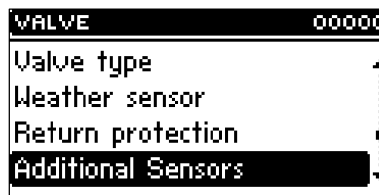**III.b.10) Weather program (weather control)** (Setting as for the main valve – see Section III.a.8).

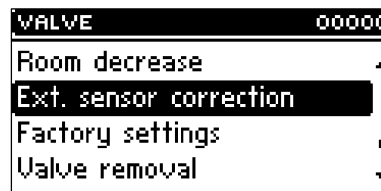**III.b.11) Return protection** - (Setting as for the main valve – see Section III.a.9).

III.b.12) Additional sensors

```
VALVE                00000
Valve type                 ▲
Weather sensor             ┊
Return protection          ◆
Additional Sensors         ┊
```

When two mixing valves are used and you select this function you will be able to select the sensors from which temperature data are to be retrieved for a valve (for return and outside temperature sensors). Temperatures can be retrieved from the sensors of the valve being set (*Own*) or as per the controller sensors (*Main controller*).

III.b.13) Room thermostat reduction (Setting as for the main valve – see Section III.a.10).

III.b.14) External sensor adjustment

```
VALVE                00000
Room decrease              ▲
Ext. sensor correction     ┊
Factory settings           ▊
Valve removal              ▼
```

The external sensor is to be adjusted during installation or after prolonged use of the thermostat if the outside temperature displayed deviates from the actual one. Adjustment range: -10 to +10 $^{\circ}$C with an accuracy of 1°C

III.b.15) Factory settings (Settings as for the main valve – see Section III.a.12)

III.b.16) Valve removal

```
VALVE                00000
Room decrease              ▲
Ext. sensor correction     ┊
Factory settings           ┊
Valve removal              ▼
```
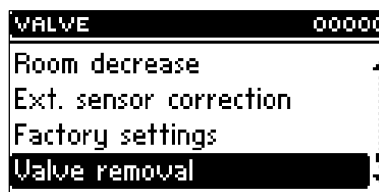
This function is used to completely remove a valve from the controller memory. *Valve removal* is used for example when removing or replacing a module (the new module requires to be registered again).

III.b.17) About the program

When this option is selected the display will show the software version of the active valve module.

III.c)Valve 2

All settings for valve 2 are made in the same way as in the case of valve 1.

III.d) GSM module

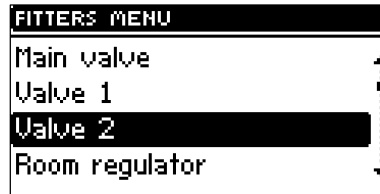**NOTE:** Controlling of this type is possible after purchasing and connecting, to the controller, the additional control module **ST-65** which is not attached to the regulator as a standard feature.

The GSM module is an optional device cooperating with the boiler controller, enabling remote control of the boiler operation with the use of a mobile phone. The User is notified with a text message on each alert of the boiler controller, and by sending an appropriate text message at any time, he or she receives a return message with the information on the current temperature of all sensors. After entering an authentication code it is also possible to remotely change the set temperatures.

The GSM module can also operate independently from the boiler controller. It has two inputs with temperature sensors, single contact input for use in any configuration (detecting short circuit/opening of contacts) and one controlled output (e.g. possibility to connect additional contactor to control any electrical circuit).

When any temperature sensor reaches the preset deactivation temperature, maximum or minimum, the module will automatically send a text message with such information. It is similar in the case of a short-circuit or opening of contact input, which may be used e.g. for simple protection of property.

III.e) Internet module

NOTE: *Controlling of this type is possible after purchasing and connecting, to the controller, the additional control module ST-500 which is not attached to the regulator as a standard feature.*
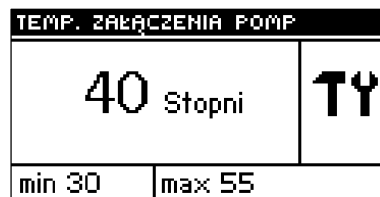
The Internet module is a device enabling remote control of the boiler over the Internet or local network . On the home computer screen the user controls the condition of all boiler system devices and the operation of each device is presented in the animated form.

