Centrometal

HEATING TECHNIQUE

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Technical instructions

for installation, handling and maintenance
of electric block-boiler for heating systems with thermoregulatory microprocessor

El-Cm Classic

Content

1. Description of symbols and instructions for safe work

1.1 Description of symbols

Warnings

	Warnings in text are marked by gray triangle, background warnings are framed
	Electric shock danger is marked by lightning symbol in warning triangle

The signal words at the beginning of the warning mean the way and level of consequences if protective measures are not applied.

- **NOTE** means that smaller material damages may occur.
- **CAUTION** means that smaller to middle injuries may occur.
- **WARNING** means that heavy injuries may occur.
- **DANGER** means that heavy injuries may occur.

Important information

Important information, meaning no danger for people and things, are marked by the symbol displayed in the following text.
These are limited by lines, above and below the text.

Further symbols

Symbol	Meaning
□	Action step
□	Directives to other places in document or to other documents.
•	Enumeration/Entry from the list
–	Enumeration/Entry from the list (2.)

Table1

1.2 Instructions for safe work

General safety instructions

Non-compliance with safety instructions may cause heavy injuries – or lethal outcomes and material damages and environment pollution.

- □ Electrical installation should be examined by an expert prior to the device assembly.
- □ All electric works should be performed by authorised person in accordance with corresponding regulations.
- □ Commissioning and maintenance and repairs should be done by authorised service only.
- □ Technical acceptance of installations should be performed in accordance with corresponding regulations.

Danger because of disrespecting security rules in alert situations, for example fire.

- □ Never expose your-self to life danger. Own security always has priority.

Damage occurred because of wrong handling

Wrong handling may lead to injuries of persons and/or installation damage.

- □ Make sure that device is available only to professionals.
- □ Installation and commissioning, and maintenance and repair, must be done only by service authorised for electrical works.

Installation and commissioning

- □ Placement of device can be done only by authorised service.
- □ Boiler can be turned on only if installation is with corresponding pressure level and working pressure regular. Do not close security valves in order to avoid damage caused by too high pressure. During warming water can leak on security valve of the hot water circuit and hot water pipes.
- □ Install this device only in the room where freezing is not possible to occur!
- □ Do not store or dispose inflammable materials or liquids in the vicinity of this device!
- □ Keep safe distance in accordance with valid regulations!

Life threat of electric power shock

- ④ Secure electric power connecting is done by authorised service! Comply with connecting scheme.
- ④ Prior to any work: turn off electric power supply. Secure against accidental turn on!
- ④ Do not mount this device in moist rooms!

Control examination / Maintenance

- ④ Recommendation for user: conclude agreement on maintenance with authorised service to perform annual maintenance and controlling examinations!
- ④ User is responsible for safety and environmental acceptance of the installation.
- ④ Comply with safety work instruction as given in the chapter *Cleaning and Maintenance*.

Authentic spare parts

There shall not be undertaken any responsibility for damage occurred due to spare parts not delivered by the manufacturer!

- ④ Use only original spare parts!

Material damages due to freezing

- ④ When there is damage due to freezing drain water from the boiler, tank and pipelines for heating. Danger of freezing does not exist only when entire installation is dry.

Instructions for service

- ④ Inform users about mode of work of device and instruct them in maintenance.
- ④ Inform users not to perform any modifications or repair on their own!
- ④ Warn users that children cannot stay near heating installations!
- ④ Fill in and submit Commissioning log and Handover log attached in this document.
- ④ Deliver technical documentation to the user!

Waste disposal

- ④ Dispose packaging materials in ecologically

Acceptable manner!

④ Secure device in ecologically acceptable manner and in authorised place!

Cleaning

④ Clean outside of device with wet cloth

2. Device data

These instructions contain important information about safe and professional assembly, commissioning and maintenance of the boiler.

These instructions are for installers who have knowledge for work with heating installations due to their professionalism and experience.

2.1 Typology

These instructions are related to the following kind of device:

El-Cm El-Cm Classic	6-27kW

2.2.1 Statement on compliances

We hereby state that devices are tested in accordance with the following directives: 2006/95/EC (low voltage directive, LVD) and 2004/108/EC (electro-magnetic compatibility directive, EMC).

2.2.2 Regular application

The boiler can be used only for heating the water for heating system and for indirect use of hot water. To ensure correct use it is mandatory to comply with instructions for handling, data on the factory plate and technical data.

2.3 Instructions for mounting

2.5

Use only original spare parts of the manufacturer or spare parts approved by the manufacturer. There shall not be any responsibility for damages caused by spare parts which have not been delivered by the manufacturer.

When mounting heating installations keep with the following instructions:

- Valid regulations in construction industry
- Regulations and norms on safety-technical equipment of heating installations
- Changes on the place of mounting according To valid regulations

2.4 Instructions for work

When working with heating installation follow next instructions:

④ Boiler should work in working range up to max temperature of 80°C and min pressure of 0.7 bars to max pressure of 2.6 bars, which should be controlled on regular basis.

④ Boiler should be handled only by adults who are familiar with instructions and work of the boiler.

④ Do not close safety valve!

Inflammatory objects must not be put on the boiler surface or close to it (within safety distance).

④ Boiler surface clean only with non-inflammatory products.

④ Inflammatory substances do not keep in the room for boiler installation (e.g. petroleum, oil, etc.)

④ During the work no one lid must be open.

④ Keep safe distance in accordance with regulations!

Inhibitors and anti-frost products

It is not allowed to use protective products against frost neither inhibitors. Id it is not possible to avoid anti-frost protection then should use anti-frost products allowed for heating installations.

Anti-frost products:

④ Reduce lifetime of the boiler and its parts;

④ Reduce heat transmission

2.6 Norms, regulations and standards

This product is in compliance with the following regulations:

- EN 50110-1:2003 – Handling and work with electrical installations
- EN 55014:2001 – Electrical-magnetic compatibility – conditions for consumers' devices for households, electric devices and similar devices
- EN 60 335-1+ed.2:2003 Electric devices for households
- EN 60 335-1+ed.2 zm.A1:2005 Electric devices for households
- EN 61000-3-2 ed.3:2006 Electrical-magnetic compatibility (EMC) – emission limits for harmonic power
- EN 61000-3-3:1997 Electrical-magnetic compatibility (EMC) – Law on determination of fluctuation of voltage and frequency of low power distributive network

2.7 Tools, materials and auxiliary measures

Standard tools for heating installations, water supply and electric-installations are needed for mounting and maintenance of the boiler.

2.8 Minimum distances and burnable construction materials

Depending on valid regulations, other minimum distances could be applied, different than mentioned below:

④ Comply with regulations of electrical installations and minimum distances which are in force in the subject country

④ Minimum distance for heavy inflammable and self-extinguishing materials is 200 mm

Inflammability of components		
A	Non-inflammable	
A1:	Non-inflammable	Asbestos, stone, wall tiles, baked clay, plaster (with no organic additives)
A2:	With smaller quantity of added elements (organic components)	Plaster cardboards plates, base felt, glass fibres, plates of ACUMIN, ISOMIN, RAIOT, LOGNOS, VELOX, AND HERACLITUS
B	Inflammable	
B1:	Hardly inflammable	Beech, oak, veneered wood, felt, HOBREX, VERSALIT and UMAKART plates
B2:	Normally inflammable	Pine, larch and spruce, veneered wood
B3:	Inflammable	Asphalt, cardboard, cellulose materials, tar-paper, plywood plates, cork plates, polyurethane, polystyrene, polyethylene, floor fibre materials

Table 2: Ign*itable materials and composition of elements according to DIN 4102*

2.9 Product description

Basic components of boiler:

- Boiler body
- Device frame and casing
- Control unit
- Pump
- Expansion dish (per capacity)
- Processor board and boiler electronics
- Water pressure sensor
- Safety valve

Boiler can be installed as integral part of the central heating system, floor heating, hybrid, or accumulation systems.

Boiler is compounded of weld housing of steel tin with thermal insulation. The boiler is fixed on the wall by supplied mounting set. Installed heating insulation in boiler jacket reduces loss of the heat, and also protects against noise.

Safety elements (vent valve, managing surface fuse and temperature safety limitation) are mounted at the top of boiler.

Depending on the type of the boiler, different elements of heating are used. Heating elements' performance can be adjusted according to grades. Different performance grades sets can be obtained through control panel. Number and division of performance grades are visible from technical data (See chapter 2.13.2).

1 UL Return boiler's line
2 IZ Start boiler's line
3 Boiler's exchanger
4 Electric heaters
5 Expansion dish
6 Circulating pump
7 Vent valve (on pump)
8 Safety valve (on pump)
9 Drain faucet
10 Automatic air vent
11 Automatic fuses with voltage trigger
12 Terminal for room thermostat
13 Microprocessor plate
14 Electric heaters contacts
15 Temperature sensor
16 Safety thermostat (STB)
17 Control panel with display
18 Flexible hose of expansion dish
19 Drainage hose of air vent
20 Power switch (ON/OFF)
21 Electric cable access sleeve
22 Drainage hose of safety valve

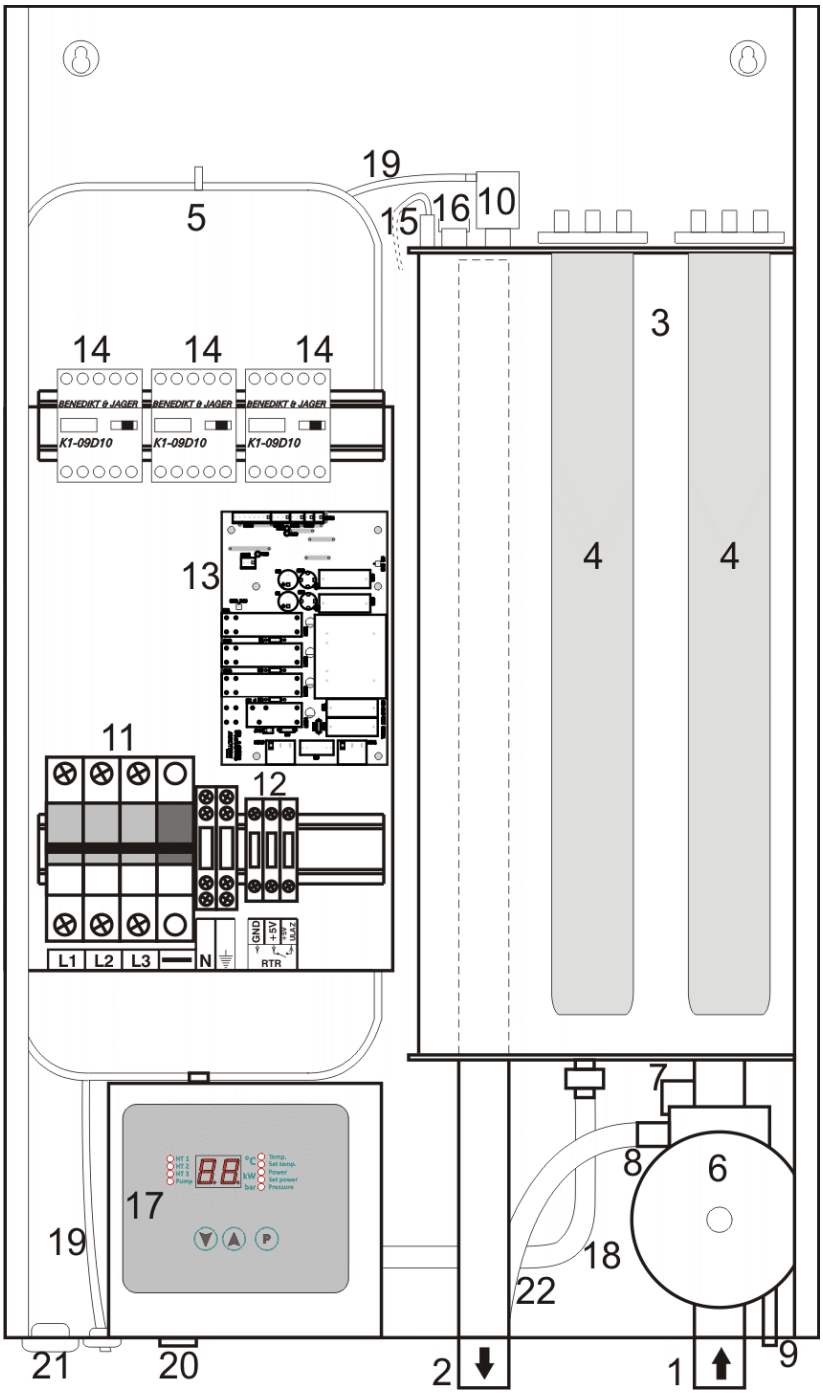

Figure 1: Open device view

2.10 Waste disposal

④ Dispose packaging materials in ecologically sound manner!
④ Components that should be changed dispose in ecologically sound manner.

