

EloBLOCK v.13

BASIC CHARACTERISTICS

- Properties
- Technical specification
- Functional schematic diagram
- Boiler protection functions

Properties

- Continuous power modulation
- Equithermal control (if the outdoor sensor is connected)
- Self-diagnostic system (extended ability to identify non-standard situations / fault code log memory)
- Simple and well-arranged controls
- Antifreeze protection
- 2-speed pump with automatic speed-switching
- HDO mode
- Adjusted for floor heating
- Possibility to connect multiple boilers in a cascade
- Possibility to connect using a release relay
- Possibility to connect to single-phase distribution
- Possibility to connect an external hot water tank

Technical specification

Basic parameters for RAY boilers		6, 9, 12, 14, 18, 21, 24, 28 K v.13
Electrical voltage	(6 - 28 kW)	3 x 230V/400V + N + PE, 50 Hz
Electrical current max.	(28 kW)	3 x 43 A
Input	(kW)	6, 9, 12, 14, 18, 21, 24, 28
Efficiency	(%)	99
Maximum operating temperature of heating water	°C	85
Maximum circulating pump delivery	kPa	50
Expansion tank	liter	7
Minimum boiler operating pressure	kPa	80
Maximum boiler operating pressure	kPa	300
Recommended boiler operating pressure	kPa	100 - 200
Electrical protection class		IP 40
Heating water connection		G 3/4"
Top-up/Draining connection		G 1/2"
Dimensions (h / w / d)	(mm)	740 / 410 / 310
Weight of boiler without water	(kg)	34

Recommended breaker sizes and conductor cross-sections

Boiler output (kW)	Quantity and output of heating units	Maximum single phase current (A)	Breaker rated current (A)	Cross-section of feed conductor - Cu (mm ²)
6	2 x 3 kW	9,5 (28*)	10 (32*)	1,5 (6*)
9	3 kW + 6 kW	14 (39*)	16 (50*)	2,5 (10*)
12	2 x 6 kW	18,5	20	2,5
14	2 x 7 kW	23	25	4
18	3 x 6 kW	27,5	32	4
21	3 x 7 kW	32	40	6
24	4 x 6 kW	36,5	40	6
28	4 x 7 kW	43	50	10

**applies if connected to a single phase*

Continuous output modulation

The electric boiler is equipped with continuous power modulation (gradual power switching), so there is no adverse load on the electricity network when the electric boiler is switched on.

Continuous modulation of the boiler output consists in the gradual switching or disconnecting of individual heating units and parts thereof. The purpose of this system is the efficient use of the boiler power to achieve maximum thermal comfort.

This feature is also related to the setting of the current output of the boiler. Power can be adjusted (increased or reduced) depending on need in accordance with the following table

while the display shows the power in front of the decimal point (e.g. if a 14 kW boiler is heating to a current output of 11.7 kW, the display shows 11).

Boiler output	Heating units (kW)	Individual output cascades (kW)												
6 kW	3 + 3	1	2	3	4	5	6							
9 kW	6 + 3	1	2	3	4	5	6	7	8	9				
12 kW	6 + 6	2	4	6	8	10	12							
14 kW	7 + 7	2,3	4,7	7	9,3	11,7	14							
18 kW	6 + 6 + 6	2	4	6	8	10	12	14	16	18				
21 kW	7 + 7 + 7	2,3	4,7	7	9,3	11,7	14	16,3	18,7	21				
24 kW	6 + 6 + 6 + 6	2	4	6	8	10	12	14	16	18	20	22	24	
28 kW	7 + 7 + 7 + 7	2,3	4,7	7	9,3	11,7	14	16,3	18,7	21	23,3	25,7	28	

Boiler protective functions

Antifreeze protection

To protect the boiler (but not the heating system and distributions) against freezing, it has built-in antifreeze protection.

When the temperature of the heating water drops below 8°C, the pump is switched on irrespective of requests from the indoor regulator, even when summer mode is set.

If the temperature of heating water in the boiler rises and reaches 10°C, the pump is automatically switched off. If the temperature of the heating water continues to decline, when it reaches 5°C the boiler is switched on and keeps heating the water until its temperature reaches 25 °C.

If the heating water temperature keeps decreasing, the boiler is disabled when the temperature drops below 3° C.

Antifreeze protection of hot water tank

When the temperature in the hot water tank drops to 5°C, the boiler heats the water in the tank to 8°C. If the temperature of water in the tank continues to decline, reaching a temperature of 3°C will disable the boiler.

Note: This function is only active if an external tank is connected which is equipped with NTC sensor.

Heating water pump protection

After continuously resting for 23 hours, brief activation of the pump (for about 1 min) to its lowest speed will prevent the pump being disabled or becoming blocked following a longer service break.

Notice: This function of the boiler cannot be disabled.

Pump switch-off delay

For hot water heating in an external tank, the pump switch-off delay is set to 1 minute.

For heating water, the pump switch-off delay is set to 10 min.

The pump switch-off delay can be changed, if necessary, by an authorized service technician.

Notice: This function is only active only when the boiler is connected to line voltage and when the main switch is switched on.

Protection of actuator-controlled 3-way valve (only if an external hot water tank with NTC sensor is connected)

If an external hot water tank is connected to the boiler through an actuator-controlled 3-way valve, then this valve is protected against jamming; if there is no request to heat hot water in the tank over a period of 23 hours (the valve is in the same position), the valve is switched to the opposite position.

Boiler protective functions

Power disruptions

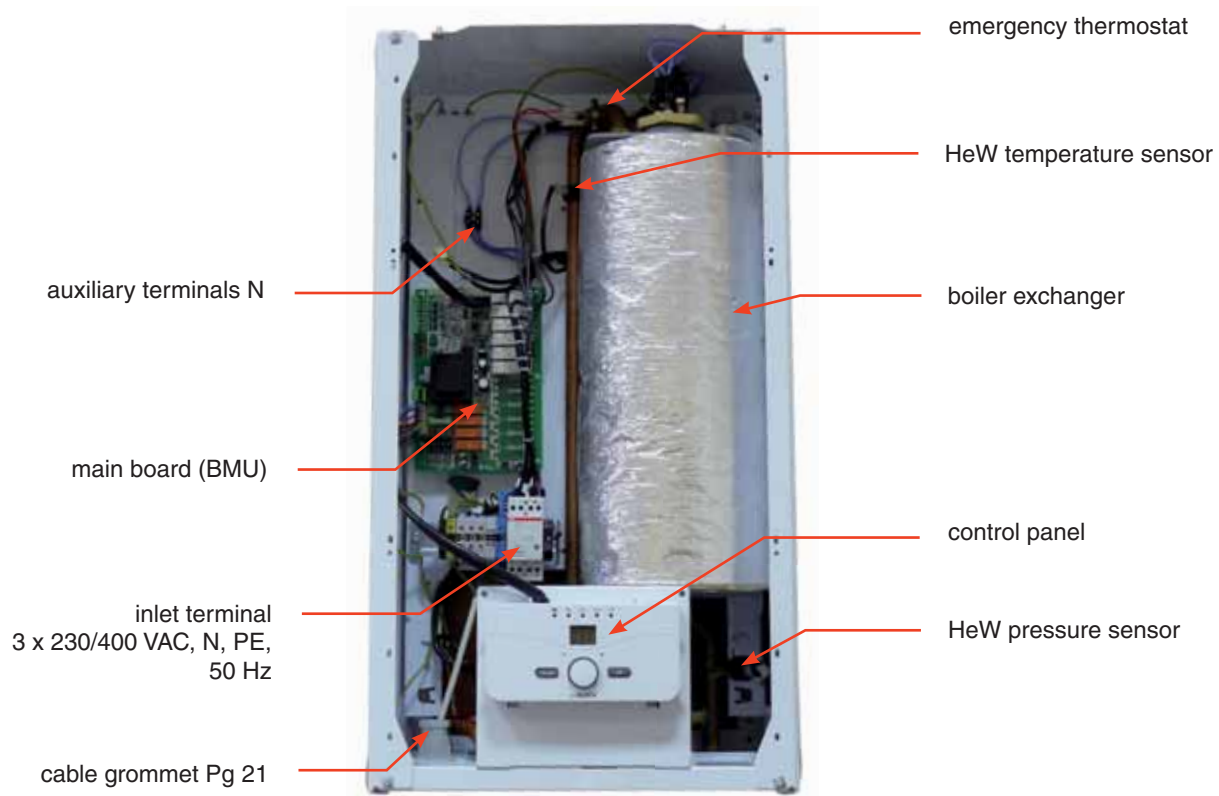
When the power supply is shut off, the boiler will shut down. When the power supply is restored, the boiler will automatically restart itself without losing any parameter settings.

Safety valve

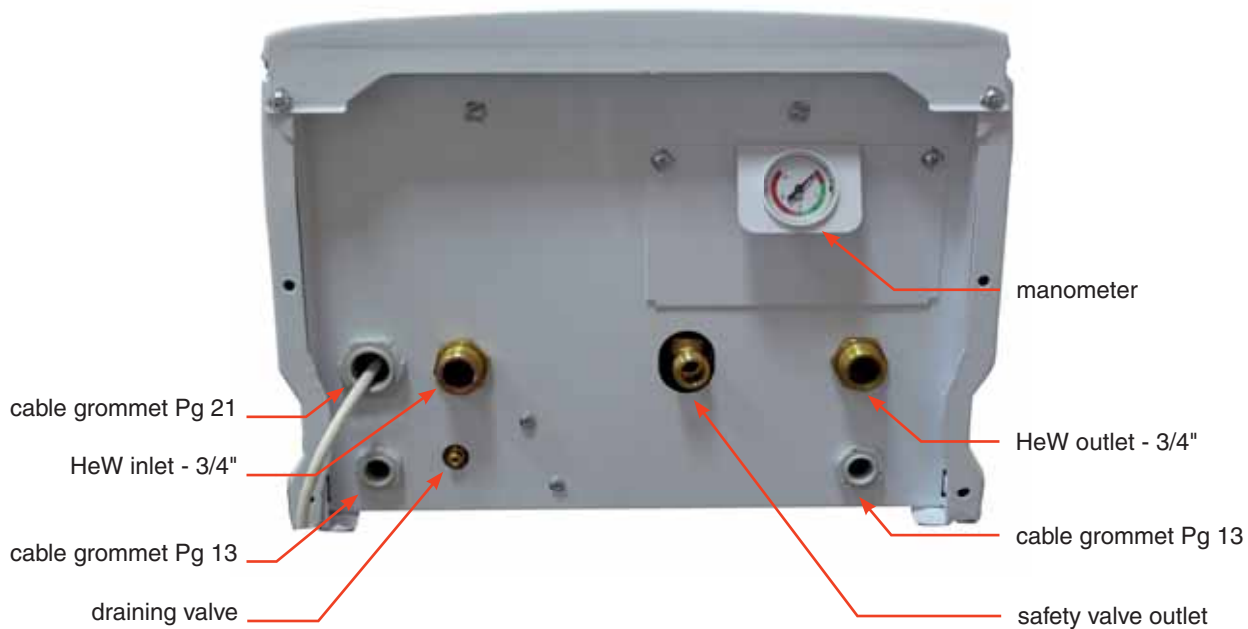
The boiler is equipped with a safety valve with an opening pressure of 3 bar. DO NOT TOUCH THE VALVE! Whenever the safety valve releases heating water, switch the boiler off and disconnect it from the power supply. Contact a service organization. If pressure inside the heating system keeps dropping, consult the problem with your service organization.

Please note: All of the described electronic protection functions are enabled only if the boiler is connected to a power supply (the power cord plug is inserted into a power socket and the main switch is in the ON position).

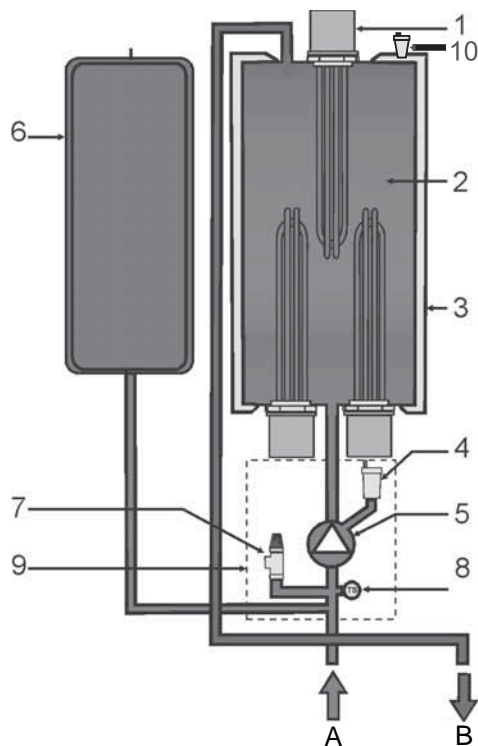
Functional schematic diagram of the EloBLOCK boiler



Basic description of EloBLOCK boiler

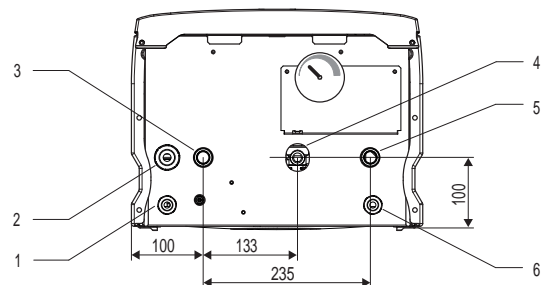
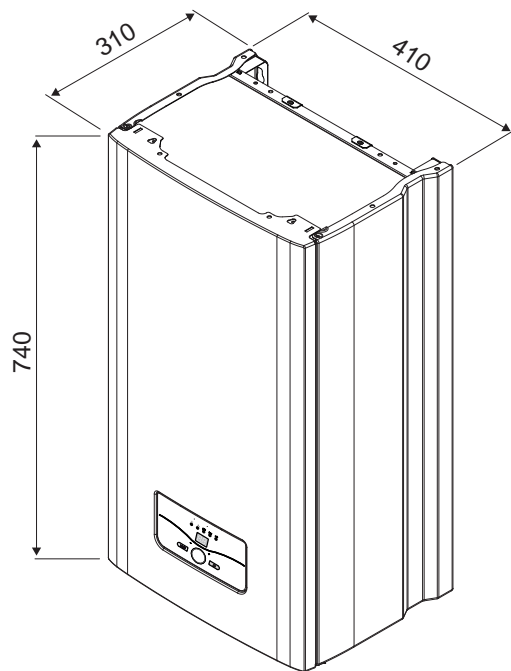


Functional schematic diagram EloBLOCK



- 1 Heating units
- 2 Boiler exchanger
- 3 Insulation
- 4 Air release valve
- 5 Pump
- 6 Expansion tank
- 7 Heating water safety valve
- 8 Heating water pressure sensor
- 9 Integrated hydraulic block
- 10 Exchanger air release valve
- A Heating water inlet
- B Heating water outlet

Boiler connection dimensions

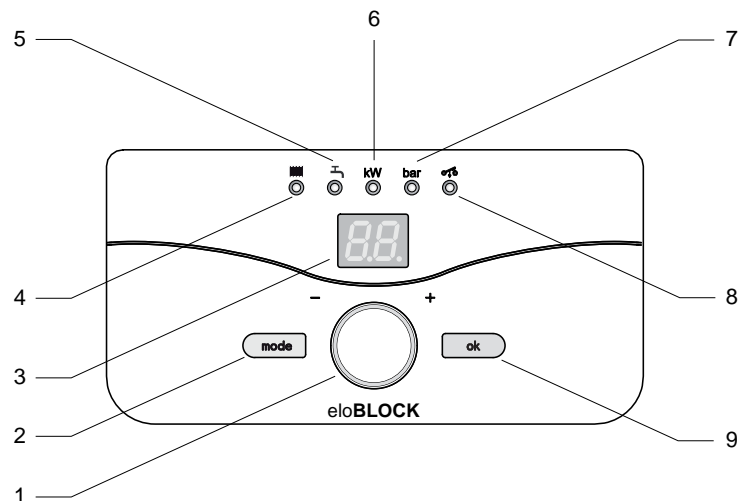


1. Cable grommet Pg 13
2. Cable grommet Pg 21
3. Heating water inlet - G 3/4"
4. Safety valve outlet
5. Heating water outlet - G 3/4"
6. Cable grommet Pg 13

Boiler controls

- Reading mode
- Setting mode
- Fault codes
- Service level – parameter setting

Control panel - description



1. Circural control - used to select and view the status parameter setting the value of the parameter.
2. MODE button - used to select parameter settings.
3. Display – displays the boiler operating parameters and the parameters to be set.
4. Hot water (HeW) LED – indicates that the heating water temperature display or setting mode has been selected.
5. Hot water (HoW) LED – indicates that the hot water

- temperature display or setting mode has been selected.
6. kW LED – indicates that the boiler output display or setting mode has been selected.
7. HeW pressure LED – indicates that the heating water pressure display mode has been selected.
8. HDO LED – indicates active HDO status (defective switching relay).
9. OK button - confirm the value of setting parameter.

