Controllers

User's manual

i-1

EN

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1 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 shoud 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 October 30th 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.

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

2   DESCRIPTION OF THE DEVICE

i-1 thermoregulator is intended for controlling a three- or four-way mixing valve with the possibility of connecting additional valve pump. Optionally, the controller may cooperate with two valve modules i-1, i-1M or ST-431N which makes it possible to control up to 3 mixing valves. The controller features weather-based control, weekly control schedule and it may cooperate with a room regulator. Another asset of the device is return temperature protection against too cold water returning to the CH boiler.

Functions offered by the controller:

- Smooth control of a three- or four-way valve
- Pump control
- Controlling two additional valves via additional valve modules (e.g. ST-61v4, i-1)
- Possibility of connecting ST-505 ETHERNET, WiFi RS
- Return temperature protection
- Weekly and weather-based control
- Compatible with RS and two-state room regulators

Controller equipment:

- LCD display
- CH boiler temperature sensor
- Valve temperature sensor
- Return temperature sensor
- External weather sensor
- Wall-mountable casing

3   HOW TO INSTALL

The controller should be installed by a qualified person.

⚠ **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 accidentally switched on.

⚠ **WARNING**
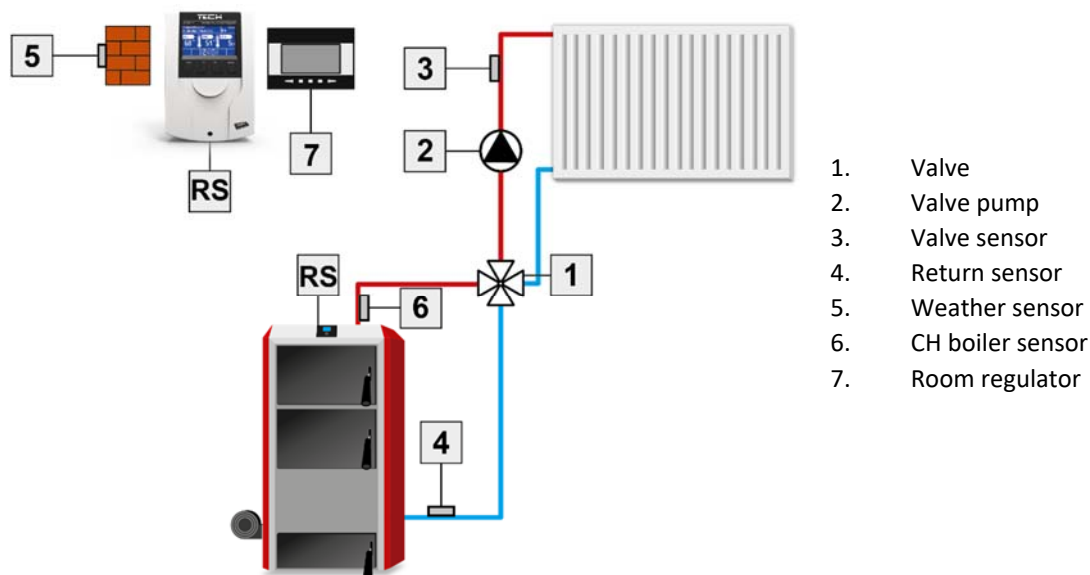Incorrect connection of wires may damage the regulator!

⚠ **NOTE**
Plug RS cable to RS socket labelled RS STEROWN connecting i-1 valve module to the main controller (CH boiler controller or other valve module i-1). Use this socket only if i-1 is to operate in subordinate mode.

Connect the controlled devices to the socket labelled RS MODUŁY: e.g. Internet module, GSM module or other valve module. Use this socket only if i-1 is to operate in master mode.

Example installation scheme:

1.   Valve
2.   Valve pump
3.   Valve sensor
4.   Return sensor
5.   Weather sensor
6.   CH boiler sensor
7.   Room regulator

4   How to use the controller

There are 4 buttons used to control the device.

➩   **EXIT** - in the main screen view it is used to open up the screen view selection panel. In the menu it is used to exit the menu and cancel the settings.

➩   **MINUS** - in the main screen view it is used to decrease the pre-set valve temperature. In the menu it is used to navigate through menu options and decrease the edited value.

➩   **PLUS** - in the main screen view it is used to increase the pre-set valve temperature. In the menu it is used to navigate through menu options and increase the edited value.

➩   **MENU** - it is used to enter the menu and confirm the settings.

| Display		MENU button
EXIT button		
	Navigation buttons	

4.1 CH SCREEN
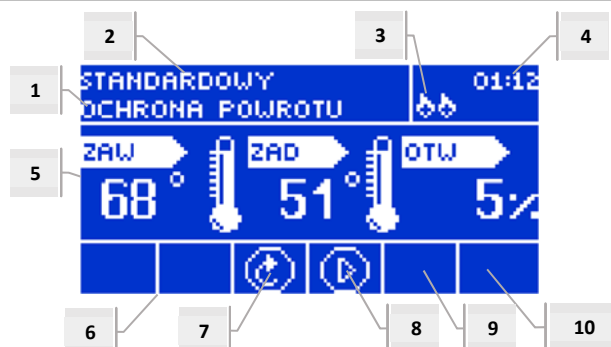
1. Valve status:
   - OFF
   - Operation
   - CH boiler protection -it is displayed on the screen when CH boiler protection is activated; i.e. when the temperature increases to the value defined in the settings.
   - Return protection - it is displayed on the screen when return protection is activated; i.e. when the return temperature is lower than the threshold temperature defined in the settings.
   - Calibration
   - Floor overheating
   - Alarm
   - Stop – it appears in *Summer mode* when *Closing below threshold* function is active - when CH temperature is lower than the pre-set value or when Room regulator function -> Closing is active - when the room temperature has been reached.
2. Controller operation mode
3. „P" is displayed in this place when a room regulator is connected to i-1 module.
4. Current time
5. From the left:
   - Current valve temperature
   - Pre-set valve temperature
   - Level of valve opening
6. Icon indicating that additional module (of valve 1 and 2) is switched on.
7. Icon indicating valve status or selected valve type (CH, floor or return protection).
8. Icon indicating valve pump operation
9. Icon indicating that summer mode is selected
10. Icon indicating that communication with the main controller is active

ICON	Description
	Additional valve module - the icon is displayed in the area no. 6 - valve 1 or 2 module. It is displayed after the additional valve-controlling module (e.g. i-1, ST-61v4) has been connected and registered.
	Icon displayed in the area no. 7. It indicates that the controller manages CH valve - MENU -> Fitter's menu -> Built-in valve -> Valve type -> CH valve).
	Icon displayed in the area no. 7. It indicates that the controller manages floor valve - MENU -> Fitter's menu -> Built-in valve -> Valve type -> floor valve).
	Icon displayed in the area no. 7. It indicates that the controller manages return protection - MENU -> Fitter's menu -> Built-in valve -> Valve type -> Return protection).
	Icon displayed in the area no. 7. It indicates that valve calibration is active.
	Icon displayed in the area no. 8. It is displayed during pump operation.
	Icon displayed in the area no. 9. It indicates that summer mode is selected.
	Icon displayed in the area no. 10. It is displayed only in subordinate mode and it indicates active communication.