2.11 Delivery scope

When delivery the boiler stick to the following:

④ Check if packaging is damaged during delivery.

④ Check if delivery is complete.

Part	Pieces
Boiler El-Cm Classic	1
Assembly Set	1
Instructions for handling	1

2.12 Factory plate

Factory data plate is placed on the external side of the boiler and contains the following technical data:

- Boiler type
- Batch / Catalogue number
- Power
- Input power
- Maximum temperature
- Working pressure
- Water volume
- Mass
- Electric power supply
- Protection grade
- Manufacturer

2.13 Dimensions and technical data

2.13.1 Dimensions and technical data for boiler EI-Cm EI-Cm Classic

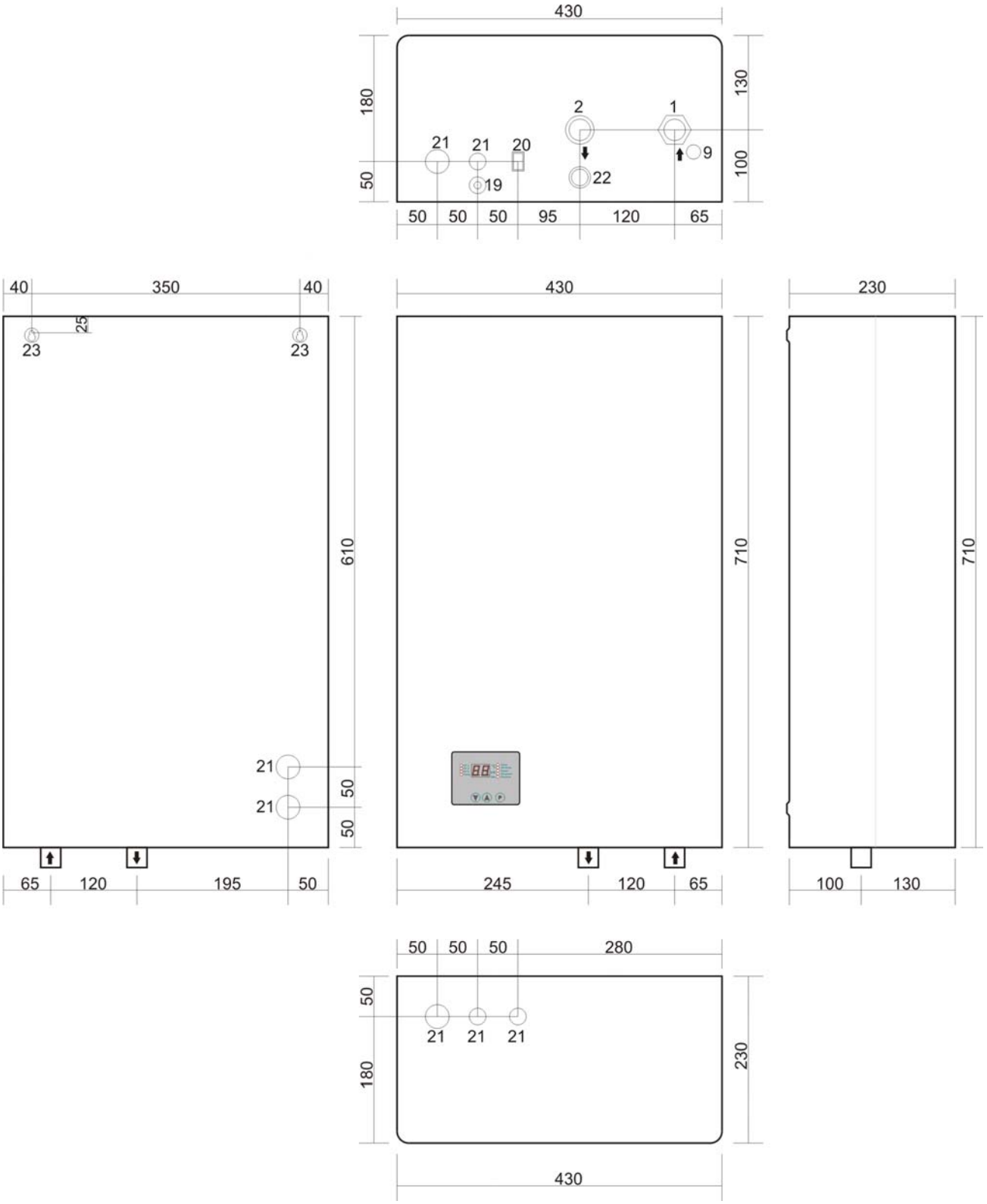

Figure 2: Dimensions and connections

2.13.2 Technical data

	Unit	CVM-6	CVM-9	CVM-12	CVM-18	CVM-24	CVM-27
Power	KW	6	9	12	18	24	27
Usability level	%	99	99	99	99	99	99
Number of power grades		3	3	3	3	3	3
Division of power grades		3×2	3×3	3×4	3×6	3×8	3×9
Network voltage	V AC	3N ~ 400/230V 50Hz					
Protection level		IP40					
Needed fuses	A	16	20	25	32	40	50
Min diameter of input cable	mm²	5×2.5	5×2.5	5×4	5×4	5×6	5×6
Safety valve	Bar	3					
Max allowed working pressure	Bar	2, 6					
Min allowed working pressure	Bar	0, 4					
Max boiler temperature	°C	80					
Water volume in boiler	ℓ	12, 5					
Expansion dish volume	ℓ	8					
Connection of start line		DN20 (3/4”)					
Connection of return line		DN20 (3/4”)					
Device mass (without water)	Kg	23	24	24	25	25	25
Dimensions	mm	7 710×430×230 (Height × Width × Depth)					
Microprocessor Unit		EK_CPU_LCTR1					

Table 3: Technical data of El-Cm El-Cm Classic Device

3. Transportation

NOTE: Transport damages

- Pay attention on instructions for transportation on packaging!
- Use adequate transportation means, i.e. carts for bags with tighten strip. The product should be **in horizontal position** during transportation.
- Avoid shocks or collisions!

- Packed boiler put on carts for bags if needed secure it with strip and drive it to its mounting place.
- Remove packaging
- Remove packaging materials and dispose it in ecologically acceptable manner.

4. Installation of device

CAUTION: Human or material damages occurred because of irregular installation!

④ Never install boiler without expansion dish (AG) and safety valve.

④ Boiler must not be installed in protective zone of important area or at the place of bath.

NOTE: Material damage due to freezing!

④ Boiler must be installed only in room safe of freezing.

4.1 Be careful prior to assembly

NOTE: Material damage occurred due to incompliance with further instructions!

④ Respect instructions for boiler and all installed components

Prior to installing take care of the following:

- All electrical connectors, protective measures and fusses should be done by professional person respecting all valid norms, regulations and local laws.
- Electric connector should be done according to the connecting plans.
- After corresponding installation of device execute grounding of the plant.
- Before opening device and all works turn off electric supply.
- Non-professional and non-authorised attempts to connect device under voltage can produce material damage of device and hazardous electrical shocks.

4.2 Distances

DANGER: Fire threat due to burnable materials and liquids!

 Do not dispose burnable materials and liquids close to the boiler.

 Let know the user the valid regulations for minimum distances from burnable materials (Section 2.8, p.7)

- Comply with regulations on electric installations and minimum distances in force in subject countries.
- Place boiler on the wall in such manner to leave free space as illustrated in the Figure 3.

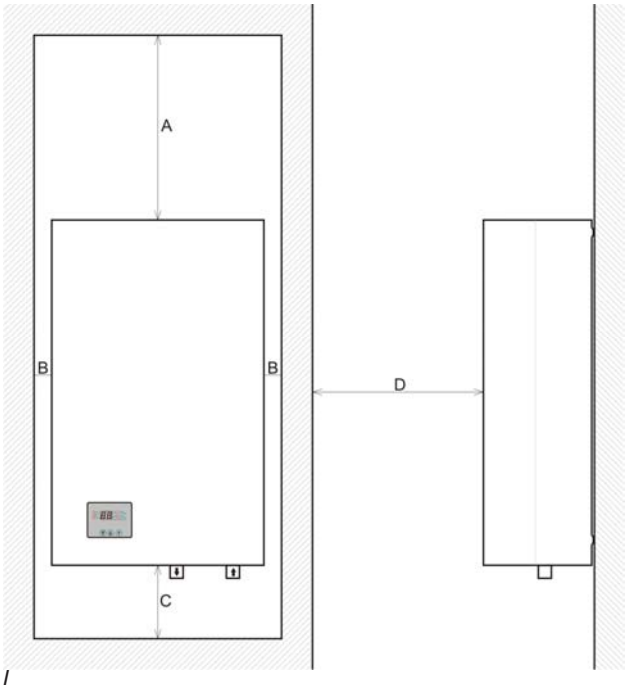

Figure3: *Minimum distance during installation*
A = 500mm / B = 50mm / C = 200mm / D = 500mm

4.3 Demounting front boiler casing

Boiler casing can be removed for simple handling and installation.

④ Unscrew 3 bolts at top lid

④ Unscrew 3 bolts at bottom lid.

④ With slow pulling toward you demount front casing of the boiler.

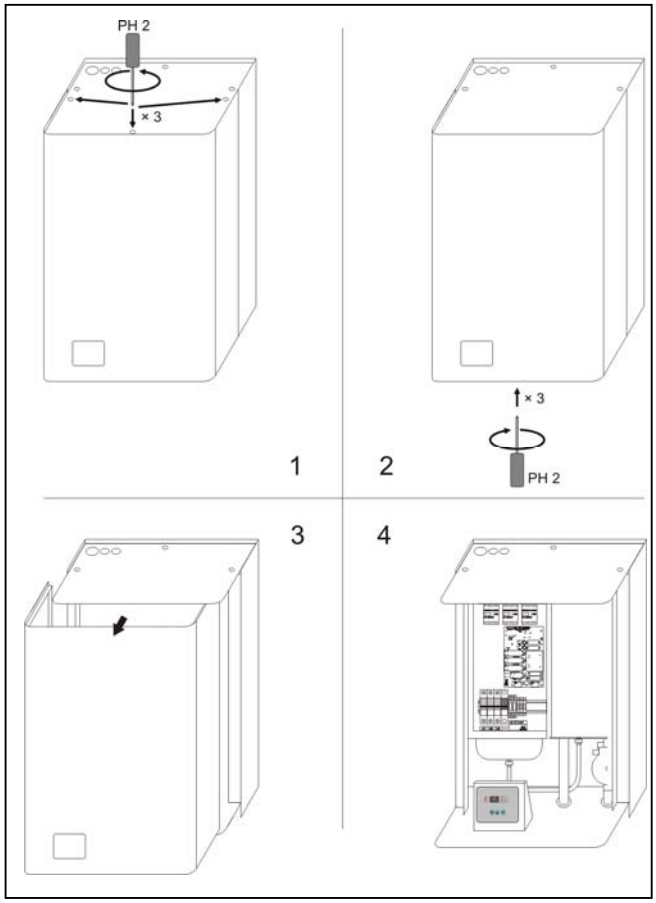

Figure4: Opening the boiler (Demounting front casing)

4.4 Mounting boiler

NOTE: Material damage occurred by irregular installation on the wall**!**

④ It is necessary to use proper material for fixing.

