

# **Installation, operation and maintenance manual for electric boilers**

**(User´s Manual)**

**Version: September 2015**

**THERM ELN 8**

**THERM ELN 15**

09/2015

**®**  
**THERMORA**

## 1. CONTENTS

1.	CONTENTS .....	2
2.	USE .....	3
3.	GENERAL DESCRIPTION .....	3
4.	TECHNICAL DATA .....	6
5.	BASIC INSTRUCTIONS FOR THE BOILER ASSEMBLY .....	6
6.	BOILER OPERATION .....	10
7.	SPECIAL BOILER FEATURES .....	13
8.	COMMISSIONING .....	13
9.	GRAPH OF CONNECTING OVER-PRESSURE VALUES OF HEATING WATER THAT CAN BE APPLIED .....	15
10.	EL. CONNECTION OF THERM ELN BOILERS.....	16
11.	WARRANTY AND RELIABILITY FOR DEFECTS .....	18
12.	INTERCONNECTION WITH THE SOLAR SYSTEM.....	18
13.	DHW HEATING .....	19
14.	THERM ELN 8 BOILER SET.....	20
15.	THERM ELN 15 BOILER SET .....	20
16.	DIMENSIONS AND CONNECTIONS.....	21
17.	RECORD OF WARRANTY REPAIRS AND ANNUAL INSPECTIONS .....	22

## 2. USE

The THERM ELN boiler is a suspension hot-water electric boiler designed for heating hot water systems with forced water circulation. The electric boiler can be used as a universal heat source for heating flats, family and holiday homes as well as an alternative source when another main heating source is used, such as heat pumps, accumulation systems, etc.

In addition to heating, the boiler can also be used to heat domestic hot water (DHW) in an external indirect storage tank (so called DHW module needs to be added).

## 3. GENERAL DESCRIPTION

THERM ELN boilers come with two output levels: 8 and 15 kW. The core of the electric boiler consists of a steel vessel with integrated heating rods, heating temperature sensor and safety thermostat. The vessel is made of coated sheet steel with thermal insulation. In the bottom part of the boiler vessel there are return water and heating water outlets. The collar in the upper part of the vessel is adjusted for the temperature sensor pocket and emergency thermostat sensor pocket. In the upper part of the vessel, there are threaded coupling sleeves. The 7.5 kW **heating rods** (1-2 pcs - in each heating rod, there are three separate 2.5 kW heating bodies) are bolted to the coupling sleeves. The bottom part of the boiler features a special hydroblock which is fitted with a circulation pump, by-pass, pressure sensor and heating system filling and discharge valves. At the highest point in the boiler's water circuit, there's an automatic air vent valve.

The boiler is controlled and regulated by the automatic microprocessor control system which is situated in the upper part of the boiler under the control panel, along with other electric components (contactor, main wiring terminals).

The boiler **switch, circuit breaker and power lines for the heating rods, is not situated on the boiler**, but is part of the el. switchboard for the given flat or house. **During installation of the electric boiler, there needs to be sufficiently dimensioned main contactor or switch (properly marked!) connected in its immediate vicinity**, which is used to disconnect the electric boiler from the mains.

### ◆ Description of the boiler operation:

The operating phase of the boiler is initiated when the temperature of the heating system drops under the temperature set on the boiler control panel or under the temperature set on the room thermostat. The control circuit of the heating rods is activated and the heating water in the boiler body is heated up gradually. When the required room temperature is reached (when the room thermostat is used), the microprocessor control unit starts disconnecting the heating bodies one by one and the heating water will no longer be heated. At this moment, the adjustable pump rundown is activated.

In order to ensure maximum safety, the THERM ELN boiler comes with an emergency thermostat as standard. The emergency thermostat is connected within the control circuit of the integrated electric contactor. The emergency thermostat is disconnected, and thus the boiler is put out of operation (disconnection of the control circuit of the relay and heating rods), once the temperature reaches 105°C. When the emergency thermostat has been disconnected, only an authorized service technician may put the boiler back into operation. Another safety feature of the boiler includes the pressure sensor which disconnects the control circuit if the water pressure in the heating system decreases (a lack of water in the heating system). When water in the heating system has been re-filled, the boiler is put back into operation automatically. Before the boiler is switched on and while it is in operation, air needs to be bled properly out of the heating system. Air is bled out of the heating system partly via the automatic air vent valves situated at the highest point of the boiler body and on the pump.

#### ◆ **Some main properties and advantages of THERM- ELN electric boilers:**

- Precise microprocessor control
- **Easy-to-read two-digit LED display** (shows the selected temperature, pressure, output, failures and other messages)
- Very quiet operation (switch relay of the heating bodies)
- Modern design
- Compact dimensions
- Ergonomic, interactive digital control
- Smooth regulation in 2.5 (5.0) kW increments
- Energy-saving circulation pump with run-down adjustable during servicing
- Pump protection against blocking
- Anti-freeze protection
- Possibility of DHW heating (the DHW module needs to be added)
- Possibility of controlling the output temperature by 0 – 10 V signal
- Integrated safety switch contactor of all output phases
- Even load of the heating rods and heating bodies
- Switching system of the boiler using the HDO signal (demand site management)
- Integrated circulation pump, expansion vessel, by-pass, safety valve
- Integrated refill and discharge of the heating water
- Automatic bleeding
- Digital heating water pressure sensor
- Auto-diagnostics, clear service error messages
- Possibility to set selected boiler parameters (service menu)

#### ◆ **Brief description of the main advantages of the THERM ELN electric boiler:**

##### **Easy and intuitive control**

The control system is designed in such a way so as to be simple, comprehensible and clear. The ease of control is supported by the clearly arranged LED display with clear signals provided by LED indicators.

##### **Pump protection against blocking**

If the pump is cranked up regularly once every 24 hours, it will prevent the pump from being blocked during a longer shut-down of the boiler. Furthermore, when the panel (boiler) power supply is switched on, the circulation pump will turn on after the first 10 seconds even if heating is not requested. In such a case, it will remain in operation for 30 seconds.

##### **Possibility of DHW heating**

The THERM ELN boiler can be connected with an external indirect storage tank for DHW heating. The tank is heated with the heating water thanks to the three-way valve adjustment. In order to ensure DHW heating, the boiler control panel needs to be extended with the so called DHW module.

##### **External controls**

The boiler can be controlled by the room thermostat. Boiler control by the room thermostat leads to further energy savings.

### **Safety switch contactor**

A safety 3-phase contactor is integrated in the electric power branches on the boiler inlet.

In emergency cases and in other abnormal conditions, the contactor can cut off current from the heating rods, thus preventing any dangerous situations.

### **Overheating protection**

If the heating water temperature exceeds 95°C, overheating error E.3 is reported. The error will be cleared when the temperature drops below 91°C.

### **Uniform load on the heating rods**

The principle of uniform load on the heating rods helps to increase their service life. The rod which was connected first will be the first one to be disconnected in the regulation cycle, which leads to increased overall reliability and a longer service life of the appliance. The processor evaluates the time of operation of the individual heating rods and switches them on in such a way so that the boiler (boiler body) is under uniform thermal load, if possible, and the rods are under uniform operating load.

### **Switching system of the boiler by HDO**

The THERM ELN boiler signals and responds to commands from the HDO receiver from the external switchboard. The receiver output shall be a signal connected with the neutral wire which is connected to the HDO/N terminal. This remote control method makes it possible to operate the boiler when the tariff rate is low, thus considerably reducing the electricity costs.

*!!! In case of other methods of HDO receiver installation, with a phase (HDO/L1 -L3) as the output, transfer to the N level (neutral wire) needs to be ensured in the external switchboard by installing an auxiliary relay etc.!!!*

### **Analogue signal control**

The heating water output temperature can be controlled within the given range by analogue signal – control voltage from 0 to 10V.