Apart from the possibility to view the temperature of every sensor, the user has the possibility of introducing changes of the set temperatures for both the pumps and the mixing valves.

After activating the Internet module and selecting the DHCP option, the controller will automatically download such parameters from the local network as: IP address, IP Mask, Gateway address and DNS Address. In the case of any problems with downloading network parameters of the existing network, there is a possibility of setting these parameters manually. The method of obtaining local network parameters has been described in the instructions for *the Internet module*.
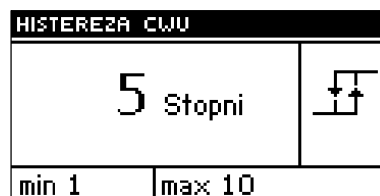
The function *Reset module password* may be used when the User, on the login page, has changed the factory user's password to his or her password. When a new password is lost, it is possible to return to the factory password after resetting the module password.

III.f) Pump activation temperature

```
MENU INSTALATORA
◄◄◄ Wyjście ◄◄◄
Zawór 1
Zawór 2
Temp. załączenia pomp
```
```
TEMP. ZAŁĄCZENIA POMP

40 Stopni        TY

min 30    max 55
```
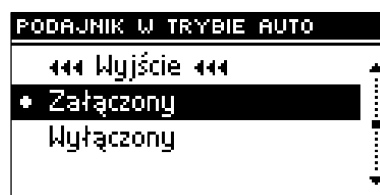
The option is used to set the activation temperature for central heating and domestic hot water pumps (the temperature is measured on the boiler). None of the pumps will operate if the temperature is lower than the preset one. If the actual temperature is higher than the preset one the pumps are working but they operate depending on the operation mode (see: pump operation modes)

III.g) HUW hysteresis

```
MENU INSTALATORA
◄◄◄ Wyjście ◄◄◄
Histereza kotła
Histereza CWU
Regulator pokojowy
```
```
HISTEREZA CWU

5 Stopni        �

min 1    max 10
```
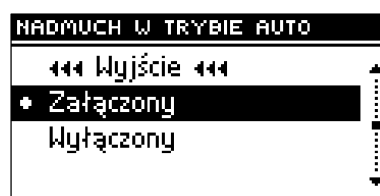
This option is used to set the hysteresis of the set temperature in the reboiler. It is the maximum difference between the set temperature (that is required in the reboiler) and the current temperature in the reboiler at which the HUW pump will activate. (for example: when the set temperature has the value of 55° C and the hysteresis is 5° C. After reaching the set temperature, that is 55° C, the HUW shuts down   and causes activation of the CH pump. Re-activation of the HUW pump will proceed when the temperature decreases to 50° C).

III.h) Feeder in auto mode

```
MENU INSTALATORA
◄◄◄ Wyjście ◄◄◄
Podajnik w trybie auto
Nadmuch w trybie auto
Moduł GSM
```
```
PODAJNIK W TRYBIE AUTO
    ◄◄◄ Wyjście ◄◄◄
•  Załączony
    Wyłączony
```
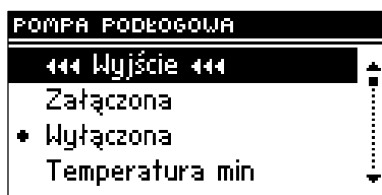
The option allows enabling and disabling the automatic operation of the feeder. The feeder can be disabled to feed fuel manually or to shut the boiler down.

