

LEB TS

WALL MOUNTED ELECTRIC BOILER



Rev. 02 - 06/2019

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Dear Customer,

Thank you for choosing the wall-mounted electric boiler (heating unit) intended to be used in the heating system and designed to provide comfort.

The **LEB - TS** electric heating unit is manufactured with state-of-the-art technology to guarantee reliability and satisfy your needs. Please follow the installation and maintenance basic requirements. So, please read carefully this manual before using the unit and follow its instructions.

We hope that the **LEB - TS** electric heating unit will create an environment in which you will enjoy thermal comfort.

Please observe the following warnings and recommendations:

1. Install and maintain the heating unit and its auxiliary devices according to the indications that correspond to this model, following all regulations and standards in force and the supplier's technical specifications.
2. Mount the heating unit in the specified conditions in order to make sure that all the protection and operating devices work well for their intended purpose.
3. Make sure that the heating unit is commissioned by the supplier or by the supplier's authorized personnel.
4. For the heating unit commissioning as well as in the event of failures, please contact the specialized personnel as indicated by the supplier. Any intervention by unauthorized personnel may lead to the heating unit breakdown (and possible failures of the auxiliary devices).
5. Check the accessories integrity.
6. Check the delivered models to make sure that they are what you ordered.
7. In case you have any doubts as to the safe operation of the heating unit, please read carefully this manual and follow its instructions.
8. Please do not remove or destroy the stickers and the identification plates attached to the heating unit.
9. The heating unit complies with the following standards: EN 60335-1:2012+AC:2014+A11:2014.
10. At the end of the service life, please recycle the heating unit and its accessories in compliance with the legislation in force.

1 USER INSTRUCTIONS

1.1 Introduction

In order to follow the development trends in the field, **FERROLI** decided to launch the **LEB - TS** series direct heating electric units with capacities of 6kW~28kW.

This is a highly efficient heating boiler, which means that the entire operation system is designed independently of the heating system. The heating unit's use with its intended applications is easy, through the LCD screen control panel.

1.2 Safety of goods and persons

Use the heating unit in accordance with the requirements included in this manual and in the manual's annexes. It is very important to ensure the proper operation of the heating unit, avoiding unauthorized access of children, of persons under the influence of drugs and alcohol, of all persons without discernment etc.

The supplier provides the products in compliance with the corresponding regulations and standards, as well as the products from the series as per the ISO 9001 quality management system.

After you gained access to the contractual party's network, to which you agreed, make sure you remain informed with regard to the products improvements (for instance, those concerning mounting, commissioning, and when you use the heating unit, those concerning the unit's adjustment and control, with a view to local conditions, during and after the guarantee period).

IMPORTANT SAFETY INSTRUCTIONS

READ CAREFULLY AND STORE FOR FUTURE USE.

- This appliance may be used by children 8 years of age and older and by persons with physical or mental impairments or by inexperienced persons, if they are properly supervised or have been informed about how to use this product in a safe manner and understand the potential dangers. Cleaning and maintenance performed by the user must not be performed by unsupervised children.
- Children from 3 to 8 years of age may only turn this appliance on and off under the condition that it is located or installed in its intended normal operating position and that they are under supervision or were informed about the safe operation of the appliance and understand the potential hazards. Children from 3 to 8 years of age must not insert the plug into the power socket or clean the appliance or carry out maintenance performed by the user.
- Children younger than 3 years of age should be prevented from accessing the appliance unless they are under constant supervision.
- Children must not play with the appliance.

1.3 Control panel

Display

LCD screen

The control panel has 8 keys, 1 screen and 2 buttons.

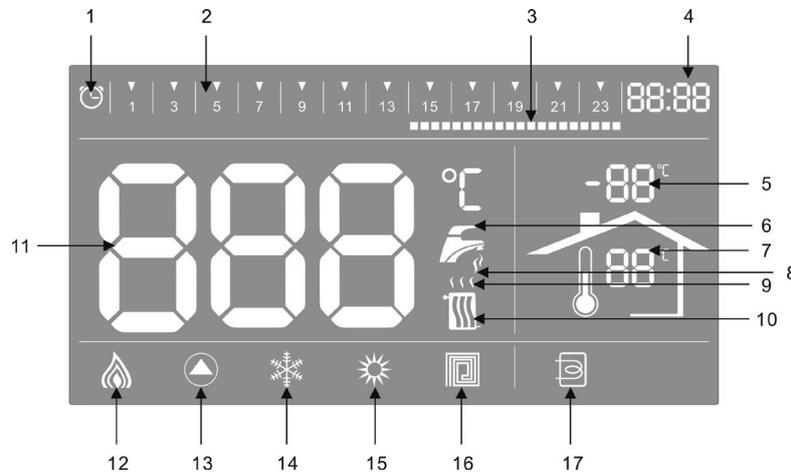


fig. 1 -

S/N	Description
1	Indicator for heating programming in winter mode.
2	Indicator for the program's intervals. Divide a day (24 hours) in 48 time intervals, and the indicator will be started simultaneously with the chronometer function indicator.
3	Time intervals for the heating programming. By setting a time interval, it is possible to start and stop some indicators for the respective individual time interval. If the indicators start, there is a heating request. Otherwise, no heating request for the respective interval is recorded.
4	Current time indicator.
5	Outside temperature indicator. After installing the probe for outside temperature and performing the configuration in the main panel, the indicator displays the probe's temperature readings of the outside temperature.
6	Domestic hot water (DHW) indicator. It is permanently displayed in DHW tank configuration, summer or winter, and blinks while setting a DHW target temperature.
7	Inside temperature indicator. When the OT thermostat is connected, it displays the OT thermostat's readings to render the room's temperature; the thermostat could also render the temperature detected in the room temperature probe mounted in the system.
8	Domestic hot water (DHW) operating indicator. It blinks when the heating unit operates in the DHW mode or when the target temperature for domestic hot water is set.
9	Heating functioning indicator. It blinks during heating or when the adjusted heating temperature is set.
10	Heating indicator. Displayed in "winter" mode.
11	Display of the menu, faults and temperature. When the target heating temperature is set, it blinks to indicate the target heating temperature, and when the water target temperature is set, it blinks to indicate the target temperature of the domestic hot water. In the status without settings and without faults, it indicates the current temperature of the domestic hot water in the summer mode, or in the domestic hot water modes during the winter. In the winter mode, it indicates the current temperature of the domestic hot water (DHW), and during the heating of the DHW tank, it indicates the temperature inside the tank.
12	Power indicator. It shows the current thermal power, totalizing 3 exchanges.
13	Circulating pump operation indicator. It is started when the pump operates.
14	Winter mode indicator. It is started when the boiler is set in the winter mode.
15	Summer mode indicator. It is started when the boiler is set in the summer mode.
16	Floor heating indicator. It is started when the floor heating mode is selected. Usually it is off.
17	Domestic hot water (DHW) tank connection indicator. It is on when the system uses a DHW tank.