### **Auto-diagnostics, clear signals and service messages**

The THERM ELN electric boiler features a very useful auto-diagnostics system - especially for service purposes. This feature helps to eliminate any boiler defects quickly and effectively.

#### 4. Technical data

		<b>THERM ELN 8</b>	<b>THERM ELN 15</b>
Nominal heat output	kW	7.5	15
Minimum regulation level of the output	W	2500	5000
Number of output regulation levels	-	3	3
Rated current	A	11(33)	22
Degree of protection	IP	40	
Electric voltage / frequency	V/Hz	3 x 400 + N + PE/50	
Maximum rated current	A	3x 12 (1x36)	3 x 24
Main circuit breaker for electric installation	A	16 (40)	25
Rated current of the control circuit breaker	A	1.25	
Electric service life of relay	-	1.10 <sup>5</sup> cycles (16 A, 250V/50 Hz)	
Mechanical service life of relay	-	10.10 <sup>6</sup> cycles	
Heating water input - output	-	G 3/4" outer	
Min. working overpressure of the heating system	bar	0.5	
Max. working overpressure of the heating system	bar	3.0	
Maximum temperature of heating water	°C	80	
Water volume of the boiler	l	6.8	9.6
Efficiency at the rated power	%	99.5	
Capacity of expansion tank	l	7	
Dimensions (height/width/depth)	mm	800/400/235	
Weight of the boiler without water (gross)	kg	31 (34)	33 (35)

#### ◆ Production control

All parts of the boiler are checked and set by the producer before assembly. Each boiler is tested for leak tightness of the water circuit, and the control and safety features are adjusted and tested. The boiler is manufactured in accordance with: CSN EN 60 335-1, CSN EN 60 335-1 ed.2, CSN EN 60 335-1 ed.3 CSN EN 60 335-2-30 ed. 2, 60335-2-30 ed.3, CSN 06 1008, CSN 07 7401, CSN 07 0240, CSN 06 0310, CSN 06 0830, CSN EN 60 730-1, CSN 06 1010, NV no. 163/2002 Coll., NV 17/2003 Coll., NV 616/2006 Coll.

#### 5. Basic instructions for the boiler assembly

The electric boilers are designed for operation without necessary electrical engineering qualifications. The operator may only handle the controls specified in this manual. Under no circumstances shall the operators interfere with electrical wiring.

The electric boilers are intended for permanent connection to fixed wiring with mains voltage. A switch-off device shall be integrated in the fixed wiring of the electric boiler – main switch and adequate circuit breaker.

Electric boilers may only be assembled by a qualified company or authorized technician with the necessary electrical engineering qualifications, in compliance with any advice and notices contained in this manual. Assembly shall be carried out in compliance with applicable standards and regulations! Connection of the electric heating is subject to approval by the local electricity distribution plant. The applicant needs to request a preliminary approval with the potential connection of higher input power and request the relevant rate. If new central heating is constructed or an old one reconstructed, we recommend that the project be drawn up by a professional. A prerequisite for the manufacturer's warranty is professional commissioning by an authorized service company! Connection to the mains and electrical wiring may only be carried out by an expert having the qualifications required by Czech Regulation no. 50/1978 Coll.

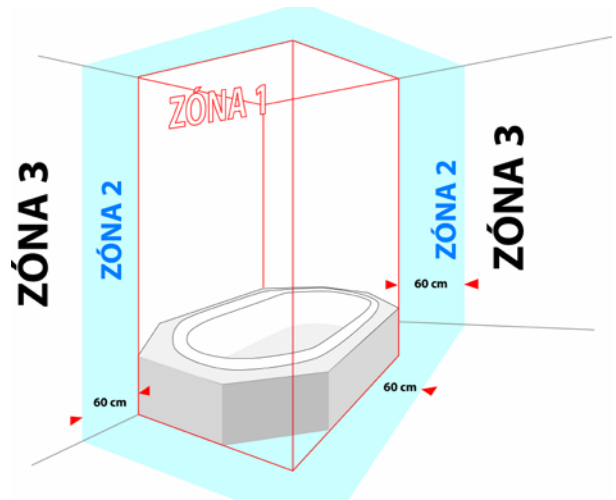
The installation site for the electric boiler shall provide necessary access for operation and service purposes. Minimum distances between the boiler and a fixed barrier are shown in chapter "Suspending the boiler". After

assembly, request a demonstration of the boiler operation and have operators trained by a professional from the assembly company. After commissioning, the authorized service technician shall confirm the warranty card for the electric boiler.

For the electric boiler installation, there needs to be pressured water available on site in order to fill the system.

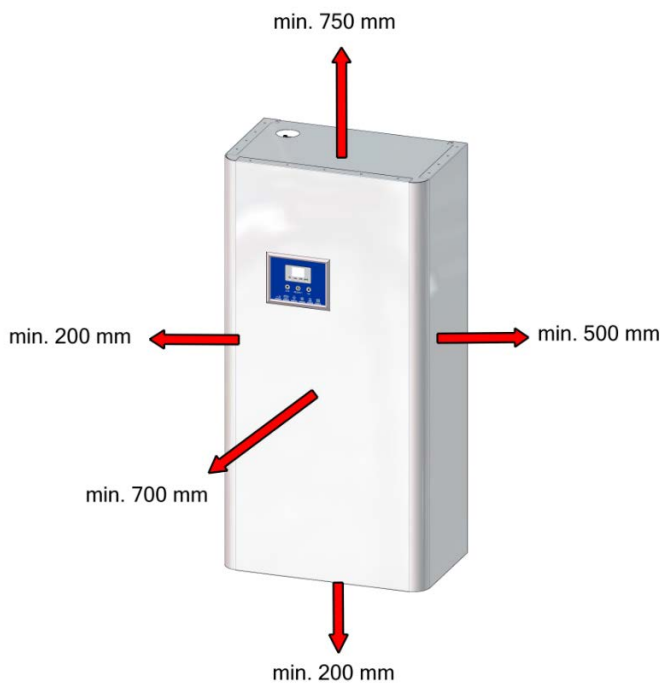
◆ **Location of the boiler**

The electric boiler may be installed in the basic AA5/AB5 environment according to CSN 2000-3 and CSN 33-2000-5:51 ed.3 (temperature range from +5 to 40°C, humidity depending on the temperature up to max. 85%, without harmful chemical effects). Suitable for installation in both residential and non-residential premises. The boiler shall not be installed in areas with a bath, in bathrooms, shower rooms in zones 0, 1 and 2 according to CSN 33 2000-7-701 ed.2:2007 and in wash rooms according to CSN 33 2130 ed.2:2009. In addition to that, it shall not be installed in zone 3 either if there is a chance that a jet of water intended for cleaning might be present. When the boiler is installed in permissible zones, appropriate protection from electric shock needs to be ensured according to the aforementioned standard.

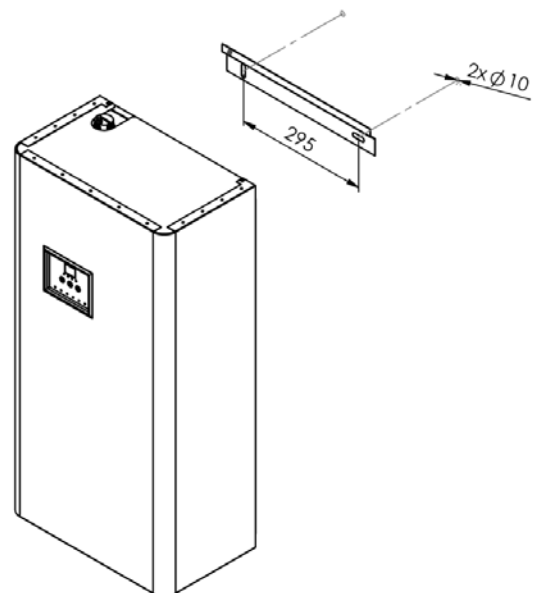


There shall be necessary access for operation and service purposes on the installation site.

