TECH CONTROLLERS

USER MANUAL

EU-L-X WiFi

EN

www.tech-controllers.com

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JG. 27.04.2022

The pictures and diagrams are for illustration purposes only.

The manufacturer reserves the right to introduce some changes.

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 put in a different place, make sure that the user's manual is stored 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 products described in the manual may have been introduced subsequent to its completion on October 14th 2022. The manufacturer retains the right to introduce changes to the structure or colours. 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. SYSTEM DESCRIPTION

The EU-L-X WiFi controller is part of a heating/cooling control system that enables an expansion of the control of an existing thermal installation by the introduction of heat zoning. The primary function is to maintain a preset temperature in each zone. EU- L-X WiFi is a device that, together with all peripheral devices, such as room sensors, room regulators, floor sensors, external sensor, window sensors, thermostatic actuators, form the entire integrated system.

Thanks to its extensive software, the EU-L-X WiFi controller can perform a number of functions:

- support for EU-R-12b, EU-R-12s, EU-F-12b and EU-R-X cable regulators
- controlling wireless regulators: EU-R-8X, EU-R-8b, EU-R-8b Plus, EU-R-8s Plus, EU-F-8z or sensors: EU-C-8r, EU-C-mini, EU-CL-mini
- support for floor temperature sensors
- support for external sensors and weather controls
- support for wireless window sensors (up to 6 pcs per zone)
- possibility to control STT-868, STT-869 or EU-G-X wireless actuators (6 pcs per zone)
- possibility of operating thermoelectric actuators
- possibility of operating a mixing valve – after connecting the EU-i-1, EU-i-1m valve module
- control of a heating or cooling device by means of a potential-free contact
- one 230V output to pump
- possibility to set an individual operating schedule for every zone
- possibility of updating the software via USB port.

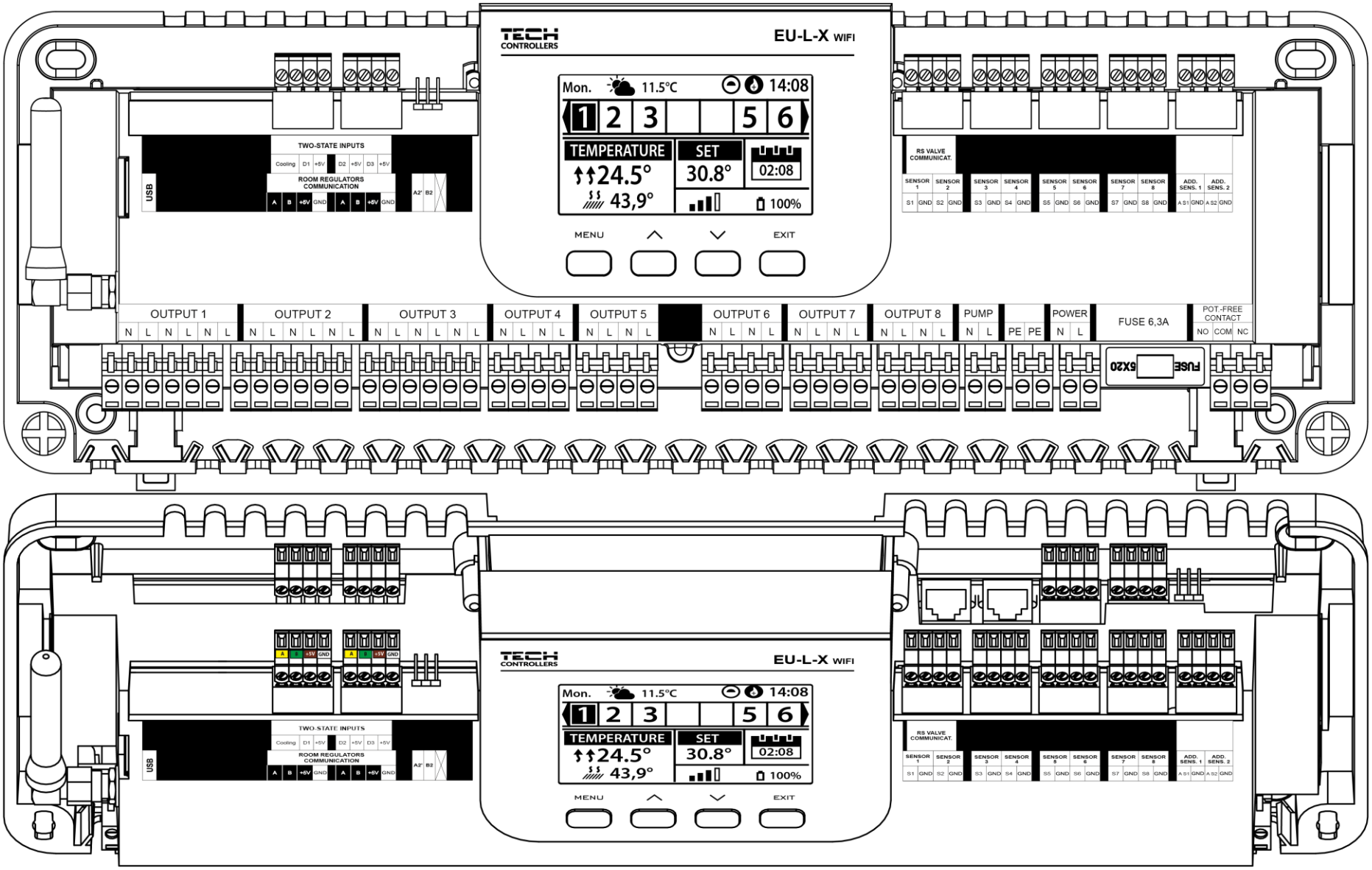
III. HOW TO INSTALL

The EU-L-X WiFi controller should only be installed by a properly qualified person.

WARNING

If pump manufacturer requires an external main switch, power supply fuse or additional residual current device selective for distorted currents it is recomemnded not to connect pumps directly to pump control outputs.

To avoid damaging to the device, an additional safety circuit must be used between the regulator and the pump. The manufacturer recommends the ZP-01 pump adapter, which must be purchased separately.


TECH CONTROLLERS
EU-L-X WIFI
Mon. 11.5°C 14:08
1 2 3 5 6
TEMPERATURE
SET
24.5°
30.8°
43,9°
02:08
100%
MENU
EXIT
TWO-STATE INPUTS
Cooling D1 +5V D2 +5V D3 +5V
ROOM REGULATORS COMMUNICATION
A B +5V GND A B +5V GND
USB
A2' B2
RS VALVE COMMUNICAT.
SENSOR 1 SENSOR 2 SENSOR 3 SENSOR 4 SENSOR 5 SENSOR 6 SENSOR 7 SENSOR 8 ADD. SENS. 1 ADD. SENS. 2
S1 GND S2 GND S3 GND S4 GND S5 GND S6 GND S7 GND S8 GND A S1 GND A S2 GND
OUTPUT 1 OUTPUT 2 OUTPUT 3 OUTPUT 4 OUTPUT 5 OUTPUT 6 OUTPUT 7 OUTPUT 8 PUMP POWER FUSE 6,3A POT-FREE CONTACT
N L N L N L
PE PE
NO COM NC
FUSE 6X20