1.4 Keys functions

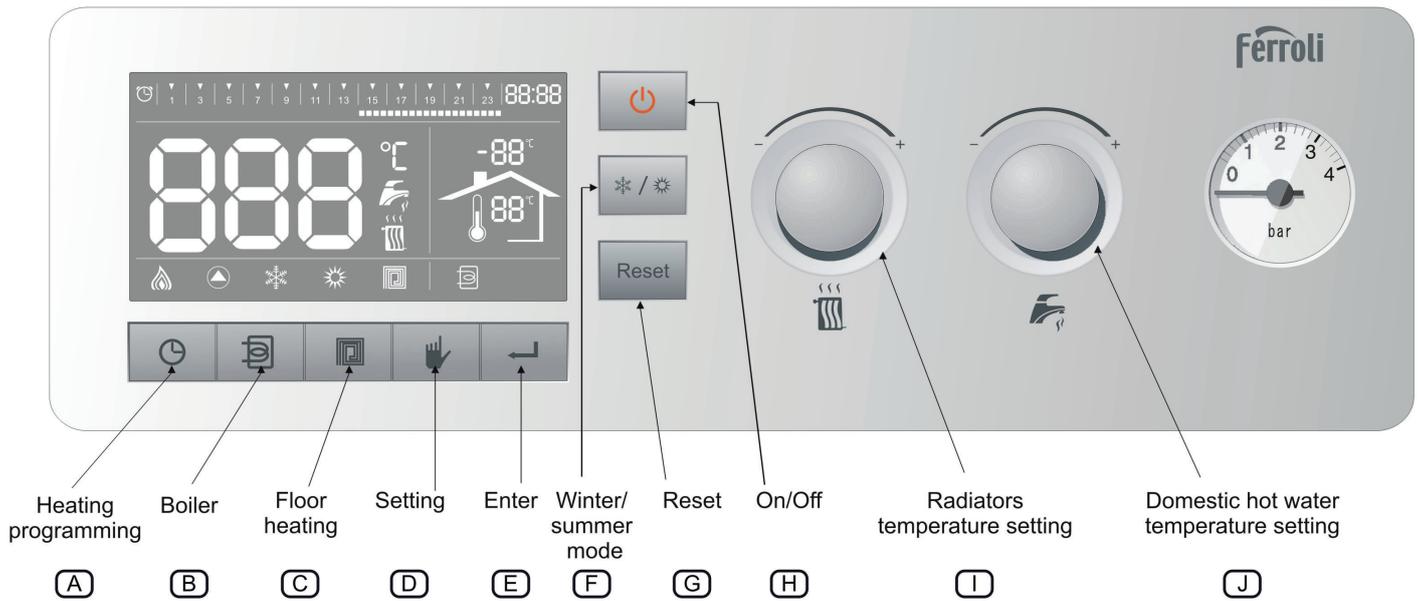


fig. 2 -

- A: Key for the activation of the heating program:**
Press the key to activate/deactivate the heating program. Keep the key pressed for 3 seconds to activate the setting of hour and heating intervals. In the summer mode, the key has no function.
- B: Domestic hot water (DHW) tank key:**
To connect the DHW tank to the electric heating unit, press the DHW key to activate or deactivate the DHW tank mode.
- C: Floor heating key:**
Press the floor heating key to switch between radiator and floor heating when the electric heating unit is in the heating mode. When the floor heating mode is activated, you can set a temperature of up to 60°C for the heating water (allowed variation interval is 30-60°C). After heating, the temperature value may vary by 8°C. When the floor heating mode is deactivated, you can set a temperature of up to 80°C for the hot water (allowed variation interval is 30-80°C).
- D: Set key:**
The key functions in the setting menu. For more details, please see the next chapter.
- E: OK key:**
Shortly press the key to immediately exit the setting menu, if you are in the setting menu, and save the most recently performed changes.
- F: Key to select the winter and the summer modes:**
Press the key to select the winter and the summer modes, to switch between the electric heating unit's winter and summer modes.
- G: Reset key:**
Shortly press the key to erase the fault status. In the case of faultless status and setting status, shortly press the key to exit the setting status. Keep the key pressed for 10 seconds to activate the setting menu.
- H: On/Off key:**
Press the On/Off key to activate the switch between the electric heating unit's start and stop. In the status without settings and faults, press the key once to go to the Off mode and end all requests, and the LCD screen will show the message "Stopped". Only the water pump's anti-blocking device and the anti-blocking device of the anti-freeze protection will continue to function. While in the "Stopped" mode, for the protection against frost of the electric heating unit or of the domestic hot water (DHW) tank, the LCD screen will show the message "FD", indicating the fact that the anti-freeze protection device is in operation. To return to the standby mode, press again the On/Off key.
- I: Heating button:**
The button can be freely turned and can be used to set the temperature of the heating water and of other parameters. In the status without settings and faults, turn the button to change the heating water target temperature. At that moment, the indicator for heating and the indicator for heating functioning could blink. To exit the setting status, press the reset key.
- J: Domestic hot water button:**
The button can be turned freely and can be used to set the domestic hot water temperature and other parameters. In the status without settings and faults, turn the button to change the domestic hot water target temperature. At that moment, the heating indicator and the heating functioning indicator flash intermittently. To exit the setting status, press the reset key.

1.5 Faults remedy

The heating unit operates improperly when the following fault codes are displayed intermittently on the LCD screen. “A” means faults resulted from blockages and requires manual intervention; “F” represents automatically remedied faults. The fault codes disappear automatically after the remedy of the faults.

Fault Code	Fault description	Type
A01	Electric leakages	Blockage
A03	Temperature limiter (decoupled mechanic temperature limiter)	Blockage
A06	Temperature in the heating unit above 90°C	Blockage
A08	Heating sensor or domestic hot water sensor disconnected from the flow pipe (normally, after a 5-minute heating order, the temperature increases on the flow pipe sensor and on the domestic hot water sensor do not exceed 3°C. No temperatures above 40°C are detected).	Blockage
F10	Faulted heating temperature sensor (faulted NTC sensor, short circuited cables, unconnected cables, or interrupted cables).	Reset after fault remedy
F13	Outdoor temperature sensor faulted (faulted NTC sensor, short circuited cables, unconnected cables, or interrupted cables).	Reset after fault remedy
F14	Faulty temperature sensor for the water inside the domestic hot water (DHW) tank (faulted NTC sensor, short-circuited cables, unconnected cables, or interrupted cables).	Reset after fault remedy
F37	The water pressure inside the installation is not correct (pressure too low, water pressure switch not connected or defective)	Reset after fault remedy
F41	System out of operation (in case of a temperature gradient higher than the reference value). Make sure that there is circulation in the heat exchanger; check the open position of the valves, check the circulating pump operation). In such a case, the fault can be automatically remedied after the temperature gradient become $\leq 5^{\circ}\text{C}$.	Reset after fault remedy

1.6 Functions

A: Hour and heating program intervals setting:

During normal operation, keep the heating activation program key pressed for 3 seconds in order to activate the hour setting, starting with the setting of the hour. Turn the heating button to change the parameters. Shortly press the set key once to store the hour setting data and continue with the minutes setting. Turn the heating button to change the parameters. Shortly press the set key once to store the minutes setting data. If the heating unit is in the summer mode, you can activate the setting of the heating program intervals. Turn the heating button through the points of the heating program intervals. Shortly press once the set key to activate/deactivate the selected point of the heating program interval. After finishing the setting, press the OK key to exit and store the performed changes. If you do not want to store the performed changes, shortly press the reset key to exit the menu.

B: Domestic hot water (DHW) tank key use:

The DHW tank key can be used if the tank is connected (P05 from the menu is set in the Stopped mode). If the DHW tank is not allocated for other purposes, the key has no function.

C: Temperature setting and control:

1. Heating temperature set interval: 30-80°C The temperature drop that lets the boiler restart after shut off when the supply became higher than the set point: 5-20°C
2. Temperature set interval inside the DHW tank 30- 60°C. The temperature drop that lets the boiler restart after shut off when the supply became higher than the set point : 5-20°C.
3. Heating temperature to start: $T_w < T_s - \Delta T$

***Note: T_w =working temperature; T_s =set temperature; ΔT =The temperature drop that lets the boiler restart after shut off when the supply became higher than the set point.**

D: Frost protection function:

Class I frost protection: for temperatures 8°C, the water pump keeps operating until heating temperature reaches $\geq 10^{\circ}\text{C}$, and in such conditions the frost protection function becomes active and the FD message is displayed on the screen, while the anti-freeze function is active, when the unit is in the OFF mode.

Class II frost protection: for temperatures 5°C, the water pump is activated and the resistances coupled to start heating. The resistances are decoupled in the case of temperatures $\geq 30^{\circ}\text{C}$, and the pump will keep operating for a short period of time. During the unit's frost protection function activation, the screen displays the temperature, if the unit is in the OFF mode.

E: Outdoor temperature compensation

Follow the operation 1.7 and enter PO7 menu, choose a curve by the heated rotary knob. When set the curve, it shows C (C--, C01-C10) in the first digit. C-- means close the outdoor temperature compensation function. The boiler will operate automatically according to the target temperature which set by the users with the rotary knob. C01-C10 means to adjust the target water temperature by the means of curve 1 to 10.

Please refer to fig. 3 for the compensation curve.

And then follow the operation 1.7 and enter to P06 menu, adjust the offset by the domestic heated rotary knob. When set the offset, it shows O in the first digit (setting range is 030-050). 030-050 means to operate with relative offset data base on the current curve.

Compensation curve

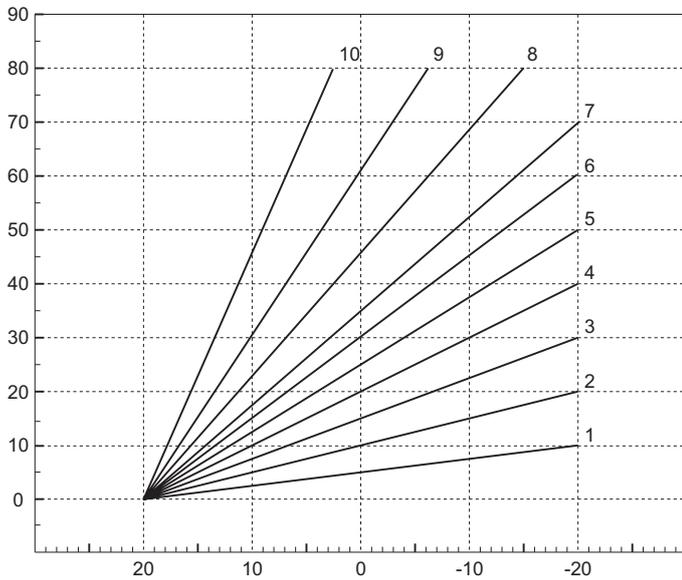


fig. 3 -

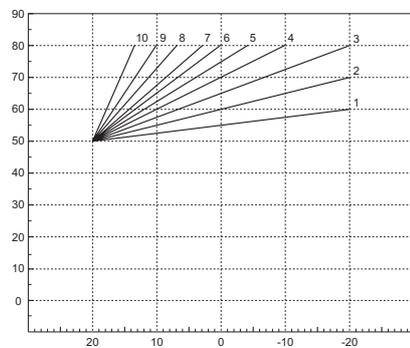
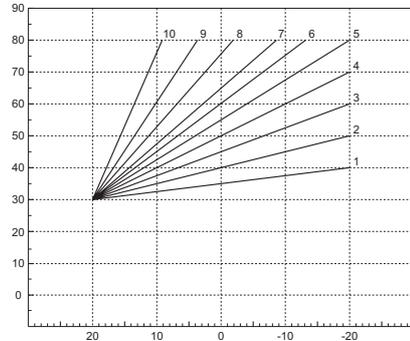


fig. 4 -

After finishing the setting, press the OK key to exit and store the performed changes. In the case in which you do not want to store the performed changes, shortly press the reset key to leave the menu.