◆ **Suspending the boiler**



The electric boiler shall be mounted to a wall using the suspension bar, wall plugs and screws included in the delivery. For ideal suspension, the room needs to have a flat wall with a sufficient load-bearing capacity. Direct suspension e.g. from plasterboard structures is not recommended. In case of installation on a wall with a lower load-bearing



capacity, it is recommended that a construction technician be consulted. Under the bottom edge of the boiler and above the upper edge of the casing, a service space of at least 200mm and 750mm, respectively, needs to be maintained for the purposes of inspection or replacement of the heating bodies.

#### ◆ Connecting the boiler to the hot-water system

The electric boiler shall be connected to the distribution system in such a way so as to avoid presence of air in the system. As the boiler is a hot-water flow boiler fitted with its own pump, its connection the heating system needs to be carried out based on a design following calculations of the hydraulic relations for the entire system. To use the output to the maximum and to ensure proper operation and a long service life, it is necessary to maintain a minimum overpressure of the heating system of 0.5 bar.

Before testing and commissioning, the heating system shall be flushed out thoroughly until it is completely clean following a procedure indicated in CSN 06 0310. To prevent contamination of the boiler system, the inlet of return water from the heating system into the boiler must be fitted with a suitable filter and sludge separator.

The heating system must be implemented in accordance with **CSN 06 0830** – Heating systems in buildings – Security equipment and with **CSN 06 0310** – Heating systems in buildings – Design and assembly.

#### !!! We recommend:

- charging the system with soft water according to CSN 07 7401;
- separating the electric boiler (any type) on both the input and output with a shut-off valve (see CSN 06 8030) so that it is not necessary to discharge the entire system in case of an inspection or repair of the electric boiler or cleaning of the filter.

#### ◆ Connecting the boiler to the mains

Electrical wiring shall only be carried out by an authorized person within the meaning of Regulation no. 50/78 Coll., on electrical engineering qualifications. Certification of the boiler installation and commissioning shall be appropriately recorded in the warranty card. No interventions with the internal wiring of the boiler (unless otherwise mentioned in this manual - e.g. connection of an external regulator instead of the jumper, etc.) shall be permissible!

**The boiler control panel shall be connected according to CSN through wiring with independent protection which can be switched off in the immediate vicinity of the electric boiler!**

If the electric boiler is installed in a bathroom, a residual current device needs to be used.

Supply in a 5-wire system is connected to terminals L1, L2, L3, N, PE, while in a 4-wire system N and PE terminals are interconnected and supply is connected to terminals L1, L2, L3, PE.

In case of HDO connection (demand site management) to the control cabinet of the electric boiler, the HDO receiver input is connected to terminal HDO/N.

**ATTENTION!** When a signal from the HDO receiver to terminal HDO/N is used, make sure that **all the coils of other appliances' contactors** (e.g. also of the boiler if it is connected to the common HDO signal) **are powered by the same phase!**

**Recommended cable diameters under plaster:**

<b>Boiler output (kW)</b>	<b>8</b>	<b>15</b>
Current consumption [A]	12	24
CYKY 5 [mm <sup>2</sup> ]	2.5	4

#### ◆ Connecting the electric boiler to a single phase

In some cases, the THERM ELN 8 electric boiler can be connected to a single phase system only. For such cases, a jumper is included which interconnects all the three terminals L1, L2 and L3. The supply cable with a max. diameter of 6 mm<sup>2</sup> can then be connected to any of the three terminals L1, L2 or L3. We recommend protection with a single-phase circuit breaker according to the table! The jumper and the screws are included in the delivery. Before the connection, the plastic partitions separating the terminals of the individual phases need to be removed.





3-phase jumper

◆ **Charging the heating system**

When charging the heating system, the boiler shall be unplugged from the mains by disconnecting the main circuit breaker. The charge pressure with a cold system should be between 1 and 1.5 bar. The system shall be charged slowly so that air bubbles can be released through the vent valves. In accordance with **CSN 07 7401**, water used for the first charge as well as for any re-fill must be clear, colourless, without suspended substances, oil and chemically aggressive ingredients, it must not be acidic (pH must not be lower than 7) and have minimal carbonate hardness (max. 3.5 mval/l). When treating the water in relation to its hardness, only approved agents shall be used.

**Should these requirements not be fulfilled, the warranty shall not apply to any damaged components!**

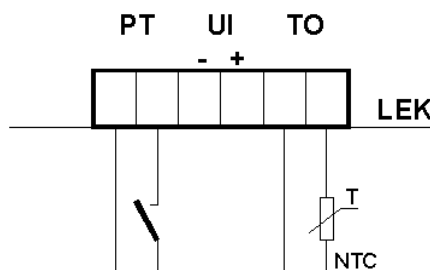
◆ **Selection of regulation and control features**

The boiler comes with basic control and safety features as indicated in the following wiring diagrams. The THERM ELN boiler is able to control its output automatically. It is fitted with its own PID regulation which prevents the boiler from overheating beyond the temperature setpoint. For example, when the heating water temperature is set to 80°C, regular electric boilers tend to overheat up to the temperature of 96°C, while the THERM ELN boiler heats up to the max. temperature of approx. 84°C.

In any case, it is economical as well as recommended that the electric boiler be controlled by a subordinate regulator - room thermostat. Such regulators are not included in the delivery of the boiler! For control based on the room temperature, Thermona delivers and recommends a wide range of room thermostats: e.g. PT 22, CMR 707, CMT 727 (wireless design) etc.

◆ **Connecting the room thermostat**

The room thermostat (switch contact only) shall be connected directly to the screw terminal PT on the boiler automatic control system. Voltage on the left terminal is +24 Vss, on the right one there is the measurement input. 3 to 5 mA current passes through the contact when connected.



**Connection of the room thermostat and servicing of the electrical system of the boiler shall only be carried out by authorized service companies!**

#### ◆ HDO - demand site management

Demand site management (HDO), together with electricity, allows the customers to transmit various commands concerning the rate changeover on the electricity meter and operation of some appliances via standard distribution networks. Demand site management is a set of technical means (such as transmitters, receivers, central automatic systems, transmission routes, etc.) which allow commands or signals to be transmitted in order to turn appliances on or off. The HDO system replaced the time switch used in the past. Each customer who uses tariff switching must be equipped with the necessary tariff switching equipment. Such equipment is situated on the electricity meter panel and cooperates with the electric boiler. HDO receiver is a device which carries out the required switching operation (e.g. blocks / unblocks the appliance) based on the evaluated HDO signal.