4.2   RETURN PROTECTION SCREEN
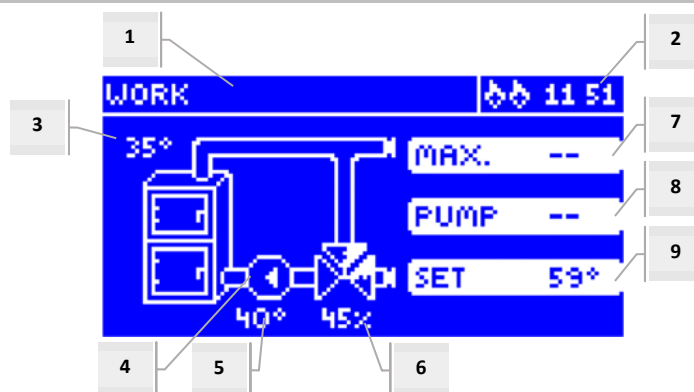
1. Valve status – as in CH screen
2. Current time
3. CH sensor - current CH boiler temperature
4. Pump status (it changes its position during operation)
5. Current return temperature
6. Percent of valve opening
7. CH boiler protection temperature - maximum CH boiler temperature set in the valve menu.
8. Pump activation temperature or „OFF" when the pump is switched off.
9. Return protection temperature - the pre-set value

4.3   VALVE SCREEN
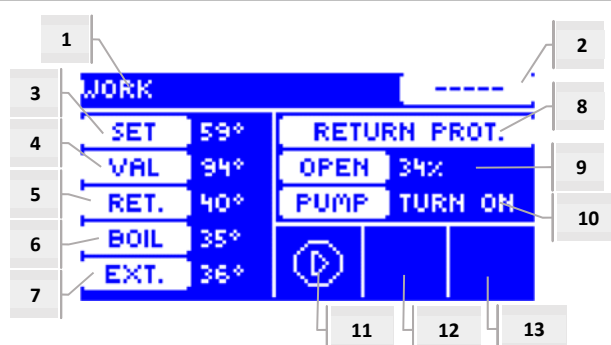
1. Valve status – as in CH screen
2. Valve address
3. Pre-set valve temperature and change
4. Current valve temperature
5. Current return temperature
6. Current CH boiler temperature
7. Current external temperature
8. Valve type
9. Percent of opening
10. Valve pump operation mode
11. Valve pump status
12. Information about the connected room regulator or weather-based control mode
13. Information about active communication with a subordinate controller.

ICON	Description
	Valve pump mode icon - it is displayed in the area no. 11. It indicates that the pump is switched on and active.
	Room regulator icon - it is displayed in the area no. 12. It indicates that a room regulator is connected to the valve controller.
	Icon indicating that the pre-set room temperature has been reached. It is displayed in the area no. 12.
	Weather-based control icon - it is displayed in the area no. 12. It indicates that the valve operates in weather-based control mode.
	Communication icon - it is displayed in the area no. 13. It indicates communication in subordinate mode.

4.4 CONTROLLER FUNCTIONS – MAIN MENU

Main menu offers basic controller options.

4.4.1 Pre-set valve temperature

This option is used to set desired temperature which the valve is to maintain. During proper operation the temperature of water downstream of the valve approximates the pre-set valve temperature.

4.4.2 ON / OFF

This option enables the user to activate the mixing valve. When the valve is switched off, the pump is also inactive. The valve is always calibrated when the controller is connected to the mains even if the valve is deactivated. It prevents the valve from remaining in a position which may cause danger to the heating circuit.

4.4.3 Screen view

This option is used to adjust the main screen layout by choosing between CH view, sensors temperature view, return protection view or the view with parameters of one built-in or additional valve (only when the valves are active). When sensors temperature view is selected, the screen displays the valve temperature (current value), current CH boiler temperature, current return temperature and external temperature. In valve 1 and valve 2 view the screen displays parameters of the selected valve: current and pre-set temperature, external temperature, return temperature, percent of valve opening.

4.4.4 Manual mode

This option is used to manually open/close the valve (and additional valves if active) as well as to switch the pump on/off in order to check if the devices work properly.
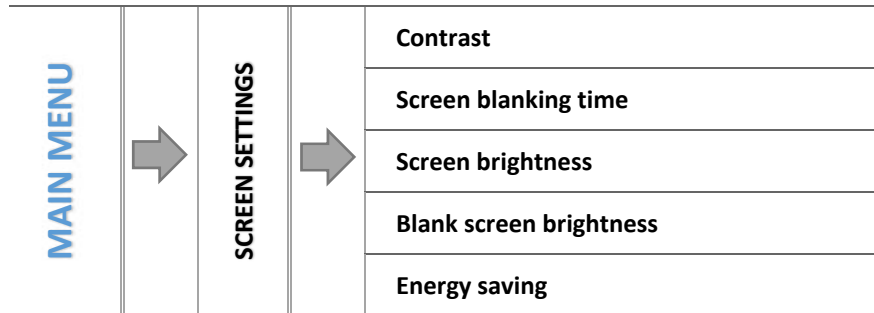
4.4.5   Fitter's menu

Functions available in the Fitter's menu should be configured by qualified fitters and concern advanced parameters of the controller.

4.4.6   Service menu

Functions available in this submenu should be accessed only by service staff and qualified fitters. Access to this menu is secured with a code provided by TECH.

