

Controllers

USER MANUAL

i-2

EN



TABLE OF CONTENTS

I.	Safety	4
II.	Device description	5
III.	Installation	6
IV.	First start-up	10
V.	Principle of operation	11
VI.	Main screen description	11
VII.	Controller menu	12
1.1.	Block diagram of central heating circulation	12
1.2.	Operation mode	13
1.3.	Circulation 1	13
1.4.	DHW pump	14
1.5.	Pump anti-stop	14
2.1.	Block diagram of manual mode	15
3.1.	Block diagram of fitter's menu	16
3.2.	TECH RS regulator	17
3.3.	Number of valves	17
3.4.	Valve 1	17
3.5.	Additional contacts	17
3.6.	Ethernet module	18
3.7.	External sensor calibration	18
3.8.	Factory settings	18
6.1.	Block diagram of settings	20
6.2.	Language selection	20
6.3.	Time settings	20
6.4.	Screen settings	20
6.5.	Alarm sound	21
6.6.	Blockade	21
6.7.	Software version	21
7.1.	Simplified block diagram of valve 1 submenu	22
7.2.	Valve type	23
7.3.	Opening time	23
7.4.	Room regulator	23
7.5.	Pump activation	25
7.6.	Maxing valve settings	25
7.7.	CH sensor selection	27
7.8.	Protections	27

7.9.	Velve deactivation	27
7.10.	Factory settings	30
8.1.	Simplified block diagram – additional contacts submenu	31
8.2.	Buffer	32
8.3.	CH pump	33
8.4.	DHW	34
8.5.	Operation control	36
8.6.	Room regulator control	37
8.7.	Circulating pump	38
8.8.	Need for heating	39
8.9.	Weekly control	40
8.10.	DHW buffer	40
8.11.	Relays	41
8.12.	Additional heating source	41
8.13.	Buffer pump	43
8.14.	Off	43
8.15.	Alarm	43
VIII.	Weekly control	44
IX.	Technical data	46
X.	Protections and alarms	Błąd! Nie zdefiniowano zakładki.
XI.	Software update	47

I. 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 June 9th 2017. 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.

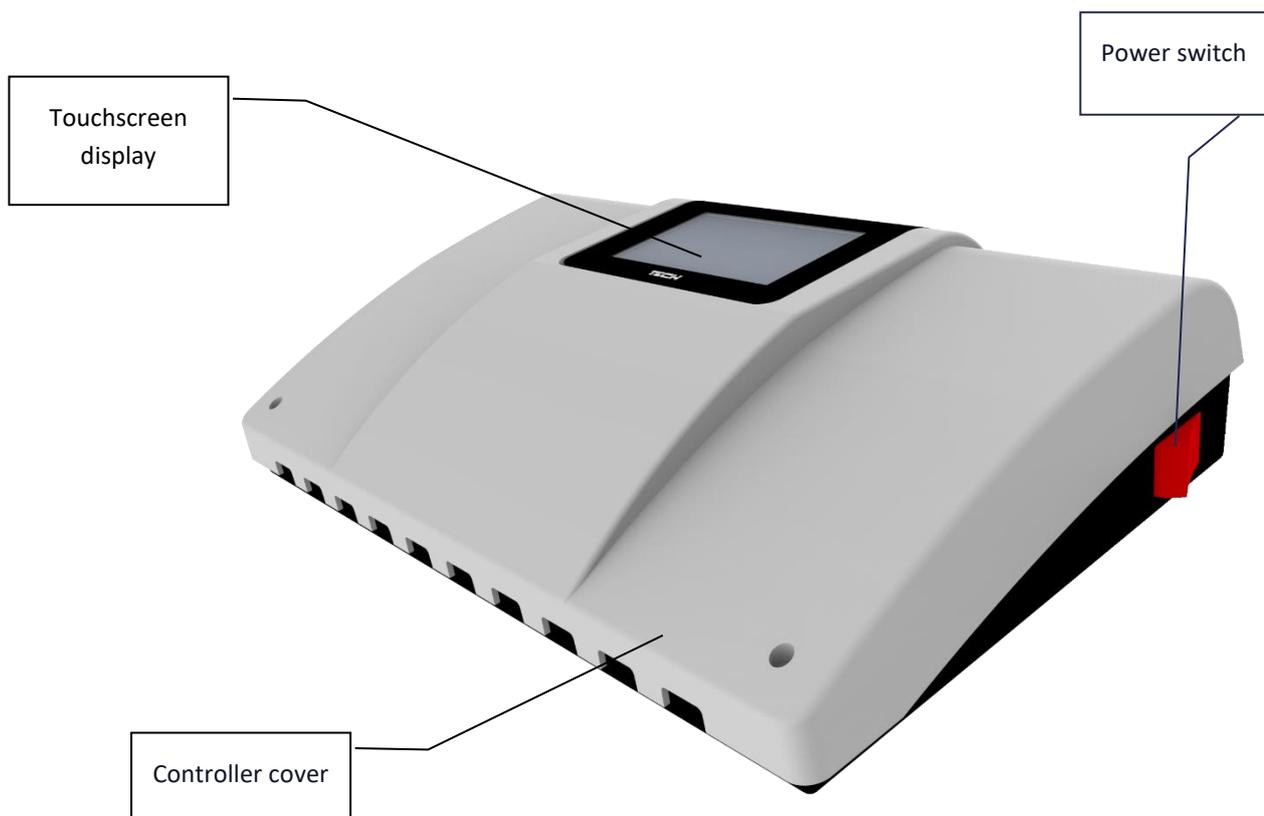
Care for the natural environment is our priority. Being aware of the fact that we manufacture electronic devices obligates us to dispose of used elements and electronic equipment in a manner which is safe for nature. As a result, the company has received a registry number assigned by the Main Inspector of Environmental Protection. The symbol of a crossed out rubbish bin on a product means that the product must not be thrown out to ordinary waste bins. By segregating waste intended for recycling, we help protect the natural environment. It is the user's responsibility to transfer waste electrical and electronic equipment to the selected collection point for recycling of waste generated from electronic and electrical equipment.



II. DEVICE DESCRIPTION

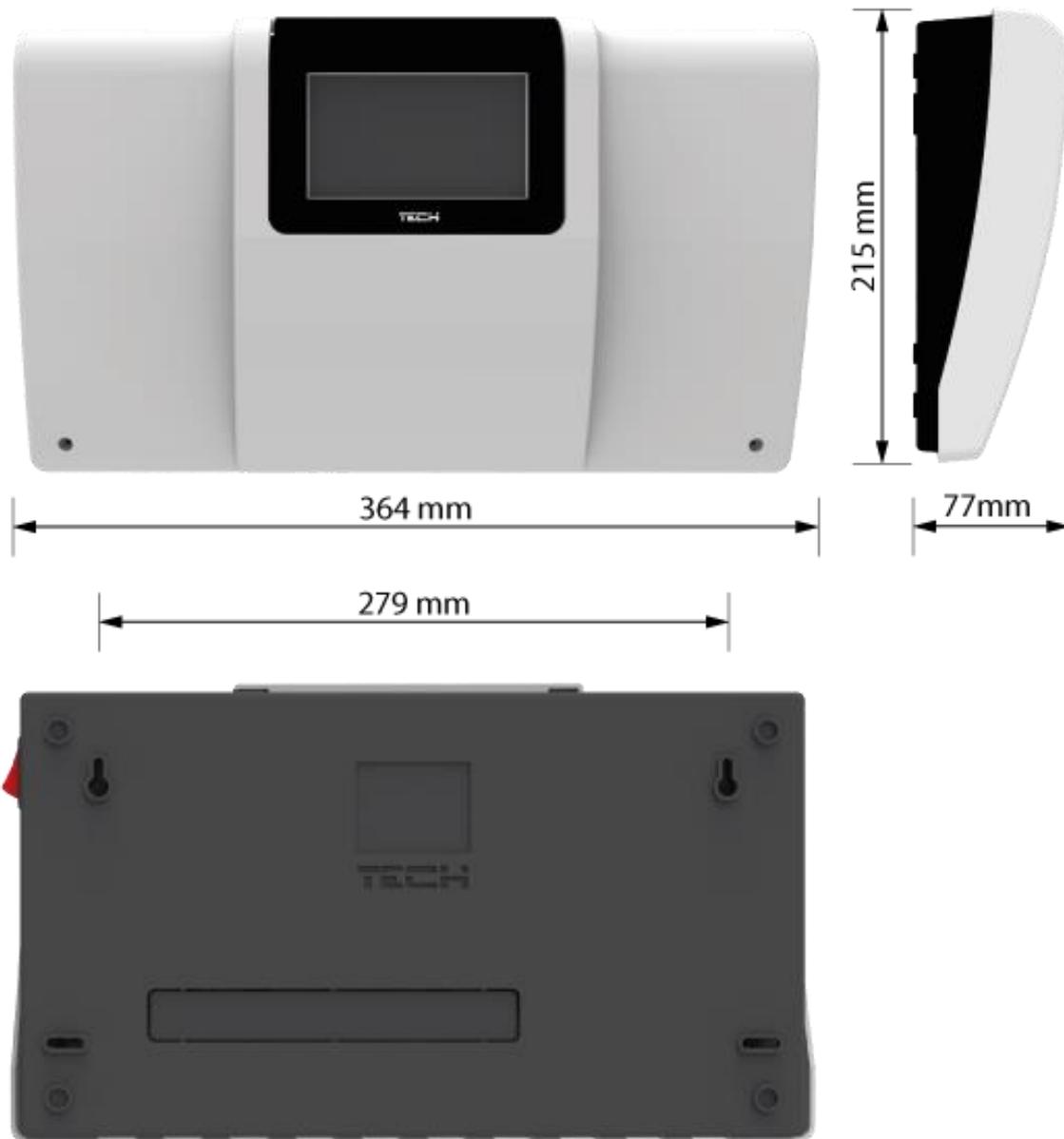
i-2 controller is a multi-function device intended for controlling central heating systems. Thanks to advanced software, the device offers a wide range of functions:

- Smooth control of three mixing valves.
- Control of the circulating pump.
- Protection against too high temperature of CH boiler water as well as too low temperature of water returning to CH boiler.
- Weather-based control.
- Weekly control.
- Two configurable no-voltage outputs.
- Two configurable voltage outputs.
- Supporting three room regulators with traditional communication (two-state).
- Supporting a room regulator with RS communication.
- Possibility of connecting ST-505 Ethernet module – it enables the user to control certain functions and view some of the parameters via the Internet.
- Possibility of connecting two additional modules controlling the valves (e.g. i-1 or i-1m) – it enables the user to control two additional valves.
- Possibility of controlling solar panels.



III. INSTALLATION

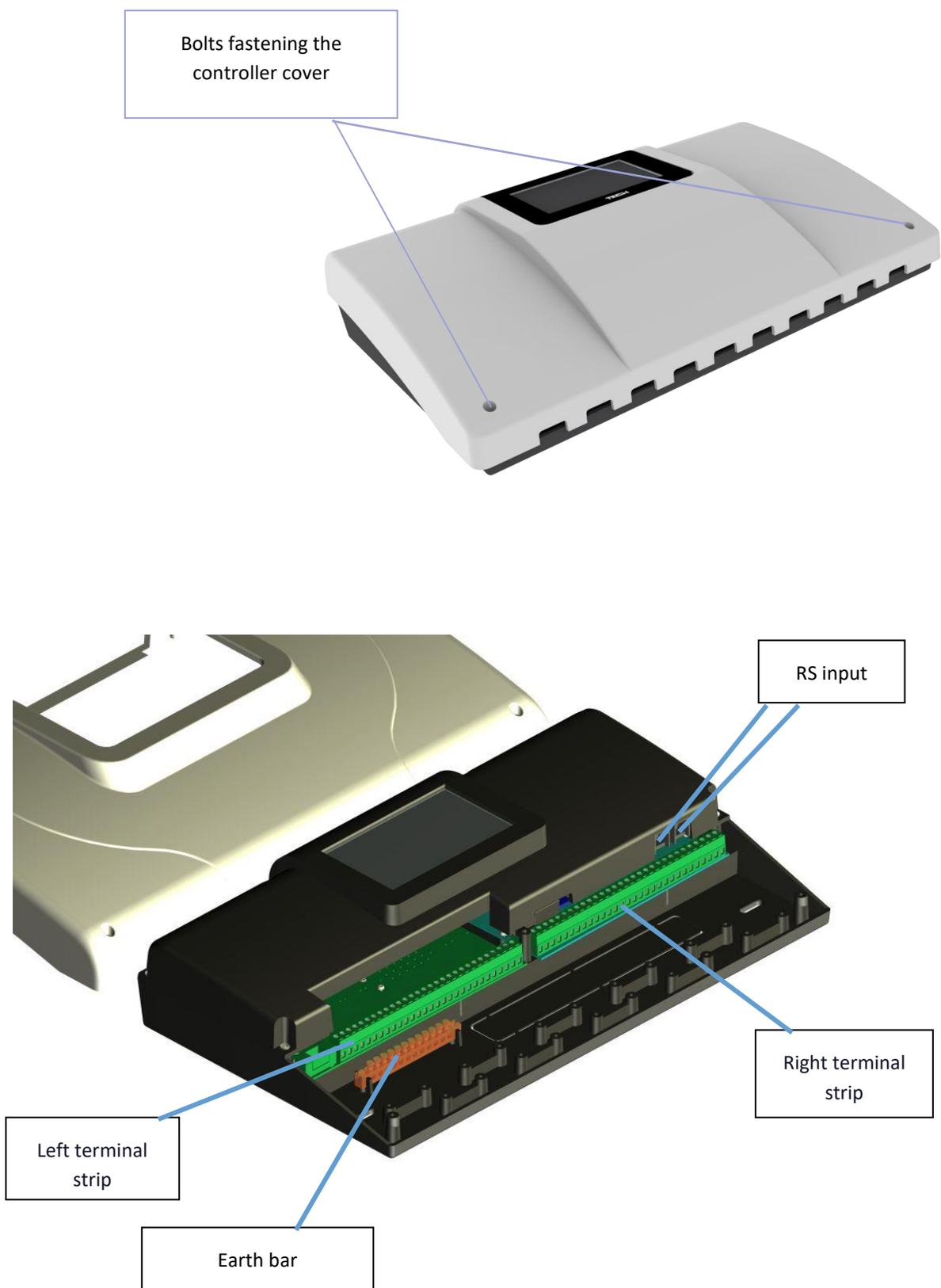
Controller should be installed by a qualified person. Regulator may be installed as a free-standing device or as a panel mountable on a wall.