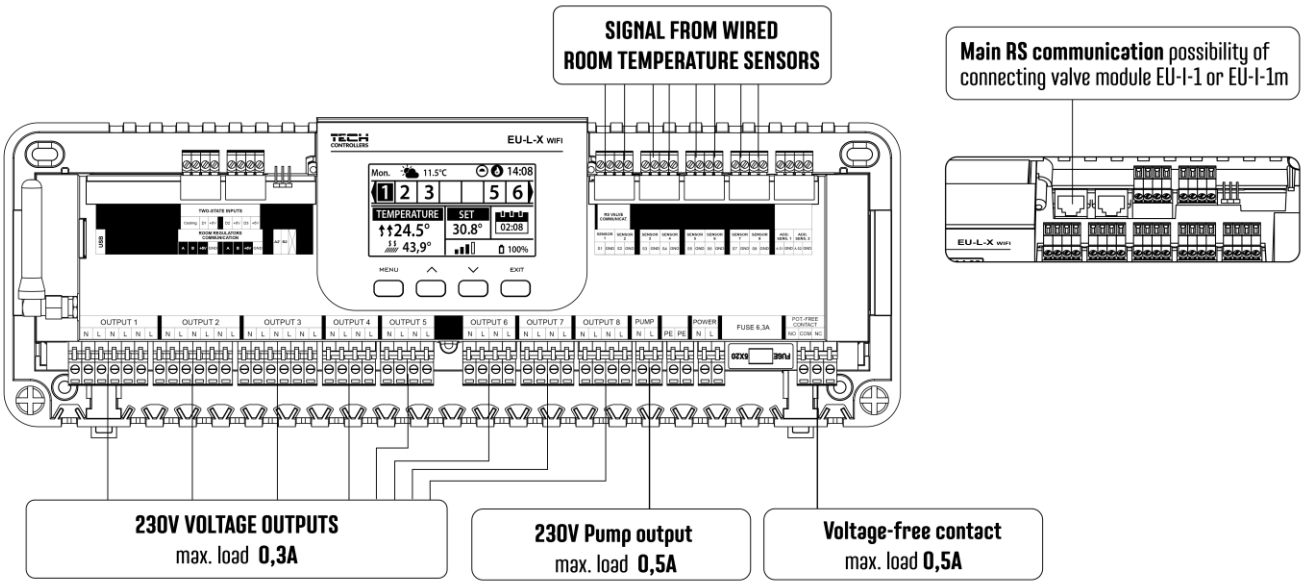
WARNING

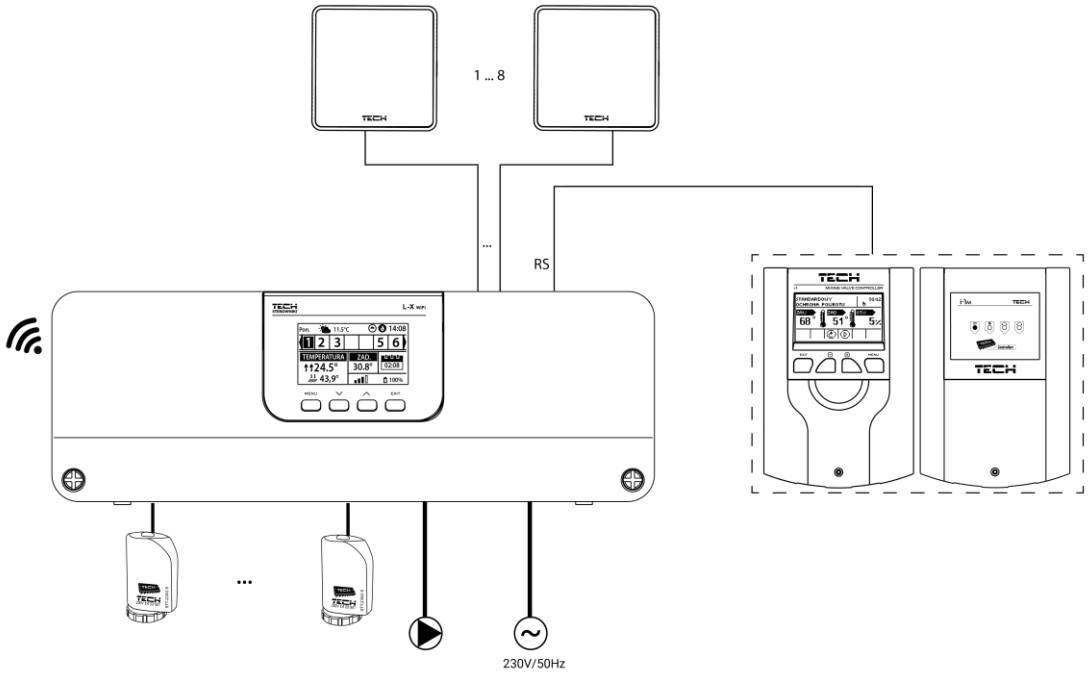
Danger of injury or death due to electric shock on live connections. Before working on the controller, disconnect its power supply and secure it against accidental switching on.

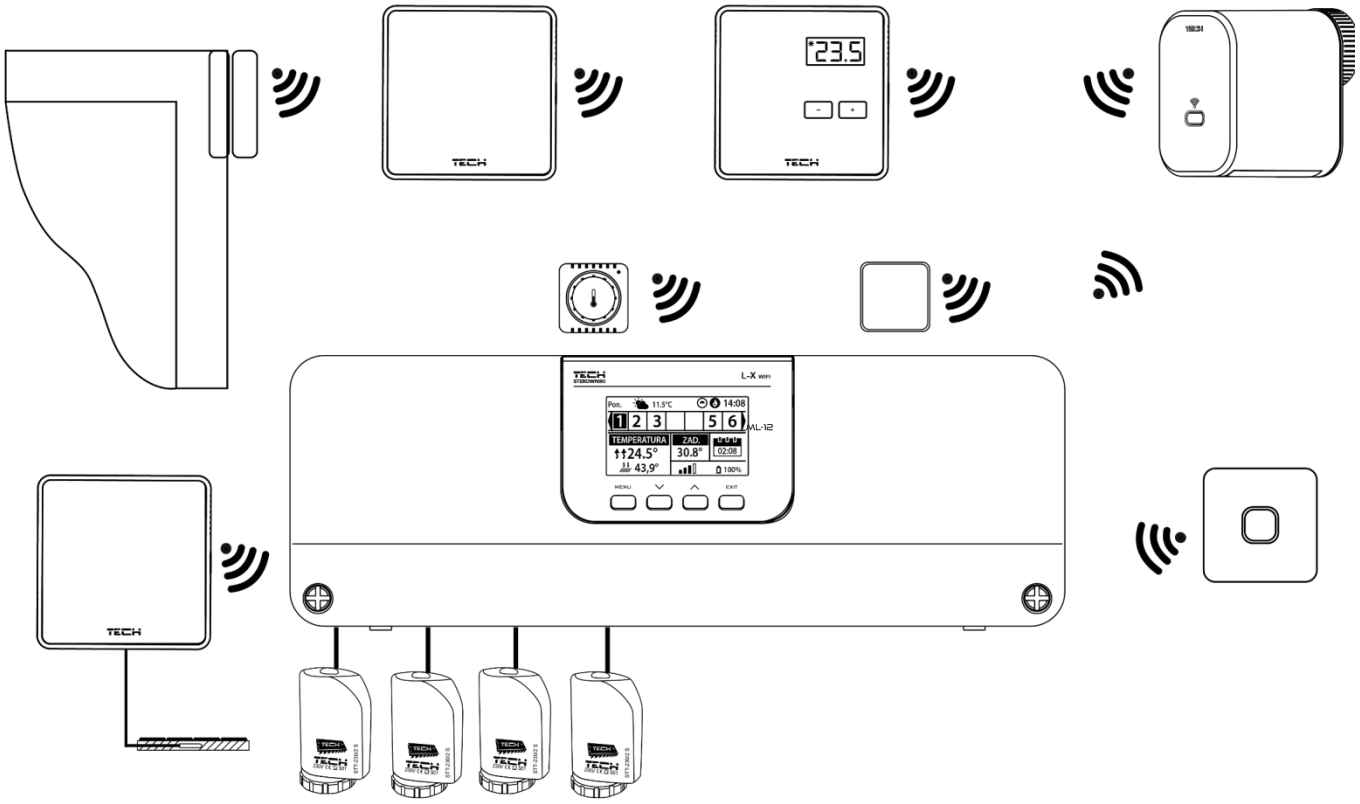
CAUTION

Incorrect wiring may damage the controller.

An illustrative diagram showing how to connect and communicate with the remaining equipment:

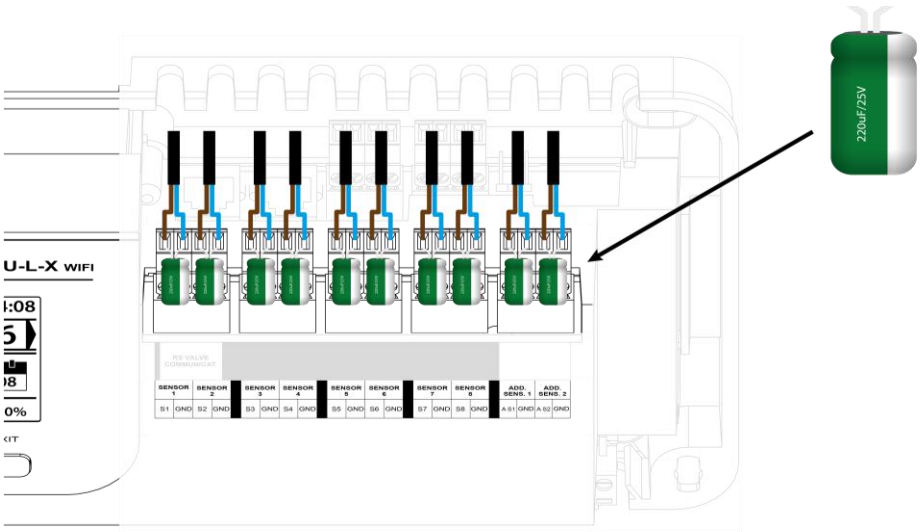






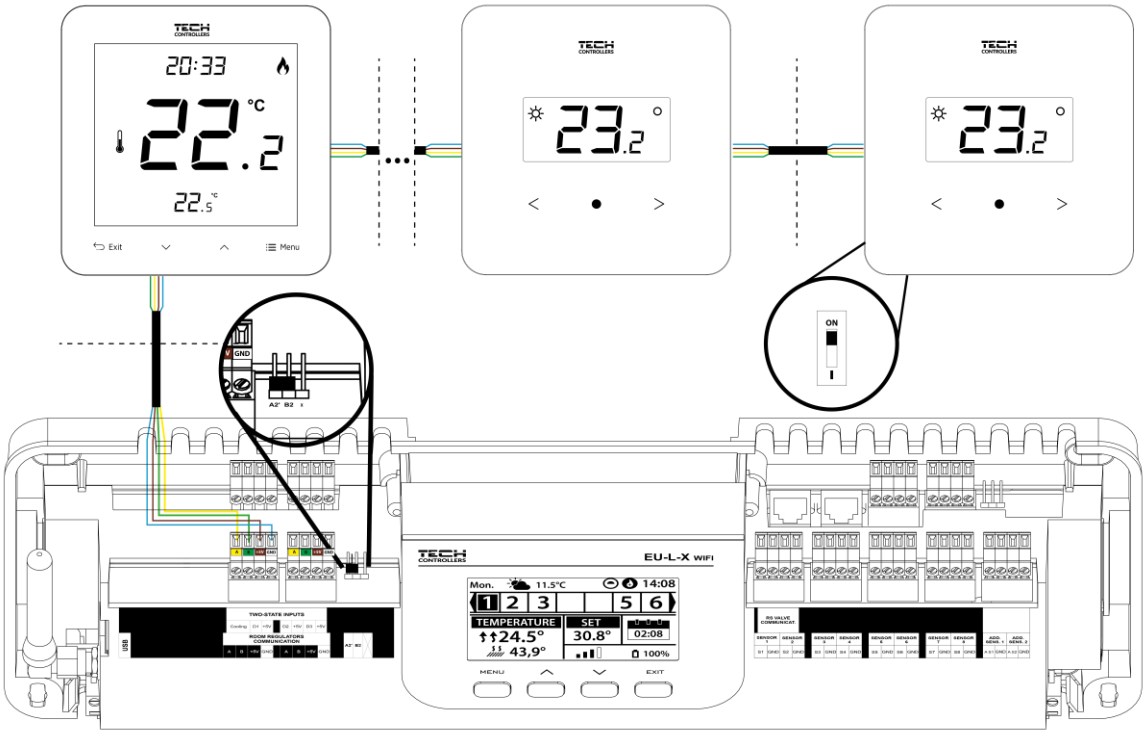
Installation of the electrolytic capacitor