After start the outdoor temperature compensation function, if detect there's faults on the outdoor temperature probe, it will show the fault code (F13) every 10 seconds. Under this situation, the system will not operate according to the pre-set outdoor temperature compensation curve, and the heated water target temperature will be acquiesced in 60 C. Under this situation, user can adjust the water target temperature by means of adjusting the rotary knob.

1.7 Menu

In the status without settings and faults, keep the reset key pressed for 10 seconds to access the menu.

By the heated rotary knob, can skim through the "TS", "HI" and "RE" menu.

Details explain as below:

"TS" means adjustable menu.

"HI" means recall menu.

"RE" means reset menu.

Press the set button to step into relevant menu.

"TS" means adjustable menu

CODE	Parameter specification	Adjustable range	System windows default
P01	Time set for water circulating pump	1 - 20 (min)	20 (min)
P02	The radiator heating temperature drop that lets the boiler restart after shut off when the supply became higher than the set point	5 — 20°C	15
P03	The underfloor heating temperature drop that lets the boiler restart after shut off when the supply became higher than the set point	5 — 20°C	08
P04	The tank temperature drop that lets the boiler restart after shut off when the supply became higher than the set point	s - 10°C	05
P05	Tank connect / disconnect settings	ON/ OFF	OFF

CODE	Parameter specification	Adjustable range	System windows default
P06	Compensation value of temperature for outdoor heating control	030 - 050°C	030
P07	Compensation curve of temperature for outdoor heating control	C--/C10	C--
P08	Number of heating elements	3 groups heating elements 6 groups heating elements 9 groups heating elements 12 groups heating elements	Only reading
P09	Fault detection option of A08	00: OFF 03: ON	00
P10	Comfortable mode in CH mode	ON/ OFF	OFF
P11	Air release in CH return pipe	ON/ OFF	OFF
P12	Goal temperature when water tank sterilization	55-70°C	65°c
P13	Water tank sterilization period	1-31 days	7 days

Setting method:

Choose page table by spinning the rotary knob, then enter by quickly clicking the setting button, then can spin the heated rotary knob to modify the parameter, by quickly clicking the setting button to quit back to main menu. After finish setting, push "ok" to save the settings. But if don't want to save, by quickly clicking the "reset key" twice to quit.

"HI" means recall menu.

The PCB can memory the last 10 faults: recall data H1: shows the current happened faults; recall data H10: shows the faults happened when longest time from now; By s quickly clicking the setting button to glide the fault chart, if want to show the relevant data just need to spin the domestic hot water rotary knob. If no record for the fault, it shows "no". If want get back to main menu, just need to push the "reset key", by quickly clicking the "reset key" twice to quit toservice menu. Not all errors are stored in memory; consecutive equal errors are stored as oneerror.

"RE" means reset menu.

Spin the heated rotary knob to switchover between "CLR" and "RES".

"CLR" means cancel the menu. If quickly clicking push the setting button, this operation will cancel all the fault records.

"RES" means reset menu. If quickly clicking push the setting button, this operation can recover all setting items in "tS" menu to acquiescent data.

Turn the heating button to select the desired parameter and access it by shortly pressing the set key. The parameter's value change is performed by means of the heating potentiometer. After the parameter's value is changed, press the set key to return to the main menu. After finishing the setting, press the OK key to exit and store the performed changes. In the case in which you do not want to store the performed changes, shortly press the reset key to leave the menu.

1.8 Filling of the installation

The electric heating unit is provided with a ball valve to fill the heating installation up to 1-3 bars. During operation, in case the pressure decreases in the system (because the air is removed from the system) to the minimum value of the above mentioned pressure, open the fill valve to supplement with water. Turn the fill valve anticlockwise to supplement with water and clockwise to close it. The electric heating unit operates usually at 1-3 bars. After filling, close the fill valve (A - fig. 5).

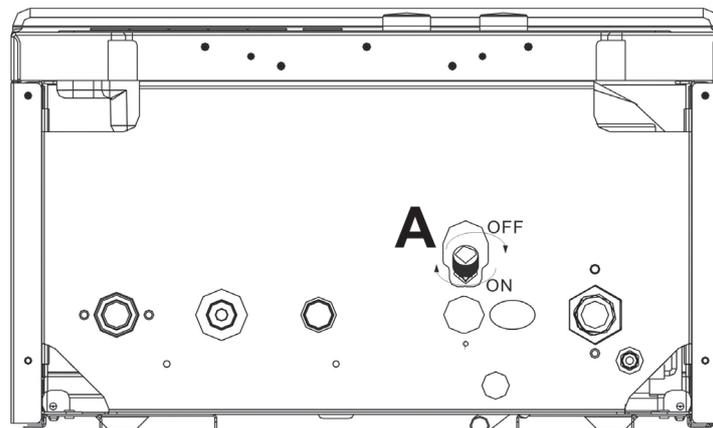


fig. 5 -

2 MOUNTING

2.1 Operating Condition and mounting location

To connect the electric heating unit to the local power supply system, please obtain the approval from the competent authority.

Users are obliged to obtain the approval for short-term use of high power devices and to pay the thermal-power related tariffs.

To use a new system of central heating or to modify the existing central heating system, it is recommended that you should use the services of specialized design personnel. Installation by authorized plumber is compulsory to obtain the supplier's guarantee. As a result, please contact our partners for the heating unit's mounting. They will offer assistance to you for the electric heating unit's use and operation.

The connection to the public power supply system and to any other electric installations is performed by specialized personnel in accordance with the rules and regulations in force.

The **LEB - TS** electric heating unit was designed to be permanently connected to the public power supply system.

Mount the **LEB - TS** electric heating unit in a position which is easily accessible for maintenance and inspection. Place the unit in relation to other objects keeping minimum distances as indicated in .

The heating unit's mounting should be performed solely by specialized and authorized technical personnel.

The guarantee certificate for the electric heating unit becomes valid after the unit's commissioning by specialized personnel.

The unit's temperature adjustments may be done by unqualified persons. Such persons may operate the control system following the instructions provided by this manual or supplied by the service company. Do not demount the electric system without permission during maintenance works.

In order to mount the electric heating unit, the water's chemical regime should be respected.

The installation will be provided with sealing and discharge valves, and the safety valve will be connected to the sewerage system.

The electric heating unit is designed for the AAS/ABS typical environment as accepted by the standards STN 330300 and STN 33 2310 (These stands only for Slovakia) (for example, the temperature interval is **+5°C** - **+40°C**, the humidity varies with the temperature, but should not exceed 85%). Do not mount the unit nor in Zones 0,1 and 2 as defined by the standard STN 332135-1 and neither in rooms with bath tubes. In bathrooms, in laundry spaces, or in rooms with showers, or in any other area in which the unit might get splashed with water. The unit's mounting in Zone 3 is permitted. Installation in zone 3 is allowed if water jets are not likely to be used there.

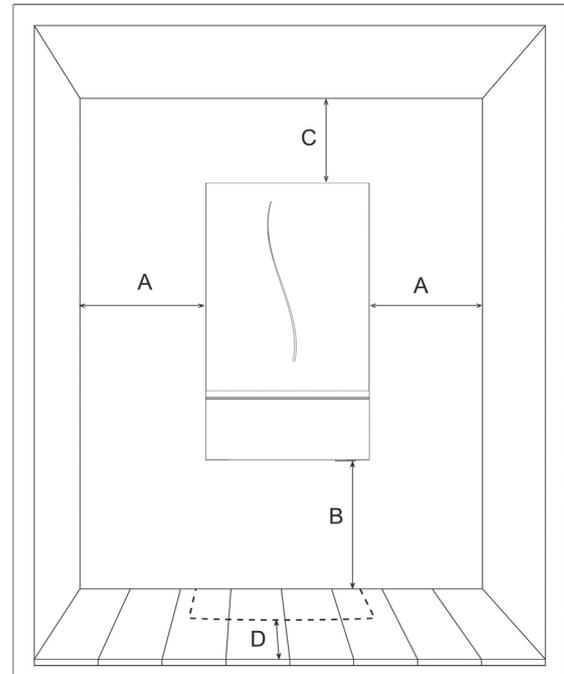


fig. 6 -

A	3 cm	15 cm
B	10 cm	30 cm
C	10 cm	20 cm
D	1.5 cm (measured from the housing with opening)	>25 cm

Protect the electric heating unit against accidental hits in accordance with the standard which specifies the allowed mounting place.

