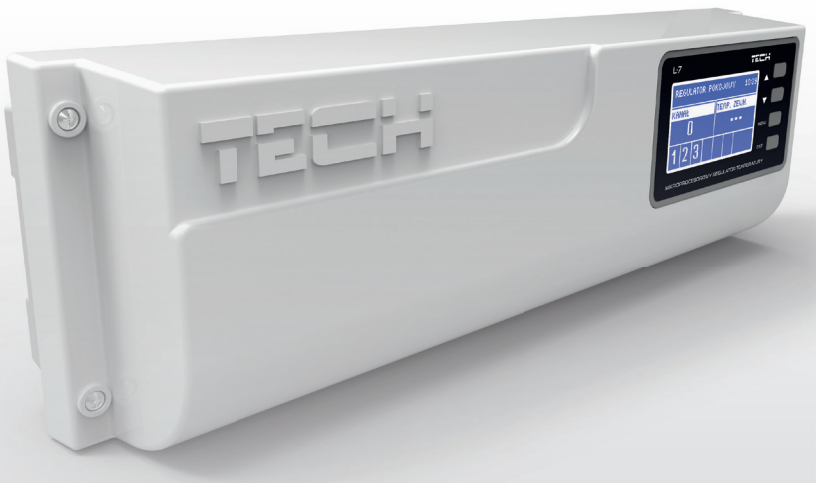
USER'S MANUAL
L-7

EN



WWW.TECH-CONTROLLERS.COM

Table of contents

I. Safety

Before using the device for the first time the user should read the following regulations carefully. Not obeying the rules included in this manual may lead to personal injuries or controller damage. The user's manual should be stored in a safe place for further reference. In order to avoid accidents and errors it should be ensured that every person using the device has familiarized themselves with the principle of operation as well as security functions of the controller. If the device is to be sold or put in a different place, make sure that the user's manual is there with the device so that any potential user has access to essential information about the device.
The manufacturer does not accept responsibility for any injuries or damage resulting from negligence; therefore, users are obliged to take the necessary safety measures listed in this manual to protect their lives and property.

WARNING

- High voltage! Make sure the regulator is disconnected from the mains before performing any activities involving the power supply (plugging cables, installing the device etc.)
- The device should be installed by a qualified electrician.
- Before starting the controller, the user 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

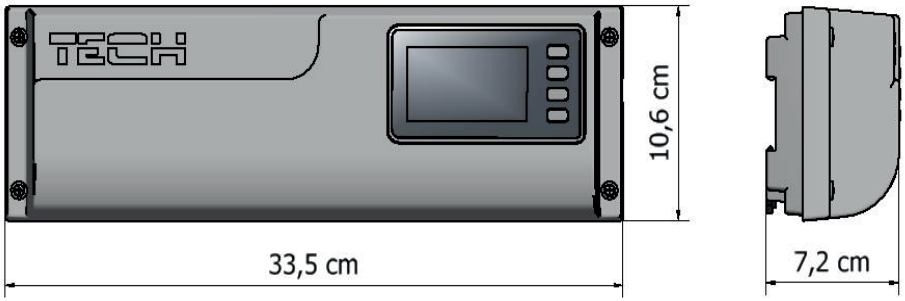
- The device may be damaged if struck by a lightning. Make sure the plug is disconnected from the power supply during storm.
- Any use other than specified by the manufacturer is forbidden.
- Before and during the heating season, the controller should be checked for condition of its cables. The user 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 February 28th 2016. 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.

II. Description of the device

- L-7 external controller is intended for controlling thermostatic valves in different heating zones. The controller enables significant energy saving due to precise temperature management in particular rooms. Thanks to advanced software the controller fulfils a wide range of functions:
- - possibility of controlling up to 22 thermostatic actuators via 8 room sensors (C-7p):
- - 3 room sensors may support up to 12 actuators (the maximum of 4 actuators per one sensor);
- - 5 room sensors may support up to 10 actuators (the maximum of 2 actuators per one sensor)
- - one 230V output for a pump
- - voltage-free contact (e.g. for controlling the heating device)
- - possibility of connecting ST-507 Internet or WiFi RS to control the system via the Internet
- - possibility of connecting M-7 wireless control panel with RS communication
- - possibility of connecting ST-61v4 or ST-431n valve module
- - possibility of updating the software via USB



Controller dimensions

II.a) Principle of operation

L-7 controller decides if a given zone needs to be heated on the basis of current temperature value sent by the room sensor (C-7p) as well as the individual operation algorithm of the zone.