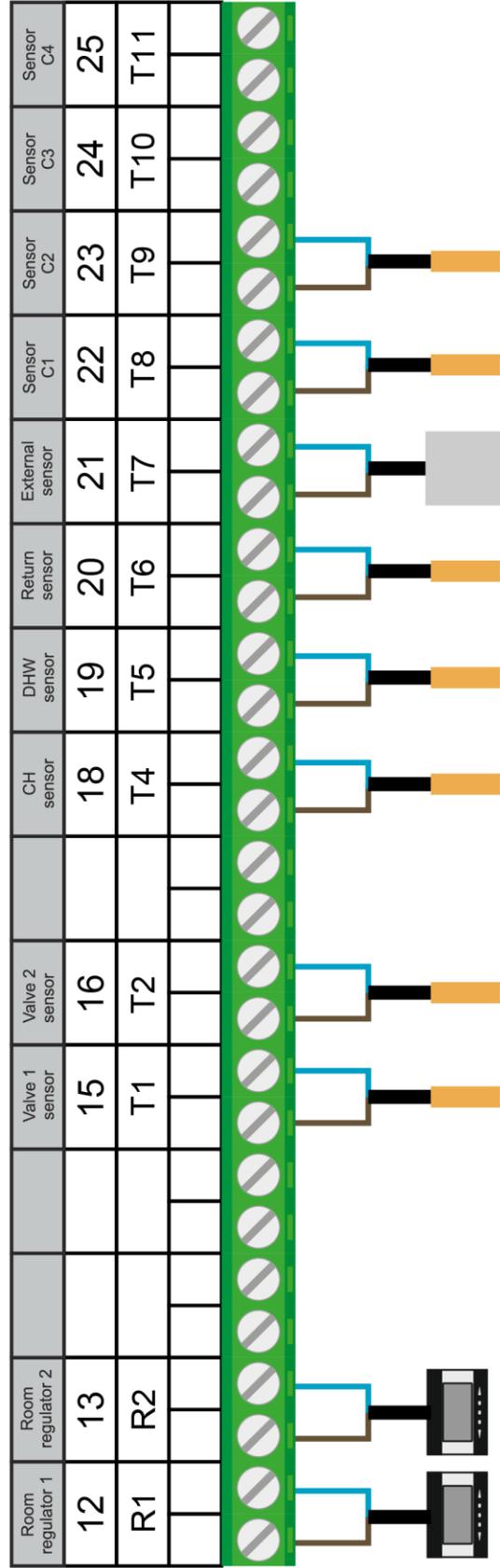
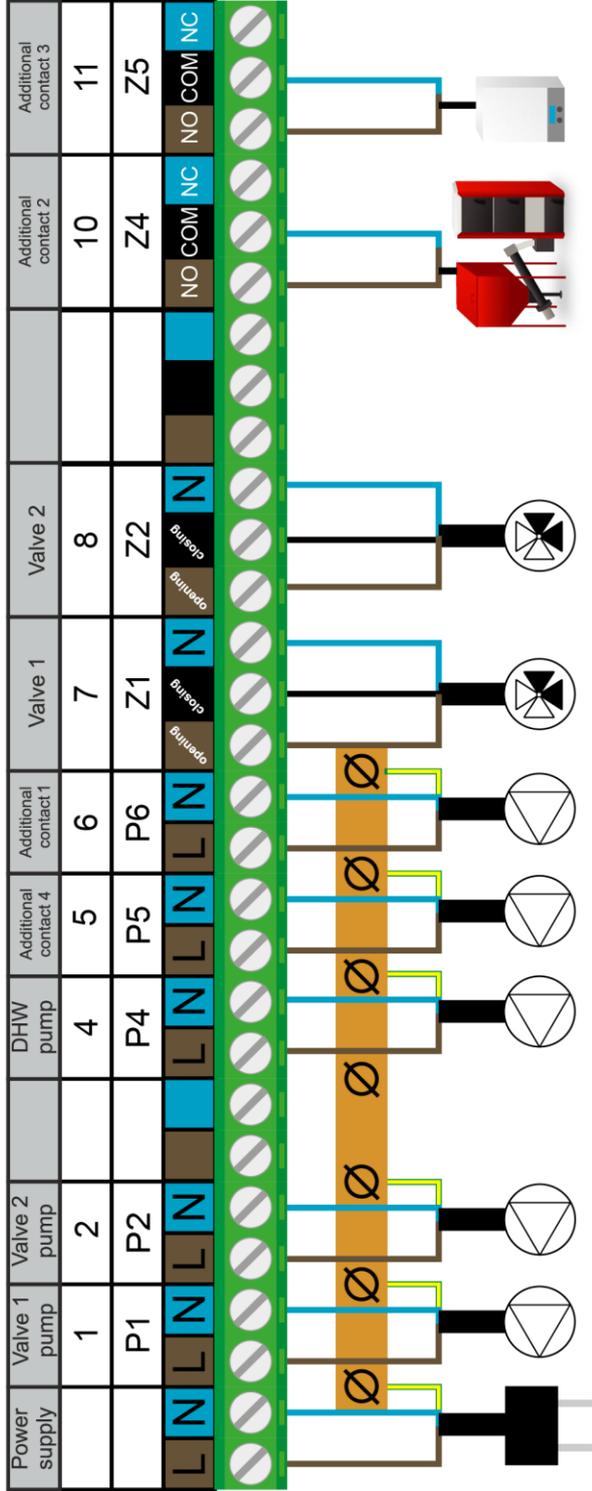


WARNING

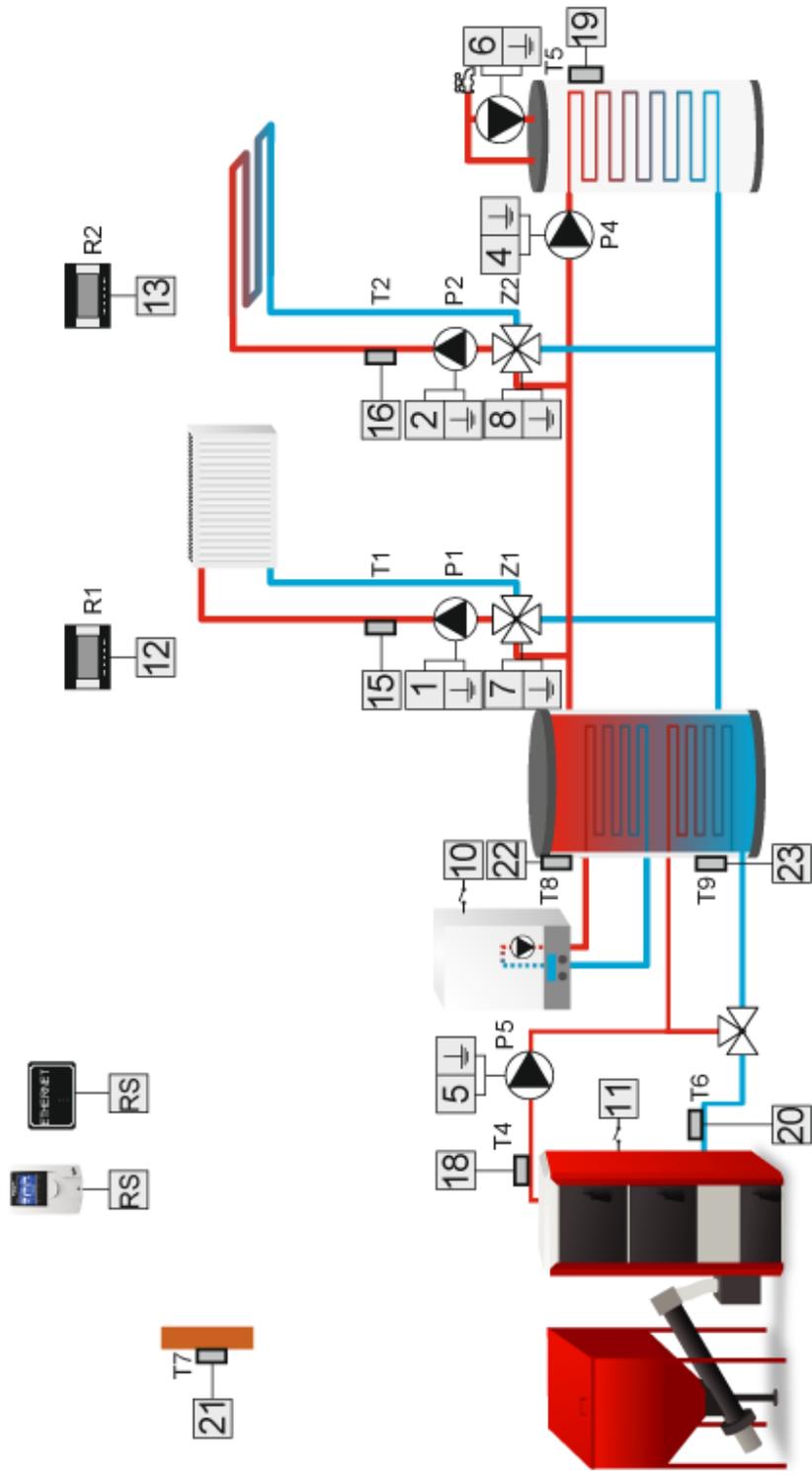
Risk of fatal electric shock from touching live connections. Before working on the controller switch off the power supply and prevent it from being switched on again.

In order to wire up the controller, the cover should be removed.





Pictorial diagram – it cannot replace CH installation project. Its aim is to present how the controller may be expanded. This heating installation diagram does not include protective elements which are necessary to ensure correct installation.



! WARNING

In case of no flow in short circulation of CH boiler (incorrect installation), return sensor should be placed at CH boiler hot water outlet in order to prevent the water from boiling.

IV. FIRST START-UP

In order for the controller to operate correctly, the following steps must be followed when starting the device for the first time:

1. Wire up the controller.
2. Set the valve actuators manually at 50%.



Actuator set at 50% opening

3. Switch the controller on.
4. After the device is switched on, the valves are calibrated automatically to 100%. If a valve opens the wrong way, the user should change the opening direction in the menu of this valve.
5. Enter the opening time of the valve in the corresponding menu – the value may be found on the actuator casing



Opening time of the valve actuator found on a rating plate

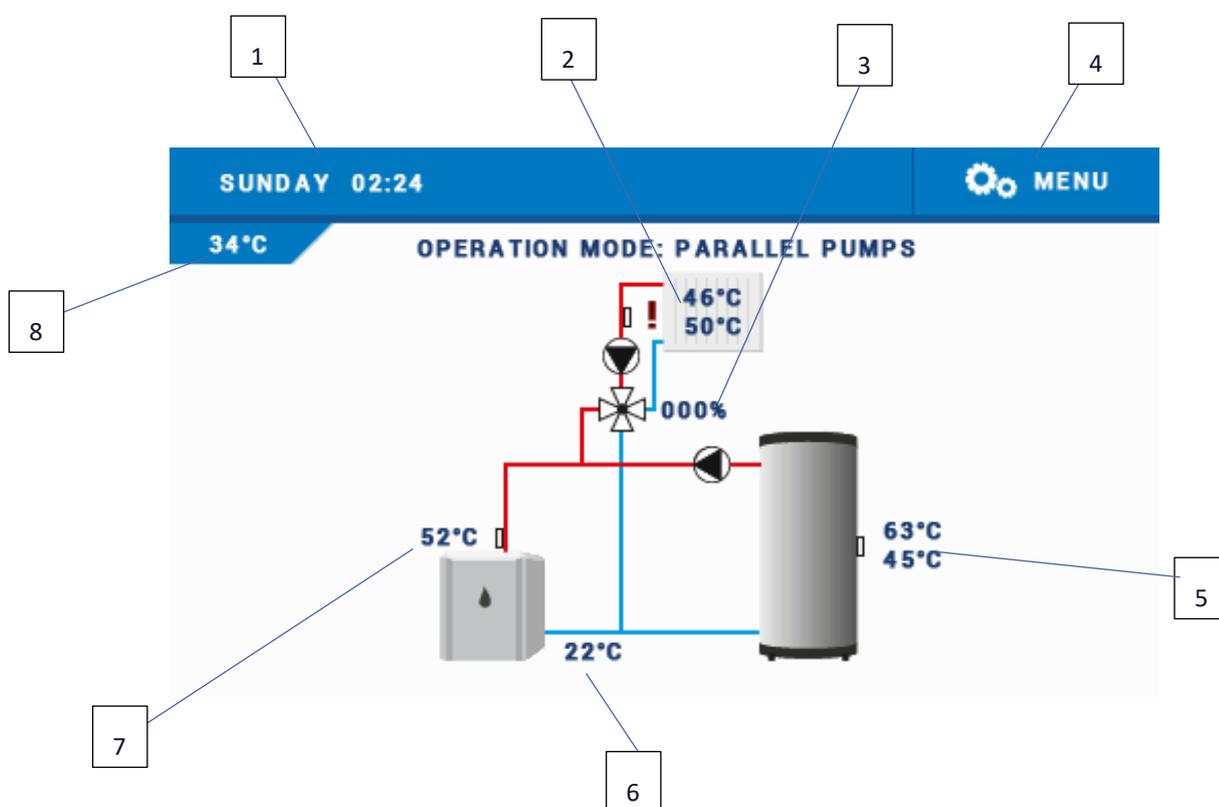
V. PRINCIPLE OF OPERATION

Controller operation involves mixing the hot circulating water with the water returning from the heating circuit in order to reach and maintain the pre-set temperature.

Pumps which are connected to each valve circuit help to distribute the water throughout the system. A pump should be connected behind the mixing valve whereas the temperature sensor should be placed behind both the pump and the valve in order to ensure accurate measurement of the valve output temperature.

VI. MAIN SCREEN DESCRIPTION

The device is controlled using the touch screen.



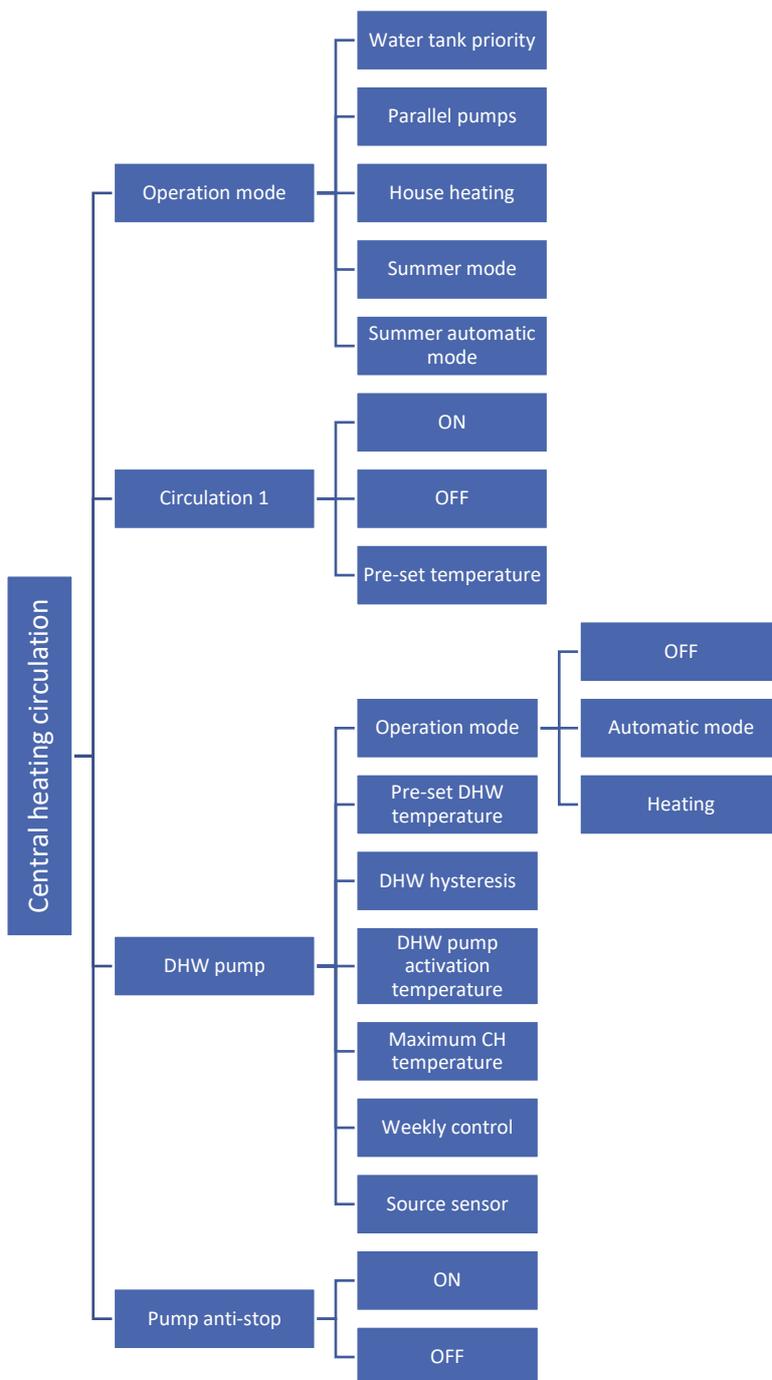
1. Current time and date
2. Current and pre-set valve temperature
3. % valve opening
4. Controller menu
5. Current and pre-set water tank temperature
6. Return temperature
7. Heat source temperature
8. External temperature

VII. CONTROLLER MENU



1. HEATING CIRCULATION

1.1. BLOCK DIAGRAM OF CENTRAL HEATING CIRCULATION



NOTE

Depending on the number of valves selected, additional options may appear in the menu: Circulation 2, Circulation 3, Additional circulation 1, Additional circulation 2. Each of these options has a similar submenu to the one described for Circulation 1.