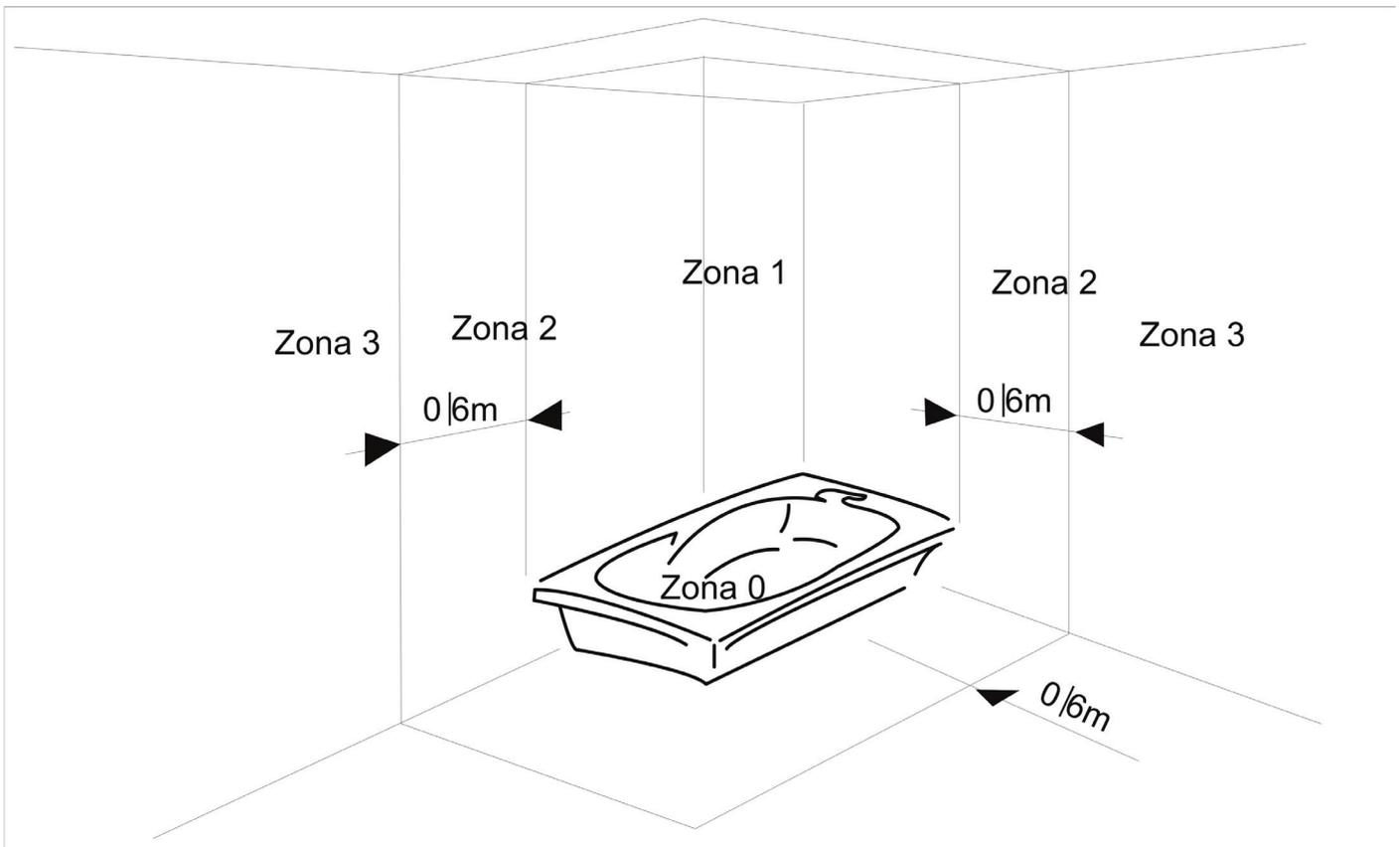


fig. 7 -

2.2 Mounting the heating unit

Fix the electric heating unit to the wall by means of fixing screws, according to fig. 8. Suspend the unit's body and its auxiliary components on tightly fixed screws. The unit's housing is fixed with screws to the posterior wall and can be disassembled. Before mounting, establish a proper place to perform repairs to the unit. In the case in which the unit is connected to an open system, provide a minimum pressure of 1 bar in the heating system.

The boiler should always be installed on a closed wall before supply power is connected!

Near the boiler an all-pole disconnection switch (with isolating distance between contacts to be not less than 3 mm in the open position) must be fitted into the power supply circuit.

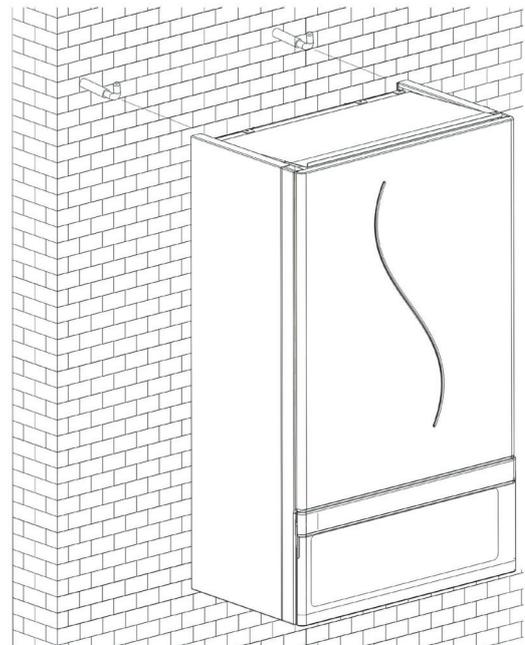


fig. 8 -

2.3 Water pipes connection

A. Water pipes mounting

Before mounting, remove all the residues and impurities from inside the water pipes so as to ensure the normal operation of the electric heating unit.

Assemble in the order indicated in Subchapter 4.1.

Connect the drain tube of the safety valve to the floor discharge tube or to the sewerage pipe to avoid water discharge on the floor in case overpressure arises in the heating system. Otherwise, the unit's supplier undertakes no responsibility for inundations produced as a result of the valve's operation.

In the case of a heating system provided with thermostat valves, the water circulation may be completely interrupted. In such a case, a by-pass will be mounted. The by-pass should have an adjustable differential or should be correlated with the circulating pump's operation stages.

B. Water quality in the hydraulic system

In the case of water with a hardness above 25°Fr, use demineralized water to avoid the formation of deposits inside the electric heating unit as a result of hard and corrosive water. It was found that even deposits with thicknesses of only a few millimetres may lead to decreased efficiency of the heat exchange, and, as a consequence, the unit's overheating thus causing serious problems. (25°Fr=14°dH)

In the case of a large system (large water content) or of a frequently fed system, water treatment is compulsory. In case partial or complete system's discharge is needed, use only properly treated water.

C. Frost protection system, heat carrier, additive and anti-frost inhibitor

The electric heating unit is provided with frost protection function. If the water temperature inside the heating system decreases below 5°C, the antifreeze mode is activated.

If the electric heating unit is no longer connected to the power supply system, the frost protection function is annulled.

If necessary, you may use a heat carrier, an additive or an anti-frost inhibitor. However, the provider of such agents should guarantee that such products do not impair the heat exchanger, the auxiliary components and the heating devices of the electric heating unit. Do not use heat carriers, additives or anti-frost inhibitors which are not indicated as compatible with the heating devices and with the electric heating unit.



Check and clean the filter and the collection device on a regular basis. Before filling the heating system with water, check the pressure inside the expansion vessel. Restore the expansion vessel's air cushion to 0.9-1 bar, if necessary.

2.4 Performance of the electric connections Electric cable connection

To connect the unit to the power supply system, the user should have obtained the approval from the area's electricity supply company and check the unit's connection characteristics which should be the same as the specifications mentioned within the connection approval. The installed electric power capacity should not exceed the value provided within the authorization. The connection to the public power supply system and to any other electric installations is performed by specialized personnel in accordance with the rules and regulations in force.

Before installing the unit, you should have a supply electric cable installed and provided with a main switch and an over-load circuit breaker, inspect the said cable and have an approval to connect the new consumer.

The electric heating units are included in the category of devices permanently connected to the power supply source. The unit's fixed supply cable should be provided with an integrated main switch. The unit is connected through proper cables to the connection strip.

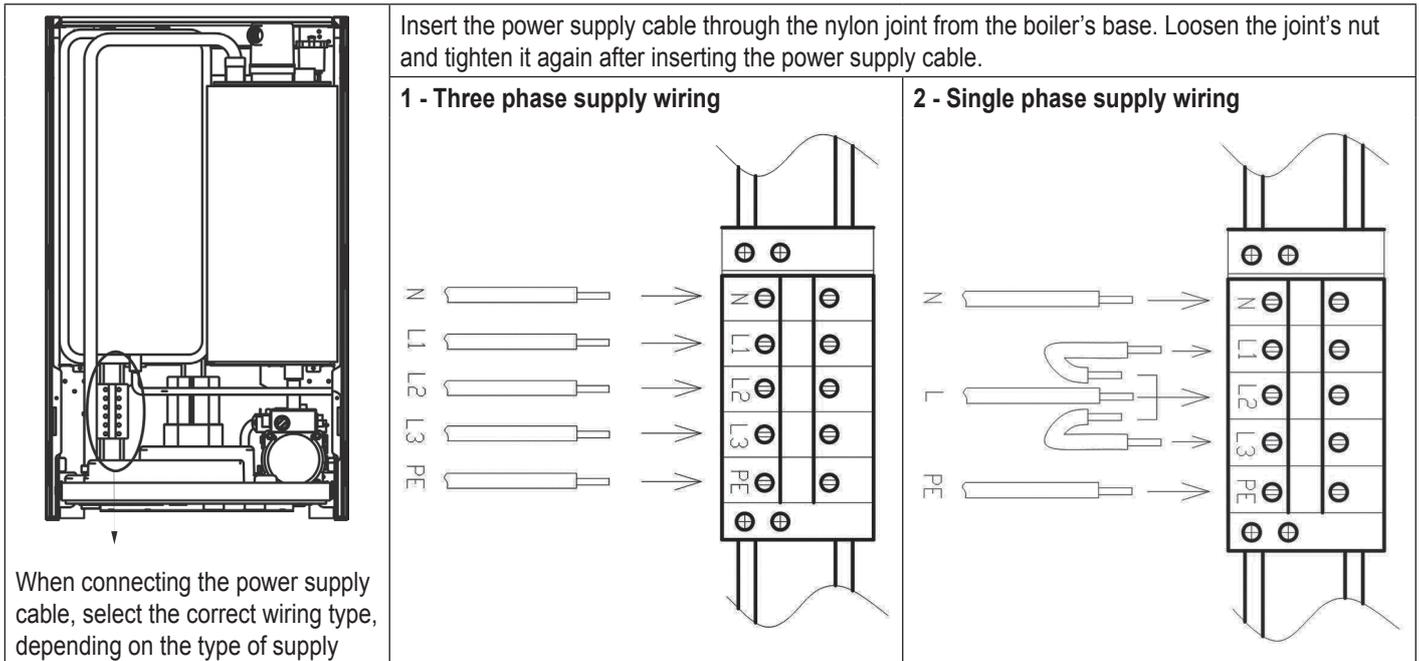
Before mounting the protection bolts, clean both sides and exterior walls of the housing as well as all the areas close to the bolts through their metallic surface. Inside the housing, under the bolt heads, insulate the conductors using terminal sleeves for cables. Tighten the connection inside by means of a copper nut provided with locking washer. Use another such nut to connect the second protection cable.