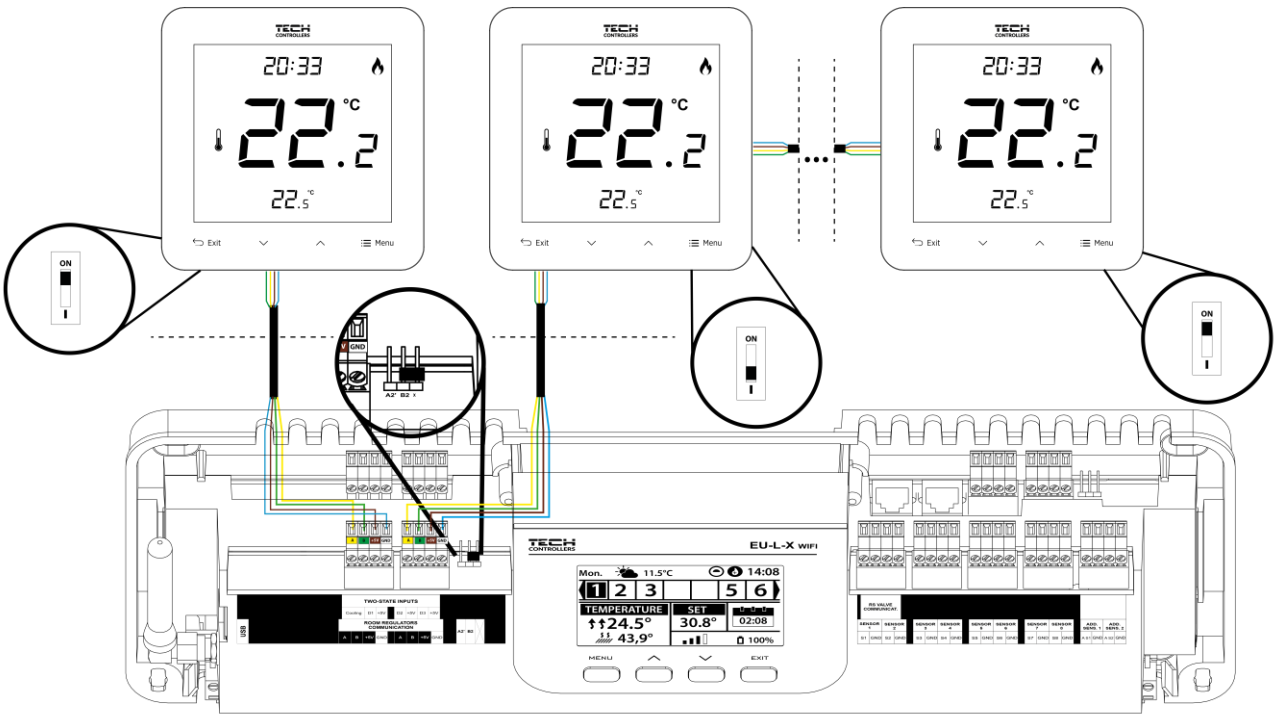
In order to reduce the phenomenon of temperature spikes read from the zone sensor, a 220uF/25V low impedance electrolytic capacitor, connected in parallel with the sensor cable, should be installed. When installing the capacitor, always pay particular attention to its polarity. The ground of the element marked with a white strip is screwed into the right terminal of the sensor connector, as seen from the front of the controller, and depicted in attached images. The second terminal of the capacitor is screwed into the terminal of the left connector. We found that this solution has completely eliminated potential distortions. However, it is worth noting that the basic principle is to correctly install the wires in order to avoid interference. The wiring should not be routed near sources of electromagnetic field, however, if such a situation has already occurred, a filter in the form of a capacitor should be applied.



Connection between the controller and the regulators

When connecting regulators to the **controller**, terminate the operation (switch the jumper in the ON position) in the **controller** and the **last** of **the regulators**.





IV. FIRST STARTUP

In order for the controller to operate correctly, the following steps must be followed for the first start-up:

Step 1: Connect the EU-L-X WiFi assembly controller with all the devices it is supposed to control

To connect the wires, remove the cover of the controller and then connect the wiring – this should be done as described on the connectors and the diagrams in the manual.

Step 2. Switch on the power supply, checking the operation of the connected devices

After connecting all devices, switch on the power supply of the controller.

Using the Manual Operation function (***Menu → Fitter's Menu → Manual Operation***), check the operation of the individual devices. Using the ∨ and ∧ buttons, select the device and press the MENU button – the device to be checked should turn on. Check all the connected devices in this manner.

Step 3. Set the current time and date

To set the current date and time, select: ***Menu → Controller settings → Time settings***.

CAUTION

The current time can be adjusted from the network automatically ***Menu → Controller settings → Time settings → Automatic.***

Step 4. Configure temperature sensors, room regulators

In order for the EU-L-X WiFi controller to support a given zone, it must receive information about the current temperature. The simplest way is to use a wired or wireless temperature sensor (e.g. EU-C-7p, EU-C-mini, EU-CL-mini, EU-C-8r). However, if you wish to be able to change the set temperature value directly from the zone, you can use room regulators, e.g. EU-R-8b, EU-R-8z, EU-R-8b Plus or dedicated ones: EU-R-12b and EU-R-12s. To pair the sensor with the controller, select: ***Menu → Fitter's menu → Zones Zone… → Room sensor → Select sensor.***

Step 5. Configure the remaining cooperating devices

The EU-L-X WiFi controller can also operate with the following devices:

- EU-i-1, EU-i-1m
- mixing valve module EU-i-1, EU-i-1m- additional contacts, e.g. EU-MW-1 (6 pcs per controller)

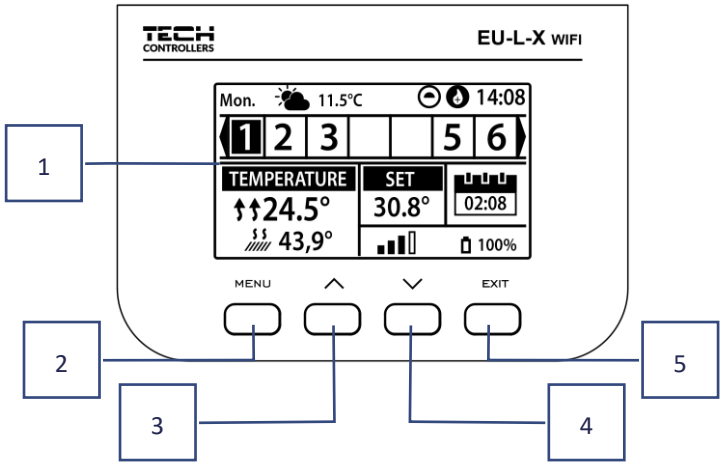
After switching on the built-in Internet module, the user has the option to control the installation via the Internet using the emodul.pl application. For configuration details, refer to the manual of the respective module.

CAUTION

If the user wants to use these devices during operation, they must be connected and/or registered.

V. MAIN SCREEN DESCRIPTION

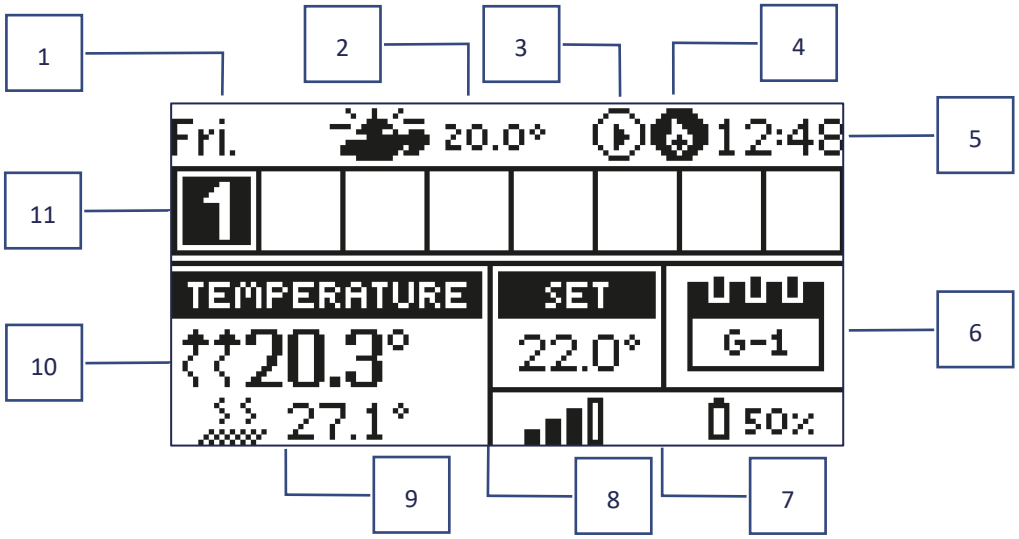
The control is carried out by means of buttons located under the display.