1.2. OPERATION MODE

This function enables the user to select one of five operation modes available:



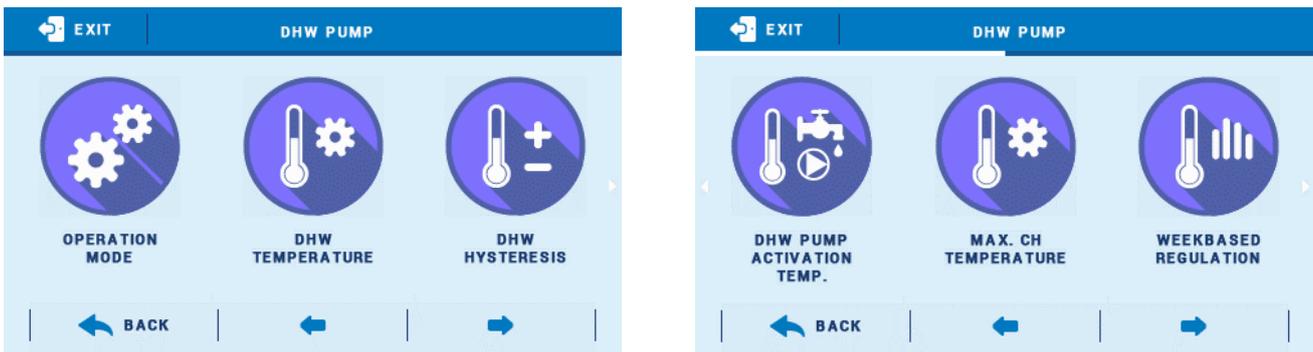
- **Boiler priority** - In this mode, water tank pump (DHW) is activated first in order to heat domestic water. Mixing valves are activated once the pre-set DHW temperature is reached. The valves operate continuously until the water tank temperature drops below the pre-set value by the pre-defined hysteresis.
- **Parallel pumps** - In this mode, all active pumps and valves operate simultaneously. The valves maintain the pre-set temperature and the water tank is heated to the pre-set temperature.
- **House heating** - In this mode, only the house circulation is heated and the main task of the controller is to maintain the pre-set valves temperature.
- **Summer mode** - in this mode, the CH valves are closed to prevent unnecessary house heating. If the CH boiler temperature is too high, the valve will be opened as an emergency procedure (it requires activating 'CH boiler protection' function!).
- **Auto summer mode** - This option involves automatic switching between modes. When the external temperature exceeds the activation threshold of Summer automatic mode, the valves will close. When the external sensor detects that a given threshold has been exceeded, the controller switches to summer mode. Average temperature is calculated on an ongoing basis. When it is lower than the pre-set value, the operation mode will switch to *parallel pumps*.

1.3. CIRCULATION 1

This function enables the user to activate/deactivate the circulation and define the pre-set temperature.

1.4. DHW PUMP

This option enables the user to configure:



- **Operation mode**
 - OFF – DHW pump is switched off.
 - Automatic mode – DHW pump operates according to *pump activation temperature* setting.
 - Heating - The pump operates until the pre-set DHW temperature is reached. In this mode, the source temperature and maximum CH temperature are ignored.
- **Pre-set DHW temperature** - This option is used to define the pre-set temperature of domestic hot water. Once the temperature is reached, the pump is disabled.
- **DHW hysteresis** - the temperature difference between device activation and its deactivation (e.g. when the *Activation temperature* is set at 60°C and the hysteresis value is 3°C, the device will be disabled when the temperature reaches 60°C and it will be activated again when the temperature drops to 57°C).
- **DHW pump activation temperature** - This option is used to set CH temperature which must be reached for the pump to be activated.
- **Maximum CH temperature** - This option is used to set the temperature at which the pump will be activated in order to transport the excess hot water into the water tank.
- **Weekbased regulation**- This function is described in detail in section VIII.
- **Source sensor** - This function enables the user to select the source sensor which will be used to provide temperature data.

1.5. PUMP ANTI-STOP

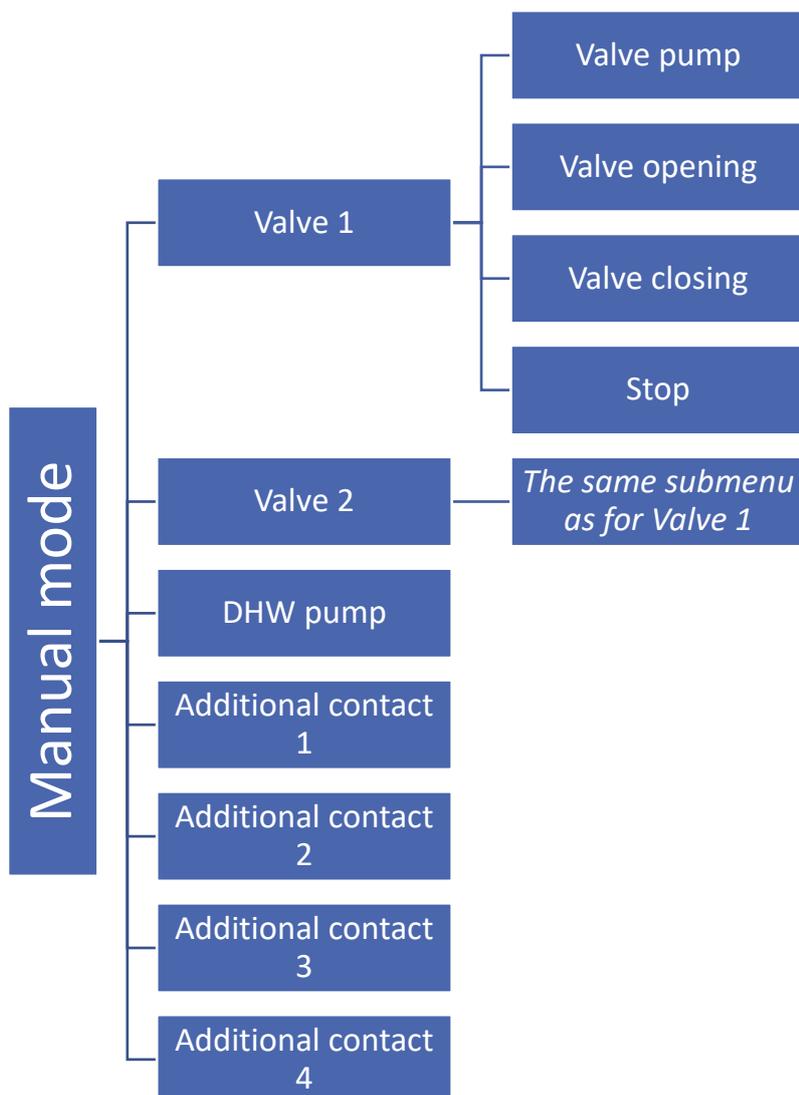
Anti-stop function prevents limestone depositing during long periods of pump standstill outside the heating season. When this function is active, the valve pump is switched on for 5 minutes every 10 days.



2. PRACA RĘCZNA

Funkcja ta umożliwia kontrolę działania poszczególnych urządzeń. Użytkownik ma możliwość ręcznego załączenia każdego z urządzeń: pompa C.W.U., styki dodatkowe oraz zawory. W przypadku zaworów użytkownik może załączyć zamykanie lub otwieranie, a także sprawdzić poprawność działania pompy danego zaworu.

2.1. BLOCK DIAGRAM OF MANUAL MODE



NOTE

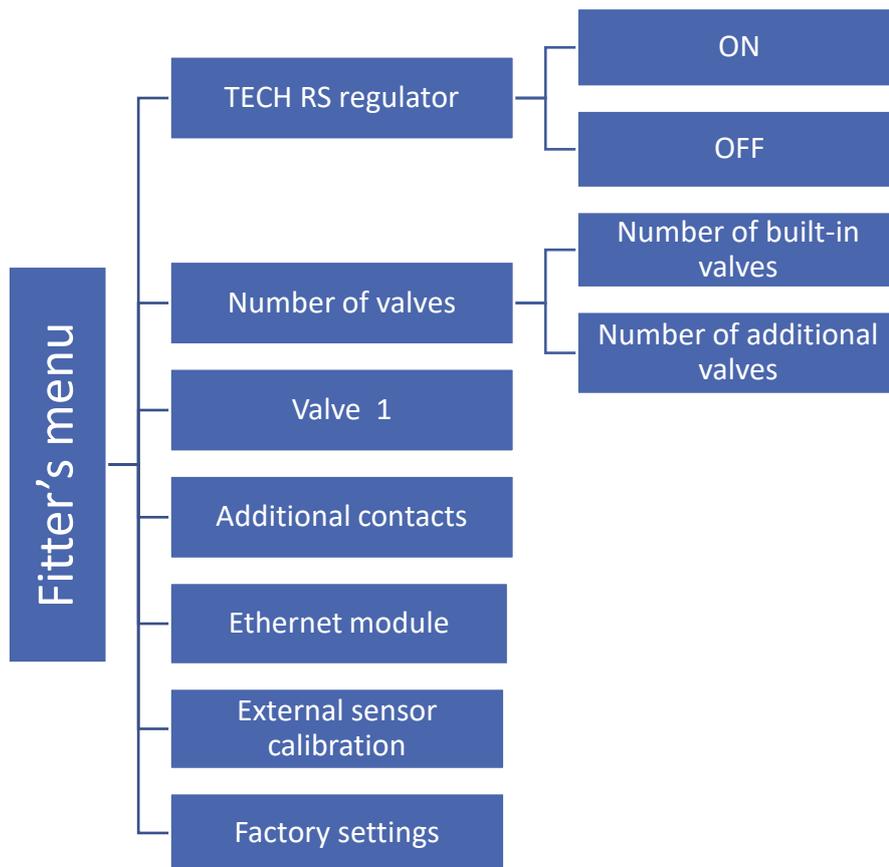
Once additional valves are registered, new options will appear in the menu: 'Additional valve 1', 'Additional valve 2' (depending on the number of additional valves registered) with the same submenu as for 'Valve 1'.



3. FITTER'S MENU

Fitter's menu is intended to be used by a qualified person in order to configure additional functions of the controller. Below you can find a simplified block diagram of Fitter's menu.

3.1. BLOCK DIAGRAM OF FITTER'S MENU



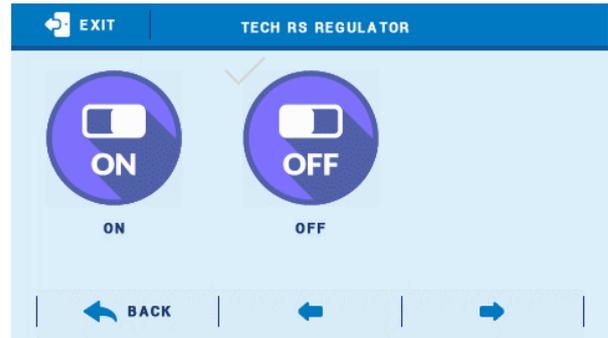
NOTE

Depending on the number of valves selected, additional options may appear in the menu: 'Valve 2', 'Additional valve 1', 'Additional valve 2', with the same submenu as for 'Valve 1' (described in section 7).

3.2. TECH RS REGULATOR

This option enables the user to switch on/off TECH room regulator with RS communication (e.g. ST-280, ST-296 RS or ST-298). In order for the regulator to cooperate with proper valve, it is necessary to activate this type of room temperature control and select proper operation mode in a given valve submenu.

TECH regulator offers RS communication function. It is connected to the controller using a four-core cable (RJ 12-type plug - 'a phone plug').

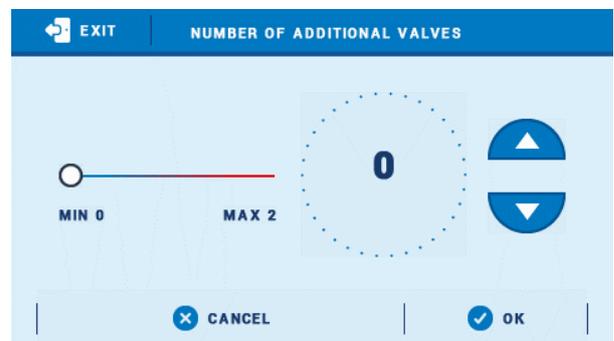
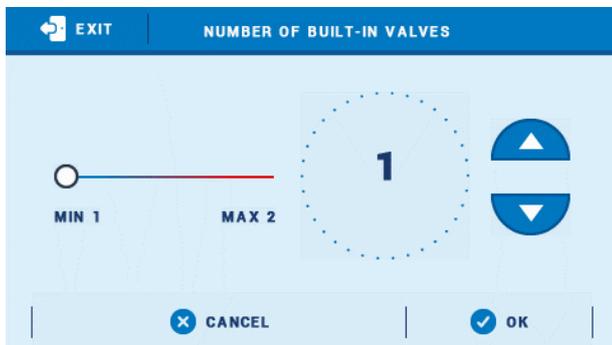


Once TECH regulator with RS communication is active, apart from controlling room temperature the user may also change the pre-set temperature of active valves and the water tank directly from the room regulator. Additionally, the user may access temperature log in the form of clear charts, view all alarms of the CH boiler controller, monitor the external temperature, set a weekly operation schedule etc.

3.3. NUMBER OF VALVES

This option is used to select the number of built-in valves (max. 2) and additional valves (max. 2).

Select the number using ▲ and ▼ or by dragging the slider.



3.4. VALVE 1

This function is described in detail in section 7.

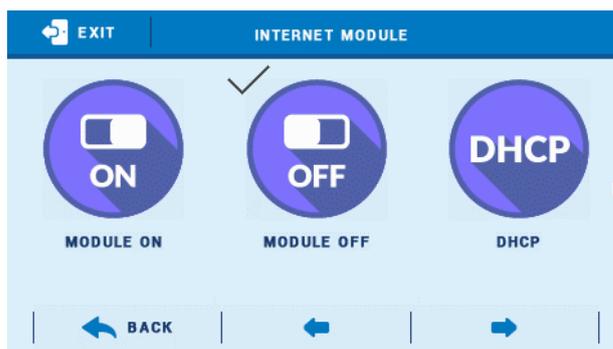
3.5. ADDITIONAL CONTACTS

This function is described in detail in section 8.

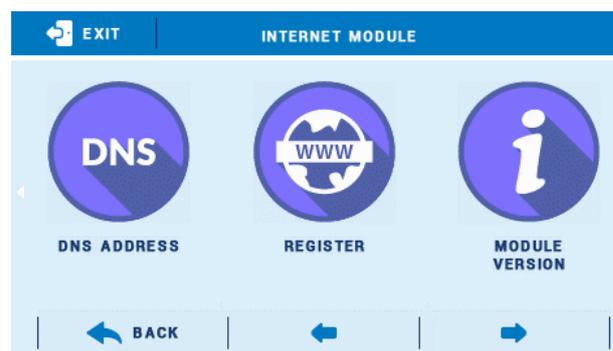
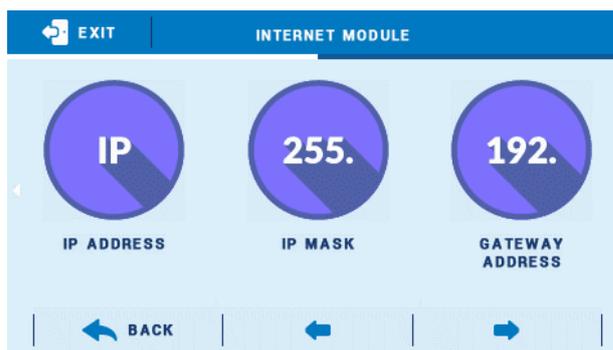
3.6. ETHERNET MODULE

Internet module is a device enabling the user remote control of the heating system. The user controls the status of all heating system devices on a computer screen, a tablet or a mobile phone.