When connecting the power supply cable, make sure that all the nuts of the electric terminals and contacts are properly tightened.

You may buy simple and complex control components, such as the inside programmable (daily or weekly) controller, from the **LEB - TS** electric heating unit's supplier or from its partners. To ensure the proper operation of the **LEB - TS** electric heating unit, it is compulsory to install an outlet voltage controller if the supply power is not guaranteed within certain limits.

The needed controller is provided

with an outlet contact with 230/0.1 charging capacity. The electric distribution board that the boiler is connected to should always contain a residual-current circuit breaker.



Connection of the room temperature controller, of the 3-way valve and of the DHW tank's NTC temperature sensor

Note:

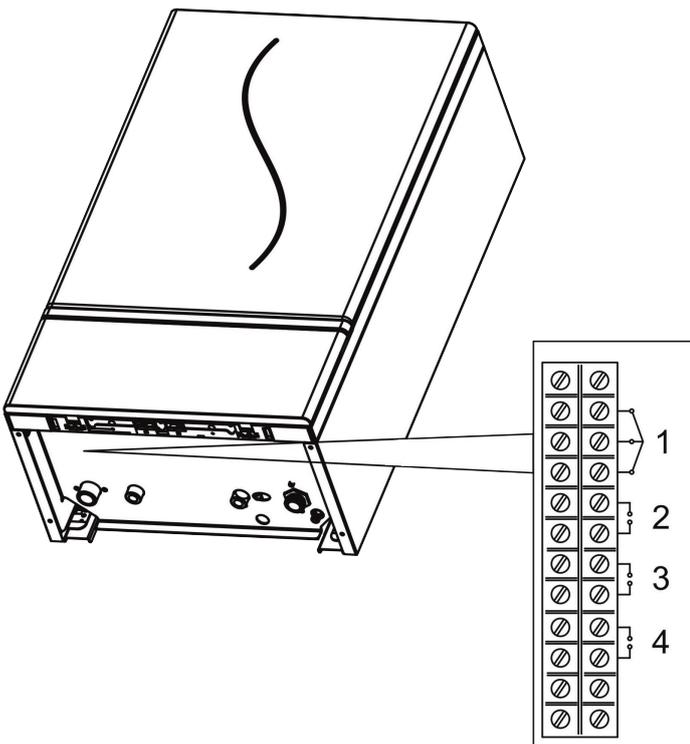
Maintain clean the room temperature controller's contacts (the ambient thermostat will be of the on/off type).

- The connection of the room thermostat should be made through a 2-wire cable, with a recommended cross section between 0.5 and 1.5 mm² and a maximum length of 25 m.
- The cable for the room thermostat should not touch the power supply cable or any other electrical device. There should be a minimum distance of 10mm between these elements.



Before using connected peripheral devices, the personnel responsible with the units mounting and installation should check the compliance of the respective devices with the unit. Take into consideration the unit's functions in relation to the user or his/her residence, as well as to the mentioned peripheral devices.

The supplier undertakes no responsibility for complaints resulted from the unit's improper assembly and mounting.



1. Terminal for cables for the 3-way source.
2. Terminal for the NTC boiler sensor.
3. Terminal for the room temperature controller.
4. Terminal for the outdoor temperature controller.

fig. 9 -

3 SERVICE AND REPAIRS

3.1 Commissioning



The commissioning should be performed only by qualified personnel.
The commissioning is necessary any time the system's and safety devices repairs are performed.

Before starting the electric heating unit

Open all the closing valves connecting the unit to the system.

Fill the system with water and check if the electric heating unit and the system were properly vented and the venting device closed automatically.

Check if there are any leakages at the heating system, at the hot water system, at the electric heating unit's connections.

Check if the electric heating unit is connected to a proper source. Check if the unit's earthing is correctly performed.

Check if there are liquids or corrosive objects in the electric heating unit's vicinity

Starting the heating unit

Start the unit.

Finish the settings in the winter mode and make sure that the contact with the room thermostat is closed. Now, the heating element of the heat exchanger heats up. The electric heating unit starts in automatic mode being controlled by the safety devices.



The heating element can stop the operation when the power supply is interrupted. The electric heating unit will resume heating when the power supply is resumed.

Operation check

Check if there is proper circulation between the electric heating unit and the heating system. Check if the electric heating unit operates properly by opening and closing the room temperature controller or the timer.

Stop

Keep the key  pressed for 5 seconds.

During the closing of the electric heating unit, the circuit board remains on.

With the heating function inactive, the message OFF appears on the LCD screen. However, the frost protection function remains active.

When the electric heating system is disconnected from the power supply system, the frost protection function is not active. To avoid frost-caused losses following the unit's long disconnection from the power supply system, the complete drain of the heating system and its filling with antifreeze agent in accordance with the requirements included in Subchapter 2.3. are recommended.

3.2 Maintenance

The regular maintenance operations help avoid any possible faults.

A full inspection once a year, before putting into operation the heating system, is recommended.

Do not demount the housing. The user can wash the housing's surface, using detergents, can control the operation modes and can supplement the system with heat carrier after the water pressure is checked, depending on the value showed by the thermo manometer.

While checking, tighten all the electric joints and water connections, clean the water pump, the Y filter, check the safety valve, the discharge valve, as well as all the safety devices. Then check if the unit operates properly.

When the unit operates in a closed heating system with an expansion vessel under pressure, check frequently the value indicated by the pressure gauge. In the cooling stage, with a decrease of the residual pressure below the limit established by the company responsible for installation, the unit's check by specialized personnel is necessary. This is not applicable in the case of the first heating or when the safety valve opens. In such cases, fill the system with water following the instructions.

Cleaning the appliance case: Use a damp, soft cloth to clean the outer painted metal case of the appliance, do not use chemicals or abrasive materials.

3.3 Repairs



The following operations must be performed solely by the competent personnel, such as the local distributor or the service provider.

The appliance must be serviced regularly by a competent, qualified person.

Only a competent engineer can remove the appliance case and carry out any work.

Electric heating unit seasonal checks

The following checks to the electric heating unit are recommended at least once a year:

- The control system and the protection system (three phase fuse, electric connections tightening, temperature sensors and safety elements etc.) should work properly.
- Check and clean the heating elements of any limestone deposits.
- When cold, the pressure inside the installation should be 1 bar. Otherwise, adjust the reference value.
- Check and restore the expansion vessel's air cushion, if needed; the pressure should be 0.9-1 bar.
- Check the proper operation of the circulating pump.
- Check the wiring's and connection strip's integrity; they should not have damages due to heating.

3.4 Faults remedy

Diagnosis

The electric heating unit is fitted with an advanced self-diagnosis system which displays the faults codes in case of breakdown on the LCD screen.

Certain faults (code "A") may lead to the unit's shutdown. To resume operation, press the reset key for a second.

In case of shutdown due to other faults (code "F"), the electric heating unit can automatically resume its operation when the parameters which caused the fault returned to normal.

The table below shows some fault causes, as well as certain solutions for the users.

In the case of a repeating fault which you cannot remedy, please contact the **FERROLI** service personnel.

Symptoms	Code	Possible causes	Solutions
No heating	A01	Electric leakages (deficiencies in the power supply)	Check if the unit is connected to the power supply system and if the three phase fuse is coupled. Ask the authorized personnel to perform this check
Temperature limiter either faulty or operated	A03	Heating temperature limiter faulted	Check if the heating temperature limiter is correctly mounted and actuated
		The is no circulation in the system	Check the circulating pump to see if there is circulation in the heating system
		The is air in the system.	
Temperature in the unit is above 90°C	A06	The water in the heating system is not recirculated	Check the recirculating pump to see if there is circulation in the heating system
		There is air in the heating system.	
Disconnected temperature sensor	A08	The heating temperature sensor is not fixed or is faulty (normally, subsequently to a 10-minute heating, the temperature increases on the temperature sensor and on the domestic hot water sensor do not exceed 3°C. Temperatures above 40°C are not detected)	Check if the heating temperature sensor is properly connected to the pipe
Faulty heating temperature sensor	F10	Faulty heating temperature sensor, such as open circuit, short-circuit, or unfixed or interrupted cables	Check the cables or replace the temperature sensor
Faulty outdoor temperature sensor	F13	Faulty outdoor temperature sensor, for reasons such as open circuit, short-circuit, or improperly fixed or interrupted cables.	Check the cables or replace the temperature sensor
Faulty domestic hot water (DHW) tank temperature sensor	F14	Faulty NTC DHW sensor, for reasons such as open circuit, short-circuit, or improperly fixed or interrupted cables	Check the cables or replace the temperature sensor
Faulty water pressure switch	F37	Not enough water pressure in the installation.	Fill the system with water
		The water pressure switch has open or faulty contacts	Check the water pressure switch and, if needed, replace
Lack of circulation in the system	F41	Clogged heating circuit	Check the open position of the valves.
		Faulty operation of the circulating pump	Check the Y filter
			Check the circulating pump