Controller display.

1. **MENU button** - enters the controller menu, confirming the settings.
2. **∨ button** - used to browse the menu functions or decrease the value of the edited parameters. This button also switches the operation parameters between the zones.
3. **∧ button** - used to browse the menu functions or increase the value of the edited parameters. This button also switches the operation parameters between the zones.
4. **EXIT button** - EXIT from the controller menu or cancel the settings or toggle the screen view (zones, zone).

Sample screens - ZONES



1. Current day of the week
2. Outside temperature
3. Pump running
4. Activated potential-free contact

	the zone is heated		the zone is cooled

5. Current time
6. Information about the operating mode/schedule in the respective zone

L	local schedule	**CON**	constant temperature
G-1….G-5	global schedule 1-5	**02:08**	time-limited

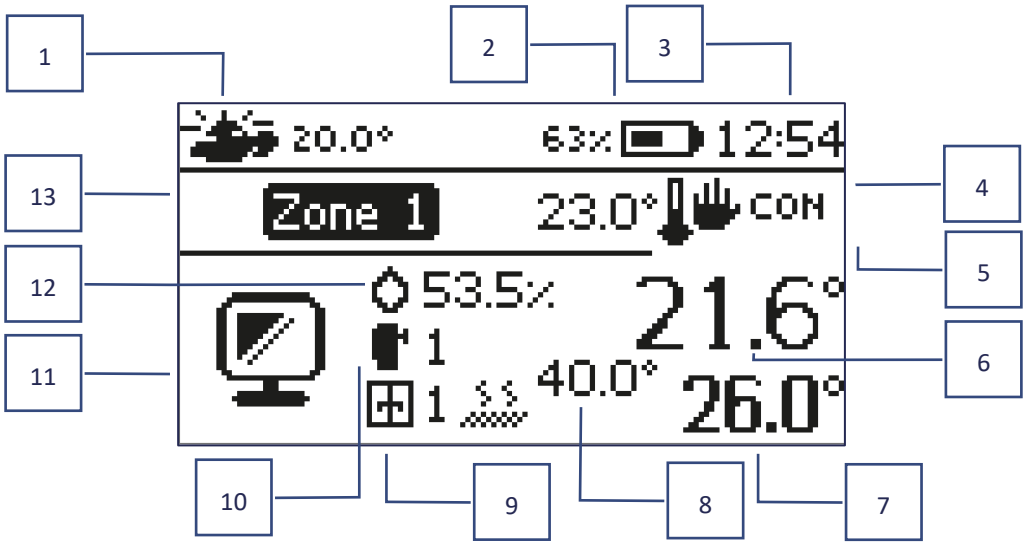
7. Signal strength and battery status of the room sensor information
8. Preset temperature in a given zone
9. Current floor temperature
10. Current temperature in a given zone

	the zone is heated		the zone is cooled

11. Zone information. A visible digit means a connected room sensor that provides information about the current temperature in the respective zone. If the zone is currently heating or cooling, depending on the mode, the digit flashes. If an alarm occurs in a given zone, an exclamation mark will be displayed instead of a digit.

    To view the current operating parameters of a specific zone, highlight its number using the ∨∧ buttons.

Sample Screen - ZONE



1. Outside temperature
2. Battery status
3. Current time
4. Current mode of operation of the displayed zone
5. The preset temperature of the given zone
6. Current temperature of the given zone
7. Current floor temperature
8. Maximum floor temperature
9. Information on the number of registered window sensors in the zone
10. Information about the number of registered actuators in the zone
11. Icon of the currently displayed zone
12. Current humidity level in the given zone
13. Zone name

VI. CONTROLLER FUNCTIONS

1. OPERATION MODE

This function enables activation of the selected operating mode.

- **Normal mode** – the preset temperature depends on the set schedule
- **Holiday mode** – the set temperature depends on the settings of this mode

Menu → Fitter's menu → Zones → Zone… → Settings → Temperature settings > Holiday mode

- **Economy mode** – the set temperature depends on the settings of this mode

Menu → Fitter's menu → Zones → Zone… → Settings → Temperature settings > Economy mode

- **Comfort mode** – the set temperature depends on the settings of this mode

Menu → Fitter's menu → Zones → Zone… → Settings → Temperature settings > Comfort mode

CAUTION

- Changing the mode to holiday, economy and comfort will apply to all zones. It is only possible to edit the setpoint temperature of the selected mode for a particular zone.
- In operation mode other than normal, it is not possible to change the set temperature from the room regulator level.

2. ZONES

- **On**

To display the zone as active on the screen, register a sensor in it (see: Fitter's Menu). The function allows you to disable the zone and hide the parameters from the main screen.

- **Set temperature**

The set temperature in the zone results from the settings of a specific mode of operation in the zone, i.e. the weekly schedule. However, it is possible to turn off the schedule and set a separate temperature and duration of this temperature. After this time, the set temperature in the zone will depend on the previously set mode. On an ongoing basis, the set temperature value, along with the time until the end of its validity, is displayed on the main screen.

CAUTION

In the event that the duration of a specific setpoint temperature is set to CON, this temperature will be valid for an indefinite period (constant temperature).

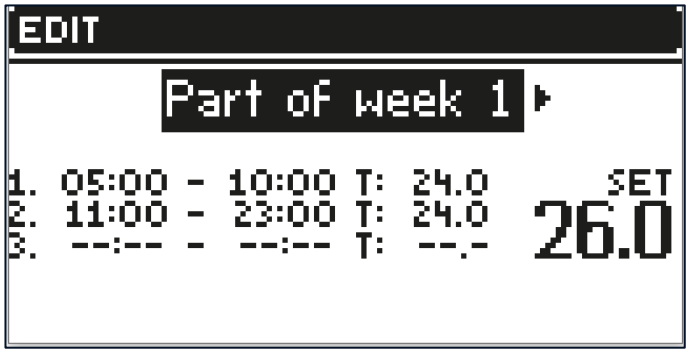
- **Operation mode**

The user has the ability to view and edit the operating mode settings for the zone.

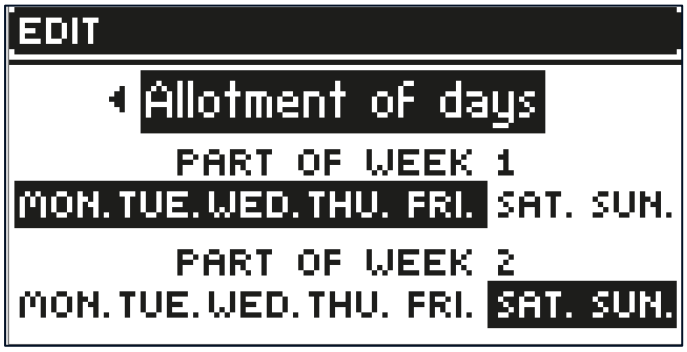
- **Local Schedule** – Schedule settings that only apply to this zone
- **Global Schedule 1-5** – These schedule settings apply to all zones, where they are active
- **Constant temperature (CON)** - this function allows you to set a separate set temperature value that will be valid in a given zone permanently, regardless of the time of day
- **With time limitation –** this function allows you to set a separate temperature that will be valid only for a specific period of time. After this time, the temperature will result from the previously applicable mode (schedule or constant without time limit).

Schedule editing

Menu → Zones → Zone… → Operating mode → Schedule… → Edit



1. Days on which the above settings apply
2. Temperature set outside the time intervals
3. Set temperatures for time intervals
4. Time intervals



To configure a schedule:

- Use the ∨ ∧ arrows to select the part of the week for which the set schedule will apply (1st part of the week or 2nd part of week).
- Use the MENU button to go to the set temperature settings that will be valid outside the time intervals - set it with the arrows, confirm using the MENU button.
- Use the MENU button to go to the settings of the time intervals and the set temperature that will be valid for the specified time interval, set it using the arrows, confirm with the MENU button.
- Then proceed to the editing of days that are to be assigned to 1st or 2nd part of the week - active days are displayed in white. The settings are confirmed with the MENU button, the arrows navigate between each day.

After setting the schedule for all days of the week, press the EXIT button and select the *Confirm* option with the MENU button.

CAUTION

The user can set three different time intervals in a given schedule (with an accuracy of 15 minutes).

3. CONTROLLER SETTINGS

- **Time settings -** the current time and date can be automatically downloaded from the network if the Internet module is connected and the automatic mode is enabled. It is also possible for the user to manually set the time and date if the automatic mode does not operate correctly.
- **Screen settings -** This function allows the user to customize the display.
- **Sound the buttons -** this option is used to enable the sound that will accompany pressing the buttons.

4. FITTER'S MENU

The fitter's menu is the most complex controller menu. Here, the user has a wide selection of functions that allow for maximum use of the controller's capabilities.

4.1. ZONES

To activate a zone on the controller display, register/activate a sensor therein and then activate the zone.

4.1.1. ROOM SENSOR

The user can register/enable any type of sensor: NTC wired, RS or wireless.

- **Hysteresis** - adds a tolerance for the room temperature in the range of 0.1 ÷ 5°C, at which there is additional heating/cooling enabled.

  Example:
  The preset room temperature is 23°C
  Hysteresis is 1°C

  The room sensor will start to indicate room underheating after the temperature drops to 22°C.

- **Calibration** - Room sensor calibration is carried out during assembly or after a longer period of use of the sensor if the displayed room temperature deviates from the actual one. Adjustment range: from -10°C to +10°C with a step of 0.1°C.

4.1.2. SET TEMPERATURE

The function is described in the ***Menu → Zones*** section.

4.1.3. OPERATION MODE

The function is described in the ***Menu → Zones*** section.