4.4.7   Screen settings

MAIN MENU	⇨	SCREEN SETTINGS	⇨	Contrast
				Screen blanking time
				Screen brightness
				Blank screen brightness
				Energy saving

Screen settings may be customized to satisfy the user's needs.

4.4.7.1   *Contrast*

This function enables the user to adjust the display contrast.

4.4.7.2   *Screen blanking time*

This function enables the user to set the screen blanking time (the screen brightness is reduced to the user-defined level - *Blank screen brightness* parameter).

4.4.7.3   *Screen brightness*

This function enables the user to adjust the screen brightness during standard operation e.g. while viewing the options, changing the settings etc.

4.4.7.4   *Blank screen brightness*

This function enables the user to adjust the brightness of the blank screen which is activated automatically after a pre-defined period of inactivity.

4.4.7.5   *Energy saving*

Once this option is activated, the screen brightness is automatically reduced by 20%.

4.4.8   Language

This option is used to choose the language version of the controller menu.

4.4.9   Factory settings

The controller is pre-configured for operation. However, the settings should be customized to the user's needs. Return to factory settings is possible at any time. Once the factory settings option is activated, all customized CH boiler settings are lost and replaced with the manufacturer's settings. Then, the valve parameters may be customized anew.

4.4.10   Software version

This option is used to view the software version number - the information is necessary when contacting the service staff.

4.5   CONTROLLER FUNCTION– FITTER'S MENU

Fitter's menu options should be configured by qualified users. They concern advanced parameters of controller operation.

4.5.1   Summer mode

In this mode the controller closes the CH valve in order not to heat the house unnecessarily. If the CH boiler temperature is too high (return protection must be active!) the valve is opened in emergency procedure. This mode is inactive in the case of controlling the floor valve and in Return protection mode.

4.5.1   TECH regulator

It is possible to connect a room regulator with RS communication to i-1 controller. This option allows the user to configure the regulator by selecting ON option.

⚠ **NOTE**
In order for i-1 controller to cooperate with the room regulator with RS communication, it is necessary to set the communication mode to *main*. Appropriate option should also be selected in Room regulator submenu.

4.5.2   Valve settings

This submenu is divided into two parts corresponding to particular valves - a built-in valve and up to two additional valves. Additional valve parameters may be accessed only after the valves have been registered.

Built-in valve

VALVE SETTINGS	BUILT-IN VALVE / ADDITIONAL VALVE	
		Valve removal**
		Version**
		ON / OFF
		Pre-set valve temperature
		Calibration
		Single stroke
		Minimum opening
		Opening time
		Measurement pause
		Valve hysteresis
		Valve type
		Weather-based control
		Room regulator
		Proportionality coefficient
		Maximum floor temperature
		Opening direction
		Sensor selection**
		CH sensor**
		CH boiler protection*
		Return protection*
		Valve pump
		External sensor calibration**
		Closing**
		Vale weekly schedule
		Factory settings

*for built-in valve only

**for additional valve only

4.5.2.1   Registration

In the case of using additional valves, it is necessary to register the valve by entering its module number before its parameters may be configured.

If i-1 RS valve module is used, it must be registered. The registration code may be found on the rear cover or in software version submenu (i-1 valve: MENU -> Software version).

The remaining valve settings may be found in Service menu. I-1 controller should be set as subordinate and the user should choose the sensors according to individual needs.

4.5.2.2   Valve removal

⚠ **NOTE**

This option is available only for an additional valve (external module).

This option is used to remove the valve from the controller memory. Valve removal is used e.g. at disassembling the valve or module replacement (re-registration of a new module is necessary).

4.5.2.3   Version

This option is used to check the software version used in the subordinate module.

4.5.2.4   ON / OFF

In order for the valve to be active, select ON. To deactivate the vale temporarily, select OFF.

4.5.2.5   Pre-set valve temperature

This option is used to set desired temperature which the valve is to maintain. During proper operation the temperature of water downstream of the valve approximates the pre-set valve temperature.

4.5.2.6   Calibration

This function enables the user to calibrate the built-in 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.

4.5.2.7   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 *proportionality coefficient* 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.

4.5.2.8   Minimum opening

The parameter determines the smallest valve opening. Thanks to this parameter, the valve may be opened minimally, to maintain the smallest flow.

4.5.2.9   Opening time

This parameter defines the time needed for the valve to open from 0% to 100% position. This value should be set in accordance with the specification given on the actuator rating plate.

4.5.2.10   Measurement pause

This parameter determines the frequency of water temperature measurement (control) behind the CH valve. If the sensor indicates a change in temperature (deviation from the pre-set value), the electric valve will open or close by the pre-set stroke, in order to return to the pre-set temperature.

4.5.2.11   Valve hysteresis

This option is used to set the hysteresis of the pre-set valve temperature. It is the difference between the pre-set (desired) temperature and the temperature at which the valve will start closing or opening.

Example:

Pre-set valve temperature	**50°C**
Hysteresis	**2°C**
Valve stops at	**50°C**
Valve closing	**48°C**
Valve opening	**52°C**

When the pre-set temperature is 50°C and the hysteresis value is 2°C, the valve stops in one position when the temperature of 50°C is reached. When the temperature drops to 48°C, the valve starts opening. When the temperature of 52°C is reached, the valve starts closing in order to reduce the temperature.

4.5.2.12   Valve type

BUILT-IN VALVE	VALVE TYPE	CH
		Floor
		Return protection
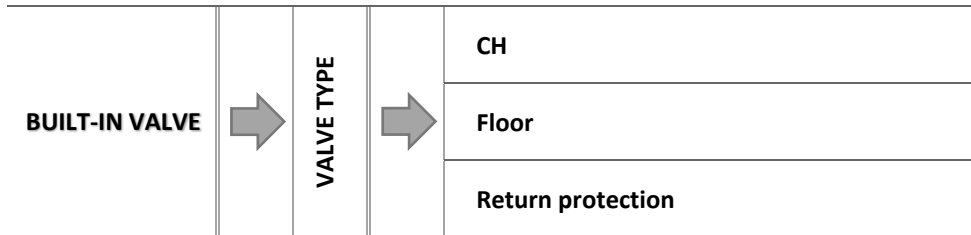
With this option the user chooses the type of valve to be controlled:

- **CH** - select if you want to control the temperature of the CH circuit using the valve sensor. The valve sensor should be installed downstream of the mixing valve on the supply pipe.
- **FLOOR** - select if you want to control the temperature of the underfloor heating circuit. It protects the underfloor heating system 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.