4 TECHNICAL CHARACTERISTICS AND PARAMETERS

4.1 Dimensions and joints

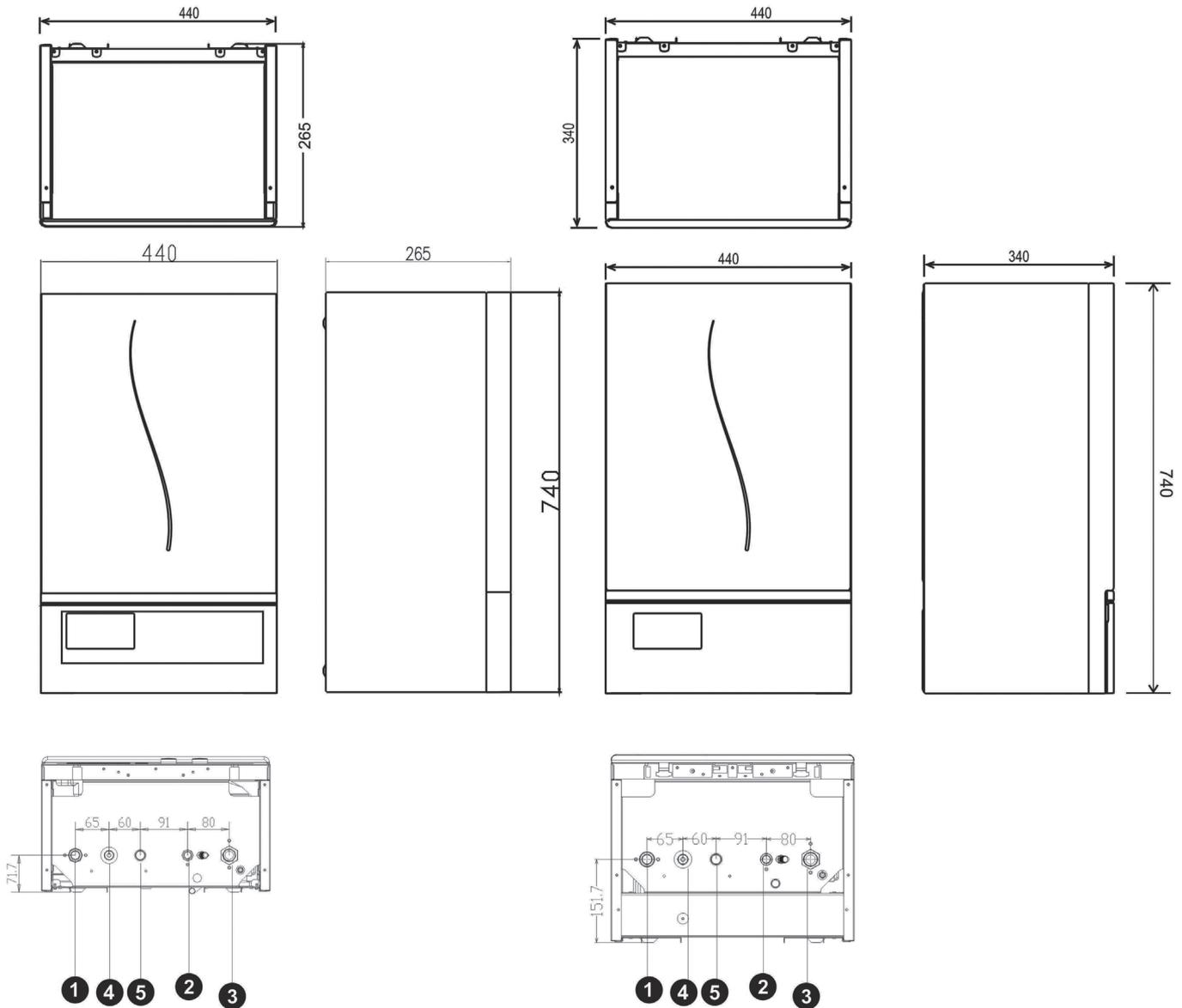
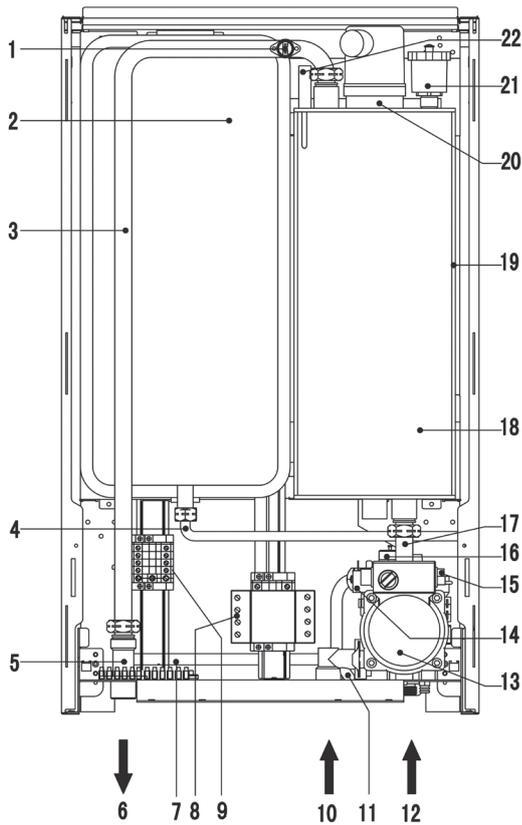


fig. 10 -

Legend

- 1 Heating system flow pipe G3/4
- 2 Water filling valve G1/2
- 3 Heating system return pipe G3/4
- 4 Power cable inlet
- 5 3-way valve power cable inlet

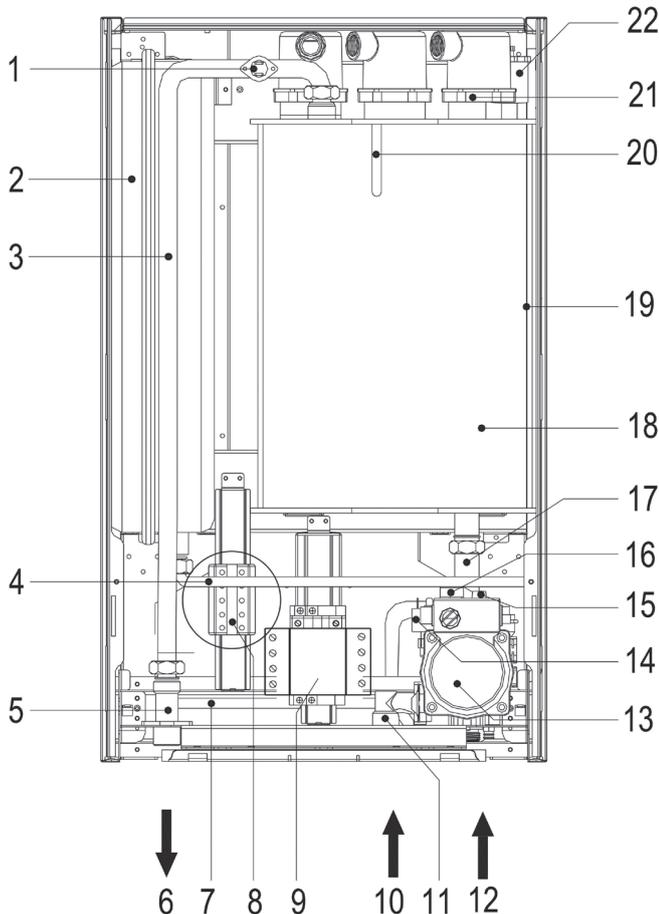
4.2 Heating unit's general drawing and main components



Legend 6-9kw

- 1 Safety thermostat 100°C
- 2 Expansion vessel
- 3 Unit's flow pipe
- 4 Expansion vessel's connection pipe
- 5 Heating drain joint
- 6 Heating water outlet
- 7 Bypass pipe
- 8 Contactor
- 9 Terminal block
- 10 Water inlet
- 11 Water filling valve
- 12 Heating water return inlet
- 13 Pump
- 14 Safety valve
- 15 Automatic venting valve
- 16 Hydraulic pressure switch
- 17 Heating return pipe
- 18 Heating body tank
- 19 Heating body isolation
- 20 Heating element
- 21 Automatic venting valve for the inner tank
- 22 Temperature sensor for the inner tank