4.1.4. OUTPUTS CONFIGURATION

This option controls the outputs: floor pump, potential-free contact and outputs of sensors 1-8 (NTC to control the temperature in the zone or floor sensor to control the temperature of the floor). Sensor outputs 1-8 are assigned to zones 1-8, respectively.

The type of sensor selected here will appear by default in the option: ***Menu → Fitter's menu → Zones → Zones... → Room sensor → Select sensor*** (for temperature sensor) and ***Menu → Fitter's Menu → Zones → Zones… → Floor heating → Floor sensor → Select sensor*** (for floor sensor).

The outputs of both sensors are used to register the zone by wire.

The function also allows switching off the pump and the contact in a given zone. Such a zone, despite the need for heating, will not participate in the control.

4.1.5. SETTINGS

- **Weather control** - the option to turn the weather control on/off.

CAUTION

Weather control works only if in the ***Menu → Fitter's menu → External sensor,*** the ***Weather control*** option was checked.

- **Heating** – the function enables/disables the heating function. There is also a selection of a schedule that will be valid for the zone during heating and for editing of a separate constant temperature.

- **Cooling** - this function enables/disables the cooling function. There is also a selection of a schedule that will be valid in the zone during cooling and editing of a separate constant temperature.

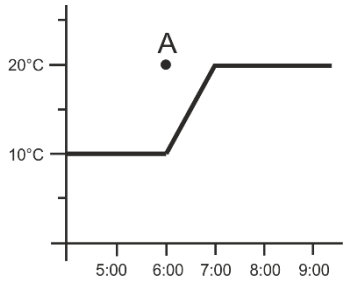
- **Temperature settings** – the function is used to set the temperature for the three operating modes (Holiday mode, Economy mode, Comfort mode).

- **Optimum start**

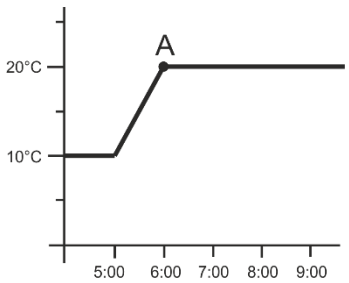
Optimum start is an intelligent heating control system. It enables continuous monitoring of the heating system and the use of this information to automatically activate the heating in advance of the time required to reach the set temperatures.

This system does not require any involvement on the part of the user and precisely responds to any changes that affect the efficiency of the heating system. If, for example, there are changes made to the installation and the house warms up faster, the optimum start system will identify the change at the next programmed temperature change resulting from the schedule, and in the subsequent cycle it will delay the activation of the heating until the last moment, reducing the time required to reach the preset temperature.

Room temperature – OPTIMUM START function OFF



Room temperature – OPTIMUM START function ON



A – programmed moment of changing the economic temperature to the comfortable one

Activating this function will ensure that when the programmed change of the set temperature resulting from the schedule occurs, the current temperature in the room will be close to the desired value.

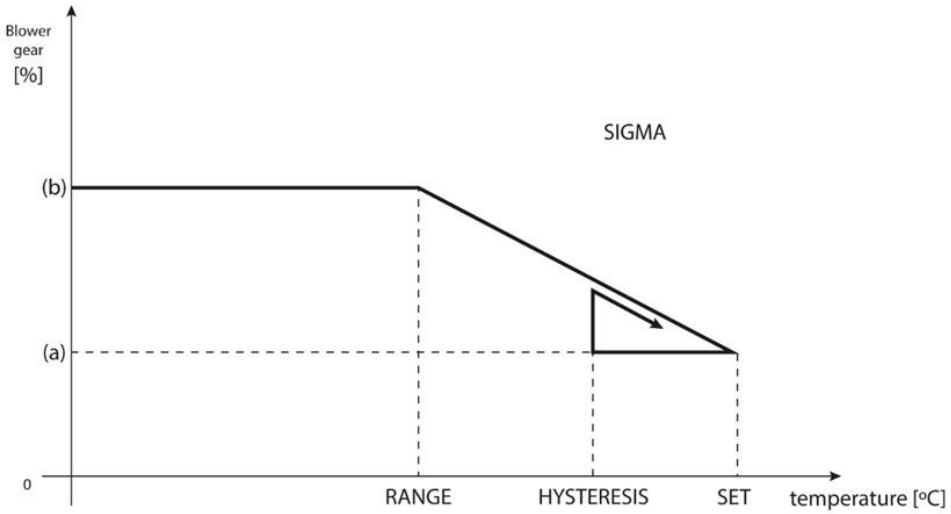
CAUTION

The optimum start function only works in the heating mode.

4.1.6. ACTUATORS

➢ **Settings**

- **SIGMA** - the function enables seamless control of the electric actuator. The user can set the **minimum and maximum openings of the valve** – this means that the degree of opening and closing of the valve will never exceed these values. In addition, the user adjusts the **Range** parameter, which determines at which room temperature the valve will start to close and open.



(a) - min. opening
(b) - Actuator opening
ZAD - set temperature

CAUTION

The Sigma function is only available for STT-868 or STT-869 actuators.

Example:

Zone preset temperature: 23˚C
Minimum opening: 30%
Maximum opening: 90%
Range: 5˚C
Hysteresis: 2˚C

With the above settings, the actuator will start to close once the temperature in the zone reaches 18°C (preset temperature minus the range value). The minimum opening will occur when the zone temperature reaches the set point.

Once the set point is reached, the temperature in the zone will start to drop. When it reaches 21°C (set temperature minus hysteresis value), the actuator will start to open reaching maximum opening when the temperature in the zone reaches 18°C.

- **Protection** - When this function is selected, the controller checks the temperature. If the set temperature is exceeded by the number of degrees in the ***Range*** parameter, then all actuators in a given zone will be closed (0% opening). This function only works with the SIGMA function enabled.
- **Emergency mode** – This allows for manual actuator opening alteration in case an alarm is triggered in the respective zone (e.g. by sensor failure or room regulator communication error). If the regulator does not

operate correctly, setting the actuator opening will be possible via the master controller or the mobile (Internet) app.
If the regulator operates correctly, this mode does not affect the operation of actuators, as it is the controller that sets their opening on the basis of setpoint temperature. In case of loss of power in the master controller, the actuators will be switched to their default position, as set in the main parameters.

- **Actuator 1-6** - option enables the user to register a wireless actuator. To do this, select ***Register*** and briefly press the communication button on the actuator. After successful registration, an additional ***information*** function appears, where the user can view the actuator parameters, e.g. battery status, range, etc. It is also possible to delete one or all actuators at the same time.

4.1.7. WINDOW SENSORS

- **Settings**

  - **On** - the function enables the activation of window sensors in a given zone (window sensor registration required).

  - **Delay Time** - This function allows you to set the delay time. After the preset delay time, the main controller responds to the opening of the window and blocks heating or cooling in the respective zone.

Example: The delay time is set to 10 minutes. Once the window is opened, the sensor sends information to the main controller about opening the window. The sensor confirms the current state of the window from time to time. If after the delay time (10 minutes) the window remains open, the main controller will close the actuators and turn off the overheating of the zone.

CAUTION

If the delay time is set to 0, then the signal to the actuators to close will be transmitted immediately.

- **Wireless** – option to register window sensors (1-6 pcs per zone). To do this, select ***Register*** and briefly press the communication button on the sensor. After successful registration, an additional ***Information*** function appears, where the user can view the sensor parameters, e.g. battery status, range, etc. It is also possible to delete a given sensor or all at the same time.

4.1.8. FLOOR HEATING

- **Floor Sensor**

  - **Sensor Selection** - This function is used to enable (wired) or register (wireless) floor sensors. In the case of a wireless sensor, register it by additionally pressing the communication button on the sensor.

  - **Hysteresis** - adds a tolerance for the room temperature in the range of 0.1 ÷ 5°C, at which the additional heating/cooling is enabled.

Example:
The maximum floor temperature is 45°C
Hysteresis is 2°C

The controller will deactivate the contact after exceeding 45°C at the floor sensor. If the temperature starts to drop, the contact will be switched back on again after the temperature at the floor sensor drops to 43 C (unless the room temperature has been reached).

- **Calibration** - Floor sensor calibration is carried out during assembly or after a longer period of use of the sensor if the displayed floor temperature deviates from the actual one. Adjustment range: from -10°C to +10°C with a step of 0.1°C.

CAUTION
The floor sensor is not used during the cooling mode.

➢**Operation mode**

- **Off** – Selecting this option disables the floor heating mode, i.e. ***Floor Protection*** nor ***Comfort Mode*** are not active.

- **Floor protection** – This function is used to keep the floor temperature below the set maximum temperature to protect the system from overheating. When the temperature rises to the set maximum temperature, the reheating of the zone will be switched off.

- **Comfort mode** – This function is used to maintain a comfortable floor temperature, i.e. the controller will monitor the current temperature. When the temperature rises to the set maximum temperature, the zone heating will be switched off to protect the system from overheating. When the floor temperature drops below the set minimum temperature, the zone reheat will be switched back on.

➢ **Min. temperature**

The function is used to set the minimum temperature to protect the floor from cooling down. When the floor temperature drops below the set minimum temperature, the zone reheat will be switched back on. This function is only available when you select ***Comfort Mode***.

➢ **Max. temperature**

The maximum floor temperature is the floor temperature threshold above which the controller will switch off the heating regardless of the current room temperature. This function protects the installation from overheating.

4.2. ADDITIONAL CONTACTS

The function allows you to handle additional contacts. First of all, it is necessary to register such a contact (1-6 pcs.). To do this, select the ***Registration*** option and briefly press the communication button on the device, e.g. MW-1.