This chapter describes boiler mounting on the wall.

④ Draw position of drilling holes for mounting set respecting minimum distances (Figure 3).

④ Drill holes upon dimensions given in Figure 2.

④ Put into drilled holes plastic dowel enclosed in device packaging (or adequate dowel for unusual kind of wall)

④ Then screw bolts into delivered dowels (or other) in such way that are left out from the wall min 5 mm-max 10mm.

④ Carefully hang device on the wall

④ Make sure that boiler is placed vertically.

④ Fixed boiler on the wall by mounting set and screw

4.5 Hydraulic attachments execution

NOTE: Material damages caused by permeable connections!

④ Attachment duct lines install without connecting on boiler connections!

Heating duct lines connect as follows:

④ Connect return line on connection IN.

④ Connect start line on connection OUT.

4.6 Filling the installations and watertight testing

Before system filling the boiler must be connected on electric installations and turned on, over ON/OFF switcher at bottom side of the boiler, to STAND BY regime to follow up with pressure value in installations on display. Using buttons ▼ and ▲ adjust thermo-regulation to pressure measuring mode (LED diode shines near the mark *bar*)

4.6.1 Filling the boiler with heating water and sealing test

④ Waterproof should be tested prior to put on the boiler.

DANGER: Injuries and/or material damages can occur with overpressure when testing watertight!
High pressure can damage regulatory and safety devices and reservoir.

④ After filling with water set the boiler on pressure that is equal to the opening pressure of safety valve.

④ Comply with maximum pressure of installed components

④ After testing sealing, open again closing valves

④ Make sure that all pressures, regulatory and safety parts work correctly

DANGER: Health threat due to mix of drinking water!

④ It is demanding to respect state norms and regulations on avoiding mix drinking water (with water from heating installations)

④ Comply with EN 1717

NOTE: Installation damage due to bad quality of water! Heating installation can be damaged by corrosion or scale depending on water characteristics

④ Comply with filling requests for water according to VDI 2035 or project documentation and catalogue

④ Check pre-pressure of expansion dish

④ Open faucet for filling and exhausting

④ Fill the boiler slowly; watch pressure on display (Figure 5):

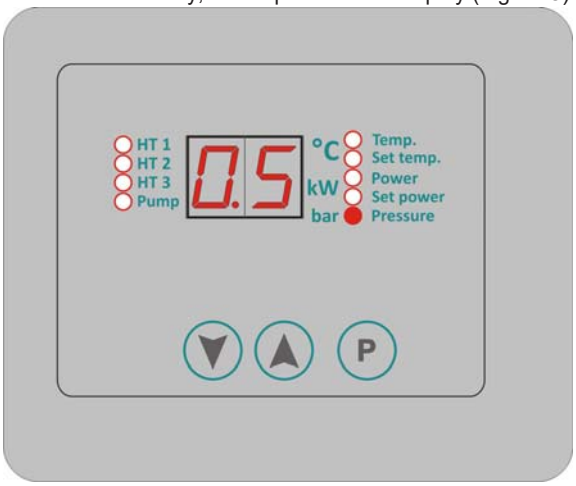

Figure 5 Display with marked pressure

NOTE: Material damage due to temperature tension!

If you fill the boiler in hot condition, temperature tension can cause cracks due to tensions. Boiler will start to leak.

④ Fill the boiler only in cold condition (temperature of empty duct can be max 40°C).

④ Fill the boiler only through quick valve on pipe installation (return line) of the boiler

When working pressure is reached close the faucet.

④ Use vent valve to air vent the boiler (□ Figure 5 and Figure 6).

④ Air-vent the installation through valve on radiator

④ When lower working pressure by air vent, water must be re-filled.

④ Test watertight according to local regulations

④ After watertight testing, open all elements that were closed doe to filling

④ Check if all safety elements work correctly

④ When the boiler is tested and no leaking was spotted - adjust correct working pressure.

- ④ Remove hose from the filling/exhausting faucet
- ④ Enter working pressure values and water quality into instructions for handling

During the first filling of repeated filling or when change the water:

- ④ Comply with requests for filling water

4.6.2 Heating pump air emission and de-blocking

- ④ Pump that exists in this device has automatic air vent so it is not necessary to perform any action about this.

When heating pump is blocked do the following:

- ④ Carefully try to release axis using screwdriver

4.6.3 Boiler and installation air emission

- ④ Carefully, using screw on air vent cup release the valve and air vent the boiler. This valve is automatic so, if respect the rule of slow filling of installation and boiler, additional manual air-vent will not be needed.

5. Electric connecting

DANGER: Life threat from electric shock!

- ④ Electric works must be done only by qualified person.
- ④ Turn off voltage supply before opening device and secure it against accidental turn on.
- ④ Comply with assembly regulations

When connecting boiler on electric installation take care on connections scheme and connecting plans. Respect mandatory diameters of cables and fusses power outside the boiler.

This device is manufactured for connection to three-phase power supply (3N ~ 400/230V 50Hz)

5.1 Positions of introducer for the introduction of the power cable

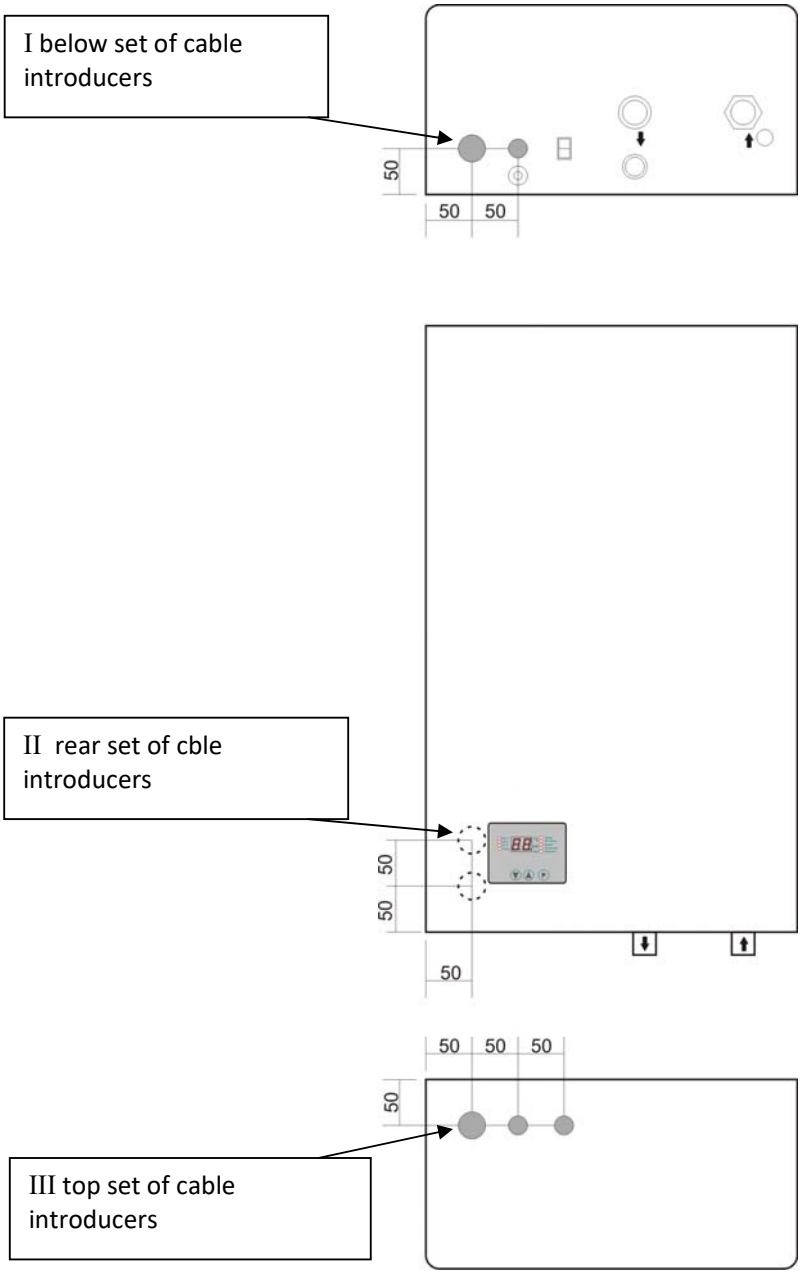

Figure 6 Illustration of the position of cable introducers on the boiler

This device is equipped with three (3) sets of introducers for power cable.

I set introducers (main set) is on lower side (below) of device. They are on lower plate of device in the back left corner (See Figure 6). It is intended for connecting device when power cable comes from the lower side of the boiler.

II set introducers is placed on the rear of device and is used when cables on the wall are prepared for the boiler. They provide power cable from the wall to get directly into the boiler. When front lid is removed, it is visible in lower left side two openings of dimensions of 28 mm, placed one above the other. This mode of connecting secures just aesthetic function because cables are not visible (See Figure 6).

III set introducers are placed on the top of boiler in rear left corner (See Figure 6) they are intended for connecting device when power cable comes from the upper side of device.

5.2 Connecting power (voltage) cable

- Commencing should be performed according to the mounting scheme as given in the Figure7.

In the boiler, instead of classical row immobilizer are placed three pole automatic fuses to introduce the power cable. This set of automatic fuses has remote power trigger superstructure, enabling safety set having short-lasting electric power protection and ability to react on overheating (signal from safety thermostat activates power trigger) and simultaneously turn off supply of all three phases into device.

- Phase conductors are connected to three-pole fusses (L1, L2, and L3)

WARNING! When connecting phase conductors; It is demanding to tight well screws in automatic fusses to achieve better joint between cable and clamp.

DANGER! If there is no good joint between cable and clamp, then uncontrolled warning of fusses can occur and its termination at the end.

- Neutral (zero) duct line is connected to corresponding row immobilizer (N) which is placed on the right hand side of the fuses set with voltage trigger. Row immobilizer of zero duct line is of blue colour.
- Grounding duct line should be connected in the row immobilizer clearly labeled with grounding symbol. Row immobilizer of the duct line for grounding is of green-yellow colour.

NOTE: Remote voltage trigger is connected by manufacturer within safety set of this device and **no cable** should be connected with it

NOTE: Room thermostat is connected on additional row immobilizers (5V IN) and it interrupts voltage of 5V DC that comes from boiler table microprocessor.