fig. 11 -

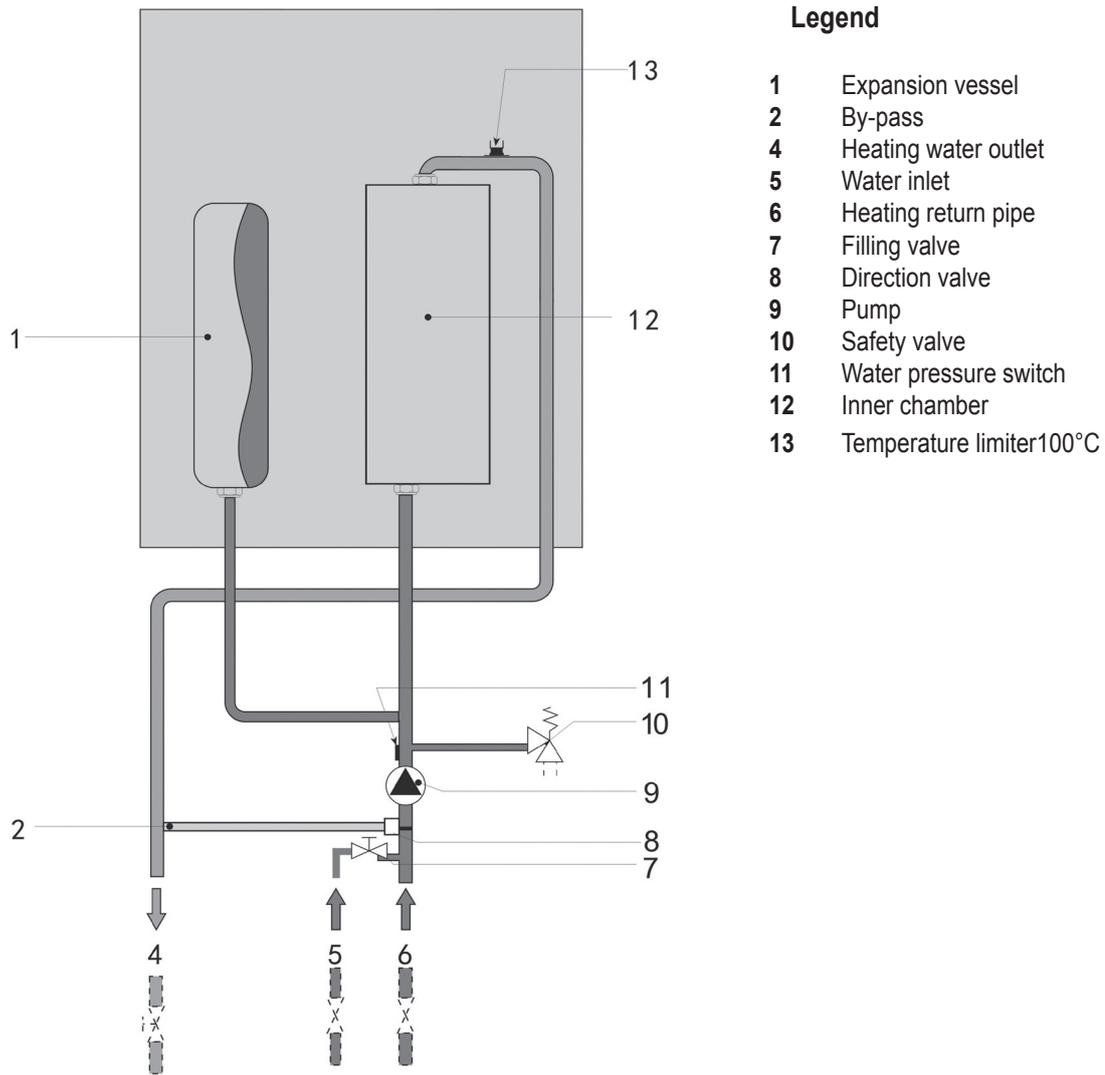


Legend 12-28kw

- 1 Safety thermostat 100°C
- 2 Expansion vessel
- 3 Unit's flow pipe
- 4 Expansion vessel's connection pipe
- 5 Heating drain joint
- 6 Heating water outlet
- 7 Bypass pipe
- 8 Terminal block
- 9 Contactor
- 10 Water inlet
- 11 Water filling valve
- 12 Heating water return inlet
- 13 Pump
- 14 Safety valve
- 15 Automatic venting valve
- 16 Hydraulic pressureswitch
- 17 Heating returnpipe
- 18 Inner chamber
- 19 Inner tank
- 20 Temperature sensor for theinner tank
- 21 Heating element
- 22 Automatic venting valve for the inner tank

fig. 12 -

4.3 Hydraulic scheme



- Legend**
- 1 Expansion vessel
 - 2 By-pass
 - 4 Heating water outlet
 - 5 Water inlet
 - 6 Heating return pipe
 - 7 Filling valve
 - 8 Direction valve
 - 9 Pump
 - 10 Safety valve
 - 11 Water pressure switch
 - 12 Inner chamber
 - 13 Temperature limiter 100°C

fig. 13 -

4.4 Circulating pump diagram

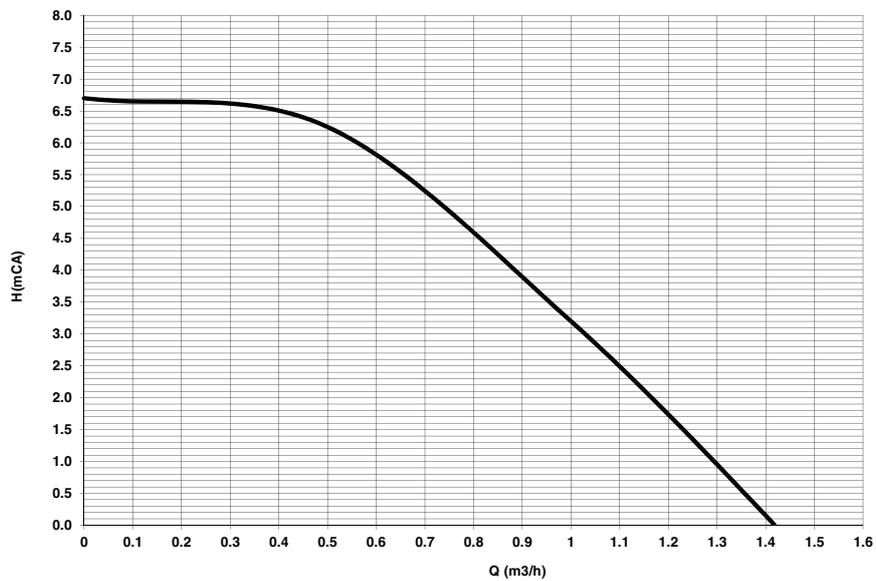


fig. 14 -

H = Head Q = Flow

4.5 Technical parameters

Single phase power supply	V	220-240V~/50Hz
Three phase power supply	V	400V 3N~/50Hz
Peak current intensity	A	41
Absorbed electrical power	kW	6,7.5 , 9
Output	%	99.5
Peak heat carrier temperature	°C	80
Circulating pump capacity, max.	bar	0.5
Expansion vessel volume	L	10
Expansion vessel volume	bar	0.8
Maximum working pressure	bar	3
Recommended working pressure	bar	1 - 1.7
Electrical protection class		IP 20
Unit flow pipe/return pipe connection		G 3/4"
Water fill/discharge connection		G 1/2"
Dimensions: H x L x D	mm	740 X 440 X 265
Weight (without water)	Kg	29

Recommended sections for circuit breakers and conductors

Unit power (kW)	Heating elements number and power	Peak current intensity through phase I (A)	Minimum power supply cable section copper (mm ²)		
			Single phase	Three phase line	Three phase null
6	6 elements of 1kw	28	4	1,5	2,5
7,5	6 elements of 1.25kw	34	6	1,5	4
9	6 elements of 1.5kw	41	10	2,5	6,6

Three phase power supply	V	400V 3N~/50Hz
Peak current intensity	A	44
Absorbed electrical power	kW	12. 15. 18. 21. 24. 28
Output	%	99.5
Peak heat carrier temperature	°C	80
Circulating pump capacity, max.	bar	0.5
Expansion vessel volume	L	10
Expansion vessel volume	bar	0.8
Maximum working pressure	bar	3
Recommended working pressure	bar	1 - 1.7
Electrical protection class		IP 20
Unit flow pipe/return pipe connection		G 3/4"
Water fill/discharge connection		G 1/2"
Dimensions: H x L x D	mm	740 X 440 X 340
Weight (without water)	Kg	40

Recommended sections for circuit breakers and conductors

Unit power (kW)	Heating elements number and power	Peak current intensity through phase I (A)	Minimum power supply cable section copper (mm ²)	
			Three phase line	Three phase null
12	12 elements of 1kw	18,2	2.5	2.5
15	12 elements of 1.25kw	22,8	2.5	2.5
18	12 elements of 1.5kw	27,3	4	4
21	12 elements of 1.75kw	31,9	4	4
24	12 elements of 2kw	36,4	6	6,6
28	12 elements of 2.33kw	44	6	6,6

Erp data

Parameter	Symbol	Unitat	6kW	7.5kW	9kW
Seasonal space heating energy efficiency class			D	D	D
Rated heat output	Pn	kW	6	7	9
Seasonal space heating energy efficiency	η_s	%	36	36	36
Useful heat output					
Useful heat output at rated heat output and high-temperature regime(*)	P4	kW	5,9	7,4	8,9
Useful heat output at 30% of rated heat output and low- temperature regime(**)	P1	kW	0,0	0,0	0,0
Useful efficiency					
Useful efficiency at rated heat output and high-temperature regime(*)	η_4	%	39,5	39,6	39,6
Useful efficiency at 30% of rated heat output and low- temperature regime(**)	η_1	%	0,0	0,0	0,0
Auxiliary electricity consumption					
At full load	elmax	kW	6,000	7,500	9,000
At part load	elmin	kW	0,000	0,000	0,000
In standby mode	PSB	kW	0,001	0,001	0,001
Other items					
Standby heat loss	Pstby	kW	0,072	0,072	0,072
Ignition burner power consumption	Pign	kW	0,000	0,000	0,000
Annual energy consumption	QHE	GJ	47	59	71
Sound power level	LWA	dB	31	32	34