Apart from the possibility to view the temperature of every sensor, the user can change the pre-set temperature of the pumps as well as the mixing valves.



After switching the module on and selecting DHCP option, the controller automatically downloads such parameters as IP address, IP mask, gateway address and DNS address from the local network. If any problems arise when downloading the network parameters, they may be set manually. The procedure of obtaining these parameters is described in detail in the instruction manual of the Internet Module.



NOTE

This type of control is available only after purchasing and connecting an additional controlling module ST-507 or WiFi RS, which is not included in the standard controller set.

3.7. EXTERNAL SENSOR CALIBRATION

External sensor calibration is performed when mounting the regulator or after it has been used for a long time, if the external temperature displayed on the sensor differs from the actual temperature. Calibration setting range is from -10°C to $+10^{\circ}\text{C}$.

3.8. FACTORY SETTINGS

This option enables the user to restore factory settings defined by the manufacturer.



4. PARAMETERS SCREEN

It enables the user to view all sensors connected to the controller. The user may monitor:

- Sensors temperatures
- Status of room regulators
- Status of valves 1,2
- Status of additional valves 1,2
- Status of pump
- Status of contacts

EXIT		PARAMETER SCREEN	
PAGE: 1/3			
VALVE 1 SENSOR	62.1°C	REGULATOR 1	ON
VALVE 1 PUMP	OFF	REGULATOR 2	OFF
VALVE 1 OPENING	OFF		
VALVE 1 CLOSING	OFF		
OPENING VALVE 1	0%		
VALVE 2 SENSOR	35.7°C		
VALVE 2 PUMP	OFF		
VALVE 2 OPENING	OFF		
VALVE 2 CLOSING	OFF		
OPENING VALVE 2	0%		

EXIT		PARAMETER SCREEN	
PAGE: 2/3			
CH SENSOR	62.3°C	ADDITIONAL CONTACT 1	OFF
DHW SENSOR	25.1°C	ADDITIONAL CONTACT 4	OFF
VALVE 1 SENSOR	61.7°C	ADDITIONAL CONTACT 2	OFF
VALVE 2 SENSOR	35.5°C	ADDITIONAL CONTACT 3	OFF
ADDITIONAL SENSOR 1	64.6°C	DHW PUMP	ON
ADDITIONAL SENSOR 2	23.8°C	VALVE 1 PUMP	OFF
ADDITIONAL SENSOR 3	27.3°C	VALVE 2 PUMP	OFF
ADDITIONAL SENSOR 4	-28.8°C		
RETURN SENSOR	24.0°C		
EXTERNAL SENSOR	24.1°C		



5. PANELS VIEW

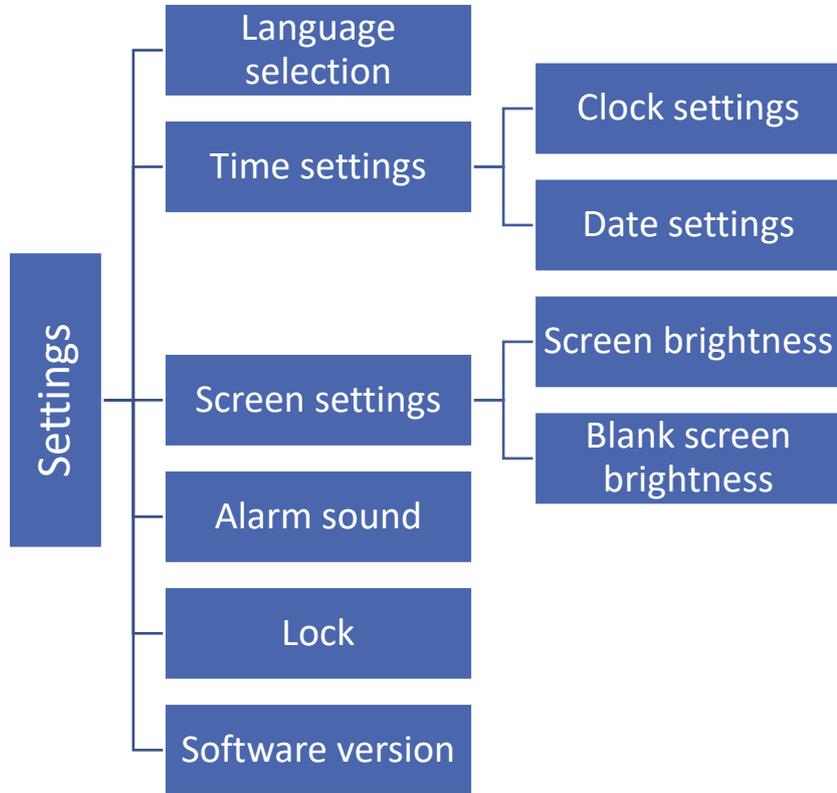
This view enables the user to view current status of additional contacts. The user may easily move on to editing selected parameters.

EXIT		PANEL VIEW		BACK	
ADDITIONAL CONTACT 1		ADDITIONAL CONTACT 2		ADDITIONAL CONTACT 3	
BUFFER		CIRCULATION PUMP		LACK	
🔥 24°C	🌡️ 50°C	🕒 5	🕒 5		
🔥 42°C	🌡️ 50°C				
ADDITIONAL CONTACT 4					
BUFFER DHW					
🔥 24°C	🌡️ 50°C				
🔥 42°C	🌡️ 50°C				
📅	🚫				



6. SETTINGS

6.1. BLOCK DIAGRAM OF SETTINGS



6.2. LANGUAGE SELECTION

This option is used to select the software language preferred by the user.

6.3. TIME SETTINGS

This option is used to set current time which is displayed in the main screen view.

Use icons: ▲ and ▼ to set the desired value and confirm by pressing OK.

6.4. SCREEN SETTINGS

Screen brightness may be adjusted to individual user's needs. New settings are saved once the user exits the screen settings menu.

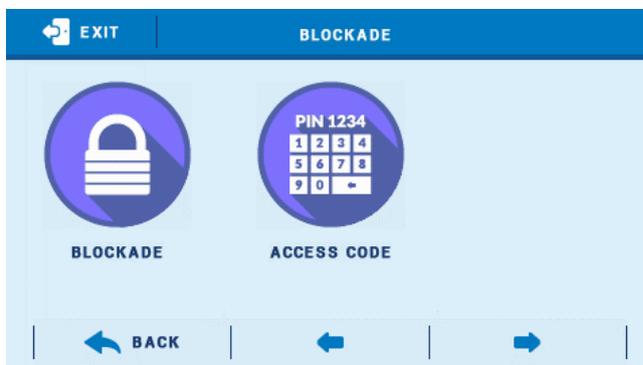
6.5. ALARM SOUND

This option is used to activate/deactivate an alarm sound informing about failure.

6.6. BLOCKADE

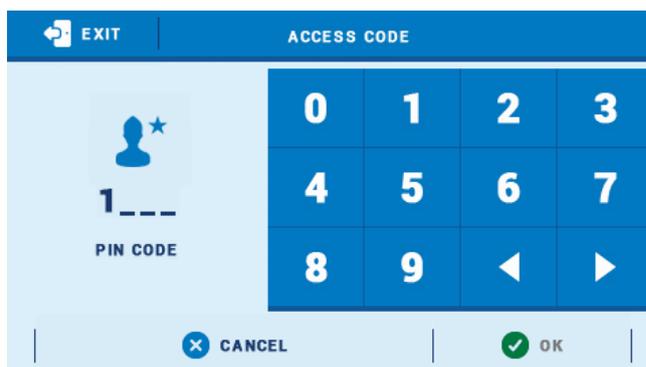
This function enables the user to lock access to the main menu. Follow these steps:

1. Select Access Code option
2. Set your PIN code which will enable you to access the menu
3. Click OK to confirm



NOTE

Default PIN code is 0000. Once the PIN code is changed, the default code does not work. If you forget your PIN code, enter 3950.



6.7. SOFTWARE VERSION

When this option is selected, the display shows the logo of the manufacturer as well as the software version used in the regulator.



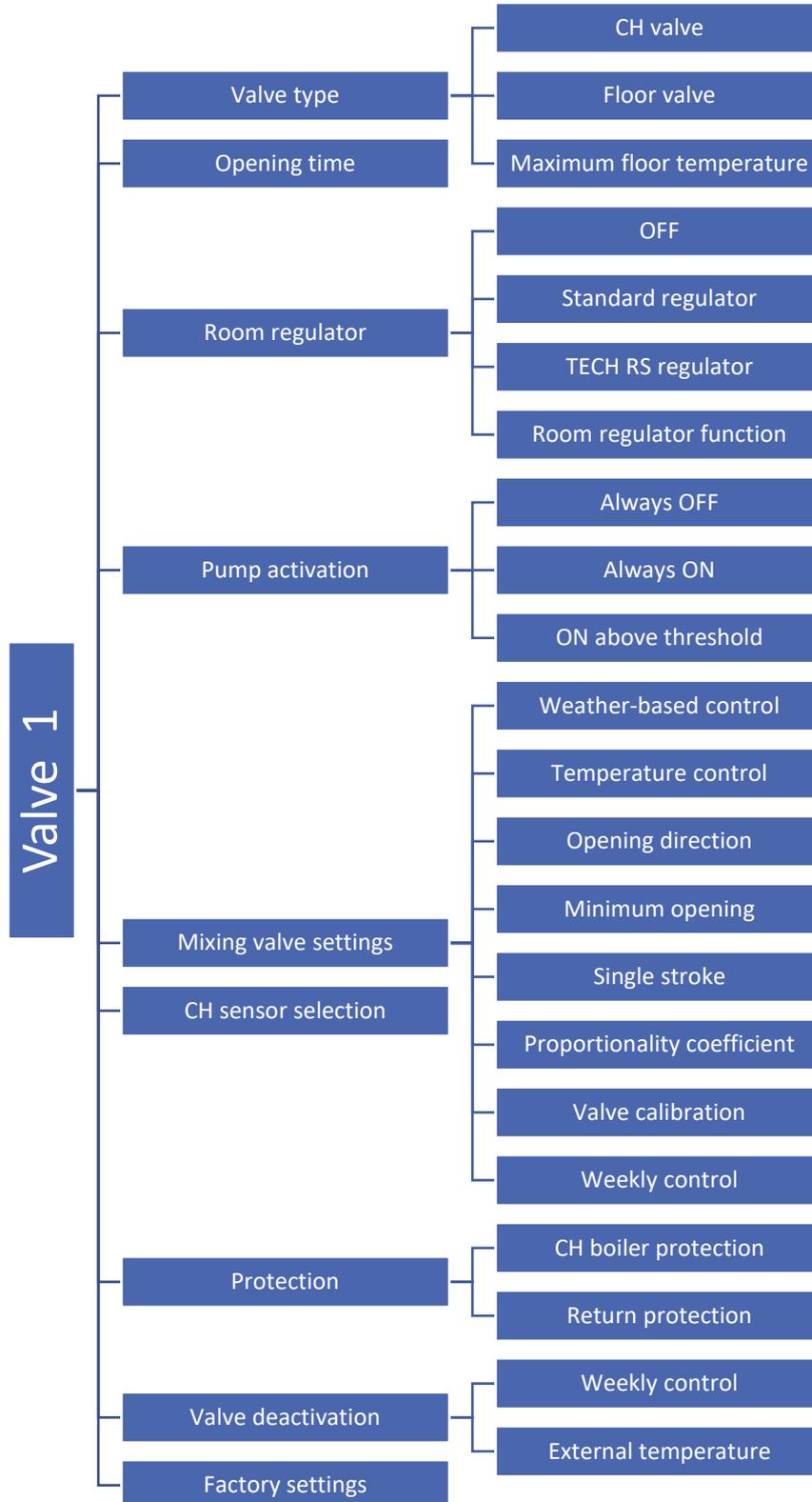
NOTE

When contacting Service Department of TECH company it is necessary to provide the software version number.



7. VALVES

7.1. SIMPLIFIED BLOCK DIAGRAM OF VALVE 1 SUBMENU



7.2. VALVE TYPE

By means of this setting the user selects the type of valve to be controlled:

- **CH valve** – selected if the user wants to control the CH circulation temperature.
- **Floor valve** - selected if the user wants to control the temperature of the underfloor heating circulation. It protects the underfloor heating installation against dangerous temperature. If the user selects CH as the valve type and connects it to the underfloor heating system, the fragile floor installation may be damaged. Once this option is selected, the user also defines the maximum floor temperature.
- **Max. floor temperature** - it is the maximum temperature which does not damage the underfloor heating system. Setting range: 40°C to 55 °C.

Once maximum floor temperature is reached, the valve is closed completely. If the maximum floor temperature is reached, CH boiler protection function will be deactivated. In such a case, protecting underfloor heating system is assigned higher priority.



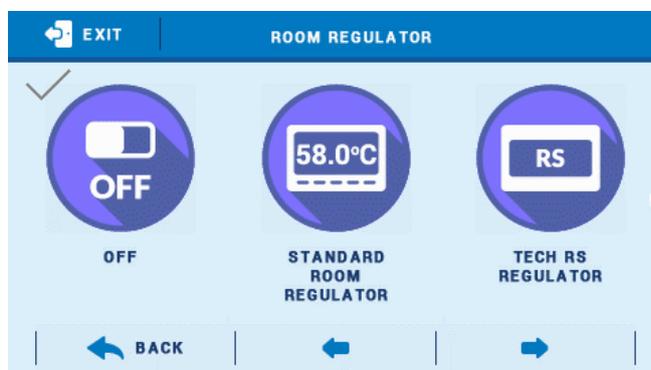
7.3. OPENING TIME

This parameter defines the time needed for the valve actuator to open the valve from 0% to 100% position. This value should be adjusted to the value given on the actuator rating plate. It is described in 'First start-up' section.

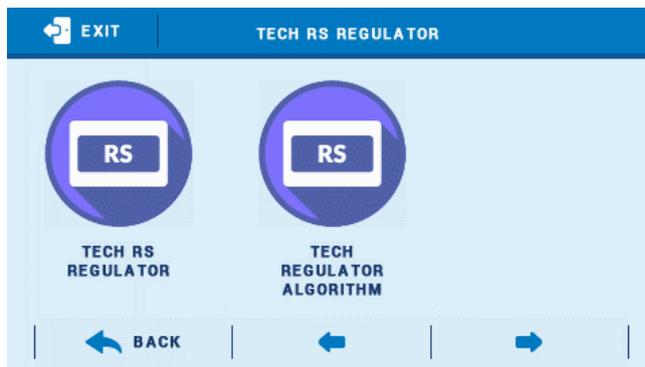
7.4. ROOM REGULATOR

This function enables the user to activate and choose the type of room regulator which will be assigned to a given valve.

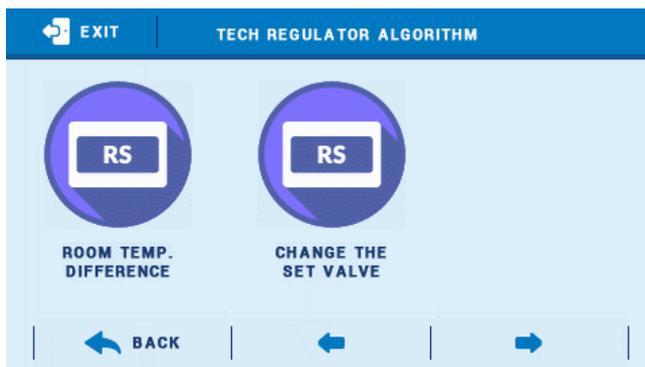
- **Standard regulator** - When this type of two-state regulator is selected, the valve works according to room regulator function. This regulator should be connected to the controller in the place labelled *Room regulator 1, 2 or 3* using a two-core cable.