- It is recommended to use room thermostats with independent power supply like batteries
- This boiler is not predicted to work without room thermostat or external control unit

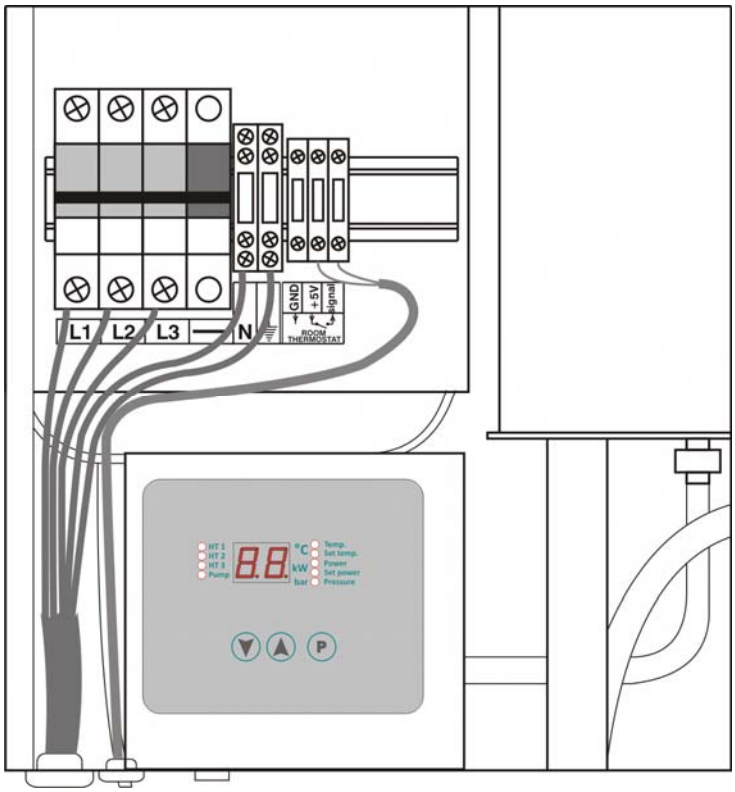

Figure 7: Scheme for connecting power cable

- When connect power cable into the boiler through any of Three selected introducing sets carefully pull the cable To three-pole fuses avoiding to damage Cable sets within device.

NOTE! Only qualified person may execute This device connecting

- When connect power cable and room thermostat, it is necessary, prior to closing device, or prior to mount front casing, to lift fusses set together with Remote power triggers in order to secure power supply into boiler.

5.3 Scheme of power cable connecting

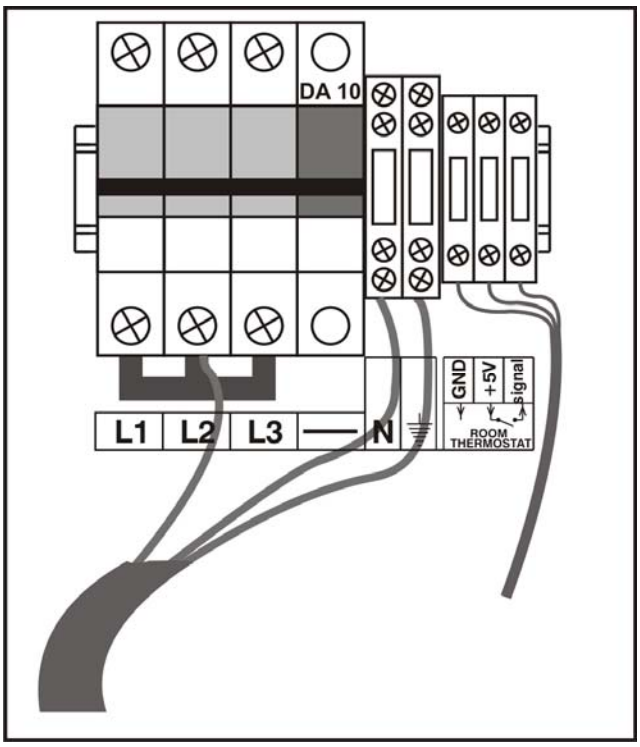

Figure 8: **Scheme of boiler connecting to mono-phase**
Power supply – ONLY FOR POWER OF 6kW AND 9kW

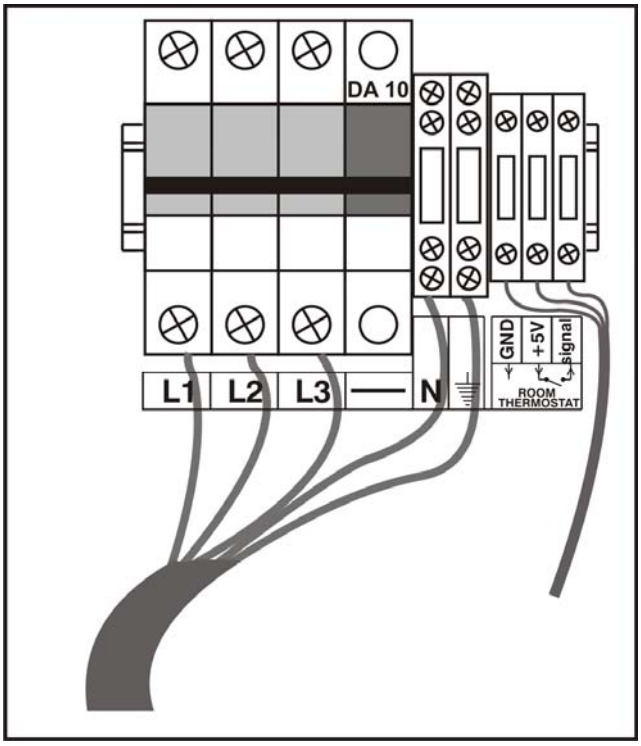

Figure 9: **Scheme of boiler connecting on three-phase power supply**

5.4 Connect external control of boiler (room thermostat)

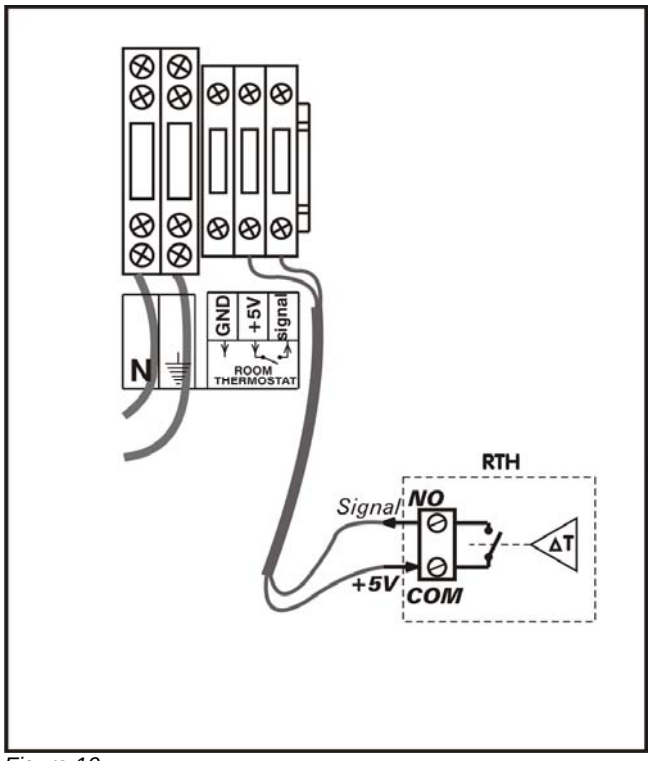

Figure 10:

Scheme of digital programmed room thermostat connecting with battery supply

WARNING: Use room thermostat with no-voltage contacts

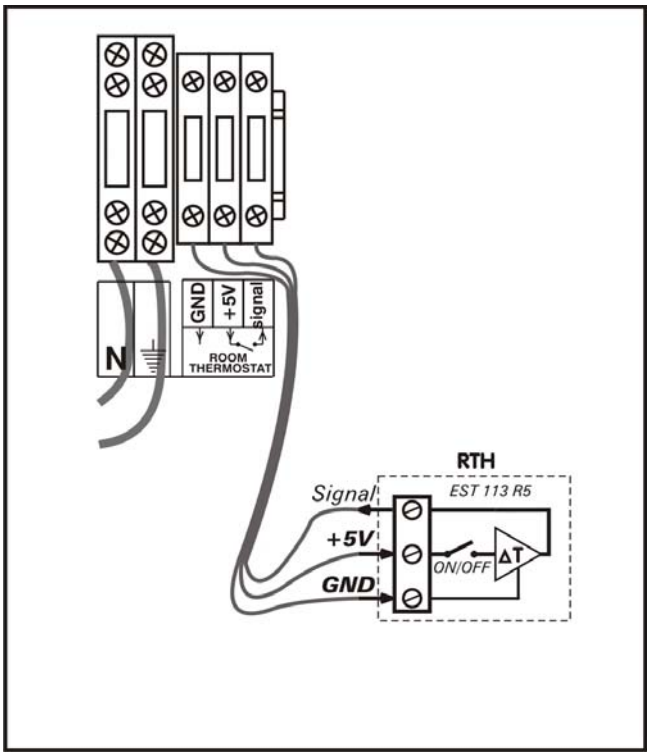

Figure 11:

5.5 Electric schemes of connection

All quoted cross-sections of cables are minimal. Cross-sections that should be placed depend on length of the line and placing mode.

④ Cable cross-sections should be dimensioned according to local regulations.

Legend	
3P A	Three-pole automatic fuse
DA	Remote power trigger
ST	Safety thermostat (Klixon)
RTH	Room thermostat
RS 1, RS 2, RS 3	Connecting clamps of room thermostat **WARNING: voltage 5V DC**
P1	Main switcher ON/OFF
CP	Circulation pump
RK1, RK2, RK3	Relay contact (for **9**,**12** and **18**kW)
K1, K2, K3	Contact (for **24**kW and **27**kW)
G1	Heater -3×1500W for boiler of **9** kW -3×2000W for boiler of **6**, **12**, **18**kW -3×2667W for boiler of **24**kW -3×3000W for boiler **27**kW
G2	Heater -3×1500W for boiler of **9** kW -3×2000W for boiler of **12**, **18**kW -3×2667W for boiler of **24**kW -3×3000W for boiler of **27**kW
G3	Heater -3×2000W for boiler of **18**kW -3×2667W for boiler of **24**kW -3×3000W for boiler of **27**kW

Legend	
LCTR 1	Microprocessor thermal regulator
OS 1	Electric fuse 230V T500mA
OS 2	Electric fuse 230V T2A
OS 3	Electric fuse 24V T500mA
OS 4	Electric fuse 8V T500mA
KON1	Supply connector (230V AC)
KON2	Circulation pump connection
K 101	Pressure sensor connection
SP	Pressure sensor
K 102	Temperature sensor connection
TS	Temperature sensor
K 105	Interface connection (LCI1)
K 106	Room thermostat connection (RTH)
RE 1	–Heater relay (for boiler of 6kW) –Contact K1 turn on relay (for boiler of all other power)
RE 2	–Heater relay (for boiler of 6 kW) –Contact K2 turn on relay (for boilers of all other power)
RE 3	–Heater relay for boiler of 6kW –Contact K3 turn on relay (for boilers of all other power)