#### ◆ Evaluating the HDO signal

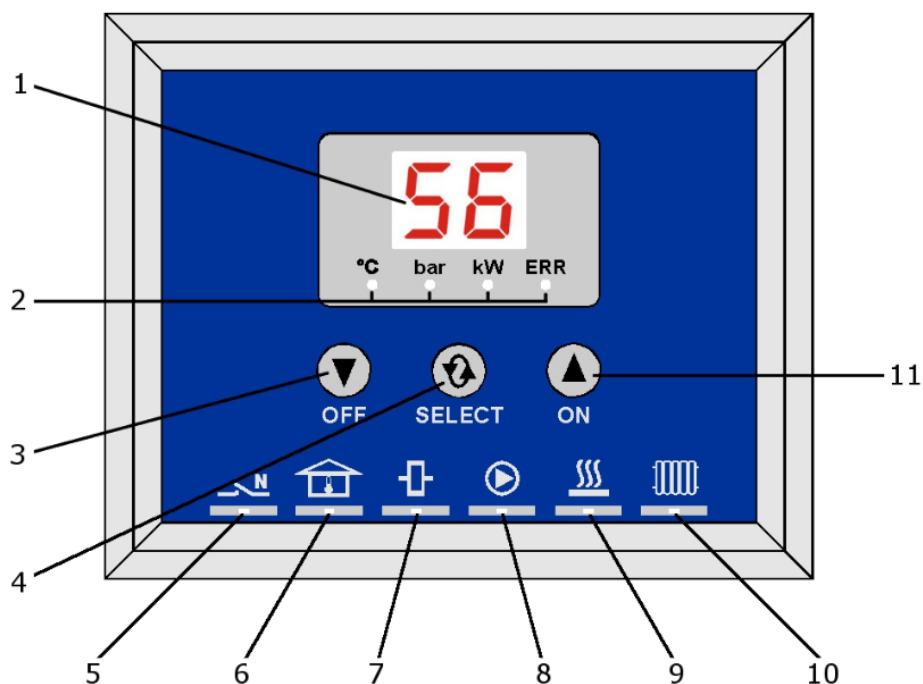
The automatic system is factory set in such a way so that the boiler operation does **not require** presence of the HDO signal. If the HDO signal terminal remains unconnected, the boiler will keep operating this way. However, if HDO signal is transmitted to the automatic system for more than 5 seconds, the automatic system will respect it – i.e. the boiler will be working only if the signal is present (the same applies to DHW heating and antifreeze protection), while if it is not present, boiler operation will be blocked.










The original state when the automatic system does not require the HDO signal for boiler operation can be restored by entering the boiler type in the service menu.

## 6. Boiler operation

#### ◆ Boiler control panel - description

The user can operate the boiler using the two-digit display, three buttons and 10 LED indicators. With the control panel, easy intuitive control and display of the boiler functions is possible.




1. **LED display**
2. **4 x LED display option indication**
3.  Press and hold: **Heating off** (switch to the summer mode)  
When pressed for a short time: **Setting the heating water temperature**
4.  **SELECT - display option** button
  - heating water temperature,
  - pressure in the system,
  - instantaneous power of the boiler,
  - failure number.
5.  **Presence of the HDO signal**
6.  **Room thermostat ON**
7.  **Contactor ON**
8.  **Circulation pump ON**
9.  **Heating in operation**
10.  **Heating mode (winter mode)**
11.  Press and hold: **Heating ON** (switch to the winter mode)  
When pressed for a short time: **Setting the heating water temperature**

#### ◆ **Boiler control panel - display of the operating values**

When the boiler is connected to a power source, the firmware version will appear on the display for two seconds.


**In the operating mode, the following parameters will be shown on the display based on the user's selection:** heating water temperature - pressure in the system - instantaneous power - failure number.

The parameter to be displayed is selected by pressing the  - **SELECT** button in the middle. The parameter which is currently shown is indicated by one of the four LED indicators under the display (°C – bar – kW – ERR).

Further information about the boiler state is provided by six LED indicators positioned one by one under the buttons, from left to right:

- the first one is ON when the HDO (demand site management) signal is present
- the second indicator from the left is ON when the room thermostat contact is connected
- the third one is ON when the contactor is connected
- the fourth one is ON when the circulation pump is in operation
- the fifth one is ON or flashes to indicate heating (at least one heating body is ON)
- the rightmost indicator is ON when the heating is ON (winter mode).

#### ◆ **Boiler control panel - indication of heating**

When the LED indicator for the  symbol in the bottom row is OFF, zero is shown for the selected output display. None of the heating bodies is working.


When the fifth LED indicator in the bottom row is ON (or flashing), the output in kW is indicated for the selected output display (2.5 – 5.0 – 7.5 or 5 – 10 – 15).


Indicator continuously ON – the boiler is working as requested by the room thermostat.

Indicator flashing fast (approx. two flashes in a second) – the boiler is working as requested by the antifreeze protection.



Indicator flashing slowly (approx. one flash in three seconds) – the boiler is heating DHW. For this purpose, the panel shall be supplemented with the DHW module.

#### ◆ Heating ON and OFF, winter and summer mode





When you press and hold (for more than two seconds) the  button (OFF), heating will be switched OFF – boiler will be switched to the summer mode. In this mode, heating is not switched ON when the room thermostat contact is connected. DHW heating is possible (if the boiler is fitted with the DHW module). Antifreeze protection as well as protection of the pump against blocking is working. When the heating indicator (bottom right) is OFF, it indicates that heating is OFF.

To turn on the heating, press and hold the  button (ON) – the boiler will switch to the winter mode. When the heating indicator (bottom right) is ON, it indicates that heating is ON.

#### ◆ Setting the required temperature (boiler thermostat) and means of control (thermostat – voltage)

When the heating water temperature is displayed, the  (OFF) and  (ON) are touch buttons. When you press any of them for a short time (less than two seconds), the display will indicate the required output temperature or Ui if the output temperature control with analogue control voltage at the Ui input is set.

You can change the data on the display with the arrow keys. When the °C LED indicator is flashing, it indicates the mode in which the required value is shown and set.

The required temperature can be changed from 20 to 80°C (the limits can be adjusted in the service menu). By pressing the  (OFF) button when the lowest value is shown, you will switch to Ui (analogue voltage control). The value set can be confirmed by pressing the  button. The settings will be stored automatically after ten seconds from the last time any of the  (OFF) or  (ON) buttons was pressed even if you do not press this button. In both cases, the display will return to the indication of the actual temperature of heating water.

#### ◆ Indications and error messages

When the LED ERR indicator situated on the right under the display is flashing, it indicates an error. In case of an error, the LED ERR indicator is flashing no matter what parameter is displayed.

When you select the error number to be displayed (with the SELECT button) and there is no error, the LED ERR indicator will be ON and dashes (--) will be shown on the display. If there is an error, the LED ERR indicator will be flashing and the display will indicate the error number in the form of E.X, where X is the error number. Errors which can be diagnosed are provided in the following table.

Error code	Meaning
E.2	LOW PRESSURE (< 0.5 bar)
E.3	OVERHEATING (water temperature > 95°C)
E.4	FAILURE OF THE HEATING WATER TEMPERATURE SENSOR (short-circuit or interruption)
E.6	EMERGENCY THERMOSTAT RESPONSE
E.9	PRESSURE SENSOR FAILURE

If several errors occur simultaneously, they are shown on the display one by one in turn, approx. one second apart.

Except for the **E.6** error - excessive temperature of the emergency thermostat - all the other errors will switch the boiler to the error mode (disconnection of the heating rods) which will be terminated automatically once the error has been eliminated while the boiler operation will resume automatically.

**An error discovered by the emergency thermostat is irreversible (the thermostat is only fitted with manual reset which shall only be used by an authorized service technician once the cause of the error has been determined).**

#### ◆ Service menu

With the THERM ELN boiler, it is possible to configure certain selected parameters. As such parameters can significantly affect the boiler operation, they are concealed in the “service menu”. **This menu is only accessible to a service technician authorized by the manufacturer.**

Parameter	Meaning	Minimum	Maximum	Default
P.0	PUMP RUN-DOWN [minutes]	1	30	3
P.1	MINIMUM HEATING WATER TEMPERATURE SETPOINT [°C]	5	70	20
P.2	MAXIMUM HEATING WATER TEMPERATURE SETPOINT [°C]	30	90	80
P.3	DIFFERENCE AND HYSTERESIS OF HEATING RODS SWITCH-ON [°C]	1	5	2
P.4	VOLTAGE FROM THE PRESSURE SENSOR AT P = 0 BAR [V]	0.0	1.5	0,5
P.5	VOLTAGE FROM THE PRESSURE SENSOR AT P = 4 BAR [V]	2.0	5.0	2.5
P.6	BOILER MODEL	7.5	15	7.5
P.7	ANTI-FREEZE PROTECTION	no	yes	yes
P.8	HEATING WATER TEMPERATURE DURING DHW HEATING [°C]	60	90	80

## 7. Special boiler features

#### ◆ Antifreeze protection

If the conditions for operation are met (no failures and HDO is ON) and the output water temperature drops below 5°C, the circulation pump will turn on, the contactor will be connected and one level of output will be switched on. The heating operation will stop as soon as the output water temperature exceeds 15°C. If the lower limit of the required heating water temperature is set to less than 15°C in the service menu, the heating operation will stop once this limit is reached, except for cases when such limit is set to less than 6°C. In such a case, the heating operation will stop when the 6°C temperature is reached.