Parameter	Symbol	Unitat	12kW	15kW	18kW	21kW	24kW	28kW
Seasonal space heating energy efficiency class			D	D	D	D	D	D
Rated heat output	Pn	kW	12	15	18	21	24	28
Seasonal space heating energy efficiency	η_s	%	36	36	36	36	36	36
Useful heat output								
Useful heat output at rated heat output and high-temperature regime(*)	P4	kW	11,9	14,9	17,9	20,9	23,9	27,9
Useful heat output at 30% of rated heat output and low- temperature regime(**)	P1	kW	0,0	0,0	0,0	0,0	0,0	0,0
Useful efficiency								
Useful efficiency at rated heat output and high-temperature regime(*)	η_4	%	39,6	39,7	39,6	39,8	39,8	39,8
Useful efficiency at 30% of rated heat output and low- temperature regime(**)	η_1	%	0,0	0,0	0,0	0,0	0,0	0,0
Auxiliary electricity consumption								
At full load	elmax	kW	12,000	15,000	18,000	21,000	24,000	28,000
At part load	elmin	kW	0,000	0,000	0,000	0,000	0,000	0,000
In standby mode	PSB	kW	0,001	0,001	0,001	0,001	0,001	0,001
Other items								
Standby heat loss	Pstby	kW	0,090	0,090	0,090	0,090	0,090	0,090
Ignition burner power consumption	Pign	kW	0,000	0,000	0,000	0,000	0,000	0,000
Annual energy consumption	QHE	GJ	95	119	142	166	189	221
Sound power level	LWA	dB	36	37	38	39	40	41

(*) High temperature regime means a return temperature of 60°C entering the heating system and a supply temperature of 80°C Lock-heating system

(**)The low temperature means a return temperature for condensing boilers 30°C, 37°C for low temperature boilers and 50°C other instalatli heating (at the entrance to the heating system)

4.6 Heating unit circuit scheme

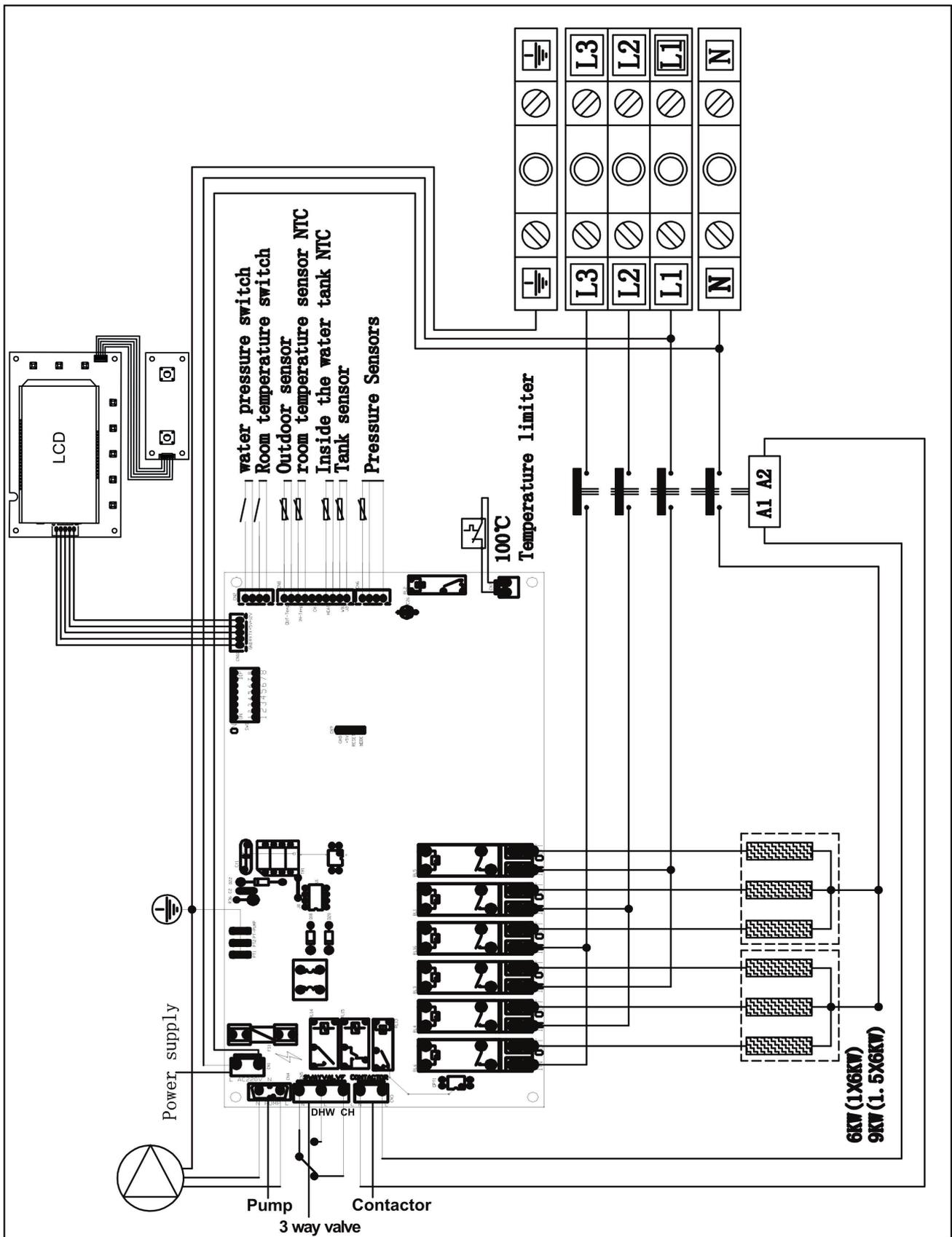


fig. 15 -

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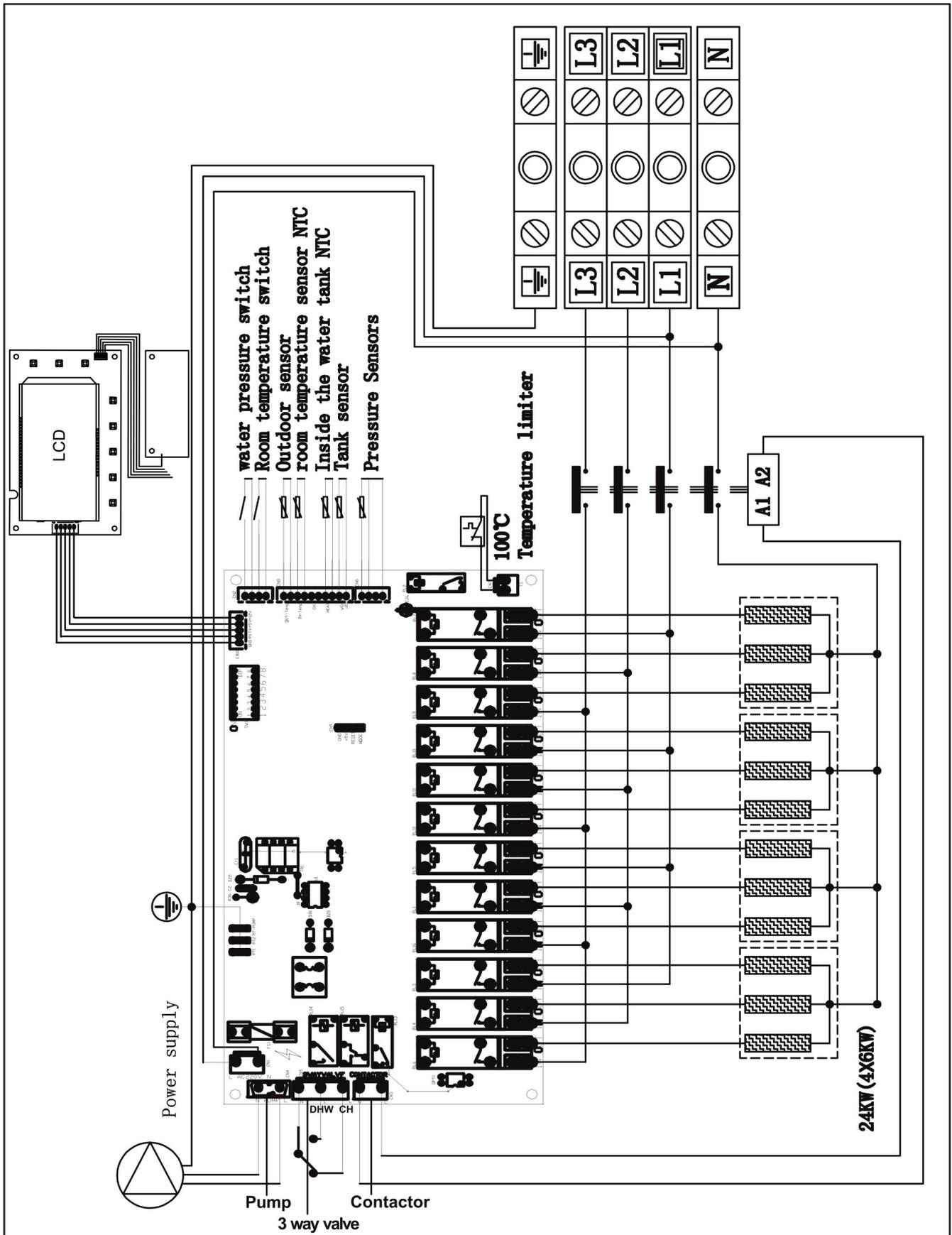


fig. 16 -

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