Control panel - description

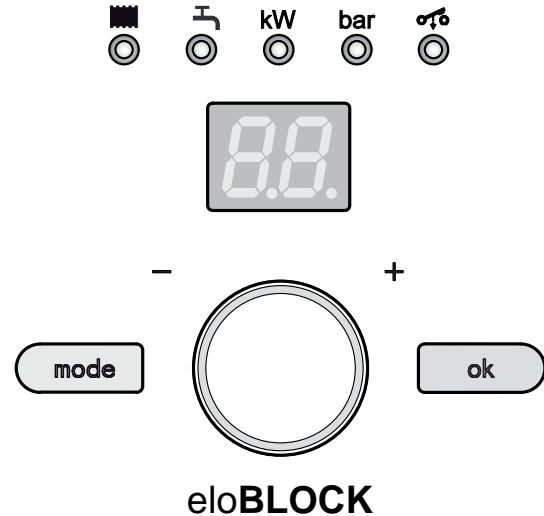
The Start-up and shutdown of the boiler is controlled via the main switch, which during the installation of the boiler must be placed outside of the boiler on the feeding electrical line.

The actual value data can be monitored and the required parameters adjusted using the control panel.

Besides the user level, the boiler is also equipped with access to a “service level”, where it is possible to monitor the following data:

1. Course of the boiler operation.
2. Setup of boiler parameters (boiler output, pump switch-off delay, etc.)

Access to such levels is not allowed to a standard user. Access to the “service level” requires an access code which is shown in the “Service Level” section. Access is only allowed for authorized service partners.



Control panel - description



Indication of numerical values on the display

If the number indicated on the display ranges from - 9 to 99, the display shows a specific number.



If the number indicated on the display is smaller than - 9 (i.e. -10,-11, ...), the lower part of the display shows two hyphens.

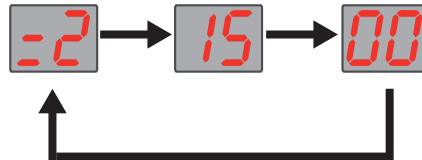


If the number indicated on the display is higher than 99 (i.e. 100, 101, ...), the top part of the display shows two hyphens.

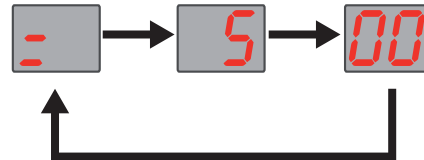
Indication of statistical values on the display

When displaying statistical values on the display (boiler operation in hours, number of heating cycles, etc.), the display alternately shows values in the form = X XX XX.

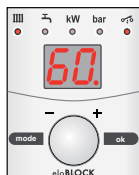
The example shows a value of 21,500 (twenty one thousand five hundred).



The example shows a value of 500 (five hundred).

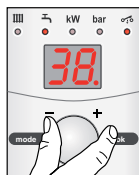


Control panel – reading mode



Indication of the actual temperature of the heating water in the system in °C

Display of the current HeW temperature in the system is indicated by a lit HeW LED on the control panel. A lit LED in the bottom right corner during this display indicates that the boiler has sent a request to heat the HeW in the system. Turn the circular control to the right will move to the next display state parameter.



Indication of hot water temperature in °C

Display of the current HoW temperature is indicated by the HoW LED on the control panel being lit. A lit LED in the bottom right corner during this display indicates that the boiler has sent a request to heat the HoW in the external tank. Turn the circular control to the right will move to the next display state parameter.

Please note: This parameter will appear on the display only if the boiler is coupled with an external HoW tank with an NTC sensor.



Indication of current boiler output in kW

Display of the current boiler output is indicated by a lit kW LED on the control panel. Turn the circular control to the right will move to the next display state parameter.

Control panel – reading mode



Display of heating water pressure in the system in bars

Display of the heating water pressure in the system is indicated by a lit bar LED on the control panel. Turn the circular control to the right will move to the next display state parameter.

Please note: This parameter will appear on the display only if an external temperature sensor is connected to the boiler.



Indication of the set equithermal curve

Display of the equithermal curve setting is not indicated by any lit LED on the control panel. Turn the circular control to the right will move to the next display state parameter.



Indication of equithermal curve shift

Display of the selected equithermal curve shift is not indicated by any LED on the control panel. Turn the circular control to the right will move to the next display state parameter.

Control panel – setting mode



Setting heating water temperature in the system in °C

Pressing the MODE button in the HeW temperature display mode will switch the system to the HeW temperature set-up mode. This mode is indicated by a flashing HeW LED on the control panel. Using the circular control set the HeW temperature to the required value. The HeW temperature can be set within the range 25 - 85°C. By selecting the value "---", the HeW heating will be switched off. By pressing the OK button save the selected value and return back to the HeW display mode – the HeW LED stops flashing.



Setting hot water temperature in °C

Pressing the MODE button in the HoW temperature display mode will switch the system to the HoW temperature in the external tank set-up mode. This mode is indicated by a flashing HoW LED on the control panel. Using the circular control set the HoW temperature to required value. The HoW temperature can be set within the range 35 - 70°C. By selecting the value "---", the HoW heating will be switched off. By pressing the OK button save the set value and return back to the HoW display mode – the HoW LED stops flashing.

Please note: This parameter can be set only if the boiler is coupled with an external HoW tank with an NTC sensor.



Setting the boiler output in kW

Pressing the MODE button in the current boiler output display mode will switch the system to the boiler output set-up mode. This mode is indicated by a flashing kW LED on the control panel. Using the circular control set the boiler output in kW to the required value. The output range depends on the boiler model (maximum boiler output). By pressing the OK button save the set value and return back to the boiler output display mode – the bar LED stops flashing.

Please note: The following settings can be made only if an exterior temperature sensor is connected to the boiler.

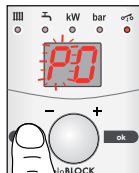
Control panel – setting mode

Please note: The following parameters can only be set if an outdoor temperature sensor is connected to the boiler.



Setting the equithermal curve

Pressing the MODE button in the equithermal curve display mode will switch the system to the equithermal curve set-up mode. This mode is indicated by a flashing letter E on the control panel. Using the circular control select the required equithermal curve. Equithermal curves available are E0 to E9. Selecting value “E-” will disable the equithermal control. By pressing the OK button save the selected equithermal curve setting and return back to the boiler output display mode – letter E on the display will stop flashing.



Setting the equithermal curve shift

Pressing the MODE button in the equithermal curve shift display mode will switch the system to the equithermal curve shift set-up mode. This mode is indicated by a flashing letter P on the control panel. Using the circular control select the required equithermal curve shift. Equithermal curve shifts available are P0 to P9. By pressing the OK button save the selected equithermal curve shift setting and return back to the equithermal curve shift display mode – letter P on the display will stop flashing.

Equithermal mode

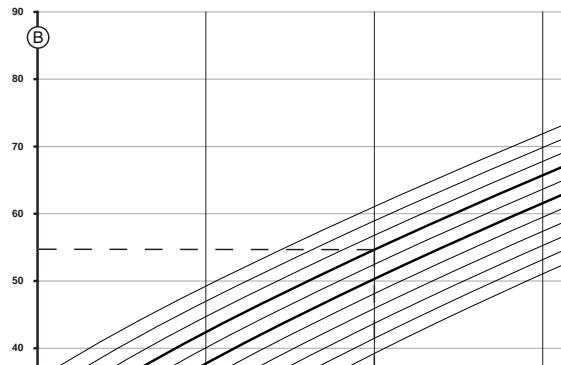
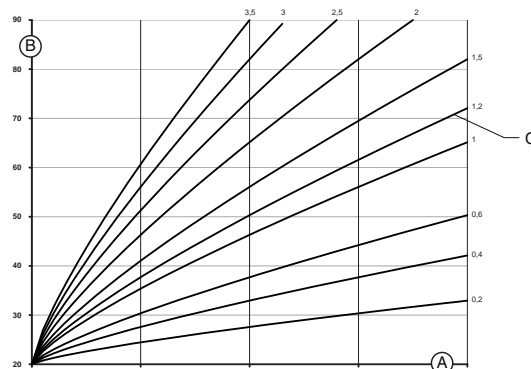
Please note: Equithermal control of the boiler can only be operated if a well-located outdoor temperature sensor is connected to the boiler.

In this mode of control, the boiler outlet temperature is controlled on the basis of the outdoor temperature. When setting this control, all radiator valves must be opened to maximum, and all doors and windows must be closed. The setting is done in small steps and a break of two hours must be made after every change.

Please note: Setting the maximum temperature of the heating water on the control panel of the boiler can affect the equithermal control activity. The heating water temperature selected on the control panel is also the limiting temperature. The room control unit cannot exceed the temperature limit set on the control panel of the boiler.

Adequate setting of the heating water temperature on the control panel of the boiler is one of the ways of preventing the permitted maximum temperature being exceeded for the heating system (floor heating). Even despite this, the boiler must be fitted with an emergency thermostat for floor heating (not part of standard delivery). The emergency thermostat for floor heating is to be connected to the input terminal board of the boiler (see the electrical wiring diagram, see 13)

Note: The boiler is factory-fitted with a jumper on the terminals for connecting an emergency thermostat for floor heating. Before the thermostat is connected, the jumper must be removed.



Equithermal mode

Display	E-	E0	E1	E2	E3	E4	E5	E6	E7	E8	E9
Curve	0	0,2	0,4	0,6	1,0	1,2	1,5	2,0	2,5	3,0	3,5

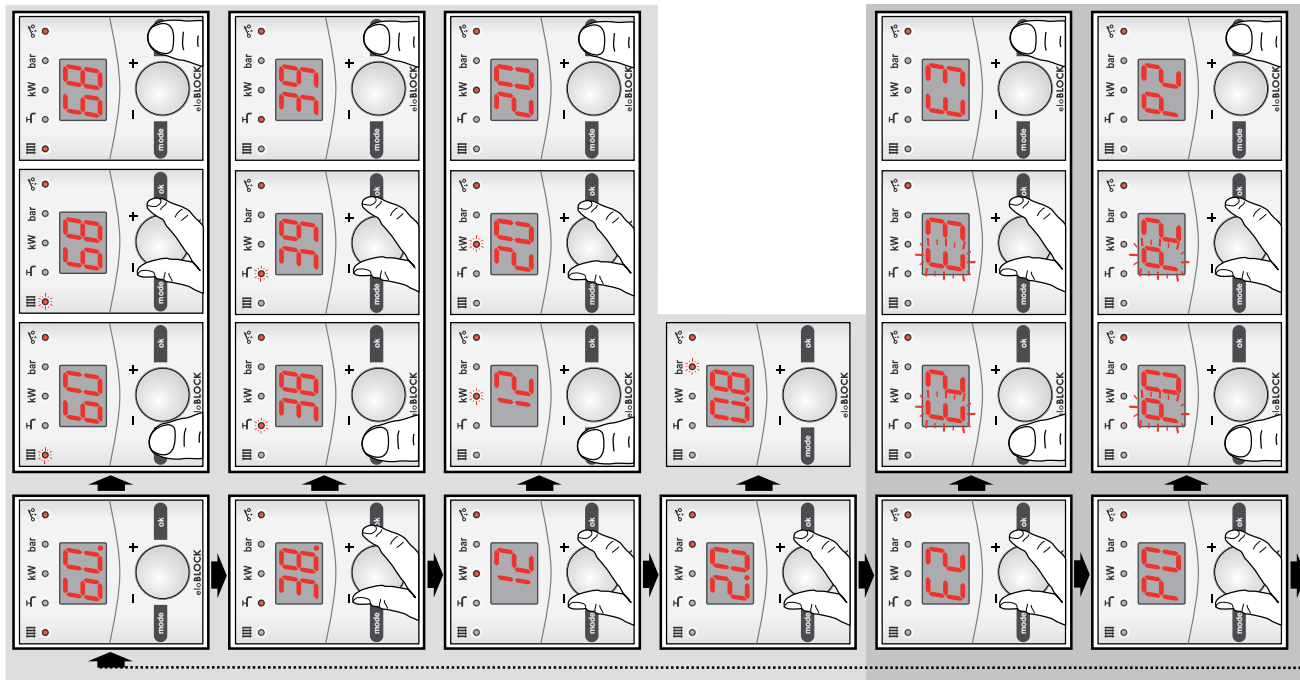
Display	P-	P0	P1	P2	P3	P4	P5	P6	P7	P8	P9
Required temperature	20	15	16	17	18	19	21	22	23	24	25

Example of equithermal curve setting

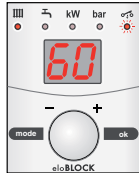
If the heating curve 1.2 is chosen and, at the same time, a temperature different than 20 °C, for example a temperature of 22°C is chosen as the temperature required for the heated area, the heating curve will shift according to the example (Pic.3). The selected heating curve 1.2 is in parallel shifted on the axis „D“ at an angle of 45 °. The result is that at the required temperature of 22 °C for the heated area and the outdoor temperature of 5 °C, the control automatically calculates the required temperature of the heating water to approx. 56 °C.

Please note: If the required room temperature is not reached or the raising of the temperature in the room is too slow, select a higher number for the heating curve.

Boiler control diagram



Boiler fault conditions



Stuck relay

In this situation, the HDO LED will begin to flash on the control panel. The boiler will try to free the relay. If it fails, the display will show error F41. The boiler will keep on working at the minimum temperature. After having been switched on and off, the boiler will work in the standard mode, but the HDO LED will keep flashing. It is necessary to call an authorized service technician.

Inspection:

1. On completion of the requirements for the heating - at end of a cycle in R & D (disengagement RT) or HoW (container is at the desired temperature).
2. The activation of a software limiter temperature, ie setpointu come to exceed 5 °C.

Note: The function is active whenever the boiler is in „standby“ mode (does not meet any requirement). Whenever it comes to the activation of the detector is carried out.

If the boiler is working with jumper and external sensor offhand HoW, may come to detect relay glued to the moment when the temperature in the system is not about 5 °C greater than the calculated equitherm.

Check bonded relay is tied to the regime in which the boiler is working. It is tied to the state of the heating function. In this state, not the boiler heat and there is a bonded relay control is always active. The boiler in this state will always come to an end when heating spirals, ie:

1. after the R & D requirements for heating, HoW, frost protection - heating.
2. to activate the software limiter temperature - setpoint + 5 °C

Note: By activating the detector (eg accidental contact relay switching on) the function is activated (ie, as in point 1).

So in:

HoW: it can happen - 1 and 2

HeW: room thermostat - 1 and 2

HeW: jumper + external sensor

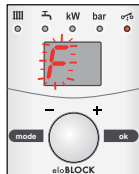
Boiler fault conditions



Decrease of heating water pressure in the system

If the heating water pressure decreases below 0.8 bar, the bar LED will begin to flash. The boiler will keep on working, but the pressure in the system needs to be increased by topping-up the water in the heating system to the required value of 1 – 2 bars. After reaching the required pressure in the heating system, the boiler will return to its standard mode.

If the fault persists, call an authorized service technician.



Display of fault conditions – F code

When displaying the boiler fault conditions, using the fault code the display alternately shows the letter F and the relevant two-digit number which identifies a specific fault.

In such case, the boiler is out of service. Call an authorized service technician.