If heating is necessary, the controller activates the additional contact which may be used e.g. for controlling the heating device.

When the delay time has elapsed (parameter: Main menu/Pump/Delay), the controller activates CH pump.

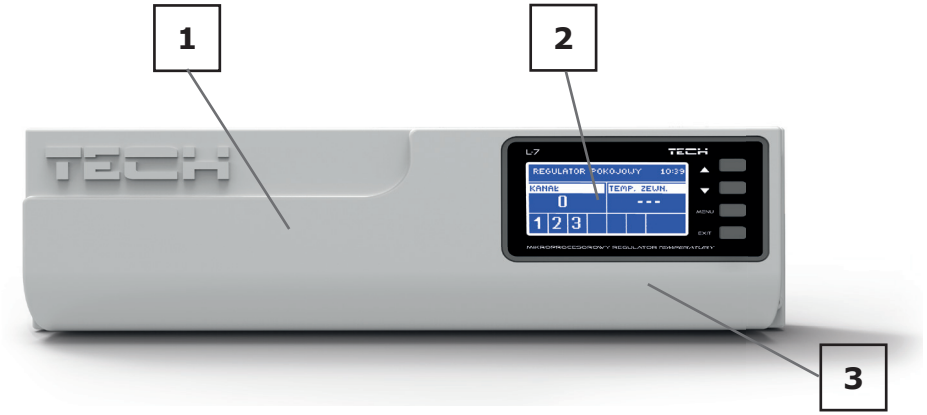
The signal from each zone is transmitted to L-7 controller via room sensors.

In each zone the user installs wired valve actuators STT-230/2.

III. Installation

The controller should be installed by a qualified person.

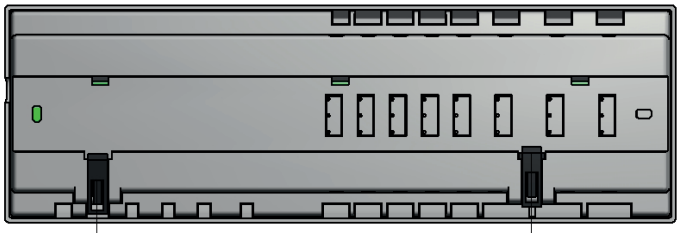
WARNING
Risk of fatal electric shock from touching live connections. Before working on the controller switch off the power supply and prevent it from being accidentally switched on.



1. Cover (it should be removed to connect the devices to be controlled)
2. Display
3. Buttons

L-7 controller may be installed as a free-standing device or as a panel mountable on a wall.