## 8. Commissioning

**During commissioning, a service technician authorised by the manufacturer shall familiarize the user with the boiler operation, with its individual components, the safety features and control and shall fill in the warranty card and provide this user manual to the user.**

**The user is obliged to ensure of the correct use of the boiler in accordance with this manual which is a condition of acceptance of the warranty. In addition, it is strictly forbidden to intervene in any manner into the secured parts in the boiler!**


**Notice:** The setting of output range of the boiler and other parameters must be in accordance with the technical data. Any overloading and incorrect use of the boiler may cause the devaluation of its components. The warranty cannot be applied for such damaged components.

#### ◆ General instructions:



Before the electric boiler is put into operation, make sure to check the following:

- connection to the heating system
- opening of the fitting separating the electric boiler and the system and securing the fitting against unauthorized handling
- check that the system is filled with soft water (or check the pressure) and that no air is present in the system
- electrical connections and protection in accordance with CSN. See chapter “Electric boiler assembly”.

#### Start-up procedure:

- switch on the main circuit breaker (switch) in the supply line, turn on the boiler by pressing and holding the  (ON) button.
- Set the required output temperature of the boiler to the maximum value
- check that all the safety thermostats and controls operate properly

The electric boiler is very easy and fast to operate and no special qualifications are required for it. **However, the boiler shall only be operated by adults who have been familiarized with the boiler function and operation.** Such instructions shall be provided by the installer when the boiler is connected and put into operation.

- When the display is on, there is control mains voltage in the boiler.
- Set the room thermostat (or another external control) to the required temperature.
- Press the arrow-up key to display the current heating water temperature. Press the  (ON) button to turn on the boiler. At the same time, the circulation pump will turn on and remain in operation for the time given by the parameters set. The heating function is indicated by the LED indicator with the  symbol. When the temperature setpoint is reached, the automatic system will switch off the heating bodies one by one so as to maintain the heating water temperature setpoint within the limits given by the parameters.
- **Initial heating:** maintains the highest possible operating temperature of the medium in the heating system for 4 hours. During operation, bleed the air from the system carefully so as to get rid of any remaining air after bleeding in cold condition. When the system has cooled down, refill it with water.
- In case of a power cut (or HDO signal interruption depending on the settings), the boiler will be put out of operation. When power is restored, the electric boiler will resume operation automatically.
- Do not place any objects inside the electric boiler or on its casing.
- The minimum water pressure on the input to the circulation pump shall be 0.5 bar

#### **Setting the pressure in the expansion vessel**


Once the system has been filled with a heat-conductive medium and air has been bled out of the system properly, take a note of the water pressure in the system shown on the display. Adjust the value of filling overpressure of the air in the expansion vessel by bleeding the air out until the same value is achieved. Fill the system with water until the system pressure reaches a value higher by 10 kPa. If the filling overpressure of air in

the expansion vessel is not adjusted properly, the same failures occur as in case of an insufficiently dimensioned expansion vessel, i.e. substantial pressure changes during operation.

◆ **Maintenance**

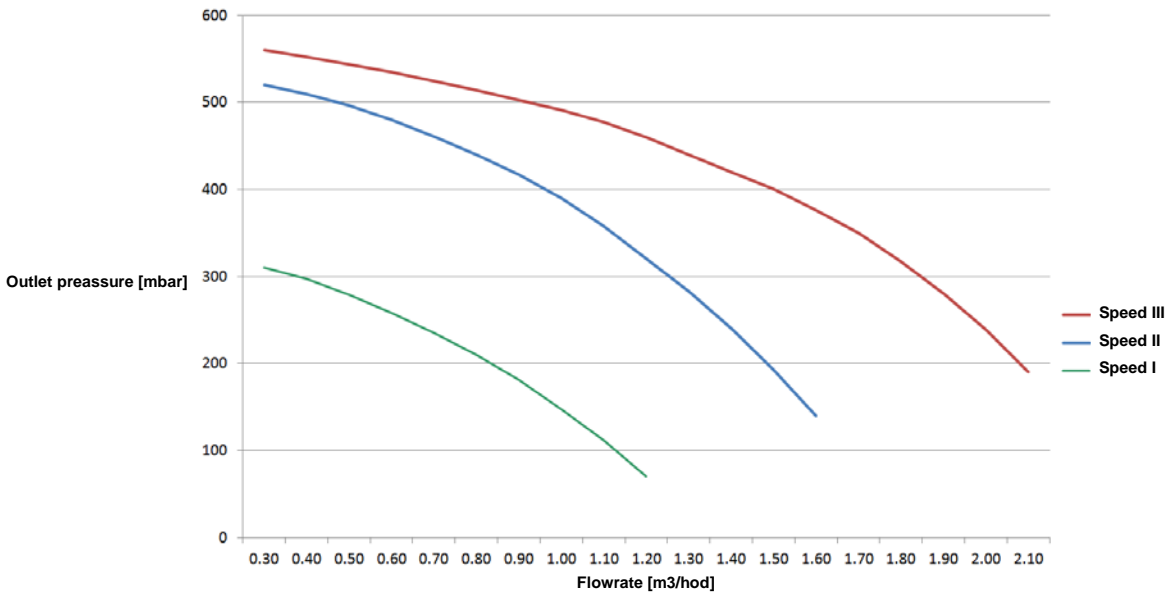
Regular maintenance is very important for reliable operation, a long service life of the boiler and components thereof. We recommend that the user contact a local service company authorized by the manufacturer and arrange regular annual inspections of the boiler (which is one of the conditions for warranty claims). The service technician shall, besides other things, check e.g. the boiler controls and safety features. For perfect operation of the heating system, it is also necessary to regularly inspect the initial water pressure in a cold condition. If there is any pressure drop, it is necessary to refill water into the heating system. The outer casing can be cleaned, e.g. with a cloth soaked in soap water, and wiped dry.

◆ **Putting the boiler out of operation**

The boiler can be turned off for a shorter period of time by pressing the  (OFF) button or using the switch on the room thermostat. If the boiler is to be put out of operation for a longer period of time outside of the heating season (e.g. during summer holidays), it should be switched off with the external main circuit breaker (switch) provided that there is no risk that the system might freeze up, or that the pump might be blocked (when the boiler is put out of operation, these features are naturally not available).