- **TECH RS regulator (with RS communication)** - When this type of two-state regulator is selected, the valve works according to room regulator function. Activation of this regulator enables the user to view the current temperature of the CH boiler, water tank and the valves. This regulator should be plugged to RJ (telephone-type) socket of the i-2 controller using a four-core cable with appropriate plugs (to the RS socket).



- **TECH regulator algorithm** - (with RS communication). When this type of regulator is selected and 'room temperature reduction' function is activated, the valve works according to <change in pre-set valve temp.> and <room temperature difference> parameters. Activation of this regulator enables the user to view the current temperature of the CH boiler, water tank and the valves. This regulator should be plugged to RJ (telephone-type) socket of the i-2 controller using a four-core cable with appropriate plugs (to the RS socket).



- **Room temperature difference** - This setting is used to define the single unit change in the current room temperature (with the accuracy of 0.1°C) at which a predefined change in the set temperature of the valve will be introduced (function available only with TECH room regulator with RS communication).

Example:

setting: room temperature difference 0,5°C

setting: change in pre-set valve temperature 1°C

setting: pre-set temperature of the valve 40°C

setting: pre-set temperature of the room regulator 23°C

Case 1. If the room temperature rises to 23.5°C (0.5°C above the pre-set room temp.), the pre-set valve temperature drops to 39°C (temp. reduction of 1°C).

Case 2. If the room temperature drops to 22°C (1°C below the pre-set room temp.), the valve increases its pre-set temperature to 42°C (temp. increase of 2°C).

- **Change in pre-set valve temp.** - This setting determines by how many degrees the valve temperature is to increase or decrease with a single unit change in room temperature (see: *Room temperature difference*) This function is active only with TECH room regulator and it is closely related to the *Room temperature difference* parameter.

- **Room regulator function** - This parameter defines the influence of room regulator on valve operation.
 - **Closing** - When room regulator sends a signal informing that the pre-set room temperature has been reached, the controller will close the main valve.
 - **Room temperature reduction** - When room regulator sends a signal informing that the pre-set room temperature has been reached, the pre-set valve temperature will be reduced by the value defined in this parameter (TECH regulator algorithm calculates room temperature reduction on the basis of room temperature difference).
 - **Pump deactivation** – When room regulator sends a signal informing that the pre-set room temperature has been reached, the controller will disable the pump.



NOTE

Function available only for built-in valves.

7.5. PUMP ACTIVATION

This option is used to select pump operation mode:

- **Always OFF** - the pump is inactive all the time, the regulator controls only valve operation.
- **Always ON** - the pump operates all the time, regardless of temperatures.
- **Always above the treshold** - the pump is switched on above pre-set activation temperature. Settings range: 1°C to 80 °C.



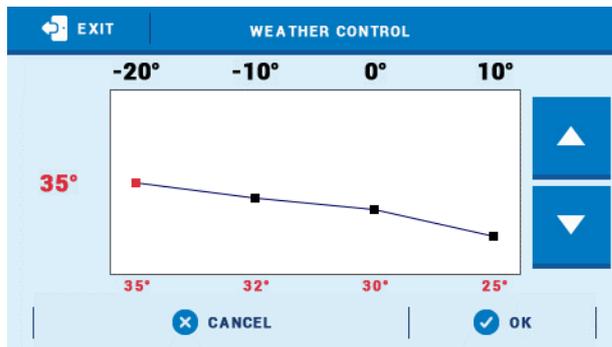
7.6. MAXING VALVE SETTINGS

- **Weather-based control** - For the function of weather control to be active, the external sensor mustn't be exposed to sunlight or influenced by the weather conditions. After it is installed in an appropriate place, weather control function needs to be activated in the controller menu.

For the valve to operate correctly, the user defines the pre-set temperature (behind the valve) for 4 intermediate external temperatures: -20°C, -10°C, 0°C and 10°C.



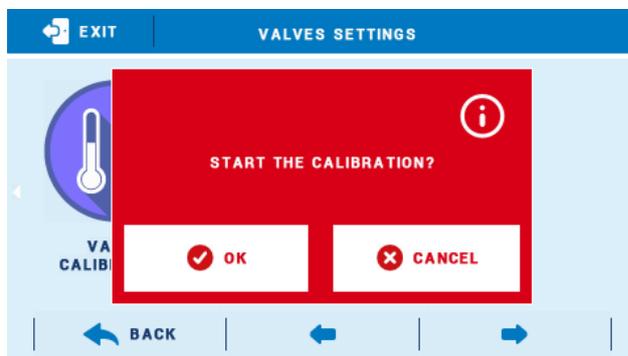
In order to configure the pre-set temperature value, touch and drag appropriate points up or down (the pre-set valve temperature will be displayed on the left), or use arrows ▲ and ▼ to select the temperature value. Subsequently, the display will show the heating curve.



- Temperature control** - This parameter determines water temperature measurement (control) frequency behind the CH or DHW installation valve. If the sensor indicates a change in temperature (deviation from the pre-set value), then the electric valve will open or close by the pre-set stroke, in order to return to the pre-set temperature.
- Opening direction** - If, after connecting the valve to the controller, it turns out that it is connected the other way round, then the power supply cables do not have to be switched. Instead, it is enough to change the opening direction in this parameter: *LEFT* or *RIGHT*. Function available only for built-in valves.
- Minimum opening** - The parameter determines the smallest valve opening. Thanks to this parameter, the valve may be opened minimally, to maintain the smallest flow. Setting 0° disables the valve pump.
- Single stroke** - This is a maximum single stroke (opening or closing) that the valve may make during one temperature sampling. If the temperature is near the pre-set value, the stroke is calculated on the basis of *PROP_COEFF* parameter value. The smaller the single stroke, the more precisely the set temperature can be achieved. However, it takes longer for the set temperature to be reached.
- Proportionality coefficient** - Proportionality coefficient is used for defining valve stroke. The closer the pre-set temperature, the smaller the stroke. If the coefficient value is high, the valve takes less time to open but at the same time the opening degree is less accurate. The following formula is used to calculate the percent of a single opening:

$$(\text{PRE-SET_TEMP} - \text{SENSOR_TEMP}) * (\text{PROP_COEFF} / 10)$$

- Calibration** - This function enables the user to calibrate a given valve at any time. During this process the valve is restored to its safe position – in the case of CH valve it is fully opened whereas in the case of floor valve it is closed.
- Weekly control** - This function is described in section VIII.



7.7. CH SENSOR SELECTION

This option is used to select the sensor which should serve as CH sensor. It may be any sensor which is connected to the controller.

NOTE



Always make sure if proper sensor is selected to ensure correct pump operation.

7.8. PROTECTIONS

- **CH boiler protection** - this function serves to prevent the hazardous growth of CH boiler temperature. The user sets the maximum acceptable CH boiler temperature. In case of the hazardous growth in temperature, the valve begins to open in order to cool the CH boiler down. This function is activate by default.



NOTE This option is not available for floor valves.

- **Return protection** - this function is used to set CH boiler protection against too cool water returning from the main circulation, which could cause low-temperature boiler corrosion. The return protection involves closing the valve when the temperature is too low, until the short circulation of the boiler reaches appropriate temperature.



NOTE



To ensure effectiveness of this protection, it is necessary to activate the valve in the heating circulation menu.

7.9. VELVE DEACTIVATION

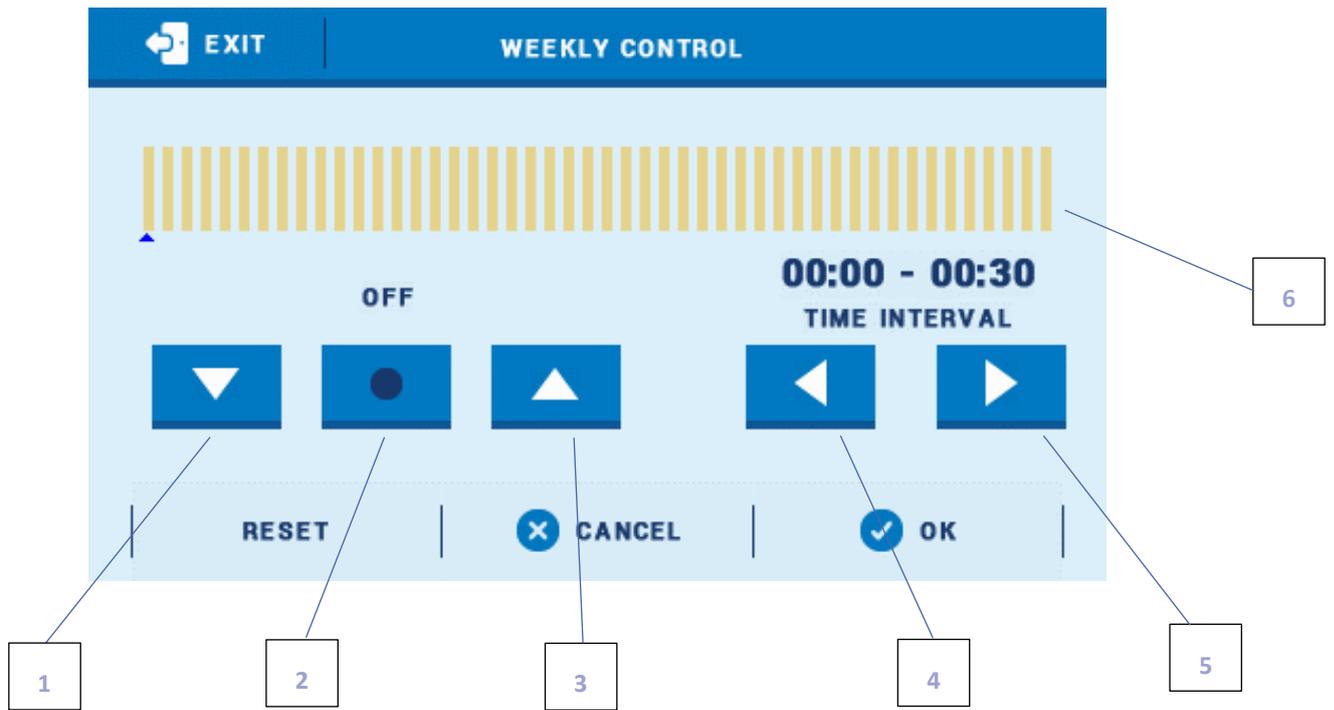
Once this function is selected, valve operation depends on weekly control settings and external temperature.

- **Weekly control** - once this function is selected, the user may activate/deactivate weekly operation schedule and define the time when the valve will be closed.

NOTE



Operation schedule in <Weekly control> may be defined as 'weekly control ON/OFF', which is different from Weekly control presented elsewhere in the menu. Weekly control is described in detail in section VIII.



1. OFF
2. Copy previous step
3. ON
4. Change time period backwards
5. Change time period forwards
6. Time period bar (24 hours)

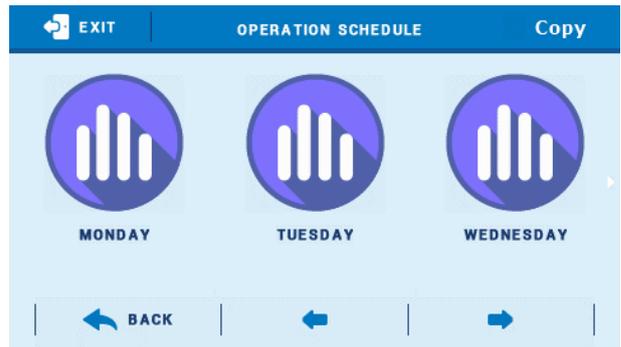
Example:

In order to program valve closing at 09:00 - 13:00, the user should:

1. Select <OFF>
2. Select  and set the time period: 09:00 - 09:30
3. Select <ON>
4. Select  to copy the setting (the colour will change to red)
5. Select  to set the time period: 12:30 - 13:00
6. Press <OK> to confirm

It is possible to copy the settings for selected days of the week:

- ✓ Select <Copy> (top right-hand corner)



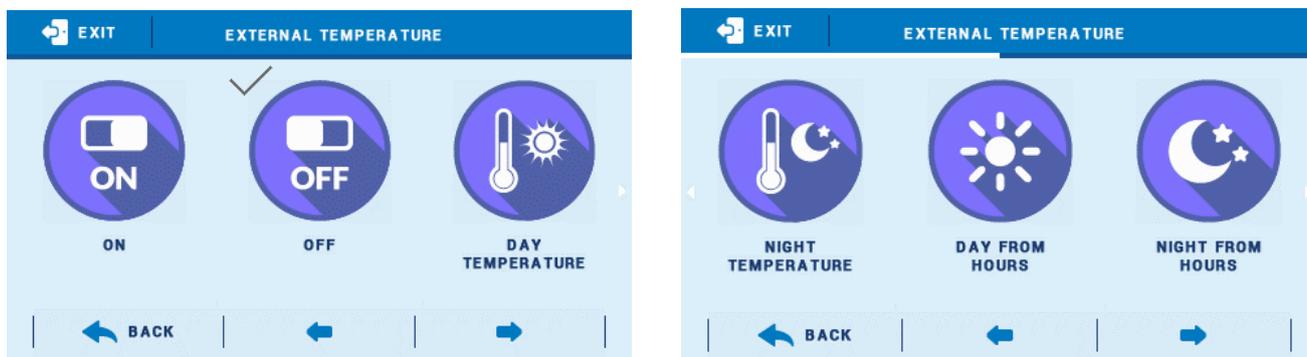
- ✓ Select the day to copy the settings from



- ✓ Select day(s) to which the settings will be copied



- **External temperature** - The user may set nighttime and daytime temperature at which the valve will be deactivated. It is also possible to program hours when the controller will operate in day or night mode. The user sets the hysteresis of valve deactivation temperature.



7.10. FACTORY SETTINGS

This function enables the user to restore the factory settings for a particular valve. Restoring factory settings does not change the selected valve type (CH or floor).