- **RETURN PROTECTION** - select if you want to control the return temperature using the return sensor. When this type of valve is selected, only return and CH boiler sensors are active whereas the valve sensor should not be connected to the controller. In this mode, the valve priority is to protect the CH boiler return against low temperature. When *CH boiler protection* option is selected as well, the valve also protects the CH boiler against overheating. When the valve is closed (0% opening), water flows only through the short circuit whereas when the valve is open (100% opening), the short circuit is closed and water flows through all the heating system.

⚠️ **WARNING**

When CH boiler protection is active, CH temperature does not influence the valve opening. In extreme cases it may cause CH boiler overheating. Therefore, it is advisable to configure CH boiler protection settings.

4.5.2.13   Weather-based control

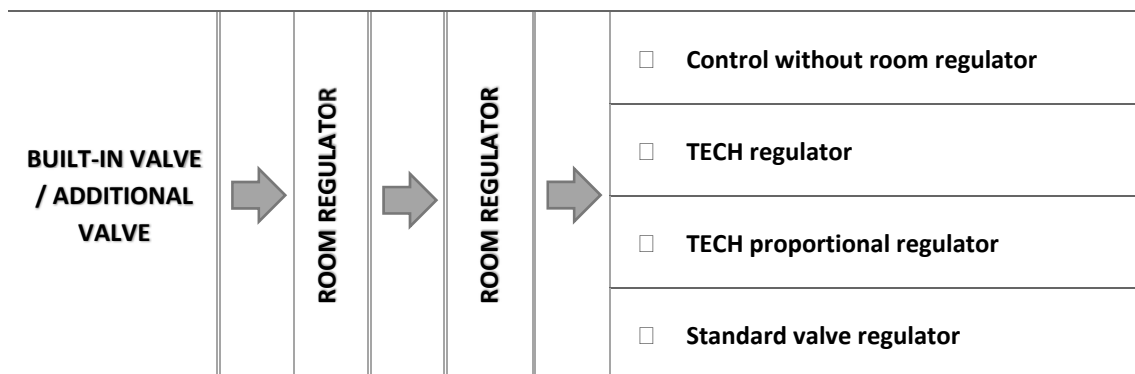| BUILT-IN VALVE | WEATHER-BASED CONTROL | ON / OFF |
| | | Heating curve |
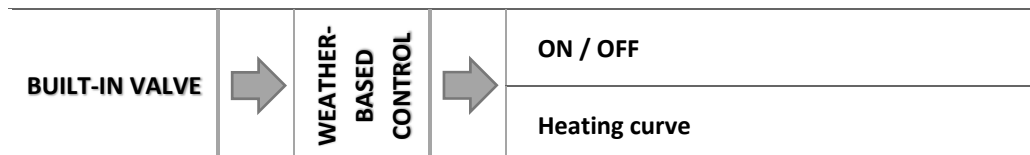
For the function of weather control to be active, the external sensor mustn't be exposed to sunlight or influenced by the weather conditions. After it is installed in an appropriate place, weather control function needs to be activated in the controller menu.

4.5.2.13.1   Heating curve

Heating curve - a curve according to which the pre-set controller temperature is determined, on the basis of external temperature. In our controller, this curve is constructed on the basis of four pre-set temperatures (downstream of the valve) for respective values of external temperatures -20°C, -10°C, 0°C and 10°C.

4.5.2.14　Room regulator
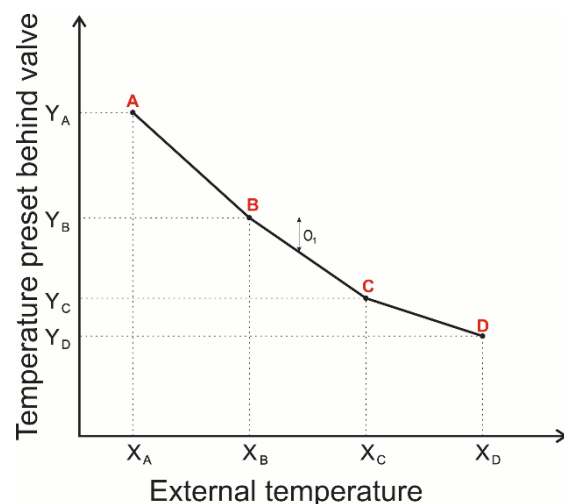
BUILT-IN VALVE / ADDITIONAL VALVE	ROOM REGULATOR	ROOM REGULATOR	☐ Control without room regulator
			☐ TECH regulator
			☐ TECH proportional regulator
			☐ Standard valve regulator

This submenu is used to configure the parameters of room regulator which is to control the valve.

4.5.2.14.1　Control without room regulator

When this option is selected, room regulator does not influence the valve operation.

4.5.2.14.2　TECH regulator

The valve is controlled by a room regulator with RS communication. When this function is selected, the regulator operates according to *Room reg. temp. lower* parameter.

4.5.2.14.3　TECH proportional regulator

This type of regulator allows the user to view current temperatures of the CH boiler, water tank and the valves. It should be connected to RS socket of the controller. When this type of room regulator is selected, the valve is controlled according to *Change in the set temp* and *Room temperature difference* parameters.

4.5.2.14.4　Standard valve regulator

When this option is selected, the valve is controlled by a standard two-state regulator (without RS communication). The controller operates according to *Room reg. temp. lower* parameter.

4.5.2.14.5　Room regulator options

BUILT-IN VALVE	ROOM REGULATOR	Room reg. temp. lower
		Room temperature difference
		Change in the set temp.
		Room regulator function
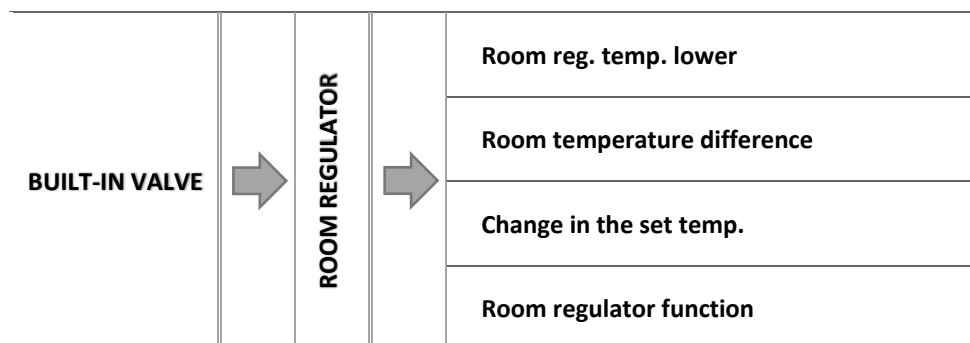
　　o　Room reg. temp. lower

⚠ **NOTE**
This parameter concerns Standard valve regulator and TECH regulator.