**9. Graph of connecting over-pressure values of heating water that can be applied**

*Caution: The curves of the connecting over-pressure values of heating water are designed for WILO pumps at different levels of regulation.*

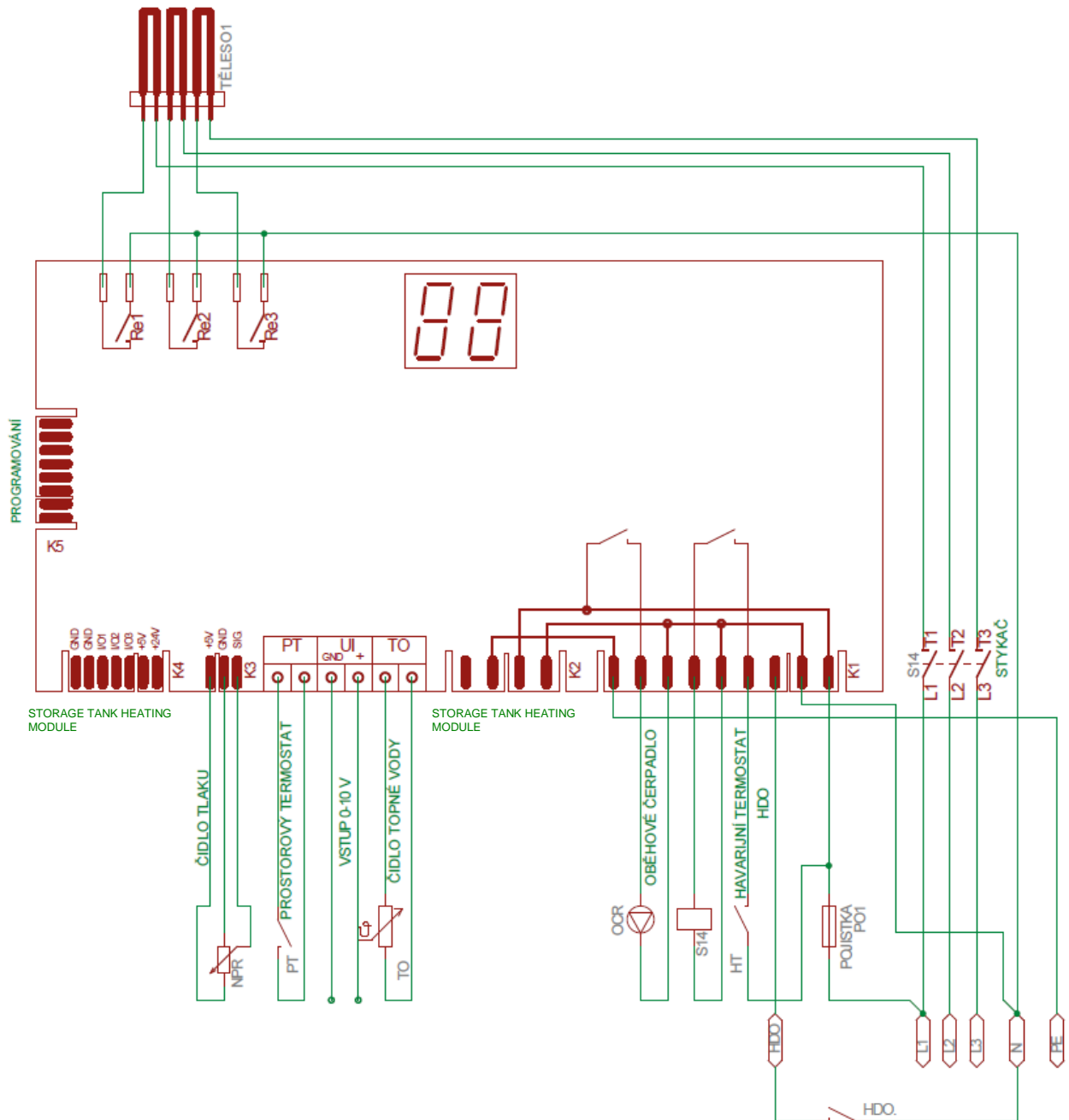


◆ **Minimum flow at a 20°C temperature gradient**

<b>THERM 8 ELN</b>	<b>0.35</b>	<b>m<sup>3</sup>/hour</b>
<b>THERM 15 ELN</b>	<b>0.70</b>	<b>m<sup>3</sup>/hour</b>

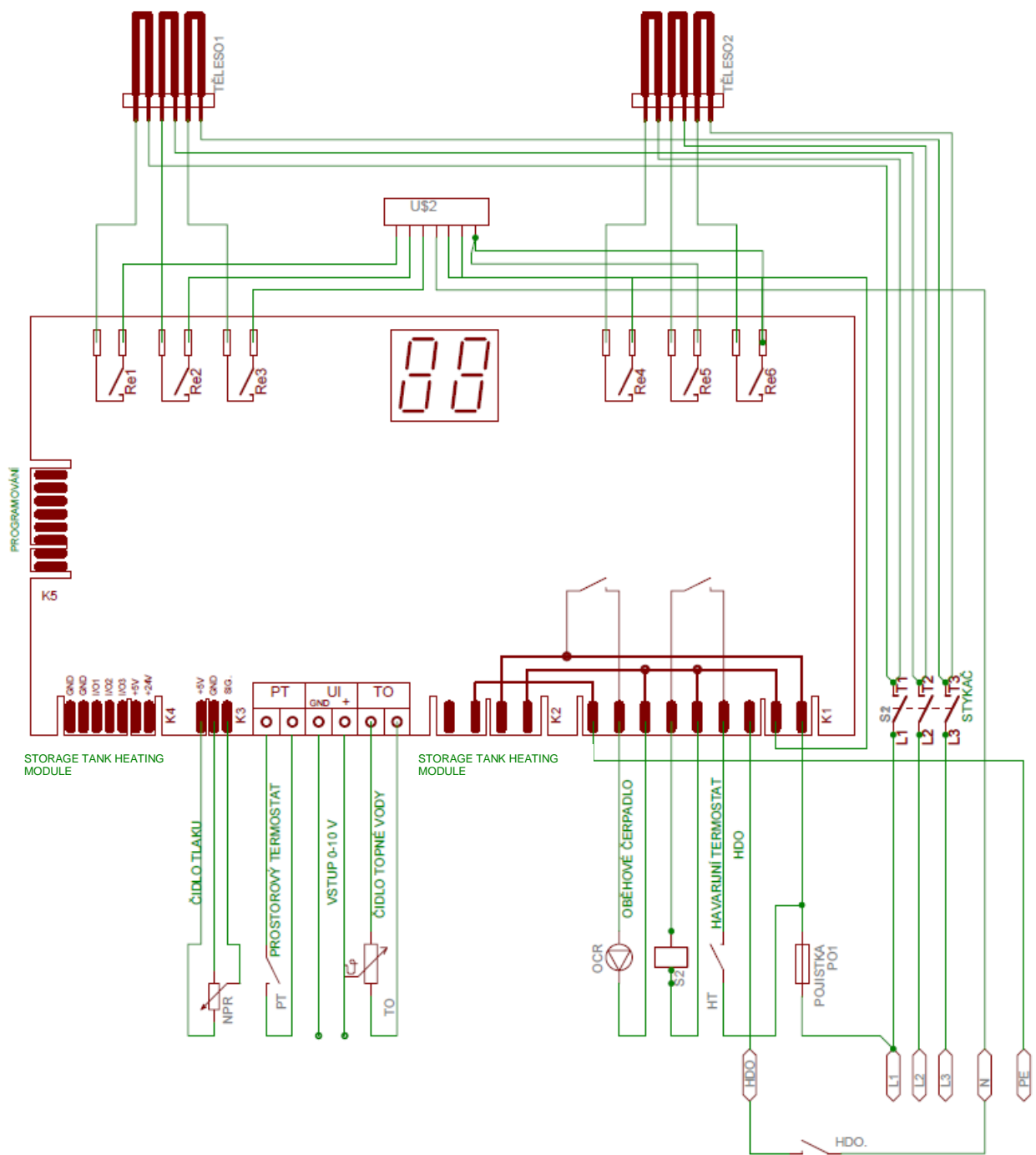
## 10. Electrical connection of THERM ELN boilers

### ◆ Electrical connection of THERM ELN 8 boilers





◆ Electrical connection of THERM ELN 15 boilers



## 11. Warranty and reliability for defects

The manufacturer shall not be liable for any mechanical damage to the individual components caused as a result of thoughtless treatment, for damage caused by unprofessional intervention into the electronic system during the adjustment and connection of the add-in regulations, for damage caused by the use of parts and components other than the original components used by the manufacturer. The warranty shall also not be applicable to defects caused by non-compliance with the binding warnings and terms stated in individual parts of this Operation and Maintenance Manual. Furthermore, the warranty shall not apply to non-standard conditions in the distribution systems (el. voltage fluctuations – especially overvoltage peaks, etc.), defects of equipment other than the boiler which affect its operation, damage caused by external factors, mechanical damage, storage, transport and defects caused as a result of a natural disaster, etc. In such cases, the service company may seek reimbursement of the repair costs by the customer.