Table 4: Legend of connecting schemes El-Cm El-Cm Classic

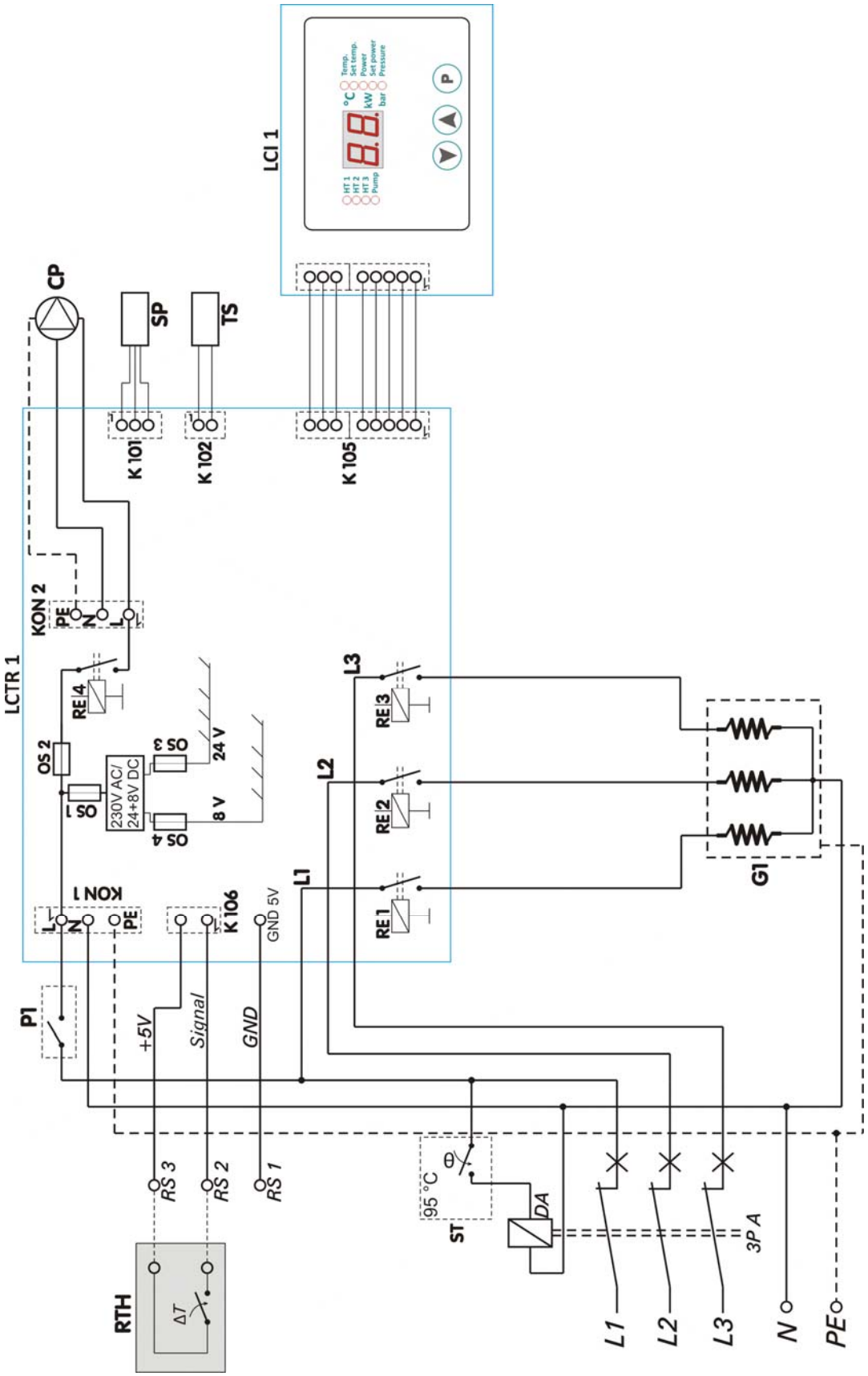

*Figure 12: Boiler electric scheme **EI-Cm EI-Cm Classic** with nominal power of 6kW*

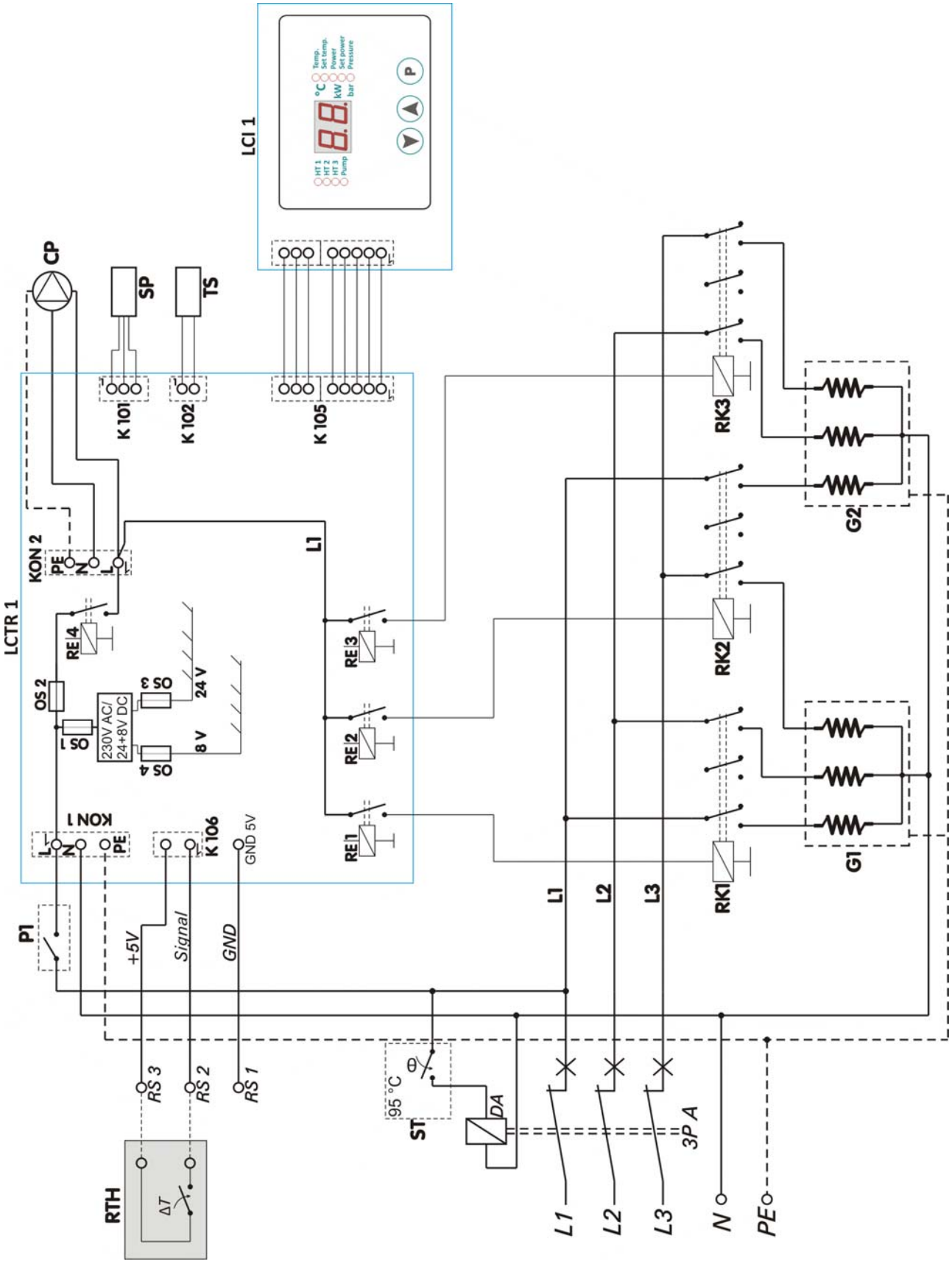

*Figure 13: Boiler electric scheme **EI-Cm EI-Cm Classic** with nominal power of 9kW and 12kW*

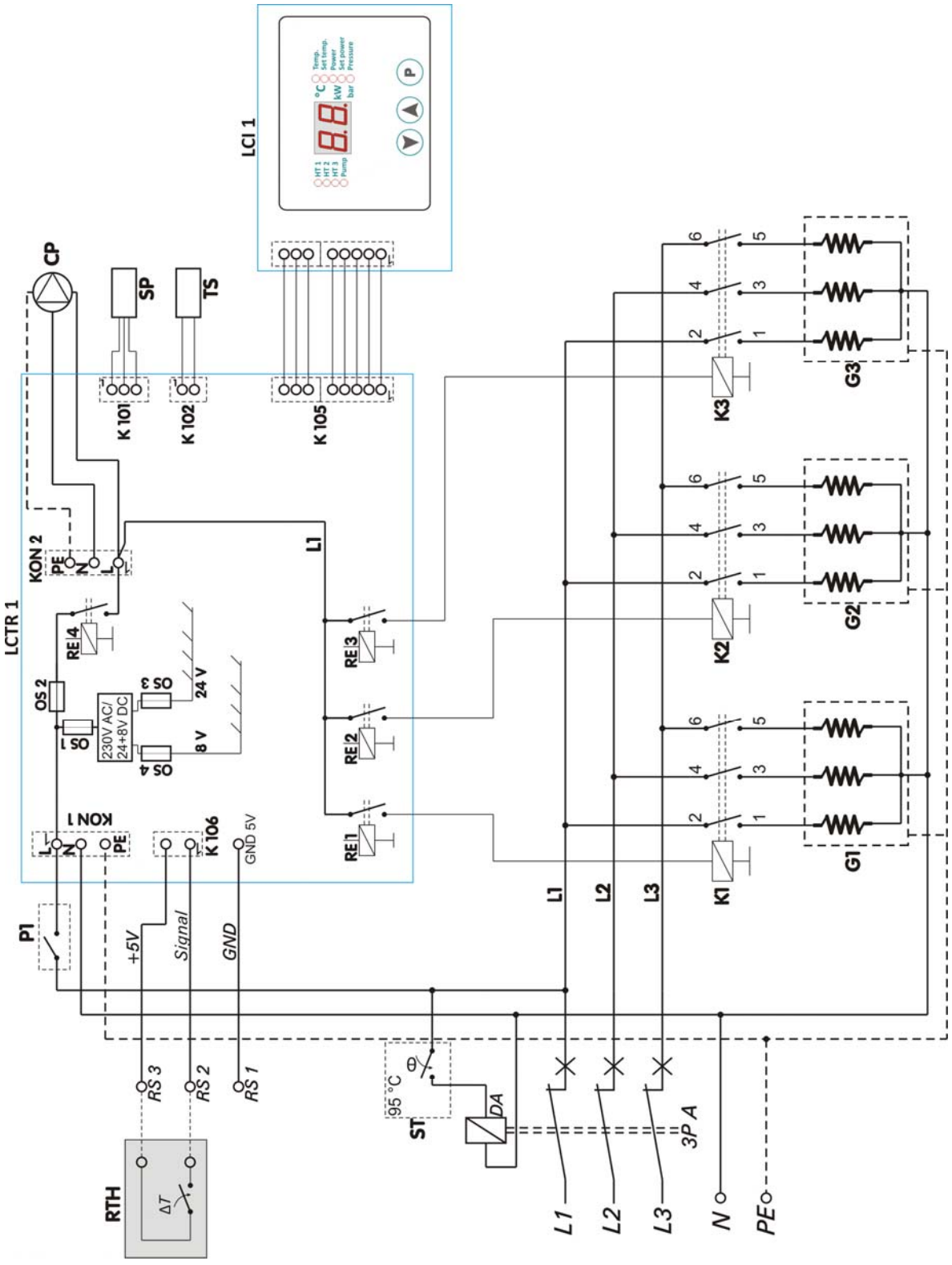

*Figure 14: Boiler electric scheme **El-Cm El-Cm Classic** with nominal power of 18kW, 24kW and27kW*

6. Commissioning

When complete below described works fill in the Commissioning log (Chapter 6.3).

6.1 Before commissioning

NOTE: Material damage occurred due to unprofessional operating!

Start-up without sufficient quantity of water destroys device!

④ Turn on the boiler and use it only if there is sufficient quantity of water.