The user defines the temperature value by which the pre-set valve temperature will be reduced when the pre-set room regulator temperature is reached.

　　o　Room temperature difference

⚠ **NOTE**
This parameter concerns *TECH proportional regulator* function.

This setting is used to define a single change in the current room temperature (with the accuracy of 0.1°C) at which a predefined change in the pre-set temperature of the valve is introduced

o   Change in the set temp.

⚠ **NOTE**
This parameter concerns *TECH proportional regulator* function.

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.

Example:

SETTINGS:	
Room temperature difference	0,5°C
Change in the set temp.	1°C
Pre-set valve temperature	40°C
Pre-set temperature of room regulator	23°C

Case 1:

If the room temperature rises to 23,5ºC (0,5ºC above the pre-set room temperature), the valve closes until 39ºC is reached (1ºC change).

Case 2:

If the room temperature drops to 22ºC (1ºC below the pre-set room temperature), the valve opens until 42ºC is reached (2ºC change - because every 0,5°C of room temperature difference, the pre-set valve temperature changes by 1°C).

o   Room regulator function

This function is used to decide if the valve should close or the temperature should decrease when the pre-set temperature has been reached.

4.5.2.15   Proportionality coefficient

Proportionality coefficient is used for defining valve stroke. The closer to 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:

$$percent\ of\ a\ single\ opening = (set\ temperature - sensor\ temperature) \cdot \frac{proportionality\ coefficient}{10}$$

4.5.2.16   Opening direction

BUILT-IN VALVE → OPENING DIRECTION →	Left
	Right
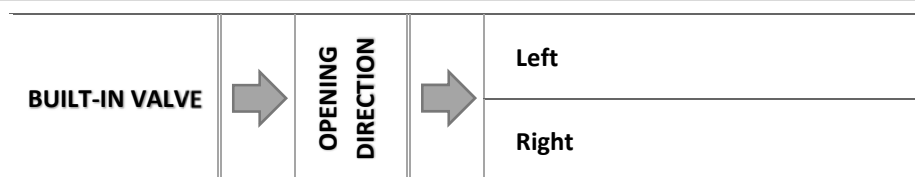
If, after connecting the valve to the controller, it turns out that it is connected the other way round, then the power supply cables do not have to be switched. Instead, it is enough to change the opening direction in this parameter: LEFT or RIGHT.

4.5.2.17   Maximum floor temperature

⚠ **NOTE**
This option is available only when the valve type selected is floor valve.

This function is used to define the maximum temperature of the valve sensor (if floor valve is selected). Once this temperature is reached, the valve is closed, the pump is disabled and main screen of the controller informs about floor overheating.

4.5.2.18 Sensor selection

This option concerns return sensor and external sensor. It is used to choose if the additional valve operation control should be based on the readings from the sensors of the valve module or the main controller sensors.

4.5.2.19 CH sensor

This options concerns CH sensor. It is used to choose if the additional valve operation should be based on the readings from the sensors of the valve module or the main controller sensors.

4.5.2.20 CH boiler protection

| BUILT-IN VALVE | CH BOILER PROTECTION | OFF |
| | | ON |
| | | Maximum temperature |
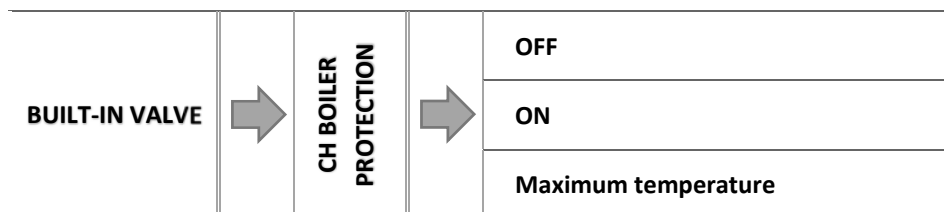
The protection against too high return temperature serves to prevent the hazardous growth in CH boiler temperature. The user sets the maximum acceptable return temperature. In case of the hazardous growth in temperature, the valve begins to open to house heating system in order to cool the CH boiler down.

4.5.2.20.1 Maximum temperature

The user defines the maximum acceptable CH temperature at which the valve will open.