Chybové hlásenia



F.00 - Disconnected NTC sensor at the outlet of the heating water

- the fault is displayed when the NTC sensor is disconnected at the outlet
- the fault is automatically removed after the NTC sensor is reconnected
- the NTC sensor is detected as having been disconnected if the voltage is higher than 4.75V



F.10 - Short-circuit to the NTC sensor at the outlet of the heating water

- the fault is displayed when a short-circuit occurs to the NTC sensor at the outlet
- the fault is automatically removed after the NTC sensor is reconnected
- the NTC sensor is detected as having been short-circuited if the voltage is lower than 0.45V



F.13 - Short-circuit to the NTS sensor of the external hot water tank

- the fault is displayed when a short-circuit occurs to the NTC sensor of the external hot water tank
- the fault is automatically removed after the NTC sensor is reconnected
- the NTC sensor is detected as having been short-circuited if the voltage is lower than 0.45V



F.19 - Short-circuit to the NTC outdoor temperature sensor

- the fault is displayed when a short-circuit occurs to NTC outdoor temperature sensor
- the fault is automatically removed after the NTC sensor is reconnected
- the NTC sensor is detected as having been short-circuited if the voltage is lower than 0.45V
- the fault is not displayed if the equithermal control function is off (E-)

Error messages



F.20 - Boiler overheating

- the fault is displayed if the safety thermostat is activated due to the boiler overheating
- the fault is automatically removed after a manual reset of the safety thermostat



F.22 - Water loss – low pressure in the heating system

- the fault is displayed if the heating water pressure decreases below 0.6 bar
- the fault is automatically removed if the heating water pressure increases above 0.6 bar by topping-up the water in the heating system
- the fault is not displayed if the pressure sensor is faulty



F.41 - Stuck relay

- the fault is displayed if the boiler fails to free the relay 5 times in a row
- the fault is removed after the boiler is switched off and on again
- after the boiler is switched on again, the boiler keeps signalling the sticking relay through the flashing HDO LED
- the fault is deleted after the boiler factory settings are restored to the EEPROM (code d.96)



F.63 - EEPROM memory error

- the fault is displayed if an error occurs in the data stored in the EEPROM or if an error occurs in the EEPROM communication
- the fault is removed after the boiler factory settings are restored to the EEPROM (code d.96)

Error messages



F.73 - Short-circuit (signal – GND) or disconnection of the heating water pressure sensor

- the fault is displayed when the heating water pressure sensor is short-circuited (signal – GND) or disconnected
- the fault is automatically removed when the pressure sensor is reconnected to the correct place
- the sensor is detected as having been short-circuited or disconnected, if the voltage is lower than 1V



F.74 - Short-circuit (signal - +5V) to the heating water pressure sensor

- the fault is displayed when the heating water pressure sensor is short-circuited (signal – GND) or disconnected
- the fault is automatically removed when the pressure sensor is reconnected to the correct place
- the sensor is detected as having been short-circuited with +5V, if the voltage is higher than 4V



F.85 - Boiler freezing

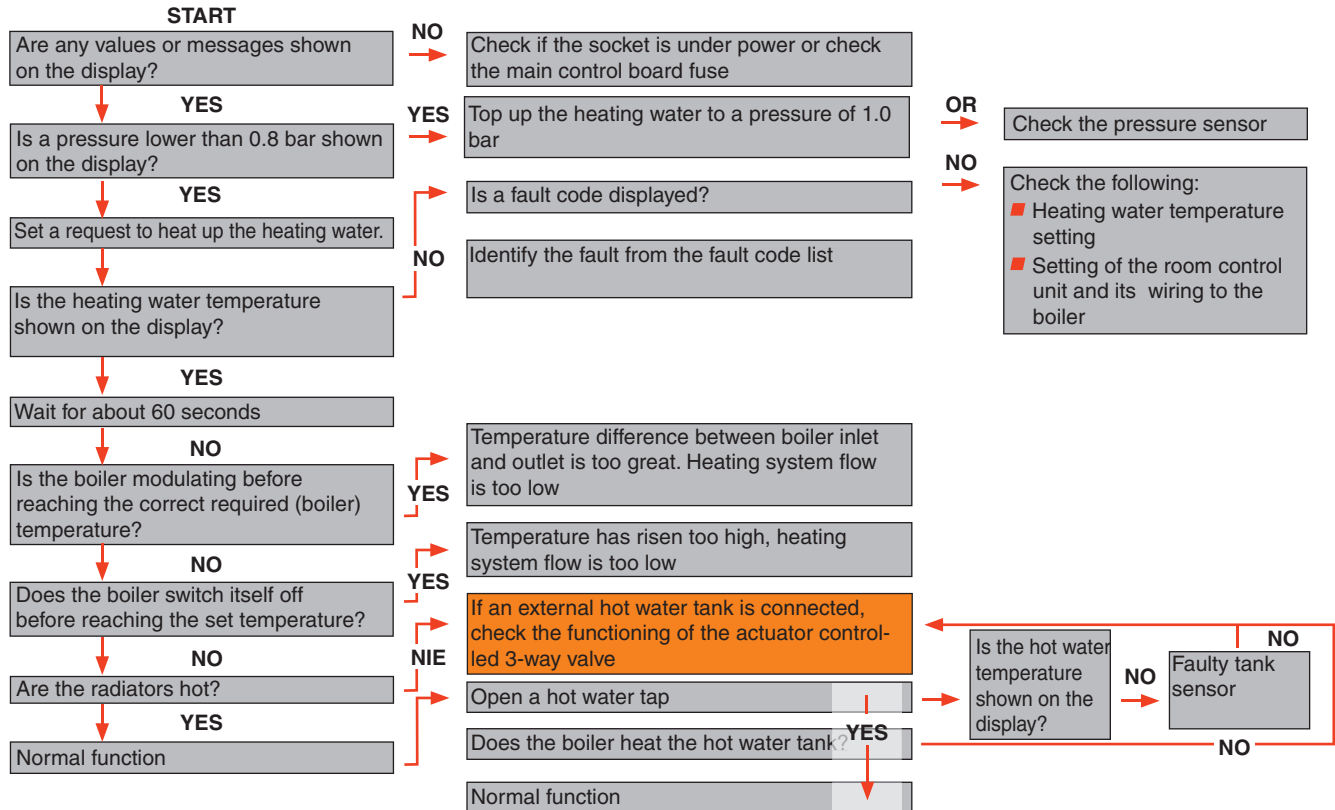
- the fault is displayed if the temperature on the NTC sensor at the heating water outlet drops below 3 °C
- the fault is automatically removed when the temperature on the NTC sensor at the heating water inlet rises to 4 °C
- the fault is not displayed if the NTC sensor at the outlet is faulty



F.86 - External hot water tank freezing

- the fault is displayed if the temperature on the NTC sensor of the hot water tank drops below 3 °C
- the fault is automatically removed when the temperature on the NTC sensor of the hot water tank rises to 4 °C
- the fault is not displayed if the NTC sensor of the hot water tank is faulty or the heating of water in the tank is off – heating of water is set to „--“

Localising faults



Service mode

Please note: The service regime allows access to and setting of service parameter values (d-codes) of EloBLOCK electric boilers to which the end user has no access.

Access to service mode

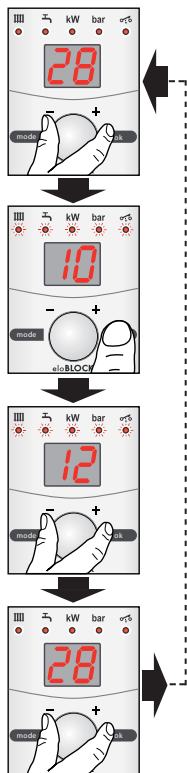
Turn the circular control to the right „+“ or left „-“ will move to display the pressure in the HeW system (bar LED light on the control panel of the boiler).



Press and hold MODE, at least 10 seconds, moving into the service mode (LED lit all the boiler control panel, the display shows the number of service parameter).

Service mode

Turn the circular control to right „+“ or left „-“ show the required service parameter.



Press the OK to select the desired service parameter (all the diodes on the control panel of the boiler intermittently lit (flashing) is displayed on the display current set value of the selected service parameter).

Turn the circular control to right „+“ or left „-“ set the desired value of the selected service parameter.

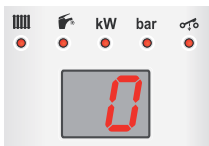
Press the OK to confirm the desired value of the selected service parameter and return to the selection of service parameter (all leds lit on boiler control panel, the display shows the number of service parameter).

Service mode



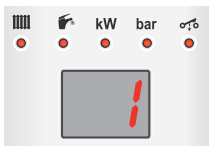
The current pressing buttons MODE and OK to return to the imaging mode (reading mode).
The non-withdrawal from service mode to 4 minutes, the boiler itself automatically switches to display mode.

Parameter setting – service mode



d.00 - Setting the maximum output in kW in the heating water system

Setting the maximum boiler output for heating the heating water in the system.
The maximum output value can be set depending on the type of boiler.
Factory setting: maximum output

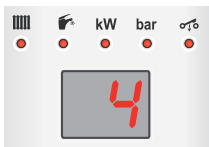


d.01 - Setting the pump switch-off delay for the heating water system in minutes

Setting the switch-off delay for the pump after the heating of heating water in the system is finished.
Setting range:

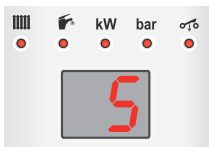
- the pump runs constantly - PE
- maximum switch-off delay - 60
- minimum switch-off delay - 2

Factory setting: 10



d.04 - Displaying the actual hot water temperature

Displaying the actual temperature in the external hot water tank.
The temperature is only displayed if the tank NTC sensor is connected.

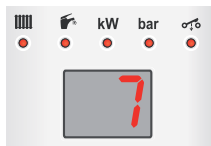


d.05 - Displaying the target heating water temperature

Displaying the target temperature of the primary circuit depends on the actual status of heating (heating of the heating water in the system, water tank and antifreeze protection, equithermal control).

Example: When heating the heating water in the system, it shows the set temperature of the heating water; during equithermal control, it shows the calculated temperature of the heating water based on the equithermal control setting.

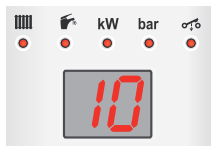
Parameter setting – service mode



d.07 - Setting the hot water temperature in °C

Setting the target temperature for the water in the external hot water tank. The setting is identical with the user setting.

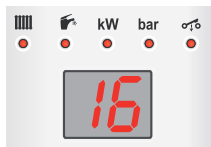
Factory setting: 60



d.10 - Displaying the actual pump speed

Displaying the actual speed of the heating water pump:

- 0 - the pump is idle
- 1 - 1st level, the pump runs at its highest speed
- 2 - 2nd level, the pump runs at its lowest speed

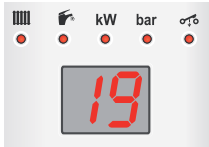


d.16 - Request from room control unit

Displaying the actual status of the room control unit.

- 0 - disconnected, no request to heat the heating water
- 1 - connected, request from the room control unit to heat the heating water

Parameter setting – service mode



d.19 - Setting the pump

The boiler is equipped with a 2-speed pump with automatic speed switching.

- 1 - 1st level, high speed
- 2 - 2nd level, low speed

The table shows the setting modes for the pump speed for individual heating phases.

Mode	Hot water heating	Hot water heating switch-off delay	Heating water heating	Switch-off delay in the heating water system
0	1. st	1. st	1. st	1. st
1	1. st	1. st	1. st	2. st
2	1. st	1. st	2. st	2. st
3	2. st	2. st	2. st	2. st

Factory setting: 1

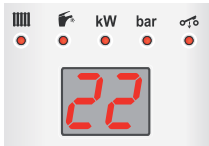


d.20 - Setting the maximum water temperature in the tank in °C

Setting the maximum temperature allowed in the external hot water tank in °C.

Setting range: - maximum: 70
 - minimum: 35

Factory setting: 65

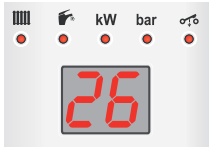


d.22 - Request for tank reheating

Displaying the reheating status of the external hot water tank.

- 0 - no request to reheat the tank
- 1 - active request to reheat the tank

Parameter setting – service mode

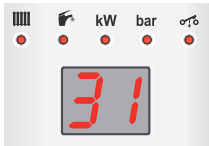


d.26 - Fault signalling using the 3-way valve

If the boiler is not used for heating the water in the external tank, the connector for connecting the actuator-controlled 3-way valve (electrical diagram of the boiler, see 17) can be used for signalling boiler faults.

- 0 - works as a 3-way valve
- 1 - works as fault signalling (cannot be set if the external hot water tank NTC sensor is connected)

Factory setting: 0



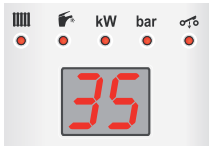
d.31 - Setting the target temperature for the heating water in the system in °C

Setting the target temperature of the heating water in the system. The setting is identical with the user setting.

Setting range: - maximum: 85

- minimum: 25

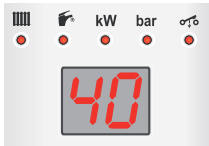
Factory setting: 80



d.35 - Actual position of the actuator-controlled 3-way valve

Displaying the actual status of the actuator-controlled 3-way valve:

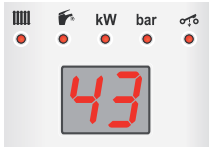
- 0 - heating of the heating water in the heating system
- 1 - the valve is changing position – undefined position
- 2 - heating the external hot water tank



d.40 - Actual temperature of heating water at the outlet in °C

Displaying the actual temperature of the heating water at the outlet of the boiler.

Parameter setting – service mode

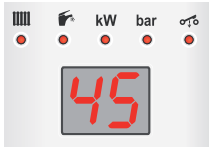


d.43 - Setting the equithermal curve

Setting the equithermal curve values - E:

Display	E-	E0	E1	E2	E3	E4	E5	E6	E7	E8	E9
Curve	0	0,2	0,4	0,6	1,0	1,2	1,5	2,0	2,5	3,0	3,5

Factory setting: E-



d.45 - Setting the equithermal curve shift

Setting the equithermal curve shift - P

Display	P-	P0	P1	P2	P3	P4	P5	P6	P7	P8	P9
Required temp.	20	15	16	17	18	19	21	22	23	24	25

Factory setting: P-

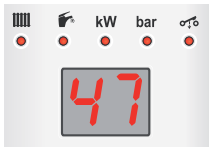


d.46 - Heating system switch-off temperature

Setting the outdoor temperature at which the boiler will switch the heating of heating water in the system – summer mode (only if an outdoor temperature sensor is connected):

Setting range: 15 - 25

Factory setting: 22

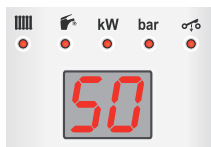


d.47 - Actual outdoor temperature in °C

Displaying the actual outdoor temperature in °C.

Display is only possible if an outdoor temperature sensor is connected to the boiler.

Parameter setting – service mode

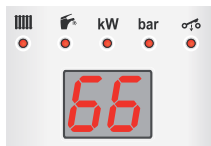


d.50 - Deactivation of antifreeze protections

If the boiler is operated with an antifreeze mixture, antifreeze protection of the boiler and the external hot water tank can be deactivated.

- 0 - antifreeze protection is active
- 1 - antifreeze protection is inactive

Factory setting: 0

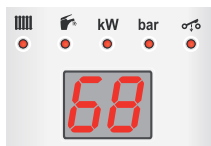


d.66 - Setting the switching of heating units

Setting the method of switching heating units or individual parts (coils) thereof:

- 0 - continuous output modulation
- 1 - symmetric switching - switching of individual heating units

Factory setting: 0

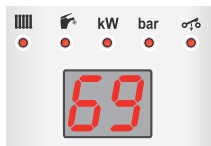


d.68 - Setting the release relay entry function

The value of the parameter determines which phase will be restricted upon output:

- 0 - the output restriction is off
- 1 - L1 phase restriction;
- 2 - L2 phase restriction;
- 3 - L3 phase restriction
- 4 - all phase restriction

Factory setting: 0



d.69 - Setting the reserved output in kW

Setting the output reserved for other electrical equipment.

The possible setting values depend on the setting of parameter d.68

Value of parameter d.68	d.69 - minimum	d.69 - maximum
1, 2, 3	0	max. output / 3
4	0	max. output

Factory setting: 0

Parameter setting – service mode

Function of boiler operation in symmetric mode.

Activating this mode will switch the boiler in three coils at once – parameter d.66. It means that each phase will involve the same number of coils, except for activating the release relay input with function 1, 2, 3 (reservation of output on separate phases). After deactivation, the load will be readjusted. If it is necessary to maintain symmetrical mode even after activating the release relay input, its function needs to be set to 4 (all phase reservation).

Functions and setting the entry of release relay.

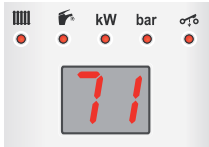
The entry for the release relay is intended for temporary restriction of the boiler output; reservation of output for other equipment connected to the same distribution network as the electric boiler. The setting is split into two parameters. Parameter d.68 activates and at the same time sets the phases on which the output is to be reserved. If the parameter is set to 0, the output reservation function is inactive. If the parameter is set to 1, 2, 3, the output is only reserved from one phase. If the parameter is set to 4, the output is reserved from all phases. Parameter d.69 thus sets the value of the reserved output, while the setting depends on the setting of parameter d.68. The output will be reserved from the maximum output of the boiler.

Note: Each heating unit consists of three heating coils. For example, the 9K boiler has two units: one 3kW unit with 1kW coils ($1\text{kW} \times 3 = 3\text{kW}$) and one 6kW unit with 2kW coils ($2\text{kW} \times 3 = 6\text{kW}$). Each phase involves one 1 kW coil and one 2kW coil. The 18K boiler has three 6kW units, each having three 2kW coils, i.e. $2\text{kW} \times 3 = 6\text{kW} \times 3 = 18\text{kW}$.