Boiler must work with minimum pressure of 0.7 bars

Before turn on, test if the following elements and joints are connecter correctly and work correctly:

- Watertight of heating installation
- All pipes connected into ducts
- All electric connectors

6.2 First turn on

NOTE: Material damage due to incorrect handling

④ Instruct client/user how to handle device

④ Prior to turn on check if heating installation is filled with water and air-vent

④ Turn on main switcher (below device)

④ Heating system and device parameters will appear on display

④ Device is adjusted by default on min temperature of 10°C and power of 0 kW

④ Only the pressure value in installation on display will be the one which you adjusted during filling the installation with water

6.3 Start-up log

	Start-up works	Page	Measuring values	Notes
1.	Boiler type			
2.	Serial number			
3.	Set thermostat regulation		☐	
4.	Fill and air-vent heating installation and check sealing of all connectors	16	☐	
5.	Establish working pressure Check expansion dish pressure		☐ _____bar ☐ _____bar	
6.	Test safety devices	16	☐	
7.	Set electric connection according to local regulations	16	☐	
8.	Test function	16	☐	
9.	Users informed, technical documentation submitted		☐	
10.	Certificate of professional turn on device		Service seal / Signature / Date	

Table 5: Start-up log

7. Heating installation handling

7.1 Working Instruction

Safety Instructions

- Only adults familiar with instructions and working mode may operate the boiler
- Make sure there are no children in the boiler area.
- Do not dispose or store inflammable materials within safe distance of 400 mm round the boiler
- Inflammable materials must not be placed on the boiler.
- User must comply with instructions for operating the boiler.
- User may only turn on the boiler (except the first start-up), adjust temperature on the regulating device and turn off the boiler. All other operations must be performed by authorised service.
- Authorised person who performed installation is obliged to inform the user about handling and correct and safe work of boiler.
- In the event of alert situation, explosion, fire, gas or steam leaking, the boiler must not work.
- Be aware of inflammable characteristics of components (Instructions on installations and maintenance)

7.2 Modifying elements

7.2.1 Device functions

We will give here brief information of the most important characteristics of the boiler El-Cm El-Cm Classic:

- Electric boiler El-Cm El-Cm Classic contains all elements of the boiler sub-station or small boiler room.
- This model contains many advanced functions that make easier work with this device and provide longer life and safer handling.
- Temperature and hydraulic pressure sensors follow up with changes in heating process sending information to microprocessor which manage the boiler on that base.
- Communication between user / installer (servicer) and device is done through user interface where is possible to see important device parameters.
- Adjustment is performed through three buttons placed in lower part of control panel.

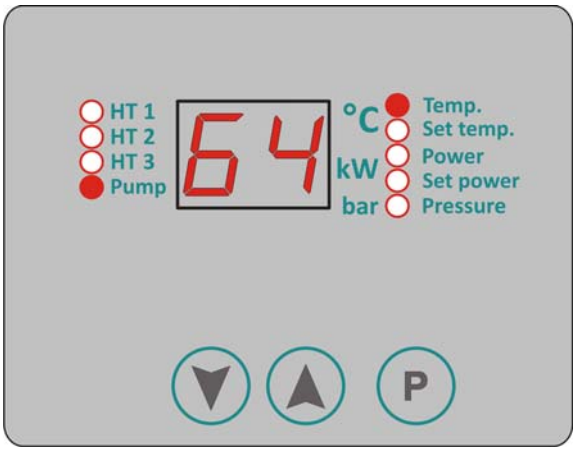

Figure 15: Control panel view

-**HT 1**: Indicates work of heater no. 1
-**HT 2**: Indicates work of heater no. 2
-**HT 3**: Indicates work of heater no. 3
-**Pump**: Indicates work of circulating pump
-**Temp**: Present temperature display [°C]
-**Set temp**: Set temperature display [°C]
-**Power**: Present engaged power [kW]
-**Set power**: Set engaged power [kW]
-**Pressure**: Present pressure [bar]
- ▼ Button to reduce parameters value
  And search down through Menu
- ▲ Button to increase parameters value
  And search up through Menu
- **P**: Button to select parameter

7.2.2 Basic adjustments

Display permanently shows present temperature;

to see other parameters press button ▼ and ▲.

To select other parameters that wish to adjust use button ***P***.

Given temperature can be set in the range between 10 °C ÷ 80 °C, using steps of 1 °C

Given power can be set in three grades depending on device nominal power (see table). Turn on/turn off the heater is dome periodically with time span of ~3sec in order to avoid shocks to electric net.

Table 6: Power and adjusting steps

Boiler power	Steps (kW)
6 kW	2+2+2
9kW	3+3+3
12kW	4+4+4
18kW	6+6+6
24kW	8+8+8
27kW	9+9+9

- For normal work of this device it is necessary to set working pressure in range between 0.7-2.1 bar (recommendation is 1.0 bar) during filling and maintenance.
- When working pressure is lower than 0.7 bar LED diode will signal warning (see chapter 7.3.3 pressure warnings), and if working pressure continues to decrease and fall below 0.4 bar the boiler will turn off indicating mistakes on display.
- When working pressure is higher than 2.1 bar LED diode will signal warning (see chapter 7.3.3 pressure warnings), and if it increases over 2.6 bar the boiler will turn off.

WARNING!: If working pressure continues to grow up to 3 bar mechanical safety valve will start to leak heating water out of the boiler.

7.3 Regulation of heating

- Circulating pump and electrical heaters turn on by command of room thermostat.
- When boiler reaches set temperature of water in the system, heaters turn off (with intervals of 3 sec to eliminate shock to electric power net), and pump continues to work until room thermometer turns off. Heaters will again turn on when water temperature fails 2°C below set temperature – if room thermostat requires so. Microprocessor thermo-regulator measures time of work for each heater, changes heaters (if there is inactive heater available) after 30 min of continual work. Such working mode provides equal load of all heaters and relays, and their life-time is significantly longer.

If relay of pump does not turn on for any reason, heaters will not too.

- When room temperature is reached, microprocessor turns off heaters and pump, but after 2 min after heaters turn off – during that time LED diode indicating work of pump will flash meaning that countdown 2 minutes is in progress after which time the pump will turn off.

7.3.1 Boiler set temperature adjusting

- Using buttons ▼ or ▲ select mod to display set temperature
- LED diode starts to flash behind the sign: Set temp. Press button ***P*** –*Set temp.* LED diode starts to flash meaning it is possible to increase/decrease given temperature of the boiler using button ▼ or ▲. Each touch to the button will increase/decrease given temperature of the boiler for 1 °C. Working temperature range is 10 °C ÷ 80 °C.

Confirmation of change must be done by pressing button ***P.*** If change is not confirmed, 15 sec after pressing any button (except ***P),*** controller continues to work on old value of set temperature and exits adjusting mode.

When change is confirmed pressing button ***P***, display keeps the new value of temperature for 15 sec, and then returns back to basic representation, or the present temperature will appear on display.

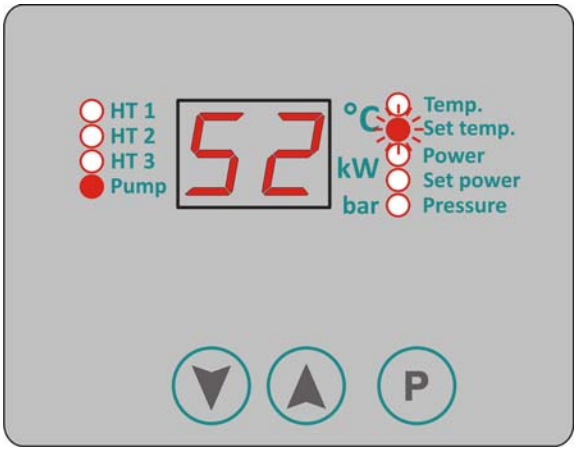

Figure 16: Given boiler temperature adjusting

7.3.2 Boiler given power adjusting

- Using button ▼ or ▲ select mode for adjusting given power – *Set power* LED diode starts to flash. Now press button ***P*** – Set power LED diode starts to flash meaning that it is possible to increase/decrease given power of the boiler using button ▼ or ▲. Each touch to the button will increase/decrease given power of the boiler for 1 step of power (see table 6).

Confirmation of change must be done by pressing button ***P.*** If change is not confirmed, 15 sec after pressing any button (except ***P),*** controller continues to work on old value of set power and exits adjusting mode.

When change is confirmed pressing button ***P***, display keeps the new value of power for 15 sec, and then returns back to basic representation, or the present temperature will appear on display.

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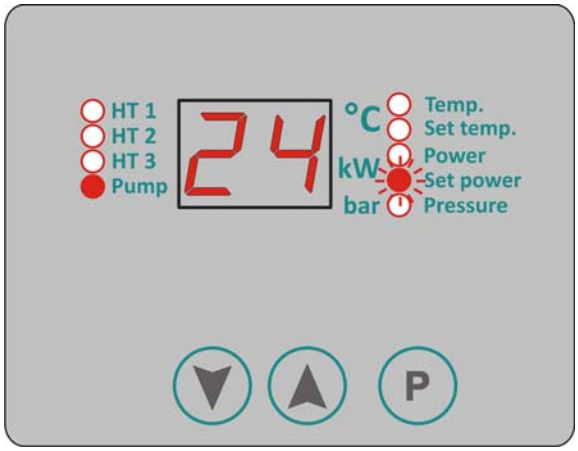


Figure 17: Given boiler power adjustment

7.3.3 Warnings about pressure

If the pressure in the system decreases to P≤0.6 bar, the boiler works normally, but diode indicating pressure measurements starts to flash slowly (Figure 18). It is necessary to re-fill installations up to P≤0.7 bar in order to a stop automatic flashing.
If pressure increases up to P≤2.2 bar, boiler work normally but pressure measurements indicator starts to flash slowly (Figure 18). It is necessary to reduce the pressure to P≤2.1 bar in order to stop automatic flashing.

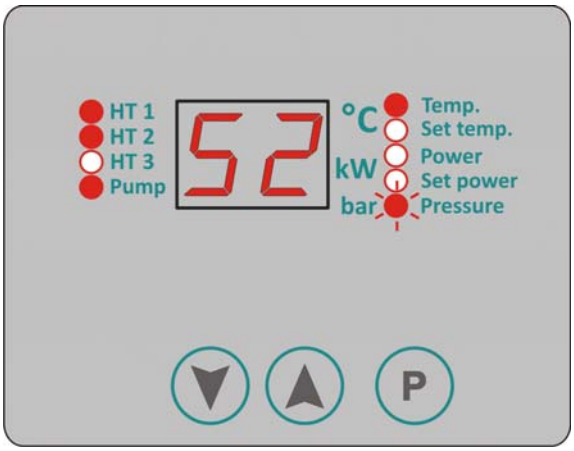


Figure 18: Warning- pressure close to disabled value

If the pressure in system decreases on P≤0.3 bar, the boiler turns off all heaters and pump (delayed for 2 min), and pressure measuring indicator starts to flash quickly (Figure 19). It is necessary to re-fill installation up to P≤0.7 bar in order to stop automatic flashing indicating this mistake and to continue normal work of the boiler.

If the pressure in system increases on P≤2.6 bar, the boiler turns off all heaters and pump (delayed for 2 min), and pressure measuring indicator starts to flash quickly. Display still shows present temperature of the boiler (Figure 19). It is necessary to reduce pressure to P≤2.1 bar in order to stop automatic flashing indicating warning and to continue normal work of the boiler according to the set values of parameters.