4.5.2.21 Return protection

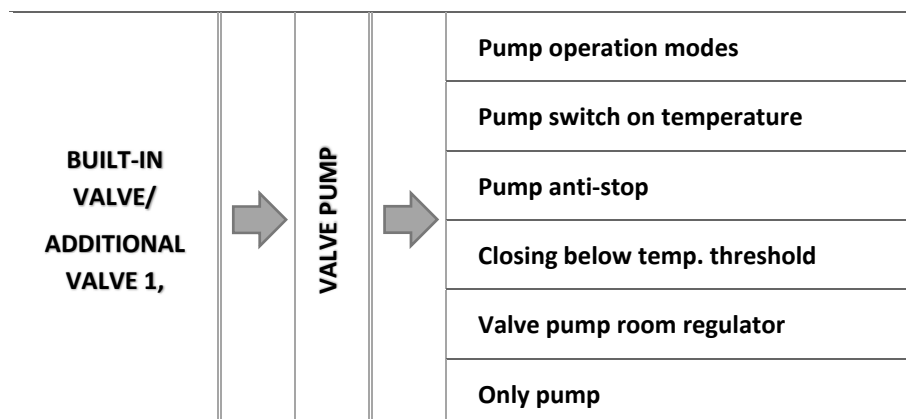| BUILT-IN VALVE/ ADDITIONAL VALVE 1, 2 | RETURN PROTECTION | OFF |
| | | ON |
| | | Minimum return temperature |
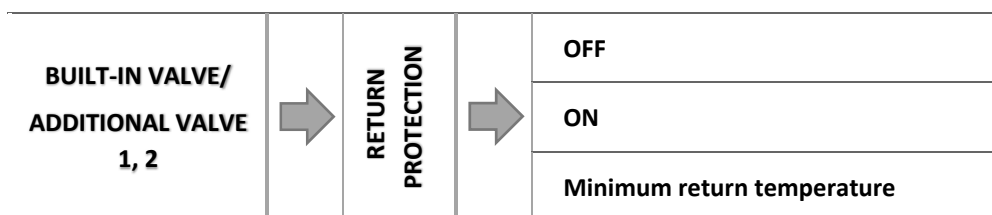
This function allows setting up CH boiler protection against too cool water returning from the main circulation, which could cause low-temperature boiler corrosion. The return protection involves closing the valve when the temperature is too low, until the short circulation of the boiler reaches the appropriate temperature.
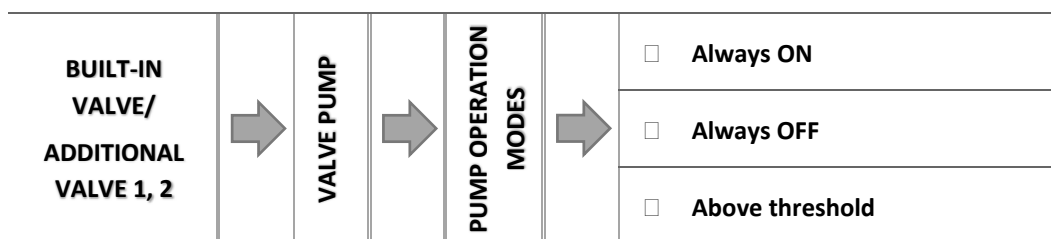
4.5.2.21.1 Minimum return temperature

The user defines the minimum acceptable return temperature at which the valve will close.

4.5.2.22 Valve pump

BUILT-IN VALVE/ ADDITIONAL VALVE 1,	VALVE PUMP	Pump operation modes
		Pump switch on temperature
		Pump anti-stop
		Closing below temp. threshold
		Valve pump room regulator
		Only pump

4.5.2.22.1   Pump operation modes

BUILT-IN VALVE/ ADDITIONAL VALVE 1, 2	→	VALVE PUMP	→	PUMP OPERATION MODES	→	☐ Always ON
						☐ Always OFF
						☐ Above threshold

This option is used to select the pump operation mode.

- o <u>Always ON</u> - the pump operates all the time, regardless of temperatures.
- o <u>Always OFF</u> - the pump is permanently deactivated and the regulator controls only valve operation
- o <u>ON above threshold -</u> the pump is activated above the pre-set activation temperature. If the pump is to be activated above the threshold, the user should also define the *threshold temperature of pump activation*. The temperature is read from CH sensor.

4.5.2.22.2   Pump switch on temperature

This option concerns the pump operating above the threshold (see: above). The valve pump is switched on when the CH boiler reaches the pump activation temperature.

4.5.2.22.3   Pump anti-stop

When this function is active, the valve pump is activated every 10 days for 2 minutes. It prevents stagnant water in the heating system outside the heating season.

4.5.2.22.4   Closing below temp. threshold

Once this function is activated (by selecting ON), the valve remains closed until the CH boiler sensor reaches the pump activation temperature.

⚠️ **NOTE**

If i-1 is used as the additional valve module, *pump anti-stop* and *closing below temp. threshold* may be configured directly from the subordinate module menu.

4.5.2.22.5   Valve pump room regulator

When this option is active, the room regulator disables the pump when the pre-set temperature has been reached.

4.5.2.22.6   Only pump

When this option is active, the regulator controls only the pump while the valve is not controlled.

4.5.2.23   *External sensor calibration*

External sensor calibration is performed while mounting or after the regulator has been used for a long time, if the external temperature displayed differs from the actual temperature. Calibration range is from -10°C to +10°C.

4.5.2.24   *Closing*

⚠️ **NOTE**

Function available after entering the code.

This parameter is used to decide if the valve should close or open once it as been switched off in CH mode. Select this option to close the valve. If this function is not selected, the valve will open.

4.5.2.25   Valve weekly control

This function enables the user to program daily changes of the pre-set valve temperature for particular time and day of the week. The settings range for the temperature changes is +/-10˚C.

In order to activate weekly control, select *mode 1* or *mode 2.* Detailed settings of each mode are provided in the following sections: *Set mode 1* and *Set mode 2.* (separate settings for each day of the week) and mode 2 (separate settings for working days and the weekend).

⚠ **NOTE**
In order for this function to work properly, it is necessary to set current date and time.

- **HOW TO CONFIGURE WEEKLY CONTROL**

There are 2 modes of settings weekly control:

MODE 1 – the user sets the temperature deviations for each day of the week separately

Configuring mode 1:

⇨ Select: Set mode 1
⇨ Select the day of the week to be edited

⇨ The following screen appears on the display:
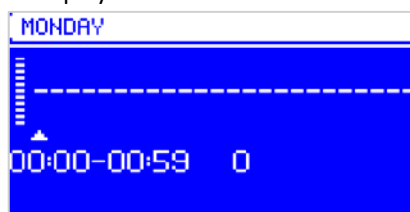
⇨ Use <+> <-> buttons to select the hour to be edited and press MENU to confirm.
⇨ Select CHANGE from the options which appear at the bottom of the screen by pressing MENU when this option is highlighted in white.
⇨ Increase or decrease the temperature as needed and confirm.
⇨ The range of pre-set temperature change is -10°C to 10°C.

⇨ If you want to copy the temperature change value for the next hours, press MENU button when the setting is selected. When options appear at the bottom of the screen, select COPY and use <+> <-> buttons to copy the settings into the previous or the following hour. Press MENU to confirm.