After registering and switching on the device, the following functions will appear:

- **Information** - information about the status, operating mode and contact range is displayed on the controller screen
- **On** - option to enable/disable contact operation
- **Operating mode** – user available option to activate the selected contact operation mode
- **Time mode** – the function allows setting the contact operation time for a specific time
  The user can change the contact status by selecting/deselecting the ***Active*** option and then setting the ***Duration*** of this mode
- **Constant mode** – the function allows setting the contact to operate permanently. It is possible to change the contact status by selecting/deselecting the ***Active*** option
- **Relays** – the contact works according to the zones to which it has been assigned
- **Dehumidification** – if the ***Maximum Humidity is exceeded in a given zone,*** this option allows you to start the air dryer
- **Schedule settings** – the function allows you to set a separate contact operation schedule (regardless of the status of the controller zones).

CAUTION

The ***Dehumidification*** function works only in the ***Cooling*** operation mode.

- **Delete** – this option is used to delete the selected contact.

4.3. MIXING VALVE

The EU-L-X WiFi controller can operate an additional valve using a valve module (e.g. i-1m). This valve has RS communication, but it is necessary to carry out the registration process, which will require you to quote the module number located in the rear of its housing, or in the software information screen). After correct registration, it is possible to set individual parameters of the Additional valve.

- **Information** - the function allows you to view the valve parameters status.
- **Register** - After entering the code on the back of the valve or in the ***Menu → Software Information***, you can register the valve with the main controller.

- **Manual mode** – the user has the ability to manually stop the valve operation, open/close the valve and switch the pump on and off in order to control the correct operation of the devices.

- **Version** - This function displays the valve software version number. This information is necessary when contacting the service.

- **Valve removal** - This function is used to completely delete the valve. The function is used, for example, when removing the valve or replacing the module (it is then necessary to re-register the new module).

- **On** – option to enable or disable the valve temporarily.

- **Valve set temperature** – this parameter allows you to set the valve set temperature.

- **Summer mode** – turning on the summer mode closes the valve to avoid unnecessary heating of the house. If the boiler temperature is too high (enabled boiler protection is required), the valve will be opened in emergency mode. This mode is not active in ***Return protection*** mode.

- **Calibration** - This function can be used to calibrate the built-in valve, e.g. after prolonged use. During calibration, the valve is set to a safe position, i.e. for the CH valve and the ***Return protection*** type to reach its fully open position, and for floor valve and the ***Cooling*** type, to fully return to its closed position.

- **Single stroke** - This is the maximum single stroke (opening or closing) that the valve can perform during single temperature sampling. If the temperature is close to the set point, this stroke is calculated on the basis of the ***Proportionality coefficient*** parameter. The smaller the unit stroke, the more precisely the set temperature can be reached, but the set temperature is reached over a longer period of time.

- **Minimum opening** - A parameter that specifies the smallest valve opening in percent. This parameter enables the valve to be left slightly open to maintain the minimum flow.

CAUTION

If we set the minimum opening of the valve to 0% (complete closing), the pump will not operate when the valve is closed.

- **Opening time** - A parameter that specifies the time it takes the valve actuator to open the valve from 0% to 100%. This time should be selected to match that of the valve actuator (as indicated on its nameplate).

- **Measurement pause** - This parameter determines the frequency of measuring (control) of water temperature downstream of the CH installation valve. If the sensor indicates a temperature change (deviation from the set point), then the solenoid valve will open or close by the preset value to return to the preset temperature.
- **Valve Hysteresis** - This option is used to set the valve setpoint temperature hysteresis. This is the difference between the preset temperature and the temperature at which the valve will start to close or open.

  Example: Valve preset temperature: 50°C
  Hysteresis: 2°C
  Valve stop: 50°C
  Valve opening: 48°C
  Valve closing: 52°C

  When the set temperature is 50°C and the hysteresis is 2°C, the valve will stop in one position when the temperature reaches 50°C, when the temperature drops to 48°C, it will start to open and when it reaches 52°C, the valve will start to close in order to lower the temperature.

- **Valve type** – This option enables the user to select the following valve types:

  - **CH valve** - set when we wish to control the temperature in the CH circuit using the valve sensor. The valve sensor shall be placed downstream of the mixing valve on the supply pipe.

  - **Floor valve** - set when we wish to adjust the temperature on the underfloor heating circuit. The floor type protects the floor system against excessive temperatures. If the type of valve is set as CH and it is connected to the floor system, it may lead to damage to the floor system.

  - **Return protection** - set when we wish to adjust the temperature at the return of our installation using the return sensor. Only return and boiler sensors are active in this type of valve, and the valve sensor is not connected to the controller. In this configuration, the valve protects the boiler's return from cold temperature as a priority, and if the ***Boiler protection*** function is selected, it also protects the boiler from overheating. If the valve is closed (0% open), the water flows only in a short circuit, while the full opening of the valve (100%) means that the short circuit is closed and the water flows through the entire central heating system.

    CAUTION
    If the ***Boiler Protection*** is off, the CH temperature will not affect the opening of the valve. In extreme cases, the boiler may overheat, so it is recommended to configure the boiler protection settings.
    For this type of valve, refer to the ***Return Protection Screen.***

  - **Cooling** - set when we want to adjust the temperature of the cooling system (the valve opens when the set temperature is lower than the temperature of the valve sensor). ***Boiler protection and Return protection*** do not work in this type of valve. This type of valve operates despite the active ***Summer mode***, while the pump operates using the shutdown threshold. In addition, this type of valve has a separate heating curve incorporated as a function of the ***Weather sensor***.

- **Opening in CH calibration** – When this function is enabled, the valve starts its calibration from the opening phase. This function is only available when the valve type is set as a ***CH Valve***.

- **Floor heating - summer** – This function is only visible after selecting the valve type as ***Floor Valve***. When this function is enabled, the floor valve will operate in the ***Summer Mode***.

➢ **Weather control** – For the weather function to be active, place the external sensor in a not insolated location, one that is not exposed to atmospheric influences. After installing and connecting the sensor, switch on the ***Weather control*** function in the controller menu.

CAUTION
This setting is not available in the ***Cooling*** and ***Return Protection*** Modes.

Heating curve - this is the curve according to which the set temperature of the controller is determined on the basis of the external temperature. In order for the valve to operate properly, the set temperature (downstream the valve) is set for four intermediate external temperatures: -20°C, -10°C, 0°C and 10°C. There is a separate heating curve for the ***Cooling*** mode. It is set for intermediate outdoor temperatures of: 10°C, 20°C, 30°C, 40°C.

➢ **Room regulator**

- **Controller type**

→ **Control without room regulator** - This option should be checked when we do not want the room regulator to affect the operation of the valve.
→ **RS regulator - decrease** - check this option if the valve is to be controlled by a room regulator equipped with RS communication. When this function is checked, the controller will operate according to the ***Lower room temp.*** parameter.
→ **RS regulator - proportion** - When this regulator is switched on, the current boiler and valve temperatures can be viewed. With this function checked, the controller will operate according to the ***Room Temperature Difference*** and ***Setpoint Temperature Change*** parameters.
→ **Standard room regulator** - this option is checked if the valve is to be controlled by a two-state regulator (not equipped with RS communication). When this function is checked, the controller will operate according to the ***Room regulator temperature lower*** parameter.

- **Room regulator temp. lower** - In this setting, set the value by which the valve will lower its set temperature once the temperature set in the room regulator is reached (room heating).

CAUTION
This parameter applies to the ***Standard room regulator*** and ***RS regulator decrease*** functions.

- **Room temperature difference** - This setting determines the unit change in the current room temperature (to the nearest 0.1°C) at which a specific change in the set temperature of the valve will occur.

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

Example: Room temperature difference: 0.5°C
Valve set temperature change: 1°C
Valve set temperature: 40°C
Room regulator set temperature: 23°C

If the room temperature rises to 23.5°C (by 0.5°C above the set room temperature), the valve closes to the 39°C preset (by 1°C).

CAUTION
The parameter applies to the ***RS proportional regulator*** function.

- **Room regulator function** - In this function, it is necessary to set whether the valve will close (***Closing***) or the temperature will lower (***Room regulator temperature lower***) once it is heated.

➢ **Proportionality coefficient** – The proportionality coefficient is used to determine the valve stroke. The closer to the set temperature, the smaller the stroke. If this coefficient is high, the valve will reach a similar opening faster, but it will be less precise.

The percentage of the unit opening is calculated using the following formula:

(set temperature – sensor temp.) x (proportionality coefficient/10)

➢ **Maximum floor temperature** – This function specifies the maximum temperature that the valve sensor can reach (if Floor valve is selected). When this value is reached, the valve closes, switching off the pump, and the information about overheating of the floor appears on the main screen of the controller.

CAUTION
This is only visible if the valve type is set to ***Floor valve***.

➢ **Opening direction** – If, after connecting the valve to the controller, it turns out that it was supposed to be connected in the opposite direction, it is not necessary to switch the supply lines, but it is possible to change the opening direction of the valve by selecting the selected direction: Right or Left.

➢ **Sensor Selection** – This option applies to the return sensor and the external sensor and allows you to determine whether the additional valve operation should take into account the ***Self*** of the valve module or the ***Main sensor*** (Only in Slave Mode).

➢ **CH sensor selection** – This option applies to the CH sensor and allows you to determine whether the function of the additional valve should take into account the ***Self*** of the valve module or the ***Main sensor*** (Only in slave mode).

➢ **Boiler protection** – This provides protection against excessive CH temperature, and is intended to prevent dangerous increase of boiler temperature. The user must first set the maximum permissible boiler temperature. In the event of a dangerous temperature rise, the valve begins to open to cool the boiler down. The user also sets the maximum permissible CH temperature, after which the valve will open.