THERMONA spol. s r. o. provides a warranty on its products in accordance with the terms and conditions specified in the warranty card delivered with the product.

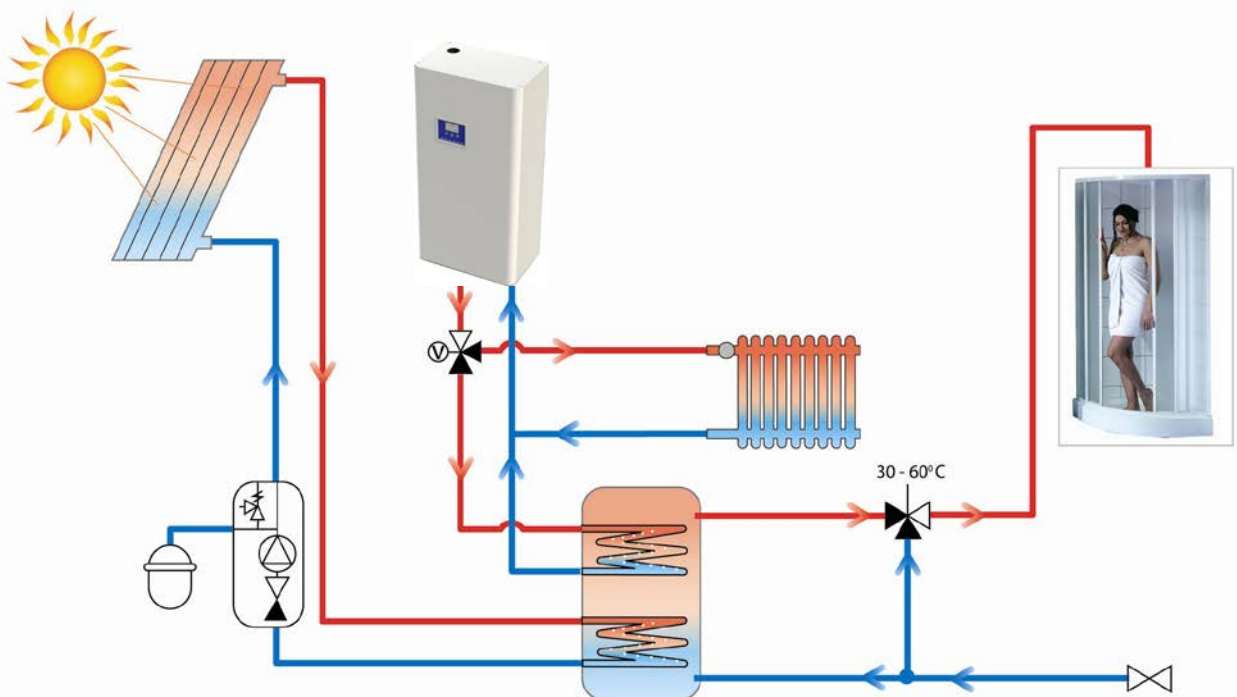
### Conditions for warranty claims:

1. Regular inspection of the boiler once a year. Inspections shall only be carried out by an authorized organization, i.e. authorized service company (such inspections are not included in the price of the boiler!).
2. All the records of warranty repairs and annual inspections of the boilers are to be documented in the appendix to this manual.

## 12. Interconnection with the solar system

THERM ELN electric boilers can also be used as an alternative (additional) heat source in addition to solar systems. The primary source for DHW tank heating is the solar system. When the sunlight, and thus energy supplied to the tank, is low, the THERM ELN electric boiler is activated and provides additional heating to the storage tank. This will ensure sufficient supply of hot water e.g. on cloudy days or during increased consumption. Make use of solar sets with Thermona electric boilers at favourable prices (for details, please visit [www.thermona.cz](http://www.thermona.cz)).

### The principle for connecting additional heating by means of the THERM ELN electric boiler.

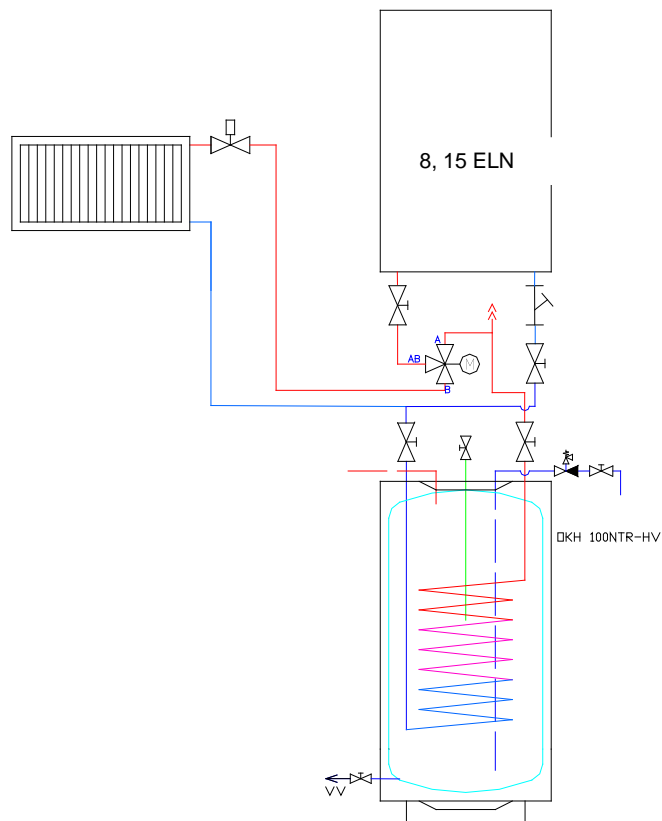


### 13. DHW heating

The THERM ELN boiler can be connected with an external indirect storage tank for DHW heating. In order to ensure DHW heating, the control panel of the LEKCPU boiler needs to be extended with the so called DHW module. The module consists of a LEKBOD panel which is connected with the LEKCPU panel by means of two cables (power and signal cable). The LEKBOD panel can be connected with the storage tank thermostat contact by means of screw terminals and with a 3-way valve (230 Vst) by means of a cable with the 3-pin RAST 5 connector. The LEKBOD panel is mounted on a DIN-rail next to the contactor and supply terminals. **Connection of the DHW module and servicing of the electrical system of the boiler may only be carried out by authorized service companies!**

The storage tank is heated by automatic adjustment of the 3-way valve. Operation with the DHW storage tank is always subordinate to heating and the selected temperature is always maintained without any time limits (except for the HDO signal). If the temperature in the storage tank drops below the setpoint, the 3-way valve in the boiler system will be adjusted in the first place and the boiler water will be heating the external indirect DHW storage tank.