8. ADDITIONAL CONTACTS

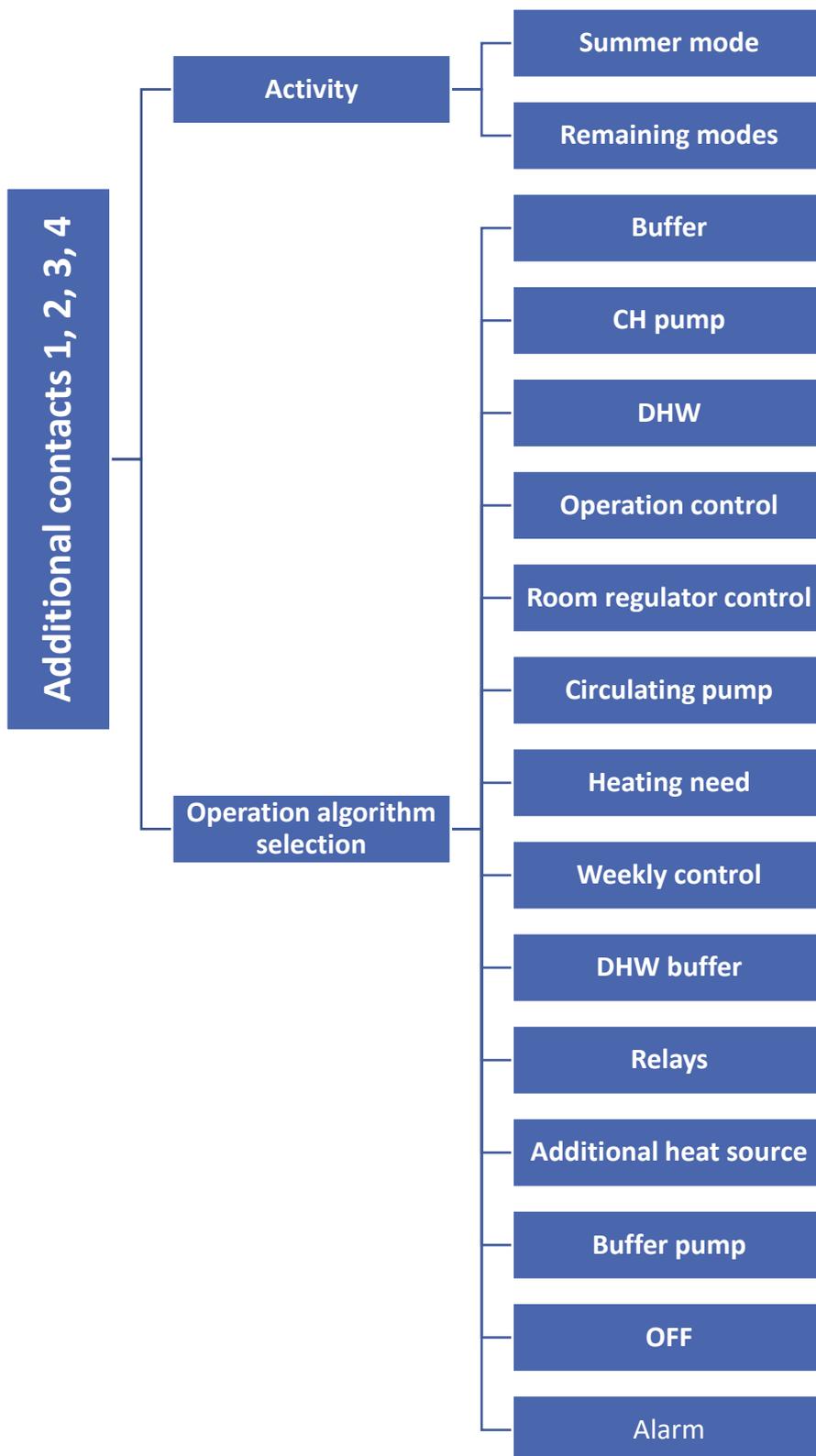
This option is used to activate/deactivate additional contacts. Voltage outputs 230V are intended for connecting additional contacts 1 and 4 whereas voltage free outputs are intended for connecting contacts 2 and 3.

Various devices may be connected to additional contacts (e.g. pumps or heating devices). It is possible to control their operation mode by selecting one of algorithms and choosing sensors to provide data for control purposes.

First, select when a given contact is to be active in *Activity* submenu (Summer mode or Remaining modes). Both options are selected by default - additional contact is active regardless of current operation mode of the controller. The user may select Summer mode if necessary.

Enter *Algorithm selection* submenu and select the function which the connected device is to serve. Tapping on function icon enables the user to configure operation parameters of the device.

This section includes pictorial diagrams of system connections. They cannot replace CH installation project. Their main aim is to present how the controller system may be expanded.



NOTE



This section includes pictorial diagrams of system connections. They cannot replace CH installation project.

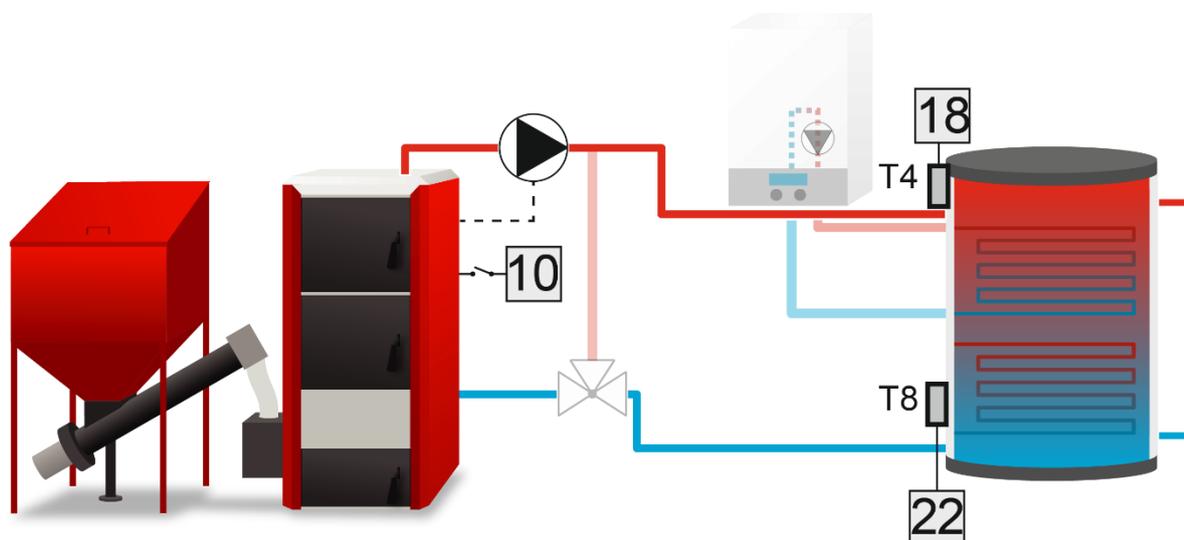
8.2. BUFFER

This algorithm is used to heat water in the buffer by activating the heating device.



Example:

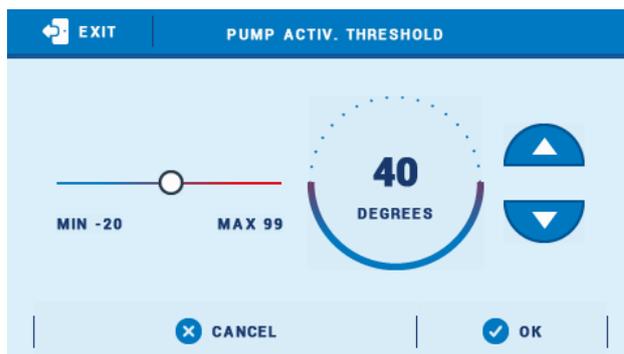
Part of the heating system is handled by CH boiler and buffer. CH boiler is connected to voltage-free contact with buffer function. Its task is to heat water in the buffer. Top buffer temperature is read by sensor T4 (CH) and bottom buffer temperature is read by sensor T8. CH boiler is enabled when the temperature on both sensors drops below the pre-set values and it is disabled when T8 sensor temperature is exceeded by <bottom buffer temperature>.



8.3. CH PUMP

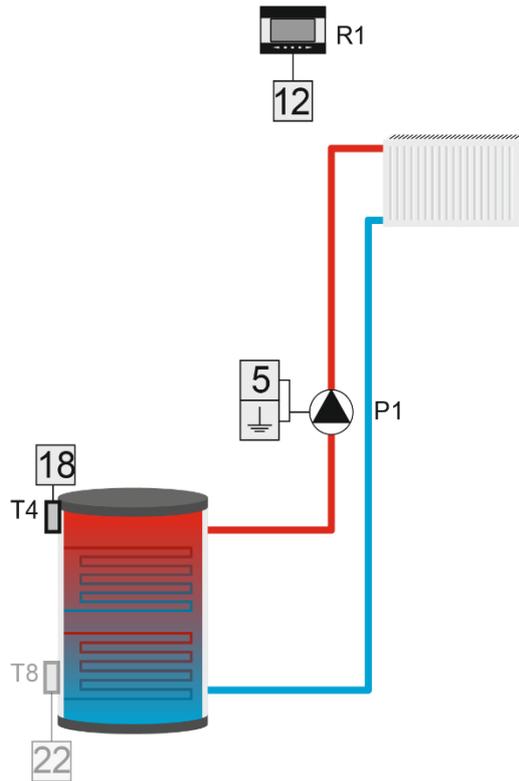
This algorithm is used to control CH pump. The following settings need to be configured properly:

- **Pump activation threshold** - this option is used to set the device activation temperature. Below this temperature the device remains inactive; above this value the device is enabled.
- **Hysteresis** - the temperature difference between device activation and its deactivation (e.g. when the Activation temperature is set at 40°C and the hysteresis value is 5°C, the device will be enabled when the temperature reaches 40°C and it will be disabled when the temperature drops to 35°C).
- **Sensor** - This option is used to select the sensor which will provide temperature data necessary for controlling the device connected to additional contact.
- **Room regulator** – Once a room regulator or DHW tank is selected, the device connected to additional contact will start operating when the selected room regulator or DHW tank reaches the pre-set temperature.



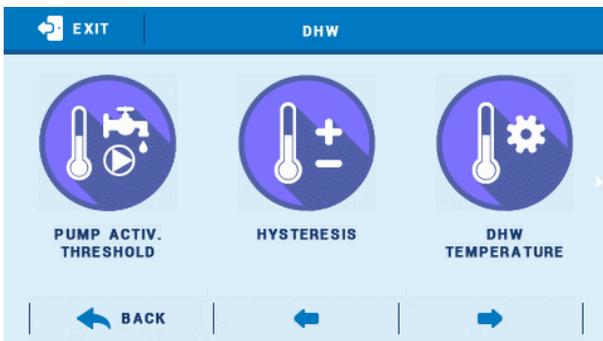
Example:

Part of the CH system is handled by buffer and pump. Pump is connected to additional contact and buffer temperature is read from sensor T4 (CH). The pump is enabled when the temperature on the sensor exceeds <pump activation threshold> and it is disabled when the room temperature is reached or when T4 sensor temperature drops below <pump activation threshold>.



8.4. DHW

This algorithm is used to control DHW pump. The following settings need to be configured properly:



- **Pump activation threshold** - this option is used to set the device activation temperature (measured by the heat source sensor which reads the temperature of the heat source e.g. CH boiler). Below this temperature the device remains inactive; above this value the device is enabled and operates until the pre-set temperature is reached.
- **Hysteresis** - the temperature difference between device activation and its deactivation. Once the pre-set temperature is reached, the device is disabled. It is enabled again when the temperature measured by the sensor drops below the pre-set temperature by hysteresis value ((e.g. when the pre-set temperature is set at 60°C and the hysteresis value is 3°C, the device will be disabled when the temperature reaches 60°C and it will be enabled when the temperature drops to 57°C).
- **Pre-set DHW temperature** - this parameter is used to define the pre-set temperature. Once it is reached, the device is disabled. The temperature is measured by DHW sensor.

- **Maximum temperature** – this option is used to set maximum temperature of source sensor. Once it has been reached, the device is enabled and remains active until the source temperature drops below maximum temperature by 2°C or DHW sensor temperature exceeds the source temperature. This function serves as protection against system overheating.
- **Source sensor** - this option is used to select the sensor which will provide temperature data necessary for controlling the device connected to additional contact.
- **DHW sensor** - this option is used to select the sensor which will provide temperature data necessary for controlling the device connected to additional contact (pre-set temperature).

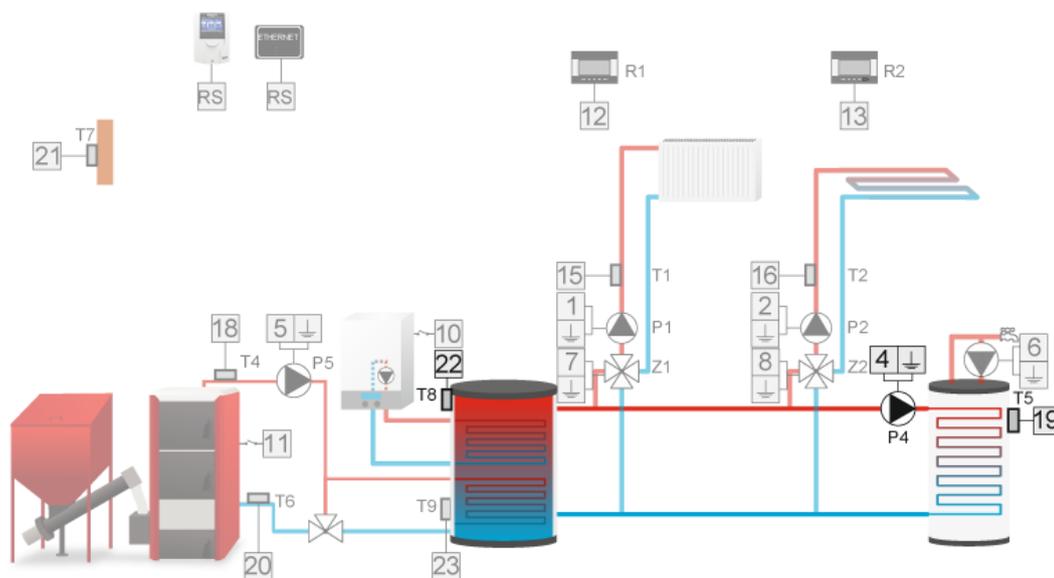
Example:

Part of the heating system is handled by buffer and pump. Pump is connected to additional contact. Buffer temperature is read from sensor T4 (CH) and water tank temperature is read from sensor T5 (DHW).

The contact is activated when:

- Source temperature exceeds <pump activation threshold >
- Pre-set DHW temperature has not been reached
- Source sensor temperature is higher than T5 sensor temperature

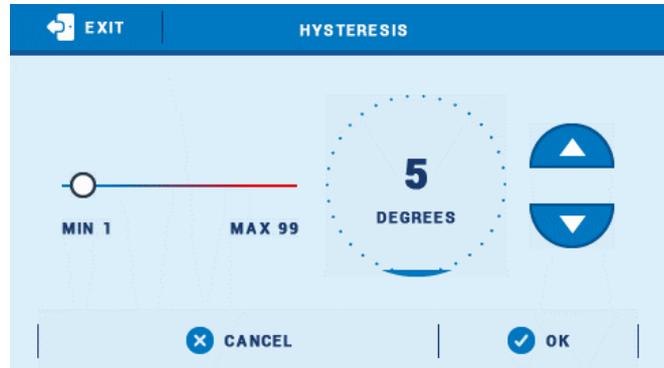
If source temperature exceeds <maximum temperature>, the pump will be enabled in order to transfer the excess heat from the heat source.



8.5. OPERATION CONTROL

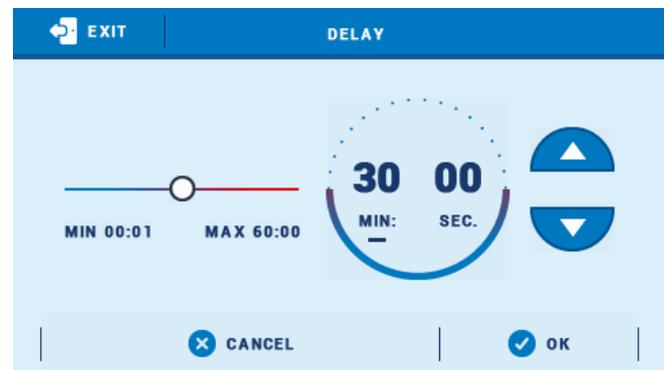
If the user selects this option, additional contact will be used to control other contact operation. In order for this function to operate correctly, the following parameters need to be configured:

- **Pre-set** - this parameter defines the pre-set temperature which must be reached by the selected sensor. Reaching this temperature proves that the device connected to this contact operates properly.

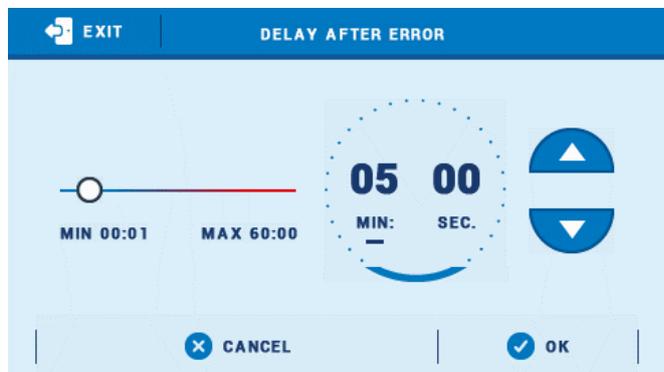


- **Hysteresis** - this option is used to set the hysteresis of pre-set temperature for the selected sensor.