The controller may be installed on a DIN strip



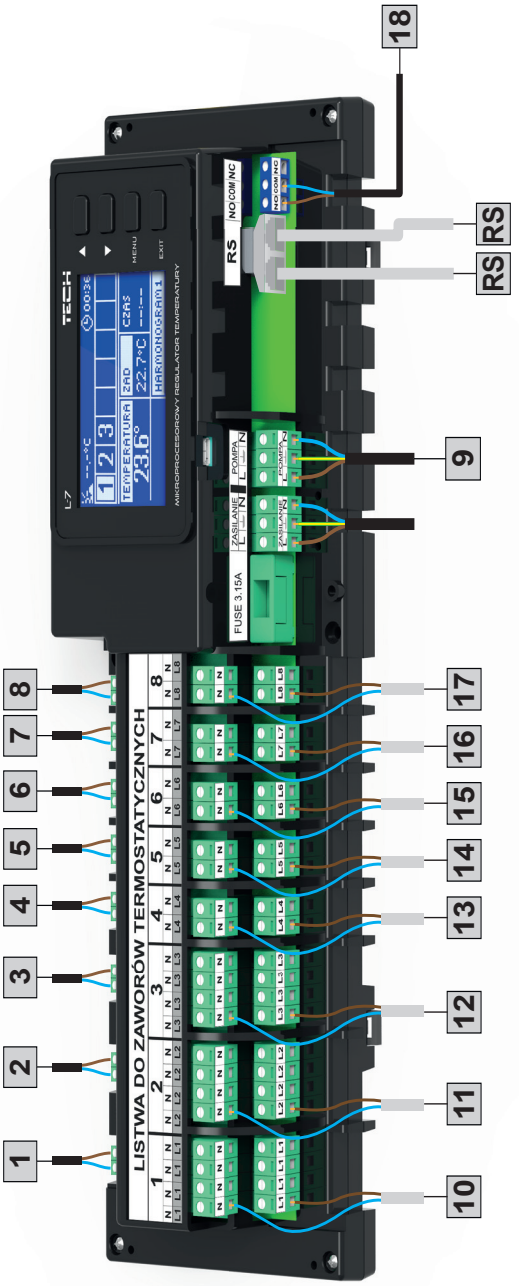
III.a) First start-up

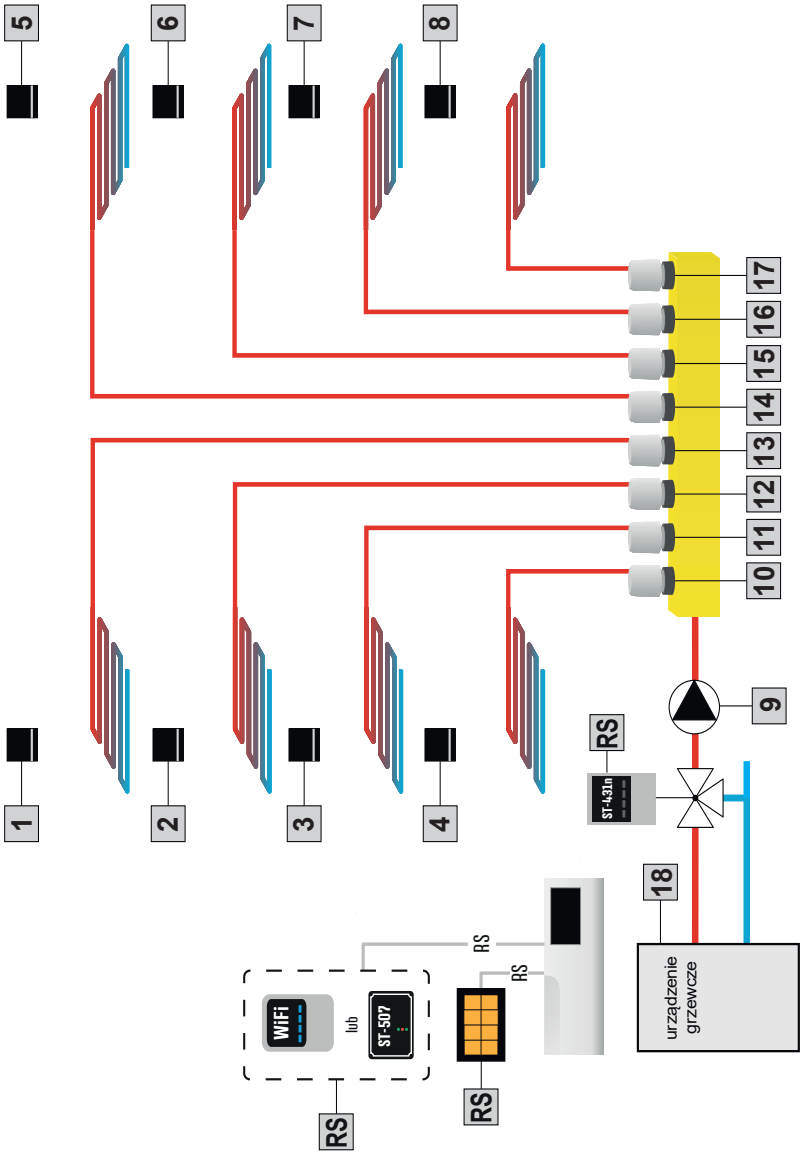
In order for the controller to operate correctly, the user must follow these steps when starting the device for the first time:

1. Connect L-7 with all the subordinate devices to be controlled
2. Switch on the power supply and check if the devices work.
3. Activate the Internet module.
4. Set current time and date.
5. Configure the temperature sensors settings.

Step 1: Connect L-7 with all subordinate devices to be controlled

Remove the cover and connect the wires following the clues on the connectors and the diagrams presented below.
Follow this order while connecting:
- all the necessary valve actuators ST-230/2 (connectors 1..8)
- Internet module (using RS cable)
- pump
- an additional device


18
RS
RS
9
17
16
15
14
13
12
11
10
1
2
3
4
5
6
7
8
LISTWA DO ZAWORÓW TERMOSTATYCZNYCH
TECH
MIKROPROCESOROWY REGULATOR TEMPERATURY
TEMPERATURA
23.6°C
HARMONOGRAM1
FUSE 3.15A
ZASILANIE
POMPA
RS
NO COM NC