Examples:

1. Connection of an 18K electric boiler (18kW output) and a separate electric hot water tank with 2.5kW output. The tank is connected to the L2 phase (we assume that the L2 phase is connected to terminal "V").
 - d.68 – setting 2, disconnecting output from L2 phase.
 - d.69 – setting 4, reserving 4kW output. After activating the release relay entry, the maximum output of the boiler will be restricted to 14kW with a maximum of 1 coil connected on the L2 phase.
2. Connection of a 28K electric boiler (28kW output) and a three-phase electrical equipment with 5kW output.
 - d.68 - setting 4, disconnecting output from all 3 phases.
 - d.69 - setting 7, reserving 7kW output. After activating the release relay entry, the maximum output of the boiler will be restricted to 21kW with a maximum of 3 coils connected on each phase.

Parameter setting – service mode

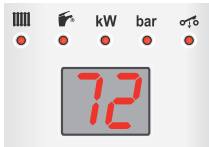


d.71 - Setting the maximum temperature of the heating water in the system in °C

Setting the maximum temperature of the heating water in the heating system in °C.

Setting range: - maximum: 85
 - minimum: 25

Factory setting: 80

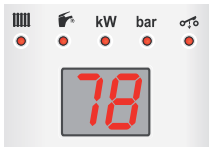


d.72 - Setting the pump switch-off delay for the water tank in minutes

Setting the pump switch-off delay after the heating of the external hot water tank is finished, in minutes.

Setting range: - maximum: 10
 - minimum: 1

Factory setting: 1



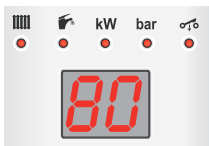
d.78 - Setting the temperature of the hot water during tank heating

Setting the temperature variance during the heating of the external hot water tank. Final temperature = set hot water temperature + parameter value

Setting range: - maximum: 50
 - minimum: 5

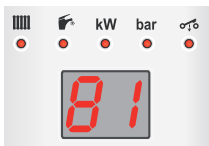
Factory setting: 50

Parameter setting – service mode



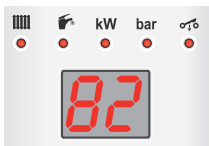
d.80 - Boiler operation for the heating water in hours

Zobrazenie času prevádzky kotla do VV v hodinách.



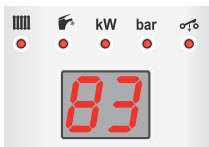
d.81 - Boiler operation for the hot water tank in hours

Displaying the time of operation of the boiler for the external hot water tank in hours.



d.82 - Number of heating cycles for the heating water

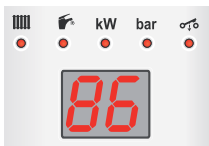
Displaying the number of heating cycles for the heating water. A heating cycle is understood to be the time from the receipt of a request for heating in the heating water system until its completion.



d.83 - Number of heating cycles for the hot water tank

Displaying the number of heating cycles for the hot water tank. A heating cycle is understood to be the time from the receipt of a request to reheat the external hot water tank until its completion.

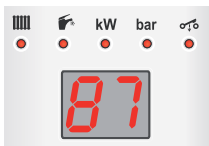
Parameter setting – service mode



d.86 - Average number of relay cycles

Displaying the average number of cycles for each relay x 100.

Example: If the display shows number = 1 23 45, the average number of cycles for each relay is 1 234 500.

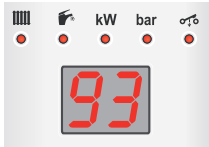


d.87 - Average coil heating time

Displaying the average heating time of each coil in hours.

Note: The display of values for codes d.80, d.81, d.82, d.83 and d.87 is explained on page 13, in the paragraph "Display of statistical values".

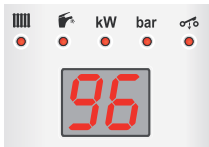
Parameter setting – service mode



d.93 - Setting the type of boiler

Setting range: - maximum: 8
- minimum: 1

Value	Type of boiler	Heating units (kW)	Minimum switching step	Starting output into the system
1	6 K	0 : 0 : 3 : 3	1000 W	3 kW
2	9 K	0 : 0 : 6 : 3	1000 W (2000 W)	3 kW
3	12 K	0 : 0 : 6 : 6	2000 W	6 kW
4	14 K	0 : 0 : 7 : 7	2334 W	7 kW
5	18 K	0 : 6 : 6 : 6	2000 W	6 kW
6	21 K	0 : 7 : 7 : 7	2334 W	7 kW
7	24 K	6 : 6 : 6 : 6	2000 W	6 kW
8	28 K	7 : 7 : 7 : 7	2334 W	7 kW



d.96 - Factory settings

Setting the boiler to factory setting values (EEPROM overwrite). Statistical information of the boiler will not be deleted.

Set the value "1" and confirm the setting to restore the boiler factory settings.

Parameter setting – service mode

The table shows the values of the parameters set by the manufacturer. When restoring the factory settings (using parameter d.96); the value of the parameters will change according to the following table and to come to delete the stuck relay signals:

Parameter	Factory setting
d.00	max. output
d.01	10
d.07	60
d.19	1
d.20	65
d.26	0
d.31	80
d.43	E-
d.45	P-
d.46	22
d.50	0
d.66	0
d.68	0
d.69	0
d.71	80
d.72	1
d.78	50

Setting the boiler

- Air-bleeding the system

Air-bleeding the system

Before first activation of the boiler, bleed air from the boiler heat exchanger using the manual air-release valve. To prevent undesired penetration of water into the electrical system of the boiler, the air-release valve is fitted with a hose. When bleeding the system, attach a container to the end of the hose to prevent water penetrating into the boiler electrical system.



Components

- Description
- Dismantling

Hydroblock



Pump

Description

Manufacturer: Wilo
Power supply: 230V/50Hz
Number of speeds: 2
Speed 1: 2500
Speed 2: 2600

Please note: Before running the boiler, we recommend taking the following steps.

- Unscrew the cap (c) of the air release valve.
- Loosen and unscrew the rotor shaft cover (K) and turn the shaft using a flat screwdriver. If you feel any noticeable resistance when turning the shaft, the motor part of the pump must be dismantled. After this has been done, clean the entire armature and stator. If clogging of the pump occurred after the boiler was put into service, such type of repair cannot be claimed under warranty.



Dismantling the pump

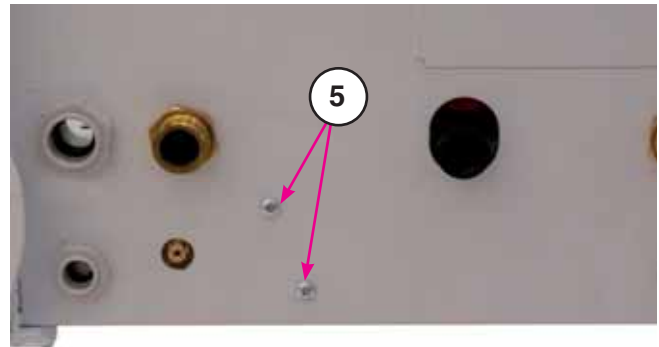
Before starting to dismantle the pump, ensure that the following conditions have been met:

- The heating water inside the boiler has reached a safe temperature (40 °C).
- The boiler has been switched off at the main switch.
- The heating water inlet and outlet have been closed.
- Water has been drained from the boiler.

Dismantling procedure

- Remove the connecting cable of the pump from the control panel of the boiler (1).
- Remove the heating water pipe between the pump and the heat exchanger (2).
- Remove the expansion tank pipe (3).
- Pull out the safety clip (4).
- Release and unscrew the pump safety screws on the bottom of the boiler (5).
- Smoothly turn the pump clockwise to remove it

Please note: When reinstalling the pump, always use new gaskets. To make the installation of the pump easier, apply some water-based petrolatum to the O-ring seals.



Safety valve

Characteristic

If the maximum allowed pressure inside the boiler is exceeded, the safety valve ensures the safe release of water.

Specification

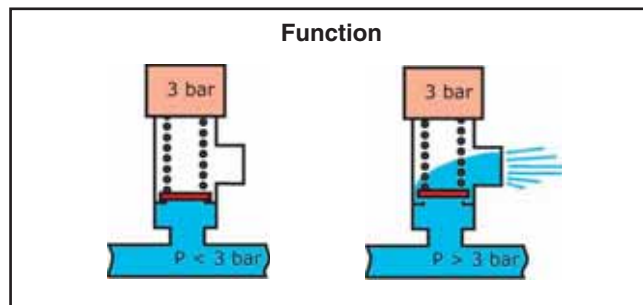
Transfer pressure (P): 3 bars

Please note: We recommend that a suitable discharge hose be fitted to the overflow output of the safety valve.

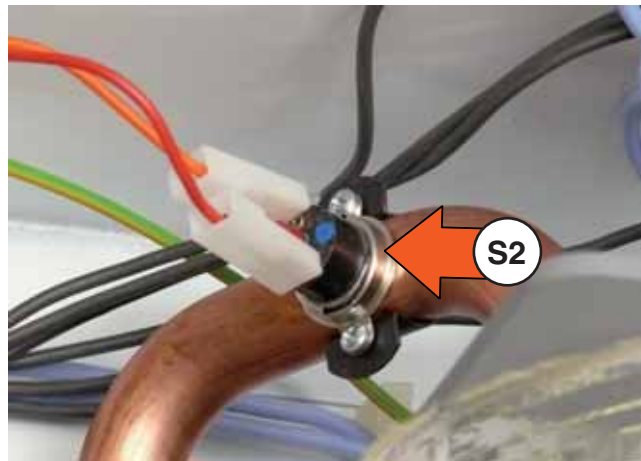
When dismantling the safety valve

V prípade demontáže poistného ventilu:

- Let the boiler cool down to about 40 °C.
- Disconnect the boiler from the power supply.
- Shut all taps beneath the boiler.
- Remove the safety valve vent.
- Drain water from the boiler using the drain valve.
- Remove the safety clip from the safety valve (1) - see illustration.



Heating water temperature sensors



Description

Heating water temperature sensor (S1). To replace it, remove the entire sensor with the clip and disconnect both connectors.

Emergency thermostat (S2). 100 °C = boiler shutdown - fault F20. The emergency thermostat is located on the outlet of the boiler heat exchanger. To replace it, unscrew the two screws on the thermostat bracket, remove the entire thermostat with the bracket and disconnect both connectors.

Pressure sensor - description

Properties

The pressure sensor measures the water pressure inside the boiler (heating system).

If there is not enough water in the boiler, the pressure sensor sends the information to the boiler control panel which shuts down the boiler.

Description of the function

The water pressure increases the volume of a membrane which carries a magnet. The magnet is located opposite a Hall's probe which changes the output voltage for the boiler control panel on the basis of changes in the magnetic field. Changes in the magnetic field depend on the distance between the Hall's probe and the position of the magnet.

Measuring points

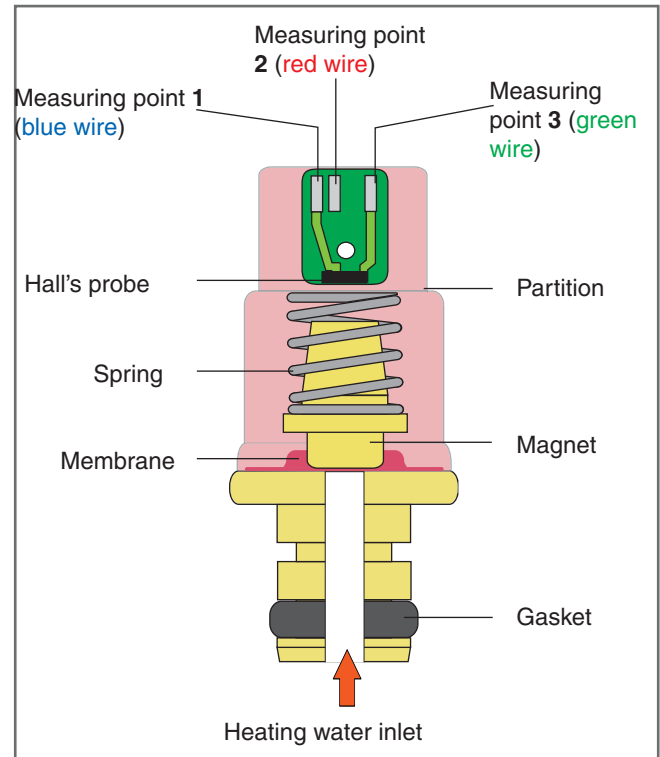
Sensor input voltage: Measuring points 1 and 2 = 5 V DC

Control values: Measuring points 1 and 3

at 1 bar / 1,7V DC

at 1,5 bar / 2V DC

at 2 bar / 2,3V DC

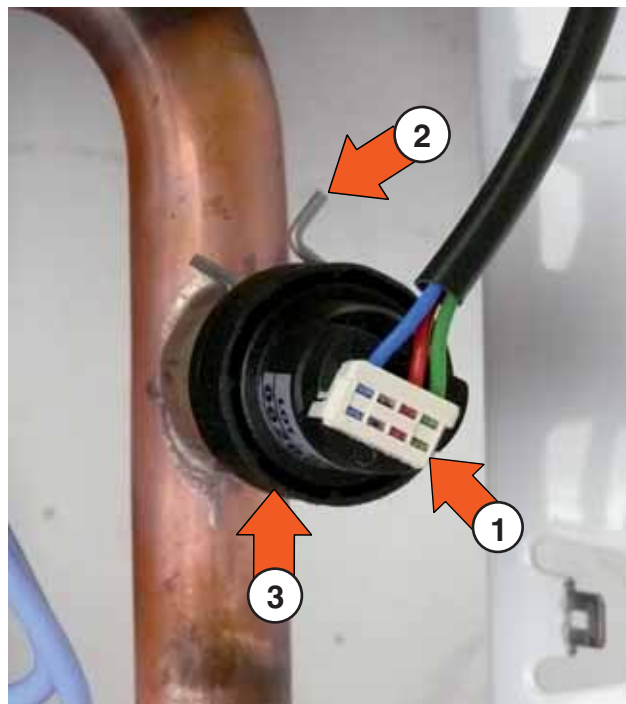


Dismantling the pressure sensor

Dismantling

Before starting to dismantle the pressure sensor, shut off the heating water supply to the boiler and then drain the boiler using the drain valve.

- Pull off the pressure sensor connector (1).
- Using a flat screwdriver, remove the pressure sensor safety clip (2).
- Pull to remove the pressure sensor (3).



Dismantling the heating water exchanger

Before dismantling the heating water exchanger, ensure that the following conditions have been met:

- The heating water and hot water inside the boiler have reached a safe temperature (40 °C).
- The boiler has been switched off at the main switch.
- The boiler has been disconnected from the main power supply.
- All heating water inlets and outlets have been closed.
- Water has been drained from the boiler.

Dismantling procedure

- Remove the front cover, side cover and top cover of the boiler.
- Disconnect the heating coil wires from the boiler control panel and terminal box N (blue) and disconnect the earth wire.
- Remove the heating water inlet pipe on the bottom of the exchanger (Fig. 1).
- Remove the heating water outlet pipe on the top of the exchanger (Fig. 2).
- Loosen and unscrew the two screws on the top of the exchanger (Fig. 3).
- Remove the entire exchanger from the boiler by pulling it upwards.

Note: Repair of a clogged heat exchanger cannot be claimed under warranty.



Dismantling the heating coils

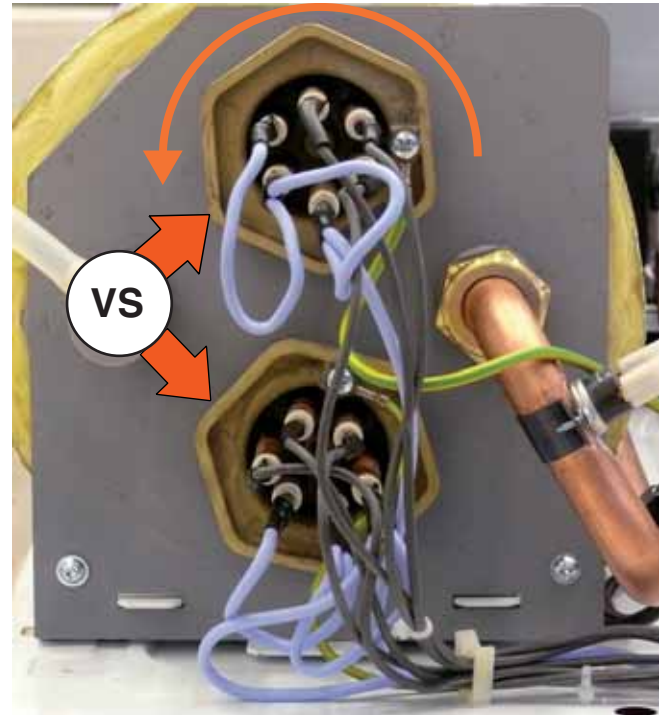
Before dismantling the heating coils (HC), ensure that the following conditions have been met:

- The heating and hot water inside the boiler has reached safe temperature (40 °C).
- The boiler has been switched off with the main switch.
- The boiler has been disconnected from the main power supply.
- All heating water inlets and outlets have been closed.
- Water has been drained from the boiler.