Example:
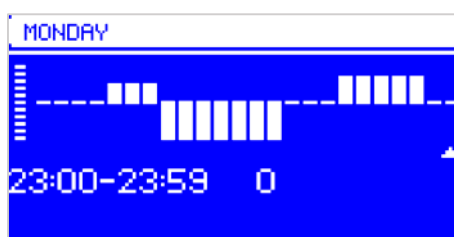
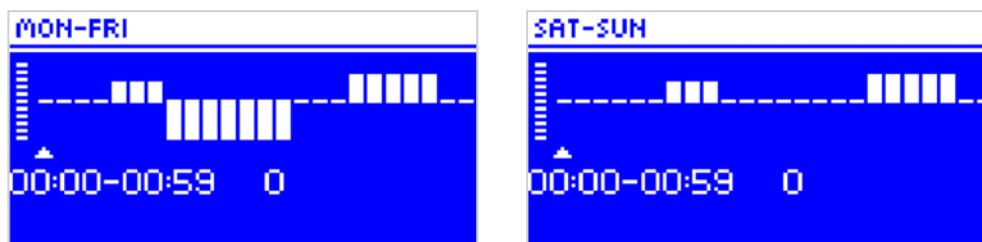|	Hour	Temperature - **weekly control setting** (+/-)
	Monday	
PRE-SET	4^{00} - 7^{00}	+5°C
	7^{00} - 14^{00}	-10°C
	17^{00} - 22^{00}	+7°C

If the pre-set CH boiler temperature is 50°C, on Mondays between 4{00} and 700 the CH boiler will increase by 5°C to reach 55°C; between 7^{00} and 14^{00} it will drop by 10°C, to reach 40°C, and between 1700 and 2200 it will increase to reach 57°C. If the pre-set CH boiler temperature is 50°C, on Mondays between 4^{00} and 7^{00} the CH boiler will increase by 5°C to reach 55°C; between 7^{00} and 14^{00} it will drop by 10°C, to reach 40°C, and between 17^{00} and 22^{00} it will increase to reach 57°C.

MODE 2 – the user sets the temperature deviations for all working days (Monday-Friday) and for the weekend (Saturday-Sunday) separately.

Configuring mode 2:

- ⇨ Select: Set mode 2.
- ⇨ Select the part of the week to be edited.
- ⇨ Follow the same procedure as in the case of Mode 1.

***Example*:**

	Hour	Temperature - **weekly control setting** (+/-)
	Monday - Friday	
PRE-SET	4^{00} - 7^{00}	+5°C
	7^{00} - 14^{00}	-10°C
	17^{00} - 22^{00}	+7°C
	Saturday - Sunday	
PRE-SET	6^{00} - 9^{00}	+5°C
	17^{00} - 22^{00}	+7°C

If the pre-set CH boiler temperature is 50°C, from Monday to Friday between 4^{00} and 7^{00} the CH boiler will increase by 5°C to reach 55°C; between 7^{00} and 14^{00} it will drop by 10°C, to reach 40°C, and between 17^{00} and 22^{00} it will increase to reach 57°C.

At the weekend, between 6^{00} and 9^{00} the temperature will increase by 5°C to reach 55°C, and between 17^{00} and 22^{00} it will increase to reach 57°C.
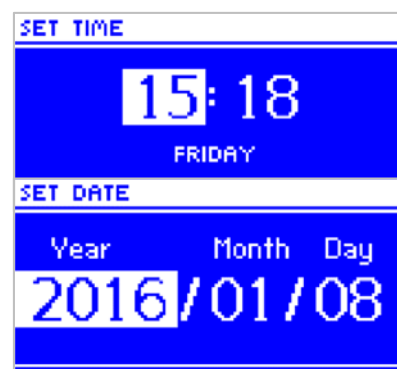
4.5.2.26   Factory settings

This function enables the user to restore the factory settings for a particular valve. Restoring factory settings changes the type of valve selected to CH valve.

4.5.3   Time settings

This parameter is used to set current time.

- ⇨ Use <+> and <-> to set the hour and minutes separately .

4.5.4   Date settings
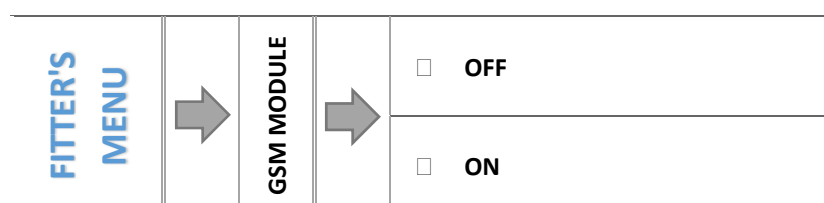
This parameter is used to set current date.

- ⇨ Use <+> and <-> to set day, month and year separately.

4.5.5   GSM module

⚠ NOTE

This type of control is available only after purchasing and connecting an additional controlling module ST-65 which is not included in the standard controller set.

- ⇨ If the controller is equipped with additional GSM module, it is necessary to activate it by selecting *ON*.

GSM Module is an optional device which, cooperating with the controller, enables the user remote control of the CH boiler operation via mobile phone. The user is sent an SMS each time an alarm occurs. Moreover, after sending a certain text message, the user receives feedback on the current temperature of all the sensors. Remote change of the preset temperatures is also possible after entering the authorisation code.

GSM Module may operate independently of the CH boiler controller. It has two additional inputs with temperature sensors, one contact input to be used in any configuration (detecting closing/opening of contacts) and one controlled output (e.g. a possibility of connecting an additional contractor to control any electric circuit)
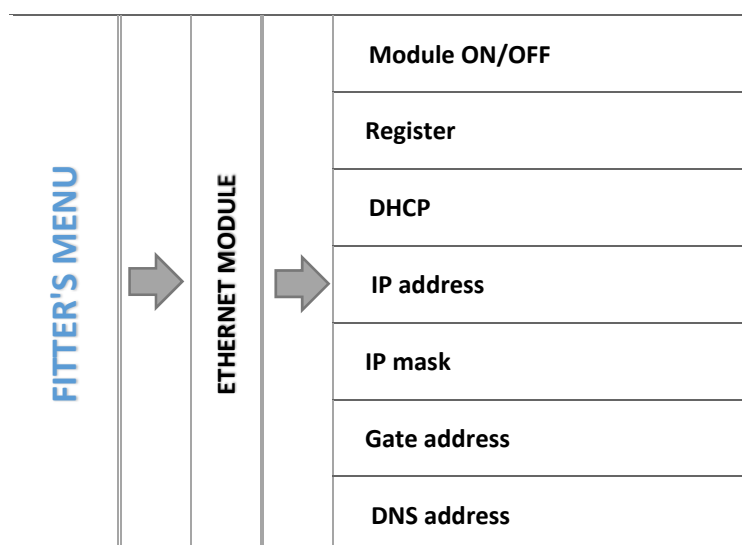
When any of the temperature sensors reaches the pre-set maximum or minimum temperature, the module automatically sends an SMS message with such information. A similar procedure is used in the case of opening or closing of the contact input, which may be used as a simple means of property protection.