Pictorial diagram presenting wiring and communication with other devices in the system

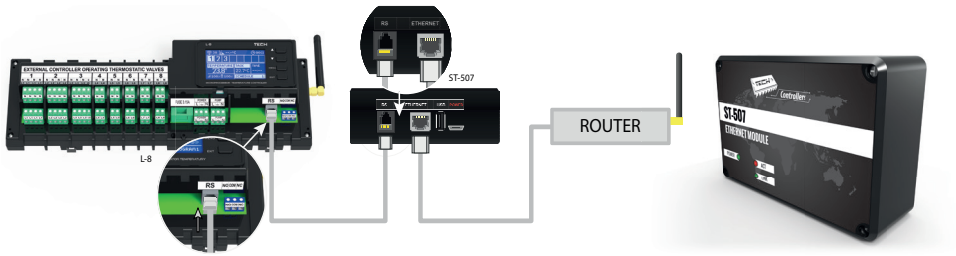
STEP 2: Switch on the power supply and check if the devices work

After all the devices have been connected, switch on the power supply.

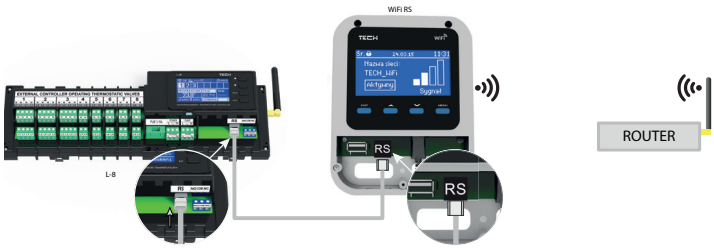
Use Manual operation function in order to check if particular devices work properly. Use ▲ and ▼ to select the device and press MENU – the device should switch on. Follow this procedure to check all the devices.

STEP 3: Activate the Internet module

L-7 external controller is compatible with ST-507 and WiFi RS.
WiFi RS uses WiFi wireless network whereas ST-507 needs to be connected to a router with RJ45 network cable.



Connection diagram for ST-507 Internet module.



Connection diagram for WiFi RS.

ST-507 Internet module or WiFi RS should be connected as illustrated in the diagrams above. Next, activate the module: Main menu/Fitter's menu/Internet module/ON. Further steps are described in detail in the instruction manual for the Internet module.

NOTE
The user should enable the Internet module to connect with data servers listening on TCP/2000 port. Most computer networks are protected by various software (firewalls, anti-virus software etc.) which may block data exchange with the above mentioned port. If any problems arise, contact technical support or your computer network administrator.

STEP 4. Set current time and date

Set current time and date in the fitter's menu.

STEP 5. Configure the temperature sensors, room regulators

TTo enable L-7 external controller to control a given zone, it is necessary to provide it with current temperature value. The easiest way is to use C-7p temperature sensor.

The user may also choose M-7 room regulator which offers additional functionalities apart from sending the current temperature readings. It serves as a control panel enabling the user to change the pre-set zone temperatures, adjust the local and global weekly schedules etc.

Room temperature sensor C-7p:

The room sensor should be activated in a particular zone. Plug the sensor cable into the connector assigned to the selected zone and select ON in the zone submenu.

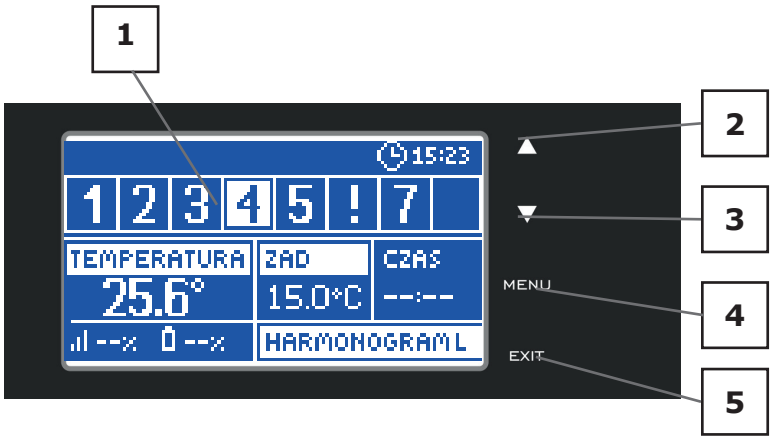
WARNING
Only one room sensor may be assigned to one zone.