Dismantling procedure

- Remove the front, bottom and top cover of the boiler (according to which coil you wish to remove).
- Disconnect the relevant heating coil wires from the boiler control panel and terminal box N (blue) and disconnect the earth wire.
- Using the right size spanner, unscrew the coil anti-clockwise from the housing of the boiler heat exchanger.

Note: Repair of a clogged heating coil cannot be claimed under warranty.



Expansion vessel

Description

The expansion tank serves to balance the pressure of the heating water which expands when heated. The expansion tank of the boiler is sufficient for up to 90 l of heating water in the system (at a temperature of 75 °C). It is located at the back of the boiler.

Please note: Ensure that the expansion tank is sufficient for the given volume of water in the heating system (see the project documentation for installation).

Filling the expansion tank

Before starting to fill the heating system, check the pressure inside the expansion tank. The initial gas pressure (P_n) inside the expansion tank should be 0.2 bar higher than the static height of the water column (P_{st}) inside the heating system.

Subsequently, allow the heating system to fill. The intake pressure of water (P_f) should be 0.2 – 0.3 bar higher than the gas pressure (P_n) inside the expansion tank. The intake pressure is checked when cold with a manometer on the water side, after air-bleeding.

The expansion tank filling valve is located on its top – see diagram.

Note: If water runs from the filling valve, it is an indication that the expansion tank membrane is damaged, in which case the expansion tank must be replaced.



Expansion vessel

Description

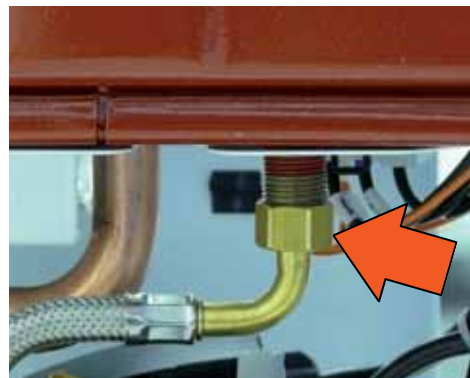
Before dismantling the expansion tank, ensure that the following conditions have been met:

- The heating water inside the boiler has reached a safe temperature (40 °C).
- The boiler has been switched off at the main switch.
- The boiler has been disconnected from the main power supply.
- The heating water inlet and outlet of have been closed.
- Water has been drained from the boiler.

Procedure:

- Loosen and unscrew the screws on the top of the boiler frame.
- Loosen and unscrew the nut on the inlet pipe leading to the expansion tank.
- Remove the expansion tank from behind the boiler by pulling it upwards.

Note: When reinstalling the expansion vessel, always use new seals.

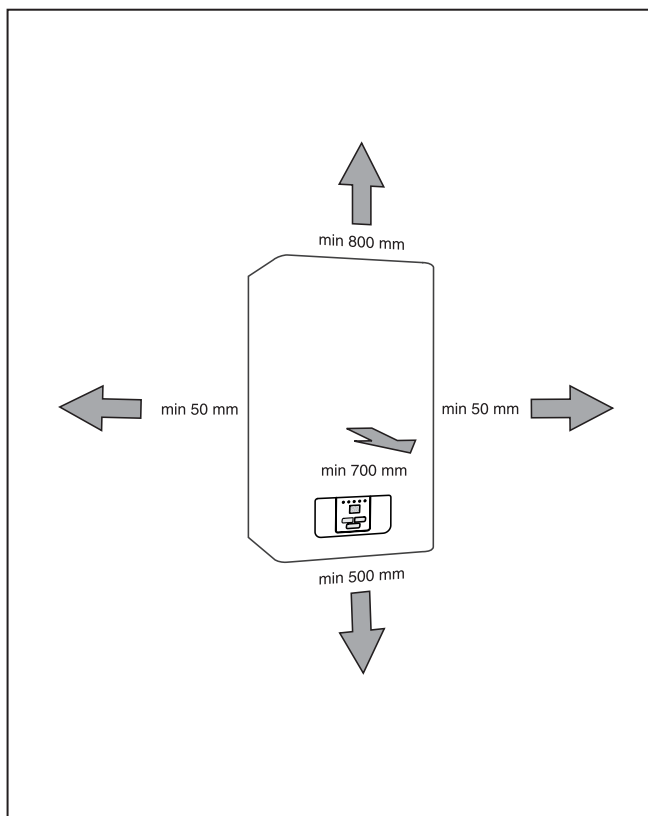




Installing the boiler

- Installation conditions
- Putting the boiler into operation

Recommended boiler installation distances

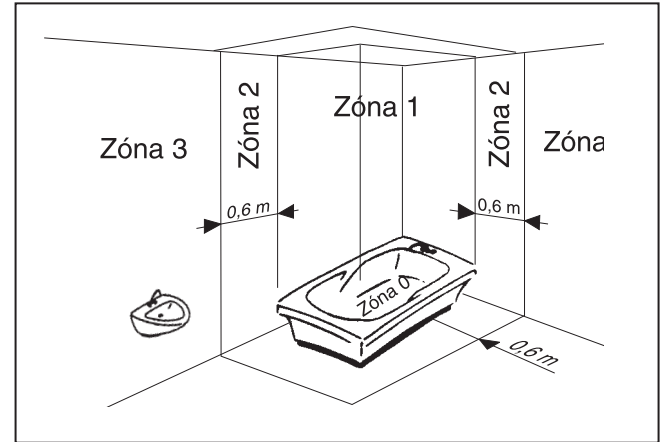


An appropriate place must be chosen for the installation of an electric boiler which allows the necessary access for servicing or service inspections. The minimum distances between the boiler and a fixed obstruction are shown in the diagram.

Installation zones

The boiler must not be installed in the space beneath bathtubs, in bathrooms, washrooms and showers in Zone 0, 1 and 2 according to STN 33 2135-1. It must not also be installed in Zone 3 where there is the risk of a jet of water intended for cleaning (e.g. in public spas, bathtubs and showers used in schools, plants, sport clubs, public facilities, etc.).

If the boiler is installed in the allowed zones, protection against electric shock specified under the same standard must be installed at the same time.



Installation conditions

Note: EloBLOCK v.13 electric boilers have not by-pass, so we recommend add a by-pass directly in the heating system.

Connecting the boiler to heating water distributions

The connection end pieces of the boiler must not be loaded by forces from the heating system pipe-work. This requires using exact dimensions of all connection pipe ends, height-wise and by their distance from the wall and mutual distances between inlets and outlets.

We recommend the boiler connection to the heating system be designed in such a way that when having to repair the boiler, it is possible to drain the heating water from the boiler only.

During reconstruction, under unfavourable construction dispositions, etc., it is possible to connect the boiler to the heating system using flexible parts (hoses) which are intended for such purpose.

If using flexible parts, these should be as short as possible, protected against mechanical and chemical stress and damage and always replaced by new ones prior to the end of their life and reliability to meet their parameters (according to manufacturing data).

Floor heating

The EloBLOCK boiler is adapted for the heating of water in floor heating systems, in which case an emergency thermostat for floor heating (not included) must be connected to the boiler. The emergency thermostat for floor heating is to be connected to the input terminal board of the boiler (see the boiler electrical wiring diagram, see 13).

Note: The boiler is factory-fitted with a jumper on the terminals for connecting an emergency thermostat for floor heating. Before the thermostat is connected, the jumper must be removed.

Operating pressure in the boiler and the heating system

The heating system (measured on the boiler) must be filled to a minimum hydraulic pressure of 1 bar (corresponds to a hydrostatic water column of 10 m). We recommend maintaining the pressure within the range 1 and 2 bar. The boiler expansion vessel is sufficient for a heating system with no more than 90 litres of heating water (at a temperature of 75°C).

Thermostatic heater valves

If the room control unit is installed, at least one heater in the reference room should be left without a thermostatic valve. To increase thermal comfort, we recommend that no thermostatic valves are installed in the room which is fitted with the room control unit.

Installation conditions

Cleanliness of the heating system

Before installing a new boiler, it is essential that the system is thoroughly cleaned. In older systems, all sludge which has accumulated at the bottom of heaters must be flushed out (not only in gravitation systems).

In new systems, conservation products that are used by most manufacturers of heating elements and piping must also be removed.

It is recommended to fit a sludge trap in front of the boiler (i.e. on the heating water return pipe). It should be designed in such a way as to allow emptying at regular intervals without the necessity of draining large amounts of heating water. The sludge trap may be combined with a filter, but a filter with a sieve does not alone provide sufficient protection. The filter and the sludge trap must be regularly checked and cleaned.

Using antifreeze

Because of its properties, the use of antifreeze during boiler operation must be consulted with the Vaillant service centre. In particular, it concerns a reduction in heat transfer, high volume expansion, aging and especially damage to the heating water heat exchangers.

Please note: Boiler faults occurring due to the use of antifreeze are not covered by the boiler warranty

Content delivery

Delivery content:

EloBLOCK boilers are delivered completely assembled and function-tested.

Each delivery includes:

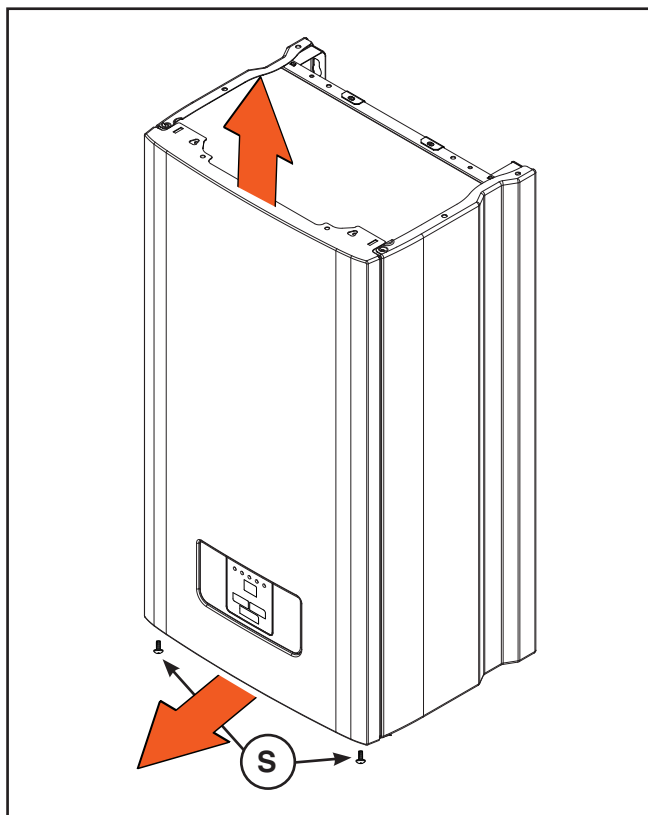
1. Boiler
2. Hanging rails, including fasteners for fixing the boiler on the wall
3. Operating instructions and installation guide
4. Service book
5. List of service centres
6. Warranty certificate

Putting the boiler into service

Before putting the boiler into service, carry out the following basic actions:

- Before filling the boiler with heating water, check the pressure inside the expansion tank and top up if necessary.
 - Ensure that the expansion tank capacity matches the volume of the given heating system.
 - Fill the system and the boiler with heating water to the required operating pressure (1 – 2 bar).
 - Check all heating system and boiler connections for leaks.
 - Check the connection of the boiler to the power supply. Check whether the boiler is protected with adequate fuse types.
 - Release the air-release valve cap.
 - If the boiler will be run with a room thermostat, check its interconnection with the boiler.
 - Turn the boiler on at the main switch.
 - Enter a request to heat (using the room thermostat).
 - Check the boiler output setting and, if necessary, adjust it according to the required values.
 - Adjust the boiler maximum heating output taking into account any heat losses of the building.
 - Check the boiler settings.
 - Air-bleed all heaters and, if necessary, pressurize the heating water system.
- Check the functions of the operating thermostat, thermal fuse, pressure switch and controls on the panel.
 - **Train the operator in controlling the boiler.**
 - Confirm the Warranty Certificate and send the Report of Putting the Boiler into Service to the manufacturer.

Removing the front cover



The front cover of the boiler can be removed after unscrewing two safety screws (S) which are located at the corners of the boiler bottom section – see diagram. Remove the cover by pulling the bottom section towards you and then lift it upwards.

Note: When reinstalling the front cover, ensure that the plastic frame is inserted correctly.

Pressurizing the heating water circuit

Water can be topped up in the heating system (only in small quantities) through the top-up valve, which is recommended to be placed in front of the heating water inlet of the boiler (the top-up valve is not included in the boiler delivery package).

When topping up the water, the following conditions must be met:

1. The pressure of the water supplied to the boiler must always be higher than the pressure of water in the heating system.
2. Water can only be topped up when the boiler is cold (heating water temperature in the boiler is not higher than 30 °C).
3. The recommended pressure of water in the cold boiler (to 30 °C) ranges between 1 – 2 bar.
4. The pressure in the expansion tank must be checked and adjusted to the required value, if necessary.

The manufacturer disclaims responsibility for any damage caused by inappropriate manipulation of the top-up valve and failure to comply with the above requirements.

Damage and failure occurring due to such inappropriate handling are not covered by the boiler warranty.

Pressurizing the heating water circuit:

- Ensure that the boiler is connected to mains electrical power and the main switch is ON.

- If the boiler display indicates the heating water pressure below 0.8 bar, it shows the actual value of the pressure while the bar LED flashes on the boiler control panel.
- Slowly open the top-up valve. Watch the increasing pressure on the control panel display.
- Add water to the system so that the pressure ranges between 1 – 2 bar.
- After the required pressure is reached, close the top-up valve manually.
- Bleed air from all heaters (water must be drained smoothly, without any air bubbles).
- Ensure that the pressure shown on the boiler's display ranges between 1 – 2 bar. If necessary, pressurize the system again

Draining heating water from the boiler

To drain water from the boiler, use the drain valve which is located on the heating water inlet pipe of the boiler.

Full discharge of water from only the boiler or from the entire heating system and its refilling should be carried out through filling (draining) outlets placed at appropriate locations on the heating system.

Filling and draining of water in the heating system and the subsequent operations (air-bleeding, setting the expansion tank) are not covered by the boiler warranty.

If there is a risk of hot water freezing in the boiler or distributions, adequate steps must be taken to ensure the complete removal of water from the system.





Electrical installations

- Electrical installation requirements
- Table of NTC sensor values
- Boiler control board
- Electrical diagrams

Electrical installation requirements

Electrical heating connection is subject to the approval of the local electricity distribution plant. Potential users must request preliminary approval for connecting to higher electrical power and the rate for an apartment with direct heating.

When building new or reconstructing old central heating, it is recommended that the project be prepared by an expert.

Professional installation by an authorized service organization is a condition for obtaining warranty from the manufacturer!

Contact our contracted partners who will connect your boiler in a professional manner and provide advice on the operation of electric heating.

Connection to mains electrical power and the electrical installation can only be carried out by electricians qualified under Act No. 124/2006 Coll.

Electric boilers are designed to be permanently connected to fixed mains power supply distribution. The fixed electrical distribution of the boiler must be fitted with a main switching device where the distance between disconnected contacts is at least 3 mm at all poles, under compliance with the applicable regulations.

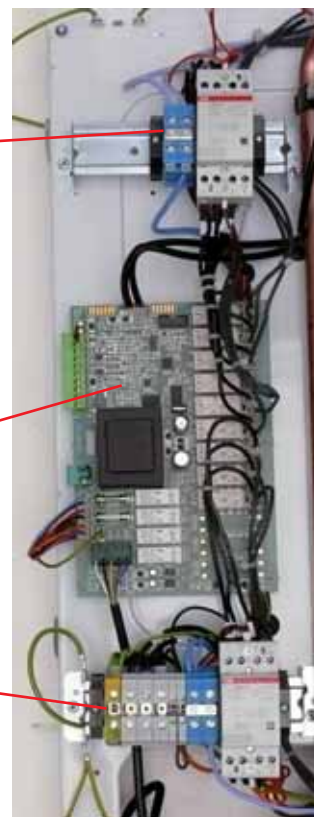
Before assembly, the user must ensure the construction of a power supply with a main switch for heating, short circuit protection and other adjustments of electrical house installations, including an initial review of such installations and registration for electricity consumption.

After connecting the supply wires, it is necessary to check the proper tightening of all screws on power terminals and connectors.