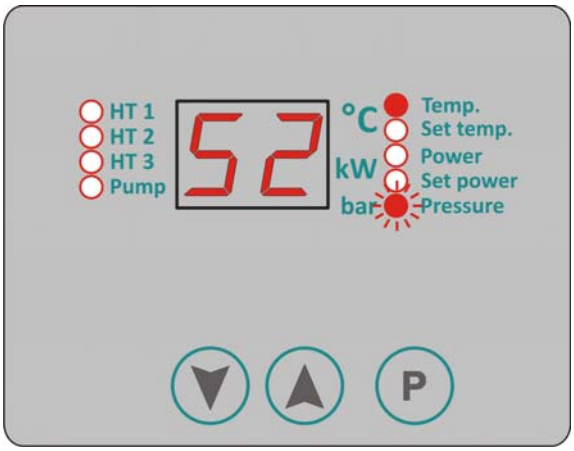


Figure 19: Mistake – Exceeding enabled pressure value

Pressure measurements are done by digital sensor integrated in circular pump. If the sensor is stopped or in circuit break, then all heaters and pump will turn off (delayed for 2 min), and pressure measurements indicator starts to flash quickly. Display still has present temperature of the boiler (Figure 19).

When select pressure using button ▼ or ▲, instead its value the display will show the code for mistake: **EP** (Error Pressure), as illustrated in the Figure 20.

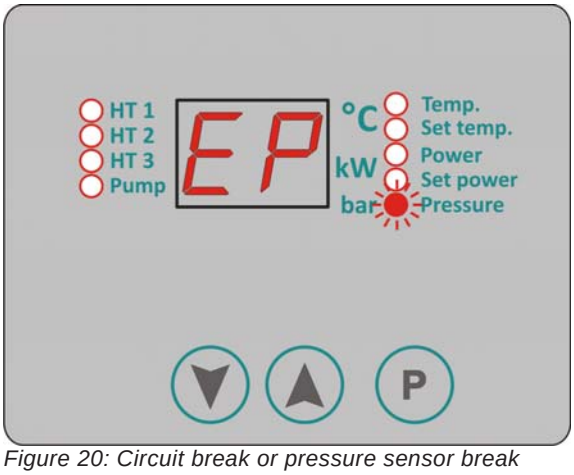


Figure 20: Circuit break or pressure sensor break

In this case it is necessary to put off power supply and call authorised service to establish and remove the cause of the problem.

7.3.4 Low temperature warning

If temperature of the system decreases to T≤4°C, the boiler continues to work normally, but measuring temperature indicator starts to flash slowly (Figure 21). It is necessary to increase temperature to T≤5°C in order to stop automatic flashing of warning indicator.

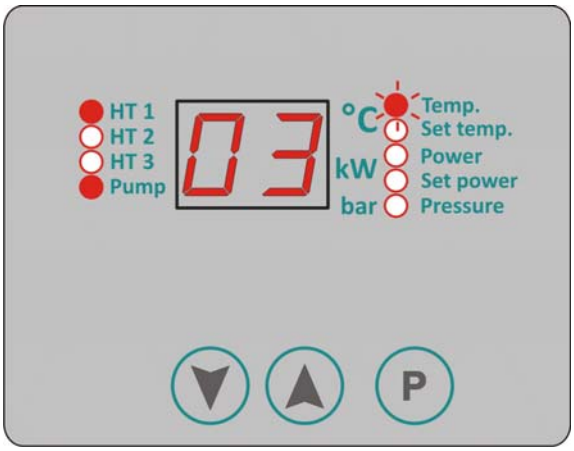


Figure21: Warning- Temperature near restricted low temperature

If temperature of the system decreases to T≤2°C, all heaters and pump will turn off (delays for 2 min), and temperature measuring indicator will flash quickly (Figure 22). With this temperature value there is danger of freezing and boiler damage, so the work of this device will be blocked. To continue with boiler work it is necessary to increase temperature up to T≤5°C.

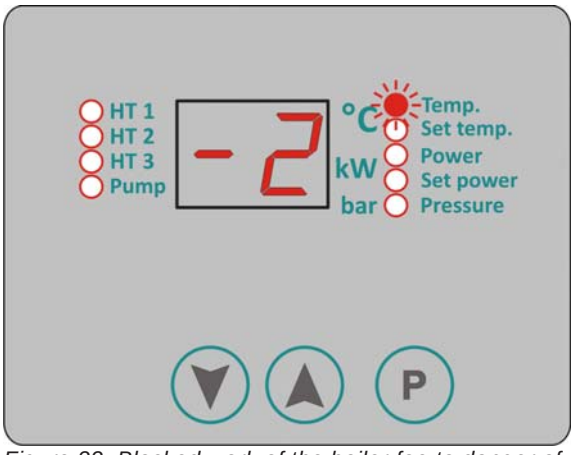


Figure 22: Blocked work of the boiler foe to danger of freezing

Warning for freezing!
If heating system is out of function the freezing can occur;
It is mandatory to secure the system
Empty the entire installation

Present temperature displayed on the screen is possible for values T≤-9°C. Temperature below -9°C is not possible to be displayed on the screen so the code EL will appear on display meaning the temperature is below -9°C, or temperature sensor is in circuit break (Figure 23).

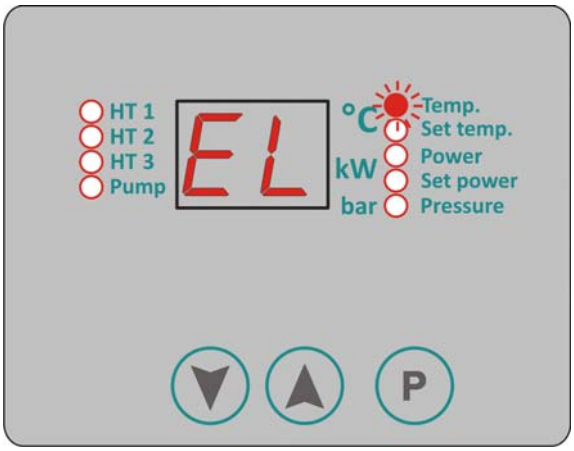


Figure 23: Temperature below -9 °C or sensor circuit break

WARNING: Material damage due to freezing!

7.3.5 Warning with high temperature

If temperature of the system increases to T≥85°C, the pump works continually (due to taking heating energy through pipe routing network), but measuring temperature indicator starts to flash slowly (Figure 24). It is necessary to decrease temperature to T≤84°C in order to stop automatic flashing of warning indicator and continue with normal work of boiler.
.

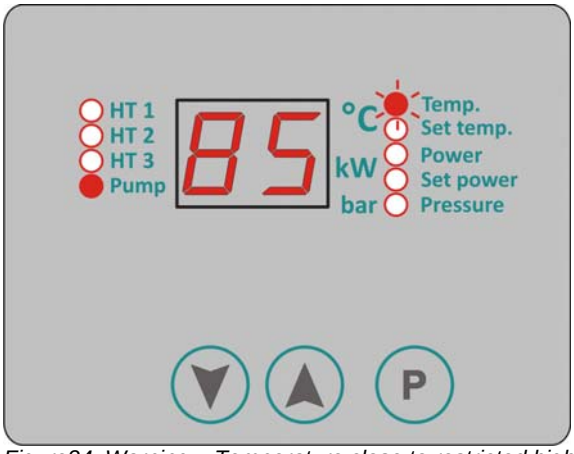


Figure24: Warning – Temperature close to restricted high temperature value

If temperature of the system increases to T≥89°C, the pump works continually (due to taking heating energy through pipe routing network), but measuring temperature indicator starts to flash quickly (Figure 25). It is necessary to decrease temperature to T≤88°C in order to stop automatic flashing of this mistake warning indicator.

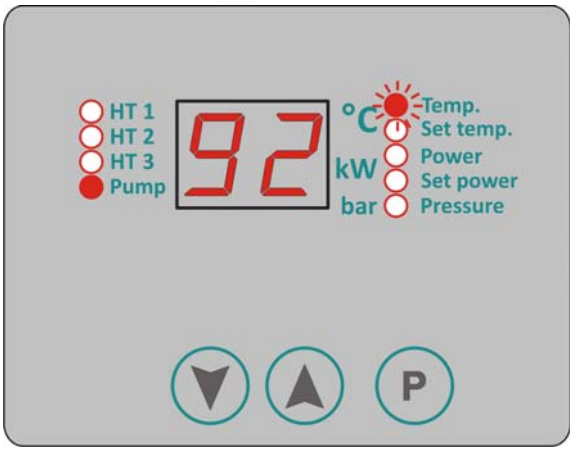


Figure 25: Blocked work of the heaters due to danger of thermic overload, pump work continually

If temperature increases to T≥100 °C, display of its value is not possible to see on the screen so in this will appear code EH meaning that temperature is T≥100 °C (Figure 26). Measuring temperature indicator will continue to flash quickly.

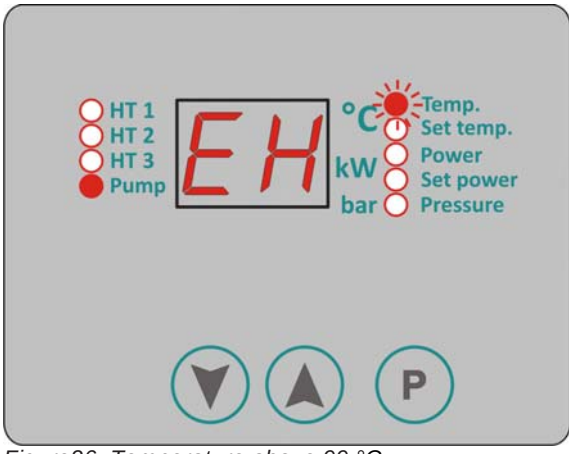


Figure26: Temperature above 99 °C

WARNING: Material damage due to overheating!

In this case it is necessary to turn off this device out of electric power supply and call authorised service to establish and remove the cause of problem.

If temperature sensor brake occurs, the code ES will appear on the screen meaning that temperature sensor is in break (Figure 27). Temperature measuring indicator will continue to flash quickly.

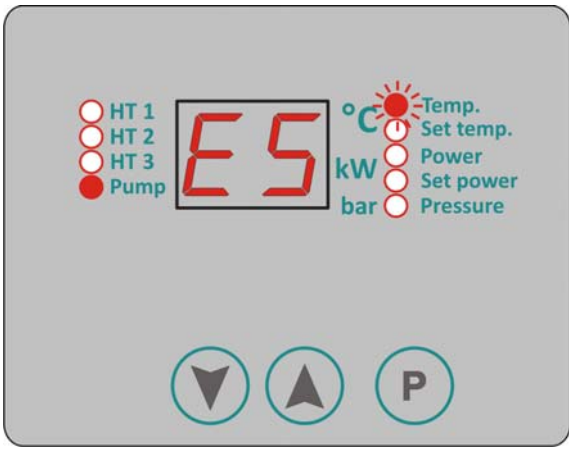


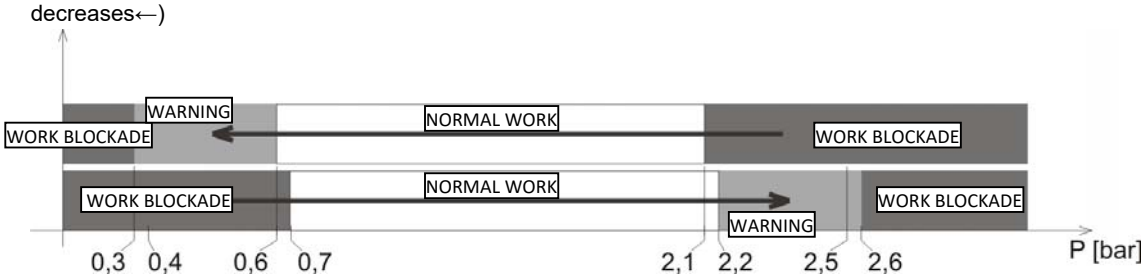
Figure 27: Temperature sensor in discontinuity

7.3.6 Signal and code of warning and mistakes

☼ **Pressure -** slow flashing - Warning: Pressure near lower limit (0,4bar ≤ P ≤ 0,6bar)
Or upper limit (2,2bar ≤ P ≤ 2,6bar) of allowed pressure
Measure: Bring the system to the necessary pressure value