It is possible to set individual pre-set temperature value and weekly schedule for each room sensor assigned to a given zone. The settings may be configured both in the controller menu (Main menu/Zones) and via www.emodul.eu (using ST-507).

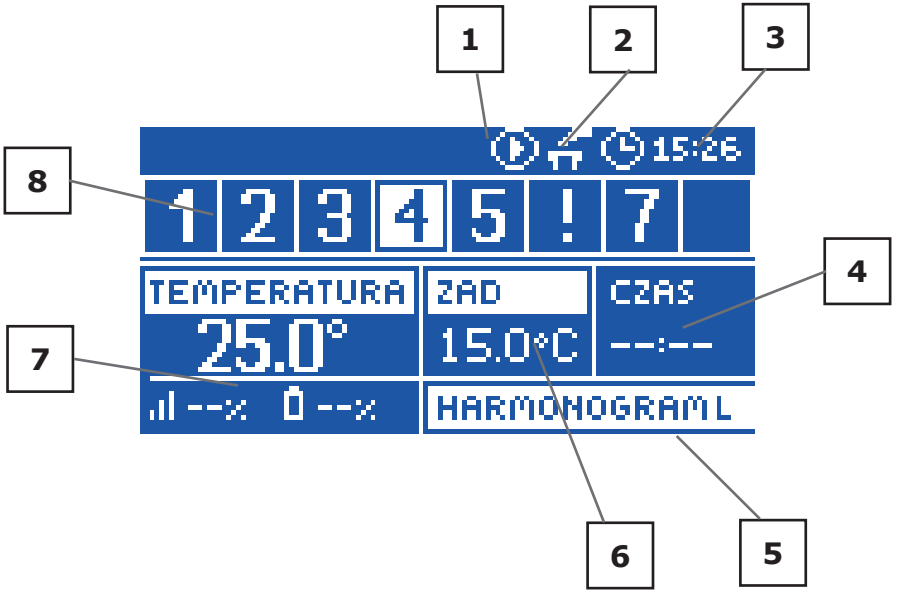
Room regulator M-7 (control panel):
In order to activate M-7 room regulator (control panel), connect it to L-7 controller using RS cable and select ON in the controller menu: Main menu/Fitter's menu/ TECH regulator.

IV. Main screen view and description

The user navigates in the menu structure using the buttons located next to the display



1. Display
2. ▲- „up" „plus" – it is used to view the menu options and increase the value while editing parameters. During standard operation the button is used to switch between different zones parameters.
3. ▼ - „down" „minus" - it is used to view the menu options and decrease the value while editing parameters. During standard operation the button is used to switch between different zones parameters.
4. MENU button – it is used to enter the controller menu and confirm the new settings
5. EXIT button – it is used to exit the menu and cancel the settings



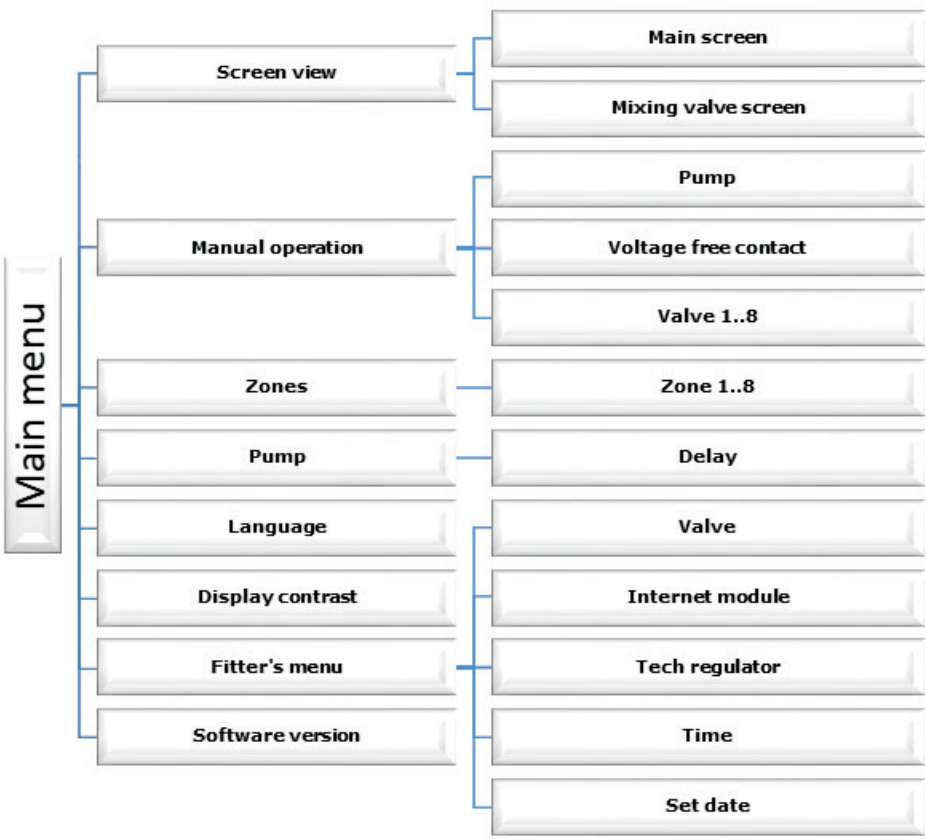
11. An icon indicating pump operation
2. An icon indicating that the additional contact is switched on
3. Current time
4. Time left until the manually set temperature in a given zone changes
5. Information about the type of current weekly schedule
6. Pre-set temperature in a given zone (backlit number in the zone bar – see: description no. 12)