Auxiliary terminals N

main board

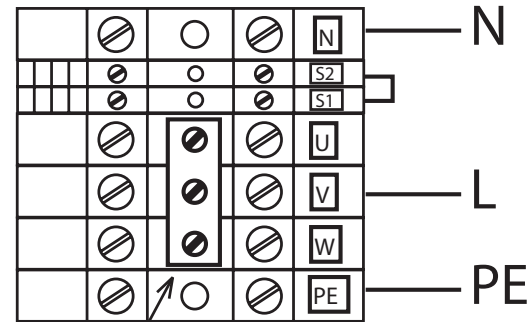
Input terminal box



Electrical installation requirements

Single phase connection

EloBLOCK boilers of the 6 and 9 kW performance series can alternatively also be connected to a 1-phase power network if 3-phase distribution is not available. In such case, it is necessary to use a connecting bridge which is included in the boiler delivery package. The connecting bridge serves to connect the phase conductor terminals on the input terminal box of the boiler.



Electrical installation requirements

Floor heating

The EloBLOCK boiler is adapted for the heating of water in floor heating systems, in which case an emergency thermostat for floor heating (not included) must be connected to the boiler. The emergency thermostat for floor heating is to be connected to the input terminal box of the boiler (see the electrical wiring diagram of the boiler, see 13).

Note: The boiler is factory-fitted with a jumper on the terminals for connecting an emergency thermostat for floor heating. Before the thermostat is connected, the jumper must be removed.

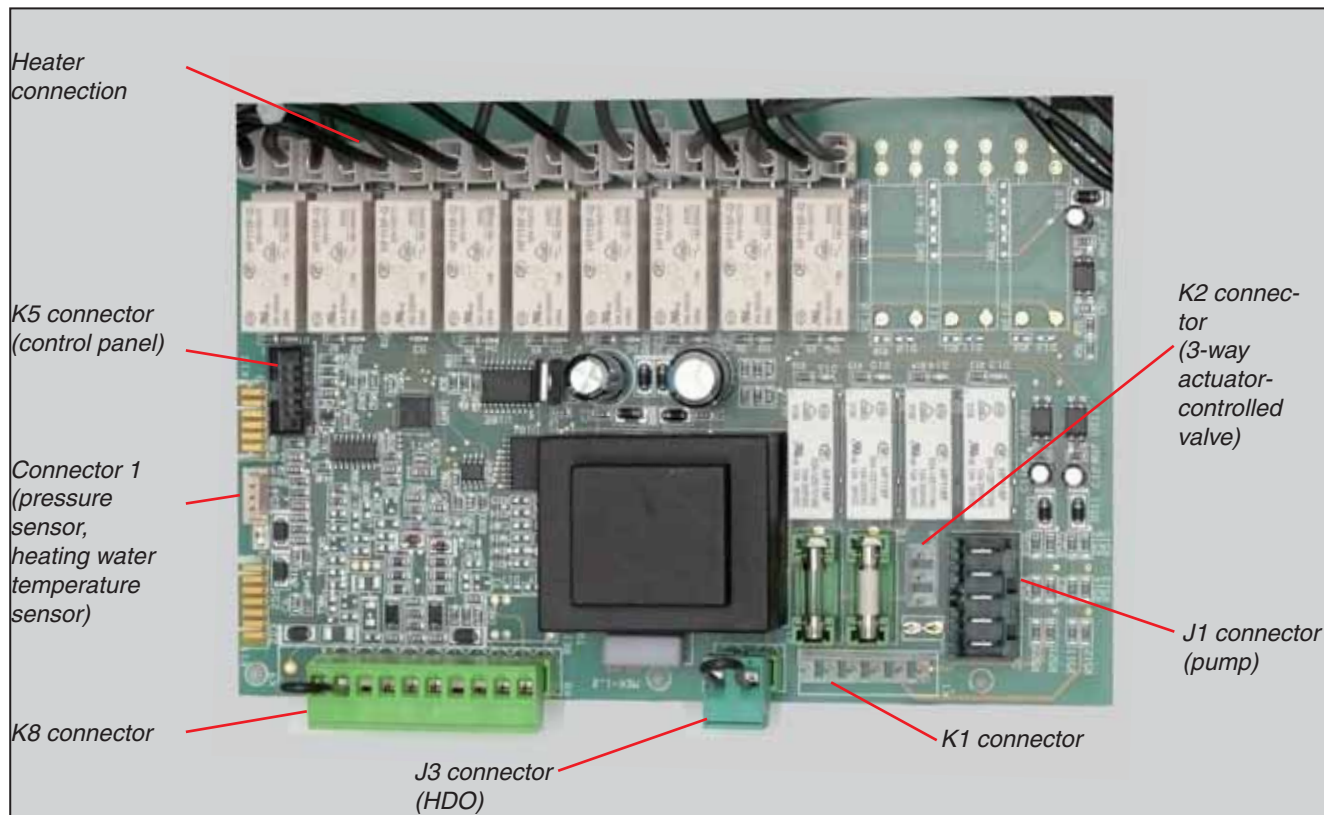


Terminals for connecting an emergency thermostat for floor heating (009642)

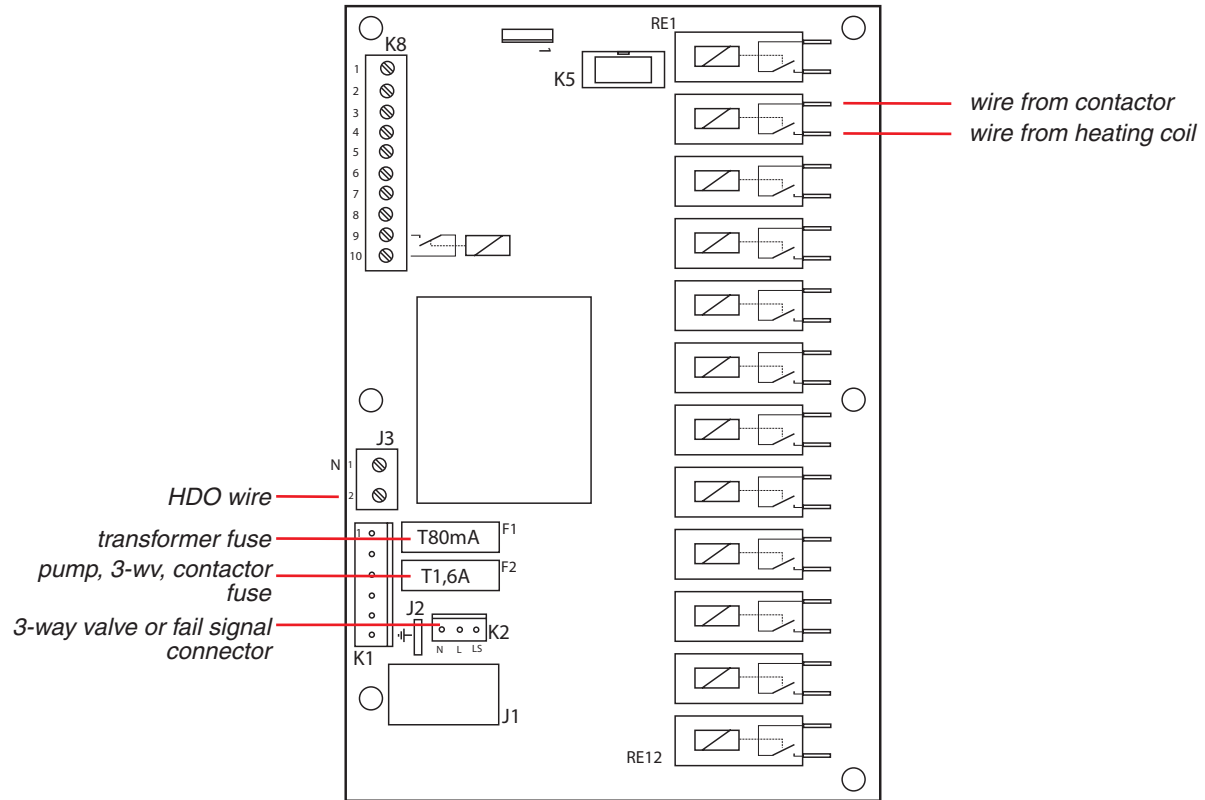
Table of NTC sensor values

Temperature (°C)	Resistance (Ω)
0	32600
10	19900
20	12500
30	8000
40	5300
50	3600
60	2500
70	1750
80	1260
90	920

Main board



Main board



Main board

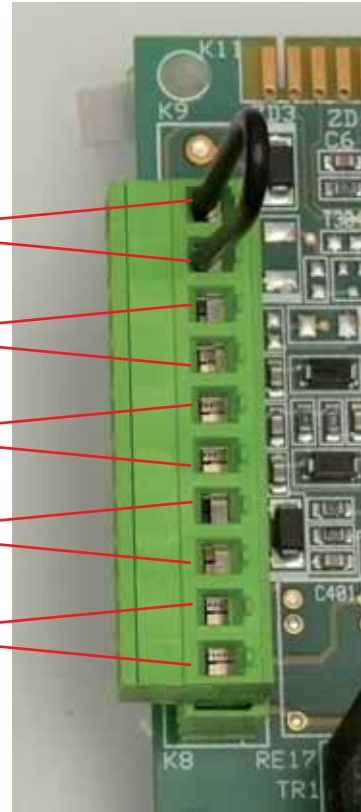
*Terminals for connecting a room control unit
(Before connecting the room control unit, the
jumper must be removed)*

*Terminals for connecting an out-
door temperature sensor*

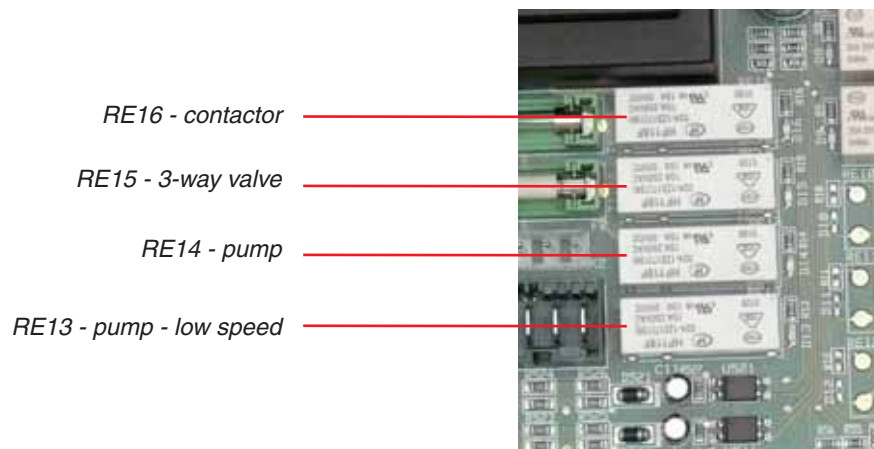
Terminals for connecting a release relay

*Terminals for connecting an NTC tempera-
ture sensor for an external hot water tank*

*Terminals for connecting boilers into a cascade
(only for 24 K and 28 K versions)*



Main board - relays



Control board - interface

Description

The control board is fitted with control components and a segment display. It serves to transfer information to the main control board of the boiler. It is situated beneath the main control board.

control board -
interface



Replacing the control board and interface

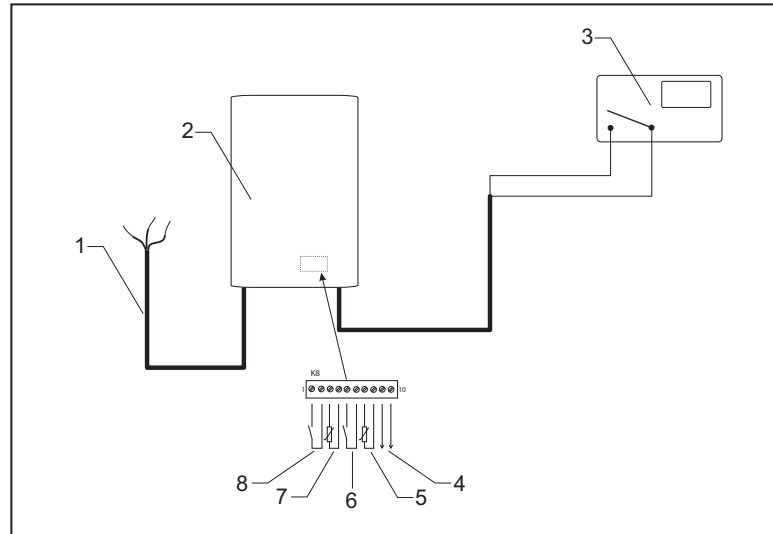
When replacing the control board (BMU) and the interface (AI) in EloBLOCK series boilers, comply with the following procedure:

- Switch the boiler off and disconnect it from the power main.
- Disconnect all connectors on the BMU and AI board.
- Replace the BMU and AI board.
- Connect all connectors to their original place and check the connection accuracy according to the boiler electrical diagram.
- Connect the boiler to the power main and switch it on.
- Check the boiler version - parameter 93, or set the correct value according to the table shown in the Setting the Parameters section.
- Exit service mode and after about 1 minute, switch the boiler off and on again.

Note: After replacing the BMU and AI, the board includes factory settings, so check and adjust all parameters, if necessary.

Note: BMU identifies the version every time you start the boiler. When wrong identification then switch your boiler off and check the connections to AI.

Connection diagram for external devices

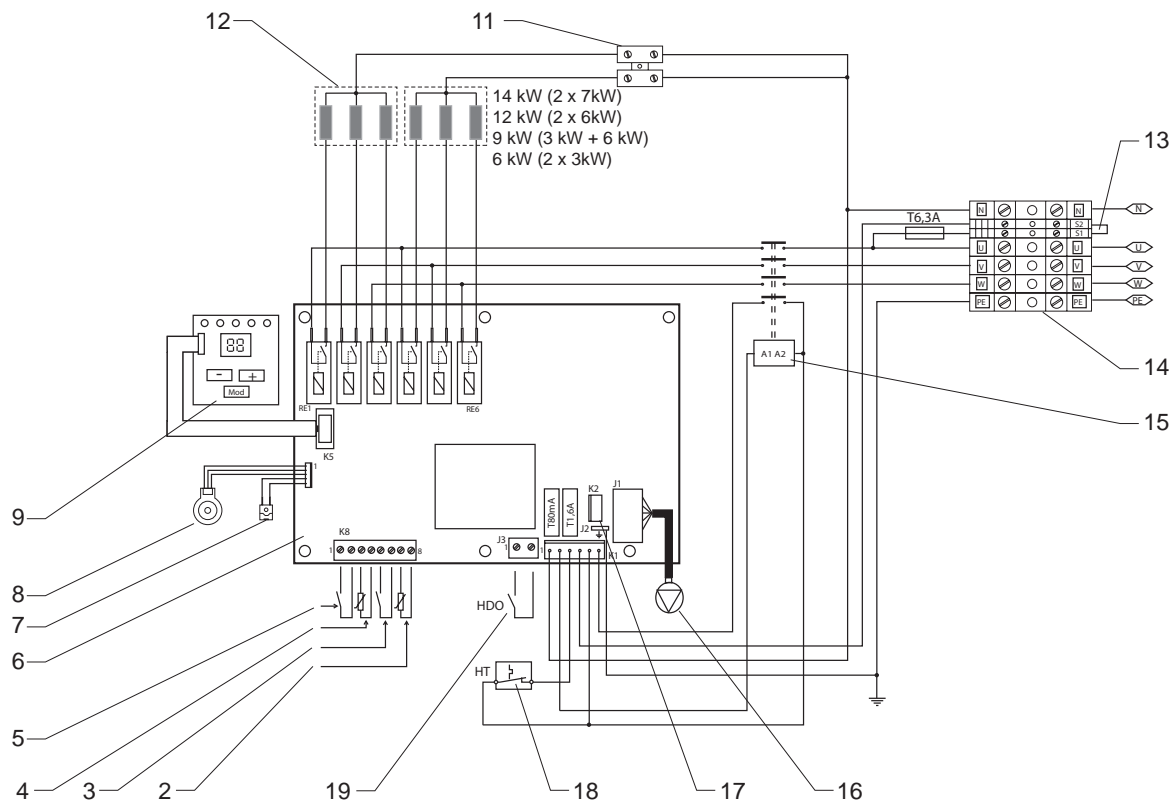


- 1 Main power supply
- 2 Boiler
- 3 Room control unit
- 4 Terminals for cascade connection (only for 24 and 28 kW)
- 5 Terminals for NTC sensor for hot water tank
- 6 Release relay
- 7 Terminals for outdoor temperature sensor
- 8 Room control unit terminals