- **Delay** - If the pre-set temperature of the selected sensor has not been reached after this time, it means that the additional contact which is controlled does not work properly. In such a case, the controller forces activation of the device connected to the controlling contact. The device remains active until the pre-set temperature is reached.



- **Delay after error** - If the pre-set temperature is still not reached within this time after an error of controlled contact has occurred, the controller again forces activation of the device connected to the controlling contact.



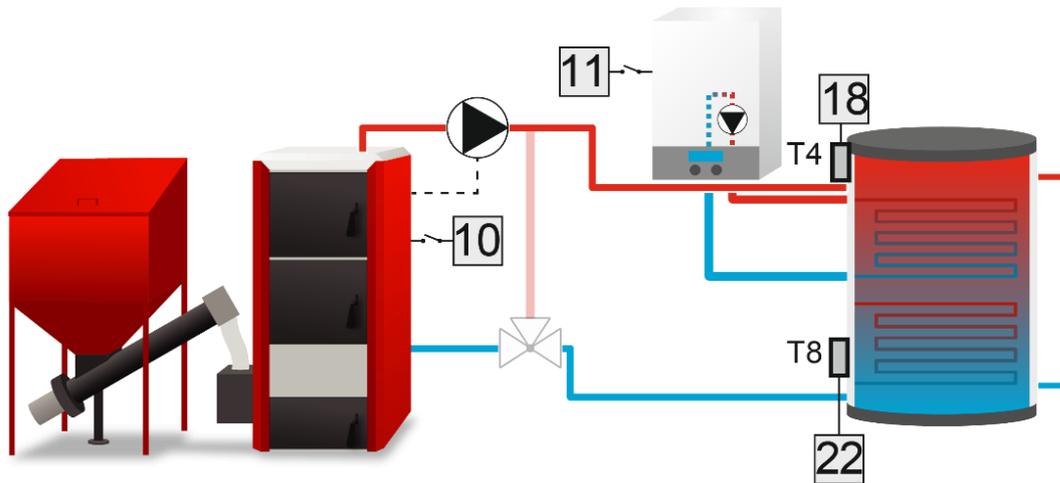
- **Sensor** - This function enables the user to choose the sensor which will provide temperature readings.

- **Additional contact** - This function enables the user to choose the additional contact which is to be controlled.

- **Weekly control** - Operation control may be active on selected days of the week at pre-defined time. The user must activate and configure weekly control function following the steps described in section VII.

Example:

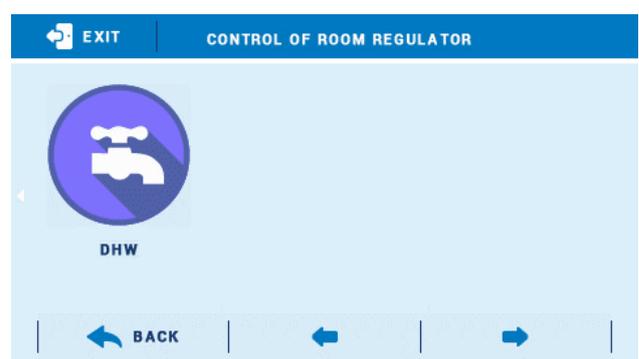
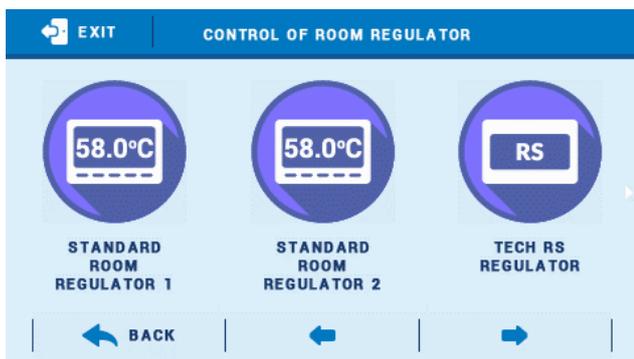
Part of the heating system is handled by 2 CH boilers and a buffer. The task of the boilers is to heat the water in the buffer. Gas boiler is connected to voltage-free contact 2 with operation control function. The other boiler is connected to voltage-free contact 3 with buffer function. Buffer temperature is read by sensor T4 (CH). Additional contact supporting the gas boiler will be used to control the operation of the other boiler. If the controlled device does not get activated and the selected sensor fails to reach the pre-set temperature within the delay time, the controller will activate the device connected to the controlling contact.



8.6. ROOM REGULATOR CONTROL

This algorithm is intended for controlling the device which is to operate according to the signal from the room regulator.

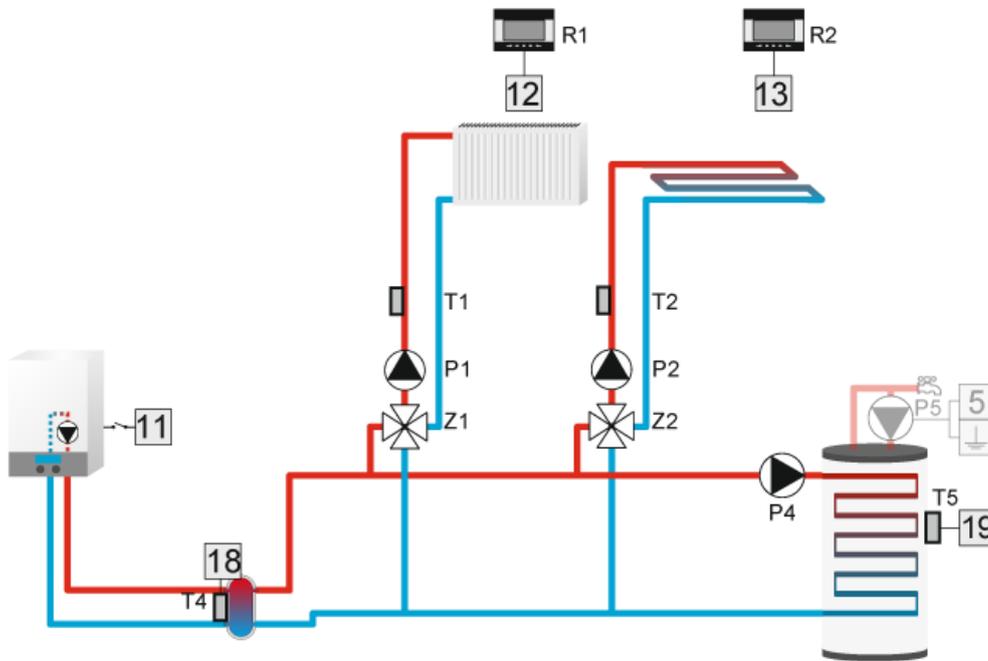
When the pre-set room temperature has not been reached, the contact remains closed (the device is active). Once the pre-set temperature is reached, the contact opens (the device is disabled).



Additional device operation may be based on signal from more than one room regulator - the device will switch off only when all room regulators reach their pre-set temperatures. Once DHW option is selected, additional device activation/deactivation will depend on water tank temperature - when the pre-set value is reached, the device will be disabled.

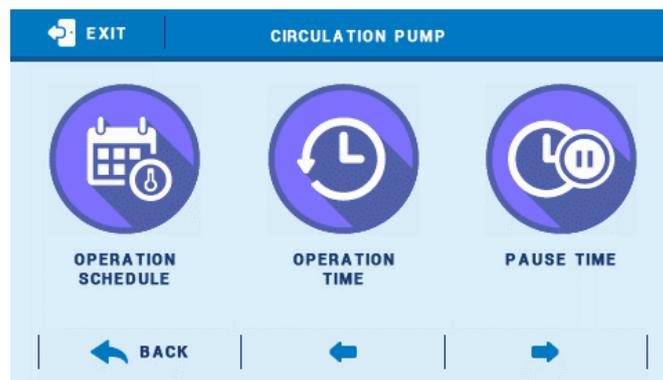
Example:

The controller handles central heating system with CH boiler and three valves. Gas boiler is connected to voltage-free contact. The user selected standard regulator 1, standard regulator 2, TECH RS regulator and DHW function. If any of these devices signals the need for heating, the contact will close and the device will be active until all the regulators reach their pre-set temperatures.



8.7. CIRCULATING PUMP

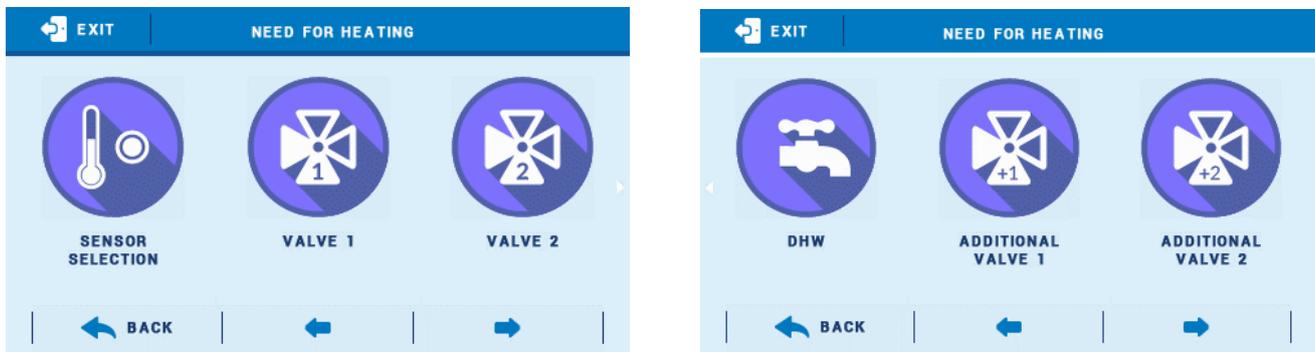
This function is used to control the pump which mixes hot water between the water tank and DHW receivers.



After activating this function the user sets the 24-hour cycle of pump pause and activation (with the accuracy of 30 minutes). In order to make setting the 24-hour cycle easier, the user may copy a selected time interval into the next one. After the operation schedule is defined, the user sets the pump operation time and the pump pause time while the previously selected time interval is active. The user may easily delete the previously saved settings in order to introduce new intervals. Configuring operations schedule is described in detail in section 7.8.

8.8. NEED FOR HEATING

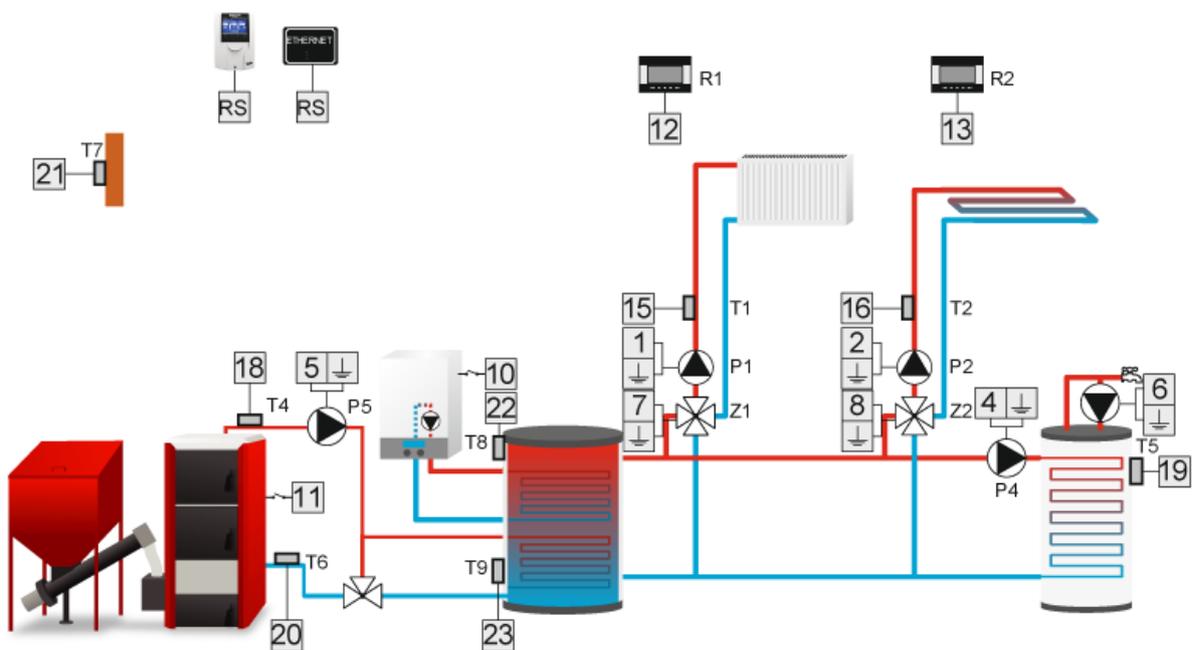
The device connected to additional contact will be enabled in order to heat the valve when the pre-set valve temperature cannot be reached. Once this option is selected, the user chooses the temperature sensor which will provide temperature readings for this function.



If the temperature read from the sensor is lower than the pre-set valve temperature (more than one valve may be selected at the same time), the device will be activated in order to increase the temperature at the valve.

Example:

The controller handles central heating system with CH boiler and three valves. Gas boiler is connected to voltage-free contact with Heating need function. The pre-set valve temperature is 50°C. The sensor selected for Heating need function is T4 (CH). When the CH boiler temperature drops below 50°C (CH boiler cannot increase the valve temperature in order to reach the pre-set value) the controller will activate the heater.



8.9. WEEKLY CONTROL

Once weekly control function is selected, the user configures contact activation schedule.

Setting Operation schedule is described in section 7.9.

8.10. DHW BUFFER

The device will operate until the pre-set temperature values of buffer 'top' and 'bottom' are reached – in order for the pump to be switched off, both sensors must reach the pre-set temperature. After the pre-set temperature of buffer 'top' is reached, the pump will still operate for the period of time set by the user as the delay time.



Moreover, the device may operate according to weekly program (described in detail in section 9), which controls the temperature of the upper sensor. The user may choose which sensors will serve as top and bottom sensors.

- **Pre-set buffer temp. top** - this function enables the user to define the pre-set temperature for the upper part of the buffer (sensor should be placed in the upper part of the tank). Once this value is reached and the delay time elapses, the pump is disabled (provided that the pre-set buffer temperature bottom has also been reached).
- **Pre-set buffer temp. bottom** – this function enables the user to define the pre-set temperature for the lower part of the buffer (sensor should be placed in the lower part of the tank).
- **Top hysteresis** – this option is used to set the hysteresis for the top sensor. After pre-set buffer temp. top and pre-set buffer temp. bottom have been reached, the device is switched off. It is activated again when the sensor temperature drops to the pre-set value minus top hysteresis. (for example: if the pre-set buffer temp. top is 70°C and the hysteresis value is 5°C, the device will be switched off when the temperature reaches 70 °C whereas its operation will be restored when the temperature drops to 65°C).
- **Bottom hysteresis** – This option is used to set the hysteresis for the bottom sensor.
- **Delay** – this device enables the user to define how long the device should remain active after the pre-set buffer temp. top has been reached.
- **Weekly control** - This function is described in detail in section 9.

- **Top sensor** – this option is used to select the sensor which will serve as the top sensor. It should be placed in the upper part of the tank.
- **Bottom sensor** - this option is used to select the sensor which will serve as the bottom sensor. It should be placed in the lower part of the tank.

8.11. RELAYS

This algorithm is used to control the device which is to be enabled at the same time as selected devices in the heating system.