CAUTION
The function is not active for the ***Cooling*** and ***Floor*** valve types.

➢ **Return protection** – This function allows to set the boiler protection against too cold water returning from the main circuit, which could cause low temperature corrosion of the boiler. The return protection works in such a way that when the temperature is too low, the valve closes until the short circuit of the boiler reaches the required temperature.

CAUTION
The function does not appear for the valve type ***Cooling***.

➢ **Valve pump**
- **Pump operating modes** – the function allows you to select the pump operating mode:
  → **Always OFF** - the pump is switched off permanently and the controller only controls the operation of the valve
  → **Always ON** - pump runs at all times regardless of temperature

→ **Above the threshold** - the pump turns on above the set switching temperature. If the pump is to be switched on above the threshold, the threshold pump switching temperature must also be set. The value from the CH sensor is taken into account.

- **Pumps switch on temperature** - This option applies to the pump operating above the threshold. The valve pump will switch on when the boiler sensor reaches the pump switching temperature.
- **Pump anti-stop** - When enabled, the valve pump will turn on every 10 days for 2 minutes. This prevents water from fouling the installation outside the heating season.
- **Closing below temperature threshold** - When this function is activated (check the Enabled option), the valve will remain closed until the boiler sensor reaches the pump switching temperature.

CAUTION
If the additional valve module is an i-1 model, the anti-fouling functions of the pumps and the closure below the threshold can be set directly from the sub-menu of that module.

- **Valve pump room regulator** - Option whereby the room regulator switches the pump off once heated.
- **Only pump** - When enabled, the controller controls only the pump and the valve is not controlled.

➢ **External sensor calibration** – This function is used to adjust the external sensor, it is done during installation or after prolonged use of the sensor if the displayed external temperature deviates from the actual one. The user specifies the correction value applied (adjustment range: -10 to +10°C).

➢ **Valve closing** – Parameter in which the behaviour of the valve in the CH mode is set after it is switched off. Enabling this option closes the valve and disabling opens it.

➢ **Valve weekly control** – The weekly control allows you to program deviations of the valve set temperature on particular days of the week at specific times. The temperature deviations set are in the range of +/-10°C.

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

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

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

→ Select the option: ***Set Mode 1***
→ Select the day of the week for which you wish to change the temperature settings
→ Use the ∨∧ buttons to select the time for which you want to change the temperature. Confirm the selection by pressing the MENU button
→ Options appear at the bottom, select CHANGE by pressing the MENU button when it is highlighted in white.
→ Then decrease or increase the temperature by the selected value and confirm.
→ If you want to apply the same change also to the neighboring hours, press the MENU button on the selected setting, and after the option appears at the bottom of the screen, select COPY and copy the setting to the subsequent or previous hour using the ∨∧ buttons. Confirm the settings by pressing MENU.

Example:

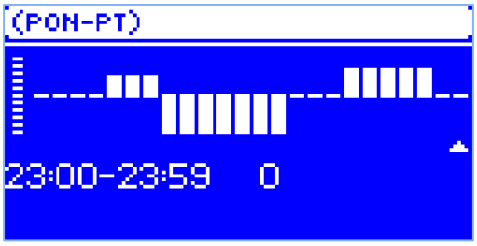
	Time	Temperature – **Set for weekly control**
Monday		
PRESET	4^{00} - 7^{00}	+5°C
	7^{00} - 14^{00}	-10°C
	17^{00} - 22^{00}	+7°C

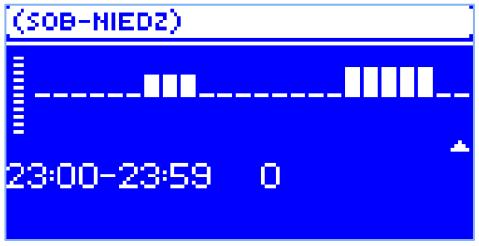
In this case, if the temperature set on the valve is 50°C, on Mondays, from 4^{00} to 7^{00} hours, the temperature set on the valve will increase by 5°C, or to 55°C; in the hours from 7^{00} to 14^{00} it will decrease by 10°C, so it will be 40°C, while between 17^{00} and 22^{00} it will increase to 57°C.

MODE 2 - in this mode, it is possible to program the temperature deviations in detail for all **working days** (Monday – Friday) and for the **weekend** (Saturday – Sunday). To do this:

→ Select the option: ***Set Mode 2***
→ Select the part of the week for which you wish to change the temperature settings
→ The further procedure is the same as in ***Mode 1***

Example:





	Time	Temperature - **Set for weekly control**
Monday - Friday		
PRESET	4^{00} - 7^{00}	+5°C
	7^{00} - 14^{00}	-10°C
	17^{00} - 22^{00}	+7°C
Saturday - Sunday		
PRESET	6^{00} - 9^{00}	+5°C
	17^{00} - 22^{00}	+7°C

In this case, if the temperature set on the valve is 50°C Monday to Friday, from 4^{00} to 7^{00}, the temperature on the valve will increase by 5°C, or to 55°C; in the hours from 7^{00} to 14^{00} it will decrease by 10°C, so it will be 40°C, while between 17^{00} and 22^{00} it will increase to 57°C.
During the weekend, from 6^{00} to 9^{00} hours, the temperature on the valve will rise by 5°C, that is to 55°C, and between 17^{00} and 22^{00} it will rise to 57°C.

➢ **Factory settings** – This parameter allows you to return to the settings of a given valve saved by the manufacturer. Restoring the factory settings changes the valve type to a CH valve.

4.4. INTERNET MODULE

The Internet module is a device that allows remote control of the installation. The user can control the operation of various devices and change some parameters using the ***emodul.pl*** application.

The device has a built-in Internet module. After switching on the Internet module and selecting the DHCP option, the controller will automatically retrieve parameters such as: IP address, IP mask, Gateway address and DNS address from the local network.

Required network settings

In order for the Internet module to operate correctly, it is required to connect the module to a network with a DHCP server and an open port 2000. Once the Internet module is properly connected to the network, go to the module settings menu (in the master controller). If the network does not have a DHCP server, the Internet module must be configured by its administrator by entering the appropriate parameters (DHCP, IP Address, Gateway Address, Subnet Mask, DNS Address). Configuration can be accomplished by:

1. Go to the settings menu of the Internet module.
2. Select the "Enabled" option
3. Then check if the "DHCP" option is checked.
4. Enter “WIFI Selection”
5. Then select your WIFI network and enter its password.
6. Wait for a moment (ca. 1min) and check if the IP address has been assigned. Go to the "IP Address" tab and check if the value is different than 0.0.0.0/ -.-.-.- .
   a. If the value still indicates 0.0.0.0 / -.-.-.-.- check the network settings or the Ethernet connection between the Internet module and the device.
7. After correctly assigning the IP address, we can start registering the module to generate the code that is required to assign it to an application account.

4.5. MANUAL MODE

This function allows you to control the operation of individual devices. The user can manually switch on each of the devices: pump, potential-free contact and individual valve actuators. It is recommended to use manual operation mode, to check the correct operation of the connected devices at the first start-up.

4.6. EXTERNAL SENSOR

CAUTION

This function is only available when an external sensor has been registered in the EU-L-X WiFi controller.

You can connect an external temperature sensor to the EU-L-X WiFi controller (connector in the controller- **Additional sensor 1**), which allows you to switch on the weather control, by:

- **Sensor Selection** – You can select either a NTC wired sensor or the C-8zr wireless sensor. Wireless sensor requires registration.
- **Calibration** - Calibration is performed at installation or after prolonged use of the sensor if the temperature measured by the sensor deviates from the actual temperature. Adjustment range is from -10°C to +10°C with a step of 0.1°C.

In the case of a wireless sensor, the subsequent parameters relate to the range and level of the battery.

4.7. HEATING STOPPING

Function to prevent actuators from turning on at specified time intervals.

- **Date settings**
  - **Heating deactivation** – Set the date from which the heating will be switched off
  - **Heating activation** - setting the date from which the heating will be switched on

- **Weather control** - When the external sensor is connected, the main screen will display the external temperature and the controller menu will display the mean external temperature.

  The function based on the outside temperature allows determining the mean temperature, which will work on the basis of the temperature threshold. If the mean temperature exceeds the specified temperature threshold, the controller will switch off the heating of the zone in which the weather control function is active.
  - **On** – to use the weather control, the selected sensor must be enabled.

- **Averaging time** – the user sets the time on the basis of which the mean outside temperature will be calculated. Setting range is from 6 to 24 hours.
- **Temperature threshold** – this is a function protecting against excessive heating of the given zone. The zone in which the weather control is switched on will be blocked from overheating if the mean daily outdoor temperature exceeds the set threshold temperature. For example, when temperatures rise in the spring, the controller will block unnecessary room heating.
- **Average external temperature** – temperature value calculated on the basis of the **Averaging time**.

4.8. POTENTIAL-FREE CONTACT

The EU-L-X WiFi controller will activate the potential-free contact (after counting down the delay time) when any of the zones has not reached the set temperature (heating – when the zone is underheated, cooling – when the temperature in the zone is too high). The controller deactivates the contact once the set temperature has been reached.

- **Operation delay** - the function allows the user to set the delay time of switching on the potential-free contact after the temperature drops below the set temperature in any of the zones.

4.9. PUMP

The EU-L-X WiFi controller controls the operation of the pump – it turns on the pump (after counting down the delay time) when any of the zones is underheated and when the floor pump option is enabled in the respective zone. When all zones are heated (the set temperature is reached), the controller switches off the pump.

- **Operation delay** - the function allows the user to set the delay time of switching on the pump after the temperature drops below the set temperature in any of the zones. The delay in switching on the pump is used to allow the valve actuator to open.