III.i) Blowing in auto mode

```
MENU INSTALATORA
◄◄◄ Wyjście ◄◄◄
Podajnik w trybie auto
Nadmuch w trybie auto
Moduł GSM
```
```
NADMUCH W TRYBIE AUTO
    ◄◄◄ Wyjście ◄◄◄
•  Załączony
    Wyłączony
```

Automatic operation of the fan can be enabled or disabled using this function. Blowing can be disabled to manually control the natural chimney draught.
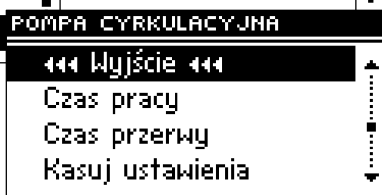
III.j) Floor pump

MENU INSTALATORA	POMPA PODŁOGOWA	POMPA PODŁOGOWA
◄◄◄ Wyjście ◄◄◄	◄◄◄ Wyjście ◄◄◄	◄◄◄ Wyjście ◄◄◄
Moduł internetowy	Załączona	Temperatura max
Pompa podłogowa	● Wyłączona	
Pompa cyrkulacyjna	Temperatura min	

The function is used to control the floor heating. The user sets the floor heating temperature in the range between 30ºC to 55ºC. After activation of the floor pump the minimum (threshold) temperature (measured on the boiler) and the maximum (preset) temperature of the floor heating (measured on the pump sensor) should be set. The floor pump is not operating below the minimum temperature. It turns on after the minimum temperature is exceeded until the preset maximum temperature is reached.

Once the preset temperature is reached the pump turns off and it is restarted if the temperature drops 2ºC below the pre-set value.

III.k) Circulation pump

MENU INSTALATORA	POMPA CYRKULACYJNA
◄◄◄ Wyjście ◄◄◄	◄◄◄ Wyjście ◄◄◄
Moduł internetowy	Załączona
Pompa podłogowa	● Wyłączona
Pompa cyrkulacyjna	Plan pracy

POMPA CYRKULACYJNA
◄◄◄ Wyjście ◄◄◄
Czas pracy
Czas przerwy
Kasuj ustawienia

🕐 14:00-14:30

WYŁĄCZONA **KOPIUJ** WYJŚCIE

The function allows to control the pump which is used to mix hot water between the boiler and the domestic hot water taps. After the function is activated the user sets the 24h activation cycle or pause cycle accurate to 30 minutes.

To facilitate the 24h operation and pause cycle setting it is possible to copy the selected time interval to another interval.

After the operation schedule has been set it is necessary to set the working and pause times for the pump while the previously selected time period is active. If necessary the previous settings can be easily deleted to facilitate setting of new intervals.

III.l) Clock

MENU INSTALATORA	USTAW CZAS
◄◄◄ Wyjście ◄◄◄	02:**45**
Zegar	NIEDZIELA
Ustaw datę	
Czułość impulsatora	

You can use the clock settings to enter the current time and day of the week.

III.m) Set the date

The function is used to set current date (day and month).

III.n) Pulser sensitivity

With this setting you can change the sensitivity of the pulser knob within a range from 1 to 3 (where 1 means the highest sensitivity).

III.o) Language selection

Using this function, the user selects the language in which the controller will be operated.

III.p) PID ON/OFF

This option enables the user to deactivate zPID control. In such a case, the controller functions as a two-state regulator and the menu presents the following additional functions:

- **Fuel feeding time**

This option is used to set the feeder operation time. The value should be adjusted to the type of the CH boiler as well as the type of fuel used.

- **Feeder pause**

This option is used to set the feeder pause time. The value should be adjusted to the type of the CH boiler as well as the type of fuel used.

Incorrect operation and pause time may result in inefficient operation of CH boiler, i.e. unburnt coal left or failure to reach the pre-set temperature of the CH boiler. Appropriate pause and operation time ensures efficient operation of the CH boiler.

- **Blow force**

This function is used to control the fan speed. The setting range is 1-100%. Initially the fan always operates at a full speed, which enables successful activation even if the motor is dusty.

- **Temperature alarm**

This function enables the user to define when the temperature alarm is to be activated. If the CH boiler temperature does not reach the setpoint value during the period of time defined by the user, an alarm is activated and the display shows an appropriate message. The alarm may be deactivated by pressing OK (previous operation mode is restored).