7. Current temperature of C-8-r sensor in a given zone (backlit number in the zone bar – see: description no. 12)
8. Zone information:
The digit displayed indicates that the corresponding room sensor is connected and sends current temperature information. If the zone temperature is too low, the digit flashes. In the event of a zone alarm, an exclamation mark is displayed instead of the digit. In order to view the operation parameters of a given zone, select its number using ▲ or ▼.

V. Controller function

Due to multiple function fulfilled by the controller, the menu is divided into Main menu and Fitter's menu.

V.a) Block diagram of the main menu



V.b) Screen view

- In this submenu the user may adjust the main screen view:
- Main screen – including particular zones parameters e.g. pre-set temperature, current temperature etc.
- Mixing valve screen – including mixing valve operation parameters.

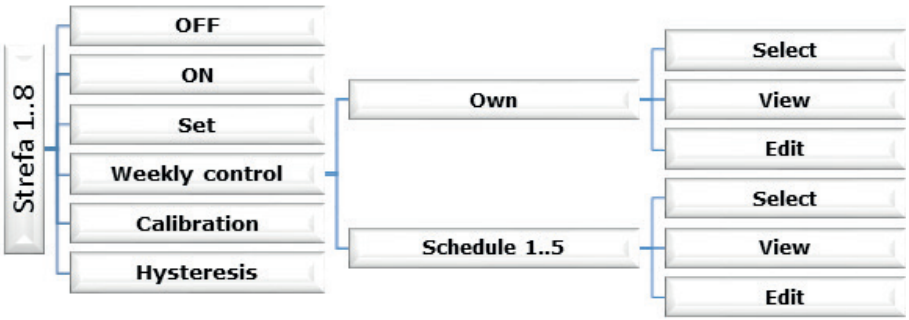
V.c) Manual operation

This function enables the user to activate particular devices (pump, voltage-free contact and valve actuators) independently of the others in order to check if they operate properly. It is advisable to check the devices using this procedure at the first start-up.

V.d) Zones

This submenu enables the user to configure operation parameters for particular zones. When the pre-set temperature value in a zone is reached, L-7 controller labels the zone as sufficiently heated and the status remains unchanged until the temperature drops below the pre-set temperature by hysteresis value. When the temperature in all the zones is sufficient, the controller disables both the pump and the voltage-free contact.

Submenu of each zone:



V.d.1) OFF/ON

After the room sensor has been connected and registered in a given zone, it is used by L-7 controller. The sensor may be deactivated by selecting OFF option.

V.d.2) Pre-set temperature

The pre-set zone temperature depends on the weekly schedule settings. However, this function enables the user to change this value separately.
After the value has been set, the user defines how long the temperature should apply. When the time elapses, the pre-set temperature depends on the weekly schedule again. If the user sets 00:00 as the time, the temperature applies for indefinite period of time.
The main screen displays current pre-set temperature value and the time left (see: Main screen description).

V.d.3) Weekly control

L-7 controller offers two types of weekly schedules:

Own – local schedule
This weekly schedule is assigned to a given zone only. After the room sensor has been detected by the external controller, the schedule is activated automatically in this zone and may be adjusted by the user to individual needs.

1..5 schedules – global schedule
These schedules have universal settings for all zones and they cannot be edited in the external controller (to introduce changes it is necessary to connect to the Internet via the Internet module).

In order to assign a schedule to a given zone, choose Select option.