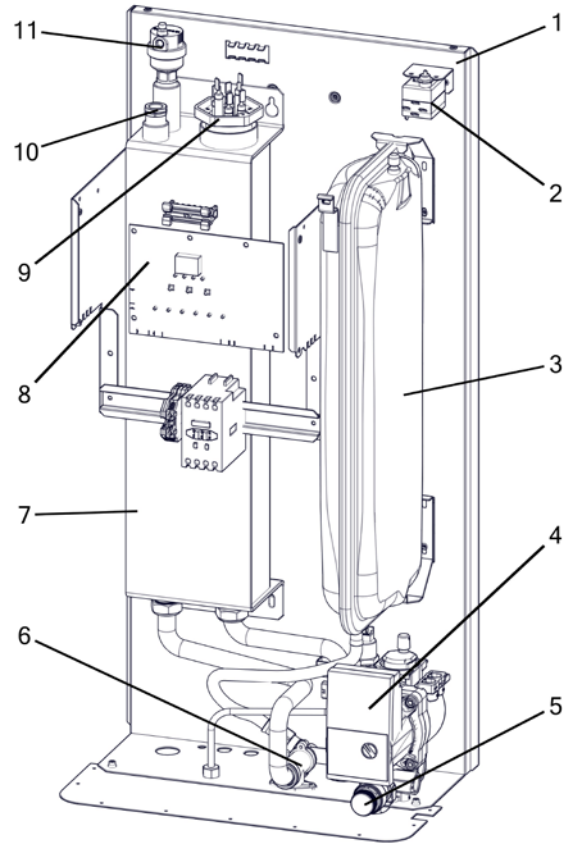
#### ◆ Sample wiring diagram of the ELN 8, 15\* electric boiler with indirect storage tank OKH 100 NTR-HV



\* For the given tank volume, a corresponding boiler type and output has been selected.

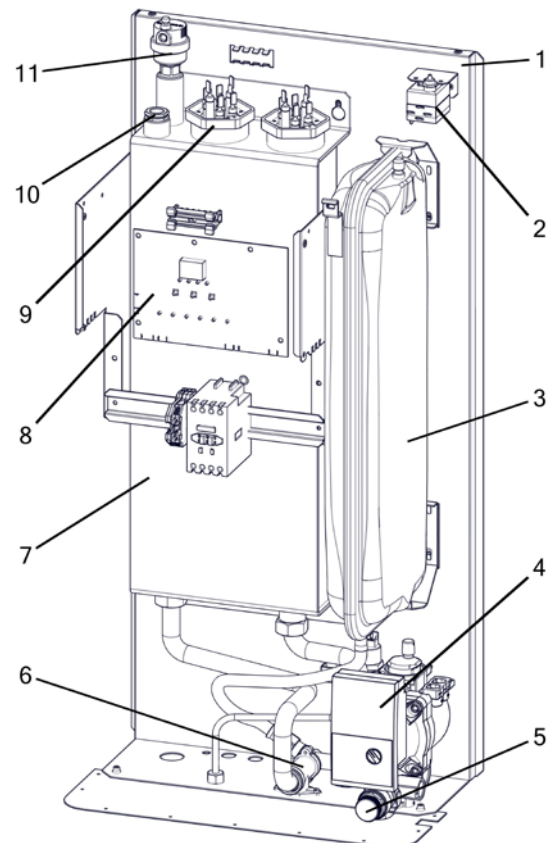
#### 14. THERM ELN 8 boiler set

- 1 - Boiler frame
- 2 - Emergency thermostat (the sensor is situated in the pocket along with the temperature sensor)
- 3 - 7L expansion tank
- 4 - Circulation pump
- 5 - Safety valve
- 6 - Hydroblock
- 7 - Boiler exchanger
- 8 - Automated control system
- 9 - Heating rod
- 10 - Emergency thermostat and temperature sensor pocket
- 11 - Vent valve

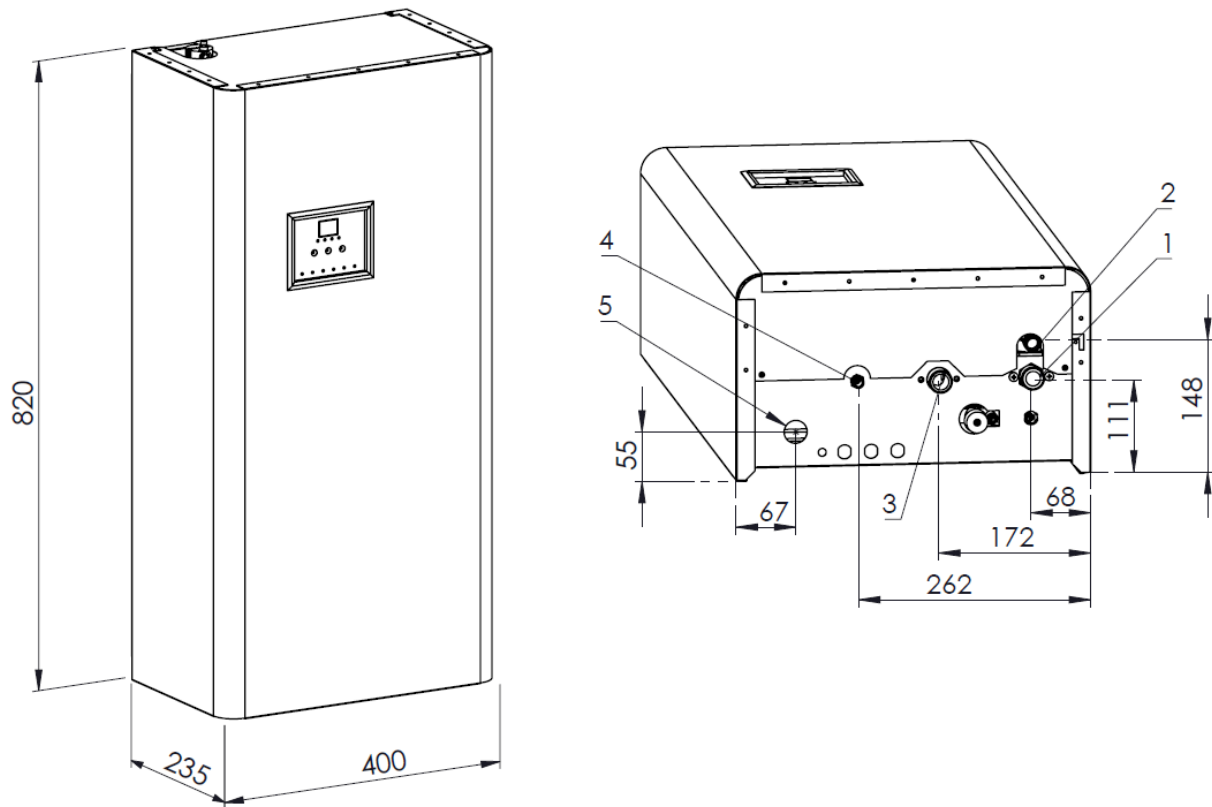


#### 15. THERM ELN 15 boiler set

- 1 - Boiler frame
- 2 - Emergency thermostat (the sensor is situated in the pocket along with the temperature sensor)
- 3 - Expansion tank 7 l
- 4 - Circulation pump
- 5 - Safety valve
- 6 - Hydroblock
- 7 - Boiler exchanger
- 8 - Automated control system
- 9 - Heating rod
- 10 - Emergency thermostat and temperature sensor pocket
- 11 - Vent valve



## 16. Dimensions and connections



- 1- Return water inlet -  $\frac{3}{4}$ " - male thread
- 2- Safety valve outlet
- 3- Return water outlet -  $\frac{3}{4}$ " - male thread
- 4- Inlet for the system recharge -  $\frac{1}{2}$ " - male thread
- 5- Supply cable grommet



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## CERTIFICATE OF QUALITY AND COMPLETENESS OF THE PRODUCT

**THERM ELN direct electric boiler**

**Type:** THERM ELN .....

**Serial number:** .....

*The appliance is in compliance with the requirements of European Directives 89/336/EHS, 73/23/EHS and other related technical regulations, standards and recommendations. When used under conditions recommended by the manufacturer, its operation is safe. Measures have been taken to ensure compliance of this appliance being launched to the market with technical documentation and basic technical, safety and sanitary requirements.*

**Technical inspection:**

**date:** .....

**stamp and signature:** .....

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