- **Blow force**

This function is used to control the fan speed. The setting range is 1-100% (the values may be regarded as fan gears). The higher the gear is, the faster the fan works. 1% is the minimum fan speed whereas 100% is the maximum fan speed.

- **Operation in sustain mode**

This option is used to set the feeder operation time when the CH boiler operates in sustain mode.

- **Pause in sustain mode**

This option is used to set the feeder pause time when the CH boiler operates in sustain mode (operating above the setpoint temperature).

Attention: Incorrect setting of both operation and pause time may result in further temperature increase! The user should make sure that the pause time in sustain mode is not too short.

- **Fan in sustain mode**

This option is used to set the fan operation and pause time in sustain mode.

- **CH boiler hysteresis**

This option is used to set the set temperature hysteresis. It is the difference between the temperature of entering the sustain mode and the temperature of restoring the operation mode (e.g. when the set temperature value is 60ºC and the hysteresis is 3ºC, entering the sustain mode takes place at 60ºC, whereas returning to the operation mode takes place when the temperature drops to 57ºC).

When PID function is deactivated, the following functions (typical of PID control mode) disappear from the main menu and the fitter's menu:

- **Fire-up,**
- **Fan coefficient,**
- **CH boiler power coefficient,**

III.r) Room controller unit

This function allows to programme the operation of the room controller as follows:

➔ Off – the state of the room controller has no impact on other settings

➔ Boiler – after the room controller has indicated that the preset temperature is reached the preset boiler temperature will be reduced (detailed setting - see Item II.15)

➔ Central Heating pump - after the room controller has indicated that the preset temperature is reached the central heating pump will be shut off (detailed setting - see Item II.15)

➔ Room controller – the function allows to select the controller type connected to ST-480 controller to operate with the above selected unit. Two options are available:
 ➢ two-state (standard controller)
  ➢ TECH controller

After TECH Controller option is enabled a letter "P" appears in the upper part of the display in the main screen of the controller. A flashing letter "P" indicates that the temperature in the room is too low. As soon as the required room temperature is reached the letter "P" stops flashing and stays on

If both controllers are selected the room control temperature reduction will be active only after both controllers have sent a signal confirming that the preset room temperature has been reached.

III.s) Display contrast

Allows changing the display contrast settings.

IV. Service menu
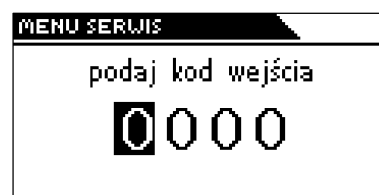
A 4-digit code has to be input to enter service functions of ST-480 controller. The code is in

possession of Tech Company.

V. Protections

To ensure maximally safe and unfailing operation, the regulator has a number of protections. In the case of an alarm, a sound signal is activated and an appropriate message is shown on the display.

To make the controller return to operation, press **the pulse generator**.

V.a) Temperature alarm

This protection is activated only in the **operation** mode (that is when the boiler temperature is lower than *the set temperature*). If the boiler temperature does not increase throughout the period set by the user, the alarm is activated, the feeder and the blow-in are deactivated (the water pump is turned on regardless of the boiler temperature) and a sound signal is activated. An appropriate message will be shown on the display.

The alarm will be disabled after pressing **the knob of the pulse generator**. The regulator returns to the recently set operation mode.

V.b) Thermal protection

It is an additional bimetallic mini-sensor (located at the boiler temperature sensor), disconnecting the fan and the feeder in the event of exceeding the alarm temperature: 85° C. Its activation prevents the water in the installation from boiling , in the event when the boiler overheats or the controller is damaged. After activation of this protection, when the temperature goes down to a safe value, the sensor will unlock automatically and the alarm will be deactivated. In the case of damage or overheating of this sensor, the fan the and feeder will be disconnected.

V.c) Automatic sensor control

In the event of damage of each of the sensors the sound alarm is activated, additionally signalling , the defect on the relevant display, e.g.: "**CH sensor damaged**". The feeder and the blow-in is disabled. The pumps operate according to the set temperatures, regardless of alarms.