In order to adjust the global schedule as the current schedule in a given zone, choose Edit option. After the schedule has been modified and saved, it is overwritten as a local schedule.

The type of weekly schedule assigned to a zone is displayed in the main screen (See: Main screen description – screen area no. 9).

Edit
In order to start editing, select Edit option.

The user may program up to 3 time periods with pre-defined time limits (with the accuracy of 15 minutes). Separate temperature value is assigned to each time period. The next step involves setting the temperature value to apply outside the time periods.

The last step involves choosing days of the week when the settings should apply. Use ▲ to edit the next day and press ▼ to select/deselect.

V.d.4) Calibration
Room sensor calibration should be performed while mounting or after it has been used for a long time, if the external temperature displayed differs from the actual temperature. Calibration setting range is from -10ºC to +10ºC with the accuracy of 0,1ºC.

V.d.5) Hysteresis
This function is used to define tolerance of the pre-set temperature in order to prevent undesired oscillation in case of small temperature fluctuation (within the range 0 ÷ 10ºC) with the accuracy of 0,1°C.
Example: if the pre-set temperature is 23ºC and the hysteresis is 0,5ºC, the zone temperature is considered too low when it drops to 22,5ºC.

V.e) Pump
L-7 controls the pump operation by activating it (after the delay time) if the temperature in any of the zones is too low. If the pre-set temperature of each zone is reached, the controller disables the pump.
Delay function enables the user to define the activation delay time after the temperature of any zone drops below the pre-set value. Activation delay is used to ensure enough time for the valve to open.

V.f) Language
This option is used to select the language version.

V.g) Display contrast
This option is used to adjust the display contras to individual user's needs.

V.h) Fitter's menu

Fitter's menu should be accessed by a qualified person. It enables the fitter to adjust additional controller functions.

V.h.1) Valve

L-7 external controller may also control an additional valve via a valve module (e.g. ST-431N). The regulators communicate via RS communication but registration is necessary. There is a rage of parameters to configure the valve operation and adjust it to individual needs.

- **Pre-set valve temperature**

This function is used to define the pre-set valve temperature. It is measured by the valve sensor.

- **Registration**

Configuring additional valve parameters is possible only after the valve has been registered by entering the module number (given on the back side of the control module or in software version screen).

- **Valve status**

This function is used to deactivate the valve. If the valve is to be activated again, it is not necessary to register again.

- **Temperature control**

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), then the electric valve will open or close by the set stroke, in order to return to the pre-set temperature.

- **Opening time**

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

- **Single stroke**

This function is used to define the maximum single stroke (opening or closing) that the valve may make during one temperature sampling. The smaller the single stroke, the more precisely the pre-set temperature can be achieved. However, it takes longer for the set temperature to be reached.

- **Minimum opening**

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

- **Valve type**

By means of this setting the user selects the type of controlled valve out of the following:

CH – selected if the user wants to control the CH circuit temperature.
FLOOR- selected if the user wants to control the temperature of the underfloor heating circuit. It protects the underfloor heating installation against dangerous temperature. If the user selects CH as the valve type and connects it to the underfloor heating system, the fragile floor installation may be damaged.

- **Weather-based control**

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

For the valve to operate correctly, the user defines the pre-set temperature (behind the valve) for 4 intermediate external temperatures:-20ºC, -10ºC, 0ºC and 10ºC.
The user selects external temperature value using UP and DOWN arrows and defines a corresponding pre-set temperature value using LEFT and RIGHT arrows.

Heating curve – it is 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 for respective values of external temperatures. The more points constructing the curve, the greater its accuracy, which allows its flexible shaping. In our opinion, four points seem a very good compromise ensuring decent accuracy and easiness of setting the course of this curve.

NOTE
After weather-based control is switched on, Pre-set valve temperature parameter is not available (Main menu-valve settings).

- **Room regulator**

This function is used to define how the room regulator settings influence a particular valve.

Room regulator – this option is used to select the type of room regulator cooperating with the valve. The following options are available:

- OFF – the room regulator status does not influence the valve setting;

- Standard regulator – a two-state regulator. This settings refers to the regulator connected directly to the valve controlling module.

Room temperature reduction - when the room regulator reaches the pre-set temperature, the pre-set valve temperature drops by the value defined in this parameter.

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

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

- **Return protection**

This function enables the user to set the CH boiler protection against too cool water returning from the main circulation, which could cause low-temperature CH boiler corrosion. The return protection involves closing the valve when the temperature is too low, until the short circulation of the CH boiler reaches the appropriate temperature. After activating it, the user presets the minimum acceptable return temperature.