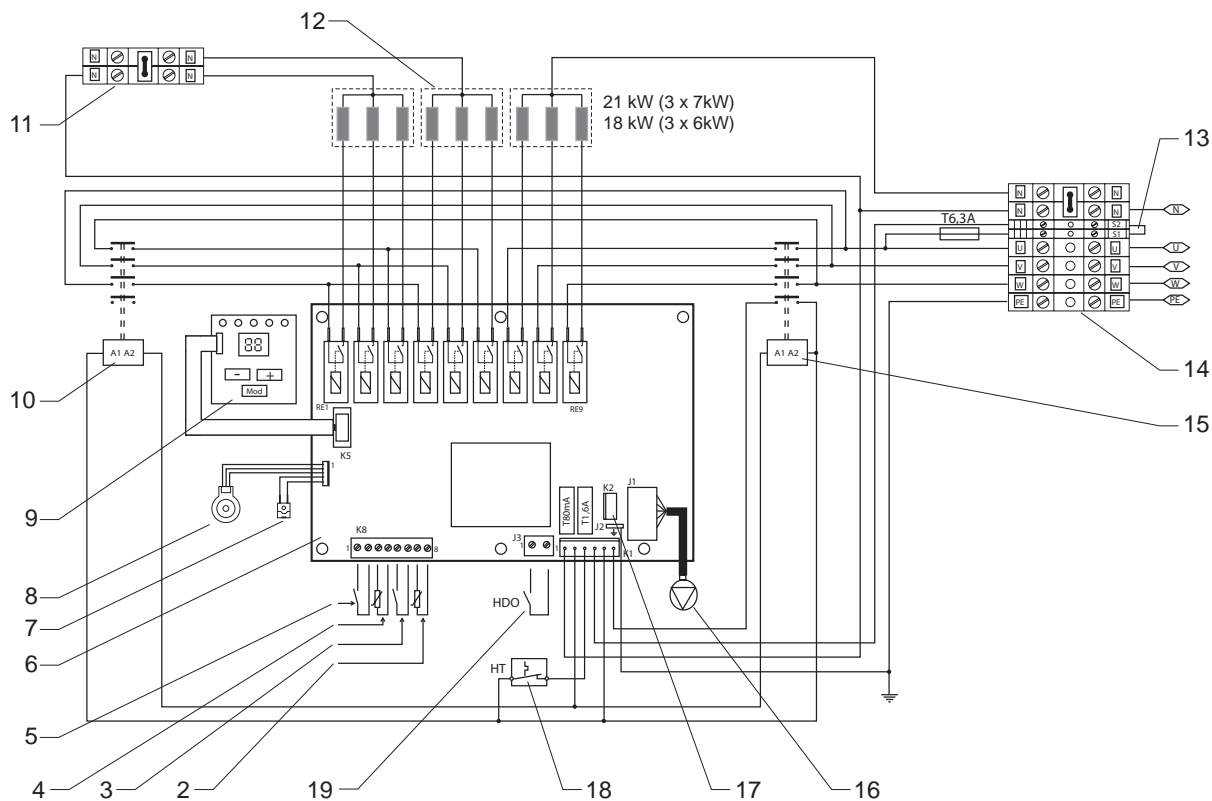
Legend of electrical diagrams

- 1 Terminals for connecting boilers into a cascade
- 2 Terminals for connecting NTC sensor for a hot water tank
- 3 Release relay
- 4 Terminals for connecting an outdoor temperature sensor
- 5 Terminals for connecting a room control unit
- 6 Control board
- 7 Heating water temperature sensor
- 8 Heating water pressure sensor
- 9 Control panel
- 10 Contactor 2
- 11 Auxiliary terminals N
- 12 Heaters
- 13 Blocking, connecting an emergency thermostat for floor heating
- 14 Input terminal box 3 x 230/400 VAC, N, PE, 50 Hz
- 15 Contactor 1
- 16 Pump
- 17 Connector for a 3-way actuator-controlled valve
- 18 Emergency thermostat
- 19 HDO connection

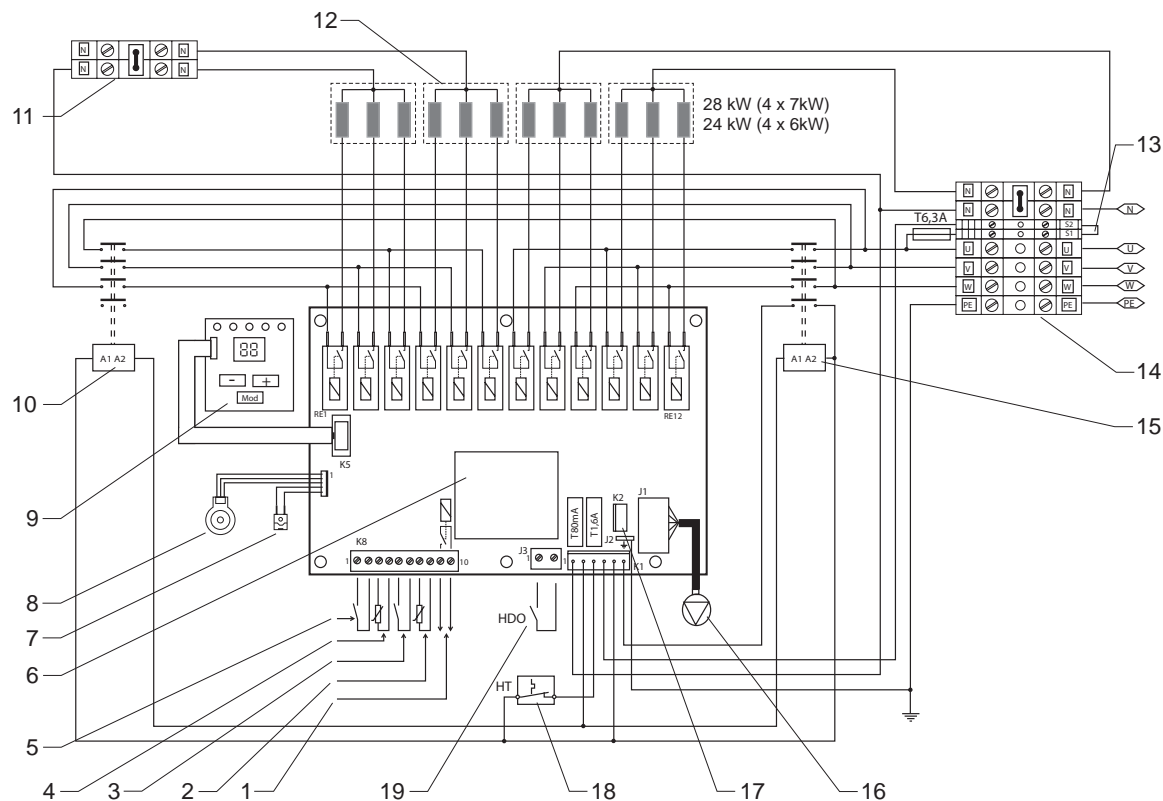
Electrical diagram for 6 (9, 12, 14) K 13 boilers



Electrical diagram for 18 (21) K 13 boilers

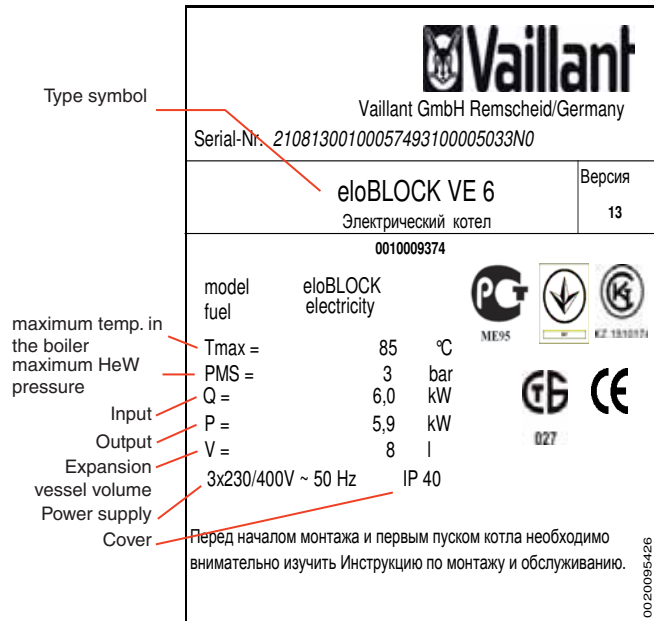


Electrical diagram for 24 (28) K 13 boilers



Identification of the boiler

Boiler serial number - Identification



The boiler identification plate is accessible when the front cover of the boiler is removed.

The identification plate is situated on the bottom cover of the boiler.

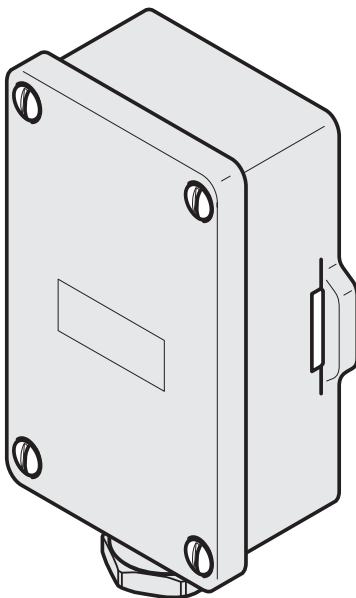
Please note: Boilers with deliberately damaged or changed identification plates are not covered by the manufacturer's warranty.



Boiler accessories

- Outdoor sensor
- Space controllers
- Converting the boiler to hot water heating function

Outdoor sensor



An outdoor sensor is only connected to the boiler if the user requires that the boiler be controlled according to the outdoor temperature – equithermal mode.

To ensure that equithermal regulation functions correctly, it is necessary to use the outdoor sensor. Everything can be found among the original Vaillant brand accessories.

The outdoor sensor is to be connected to the boiler control board, directly to the designated terminal (Outdoor NTC)

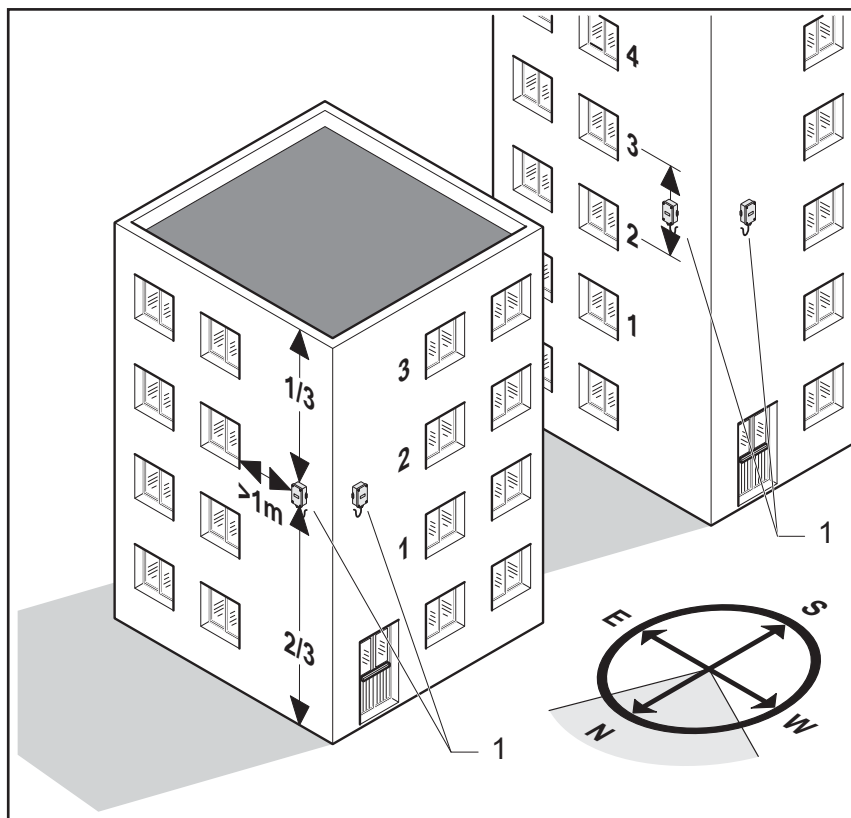
Outdoor sensor parameters:

Nominal power supply	5 V
Input	< 10 mW
Electrical category	II
Electrical cover	IP44

Contents of delivery (000693 - VRC 693)

1. Outdoor sensor
2. Outdoor sensor installation manual

Connecting the outdoor sensor - location



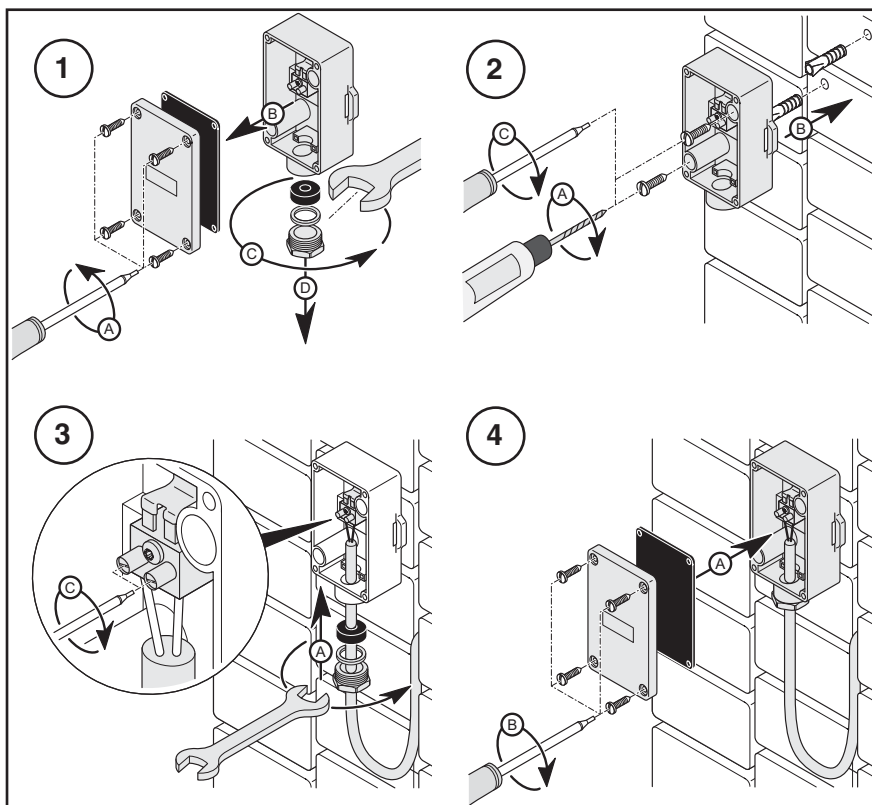
An outdoor temperature sensor must be connected in such a way that it is not affected by sunshine or other sources of heat (windows, doors, cooker-hood outlets, etc.) It is recommended that the outdoor sensor be installed on the northern side of the building. The outdoor sensor must be connected to the boiler by a two-core cable. We recommend using a copper cable with minimum wire cross-section of $2 \times 0.75 \text{ mm}^2$.

The maximum Ohm resistance of the cable is 10Ω ; the maximum recommended cable length is 15 m.

The cable cannot be installed in parallel with any power cable.

Please note: When positioning the outdoor sensor, take maximum caution.

Connecting the outdoor sensor - location



Installation:

1. Remove the protective cover of the outdoor sensor.
2. Loosen the wiring cable grommet.
3. Install the outdoor sensor on the wall using wall plugs and screws.
4. Slide the wiring cable through the grommet and connect the wire to the terminal box. .
5. Install the protective cover of the sensor.
6. Connect the other end of the wiring cable to the boiler terminal (see "Connection diagram for external devices").

Table of outdoor sensor values

Temperature (°C)	Resistance (Ω)
-25	2167
-20	2076
-15	1976
-10	1862
-5	1745
0	1619
5	1494
10	1387
15	1246
20	1128
25	1020
30	920
35	831
40	740

Controlling the boiler using the room control unit

Operation of the boiler with the room control unit

If using the room control unit, it is necessary to set the maximum temperature of the heating water on the boiler control panel which was designed for your heating system (to avoid any damage to the system) and which is able to cover any heat losses of the building even at low outdoor temperatures. The heating of heating water can be then only be controlled by the control unit up to the selected maximum temperature of the heating water set on the boiler control panel.

Note: We recommend that no thermostatic valves are installed on heaters in the room which is fitted with the room control unit.

Please note: The manufacturer disclaims responsibility for any damage caused by incorrect setting of the boiler or room control unit.

Before the control unit is connected, the jumper must be removed.

When the room control unit is disconnected, the respective terminals must be fitted with a jumper.

ON/OFF controller

The boiler maintains the selected heating water temperature. Boiler operation is interrupted (on/off) depending on the temperature in the room fitted with the room control unit.

To control the boiler with a room control unit, only a voltage-free control unit, which does not carry any extra voltage, can be used.

The power handling capacity of the control unit with relay switching is 24 V / 0.1 A. The room control unit is connected to the control board terminals (see the electrical diagram for the boiler, see. 5). The terminals are factory-fitted with a jumper.

HDO

The boiler is equipped with a switch block contactor to control the HDO (mass remote control) signal which is connected to the J13 connector (see the electrical diagram of the boiler, see 19).

The HDO LED indicates the on-state of the contactor controlled by the HDO signal and thus also whether or not there is any exclusion of a low tariff rate for direct heating. With the low tariff rate, the LED is illuminated.

Please note: If the HDO function is not used, the relevant connectors must be fitted with a jumper.