*In the case of damage of the CH sensor or the feeder, the alarm will be active until the sensor is replaced with a new one. If the HUW sensor is damaged, one should press the **menu** button, which will turn off the alarm and the controller will return to the one pump (CH) operation mode. In order to ensure that the boiler will be able to work in all modes, the sensor must be replaced with a new one.*

V.d) Protection against boiling of water in the boiler

This protection is applies only to **reboiler priority** operation mode. When the set reboiler temperature is e.g. . 55° C and the actual temperature in the boiler increases up to 62° C (this is the so-called the priority temperature), then the controller will turn off and the feeder the fan. If the temperature in the boiler still increases up to 80° C, the CH pump will be activated. When the temperature still increases, then the alarm will be activate at the temperature of 85° C. Most often such a condition may appear when the reboiler is damaged, the sensor is improperly fitted or the pump is damaged. However, when the temperature drops, then at the threshold of 60° C the controller will turn on the feeder and the blow-in and will run in the operating mode until the temperature of 62° C is reached.

V.e) Temperature protection

The regulator has an additional protection in the event of damage of the bimetallic sensor. After exceeding the temperature of 85ºC, the alarm is activated, signalling the following on the display: "**Temperature too high**". Despite damage of the bimetallic sensor, the controller receives information on the current temperature in the boiler from the electronic sensor. In the case of exceeding the alarm temperature, the fan is turned off and, at the same time, both pumps begin to operate in order to distribute hot water across the house installation.

V.f) Fuel container protection

On the fuel feeder there is an additional temperature measuring sensor. In the event of its significant increase (above 70º C), the alarm is activated; the feeder is activated every 10 minutes, which causes pushing the fuel to the combustion chamber. This way the feeder sensor protects against fuel ignition in the container.

V.g) Fuse

The regulator has a WT 6.3A tubular fuse insert, protecting the network. Using a fuse with a higher value can cause damage to the existing controller.
ATTENTION: The fuse of higher value should not be used. Assembling the fuse with a higher value may cause damage to the controller.

VI. Maintenance

EL480 controller must be checked for the technical condition of its wires before and during the heating season. You should also check the mounting of the controller, clean it of dust and other contamination. Furthermore, you should also measure the effectiveness of the grounding of the motors (central heating pump, hot water pump and blower).

No.	Specification	Unit	
1	Power supply	V	230V/50Hz +/-10%
2	Power consumption	W	11
3	Ambient temperature	˚C	5÷50
4	Load on output of central heating pump; domestic hot water pump, floor pump; circulation pump; valve	A	0,5
5	Load on blower output	A	0,6
6	Load on fuel feeder output	A	2
7	Range of temperature measurement	˚C	0÷90
8	Accuracy of measurement	˚C	1
9	Range of temperature setting	˚C	45÷80
10	Thermal resistance of the sensor	˚C	-25÷90
11	Fuse link	A	6,3

VII.   Assembly

NOTE: Installation should be performed by a properly qualified technician! **Do not** install the unit with the power on (make sure that the plug is disconnected from the mains)!
NOTE: Incorrect wiring may damage the controller!
   Controller wiring connection diagram
Particular attention should be paid when making cable connections with the controller. Especially, the grounding conductor should be connected properly
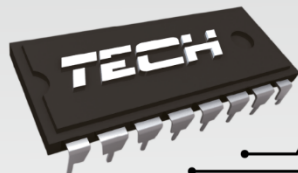
EL480ZPID

USER MANUAL

Table of contents

TECH Controllers

TECH Sp.j.

Wieprz 1047A
34-122 Wieprz

SERWIS

32-652 Bulowice,
Skotnica 120

Tel. +48 33 8759380, +48 33 8705105
+48 33 8751920, +48 33 8704700
Fax. +48 33 8454547

serwis@techsterowniki.pl

Monday - Friday
7:00 - 16:00
Saturday
9:00 - 12:00