4.5.6   Internet module

⚠ **NOTE**
This type of control is available only after purchasing and connecting an additional controlling module ST-505 which is not included in the standard controller set.

FITTER'S MENU	→	ETHERNET MODULE	→	Module ON/OFF
				Register
				DHCP
				IP address
				IP mask
				Gate address
				DNS address

⇨ Before registering the module, it is necessary to create user's account on emodul.pl (if you do not have one).

⇨ Once the module has been connected properly, select *Module ON*.

⇨ Next select *Registration*. The controller will generate a code.

⇨ Log on emodul.pl, go to Settings tab and enter the code which appeared on the controller screen.

⇨ It is possible to assign any name or description to the module as well as provide phone number and e-mail address to which the notifications will be sent.

⇨ Once generated, the code should be entered within an hour. Otherwise, it will become invalid and it will be necessary to generate a new one.

⇨ Internet module parameters such as IP address, IP mask, gate address enc. may be set manually or by selecting DHCP option.

⇨ Internet module is a device enabling the user remote control of the CH boiler via the Internet. Emodul.pl enables the user to control the status of all CH boiler system devices and temperature sensors on the home computer screen, tablet or smart phone. Tapping on corresponding icons, the user may adjust the operation parameters, pre-set temperatures for pumps and valves enc.

4.5.7 Communication mode

The user may choose between main communication mode (independent) or subordinate mode (in cooperation with the master controller at the CH boiler or other valve module ST-431N).

In subordinate communication mode, the valve controller serves as the module and its settings are configured via the CH boiler controller. The following options are unavailable: connecting a room regulator with RS communication (e.g. ST-280, ST-298), connecting the Internet module (ST-65) or the additional valve module (ST-61).

4.5.8 External sensor calibration

External sensor calibration is performed while mounting or after it has been used for a long time, if the external temperature displayed differs from the actual temperature. Calibration range is from -10⁰C to +10⁰C. *Averaging time* parameter defines the frequency at which the external sensor readings are sent to the controller.

4.5.9 Software update

This function is used to update/change the software version installed in the controller.

⚠️ NOTE

- It is advisable to have software update conducted by a qualified fitter. Once the change has been introduced, it is impossible to restore previous settings.

- The memory stick which is going to be used to save the setup file should be empty (preferably formatted).

Make sure that the file saved on the memory stick has exactly the same name as the downloaded file so that it is not overwritten.

- Mode 1:
⇨ Insert the memory stick with the software into the controller USB port.
  ⇨ Select *Software update* (in the fitter's menu).
  ⇨ Confirm controller restart
  ⇨
      o Software update starts automatically.
      o The controller restarts
    o Once restarted, the controller display shows the starting screen with software version
    o Once the installation process is completed, the display shows the main screen.
  ⇨ When software update has been completed, remove the memory stick from USB port.

- Mode 2:
⇨ Insert the memory stick with the software into the controller USB port.
⇨ Reset the device by unplugging it and plugging it back in.
⇨ When the controller starts again, wait until the software update process starts.
      o The following part of software update is the same is in Mode 1.

4.5.10 Factory settings

This option is used to restore the factory settings of the fitter's menu.

5   PROTECTIONS AND ALARMS

In order to ensure safe and failure-free operation, the regulator has been equipped with a range of protections. In case of alarm, a sound signal is activated and an appropriate message appears on the screen.

ALARM/NOTIFICATION	DESCRIPTION
TEMPERATURE ALARM	It stops the valve temperature control and sets the valve in its safe position (floor valve - closed; CH valve-open).
VALVE SENSOR	No sensor connected/ improperly connected sensor/ sensor damage. The sensor is essential for proper valve operation so it needs to be replaced immediately.
RETURN SENSOR	This alarm occurs when return protection function is active and the sensor is damaged. Check the sensor mounting or replace if damaged. It is possible to deactivate the alarm by disabling return protection function
WEATHER SENSOR	This alarm occurs when the external temperature sensor is damaged. The alarm may be deactivated when undamaged sensor is installed properly. The alarm does not occur in other operation modes than 'Weather-based control' or 'Room control with weather-based control'.
CH SENSOR DAMAGED	This alarm may occur if the device has been improperly configured with the sensor, the sensor has not been connected or has been damaged. In order to solve the problem, check the connections on the terminal block, make sure the connection cable is not damaged and there is no short circuit, check if the sensor works properly by connecting another sensor in its place and checking its readings.

6   TECHNICAL DATA

No.	Specification	Unit	
1	Supply voltage	V	230 +/-10% /50Hz
2	Power consumption	W	max. 4
3	Ambient temperature	^{O}C	5÷50
4	Range of temperature settings	^{O}C	0÷90
5	Thermal resistance of sensors	^{O}C	-25÷95
6	Output load	A	0,5
7	Fuse link	A	1,6
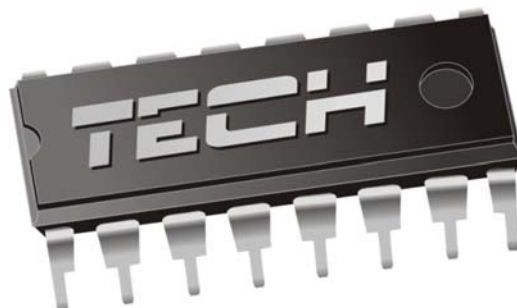
EU DECLARATION OF CONFORMITY

Hereby, we declare under our sole responsibility that **i-1** 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.**
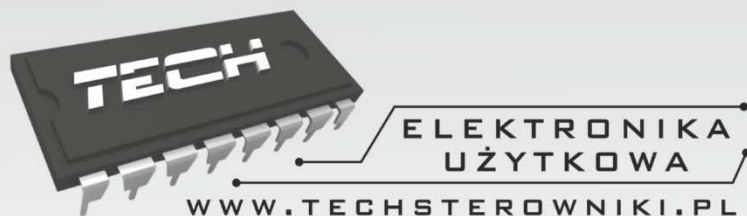

For compliance assessment, harmonized standards were used:

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, 30. 11. 2017