Note: If not used, the HDO indicates the power voltage.

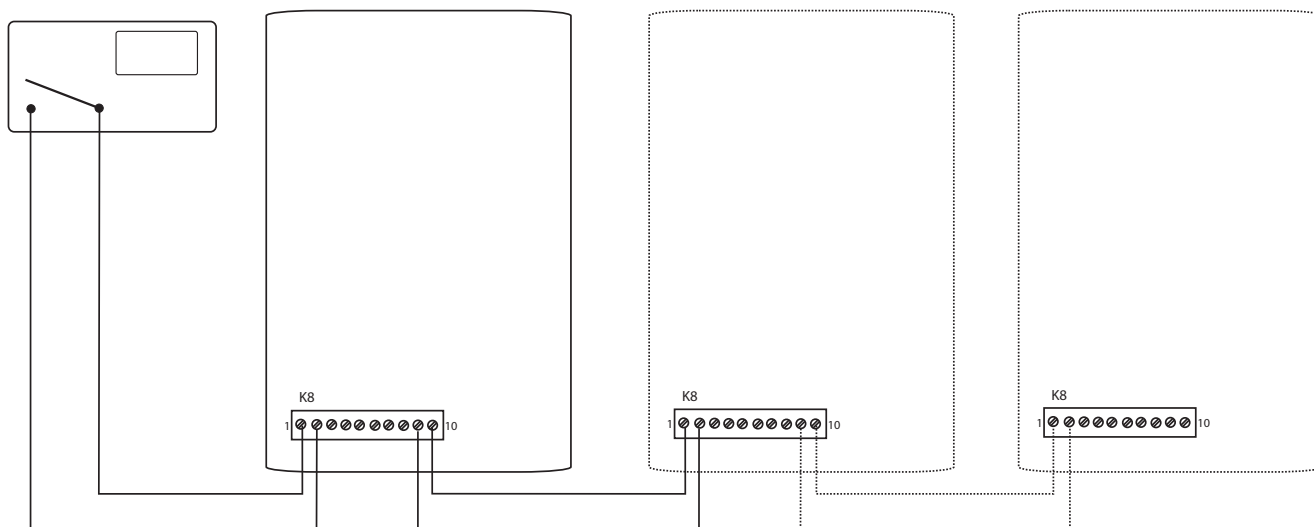


Connecting boilers into a cascade

If the boiler performance is unable to cover the heat losses of the building, another source can be connected with the 24 and 28 kW boiler series. When connecting the boilers into a cascade, such cascade is controlled with a single room control unit connected to the first “controlling boiler”. To be able to operate the cascade boiler control, it is necessary to link terminals 9 and 10 of the controlling boiler with terminals 1 and 2 of the second controlled boiler on the K8 connector on the boiler control board. The contacts of the room control unit must be linked with terminals 1 and 2 of the controlling boiler.

When two or more electric boilers work in a cascade, the second boiler will always switch on with a delay after operation of the last stage of the previous boiler.

Connecting boilers into a cascade



Release relay

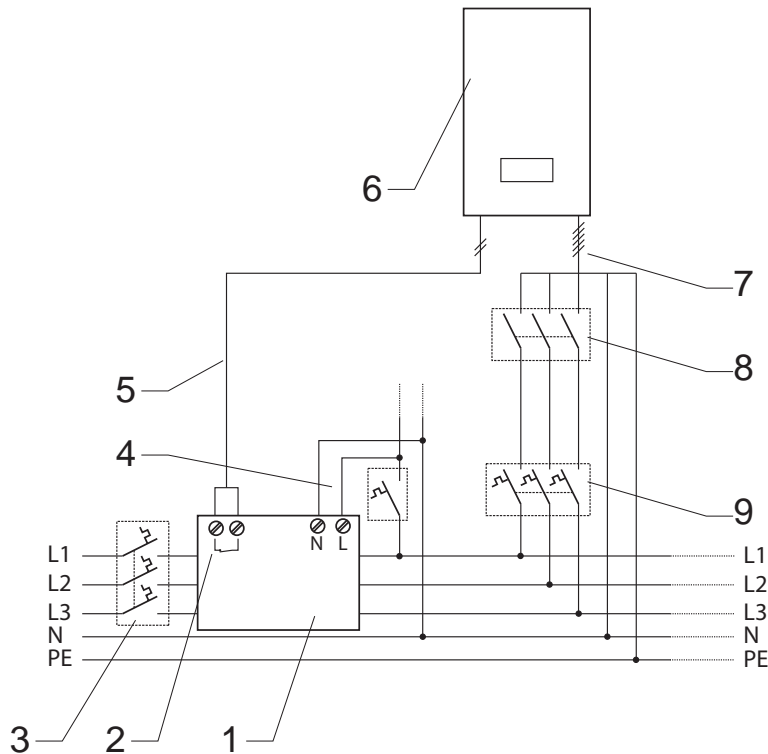
The release relay allows control of the boiler output depending on the power distribution load in the building where the boiler is installed. This method of control can, for example, use the “three-phase current-carrying capacity retarder”.

In practice, a boiler with such device automatically reduces the boiler output with an excessive increase in the load on the power network (washing machine, cooker, kettle, etc.) In contrast, with reduced load on the power network, the boiler output increases back to the required value. This method of control is used where it is not possible to increase the rating of the main breaker in the given building. The external release relay is connected to terminals 5 and 6 of the K8 connector on the boiler control board.

The overall assessment of suitability of combining the boiler with an external device for the purpose of automatically reducing the boiler output must be thoroughly considered by a designer and service technician. It is necessary to always consider the function of the boiler and the appointed external device with respect to the course and needs of a household or operation. The manufacturer disclaims responsibility for any faults caused by improper installation design.

Release relay

- 1 Maximum voltage relay (release relay)
- 2 Output – voltage-free contact
- 3 Mains breaker
- 4 Relay power supply
- 5 Connection to K8 connector (terminals 5 and 6) of the electric boiler
- 6 Electric boiler
- 7 Connection to terminals U, V, W, N, PE of the input terminal box of the electric boiler
- 8 Electric boiler switch
- 9 Electrical circuit breaker



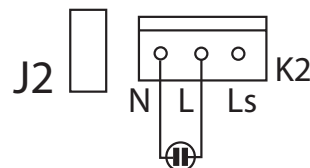
Fail signal - connector K2

If we use the K2 connector to signal the failure of the boiler, so d.26 parameter must be set to „1“. Relay R15 (3-way valve) is switched on when the boiler is located in one of the disorders Fxx.

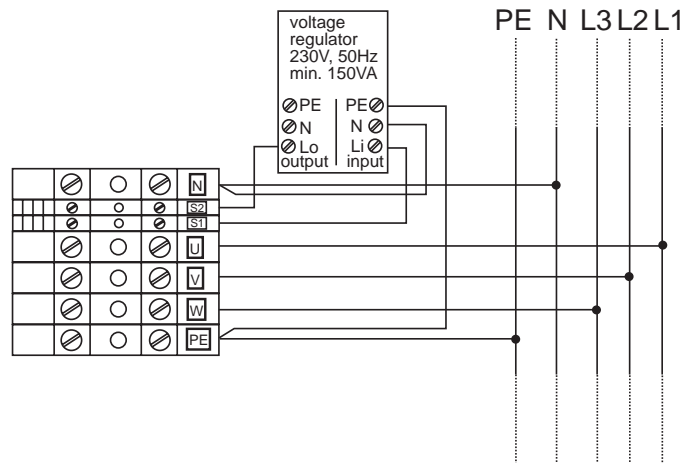
The connector K2, originally designed for 3-way valve can connect the device signalizing light, sound, relays etc.

Output parameters: 230V, 50Hz, max. power is withdrawn 25VA

Cable connect with AKZ 950/3 - rast 5,08 or equivalent type.



Stabilizer connection



Converting the boiler to hot water heating function



EloBLOCK electric boilers can be interconnected with hot water tanks with indirect heating of the Vaillant series B60Z, B100MS, B100Z, B200S, B200Z and B120S. Communication between the boiler and the water tank must be ensured by the NTC sensor, which is connected to the K8 connector on the boiler control board (see the electrical diagram of the boiler, see 2). To ensure the proper functioning of the boiler and the water tank, use the 0020015570 connecting set supplied by Vaillant. The terminals of the 3-way actuator-controlled valve are connected to the K2 connector on the boiler control board.

Converting the boiler to hot water heating function

Installation:

- Unless already equipped with one, install the supplied temperature sensor in the hot water tank. When inserting the sensor into the tank socket, ensure that the inserted length is as specified in the tank documentation.
- Connect the NTC sensor wires to the K8 terminal (see. 2) on the boiler control board – see diagram.
- Connect the wires of the 3 – way actuator-controlled valve to the K2 connector on the boiler control board – see diagram.

Converting the boiler to hot water heating function

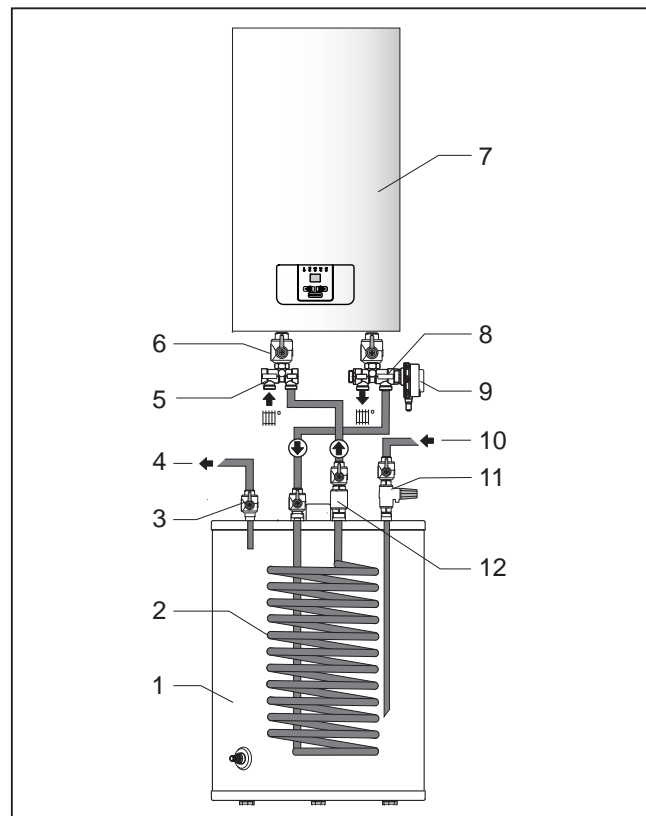
Installation:

- Install throttle valves on the heating water inlet and outlet leading to the water tank.
- Fit a backflow valve on the heating water outlet of the water tank which must open in the direction of the water flow.
- Connect the heating water inlet and outlet of the water tank.
- Fit a safety valve allowing a maximum pressure of 6 bar on the cold water inlet of the water tank.

Note: If the supply water pressure is higher, use a pressure reduction valve.

- Check all newly made connections.
- Check the function of the boiler and of the new water tank.
- Train the boiler operator with respect to the new installation controls.

- 1 Hot water tank
- 2 Water tank heat exchanger
- 3 Throttle valve
- 4 Hot water outlet
- 5 Distribution unit
- 6 Throttle valve
- 7 Electric boiler
- 8 3-way actuator-controlled valve
- 9 3-way valve actuator
- 10 Cold water inlet
- 11 Hot water safety valve with a backflow valve
- 12 Backflow valve (must be installed in the direction of the water flow)



External tank loading

Measurement terms

- pump speed d.19 = 1
- post-run after HoW 2 min.
- initial temperature measured at the outlet of the tank and after it reached the boiler is put into operation
- summer mode selected
- inlet water temperature 13 °C
- discharging speed 10 l / min
- *after 10 minutes

6K13 + uniSTOR VIH R 120

	Δt (d.78)	loading time	temperature - boiler thermometer*	outlet temperature from tank*
15 - 60 °C	5 K	69 min	60 °C	61 °C
15 - 60 °C	15 K	65 min	63 °C	63 °C
15 - 60 °C	50 K	63 min	63 °C	63 °C
30 - 60 °C	5 K	67 min	60 °C	61 °C
30 - 60 °C	15 K	61 min	63 °C	63 °C
30 - 60 °C	50 K	60 min	63 °C	63 °C

9K13 + uniSTOR VIH R 120

	Δt (d.78)	loading time	temperature - boiler thermometer*	outlet temperature from tank*
15 - 60 °C	5 K	58 min	61 °C	62 °C
15 - 60 °C	15 K	44 min	64 °C	64 °C
15 - 60 °C	50 K	42 min	65 °C	65 °C
30 - 60 °C	5 K	50 min	61 °C	61 °C
30 - 60 °C	15 K	41 min	64 °C	64 °C
30 - 60 °C	50 K	39 min	64 °C	64 °C

12K13 + uniSTOR VIH R 120

	Δt (d.78)	loading time	temperature - boiler thermometer*	outlet temperature from tank*
15 - 60 °C	5 K	50 min	60 °C	61 °C
15 - 60 °C	15 K	36 min	63 °C	63 °C
15 - 60 °C	50 K	32 min	65 °C	65 °C
30 - 60 °C	5 K	47 min	60 °C	61 °C
30 - 60 °C	15 K	31 min	63 °C	63 °C
30 - 60 °C	50 K	29 min	65 °C	65 °C

External tank loading

14K13 + uniSTOR VIH R 120

	Δt (d.78)	loading time	temperature - boiler thermometer*	outlet temperature from tank*
15 - 60 °C	5 K	49 min	61 °C	62 °C
15 - 60 °C	15 K	31 min	63 °C	63 °C
15 - 60 °C	50 K	29 min	66 °C	66 °C
30 - 60 °C	5 K	46 min	60 °C	61 °C
30 - 60 °C	15 K	28 min	63 °C	63 °C
30 - 60 °C	50 K	26 min	66 °C	66 °C

21K13 + uniSTOR VIH R 120

	Δt (d.78)	loading time	temperature - boiler thermometer*	outlet temperature from tank*
15 - 60 °C	5 K	48 min	60 °C	61 °C
15 - 60 °C	15 K	27 min	64 °C	64 °C
15 - 60 °C	50 K	21 min	66 °C	66 °C
30 - 60 °C	5 K	46 min	60 °C	62 °C
30 - 60 °C	15 K	24 min	63 °C	64 °C
30 - 60 °C	50 K	19 min	66 °C	66 °C

18K13 + uniSTOR VIH R 120

	Δt (d.78)	loading time	temperature - boiler thermometer*	outlet temperature from tank*
15 - 60 °C	5 K	48 min	60 °C	61 °C
15 - 60 °C	15 K	28 min	64 °C	64 °C
15 - 60 °C	50 K	26 min	67 °C	67 °C
30 - 60 °C	5 K	46 min	60 °C	61 °C
30 - 60 °C	15 K	25 min	64 °C	64 °C
30 - 60 °C	50 K	22 min	67 °C	67 °C

24K13 + uniSTOR VIH R 120

	Δt (d.78)	loading time	temperature - boiler thermometer*	outlet temperature from tank*
15 - 60 °C	5 K	48 min	60 °C	62 °C
15 - 60 °C	15 K	27 min	63 °C	64 °C
15 - 60 °C	50 K	20 min	66 °C	66 °C
30 - 60 °C	5 K	44 min	60 °C	61 °C
30 - 60 °C	15 K	24 min	64 °C	64 °C
30 - 60 °C	50 K	18 min	66 °C	66 °C

External tank loading

28K13 + uniSTOR VIH R 120

	Δt (d.78)	loading time	temperature - boiler thermometer*	outlet temperature from tank*
15 - 60 °C	5 K	47 min	60 °C	61 °C
15 - 60 °C	15 K	25 min	64 °C	64 °C
15 - 60 °C	50 K	19 min	66 °C	66 °C
30 - 60 °C	5 K	44 min	60 °C	61 °C
30 - 60 °C	15 K	23 min	63 °C	64 °C
30 - 60 °C	50 K	17 min	66 °C	66 °C

Mounting the boiler

To mount the boiler on the wall, it is recommended to use the mounting bracket which is included in the boiler delivery package and which needs to be attached to the wall. Install the structural unit of the boiler with pump and accessories on the bracket. The boiler shell is removable, attached to the back wall by screws. Before mounting, choose a suitable place for the boiler that will allow any service operations without major restrictions.

Mounting procedure

1. Mark the positions of holes and drill holes to attach the mounting bracket.
2. Insert wall plugs into the holes made for the mounting bracket which is then screwed on with the supplied screws.
3. Hang the boiler on the mounting bracket.
4. Remove the plastic plugs from the boiler outlets.
5. Install a protective filter (not included in the boiler delivery) on the heating water inlet.
6. Fit throttle valves (not included in the boiler delivery) on all boiler outlets.
7. Connect the heating water pipes to the throttle valves.
8. Fill the boiler with water.
9. Check all connections for leaks.