- **Factory settings**

This function is used to restore valve factory settings configured by the manufacturer.

- **Valve removal**

This option is used to delete 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)

V.h.2) Internet module

L-7 controller may cooperate with the Internet module, which enables the user to view and adjust certain parameters via the Internet. Such online control is possible only after purchasing and connecting an additional module ST-5072.

The Internet module may be connected to L-7 via RS cable. After it has been connected, select Registration. The controller generates a code which the user should enter on the Internet website. Detailed description of the procedure is available in the Internet module instruction manual.

Internet module is a device enabling the user remote control of the regulator via the Internet. The user controls the status of all valves on the home computer screen.
After switching the module on and selecting DHCP option, the controller automatically downloads such parameters as IP address, IP mask, gateway address and DNS address from the local network. If any problems arise when downloading the network parameters, they may be set manually. The procedure of obtaining these parameters is described in detail in the instruction manual of the Internet Module
.

V.h.3) Time

This function is used to set current time.

V.h.4) Set date

This function is used to set current date.

V.i) Software version

When this option is selected, the display shows the logo of the CH boiler manufacturer and the controller software version.

VI. Protections and alarms

In order to ensure safe and failure-free operation, the regulator has been equipped with a range of safeguards. In case of an alarm, a sound signal is activated and the display shows a message informing about the detected problem.

Automatic sensor control

In the event of temperature sensor or external sensor damage, an alarm is activated and the display shows an appropriate message, e.g.: „Alarm: no communication".

The alarm remains active until the fault is removed (the sensor battery or the sensor itself is replaced) and alarm is deleted in the external controller

How to delete the zone alarm in the external controller

Select the zone in which the alarm occurred (indicated by the exclamation mark instead of the number). Press EXIT – two options appear on the screen:

-Reset

The external controller re-attempts to communicate with the sensor (it may take up to several minutes). Until the communication is established, the valve remains in the alarm mode (closed – zone temperature reached). If the communication attempt fails, the alarm activates again.

-Deactivate

This option deactivates the zone altogether. It may be activated again by selecting Activate in Main menu/Sensors/1..8 zones.

This alarm may also be deactivated via the Internet website. If the alarm is caused by empty batteries, it is deactivated automatically after the batteries have been replaced.

Fuse

The regulator has a WT 6,3A tube fuse-link (5x20mm) protecting the network.

WARNING

Higher amperage fuse should not be used as it may damage the controller.

VII. Software update

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

In order to install new software, the controller must be unplugged from the power supply. Next, insert the memory stick with the new software into the USB port. Connect the controller to the power supply at the same time holding EXIT button. It is necessary to hold EXIT button until a single sound signal is heard – it signalises that the software update process has been initiated. After it has been completed, the controller restarts automatically.

WARNING
Do not switch the controller off while updating the software.

VIII. Technical data

Power supply	230V +/-10% / 50Hz
Sensors thermal resistance	- 30°C : 99°C
Pump output load	0,5A
Outputs 1-8 load	0,3A
Power consumption	7W
Fuse	6,3A

EU Declaration of conformity no. 218/2016

Hereby, we declare under our sole responsibility that L-7 manufactured by TECH, headquartered in Wieprz Biała Droga 31, 34-122 Wieprz, is compliant with:

- Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio equipment and telecommunications terminal equipment and the mutual recognition of their conformity,
- 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 hazard-ous substances in electrical and electronic equip-ment, implementing provisions of RoHS directive 2011/65/EU.

For compliance assessment, harmonized standards were used:

PN-ETSI EN 301 489-1 V1.9.2:2012
PN-ETSI EN 301 489-3 V1.6.1:2014-03
PN-ETSI EN 300 220-1 V2.4.1:2013-02
PN-ETSI EN 300 220-2 V2.4.1:2013-02
PN-EN 60730-2-9:2011, PN-EN 60730-1:2012

PAWEŁ JURA JANUSZ MASTER
WŁAŚCICIELE TECH SPÓŁKA Z OGRANICZONĄ ODPOWIEDZIALNOŚCIĄ SP. K.

Wieprz, 31. V 2016

TECH

Spólka z ograniczoną odpowiedzialnością Sp.k.

Biała Droga 31
34-122 Wiperz

SERWIS
34-652 Bulowice
ul. Skotnica 120

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

serwis@techsterowniki.pl

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

WWW.TECH-CONTROLLERS.COM