☼ **Pressure -** quick flashing - Mistake: Exceeding lower limit (0,3bar ≤ P)
Or upper limit (P ≥ 2,6bar) of allowed pressure
Measure: Bring the system to the necessary pressure value

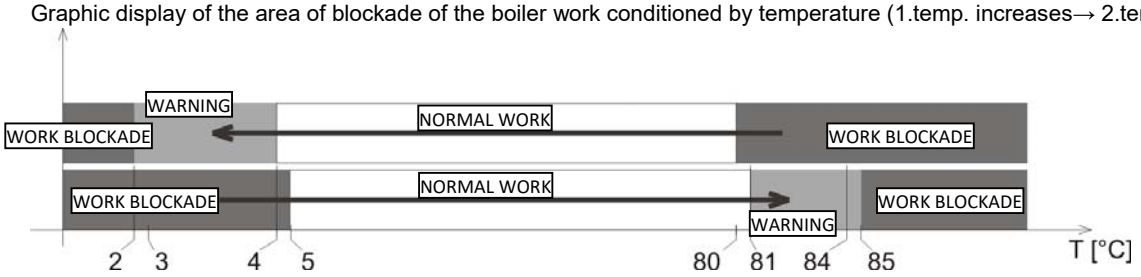
Graphic display of the area of blockade of the boiler work conditioned by the pressure (1.pressure increases→ 2.pressure decreases←)



☼ **Temperature –** slow flashing - Warning: lower limit exceeding (T≤4 °C) or upper limit
(T≥85 °C) of temperature of the heating system
Measure: Check if valves are open, the functionality of circulation pump
And relay/contactor;

☼ **Temperature –** quick flashing - Mistake: lower limit exceeding (T≤2 °C) or upper limit
(T≥89 °C) of temperature of the heating system
Measure: Turn off electric power supply for the boiler. Call service.

Graphic display of the area of blockade of the boiler work conditioned by temperature (1.temp. increases→ 2.temp. decreases←)



Mistake signals on display

EP - Mistake: Pressure sensor in break or circuit break – all turned off
Measure: Turn off power supply. Call service.

EL - Mistake: Very low boiler temperature or temperature sensor circuit break – all turned off
Measure: Turn off power supply. Call service.

EH - Mistake: Very high temperature (T≥100 °C) not able to display – all turned off
Measure: Turn off power supply. Call service.

ES - Mistake: Boiler temperature sensor breaker – all turned off
Measure: Turn off power supply. Call service.

7.3.7 Room temperature regulator

This device is not produced for work without room temperature regulator. It must be installed in reference room. Managing temperature of all rooms is done by this remote control. Radiators in reference room should not be equipped by thermo-static valves or these must always be open. All radiators in other rooms must be equipped by thermostat valves. Connecting room-regulator is described in chapter 5.4. When mounting room-regulator in reference room you must comply with manufacturer instructions.

7.3.8 Heating discontinuity

With short-time discontinuity of heating working regime the boiler temperature must be decreased using thermo-regulator of the boiler. To prevent heating installations freezing temperature of the boiler must not be set below 5°C. With longer discontinuity of heating working regime of the boiler must be cut off the power (⌀ chapter 7.4)

7.4 Boiler out of power

If heating installation is not in drive, it could freeze with low temperatures.

④ Protect heating installations against freezing
④ If there is danger of freezing and boiler is not in drive, Discharge entire installation
④ Main power breaker on lower plate put in position ***0*** (put off)

When put off for longer period, the heating pump can be blocked. To remove blockade should act as with air vent procedure. (⌀ chapter 4.6.2)

---

8 Cleaning and maintenance

DANGER:
Life threat of electric power shock!

④ Electric power work must be done only By qualified person

④ Before opening device: turn heating installation off electric power supply using safety switcher and disconnect it from power supply net through corresponding fuse.

④ Secure heating installation against accidental turn on

④ Comply with instructions for installation

WARNING: material damage due to unprofessional maintenance!

Insufficient or unprofessional maintenance of boiler Can lead to damage or destruction and to loss of Warranty rights

④ Secure regular, entire and professional maintenance of heating installation

④ Electric parts and work units protect against water and humidity

Use only spare parts delivered by the manufacturer or those approved by manufacturer. There will be no responsibility for damage occurred due to spare parts not delivered by the manufacturer.

Control examination log is provided on page 30.

④ Perform works in accordance with log on control and maintenance

④ All deficiencies remove immediately

8.1 Boiler cleaning

- Clean this device externally with wet cloth.

8.2 Check working pressure; re-fill water and air-vent installation

DANGER: Health threat due to mix of drinking water!

④ It is demanding to respect state regulations to avoid mix of drinking water (with water from heating installations)

④ Comply with EN 1717

Set working pressure of at least 1 bar depending on height of installations

Volume of new filled water is reduced during first days after filling due to heating. This produces air pillows making obstructions to heating system.

Testing working pressure

 Working pressure of new heating installation should control on daily basis at the beginning of its work. If needed, re-fill water and air vent the system.

later check working pressure once per month. If needed, re-fill water and air vent the system

Check working pressure. If it decreases below 1 bar re-fill water

 Re-fill the water

 Air vent the heating installation

 Check working pressure again

8.3 Re-fill the water and air-vent the installation

WARNING: Material damage due to heat tension. Filling heating installations in warm condition can produce cracks due to tension

④ Fill heating installation only in cold condition (temperature of starting duct lines of max 40 °C)

WARNING: Material damage due to frequent re-filling!

Due to frequent water re-filling installations can be damaged by corrosion and carbonate layers depending on water characteristics

④ Test sealing and watertight of heating installations and expansion dish on functionality

- Connect hose on water faucet
- Fill the hose with water and connect to connector for filling/draining
- Tighten the hose and open the water faucet for filling/draining
- Slowly fill the heating installation while following up with pressure (manometer)
- During filling procedure air vents the system
- When reach working pressure close the drainage faucet
- When working pressure is decreased by air vent re-fill the water
- Remove the hose from filling/drainage faucet

8.4 Inspection and maintenance log

Perform maintenance on annual basis or when inspection indicates installation condition requesting maintenance.

Record on commissioning, inspection and maintenance serves as addendum for photocopy.

④ Executed works should be authorised by signature and date.

Inspection and maintenance works when needed		Page	Date: _____	Date: _____	Date: _____
1.	Check condition of installations		☐	☐	☐
2.	Visual and functional control		☐	☐	☐
4.	Making working pressure				
	• Check pre-pressure of expansion dish • Working pressure set on • Heating installation air vent • Check safety heating valve				
5.	Clean water filter		☐	☐	☐
6.	Check if there is any damage on electric duct lines		☐	☐	☐
7.	Check if electric control connections and used elements are fitted; tighten it if needed		☐	☐	☐
8.	Check thermo-regulator on boiler		☐	☐	☐
9.	Check function of safety parts		☐	☐	☐
10.	Check remote control function		☐	☐	☐
11.	Check insulation of the rod heater		☐	☐	☐
12.	Check function of grounding device				
13.	Check insolation of electric switchboard		☐	☐	☐
14.	Check heating pump function		☐	☐	☐
15.	Make final control of inspection works and document results of measuring and inspecting		☐	☐	☐
16.	Certification of professionally conducted inspection		Seal/Signature	Seal/Signature	Seal/Signature

Table 7: Inspection and maintenance log

9 Environment protection / Waste disposal

One of the basic concepts of business is environment protection. Quality of products, thriftiness and environment protection are equally valuable goals for us.

It is critical to strictly comply with law and regulations on environment protection. In order to protect environment and respecting economy concepts we use only the best technique and materials.

Packaging

Regarding packaging, we respect system of recycling which is specific in certain states and which secure optimal recycling
All materials applied for packaging do not harm environment and It is possible to recycle it.

Old devices

Old devices contain valuable materials that can recycle. Structures are easily demountable and plastic materials are labeled. In such manner structures can be sorted and deliver for recycling.

10 Troubles and troubleshooting

Troubleshooting on regulations and hydraulics must be done by an authorised firm.

For repairs use only original spare parts.

Trouble:	Description:	Cause:	Measure:
Boiler does not react after turn on of main switcher	Display does not react, other components do not work	- Boiler is out of power supply - Fuses on bottom plate are off - Vanishing of managing phase - Damage of main fuse ON/ OFF	- Provide power supply - Turn on fuses - Check if fuses have three phases on output - Change damaged part
Boiler does not heat or insufficiently heat/heating pump works	All on display are within recommended values but boiler does not make hot water	- Lack of 1 or 2 phases - Small power of boiler - Some relay damaged - Some heater damaged	- Check all three phases - Check set power of boiler - Change damaged part - Change damaged part
Boiler heats but it is very noisy	Higher level of noise during work	- Air in the system - Small water flow - Possible carbonate layer on heater	- Check if the system is air vented and vent it - Check valves below boiler and open it - Clean filter below boiler - Take out heaters and clean it (this is not included in claims during warranty period)
Boiler turns on quickly	Reaches temperature too quickly and turns on	- Valves below the boiler off - Pump fuse stop to work - Pump jammed - Pump inaccurate	- Open valves - Change inaccurate part - Start pump rotor - Change inaccurate part
Great oscillations of working pressure	Too fast and too big changes of working pressure	- One valve off - Expansion dish pressure inadequate - Inaccurate dish	- Open the valve - Check pressure in expansion dish and if needed set dish pressure adequately - Change inaccurate part

Table 8: Troubles and troubleshooting

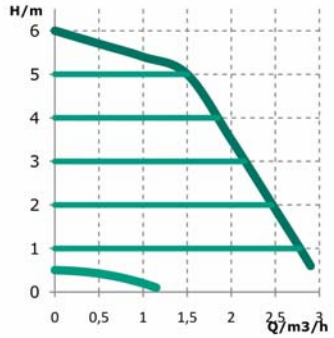
11. Instruction for design

11.1 Pump Wilo Yonos Para MSL 12/6 RKA

This device has built in circulation pump produced by German manufacturer Wilo in compliance with ErP Directive with following main characteristics:
- Energy Efficiency Index (EEI) ≤ 0.20
- Max. Delivery Head = 6m
- Max. Volume Flow = 2,5m³/h

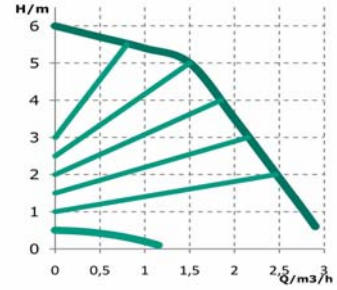
Figure 28: Circulation pump Wilo Yonos Para

Work regime of the pump ΔP – Const
Recommended for systems of floor heating and old installations with large diameter pipes



Δp-c

Work regime of the pump ΔP – Variable
Recommended for radiator systems
With thermostat regulation valves



Δp-v

Characteristics of the pump WILO Yonos PARA

	n l / m	P1 W	I A	Motor protection
MSL12/6 RKA	800÷4300	3÷45	0,03÷0,44	Integrated

11.2 Systems on which the El-Cm Classic Plus Boiler can be connected

- All systems for heating the space designed for 80/60 temperature regime (or lower)
- Closed heating systems
- Systems with boiler on solid fuel

WARNING! When connecting boiler to such system it is mandatory to take care that both pumps in the system push water in the same direction to prevent flow crash. Increased hydraulic tensions are possible including cracking of some components.

- It can be used as heating device for water in accumulating boilers over exchanger

- It can also be used in certain technological processes providing that there is no need for water temperature higher than 60°C.

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