4.10. HEATING - COOLING

The function allows you to select the operating mode:

- **Heating** – all zones are heated
- **Cooling** – all zones are cooled
- **Automatic** – the controller switches the mode between heating and cooling based on the two-state input.

4.11. ANTI-STOP SETTINGS

This function forces the operation of pumps and valves (check the option first), which prevents scale deposits during the period of prolonged inactivity of pumps and valves, e.g. outside the heating season. If this function is enabled, the pump and valves will switch on for the set time and with a specified interval (e.g. every 10 days for 5 min.).

4.12. MAXIMUM HUMIDITY

If the current humidity level is higher than the set maximum humidity, the cooling of the zone will be disconnected.

CAUTION

The function is only active in ***Cooling*** mode, provided that a sensor with humidity measurement is registered in the zone.

4.13. LANGUAGE

The function allows you to change the controller language version.

4.14. HEAT PUMP

Dedicated mode for the installation operating with a heat pump, allowing for optimal use of its capabilities.

- **Energy saving mode** – ticking the option will start the mode and more options will appear.
- **Minimum pause time** – a parameter limiting the number of compressor switches, which allows to extend the life of the compressor.
  Regardless of the need to reheat a given zone, the compressor will start only after the time counted from the end of the previous work cycle has elapsed.

- **Bypass** – an option needed in the absence of a buffer, providing the heat pump with an appropriate heat capacity.
  It relies on sequential opening of subsequent zones every specified time.
  - **Floor pump** – activate/deactivate floor pump
  - **Cycle time** – time for which the selected zone will be opened.

4.15. FACTORY SETTINGS

The function allows you to return to the fitter's menu settings saved by the manufacturer.

5. SERVICE MENU

The driver service menu is only available to authorized persons and is protected by the proprietary code of Tech Sterowniki.

6. FACTORY SETTINGS

The function allows you to return to the default settings of the controller, as defined by the manufacturer.

7. SOFTWARE VERSION

When this option is activated, the manufacturer's logo will appear on the display, along with the controller software version number. The software revision is required when contacting the Tech Sterowniki service.

VII.ALARM LIST

Alarm	Possible cause	How to fix it
Sensor damaged (room sensor, floor sensor)	Sensor shorted or damaged	- Check the connection with the sensor - Replace the sensor with a new one or contact the service staff if necessary.
No communication with sensor/ wireless regulator	- No range - No battery - Flat battery	- Put the sensor/regulator in a different place - Insert batteries in the sensor/regulator The alarm deactivates automatically when communication is established.
No communication with module/ control panel / wireless contact	No range	- Put the device in a different place or use a repeater to extend the range. The alarm deactivates automatically when communication is established.
No Open Therm communication	- Communication cable damaged - Gas boiler switched off or damaged	Check the connection with the gas boiler. Contact the service staff if necessary.

Software update	System communication versions in the two devices are not compatible	Update the software to the latest version.
STT-868 actuator alarm		
ERROR #0	Flat battery in the actuator	Replace the batteries
ERROR #1	Some mechanical or electronic parts have been damaged	Contact the service staff
ERROR #2	- No piston controlling the valve - Too big stroke (movement) of the valve - The actuator has been incorrectly mounted on the radiator - Inappropriate valve on the radiator	- Install a piston controlling the actuator - Check the valve stroke - Install the actuator correctly - Replace the valve on the radiator
ERROR #3	- The valve got stuck - Inappropriate valve on the radiator - Too little stroke (movement) of the valve	- Inspect the valve operation - Replace the valve on the radiator - Check the valve stroke
ERROR #4	- No range - No batteries	- Check the distance between the actuator and the controller - Insert batteries into the actuator After the communication is re-established, the alarm is deactivated automatically.
STT-869 actuator alarm		
ERROR #1 - Calibration error 1 – Moving the screw to the mounting position took too much time	- The limit switch sensor is damaged	- Calibrate actuator again by holding the communication button until the third flash of green light - Call the service staff
ERROR #2 - Calibration error 2 – The screw is maximally pulled out. No resistance while pulling out	- The actuator has not been screwed to the valve or has not been screwed completely - The valve stroke is too big or the valve dimensions are not typical - Actuator current sensor is damaged	- Check if the controller has been installed properly - Replace the batteries - Calibrate actuator again by holding the communication button until the third flash of green light - Call the service staff
ERROR #3 - Calibration error 3 - The screw has not been pulled out enough - the screw meets resistance too early	- The valve stroke is too small or the valve dimensions are not typical - Actuator current sensor is damaged - Low battery level	- Replace the batteries - Contact the service staff
ERROR #4 - No feedback	- The master controller is switched off - Poor range or no range to connect with the master controller - Radio module in the actuator is damaged	- Check if the master controller is on - Reduce the distance from the master controller - Call the service staff
ERROR #5 - Low battery level	The battery is flat	Replace the batteries
ERROR #6 - Encoder is locked	The encoder is damaged	- Calibrate actuator again by holding the communication button until the third flash of green light - Call the service staff
ERROR #7 - To high voltage	- Unevenness of the screw, the thread etc. may cause excessive resistance - Too high resistance of gear or motor	

	- Current sensor is damaged	
ERROR #8 - Limit switch sensor error	Limit switch sensor damaged	
EU-G-X actuator alarm		
ERROR #1 Calibration error 1 - Bolt retraction to mounting position took too long.	- Locked/damaged actuator piston.	Check the assembly and recalibrate the actuator.
ERROR #2 Calibration error 2 - Bolt maximally extended as it did not meet any resistance during extension.	- actuator was not screwed properly onto the valve - the actuator was not fully tightened onto the valve - actuator movement was excessive, or non-standard valve encountered - motor load measurement failure occurred	Check the assembly and recalibrate the actuator.
ERROR #3 Calibration error 3 - Bolt extension too short. The bolt met resistance too early during the calibration process.	- valve movement was too small, or a non-standard valve encountered - motor load measurement failure - motor load measurement inaccurate due to low battery charge	Check the assembly and recalibrate the actuator.
ERROR #4 Actuator feedback communication error. For the last x minutes, the actuator did not receive a data package via wireless communication. After this error is triggered, the actuator will set itself to 50% opening.	- master controller disabled - poor signal or no signal originating from the master controller - defective RC module in the actuator	The error will reset after a data package is received.
ERROR #5 Battery low	- battery depleted	The actuator will detect battery replacement after voltage rises and launch calibration.
ERROR #6	-	-
ERROR #7 - Actuator blocked	- while changing the opening of the valve, excessive load was encountered	Recalibrate the actuator.

VIII. SOFTWARE UPDATE

To upload new software, disconnect the controller from the network. Insert the USB flash drive containing the new software into the USB port. Then connect the controller to the network while holding down the EXIT button. Hold down the EXIT button until you hear a single beep marking the start of new software uploading. Once the task is completed, the controller restarts itself.

CAUTION

- The process of uploading new software to the controller may only be carried out by a qualified installer. After changing the software, it is not possible to restore the previous settings.
- Do not turn off the controller while updating the software.

IX. TECHNICAL DATA

Power supply	230V ± 10% / 50 Hz
Max. power consumption	5W
Ambient working temperature	5 ÷ 50°C
Potential contacts 1-8 max. output load	0.3A
Pump max. output load	0.5A
Potential-free contact nominal output load	230V AC / 0.5A (AC1) * 24V DC / 0.5A (DC1) **
NTC sensor thermal resistance	-30 ÷ 50°C
Operation frequency	868MHz
Fuse	6.3A
Transmission IEEE 802.11 b/g/n	

* AC1 load category: single-phase, resistive or slightly inductive AC load.

** DC1 load category: direct current, resistive or slightly inductive load.

EU DECLARATION OF CONFORMITY

Hereby, we declare under our sole responsibility that **EU-L-X WiFi** manufactured by TECH STEROWNIKI II Sp. z o.o., head-quartered in Wieprz Biała Droga 31, 34-122 Wieprz, is compliant with Directive **2014/53/EU** of the European parliament and of the Council of 16 April 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of radio equipment, Directive **2009/125/EC** establishing a framework for the setting of ecodesign requirements for energy-related products as well as the regulation by the MINISTRY OF ENTREPRENEURSHIP AND TECHNOLOGY of 24 June 2019 amending the regulation concerning the essential requirements as regards the restriction of the use of certain hazardous substances in electrical and electronic equipment, implementing provisions of Directive (EU) 2017/2102 of the European Parliament and of the Council of 15 November 2017 amending Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (OJ L 305, 21.11.2017, p. 8).

For compliance assessment, harmonized standards were used:

PN-EN IEC 60730-2-9 :2019-06 art. 3.1a Safety of use

PN-EN IEC 62368-1:2020-11 art. 3.1 a Safety of use

PN-EN 62479:2011 art. 3.1 a Safety of use

ETSI EN 301 489-1 V2.2.3 (2019-11) art.3.1b Electromagnetic compatibility

ETSI EN 301 489-3 V2.1.1 (2019-03) art.3.1 b Electromagnetic compatibility

ETSI EN 301 489-17 V3.2.4 (2020-09) art.3.1b Electromagnetic compatibility

ETSI EN 300 328 V2.2.2 (2019-07) art.3.2 Effective and coherent use of radio spectrum

ETSI EN 300 220-2 V3.2.1 (2018-06) art.3.2 Effective and coherent use of radio spectrum

ETSI EN 300 220-1 V3.1.1 (2017-02) art.3.2 Effective and coherent use of radio spectrum

EN IEC 63000:2018 RoHS

Wieprz, 14.09.2022

Paweł Jura Janusz Master

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