Operation mode function enables the user to decide when the contact will be activated:

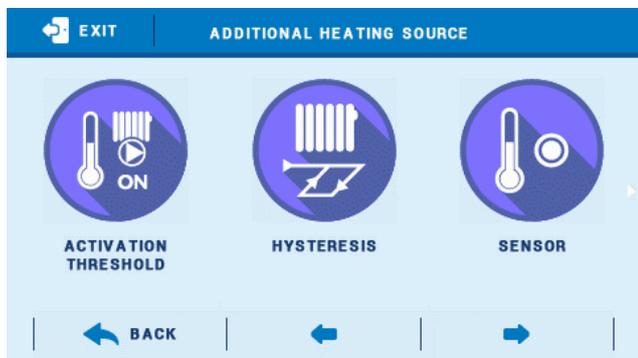
- **All** - The contact is enabled when all relays are active.
- **Any** - The contact is enabled when any of the relays in active.
- **None** - The contact is enabled, when no relay is active.



8.12. ADDITIONAL HEATING SOURCE

The additional heat source will be enabled when the temperature read by the sensor drops below the activation temperature. It will operate until the temperature exceeds the threshold value by hysteresis.

Additional factor influencing additional heat source operation may be a room regulator. If any of them is selected, the additional heat source will be enabled if the pre-set temperature of the regulator has not been reached, regardless of other circumstances.

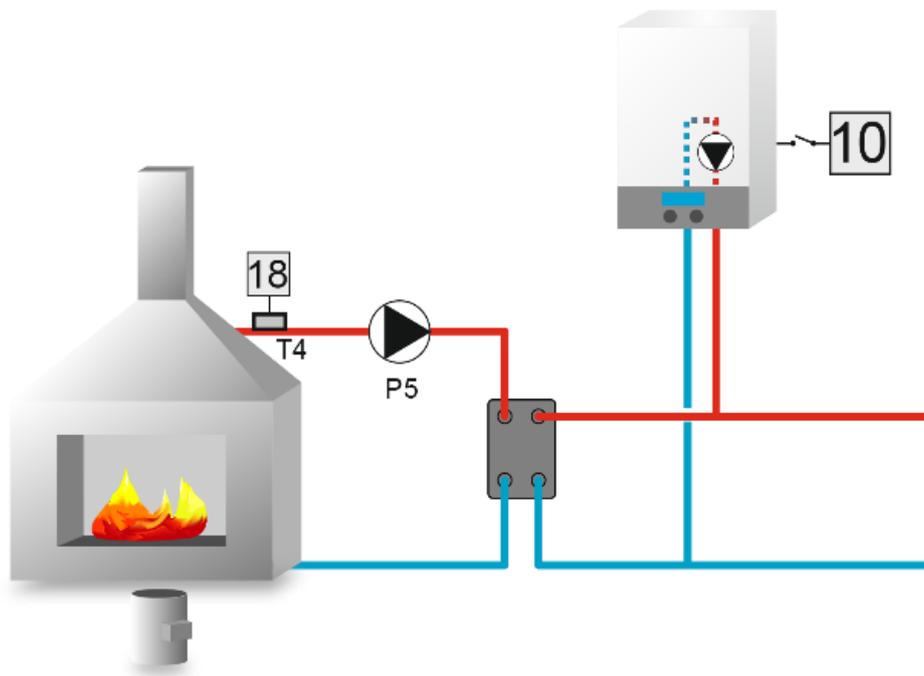


- **Pump activation threshold** – this function is used to set pump activation/deactivation threshold. Additional heat source will be enabled when the temperature of the selected sensor drops below the threshold value.

- **Hysteresis** - This function is used to set the hysteresis of pump activation temperature.
- **Sensor** – This function is used to select the sensor which will provide temperature readings for additional heat source activation/deactivation.
- **Room regulator** – This function is used to select the room regulator which will influence additional heat source operation. When the pre-set temperature of this regulator is not reached, the controller will enable the additional heat source regardless of current temperature of the selected sensor.

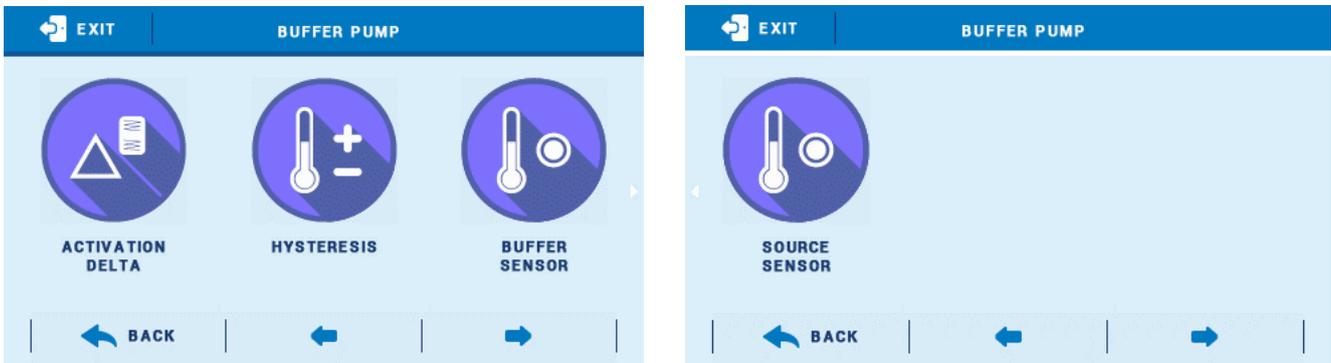
Example:

Part of the heating system is handled by fireplace and gas boiler. CH boiler is connected to voltage-free contact and the fireplace temperature is read from sensor T4 (CH). The pump will be enabled when the sensor temperature does not exceed <activation threshold>. The pump will be disabled when the room temperature is reached or when T4 sensor exceeds <activation threshold>.



8.13. BUFFER PUMP

Buffer pump will be enabled when source sensor temperature exceeds buffer temperature by activation delta. The pump will remain active until threshold temperature plus hysteresis is reached.



- **Activation delta** - It is the difference between source temperature and buffer temperature at which the pump is enabled (it is the pump activation threshold).
- **Hysteresis** - This function is used to set the hysteresis of pump activation threshold.
- **Buffer sensor** – This function is used to select the sensor which will provide temperature data for buffer pump activation/deactivation.
- **Source sensor** – This function is used to select the sensor which will provide temperature data for buffer activation/deactivation.

8.14. OFF

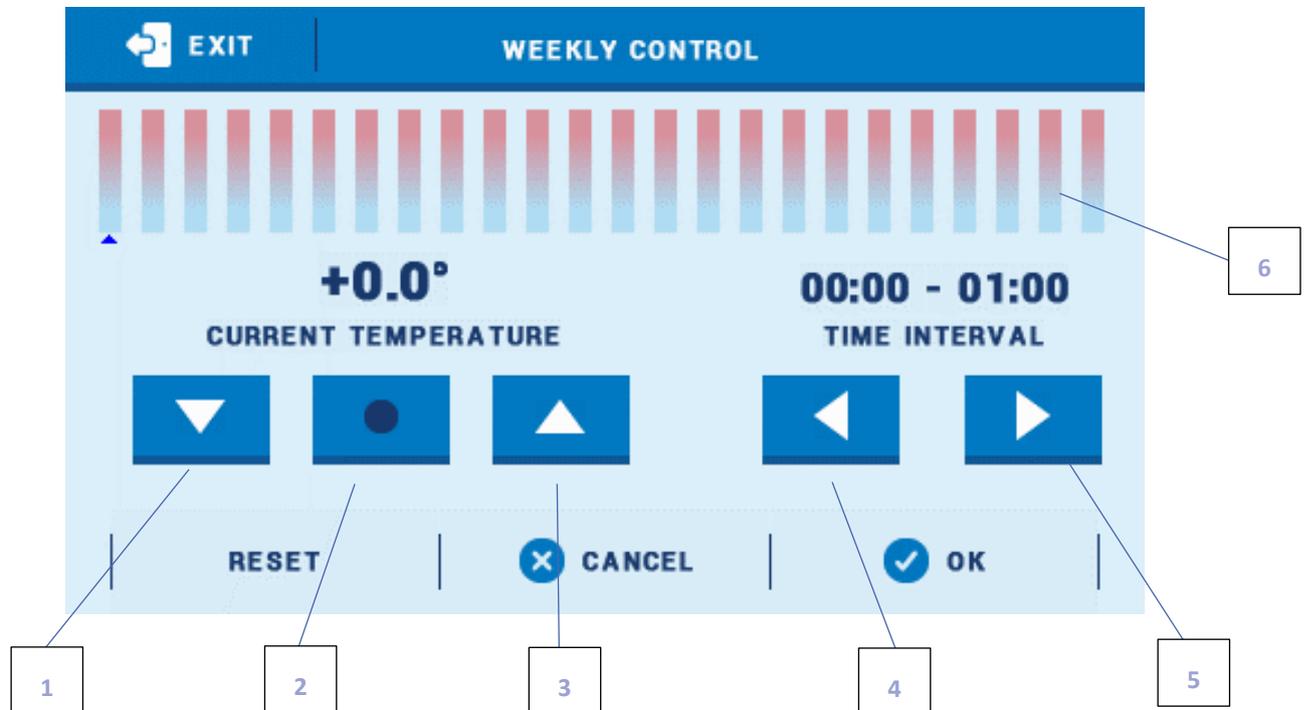
This option is used to deactivate the additional contact altogether.

8.15. ALARM

This function enables the user to decide if the device connected to the additional contact is to be switched on or off when an alarm occurs.

VIII. WEEKLY CONTROL

Weekly control function enables the user to program daily temperature changes. The pre-set temperature deviation range is +/- 20°C.



1. Decrease temperature deviation
2. Copy previous step
3. Increase temperature deviation
4. Change time period backwards
5. Change time period forwards
6. Time period bar (24 hours)

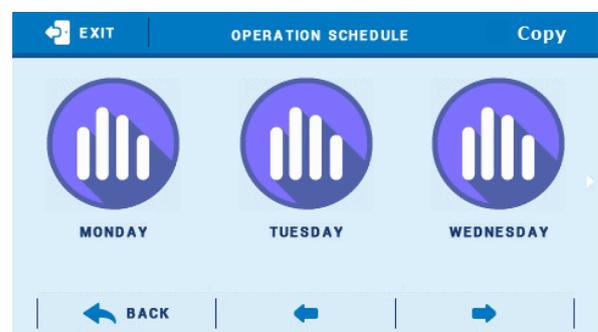
Example:

1. Set current time and date (Menu > Settings > Time settings > Clock settings/Date settings).
2. Select day of the week (Schedule modification) to program temperature deviation for certain hours. In order to program +5°C deviation for 06:00AM - 07:00AM and -5°C for 07:00AM- 3:00PM, follow these steps:

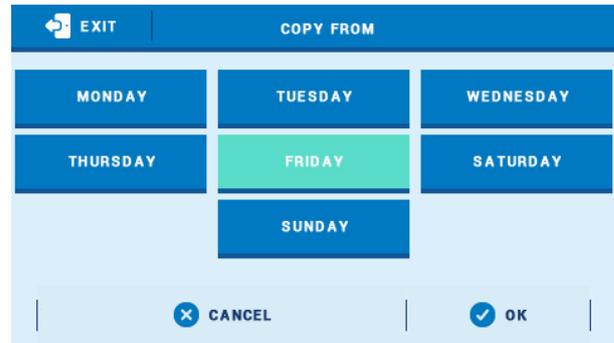
- Select  and set time period: 06:00AM - 07:00AM
- Select  and set temperature deviation: +5°C
- Select  and set time period: 07:00AM - 08:00AM
- Select  and set time deviation: -5°C
- Select  to copy the setting (the colour will change to red)
- Select  to set time period: 02:00PM – 03:00PM
- Press <OK> to confirm

3. It is possible to copy the settings for selected days of the week:

- ✓ Select <Copy> (top right-hand corner)



- ✓ Select the day to copy the settings from



- ✓ Select day(s) to which the settings will be copied



IX. TECHNICAL DATA

Specification	Value
Range of CH valve temperature setting	from 10°C to 99°C
Range of floor valve temperature regulation	from 10°C to 50°C
Range of DHW tank temperature setting	from 5°C to 80°C
Supply voltage	230V +/- 10%
Supply voltage frequency	50Hz
Maximum power consumption	12W
Ambient temperature	from 5°C to 50°C
Nominal output load	0,5A
Fuse link	6,3A
Thermal resistance of the sensors	from -30°C to 99°C

X. PROTECTIONS AND ALARMS

In case of an alarm, a sound signal is activated and the display shows an appropriate message.

Alarm	How to fix it
CH sensor damaged	- Check if the sensor is installed properly - Call the service
DHW sensor damaged	
Valve 1,2 sensor damaged	
Additional valve 1, 2 sensor damaged	
Return sensor damaged	
External temperature sensor damaged	
Return sensor of additional valve 1,2 damaged	
External sensor of additional valve 1,2 damaged	
Additional sensor 1, 2, 3, 4 damaged	

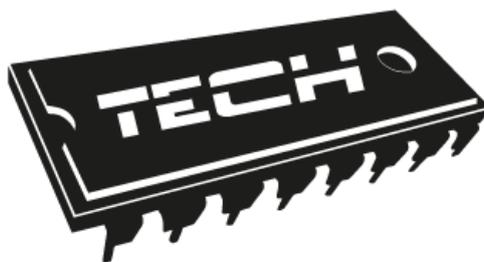
XI. SOFTWARE UPDATE

In order to install new software, the controller must be unplugged from the power supply. Next, insert the memory stick with the new software into the USB port. Connect the controller to the power supply. A single sound signals that the software update process has been initiated.



NOTE

Software update shall be conducted only by a qualified fitter. After the software has been updated, it is not possible to restore previous settings.



EU Declaration of conformity

Hereby, we declare under our sole responsibility that **i-2** regulator manufactured by TECH, headquartered in Wieprz Biała Droga 31, 34-122 Wieprz, is compliant with:

- Directive 2014/35/EU of the European Parliament and of the Council of February 26, 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 Journal of Laws L 96, of 29.03.2014, p. 357)**,
- Directive 2014/30/EU of the European Parliament and of the Council of February 26, 2014 on the harmonisation of the laws of Member States relating to **electromagnetic compatibility** (EU Journal of Laws 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,
- the regulation by the Ministry of Economy of May 8, 2013 concerning the essential requirements as regards *the restriction of the use of certain hazardous substances in electrical and electronic equipment*, implementing provisions of **RoHS directive 2011/65/EU**.

For compliance assessment, harmonized standards were used:

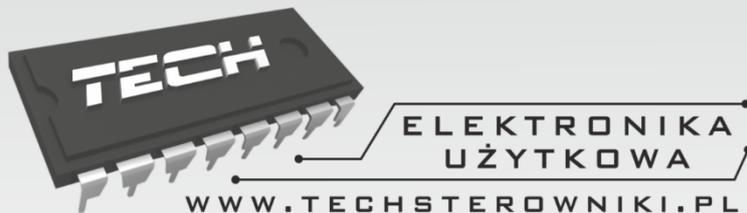
PN-EN 60730-2-9:2011, PN-EN 60730-1:2016-10.


PAWEŁ JURA


JANUSZ MASTER

WŁAŚCICIELE TECH SPÓŁKA Z OGRANICZONĄ ODPOWIEDZIALNOŚCIĄ SP. K.

Wieprz, 09.06.2017



TECH STEROWNIKI

Spółka z ograniczoną odpowiedzialnością Sp. k.

*Biała Droga 31
34-122 Wieprz*

SERWIS

**32-652 Bulowice,
Skotnica 120**

**Tel. +48 33 8759380, +48 33 3300018
+48 33 8751920, +48 33 8704700
Fax. +48 33 8454547**

serwis@techsterowniki.pl

Monday - Friday

7:00 - 16:00

Saturday

9:00 - 12:00